BONNEVILLE POWER ADMINISTRATION

Lower Granite Dam Smolt Monitoring Program

Annual Report 2004 - 2005 November 2005 DOE/BP-00022085-1

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LOWER GRANITE DAM
SMOLT MONITORING PROGRAM

ANNUAL REPORT

March 2004 – Feburary 2005

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Summary

The 2004 fish collection season at Lower Granite Dam (LGR) was characterized by above average water temperatures, below average flows and spill, low levels of debris. The number of smolts collected for all species groups (with the exception of clipped and unclipped sockeye/kokanee) exceeded all previous collection numbers. With the continued release of unclipped supplementation chinook, steelhead and sockeye above LGR, we can not accurately distinguish wild chinook, wild steelhead and wild sockeye/kokanee from hatchery reared unclipped chinook and sockeye/kokanee in the sample. Wild steelhead can be identified from hatchery steelhead by the eroded dorsal and pectoral fins exhibited on unclipped hatchery steelhead. The numbers in the wild columns beginning in 1998 include wild and unclipped hatchery origin smolts. This season a total of 11,787,539 juvenile salmonids was collected at LGR. Of these, 11,253,837 were transported to release sites below Bonneville Dam, 11,164,132 by barge and 89,705 by truck. An additional 501,395 fish were bypassed to the river due to over-capacity of the raceways and for research purposes. According to the PTAGIS database, 177,009 PIT-tagged fish were detected at LGR in 2004. Of these, 105,894 (59.8%) were bypassed through the PIT-tag diversion system, 69,130 (39.1%) were diverted to the raceways to be transported, 1,640 (0.9%) were diverted to the sample tank, sampled and then transported, 345 (0.2%) were undetected at any of the bypass, raceway or sample exit monitors.

Introduction

The Smolt Monitoring Program (SMP) is designed to provide a consistent, real-time database on fish passage and document the migration characteristics of the stocks of salmon and steelhead in the Columbia Basin. Each SMP site collects daily data on fish passage, river conditions (total river flow, spill and flow through the powerhouse) and other site-specific data required by Fish Passage Center (FPC) during the migration season. The FPC staff oversees and guides the SMP sampling program. The Fish Passage Center uses the SMP data collected at the SMP sites to work with fishery managers to seek appropriate flow and spill measures to enhance smolt passage and survival as identified in the hydro system's operations requirements set forth in NMFS Biological Opinion and in the Northwest Power Planning Council's Fish and Wildlife Program (NMFS, 2004).

Lower Granite Dam is located on the Snake River approximately 173 kilometers upstream of its confluence with the Columbia River. Lower Granite Dam is the first of eight dams and the first of four juvenile fish collection facilities on the Snake River that migratory juvenile salmonids from the upper Snake River and its tributaries encounter on their way to the ocean. All four collection and transportation sites on the Snake River are operated by the Corps of Engineers. Most of the fish collected are transported in barges and trucks to release locations below Bonneville Dam on the Columbia River. They then complete the remaining 225 kilometer journey to the ocean on their own. Some smolts are bypassed back to the river at LGR to continue their downstream migration through the hydro system. Some smolts migrate past LGR, avoiding the juvenile collection system or may be collected at facilities below LGR and transported or migrate past the remaining dams, 694 kilometers to the Pacific Ocean.

At LGR, SMP staff collected and recorded data by inspecting a sample of each day's total smolt collection. Staff technicians and biologists identified and recorded the following

information for each fish sampled; species, descaling, diseases and hatchery marks (fin clips, coded-wire tags, and elastomer tags, fin erosion on unclipped steelhead and freeze brands). Lengths, weights, injuries, and external signs of disease and/or stress were taken on a sub-sample of up to one hundred fish of each species, daily. The staff also collected daily river flow and river temperature data, river turbidity, monitored and assisted on-site research activities, conducted daily juvenile fishway inspections, monitored dam operations as they pertain to fish passage conditions, maintained records of sample and collection data, transmited daily reports to the FPC and the Corp of Engineers and prepareed weekly and annual reports. The SMP has been active at LGR since 1984 and operated by the Washington State Department of Fish and Wildlife (WDFW) since 1988.

River Conditions

Flow

The 2004 flows in the Snake River were the third lowest since 1999. Flows exceeded 100 kcfs for 13 consecutive days, from May 28 to June 9 and peaked at 130.79 kcfs May 30th. Flows in 2003 exceeded 100 kcfs on 20 consecutive days from May 25 through June 13 and 2002 flows exceeded 100 kcfs on 20 days but not consecutively. Flows did not exceed 100 kcfs on any day in 2001 (Table 1).

Table 1. Annual peak flows (kcfs) and the corresponding dates at LGR, 1997-2004.

	1997	1998	1999	2000	2001	2002	2003	2004
Peak Flows	225.82	214.66	192.63	115.03	90.51	136.81	210.77	130.79
Date	(May 18)	(May 28)	(May 27)	(April 24)	(May 17)	(June 1)	(June 1)	(May 30)

Spring river flows starting with the last days in March ranged between 42.53 kcfs and 59.42 kcfs. Flows in April (including March 26-31) averaged 49.37 kcfs and ranged between 39.44 kcfs and 62.11 kcfs. May river flows averaged 77.83 kcfs and ranged between 48.57 kcfs and 130.79 kcfs. River flows averaged 74.16 kcfs in June and ranged between 33.83 and 119.88 (Table 2, Figure 1).

Flows in 2004 exceeded 85 kcfs on 19 days, 90 kcfs on 15 days, 100 kcfs on 13 days, 110 kcfs on 5 days, 120 kcfs on three days and 130 kcfs on one day. Flows decreased in July with the low of 27.55 kcfs July 29 and averaged 35.44 kcfs for the month. Flows averaged 26.82 kcfs in August and 26.50 kcfs in September. Average daily flows in October were as low as 13.46 kcfs October 10 and averaged 18.0 kcfs.

Spill

National Marine Fisheries Service Biological Opinion, Action 40 identifies that spill will occur at LGR when seasonal average flows are projected to meet or exceed 85 kcfs. Spill for juvenile fish passage began April 4 between 0600 and 1800 hours at LGR and continued until April 23. Due to low flow forcasts, spill was ended on April 23. High fish mortality at the Juvenile Fish Facility on May 6, resulted in Fish Managers electing to spill between May 6 at 1600 hours and May 7 at 0700 hours. On May 28 spill began at 1700 hours due to flows in excess of powerhouse capacity and ended June 10 at 1700 hours. There was also spill from 1200

to 1500 for line testing on September 9 and intermittent spill occurred from 1800 hours September 21 to 1800 hours September 23 to accommodate Doble testing. Spillway discharge was higher than anticipated due to turbine Unit #1 being off-line since April 30, 2002.

Table 2. Comparison of average monthly river flow and spill at LGR, 1999-2004.

	1999	2000	2001	2002	2003	2004	'99-03 Avg.
				Flow (kcfs)			
April[1]	97.46	83.51	35.60	70.91	67.17	49.37	70.93
May	109.69	84.15	63.28	80.11	91.27	77.83	85.70
June	135.76	64.43	36.52	95.44	93.47	74.16	85.12
July	55.54	37.97	26.64	39.47	32.93	35.44	38.51
August	38.18	26.30	24.05	29.49	26.24	26.82	28.86
September	22.92	22.02	14.48	21.76	21.16	26.50	20.45
October	23.44	22.64	15.27	16.92	15.62	17.98	18.78
				Spill (kcfs)			
April[1]	30.24	16.87	0.00	18.95	15.44	10.11	16.30
May	41.85	21.29	0.00	28.69	29.56	3.97	24.28
June	46.57	20.74	0.00	35.15	24.02	5.70	25.30
July	0.52	0.00	0.00	6.46	0.19	0.00	1.44
August	0.29	0.00	0.48	<0.1	0.34	0.00	0.24
September	0.00	0.00	<0.1	<0.1	0.00	0.83	<0.1
October	0.00	0.57	<0.1	0.00	0.29	0.00	0.18

1 Includes March 26-31

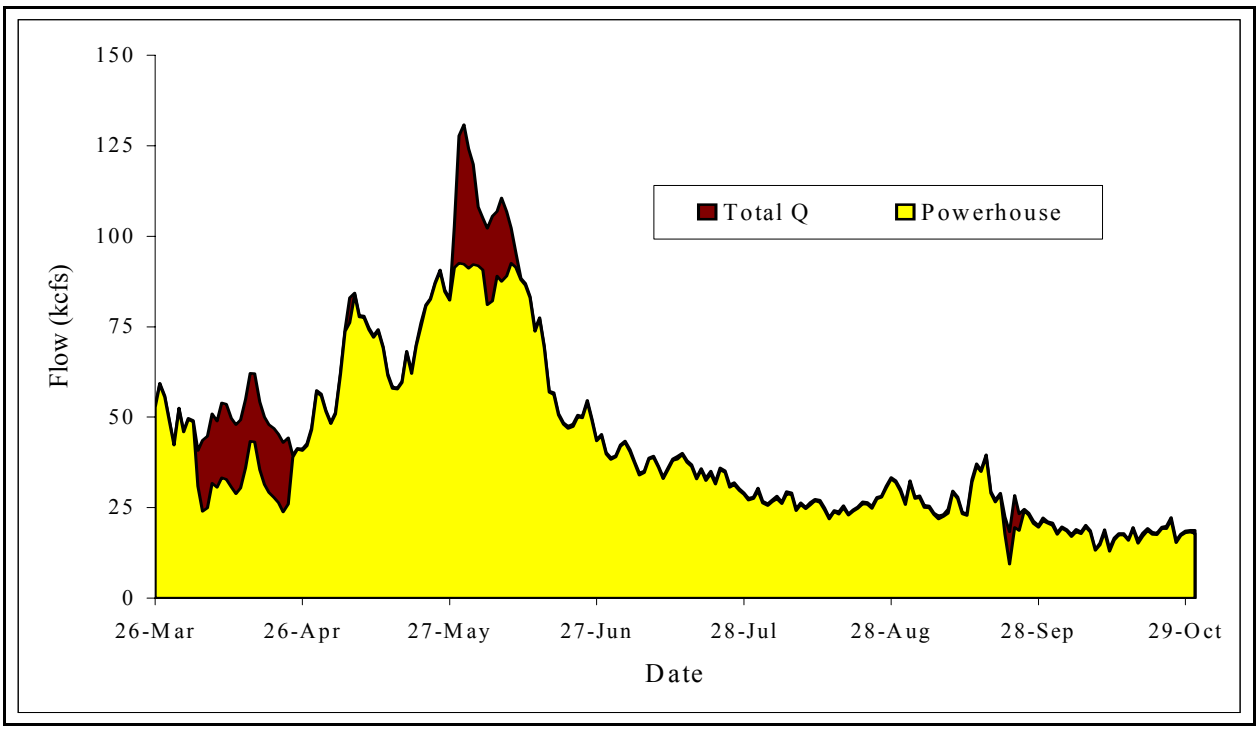

Figure 1. Daily average powerhouse discharge and spill at LGR, 2004.

The Snake River projects were drafted to minimum operation pool (MOP) April 3. Lower Granite pool was drafted to 733-734 feet above mean sea level (MSL) and Little Goose pool to 633-634 feet above MSL. Little Goose pool was refilled to 636-637 feet above MSL September 5 and remained that way throughout the fish sampling season in order to improve adult fish passage operations at LGR. Lower Granite reservoir was refilled in November.

Temperature

The 2004 facility water temperatures were above average at the beginning of the season, March 26, and about average at the end of the season, October 31. The facility water temperature was 8.5°C (47.3°F) at the beginning of the fish collection season March 26 compared to 7.2°C (44.9°F) in 2003 and remained below 15.6°C (60.1°F) until June 19 (Table 5 of Appendix 1). The facility water temperature did not reach 20.5°C (69.0°F) until July 22 and peaked July 24 at 22.1°C (71.8°F). The highest water temperatures recorded at LGR in the last 13 years was 23.0°C (73.4°F) in 1992 and 1998. The greatest number of days in a season when the facility water temperature was equal to or exceeded 20.5°C occurred in 1998 (66) and the greatest number of consecutive days exceeding 20.5°C was in 1994 (52) while the earliest date for this temperature was in 2003 (Table 3). Facility water temperatures did not drop below 15.6°C (60.0°F) until October 21 and then decreased to 12.6°C (54.7°F) on the last day of sampling (October 31). Dworshak Dam began increasing flows through the powerhouse for flow and temperature augemtation on July 1. Flows through the powerhouse were gradually increased until July 12, when flows exceeded powerhouse capacity and spill was initiated to reach a total discharge of approximately 13.5 kcfs. The temperature of water released at Dworshak Dam is in the mid 40s°F and is used to cool Snake River temperatures.

Table 3. Annual temperature maximums at LGR, 1992-2004.

Year	Maximum Temp. ºC (ºF)	Maximum Temp. Date(s)	No. of days temperature ≥20.5ºC (≥69.0ºF)	No. of consecutive days temperature ≥20.5ºC (≥69.0ºF)	First date temperature ≥20.5ºC (≥69.0ºF)
1992	23.0 (73.4)	8/27-8/28	34	34	7/30
1993	21.1 (70.0)	8/23	7	6	8/22
1994	23.0 (73.4)	8/17-8/24	56	52	7/6
1995	21.0 (69.8)	7/18-7/23; 7/25-7/26	19	12	7/18
1996	22.0 (71.6)	7/31	28	20	7/18
1997	22.0 (71.6)	9/4-9/14	30	29	8/6
1998	23.0 (73.4)	9/9-9/11; 9/17	66	27	7/10
1999	20.5 (69.0)	8/25; 8/28-8/29	3	2	8/1
2000	20.6 (69.1)	8/10	2	2	8/9
2001	21.5 (70.7)	7/8; 7/11	8	5	7/6
2002	21.5 (70.7)	7/25	6	5	7/18
2003	22.6 (72.7)	7/31	40	8	6/29
2004	22.1 (71.8)	7/24	32	17	7/22

Temperature units (TUs), the number of degrees Fahrenheit above 32°F, are one measure of the relative temperature over a period of time. The 1,738 TUs recorded for the spring migration, April 1 through June 20, 2004 is 13.9% greater than the 1992-2003 average of 1,526 TUs (Figure 2). The summer/fall total of 4,464 TUs from June 21-October 31, 2004 is 2.5% greater than the 1992-2003 TU average of 4,337 and 3.9% greater for the same time frame in 2003 (Figure 3). From April 1 through October 31, 2004, the season total of 6,202 TUs is <1% greater than the 2003 total of 6,168 TUs and is 2.7% greater than the 1992-2003 average of 6,037 TUs (Figure 4).

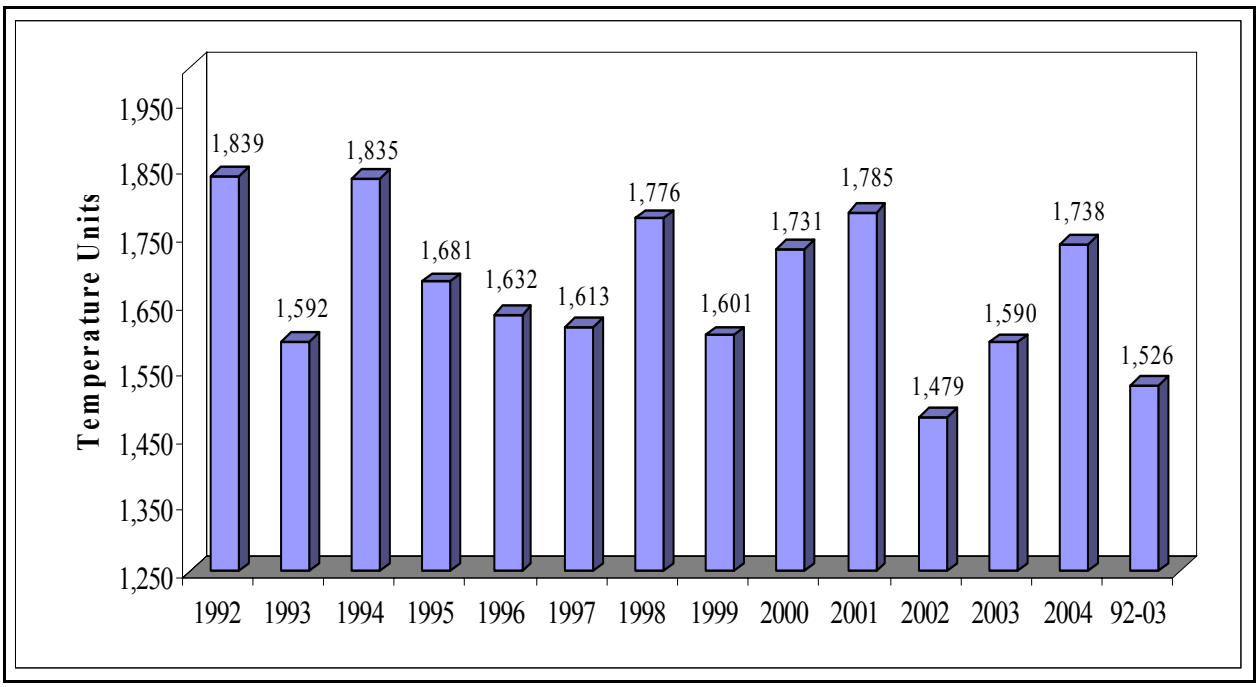

Figure 2. Cumulative temperature units at LGR April 1 to June 20, 1992-2004.

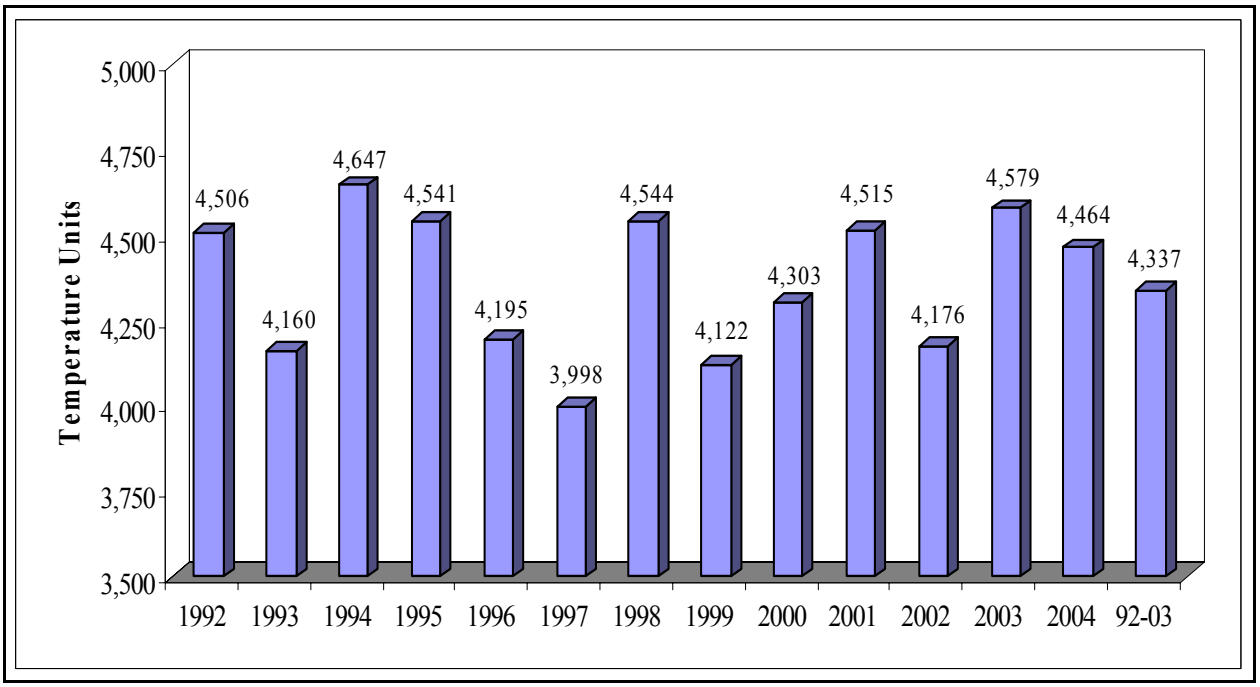

Figure 3. Cumulative temperature units at LGR June 21 to October 31, 1992-2004.

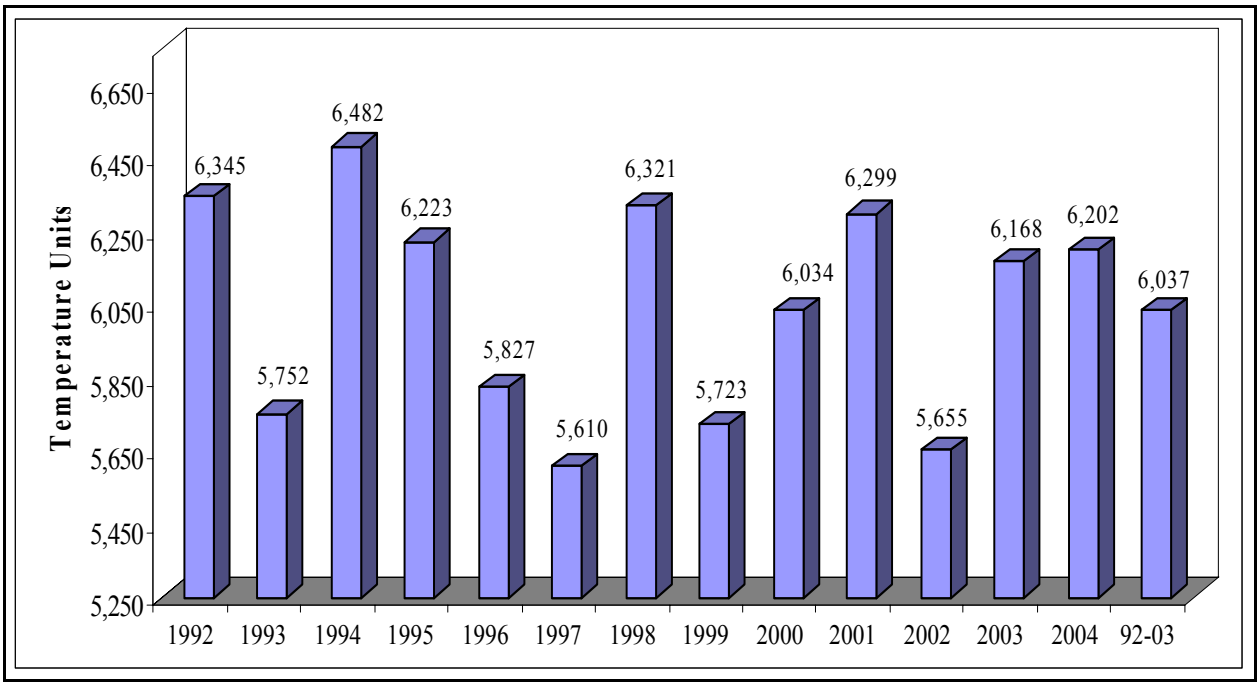

Figure 4. Cumulative temperature units at LGR from April 1 to October 31, 1992-2004.

Debris

We have measured the volume of small woody debris collected in the sample tank daily since 1998. Additionally, we made daily estimates of floating debris in the forebay and recorded forebay debris removal events, trash rack raking events and de-watering screen-cleaning events. Daily facility debris loads were estimated based on daily sample tank accumulations and sample rates. The volume of woody debris too large to pass through the separator bars was not estimated.

A total of 237.4 cubic feet of small woody debris passed through the fish facility in 2004. This is a 78% decrease from the 2003 total of 1056.8 cubic feet of small woody debris. Daily debris accumulation averaged 1.08 cubic feet per day (Table 4).

Table 4. Debris levels at LGR, 1998-2004.

	Peak Flows in	Cubic Feet of Debris in the Sample		Cubic Feet of Debris in the Collection	
Year	Cubic Feet/Sec.	Daily Ave.	Season Total	Daily Ave.	Season Total
1998	214	0.68	150.1	4.27	939.3
1999	193	0.47	107.7	3.17	728.9
2000	115	0.16	34.7	0.96	211.8
2001	90	0.13	29.6	0.79	173.8
2002	137	0.03	6.6	0.41	90.2
2003	210	0.16	35.6	4.80	1,056.8
98-03 ave.	160	0.26	60.7	2.22	533.4
2004	131	0.19	41.9	1.08	237.4

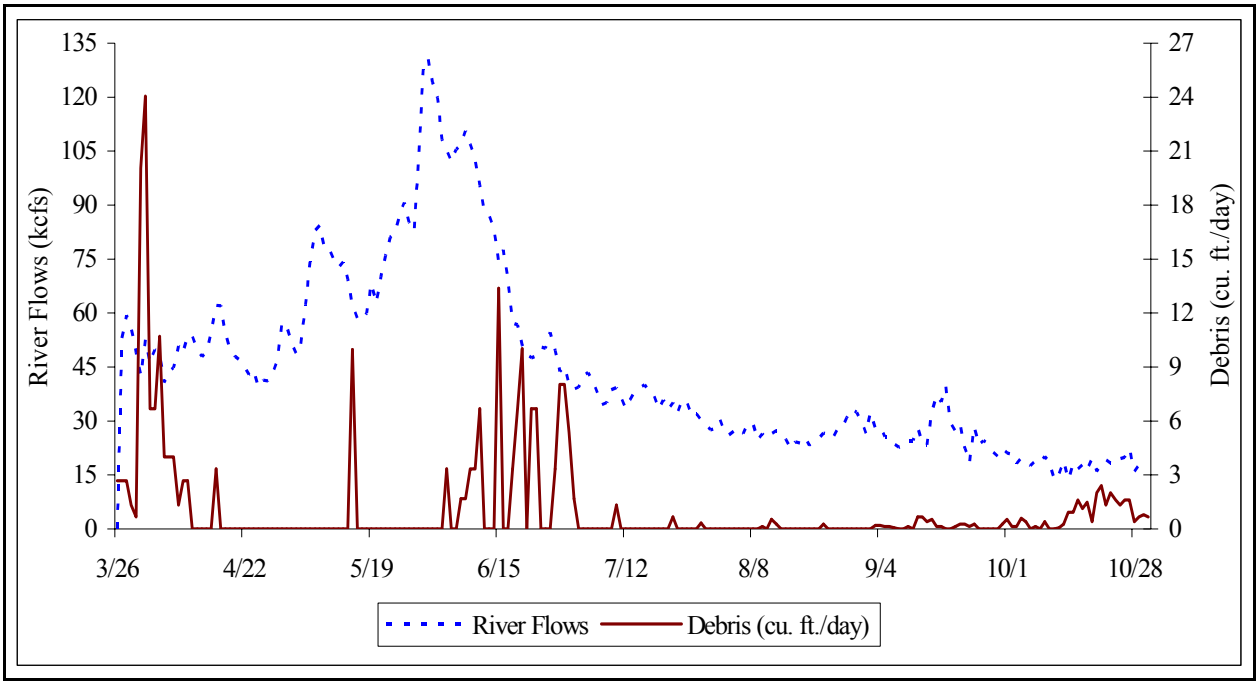

Figure 5. Estimated daily small woody debris accumulation in the juvenile fish bypass system and river flows at LGR, 2004.

Debris peaks at the juvenile fish facility usually occur when the facility is first watered up, after reservoir fluctuations, turbulent weather events and high river flows during spring runoff. This year debris accumulation at the juvenile fish facility did not follow this trend, peaking seven days after startup on April 1, on May 15 as flows decreased and June 15, 16 days after the season's peak flows. Late season debris is the result of leaves rather than woody debris accumulating at the juvenile fish facility (Figure 5).

Towing debris away from the powerhouse with the use of log booms has not been done since 1999 when the floating woody debris in the forebay reached a maximum estimated area of four acres between June 17 and early July. Floating debris reached a maximum of two acres this year. When the Removable Spillway Weir (RSW) attached to spillbay one is in operation, floating debris was flushed down river and towing debris using the log booms is not needed.

The Lower Granite Dam Juvenile Fish Facility primary dewatering structure consists of an inclined screen of stainless steel mesh supported by heavy bar screen just upstream from the porosity control perforated plate for the separator. There is no mechanical cleaning device on this screen. Corp of Engineers staff clean this screen with a long handled brush or scraper at periods ranging from every hour to once or twice per day depending on amount of debris accumulation. When the incline screen on the separator system becomes severely clogged with debris, it is necessary to go into temporary bypass mode by closing the dewatering valve below the screen and opening the 72-inch bypass valve. This takes pressure off of the incline screen and allows debris to either float off or be brushed off easily. Typically, it takes 20 minutes to complete this procedure during which time fish are bypassed back to the river. Fish were bypassed during 36 cleaning events in 1999, none in 2000, one in 2002 ten in 2003 and none in 2004.

Turbidity

Turbidity (water clarity or visibility) was measured daily using a secchi disk, a six-inch black and white disk attached to the end of a two-meter rod with graduations in tenths of feet. Measurements were taken between 10 A.M. and noon from the surface of the fish ladder adjacent to the adult fish viewing windows. Visibility and flow relationships were similar to those observed in previous years when peak flows carrying suspended solid particle materials resulted in reduced visibility (Figure 6). Visibility and fish collection also followed the pattern of increased fish collection during periods of increased turbidity (Figure 7).

This season we recorded five distinctive increases in turbidity. Four of these increases correspond to increased river flows. As flows increased on May 7 to 84.35, visibility decreased to 2.0 feet on May 12. On May 30, river flows peaked at 130.78 kcfs and visibility reached its lowest at 1.6 feet on My 24 as flows were increasing and 1.7 feet on May 30. Flows decreased from May 30 until June 4 and then increased to 110.56 kcfs on June 7 with a corresponding decrease in visibility to 2.9 feet on June 8. Rains in early July resulted in a sharp decrease in visibility on July 7 to 1.8 feet (Figures 6).

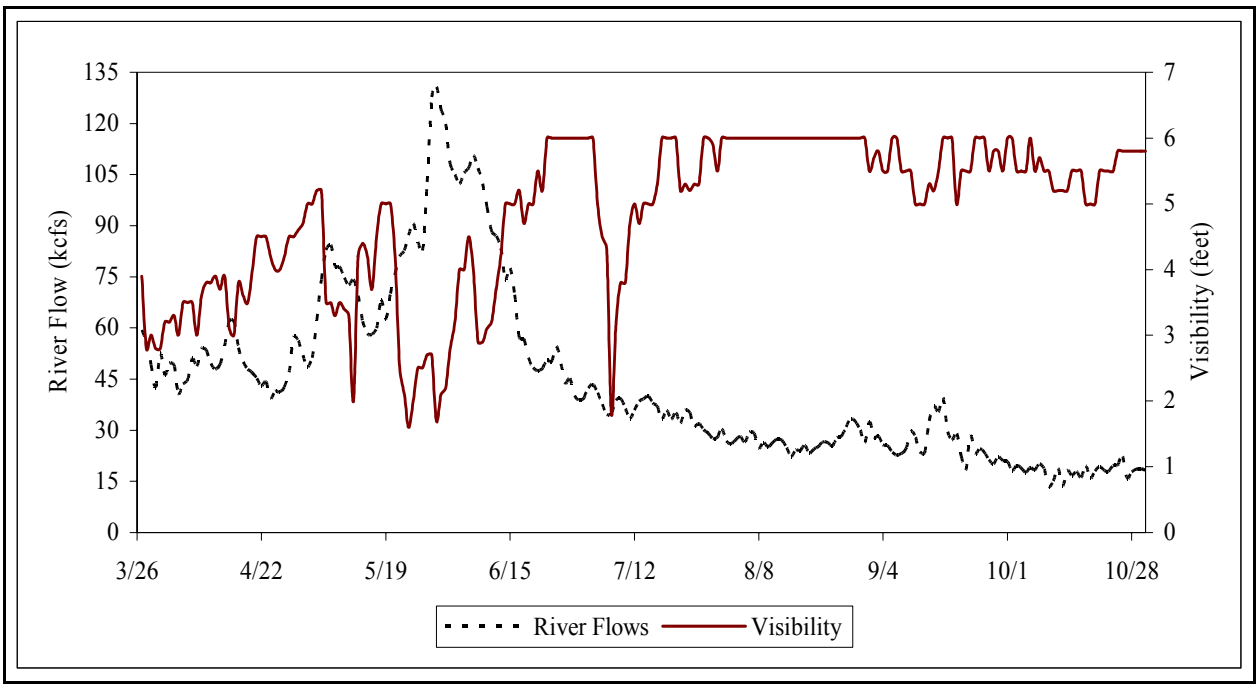

Figure 6. Fish ladder visibility and river flows at LGR, 2004.

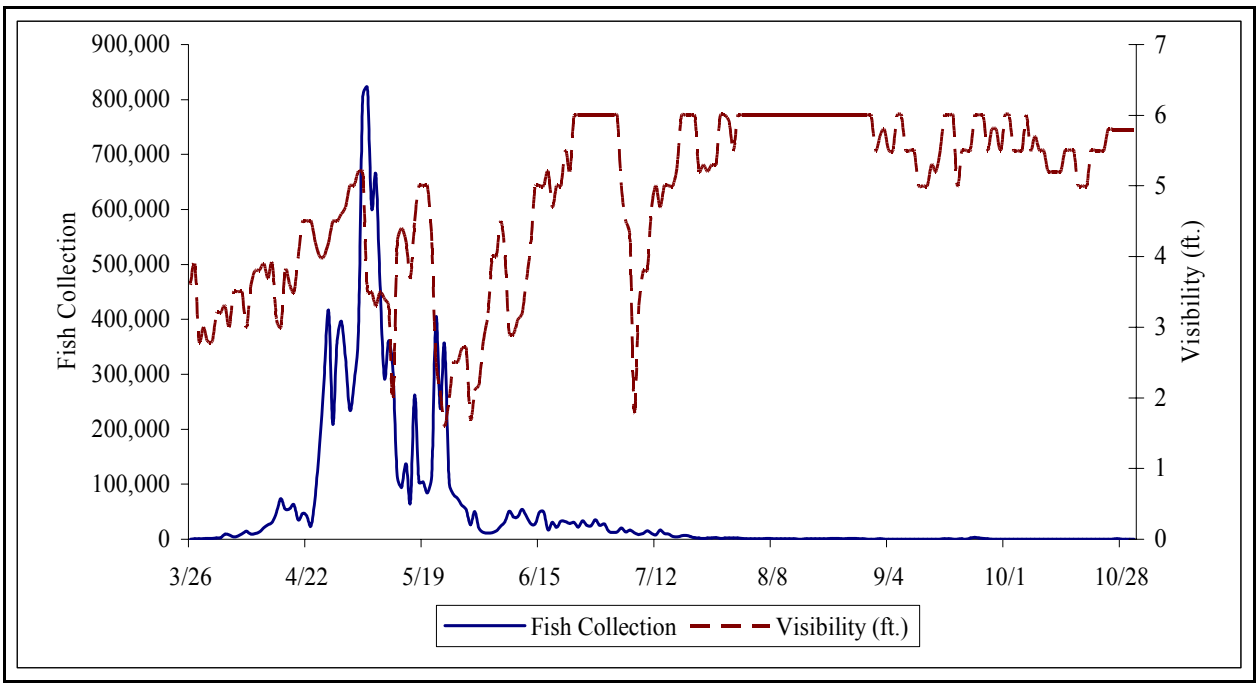

Figure 7. Fish ladder visibility and smolt collection at LGR, 2004.

Sample Program and Summary

Overview

Daily samples of fish from the general collection were counted by hand and examined throughout the season. Sample data included counts by species, weights, lengths and descaling data and were recorded and summarized daily to provide real-time information for the Smolt Monitoring Program and for the Corps of Engineers transportation program. Daily samples were collected over a 24-hour period starting and ending at 0700 and processed between 0730 and 1000 each day. In the latter part of the season when collection numbers declined daily samples were processed every-other-day. At different times during the season researchers utilized anesthetized fish from the sample for marking and study purposes. We sampled a total of 132,011 smolts, 1.1% of the total collection this season (Table 6 and 7). Daily sample size averaged 600 smolts compared to 484 in 2003 and 470 in 2002. Sample size ranged between 14 and 5,512 smolts in 2004 compare to 14 and 1963 smolts in 2003 and 35 and 3,314 in 2002.

Daily sample procedure

Fish diverted to the sample tank were held for up to 24 hours prior to examination. The 24-hour sample period started at 0700. At the end of each 24-hour sampling period the entire sample was processed. Screens in the sample holding tank were moved forward to crowd fish to the front of the tank. Once the fish were crowded, small groups of fish were guided into pre-anesthetic chambers through knife gates. Batch sizes typically ranged between 30 and 60 fish per chamber. The fish anesthetic, ethyl m-aminobenzoate methanosulfonate (MS-222®) was added to the chamber to obtain a concentration of about 62 mg/l. At this concentration, about 95 percent of the fish were sedated within three minutes. Once anesthetized, these fish were flushed through the exit valve sending them to the sorting trough inside the lab.

The sorting trough is part of a re-circulating water system with temperature control and aeration. The anesthetic levels in the system are set to keep fish sedated and easy to handle during the sample. Typically, the MS-222 levels averaged between 55-60 mg/L. Sample fish remained in the sorting tank for as little as five seconds and up to five minutes. We strive to process fish within three minutes of entering the tank to minimize the effects of sedation and handling.

All fish handled in the sorting trough were enumerated by species, examined for hatchery marks, and descaling. A detailed sub-sample of up to 100 fish of each species was conducted during each daily sample. In the detailed sub-sample fish were held in a water-filled tray on an electronic balance as we recorded species, individual fish length and weight, unique hatchery marks, descaling, injuries and external symptoms of disease. This detailed sub-sample provides the Corps with fish per pound and species composition data which is used to calculate raceway, barge and truck loading densities. Immediately after sampling, fish were routed in fresh water to the recovery tank on non-transport days or routed directly onto a waiting truck or barge on transport days. The maximum time that any fish was held at the fish facility was 48 hours.

Sample rates

The sample system at LGR includes two primary slide gates located in the bottom of the flumes a few feet downstream of the separator. These slide gates are controlled by a timer calibrated in tenths of a minute. When the slide gates are closed fish are sent to a sample holding tank at the separator. The primary gates can be set to override the sample if a pit tagged fish is detected. The sample holding tank at the separator has four 4-inch counter tunnel exits connected to a 12 inch pipe leading to the primary sample tank which is divided into two equal halves, each with two pre-anesthetizing chambers. Corp of Engineer staff set the slide gates to open and close six times per hour. The length of time the gates are closed depends upon the sample rate. For example, if the sample rate is 10%, the gate closes for sixty seconds, six times per hour for a total of six minutes, or one tenth of an hour. The sample rate is determined by the number of fish entering the system with the attempt to sample between 250 and 750 fish (Table 5).

The PIT tag diversion system was operated in the standard diversion mode (NON-DIVERT during the sample), between March 25 at 0700 hours and July 26 at 1200 hours. During this time, the sample diversion gate overrode the PIT-tag diversion gate and any fish present during a sample diversion gate operation went to the sample holding tank. From July 26 at 1200 hours until the end of the season, the PIT-tag diversion system was set to divert all PIT-tagged fish, overriding the sample diversion gate.

Table 5. Lower Granite Dam Juvenile Fish Facility sample rate guidelines.

Estimated Daily Collection	Sample Rate (%)	Equivalent Multiplier 1/sample rate	Estimated Number of Fish in Sample
Emergency	0.50%	200	
> 75,000	0.70%	143	>525
50,000 - 75,000	1.00%	100	500 - 750
35,000 - 50,000	1.50%	66.6	525 - 750
25,000 - 35,000	2.00%	50	500 - 750
16,500 - 25,000	3.00%	33.3	495 - 750
12,500 - 16,500	4.00%	25	500 - 660
10,000 - 12,500	5.00%	20	500 - 625
7,500 - 10,000	7.00%	14.3	525 - 700
5,000 - 7,500	10.00%	10	500 - 750
4,000 - 5,000	12.50%	8	500 - 625
3,000 - 4,000	15.00%	6.66	450 - 600
2,500 - 3,000	20.00%	5	500 - 600
1,500 - 2,500	25.00%	4	375 - 625
500 - 1,500	50.00%	2	250 - 750
< 500	100.00%	1	< 500

Season sample summary

Sampling began at Lower Granite at 0700 hours March 26 and continued daily through October 31. The sample rate was set at 10% March 26 and fluctuated throughout the season based on daily fish collection numbers and Fish Passage Center (FPC) guidelines (Table 5). On September 2 the sample rate was set at 100% and every-other-day sampling began. The sample rate was lowered to 25% between September 24 and October 1 due to increased fish collection. The sample rate was reset to 100% October 2 and remained unchanged through the end of the season October 31. This season, 220 daily samples were processed.

A total of 132,011 fish, 1.1% of the total collection, was sampled in 2004, compared to 106,503 fish, 1.7% of the total collection, sampled in 2003 (Tables 6 and 7) and 103,396 fish, 2.6% of the collection sampled in 2002. The total number of fish sampled by species included 29,492 clipped yearling chinook, 12,340 unclipped yearling chinook, 527 clipped subyearling fall chinook, 44,266 unclipped subyearling fall chinook, 34,029 clipped steelhead, 8,954 unclipped steelhead, 48 clipped sockeye/kokanee, 423 unclipped sockeye/kokanee and 1,932 coho (clipped and unclipped combined).

Sample size exceeded 1,000 fish on 31 days, exceeded 2000 fish on 15 days, 3000 fish on five days, 4000 fish on four days and was greater than 5000 fish on two days.

Table 6. Annual percentage of salmonids collected that were sampled at LGR, 1999-2004.

	Yearling Chinook		Subyearling Chinook		Steelhead		Sockeye/Kokanee		Coho	
Year	Clipped[2]	No Clip[1]	Clipped	No Clip	Clipped[2]	No Clip[1]	Clipped[2]	No Clip[1]	All	Total
1999	0.9	2.0	54.2	19.8	1.2	1.4	4.2	6.1	2.1	2.0
2000	0.8	2.2	---	10.3	1.0	1.4	2.5	11.6	1.9	1.8
2001	1.1	1.5	4.3	8.0	11.4	12.8	2.1	17.1	3.7	1.8
2002	1.5	1.8	5.3	7.8	1.6	1.8	2.9	2.1	2.2	2.6
2003	0.9	1.3	2.1	5.3	0.9	1.1	1.0	1.5	1.4	1.7
99-03	1.2	1.9	17.3	10.7	3.4	3.8	2.9	7.8	2.4	2.2
2004	1.5	1.2	1.5	1.6	0.3	0.3	4.2	12.8	0.5	1.1

1Wild chinook, wild steelhead and wild sockeye/kokanee designated in text as unclipped beginning in 2000.
2Hatchery chinook, hatchery steelhead and hatchery sockeye/kokanee designated in text as clipped for 2000-2004.

A total of 98 fallbacks were examined in daily samples from September 2 to September 24 and from October 2 to October 31, when the sample rate was 100%. The 98 fallbacks accounted for 77.2% of the 127 total fallbacks recorded in daily samples during the season. Of the 98 fallbacks examined, there were seven adult unclipped steelhead (7.1%), 41 adult clipped steelhead (41.8%), five unclipped jack chinook (5.1%), 41 clipped jack chinook (41.8%), and four clipped adult chinook (4.0%).

Table 7. Weekly sample rates in percent and sample totals at LGR, 2004.

Week Ending	Sample rate (%)	Yearling Chinook		Subyearling Chinook		Steelhead		Sockeye/Kokanee		Coho	Total
		Clipped[2]	No Clip[1]	Clipped[2]	No Clip[1]	Clipped[2]	No Clip[1]	Clipped[2]	No Clip[1]	All	
4/1	10.00%	109	206	0	3	160	225	0	4	11	718
4/8	10.00%	1,490	2,622	0	10	695	472	0	15	11	5,315
4/15	3.00%	2,663	1,254	0	14	425	460	0	3	17	4,836
4/22	0.94%	1,736	852	0	8	622	237	0	0	15	3,470
4/29	0.67%	4,698	1,372	0	2	3,848	418	0	0	29	10,367
5/6	0.67%	12,907	2,531	0	6	4,922	1,372	0	0	40	21,778
5/13	0.67%	3,844	1,406	0	3	10,168	2,893	2	3	472	18,791
5/20	0.67%	622	488	0	1	3,575	731	10	2	285	5,714
5/27	0.67%	566	551	0	8	6,192	1,177	12	5	664	9,175
6/3	0.73%	72	192	92	24	982	235	2	0	114	1,713
6/10	2.00%	89	309	337	2,663	606	218	8	4	74	4,308
6/17	1.64%	21	88	70	2,689	175	106	6	1	51	3,207
6/24	1.74%	8	63	20	3,152	127	44	3	0	30	3,447
7/1	3.58%	19	160	5	6,193	197	56	2	0	38	6,670
7/8	4.00%	4	62	1	3,563	154	37	1	1	22	3,845
7/15	5.00%	5	77	0	3,824	71	28	1	0	9	4,015
7/22	7.45%	4	55	0	2,220	107	37	0	0	5	2,428
7/29	18.90%	0	12	2	2,263	235	70	0	0	5	2,587
8/5	21.40%	2	4	0	1,680	192	45	0	1	7	1,931
8/12	25.00%	1	3	0	1,275	72	20	0	2	3	1,376
8/19	25.00%	0	1	0	798	79	18	0	0	6	902
8/26	25.00%	0	0	0	1,678	58	9	0	1	0	1,746
9/2	32.41%	0	2	0	1,121	39	1	1	6	8	1,178
9/9	100%	0	6	0	970	30	5	0	9	8	1,028
9/16	100%	0	2	0	663	50	9	0	22	2	748
9/23	100%	0	2	0	4,186	147	13	0	92	1	4,441
9/30	25.00%	0	3	0	1,847	5	1	0	14	2	1,872
10/7	87.23%	10	1	0	553	12	2	0	35	2	615
10/14	100%	45	2	0	786	20	1	0	38	0	892
10/21	100%	166	4	0	583	31	7	0	34	1	826
10/28	100%	334	8	0	1,296	31	6	0	63	0	1,738
10/31	100%	77	2	0	184	2	1	0	68	0	334
Totals		29,492	12,340	527	44,266	34,029	8,954	48	423	1,932	132,011

[1]Wild chinook, wild steelhead and wild sockeye/kokanee designated in text as unclipped beginning in 2000.
[2]Hatchery chinook, hatchery steelhead and hatchery sockeye/kokanee designated in text as clipped for 2000-2004..

Two agencies, the United States Geological Survey Biological Research Division (USGS-BRD) and the National Oceanic Atmospheric Administration (NOAA Fisheries) conducted five studies using fish from the daily samples at LGR Juvenile Fish Facility in 2004. Researchers utilized 2,724 smolts from the sample in 2004 compared to 6,780 in 2003, 6,774 in 2002, 2,302 in 2001 and 8,452 smolts in 2000. Of the 2,724 smolts taken from the sample this season, 2,644 (97%) were tagged for research and 78 (2.9%) were handled and transported (Table 8).

Table 8. Total number of fish taken from the sample for research at LGR, 2004.

	Yearling Chinook		Subyearling Chinook		Steelhead		Sockeye/Kokanee		Coho	
Summary	Clipped	No Clip	Clipped	No Clip	Clipped	No Clip	Clipped	No Clip	All	Total
Tag'd, byp	0	0	0	99	0	0	0	0	0	99
Tag'd, trans	0	0	0	2,545	0	0	0	0	0	2,545
Handled, trans	0	0	0	78	0	0	0	0	0	78
Mortalities	0	0	0	2	0	0	0	0	0	2
Totals	0	0	0	2,724	0	0	0	0	0	2,724

The National Oceanic Atmospheric Administration (NOAA Fisheries) collected a total of 2,545 unclipped subyearling fall chinook from daily samples at LGR Juvenile Fish Facility. These fish were PIT-tagged and transported to assess the survival and return rate of late season transported fish (Table 9).

Table 9. Number of subyearling fall chinook taken from the sample by NOAA Fisheries for late-season transportation study at LGR, September 4- October 31, 2004.

	Yearling Chinook		Subyearling Chinook		Steelhead		Sockeye/Kokanee		Coho	
	Clipped	No Clip	Clipped	No Clip	Clipped	No Clip	Clipped	No Clip	All	Total
Tag'd, byp	0	0	0	0	0	0	0	0	0	0
Tag'd, trans	0	0	0	2,545	0	0	0	0	0	2,545
Handled, trans	0	0	0	0	0	0	0	0	0	0
Totals	0	0	0	2,545	0	0	0	0	0	2,545

The United States Geological Survey Biological Research Division (USGS-BRD) collected a total of 179 smolts from July 28 to August 31 from daily samples at the LGR Juvenile Fish Facility. They surgically implanted radio-tags and bypassed 99 unclipped subyearling fall chinook. In addition, 78 unclipped subyearling fall chinook were handled and transported without being tagged, and two of the tagged smolts were recorded as mortalities (Table 10).

Table 10. Number of subyearling fall chinook taken from the sample by USGS-BRD flow augmentation research at LGR, July 28-August 31, 2004.

	Yearling Chinook		Subyearling Chinook		Steelhead		Sockeye/Kokanee		Coho	
	Clipped	No Clip	Clipped	No Clip	Clipped	No Clip	Clipped	No Clip	All	Total
Tag'd, byp	0	0	0	99	0	0	0	0	0	99
Handled, trans	0	0	0	78	0	0	0	0	0	78
Mortalities	0	0	0	2	0	0	0	0	0	2
Totals	0	0	0	179	0	0	0	0	0	179

Mark Recapture

Staff recorded hatchery marks and tags from all smolts examined for the Smolt Monitoring Program (SMP) and Gas Bubble Trauma sampling program (GBT). These marks included freeze brands, clipped fins, visual implanted elastomer tags (VIE) and coded-wire tags (CWT). Information recorded for each mark type included type of mark, location, orientation, color, fin clips and lengths on branded fish. This information was reported daily to the Fish Passage Center throughout the season. We also recorded passive integrated transponder (PIT) tag codes from tagged fish collected in GBT samples and PIT-tagged fish mortalities recovered from the sample, raceways and recovery tank. PIT-tag records were flagged with conditional codes "RE" for recaptured fish and "M" for mortalities where appropriate and were submitted to the Columbia River Basin PIT-Tag Information System (PTAGIS).

Because many groups of hatchery juveniles are not fin clipped we are unable to distinguish unclipped hatchery fish from naturally reared wild migrants. Therefore, we did not record juveniles as hatchery or wild but as clipped or unclipped. All unclipped yearling and subyearling chinook were scanned for coded-wire tags (CWT). We also recorded the number of steelhead with fin erosion/deformities, typical of hatchery rearing on unclipped steelhead. In 2004 we estimated to have collected 36.0% of the marked hatchery fish released above LGR (9,043,420 of 25,090,685) (Table 11). Of the hatchery released fish, marked fish (elastomer tags, coded-wire tags, eroded fins and freeze brands), the number and percent of each marked group collected and passage date for these marked groups is summarized in Tables 12 and 13.

Table 11. Number of hatchery fish released above LGR, number of hatchery fish collected at LGR and the percent of release collected at LGR, 2000-2004.

Year	Total Hatchery Fish Released Above LGR	Total Hatchery Marked Fish Collected	Percent Collected
2000	17,635,542	6,733,035	38.2%
2001	16,489,551	6,697,823	40.6%
2002	25,466,576	2,921,032	11.5%
2003	26,793,442	4,607,471	17.2%
2004	25,090,685	9,043,420	36.0%

Table 12. Number of hatchery marked fish released above LGR and the numbers and percent of each marked group collected at LGR, 2004.

[1]Mark Code	Rearing Type & Species	Race	Hatchery	Release Site	RKm To LGR	Total Released	Total Recapture	Percent Recovered
CWT, nc	H. Chinook	SP&SU	Multiple Sites	Eight Sites		825,676	208,490	25.25%
CWT, nc	H. Chinook	FA	L. F./Cherry Ln	Three Sites		560,435	200,855	35.84%
CWT, nc	H. Coho		Multiple Sites	Clear, Lapwai, Potlatch Cr.	70 & 75	160,780	35,364	21.99%
Fin Eroded, nc	H. Steelhead	SU	Multiple Sites	Fourteen Sites		937,727	537,445	57.31%
EL-LE-GR	H. Chinook	FA	Lyons Ferry	Big Canyon Accl. Pd.	108	108,420	32,445	29.93%
EL-RE-GR	H. Chinook	FA	Lyons Ferry	Pittsburg Landing	173	154,151	37,379	24.25%
EL-LE-BL	H. Chinook	FA	Lyons Ferry	Cpt. John Accl. Pd.	90	153,654	33,645	21.90%
EL-RE-RD	H. Chinook	SP	Looking Glass	Lostine Acc. Pd	292	116,652	16,559	14.20%
EL-RE-GR	H. Chinook	SU	McCall	Johnson Creek	429	111,854	6,569	5.87%
EL-RE-GR	H. Chinook	SP	Lookingglass	Catherine Cr. Acc. Pond	378	70,959	2,091	2.95%
EL-RE-OR	H. Steelhead	SU	Clearwater	Meadow Cr. & Mill Cr. Br.	224	51,923	19,557	37.67%
EL-LE-BL	H. Steelhead	SU	Clearwater	Red River Acc. Pond	299	51,002	15,824	31.03%
EL-LE-OR	H. Steelhead	SU	Clearwater	Red River Acc. Pond	299	50,253	20,749	41.29%
FB-LA-S-1	H. Steelhead	SU	Lyons Ferry	Cottonwood Acc. Pond	144	40,202	13,286	33.05%
Totals						3,393,688	1,180,258	34.78%

[1]Mark Codes: FB = freeze brands (location, brand-orientation), EL = elastomer tags (side-color); FE = fin erosion; CWT = coded wire tag; nc = no fin clip. Table does not include marked fish collected during GBT examinations.

Table 13. Passage dates of unclipped and marked hatchery fish collected at LGR, 2004.

[1]Mark Code	Species, run & rear type	Release Date	First Observed	25%	50%	75%	Last Observed
CWT, nc	HCH1, SPSU	June 12, 03 – Oct. 10, 04	March 26	May 3	May 5	May 7	Oct 21
CWT, nc	HCH0, FA	May 21 – June 30, 04	June 5	June 20	June 27	July 4	Oct 29
CWT, nc	HCoho	July22, 03 - May 3, 04	March 29	May 12	May 21	May 25	Aug 28
Fin Eroded, nc	H ST, SU	March 29 – May 7, 04	March 29	May 5	May 8	May 17	9/18
EL-LE-GR	HCH1, FA	April 12 , 04	April 19	April 26	April 29	May 4	June 16
EL-RE-GR	HCH1, FA	April 12, 04	April 16	April 22	April 26	April 30	May 22
EL-LE-BL	HCH1, FA	April 5, 04	April 11	April 16	April 19	April 26	May 11
EL-RE-RD	HCH1, SP	March 12 – March 21, 04	April 3	April 29	May 3	May 5	May 10
EL-RE-GR	HCH1, SU	March 15 - 19, 04	April 16	May 2	May 6	May 13	June 8
EL-RE-GR	HCH1, SP	April 1 – 14, 04	April 26	April 28	May 3	May 6	May 8
EL-RE-OR	H. Steelhead	April 27, 04	May 3	May 7	May 8	May 10	May 27
EL-LE-BL	H. Steelhead	April 16 – 26, 04	April 26	May 8	May 12	May 17	May 31
EL-LE-OR	H. Steelhead	April 16 – 26, 04	May 2	May 5	May 8	May 11	May 29
FB LA S-1	H.ST, SU	April 1 – 30, 04	April 20	April 26	April 27	May 5	May 24

[1]Mark Codes: FB = freeze brands (location, brand, orientation); EL = elastomer tags (side, color). No fin clip, nc.

Unclipped Mark Recoveries

Unclipped Hatchery Coded-Wire Tagged Yearling Chinook

We recorded 1,645 unclipped hatchery yearling chinook collected at LGR that were marked with coded-wire tags (CWT) in the daily sample. The IDFG releases included 56,174 CWT marked fish from Papoose Cr., 187,961 from the Sawtooth Hatchery, 124,185 from the Pahsimeroi Hatchery 166,616 from Knox Bridge on the Salmon River and 61,800 from Stolle Meadows Acclimation Pond. The Umatilla Tribe released 70,088 into the upper Grand Ronde River and The Nez Perce Tribe release 2,542 from Johnson Cr. and 156,310 from Lolo Cr. for a total release of 825,676 unclipped coded-wire tagged hatchery yearling chinook above Lower Granite Dam (LGR). The 1,645 observed in daily samples represents a collection of 208,490 fish, 25.3% of the 825,676 tagged fish released. Sawtooth Hatchery, Pahsimeroi Hatchery, Knox Bridge, Stolle Meadows Acclimation Pond, Johnson Cr., upper Grande Ronde R. and Papoose Cr., are 744, 618, 454, 467, 426, 418 and 310 river kilometers above LGR respectively. These fish were released between July 12, 2003 and April 15, 2004 with the peak daily collection at LGR of 42,239 on May 6, compared to 6,866 on April 27, 2003 (Figure 8, Tables 12 - 14).

Table 14. Number of unclipped CWT marked yearling spring/summer chinook released, collected at LGR and peak collection day, 2000-2004.

Year	Number released	Number collected	Percent of Release Collected	Peak Collection Day
2000	123,425	27,530	22.3%	5/5
2001	627,431	176,823	28.2%	5/1
2002	1,058,334	91,820	8.7%	5/6
2003	887,896	115,913	13.1%	4/27
2004	825,676	208,490	25.3%	5/6

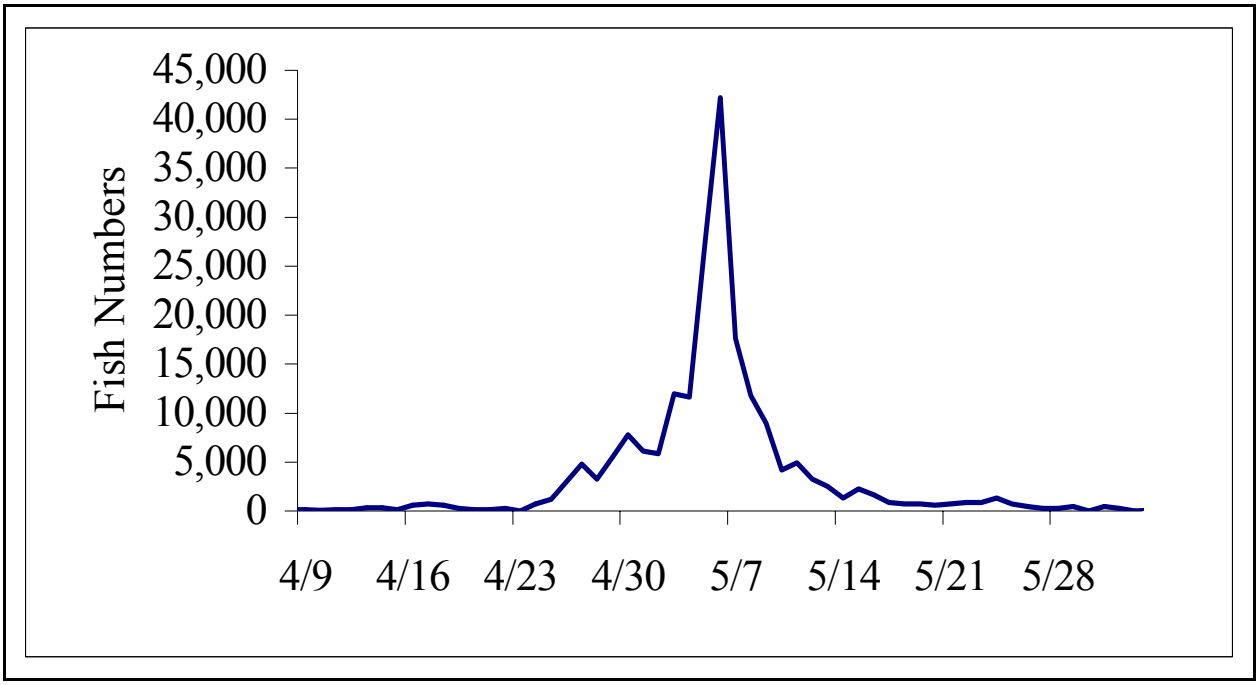

Figure 8. Daily collection of unclipped hatchery yearling chinook with coded-wire tags, 2004.

Unclipped Hatchery Coded-wire Tagged Subyearling Fall Chinook

SMP staff recorded 5,296 CWT marked unclipped hatchery subyearling fall chinook in daily samples. This represents an expanded total of 200,855 CWT marked unclipped hatchery subyearling fall chinook collected at LGR. A total of 560,435 unclipped hatchery subyearling fall chinook marked with CWTs was released by the Nez Perce tribe above LGR in 2004 compared to 1,271,953 in 2003, a 48% decrease over last years 1,271,953 CWT marked unclipped subyearling chinook released. Between May 27 and June 21, the Nez Perce tribe released 169,596 CWT marked unclipped hatchery subyearling fall chinook from Nez Perce Tribal Harchery, 198,190 from Big Canyon Acclimation Facility and 192,649 from Captain John Acclimation Facility. The 200,855 collected CWT marked unclipped hatchery subyearling fall chinook represents 35.8% of the 560,435 released. The peak collection of 11,150 was on June 20, slightly earlier than previous years. The Nez Perce Tribal Hatchery, Big Canyon Acclimation Facility, Captain John Acclimation Pond are 89, 108 and 90 river kilometers above LGR, respectively. (Figure 9, Tables 12, 13 and 15).

Table 15. Number of unclipped CWT marked subyearling fall chinook released, collected at LGR and peak collection day, 2000-2004.

Year	Number released	Number collected	Percent of Release Collected	Peak Collection Day
2000	397,503	87,450	22.0%	7/4
2001	393,689	111,158	28.2%	7/3
2002	765,167	141,214	18.5%	7/21
2003	1,271,953	367,097	28.9%	6/22
2004	560,435	200,855	35.8%	6/20

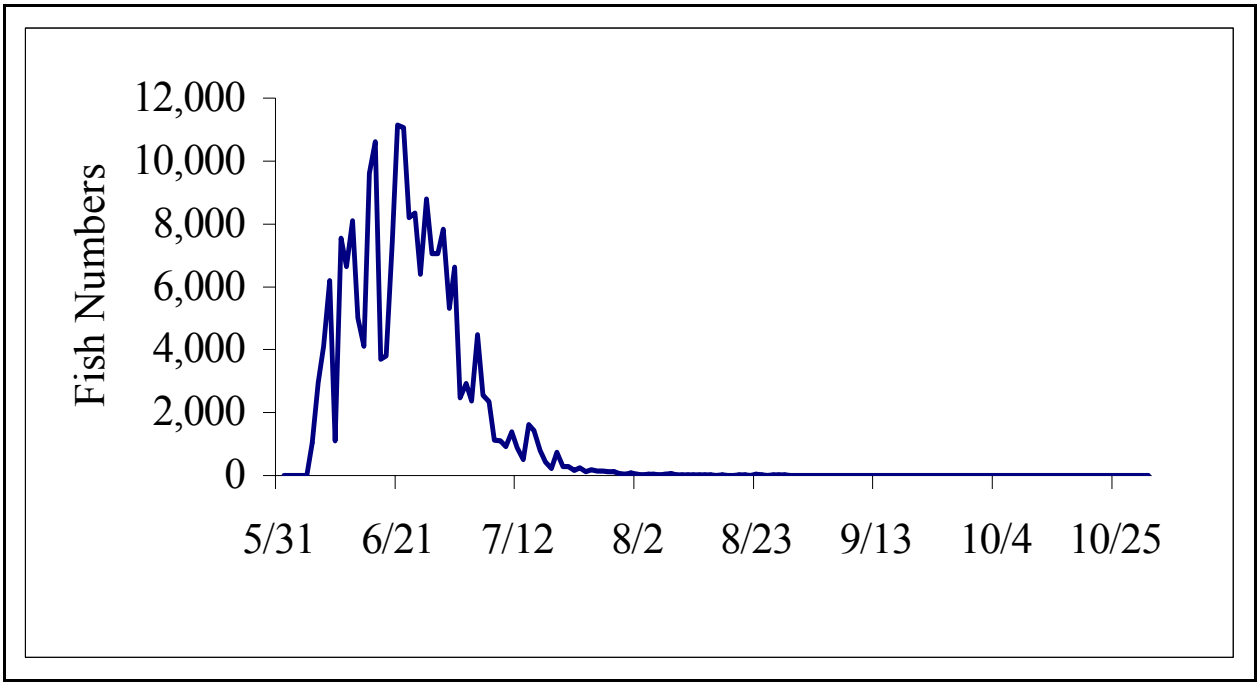

Figure 9. Daily collection of unclipped hatchery subyearling fall chinook with CWT at Lower Granite, 2004.

Unclipped Hatchery Coded-wire Tagged Coho

SMP staff examined 273 unclipped coho with CWTs at LGR. When expanded, this represents a collection of 35,364 unclipped coho with CWTs. The Nez Pierce Tribe released a total of 160,780 unclipped coho marked with CWTs. Of the 160,780 CWT marked coho, 100,694 were Kooskia Hatchery coho released into Clear Creek on April 24, 30,085 were Eagle Creek National Fish Hatchery coho released into Lapwai Creek between March 1 and March 12 and 30,001 were Eagle Creek National Fish Hatchery coho released into Potlatch River between March 2 and March 4. The 35,364 collected CWT marked unclipped coho represents 22% of the 160,780 released. Lapwai Creek, Potlatch River and Clear Creek are 63, 75 and 175, river kilometers above LGR respectively. The peak collection day of 3,284 coded wire-tagged coho occurred on May 24 (Figure 10, Tables 12, 13 and16).

Table 16. Number of unclipped CWT marked coho released, collected at LGR and peak collection day, 2000-2004.

Year	Number released	Number collected	Percent of Release Collected	Peak Collection Day
2000	120,000	14,280	11.9%	5/26
2001	60,000	7,095	11.8%	5/20
2002	108,718	4,494	4.1%	5/22
2003	114,044	10,870	9.5%	5/27
2004	160,780	35,364	22.0%	5/24

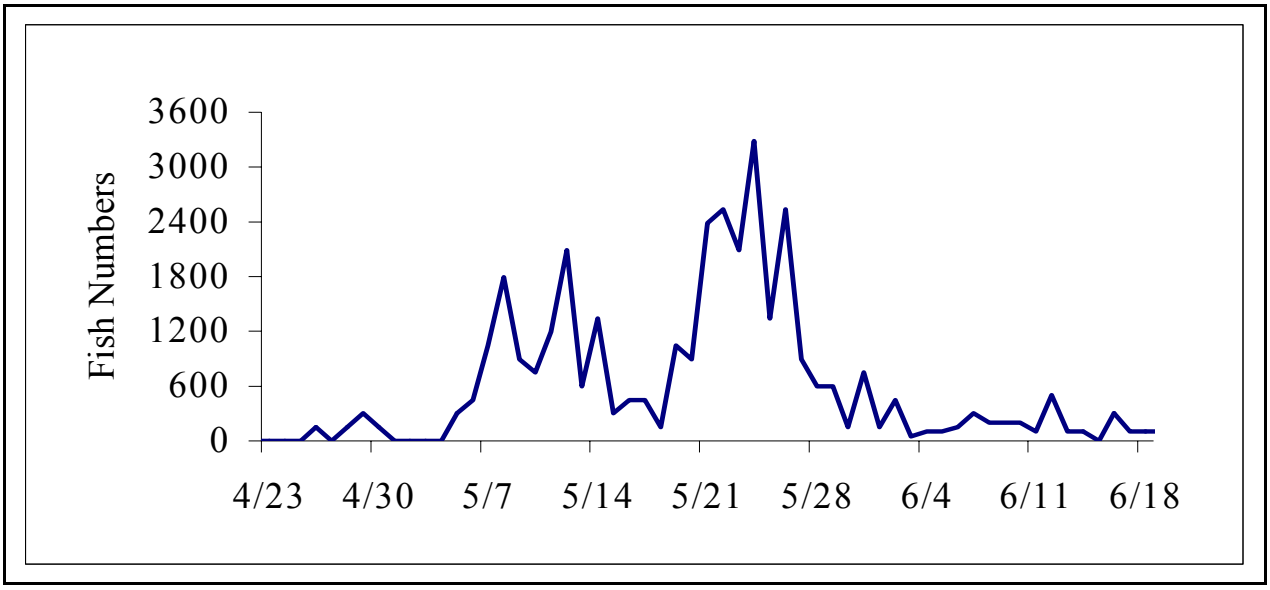

Figure 10. Daily collection of unclipped coded-wire tagged coho at Lower Granite, 2004.

Unclipped Steelhead of Hatchery Origin

A total of 8,908 unclipped steelhead were observed in daily samples. Of those, 4,111 (46%) showed fin erosion typical of hatchery rearing. The 4,111 unclipped fin eroded steelhead represent a collection of 537,445 unclipped steelhead of hatchery origin (based on fin erosion). The Nez Pierce Tribe, United States Fish and Wildlife Service, Idaho Department of Fish and Game and the Oregon Department of Fish and Wildlife made fourteen releases from thirteen locations, releasing 937,727 unmarked steelhead above LGR. The collection of 537,445

unclipped hatchery steelhead with fin erosion represents 57.3% of the 937,727 released. These releases were made between March 29 and May 13, 2004 from sites up to 732 river kilometers above LGR. Peak collection of 53,284 unclipped steelhead of hatchery origin was on May 8 (Figure 11, Tables 12, 13 and 17).

Table 17. Number of unclipped steelhead with fin erosion released, collected at LGR and peak collection day, 2000-2004.

Year	Number released	Number collected	Percent of Release Collected	Peak Collection Day
2000	596,700	307,284	51.5%	5/6
2001	852,195	430,694	50.5%	5/16
2002	1,420,838	182,870	12.9%	5/16
2003	1,186,853	215,944	18.2%	5/26
2004	937,727	537,445	57.3%	5/8

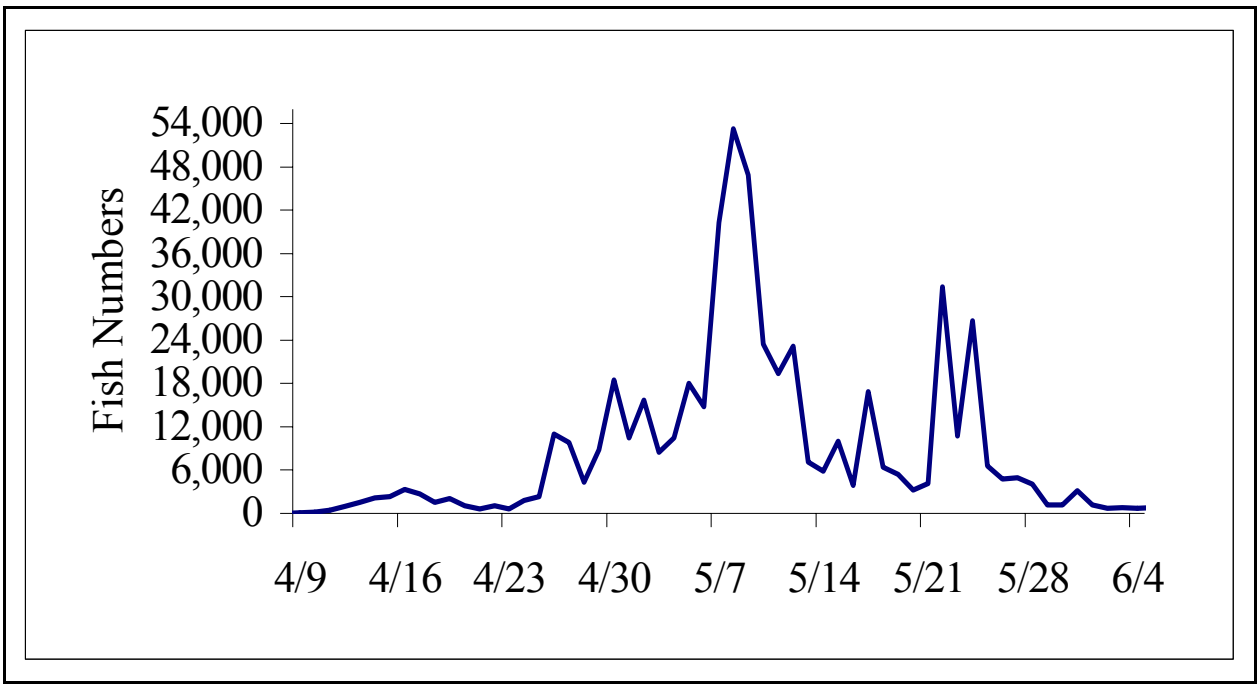

Figure 11. Daily collection of unclipped fin eroded steelhead at Lower Granite, 2004.

Elastomer Mark Recoveries

Visual elastomer marks (VIE) were reported for eight different groups of fish released above LGR this season (Tables 12 and 13). With the exception of the Right Eye Green elastomer tags (RE-GR), all the VIE marks were unique for each group or specie. The RE-GR VIE was used to mark one group of yearling spring chinook and one group of yearling fall chinook. Based on the typical body morphology common to yearling fall chinook versus spring chinook, staff biologists assigned each LE-GR VIE as either a yearling fall or yearling spring chinook. We recognize that there is some risk of error with this approach, however we believe that the summary derived from this approach presents a valid assessment of the arrival timing and collection at LGR for each group.

Left Eye Green Elastomer Tagged Hatchery Yearling Fall Chinook

The Nez Pierce Tribe released three groups of Lyons Ferry Hatchery yearling fall chinook marked with colored elastomer (VIE) tags above Lower Granite.

The first group of 108,420 fish received left eye/green elastomer tags (EL-LGR) and was released at Big Canyon Acclimation Facility on the Clearwater River, 108 river kilometers above LGR on April 12. Staff examined 219 left eye green elastomer tagged hatchery yearling fall chinook in daily samples. This represents a total of 32,445 EL-LGR marked fish collected at Lower Granite between April 19 and June 16. The peak day of collection of 2,836 EL-LGR marked fish occurred on May 4. The 32,445 collected represents 29.9% of the total release (Figure 12, Tables 12, 13 and 18).

Table 18. Number of left eye green elastomer tagged hatchery yearling fall chinook released, collected at LGR and peak collection day, 2000-2004.

Year	Number released	Number collected	Percent of Release Collected	Peak Collection Day
1998	61,472	17,417	28.3%	5/3
1999	228,451	51,490	22.5%	4/22
2000	131,306	30,644	23.3%	4/16
2001	113,215	43,104	38.1%	4/27
2002	137,465	23,252	16.9%	4/16
2003	132,251	39,632	30.0%	4/23
2004	108,420	32,445	29.9%	5/4

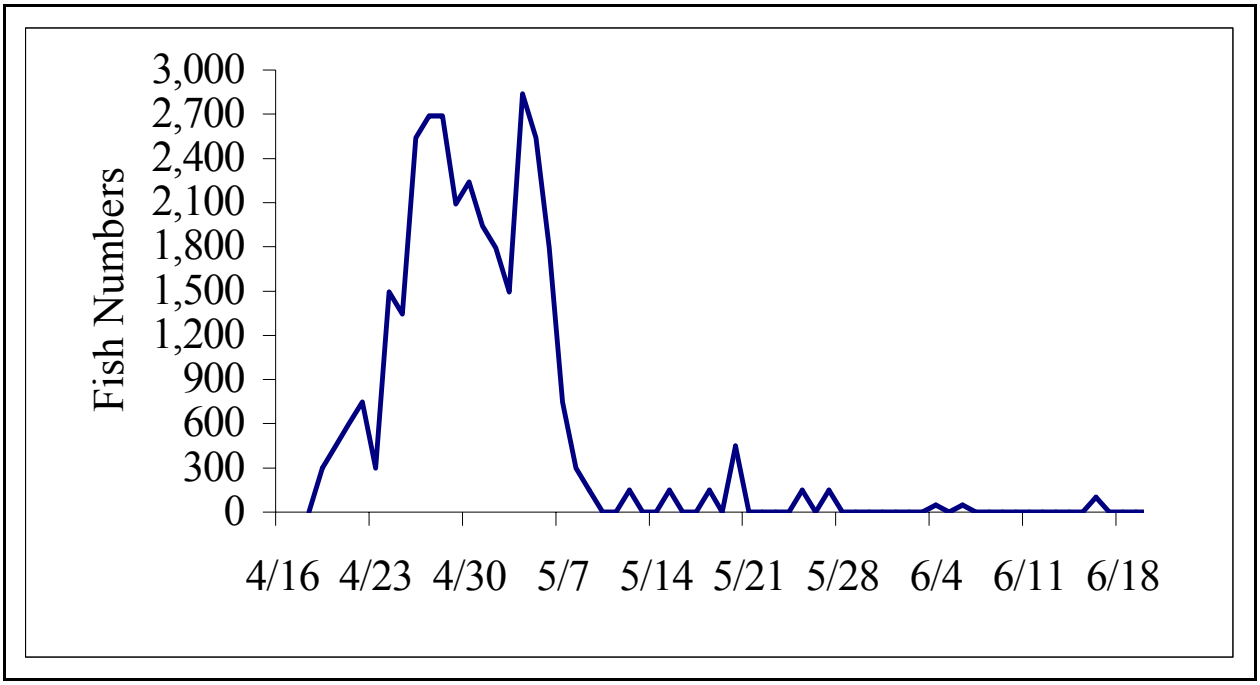

Figure 12. Daily collection of yearling fall chinook with left eye green elastomer tags at LGR, 2004.

Right Eye Green Elastomer Tagged Hatchery Yearling Fall Chinook

Another group of 154,151 Lyons Ferry Hatchery yearling fall chinook smolts received right eye/green elastomer tags (EL-RGR) and was released from Pittsburg Landing Acclimation Facility 173 river kilometers above LGR on April 12. The SMP staff observed 251 of these fish in daily samples. This represents a collection of 37,379 EL-RGR marked fish at Lower Granite between April 16 and May 22, 24.2% of those released. The peak collection of 4,493 occurred on April 21. (Figure 13, Tables 12, 13 and 19).

Table 19. Number of right eye green elastomer tagged hatchery yearling fall chinook released, collected at LGR and peak collection day, 1998-2004.

Year	Number released	Number collected	Percent of Release Collected	Peak Collection Day
1998	114,814	46,360	40.4%	4/25
1999	142,882	42,835	30.0%	4/22
2000	134,709	28,723	21.3%	4/17
2001	103,741	33,747	32.5%	4/27
2002	132,577	26,595	20.1%	4/27
2003	118,343	30,087	25.4%	4/25
2004	154,151	37,379	24.2%	4/21

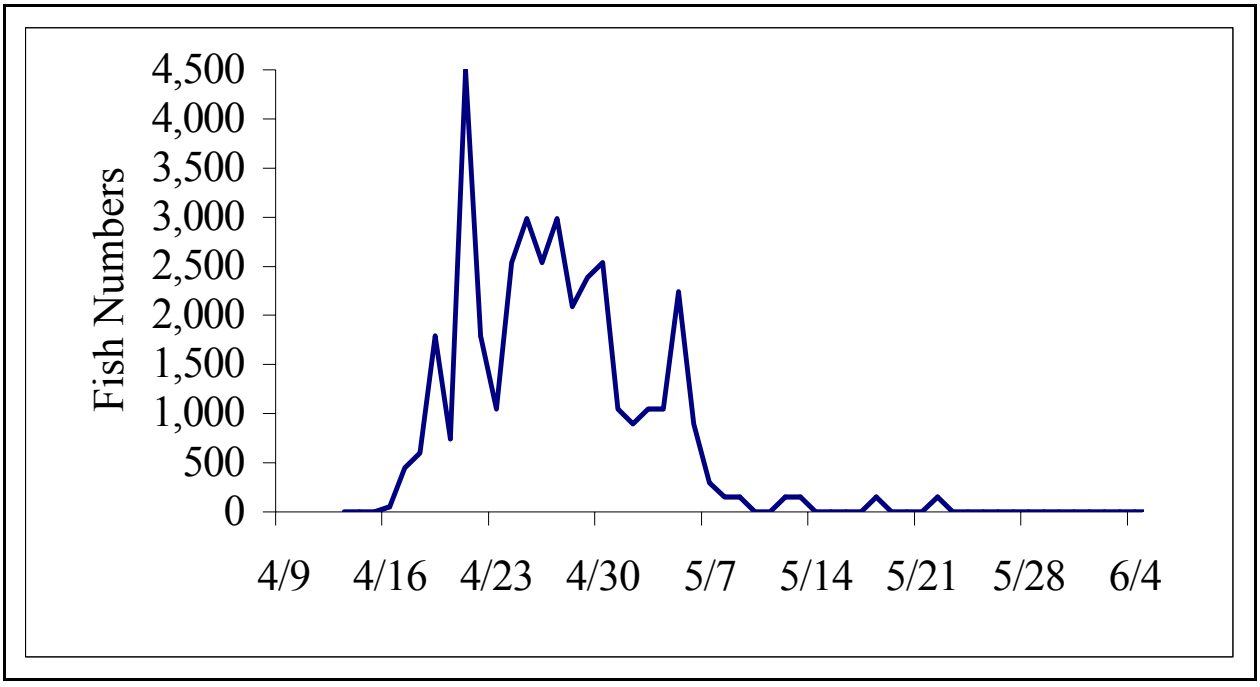

Figure 13. Daily collected yearling fall chinook with right eye green elastomer tags at LGR in 2004.

Left Eye Blue Elastomer Tagged Hatchery Yearling Fall Chinook

The third group of 153,654 Lyons Ferry Hatchery yearling fall chinook received left eye/blue tags (EL-BL) and was released from Captain John Rapids Acclimation Pond, 90 river kilometers above LGR, on April 5. A total of 370 left eye blue elastomer tagged hatchery yearling fall chinook were reported in daily samples. These fish represent a collection of 33,645 EL-BL marked fish between April 11 and May11 with a peak collection of 4,350 on April 16. The 33,645 collected represent 21.9% of the 153,654 released. (Figure 14, Tables 12, 13 and 20).

Table 20. Number of left eye blue elastomer tagged hatchery yearling fall chinook released, collected at LGR and peak collection day, 1998-2004.

Year	Number released	Number collected	Percent of Release Collected	Peak Collection Day
1998	133,205	37,415	28.1%	4/25
1999	157,310	46,447	29.5%	4/22
2000	131,324	36,283	27.6%	4/17
2001	101,976	33,747	33.1%	4/21
2002	128,604	25,402	19.8%	4/21
2003	135,056	29,239	21.6%	4/25
2004	153,654	33,645	21.9%	4/16

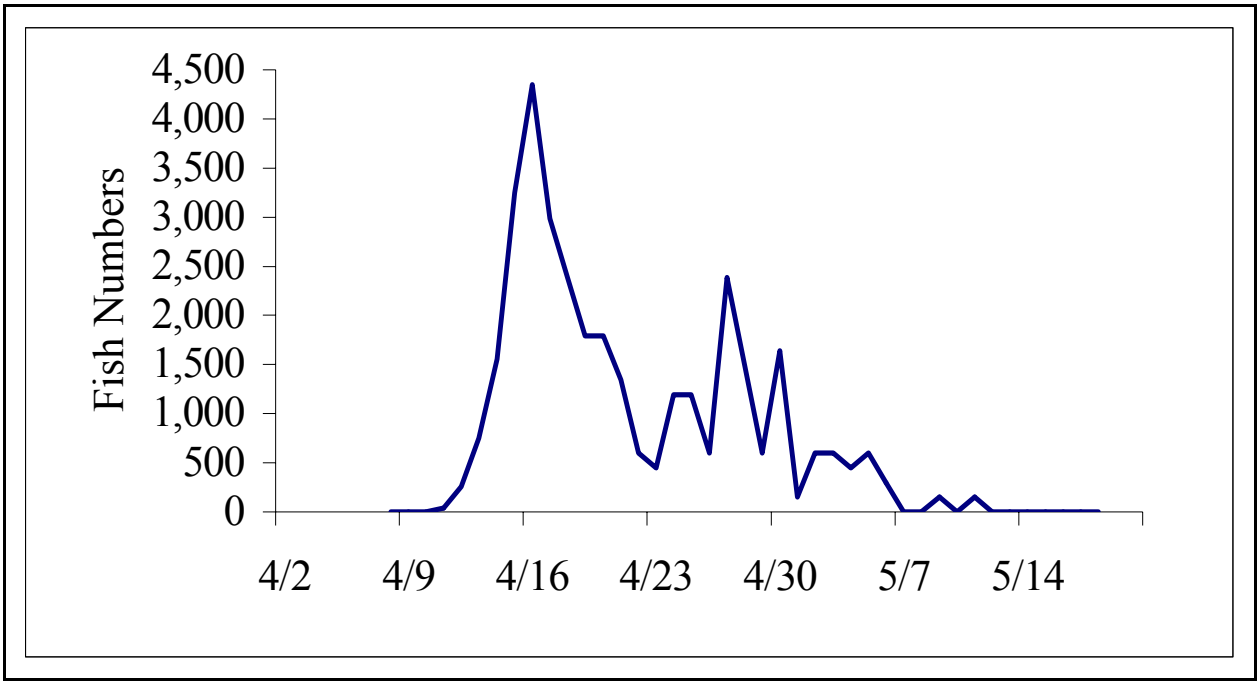

Figure 14. Daily collection of yearling fall chinook with left eye blue elastomer tags at LGR, 2004.

Left Eye Red Elastomer Tagged Unclipped Hatchery Yearling Spring Chinook

A total of 132 unclipped yearling chinook with a left eye red (LE-RD) VIE tag were examined in daily samples. The Nez Perce Tribe (NEZP) released two groups of Lookingglass Hatchery reared yearling spring chinook with LE-RD elastomer tags into Lostine Acclimation Pond, 292 river kilometers above LGR. The first group of 58,508 was released between March 12 and March 21. The second group of 58,144 was released between March 29 and April 14 for a combined release total of 116,652 fish. The 132 fish examined in daily samples represents a collection of 16,559 fish, 14.2% of the total released. Peak collection day was 2,985 smolts on May 5 (Figure 15, Tables 12, 13 and 21).

Table 21. Number of LE-RD elastomer tagged unclipped yearling spring chinook released, collected at LGR and peak collection day, 2002-2004.

Year	Number released	Number collected	Percent of Release Collected	Peak Collection Day
2002	31,464	2,367	7.5%	5/5 and 5/8
2003	101,979	15,023	14.9%	5/1
2004	116,652	16,559	14.2%	5/5

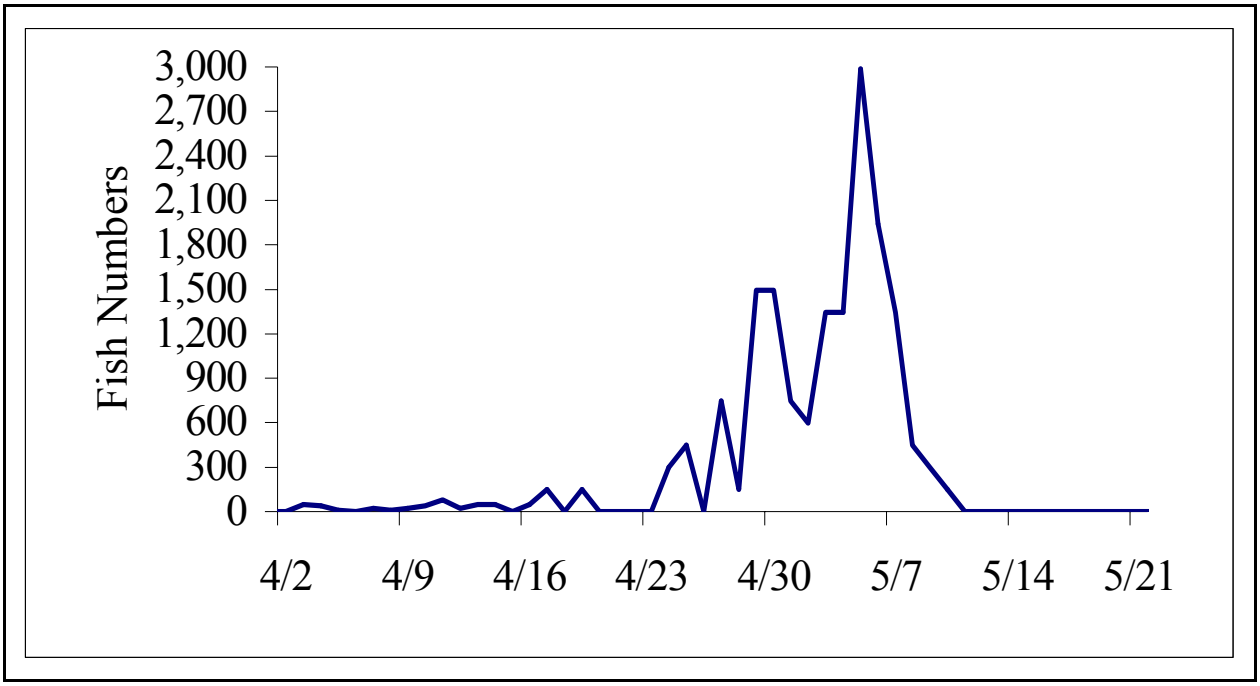

Figure 15. Daily collection of unclipped hatchery yearling chinook with right eye red elastomers at LGR, 2004.

Right Eye Green Elastomer Tagged, Unclipped Hatchery Yearling Summer Chinook

Between April 3 and May 10, 46 McCall Hatchery yearling chinook with right eye green elastomer tags (RE-GR) were recorded in daily samples. The Nez Perce Tribe released a total of 111,854 yearling chinook with RE-GR elastomer tags into Johnson Creek between March 15 and March 19, 432 river kilometers above LGR. These 46 fish represent a collection of 6,569 fish, 5.9% of the total released with a peak collection of 1,045 on May 5 (Figure 16, Tables 12, 13 and 22). Last year, this release group was marked with right-eye orange elastomer tags and in 2002 with right-eye green elastomer tags.

Table 22. Number of RE-GR elastomer tagged unclipped yearling summer chinook released, collected at LGR and peak collection day, 2002-2003.

Year	Number released	Number collected	Percent of Release Collected	Peak Collection Day
2002	56,296	300	0.5%	6/2
2003	72,146	1,643	2.3%	5/21
2004	111,854	6,569	5.9%	5/5

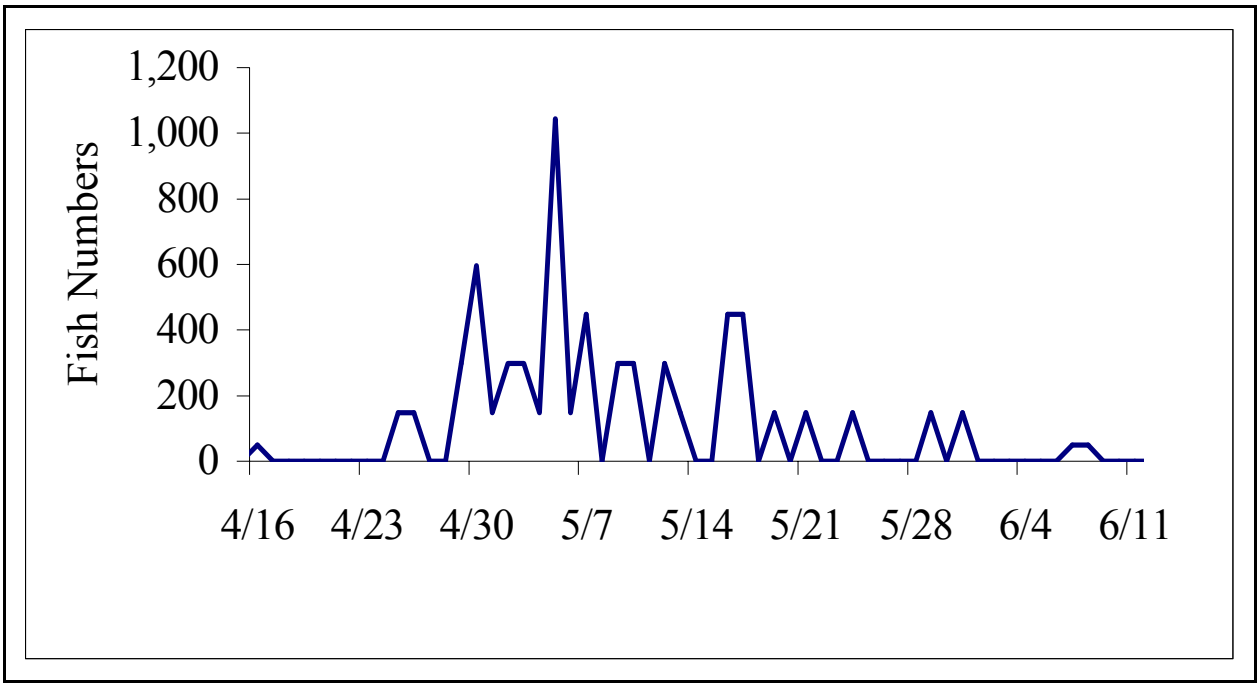

Figure 16. Daily collection of unclipped hatchery yearling summer chinook with right eye green elastomers, at LGR, 2004.

Right Eye Green Elastomer Tagged Hatchery Unclipped Yearling Spring Chinook

Between April 26 and May 8, 14 unclipped hatchery yearling spring chinook with right eye green elastomer tags (RE-GR) were observed in daily samples. The Umatilla Tribe released 70,959 Lookingglass Hatchery yearling spring chinook with RE-GR elastomer tags into the Catherine Creek Acclimation Pond between April 1 and April 14, 378 river kilometers above LGR. Catherine Creek is a tributary of the Grande Ronde River. The 14 recorded fish represents a collection of 2,091 fish, 2.9% of the release group. Peak collection of 448 fish occurred on April 29 and May 6 (Figure 17, Tables 12, 13 and 23). Last year this release group was marked with right-eye green elastomer tags.

Table 23. Number of RE-GR elastomer tagged yearling summer chinook released, collected at LGR and peak collection day, 2002-2003.

Year	Number released	Number collected	Percent of Release Collected	Peak Collection Day
2003	24,092	1,145	4.8%	5/7
2004	70,959	2,091	2.9%	4/26 & 5/6

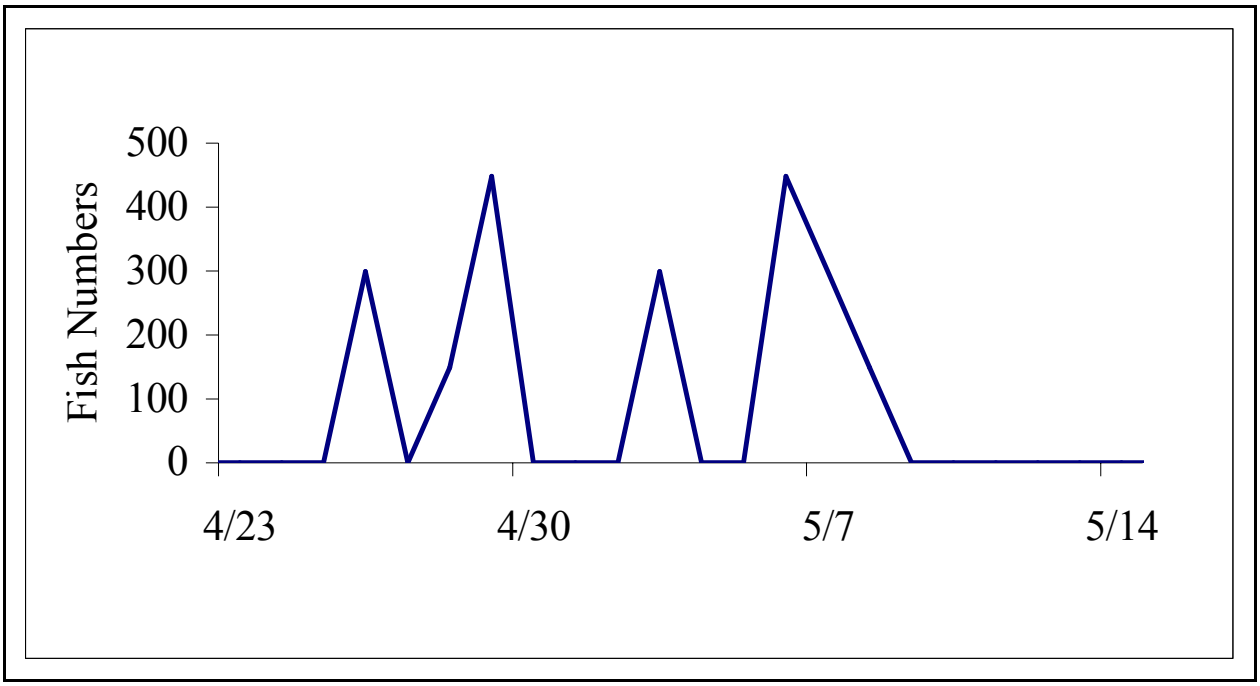

Figure 17. Daily collection of unclipped yearling spring chinook with right eye green elastomers at LGR, 2004.

Left Eye Blue Elastomer Tagged Unclipped Summer Steelhead

Between April 26 and May 31, 106 unclipped hatchery summer steelhead tagged with left-eye blue elastomer tags (LE-BL) were recorded in daily samples. The Idaho Department of Fish and Game released 51,002 LE-BL tagged unclipped summer steelhead from the Red River Acclimation Pond between April 16 and April 26, 299 river kilometers above LGR. The 106 fish recorded represents a collection of 15,824 fish, 31.0% of the release group. Peak collection of 1,791 occurred on May 17 (Figure 18, Tables 12 and 13).

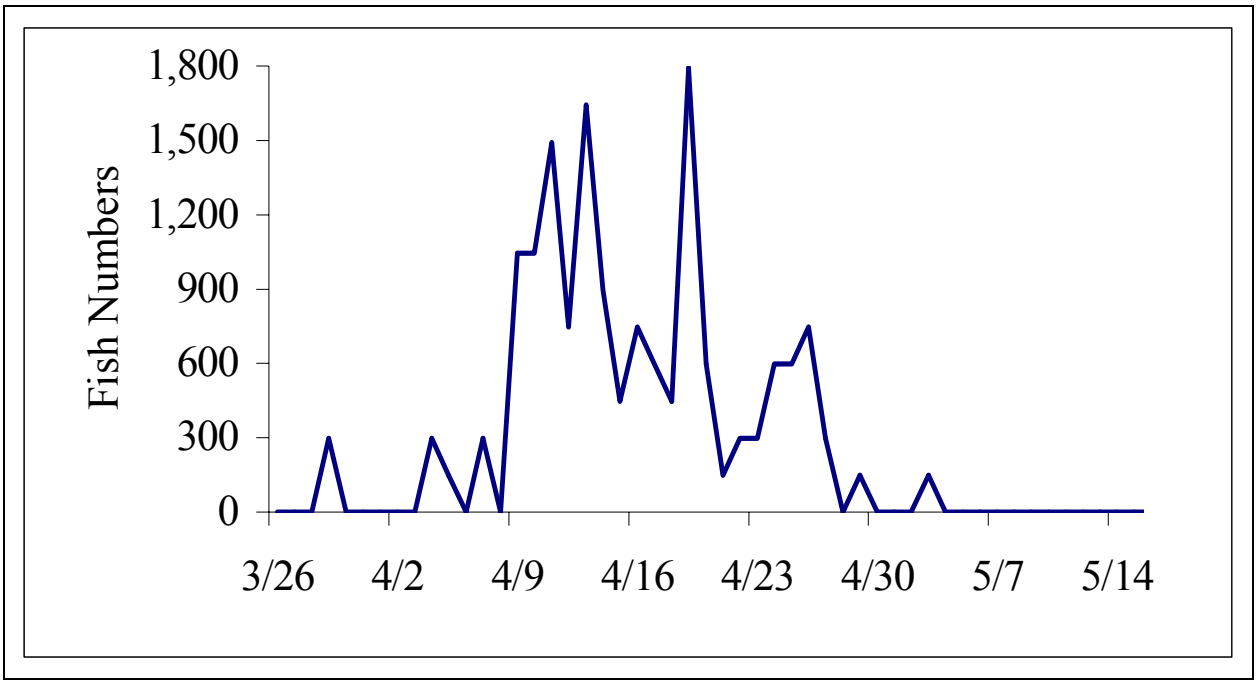

Figure 18. Daily collection of unclipped summer steelhead with left eye blue elastomers at LGR, 2004.

Left Eye Orange Elastomer Tagged Unclipped Summer Steelhead

Between May 2 and May 29, 139 unclipped hatchery summer steelhead tagged with left-eye orange elastomer tags (LE-OR) were recorded in daily samples. The Idaho Department of Fish and Game released 50,253 LE-OR tagged unclipped summer steelhead from the Red River Acclimation Pond between April 16 and April 26, 299 river kilometers above LGR. The 139 fish recorded represents a collection of 20,749 fish, 41.3% of the release group. Peak collection of 3,284 occurred on May 8 (Figure 19, Tables 12 and 13).

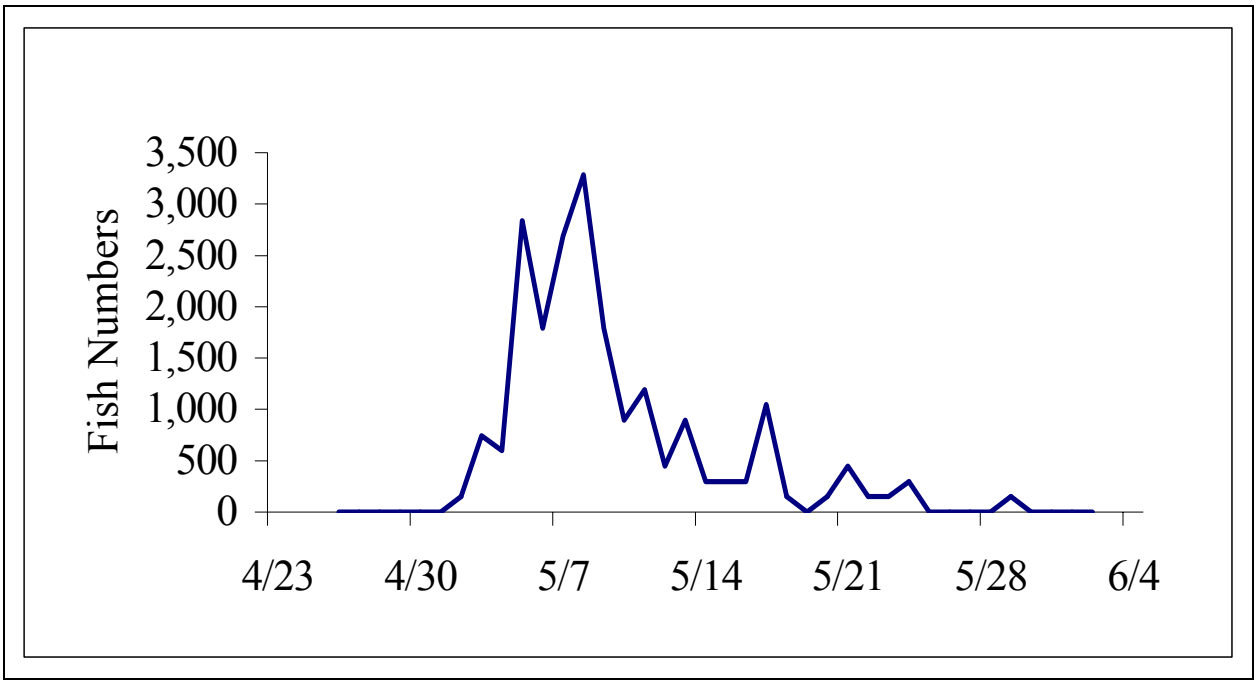

Figure 19. Daily collection of unclipped summer steelhead with left eye orange elastomer tags at LGR, 2004.

Right Eye Orange Elastomer Tagged Unclipped Summer Steelhead

Between May 3 and May 27, 131 unclipped hatchery summer steelhead tagged with right-eye orange elastomer tags (RE-OR) were recorded in daily samples. The Nez Perce Tribe released a total of 51,923 LE-OR tagged unclipped summer steelhead, 25,962 from Mill Creek Bridge on April 27 and 25,961 on April 29 into Meadow Creek approximately 223 river kilometers above LGR. The 131 fish recorded represents a collection of 19,557 fish, 37.6% of the release groups. Peak collection of 4,478 was recorded May 7 (Figure 20, Tables 12 and 13).

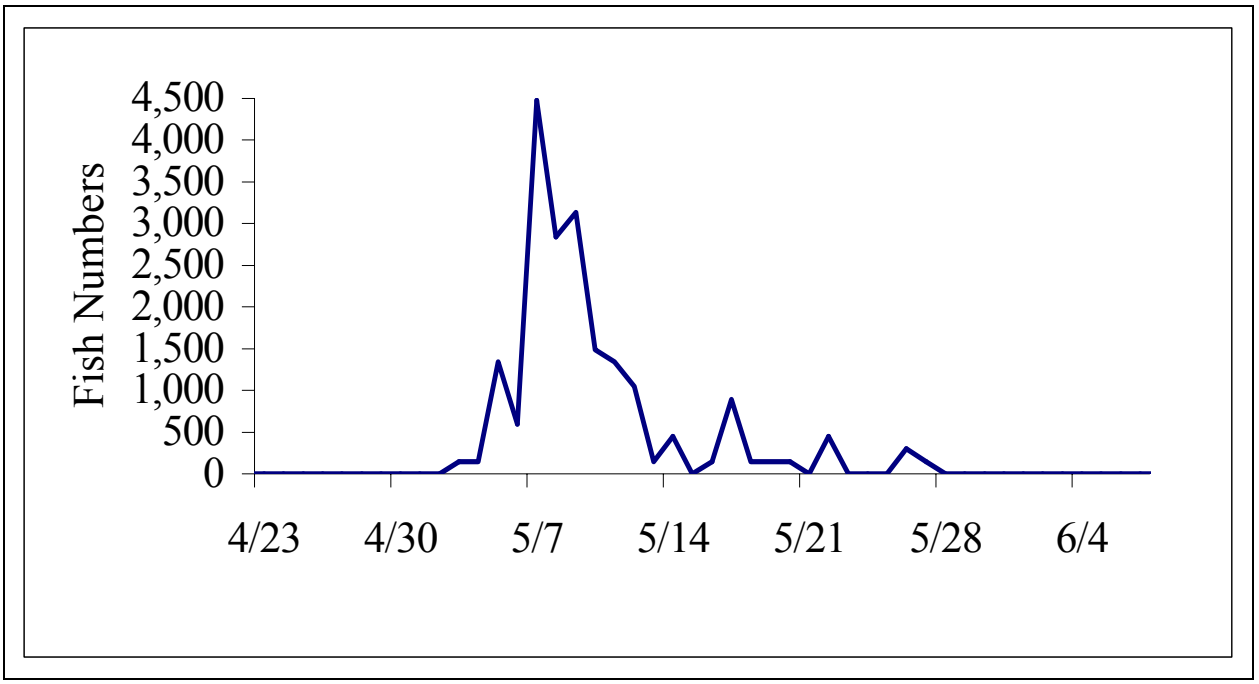

Figure 20. Daily collection of unclipped summer steelhead with right eye orange elastomer tags at LGR, 2004.

Freeze Branded Mark Recoveries

LA-S-1 Freeze Branded Hatchery Steelhead

Only one freeze brand was seen this year. Between April 24 and May 24, 89 hatchery steelhead with the freeze brand of "S" in the first position on the left side of the body, anterior of the dorsal fin (LS-S-1) were seen in daily samples. The Washington Department of Fish and Wildlife released 40,202 Lyons Ferry Hatchery summer steelhead with the freeze brand LA-S-1 from the Cottonwood Acclimation Pond between April 1 and April 30, 141 river kilometers above LGR. The 89 fish recorded represents a collection of 13,286, 33% of the released fish with a peak collection of 3,284 on April 27 (Figure 21, Tables 12 and 13).

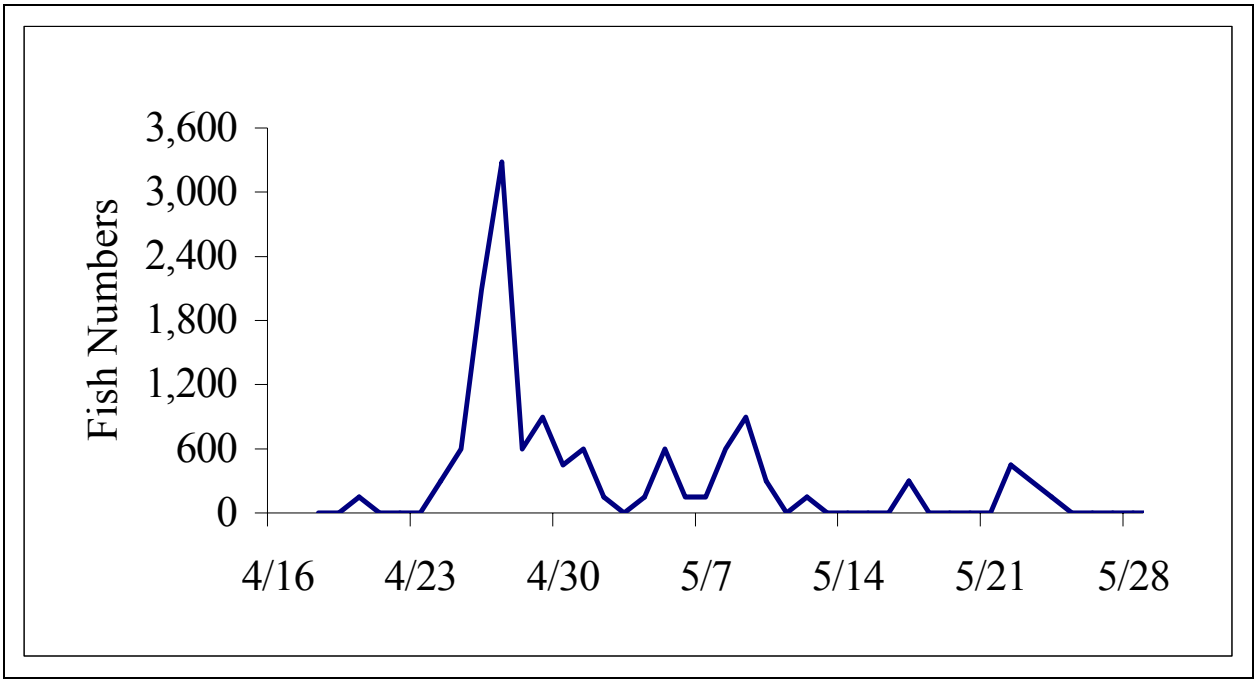

Figure 21. Daily collection of WDFW summer steelhead with the freeze brand LA-S-1 at LGR, 2004.

Marked fish recorded during Gas Bubble Trauma Exams

Mark records for fish captured off the separator for Gas Bubble Trauma (GBT) examinations were reported to FPC. Marked fish recorded during GBT exams included 32 colored elastomer (VIE) tagged hatchery yearling chinook. These included five yearling chinook with left eye green tags, 15 with right eye green tags and 12 with left eye blue tags. Additionally, 33 unclipped steelhead were recorded as having fin erosion, typical of hatchery rearing.

All fish removed from the separator during the GBT monitoring program were scanned for PIT-tags. PIT-tagged fish were not examined for GBT but placed in fresh water and allowed to recover from the anesthesia before being returned to the separator. All PIT-tag codes were stored in a scanner and recorded on a form with species, rearing type and hatchery mark information. Daily PIT-tag records were combined into one tagging file and sent to PTAGIS (GBT Sample Summary). A total of six clipped yearling chinook fish with PIT-tags were netted during GBT sampling (Table 24).

Table 24. Records of PIT-tagged fish detected in during GBT sampling.

Organization	Tag Site	Release Date	Release Site	Run	Species/Rearing	Number
NPT	CJRAP	4/02/04	CJRAP	Fall	H.Chinook	1
USFWS	DWOR	3/31/04	DWORNF	Spring	H. Chinook	1
FPC	RAPH	3/15 & 2/2/04	RAPH	Spring	H.Chinook	4

Abbreviations: NPT = Nez Perce Tribe, USFWS = United States Fish and Wildlife Service, FPC = Fish Passage Center, CJRAP = Captain John Rapids Acclimation Pond, DWORNF = Dworshak National Fish Hatchery, RAPH = Rapid River Hatchery,

GBT Sample Program and Summary

GBT Sampling Procedures

Sampling methods to identify levels of dissolved gas in juvenile salmonids have undergone continuous review since the program began in 1994. Current examination techniques, sampling methods and protocol are based on research conducted by fish physiologists and health specialists/pathologists with the United States Geological Survey, Biological Research Division (USGS-BRD) at the Columbia River Lab at Cook, WA. Fish Passage Center staff have actively guided and participated in this process. USGS-BRD staff has conducted training sessions at the beginning of each season for the past four years. Staff from LGR attended this season's Gas Bubble Trauma (GBT) training seminar at the Cook lab on April 5 where fish handling methods, examination techniques, and data handling protocols were reviewed and demonstrated. Site specific sample protocols at LGR called for us to examine 100 yearling chinook and/or steelhead, clipped or unclipped, on Tuesdays, between April 6 and June 29.

Smolts collected for GBT samples were netted from the open flume in front of the separator bars. We netted fish individually and placed them in a dark five-gallon bucket with 10 liters of water. The time required to net seven fish varied with fish availability but generally took about five minutes. After collecting seven fish, the fish were taken to the GBT lab located next to the separator. Three cc of MS-222® was added to the buckets with the fish as an anesthetic, making a concentration of 30 mg/l. As the fish responded to the MS-222®, one fish at a time would be removed from the capture bucket and scanned for the presence of a PIT-tag. If a PIT-tag was detected, the code was recorded and the fish was allowed to recover and released back into the separator. Later, all PIT-tag codes were entered into a PTAGIS tagging file. If no PIT-tag was detected the fish was placed in a bucket with water and MS-222® at 80mg/l to fully sedate the fish for the detailed examination. Once fully sedated the fish was placed in an examination tray equipped with hoses that provide flowing water with 30mg/l of MS-222® directly to the mouth and over the gills during the examination. Another fish was then scanned for a PIT-tag and if not tagged, placed in the bucket of water with 80mg/l MS-222®. In addition staff also scanned all unclipped chinook for CWTs to identify these fish as hatchery origin smolts. Hatchery marks (elastomer tags, freeze brands and fin erosion on steelhead) were recorded on the GBT hand log.

Staff then used a stereomicroscope to examine the unpaired fins and both eyes on the fish in the examination tray for bubbles associated with GBT. The unpaired fins (anal and caudal fins) and both eyes were inspected for bubbles at a minimum of 10X magnification in order to allow for comparability among sites and years. Fish with bubbles were given a rating from 0-4 based on the percentage of the area covered by bubbles. A rank of 0 was assigned if no bubbles were observed; rank 1 was assigned if 1 to 5 percent of the fin or eye was covered with bubbles; rank 2 was assigned if 6 to 25 percent area was covered; rank 3 for 26 to 50 percent area covered; and rank 4 for greater than 50 percent area covered. The rank reported for the eyes was the highest rank for either eye. The lateral line, unlike previous years, was not examined in 2002 or 2003. The examiner recorded species, fin clips, fork length, presence or absence of bubbles, and the time at the start of the exam. The sampled fish was then placed in a bucket of freshwater with aeration and allowed to recover after the exam and before it was released into a raceway to prevent being diverted to the sample tank and anesthetized again. It took about two minutes to

complete each examination. At the end of the day, sample data was transcribed to a database and transmitted to FPC. GBT fish were treated and recorded as a separate sample with a sample rate of 100% and their numbers added to the following day's collection totals.

GBT Sample Summary

Due to the lack of spring run-off there was no spill after April 23. This resulted in GBT exams being conducted on only three days. We examined a total of 300 smolts for symptoms of Gas Bubble Trauma. These included 115 clipped yearling chinook, 29 unclipped yearling chinook, 107 clipped steelhead and 49 unclipped steelhead. Fish collected for GBT exams were anesthetized, examined, allowed to recover from anesthesia and then placed in raceways for transportation. Symptoms of GBT were not observed in any fish examined for GBT at LGR in 2004.

Incidental to fish netted from the separator for GBT examination, staff released six fish back into the separator because they were PIT-tagged. These six PIT-tagged fish are described in the "Marked fish recorded during Gas Bubble Trauma Exams" section (page 30).

Sample Anesthesia

The use of MS-222® to safely sedate juvenile salmonids is an important component of the smolt monitoring program. Reviews of methods employed at different sites by FPC, USGS-BRD and SMP program staff in 1992 provided specific guidelines for standard stock solutions, minimal induction times and total exposure times for SMP sampling programs. At Lower Granite Dam Juvenile Fish Facility concentrations of approximately 60 mg/L of MS-222® from stock solutions of 100 g/L enable us to follow the general guidelines and handle the juvenile salmonids safely and efficiently. Over the course of each season, adjustments are made to account for changes in water temperature and the number of fish in the sample. Induction and recovery times for a given concentration tend to decrease as water temperatures increase.

Anesthesia Procedures

Anesthetic solutions are used in the pre-anesthetic chambers, the re-circulating sample system and for GBT sampling. The pre-anesthetic chambers are drained to about 95 liters before we add between 70 and 90 ml of MS-222® to achieve an initial concentration of about 63 mg/L. This typically sedates nearly all the fish within three minutes. However, the pre-anesthetic chambers are not watertight. Fresh water seepage reduces the effective concentration. Depending upon the amount of fresh water seepage, fish response, water temperature, the size and number of smolts in the chamber, we may add more MS-222®. Once sedated, these fish are flushed down to the sorting trough.

The re-circulation system holds 670 liters of water and includes the sorting trough, sump, chilling reservoir, a rotary chiller, a filter and two pumps. We add anesthetic to the sump and chilling reservoir to achieve an initial concentration of about 50 mg/L. This level maintains sedation in most fish and allows some fish to gradually recover. The effective concentration of anesthetic in this system diminishes over time because sampled fish absorb the anesthetic and are removed from the system. Also, some leakage and infusion of fresh water occurs throughout the

sample. The longer we use the re-circulation system the more likely we are to add additional MS-222® in 50 to 100 ml increments to maintain effective concentrations. As a result, careful monitoring of fish response is a constant component of our sample procedures. To monitor anesthetic effectiveness and ensure the safety of the fish in the sample, we continuously watch and observe fish behavior and gilling rates.

Anesthetic Induction

We attempt to keep induction times between one minute but not longer than three minutes. For each batch of fish sedated in the pre-anesthetic chambers, we recorded induction times as well as the estimated number and relative size of smolts, water temperature and initial concentration of MS-222® used (Table 25). The induction time was that point when approximately 95% of the fish were belly-up or on their side and gilling evenly.

Table 25. Weekly average induction times of sample fish exposed to MS-222® at LGR, 2004.

Week Ending Date	Average Temp. (C.)	# of Batches	Average # Fish per Batch	Average # Small Fish/Batch	Percent Small Fish/Batch	Volume (mg/L) of MS-222® added to Anesthetic Chamber	Average Induction Time (seconds)
3/28	8.6	28	27	23	0.86	85	160
4/4	9.6	75	57	47	0.81	85	171
4/11	10.9	9	64	56	0.87	83	159
4/18	10.3	8	54	43	0.80	82	163
4/25	10.8	106	76	67	0.89	79	173
5/2	12.3	188	88	75	0.85	77	168
5/9	12.1	164	82	72	0.88	75	167
5/16	11.6	96	64	60	0.95	80	165
5/23	12.7	145	64	61	0.95	82	153
5/30	11.8	51	42	41	0.97	82	157
6/6	14.0	54	57	51	0.89	82	147
6/13	13.9	36	55	49	0.90	82	142
6/20	16.7	37	67	62	0.92	82	159
6/27	19.7	62	68	64	0.94	82	170
7/4	20.1	73	51	48	0.93	77	158
7/11	19.7	70	56	53	0.95	73	160
7/18	20.6	52	44	41	0.93	71	150
7/25	21.0	59	47	42	0.89	64	152
8/1	20.2	51	42	36	0.85	63	153
8/8	20.4	37	40	37	0.91	63	152
8/15	20.9	40	28	24	0.87	60	148
8/22	20.8	48	36	33	0.92	59	146
8/29	19.8	25	32	29	0.91	60	164
9/5	18.5	34	43	33	0.78	60	157
9/12	18.3	30	40	29	0.73	60	162
9/19	17.5	79	57	52	0.91	59	150
9/26	17.3	27	40	37	0.92	57	162
10/3	17.3	30	30	24	0.82	57	167
10/10	16.7	35	39	33	0.85	58	171
10/17	15.8	36	44	29	0.65	62	167
10/24	14.3	31	68	60	0.88	67	156
10/31	12.8	12	54	40	0.75	69	173

Beginning in 1999, daily records were kept by the pre-anesthetization technician. These records include temperature, number of fish per batch, number of small fish per batch, the volume of MS-222® concentration used per batch and the induction time per batch. For each

degree Celsius recorded between 1999 and 2004, the daily volume of MS-222® concentration used per batch and the daily induction time per batch were averaged (Table 26). The six year averages were graphed against the corresponding temperature. As water temperature increases, induction time decreases. The pre-anesthetization technician responds to the decline in induction time by reducing the volume of MS-222® used in each batch (Figure 22).

Table 26. Volume of MS-222® concentrate used per batch and average length of induction time per batch based on temperature, 1999-2004.

Average Temperature Celsius	Volume of MS-222® concentrate used per batch	Length of induction time (seconds)
5.0 – 5.9	87	165
6.0 – 6.9	87	160
7.0 – 7.9	76	167
8.0 – 8.9	79	162
9.0 – 9.9	79	155
10.0 – 10.9	77	152
11.0 – 11.9	79	150
12.0 – 12.9	80	154
13.0 – 13.9	79	151
14.0 – 14.9	79	149
15.0 – 15.9	79	150
16.0 – 16.9	76	155
17.0 – 17.9	71	152
18.0 – 18.9	75	146
19.0 – 19.9	77	145
20.0 – 20.9	73	145
21.0 – 21.9	68	140
22.0 – 22.9	66	121

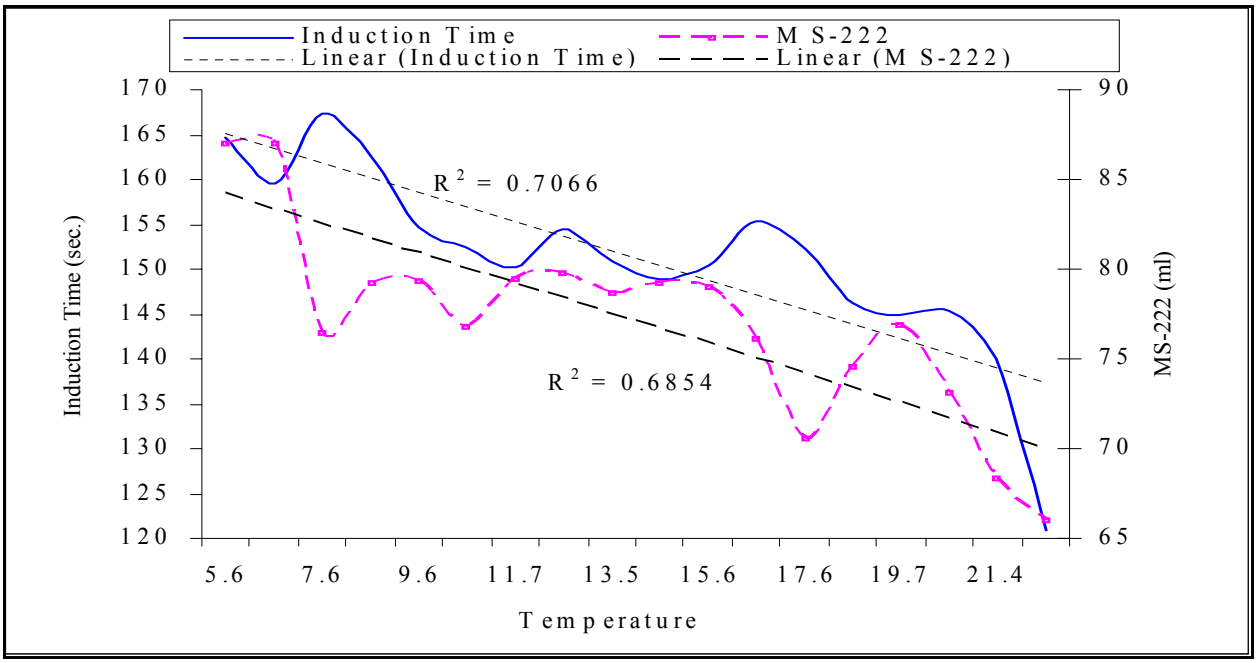

Figure 22. Milligrams/liter of MS-222® and Induction Time in seconds (with trendlines) compared to temperature at LGR, 1999-2004.

Audit of data entry

This season, a total of 220 daily sample batches were generated and sent to FPC. Fourteen batches (6.4%) were sent again because they were revised after the original posting. We categorized the errors that led to the revisions, as we have done in previous years, into six categories; setup errors, recording errors, omitted data, fish identification errors, facility errors and miscellaneous changes (Table 27). Recording errors resulted in revisions to eight batches. These errors are "typos" and inaccurate transcription of hand log data into the FPC32 data entry program. These errors included incorrect entries of elastomer codes (two batches), incorrect fin eroded entry (two batches), incorrect entry of incidental species code (one batch), incorrect entry of sub-batch (one batch), incorrect entry of race of fish (one batch) and incorrect species entry (one batch). Omitted or missing data resulted in the revision of five batches this season including; omitting the fin eroded code (three batches), omitting an elastomer tagged fish (one batch) and omitting the brand location (one batch). There was one facility error recorded from events or changes in the data because of unusual operations, mistakes in fish facility data reporting or technical problems related to the fish facility. This error occurred because the incorrect flow data was on the Corps of Engineers website and used in the original batch sent to FPC. There were no batches categorized as miscellaneous errors this season. No batches were categorized as fish identification errors this season. We had no setup errors from problems with templates or formulas within spreadsheets used to summarize daily data or software. Of our 14 revised batches, five of them involved fin eroded steelhead. The fin eroded fish code was originally added to the FPC program in just the catch section of the program. Since we keep the fin eroded fish separate from other unclipped steelhead throughout all of our data including mortalities, sampled fish and transported fish, it created some difficulty in entering just the sampled live fish into the FPC database program. Our error rate of 6.4% was slightly higher than the 5.0% we reported in 2003.

Table 27. Number and percentages of sample batches revised and resent to FPC, 2004.

Error Type	Number of re-posted batches	Percent of total re-posted batches	Percent of total number of batches
Setup	0	0.0%	0.0%
Recording	8	57.1%	3.6%
Omitted data	5	35.7%	2.3%
Fish I.D.	0	0.0%	0.0%
Facility	1	7.1%	0.5%
Miscellaneous	0	0.0%	0.0%
Total	14		6.4%

Fish Collection

Migration and Collection

The juvenile fish bypass gallery was watered up at 1030 hours March 19. Fish were bypassed through the 42-inch pipe (primary bypass) until 0700 hours March 25 when the separator was watered-up and collection of fish for transportation began. Collection ended at 0700 hours October 31. A total of 11,787,539 juvenile salmonids were collected at LGR during the 2004 operating season (Table 28). This is the largest number of smolts ever collected at LGR.

The species composition included: 3,690,180 clipped yearling chinook, 1,156,925 unclipped yearling chinook, 36,491 clipped subyearling fall chinook, 965,861 unclipped subyearling fall chinook, 4,587,116 clipped steelhead, 1,090,363 unclipped steelhead, 5,180 clipped sockeye/kokanee, 2,532 unclipped sockeye/kokanee and 252,891 coho (clipped and unclipped) (Table 28 and Appendix 1, Tables 1).

Total fish collection and transportation increased, 90.6% and 85.9%, respectively, over the totals in 2003. Collection numbers for several species groups increased compared to 2003: clipped yearling chinook (93.3%), unclipped yearling chinook (73.3%), clipped steelhead (145.2%) and unclipped steelhead (133.7%), and coho (clipped and unclipped, 180.7%). The numbers collected declined for clipped subyearling fall chinook (-68.2%), unclipped subyearling fall chinook (-8.5%), clipped sockeye (-26.1%) and unclipped sockeye/kokanee (-7.8%) (Table 28).

Table 28. Annual collection, bypass and transport at LGR, 1999-2004.

Year	Yearling Chinook		Subyearling[1] Chinook		Steelhead		Sockeye/Kokanee[2]		Coho	
	Clipped	No Clip	Clipped	No Clip	Clipped[2]	No Clip	Clipped	No Clip	Hatchery	Total
Collection										
1999	1,762,655	410,842	107	257,400	3,032,104	323,083	10,085	7,975	78,621	5,882,872
2000	2,007,545	442,635	---	681,803	4,281,834	757,786	2,688	4,152	122,103	8,300,546
2001	1,370,898	587,375	40,175	699,676	4,555,036	1,025,435	3,182	1,669	58,255	8,341,701
2002	1,196,249	341,050	25,813	606,471	1,268,841	430,092	3,835	47,897	80,777	4,001,025
2003	1,909,312	667,719	114,614	1,055,198	1,870,652	466,498	7,014	2,746	90,072	6,183,825
2004	3,690,180	1,156,925	36,491	965,861	4,587,116	1,090,363	5,180	2,532	252,891	11,787,539
Bypass										
1999	88,628	27,289	---	861	235,513	30,851	1,338	309	14,609	399,398
2000	53,561	61,883	----	46	143,732	82,869	0	16	400	342,507
2001	60,319	18,879	1	0	231,830	38,994	37	184	976	351,220
2002	2,908	35,244	36	174	21,490	44,410	0	7	5	104,274
2003	2,428	43,461	111	2,783	21,034	32,516	0	0	7	102,340
2004	110,065	41,267	2,849	43,589	232,510	57,478	255	30	13,352	501,395
Truck										
1999	9,235	23,261	106	162,540	26,133	9,158	315	1,640	1,564	233,952
2000	4,072	3,151	----	145,460	10,875	6,596	28	1,002	611	171,795
2001	3,035	3,860	268	84,719	28,611	8,522	12	451	1,845	131,323
2002	7,733	3,754	5	56,748	2,353	1,217	20	644	39	72,513
2003	22,629	31,638	72	25,936	7,016	8,711	21	68	191	96,282
2004	16,529	28,140	0	28,200	8,976	7,018	4	569	269	89,705
Barge										
1999	1,653,625	357,962	---	91,851	2,769,501	282,912	8,348	5,652	62,254	5,232,105
2000	1,947,270	376,939	----	533,095	4,126,649	668,158	2,658	3,039	121,045	7,778,853
2001	1,304,304	563,474	39,739	611,306	4,292,959	977,250	3,133	982	55,289	7,848,436
2002	1,182,415	301,383	25,405	542,145	1,244,007	384,201	3,753	45,748	80,608	3,809,665
2003	1,879,956	590,937	111,140	1,011,242	1,840,995	424,802	6,907	2,642	89,264	5,957,885
2004	3,545,729	1,082,182	33,392	888,872	4,342,892	1,025,358	4,902	1,843	238,962	11,164,132
Total Transport										
1999	1,662,860	381,223	106	254,391	2,795,634	292,070	8,663	7,292	63,818	5,466,057
2000	1,951,342	380,090	----	678,555	4,137,524	674,754	2,686	4,041	121,656	7,950,648
2001	1,307,339	567,334	40,007	696,025	4,321,570	985,772	3,145	1,433	57,134	7,979,759
2002	1,190,148	305,137	25,410	598,893	1,246,360	385,418	3,773	46,392	80,647	3,882,178
2003	1,902,585	622,575	111,212	1,037,178	1,848,011	433,513	6,928	2,710	89,455	6,054,167
2004	3,562,258	1,110,322	33,392	917,072	4,351,868	1,032,376	4,906	2,412	239,231	11,253,837

Peak Collection Days

Peak collection days for the 2004 migration season were very similar to the two previous year's pattern. The peak daily collection total (822,687) occurred May 6, just as it did in 2002, 2003 and it was also the peak collection day for yearling chinook the last three years. In 1999, 2000 and 2001 the peak day of collection was also the peak collection day for clipped steelhead. With the exception of the peak collection day, June 16, for unclipped subyearling fall chinook, peak collection days for other species groups occurred between May 6 and May 29 in 2004. There were 18 consecutive days (27 days total) in which the total daily collection exceeded 100,000 fish this season compared to 21 days in 2003. (Table 29 and Figures 23 – 37).

Table 29. Peak collection days at LGR, 1999-2004.

	Yearling Chinook		Subyearling[1] Chinook		Steelhead		Sockeye/Kokanee[2]		Coho	
Year	Clipped	No Clip	Clipped	No Clip[2]	Clipped	No Clip	Clipped	No Clip	All	Total
1996	May 14	April 21	---	July 13	April 27	April 27	May 17	April 2	May 19	April 27
	(31,350)	(9,000)	---	(1,004)	(366,900)	(22,350)	(750)	(910)	(1,650)	(407,550)
1997	April 22	April 22	July 18	July 2	May 2	April 22	July 25	April 22	May 27	May 2
	(13,070)	(5,730)	(2,876)	(480)	(250,146)	(27,821)	(28)	(400)	(150)	(261,350)
1998	May 4	May 3	June 1	July 9	May 4	April 28	May 15	May 15	May 15	May 4
	(70,950)	(19,050)	(60)	(6,210)	(375,900)	(40,220)	(5,550)	(450)	(15,000)	(489,450)
1999	May 9	April 27	July 31	June 9	May 5	May 26	May 29	May 2	May 26	May 5
	(82,650)	(20,877)	(10)	(12,700)	(291,750)	(19,050)	(1,800)	(300)	(8,400)	(353,250)
2000	May 5	April 15	---	July 3	May 7	May 7	May 23	May 28	May 25	May 7
	(171,300)	(18,100)	---	(71,900)	(343,350)	(49,350)	(600)	(300)	(15,600)	(491,250)
2001	May 1	April 30	June 13	July 4	May 16	May 2	May 22	May 17	July 4	May 16
	(122,100)	(34,350)	(4,840)	(80,300)	(338,017)	(72,020)	(450)	(300)	(3,960)	(500,650)
2002	May 6	May 6	June 30	July 21	May 23	May 23	May 19	May 21	May 21	May 6
	(94,333)	(20,166)	(1,833)	(59,457)	(85,900)	(27,000)	(700)	(4,000)	(13,700)	(193,833)
2003	May 6	May 6	May 31	June 22	May 27	May 26	May 30	May 29	May 27	May 6
	(138,657)	(37,761)	(10,149)	(50,500)	(122,687)	(21,200)	(1,493)	(448)	(11,642)	(221,941)
2004	May 6	May 6	May 29	June 16	May 8	May 8	May 23	May 22	May 22	May 6
	(571,642)	(101,642)	(6,418)	(46,100)	(369,552)	(110,896)	(597)	(448)	(21,791)	(822,687)

1Wild chinook, wild steelhead and wild sockeye/kokanee designated in text as unclipped beginning in 2000.
2Hatchery chinook, hatchery steelhead and hatchery sockeye/kokanee designated in text as clipped for 2000-2004.

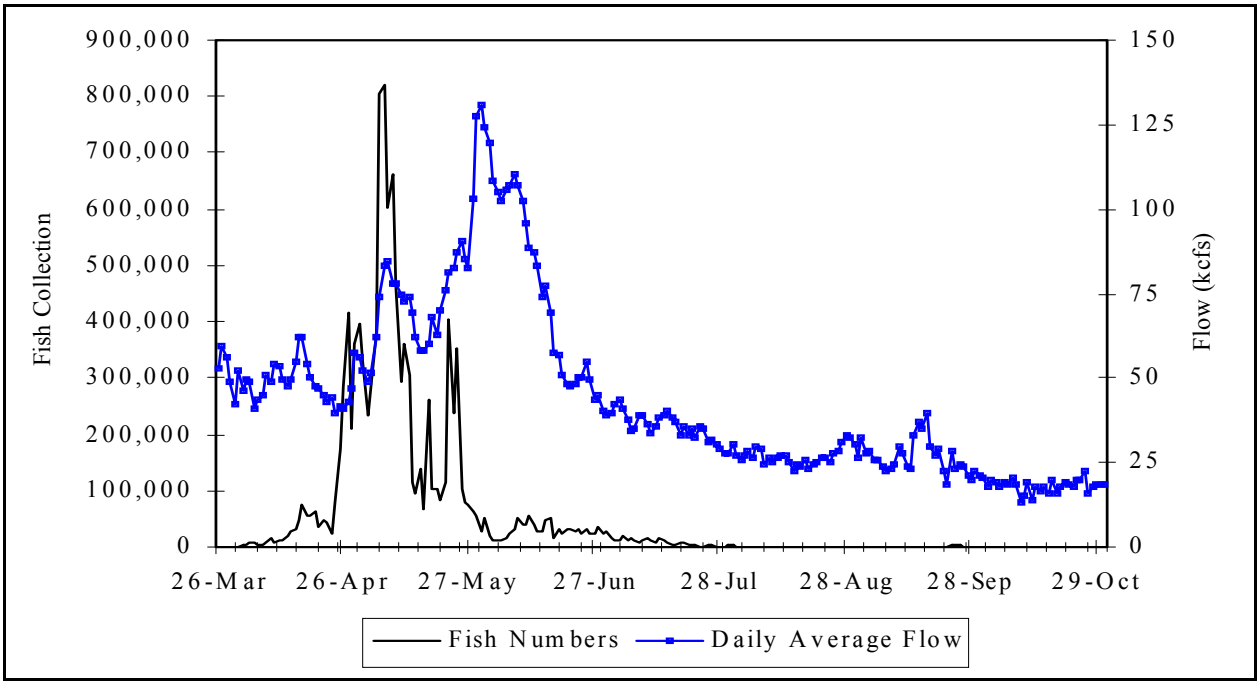

Figure 23. Daily juvenile salmonid collection and river flow at LGR from March 26 through October 31, 2004.

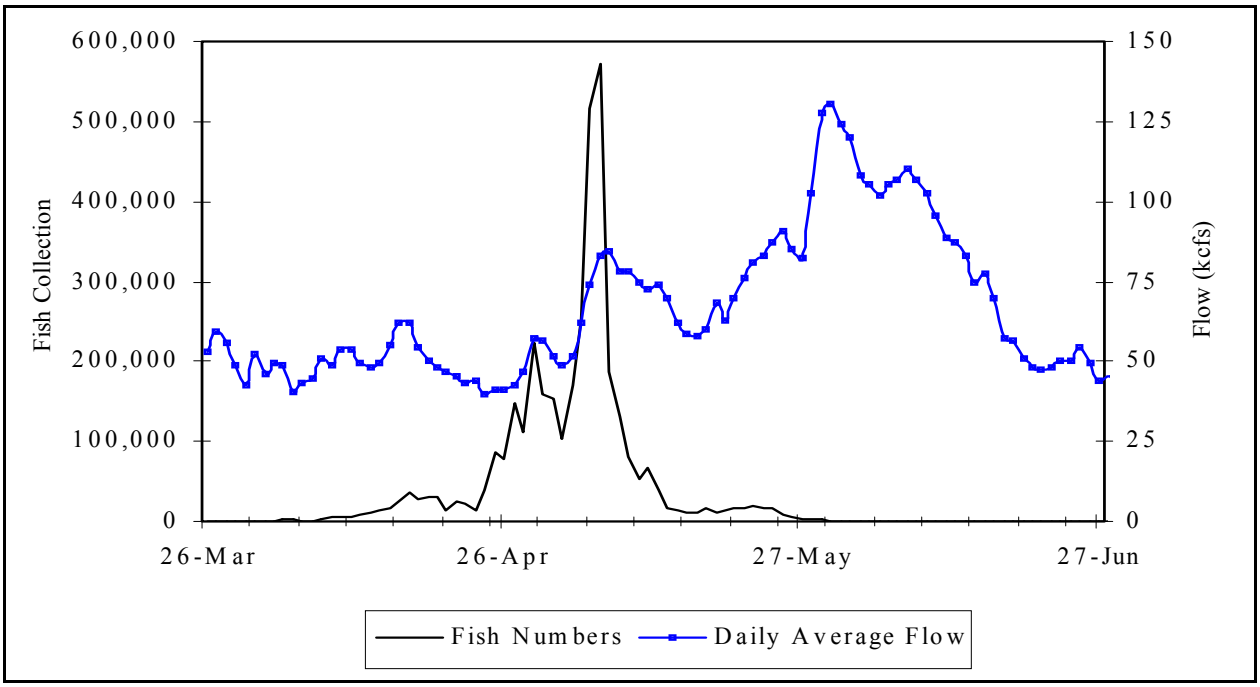

Figure 24. Daily collection of clipped yearling chinook and river flow at LGR from March 26 through June 27, 2004.

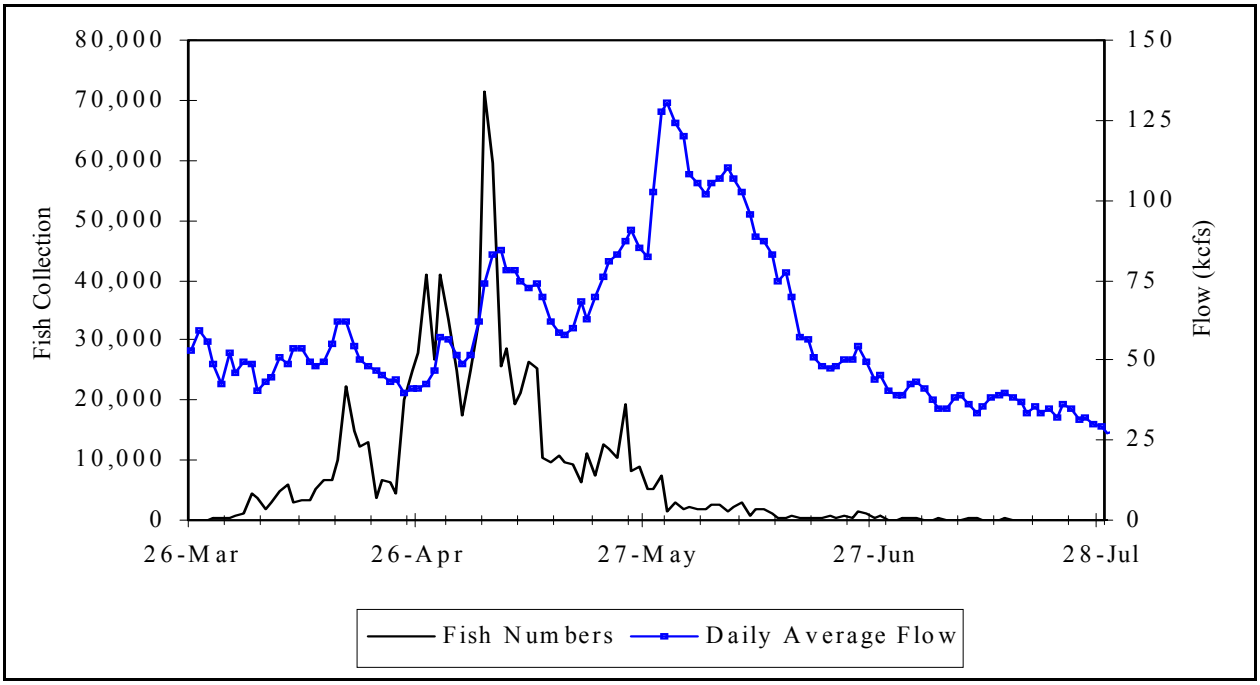

Figure 25. Daily collection of unclipped yearling chinook without CWT and river flow at LGR from March 26 through July 28, 2004.

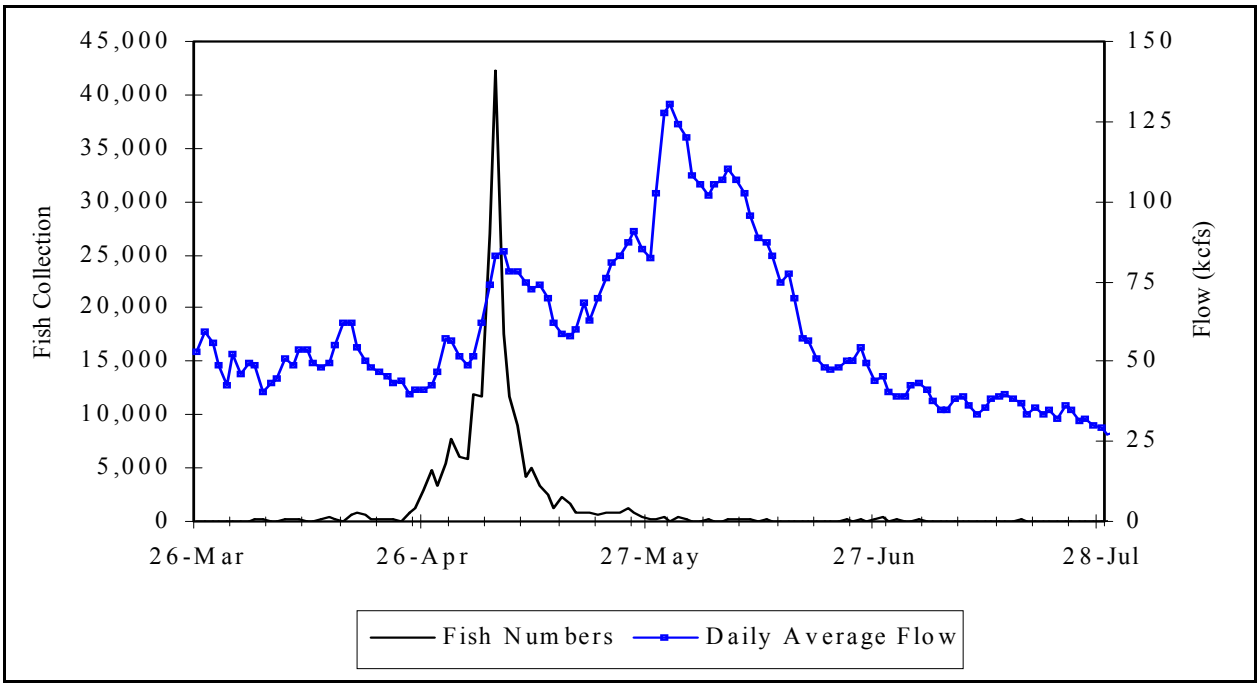

Figure 26. Daily collection of unclipped yearling chinook with CWT and river flow at LGR from March 26 through July 28, 2004.

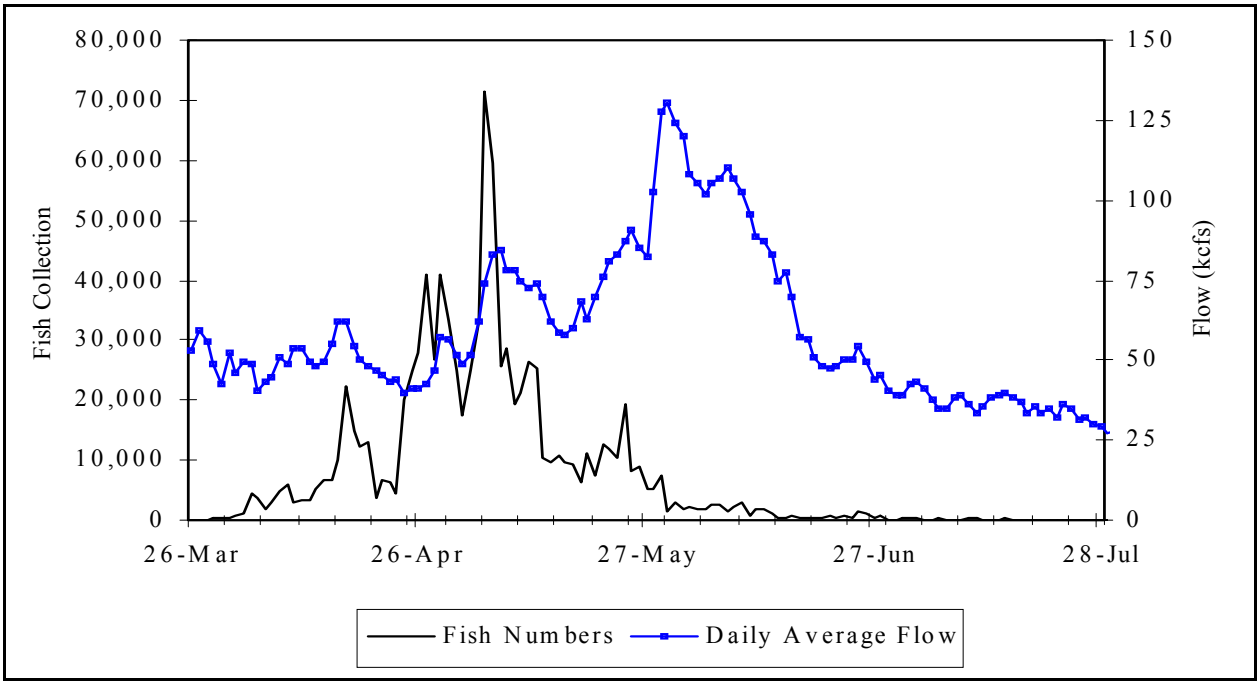

Figure 27. Daily collection of clipped subyearling chinook and river flow at LGR from April 26 through July 28, 2004.

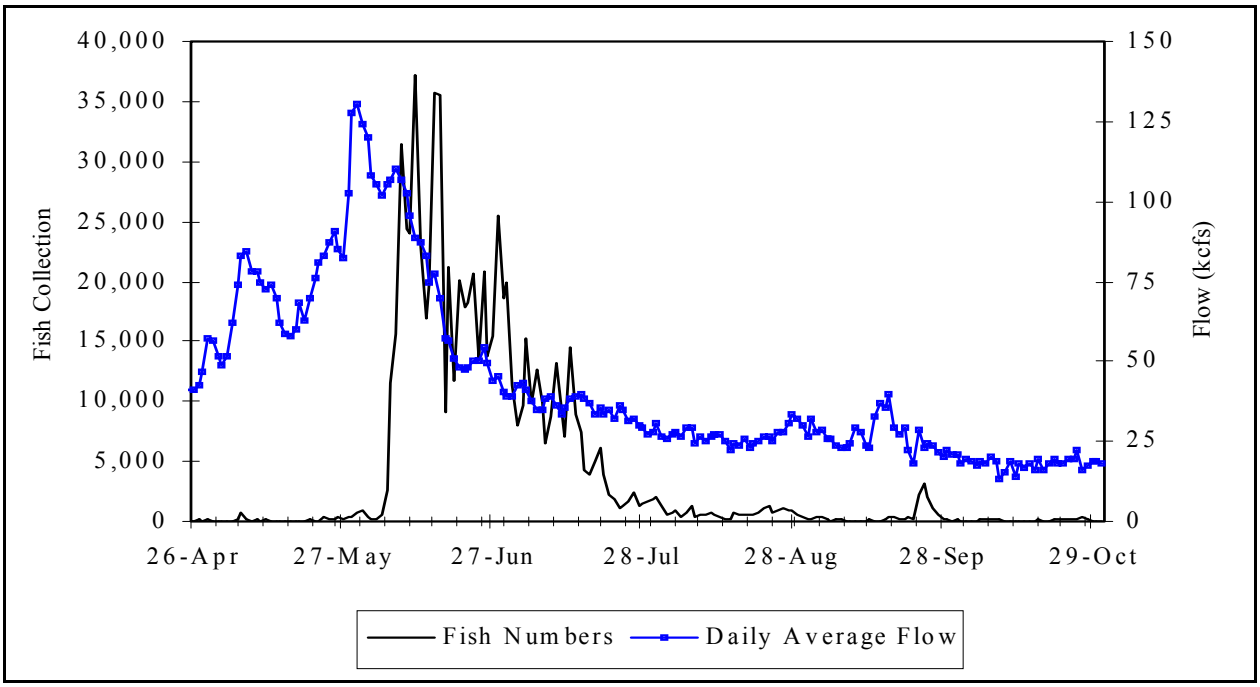

Figure 28. Daily collection of unclipped subyearling chinook without CWT and river flow at LGR from April 26 through October 31, 2004.

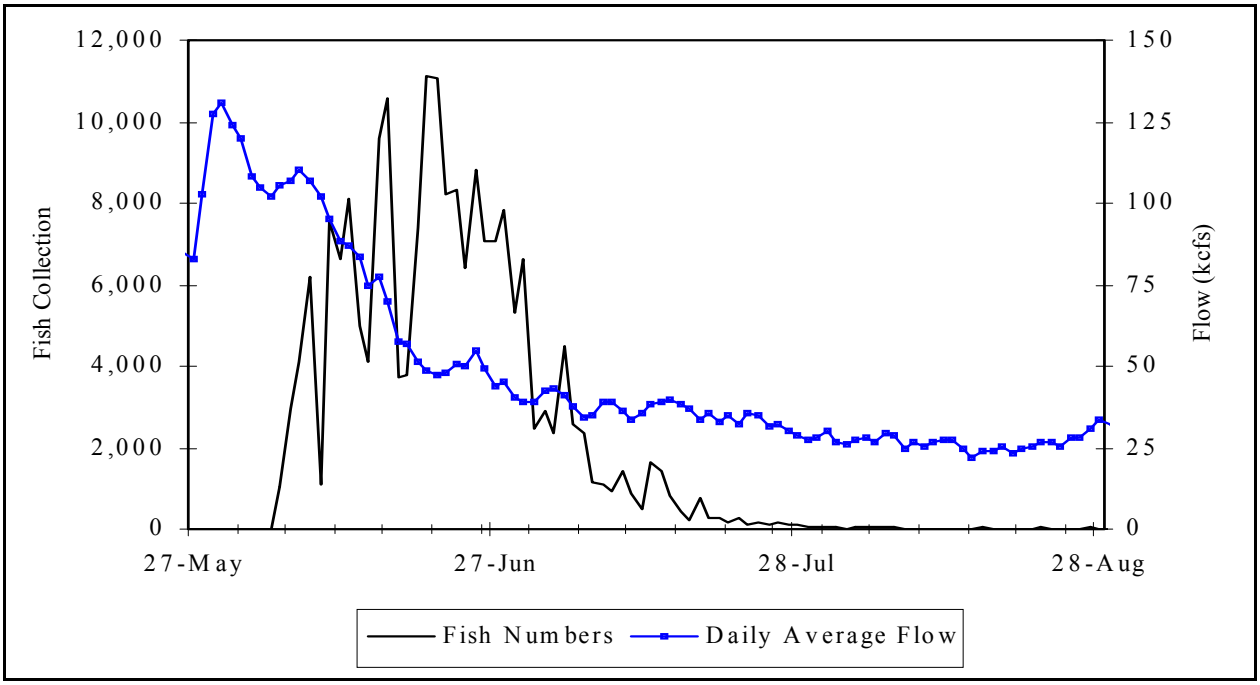

Figure 29. Daily collection of unclipped subyearling chinook with CWT and river flow at LGR from May 27 through Auguts 31, 2004.

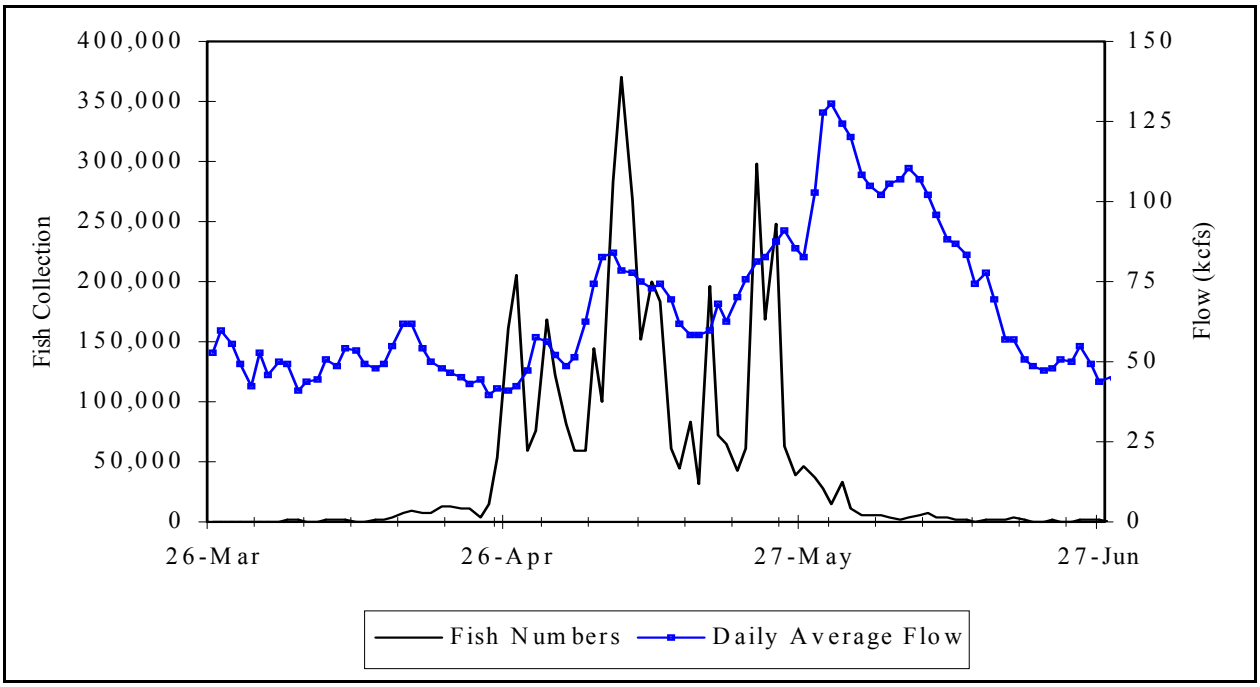

Figure 30. Daily collection of clipped steelhead and river flow at LGR from March 26 through June 27, 2004.

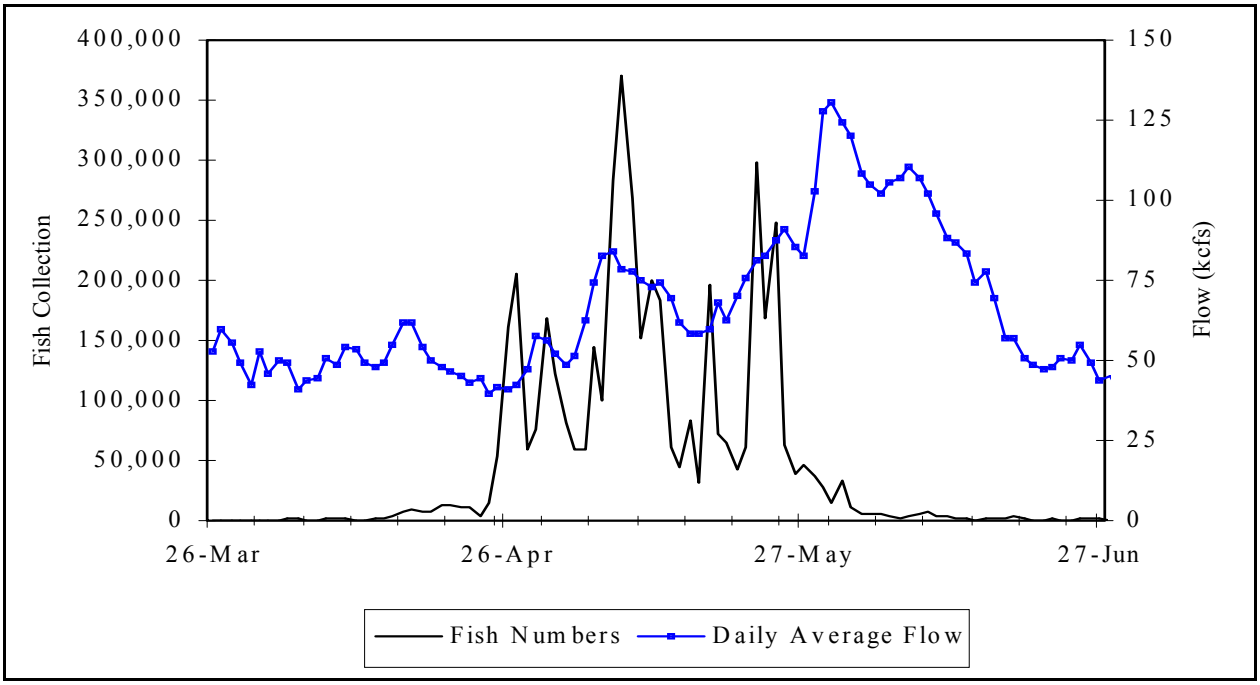

Figure 31. Daily collection of unclipped steelhead without fin erosion and river flow at LGR from March 26 through June 27, 2004.

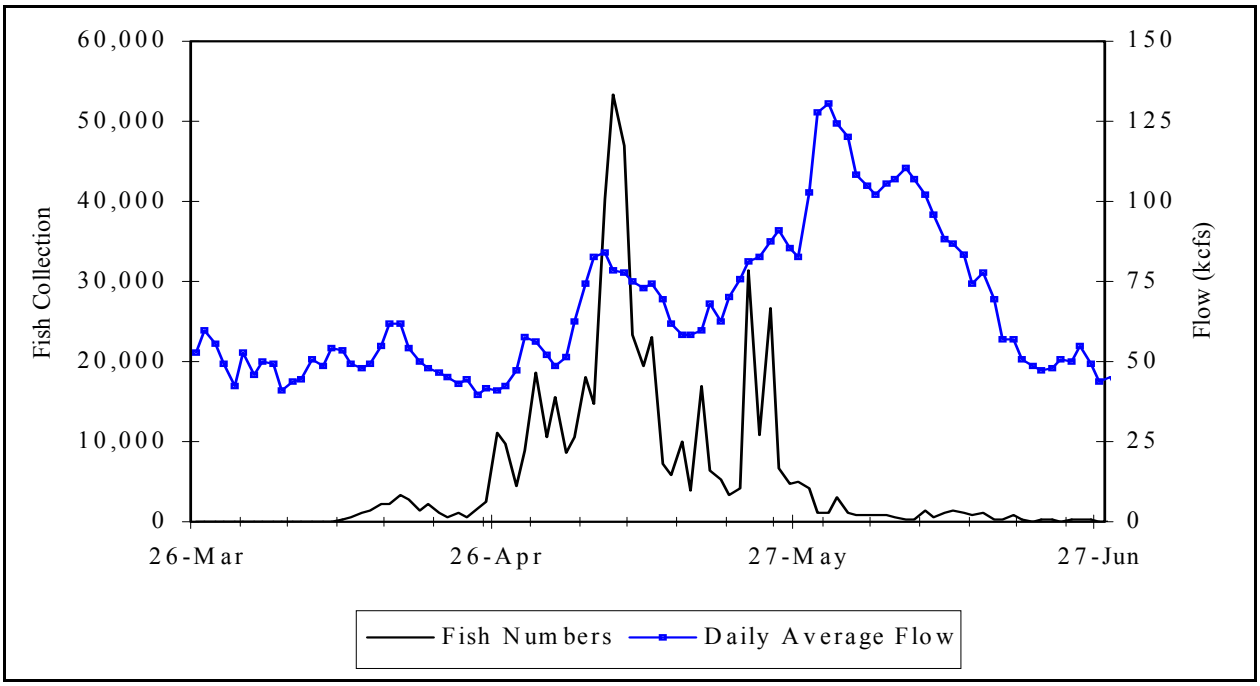

Figure 32. Daily collection of unclipped steelhead with fin erosion and river flow at LGR from March 26 through June 27, 2004.

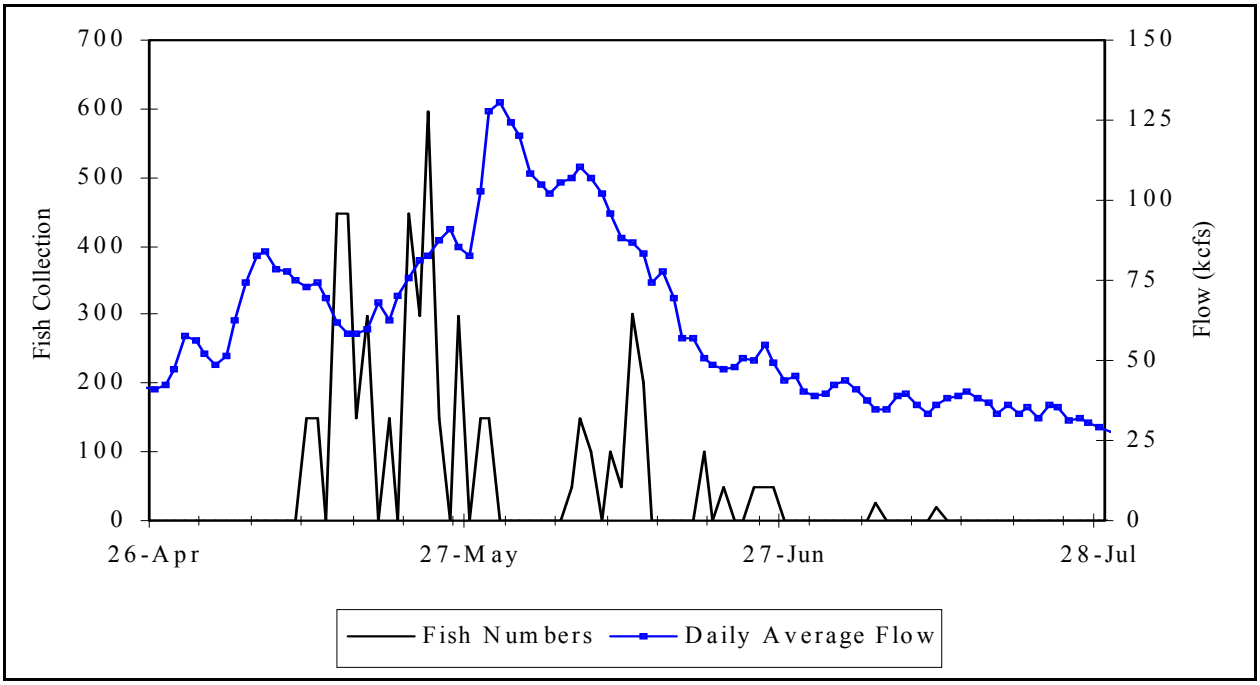

Figure 33. Daily collection of clipped sockeye and river flow at LGR from April 26 through July 28, 2004.

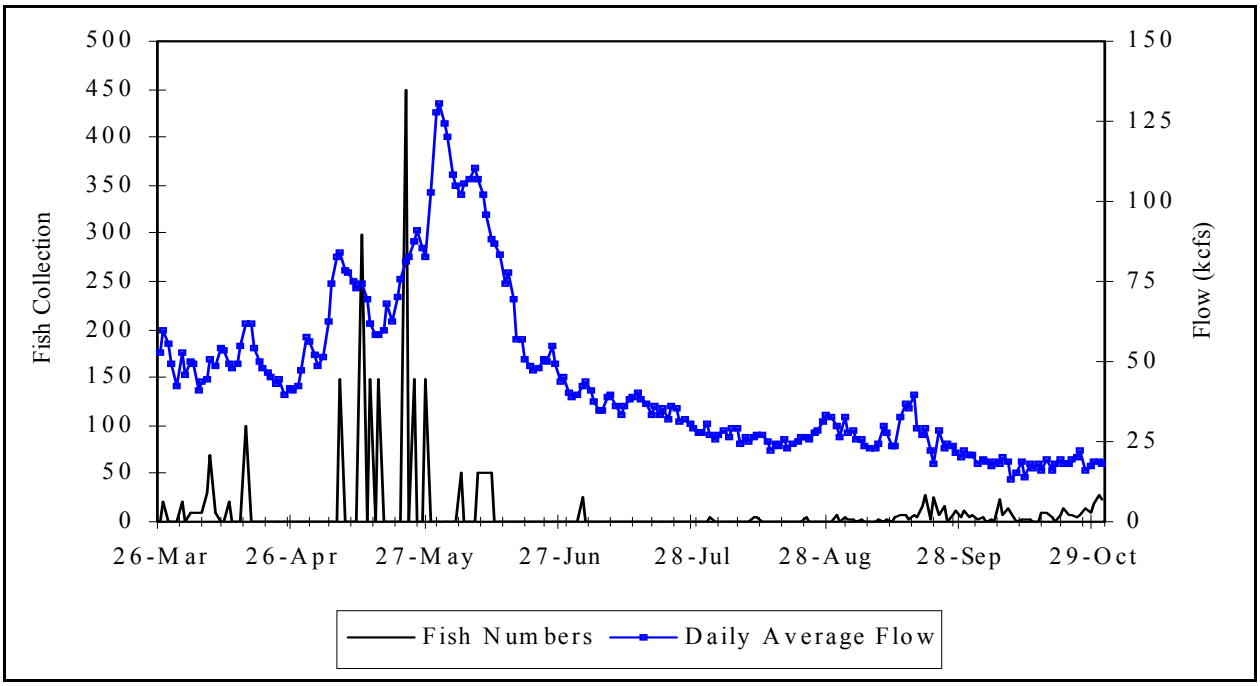

Figure 34. Daily collection of unclipped sockeye and river flow at LGR from March 26 through August 31, 2004.

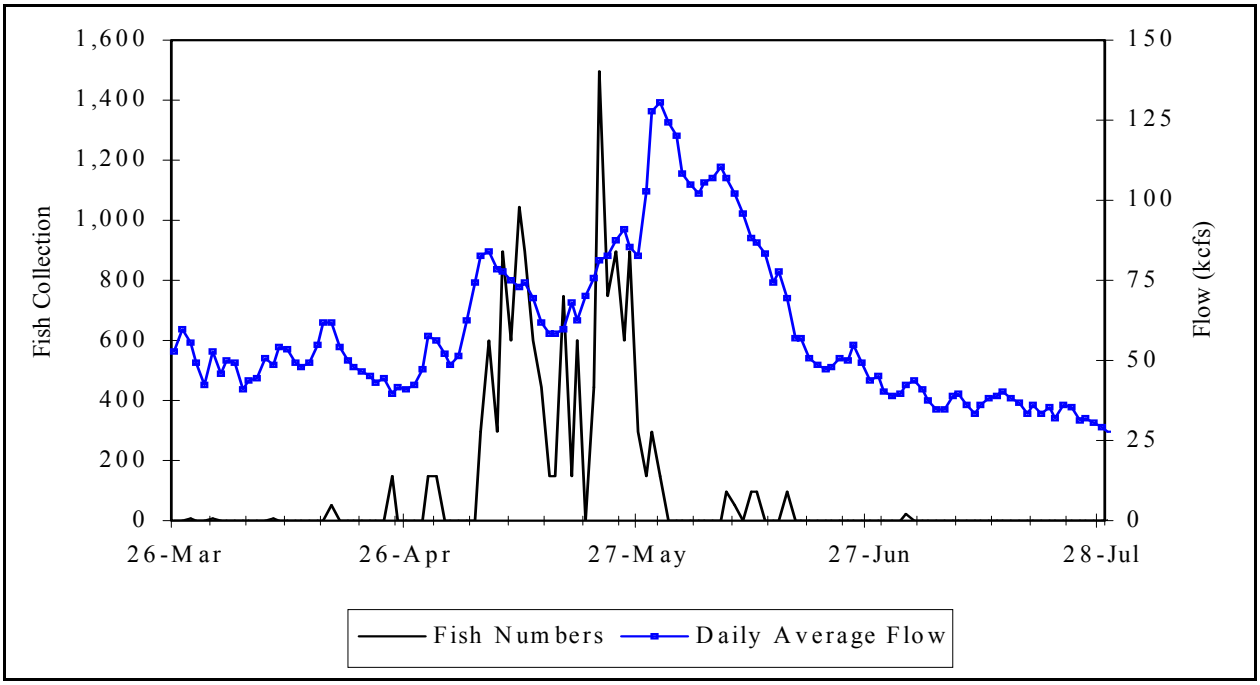

Figure 35. Daily collection of clipped coho and river flow at LGR from March 26 through July 28, 2004.

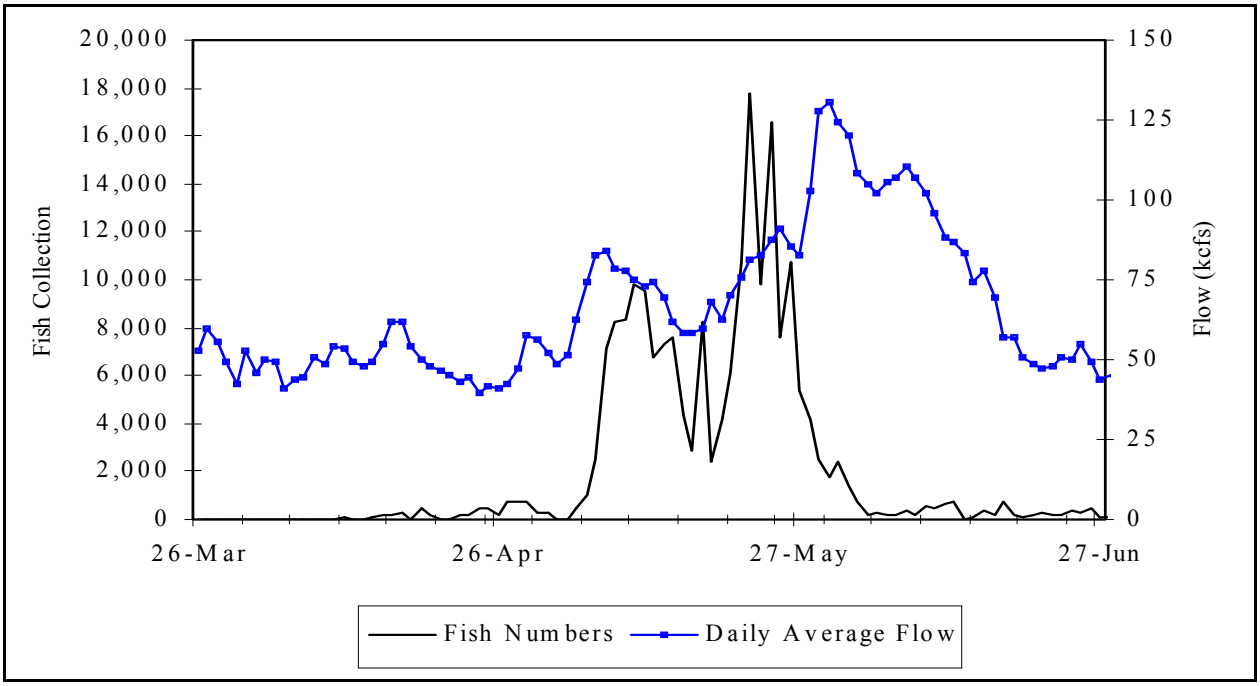

Figure 36. Daily collection of unclipped coho and river flow at LGR from March 26 through July 28, 2004.

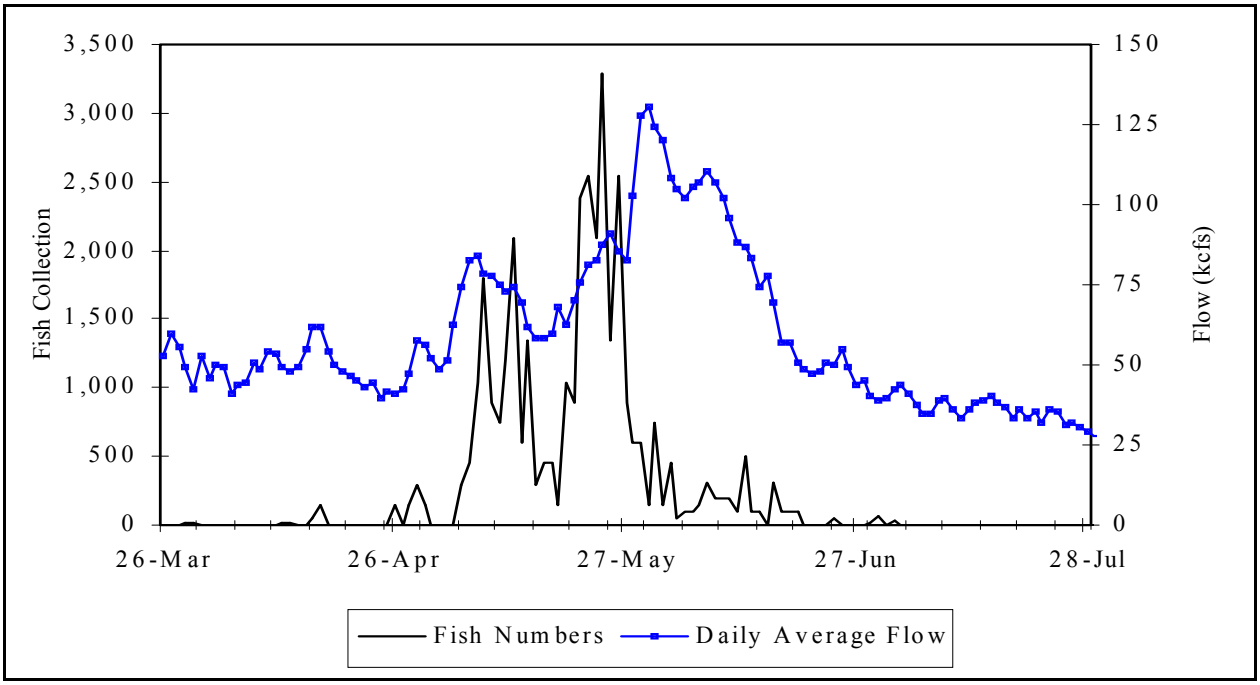

Figure 37. Daily collection of unclipped coho with CWT and river flow at LGR from March 26 through July 28, 2004.

Migration Run Timing

The distribution of daily collection counts for a particular species provides a measure of migration timing for smolts passing LGR (Table 30). Collection efficiency, flow and spill volume influence daily and seasonal collection at the facility. Thus, the 10% and 90% dates are approximations of the middle 80% passage timing for smolts passing LGR. These dates of 10% and 90% passage are based on the cumulative daily collection.

Table 30. Estimated 10%, 50% and 90% passage dates based on cumulative numbers of fish at LGR, 1996-2004.

	Yearling Chinook		Subyearling[1, 2] Chinook		Steelhead		Sockeye/Kokanee		Coho	
	Clipped	No Clip[3]	Clipped	No Clip[3]	Clipped	No Clip	Clipped	No Clip	All	Total
10%										
1996	4/24	4/17	----	6/27	4/24	4/17	5/17	3/30	5/18	4/23
1997	4/22	4/13	6/30	6/22	4/23	4/17	7/18	4/23	5/22	4/22
1998	4/20	4/12	6/1	6/24	4/27	4/25	5/8	5/11	5/6	4/24
1999	4/23	4/17	8/3	6/10	4/22	4/14	5/15	5/20	4/23	4/23
2000	4/22	4/15	----	6/18	4/22	4/18	5/11	4/12	5/12	4/23
2001	4/13	4/6	6/7	6/7	4/23	4/13	5/14	3/27	5/6	4/16
2002	4/18	4/15	6/3	6/25	4/21	4/17	5/16	4/23	5/18	4/19
2003	4/22	4/14	5/31	6/7	4/25	4/19	5/28	4/25	5/18	4/24
2004	4/24	4/17	5/28	6/8	4/26	4/28	5/13	4/14	5/7	4/26
50%										
1996	5/15	4/25	----	8/9	5/15	4/27	6/9	4/4	6/7	5/17
1997	5/3	4/23	7/19	7/18	5/3	4/29	7/29	5/14	6/2	5/3
1998	4/30	5/2	6/7	7/14	5/4	5/5	5/12	5/14	5/15	5/4
1999	5/6	5/1	8/29	7/18	5/7	5/10	5/29	5/2	5/26	5/8
2000	5/4	5/2	----	7/5	5/6	5/7	5/23	5/25	5/24	5/6
2001	5/3	5/5	6/14	7/4	5/9	5/7	5/27	5/18	6/5	5/10
2002	5/6	5/5	6/19	7/16	5/10	5/18	5/21	5/18	5/23	5/14
2003	5/6	5/2	6/13	6/23	5/14	5/17	6/1	5/28	5/27	5/14
2004	5/4	5/4	6/5	6/21	5/9	5/8	5/22	5/21	5/20	5/6
90%										
1996	5/19	5/19	----	8/29	6/26	5/20	6/15	5/16	6/17	5/19
1997	5/20	5/16	8/19	9/18	5/23	5/19	9/17	7/5	6/27	5/25
1998	5/10	5/17	6/17	8/30	5/20	5/23	5/26	5/26	5/29	5/20
1999	5/22	6/2	11/8	8/22	5/30	6/7	6/7	6/9	5/30	5/30
2000	5/13	6/3	----	8/26	5/23	5/24	5/28	9/15	6/3	6/2
2001	5/17	5/25	7/5	8/10	5/26	5/27	6/13	6/12	7/13	6/15
2002	5/20	5/24	6/30	8/11	5/28	5/31	6/10	5/28	6/7	7/6
2003	5/18	5/26	6/27	7/18	5/28	5/30	6/5	6/8	6/15	6/22
2004	5/9	5/21	6/13	7/13	5/23	5/23	6/12	9/28	5/27	5/30

[1] Hatchery subyearling chinook were not present until 1997.

[2] Unclipped hatchery subyearling chinook were indistinguishable from wild subyearling chinook in 1999 - 2004.

[3] Includes unclipped hatchery chinook with CWT in 1999 - 2004.

Passage dates for hatchery reared fish typically reflect release dates. Passage dates for naturally produced smolts reflect many variables including photoperiod, flow and water temperatures. Passage dates for hatchery subyearling fall chinook this season were influenced by the late May, early June release of approximately 1,332,415 unclipped (560,435 cwt) and 176,580 clipped subyearling fall chinook above Lower Granite Dam.

Clipped and unclipped yearling chinook 10% passage dates in 2004 followed the general trend for 1996-2003, with clipped yearling chinook averaging eight days earlier than their unclipped counterpart (Table 30). Since 2001 clipped and unclipped yearling chinook 10% passage dates are becoming later each year. The 2004 10% passage dates for clipped and unclipped yearling chinook were similar to those observed 1996-2000. Clipped and unclipped subyearling chinook 10% passage dates were similar to those observed in 2003, but both 2003 and 2004 10% passage dates were earlier than those observed 1996-2002. The clipped steelhead 10% passage date of April 26 was similar to previous years while the unclipped steehead 10% passage date of April 28 was the latest recorded 1996-2003. Clipped sockeye and unclipped sockeye 10% passage dates were similar to previous years. The coho 10% passage date of May 7 was earlier than in the previous two years (Table 30 and Figure 38).

The 50% passage dates in 2004 was similar to 2003 for clipped and unclipped yearling chinook and earlier for all other species. Clipped and unclipped subyearling chinook continue their trend for earlier 50% passage dates and were the earliest recorded in the years 1996-2003. The overall 50% passage date for all species combined was the earliest recorded since 2000.

The number of days for the middle 80% passage run-timing (35 days) for all species combined in 2004 was 25 days less than in 2003 and 11 days less than 1996-2003 average of 46 days (Table 31). All species 80% passage dates were less than the 1996-2003 average except for clipped and unclipped sockeye. In 2004, clipped yearling Chinook, clipped subyearling Chinook, unclipped subyearling Chinook, unclipped steelhead and coho all had the least number of days recorded for 80% passage compared to 1996-2003 (Figure 38).

The 90% passage dates for all species except sockeye were earlier in 2004 compared to 2003. Clipped yearling chinook had its earliest 90% passage date compared to 1996-2003 and was 11 days earlier than in 2003. The unclipped yearling chinook 90% passage date was its earliest observed since 1998 and was 5 days earlier than in 2003. In all years except 1996 and 1997 the clipped yearling chinook 90% passage date was significantly earlier than that observed for unclipped yearling chinook. Clipped and unclipped subyearling chinook 90% passage dates were the earliest observed in the years 1996-2003 and the clipped subyearling chinook 90% passage date was a month earlier than the unclipped subyearling chinook. The clipped steelhead 90% passage date was the earliest observed since 1998 while the unclipped steelhead 90% passage date was the earliest observed since 2001. The unclipped steelhead 90% passage dates have been much more variable than the clipped steelhead and in all years were much later than those observed for clipped steelhead. Clipped sockeye and unclipped sockeye 90% passage dates were later than observed in 2003. The coho 90% passage date was the earliest recorded in the years 1996-2003, and was 19 days earlier than in 2003. The overall 90% passage date for all species combined was May 30 in 2004, 23 days earlier than observed in 2003 and the earliest recorded since 1999.

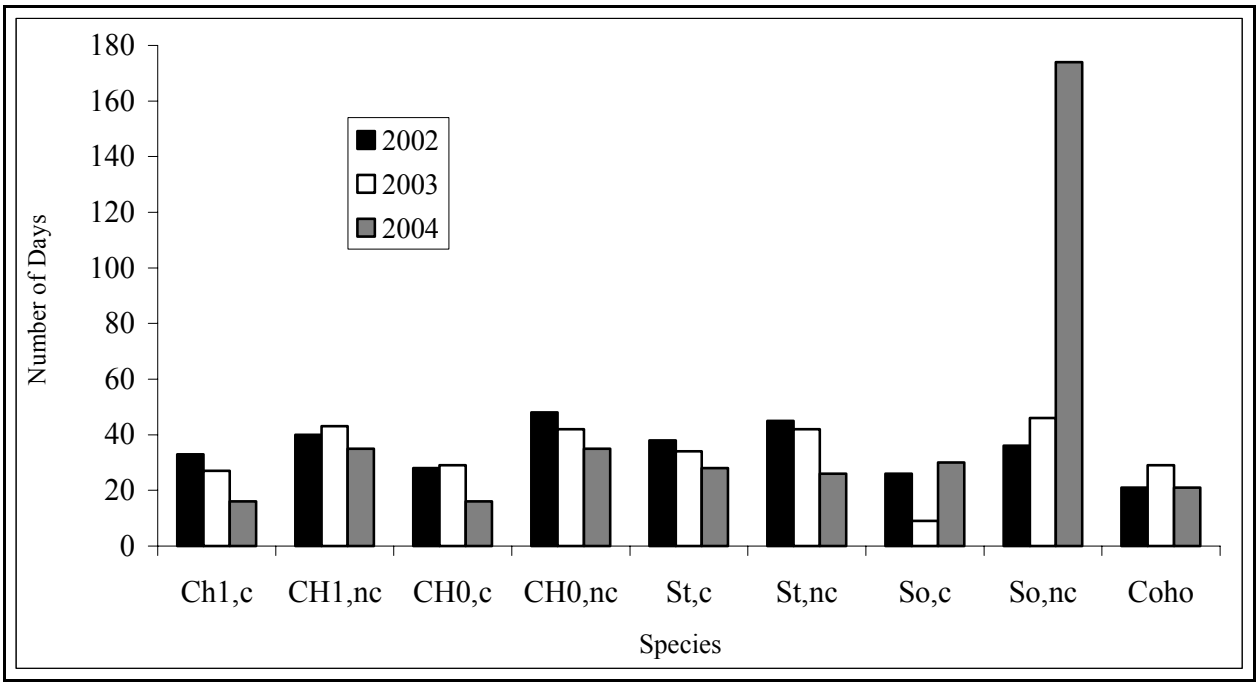

Figure 38. Estimated number of days for the middle 80% passage run-timing based on the 10% and 90% cumulative numbers of fish (by species) at LGR, 2002 through 2004.

Table 31. The estimated number of days for the middle 80% passage at LGR, 1996-2004.

	Yearling Chinook		Subyearling[1, 2] Chinook		Steelhead		Sockeye/Kokanee		Coho	
Year	Clipped	No Clip[3]	Clipped	No Clip[3]	Clipped	No Clip	Clipped	No Clip	All	Total
1996	26	33	----	64	64	34	30	48	31	27
1997	29	34	51	89	30	33	62	74	37	34
1998	21	36	17	68	24	29	19	16	24	27
1999	30	47	98	74	39	55	24	21	38	38
2000	22	50	----	70	32	37	18	157	23	41
2001	35	50	29	65	35	45	31	78	69	61
2002	33	40	28	48	38	45	26	36	21	79
2003	27	43	29	42	34	42	9	46	29	60
2004	16	35	16	35	28	26	30	174	21	35
96-03 avg	28	42	42	65	37	40	27	60	34	46

[1]Hatchery subyearling chinook were not present until 1997.
[2] Unclipped hatchery subyearling chinook were indistinguishable from wild subyearling chinook in 1999 - 2004.
[3]Includes unclipped hatchery chinook with CWT in 1999-2004.

Transportation

An estimated 11,253,837 juvenile salmonids (95.5%) of all fish collected were transported from Lower Granite Dam in 2004 (Table 28) compared to 6,054,167 in 2003. The numbers of fish and the percentages transported of each species group in 2004 included: 3,562,258 clipped yearling chinook (96.5%), 1,110,322 unclipped yearling chinook (96.0%), 33,392 clipped subyearling fall chinook (91.5%), 917,072 unclipped subyearling fall chinook (94.9%), 4,351,868 clipped steelhead (94.9%), 1,032,376 unclipped steelhead (94.7%), 4,906 clipped sockeye/kokanee (94.7%), 2,412 unclipped sockeye/kokanee (95.3%) and 239,231 coho (94.6%).

The COE began the transport season using trucks to transport smolts. As the numbers of collected smolts increased the COE switched to barges and as the numbers declined, resumed using trucks. The first truck left Lower Granite March 27 and every-other-day truck transport continued through April 10. The first barge departed Lower Granite April 12 and every-other-day barge transport continued through April 22. From April 23 through May 30 the Corps barged fish everyday and then every-other-day June 1 through August 16. Every-other-day trucking resumed August 18 and continued until October 31. The 3,500-gallon tanker trailers were used during the early and late-season trucking phase through September 3. The 300-gallon pickup-mounted midi-tanker was brought into use for transport September 5. The 3,500 gallon tanker was used September 23, 25 and 27 due to increased fish numbers. The midi-tanker was used again from September 29 through October 31.

Approximately 89,705 juvenile salmonids, 0.8% of the fish transported in 2004, were transported by truck compared to 96,282 (1.6%) in 2003 (Table 28). The numbers of fish trucked and the percentages of the total transported for each species group in 2004 included: 16,529 clipped yearling chinook (0.5%), 28,140 unclipped yearling chinook (2.5%), no clipped subyearling fall chinook (0.0%), 28,200 unclipped subyearling fall chinook (3.1%), 8,976 clipped steelhead (0.2%), 7,018 unclipped steelhead (0.7%), four clipped sockeye/kokanee (0.1%), 569 unclipped sockeye/kokanee (23.6%) and 269 coho (0.8%).

An estimated 11,164,132 (99.2%) juvenile salmonids were barged from LGR in 2004 (Table 28). The number of fish barged and the percentages of the total transported by species group included: 3,545,729 clipped yearling chinook (96.5%), 1,082,182 unclipped yearling chinook (97.5%), 33,392 clipped subyearling fall chinook (100%), 888,872 unclipped subyearling fall chinook (96.9%), 4,342,892 clipped steelhead (99.8%), 1,025,358 unclipped steelhead (99.3%), 4,902 clipped sockeye/kokanee (99.9%), 1,843 unclipped sockeye/kokanee (76.4%) and 238,962 coho (99.9%).

In addition to the 11,164,132 smolts transported by barge from LGR, another 12,913,015 were loaded onto barges at Little Goose Dam (5,027,085), Lower Monumental Dam (1,306,059) and McNary Dam (6,579,689).

Bypass

Primary bypass at Lower Granite (fish diverted to the river before going over the separator) was initiated March 15 at 1430 hours and continued until 0700 hours on March 25 when collection began. At 0700 hours October 31, the system returned to primary bypass when collection for the transportation program ended. The facility remained in primary bypass until December when the entire bypass system was de-watered for the season. When the facility is in primary bypass mode, no estimates of the number of fish bypassed are made because fish do not pass through the counting system.

During the 2004 collection season an estimated 501,395 juvenile salmonids, 4.3% of the collection, were bypassed from Lower Granite Dam (Table 28). This is nearly four times greater than the 102,340 juvenile salmonids bypassed in 2003. The numbers and percentages of fish bypassed during 2004 by species group included: 110,065 clipped yearling chinook (3.0%), 41,267 unclipped yearling chinook (3.6%), 2,849 clipped subyearling fall chinook (7.8%), 43,589 unclipped subyearling fall chinook (4.5%), 232,510 clipped steelhead (5.1%), 57,478 unclipped steelhead (5.3%), 13,352 coho (5.3%), 255 clipped sockeye/kokanee (4.9%) and 30 unclipped sockeye/kokanee (1.2%).

Most of the bypassed fish were released back to the river when collection numbers exceeded raceway capacity. An estimated total of 417,589 smolts were bypassed in this manner in 2004, 135,663 May 5-7, 121,618 May 9-10, and 163,322 May 23-25.

To reduce loading densities when the fish facility goes to 100% in early fall, steelhead juveniles were bypassed to the river. Steelhead were bypassed to the river this season beginning September 2, the same date as in 2003. In 2002, steelhead were not returned to the river until October 17. A total of 337 clipped and 44 unclipped steelhead were bypassed from September 2 to October 31, the end of the 2004 transportation season.

The PIT tag diversion system was operated in the standard diversion mode (NON-DIVERT during the sample), between March 25 at 0700 hours and July 26 at 1200 hours. During this time, the sample diversion gate overrode the PIT-tag diversion gate and any fish present during a sample diversion gate operation went to the sample holding tank. From July 26 at 1200 hours until the end of the season, the PIT-tag diversion system was set to divert all PIT-tagged fish, overriding the sample diversion gate.

Some fish were also bypassed as a part of on-going research projects at Lower Granite Dam. These fish are not included in the facility bypass numbers. The National Oceanic and Atmospheric Administration (NOAA) Fisheries PIT-tagged and bypassed three unclipped yearling chinook, 2,849 clipped subyearling fall chinook and 43,233 unclipped subyearling fall chinook for their Transportation Study. NOAA Fisheries also PIT-tagged and bypassed 9,311 unclipped yearling chinook, 19,759 clipped steelhead and 8,170 unclipped steelhead for their Survival Study. The United States Geological Survey Biological Research Division (USGS-BRD) radio-tagged and bypassed 99 unclipped subyearling fall chinook.

PIT-tag Diversion

The PIT tag diversion system was operated in the standard diversion mode (non-divert during the sample), between March 25 and 0700 hours and July 26 at 1200 hours. During this time, the sample diversion gate overrode the PIT-tag diversion gate and any fish present during a sample diversion gate operation went to the sample holding tank. From July 26 at 1200 hours until the end of the season, the PIT-tag diversion system was set to divert all PIT-tagged fish, overriding the sample diversion gate. Most of the PIT-tagged fish, detected exiting the separator, were diverted to the river for research purposes. Some were diverted to the raceways to be transported for research purposes. Others missed by the diversion system were sent to either the raceways or the sample tank and transported. An unknown number of non-tagged fish were bypassed by the PIT-tag diversion system along with the tagged fish. Fish bypassed through the PIT-tag diversion system are not included in the facility bypass numbers. The design of the research, for which a group of fish is tagged, determines whether that group of fish is bypassed or transported. Between 1997 and 2002, approximately 63% of the PIT-tagged fish detected at LGR were bypassed and 36% were transported in each year. In 2003 this ratio was reversed, 41% were bypassed to the river and 58% were transported. In 2004 60% of the PIT-tagged smolts were bypassed and 40% were transported, similar to that observed 1997-2002.

According to the PTAGIS database, 177,009 PIT-tagged fish were detected at LGR in 2004, compared to 152,268 in 2003, 95,022 in 2002 and 211,914 in 2001 (Table 32 and 33). Of these, 105,894 (60%) were bypassed through the PIT-tag diversion system, 69,130 (39%) were diverted to the raceways and transported, 1,640 (1%) were diverted to the sample tank (sampled and then transported) and 345 (<1%) were not detected at any of the exit monitors (fish disposition unknown). There were 237 smolts that had PIT-tags classified as orphans in the ptagis database. The total number of fish detected by species at LGR included 98,319 hatchery yearling chinook, 19,499 wild yearling chinook, 12,121 hatchery subyearling chinook, 236 wild subyearling chinook, 3,105 hatchery chinook of unknown race, 6,450 wild chinook of unknown race, three chinook of unknown rearing type or age, 109 unknown rearing type yearling chinook, 22,358 hatchery steelhead, 11,708 wild steelhead, one steelhead of unknown rearing type, 1,754 hatchery coho, 893 hatchery sockeye, 216 wild sockeye and 237 orphans.

The 105,894 PIT-tagged fish bypassed to the river included 43,926 hatchery yearling chinook, 3,044 hatchery chinook of unknown race, 11,726 wild yearling chinook, 4,028 wild chinook of unknown race, three unknown rearing/race type chinook, 11,691 hatchery subyearling chinook, 209 wild subyearling chinook, 64 yearling chinook of unknown race, 21,822 hatchery steelhead, 7,408 wild steelhead, 57 hatchery sockeye/kokanee, two wild sockeye/kokanee, 1,724 hatchery coho and 190 orphans. Another 69,130 PIT-tagged fish were diverted to raceways and transported. This group included 53,454 hatchery yearling chinook, 7,468 wild yearling chinook, 233 hatchery subyearling chinook, 27 hatchery chinook of unknown race, 2,291 wild chinook of unknown race, 45 yearling chinook of unknown race, four wild fall chinook, 351 hatchery steelhead, 4,172 wild steelhead, one steelhead of unknown rear type, 827 hatchery sockeye/kokanee, 209 wild sockeye/kokanee, 17 hatchery coho and 31 orphans.

The 1,640 PIT-tagged fish diverted to the sample tank and transported included 754 hatchery yearling chinook, 176 hatchery subyearling chinook, 29 hatchery chinook of unknown race, 118 wild chinook of unknown rearing, 252 wild yearling chinook, 22 wild subyearling chinook, 13 hatchery coho, 156 hatchery steelhead, 107 wild steelhead, nine hatchery sockeye,

three wild sockeye and one orphan.

Only 345 PIT-tagged fish were not detected at an exit monitor this season: 185 hatchery yearling chinook, 21 hatchery subyearling chinook, five hatchery chinook of unknown race, 53 wild yearling chinook, 13 wild chinook of unknown race, one wild subyearling chinook, 29 hatchery steelhead, 21 wild steelhead, two wild sockeye and 15 orphans. The total of 345 PIT-tagged fish not detected at an exit monitor is lower than the 802 in 2003, 4,519 in 2002 and 2,242 in 2001.

Table 32. Final disposition of PIT-tagged juvenile salmonids detected at LGR in 2004.

	Yearling Chinook			Subyearling Chinook		Unknown Chinook		Unknown Chinook	Steelhead			Sockeye		Coho		
Diversion	Hatch	Wild	Unk	Hatch	Wild	Hatch	Wild	Unk	Hatch	Wild	Unk	Hatch	Wild	All	Orphan	Total
Raceway	53,454	7,468	45	233	4	27	2,291		351	4,172	1	827	209	17	31	69,130
Bypass	43,926	11,726	64	11,691	209	3,044	4,028	3	21,822	7,408		57	2	1,724	190	105,894
Sample	754	252		176	22	29	118		156	107		9	3	13	1	1,640
Unk Exit	185	53		21	1	5	13		29	21			2		15	345
Totals	98,319	19,499	109	12,121	236	3,105	6,450	3	22,358	11,708	1	893	216	1,754	237	177,009

Note: PIT-tagged fish were denoted as hatchery or wild rather than clipped and unclipped.

Table 33. Disposition of PIT-tagged fish detected at LGR, 1996-2004.

Year	Bypass to River		Raceways/Transport		Sample Tank/Transport		Not Detected at Exit		Total
1996	48,934	89.41%	3,719	6.80%	1,392	2.54%	686	1.25%	54,731
1997	46,691	59.29%	28,564	36.28%	1,803	2.29%	1,686	2.14%	78,744
1998	81,000	59.76%	50,126	36.98%	1,683	1.24%	2,729	2.01%	135,538
1999	47,574	59.98%	29,251	36.88%	1,359	1.71%	1134	1.43%	79,318
2000	62,409	61.90%	34,437	34.15%	1,287	1.28%	2,696	2.67%	100,829
2001	130,825	61.40%	75,684	35.52%	4,294	2.02%	2,272	1.07%	213,075
2002	57,920	60.95%	29,933	31.50%	2,650	2.79%	4,519	4.76%	95,022
2003	62,122	40.80%	87,119	57.21%	2,225	1.46%	802	0.53%	152,268
96-03 ave.	67,184	59.10%	42,354	37.25%	2,087	1.84%	2,066	1.82%	113,691
2004	105,894	59.82%	69,130	39.05%	1,640	0.93%	345	0.20%	177,009

PIT-tag Detections

A total of 70,770 PIT-tagged fish were sent to raceways or the sample tank. We scanned all sample mortalities and raceway mortalities for the presence of PIT-tags and reported these to PTAGIS since 1998. We found 183 mortalities (0.26% of the 70,770 PIT-tagged fish that entered raceways or the sample tank) to have PIT-tags compared to 346 of 89,344 (0.39%) in 2003. The PIT-tagged fish mortality rate of 0.26% in 2004 is lower than the 1998-2003 average of 0.31% (Table 34). PIT-tagged fish mortality rates at LGR showed similar trends when compared to the overall facility mortality rates. PIT-tagged fish mortality rates were higher than the total facility mortality rate in all years examined except for 2000 and 2003–2004.

Table 34. Sample and raceway PIT-tag mortality at LGR, 1998-2004.

Year	Number of PIT-tag Mortalities	No. of PIT-tags Detected in Sample and Raceways	PIT-tag Mortality (%) in Sample and Raceways	Facility Mortality (%) (Comparison)
1998	117	51,809	0.23%	0.16%
1999	173	30,610	0.57%	0.28%
2000	7	35,724	0.02%	0.09%
2001	168	79,978	0.21%	0.13%
2002	186	32,583	0.57%	0.34%
2003	346	89,344	0.39%	0.43%
98-03 ave.	166	53,341	0.31%	0.22%
2004	183	70,770	0.26%	0.27%

All fish removed from the separator during the GBT monitoring program were scanned for PIT-tags. PIT-tagged fish were not examined for GBT but placed in fresh water and allowed to recover from the anesthesia before being returned to the separator. All PIT-tag codes were stored in a scanner and recorded on a form with species, rearing type and hatchery mark information. Daily PIT-tag records were combined into one tagging file and sent to PTAGIS (GBT Sample Summary). A total of six clipped yearling chinook with PIT-tags fish were netted during GBT sampling and are listed in Table 24.

We have also reported the PIT-tag detections at LGR when the sample rate is set at 100%. A total of 52 smolts were detected by the PIT-tag system between 0600 hours September 1 and 0600 hours September 23 and between 0600 hours October 1 and 0600 hours October 31, when the sample rate was at 100%. Of these, 45 were hatchery fall chinook released by the Nez Perce Tribe (NPT) into the Clearwater River, two were wild unknown chinook released by the United States Fish and Wildlife Service into the Snake River (km 224-303), two were hatchery spring chinook released by the NPT into Meadow Cr., one wild spring chinook released by Idaho Fish and Game (IDFG) at the Crooked River Trap, one hatchery summer steelhead released by IDFG into Yankee Fork and one hatchery spring chinook released by IDFG from Powell Rearing Pond (Table 35).

Table 35. Records of PIT-tagged fish detected in daily samples at LGR between 0600 hours September 1 and 0600 hours October 31 with 100% sample rate.

Organization	Tag Site	Release Date	Release Site	Run	Rearing and Species	Number
NPT	CLWR	6/15-7/27/04	CLWR	Fall	Wild Chinook	45
NPT	NPTH	6/16-6/22/04	Meadow Cr.	Spring	Hatchery Chinook	2
USFWS	Snake3	6/1-6/29/04	Snake3	Unknown	Wild Chinook	2
IDFG	CROTRP	5/19/04	CROTRP	Spring	Wild Chinook	1
IDFG	HAGE	5/10/04	YANKFK	Summer	Hatchery Steelhead	1
IDFG	POWP	9/25/04	POWP	Spring	Hatchery Chinook	1
					Total	52

Abbreviations: NPT-Nez Perce Tribe, USFWS-United States Fish and Wildlife Service, IDFG-Idaho Fish and Game, CLWR-Clearwater River, NPTH-Nez Perce Tribal Hatchery, Snake3-Clearwater River to Salmon River (km 224-303), CROTRP-Crooked River Trap, HAGE-Hagerman National Fish Hatchery, POWP-Powell Rearing Pond, YANKFK-Yankee Fork.

In the weekly LGR task order reports prepared for the Corps of Engineers we reported the number of PIT-tagged smolts detected at LGR by species, race type, rear type, release dates, release site, tag site and tagging organization. We summarized these observed detections at LGR by species, rear type (hatchery or wild), run type (spring, summer or fall), tag site and release site groups by week, Friday-Thursday. We combined detections for common tagging sites with different release sites. Typically, these are hatchery tag sites that had several release sites and wild fish tagged and released in different reaches of the same river or creek. PIT-tagged smolts detected at LGR identified as unknown race, rear type, or as orphans in the data download from PITAGIS were not included in these summaries.

The number of fish collected in 2004 was the highest recorded at LGR because there was very little spill, so higher rates of detection were observed for nearly all groups of PIT-tagged fish. In 2001, very low flows and no spill occurred at LGR which also resulted in high rates of detections. In 2002 and 2003, flows were higher and the project spilled water for fish passage throughout the spring migration to test and evaluate the removable spillway weir. All PIT-tag release groups are summarized in Appendix 2.

Hatchery Yearling Spring Chinook

The largest number of PIT-tagged hatchery yearling spring chinook detected at LGR during the 2004 sampling season originated from fish tagged at five hatcheries. These hatcheries were Lookingglass, Rapid River, Dworshak, Clearwater and Kooskia, respectively. Lookingglass Hatchery PIT-tagged smolts accounted for the most PIT-tagged hatchery yearling spring chinook detected at LGR (25,348) followed by 22,598 from Rapid River Hatchery, 21,232 from Dworshak Hatchery, 648 from Clearwater Hatchery and 524 from Kooskia Hatchery.

More than 99 % of the PIT-tagged fish from these five hatcheries were detected by week 9 in 2004. In 2003, more than 99 % of the PIT-tagged fish from these hatcheries were detected by week 11, slightly later than observed in 2004. These hatchery groups of PIT-tagged smolts had more fish detected in 2004 during their peak week of detections than those observed in 2002 and 2003. For example, in 2004, 52.4% of the Rapid River PIT-tagged smolts were detected during their peak week of detections, 28.6%in 2003, 50.1% in 2002 and 59.8% in 2001.

All five groups of PIT-tagged hatchery spring chinook detections peaked during week 5 (Figures 39-43). In 2003 peak detections occurred during week 6 for Lookingglass, Rapid River

and Dworshak hatcheries and during week 5 for Clearwater and Kooskia hatcheries (Table 36). In 2004 all hatchery release groups showed a large single peak week of detections to LGR compared to 2003 when detection rates peaked at lower levels and had two or more weeks of similar peak detections. Rapid River and Dworshak Hatchery PIT-tagged smolts showed a large single peak week of detection in 2001 and 2002. Lookingglass, Clearwater and Kooskia Hatchery PIT-tagged smolts showed fewer detections during the peak weeks and had two or more weeks of similar peak detections in 2001-2003 unlike the large single peak week of detections observed in 2004.

PIT-tag detection rates for each release group was greater than those observed in 2002 and 2003 but were still lower than the detection rates observed during 2001's no spill year (Table 36).

Table 36. PIT-tagged hatchery spring chinook release groups at LGR, 2001-2004.

Hatchery	Peak Week	Peak Date	% Detected During the Peak Week	Total Released	Total Detected	Percent Detected
2001						
Rapid River	5	April 27-May 3	59.8	55,091	29,399	53.4
Dworshak	5	April 27-May 3	52.3	55,142	28,989	52.6
Lookingglass	7	May 11-17	37.3	42,000	21,732	51.7
Clearwater	5	April 27-May 3	63.8	1,657	962	58.1
Kooskia	5	April 27-May 3	33.7	749	306	41.0
2002						
Rapid River	6	May 3-9	50.1	183,924	27,811	15.1
Dworshak	6	May 3-9	40.6	54,725	6,526	11.9
Lookingglass	8	May 17-23	33.7	42,000	7,445	17.7
Clearwater	6	May 3-9	30.0	3,671	260	7.1
Kooskia	8	May 17-23	35.9	1,500	167	11.1
2003						
Rapid River	6	May 2-8	28.6	184,475	42,511	23.0
Dworshak	6	May 2-8	19.3	54,705	10,782	19.7
Lookingglass	6	May 2-8	26.7	42,000	10,360	24.7
Clearwater	5	April 25-31	28.9	4,820	713	14.8
Kooskia	5	April 25-31	26.4	1,501	277	18.5
2004						
Rapid River	5	April 30-May 6	52.4	51,969	22,598	43.5
Dworshak	5	April 30-May 6	49.1	51,616	21,232	41.1
Lookingglass	5	April 30-May 6	52.5	64,506	25,348	39.3
Clearwater	5	April 30-May 6	49.7	2,396	648	27.1
Kooskia	5	April 30-May 6	37.8	1,505	524	34.8

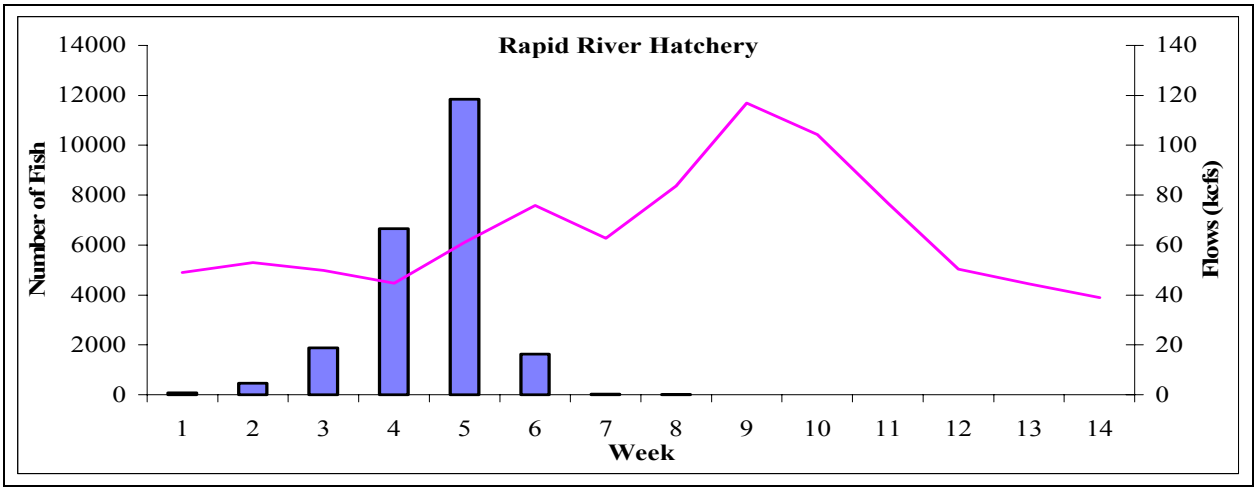

Figure 39. Number of PIT-tagged Rapid River Hatchery spring chinook detected by week and flows at LGR, 2004.

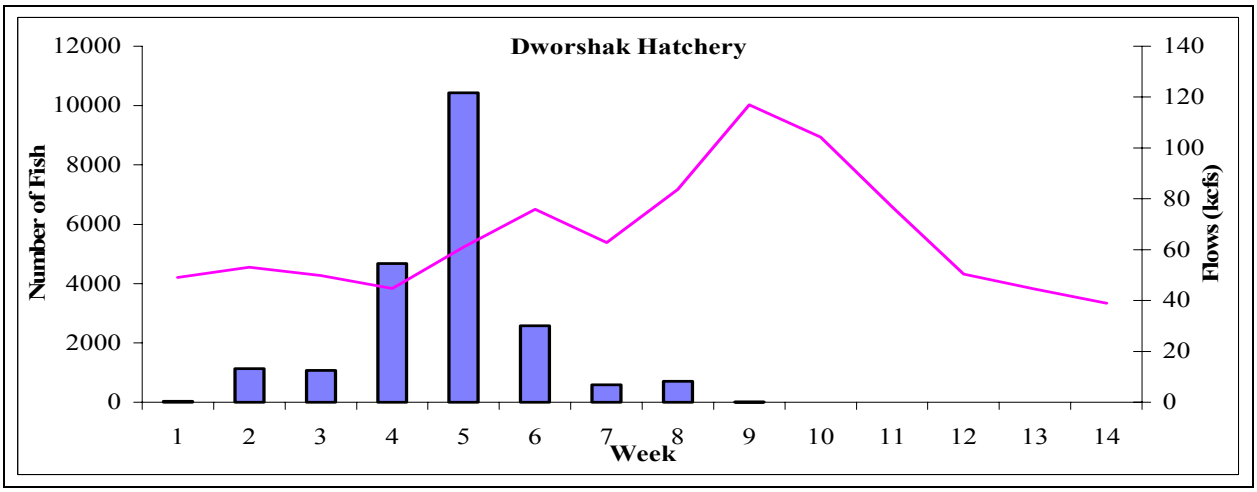

Figure 40. Number of PIT-tagged Dworshak Hatchery spring chinook detected by week and flows at LGR, 2004.

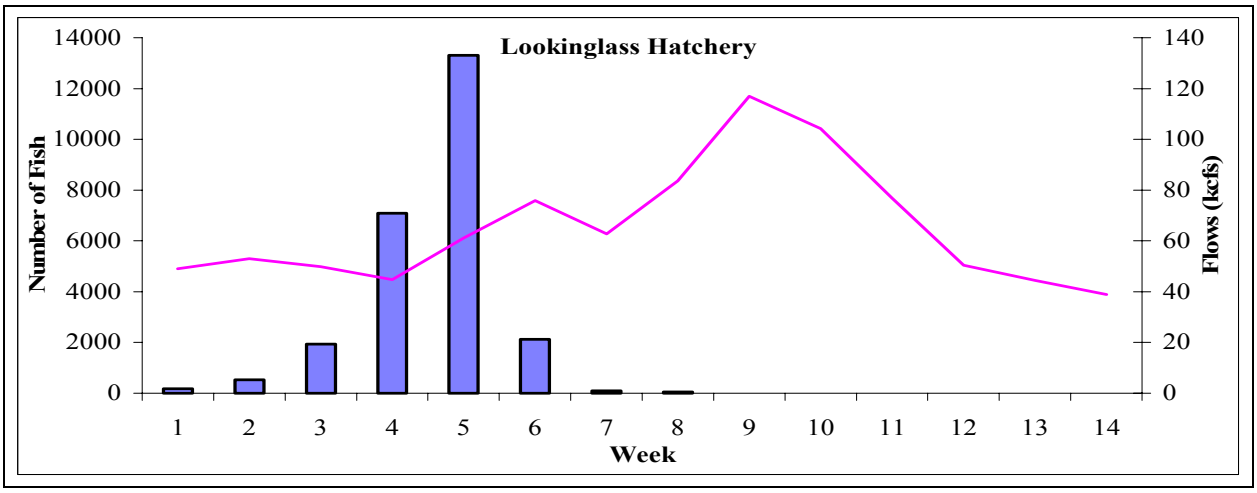

Figure 41. Number of PIT-tagged Lookinglass Hatchery spring chinook detected by week and flows at LGR, 2004.

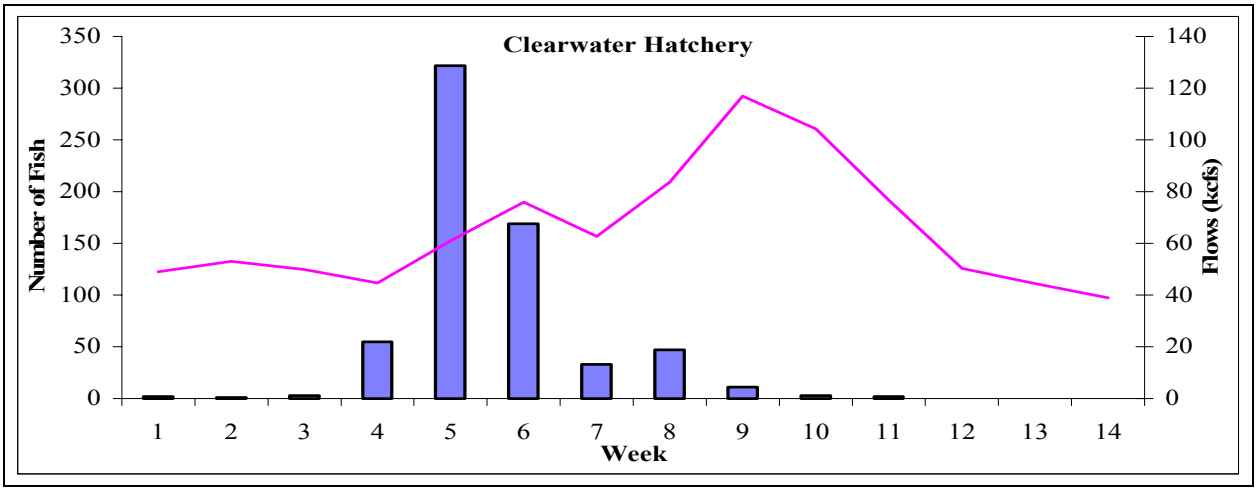

Figure 42. Number of PIT-tagged Clearwater Hatchery spring chinook detected by week and flows at LGR, 2004.

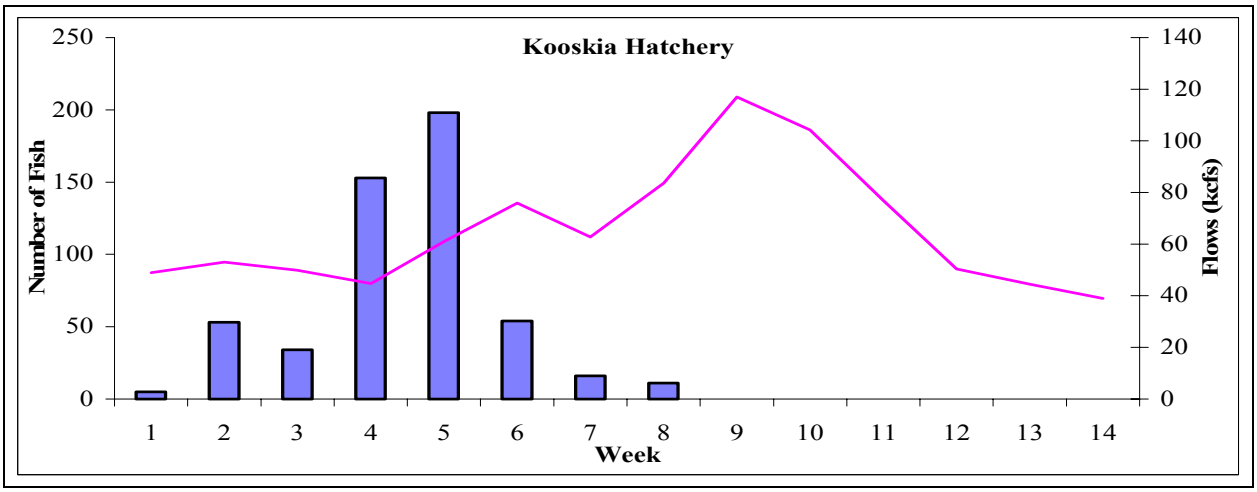

Figure 43. Number of PIT-tagged Kooskia Hatchery spring chinook detected by week and flows at LGR, 2004.

Wild Yearling Spring Chinook

Wild yearling spring chinook collected and PIT-tagged at traps and in streams typically have the same tag site and release site and we grouped these by tagging site. Depending upon the trap location or stream site where the fish were tagged, the tagged chinook may represent stock components from one or more tributaries upstream of the tagging site.

More than 10,512 PIT-tagged wild yearling spring chinook were detected at Lower Granite Dam this season originating from 42 tagging sites compared to 5,540 PIT-tagged wild yearling spring chinook detected from 47 tagging sites in 2003 and 2,972 PIT-tagged wild yearling spring chinook detected from 32 tagging sites in 2002. Most of the detections this year originated from juveniles tagged at the Grande Ronde Trap (1,628), Sawtooth Trap (1,297), Marsh Cr. Trap (1,007), Lolo Creek (712), and Lemhi River Weir (673). Detections of PIT-tagged wild spring chinook from the Grande Ronde Trap peaked week 5, Sawtooth Trap peaked week 6, Lolo Creek peaked week 8, Lemhi River Weir peaked week 4 and Marsh Cr. Trap

peaked week 6 (Figures 44-48). Each of these groups peaked slightly earlier than in previous years and did not appear to coincide with peak flows. More than 99% of all detections for these groups were recorded by the end of week 16, similar to previous years.

The different groups of tagged wild spring chinook peaked as early as week 4 (Lemhi River Weir) and as late as week 8 (Lolo Cr.) while PIT-tagged hatchery spring chinook detections peaked during week 5. These same trends were observed in previous years. More PIT-tagged fish were detected from these groups in 2004 than in previous years and each group had a higher percent of PIT-tagged fish detected at LGR than in 2003 (Table 37).

Table 37. PIT-tagged wild spring chinook release groups at LGR, 2001-2004.

Tag Site	Peak Week	Peak Date	% Detected During the Peak Week	Total Released	Total Detected	Percent Detected
2001						
Grand Ronde Trap	5	April 27-May 3	36.7			
Sawtooth Trap	7	May 11-17	34.2	1,589	389	24.5
Lolo Cr.	10	June 1-7	17	1,396	311	22.3
Lemhi R. Weir	6	May 4-10	38.2	1,593	424	26.6
Marsh Cr. Trap	6	May 3-9	100	60	1	1.7
2002						
Grande Ronde Trap	3	April 12-18	30.1	1,336	286	21.4
Sawtooth Trap	8	May 17-23	34.1	3,357	214	6.4
Lolo Cr.	12	June 14-20	16.2	2,986	247	8.3
Lemhi R. Weir	14	June 28-July 4	24.2	1,565	293	18.7
Marsh Cr. Trap	8	May 17-23	26.8	1,854	142	7.7
2003						
Grande Ronde Trap	4	April 18-24	21.7	2669	861	32.3
Sawtooth Trap	9	May 23-29	33.7	6418	754	11.8
Lolo Cr.	11	June 6-12	31.0	3335	449	13.5
Lemhi R. Weir	5	April 25-May 1	27.5	3332	262	7.9
Marsh Cr. Trap	9	May 23-29	17.7	4122	356	8.6
2004						
Grande Ronde Trap	5	April 30-May 6	25.3	3,103	1,628	52.5
Sawtooth Trap	6	May 7-13	26.5	7,099	1,297	18.3
Lolo Cr.	8	May 21-27	34.3	2,583	712	27.6
Lemhi R. Weir	4	April 23-29	25.6	4,060	673	16.6
Marsh Cr. Trap	6	May 7-13	18.9	6,099	1007	16.5

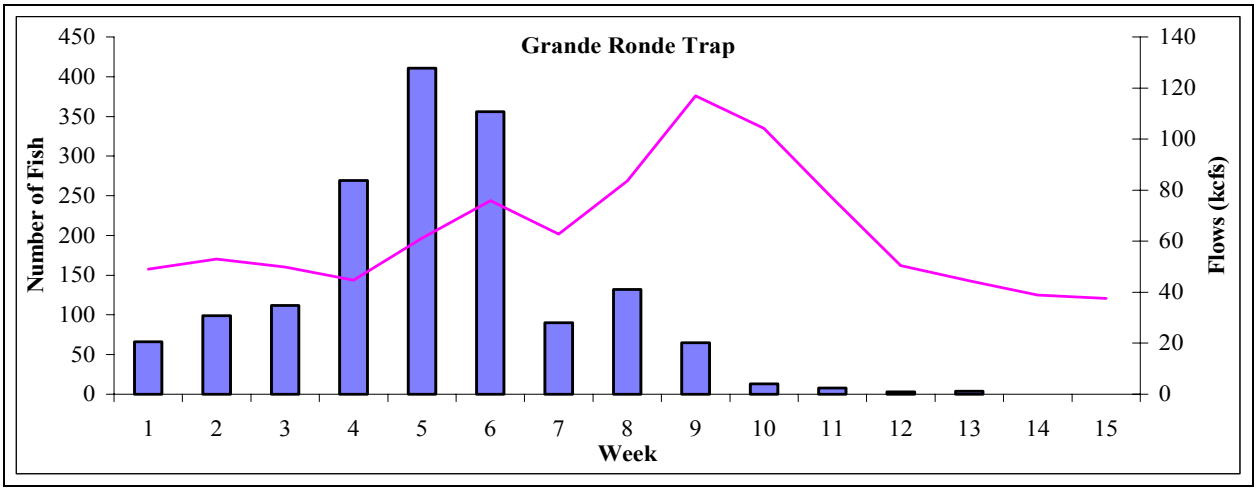

Figure 44. Number of PIT-tagged Grande Ronde Trap wild spring chinook detected by week and flows at LGR, 2004.

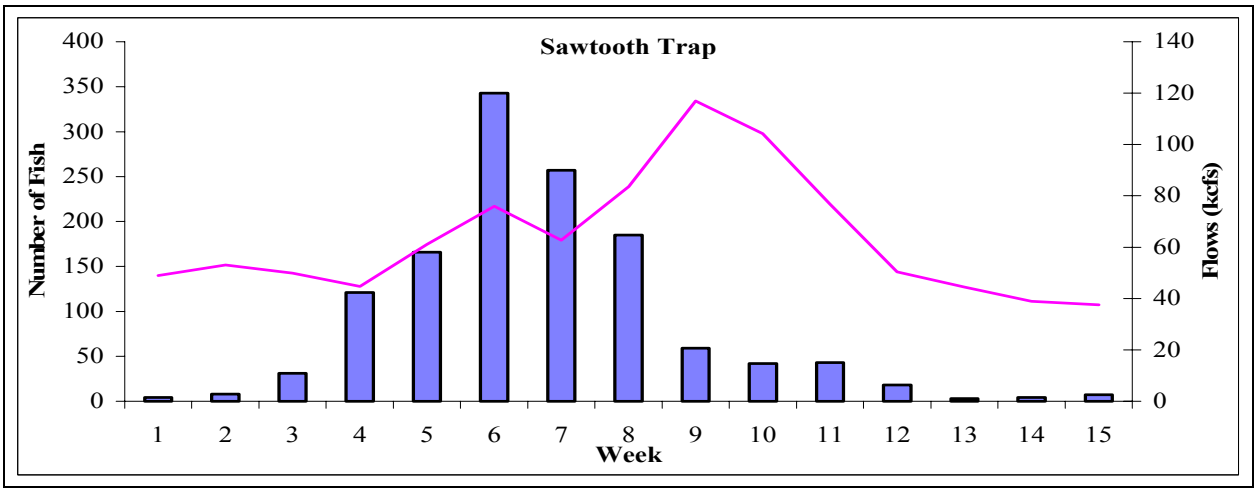

Figure 45. Number of PIT-tagged Sawtooth Trap wild spring chinook detected by week and flows at LGR, 2004.

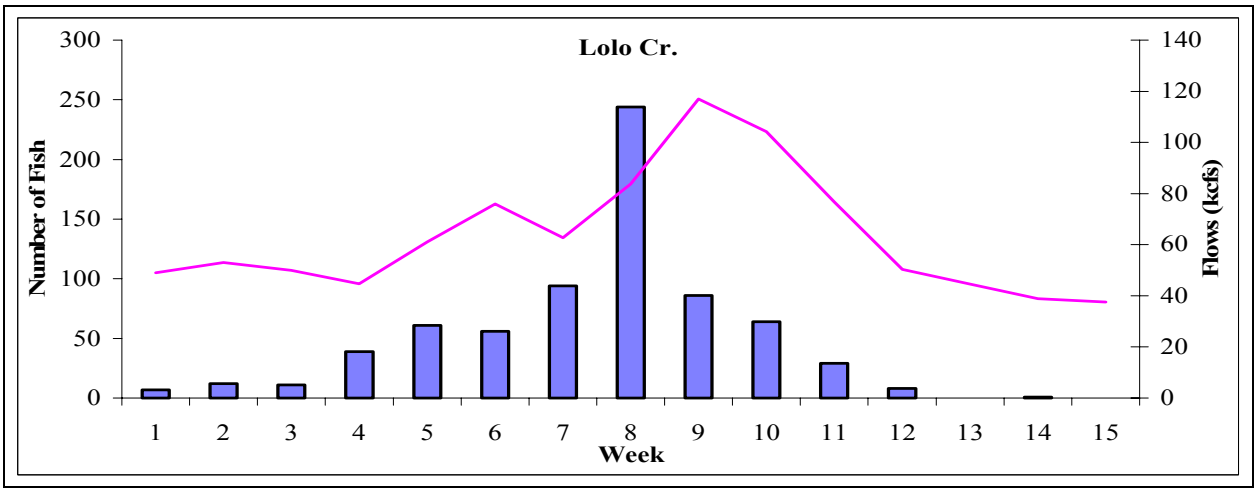

Figure 46. Number of PIT-tagged Lolo Cr. wild spring chinook detected by week and flows at LGR, 2004.

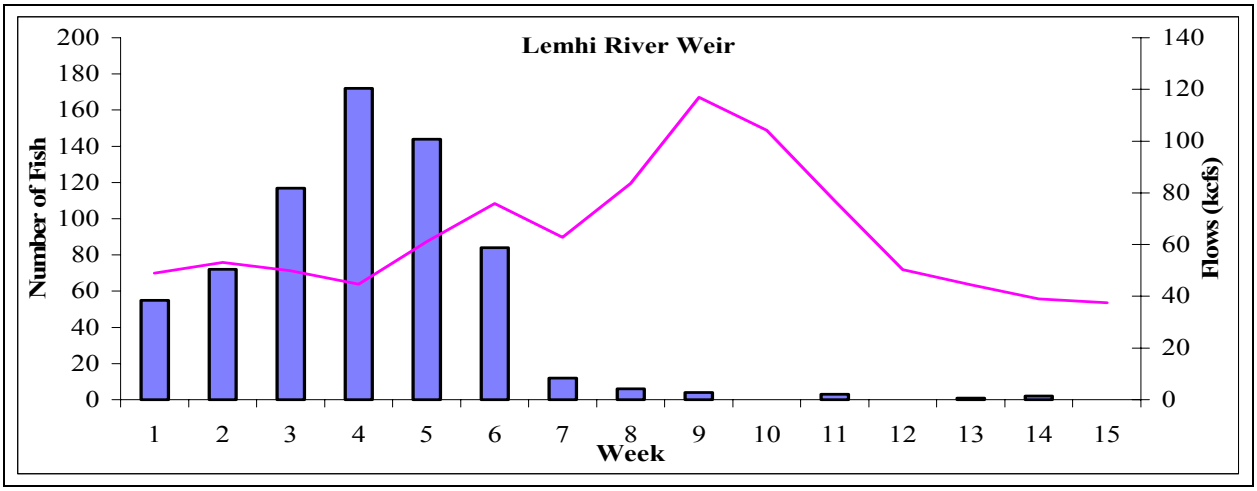

Figure 47. Number of PIT-tagged Lemhi River Weir wild spring chinook detected by week and flows at LGR, 2004.

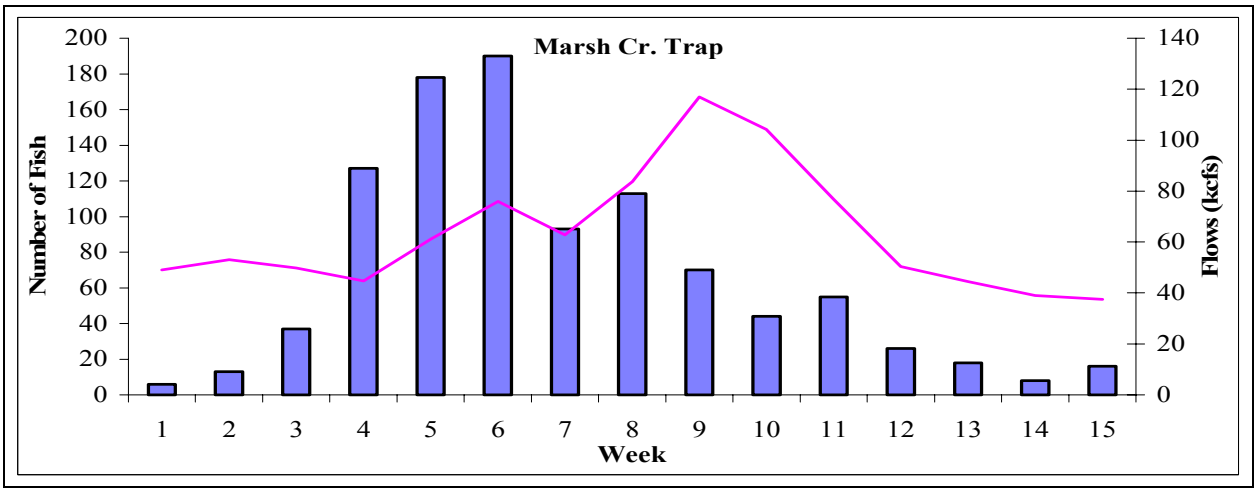

Figure 48. Number of PIT-tagged Marsh Cr. Trap wild spring chinook detected by week and flows at LGR, 2004.

Hatchery Yearling Summer Chinook

Hatchery yearling summer chinook were PIT-tagged at McCall Hatchery, Imnaha Trap, Pahsimeroi Pond, South Fork Salmon River Trap, Salmon River Trap and Stolle Pond. In 2001 and 2002 the Salmon River sites did not classify any PIT-tagged fish as summer chinook like in 2003 and 2004. McCall Hatchery PIT-tagged smolts accounted for 31,554 PIT-tagged hatchery yearling summer chinook detected at LGR, over twice as many as the 14,755 detected in 2003. Pahsimeroi Pond had 319 PIT-tagged smolts detected followed by 60 from the South Fork Salmon River Trap, 17 from Stolle Pond, nine from Salmon River Trap and three from Imnaha Trap.

Peak weeks of detection for PIT-tagged summer chinook yearlings from McCall Hatchery (week 5) and South Fork Salmon River Trap (week 6) occurred earlier than in 2003. Pahsimeroi Pond, Imnaha Trap and Salmon River Trap PIT-tagged fish detections all peaked during week 5, which was similar to the peaks observed in 2003. Similar to previous years, detections for all groups exceeded 99 % by the end of week 9. McCall Hatchery, Pahsimeroi Pond and Imnaha Trap had their highest detection rates to Lower Granite Dam since 2001's no spill year (Table 38). South Fork Salmon River Trap and Salmon River Trap also had higher rates of detection in 2004 compared to 2003, but they did not classify these as summer Chinook in 2001 or 2002. Similar to previous years the detection rates of PIT-tagged hatchery summer Chinook does not seem to correspond to the peaks in spring flows at LGR (Figures 49-54).

Table 38. PIT-tagged hatchery summer chinook release groups at LGR, 2001-2004.

Tag Site	Peak Week	Peak Date	% Detected During the Peak Week	Total Released	Total Detected	Percent Detected
2001						
McCall Hatchery	7	May 11-17	49.3	56,327	29,494	52.4
Pahsimeroi Pond	7	May 11-17	45.3	1,002	488	48.7
Imnaha Trap	5	April 27-May 3	56.2	3,008	1,706	56.7
2002						
McCall Hatchery	8	May 17-23	41.6	65,416	7,564	11.6
Pahsimeroi Pond	6	May 3-9	48.2	992	135	13.6
Imnaha Trap	6	May 3-9	32.8	3,022	467	15.5
2003						
McCall Hatchery	8	May 16-22	35.6	87,046	14,755	17.0
Pahsimeroi Pond	5	April 25-May 1	36.8	982	193	19.7
Imnaha Trap	6	May 2-8	46.2	47	13	27.7
S. Fk. Salmon R. Trap	10	May 30-June 5	27.7	608	46	7.6
Salmon Trap	6	May 2-8	23.1	50	13	26.0
2004						
McCall Hatchery	5	April 30-May 6	53.4	81,187	31,554	38.9
Pahsimeroi Pond	5	April 30-May 6	69.9	972	319	32.8
Imnaha Trap	5	April 30-May 6	66.7	1	3	300
S. Fk. Salmon R. Trap	6	May 7-13	36.7	617	60	9.7
Salmon Trap	5	April 30-May 6	33.3	21	9	42.9
Stolle Pond	6	May 7-13	35.3	590	17	2.9

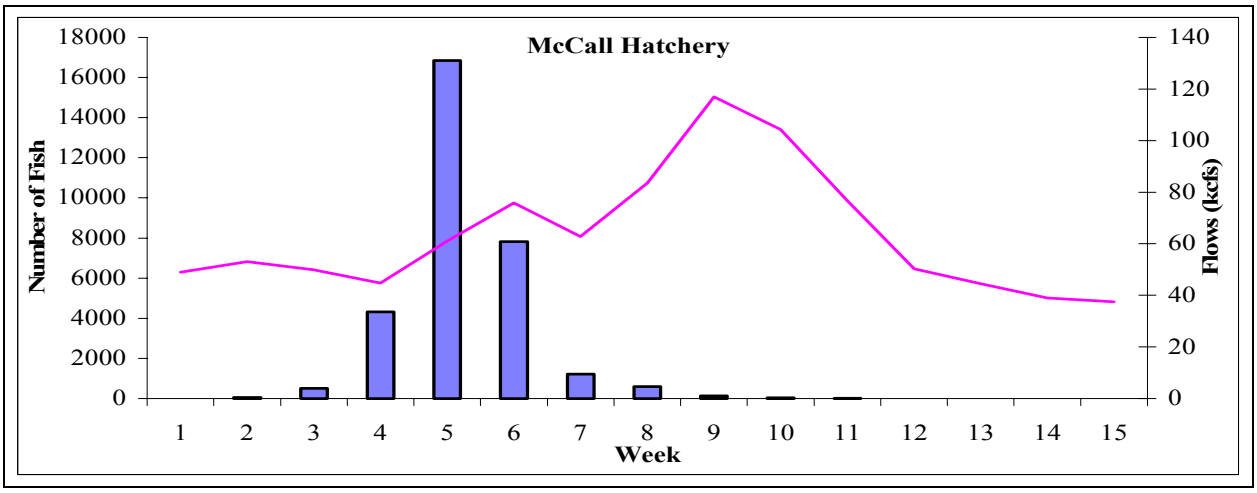

Figure 49. Number of PIT-tagged McCall Hatchery summer chinook detected by week and flows at LGR, 2004.

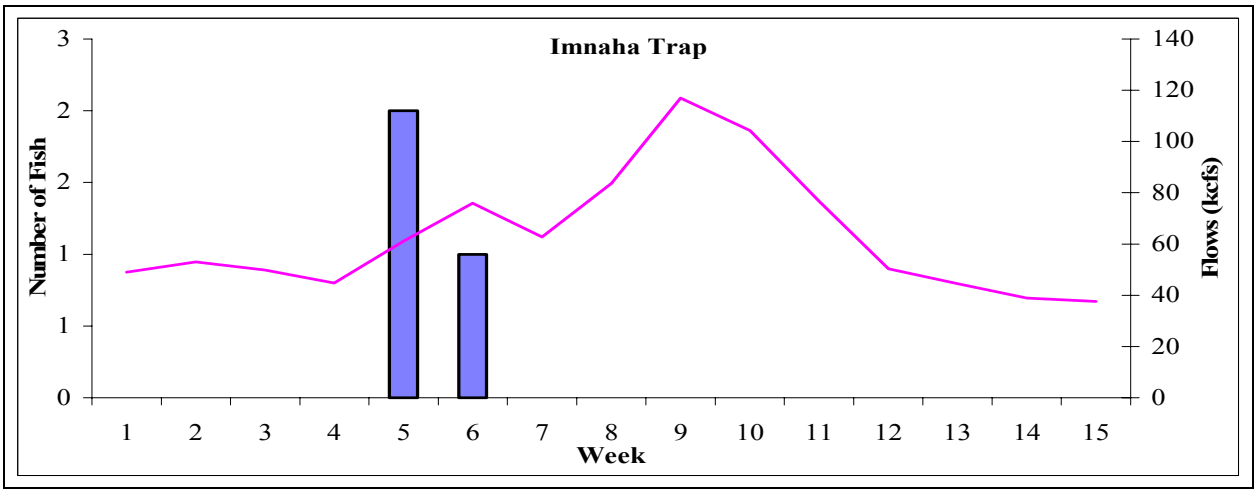

Figure 50. Number of PIT-tagged Imnaha Trap hatchery summer chinook detected by week and flows at LGR, 2004.

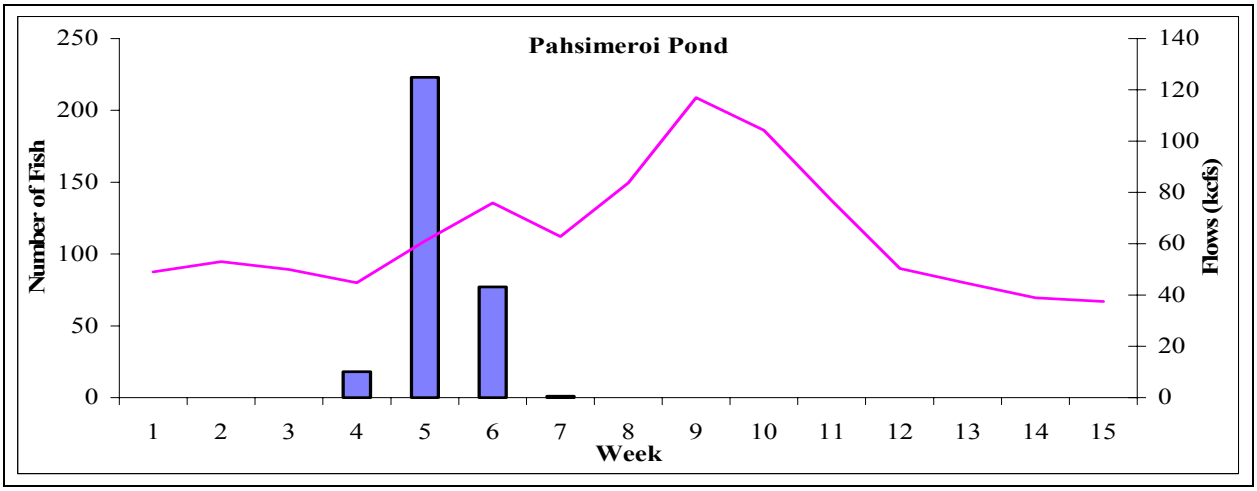

Figure 51. Number of PIT-tagged Pahsimeroi Pond hatchery summer chinook detected by week and flows at LGR, 2004.

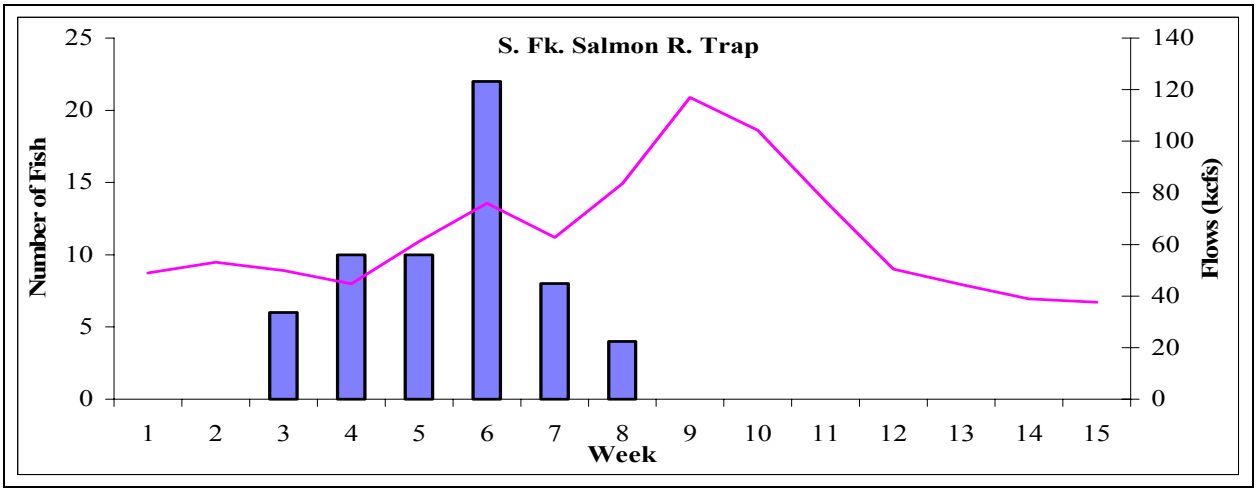

Figure 52. Number of PIT-tagged South Fork Salmon River Trap hatchery summer chinook detected by week and flows at LGR, 2004.

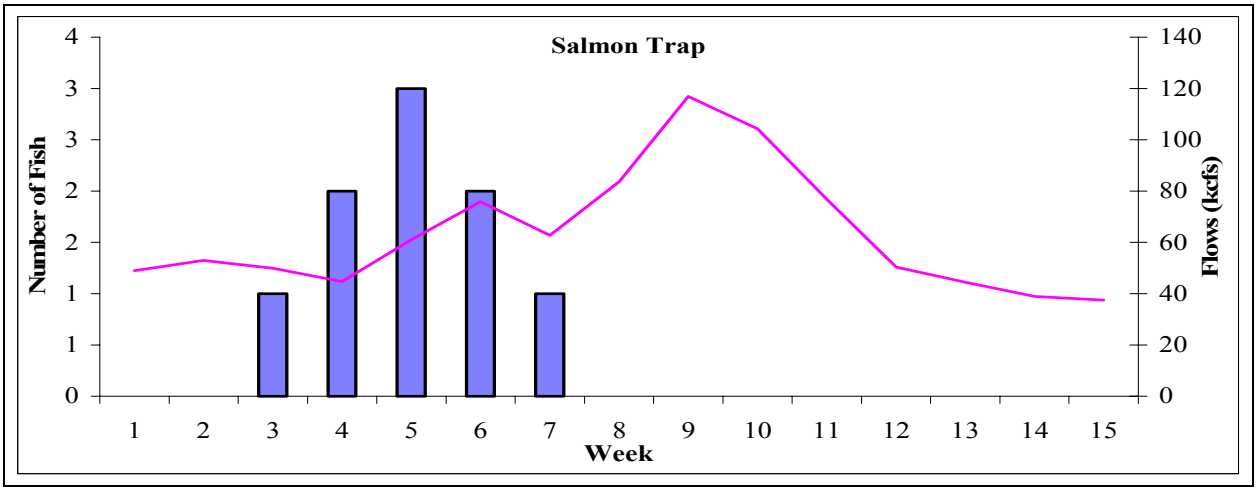

Figure 53. Number of PIT-tagged Salmon River Trap hatchery summer chinook detected by week and flows at LGR, 2004.

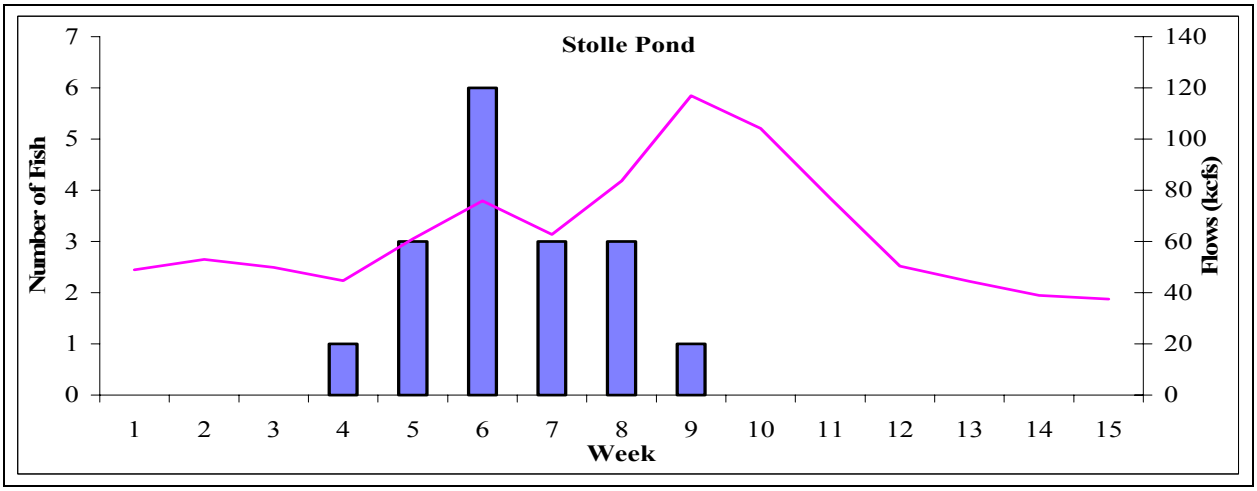

Figure 54. Number of PIT-tagged Stolle Pond hatchery summer chinook detected by week and flows at LGR, 2004.

Wild Yearling Summer Chinook

Wild summer chinook collected and PIT-tagged at the traps and in stream typically have the same tag and release site and we grouped these by tagging site. Depending upon the trap location or stream site where the fish were tagged, the tagged chinook may represent stock components from one or more different tributaries upstream of the tagging site. There were 8,576 PIT-tagged wild yearling summer chinook detected at LGR this season originating from 6 tagging sites. Most of the detections originated from juveniles tagged at the Imnaha Trap (4,665), followed by Johnson Creek and Trap (1,571), Pahsimeroi Trap (1,118), South Fork Salmon River and Trap (713) and Secesh River (249).

All release groups of PIT-tagged wild yearling summer chinook showed some variation in the peak week of detections between the years, 2001-2004. Imnaha Trap and Secesh River detections varied the least, peaking between week 3 and week 6 in all four years. Imnaha Trap detections peaked week 5, week 6, week 4 and week 5 from 2001-2004. Secesh River detections peaked week 5, week 3, week 4 and week 4 from 2001-2004. South Fork Salmon River and Trap PIT-tagged fish peaked week 6 in 2004, week 9 in 2003, week 10 in 2002 and week 7 in 2001. Johnson Cr. Trap detections peaked week 6 in 2004, week 9 in 2003, week 3 in 2002 and week 7 in 2001. Pahsimeroi trap detections peaked week 11 in 2004, week 4 in 2003, week 13 in 2002 and week 6 in 2001 (Table 39). Johnson Cr. Trap and Pahsimeroi River Trap peak detections have shown a great deal of variation from year to year.

The overall detection rates for each group in 2004 were higher than those observed in 2002 and 2003 yet lower than those observed in 2001 (no spill). Total detections for these groups did not reach 99% until week 16, similar to previous years. In comparison, total detections for PIT-tagged hatchery summer chinook release groups exceeded 99% by week 9, about 7 weeks earlier than the wild yearling summer chinook groups. With the exception of the PIT-tagged smolts released from the Imnaha Trap, the wild yearling summer chinook smolts exhibited a more protracted migration period to LGR than PIT-tagged hatchery yearling summer chinook. Detections of PIT-tagged wild yearling summer Chinook appear to be more related to flows observed at LGR than hatchery yearling summer Chinook (Figures 55-59).

Table 39. PIT-tagged wild summer chinook release groups at LGR, 2001-2004.

Tag Site	Peak Week	Peak Date	% Detected During the Peak Week	Total Released	Total Detected	Percent Detected
2001						
Imnaha Trap	5	April 27-May 3	47.2	12,062	7,277	60.3
Secesh R.	5	April 27-May 3	48.0	4,232	1,285	30.4
Johnson Cr. Trap	7	May 11-17	26.9	5,626	2,072	36.8
S. Fk. Salmon R. and Trap	7	May 11-17	21.8	1,950	432	22.2
Pahsimeroi R. Trap	6	May 4-10	33.6	2,288	468	20.5
2002						
Imnaha Trap	6	May 3-9	29.0	6,237	655	10.5
Secesh R.	3	April 12-18	24.6	4,554	191	4.2
Johnson Cr. Trap	3	April 12-18	26.0	7,009	477	6.8
S. Fk. Salmon R. and Trap	10	May 31-June 6	21.2	2,072	193	9.3
Pahsimeroi R. Trap	13	June 21-27	27.7	2,247	329	14.6
2003						
Imnaha Trap	4	April 18-24	20.2	12,560	2,401	19.1
Secesh R.	4	April 18-24	14.9	7,123	268	3.8
Johnson Cr. Trap	9	May 23-29	21.0	11,393	878	7.7
S. Fk. Salmon R. and Trap	9	May 23-29	15.5	6,021	323	5.4
Pahsimeroi R. Trap	4	April 18-24	17.6	8,523	890	10.4
2004						
Imnaha Trap	5	April 30-May 6	34.8	13,346	4,665	35.0
Secesh R.	4	April 23-29	14.5	3,474	249	7.2
Johnson Cr. Trap	6	May 7-13	24.4	8,091	1,571	19.4
S. Fk. Salmon R. and Trap	6	May 7-13	17.3	6,351	713	11.2
Pahsimeroi R. Trap	11	June 11-17	17.5	6,540	1,118	17.1

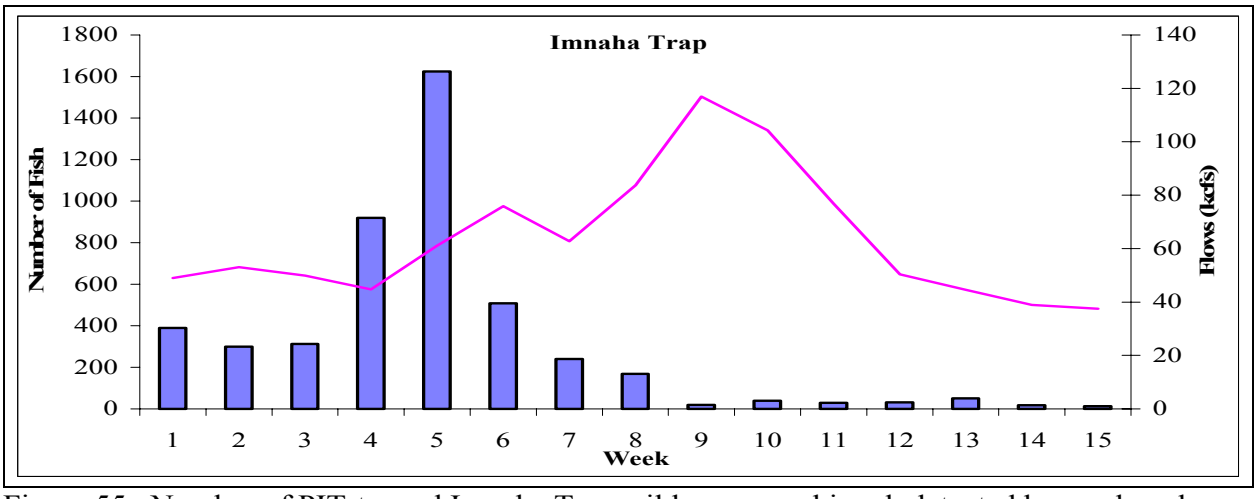

Figure 55. Number of PIT-tagged Imnaha Trap wild summer chinook detected by week and flows at LGR, 2004.

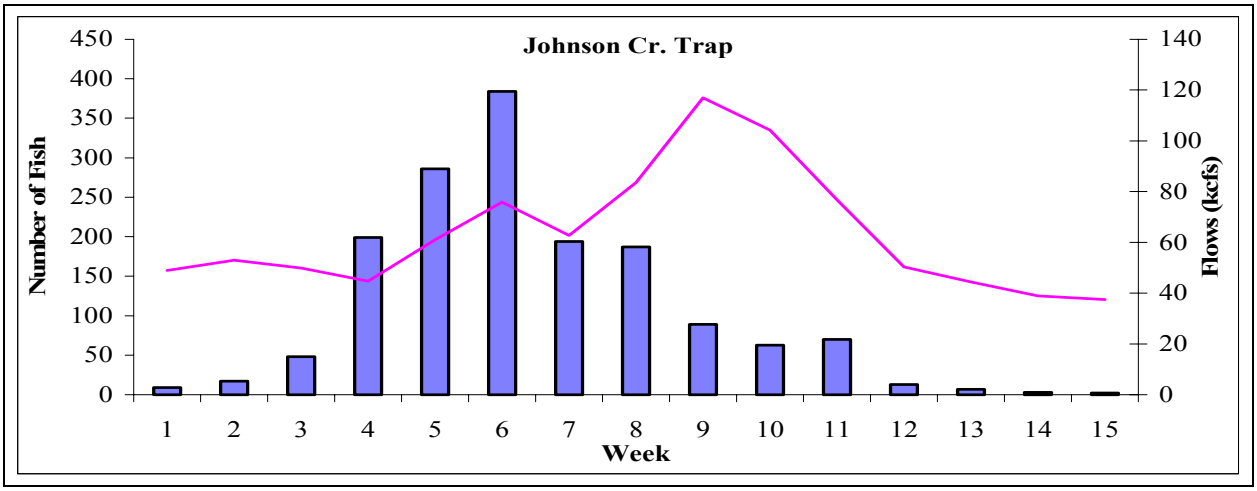

Figure 56. Number of PIT-tagged Johnson Cr. Trap wild summer chinook detected by week and flows at LGR, 2004.

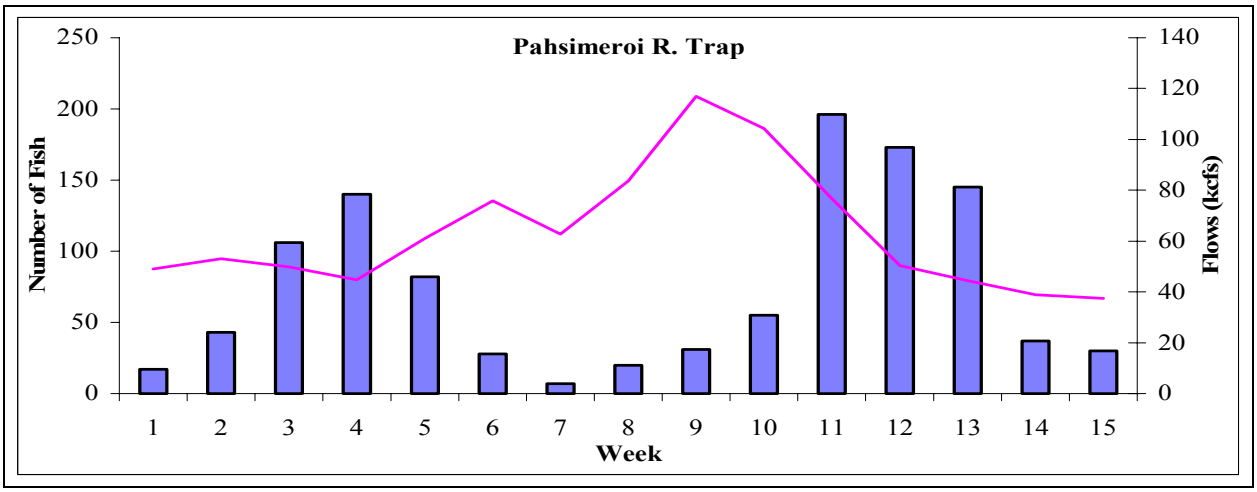

Figure 57. Number of PIT-tagged Pahsimeroi Trap wild summer chinook detected by week and flows at LGR, 2004.

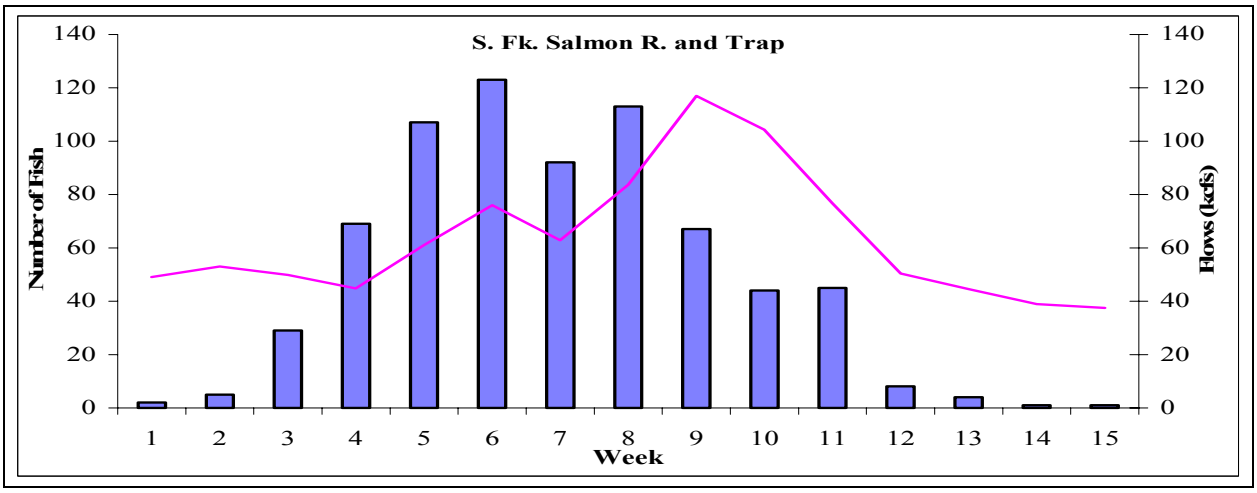

Figure 58. Number of PIT-tagged South Fork Salmon River and Trap wild summer chinook detected by week and flows at LGR, 2004.

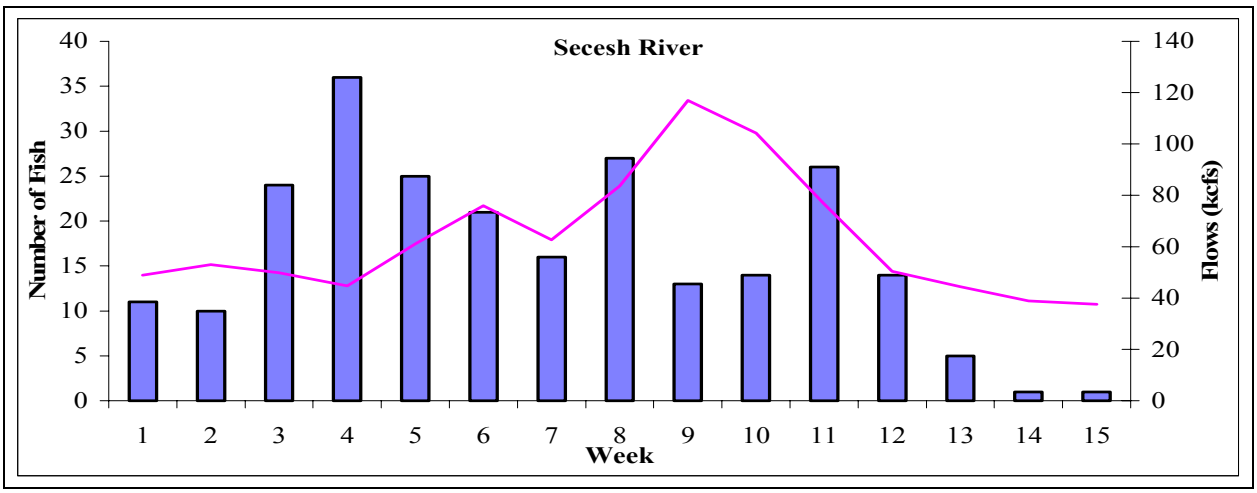

Figure 59. Number of PIT-tagged Secesh River wild summer chinook detected by week and flows at LGR, 2004.

Hatchery Yearling Fall Chinook with Elastomer Tags

Three groups of elastomer tagged Lyons Ferry Hatchery yearling fall chinook were PIT-tagged and transported to one of three sites above LGR for acclimation and release. These sites are Big Canyon Cr. Acclimation Pond (BCCAP), Pittsburg Landing Acclimation Pond (PLAP) and Captain John Rapids Acclimation Pond (CJRAP).

PIT-tagged elastomer tagged yearling fall chinook from BCCAP accounted for 2,084 detections at LGR followed by PLAP (1,933) and CJRAP (1,572) (Table 40). BCCAP and PLAP detections peaked during week 4 while CJRAP detections peaked during week 3, similar to the run timings observed for each group in previous years (Figures 60-62). As in previous years, more than 99% of the total detections for each group were recorded by the end of week 8. Detection rates at LGR were the highest since 2001's record low flow year for BCCAP and PLAP, in 2004. In previous years, detection rates for PIT-tagged fish from CJRAP have consistently been slightly higher than those for PLAP and BCCAP. This was not observed in 2004 as CJRAP smolts were detected at a lower rate than either BCCAP or PLAP smolts.

Table 40. PIT-tagged hatchery yearling fall chinook (elastomer tagged) release groups at LGR, 2001-2004.

Release Site	Peak Week	Peak Date	% Detected During the Peak Week	Total Released	Total Detected	Percent Detected
2001						
Big Canyon Cr. Acc. Fac.	5	April 27-May 3	54.0	7,499	3,593	47.9
Capt. John Rapids Acc. Pond	5	April 27-May 3	58.2	2,518	1,326	52.7
Pittsburg Landing Acc. Fac.	5	April 27-May 3	52.7	7,503	3,629	48.4
2002						
Big Canyon Cr. Acc. Fac.	3	April 12-18	41.0	7,482	1,851	24.7
Capt. John Rapids Acc. Pond	5	April 26-May 2	36.7	2,487	686	27.6
Pittsburg Landing Acc. Fac.	5	April 26-May 2	43.2	7,545	1,634	21.7
2003						
Big Canyon Cr. Acc. Fac.	5	April 25-May 1	40.7	7,494	2,566	34.2
Capt. John Rapids Acc. Pond	4	April 18-24	47.6	2,497	947	37.9
Pittsburg Landing Acc. Fac.	5	April 25-May 1	46.5	7,492	2,734	36.5
2004						
Big Canyon Cr. Acc. Fac.	4	April 23-29	42.5	4,984	2,084	41.8
Capt. John Rapids Acc. Pond	3	April 16-22	41.9	4,982	1,572	31.6
Pittsburg Landing Acc. Fac.	4	April 23-29	51.2	4,983	1,933	38.8

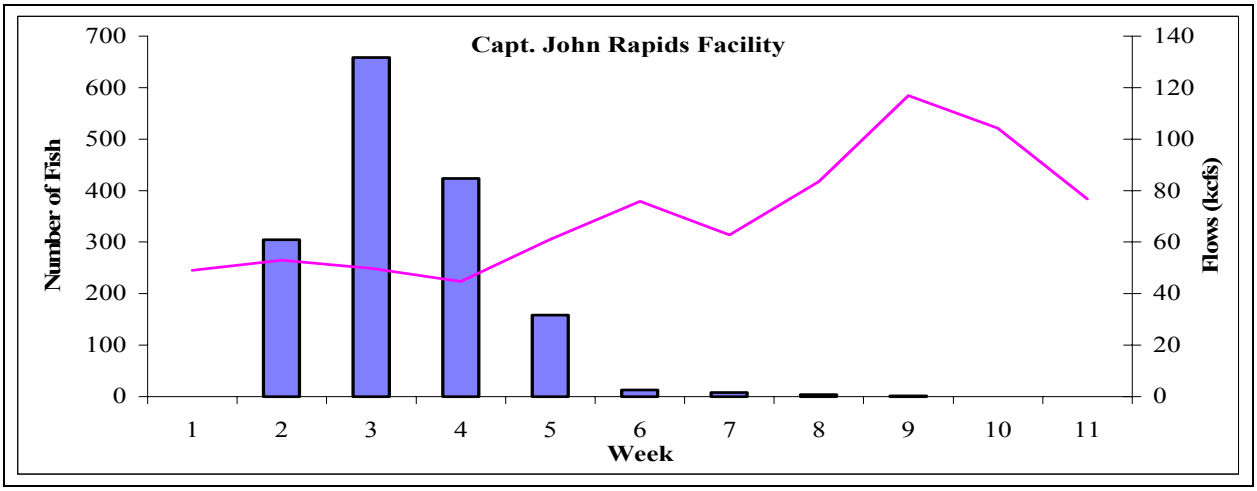

Figure 60. Number of PIT-tagged Captain John Rapids hatchery yearling fall chinook detected by week and flows at LGR, 2004.

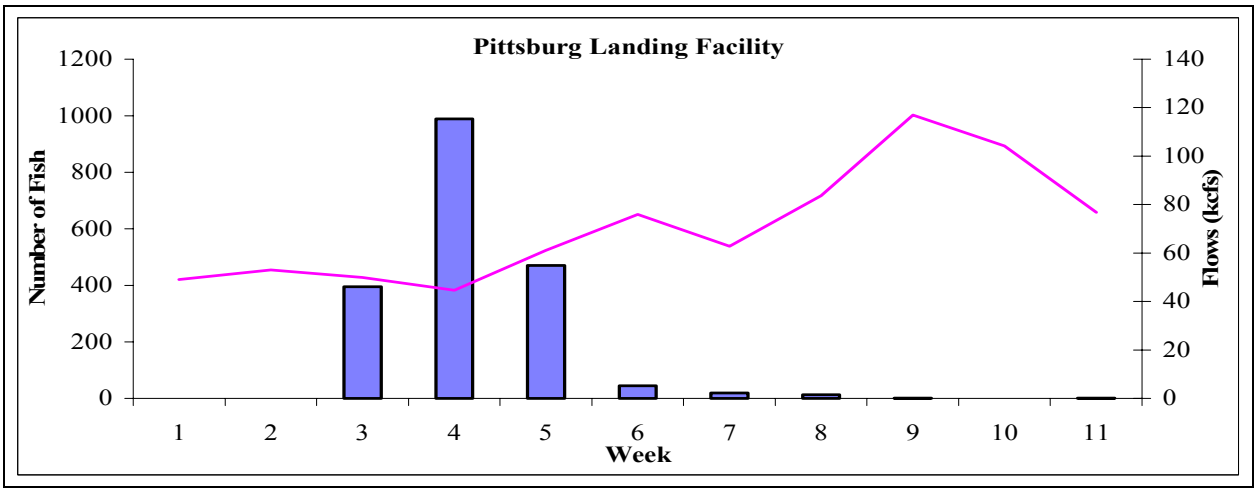

Figure 61. Number of PIT-tagged Pittsburg Landing hatchery yearling fall chinook detected by week and flows at LGR, 2004.

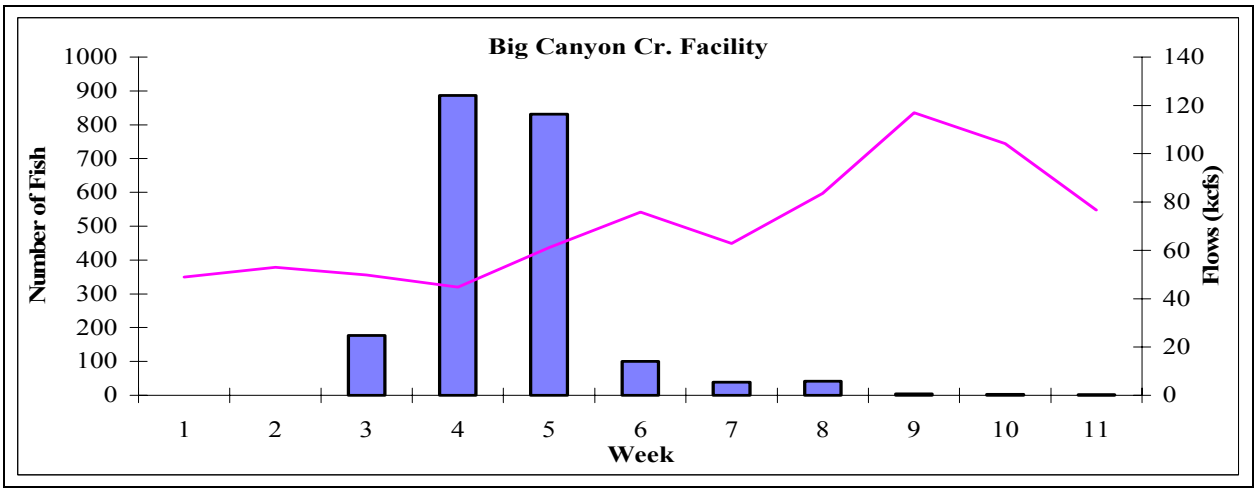

Figure 62. Number of PIT-tagged Big Canyon hatchery yearling fall chinook detected by week and flows at LGR, 2004.

Hatchery Subyearling Chinook

PIT-tagged hatchery subyearling chinook were grouped together by release site. There were eight groups of PIT-tagged hatchery subyearling chinook detected at LGR in 2004, but only four of these had fish detected from 2004 releases.

Captain John Rapids Acclimation Pond (1,082) had the most PIT-tagged fish detected at LGR in 2004 followed respectively by Big Canyon Cr. Acclimation Pond (1,010), Nez Perce Tribal Hatchery (996) and Pittsburg Landing Acclimation Pond (837). Nearly all the PIT-tagged smolts detected this season were released in 2004, however a few PIT-tagged smolts released in 2003 from the Snake River, Pittsburg Landing Acclimation Pond, Big Canyon Cr. Acclimation Pond, Nez Perce Tribal Hatchery and North Valley Acclimation Pond were detected during the first eight weeks of the 2004 season at LGR.

The peak weeks of detection, weeks 10-13, were similar to those observed in 2003 and were earlier than the detections observed in 2001 and 2002 (Table 41). Peak detections occurred after the peak flows for each release group (Figures 63-66).

BCCAP, CJRAP and NPTH detection rates at Lower Granite Dam were the highest observed from 2001-2004 while the detection rate for PLAP smolts was the second highest observed since 2001.

Table 41. PIT-tagged hatchery subyearling chinook release groups at LGR, 2001-2004.

Release Site	Peak Week	Peak Date	% Detected During the Peak Week	Total Released	Total Detected	Percent Detected
2001						
Big Canyon Cr. Fac.	14	June 29-July 5	26.2	27,339	5,894	21.6
Pittsburg Landing Fac.	14	June 29-July 5	27.0	1,974	441	22.3
Captain John Rapids Fac.	14	June 29-July 5	24.7	4,516	932	20.6
2002						
Big Canyon Cr. Fac.	17	July 19-25	25.3	5,016	1,149	22.9
Pittsburg Landing Fac.	15	July 5-11	22.7	2,539	587	23.1
Captain John Rapids Fac.	17	July 19-25	26.4	5,024	1,298	25.8
2003						
Big Canyon Cr. Fac.	11	June 6-12	32.0	2,495	893	35.8
Pittsburg Landing Fac.	13	June 20-26	41.0	17,483	6,120	35.0
Captain John Rapids Fac.	10	May 30-June 5	51.5	2,498	497	19.9
Nez Perce Tribal Hatchery	11	June 6-12	34.4	5,449	1,543	28.3
2004						
Big Canyon Cr. Fac.	11	June 11-17	31.9	2,490	1,010	40.6
Pittsburg Landing Fac.	10	June 4-10	61.8	2,496	837	33.5
Capt. John Rapids Pond	11	June 11-17	50.0	2,493	1,082	43.4
Nez Perce Tribal Hatchery	13	June 25-July 1	40.7	2,615	996	38.1

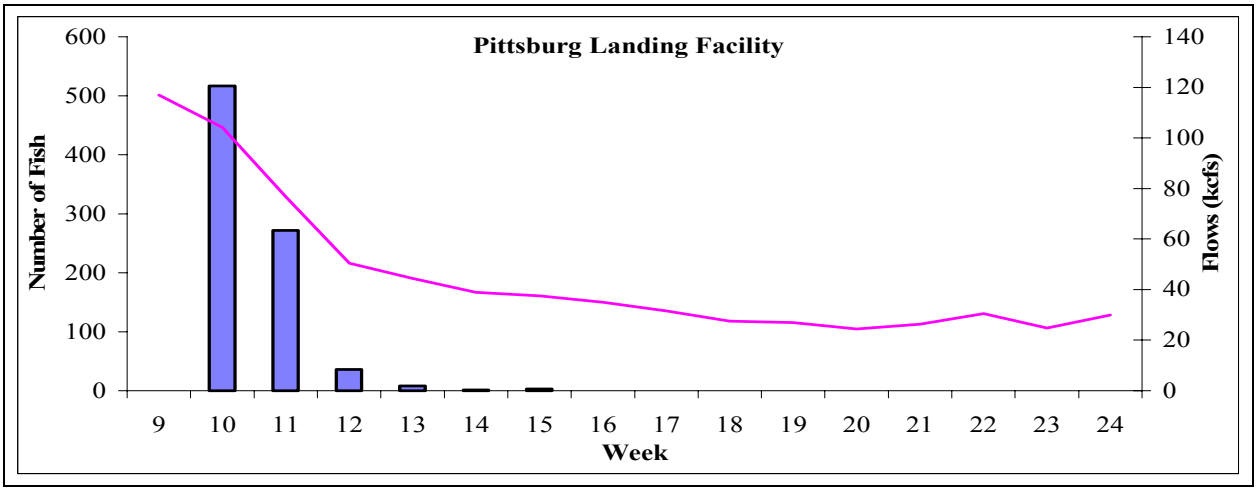

Figure 63. Number of PIT-tagged Pittsburg Landing hatchery subyearling fall chinook detected by week and flows at LGR, 2004.

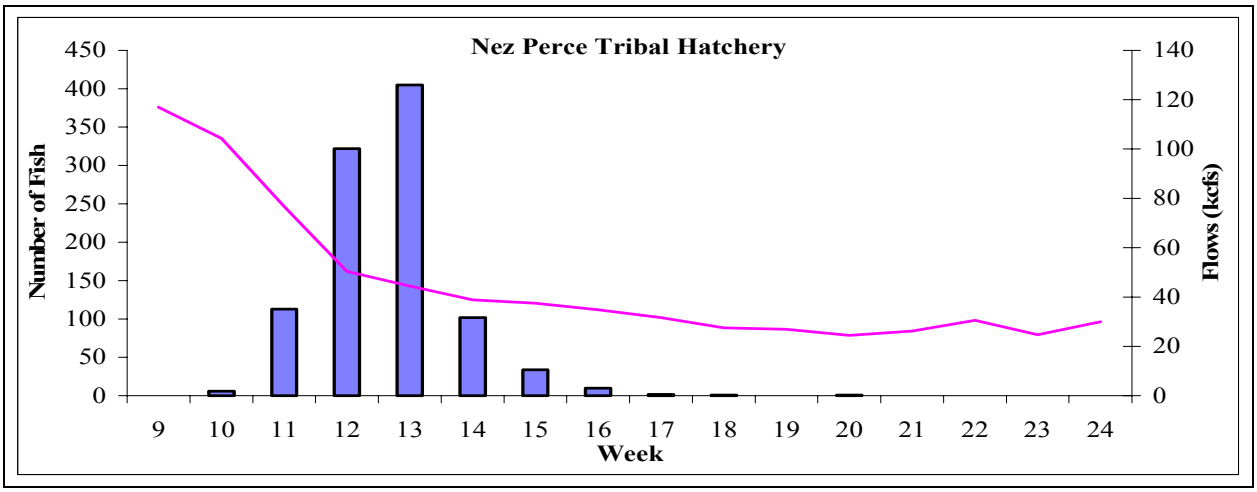

Figure 64. Number of PIT-tagged Nez Perce Tribal Hatchery, hatchery subyearling fall chinook detected by week and flows at LGR, 2004.

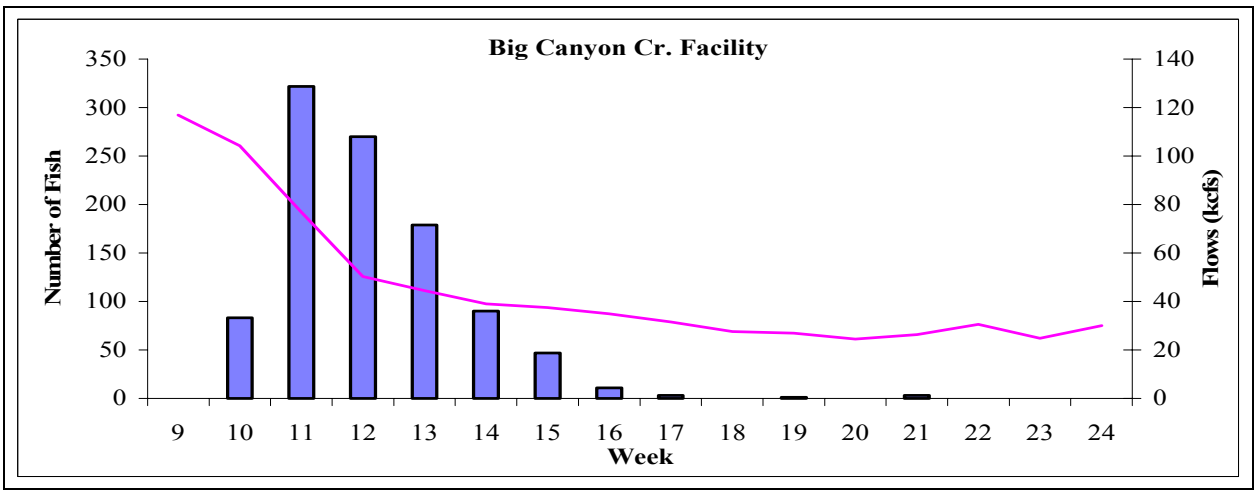

Figure 65. Number of PIT-tagged Big Canyon Cr. hatchery subyearling fall chinook detected by week and flows at LGR, 2004.

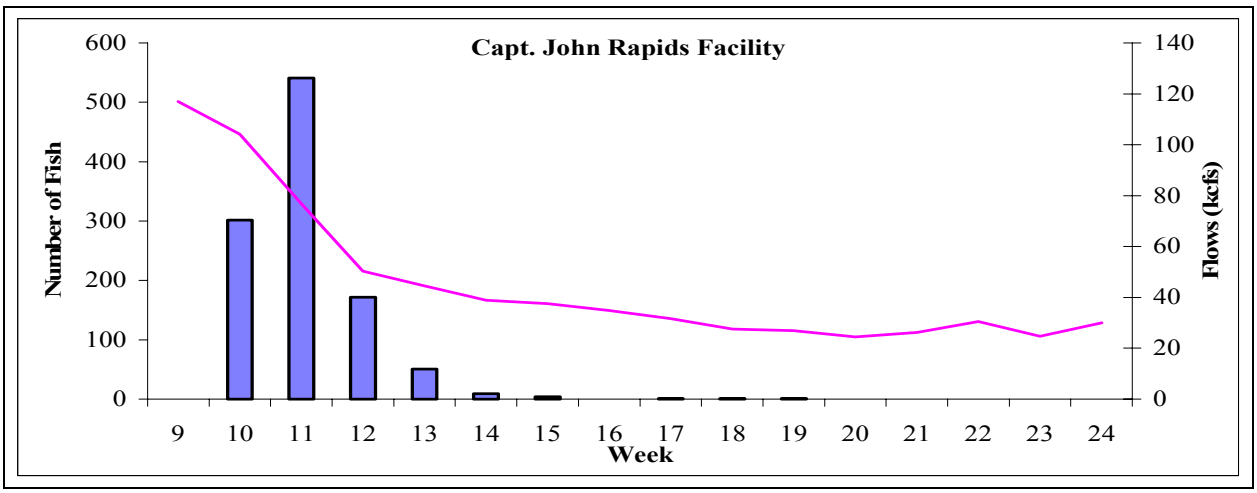

Figure 66. Number of PIT-tagged Captain John Rapids hatchery subyearling fall chinook detected by week and flows at LGR, 2004.

Hatchery Steelhead

PIT-tagged hatchery steelhead were released at multiple release sites, therefore we grouped PIT-tagged hatchery steelhead by the hatchery where they were PIT-tagged. Hatchery steelhead tagged at traps and subsequently detected at LGR were not included in this analysis due to unknown hatchery origin.

Clearwater Hatchery (7,091) had the most PIT-tagged hatchery steelhead smolts detected at LGR during the 2004 season followed respectively by Magic Valley Hatchery (2,000), Irrigon Hatchery (1,342), Dworshak Hatchery (951), Niagra Springs Hatchery (736) and Hagerman Hatchery (676) (Table 42). Peak weeks of detection for PIT-tagged hatchery steelhead were similar to those observed in previous years. Detection rates at LGR were the highest observed for Magic Valley Hatchery, Clearwater Hatchery and Niagra Springs Hatchery from 2001-2004. Hagerman Hatchery and Dworshak Hatchery had the second highest detection rates in the four years examined. Irrigon Hatchery PIT-tagged steelhead have consistently been the latest group to arrive at LGR and in 2004 had the lowest detection rate at LGR (Figures 67-72).

Table 42. PIT-tagged hatchery steelhead release groups at LGR, 2001-2004.

Hatchery	Peak Week	Peak Date	% Detected During the Peak Week	Total Released	Total Detected	Percent Detected
2001						
Irrigon	8	May 18-24	36.4	3,607	1,266	35.1
Magic Valley	7	May 11-17	30.7	2,701	1,513	56.0
Hagerman	7	May 11-17	32.1	1,787	971	54.3
Clearwater	5	April 27-May 3	34.0	1,496	782	52.3
Niagra Springs	7	May 11-17	41.3	901	172	19.1
Dworshak	5	April 27-May 3	63.1	6,016	4,162	69.2
2002						
Irrigon	8	May 17-23	29.0	5,597	555	9.9
Magic Valley	9	May 24-30	33.0	2,994	737	24.6
Hagerman	8	May 17-23	23.4	1,198	167	13.9
Clearwater	9	May 24-30	36.0	1,201	161	13.4
Niagra Springs	9	May 24-30	34.4	897	157	17.5
Dworshak	9	May 24-30	27.5	1,500	40	2.7
2003						
Irrigon	9	May 23-29	30.4	2,012	759	37.7
Magic Valley	5	April 25-May 1	23.4	3,268	594	18.2
Hagerman	8	May 16-22	33.5	1,939	520	26.8
Clearwater	5	April 25-May 1	27.9	3,967	729	18.4
Niagra Springs	9	May 23-29	31.1	1,194	277	23.2
Dworshak	5	April 25-May 1	58.4	1,500	363	24.2
2004						
Irrigon	8	May 21-27	35.9	5,238	1,342	25.6
Magic Valley	6	May 7-13	42.2	3,185	2,000	62.8
Hagerman	8	May 21-27	34.6	1,450	676	46.6
Clearwater	6	May 7-13	49.0	11,169	7,091	63.5
Niagra Springs	6	May 7-13	33.8	1,190	736	61.8
Dworshak	4	April 23-29	45.2	1,496	951	63.6

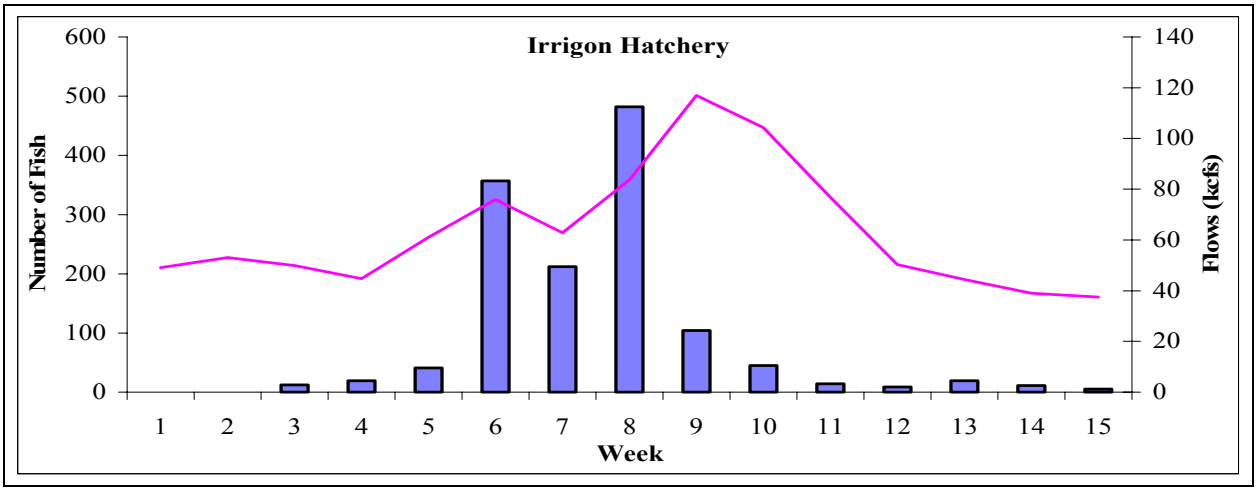

Figure 67. Number of PIT-tagged Irrigon hatchery steelhead detected by week and flows at LGR, 2004.

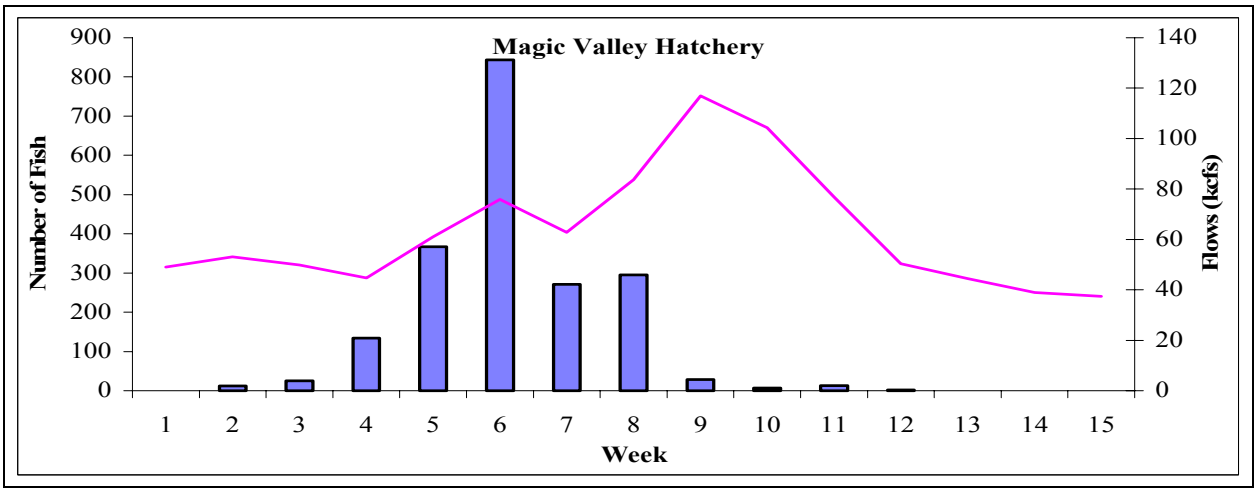

Figure 68. Number of PIT-tagged Magic Valley hatchery steelhead detected by week and flows at LGR, 2004.

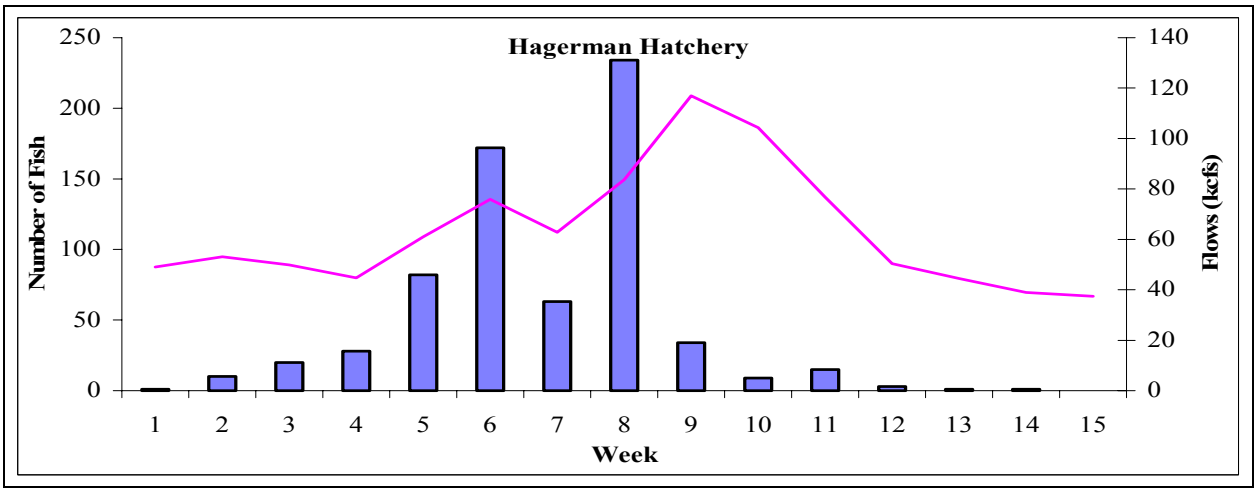

Figure 69. Number of PIT-tagged Hagerman hatchery steelhead detected by week and flows at LGR, 2004.

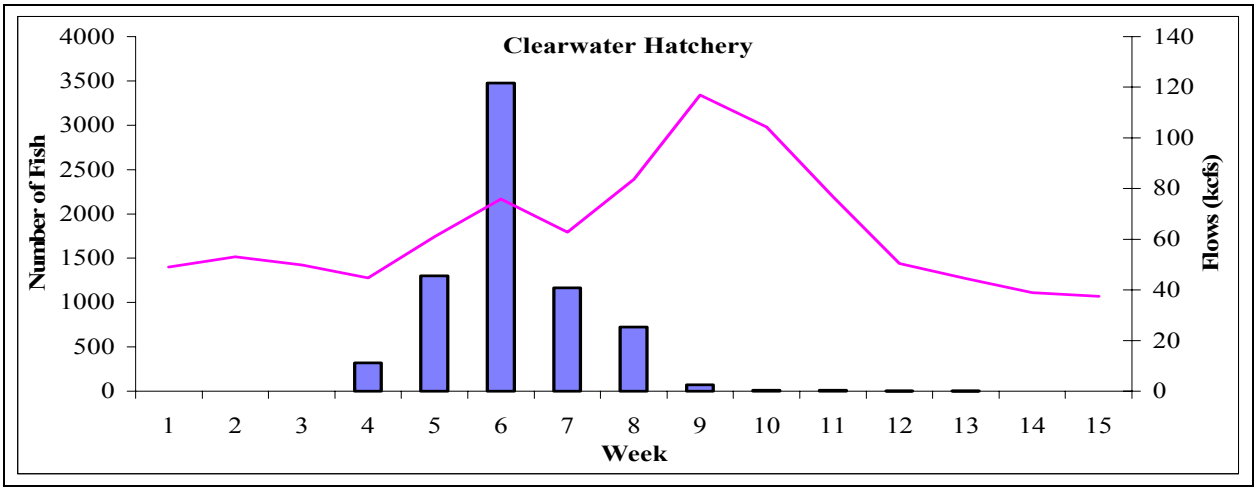

Figure 70. Number of PIT-tagged Clearwater hatchery steelhead detected by week and flows at LGR, 2004.

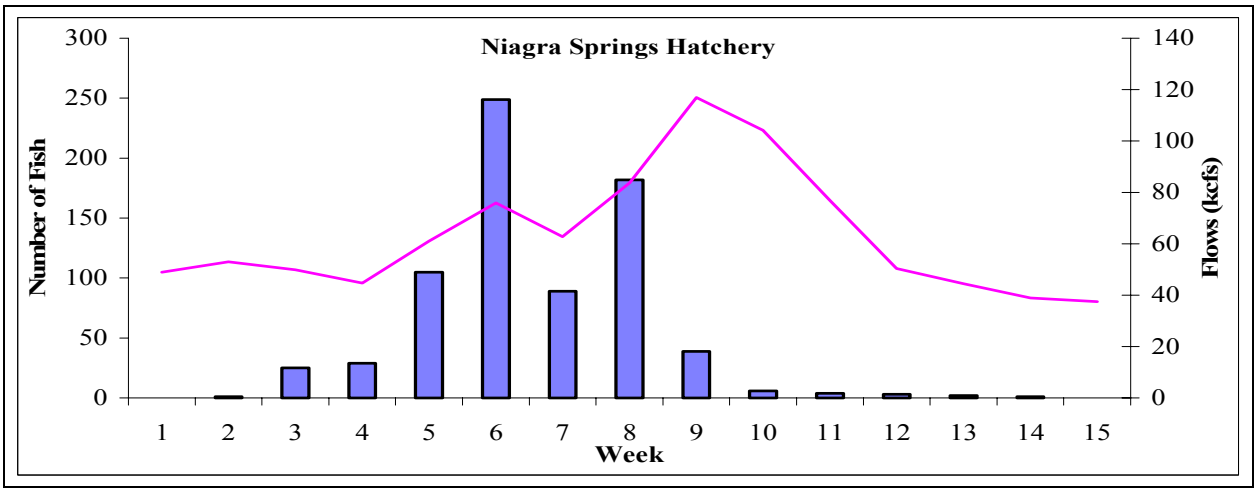

Figure 71. Number of PIT-tagged Niagra Springs hatchery steelhead detected by week and flows at LGR, 2004.

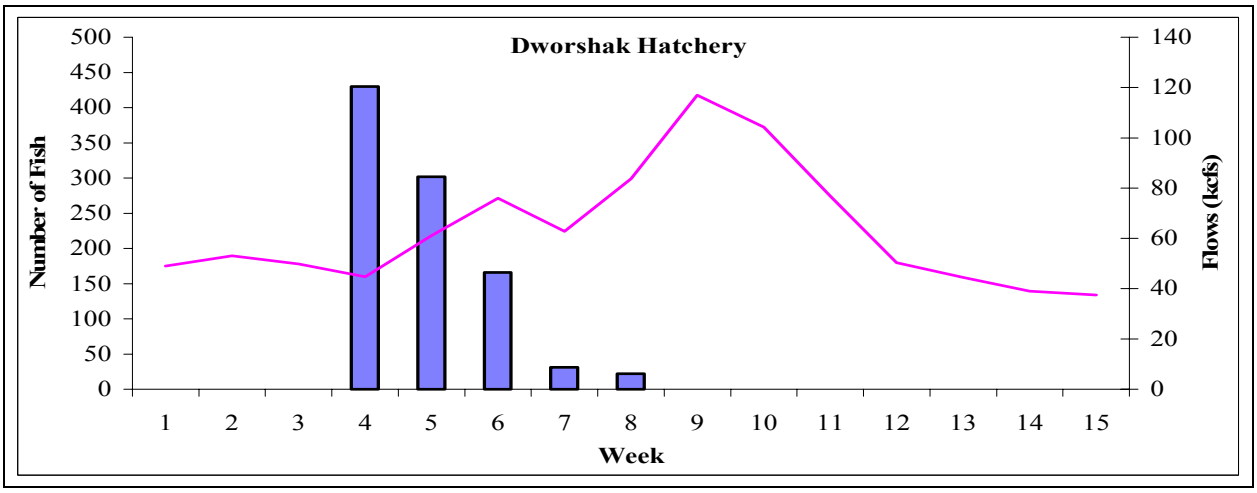

Figure 72. Number of PIT-tagged Dworshak hatchery steelhead detected by week and flows at LGR, 2004.

Wild Steelhead

Wild steelhead captured and PIT-tagged at traps and stream locations were grouped by tag site. Fish tagged at these sites include different stock components of upstream tributaries of wild steelhead so the specific origin of a wild steelhead smolt is unknown. This data includes all wild steelhead detected at LGR in 2004 including those tagged in prior years

The five trap sites with the greatest number of PIT-tagged fish detected at LGR in 2004 were Imnaha trap (3,628), Fish Cr. trap (1,787), Snake trap (1,458), Grande Ronde trap (566) and Clearwater trap (520). All release groups peak week of detections were much earlier than those observed in the previous two years except for Fish Cr. Trap fish which peaked week 5 in 2003 and 2004. Peak weekly detections for all groups occurred prior to peak flows (Figures 73-77). Detection rates at LGR were significantly higher for all groups of PIT-tagged wild steelhead in 2004 compared to 2002 and 2003 (Table 43). During the 2001 and 2004 low water years, with no spill in 2001 and very little spill in 2004, wild steelhead were detected at LGR sooner than in more average water years (2002 and 2003) and had much higher detection rates.

Table 43. PIT-tagged wild steelhead release groups at LGR, 2001-2004.

Tag Site	Peak Week	Peak Date	% Detected During the Peak Week	Total Released	Total Detected	Percent Detected
2001						
Fish Cr. Trap	5	April 27-May 3	70.1	5,893	3,366	57.1
Imnaha Trap	7	May 11-17	46.7	3,681	2,654	72.1
Snake Trap	6	May 4-10	57.5	876	717	81.9
Grande Ronde Trap	6	May 4-10	26.9	602	276	45.9
2002						
Fish Cr. Trap	3	April 12-18	50.1	7,031	1,413	20.1
Imnaha Trap	8	May 17-23	23.1	4,809	1,029	21.4
Snake Trap	8	May 17-23	23.2	2,518	612	24.3
Grande Ronde Trap	9	May 24-30	28.5	609	151	24.8
2003						
Fish Cr. Trap	5	April 25-May 1	23.7	5,286	819	15.5
Imnaha Trap	8	May 16-22	35.2	6,303	1,891	30.0
Snake Trap	9	May 23-29	31.2	1,208	397	32.9
Clearwater Trap	8	May 16-22	39.5	457	167	36.5
Grande Ronde Trap	9	May 23-29	37.2	612	218	35.6
2004						
Fish Cr. Trap	5	April 30-May 6	43.1	7,493	1,787	23.9
Imnaha Trap	5	April 30-May 6	27.5	5,720	3,628	63.4
Snake Trap	6	May 7-13	40.5	1,923	1,458	75.8
Clearwater Trap	5	April 30-May 6	41.7	990	520	52.5
Grande Ronde Trap	6	May 7-13	43.1	771	566	73.4

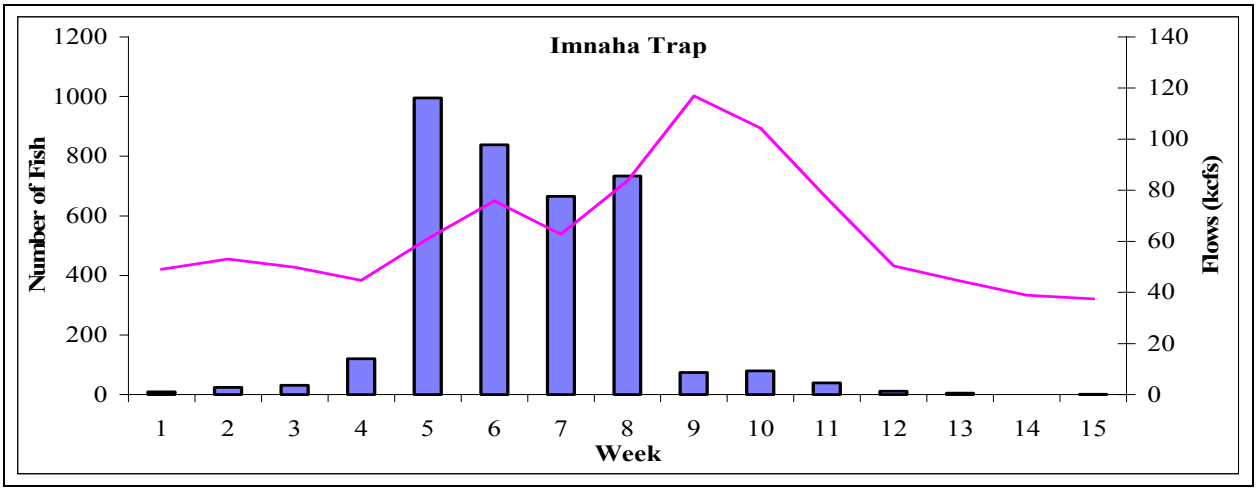

Figure 73. Number of PIT-tagged Imnaha trap wild steelhead detected by week and flows at LGR, 2004.

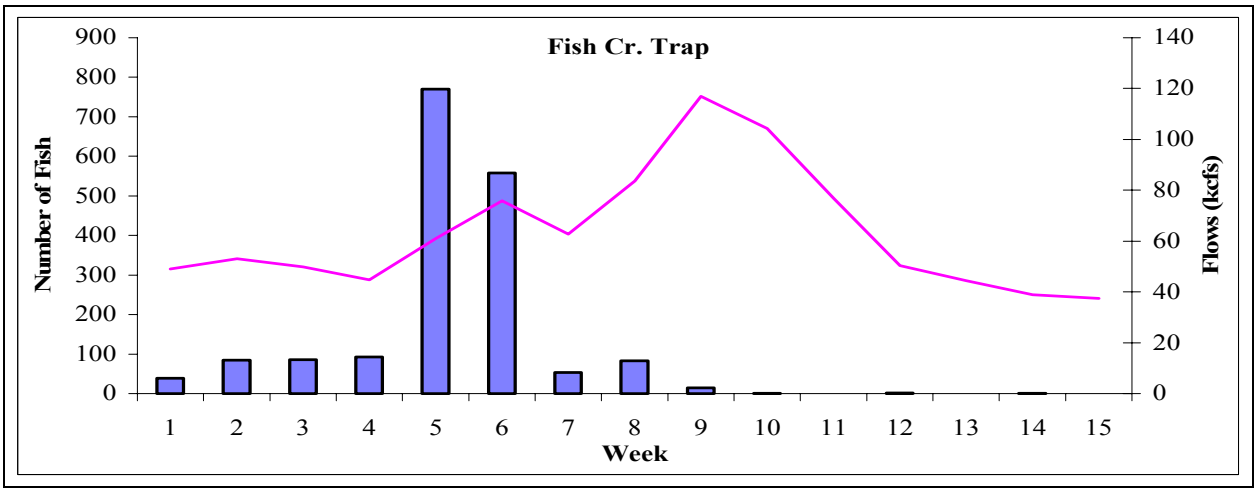

Figure 74. Number of PIT-tagged Fish Cr. trap wild steelhead detected by week and flows at LGR, 2004.

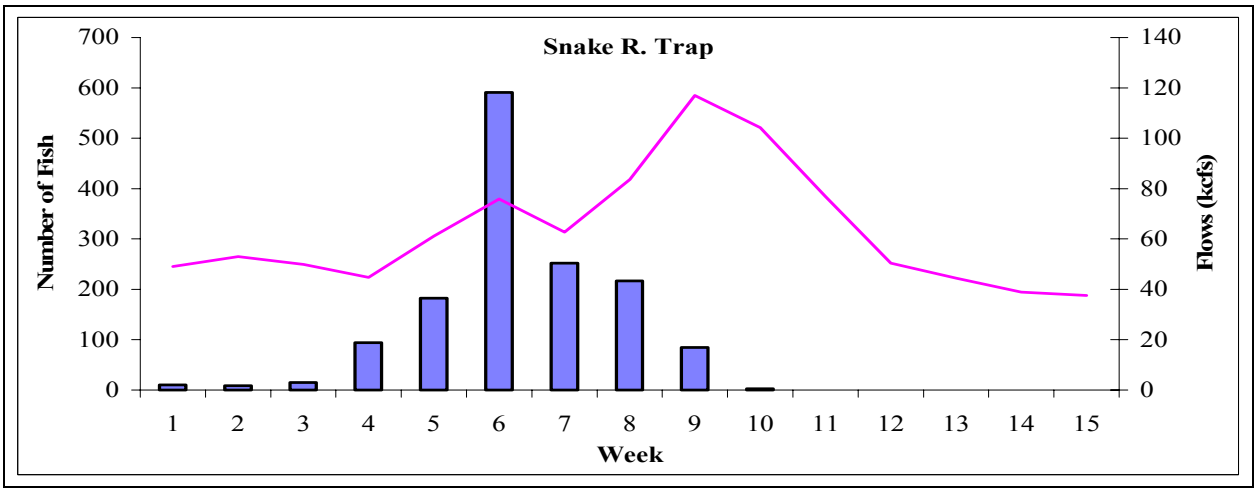

Figure 75. Number of PIT-tagged Snake River trap wild steelhead detected by week and flows at LGR, 2004.

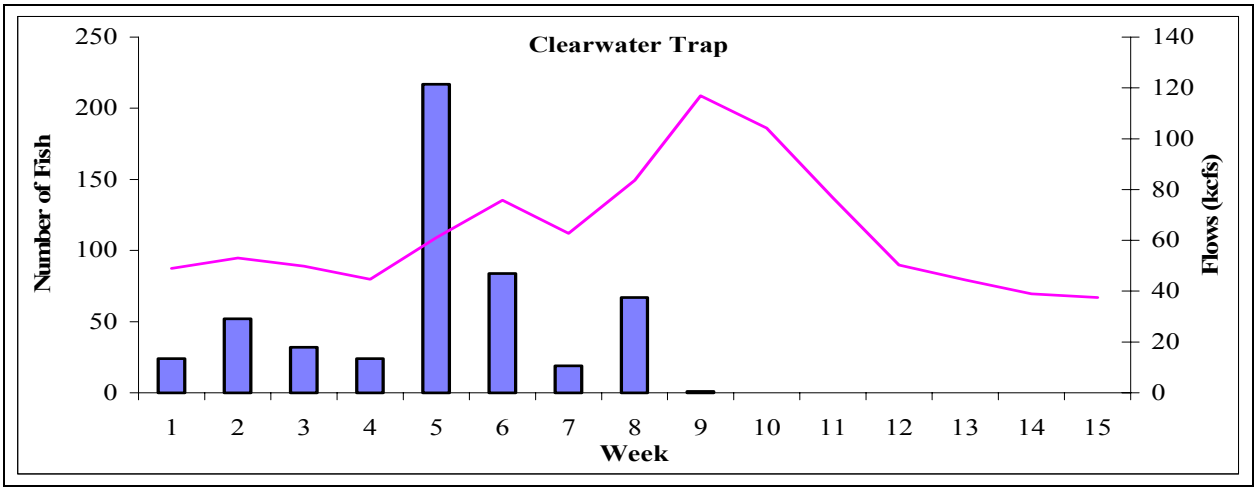

Figure 76. Number of PIT-tagged Clearwater trap wild steelhead detected by week and flows at LGR, 2004.

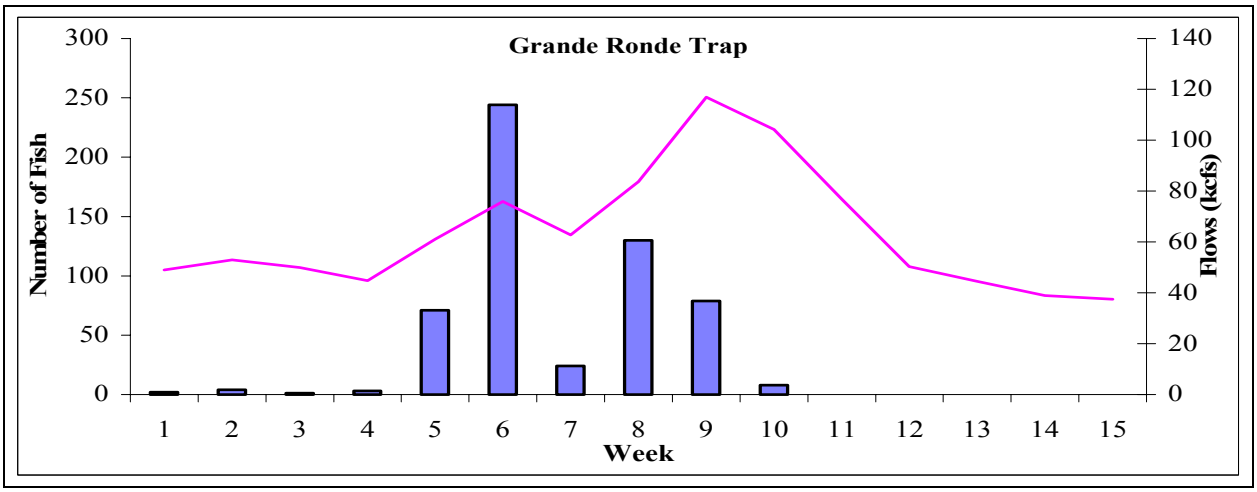

Figure 77. Number of PIT-tagged Grande Rhonde trap wild steelhead detected by week and flows at LGR, 2004.

Hatchery Sockeye

PIT-tagged hatchery sockeye were tagged at multiple sites, therefore we grouped PIT-tagged hatchery sockeye groups by their release site. PIT-tagged hatchery sockeye were detected at Lower Granite Dam from six release sites this season (Table 44).

Redfish Lake Cr. trap (511) had the most PIT-tagged smolts detected at Lower Granite Dam in 2004 followed respectively by Sawtooth Hatchery smolts released into Pettit Lake (139), Pettit Lake (106), Redfish Lake (96), Pettit Lake Cr. (19) and Sawtooth Hatchery (19). (Table 44, Figures 78-83). In 2004, all of the PIT-tagged hatchery sockeye detected at Lower Granite Dam were detected earlier than in the previous three years and did not appear to be as related to peak flows. Compared to other PIT-tagged species groups, detection rates at Lower Granite Dam for PIT-tagged sockeye, are typically lower. Detection rates for PIT-tagged sockeye have been higher during years of low (2004) or no spill (2001). No Alturas Lake hatchery sockeye were detected at Lower Granite Dam in 2004. The groups released in the lakes as fry have much lower detection rates than the hatchery sockeye tagged at the traps or stream sites as smolts.

Table 44. PIT-tagged hatchery sockeye release groups at LGR, 2001-2004.

Release Site	Peak Week	Peak Date	% Detected During the Peak Week	Total Released	Total Detected	Percent Detected
2001						
Pettit Lk. Cr.	8	May 18-24	56.7	143	30	21.0
Pettit Lk. Cr. from Alturas L. Cr.	10	June 1-7	50.0	130	2	1.5
Alturas Cr.	8	May 18-24	80.3	385	71	18.4
Redfish Lk. Cr. Trap	8	May 18-24	33.9	1,390	325	23.4
Redfish Lk. Cr. from Bonn. Hat.	7	May 11-17	54.7	1,000	117	11.7
2002						
Pettit Lk. Cr.	9	May 24-30	75.0	390	16	4.1
Alturas Cr.	9	May 24-30	75.0	249	4	1.6
Redfish Lk. Cr. Trap from Sawt. Hat.	8	May 17-23	97.1	994	34	3.4
Redfish Lk. Cr. Trap	8	May 17-23	30.4	1,813	112	6.2
2003						
Pettit Lk. Cr.	9	May 23-29	83.3	75	6	8.0
Redfish Lake Cr.	10	May 30-June 5	49.2	1,331	122	9.2
Redfish Lake from Bonn. Hat.	10	May 30-June 5	60.0	1,007	15	1.5
Redfish Lake from Sawt. Hat.	10	May 30-June 5	61.1	1,015	36	3.5
Pettit Lake from Bonn. Hat.	10	May 30-June 5	73.6	1,565	140	8.9
Pettit Lake from Sawt. Hat.	10	May 30-June 5	62.4	2,013	263	13.1
Alturas Lake	11	June 6-12	50.0	1,481	4	0.3
2004						
Pettit Lake	7	May 14-20	43.4	2,014	106	5.3
Redfish Lake	8	May 21-27	36.5	1,519	96	6.3
Sawtooth Hat.	8	May 21-27	100.0	96	19	20.0
Redfish Lake Cr. Trap	8	May 21-27	26.6	1,915	511	26.7
Pettit Lake from Sawt. Hat.	6	May 7-13	54.7	2,017	139	6.9
Pettit Lake Cr.	6	May 7-13	57.9	203	19	9.4

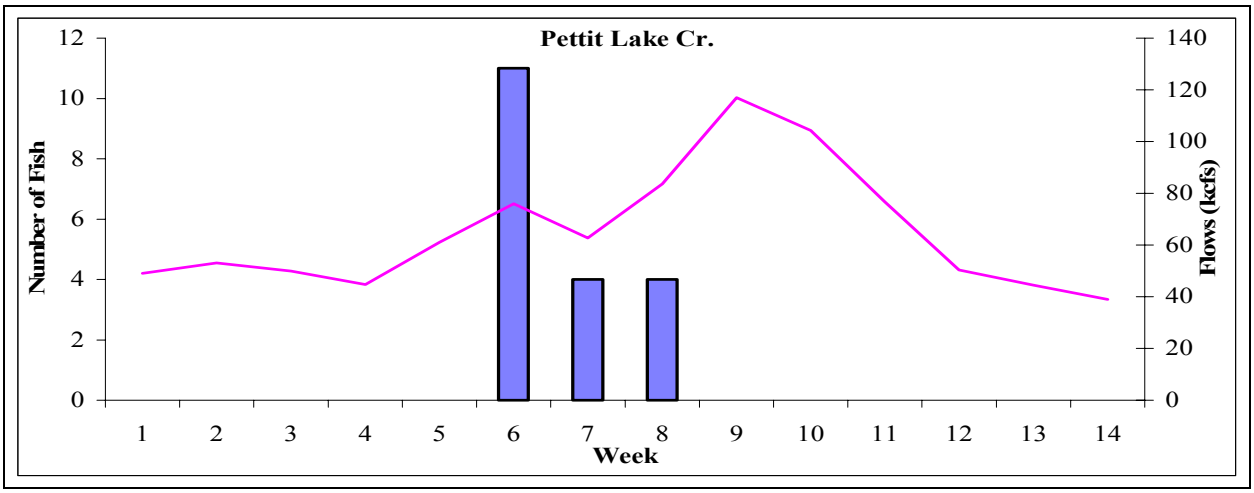

Figure 78. Number of PIT-tagged Pettit Lake Cr. hatchery sockeye detected by week and flows at LGR, 2004.

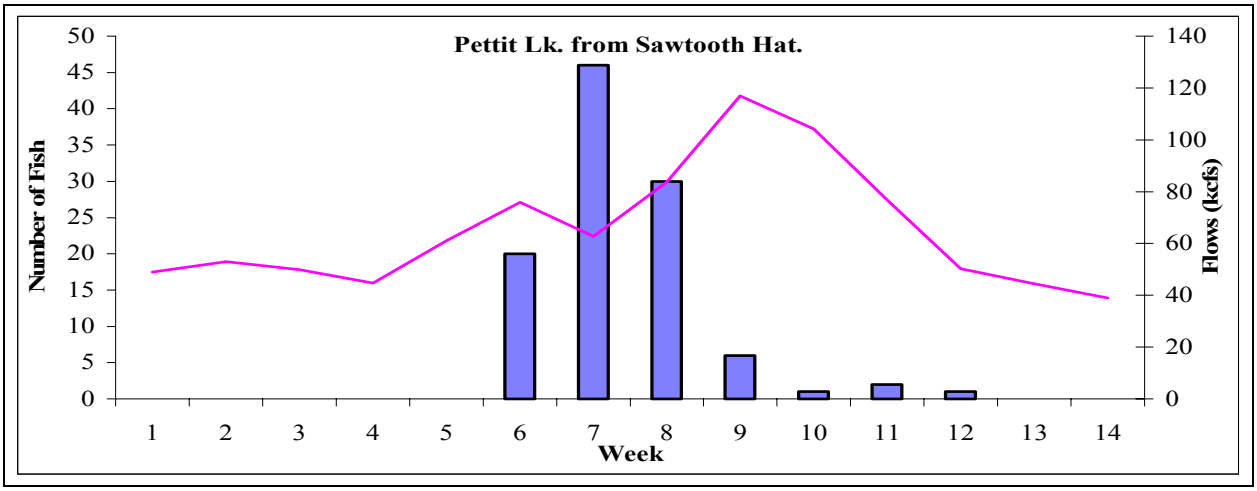

Figure 79. Number of PIT-tagged Pettit Lake hatchery sockeye from Sawtooth Hatchery detected by week and flows at LGR, 2004.

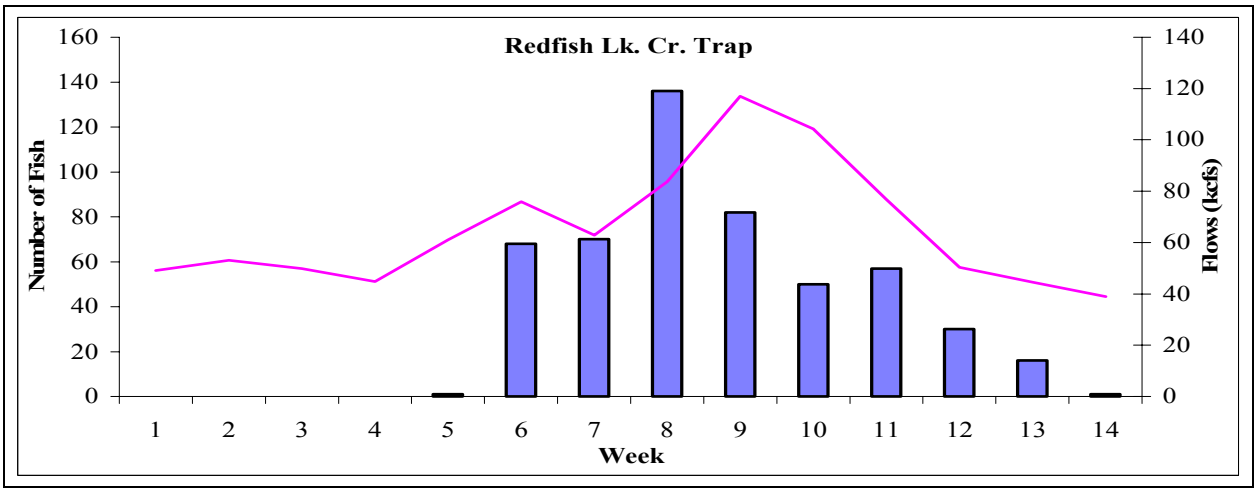

Figure 80. Number of PIT-tagged Redfish Lake Cr. trap hatchery sockeye detected by week and flows at LGR, 2004.

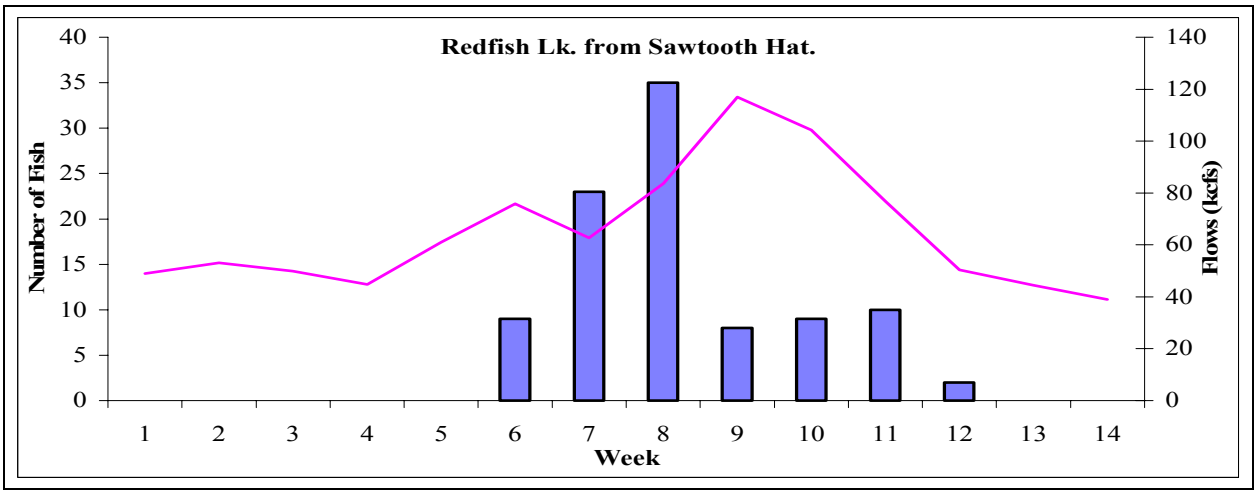

Figure 81. Number of PIT-tagged Redfish Lake hatchery sockeye from Sawtooth Hatchery detected by week and flows at LGR, 2004.

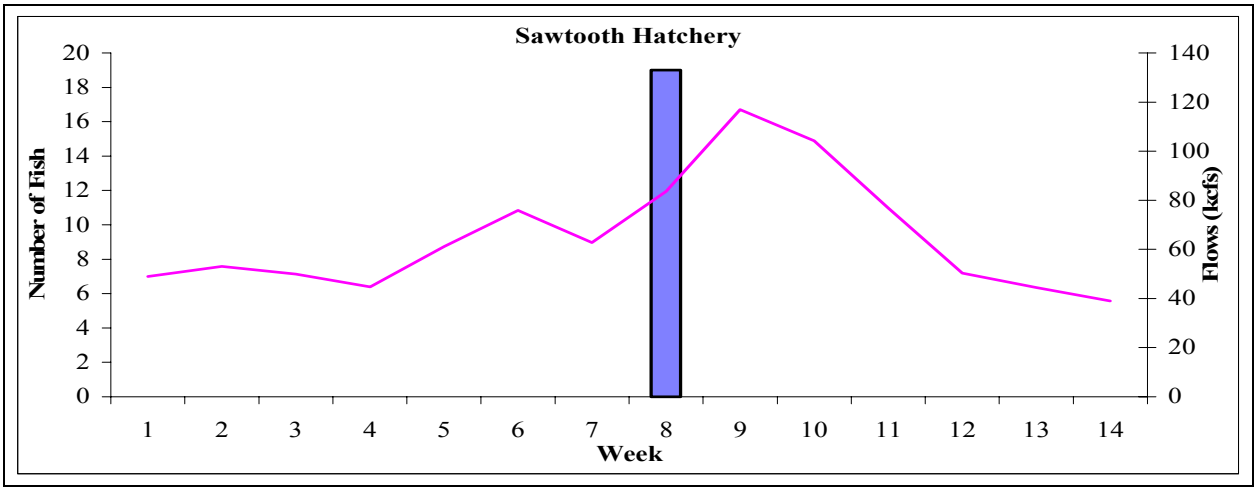

Figure 82. Number of PIT-tagged Sawtooth Hatchery Sockeye detected by week and flows at LGR, 2004.

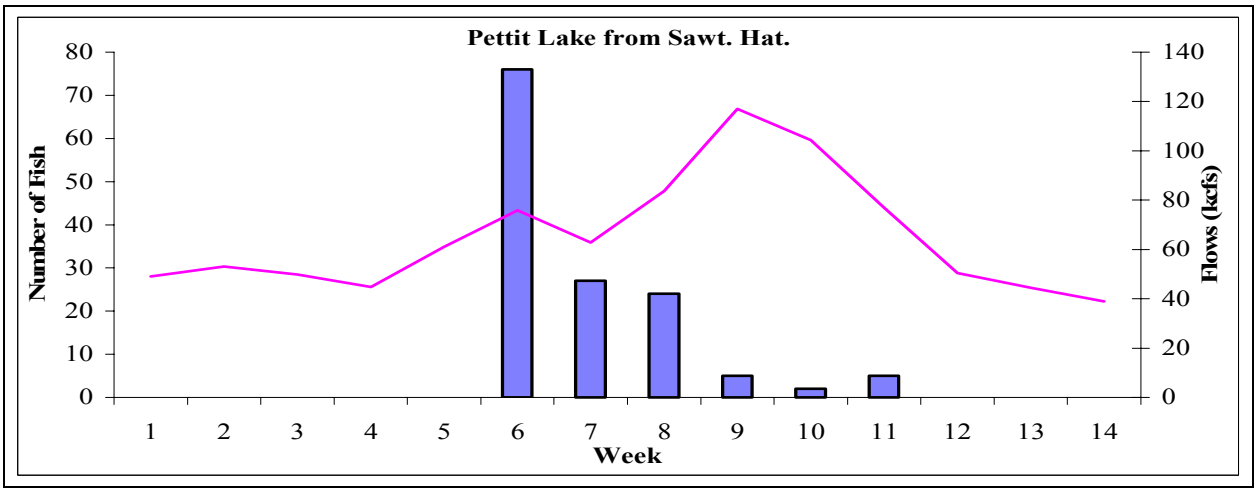

Figure 83. Number of PIT-tagged Sawtooth Hatchery sockeye released into Pettit Lake detected by week and flows at LGR, 2004.

Wild Sockeye

There were two release groups or sites for sockeye that were classified as wild in the PTAGIS database and 215 of these PIT-tagged sockeye were detected at Lower Granite in 2004. Detections peaked during week 6 for Redfish Lake Cr. Trap and Pettit Lake Cr. wild sockeye. The Redfish Lake Cr. trap wild sockeye peak detections occurred two weeks earlier than the hatchery sockeye from Redfish Lake Cr. trap. There were only two detections of PIT-tagged wild sockeye from Pettit Lake Cr. (Figures 84-85).

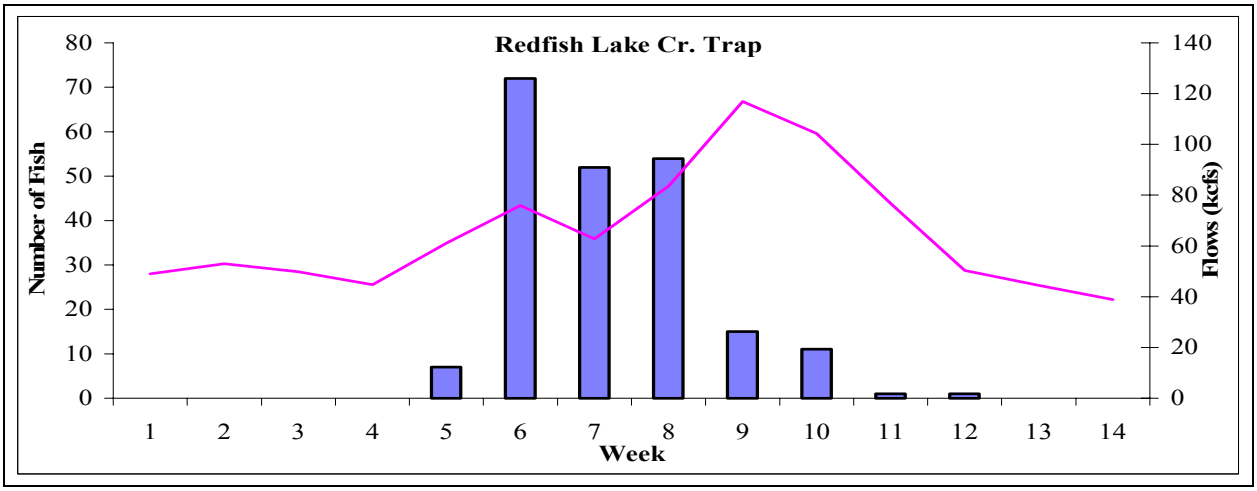

Figure 84. Number of PIT-tagged Redfish Lake Cr.trap wild sockeye detected by week and flows at LGR, 2004.

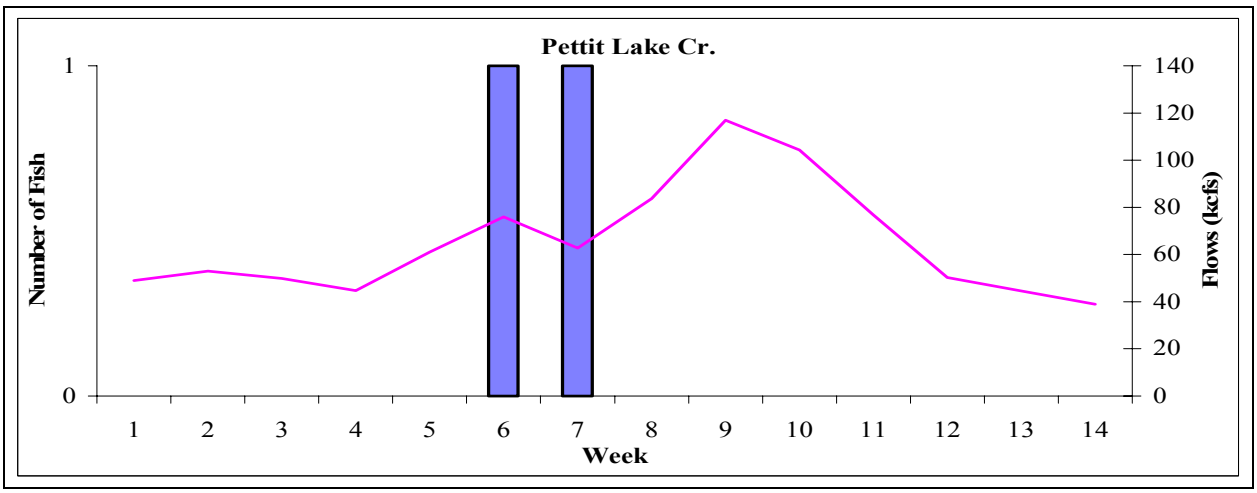

Figure 85. Number of PIT-tagged Pettit Lake Cr. wild sockeye detected by week and flows at LGR, 2004.

Coho

PIT-tagged coho detected at Lower Granite Dam this season were released from seven sites, one more site than reported in 2003. Lapwai Cr. (877) had the most PIT-tagged coho detected at Lower Granite Dam followed by Kooskia Hatchery (745), S. Fk. Clearwater R. (87), O'Hara Cr. (29), Eldorado Cr. (11), Meadow Cr. (2), and Potlatch R. (1). In previous years coho peak detections occurred in weeks during or just after peak flows. In 2004 most groups peak detections occurred before the peak flows for the season and significantly earlier than that observed in previous years (Figures 86-91).

Detection rates over the last four years ranged from a low of 0.1% to a high of 49.7% (Table 45). In previous years most of the coho in these groups were tagged and released as parr and detection rates for these coho have been very low. This year the Kooskia Hatchery and Lapwai Cr. PIT-tagged coho were released as smolts and had the highest detection rates observed to Lower Granite Dam in the four years examined. S. Fk. Clearwater River, Potlatch River, Eldorado Cr., Meadow Cr. and O'Hara Cr. all had very low detection rates and were released as Parr in previous years. Although these groups had very low detection rates after their peak migration year it still made up a significant percentage of the 2004 detections to Lower Granite Dam. The highest detection rates recorded at Lower Granite each year have been those observed for those groups of coho PIT-tagged prior to smolting and released as smolts, and these groups also included the Kooskia hatchery and Lapwai Cr. release groups in 2003.

Table 45. PIT-tagged coho release groups at LGR, 2001-2004.

Release Site (Hatchery)	Peak Week	Peak Date	% Detected During the Peak Week	Total Released	Total Detected	Percent Detected
2001						
Lapwai Cr. (WNFH)	9	May 25-31	28.9	1,035	111	10.7
Eldorado Cr. (CLWH)	14	June 29-July 5	44.6	1,553	74	4.8
Potlatch R. (WNFH)	8	May 18-24	24.1	1,042	58	5.6
Lolo Cr.	14	June 29-July 5	18.2	708	22	3.1
Meadow Cr. (CLWH)	16	July 13-19	25.0	1,443	16	1.1
2002						
Kooskia Hatchery	10	May 31-June 6	77.3	994	44	4.4
Lapwai Cr. (WNFH)	10	May 31-June 6	43.8	1,050	16	1.5
Potlatch R. (WNFH)	11	June 7-13	66.7	1,049	3	0.3
Meadow Cr. (CLWH)	13	June 21-27	33.0	1,024	21	2.1
Eldorado Cr. (CLWH)	13	June 21-27	26.3	1,000	19	1.9
2003						
Kooskia Hatchery	9	May 23-29	56.0	1,000	168	16.8
Lapwai Cr. (Eagle Cr.)	10	May 30-June 5	34.3	1,000	140	14.0
S. Fk. Clearwater (CLWH)	13	June 20-26	26.7	1,990	30	1.5
Potlatch R. (Eagle Cr.)	9	May 23-29	50.0	1,000	28	2.8
Eldorado Cr. (CLWH)	13	June 20-26	21.7	1,006	23	2.3
Meadow Cr. (CLWH)	11	June 6-12	57.1	999	14	1.4
2004						
Kooskia Hatchery	8	May 21-27	58.0	1,498	745	49.7
Lapwai Cr. (Eagle Cr. Hat)	6	May 7-13	40.0	2997	877	29.3
S. Fk. Clearwater (CLWH)	11	June 11-17	31.0	5,801	87	1.5
Potlatch R. (Eagle Cr. Hat.)	6	May 7-13	100.0	1,000	1	0.1
Eldorado Cr. (CLWH)	10	June 4-10	41.4	1,000	11	1.1
Meadow Cr. (CLWH)	8	May 21-27	45.5	1,024	2	0.2
O'Hara Cr. (CLWH)	8	May 21-27	31.0	3,124	29	0.9

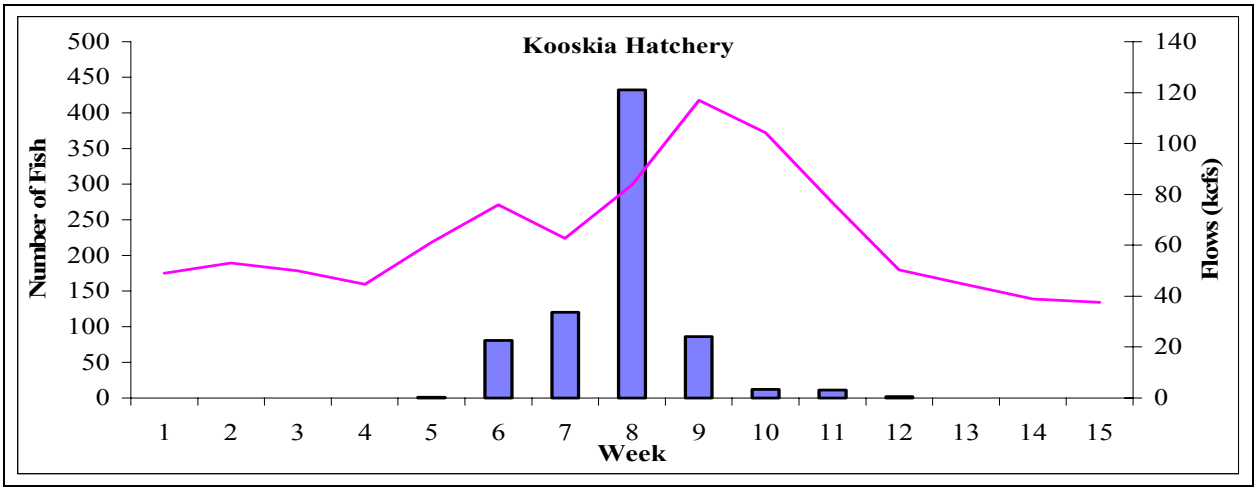

Figure 86. Number of PIT-tagged Kooskia hatchery coho detected by week and flows at LGR, 2004.

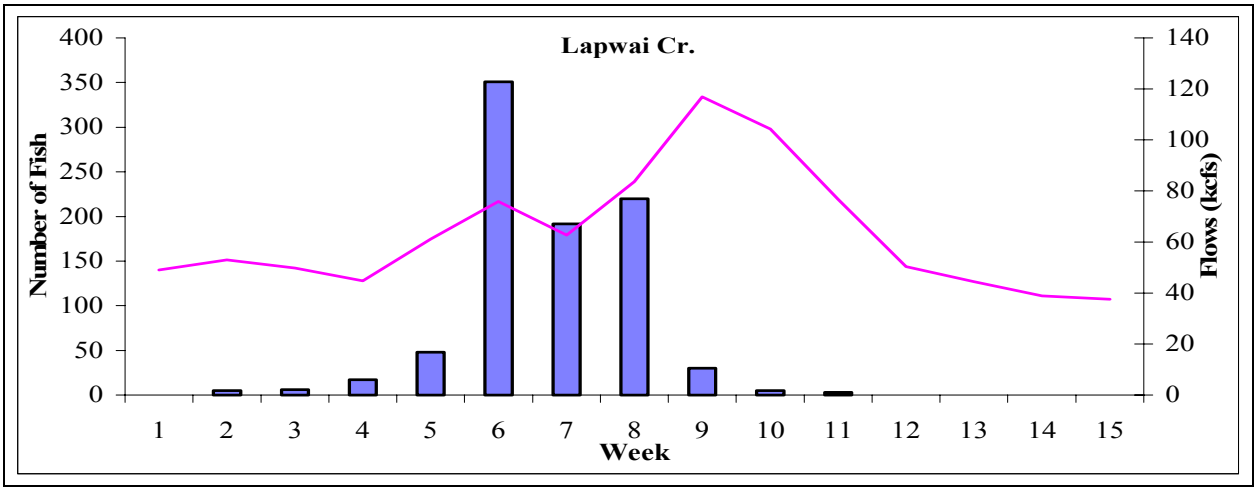

Figure 87. Number of PIT-tagged hatchery coho released into Lapwai Cr. detected by week and flows at LGR, 2004.

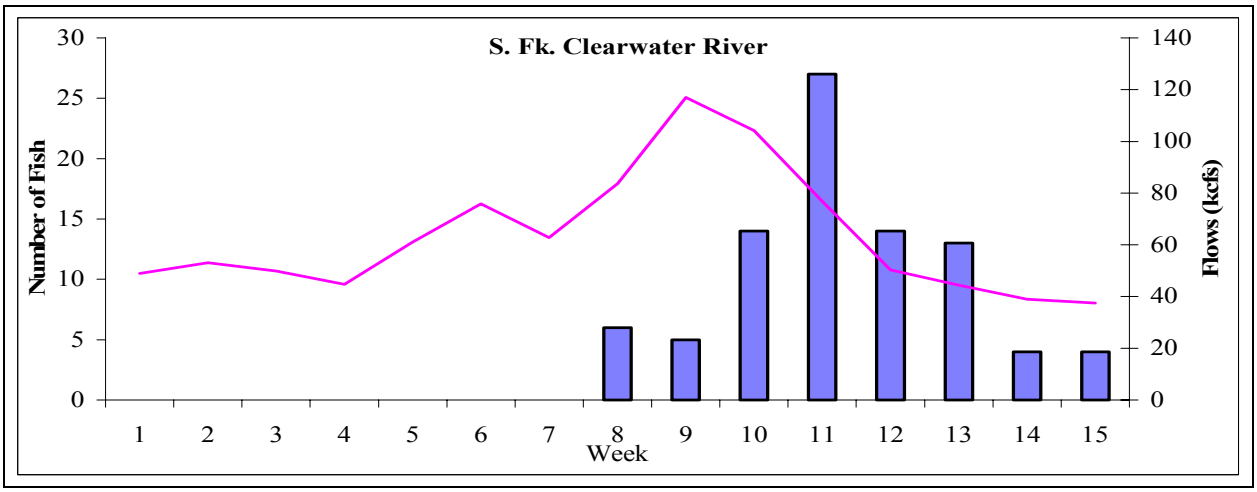

Figure 88. Number of PIT-tagged hatchery coho released into S. Fk. Clearwater R. detected by week and flows at LGR, 2004.

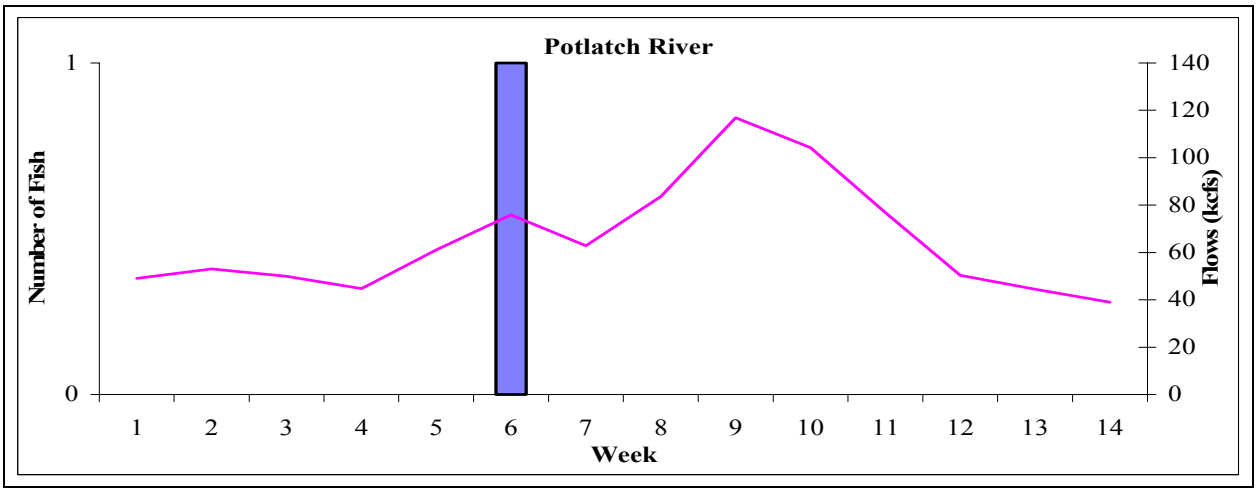

Figure 89. Number of PIT-tagged hatchery coho released into Potlatch River detected by week and flows at LGR, 2004.

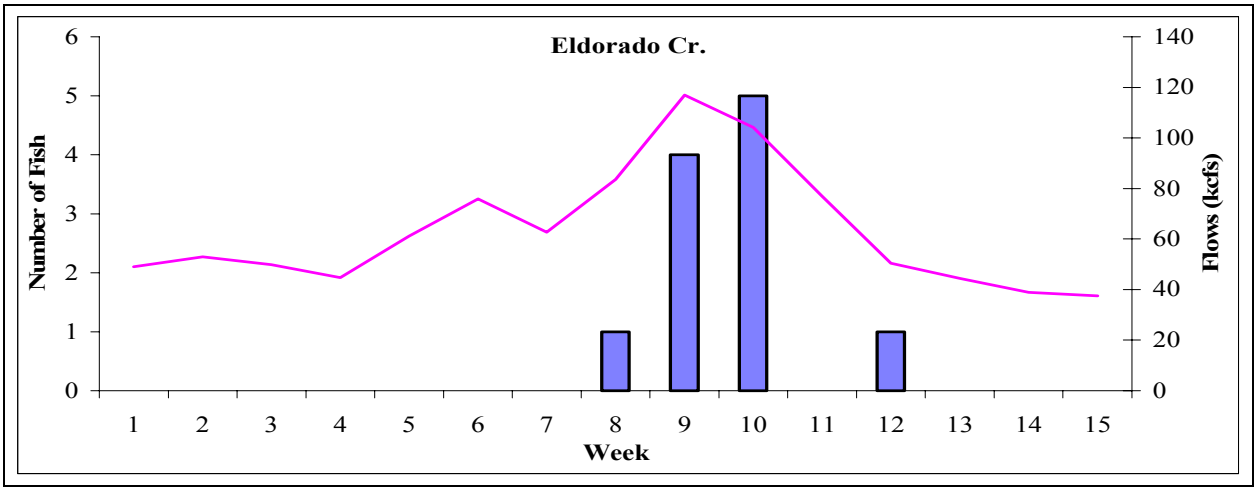

Figure 90. Number of PIT-tagged hatchery coho released into Eldorado Cr. detected by week and flows at LGR, 2004.

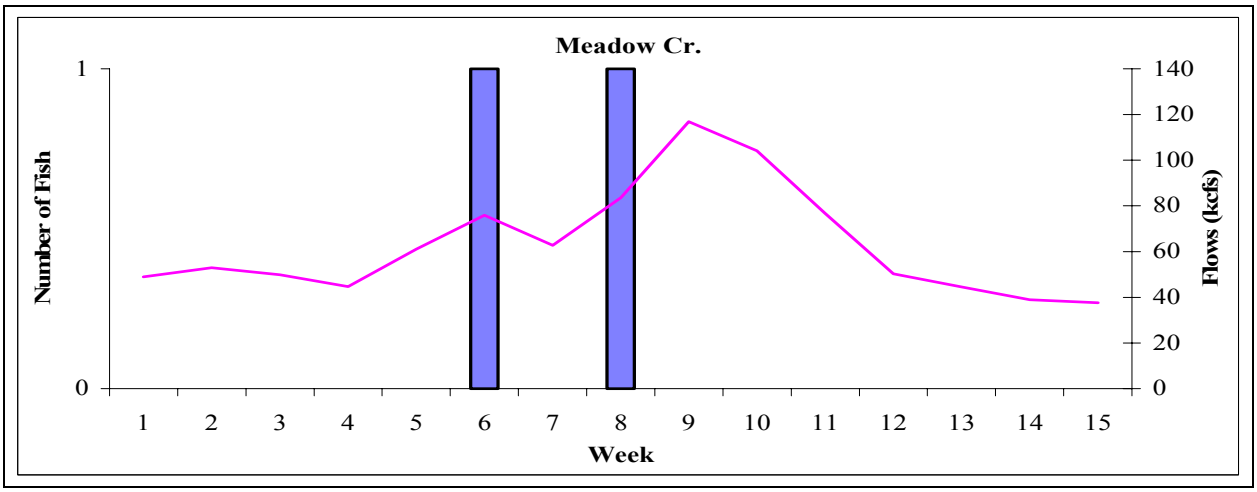

Figure 91. Number of PIT-tagged hatchery coho released into Meadow Cr. detected by week and flows at LGR, 2004.

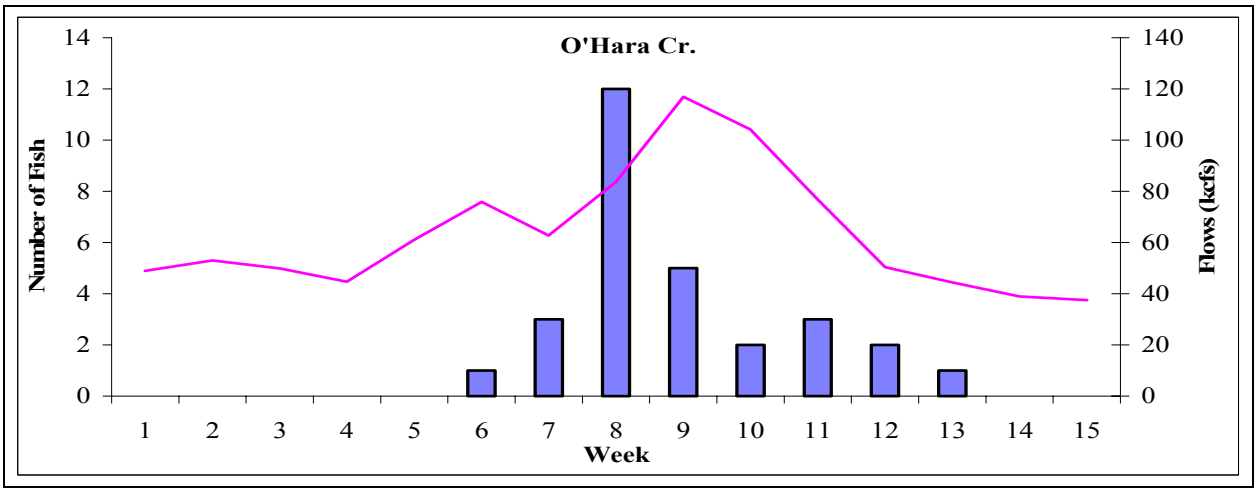

Figure 92. Number of PIT-tagged hatchery coho released into O'Hara Cr. detected by week and flows at LGR, 2004.

Fish Condition

Descaling

We began looking at gradations of scale loss in smolts during 1998 to augment the standard descaling data taken from subsample fish. The standard descaling criteria identifies a fish with 20% or greater scale loss on one side of its body as descaled, according to the Fish Passage Center guidelines. But, if scale loss was less than 20%, the guidelines did not allow us to identify the fish as descaled at all. We observed that many fish have levels of scale loss that do not fit this standard descaling criterion. Therefore, we began noting, in addition to standard descaling, if descaling was more than 5% but less than 20% and if a smolt was descaled 50% or more. Furthermore, each gradation of scale loss was characterized as patchy or scattered.

The 2004 sample descaling rate (>20%) for all species combined was 2.9%, 2.0% in 2003 and 2.2% for the 1999-2003 average (Tables 46 and 47).

The 2004 low-level patchy scale loss in the detailed sub-sample only (>5% and <20%) for all species combined was 1.5% in 2004, 1.8% in 2003, 2.0% in 2002 and 1.9% in 2001.

Table 46. Full sample annual descaling rates in percent for fish sampled at LGR, 1999-2004.

	Yearling Chinook		Subyearling Chinook		Steelhead		Sockeye/Kokanee		Coho	
Year	Clipped	No Clip[1]	Clipped	No Clip[2]	Clipped	No Clip[1]	Clipped	No Clip[1]	All	Total
1999	3.1	1.5	---	1.3	0.3	0.5	1.7	9.6	0.6	1.1
2000	3.1	1.0	----	0.6	1.8	0.9	0.0	12.0	1.3	1.3
2001	1.9	1.4	1.0	1.2	2.2	1.3	5.9	9.3	3.1	1.7
2002	2.3	1.5	0.9	1.5	4.2	2.5	1.8	6.9	2.0	2.3
2003	2.0	1.2	0.6	1.7	3.8	2.1	4.1	10.0	2.9	2.0
99-03	2.5	1.2	1.5	1.3	3.8	1.7	3.0	9.6	2.7	2.2
2004	3.6	1.7	1.0	2.3	3.1	3.5	4.3	2.7	4.7	2.9

[1]Wild chinook, wild steelhead and wild sockeye/kokanee designated in text as unclipped beginning in 2000.
[2]Hatchery chinook, hatchery steelhead and hatchery sockeye/kokanee designated in text as clipped for 2000-2004.

Weekly average descaling (>20%) rates for yearling chinook and steelhead were highest during the peak of the spring migration May 7 through May 13. There were no weeks (exception: October 29-31) during the 2004 migration season in which either clipped or unclipped sockeye/kokanee sample numbers exceeded 100 fish. Unclipped subyearling fall chinook descaling rates were highest September 10-23. Coho rates peaked May 7-13 (Table 47).

Table 47. Weekly descaling (>20%) rates in percent for fish sampled at LGR, 2004.

Week Ending	Yearling Chinook Clipped	Yearling Chinook No Clip	Subyearling Chinook Clipped	Subyearling Chinook No Clip[2]	Steelhead Clipped	Steelhead No Clip	Sockeye/Kokanee Clipped	Sockeye/Kokanee No Clip	Coho All	Total
4/1	1.8	0.5	---	*0.0	0.6	1.8	---	*0.0	*0.0	1.1
4/8	0.3	0.4	---	*0.0	0.1	0.2	---	*8.3	*0.0	0.4
4/15	0.1	0.0	---	*0.0	0.0	0.9	---	*0.0	*0.0	0.1
4/22	0.8	0.5	---	---	0.2	0.0	---	---	*0.0	0.5
4/29	3.1	2.9	---	*0.0	1.4	1.4	---	---	*0.0	2.3
5/6	3.0	1.6	---	*0.0	2.6	1.9	---	---	*0.0	2.7
5/13	12.3	5.4	---	*0.0	5.7	6.5	*0.0	*0.0	8.3	7.2
5/20	2.6	0.6	---	*0.0	1.8	1.9	*0.0	*0.0	3.9	1.9
5/27	3.0	0.5	---	*0.0	1.9	2.6	*9.1	*0.0	2.6	2.1
6/3	*2.8	0.0	*0.0	*0.0	2.0	4.3	*0.0	*0.0	6.3	2.3
6/10	*0.0	0.7	1.2	0.4	2.6	4.1	*0.0	*25.0	*6.8	1.1
6/17	*0.0	*0.0	*1.4	0.6	2.3	3.8	*0.0	*0.0	*5.9	0.8
6/24	*0.0	*0.0	*0.0	0.4	0.8	*4.7	*0.0	*0.0	*3.3	0.5
7/1	*0.0	0.0	*0.0	0.3	0.5	*1.8	*0.0	---	*2.7	0.3
7/8	*0.0	*8.2	*0.0	0.5	2.6	*2.7	*0.0	*0.0	*4.5	0.7
7/15	*0.0	*5.3	---	0.4	1.4	3.6	*0.0	*0.0	*0.0	0.5
7/22	*25.0	*0.0	---	0.4	2.9	*8.1	*0.0	*0.0	*20.0	0.7
7/29	---	*8.3	*0.0	2.1	2.2	*2.9	---	---	*25.0	2.2
8/5	*0.0	*0.0	---	3.4	3.6	*4.4	---	*0.0	*0.0	3.4
8/12	*0.0	*0.0	---	1.4	*2.8	*50.00	---	*0.0	*0.0	1.5
8/19	*0.0	*0.0	---	3.2	*1.3	*6.3	---	---	*0.0	3.1
8/26	---	---	---	2.7	*5.3	*0.0	---	---	---	2.7
9/2	---	*0.0	---	1.9	*2.6	*0.0	*100	*20.0	*0.0	2.1
9/9	*0.0	*0.0	*0.0	2.6	*0.0	*0.0	*0.0	*0.0	*0.0	2.5
9/16	*0.0	*0.0	*0.0	6.4	*0.0	*0.0	*0.0	*0.0	*0.0	5.7
9/23	*0.0	*0.0	*0.0	10.6	2.1	*7.7	*0.0	*1.3	*0.0	10.5
9/30	---	*0.0	---	3.3	*0.0	*0.0	---	*9.1	*0.0	3.3
10/7	*10.0	*0.0	---	4.6	*0.0	*0.0	*0.0	*9.1	*0.0	4.8
10/14	*2.3	*0.0	---	4.7	*0.0	*0.0	*0.0	*0.0	*0.0	4.2
10/21	1.2	*0.0	---	3.3	*0.0	*0.0	---	*3.7	*0.0	2.7
10/28	1.5	*0.0	---	2.4	*0.0	*16.7	---	*0.0	---	2.2
10/31	*0.0	*0.0	---	1.1	*0.0	*0.0	---	1.6	---	0.9
Totals										
# Desc'd	1,059	213	5	989	1,036	316	2	10	90	3,720
#Samp'd	29,052	12,197	519	43,573	33,915	8,931	46	369	1,922	130,524
% Desc'd	3.6%	1.7%	1.0%	2.3%	3.1%	3.5%	4.3%	2.7%	4.7%	2.9%

* Less than 100 fish sampled during the week.
--- No fish sampled during the week.

Injury and Disease

In addition to standard length, weight and descaling data recorded for individual smolts in the daily sub-sample, smolts were also examined for visible injuries and symptoms of disease. A total of 2,980 (13.92%) smolts from the detailed sub-sample were recorded as having some level of descaling, head, body or predator-caused injury or symptom of disease, compared to 2,958 (15.64%) smolts in 2003, 3,876 (17.33%) in 2002, 5,082 (19.04%) in 2001 and 8,233 (28.08%) in 2000. The actual proportion of injured smolts is less than the rates shown because some fish have more than one visible injury. A total of 21,407 smolts were examined in the detailed sub-sample during the 2004 season (Table 49) compared to 18,913 in 2003, 22,372 in 2002, 26,688 in 2001 and 29,316 in 2000. The injuries and diseases that we sample for are identified in Table 48.

Table 48. Key to injury data in the detailed sub-sample at LGR.

Head		**Body**	
AB	Abrasion	BL	Bloated
EI	Eye Injury	SR	Scale Regeneration
EP	Pop" Eye	EM	Emaciated
OP	Opercula	FI	Fin Injury
JW	Mandable (Jaw)	LA	Laceration
MX	Maxillary	LE	Lesion
HD	Head Deformity	BD	Deformity

Disease		**Predator**	
FU	Fungus	PA	Angler
CY	Cyst	PB	Bird
CO	Columnaris	PL	Lamprey
DI	Digenia	MD	Moribund
GH	Gill Hyperplasia	PP	Fish Bite
HE	Hemorrhage		
KD	BKD		
PA	Parasite		
SC	Scoliosis		

Table 49. Summary injuries and diseases in percent in the detailed sub-sample at LGR, 2004.

	Yearling Chinook		Subyearling Chinook		Steelhead		Sockeye/Kokanee		Coho	
	Clipped	No Clip	Clipped	No Clip	Clipped	No Clip	Clipped	No Clip	All	Total
# Sampled	3,181	3,036	216	7,272	3,834	2,612	46	278	932	21,407
Descaled										
>P	2.48%	1.68%	0.46%	2.96%	1.96%	1.57%	2.17%	3.24%	3.00%	2.34%
>S	0.88%	0.30%	0.00%	0.26%	1.12%	0.77%	2.17%	0.00%	1.07%	0.61%
<P	1.51%	0.99%	0.00%	2.01%	1.59%	0.92%	0.00%	3.24%	2.04%	1.57%
<S	0.41%	0.30%	0.00%	0.84%	0.70%	0.31%	0.00%	0.72%	0.54%	0.58%
5P	0.79%	0.36%	0.00%	0.41%	0.34%	0.15%	0.00%	0.36%	0.21%	0.40%
Total	193	110	1	471	219	97	2	21	64	1,178
%	6.07%	3.62%	0.46%	6.48%	5.71%	3.71%	4.35%	7.55%	6.87%	5.50%
Head										
AB	0.00%	0.03%	0.00%	0.06%	0.16%	0.04%	0.00%	0.00%	0.00%	0.06%
EI	0.22%	0.20%	0.00%	0.15%	0.18%	0.15%	0.00%	0.00%	0.32%	0.18%
EP	0.31%	0.03%	0.00%	0.07%	0.03%	0.08%	0.00%	0.00%	0.00%	0.09%
OP	0.25%	0.16%	0.46%	0.33%	1.20%	0.96%	0.00%	0.36%	0.11%	0.52%
JW	0.00%	0.00%	0.00%	0.03%	0.08%	0.11%	0.00%	0.00%	0.00%	0.04%
MX	0.00%	0.00%	0.00%	0.00%	0.03%	0.00%	0.00%	0.00%	0.00%	0.00%
HD	0.09%	0.03%	0.00%	0.04%	0.42%	0.54%	0.00%	0.00%	0.00%	0.17%
Total	28	14	1	49	80	49	0	1	4	226
%	0.88%	0.46%	0.46%	0.67%	2.09%	1.88%	0.00%	0.36%	0.43%	1.06%
Body										
BL	0.06%	0.07%	0.00%	0.06%	0.00%	0.00%	0.00%	0.36%	0.00%	0.04%
SR	0.09%	0.00%	0.00%	0.04%	0.05%	0.08%	0.00%	0.00%	0.00%	0.05%
EM	0.00%	0.07%	0.00%	0.01%	0.18%	0.23%	0.00%	0.00%	0.11%	0.08%
FI	1.79%	1.98%	0.46%	3.92%	2.22%	3.75%	0.00%	0.00%	4.51%	2.93%
LA	0.13%	0.16%	0.00%	0.11%	0.21%	0.23%	0.00%	0.00%	0.00%	0.14%
LE	0.03%	0.07%	0.00%	0.03%	0.13%	0.19%	0.00%	0.00%	0.00%	0.07%
BD	0.03%	0.03%	0.00%	0.03%	0.26%	0.04%	0.00%	0.00%	0.11%	0.07%
Total	68	72	1	305	117	118	0	1	44	726
%	2.14%	2.37%	0.46%	4.19%	3.05%	4.52%	0.00%	0.36%	4.72%	3.39%
Disease										
FU	0.44%	0.23%	0.00%	0.06%	0.78%	1.07%	0.00%	0.00%	0.11%	0.39%
CY	0.03%	0.00%	0.00%	0.01%	0.08%	0.00%	0.00%	0.00%	0.00%	0.02%
CO	0.03%	0.03%	0.00%	3.97%	0.00%	0.00%	0.00%	0.36%	0.11%	1.37%
DI	0.03%	0.20%	0.00%	0.01%	0.03%	1.03%	0.00%	0.00%	0.00%	0.17%
GH	0.03%	0.00%	0.00%	0.03%	0.13%	0.15%	0.00%	0.00%	0.00%	0.06%
HE	0.03%	0.43%	0.00%	1.86%	0.47%	0.08%	0.00%	0.00%	0.32%	0.80%
KD	0.00%	0.00%	0.00%	0.07%	0.13%	0.08%	0.00%	0.00%	0.00%	0.06%
PA	0.28%	0.23%	0.93%	0.10%	0.21%	0.27%	0.00%	0.00%	0.11%	0.19%
SC	0.53%	0.07%	0.00%	0.04%	0.13%	0.15%	0.00%	0.00%	0.00%	0.14%
Total	45	36	2	447	75	74	0	1	6	686
%	1.41%	1.19%	0.93%	6.15%	1.96%	2.83%	0.00%	0.36%	0.64%	3.20%
Predator Injury										
PH	0.00%	0.00%	0.00%	0.01%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
PB	0.41%	0.00%	0.46%	0.11%	1.49%	1.11%	0.00%	0.00%	0.43%	0.52%
PL	0.00%	0.00%	0.00%	0.21%	0.16%	0.08%	0.00%	0.00%	0.43%	0.13%
MD	0.19%	0.00%	0.00%	0.03%	0.03%	0.04%	0.00%	0.00%	0.00%	0.05%
PP	0.16%	0.00%	0.00%	0.10%	0.00%	0.08%	0.00%	0.00%	0.00%	0.07%
Total	24	0	1	33	64	34	0	0	8	164
%	0.75%	0.00%	0.46%	0.45%	1.67%	1.30%	0.00%	0.00%	0.86%	0.77%

Head Injuries

Head injuries observed this season included abrasions and injury to the eye, pop-eye, opercula, mandible, maxillary and deformity. Head injuries in 2004 were recorded in 1.06% of the smolts examined in the detailed sub-sample, 1.06% in 2003, 1.16% in 2002, 1.67% in 2001, and 3.86% in 2000. Injuries to opercula and eyes comprised 65.92% of the total head injuries in 2004 with steelhead (clipped and unclipped) being the species most affected, as was the case most years. Opercle and abrasion injuries have been decreasing since 2000, eye injuries are generally in decline since 2000 and head deformities in 2004 are close to the 2000-2003 average of 0.16% (Table 50 and 51).

Table 50. Head injuries by percent identified in the detailed sub-sample at LGR, 2000-2004.

	Yearling Chinook		Subyearling[1] Chinook		Steelhead		Sockeye/Kokanee		Coho	
	Clipped	No Clip	Clipped	No Clip	Clipped	No Clip	Clipped	No Clip	All	Total
2000	2.06	1.04	----	6.69	3.48	1.94	1.47	1.45	1.68	3.86
2001	1.55	0.98	0.12	0.78	3.27	1.75	1.54	0.00	1.39	1.67
2002	1.12	0.47	0.47	1.17	1.93	1.18	0.00	1.35	0.00	1.16
2003	1.72	0.69	0.49	0.66	1.68	1.25	1.47	0.00	1.66	1.06
2004	0.88	0.46	0.46	0.67	2.09	1.88	0.00	0.36	0.43	1.06

Note: Clipped subyearling fall chinook were not present in the system in year 2000.

Table 51. Head injuries by percent from the detailed sub-sample at LGR, 2000-2004.

	Yearling Chinook		Subyearling[1] Chinook		Steelhead		Sockeye/Kokanee		Coho	
	Clipped	No Clip	Clipped	No Clip	Clipped	No Clip	Clipped	No Clip	All	Total
OP										
2000	0.68	0.64	----	5.29	1.69	0.79	0.00	1.21	0.84	2.56
2001	0.61	0.50	0.00	0.28	1.47	0.65	0.00	0.00	0.44	0.69
2002	0.59	0.24	0.47	0.62	1.38	0.39	0.00	0.74	0.00	0.64
2003	1.01	0.13	0.30	0.34	1.12	0.34	0.00	0.00	0.44	0.52
2004	0.25	0.16	0.46	0.33	1.20	0.96	0.00	0.36	0.11	0.52
EI										
2000	0.49	0.17	----	0.26	0.64	0.26	0.00	0.00	0.30	0.36
2001	0.58	0.32	0.00	0.19	0.92	0.44	1.54	0.00	0.72	0.50
2002	0.32	0.16	0.00	0.26	0.34	0.43	0.00	0.49	0.00	0.29
2003	0.34	0.30	0.10	0.15	0.37	0.29	0.00	0.00	0.55	0.26
2004	0.22	0.20	0.00	0.15	0.18	0.15	0.00	0.00	0.32	0.18
AB										
2000	0.03	0.03	----	0.76	0.13	0.02	0.00	0.24	0.15	0.32
2001	0.06	0.03	0.00	0.06	0.35	0.15	0.00	0.00	0.06	0.14
2002	0.02	0.04	0.00	0.08	0.15	0.00	0.00	0.12	0.00	0.06
2003	0.04	0.00	0.00	0.06	0.04	0.10	0.00	0.00	0.11	0.05
2004	0.00	0.03	0.00	0.06	0.16	0.04	0.00	0.00	0.00	0.06
HD										
2000	0.33	0.03	----	0.06	0.80	0.69	0.00	0.00	0.08	0.34
2001	0.13	0.09	0.00	0.00	0.25	0.19	0.00	0.00	0.00	0.12
2002	0.02	0.00	0.00	0.06	0.03	0.32	0.00	0.00	0.00	0.07
2003	0.15	0.17	0.00	0.03	0.07	0.48	0.00	0.00	0.00	0.12
2004	0.09	0.03	0.00	0.04	0.42	0.54	0.00	0.00	0.00	0.17

Table 51. Continued

	Yearling Chinook		Subyearling[1] Chinook		Steelhead		Sockeye/Kokanee		Coho	
	Clipped	No Clip	Clipped	No Clip	Clipped	No Clip	Clipped	No Clip	All	Total
EP										
2000	0.27	0.03	----	0.13	0.03	0.05	0.00	0.00	0.15	0.11
2001	0.13	0.00	0.12	0.06	0.00	0.06	0.00	0.00	0.06	0.05
2002	0.10	0.04	0.00	0.06	0.00	0.04	0.00	0.00	0.00	0.05
2003	0.11	0.00	0.00	0.04	0.00	0.05	0.00	0.00	0.00	0.04
2004	0.31	0.03	0.00	0.07	0.03	0.08	0.00	0.00	0.00	0.09
JW										
2000	0.22	0.07	----	0.13	0.14	0.10	1.47	0.00	0.08	0.13
2001	0.03	0.03	0.00	0.09	0.21	0.15	0.00	0.00	0.11	0.11
2002	0.07	0.00	0.00	0.04	0.00	0.00	0.00	0.00	0.00	0.03
2003	0.04	0.09	0.10	0.01	0.07	0.00	1.47	0.00	0.11	0.05
2004	0.00	0.00	0.00	0.03	0.08	0.11	0.00	0.00	0.00	0.04
MX										
2000	0.05	0.07	----	0.06	0.05	0.02	0.00	0.00	0.08	0.05
2001	0.00	0.00	0.00	0.09	0.08	0.11	0.00	0.00	0.00	0.06
2002	0.00	0.00	0.00	0.05	0.03	0.00	0.00	0.00	0.00	0.02
2003	0.04	0.00	0.00	0.03	0.00	0.00	0.00	0.00	0.11	0.02
2004	0.00	0.00	0.00	0.00	0.03	0.00	0.00	0.00	0.00	0.00

Body Injuries

The most prevalent body injuries recorded this season included fin damage, lesions, lacerations, and emaciation. Approximately 3.39% of the smolts examined this year in the detailed sub-sample exhibited some visible body injury compared to 3.72% in 2003, 2.88% in 2002, 4.29% in 2001 and 5.92% in 2000 (Table 52). The groups most afflicted with body injuries in 2004 were coho (4.72 %), unclipped steelhead (4.52 %) and unclipped subyearling chinook (4.19 %). Fin injuries (split rays and fraying) were present in all species and represented 86.50% of all the body injuries in 2004. Fin injuries were most prevalent in coho (4.51%), followed by unclipped subyearling fall chinook (3.92%), unclipped steelhead (3.75%) and clipped steelhead (2.22). Fin injuries were highest in 2000 (5.21%), decreased to 1.95% in 2002 and have been relatively close to that rate over the last three years. The next highest body injury category in 2004 were lacerations at 0.14% of all body injuries, the approximate 2000-2004 average. Over the last five years the highest percentage for emaciated fish occurred in 2001 and since then the annual percentages have ranged from 0.05% to 0.17%. Lesions have averaged less than 0.30% from 2000-2004, with 2004 the lowest during this time frame. Lesions in 2004 were the lowest in five years (Table 53), and clipped chinook and clipped steelhead are typically the most affected groups.

Table 52. Body injuries by percent from the detailed sub-sample at LGR, 2000-2004.

	Yearling Chinook		Subyearling Chinook		Steelhead		Sockeye/Kokanee		Coho	
Year	Clipped	No Clip	Clipped	No Clip	Clipped	No Clip	Clipped	No Clip	All	Total
2000	4.06	3.62	----	7.31	6.76	4.76	0.00	2.91	6.25	5.92
2001	3.74	2.18	1.44	3.04	6.58	4.84	7.69	1.89	5.44	4.29
2002	2.13	1.02	1.74	3.79	3.64	3.01	5.56	2.08	0.00	2.88
2003	3.69	2.10	2.07	3.74	4.26	4.87	1.47	2.50	5.54	3.72
2004	2.14	2.37	0.46	4.19	3.05	4.52	0.00	0.36	4.72	3.39

Table 53. Body injuries by percent from the detailed sub-sample at LGR, 2000-2004.

	Yearling Chinook		Subyearling Chinook		Steelhead		Sockeye/Kokanee		Coho	
	Clipped	No Clip	Clipped	No Clip	Clipped	No Clip	Clipped	No Clip	All	Total
FI										
2000	3.33	3.11	----	6.76	5.48	4.21	0.00	2.66	5.86	5.21
2001	2.22	1.74	1.32	2.37	1.25	2.44	7.69	0.94	4.72	2.15
2002	1.20	0.75	1.42	2.45	2.33	2.18	4.63	1.47	0.00	1.95
2003	2.42	1.76	1.87	3.24	2.95	3.57	0.00	2.50	4.87	2.93
2004	1.79	1.98	0.46	3.92	2.22	3.75	0.00	0.00	4.51	2.93
LA										
2000	0.24	0.23	----	0.11	0.22	0.24	0.00	0.00	0.00	0.17
2001	0.23	0.03	0.00	0.08	0.13	0.13	0.00	0.47	0.00	0.10
2002	0.12	0.12	0.00	0.05	0.21	0.21	0.93	0.25	0.00	0.13
2003	0.37	0.04	0.00	0.10	0.22	0.14	0.00	0.00	0.00	0.14
2004	0.13	0.16	0.00	0.11	0.21	0.23	0.00	0.00	0.00	0.14
EM										
2000	0.03	0.10	----	0.05	0.46	0.19	0.00	0.00	0.30	0.17
2001	0.16	0.13	0.00	0.02	4.31	1.79	0.00	0.00	0.28	1.40
2002	0.02	0.00	0.00	0.00	0.15	0.14	0.00	0.25	0.00	0.05
2003	0.07	0.00	0.00	0.03	0.49	0.68	0.00	0.00	0.11	0.17
2004	0.00	0.07	0.00	0.01	0.18	0.23	0.00	0.00	0.11	0.08
LE										
2000	0.08	0.03	----	0.12	0.18	0.05	0.00	0.24	0.00	0.10
2001	0.35	0.00	0.00	0.37	0.36	0.19	0.00	0.47	0.39	0.28
2002	0.24	0.04	0.16	0.06	0.52	0.29	0.00	0.12	0.00	0.19
2003	0.34	0.04	0.00	0.08	0.37	0.34	1.47	0.00	0.44	0.20
2004	0.03	0.07	0.00	0.03	0.13	0.19	0.00	0.00	0.00	0.07
SR										
2000	0.03	0.03	----	0.13	0.18	0.00	0.00	0.00	0.08	0.10
2001	0.23	0.16	0.00	0.05	0.35	0.23	0.00	0.00	0.00	0.18
2002	0.02	0.00	0.00	0.14	0.18	0.04	0.00	0.00	0.00	0.08
2003	0.11	0.04	0.20	0.11	0.15	0.10	0.00	0.00	0.11	0.11
2004	0.09	0.00	0.00	0.04	0.05	0.08	0.00	0.00	0.00	0.05
BL										
2000	0.27	0.07	----	0.09	0.00	0.02	0.00	0.00	0.00	0.08
2001	0.26	0.00	0.12	0.06	0.00	0.00	0.00	0.00	0.00	0.05
2002	0.27	0.04	0.16	0.08	0.03	0.00	0.00	0.00	0.00	0.09
2003	0.15	0.17	0.10	0.13	0.00	0.00	0.00	0.00	0.00	0.10
2004	0.06	0.07	0.00	0.06	0.00	0.00	0.00	0.36	0.00	0.04
BD										
2000	0.08	0.03	----	0.06	0.24	0.05	0.00	0.00	0.00	0.09
2001	0.29	0.13	0.00	0.09	0.19	0.06	0.00	0.00	0.06	0.13
2002	0.24	0.08	0.00	0.04	0.21	0.14	0.00	0.00	0.00	0.12
2003	0.23	0.09	0.00	0.08	0.07	0.10	0.00	0.00	0.00	0.10
2004	0.03	0.03	0.00	0.03	0.26	0.04	0.00	0.00	0.11	0.07

Diseases

Diseases with common external symptoms noted during the season include fungus, cysts, columnaris, digenia, gill hyperplasia, hemorrhaged fin, bacterial kidney disease, parasites and scoliosis. Total disease percentages in the detailed sub-sample have been declining steadily from 10.94% in 2000 to 3.20% in 2004 (Table 54).

The percentage of subyearling fall chinook observed with symptoms consistent with columnaris (CO), yellowish blemishes, lesions, and loss of skin from the snout, decreased this year to 3.97%, compared to 6.72% in 2003, 9.50% in 2002, 13.93% in 2001 and 14.54% in 2000 (Table 55). This disease, caused by the bacterium Flavobacterium columnare, infects mainly summer and fall migrants because it becomes more virulent when water temperatures exceed 15.6ºC (60ºF). Warren Groberg, Fish Pathologist for Oregon Department of Fish and Wildlife, visited the Lower Granite Juvenile Fish Facility September 30, 1998 and provided additional information on external symptoms characteristic of columnaris. Groberg explained that the snout injuries (loss of protective skin tissue) and yellowish blemishes without broken skin were also symptoms of F. columnare infection. Based on this information, subyearling fall chinook were identified as being infected with columnaris.

Gill hyperplasia (GH), characterized by swollen or "club-shaped" gill filaments, primarily affects clipped steelhead and occurs throughout the main portion of the migration in April and May. Gill hyperplasia was recorded in 0.13% of the clipped steelhead in 2004 compared to 0.18% in 2003, 0.09% in 2002, 0.19% in 2001, and 1.50% in 2000.

Fin hemorrhaging (HE), characterized by redness in the ventral fin tissues, was observed in 0.80% of fish examined in the detailed sub-sample in 2004. It was most prevalent in unclipped subyearling fall chinook, 1.86% in 2004, 3.72% in 2003, 5.15% in 2002, 1.64% in 2001 and 6.97% in 2000.

Table 54. Diseases by percent by year from the detailed sub-sample at LGR, 2000-2004.

	Yearling Chinook		Subyearling Chinook		Steelhead		Sockeye/Kokanee		Coho	
	Clipped	No Clip	Clipped	No Clip	Clipped	No Clip	Clipped	No Clip	All	Total
Year										
2000	0.84	2.55	----	23.40	7.62	3.06	0.00	1.21	4.11	10.94
2001	1.93	0.98	1.20	15.82	3.41	4.19	1.54	1.40	5.11	6.09
2002	0.90	0.75	0.32	15.30	2.30	2.90	3.70	1.47	0.00	6.35
2003	2.37	1.13	0.79	10.88	2.11	2.46	0.00	0.00	1.37	5.26
2004	1.41	1.19	0.93	6.15	1.96	2.83	0.00	0.36	0.64	3.20

Table 55. Diseases by percent from the detailed sub-sample at LGR, 2000-2004.

	Yearling Chinook		Subyearling Chinook		Steelhead		Sockeye/Kokanee		Coho	
	Clipped	No Clip	Clipped	No Clip	Clipped	No Clip	Clipped	No Clip	All	Total
CO										
2000	0.08	0.44	----	14.54	0.40	0.19	0.00	0.24	1.22	5.39
2001	0.00	0.06	0.48	13.93	0.44	0.40	1.54	0.47	2.61	3.73
2002	0.07	0.04	0.00	9.50	0.06	0.04	0.00	0.12	0.00	3.34
2003	0.04	0.00	0.20	6.72	0.04	0.00	0.00	0.00	0.00	2.56
2004	0.03	0.03	0.00	3.97	0.00	0.00	0.00	0.36	0.11	1.37
FU										
2000	0.03	0.13	----	0.06	0.38	0.29	0.00	0.24	0.00	0.16
2001	1.00	0.35	0.00	0.00	0.46	0.74	0.00	0.94	0.22	0.42
2002	0.29	0.12	0.16	0.14	0.80	0.61	0.93	0.86	0.00	0.35
2003	1.92	0.52	0.00	0.03	0.66	0.43	0.00	0.00	0.00	0.49
2004	0.44	0.23	0.00	0.05	0.78	1.07	0.00	0.00	0.00	0.39
PA										
2000	0.11	0.13	----	0.32	2.08	0.74	0.00	0.24	0.46	0.71
2001	0.10	0.16	0.00	0.14	1.47	0.61	0.00	0.00	0.83	0.58
2002	0.29	0.20	0.00	0.37	0.89	0.54	0.00	0.25	0.00	0.41
2003	0.08	0.13	0.10	0.25	0.48	0.39	0.00	0.00	0.00	0.24
2004	0.28	0.23	0.93	0.11	0.18	0.27	0.00	0.00	0.00	0.19
HE										
2000	0.33	1.57	----	6.97	3.07	0.72	0.00	0.48	1.14	3.49
2001	0.16	0.13	0.12	1.64	0.66	0.80	0.00	0.00	0.67	0.78
2002	0.02	0.12	0.16	5.15	0.31	0.04	0.00	0.25	0.00	1.87
2003	0.08	0.26	0.30	3.72	0.33	0.10	0.00	0.00	0.00	1.52
2004	0.03	0.43	0.00	1.86	0.47	0.08	0.00	0.00	0.32	0.80
GH										
2000	0.11	0.10	----	1.08	1.50	0.34	0.00	0.00	0.23	0.78
2001	0.00	0.06	0.00	0.02	0.19	0.08	0.00	0.00	0.00	0.07
2002	0.02	0.00	0.00	0.03	0.09	0.00	0.00	0.00	0.00	0.03
2003	0.04	0.00	0.10	0.01	0.18	0.14	0.00	0.00	0.00	0.06
2004	0.03	0.00	0.00	0.03	0.13	0.15	0.00	0.00	0.00	0.06
SC										
2000	0.05	0.00	----	0.07	0.03	0.02	0.00	0.00	0.00	0.04
2001	0.03	0.00	0.00	0.02	0.03	0.00	0.00	0.00	0.00	0.01
2002	0.00	0.00	0.00	0.01	0.09	0.00	0.00	0.00	0.00	0.02
2003	0.11	0.00	0.00	0.04	0.22	0.00	0.00	0.00	0.00	0.06
2004	0.53	0.07	0.00	0.04	0.13	0.15	0.00	0.00	0.00	0.14
KD										
2000	0.11	0.07	----	0.23	0.06	0.07	0.00	0.24	0.46	0.13
2001	0.58	0.06	0.60	0.05	0.13	0.00	0.00	0.00	0.00	0.13
2002	0.17	0.04	0.00	0.09	0.06	0.00	0.93	0.00	0.00	0.08
2003	0.08	0.13	0.10	0.03	0.04	0.05	0.00	0.00	0.00	0.05
2004	0.00	0.00	0.00	0.07	0.13	0.08	0.00	0.00	0.00	0.06
DI										
2000	0.03	0.07	----	0.02	0.00	0.67	0.00	0.00	0.99	0.16
2001	0.00	0.16	0.00	0.20	0.30	1.51	0.00	0.00	0.72	0.35
2002	0.02	0.24	0.00	0.00	0.00	1.68	0.00	0.00	0.00	0.24
2003	0.04	0.09	0.00	0.00	0.04	1.35	0.00	0.00	0.00	0.17
2004	0.03	0.20	0.00	0.01	0.03	1.03	0.00	0.00	0.00	0.17

Predators

Injuries associated with predator marks included wounds inflicted by anglers, birds, and lamprey. This year, as in the previous four years, birds were the primary cause of most predator injuries. Injuries by birds (PB) in 2004, characterized by V-shaped scratches on both sides of a fish, were observed on 1.49% of the clipped steelhead and 1.11% of the unclipped steelhead, typically the most affected groups (Tables 56 and 57). Lampreys marks (PL), characterized by the presence of small disc-shaped patches of scale loss sometimes with central petechial hemorrhaging, were observed on 0.13% of the fish examined in the sub-sample in 2004.

Table 56. Predator injuries by percent from the detailed sub-sample at LGR, 2000-2004.

	Yearling Chinook		Subyearling Chinook		Steelhead		Sockeye/Kokanee		Coho	
	Clipped	No Clip	Clipped	No Clip	Clipped	No Clip	Clipped	No Clip	All	Total
Year										
2000	0.70	0.00	----	0.40	2.33	1.75	0.00	1.69	0.53	1.03
2001	0.68	0.00	0.60	0.37	2.34	1.83	1.54	0.47	0.44	1.10
2002	0.83	0.00	0.32	0.49	3.22	3.19	0.93	0.37	0.00	1.22
2003	0.30	0.00	0.00	0.00	0.07	0.43	0.00	0.00	0.57	0.13
2004	0.75	0.00	0.46	0.45	1.67	1.30	0.00	0.00	0.86	0.77

Table 57. Predator injuries by percent from the detailed sub-sample at LGR, 2000-2004.

	Yearling Chinook		Subyearling Chinook		Steelhead		Sockeye/Kokanee		Coho	
	Clipped	No Clip	Clipped	No Clip	Clipped	No Clip	Clipped	No Clip	All	Total
PH										
2000	0.00	0.00	----	0.00	0.03	0.02	0.00	0.00	0.00	0.01
2001	0.03	0.00	0.00	0.00	0.03	0.08	0.00	0.00	0.00	0.03
2002	0.00	0.00	0.00	0.00	0.00	0.04	0.00	0.00	0.00	0.00
2003	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2004	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00
PB										
2000	0.57	0.00	----	0.15	2.25	1.68	0.00	0.73	0.46	0.88
2001	0.42	0.00	0.36	0.09	2.23	1.64	1.54	0.00	0.17	0.92
2002	0.37	0.00	0.00	0.10	1.72	0.90	0.93	0.00	0.00	0.47
2003	0.15	0.00	0.00	0.00	0.07	0.43	0.00	0.00	0.23	0.09
2004	0.41	0.00	0.46	0.11	1.49	1.11	0.00	0.00	0.43	0.52
PL										
2000	0.00	0.00	----	0.03	0.00	0.00	0.00	0.00	0.00	0.01
2001	0.00	0.00	0.00	0.05	0.03	0.00	0.00	0.00	0.00	0.02
2002	0.24	0.00	0.00	0.04	1.41	2.18	0.00	0.00	0.00	0.54
2003	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.23	0.01
2004	0.00	0.00	0.00	0.21	0.16	0.08	0.00	0.00	0.43	0.13
MD										
2000	0.03	0.00	----	0.06	0.02	0.00	0.00	0.48	0.00	0.03
2001	0.06	0.00	0.24	0.16	0.05	0.02	0.00	0.47	0.17	0.06
2002	0.05	0.00	0.16	0.09	0.00	0.00	0.00	0.25	0.00	0.05
2003	0.04	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01
2004	0.19	0.00	0.00	0.03	0.03	0.04	0.00	0.00	0.00	0.05
PP										
2000	0.11	0.00	----	0.16	0.03	0.05	0.00	0.48	0.08	0.10
2001	0.16	0.00	0.00	0.08	0.00	0.08	0.00	0.00	0.11	0.06
2002	0.17	0.00	0.16	0.26	0.09	0.07	0.00	0.12	0.00	0.15
2003	0.11	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.11	0.02
2004	0.16	0.00	0.00	0.10	0.00	0.08	0.00	0.00	0.00	0.07

Fish Mortality

The overall facility mortality rate for smolts collected at LGR in 2004 was an estimated 0.27% compared to 0.43% in 2003. In all, 32,305 facility mortalities were recorded from a total collection of 11,787,539 smolts. The numbers of facility mortalities and the mortality percentages of the total collected by species group were: 17,857 clipped yearling chinook (0.48%), 5,336 unclipped yearling chinook (0.46%), 250 clipped subyearling fall chinook (0.69%), 5,198 unclipped subyearling fall chinook (0.54%), 2,738 clipped steelhead (0.06%), 509 unclipped steelhead (0.05%), 19 clipped sockeye/kokanee (0.37%), 90 unclipped sockeye/kokanee (3.55%) and 308 coho (0.12%) (Table 58).

Facility Mortality

Facility mortality included fish removed from the raceways, barges or trucks before departure, sample mortalities, recovery tank mortalities and the National Oceanic and Atmospheric Administration (NOAA Fisheries) mortalities attributed to handling. The facility mortality for all species combined in 2004 (0.27%) was similar to the 1996-2003 average of 0.22%. The mortality rate for clipped yearling chinook in 2004 was more than double the 2003 rate and was slightly above the 1996-2003 average. The unclipped yearling chinook facility mortality rate was 91.7% greater than observed in 2003 and 10.9% greater than the 1996-2003 average. The clipped subyearling fall chinook mortality rate of 0.69% is 76.0% less than observed in 2003. The unclipped subyearling fall chinook mortality rate in 2004 was 0.54% compared to 1.43% in 2003, 1.19% in 2002 and 0.52% in 2001. The facility mortality rates for clipped and unclipped steelhead in 2004 were nearly identical and closely follow the 1996-2003 average of 0.06%. The clipped sockeye/kokanee 2004 mortality rate of 0.37% is 69.9% less than in 2003 and 59.3% less than the 1996-2003 average of 0.91%. In contrast the unclipped sockeye/kokanee rate of 3.55% is 171% more than in 2003 and 19.1% more than the 1996-2003 average of 2.98%. The facility mortality rate for coho in 2004 is 50.0% less than the 1996-2003 average of 0.24% (Table 58). Weekly mortality rates are listed in Table 59.

Table 58. Annual facility mortality in percent at LGR, 1996-2004.

	Yearling Chinook		Subyearling Chinook		Steelhead		Sockeye/Kokanee		Coho	
Year	Clipped	No Clip	Clipped	No Clip	Clipped	No Clip	Clipped	No Clip	All	Total
1996	0.62	0.94	0.00	1.42	0.05	0.05	0.41	5.06	0.12	0.13
1997	0.89	0.72	2.20	3.55	0.08	0.05	2.92	3.95	0.13	0.17
1998	0.25	0.32	2.50	2.42	0.08	0.08	0.17	0.29	0.32	0.14
1999	0.60	0.55	0.93	0.83	0.03	0.04	0.83	4.69	0.25	0.28
2000	0.13	0.15	---	0.47	0.01	0.02	0.07	2.29	0.04	0.09
2001	0.22	0.19	0.38	0.52	0.04	0.07	0.00	3.12	0.25	0.13
2002	0.21	0.20	1.41	1.19	0.08	0.06	1.62	3.13	0.15	0.34
2003	0.21	0.24	2.87	1.43	0.09	0.10	1.23	1.31	0.68	0.43
96-03	0.39	0.41	1.29	1.48	0.06	0.06	0.91	2.98	0.24	0.22
2004	0.48	0.46	0.69	0.54	0.06	0.05	0.37	3.55	0.12	0.27

[1]Wild chinook, wild steelhead and wild sockeye/kokanee designated in text as unclipped beginning in 2000.
[2]Hatchery chinook, hatchery steelhead and hatchery sockeye/kokanee designated in text as clipped for 2000-2004.

Table 59. Weekly facility mortality in percent at LGR, 2004.

	Yearling Chinook		Subyearling Chinook		Steelhead		Sock/Kokanee		Coho	
Year	Clipped	No Clip	Clipped	No Clip	Clipped	No Clip	Clipped	No Clip	All	Total
4/1	1.10	1.31	----	0.00	0.25	0.58	----	5.00	0.00	0.81
4/8	0.53	0.61	----	1.00	0.07	0.04	----	4.67	0.00	0.48
4/15	0.10	0.15	----	0.52	<0.01	<0.01	----	0.00	0.00	0.09
4/22	0.19	0.16	----	0.50	0.02	0.02	----	----	0.00	0.14
4/29	1.00	1.51	----	3.02	0.03	0.05	----	----	0.18	0.66
5/6	0.40	0.21	----	0.00	0.15	0.08	----	----	0.02	0.29
5/13	0.38	0.23	----	1.12	0.03	0.02	----	2.01	0.04	0.12
5/20	0.21	0.21	----	2.68	0.04	0.04	----	0.67	0.06	0.08
5/27	0.46	0.43	----	0.59	0.05	0.04	0.39	0.40	0.15	0.10
6/3	0.39	0.15	0.18	0.49	0.12	0.06	0.00	0.00	0.31	0.14
6/10	0.09	0.08	0.65	0.33	0.09	0.04	0.75	1.00	0.46	0.28
6/17	0.19	0.22	1.57	0.47	0.06	0.09	0.36	2.00	0.16	0.44
6/24	0.44	0.06	0.72	0.40	0.19	0.06	1.00	0.00	0.57	0.38
7/1	1.83	0.29	10.63	0.69	0.49	0.80	1.00	----	0.48	0.68
7/8	2.00	0.39	12.00	0.49	0.96	1.51	4.00	32.00	1.09	0.54
7/15	0.00	0.39	0.00	0.35	1.13	0.71	0.00	0.00	0.56	0.36
7/22	4.29	0.76	0.00	0.63	0.51	1.20	0.00	0.00	3.33	0.65
7/29	0.00	2.50	6.67	1.96	0.81	3.01	0.00	0.00	4.00	1.90
8/5	11.11	5.26	0.00	1.67	0.68	1.46	0.00	40.00	0.00	1.61
8/12	0.00	0.00	0.00	0.96	0.35	1.25	0.00	0.00	0.00	0.93
8/19	0.00	0.00	0.00	2.01	0.95	6.94	0.00	0.00	4.17	2.02
8/26	0.00	0.00	0.00	1.53	1.72	0.00	0.00	50.00	0.00	1.56
9/2	0.00	0.00	0.00	1.15	1.90	0.00	0.00	6.67	0.00	1.18
9/9	0.00	0.00	0.00	1.65	3.33	0.00	0.00	44.44	0.00	2.04
9/16	0.00	0.00	0.00	3.32	0.00	0.00	0.00	4.55	0.00	3.07
9/23	0.00	0.00	0.00	3.37	0.68	0.00	0.00	14.13	0.00	3.49
9/30	0.00	0.00	0.00	0.64	0.00	0.00	0.00	8.93	0.00	0.69
10/7	0.00	0.00	0.00	1.26	0.00	0.00	0.00	4.88	0.00	1.42
10/14	2.22	0.00	0.00	1.78	5.00	0.00	0.00	2.63	0.00	1.91
10/21	0.00	0.00	0.00	0.34	0.00	14.29	0.00	20.59	0.00	1.21
10/28	0.00	0.00	0.00	0.93	0.00	0.00	0.00	22.22	0.00	1.50
10/31	1.30	0.00	0.00	2.72	0.00	0.00	0.00	5.88	0.00	2.99
#Morts	17,857	5,336	250	5,200	2,738	509	19	90	308	32,307
#Collect	3,690,180	1,156,925	36,491	965,861	4,587,116	1,090,363	5,180	2,532	252,891	11,787,539
%Morts	0.48%	0.46%	0.69%	0.54%	0.06%	0.05%	0.37%	3.55%	0.12%	0.27%

----No fish collected

Sample Mortality

Sample mortalities include dead fish removed from the sample tank prior to sampling and those from the sorting trough in the sample lab. In 2004 a total of 1,487 sample mortalities were recorded from 132,011 fish sampled, a rate of 1.13%. This compares to 1.41% in 2003 (1,505 mortalities of 106,503 fish sampled), and 1.07% with 1,104 sample mortalities in 2002 (Table 60). The 2004 sample mortality rate of 1.13% is 5.8% less than the 1996-2003 rate of 1.20%. The total sample mortalities and percent mortality by species group for 2004 included: 440 clipped yearling chinook (1.49%), 143 unclipped yearling chinook (1.16%), eight clipped subyearling fall chinook (1.52%), 693 unclipped subyearling fall chinook (1.57%), 114 clipped steelhead (0.34%), 23 unclipped steelhead (0.26%), two clipped sockeye/kokanee (4.17%), 54 unclipped sockeye/kokanee (12.77%), and 10 coho (0.52%).

Sockeye/kokanee sample mortality rates from 1996 to 2004 are the highest of all species groups and the most variable, possibly because there are small and fragile and few of these fish are sampled compared to other groups. Clipped and unclipped steelhead are the only species groups with an average sample mortality rate of less than one percent from 1996-2004 and are the least variable (Table 60). Clipped yearling chinook have the next lowest sample mortality rate and variability from 1996-2003, followed by clipped subyearling fall chinook.

Table 60. Annual sample mortality in percent at LGR, 1999-2004.

	Yearling Chinook[2]		Subyearling Chinook[2]		Steelhead[1]		Sockeye/Kokanee[1,2]		Coho	
Year	Clipped	No Clip	Clipped	No Clip	Clipped	No Clip	Clipped	No Clip	All	Total
1996	1.86	2.34	---	2.71	0.35	0.19	0.79	13.24	0.75	0.78
1997	1.34	3.15	3.89	5.66	0.41	0.45	6.71	20.59	1.87	1.65
1998	1.80	2.23	2.74	4.67	0.82	0.67	2.65	11.54	2.38	1.86
1999	1.62	1.48	0.00	1.31	0.32	0.51	1.67	9.61	0.56	1.06
2000	1.14	0.84	---	1.25	0.13	0.23	0.00	10.00	0.35	0.85
2001	0.69	0.58	1.15	1.69	0.35	0.46	0.00	13.99	1.06	0.96
2002	0.76	0.80	2.58	1.39	0.32	0.30	2.73	12.32	0.68	1.07
2003	1.07	1.01	3.99	1.83	0.43	0.62	2.74	2.50	1.06	1.41
96-03	1.29	1.55	1.79	2.56	0.39	0.43	2.16	11.72	1.09	1.20
2004	1.49	1.16	1.52	1.57	0.34	0.26	4.17	12.77	0.52	1.13

[1]Wild chinook, wild steelhead and wild sockeye/kokanee designated in text as unclipped beginning in 2000.
[2]Hatchery chinook, hatchery steelhead and hatchery sockeye/kokanee designated in text as clipped for 2000-2004.
Note: Clipped subyearling fall chinook were not present in the system in 1996 and 2000.

Barge Mortality

Barge mortalities (dead fish removed from barge holds after the barges departed LGR) also include mortalities from fish loaded at Little Goose, Lower Monumental and McNary Dams into barges originating at Lower Granite Dam. The total barge mortality rate in 2004 for all facilities combined was 0.06%, a total of 14,475 mortalities of 24,076,965 barged fish (Tables 61 and 62). The total number of smolts barged included 11,164,132 fish from Lower Granite, 5,027,085 from Little Goose Dam, 1,306,059 fish from Lower Monumental Dam and 6,579,689 from McNary Dam. Barge mortalities by species include: 7,137 clipped yearling chinook, 1,871 unclipped yearling chinook, 20 clipped subyearling fall chinook, 1,733 unclipped subyearling fall chinook, 2,838 clipped steelhead, 746 unclipped steelhead, seven clipped sockeye/kokanee, eight unclipped sockeye/kokanee and 115 coho (clipped and unclipped combined).

Table 61. Total barge mortalities from LGR, LGS, LMN and MCN dams, 1996-2004.

	Yearling Chinook		Subyearling Chinook		Steelhead		Sockeye/Kokanee		Coho	
Year	Clip	No Clip	Clip	No Clip	Clip	No Clip	Clip	No Clip	All	Total
1996	2,514	849	0	8	2,327	133	17	275	3	6,126
1997	1,169	354	0	3	1,389	44	2	37	0	2,998
1998	4,289	822	3	433	1,312	201	7	4	154	7,225
1999	3,808	889	0	148	773	146	118	61	236	6,179
2000	2,651	464	0	895	567	138	4	5	5	4,729
2001	1,037	470	46	280	1,566	562	3	0	5	3,969
2002	3,358	888	24	2,374	3,656	913	120	314	62	11,705
2003	3,408	1,111	643	4,808	2,290	868	5	4	249	13,386
96-03	2,779	731	90	1,119	1,735	376	35	88	88	7,040
2004	7,137	1,871	20	1,733	2,838	746	7	8	115	14,475

Note: 1996 and 2000 not included in clipped subyearling fall chinook 1996-2003 averages.

Table 62. Barge mortality percent 1996-2004.

Year	Number of Mortalities	Number Barged	% Mortality
1996	6,126	4,990,798	0.12%
1997	2,998	4,327,398	0.07%
1998	7,225	6,542,402	0.11%
1999	6,179	5,232,105	0.12%
2000	4,729	19,140,329	0.02%
2001	3,969	21,090,654	0.02%
2002	11,709	13,678,513	0.09%
2003	13,386	16,835,117	0.08%
96-03 avg.	7,040	11,479,665	0.06%
2004	14,475	24,076,965	0.06%

Note: Mortality percent for 1996-1999 calculated without including the number of fish barged from LGS, LMN, MCN. Mortality percent for 2000-2004 calculated using number of fish barged from all Sites (LGR, LGS, LMN and MCN).

Truck Mortality

The overall mortality rate for fish trucked from Lower Granite Dam in 2004 was 0.39%, 354 mortalities of 89,705 fish trucked. This includes fish trucked prior to barging and fish trucked during the late season ending October 31. Total 2004 trucking mortality numbers and percent by species was as follows: three clipped yearling chinook (0.02%), 345 unclipped subyearling fall chinook (1.22%), three clipped steelhead (0.03%), three unclipped steelhead (0.04%), (Table 63 and 64).

Table 63. Annual truck mortality in percent at LGR, 1996-2004.

	Yearling Chinook		Subyearling[1] Chinook		Steelhead		Sock/Kokanee		Coho	
Year	Clipped	No Clip	Clipped	No Clip[2]	Clipped	No Clip	Clipped	No Clip	All	Total
1996	1.22	0.97	0.00	0.43	0.31	0.37	0.11	1.42	0	0.41
1997	0.79	0.26	0.26	0.45	0.13	0.04	1.25	0.00	0.00	0.19
1998	0.43	0.52	0.00	0.62	0.47	0.27	0.16	0.00	0.34	0.50
1999	0.39	0.18	0.00	0.22	0.45	0.09	0.00	0.30	0.22	0.24
2000	0.54	0.89	0.00	0.17	0.50	0.53	0.00	0.40	0.00	0.23
2001	0.10	0.10	0.75	0.44	0.67	0.54	0.00	0.00	0.00	0.47
2002	0.19	0.05	0.00	0.22	0.13	0.00	0.00	0.16	0.00	0.20
2003	0.29	0.13	1.39	0.35	0.26	0.05	4.76	0.00	0.52	0.23
96-03	0.40	0.29	0.27	0.31	0.31	0.23	0.35	0.90	0.24	0.32
2004	0.02	0.00	0.00	1.22	0.03	0.04	0.00	0.00	0.00	0.39

Table 64. Annual truck mortality numbers and percent 1996-2004.

Year	Number of Mortalities	Number Trucked	% Mortality
1996	539	131,467	0.41%
1997	471	248,016	0.19%
1998	937	187,305	0.50%
1999	561	233,952	0.24%
2000	390	171,795	0.23%
2001	618	131,323	0.47%
2002	147	72,513	0.20%
2003	223	96,282	0.23%
96-03 avg.	486	159,082	0.31%
2004	354	89,705	0.39%

Incidental Fishes

Incidental species

An estimated total of 33,772 non-salmonid incidental fish entered the fish facility at Lower Granite Dam in 2004 (Table 65). This represents a decrease of 38% in total incidentals from the 2003 total of 54,857. Approximately 29,412 (88%) of this season's incidental fish were counted prior to September 2 when the sample rate was set at 100% compared to 94% in 2003, (September 2), 97% in 2002 (October 18), 92.7% in 2001 (September 6) and 92.0% in 2000 (October 2), respectively.

Peamouth were the most abundant incidental species with 8,411 collected. This is 27.4% of the total incidentals collected in 2004 and represents a 77% increase over the 4,740 collected in 2003, in the expanded sample. An estimated total of 4,796 lamprey comprised 15.6% of the total incidentals in the expanded sample in 2004. This represents a 754% decrease from the 36,184 collected in 2003. In 2002, 63,492 lamprey were collected and in 2001 and 2000, 20,572 and 6,304 were collected, respectively. This is the first year since 1998 that juvenile lamprey were not the most abundant incidental fish species collected in the expanded sample. The majority of lamprey juveniles in 2004 were collected by the end of June. Juvenile shad were the third most abundant incidental species, with 3,751 in the expanded sample, an 869% increase from the 387 collected in 2003. Other incidentals in significant numbers in the expanded sample included Whitefish (2,863), Rainbow Trout (2,804), Crappie (2,668) and Suckers (2,380). All sampled incidental fish counts were expanded based on daily sample rates to estimate the total transported collection.

Incidental species are ranked by most abundant by year are identified in Table 66.

Table 65. Estimated collection of incidental fish species at LGR, 2004.

Common Name	Scientific Name	Separator	Expanded Sample	Total Collection[1]
Pacific Lamprey (Adult)	Entosphenus tridentate	3	50	53
Pacific Lamprey (Juvenile)	E. tridentate		4,161	4,161
Pacific Lamprey (Ammocete)	E. tridentate		585	585
American Shad (Adult)	Alosa sapidissima	332	887	1,219
American Shad (Juvenile)	A. sapidissima		3,751	3,751
Smallmouth Bass	Micropterus dolomieui	9	986	995
Largemouth Bass	Micropterus salmoides		149	149
Bull Trout	Salvelinus Malma	1	0	1
Bullhead (misc.)	Amierus sp.		93	93
Common carp	Cyprinus carpio	159	12	171
Channel catfish	Ictalurus punctatus	172	113	285
Chiselmouth	Acrocheilus alutaceus	1	121	122
Crappie (misc)	Pomoxis sp.	10	2,668	2,678
Cutthroat Trout	Oncorhynchus clarkii		0	0
Flathead Catfish	Pylodictus olivaris		0	0
Kokanee[2]	Oncorhynchus nerka		8	8
Longnose dace	Rhinichthys cataractae		0	0
Peamouth	Mylocheilus caurinus	32	8,411	8,443
Rainbow Trout[3]	Oncorhynchus mykiss		2,804	2,804
Redside shiner	Richardsonius balteatus		0	0
Sand Roller	Percopsis transmontana		285	285
Sculpin	Cottus sp.		3	3
Northern Pikeminnow	Ptychocheilus oregonensis	34	371	405
Sucker (misc.)	Catostomus sp.	2,097	2,380	4,477
Sunfish (misc.)	Lepomis sp.		167	167
Whitefish	Prosopium sp.	7	2,863	2,870
White sturgeon	Acipenser transmontanus	44	0	44
Yellow perch	Perca flavescens	3	0	3
Total		2,904	30,868	33,772

[1]Incidental species collection estimated based on numbers sampled, sample rates, and separator counts.
[2]Kokanee in the sample are classified as any sockeye juvenile over 200 mm in length.
[3]Rainbow trout are classified by morphological characteristics.

Table 66. Incidental Ranking.

	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004
*Peamouth	3	2	1	3	1	2	2	5	2	1
*Lamprey, Pacific (eyed)	8	7	7	8	5	1	1	1	1	2
Shad (juvenile)	-----	-----	23	15	*18	6	10	7	12	3
*Whitefish, Mountain	2	4	6	4	4	3	4	4	4	4
*Rainbow Trout***										5
Crappie	1	1	4	1	7	4	8	6	5	6
*Sucker, (spp)	4	6	3	2	2	8	3	3	6	7
Shad (adult)	16	*17	22	19	17	10	7	10	8	8
Bass, Smallmouth	6	9	12	12	9	12	12	9	7	9
*Lamprey, Pacific (non-eyed)	5	3	2	6	3	5	5	2	3	10
Northern Pikeminnow	12	8	8	9	10	17	11	17	19	11
Sand Roller										12
Bluegill	15	12	15	10	14	11	17	14	11	13
*Chiselmouth	7	5	5	7	6	7	*9	12	15	14
Catfish, Channel	11	10	9	5	8	9	*9	15	10	15
Bullhead, (spp)	13	15	16	*11	12	15	13	11	16	16
*Lamprey, Pacific (adult)**	-----	*17	18	16	19	20	21	21	18	17
Carp, Common	18	16	17	*11	*18	18	14	16	14	18
Kokanee										19
*Sculpin, (spp)	14	13	11	13	15	16	16	19	17	20
Total	173,113	48,225	52,637	31,766	53,257	22,183	48,930	86,871	54,857	33,614

*species native to the Columbia-Snake River Basin

**Eyed and non-eyed lamprey not distinguished prior to 1995.

*** Rainbow trout are classified by morphological characteristics.

Adult Fallbacks

A total of 13,002 adult salmonids were removed from the Lower Granite separator in 2004 compared to 8,731 in 2003, an increase of 48.9% (Table 67). This included: 420 adult clipped chinook, 292 adult unclipped chinook, 230 clipped (hatchery origin) jack chinook, 56 unclipped jack chinook, 4,744 clipped steelhead, 7,233 unclipped steelhead and 27 coho. Unclipped steelhead were the most abundant adult salmonid and made up 55.6% of the total salmonid fallbacks. Clipped steelhead were second in abundance mading up 36.5% of the fallbacks. April and May were the months of highest fallbacks for clipped and unclipped steelhead while adult and jack chinook fallback counts were highest in October (Table 68).

The number of adult chinook (712) removed from the separator this season is 94.3% greater than the 2003 total of 384 and is 143.8 % greater than the 1997-2003 average. Increased numbers of fallbacks is not due to any change in LGR, but can be attributed to the increased number of adults returning from the ocean. The total jack chinook fallback count of 286 narrowly exceeds the 2003 total of 263. The number of adult clipped steelhead of 4,744 is an increase of 22.3% of the 2003 total and is 76.3% more than the 1997-2003 average. The unclipped steelhead total in 2004 is 72.0% greater than 2003 and 73.6% greater than the 1997-2003 average (Table 67).

Table 67. Annual totals of adult fallbacks released from the separator at LGR, 1997-2004.

	Adult Chinook		Jack chinook		Steelhead		Coho		
	Clipped	Unclipped	Clipped	Unclipped	Clipped	Unclipped	Sockeye	All	Totals
1997	309	161	10	9	1,944	6,609		0	9,042
1998	121	105	131	32	2,043	4,340		0	6,772
1999	67	118	60	35	2,167	4,381		0	6,828
2000	187	81	160	42	2,693	3,349		0	[1]6,513
2001	386	238	263	62	6,193	9,881		0	[1]17,024
2002	284	144	127	56	4,553	7,437		0	[1]12,602
2003	205	179	207	56	3,878	4,205		1	8,731
97-03 avg.	175	117	130	39	2,691	4,166		0	7,318
2004	420	292	230	56	4,744	7,233	0	27	13,002

[1]Includes one sockeye/kokanee

Table 68. Monthly totals of adult fallbacks released from the separator at LGR, 2004.

	Adult Chinook		Jack chinook		Steelhead		All	All	Totals
Month	Clipped	Unclipped	Clipped	Unclipped	Clipped	Unclipped	Sockeye	Coho	
*April	3	4	0	0	1,286	1,485	0	0	2,778
May	59	101	5	6	2,172	4,988	0	0	7,331
June	26	28	2	0	56	384	0	0	496
July	29	15	5	1	107	59	0	0	216
August	6	6	3	0	195	80	0	0	290
September	94	45	60	22	569	132	0	2	924
October	203	93	155	27	359	105	0	25	967
Totals	420	292	230	56	4,744	7,233	0	27	13,002

All fallback salmonids in 2004 were superficially examined for condition while being released off the separator. They are classified as good, fair, poor or dead. In 2004, 89.4 percent of all adult salmonids were classified in good or fair condition by the COE separator technician (Table 69).

Table 69. Condition of adult falbacks released from the separator at LGR, 1997-2004.

	Adult Chinook		Jack chinook		Steelhead			Coho	
	Clipped	Unclipped	Clipped	Unclipped	Unclipped	Clipped	Sockeye	All	Totals
Good									
1997	260	137	9	1,806	9	4,813		0	7,034
1998	85	85	122	1,786	32	3,435		0	5,545
1999	51	100	56	1,782	33	3,439		0	5,461
2000	161	67	158	2,161	39	2,548		0	5,134
2001	310	191	248	5,146	53	7,508		0	13,456
2002	205	105	119	3,385	52	4,845		0	8,711
2003	156	133	198	2,771	54	2,573		1	5,886
97-03 avg.	175	117	130	2,691	39	4,166		0	7,318
2004	377	274	225	56	3,485	5,428	0	27	9,872
Fair									
1997	26	13	1	103	0	1,236		0	1,379
1998	26	14	9	197	0	679		0	925
1999	11	9	4	271	2	3,129		0	3,426
2000	21	14	1	449	2	610		0	1,097
2001	41	31	11	792	4	1,639		0	2,518
2002	45	26	4	787	3	1,632		0	2,497
2003	17	28	7	700	1	882		0	1,635
97-03 avg.	27	19	5	471	2	1,401		0	1,925
2004	35	13	4	0	715	985	0	0	1,752
Poor									
1997	10	5	0	19	0	402		0	436
1998	7	3	0	54	0	167		0	231
1999	4	4	0	42	0	154		0	204
2000	4	0	1	78	1	171		0	255
2001	20	12	4	230	5	600		0	871
2002	25	9	3	327	0	777		0	1,141
2003	17	11	2	275	1	476		0	782
97-03 avg.	12	6	1	146	1	392		0	560
2004	4	4	1	0	401	632	0	0	1,042
Dead									
1997	13	6	0	16	0	158		0	193
1998	3	3	0	6	0	59		0	71
1999	1	5	0	7	0	22		0	35
2000	1	0	0	12	0	8		0	21
2001	15	4	0	25	0	134		0	178
2002	9	4	1	54	1	183		0	252
2003	15	7	0	132	0	274		0	428
97-03 avg.	8	4	0	36	0	120		0	168
2004	4	1	0	0	143	188	0	0	336

Research

Five agencies conducted eight research projects in 2004 at LGR. Two of those agencies studies impacted a total of 310,136 smolts. Three agencies, NOAA Fisheries (Gatewell Collection), the University of Idaho Fisheries Research Cooperative (Kelt Study) and Oregon State University (Transportation and Survival) conducted research that did not impact smolts from the collection. Of the smolts taken from the collection, 199,454 (64.3%) were anesthetized and handled but not utilized for research purposes. Researchers' PIT-tagged 110,393 smolts, radio-tagged or acoustic-tagged 1,559 smolts, examined 300 smolts, sacrificed two from the general collection, handled and returned to the wet separator 1,581 and reported 289 incidental smolt mortalities (Table 70).

Table 70. Research fish used at LGR, 2004.

	Yearling Chinook		Subyearling Chinook		Steelhead		Sock/Kokanee		Coho	
	Clipped	No Clip	Clipped	No Clip	Clipped	No Clip	Clipped	No Clip	All	Total
Tagged, bypassed	1	9,314	2,849	43,332	19,759	8,170	0	0	0	83,425
Tagged, transported	1,460	11,222	139	6,041	0	8,106	0	0	0	26,968
Handled, bypassed	0	0	0	0	0	0	0	0	0	0
Handled, transported	94,845	13,309	2,752	7,625	72,307	2,377	294	111	5,834	199,454
Mortalities	170	12	21	33	43	3	0	0	7	289
Totals	96,476	33,857	5,761	57,031	92,109	18,656	294	111	5,841	310,136

WDFW Gas Bubble Trauma Monitoring

The Washington Department of Fish and Wildlife (WDFW) conducted Gas Bubble Trauma (GBT) examinations on fish collected from the wet separator on Tuesdays April 13, 20 and 27. The examinations required stereo dissecting microscope inspection of the unpaired fins and both eyes of sample fish for the presence of gas bubbles. We examined up to 100 fish, chinook (clipped and unclipped) or steelhead (clipped and unclipped), depending upon the numbers of fish available. A total of 300 salmonids were examined including 115 clipped yearling chinook, 29 unclipped yearling chinook, 107 clipped steelhead and 49 unclipped steelhead (Table 71). Fish handled during sampling for GBT but not examined include four clipped yearling chinook and two unclipped yearling chinook that had PIT-taggeds and were released back into the separator to be diverted according to their research design. Smolts examined for symptoms of GBT were released into raceways to prevent them from being diverted to the sample tank and re-anesthetized. These fish were added to daily collection counts because they were not available to the sample system. The GBT sampling regime and the BiOp spill program were curtailed at the end of June due to low water levels.

Table 71. WDFW Gas Bubble Trauma examinations at LGR, 2004.

	Yearling Chinook		Subyearling Chinook		Steelhead		Sock/Kokanee		Coho	
	Clipped	No Clip	Clipped	No Clip	Clipped	No Clip	Clipped	No Clip	All	Total
Examined	115	29	0	0	107	49	0	0	0	300
Handled, transport	4	2	0	0	0	0	0	0	0	6
Mortalities	0	0	0	0	0	0	0	0	0	0
Totals	119	31	0	0	107	49	0	0	0	306

NOAA Fisheries: Subyearling Fall Chinook Late-season Transportation Evaluation Study

The objective for this study is to assess the survival and returns of late season transported subyearling fall chinook. A total of 2,545 unclipped subyearling fall chinook were taken from the daily sample, PIT-tagged and transported by truck to the release site below Bonneville Dam (Table 72).

Table 72. Subyearling fall chinook transportation evaluation, 2004.

	Yearling Chinook		Subyearling Chinook		Steelhead		Sock/Kokanee		Coho	
	Clipped	No Clip	Clipped	No Clip	Clipped	No Clip	Clipped	No Clip	All	Total
Tagged, bypassed	0	0	0	0	0	0	0	0	0	0
Tagged, transport	0	0	0	2,545	0	0	0	0	0	2,545
Handled, transport	0	0	0	0	0	0	0	0	0	0
Mortalities	0	0	0	0	0	0	0	0	0	0
Totals	0	0	0	2,545	0	0	0	0	0	2,545

NOAA Fisheries: A Study to Compare the Adult Returns of In-river Migrating versus Barged Juvenile Anadromous Salmonids

The NOAA Fisheries crew PIT-tagged a total of 22,963 smolts for the transportation evaluation study during the spring and summer migration from April 8 to July 30. These fish recovered from anesthesia in a raceway prior to final disposition. Fish tagged included 11,222 unclipped yearling chinook, 139 clipped subyearling fall chinook, 3,496 unclipped subyearling fall chinook and 8,106 unclipped steelhead that were tagged and transported (Table 73).

A total of 197,495 smolts were handled and transported but not tagged: 5,688 elastomer-tagged yearling fall chinook, 88,246 clipped yearling chinook, 12,915 unclipped yearling chinook, 2,751 clipped subyearling fall chinook, 7,546 unclipped subyearling fall chinook , 72,007 clipped steelhead, 2,280 unclipped steelhead, 294 clipped sockeye/kokanee, 111 unclipped sockeye/kokanee and 5,657 coho (clipped and unclipped).

National Marine Fisheries mortalities (mortalities removed from raceways designated for this research) were included with facility raceway mortalities and not recorded as research mortalities. Recovered mortalities totaled 259 smolts, including: 24 elastomer-tagged yearling fall chinook, 118 clipped yearling chinook, 12 unclipped yearling chinook, 21 clipped subyearling fall chinook, 31 unclipped subyearling fall chinook , 43 clipped steelhead, three unclipped steelhead and seven coho (clipped and unclipped). Most of the smolts handled and tagged for this study were collected in the east raceways and tagged in the NOAA Fisheries marking trailer adjacent to the east raceways.

Table 73. Adult returns of in-river migrating versus barged juvenile salmonids, 2004.

	Yearling Chinook		Subyearling Chinook		Steelhead		Sock/Kokanee		Coho	
	Clipped	No Clip	Clipped	No Clip	Clipped	No Clip	Clipped	No Clip	All	Total
Tag'd, Byp.	0	3	2,849	43,233	0	0	0	0	0	46,085
Tag'd, transported	0	11,222	139	3,496	0	8,106	0	0	0	22,963
[1]Handled, transport	93,934	12,915	2,751	7,546	72,007	2,280	294	111	5,657	197,495
[2]Mortalities	142	12	21	31	43	3	0	0	7	259
Total	94,076	24,152	5,760	54,306	72,050	10,389	294	111	5,664	266,802

[1] Includes 5,688 elastomer-tagged yearling fall chinook.

[2] Includes 24 elastomer-tagged yearling fall chinook.

NOAA Fisheries: A Study to Estimate Juvenile Reach Survival

This study was conducted to evaluate survival of juvenile salmonids from the Lower Granite Dam tailrace to Little Goose Dam. A total of 37,241 fish were tagged and bypassed to the river after a 24-hour recovery period. Bypassed fish included one clipped yearling chinook, 9,311 unclipped yearling chinook, 19,759 clipped steelhead and 8,170 unclipped steelhead (Table 74). This study was done in conjunction with the NOAA Fisheries Transportation Evaluation study.

Table 74. Juvenile reach survival, 2004.

	Yearling Chinook		Subyearling Chinook		Steelhead		Sock/Kokanee		Coho	
	Clipped	No Clip	Clipped	No Clip	Clipped	No Clip	Clipped	No Clip	All	Total
Tagged, bypassed	1	9,311	0	0	19,759	8,170	0	0	0	37,241
Handle, bypassed	0	0	0	0	0	0	0	0	0	0
Mortalities	0	0	0	0	0	0	0	0	0	0
Total	1	9,311	0	0	19,759	8,170	0	0	0	37,241

NOAA Fisheries: High Velocity Separator Test

Fish were collected (gatewell dipped) from gatewell slots five and six beginning May 13 and ending June 15. These fish were not considered to be collected fish because they did not enter the collection channel and therefore did not cross the wet separator to be counted. The fish collected from gatewells were trucked to Ice Harbor Dam, and then were introduced into the flume upstream of the separator for testing of the high velocity separator. A total of 9,714 smolts were collected from the gatewells at Lower Granite Dam and the species breakdown was: 45% subyearling fall chinook, 24% yearling chinook, 23% steelhead, 9% coho and less than 1% sockeye/kokanee. There were 22 mortalities recorded during gatewell collection.

University of Idaho (U of I) Kelt Study: Evaluate Steelhead (Oncorhynchus mykiss) Kelt Outmigration from Lower Granite Dam to Bonneville Dam to Assess Downstream Conversion Rates, Routes of Passage and Travel Time

U of I staff used ultrasound to identify the spawning status of adult steelhead that arrive at Lower Granite Dam bypass separator. Those determined to be kelts (post-spawned) were tagged using PIT-tags to monitor their downstream passage. From April 1 to June 3, U of I staff examined 2,906 adult steelhead (1,318 clipped and 1,588 unclipped) (Table 75). Of the 2,906 adults, 2,263 were PIT-tagged (994 clipped and 1,269 unclipped), and 983 of the PIT-tagged fish were transported (449 clipped, 534 unclipped). All non-transported fish were bypassed at LGR.

Table 75. University of Idaho kelt study at LGR, 2004.

	Examined	PIT-tagged	Transported
HST	1,318	994	449
WST	1,588	1,269	534
Total	2,906	2,263	983

United States Geological Service, Biological Resources Division (USGS): Effects of Flow Augmentation on the Migrational Behavior and Survival of Juvenile Fall Chinook Salmon

USGS-BRD collected a total of 179 smolts from July 28 to August 31 from daily samples at the Lower Granite Dam Juvenile Fish Facility. They surgically implanted radio-tags and bypassed 99 unclipped subyearling fall chinook. In addition, 78 unclipped subyearling fall chinook were handled and transported without being tagged, and two of the tagged smolts were recorded as mortalities (Table 76). These fish were held for 24 hours after tagging before their release at Heller Bar on the Snake River (98 km upstream of Lower Granite Dam) at Potlatch on the Clearwater River (2-3 miles above the confluence with the Snake River) and at Lenore on the Clearwater River (98 km above Lower Granite Dam).

Table 76. Effects of flow augmentation on the migrational behavior and survival of juvenile fall chinook, 2004.

	Yearling Chinook		Subyearling Chinook		Steelhead		Sock/Kokanee		Coho	
	Clipped	No Clip	Clipped	No Clip	Clipped	No Clip	Clipped	No Clip	All	Total
Tagged, bypassed	0	0	0	99	0	0	0	0	0	99
Handled, transport	0	0	0	78	0	0	0	0	0	78
Mortalities	0	0	0	2	0	0	0	0	0	2
Totals	0	0	0	179	0	0	0	0	0	179

Oregon State University: Effect of Transportation on Survival and Migration of Yearling Chinook and Subyearling Fall Chinook

The purpose of this study is to evaluate the survival and migratory behavior of juvenile chinook as they exit the Columbia River system. Smolts were collected for this study from the wet separator at Lower Granite Dam Juvenile Fish Facility from May 1 to May 29, 2004.

OSU staff collected 3,063 smolts from the wet separator. A total of 1,460 clipped yearling fall chinook were radio-tagged and transported. An additional 1, 575 smolts were handled, not tagged, and transported. Of these fish, there were 792 clipped yearling chinook, 363 unclipped yearling chinook, 1 clipped subyearling fall chinook, 1 unclipped subyearling fall chinook, 193 clipped steelhead, 48 unclipped steelhead and 177 coho (clipped and unclipped) and there were 28 mortalities as a result of handling (Table 77). Incidental fish captured were released back to the separator.

OSU staff also radio-tagged subyearling fall chinook for this study. A total of 52 clipped and 62 unclipped subyearling fall chinook tagged and transported. No mortalities were reported during this phase of their research.

Table 77. Effect of transportation on survival and migration of yearling chinook and subyearling fall chinook, 2004.

	Yearling Chinook		Subyearling Chinook		Steelhead		Sock/Kokanee		Coho	
	Clipped	No Clip	Clipped	No Clip	Clipped	No Clip	Clipped	No Clip	All	Total
Tagged, transport	1,460	0	0	0	0	0	0	0	0	1,460
Handled, transport	792	363	1	1	193	48	0	0	177	1,575
Mortalities	28	0	0	0	0	0	0	0	0	28
Totals	2,280	363	1	1	193	48	0	0	177	3,063

References

NMFS. 2000. Endangered Species Act Section 7 Reinitiation of Consultation regarding 1994-1998 Operation of the Federal Columbia River System and Juvenile Transportation Program in 1994 and Future Years. Available from: NMFS, Northwest Region, 7600 Sand Pont Way N.E., BIN C15700 Bldg. 1, Seattle, Washington 98115.

Appendix 1

Table 1. Daily Smolt Collection Counts, 2004

Page 1.
Daily Number of Fish Collected

	Yearling Chinook			Subyearling Chinook				Steelhead		Sockeye/Kokanee		Coho			Daily
Date	Clipped	No Clip, cwt	No Clip	Clipped	No Clip,cwt	No Clip	Fry	Clipped	No Clip	Clipped	No Clip	Clipped	No Clip,cwt	No Clip	Total
26-Mar	30	10	30	0	0	0	0	20	90	0	0	0	0	10	190
27-Mar	70	0	160	0	0	0	10	30	130	0	20	0	0	0	420
28-Mar	60	0	180	0	0	0	0	30	160	0	0	10	0	10	450
29-Mar	130	10	190	0	0	0	10	220	400	0	0	0	10	10	980
30-Mar	160	30	240	0	0	0	0	450	480	0	0	0	10	10	1,380
31-Mar	250	20	500	0	0	0	0	400	430	0	20	10	0	0	1,630
1-Apr	390	30	660	0	0	0	10	450	560	0	0	0	0	30	2,130
2-Apr	400	10	1,270	0	0	0	0	800	610	0	10	0	0	10	3,110
3-Apr	1,580	210	4,460	0	0	0	0	1,590	1,260	0	10	0	0	30	9,140
4-Apr	1,770	170	3,660	0	0	0	0	1,230	810	0	10	0	0	10	7,660
5-Apr	940	40	1,870	0	0	0	10	640	550	0	10	0	0	20	4,080
6-Apr	1,050	40	3,120	0	0	0	0	630	390	0	30	0	0	0	5,260
7-Apr	2,900	260	4,860	0	0	0	0	1,030	390	0	70	0	0	10	9,520
8-Apr	6,260	140	6,110	0	0	0	90	1,030	710	0	10	10	0	20	14,380
9-Apr	4,580	120	2,960	0	0	0	20	1,020	420	0	0	0	0	0	9,120
10-Apr	5,720	80	3,220	0	0	0	0	860	520	0	0	0	0	60	10,460
11-Apr	8,060	100	3,500	0	0	0	0	760	920	0	20	0	20	0	13,380
12-Apr	11,680	120	5,340	0	0	0	60	1,380	2,340	0	0	0	20	40	20,980
13-Apr	14,900	350	6,600	0	0	0	0	1,250	3,150	0	0	0	0	100	26,350
14-Apr	16,875	300	6,566	0	0	0	0	3,322	4,337	0	0	0	0	200	31,600
15-Apr	26,300	100	10,200	0	0	0	500	6,650	5,050	0	100	0	50	150	49,100
16-Apr	35,550	600	22,200	0	0	0	100	9,350	5,800	0	0	50	150	300	74,100
17-Apr	26,716	746	14,925	0	0	0	149	7,761	4,777	0	0	0	0	0	55,074
18-Apr	31,493	597	12,388	0	0	0	149	8,209	2,239	0	0	0	0	448	55,523
19-Apr	31,642	299	12,985	0	0	0	597	13,433	3,433	0	0	0	0	149	62,538
20-Apr	14,478	149	3,582	0	0	0	0	13,731	2,538	0	0	0	0	0	34,478
21-Apr	26,165	149	6,721	0	0	0	0	11,389	2,242	0	0	0	0	0	46,666
22-Apr	22,537	299	6,269	0	0	0	0	10,448	2,836	0	0	0	0	149	42,538
23-Apr	13,881	0	4,478	0	0	0	0	4,030	1,642	0	0	0	0	149	24,180
24-Apr	40,299	746	20,149	0	0	0	0	14,925	3,433	0	0	149	0	448	80,149
25-Apr	87,164	1,194	24,925	0	0	0	0	53,881	4,925	0	0	0	0	448	172,537
26-Apr	77,164	2,985	28,060	0	0	0	0	160,299	15,821	0	0	0	149	149	284,627
27-Apr	147,761	4,776	41,045	0	0	0	149	206,119	15,523	0	0	0	0	746	416,119
28-Apr	113,029	3,284	26,724	0	0	0	0	59,442	5,979	0	0	0	149	746	209,353
29-Apr	221,940	5,522	40,896	0	0	0	149	75,672	15,075	0	0	149	299	746	360,448
30-Apr	159,403	7,761	33,582	0	0	0	0	168,209	27,462	0	0	149	149	299	397,014
1-May	154,604	6,119	25,075	0	0	0	0	121,940	20,149	0	0	0	0	299	328,186
2-May	103,898	5,821	17,612	0	0	0	0	82,090	25,075	0	0	0	0	0	234,496
3-May	169,218	11,940	25,075	0	0	0	0	58,358	19,701	0	0	0	0	0	284,292
4-May	253,087	11,642	32,985	0	0	0	0	59,403	21,194	0	0	0	0	448	378,759
5-May	515,075	27,015	71,493	0	0	0	149	144,925	45,523	0	0	0	299	1,045	805,524
6-May	571,642	42,239	59,403	0	0	0	746	99,701	45,672	0	0	299	448	2,537	822,687
7-May	186,418	17,612	25,522	0	0	0	149	282,537	82,389	0	149	597	1,045	7,164	603,582
8-May	131,791	11,791	28,507	0	0	0	0	369,552	110,896	0	0	299	1,791	8,209	662,836
9-May	80,299	8,955	19,254	0	0	0	149	269,254	74,329	0	0	896	896	8,358	462,390
10-May	53,731	4,179	21,045	0	0	0	0	152,239	50,746	0	0	597	746	9,851	293,134

Table 1. Daily Smolt Collection Counts, 2004
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Daily Number of Fish Collected

	Yearling Chinook			Subyearling Chinook				Steelhead		Sockeye/Kokanee		Coho			Daily
Date	Clipped	No Clip, cwt	No Clip	Clipped	No Clip,cwt	No Clip	Fry	Clipped	No Clip	Clipped	No Clip	Clipped	No Clip,cwt	No Clip	Total
11-May	65,821	4,925	26,418	0	0	0	149	199,701	52,090	149	0	1,045	1,194	9,552	361,044
12-May	38,955	3,284	25,373	0	0	0	0	182,985	45,970	149	299	896	2,090	6,716	306,717
13-May	16,716	2,537	10,448	0	0	0	0	61,343	15,373	0	0	597	597	7,313	114,924
14-May	12,836	1,343	9,851	0	0	0	0	44,925	15,075	448	149	448	1,343	7,612	94,030
15-May	11,188	2,239	10,896	0	0	0	0	82,985	24,776	448	0	149	299	4,328	137,308
16-May	11,327	1,642	9,552	0	0	0	0	31,493	9,851	149	149	149	448	2,836	67,596
17-May	17,297	896	9,254	0	0	0	0	195,373	30,000	299	0	746	448	8,209	262,522
18-May	10,101	746	6,269	0	0	0	0	71,940	11,940	0	0	149	149	2,388	103,682
19-May	13,582	746	11,343	0	0	0	0	64,328	8,209	149	0	597	1,045	4,179	104,178
20-May	17,015	597	7,463	0	0	0	149	42,537	9,254	0	0	0	896	6,119	84,030
21-May	15,522	746	12,537	0	0	0	0	60,448	12,537	448	0	448	2,388	10,746	115,820
22-May	18,806	896	12,090	0	0	0	0	298,209	51,493	299	448	1,493	2,537	17,761	404,032
23-May	16,269	896	10,597	0	0	299	0	169,403	26,865	597	0	746	2,090	9,851	237,613
24-May	17,910	1,343	19,403	0	0	0	149	248,806	46,119	149	149	896	3,284	16,567	354,775
25-May	7,164	746	8,358	0	0	149	0	62,239	14,328	0	0	597	1,343	7,612	102,536
26-May	6,170	448	8,806	0	0	448	0	38,657	12,239	299	0	896	2,537	10,746	81,246
27-May	2,758	299	5,075	0	0	149	0	46,418	12,089	0	149	299	896	5,373	73,505
28-May	3,385	299	5,224	299	0	299	0	37,164	9,851	149	0	149	597	4,179	61,595
29-May	3,170	448	7,612	6,418	0	448	0	27,313	4,627	149	0	299	597	2,537	53,618
30-May	896	0	1,642	2,239	0	746	0	15,075	3,433	0	0	149	149	1,791	26,120
31-May	746	448	2,985	1,791	0	896	0	33,433	6,865	0	0	0	746	2,388	50,298
1-Jun	448	299	1,791	896	0	299	0	11,194	2,836	0	0	0	149	1,343	19,255
2-Jun	448	0	2,090	448	0	149	0	5,672	2,239	0	0	0	448	746	12,240
3-Jun	600	50	1,900	550	0	250	0	5,600	1,750	0	0	0	50	200	10,950
4-Jun	950	150	1,850	1,100	0	550	100	5,150	1,800	0	50	0	100	250	12,050
5-Jun	800	0	2,650	2,800	1,050	2,600	0	3,800	1,650	0	0	0	100	150	15,600
6-Jun	200	50	2,650	3,250	2,950	11,550	50	1,750	950	50	0	0	150	200	23,800
7-Jun	650	200	1,400	4,350	4,100	15,450	200	3,750	1,100	150	0	0	300	400	32,050
8-Jun	650	200	2,250	2,600	6,200	31,200	150	5,300	1,350	100	50	100	200	200	50,550
9-Jun	500	200	2,800	1,500	1,100	24,050	250	6,650	2,500	0	50	50	200	600	40,450
10-Jun	700	200	850	1,250	7,550	23,900	150	3,900	1,550	100	50	0	200	500	40,900
11-Jun	500	50	1,950	1,450	6,650	37,000	250	4,100	1,700	50	50	100	100	650	54,600
12-Jun	400	200	1,700	1,100	8,100	22,700	100	2,700	1,900	300	0	100	500	700	40,500
13-Jun	100	100	1,100	700	5,000	16,800	200	1,900	1,400	200	0	0	100	0	27,600
14-Jun	0	0	400	800	4,100	19,700	0	800	1,600	0	0	0	100	100	27,600
15-Jun	100	0	300	500	9,600	35,800	0	1,400	1,400	0	0	0	0	400	49,500
16-Jun	100	0	700	500	10,600	35,500	0	1,300	300	0	0	100	300	200	49,600
17-Jun	400	0	300	500	3,700	9,200	0	1,200	600	0	0	0	100	700	16,700
18-Jun	100	100	400	200	3,800	21,100	100	3,300	900	0	0	0	100	200	30,300
19-Jun	0	0	200	300	7,400	11,700	100	1,000	900	100	0	0	100	100	21,900
20-Jun	0	50	400	250	11,150	19,950	100	700	200	0	0	0	0	150	32,950
21-Jun	100	0	600	350	11,050	17,850	0	900	500	50	0	0	0	300	31,700
22-Jun	50	50	500	50	8,200	18,150	0	950	200	0	0	0	0	200	28,350
23-Jun	0	200	600	50	8,350	20,600	50	750	150	0	0	0	0	150	30,900
24-Jun	200	0	400	50	6,400	13,600	50	900	250	50	0	0	50	400	22,350
25-Jun	50	200	1,500	0	8,800	20,750	0	1,550	500	50	0	0	0	250	33,650
26-Jun	150	50	950	100	7,050	13,750	0	1,950	400	50	0	0	0	450	24,900
27-Jun	50	150	250	0	7,050	15,350	0	1,400	150	0	0	0	0	100	24,500
28-Jun	60	420	880	60	7,820	25,560	20	460	200	0	0	0	0	60	35,540
29-Jun	100	20	80	0	5,320	18,580	0	440	160	0	0	0	20	60	24,780

Table 1. Daily Smolt Collection Counts, 2004

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Daily Number of Fish Collected

	Yearling Chinook			Subyearling Chinook				Steelhead		Sockeye/Kokanee		Coho			Daily
Date	Clipped	No Clip, cwt	No Clip	Clipped	No Clip,cwt	No Clip	Fry	Clipped	No Clip	Clipped	No Clip	Clipped	No Clip,cwt	No Clip	Total
30-Jun	60	160	120	0	6,620	19,840	0	760	320	0	0	0	60	200	28,140
1-Jul	75	100	250	0	2,475	11,275	0	400	25	0	0	0	0	50	14,650
2-Jul	25	25	225	25	2,925	8,075	0	775	300	0	25	25	25	175	12,625
3-Jul	25	150	250	0	2,375	9,700	25	475	75	0	0	0	0	75	13,150
4-Jul	25	25	150	0	4,475	15,325	0	400	75	0	0	0	0	50	20,525
5-Jul	25	75	150	0	2,550	9,925	0	425	75	0	0	0	0	25	13,250
6-Jul	0	100	200	0	2,350	12,700	0	925	200	25	0	0	0	75	16,575
7-Jul	0	0	50	0	1,125	9,900	0	400	100	0	0	0	0	50	11,625
8-Jul	0	75	75	0	1,100	6,525	0	450	100	0	0	0	0	50	8,375
9-Jul	0	40	180	0	920	8,760	0	200	20	0	0	0	0	20	10,140
10-Jul	0	100	300	0	1,400	13,240	0	200	20	0	0	0	0	0	15,260
11-Jul	20	20	220	0	880	9,060	0	200	100	0	0	0	0	40	10,540
12-Jul	0	100	160	0	520	7,040	0	120	20	20	0	0	0	0	7,980
13-Jul	60	60	80	0	1,620	14,460	0	300	140	0	0	0	0	60	16,780
14-Jul	0	0	0	0	1,440	8,980	0	140	60	0	0	0	0	0	10,620
15-Jul	20	80	200	0	800	7,360	0	260	200	0	0	0	0	60	8,980
16-Jul	20	20	140	0	420	4,280	0	240	100	0	0	0	0	0	5,220
17-Jul	0	120	20	0	220	3,820	0	140	120	0	0	0	0	0	4,440
18-Jul	40	60	120	0	740	4,980	0	200	40	0	0	0	0	20	6,200
19-Jul	0	30	70	0	280	6,110	0	240	70	0	0	0	0	0	6,800
20-Jul	0	20	60	0	290	3,830	0	240	90	0	0	0	0	20	4,550
21-Jul	10	50	50	0	170	2,160	0	200	30	0	0	0	0	10	2,680
22-Jul	0	0	30	0	250	1,880	0	100	50	0	0	0	0	10	2,320
23-Jul	0	20	20	10	120	1,110	0	120	30	0	0	0	0	0	1,430
24-Jul	0	5	5	0	190	1,345	0	235	90	0	0	0	0	5	1,875
25-Jul	0	5	10	0	135	1,650	0	345	95	0	0	0	0	5	2,245
26-Jul	0	0	5	5	140	2,385	0	190	75	0	0	0	0	10	2,810
27-Jul	0	0	0	0	120	1,375	0	125	35	0	0	0	0	0	1,655
28-Jul	0	0	5	0	115	1,540	0	115	15	0	0	0	0	0	1,790
29-Jul	0	5	0	0	65	1,640	0	105	25	0	0	0	0	5	1,845
30-Jul	0	0	5	0	50	1,785	0	185	10	0	0	5	0	0	2,040
31-Jul	0	0	0	0	80	1,985	0	135	55	0	0	0	0	0	2,255
1-Aug	5	5	5	0	45	1,320	0	125	40	0	5	0	0	5	1,555
2-Aug	0	0	0	0	15	530	0	100	25	0	0	0	0	5	675
3-Aug	4	0	0	0	36	696	0	124	28	0	0	4	0	0	892
4-Aug	0	0	4	0	48	860	0	96	24	0	0	0	0	0	1,032
5-Aug	0	0	0	0	28	404	0	112	24	0	0	0	0	12	580
6-Aug	0	0	0	0	32	796	0	68	20	0	0	0	0	4	920
7-Aug	0	0	0	0	56	1,296	0	72	12	0	0	0	0	0	1,436
8-Aug	0	0	4	0	24	456	0	12	0	0	0	0	4	0	500
9-Aug	0	4	0	0	20	560	0	28	4	0	0	0	0	4	620
10-Aug	4	0	0	0	16	564	0	24	16	0	0	0	0	0	624
11-Aug	0	0	4	0	16	676	0	52	20	0	4	0	0	0	772
12-Aug	0	0	0	0	12	576	0	32	8	0	4	0	0	0	632
13-Aug	0	0	0	0	12	328	0	36	16	0	0	0	0	8	400
14-Aug	0	0	0	0	12	224	0	36	12	0	0	0	0	0	284
15-Aug	0	0	0	0	8	244	0	72	4	0	0	0	0	0	328
16-Aug	0	0	0	0	28	664	0	68	16	0	0	0	0	12	788
17-Aug	0	0	0	0	8	576	0	40	8	0	0	0	0	4	636

Table 1. Daily Smolt Collection Counts, 2004
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Daily Number of Fish Collected

	Yearling Chinook			Subyearling Chinook				Steelhead		Sockeye/Kokanee		Coho			Daily
Date	Clipped	No Clip, cwt	No Clip	Clipped	No Clip,cwt	No Clip	Fry	Clipped	No Clip	Clipped	No Clip	Clipped	No Clip,cwt	No Clip	Total
18-Aug	0	0	0	0	4	496	0	40	8	0	0	0	0	0	548
19-Aug	0	0	4	0	12	576	0	24	8	0	0	0	0	0	624
20-Aug	0	0	0	0	20	592	0	60	8	0	0	0	0	0	680
21-Aug	0	0	0	0	8	780	0	24	4	0	0	0	0	0	816
22-Aug	0	0	0	0	32	1,108	0	20	0	0	0	0	0	0	1,160
23-Aug	0	0	0	0	16	1,348	0	24	4	0	4	0	0	0	1,396
24-Aug	0	0	0	0	16	832	0	36	8	0	0	0	0	0	892
25-Aug	0	0	0	0	12	840	0	12	0	0	0	0	0	0	864
26-Aug	0	0	0	0	16	1,092	0	56	12	0	0	0	0	0	1,176
27-Aug	0	0	0	0	28	992	0	20	0	0	0	0	0	8	1,048
28-Aug	0	0	0	0	20	860	0	8	0	0	0	0	4	4	896
29-Aug	0	0	4	0	4	516	0	20	0	0	0	0	0	0	544
30-Aug	0	0	0	0	4	280	0	20	0	0	8	0	0	0	312
31-Aug	0	0	0	0	8	248	0	12	0	0	0	0	0	0	268
1-Sep	0	0	0	0	4	184	0	8	0	4	4	0	0	4	208
2-Sep	0	0	1	0	6	328	0	17	1	0	3	0	0	3	359
3-Sep	0	0	0	0	9	317	0	9	1	0	2	0	0	2	340
4-Sep	0	1	0	0	3	154	0	4	3	0	1	0	0	2	168
5-Sep	0	1	2	0	4	88	0	7	1	0	2	0	0	0	105
6-Sep	0	0	1	0	2	101	0	3	0	0	1	0	0	2	110
7-Sep	0	1	0	0	1	130	0	3	0	0	0	0	0	2	137
8-Sep	0	0	0	0	1	79	0	0	0	0	1	0	0	0	81
9-Sep	0	0	0	0	3	78	0	4	0	0	2	0	0	0	87
10-Sep	0	0	0	0	1	43	0	2	0	0	0	0	0	1	47
11-Sep	0	1	1	0	1	66	0	5	0	0	3	0	0	1	78
12-Sep	0	0	0	0	4	79	0	5	1	0	0	0	0	0	89
13-Sep	0	0	0	0	1	101	0	5	1	0	4	0	0	0	112
14-Sep	0	0	0	0	3	89	0	8	3	0	7	0	0	0	110
15-Sep	0	0	0	0	1	81	0	14	2	0	6	0	0	0	104
16-Sep	0	0	0	0	3	190	0	11	2	0	2	0	0	0	208
17-Sep	0	0	0	0	10	361	0	18	1	0	8	0	0	1	399
18-Sep	0	1	0	0	8	407	0	25	4	0	4	0	0	0	449
19-Sep	0	0	0	0	5	269	0	12	1	0	16	0	0	0	303
20-Sep	0	0	0	0	12	202	0	31	0	0	27	0	0	0	272
21-Sep	0	0	0	0	4	380	0	29	3	0	3	0	0	0	419
22-Sep	0	0	1	0	7	251	0	13	3	0	26	0	0	0	301
23-Sep	0	0	0	0	13	2,257	0	19	1	0	8	0	0	0	2,298
24-Sep	0	0	4	0	8	3,108	0	4	0	0	16	0	0	0	3,140
25-Sep	0	0	4	0	8	1,992	0	16	0	0	0	0	0	0	2,020
26-Sep	0	4	0	0	0	1,104	0	0	0	0	8	0	0	0	1,116
27-Sep	0	0	0	0	4	628	0	0	0	0	12	0	0	0	644
28-Sep	0	0	0	0	0	276	0	0	4	0	4	4	0	0	288
29-Sep	0	0	0	0	4	204	0	0	0	0	12	0	0	4	224
30-Sep	0	0	0	0	0	52	0	0	0	0	4	0	0	0	56
1-Oct	0	0	0	0	0	112	0	0	0	0	8	0	0	0	120
2-Oct	0	0	1	0	3	82	0	4	0	0	2	0	0	1	93
3-Oct	0	0	0	0	2	41	0	1	1	0	5	0	0	0	50
4-Oct	1	0	0	0	2	70	0	4	0	0	0	0	0	0	77
5-Oct	1	0	0	0	0	63	0	0	1	0	2	0	0	0	67

Table 1. Daily Smolt Collection Counts, 2004
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Daily Number of Fish Collected

	Yearling Chinook			Subyearling Chinook				Steelhead		Sockeye/Kokanee		Coho			Daily
Date	Clipped	No Clip, cwt	No Clip	Clipped	No Clip,cwt	No Clip	Fry	Clipped	No Clip	Clipped	No Clip	Clipped	No Clip,cwt	No Clip	Total
6-Oct	2	0	0	0	2	122	0	1	0	0	1	0	0	1	129
7-Oct	6	0	0	0	2	136	0	2	0	0	23	0	0	0	169
8-Oct	1	0	0	0	6	148	0	3	0	0	6	0	0	0	164
9-Oct	10	0	0	0	3	169	0	6	1	0	13	0	0	0	202
10-Oct	0	0	0	0	1	157	0	2	0	0	10	0	0	0	170
11-Oct	4	0	0	0	1	84	0	5	0	0	1	0	0	0	95
12-Oct	8	1	0	0	2	73	0	0	0	0	3	0	0	0	87
13-Oct	9	0	1	0	2	68	0	3	0	0	2	0	0	0	85
14-Oct	13	0	0	0	0	72	0	1	0	0	3	0	0	0	89
15-Oct	37	1	0	0	0	71	0	2	0	0	1	0	0	0	112
16-Oct	23	1	0	0	1	83	0	2	0	0	1	0	0	0	111
17-Oct	14	0	0	0	2	90	0	5	2	0	10	0	0	0	123
18-Oct	20	0	0	0	1	102	0	8	0	0	9	0	0	0	140
19-Oct	17	0	0	0	3	71	0	11	4	0	4	0	0	1	111
20-Oct	13	0	0	0	0	45	0	1	0	0	1	0	0	0	60
21-Oct	42	1	1	0	5	109	0	2	1	0	8	0	0	0	169
22-Oct	55	0	2	0	4	131	0	3	1	0	14	0	0	0	210
23-Oct	46	0	3	0	5	147	0	6	1	0	8	0	0	0	216
24-Oct	55	0	2	0	4	221	0	5	0	0	6	0	0	0	293
25-Oct	14	0	0	0	0	137	0	8	1	0	5	0	0	0	165
26-Oct	71	0	1	0	1	200	0	3	1	0	6	0	0	0	283
27-Oct	73	0	0	0	4	332	0	6	0	0	15	0	0	0	430
28-Oct	20	0	0	0	2	108	0	0	2	0	9	0	0	0	141
29-Oct	19	0	1	0	1	67	0	1	0	0	18	0	0	0	107
30-Oct	31	0	1	0	0	59	0	0	1	0	27	0	0	0	119
31-Oct	27	0	0	0	0	57	0	1	0	0	23	0	0	0	108
Totals	3,690,180	208,490	948,435	36,491	200,855	759,468	5,538	4,587,116	1,090,363	5,180	2,532	14,451	35,364	203,076	11,787,539

Table 2. Daily Number of Fish Transported from Lower Granite Dam, 2004

Page 1.

Daily Number of Fish Transported

	Yearling Chinook			Subyearling Chinook				Steelhead		Sockeye/Kokanee		Coho			Daily
Date	Clipped	No Clip, cwt	No Clip	Clipped	No Clip,cwt	No Clip	Fry	Clipped	No Clip	Clipped	No Clip	Clipped	No Clip,cwt	No Clip	Total
26-Mar	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
27-Mar	94	10	172	0	0	0	10	46	210	0	18	0	0	10	570
28-Mar	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
29-Mar	190	8	366	0	0	0	10	250	559	0	0	10	10	20	1,423
30-Mar	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
31-Mar	405	49	738	0	0	0	0	850	908	0	20	10	10	10	3,000
1-Apr	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2-Apr	786	39	1,926	0	0	0	10	1,250	1,170	0	9	0	0	40	5,230
3-Apr	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4-Apr	3,307	379	8,081	0	0	0	0	2,819	2,070	0	19	0	0	40	16,715
5-Apr	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6-Apr	1,974	79	4,944	0	0	0	10	1,269	939	0	37	0	0	20	9,272
7-Apr	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8-Apr	9,143	397	10,904	0	0	0	89	2,057	1,099	0	78	10	0	30	23,807
9-Apr	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10-Apr	10,293	199	6,169	0	0	0	20	1,879	940	0	0	0	0	60	19,560
11-Apr	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12-Apr	19,702	219	8,809	0	0	0	57	2,140	3,259	0	20	0	40	40	34,286
13-Apr	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
14-Apr	31,745	650	12,791	0	0	0	0	4,136	7,340	0	0	0	0	300	56,962
15-Apr	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
16-Apr	61,738	699	31,721	0	0	0	600	15,387	10,536	0	100	50	200	450	121,481
17-Apr	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
18-Apr	58,100	1,342	26,947	0	0	0	298	15,600	6,915	0	0	0	0	448	109,650
19-Apr	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
20-Apr	46,026	447	16,157	0	0	0	592	26,805	5,921	0	0	0	0	149	96,097
21-Apr	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
22-Apr	48,641	447	12,280	0	0	0	0	21,132	4,919	0	0	0	0	149	87,568
23-Apr	13,838	0	4,018	0	0	0	0	3,680	1,575	0	0	0	0	149	23,260
24-Apr	39,768	740	19,550	0	0	0	0	14,566	3,333	0	0	149	0	447	78,553
25-Apr	86,541	1,186	24,629	0	0	0	0	53,868	4,923	0	0	0	0	445	171,592
26-Apr	77,006	2,984	28,024	0	0	0	0	160,292	15,821	0	0	0	149	149	284,425
27-Apr	144,785	4,716	39,013	0	0	0	144	205,330	15,426	0	0	0	0	744	410,158
28-Apr	110,442	3,242	25,574	0	0	0	0	58,714	5,939	0	0	0	147	746	204,804
29-Apr	221,829	5,521	40,673	0	0	0	145	74,966	15,049	0	0	149	299	746	359,377
30-Apr	159,281	7,760	33,149	0	0	0	0	167,489	27,416	0	0	149	149	299	395,692
1-May	154,052	6,110	24,588	0	0	0	0	121,152	20,110	0	0	0	0	299	326,311
2-May	103,786	5,817	17,594	0	0	0	0	82,068	25,073	0	0	0	0	0	234,338
3-May	169,014	11,934	25,057	0	0	0	0	58,330	19,700	0	0	0	0	0	284,035
4-May	252,606	11,618	32,665	0	0	0	0	58,614	20,960	0	0	0	0	448	376,911
5-May	474,233	24,889	66,054	0	0	0	138	133,349	42,014	0	0	0	278	970	741,925
6-May	536,420	39,656	55,525	0	0	0	702	93,198	42,790	0	0	281	422	2,387	771,381
7-May	176,775	16,748	24,070	0	0	0	140	268,904	78,478	0	133	570	998	6,834	573,650
8-May	131,371	11,768	28,067	0	0	0	0	368,660	110,296	0	0	299	1,791	8,206	660,458
9-May	62,574	6,992	15,018	0	0	0	115	210,550	58,130	0	0	701	700	6,535	361,315
10-May	49,754	3,868	19,514	0	0	0	0	141,317	47,103	0	0	554	693	9,143	271,946
11-May	65,760	4,919	26,202	0	0	0	148	198,995	51,724	149	0	1,045	1,194	9,551	359,687

Table 2. Daily Number of Fish Transported from Lower Granite Dam, 2004
Page 2.
Daily Number of Fish Transported

	Yearling Chinook			Subyearling Chinook				Steelhead		Sockeye/Kokanee		Coho			Daily
Date	Clipped	No Clip, cwt	No Clip	Clipped	No Clip,cwt	No Clip	Fry	Clipped	No Clip	Clipped	No Clip	Clipped	No Clip,cwt	No Clip	Total
12-May	38,887	3,282	25,152	0	0	0	0	182,268	45,652	149	299	896	2,089	6,712	305,386
13-May	16,672	2,532	10,355	0	0	0	0	60,609	15,195	0	0	597	597	7,310	113,867
14-May	12,801	1,342	9,505	0	0	0	0	44,210	14,770	448	147	447	1,343	7,608	92,621
15-May	11,150	2,237	10,664	0	0	0	0	82,296	24,378	448	0	149	299	4,321	135,942
16-May	11,309	1,641	9,537	0	0	0	0	31,461	9,842	149	149	148	447	2,835	67,518
17-May	17,259	892	9,210	0	0	0	0	195,345	29,997	299	0	746	448	8,207	262,403
18-May	10,062	744	6,115	0	0	0	0	71,423	11,709	0	0	148	149	2,385	102,735
19-May	13,569	746	11,199	0	0	0	0	63,821	7,907	149	0	596	1,045	4,178	103,210
20-May	16,996	597	7,309	0	0	0	145	42,013	9,032	0	0	0	895	6,117	83,104
21-May	15,484	745	12,372	0	0	0	0	59,907	12,231	445	0	446	2,388	10,737	114,755
22-May	18,687	893	11,834	0	0	0	0	297,653	51,173	297	446	1,493	2,527	17,734	402,737
23-May	9,768	542	6,352	0	0	179	0	103,469	16,404	365	0	454	1,269	5,986	144,788
24-May	15,146	1,136	16,391	0	0	0	126	210,503	39,017	125	125	758	2,774	14,010	300,111
25-May	5,990	625	6,934	0	0	123	0	51,798	11,892	0	0	501	1,124	6,370	85,357
26-May	6,159	446	8,620	0	0	447	0	38,272	11,885	298	0	896	2,536	10,740	80,299
27-May	2,753	299	4,925	0	0	149	0	46,046	11,632	0	149	299	895	5,369	72,516
28-May	3,377	298	5,091	299	0	299	0	36,787	9,457	149	0	149	596	4,174	60,676
29-May	3,159	448	7,484	6,418	0	446	0	26,931	4,371	149	0	299	594	2,532	52,831
30-May	893	0	1,640	2,235	0	739	0	15,060	3,431	0	0	149	148	1,790	26,085
31-May	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1-Jun	1,183	744	4,764	2,674	0	1,189	0	44,576	9,694	0	0	0	885	3,718	69,427
2-Jun	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3-Jun	1,043	50	3,668	725	0	183	0	10,680	3,437	0	0	0	498	934	21,218
4-Jun	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5-Jun	1,749	150	4,243	3,454	1,050	2,739	99	8,390	3,073	0	49	0	198	393	25,587
6-Jun	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7-Jun	849	248	4,048	7,592	7,047	26,978	249	5,495	2,048	198	0	0	449	599	55,800
8-Jun	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9-Jun	1,150	399	4,994	3,051	7,275	50,404	396	11,421	3,699	99	99	148	400	800	84,335
10-Jun	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11-Jun	1,196	248	2,798	2,130	14,112	55,836	397	7,468	3,068	147	99	100	295	1,148	89,042
12-Jun	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
13-Jun	500	299	2,794	1,761	13,001	39,047	299	4,598	3,297	498	0	100	600	700	67,494
14-Jun	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15-Jun	100	0	695	843	13,682	52,909	0	2,198	2,998	0	0	0	100	498	74,023
16-Jun	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
17-Jun	499	0	998	879	14,268	38,693	0	2,498	899	0	0	100	400	898	60,132
18-Jun	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
19-Jun	100	100	600	432	11,148	28,552	200	4,298	1,798	99	0	0	198	297	47,822
20-Jun	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
21-Jun	99	50	1,000	597	22,079	37,553	100	1,599	700	49	0	0	0	449	64,275
22-Jun	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
23-Jun	49	250	1,097	79	16,525	32,540	48	1,689	350	0	0	0	0	350	52,977
24-Jun	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
25-Jun	249	200	1,893	46	15,116	29,716	50	2,437	745	100	0	0	48	647	51,247
26-Jun	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
27-Jun	198	199	1,198	99	14,080	27,222	0	3,344	546	49	0	0	0	549	47,484
28-Jun	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
29-Jun	155	439	954	42	12,473	42,438	20	889	355	0	0	0	20	118	57,903
30-Jun	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1-Jul	133	260	370	0	8,765	29,981	0	1,154	345	0	0	0	59	249	41,316

Table 2. Daily Number of Fish Transported from Lower Granite Dam, 2004
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Daily Number of Fish Transported

Date	Yearling Chinook			Subyearling Chinook				Steelhead		Sockeye/Kokanee		Coho			Daily
	Clipped	No Clip, cwt	No Clip	Clipped	No Clip,cwt	No Clip	Fry	Clipped	No Clip	Clipped	No Clip	Clipped	No Clip,cwt	No Clip	Total
2-Jul	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3-Jul	50	175	474	22	5,176	17,400	25	1,240	371	0	17	22	24	248	25,244
4-Jul	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5-Jul	48	100	299	0	7,007	25,185	0	811	143	0	0	0	0	75	33,668
6-Jul	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7-Jul	0	100	246	0	3,372	21,957	0	1,317	297	24	0	0	0	125	27,438
8-Jul	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9-Jul	0	115	255	0	1,931	14,728	0	645	119	0	0	0	0	69	17,862
10-Jul	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11-Jul	19	119	517	0	2,274	22,268	0	394	119	0	0	0	0	40	25,750
12-Jul	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
13-Jul	60	159	240	0	2,063	20,828	0	413	159	20	0	0	0	60	24,002
14-Jul	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15-Jul	20	80	198	0	2,168	15,766	0	397	259	0	0	0	0	60	18,948
16-Jul	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
17-Jul	19	140	160	0	615	7,880	0	379	218	0	0	0	0	0	9,411
18-Jul	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
19-Jul	38	90	189	0	998	10,744	0	440	109	0	0	0	0	20	12,628
20-Jul	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
21-Jul	10	68	107	0	417	5,493	0	434	117	0	0	0	0	28	6,674
22-Jul	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
23-Jul	0	20	48	9	331	2,696	0	218	79	0	0	0	0	10	3,411
24-Jul	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
25-Jul	0	10	15	0	318	2,934	0	577	180	0	0	0	0	9	4,043
26-Jul	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
27-Jul	0	0	5	5	213	3,174	0	312	105	0	0	0	0	10	3,824
28-Jul	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
29-Jul	0	5	5	0	143	2,613	0	218	40	0	0	0	0	5	3,029
30-Jul	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
31-Jul	0	0	5	0	107	3,395	0	316	65	0	0	5	0	0	3,893
1-Aug	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2-Aug	4	5	4	0	57	1,837	0	223	64	0	3	0	0	10	2,207
3-Aug	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4-Aug	4	0	4	0	83	1,518	0	220	50	0	0	4	0	0	1,883
5-Aug	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6-Aug	0	0	0	0	57	1,186	0	180	44	0	0	0	0	16	1,483
7-Aug	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8-Aug	0	0	4	0	77	1,737	0	83	12	0	0	0	4	0	1,917
9-Aug	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10-Aug	4	4	0	0	36	1,116	0	52	19	0	0	0	0	4	1,235
11-Aug	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12-Aug	0	0	4	0	28	1,236	0	84	28	0	8	0	0	0	1,388
13-Aug	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
14-Aug	0	0	0	0	22	535	0	72	27	0	0	0	0	7	663
15-Aug	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
16-Aug	0	0	0	0	35	882	0	140	17	0	0	0	0	12	1,086
17-Aug	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
18-Aug	0	0	0	0	11	1,043	0	80	16	0	0	0	0	4	1,154
19-Aug	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
20-Aug	0	0	4	0	31	1,144	0	80	15	0	0	0	0	0	1,274
21-Aug	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Table 2. Daily Number of Fish Transported from Lower Granite Dam, 2004
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Daily Number of Fish Transported

	Yearling Chinook			Subyearling Chinook				Steelhead		Sockeye/Kokanee		Coho			Daily
Date	Clipped	No Clip, cwt	No Clip	Clipped	No Clip,cwt	No Clip	Fry	Clipped	No Clip	Clipped	No Clip	Clipped	No Clip,cwt	No Clip	Total
22-Aug	0	0	0	0	39	1,841	0	44	4	0	0	0	0	0	1,928
23-Aug	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
24-Aug	0	0	0	0	32	2,160	0	58	12	0	2	0	0	0	2,264
25-Aug	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
26-Aug	0	0	0	0	25	1,905	0	67	12	0	0	0	0	0	2,009
27-Aug	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
28-Aug	0	0	0	0	46	1,822	0	27	0	0	0	0	4	12	1,911
29-Aug	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
30-Aug	0	0	4	0	8	779	0	39	0	0	7	0	0	0	837
31-Aug	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1-Sep	0	0	0	0	12	413	0	20	0	4	4	0	0	4	457
2-Sep	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3-Sep	0	0	1	0	15	638	0	5	1	0	3	0	0	5	668
4-Sep	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5-Sep	0	2	2	0	6	238	0	0	0	0	3	0	0	2	253
6-Sep	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7-Sep	0	1	1	0	3	227	0	0	0	0	0	0	0	4	236
8-Sep	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9-Sep	0	0	0	0	4	157	0	0	0	0	2	0	0	0	163
10-Sep	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11-Sep	0	1	1	0	2	106	0	0	0	0	3	0	0	2	115
12-Sep	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
13-Sep	0	0	0	0	3	175	0	0	0	0	4	0	0	0	182
14-Sep	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15-Sep	0	0	0	0	4	163	0	0	0	0	13	0	0	0	180
16-Sep	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
17-Sep	0	0	0	0	13	541	0	0	0	0	6	0	0	1	561
18-Sep	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
19-Sep	0	1	0	0	13	670	0	0	0	0	20	0	0	0	704
20-Sep	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
21-Sep	0	0	0	0	15	569	0	0	0	0	24	0	0	0	608
22-Sep	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
23-Sep	0	0	1	0	20	2,392	0	0	0	0	30	0	0	0	2,443
24-Sep	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
25-Sep	0	0	8	0	15	5,068	0	15	0	0	12	0	0	0	5,118
26-Sep	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
27-Sep	0	4	0	0	4	1,726	0	0	0	0	19	0	0	0	1,753
28-Sep	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
29-Sep	0	0	0	0	4	474	0	0	3	0	16	4	0	4	505
30-Sep	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1-Oct	0	0	0	0	0	162	0	0	0	0	12	0	0	0	174
2-Oct	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3-Oct	0	0	1	0	4	121	0	0	0	0	7	0	0	1	134
4-Oct	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5-Oct	2	0	0	0	2	130	0	0	0	0	2	0	0	0	136
6-Oct	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7-Oct	8	0	0	0	4	256	0	0	0	0	22	0	0	1	291
8-Oct	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9-Oct	11	0	0	0	9	311	0	0	0	0	19	0	0	0	350
10-Oct	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11-Oct	4	0	0	0	2	238	0	0	0	0	10	0	0	0	254

Table 2. Daily Number of Fish Transported from Lower Granite Dam, 2004
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Daily Number of Fish Transported

Date	Yearling Chinook			Subyearling Chinook				Steelhead		Sockeye/Kokanee		Coho			Daily
	Clipped	No Clip, cwt	No Clip	Clipped	No Clip,cwt	No Clip	Fry	Clipped	No Clip	Clipped	No Clip	Clipped	No Clip,cwt	No Clip	Total
12-Oct	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
13-Oct	16	1	1	0	4	139	0	0	0	0	5	0	0	0	166
14-Oct	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15-Oct	50	1	0	0	0	139	0	0	0	0	4	0	0	0	194
16-Oct	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
17-Oct	37	1	0	0	3	172	0	0	0	0	6	0	0	0	219
18-Oct	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
19-Oct	37	0	0	0	4	173	0	0	0	0	12	0	0	1	227
20-Oct	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
21-Oct	55	1	1	0	5	154	0	0	0	0	8	0	0	0	224
22-Oct	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
23-Oct	101	0	5	0	9	272	0	0	0	0	22	0	0	0	409
24-Oct	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
25-Oct	69	0	2	0	4	354	0	0	0	0	6	0	0	0	435
26-Oct	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
27-Oct	144	0	1	0	5	530	0	0	0	0	16	0	0	0	696
28-Oct	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
29-Oct	39	0	1	0	3	174	0	0	0	0	23	0	0	0	240
30-Oct	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
31-Oct	57	0	1	0	0	112	0	0	0	0	46	0	0	0	216
Total	3,562,258	199,716	910,606	33,392	198,532	713,158	5,382	4,351,868	1,032,376	4,906	2,412	13,631	33,425	192,175	11,253,837

Table 3. Daily Total of Fish Bypassed from Lower Granite Dam, 2004

Page 1.

Daily Number of Fish Bypassed

	Yearling Chinook			Subyearling Chinook				Steelhead		Sockeye/Kokanee		Coho			Daily
Date	Clipped	No Clip, cwt	No Clip	Clipped	No Clip,cwt	No Clip	Fry	Clipped	No Clip	Clipped	No Clip	Clipped	No Clip,cwt	No Clip	Total
26-Mar	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
27-Mar	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
28-Mar	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
29-Mar	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
30-Mar	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
31-Mar	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1-Apr	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2-Apr	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3-Apr	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4-Apr	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5-Apr	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6-Apr	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7-Apr	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8-Apr	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9-Apr	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10-Apr	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11-Apr	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12-Apr	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
13-Apr	1	0	105	0	0	0	0	169	65	0	0	0	0	0	340
14-Apr	0	0	259	0	0	0	0	267	82	0	0	0	0	0	608
15-Apr	0	0	299	0	0	0	0	300	200	0	0	0	0	0	799
16-Apr	0	0	319	0	0	0	0	311	111	0	0	0	0	0	741
17-Apr	0	0	320	0	0	0	0	368	99	0	0	0	0	0	787
18-Apr	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
19-Apr	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
20-Apr	0	0	400	0	0	0	0	351	50	0	0	0	0	0	801
21-Apr	0	0	184	0	0	0	0	355	63	0	0	0	0	0	602
22-Apr	0	0	516	0	0	0	0	345	96	0	0	0	0	0	957
23-Apr	0	0	450	0	0	0	0	350	67	0	0	0	0	0	867
24-Apr	0	0	450	0	0	0	0	350	97	0	0	0	0	0	897
25-Apr	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
26-Apr	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
27-Apr	0	0	360	0	0	0	0	701	72	0	0	0	0	0	1,133
28-Apr	0	0	360	0	0	0	0	700	36	0	0	0	0	0	1,096
29-Apr	0	0	201	0	0	0	0	699	26	0	0	0	0	0	926
30-Apr	0	0	420	0	0	0	0	701	41	0	0	0	0	0	1,162
1-May	0	0	419	0	0	0	0	736	31	0	0	0	0	0	1,186
2-May	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3-May	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4-May	0	0	260	0	0	0	0	735	228	0	0	0	0	0	1,223
5-May	36,393	1,909	5,281	0	0	0	11	10,870	3,393	0	0	0	21	74	57,952
6-May	33,704	2,492	3,779	0	0	0	44	6,283	2,860	0	0	18	26	150	49,356
7-May	8,421	796	1,294	0	0	0	7	13,538	3,894	0	7	27	47	324	28,355
8-May	0	0	380	0	0	0	0	803	589	0	0	0	0	0	1,772
9-May	17,481	1,950	4,192	0	0	0	32	58,617	16,181	0	0	195	195	1,820	100,663
10-May	3,841	299	1,504	0	0	0	0	10,883	3,628	0	0	43	53	704	20,955
11-May	0	0	200	0	0	0	0	665	360	0	0	0	0	0	1,225

Table 3. Daily Total of Fish Bypassed from Lower Granite Dam, 2004
Page 2.
Daily Number of Fish Bypassed

	Yearling Chinook			Subyearling Chinook				Steelhead		Sockeye/Kokanee		Coho			Daily
Date	Clipped	No Clip, cwt	No Clip	Clipped	No Clip,cwt	No Clip	Fry	Clipped	No Clip	Clipped	No Clip	Clipped	No Clip,cwt	No Clip	Total
12-May	0	0	200	0	0	0	0	680	309	0	0	0	0	0	1,189
13-May	0	0	72	0	0	0	0	666	169	0	0	0	0	0	907
14-May	0	0	328	0	0	0	0	665	297	0	0	0	0	0	1,290
15-May	0	0	200	0	0	0	0	651	397	0	0	0	0	0	1,248
16-May	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
17-May	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
18-May	0	0	140	0	0	0	0	490	226	0	0	0	0	0	856
19-May	0	0	140	0	0	0	0	490	296	0	0	0	0	0	926
20-May	0	0	140	0	0	0	0	490	215	0	0	0	0	0	845
21-May	0	0	140	0	0	0	0	490	296	0	0	0	0	0	926
22-May	0	0	140	0	0	0	0	490	310	0	0	0	0	0	940
23-May	6,318	348	4,116	0	0	116	0	65,791	10,433	232	0	290	812	3,826	92,282
24-May	2,753	206	2,982	0	0	0	23	38,243	7,089	23	23	138	505	2,546	54,531
25-May	1,153	120	1,404	0	0	24	0	10,371	2,431	0	0	96	216	1,226	17,041
26-May	0	0	175	0	0	0	0	350	347	0	0	0	0	0	872
27-May	0	0	142	0	0	0	0	351	451	0	0	0	0	0	944
28-May	0	0	125	0	0	0	0	350	388	0	0	0	0	0	863
29-May	0	0	125	0	0	0	0	350	255	0	0	0	0	0	730
30-May	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
31-May	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1-Jun	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2-Jun	0	0	157	0	0	0	0	264	275	0	0	0	0	0	696
3-Jun	0	0	157	267	0	216	0	296	275	0	0	0	0	0	1,211
4-Jun	0	0	160	147	0	201	0	279	275	0	0	0	0	0	1,062
5-Jun	0	0	96	289	0	202	0	263	101	0	0	0	0	0	951
6-Jun	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7-Jun	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8-Jun	0	0	47	522	0	1,545	0	264	74	0	0	0	0	0	2,452
9-Jun	0	0	6	490	0	3,193	0	263	76	0	0	0	0	0	4,028
10-Jun	0	0	0	312	0	2,023	0	266	116	0	0	0	0	0	2,717
11-Jun	0	0	0	166	0	2,578	0	263	64	0	0	0	0	0	3,071
12-Jun	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
13-Jun	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
14-Jun	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15-Jun	0	0	0	451	0	2,514	0	0	0	0	0	0	0	0	2,965
16-Jun	0	0	0	64	0	2,962	0	0	0	0	0	0	0	0	3,026
17-Jun	0	0	0	52	0	2,965	0	0	0	0	0	0	0	0	3,017
18-Jun	0	0	0	55	0	2,899	0	0	0	0	0	0	0	0	2,954
19-Jun	0	0	0	11	0	1,237	0	0	0	0	0	0	0	0	1,248
20-Jun	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
21-Jun	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
22-Jun	0	0	3	11	0	3,021	0	0	0	0	0	0	0	0	3,035
23-Jun	0	0	0	6	0	3,125	0	0	0	0	0	0	0	0	3,131
24-Jun	0	0	0	4	0	3,203	0	0	0	0	0	0	0	0	3,207
25-Jun	0	0	0	0	0	1,251	0	0	0	0	0	0	0	0	1,251
26-Jun	0	0	0	1	0	1,828	0	0	0	0	0	0	0	0	1,829
27-Jun	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
28-Jun	0	0	0	1	197	643	0	0	0	0	0	0	0	0	841
29-Jun	0	0	0	0	174	583	0	0	0	0	0	0	0	0	757
30-Jun	0	0	0	0	211	631	0	0	0	0	0	0	0	0	842
1-Jul	0	0	0	0	84	382	0	0	0	0	0	0	0	0	466

Table 3. Daily Total of Fish Bypassed from Lower Granite Dam, 2004
Page 3.
Daily Number of Fish Bypassed

	Yearling Chinook			Subyearling Chinook				Steelhead		Sockeye/Kokanee		Coho			Daily
Date	Clipped	No Clip, cwt	No Clip	Clipped	No Clip,cwt	No Clip	Fry	Clipped	No Clip	Clipped	No Clip	Clipped	No Clip,cwt	No Clip	Total
2-Jul	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3-Jul	0	0	0	0	98	270	0	0	0	0	0	0	0	0	368
4-Jul	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5-Jul	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6-Jul	0	0	0	0	46	248	0	0	0	0	0	0	0	0	294
7-Jul	0	0	0	0	25	259	0	0	0	0	0	0	0	0	284
8-Jul	0	0	0	0	37	222	0	0	0	0	0	0	0	0	259
9-Jul	0	0	0	0	29	273	0	0	0	0	0	0	0	0	302
10-Jul	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11-Jul	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12-Jul	0	0	0	0	21	279	0	0	0	0	0	0	0	0	300
13-Jul	0	0	0	0	31	271	0	0	0	0	0	0	0	0	302
14-Jul	0	0	0	0	35	258	0	0	0	0	0	0	0	0	293
15-Jul	0	0	0	0	30	271	0	0	0	0	0	0	0	0	301
16-Jul	0	0	0	0	18	184	0	0	0	0	0	0	0	0	202
17-Jul	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
18-Jul	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
19-Jul	0	0	0	0	13	290	0	0	0	0	0	0	0	0	303
20-Jul	0	0	0	0	20	264	0	0	0	0	0	0	0	0	284
21-Jul	0	0	0	0	14	181	0	0	0	0	0	0	0	0	195
22-Jul	0	0	0	0	22	166	0	0	0	0	0	0	0	0	188
23-Jul	0	0	0	0	9	84	0	0	0	0	0	0	0	0	93
24-Jul	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
25-Jul	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
26-Jul	0	0	0	0	17	283	0	0	0	0	0	0	0	0	300
27-Jul	0	0	0	0	20	229	0	0	0	0	0	0	0	0	249
28-Jul	0	0	0	0	19	266	0	0	0	0	0	0	0	0	285
29-Jul	0	0	0	0	12	261	0	0	0	0	0	0	0	0	273
30-Jul	0	0	0	0	8	294	0	0	0	0	0	0	0	0	302
31-Jul	0	0	0	0	0	4	0	0	0	0	0	0	0	0	4
1-Aug	0	0	0	0	0	4	0	0	0	0	0	0	0	0	4
2-Aug	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3-Aug	0	0	0	0	0	12	0	0	0	0	0	0	0	0	12
4-Aug	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5-Aug	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6-Aug	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7-Aug	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8-Aug	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9-Aug	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10-Aug	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11-Aug	0	0	0	0	0	3	0	0	0	0	0	0	0	0	3
12-Aug	0	0	0	0	0	5	0	0	0	0	0	0	0	0	5
13-Aug	0	0	0	0	0	4	0	0	0	0	0	0	0	0	4
14-Aug	0	0	0	0	0	4	0	0	0	0	0	0	0	0	4
15-Aug	0	0	0	0	0	4	0	0	0	0	0	0	0	0	4
16-Aug	0	0	0	0	0	4	0	0	0	0	0	0	0	0	4
17-Aug	0	0	0	0	0	8	0	0	0	0	0	0	0	0	8
18-Aug	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
19-Aug	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
20-Aug	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
21-Aug	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Table 3. Daily Total of Fish Bypassed from Lower Granite Dam, 2004
Page 4.
Daily Number of Fish Bypassed

	Yearling Chinook			Subyearling Chinook				Steelhead		Sockeye/Kokanee		Coho			Daily
Date	Clipped	No Clip, cwt	No Clip	Clipped	No Clip,cwt	No Clip	Fry	Clipped	No Clip	Clipped	No Clip	Clipped	No Clip,cwt	No Clip	Total
22-Aug	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
23-Aug	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
24-Aug	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
25-Aug	0	0	0	0	0	4	0	0	0	0	0	0	0	0	4
26-Aug	0	0	0	0	0	4	0	0	0	0	0	0	0	0	4
27-Aug	0	0	0	0	0	4	0	0	0	0	0	0	0	0	4
28-Aug	0	0	0	0	0	4	0	0	0	0	0	0	0	0	4
29-Aug	0	0	0	0	0	4	0	0	0	0	0	0	0	0	4
30-Aug	0	0	0	0	0	5	0	0	0	0	0	0	0	0	5
31-Aug	0	0	0	0	0	10	0	0	0	0	0	0	0	0	10
1-Sep	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2-Sep	0	0	0	0	0	0	0	17	1	0	0	0	0	0	18
3-Sep	0	0	0	0	0	0	0	4	0	0	0	0	0	0	4
4-Sep	0	0	0	0	0	0	0	4	3	0	0	0	0	0	7
5-Sep	0	0	0	0	0	0	0	7	1	0	0	0	0	0	8
6-Sep	0	0	0	0	0	0	0	3	0	0	0	0	0	0	3
7-Sep	0	0	0	0	0	0	0	2	0	0	0	0	0	0	2
8-Sep	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9-Sep	0	0	0	0	0	0	0	4	0	0	0	0	0	0	4
10-Sep	0	0	0	0	0	0	0	2	0	0	0	0	0	0	2
11-Sep	0	0	0	0	0	0	0	5	0	0	0	0	0	0	5
12-Sep	0	0	0	0	0	0	0	5	1	0	0	0	0	0	6
13-Sep	0	0	0	0	0	0	0	5	1	0	0	0	0	0	6
14-Sep	0	0	0	0	0	0	0	8	3	0	0	0	0	0	11
15-Sep	0	0	0	0	0	0	0	14	2	0	0	0	0	0	16
16-Sep	0	0	0	0	0	0	0	11	2	0	0	0	0	0	13
17-Sep	0	0	0	0	0	0	0	17	1	0	0	0	0	0	18
18-Sep	0	0	0	0	0	0	0	25	4	0	0	0	0	0	29
19-Sep	0	0	0	0	0	0	0	12	1	0	0	0	0	0	13
20-Sep	0	0	0	0	0	0	0	31	0	0	0	0	0	0	31
21-Sep	0	0	0	0	0	0	0	29	3	0	0	0	0	0	32
22-Sep	0	0	0	0	0	0	0	13	3	0	0	0	0	0	16
23-Sep	0	0	0	0	0	0	0	19	1	0	0	0	0	0	20
24-Sep	0	0	0	0	0	0	0	1	0	0	0	0	0	0	1
25-Sep	0	0	0	0	0	0	0	4	0	0	0	0	0	0	4
26-Sep	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
27-Sep	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
28-Sep	0	0	0	0	0	0	0	0	1	0	0	0	0	0	1
29-Sep	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
30-Sep	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1-Oct	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2-Oct	0	0	0	0	0	0	0	4	0	0	0	0	0	0	4
3-Oct	0	0	0	0	0	0	0	1	1	0	0	0	0	0	2
4-Oct	0	0	0	0	0	0	0	4	0	0	0	0	0	0	4
5-Oct	0	0	0	0	0	0	0	0	1	0	0	0	0	0	1
6-Oct	0	0	0	0	0	0	0	1	0	0	0	0	0	0	1
7-Oct	0	0	0	0	0	0	0	2	0	0	0	0	0	0	2
8-Oct	0	0	0	0	0	0	0	3	0	0	0	0	0	0	3
9-Oct	0	0	0	0	0	0	0	6	1	0	0	0	0	0	7
10-Oct	0	0	0	0	0	0	0	2	0	0	0	0	0	0	2
11-Oct	0	0	0	0	0	0	0	4	0	0	0	0	0	0	4

Table 3. Daily Total of Fish Bypassed from Lower Granite Dam, 2004
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Daily Number of Fish Bypassed

	Yearling Chinook			Subyearling Chinook				Steelhead		Sockeye/Kokanee		Coho			Daily
Date	Clipped	No Clip, cwt	No Clip	Clipped	No Clip,cwt	No Clip	Fry	Clipped	No Clip	Clipped	No Clip	Clipped	No Clip,cwt	No Clip	Total
12-Oct	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
13-Oct	0	0	0	0	0	0	0	3	0	0	0	0	0	0	3
14-Oct	0	0	0	0	0	0	0	1	0	0	0	0	0	0	1
15-Oct	0	0	0	0	0	0	0	2	0	0	0	0	0	0	2
16-Oct	0	0	0	0	0	0	0	2	0	0	0	0	0	0	2
17-Oct	0	0	0	0	0	0	0	5	1	0	0	0	0	0	6
18-Oct	0	0	0	0	0	0	0	8	0	0	0	0	0	0	8
19-Oct	0	0	0	0	0	0	0	11	4	0	0	0	0	0	15
20-Oct	0	0	0	0	0	0	0	1	0	0	0	0	0	0	1
21-Oct	0	0	0	0	0	0	0	2	1	0	0	0	0	0	3
22-Oct	0	0	0	0	0	0	0	3	1	0	0	0	0	0	4
23-Oct	0	0	0	0	0	0	0	6	1	0	0	0	0	0	7
24-Oct	0	0	0	0	0	0	0	5	0	0	0	0	0	0	5
25-Oct	0	0	0	0	0	0	0	8	1	0	0	0	0	0	9
26-Oct	0	0	0	0	0	0	0	3	1	0	0	0	0	0	4
27-Oct	0	0	0	0	0	0	0	6	0	0	0	0	0	0	6
28-Oct	0	0	0	0	0	0	0	0	2	0	0	0	0	0	2
29-Oct	0	0	0	0	0	0	0	1	0	0	0	0	0	0	1
30-Oct	0	0	0	0	0	0	0	0	1	0	0	0	0	0	1
31-Oct	0	0	0	0	0	0	0	1	0	0	0	0	0	0	1
Total	110,065	8,120	33,147	2,849	1,190	42,282	117	232,510	57,478	255	30	807	1,875	10,670	501,395

Table 4. Daily Facility Mortality (raceway, NMFS, recovery tank and sample) at Lower Granite Dam, 2004

Page 1.

Daily Number of Mortalities

	Yearling Chinook			Subyearling Chinook				Steelhead		Sockeye/Kokanee		Coho			Daily
Date	Clipped	No Clip, cwt	No Clip	Clipped	No Clip,cwt	No Clip	Fry	Clipped	No Clip	Clipped	No Clip	Clipped	No Clip,cwt	No Clip	Total
26-Mar	0	0	7	0	0	0	0	0	1	0	0	0	0	0	8
27-Mar	6	0	11	0	0	0	0	4	9	0	2	0	0	0	32
28-Mar	0	0	3	0	0	0	0	0	1	0	0	0	0	0	4
29-Mar	0	2	1	0	0	0	0	0	0	0	0	0	0	0	3
30-Mar	0	1	0	0	0	0	0	0	2	0	0	0	0	0	3
31-Mar	5	0	2	0	0	0	0	0	0	0	0	0	0	0	7
1-Apr	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1
2-Apr	3	1	4	0	0	0	0	0	0	0	1	0	0	0	9
3-Apr	10	0	17	0	0	0	0	0	0	0	0	0	0	0	27
4-Apr	33	1	22	0	0	0	0	1	0	0	1	0	0	0	58
5-Apr	6	1	15	0	0	0	0	0	0	0	1	0	0	0	23
6-Apr	10	0	31	0	0	0	0	1	1	0	2	0	0	0	45
7-Apr	9	1	48	0	0	0	0	1	1	0	1	0	0	0	61
8-Apr	8	2	18	0	0	0	1	2	0	0	1	0	0	0	32
9-Apr	4	1	2	0	0	0	0	1	0	0	0	0	0	0	8
10-Apr	3	0	9	0	0	0	0	0	0	0	0	0	0	0	12
11-Apr	12	1	6	0	0	0	0	0	1	0	0	0	0	0	20
12-Apr	26	0	25	0	0	0	3	0	0	0	0	0	0	0	54
13-Apr	13	0	5	0	0	0	0	0	0	0	0	0	0	0	18
14-Apr	16	0	6	0	0	0	0	0	0	0	0	0	0	0	22
15-Apr	16	0	4	0	0	0	0	0	0	0	0	0	0	0	20
16-Apr	96	1	57	0	0	0	0	2	3	0	0	0	0	0	159
17-Apr	44	1	28	0	0	0	0	1	2	0	0	0	0	0	76
18-Apr	65	0	18	0	0	0	0	1	0	0	0	0	0	0	84
19-Apr	30	1	5	0	0	0	5	2	0	0	0	0	0	0	43
20-Apr	64	0	5	0	0	0	0	6	0	0	0	0	0	0	75
21-Apr	20	0	6	0	0	0	0	0	0	0	0	0	0	0	26
22-Apr	41	1	4	0	0	0	0	5	0	0	0	0	0	0	51
23-Apr	43	0	10	0	0	0	0	0	0	0	0	0	0	0	53
24-Apr	531	6	149	0	0	0	0	9	3	0	0	0	0	1	699
25-Apr	623	8	296	0	0	0	0	13	2	0	0	0	0	3	945
26-Apr	158	1	36	0	0	0	0	7	0	0	0	0	0	0	202
27-Apr	2,976	60	1,672	0	0	0	5	88	25	0	0	0	0	2	4,828
28-Apr	2,587	42	790	0	0	0	0	28	4	0	0	0	2	0	3,453
29-Apr	111	1	22	0	0	0	4	7	0	0	0	0	0	0	145
30-Apr	122	1	13	0	0	0	0	19	5	0	0	0	0	0	160
1-May	552	9	68	0	0	0	0	52	8	0	0	0	0	0	689
2-May	112	4	18	0	0	0	0	22	2	0	0	0	0	0	158
3-May	204	6	18	0	0	0	0	28	1	0	0	0	0	0	257
4-May	481	24	60	0	0	0	0	54	6	0	0	0	0	0	625
5-May	4,449	217	158	0	0	0	0	706	116	0	0	0	0	1	5,647
6-May	1,518	91	99	0	0	0	0	220	22	0	0	0	0	0	1,950
7-May	1,222	68	158	0	0	0	2	95	17	0	9	0	0	6	1,577
8-May	420	23	60	0	0	0	0	89	11	0	0	0	0	3	606
9-May	244	13	44	0	0	0	2	87	18	0	0	0	1	3	412
10-May	136	12	27	0	0	0	0	39	15	0	0	0	0	4	233

Table 4. Daily Facility Mortality (raceway, NMFS, Recovery tank and sample) at Lower Granite Dam, 2004

Daily Number of Mortalities

	Yearling Chinook			Subyearling Chinook				Steelhead		Sockeye/Kokanee		Coho			Daily
Date	Clipped	No Clip, cwt	No Clip	Clipped	No Clip,cwt	No Clip	Fry	Clipped	No Clip	Clipped	No Clip	Clipped	No Clip,cwt	No Clip	Total
11-May	61	6	16	0	0	0	1	41	6	0	0	0	0	1	132
12-May	68	2	21	0	0	0	0	37	9	0	0	0	1	4	142
13-May	44	5	21	0	0	0	0	68	9	0	0	0	0	3	150
14-May	35	1	18	0	0	0	0	50	8	0	2	1	0	4	119
15-May	38	2	32	0	0	0	0	38	1	0	0	0	0	7	118
16-May	18	1	15	0	0	0	0	32	9	0	0	1	1	1	78
17-May	38	4	44	0	0	0	0	28	3	0	0	0	0	2	119
18-May	39	2	14	0	0	0	0	27	5	0	0	1	0	3	91
19-May	13	0	4	0	0	0	0	17	6	0	0	1	0	1	42
20-May	19	0	14	0	0	0	4	34	7	0	0	0	1	2	81
21-May	38	1	25	0	0	0	0	51	10	3	0	2	0	9	139
22-May	119	3	116	0	0	0	0	66	10	2	2	0	10	27	355
23-May	183	6	129	0	0	4	0	143	28	0	0	2	9	39	543
24-May	11	1	30	0	0	0	0	60	13	1	1	0	5	11	133
25-May	21	1	20	0	0	2	0	70	5	0	0	0	3	16	138
26-May	11	2	11	0	0	1	0	35	7	1	0	0	1	6	75
27-May	5	0	8	0	0	0	0	21	6	0	0	0	1	4	45
28-May	8	1	8	0	0	0	0	27	6	0	0	0	1	5	56
29-May	11	0	3	0	0	2	0	32	1	0	0	0	3	5	57
30-May	3	0	2	4	0	7	0	15	2	0	0	0	1	1	35
31-May	5	1	4	10	0	2	0	16	4	0	0	0	6	6	54
1-Jun	6	2	8	3	0	4	0	35	3	0	0	0	4	7	72
2-Jun	1	0	3	0	0	0	0	19	0	0	0	0	0	6	29
3-Jun	4	0	5	6	0	0	0	13	2	0	0	0	0	6	36
4-Jun	1	0	1	4	0	3	1	4	0	0	1	0	2	5	22
5-Jun	0	0	0	6	0	5	0	14	1	0	0	0	0	2	28
6-Jun	1	1	1	4	1	7	1	2	0	2	0	0	1	1	22
7-Jun	0	1	1	4	2	15	0	3	2	0	0	0	0	0	28
8-Jun	0	0	0	9	7	24	0	0	1	1	0	2	0	0	44
9-Jun	0	1	3	28	18	84	4	2	0	0	1	0	0	0	141
10-Jun	2	1	2	55	40	219	2	1	0	3	0	0	2	2	329
11-Jun	2	1	0	37	48	244	1	2	2	0	1	0	3	0	341
12-Jun	0	1	3	31	69	339	1	0	0	1	0	0	0	0	445
13-Jun	0	0	3	8	30	114	0	2	3	1	0	0	0	0	161
14-Jun	0	0	2	1	5	23	0	0	0	0	0	0	0	0	31
15-Jun	0	0	3	5	13	54	0	2	2	0	0	0	0	2	81
16-Jun	1	0	0	2	17	43	0	0	0	0	0	0	0	2	65
17-Jun	0	0	2	3	15	37	0	2	1	0	0	0	0	0	60
18-Jun	0	0	0	0	3	21	0	1	1	0	0	0	2	2	30
19-Jun	0	0	0	2	49	91	0	1	1	1	0	0	0	1	146
20-Jun	0	0	0	0	62	114	0	0	0	0	0	0	0	0	176
21-Jun	1	0	0	3	59	133	0	1	0	1	0	0	0	1	199
22-Jun	1	0	0	0	11	24	0	1	0	0	0	0	0	0	37
23-Jun	0	0	0	4	14	40	2	10	0	0	0	0	0	0	70
24-Jun	0	0	2	0	28	59	0	2	0	0	0	0	2	2	95
25-Jun	1	0	5	0	56	121	0	11	5	0	0	0	0	1	200
26-Jun	2	1	1	0	8	17	0	2	2	1	0	0	0	1	35
27-Jun	0	0	1	0	12	33	0	4	2	0	0	0	0	0	52
28-Jun	2	0	5	17	249	376	0	8	3	0	0	0	0	2	662
29-Jun	3	1	1	0	47	100	0	3	2	0	0	0	0	0	157
30-Jun	1	0	0	0	20	64	0	2	0	0	0	0	1	0	88

Table 4. Daily Facility Mortality (raceway, NMFS, Recovery tank and sample) at Lower Granite Dam, 2004

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Daily Number of Mortalities

Date	Yearling Chinook			Subyearling Chinook				Steelhead		Sockeye/Kokanee		Coho			Daily
	Clipped	No Clip, cwt	No Clip	Clipped	No Clip,cwt	No Clip	Fry	Clipped	No Clip	Clipped	No Clip	Clipped	No Clip,cwt	No Clip	Total
1-Jul	1	0	0	0	15	57	0	4	0	0	0	0	0	1	78
2-Jul	0	0	1	3	15	34	0	2	1	0	8	3	1	1	69
3-Jul	0	0	0	0	11	71	0	8	3	0	0	0	0	1	94
4-Jul	2	0	1	0	11	40	0	10	4	0	0	0	0	0	68
5-Jul	0	0	0	0	7	25	0	4	3	0	0	0	0	0	39
6-Jul	0	0	1	0	12	50	0	2	0	1	0	0	0	0	66
7-Jul	0	0	3	0	20	86	0	6	3	0	0	0	0	0	118
8-Jul	0	0	0	0	17	40	0	5	0	0	0	0	0	0	62
9-Jul	0	0	0	0	6	22	0	0	1	0	0	0	0	1	30
10-Jul	0	0	0	0	4	12	0	5	0	0	0	0	0	0	21
11-Jul	1	1	3	0	2	20	0	1	1	0	0	0	0	0	29
12-Jul	0	0	0	0	5	36	0	6	0	0	0	0	0	0	47
13-Jul	0	1	0	0	20	86	0	1	1	0	0	0	0	0	109
14-Jul	0	0	0	0	5	24	0	0	0	0	0	0	0	0	29
15-Jul	0	0	2	0	2	21	0	3	1	0	0	0	0	0	29
16-Jul	1	0	0	0	3	6	0	1	1	0	0	0	0	0	12
17-Jul	0	0	0	0	4	30	0	0	1	0	0	0	0	0	35
18-Jul	2	0	0	0	4	13	0	0	1	0	0	0	0	0	20
19-Jul	0	0	1	0	5	43	0	0	0	0	0	0	0	0	49
20-Jul	0	1	1	0	5	8	0	1	1	0	0	0	0	0	17
21-Jul	0	1	2	0	4	44	0	5	2	0	0	0	0	2	60
22-Jul	0	0	0	0	1	15	0	0	0	0	0	0	0	0	16
23-Jul	0	0	2	1	7	29	0	2	1	0	0	0	0	0	42
24-Jul	0	0	0	0	5	27	0	2	2	0	0	0	0	1	37
25-Jul	0	0	0	0	2	34	0	1	3	0	0	0	0	0	40
26-Jul	0	0	0	0	3	34	0	1	2	0	0	0	0	0	40
27-Jul	0	0	0	0	7	40	0	2	3	0	0	0	0	0	52
28-Jul	0	0	0	0	4	22	0	0	0	0	0	0	0	0	26
29-Jul	0	0	0	0	2	18	0	2	0	0	0	0	0	0	22
30-Jul	0	0	0	0	6	36	0	3	0	0	0	0	0	0	45
31-Jul	0	0	0	0	9	41	0	1	0	0	0	0	0	0	51
1-Aug	1	0	1	0	1	4	0	0	0	0	2	0	0	0	9
2-Aug	0	0	0	0	2	5	0	2	1	0	0	0	0	0	10
3-Aug	0	0	0	0	1	9	0	0	0	0	0	0	0	0	10
4-Aug	0	0	0	0	0	17	0	0	2	0	0	0	0	0	19
5-Aug	0	0	0	0	0	1	0	0	0	0	0	0	0	0	1
6-Aug	0	0	0	0	3	13	0	0	0	0	0	0	0	0	16
7-Aug	0	0	0	0	1	7	0	1	0	0	0	0	0	0	9
8-Aug	0	0	0	0	2	8	0	0	0	0	0	0	0	0	10
9-Aug	0	0	0	0	0	5	0	0	0	0	0	0	0	0	5
10-Aug	0	0	0	0	0	3	0	0	1	0	0	0	0	0	4
11-Aug	0	0	0	0	0	3	0	0	0	0	0	0	0	0	3
12-Aug	0	0	0	0	0	5	0	0	0	0	0	0	0	0	5
13-Aug	0	0	0	0	1	6	0	0	1	0	0	0	0	1	9
14-Aug	0	0	0	0	1	3	0	0	0	0	0	0	0	0	4
15-Aug	0	0	0	0	0	9	0	0	0	0	0	0	0	0	9
16-Aug	0	0	0	0	1	9	0	0	3	0	0	0	0	0	13
17-Aug	0	0	0	0	0	8	0	0	0	0	0	0	0	0	8
18-Aug	0	0	0	0	1	13	0	0	0	0	0	0	0	0	14
19-Aug	0	0	0	0	1	11	0	3	1	0	0	0	0	0	16
20-Aug	0	0	0	0	0	13	0	1	0	0	0	0	0	0	14

Table 4. Daily Facility Mortality (raceway, NMFS, Recovery tank and sample) at Lower Granite Dam, 2004

Page 4.

Daily Number of Mortalities

Date	Yearling Chinook			Subyearling Chinook				Steelhead		Sockeye/Kokanee		Coho			Daily Total
	Clipped	No Clip, cwt	No Clip	Clipped	No Clip,cwt	No Clip	Fry	Clipped	No Clip	Clipped	No Clip	Clipped	No Clip,cwt	No Clip	
21-Aug	0	0	0	0	0	22	0	0	0	0	0	0	0	0	22
22-Aug	0	0	0	0	1	25	0	0	0	0	0	0	0	0	26
23-Aug	0	0	0	0	0	14	0	1	0	0	2	0	0	0	17
24-Aug	0	0	0	0	0	6	0	1	0	0	0	0	0	0	7
25-Aug	0	0	0	0	0	5	0	0	0	0	0	0	0	0	5
26-Aug	0	0	0	0	3	14	0	1	0	0	0	0	0	0	18
27-Aug	0	0	0	0	1	11	0	1	0	0	0	0	0	0	13
28-Aug	0	0	0	0	1	11	0	0	0	0	0	0	0	0	12
29-Aug	0	0	0	0	0	4	0	0	0	0	0	0	0	0	4
30-Aug	0	0	0	0	0	4	0	1	0	0	1	0	0	0	6
31-Aug	0	0	0	0	0	3	0	0	0	0	0	0	0	0	3
1-Sep	0	0	0	0	0	6	0	0	0	0	0	0	0	0	6
2-Sep	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3-Sep	0	0	0	0	0	7	0	0	0	0	2	0	0	0	9
4-Sep	0	0	0	0	0	3	0	0	0	0	0	0	0	0	3
5-Sep	0	0	0	0	1	1	0	0	0	0	0	0	0	0	2
6-Sep	0	0	0	0	0	3	0	0	0	0	1	0	0	0	4
7-Sep	0	0	0	0	0	1	0	1	0	0	0	0	0	0	2
8-Sep	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1
9-Sep	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10-Sep	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11-Sep	0	0	0	0	0	3	0	0	0	0	0	0	0	0	3
12-Sep	0	0	0	0	2	2	0	0	0	0	0	0	0	0	4
13-Sep	0	0	0	0	0	3	0	0	0	0	0	0	0	0	3
14-Sep	0	0	0	0	0	5	0	0	0	0	0	0	0	0	5
15-Sep	0	0	0	0	0	2	0	0	0	0	0	0	0	0	2
16-Sep	0	0	0	0	0	5	0	0	0	0	1	0	0	0	6
17-Sep	0	0	0	0	0	5	0	1	0	0	3	0	0	0	9
18-Sep	0	0	0	0	0	5	0	0	0	0	0	0	0	0	5
19-Sep	0	0	0	0	0	1	0	0	0	0	0	0	0	0	1
20-Sep	0	0	0	0	1	5	0	0	0	0	5	0	0	0	11
21-Sep	0	0	0	0	0	8	0	0	0	0	1	0	0	0	9
22-Sep	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1
23-Sep	0	0	0	0	0	116	0	0	0	0	3	0	0	0	119
24-Sep	0	0	0	0	0	15	0	0	0	0	4	0	0	0	19
25-Sep	0	0	0	0	1	17	0	0	0	0	0	0	0	0	18
26-Sep	0	0	0	0	0	1	0	0	0	0	1	0	0	0	2
27-Sep	0	0	0	0	0	5	0	0	0	0	0	0	0	0	5
28-Sep	0	0	0	0	0	3	0	0	0	0	0	0	0	0	3
29-Sep	0	0	0	0	0	3	0	0	0	0	0	0	0	0	3
30-Sep	0	0	0	0	0	2	0	0	0	0	0	0	0	0	2
1-Oct	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2-Oct	0	0	0	0	1	1	0	0	0	0	0	0	0	0	2
3-Oct	0	0	0	0	0	1	0	0	0	0	0	0	0	0	1
4-Oct	0	0	0	0	0	2	0	0	0	0	0	0	0	0	2
5-Oct	0	0	0	0	0	1	0	0	0	0	0	0	0	0	1
6-Oct	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1
7-Oct	0	0	0	0	0	2	0	0	0	0	1	0	0	0	3
8-Oct	0	0	0	0	0	1	0	0	0	0	0	0	0	0	1
9-Oct	0	0	0	0	0	5	0	0	0	0	0	0	0	0	5
10-Oct	0	0	0	0	0	3	0	0	0	0	1	0	0	0	4

Table 4. Daily Facility Mortality (raceway, NMFS, Recovery tank and sample) at Lower Granite Dam, 2004
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Daily Number of Mortalities

	Yearling Chinook			Subyearling Chinook				Steelhead		Sockeye/Kokanee		Coho			Daily
Date	Clipped	No Clip, cwt	No Clip	Clipped	No Clip,cwt	No Clip	Fry	Clipped	No Clip	Clipped	No Clip	Clipped	No Clip,cwt	No Clip	Total
11-Oct	0	0	0	0	0	0	0	1	0	0	0	0	0	0	1
12-Oct	0	0	0	0	0	2	0	0	0	0	0	0	0	0	2
13-Oct	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1
14-Oct	0	0	0	0	0	3	0	0	0	0	0	0	0	0	3
15-Oct	0	0	0	0	0	1	0	0	0	0	0	0	0	0	1
16-Oct	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
17-Oct	0	0	0	0	0	1	0	0	1	0	5	0	0	0	7
18-Oct	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1
19-Oct	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
20-Oct	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1
21-Oct	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
22-Oct	0	0	0	0	0	6	0	0	0	0	0	0	0	0	6
23-Oct	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
24-Oct	0	0	0	0	0	3	0	0	0	0	5	0	0	0	8
25-Oct	0	0	0	0	0	1	0	0	0	0	0	0	0	0	1
26-Oct	0	0	0	0	0	1	0	0	0	0	3	0	0	0	4
27-Oct	0	0	0	0	0	1	0	0	0	0	2	0	0	0	3
28-Oct	0	0	0	0	0	0	0	0	0	0	4	0	0	0	4
29-Oct	0	0	0	0	0	1	0	0	0	0	0	0	0	0	1
30-Oct	1	0	0	0	0	4	0	0	0	0	2	0	0	0	7
31-Oct	0	0	0	0	0	0	0	0	0	0	2	0	0	0	2
Total	17,857	654	4,682	250	1,133	4,028	39	2,738	509	19	90	13	64	231	32,307

Table 5. Daily Descaling in Percent at Lower Granite Dam and River Conditions, 2004

Page 1.

	Yearling Chinook		Subyearling Chinook		Steelhead		Sockeye/Kokanee		Coho	Daily	River Conditions		
Date	Clipped	No clip	Clipped	No clip	Clipped	No clip	Clipped	No clip	All	Total	Total Q (kcfs)	Spill (kcfs)	Temp. (C)
26-Mar	0.00%	33.33%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	5.56%	53	0	8.5
27-Mar	0.00%	0.00%	0.00%	0.00%	33.33%	0.00%	0.00%	0.00%	0.00%	2.44%	59.42	0	8.8
28-Mar	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	55.88	0	8.5
29-Mar	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	49.1	0	8.5
30-Mar	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	42.53	0	8.7
31-Mar	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	52.47	0	8.8
1-Apr	2.56%	0.00%	0.00%	0.00%	0.00%	3.57%	0.00%	0.00%	0.00%	1.41%	46.15	0	8.6
2-Apr	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	49.71	0.07	9.0
3-Apr	1.27%	1.51%	0.00%	0.00%	0.00%	0.79%	0.00%	100.00%	0.00%	1.21%	49.03	0	9.3
4-Apr	0.00%	0.27%	0.00%	0.00%	0.82%	0.00%	0.00%	0.00%	0.00%	0.26%	40.74	9.47	9.6
5-Apr	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	43.59	19.13	9.2
6-Apr	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	44.76	19.32	9.6
7-Apr	0.00%	0.20%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.11%	50.9	18.78	9.9
8-Apr	0.48%	0.32%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.35%	48.87	17.95	10.7
9-Apr	0.00%	0.00%	0.00%	0.00%	1.96%	0.00%	0.00%	0.00%	0.00%	0.22%	53.88	20.21	10.7
10-Apr	0.00%	0.61%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.19%	53.55	20.44	11.0
11-Apr	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	49.65	18.7	10.8
12-Apr	0.51%	1.10%	0.00%	0.00%	0.00%	2.56%	0.00%	0.00%	33.33%	0.96%	47.88	18.7	11.1
13-Apr	0.34%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.19%	49.27	18.37	11.0
14-Apr	0.30%	0.00%	0.00%	0.00%	0.00%	1.16%	0.00%	0.00%	0.00%	0.32%	54.9	18.26	10.7
15-Apr	0.00%	0.00%	0.00%	0.00%	0.00%	0.99%	0.00%	0.00%	0.00%	0.10%	62.11	18.23	10.7
16-Apr	0.56%	0.22%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.34%	62.03	18.41	10.7
17-Apr	1.13%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.55%	54.17	18.24	10.8
18-Apr	2.38%	1.15%	0.00%	0.00%	1.85%	0.00%	0.00%	0.00%	0.00%	1.89%	50.03	18.3	10.6
19-Apr	0.48%	1.14%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.48%	47.9	18.33	10.3
20-Apr	0.00%	4.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.43%	46.84	18.29	9.9
21-Apr	0.57%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.32%	45.26	18.48	9.8
22-Apr	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	42.94	18.55	9.8
23-Apr	2.15%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	1.23%	44.24	17.8	10.0
24-Apr	3.88%	4.55%	0.00%	0.00%	1.02%	0.00%	0.00%	0.00%	0.00%	3.30%	39.44	0	10.3
25-Apr	2.76%	2.89%	0.00%	0.00%	1.94%	3.03%	0.00%	0.00%	0.00%	2.52%	41.39	0	10.2
26-Apr	4.72%	3.05%	0.00%	0.00%	2.25%	0.94%	0.00%	0.00%	0.00%	2.90%	41.15	0.01	10.8
27-Apr	4.51%	3.62%	0.00%	0.00%	0.94%	1.92%	0.00%	0.00%	0.00%	2.49%	42.67	0	11.3
28-Apr	0.81%	1.51%	0.00%	0.00%	0.76%	2.50%	0.00%	0.00%	0.00%	0.94%	47.01	0	11.2
29-Apr	2.78%	2.57%	0.00%	0.00%	0.99%	1.98%	0.00%	0.00%	0.00%	2.33%	57.4	0	11.6
30-Apr	3.92%	1.82%	0.00%	0.00%	2.31%	3.26%	0.00%	0.00%	0.00%	2.96%	56.37	0	12.2
1-May	4.42%	1.44%	0.00%	0.00%	2.95%	1.48%	0.00%	0.00%	0.00%	3.40%	51.91	0	12.4
2-May	3.06%	1.29%	0.00%	0.00%	3.29%	4.19%	0.00%	0.00%	0.00%	3.08%	48.57	0	12.3
3-May	3.30%	3.66%	0.00%	0.00%	3.34%	2.27%	0.00%	0.00%	0.00%	3.28%	51.3	0	11.7
4-May	1.19%	1.69%	0.00%	0.00%	1.51%	3.52%	0.00%	0.00%	0.00%	1.43%	62.25	0	12.4
5-May	2.09%	0.76%	0.00%	0.00%	2.58%	0.99%	0.00%	0.00%	0.00%	1.95%	74.22	0	12.7
6-May	4.08%	5.00%	0.00%	0.00%	4.95%	1.31%	0.00%	0.00%	9.09%	4.16%	82.96	6.37	12.7
7-May	8.48%	7.67%	0.00%	0.00%	4.34%	5.09%	0.00%	0.00%	10.17%	6.03%	84.35	0	12.5
8-May	12.47%	11.28%	0.00%	0.00%	5.54%	7.00%	0.00%	0.00%	5.80%	7.49%	78.13	0	12.5
9-May	24.16%	8.43%	0.00%	0.00%	9.04%	10.44%	0.00%	0.00%	19.12%	11.97%	77.92	0	12.3
10-May	27.73%	1.25%	0.00%	0.00%	11.98%	9.73%	0.00%	0.00%	8.00%	13.31%	74.7	0	12.4
11-May	3.26%	0.96%	0.00%	0.00%	2.70%	2.30%	0.00%	0.00%	2.53%	2.58%	72.59	0	12.0

Table 5. Daily Descaling in Percent at Lower Granite Dam, 2004
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	Yearling Chinook		Subyearling Chinook		Steelhead		Sockeye/Kokanee		Coho	Daily	River Conditions		
Date	Clipped	No clip	Clipped	No clip	Clipped	No clip	Clipped	No clip	All	Total	Total Q (kcfs)	Spill (kcfs)	Temp. (C)
12-May	5.81%	0.52%	0.00%	0.00%	2.29%	4.25%	0.00%	0.00%	3.08%	2.88%	74.23	0	11..8
13-May	2.68%	2.30%	0.00%	0.00%	2.93%	0.97%	0.00%	0.00%	10.53%	3.12%	69.47	0	11.5
14-May	0.00%	0.00%	0.00%	0.00%	2.00%	1.98%	0.00%	0.00%	3.17%	1.59%	61.99	0	10.9
15-May	2.74%	1.14%	0.00%	0.00%	2.53%	3.61%	0.00%	0.00%	12.50%	2.95%	58.4	0	11.0
16-May	2.67%	0.00%	0.00%	0.00%	0.95%	1.52%	0.00%	0.00%	4.35%	1.33%	58.1	0	10.7
17-May	9.57%	0.00%	0.00%	0.00%	1.45%	1.00%	0.00%	0.00%	4.76%	1.99%	59.97	0	11.3
18-May	1.49%	2.13%	0.00%	0.00%	2.08%	0.00%	0.00%	0.00%	0.00%	1.73%	68.27	0	12.0
19-May	0.00%	1.25%	0.00%	0.00%	2.09%	1.82%	0.00%	0.00%	2.63%	1.73%	62.65	0	12.3
20-May	0.00%	0.00%	0.00%	0.00%	1.41%	3.23%	0.00%	0.00%	0.00%	1.07%	70.09	0	12.8
21-May	0.96%	0.00%	0.00%	0.00%	1.98%	5.95%	33.33%	0.00%	0.00%	1.94%	75.99	0	13.1
22-May	7.26%	0.00%	0.00%	0.00%	2.56%	2.32%	0.00%	0.00%	1.37%	2.59%	81.04	0	12.9
23-May	2.80%	1.30%	0.00%	0.00%	1.68%	1.12%	0.00%	0.00%	5.95%	1.90%	82.82	0	12.9
24-May	2.50%	1.46%	0.00%	0.00%	1.38%	3.57%	0.00%	0.00%	5.07%	1.94%	87.25	0	12.5
25-May	2.13%	0.00%	0.00%	0.00%	1.45%	4.17%	0.00%	0.00%	0.00%	1.61%	90.7	0	12.5
26-May	0.00%	0.00%	0.00%	0.00%	1.56%	1.23%	0.00%	0.00%	2.11%	1.30%	85.23	0	12.5
27-May	0.00%	0.00%	0.00%	0.00%	2.58%	0.00%	0.00%	0.00%	2.27%	1.84%	82.65	0	12.3
28-May	0.00%	0.00%	0.00%	0.00%	1.20%	4.69%	0.00%	0.00%	0.00%	1.47%	102.8	11.1	12.5
29-May	0.00%	0.00%	0.00%	0.00%	1.10%	3.23%	0.00%	0.00%	0.00%	0.84%	127.73	34.75	12.2
30-May	16.67%	0.00%	0.00%	0.00%	3.96%	4.35%	0.00%	0.00%	42.86%	6.86%	130.79	38.15	11.7
31-May	0.00%	0.00%	0.00%	0.00%	1.34%	6.52%	0.00%	0.00%	0.00%	1.79%	124.19	32.71	11.1
1-Jun	0.00%	0.00%	0.00%	0.00%	2.67%	5.26%	0.00%	0.00%	0.00%	2.33%	119.88	27.18	11.1
2-Jun	0.00%	0.00%	0.00%	0.00%	7.89%	0.00%	0.00%	0.00%	12.50%	4.88%	108.1	15.79	11.7
3-Jun	8.33%	0.00%	0.00%	0.00%	2.68%	2.86%	0.00%	0.00%	0.00%	2.28%	105.05	14.05	12.5
4-Jun	0.00%	0.00%	0.00%	0.00%	1.96%	2.78%	0.00%	100.00%	0.00%	1.67%	102.18	20.65	13.5
5-Jun	0.00%	0.00%	1.79%	0.00%	2.63%	3.03%	0.00%	0.00%	0.00%	1.28%	105.5	22.84	14.0
6-Jun	0.00%	3.77%	0.00%	0.35%	5.71%	0.00%	0.00%	0.00%	0.00%	1.06%	106.9	17.58	14.6
7-Jun	0.00%	0.00%	0.00%	0.51%	1.33%	0.00%	0.00%	0.00%	14.29%	0.78%	110.56	22.56	14.7
8-Jun	0.00%	0.00%	0.00%	0.40%	3.77%	7.41%	0.00%	0.00%	0.00%	0.90%	106.81	17.26	14.2
9-Jun	0.00%	0.00%	7.14%	0.80%	0.75%	4.00%	0.00%	0.00%	5.88%	1.25%	102.3	9.3	13.7
10-Jun	0.00%	0.00%	4.17%	0.16%	5.13%	9.68%	0.00%	0.00%	14.29%	1.36%	95.53	3.81	13.3
11-Jun	0.00%	0.00%	3.57%	0.57%	4.88%	5.88%	0.00%	0.00%	0.00%	1.11%	88.38	0	13.3
12-Jun	0.00%	0.00%	0.00%	1.00%	0.00%	0.00%	0.00%	0.00%	7.69%	1.01%	86.96	0	13.1
13-Jun	0.00%	0.00%	0.00%	1.38%	0.00%	0.00%	0.00%	0.00%	0.00%	1.10%	83.34	0	13.4
14-Jun	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	100.00%	0.73%	74.33	0	13.4
15-Jun	0.00%	0.00%	0.00%	0.22%	0.00%	0.00%	0.00%	0.00%	0.00%	0.20%	77.52	0	14.0
16-Jun	0.00%	0.00%	0.00%	0.22%	0.00%	0.00%	0.00%	0.00%	0.00%	0.20%	69.68	0	14.7
17-Jun	0.00%	0.00%	0.00%	1.59%	0.00%	33.33%	0.00%	0.00%	0.00%	2.44%	57.23	0	15.2
18-Jun	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	56.71	0	15.0
19-Jun	0.00%	0.00%	0.00%	1.56%	0.00%	0.00%	0.00%	0.00%	0.00%	1.38%	51.03	0	15.9
20-Jun	0.00%	0.00%	0.00%	0.97%	0.00%	0.00%	0.00%	0.00%	0.00%	0.92%	48.41	0	16.3
21-Jun	0.00%	0.00%	0.00%	0.17%	0.00%	0.00%	0.00%	0.00%	0.00%	0.16%	47.51	0	17.2
22-Jun	0.00%	0.00%	0.00%	0.19%	0.00%	0.00%	0.00%	0.00%	0.00%	0.18%	48.09	0	17.1
23-Jun	0.00%	0.00%	0.00%	0.00%	6.67%	33.33%	0.00%	0.00%	0.00%	0.33%	50.54	0	17.5
24-Jun	0.00%	0.00%	0.00%	0.51%	0.00%	20.00%	0.00%	0.00%	11.11%	0.91%	50.17	0	17.8
25-Jun	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	54.62	0	18.5
26-Jun	0.00%	0.00%	0.00%	0.24%	0.00%	0.00%	0.00%	0.00%	11.11%	0.41%	49.5	0	19.0
27-Jun	0.00%	0.00%	0.00%	0.45%	0.00%	0.00%	0.00%	0.00%	0.00%	0.41%	43.79	0	18.9
28-Jun	0.00%	0.00%	0.00%	0.12%	0.00%	0.00%	0.00%	0.00%	0.00%	0.11%	45.22	0	19.3
29-Jun	0.00%	0.00%	0.00%	1.11%	4.76%	12.50%	0.00%	0.00%	0.00%	1.23%	40.22	0	20.5
30-Jun	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	38.83	0	20.8
1-Jul	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	39.34	0	20.8

Table 5. Daily Descaling in Percent at Lower Granite Dam, 2004
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	Yearling Chinook		Subyearling Chinook		Steelhead		Sockeye/Kokanee		Coho	Daily	River Conditions		
Date	Clipped	No clip	Clipped	No clip	Clipped	No clip	Clipped	No clip	All	Total	Total Q (kcfs)	Spill (kcfs)	Temp. (C)
2-Jul	0.00%	10.00%	0.00%	0.69%	6.45%	0.00%	0.00%	0.00%	0.00%	1.20%	42.33	0	21.0
3-Jul	0.00%	6.25%	0.00%	0.42%	0.00%	0.00%	0.00%	0.00%	0.00%	0.58%	43.43	0	20.0
4-Jul	0.00%	0.00%	0.00%	0.63%	6.25%	0.00%	0.00%	0.00%	0.00%	0.74%	40.99	0	19.8
5-Jul	0.00%	11.11%	0.00%	0.40%	0.00%	0.00%	0.00%	0.00%	0.00%	0.57%	37.63	0	19.8
6-Jul	0.00%	0.00%	0.00%	0.67%	0.00%	0.00%	0.00%	0.00%	33.33%	0.76%	34.55	0	20.6
7-Jul	0.00%	0.00%	0.00%	0.23%	0.00%	0.00%	0.00%	0.00%	0.00%	0.22%	35.06	0	19.7
8-Jul	0.00%	33.33%	0.00%	0.00%	5.56%	25.00%	0.00%	0.00%	0.00%	1.20%	38.71	0	19.5
9-Jul	0.00%	9.09%	0.00%	0.21%	0.00%	100.00%	0.00%	0.00%	0.00%	0.59%	39.28	0	20.3
10-Jul	0.00%	5.00%	0.00%	0.14%	0.00%	0.00%	0.00%	0.00%	0.00%	0.26%	36.4	0	19.5
11-Jul	0.00%	0.00%	0.00%	0.81%	0.00%	0.00%	0.00%	0.00%	0.00%	0.76%	33.45	0	18.7
12-Jul	0.00%	15.38%	0.00%	0.27%	16.67%	0.00%	0.00%	0.00%	0.00%	1.01%	35.92	0	19.2
13-Jul	0.00%	0.00%	0.00%	0.38%	0.00%	0.00%	0.00%	0.00%	0.00%	0.36%	38.46	0	20.1
14-Jul	0.00%	0.00%	0.00%	0.19%	0.00%	0.00%	0.00%	0.00%	0.00%	0.19%	39.13	0	19.6
15-Jul	0.00%	0.00%	0.00%	0.99%	0.00%	0.00%	0.00%	0.00%	0.00%	0.89%	40.01	0	20.3
16-Jul	100.00%	0.00%	0.00%	0.00%	8.33%	0.00%	0.00%	0.00%	0.00%	0.77%	38.05	0	19.5
17-Jul	0.00%	0.00%	0.00%	0.00%	14.29%	0.00%	0.00%	0.00%	0.00%	0.46%	36.88	0	20.2
18-Jul	0.00%	0.00%	0.00%	1.06%	0.00%	0.00%	0.00%	0.00%	0.00%	0.98%	33.28	0	20.9
19-Jul	0.00%	0.00%	0.00%	0.48%	4.17%	0.00%	0.00%	0.00%	0.00%	0.60%	35.84	0	20.9
20-Jul	0.00%	0.00%	0.00%	0.49%	0.00%	0.00%	0.00%	0.00%	50.00%	0.67%	33.18	0	21.0
21-Jul	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	35.07	0	20.7
22-Jul	0.00%	0.00%	0.00%	0.00%	0.00%	60.00%	0.00%	0.00%	0.00%	1.33%	32.07	0	20.8
23-Jul	0.00%	0.00%	0.00%	1.72%	0.00%	0.00%	0.00%	0.00%	0.00%	1.47%	35.95	0	21.0
24-Jul	0.00%	0.00%	0.00%	1.02%	11.11%	0.00%	0.00%	0.00%	0.00%	2.23%	35.18	0	22.1
25-Jul	0.00%	0.00%	0.00%	0.58%	0.00%	5.26%	0.00%	0.00%	0.00%	0.69%	31.26	0	21.9
26-Jul	0.00%	0.00%	0.00%	2.04%	0.00%	7.14%	0.00%	0.00%	0.00%	2.02%	31.95	0	20.4
27-Jul	0.00%	0.00%	0.00%	2.75%	0.00%	0.00%	0.00%	0.00%	0.00%	2.48%	30.24	0	20.4
28-Jul	0.00%	100.00%	0.00%	3.67%	0.00%	0.00%	0.00%	0.00%	0.00%	3.67%	29.1	0	20.0
29-Jul	0.00%	0.00%	0.00%	2.71%	0.00%	0.00%	0.00%	0.00%	100.00%	2.78%	27.55	0	21.0
30-Jul	0.00%	0.00%	0.00%	1.99%	2.70%	0.00%	0.00%	0.00%	0.00%	2.04%	27.94	0	20.4
31-Jul	0.00%	0.00%	0.00%	4.49%	7.41%	9.09%	0.00%	0.00%	0.00%	4.78%	30.38	0.05	20.5
1-Aug	0.00%	0.00%	0.00%	1.48%	8.00%	12.50%	0.00%	0.00%	0.00%	2.27%	26.78	0	20.4
2-Aug	0.00%	0.00%	0.00%	6.48%	10.00%	0.00%	0.00%	0.00%	0.00%	6.72%	26.04	0	20.5
3-Aug	0.00%	0.00%	0.00%	7.91%	0.00%	0.00%	0.00%	0.00%	0.00%	6.45%	27.16	0	20.2
4-Aug	0.00%	0.00%	0.00%	0.46%	0.00%	0.00%	0.00%	0.00%	0.00%	0.40%	28.17	0	19.6
5-Aug	0.00%	0.00%	0.00%	3.70%	0.00%	0.00%	0.00%	0.00%	0.00%	2.76%	26.49	0	19.7
6-Aug	0.00%	0.00%	0.00%	0.98%	0.00%	0.00%	0.00%	0.00%	0.00%	0.88%	29.43	0.23	19.3
7-Aug	0.00%	0.00%	0.00%	0.89%	11.11%	0.00%	0.00%	0.00%	0.00%	1.40%	29.08	0	19.7
8-Aug	0.00%	0.00%	0.00%	3.42%	0.00%	0.00%	0.00%	0.00%	0.00%	3.28%	24.65	0	20.0
9-Aug	0.00%	0.00%	0.00%	0.69%	0.00%	0.00%	0.00%	0.00%	0.00%	0.65%	26.37	0	21.1
10-Aug	0.00%	0.00%	0.00%	1.39%	0.00%	0.00%	0.00%	0.00%	0.00%	1.29%	25.13	0	20.4
11-Aug	0.00%	0.00%	0.00%	2.89%	0.00%	0.00%	0.00%	0.00%	0.00%	2.59%	26.41	0	21.4
12-Aug	0.00%	0.00%	0.00%	0.68%	0.00%	50.00%	0.00%	0.00%	0.00%	1.27%	27.35	0	21.2
13-Aug	0.00%	0.00%	0.00%	1.23%	0.00%	0.00%	0.00%	0.00%	0.00%	1.06%	27.08	0	20.8
14-Aug	0.00%	0.00%	0.00%	13.56%	0.00%	0.00%	0.00%	0.00%	0.00%	11.27%	24.9	0	21.6
15-Aug	0.00%	0.00%	0.00%	3.51%	0.00%	0.00%	0.00%	0.00%	0.00%	2.63%	22.25	0	20.5
16-Aug	0.00%	0.00%	0.00%	2.37%	0.00%	33.33%	0.00%	0.00%	0.00%	2.60%	24.23	0	20.0
17-Aug	0.00%	0.00%	0.00%	2.82%	0.00%	0.00%	0.00%	0.00%	0.00%	2.58%	23.9	0	21.1
18-Aug	0.00%	0.00%	0.00%	2.50%	0.00%	0.00%	0.00%	0.00%	0.00%	2.27%	25.53	0	21.0
19-Aug	0.00%	0.00%	0.00%	2.05%	16.67%	0.00%	0.00%	0.00%	0.00%	2.58%	23.23	0	21.3
20-Aug	0.00%	0.00%	0.00%	5.88%	6.67%	0.00%	0.00%	0.00%	0.00%	5.88%	24.42	0	21.7
21-Aug	0.00%	0.00%	0.00%	0.52%	16.67%	0.00%	0.00%	0.00%	0.00%	1.01%	25.23	0	21.1

Table 5. Daily Descaling in Percent at Lower Granite Dam, 2004
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	Yearling Chinook		Subyearling Chinook		Steelhead		Sockeye/Kokanee		Coho	Daily	River Conditions		
Date	Clipped	No clip	Clipped	No clip	Clipped	No clip	Clipped	No clip	All	Total	Total Q (kcfs)	Spill (kcfs)	Temp. (C)
22-Aug	0.00%	0.00%	0.00%	3.97%	20.00%	0.00%	0.00%	0.00%	0.00%	4.26%	26.6	0	20.8
23-Aug	0.00%	0.00%	0.00%	3.85%	0.00%	0.00%	0.00%	0.00%	0.00%	3.78%	26.42	0	20.4
24-Aug	0.00%	0.00%	0.00%	2.86%	0.00%	0.00%	0.00%	0.00%	0.00%	2.71%	25.36	0	20.8
25-Aug	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	27.83	0	21.0
26-Aug	0.00%	0.00%	0.00%	1.47%	0.00%	0.00%	0.00%	0.00%	0.00%	1.38%	28.24	0	20.5
27-Aug	0.00%	0.00%	0.00%	1.98%	0.00%	0.00%	0.00%	0.00%	0.00%	1.93%	30.96	0	20.0
28-Aug	0.00%	0.00%	0.00%	1.37%	0.00%	0.00%	0.00%	0.00%	0.00%	1.35%	33.36	0	19.9
29-Aug	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	32.44	0	19.6
30-Aug	0.00%	0.00%	0.00%	2.82%	0.00%	0.00%	0.00%	100.00%	0.00%	3.90%	30.1	0	19.9
31-Aug	0.00%	0.00%	0.00%	0.00%	33.33%	0.00%	0.00%	0.00%	0.00%	1.49%	26.38	0	20.1
1-Sep	0.00%	0.00%	0.00%	2.27%	0.00%	0.00%	100.00%	0.00%	0.00%	4.08%	32.41	0	20.5
2-Sep	0.00%	0.00%	0.00%	2.99%	0.00%	0.00%	0.00%	0.00%	0.00%	2.79%	27.9	0	18.6
3-Sep	0.00%	0.00%	0.00%	5.64%	0.00%	0.00%	0.00%	0.00%	0.00%	5.44%	28.27	0	18.3
4-Sep	0.00%	0.00%	0.00%	0.65%	0.00%	0.00%	0.00%	0.00%	0.00%	0.61%	25.67	0	18.8
5-Sep	0.00%	0.00%	0.00%	1.11%	0.00%	0.00%	0.00%	0.00%	0.00%	0.97%	25.5	0	18.4
6-Sep	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	23.55	0	18.4
7-Sep	0.00%	0.00%	0.00%	2.31%	0.00%	0.00%	0.00%	0.00%	0.00%	2.22%	22.72	0	18.6
8-Sep	0.00%	0.00%	0.00%	2.50%	0.00%	0.00%	0.00%	0.00%	0.00%	2.50%	23.11	0	18.8
9-Sep	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	24.54	0.78	18.5
10-Sep	0.00%	0.00%	0.00%	2.27%	0.00%	0.00%	0.00%	0.00%	0.00%	2.13%	29.57	0	18.3
11-Sep	0.00%	0.00%	0.00%	1.56%	0.00%	0.00%	0.00%	0.00%	0.00%	1.33%	27.95	0	18.6
12-Sep	0.00%	0.00%	0.00%	1.27%	0.00%	0.00%	0.00%	0.00%	0.00%	1.18%	23.65	0	18.3
13-Sep	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	23.36	0	18.0
14-Sep	0.00%	0.00%	0.00%	5.75%	0.00%	0.00%	0.00%	0.00%	0.00%	4.76%	32.77	0.11	18.4
15-Sep	0.00%	0.00%	0.00%	11.25%	0.00%	0.00%	0.00%	0.00%	0.00%	8.82%	37.14	0	18.2
16-Sep	0.00%	0.00%	0.00%	12.77%	0.00%	0.00%	0.00%	0.00%	0.00%	11.88%	35.32	0	18.0
17-Sep	0.00%	0.00%	0.00%	10.38%	0.00%	0.00%	0.00%	0.00%	0.00%	9.74%	39.59	0	17.8
18-Sep	0.00%	0.00%	0.00%	7.56%	4.00%	0.00%	0.00%	0.00%	0.00%	7.21%	29.46	0	17.5
19-Sep	0.00%	0.00%	0.00%	8.42%	0.00%	0.00%	0.00%	6.25%	0.00%	7.95%	27.1	0	17.4
20-Sep	0.00%	0.00%	0.00%	17.31%	0.00%	0.00%	0.00%	0.00%	0.00%	13.79%	29.02	0	17.4
21-Sep	0.00%	0.00%	0.00%	17.55%	6.90%	33.33%	0.00%	0.00%	0.00%	16.83%	22.48	4.22	17.5
22-Sep	0.00%	0.00%	0.00%	1.94%	0.00%	0.00%	0.00%	0.00%	0.00%	1.67%	18.34	8.28	17.5
23-Sep	0.00%	0.00%	0.00%	11.33%	0.00%	0.00%	0.00%	0.00%	0.00%	11.20%	28.39	8.48	17.5
24-Sep	0.00%	0.00%	0.00%	2.71%	0.00%	0.00%	0.00%	0.00%	0.00%	2.70%	23.23	3.86	17.3
25-Sep	0.00%	0.00%	0.00%	4.23%	0.00%	0.00%	0.00%	0.00%	0.00%	4.19%	24.6	0	17.4
26-Sep	0.00%	0.00%	0.00%	4.00%	0.00%	0.00%	0.00%	0.00%	0.00%	3.97%	23.49	0	17.0
27-Sep	0.00%	0.00%	0.00%	3.21%	0.00%	0.00%	0.00%	33.33%	0.00%	3.77%	21.3	0	16.8
28-Sep	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	20.08	0	17.5
29-Sep	0.00%	0.00%	0.00%	5.77%	0.00%	0.00%	0.00%	0.00%	0.00%	5.36%	22.18	0	17.5
30-Sep	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	21.12	0	17.4
1-Oct	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	50.00%	0.00%	3.33%	20.74	0	17.1
2-Oct	0.00%	0.00%	0.00%	2.41%	0.00%	0.00%	0.00%	0.00%	0.00%	2.20%	18.15	0	17.0
3-Oct	0.00%	0.00%	0.00%	2.38%	0.00%	0.00%	0.00%	0.00%	0.00%	2.04%	19.67	0	17.5
4-Oct	100.00%	0.00%	0.00%	2.86%	0.00%	0.00%	0.00%	0.00%	0.00%	4.00%	18.89	0	17.5
5-Oct	0.00%	0.00%	0.00%	8.06%	0.00%	0.00%	0.00%	50.00%	0.00%	9.09%	17.59	0	17.4
6-Oct	0.00%	0.00%	0.00%	4.03%	0.00%	0.00%	0.00%	0.00%	0.00%	3.91%	19.03	0	17.4
7-Oct	0.00%	0.00%	0.00%	7.35%	0.00%	0.00%	0.00%	4.55%	0.00%	6.63%	18.31	0	17.1
8-Oct	0.00%	0.00%	0.00%	5.23%	0.00%	0.00%	0.00%	0.00%	0.00%	4.91%	20.17	0	17.1
9-Oct	0.00%	0.00%	0.00%	1.20%	0.00%	0.00%	0.00%	0.00%	0.00%	1.02%	18.64	0	16.9
10-Oct	0.00%	0.00%	0.00%	2.58%	0.00%	0.00%	0.00%	0.00%	0.00%	2.41%	13.46	0	16.7
11-Oct	0.00%	0.00%	0.00%	4.71%	0.00%	0.00%	0.00%	0.00%	0.00%	4.26%	15.17	0	16.6

Table 5. Daily Descaling in Percent at Lower Granite Dam, 2004
Page 5.

	Yearling Chinook		Subyearling Chinook		Steelhead		Sockeye/Kokanee		Coho	Daily	River Conditions		
Date	Clipped	No clip	Clipped	No clip	Clipped	No clip	Clipped	No clip	All	Total	Total Q (kcfs)	Spill (kcfs)	Temp. (C)
12-Oct	0.00%	0.00%	0.00%	9.59%	0.00%	0.00%	0.00%	0.00%	0.00%	8.24%	18.9	0	16.6
13-Oct	0.00%	0.00%	0.00%	5.71%	0.00%	0.00%	0.00%	0.00%	0.00%	4.76%	13.73	0	16.4
14-Oct	7.69%	0.00%	0.00%	10.14%	0.00%	0.00%	0.00%	0.00%	0.00%	9.30%	18.13	0	16.4
15-Oct	2.70%	0.00%	0.00%	5.71%	0.00%	0.00%	0.00%	0.00%	0.00%	4.50%	16.61	0	16.3
16-Oct	4.35%	0.00%	0.00%	2.38%	0.00%	0.00%	0.00%	0.00%	0.00%	2.70%	17.83	0	16.1
17-Oct	0.00%	0.00%	0.00%	1.10%	0.00%	0.00%	0.00%	20.00%	0.00%	1.72%	16.17	0	16.1
18-Oct	0.00%	0.00%	0.00%	1.94%	0.00%	0.00%	0.00%	0.00%	0.00%	1.44%	19.56	0	15.9
19-Oct	0.00%	0.00%	0.00%	8.11%	0.00%	0.00%	0.00%	0.00%	0.00%	5.41%	15.9	0	15.7
20-Oct	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	17.9	0	15.5
21-Oct	0.00%	0.00%	0.00%	3.51%	0.00%	0.00%	0.00%	0.00%	0.00%	2.37%	19.27	0	15.2
22-Oct	3.64%	0.00%	0.00%	2.33%	0.00%	0.00%	0.00%	0.00%	0.00%	2.45%	18.19	0	14.9
23-Oct	0.00%	0.00%	0.00%	3.29%	0.00%	0.00%	0.00%	0.00%	0.00%	2.31%	17.95	0	14.7
24-Oct	1.82%	0.00%	0.00%	2.25%	0.00%	0.00%	0.00%	0.00%	0.00%	2.11%	19.59	0	14.5
25-Oct	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	19.86	0	14.3
26-Oct	2.82%	0.00%	0.00%	4.00%	0.00%	100.00%	0.00%	0.00%	0.00%	3.94%	22.3	0	14.1
27-Oct	0.00%	0.00%	0.00%	2.09%	0.00%	0.00%	0.00%	0.00%	0.00%	1.64%	15.89	0	14.0
28-Oct	0.00%	0.00%	0.00%	2.73%	0.00%	0.00%	0.00%	0.00%	0.00%	2.19%	17.68	0	13.3
29-Oct	0.00%	0.00%	0.00%	1.49%	0.00%	0.00%	0.00%	0.00%	0.00%	0.94%	18.56	0	13.0
30-Oct	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	18.73	0	12.9
31-Oct	0.00%	0.00%	0.00%	1.75%	0.00%	0.00%	0.00%	4.76%	0.00%	1.89%	18.3	0	12.6

Appendix 2

Pit-tag Tables

Table 1. Hatchery Yearling Spring Chinook PIT-tag detections by tag site detected weekly at LGR, 2004.

				WEEK																				
Organization	Tag Site	Release Site	Release Dates	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21-31	Total
FPC, NPT, ODFW	Lookingglass Hat.	Various	3/15-3/31/04	171	525	1,939	7,084	13,312	2,125	101	55	6	6	4	2	3	1	0	1	0	6	3	2	2	25,348
FPC	Rapid R. Hat.	Rapid R. Hat.	3/15/04	82	464	1,878	6,662	11,843	1,627	33	9	0	0	0	0	0	0	0	0	0	0	0	0	0	22,598
USFWS	Dworshak NFH	Various	3/31-4/1/04	34	1,130	1,079	4,674	10,434	2,578	590	703	7	1	2	0	0	0	0	0	0	0	0	0	0	21,232
USFWS, IDFG, NPT	Clearwater Hat.	Various	8/7/02-4/8/04	2	1	3	55	322	169	33	47	11	3	2	0	0	0	0	0	0	0	0	0	0	648
USFWS	Kooskia Nat. Fish Hat.	Clear Cr.	3/30/04	5	53	34	153	198	54	16	11	0	0	0	0	0	0	0	0	0	0	0	0	0	524
IDFG	Sawtooth Hat.	Salmon R.	4/13/04	0	0	0	26	358	83	2	2	0	0	0	0	0	0	0	0	0	0	0	0	0	471
ODFW	GRNTRP	GRNTRP	3/18-4/17/04	37	54	55	125	121	12	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	406
NPT	Meadow Cr.	Meadow Cr.	9/8/03-5/27/04	3	16	26	60	83	72	25	57	12	4	7	1	1	1	0	0	0	0	0	0	0	368
NPT	Lolo Cr.	Lolo Cr.	9/17/03	5	8	2	16	18	8	22	20	4	4	3	3	0	0	0	0	0	0	0	0	0	113
ODFW	GRAND2	GRAND2	4/2-4/9/04	0	0	0	29	63	6	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	99
NPT	Nez Perce Tribal Hat.	Meadow Cr.	6/30/03-6/22/04	3	5	1	15	12	13	6	4	2	4	2	2	2	1	0	1	0	6	3	2	2	86
NPT	Newsome Cr.	Newsome Cr.	9/9-9/10/03	0	0	1	0	0	3	2	6	4	2	7	8	3	5	3	1	0	0	0	0	0	45
IDFG	Crooked R. Pond	Crooked R.	9/11/03	0	0	0	0	0	0	0	1	0	0	0	0	2	1	0	0	0	0	0	0	0	4
CTUIR	Lookingglass Cr.	Lookingglass Cr.	7/29/02-10/31/03	0	0	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2
IDFG	Colt Kill Cr.	Colt Kill Cr.	8/31/03	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
IDFG	Crooked R. Trap	Crooked R. Trap	5/13/04	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	1
IDFG	Powell Rearing Pond	Powell Rear Pond	9/25/04	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1
																								Total	71,947

Table 2. Wild Yearling Chinook PIT-tag detections by tag site detected weekly at LGR, 2004.

				WEEK																					
Organization	Tag Site	Release Site	Release Dates	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21-31	Total
ODFW	GRNTRP	GRNTRP	3/10-5/28/04	66	99	112	269	411	356	90	132	65	13	8	3	4	0	0	0	0	0	0	0	0	1,628
IDFG	Sawtooth Trap	Sawtooth Trap	3/24/02-6/28/04	4	8	31	121	166	343	257	185	59	42	43	18	3	4	7	4	2	0	0	0	0	1,297
IDFG	Marsh Cr. Trap	Marsh Cr. Trap	5/18/03-6/24/04	6	13	37	127	178	190	93	113	70	44	55	26	18	8	16	10	3	0	0	0	0	1,007
NPT	Lolo Cr.	Lolo Cr.	5/21/03-5/17/04	7	12	11	39	61	56	94	244	86	64	29	8	0	1	0	0	0	0	0	0	0	712
IDFG	Lemhi R. Weir	Lemhi R. Weir	6/7/03-6/16/04	55	72	117	172	144	84	12	6	4	0	3	0	1	2	0	1	0	0	0	0	0	673
ODFW	GRAND2	GRAND2	9/22/03-5/28/04	0	0	3	28	161	84	58	173	51	27	8	2	2	1	0	0	0	0	0	0	0	598
IDFG	Red R. Trap	Red R. Trap	3/14/02-6/22/04	1	2	1	9	18	17	34	67	50	69	70	45	83	27	20	5	1	1	0	0	0	520
ODFW	Lostine R.	Lostine R.	3/10-5/14/04	2	2	9	27	62	76	73	134	38	23	12	4	1	0	0	0	0	0	0	0	0	463
IDFG	American R.	American R.	4/9/03-6/25/04	1	2	2	4	7	4	13	39	20	41	79	61	124	31	18	10	3	0	0	1	0	460
IDFG	Crooked Fk. Cr. Trap	Crooked Fk. Cr. Trap	8/1/01-6/2/04	5	8	18	66	68	65	42	72	16	8	12	2	6	2	0	0	0	0	0	0	0	390
ODFW	Catherine Cr.	Catherine Cr.	3/23/03-5/12/04	0	0	6	32	62	30	15	65	49	28	48	23	10	5	3	0	0	0	0	0	0	376
NPT	Newsome Cr.	Newsome Cr.	5/24/03-6/7/04	2	4	5	34	35	56	37	42	20	13	16	14	15	7	2	2	0	0	0	0	0	304
IDFG	Crooked R. Trap	Crooked R. Trap	5/21/03-6/28/04	2	0	0	0	1	6	5	21	20	39	59	43	44	19	9	3	1	0	0	0	1	273
ODFW	Minam R.	Minam R.	8/20/03-6/3/04	6	5	13	48	56	49	28	32	16	3	2	0	0	0	0	0	0	0	0	0	0	258
NMFS	BIG2C	BIG2C	8/15-8/22/03	2	1	25	50	37	25	17	15	9	5	7	0	0	0	0	0	0	0	0	0	0	193
NPT	Meadow Cr.	Meadow Cr.	9/10/03-5/20/04	4	7	13	33	29	30	15	19	6	0	0	0	0	0	0	0	0	0	0	0	0	156
NMFS	Valley Cr.	Valley Cr.	8/4-8/6/03	1	1	2	12	18	21	28	18	4	0	3	0	0	0	0	0	0	0	0	0	0	108
SHOBAN	East Fk. Salmon R. Trap	East Fk. Salmon R. Trap	3/27-5/2/04	0	0	1	6	23	48	16	10	1	0	1	0	0	0	0	0	0	0	0	0	0	106
NMFS	Loon Cr.	Loon Cr.	8/8-8/9/03	0	0	3	16	29	29	10	4	0	0	0	0	0	0	0	0	0	0	0	0	0	91
NMFS	Elk Cr.	Elk Cr.	7/25-7/29/03	0	1	5	12	15	14	10	13	2	4	5	0	1	0	1	0	0	0	0	0	0	83
NMFS	Marsh Cr.	Marsh Cr.	7/30-8/1/03	1	1	7	24	24	18	2	4	2	0	0	0	0	0	0	0	0	0	0	0	0	83
NMFS	Herd Cr.	Herd Cr.	8/11-8/12/03	0	3	4	23	23	21	3	3	0	0	0	1	0	0	0	0	0	0	0	0	0	81
ODFW	Imnaha R.	Imnaha R.	8/26-8/27/03	0	0	5	14	27	15	10	8	1	1	0	0	0	0	0	0	0	0	0	0	0	81
IDFG	Colt Kill Cr.	Colt Kill Cr.	4/19/03-5/21/04	1	1	0	4	4	10	6	17	6	9	4	5	7	0	0	1	0	0	0	0	0	75
NMFS	Camas Cr.	Camas Cr.	8/8-8/9/03	0	0	5	11	13	16	10	15	2	1	0	0	0	0	0	0	0	0	0	0	0	73
NPT	Squaw Cr.	Squaw Cr.	8/1/03	1	0	0	5	13	13	10	17	3	1	2	0	1	0	0	1	0	0	0	0	0	67
USFWS	Clear Cr.	Clear Cr.	5/17/03-4/29/04	4	10	4	12	12	6	5	11	0	0	1	0	0	0	0	1	0	0	0	0	0	66
NMFS	Bear Valley Cr.	Bear Valley Cr.	7/22-7/25/03	0	2	1	16	9	10	4	14	5	1	0	0	0	1	0	0	0	0	0	0	0	63
IDFG	Lemhi R.	Lemhi R.	6/26/03-5/5/04	2	3	3	13	7	12	6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	46
NMFS	West Fk. Chamberlain Cr.	West Fk. Chamberlain Cr	8/21-8/22/03	0	3	3	12	11	2	3	3	0	0	0	0	0	0	0	0	0	0	0	0	0	37
NPT	Papoose Cr.	Papoose Cr.	8/2/03	1	0	0	1	4	4	7	10	0	1	2	0	0	0	0	0	0	0	0	0	0	30
NMFS	Capehorn Cr.	Capehorn Cr.	8/1-8/2/03	0	1	2	3	8	8	0	3	1	0	0	0	0	0	0	0	0	0	0	0	0	26
NMFS	Sulfer Cr.	Sulfer Cr.	7/31-8/1/03	1	1	3	6	4	8	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0	26
CTUIR	Lookingglass Cr.	Lookingglass Cr.	9/11-11/12/03	4	4	3	3	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	17
SHOBAN	West Fk. Yankee Fk.	West Fk. Yankee Fk.	5/7/04	0	0	0	0	0	2	2	6	4	1	1	0	0	0	0	0	0	0	0	0	0	16
NMFS	Chamberlain Cr.	Chamberlain Cr.	8/22/03	1	1	2	0	3	3	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	11
IDFG	Fish Cr. Trap	Fish Cr. Trap	9/18-10/31/03	0	1	1	1	2	2	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	8
IDFG	Sawtooth Trap	Sawtooth Hat.	7/16/03	0	0	1	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3
NPT	Imnaha Trap	Imnaha Trap	5/1/04	0	0	0	0	1	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3
NMFS	Rush Cr.	Rush Cr.	8/22/03	0	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2
IDFG	Camas Cr.	Camas Cr.	8/11/03	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
IDFG	SALMF2	SALMF2	8/10/03	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
																								Total	10,512

Table 3. Hatchery Yearling Summer Chinook PIT-tag detections by tag site detected weekly at LGR, 2004.

				WEEK																					
Organization	Tag Site	Release Site	Release Dates	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21-31	Total
NPT, IDFG, ICFWRU, FPC	McCall Hat.	Various	10/28-3/24/04	1	48	503	4,314	16,842	7,830	1,225	593	143	28	20	3	3	1	0	0	0	0	0	0	0	31,554
IDFG	Pahsimeroi Pond	Pahsimeroi Hatchery	4/12 - 4/15/2004	0	0	0	18	223	77	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	319
IDFG	S. Fk. Salmon R. Trap	S. Fk. Salmon R. Trap	9/13-10/16/03	0	0	6	10	10	22	8	4	0	0	0	0	0	0	0	0	0	0	0	0	0	60
IDFG	Stolle Pond	S. Fk. Salmon R.	9/2/03	0	0	0	1	3	6	3	3	1	0	0	0	0	0	0	0	0	0	0	0	0	17
IDFG	Salmon Trap	Salmon Trap	4/7-5/7/04	0	0	1	2	3	2	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	9
NPT	Imnaha Trap	Imnaha Trap	4/17-4/25/04	0	0	0	0	2	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3
																								Total	31,962

Table 4. Wild Yearling Summer Chinook PIT-tag detections by tag site detected weekly at LGR, 2004.

				WEEK																					
Organization	Tag Site	Release Site	Release Dates	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21-31	Total
NPT	Imnaha Trap	Imnaha Trap	4/22/03-4/17/04	390	299	312	920	1,625	508	241	168	19	39	29	32	51	17	13	2	0	0	0	0	0	4,665
NPT	Johnson Cr. Trap	Johnson Cr. Trap	3/25/03-10/15/04	9	17	48	199	286	384	194	187	89	63	70	13	7	3	2	0	0	0	0	0	0	1,571
IDFG	Pahsimeroi R. Trap	Pahsimeroi R. Trap	4/17/03-6/26/04	17	43	106	140	82	28	7	20	31	55	196	173	145	37	30	8	0	0	0	0	0	1,118
NMFS, IDFG	S. Fk. Salmon R. and Tra	S. Fk. Salmon R. and Tra	7/4/03-6/16/04	2	5	29	69	107	123	92	113	67	44	45	8	4	1	1	1	2	0	0	0	0	713
NPT, NMFS	Lake Cr.	Lake Cr. And Secesh R.	8/5/02-5/21/04	4	12	16	32	26	30	27	34	22	17	22	7	7	0	0	4	0	0	0	0	0	260
NMFS, NPT	Secesh R.	Secesh R.	8/26/02-6/17/04	11	10	24	36	25	21	16	27	13	14	26	14	5	1	1	5	0	0	0	0	0	249
																								Total	8,576

Table 5. Hatchery yearling fall chinook (elastomers) PIT-tag detections by release site detected weekly at LGR, 2004.

				WEEK																				
Organization	Tag Site	Release Site	Release Dates	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21-31	Total
NPT	Capt. John Rapids Acc. Pond	Capt. John Acc. Fac.	4/5/2004	0	305	659	424	158	13	8	4	1	0	0	0	0	0	0	0	0	0	0	0	0	1,572
NPT	Big Canyon Cr. Acc. Fac.	Big Canyon Acc. Fac.	4/12/2004	0	0	177	886	831	100	39	42	4	3	2	0	0	0	0	0	0	0	0	0	0	2,084
NPT	Pittsburg Landing Acc. Fac.	Pittsburg Landing Acc. Fac.	4/12/2004	0	0	395	989	470	45	19	13	1	0	1	0	0	0	0	0	0	0	0	0	0	1,933
																								Total	5,589

Table 6. Hatchery Sub-Yearling Chinook PIT-tag detections by release site detected weekly at LGR, 2004.

				WEEK																						
Organization	Tag Site	Release Site	Release Dates	1-9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	Total
NPT	Capt. John Rapids Acc. Pond	Capt. John Acc. Fac.	6/1/04	0	302	541	172	51	9	4	0	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	1,082
NPT	Big Canyon Cr. Acc. Fac.	Big Canyon Acc. Fac.	6/2/04	0	83	322	270	179	90	47	11	3	0	1	0	3	0	0	0	1	0	0	0	0	0	0	1,010
NPT	Nez Perce Tribal Hatchery	Nez Perce Tribal Hatchery	6/4/04	0	6	113	322	405	102	34	10	2	1	0	1	0	0	0	0	0	0	0	0	0	0	0	996
NPT	Pittsburg Landing Acc. Fac.	Pittsburg Landing Acc. Fac.	5/31/04	0	517	272	36	8	1	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	837
NPT	Nez Perce Tribal Hatchery	Nez Perce Tribal Hatchery	6/18/03	12	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	12
NMFS	Lyons Ferry Hat.	Snake R. - Clwr R. to Sal. R. (km 224-303)	5/28-6/5/03	12	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	12
NPT	Pittsburg Landing Acc. Fac.	Pittsburg Landing Acc. Fac.	6/4/03	7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	7
NMFS	Lyons Ferry Hat.	Pittsburg Landing Acc. Fac.	5/29-6/4/03	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3
NPT	Big Canyon Cr. Acc. Fac.	Big Canyon Acc. Fac.	6/3/03	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3
NPT	Clearwater R.	Clearwater R.	7/20/04	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	1
NPT	N. Valley Acc. Pond	NLVP	5/29/03	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
																									Total		3,964

Table 7. Hatchery Steelhead PIT-tag detections, by tag site detected weekly at LGR, 2004.

				WEEK																				
Organization	Tag Site	Release Sites	Release Dates	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21-31	Total
USFWS, IDFG	Clearwater Hat.	Various	4/19/03-4/27/04	0	0	1	321	1,300	3,476	1,166	724	75	11	10	2	2	1	0	2	0	0	0	0	0	7,091
IDFG	Snake Trap	Snake Trap	3/26-6/3/04	20	36	55	262	407	722	660	1,058	264	13	0	0	0	1	0	0	0	0	0	0	0	3,498
NPT	Imnaha Trap	Imnaha Trap	4/14-4/17/04	0	0	24	67	337	686	433	828	118	176	141	97	52	14	9	2	4	0	0	0	0	2,988
IDFG	Magic Valley Hat.	Various	5/3/02-4/29/04	0	12	25	134	367	844	271	295	29	7	13	2	0	0	0	1	0	0	0	0	0	2,000
IDFG	Salmon Trap	Salmon Trap	4/1-5/25/04	0	6	21	73	278	537	132	420	23	1	2	0	0	0	0	0	0	0	0	0	1	1,494
ODFW	Irrigon Hat.	Various	5/2/03-5/6/04	0	0	12	19	41	357	212	482	104	45	14	9	19	11	5	7	3	0	0	1	1	1,342
ODFW	GRNTRP	GRNTRP	3/20-5/31/04	1	1	30	45	77	398	127	248	92	6	0	0	0	0	0	0	0	0	0	0	0	1,025
USFWS	Dworshak NFH	DWORMS	4/19-4/22/04	0	0	0	430	302	166	31	22	0	0	0	0	0	0	0	0	0	0	0	0	0	951
IDFG	Niagara Springs Hat.	Various	4/1/03-4/15/04	0	1	25	29	105	249	89	182	39	6	4	3	2	1	0	0	0	1	0	0	0	736
IDFG	Hagerman NFH	Various	3/29-5/10/04	1	10	20	28	82	172	63	234	34	9	15	3	1	1	0	1	1	0	0	0	1	676
IDFG	Squaw Cr. Acc. Pond	Squaw Cr. Acc. Pond	38103.50208	0	0	0	0	0	134	88	116	6	1	1	0	0	1	0	0	0	0	0	0	0	347
IDFG	Squaw Cr. (Umatilla R.)	Squaw Cr. (Umatilla R.)	5/11/04	0	0	0	0	0	0	0	130	20	7	8	1	0	1	0	0	0	0	0	0	0	167
ODFW	Minam R.	Minam R.	6/17/04	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	1
																								Total	22,316

Table 8. Wild Steelhead PIT-tag detections, by tag site detected weekly at LGR, 2004.

				WEEK																						
Organization	Tag Site	Release Sites	Release Dates	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23-31	Total
NPT	Imnaha Trap	Imnaha Trap	3/19/03-4/17/04	9	24	31	120	996	839	665	733	74	80	39	11	5	0	1	1	0	0	0	0	0	0	0	3,628
IDFG	Fish Cr. Trap	Fish Cr. Trap	7/2/02-3/25/05	39	85	86	93	770	558	54	83	15	1	0	2	0	1	0	0	0	0	0	0	0	0	0	1,787
IDFG	Snake Trap	Snake Trap	5/12/02-6/2/04	10	9	15	94	182	591	252	217	85	3	0	0	0	0	0	0	0	0	0	0	0	0	0	1,458
ODFW	GRNTRP	GRNTRP	5/26/03-5/31/04	2	4	1	3	71	244	24	130	79	8	0	0	0	0	0	0	0	0	0	0	0	0	0	566
IDFG	Clearwater Trap	Clearwater Trap	3/19/04-5/1/05	24	52	32	24	217	84	19	67	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	520
CTUIR	Lookingglass Cr.	Lookingglass Cr.	10/14/02-6/21/04	5	7	4	12	35	129	29	74	19	3	1	1	0	0	1	0	0	0	0	0	0	0	0	320
ODFW	Catherine Cr.	Catherine Cr.	3/23/78-5/20/04	2	1	2	3	23	89	14	63	27	5	6	4	1	0	0	0	1	0	0	1	0	0	0	242
NPT	Johnson Cr. Trap	Johnson Cr. Trap	7/9/01-5/22/04	5	5	6	12	70	100	12	10	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	222
ODFW	GRAND2	GRAND2	10/10/02-5/18/04	0	0	1	3	24	54	23	69	17	3	1	0	0	0	0	0	0	0	0	0	0	0	0	195
IDFG	Crooked Fk. Cr. Trap	Crooked Fk. Cr. Trap	7/4/02-5/17/04	4	9	12	7	114	20	1	3	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	172
IDFG	MOOS2N	MOOS2N	7/25-7/28/03	6	20	12	16	83	29	4	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	171
IDFG	Chamberlain Cr.	Chamberlain Cr.	7/6/02-8/22/03	1	6	1	4	27	90	4	14	4	0	0	1	0	0	0	0	0	0	0	0	0	0	0	152
IDFG	Marsh Cr. Trap	Marsh Cr. Trap	6/2/02-5/6/04	2	5	3	10	17	80	12	21	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	151
IDFG	Salmon Trap	Salmon Trap	3/24-5/25/04	0	3	5	10	43	48	14	20	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	147
IDFG	Camas Cr.	Camas Cr.	8/9/02-8/11/03	0	5	6	4	29	73	9	14	3	1	0	0	0	0	0	0	0	0	0	0	0	0	0	144
IDFG	S.Fk. Salmon R. Trap	S.Fk. Salmon R. Trap	6/27/01-6/1/04	5	5	4	6	34	75	4	6	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0	141
ODFW	Lostine R.	Lostine R.	9/20/02-5/26/04	0	0	2	1	12	51	6	28	17	3	0	2	1	0	0	0	0	0	0	0	0	0	0	123
IDFG	Sawtooth Trap	Sawtooth Trap	3/24/02-6/3/04	1	1	1	4	14	44	21	11	3	0	2	0	1	0	0	0	0	0	0	0	0	0	0	103
IDFG	YELLJC	YELLJC	8/16/02-8/9/03	2	4	2	3	10	54	8	14	2	0	1	0	0	0	0	0	0	0	0	0	0	0	0	100
IDFG	Colt Kill Cr.	Colt Kill Cr.	7/2/03-5/18/04	0	2	0	2	55	21	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	82
IDFG	Horse Cr.	Horse Cr.	7/15/02-7/15/03	1	1	3	0	12	49	4	3	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	75
IDFG	Pahsimeroi R. Trap	Pahsimeroi R. Trap	4/11/03-5/22/04	1	1	1	1	10	29	18	6	2	4	0	1	0	0	0	0	0	0	0	0	0	0	0	74
IDFG	Bargamin Cr.	Bargamin Cr.	7/12/02-7/12/03	0	0	0	2	13	45	6	5	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	73
IDFG	Fish Cr.	Fish Cr.	3/14/02-4/4/04	3	4	4	3	23	21	3	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	63
IDFG	Rapid R.	Rapid R.	8/11-8/12/03	1	3	1	1	5	36	3	4	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	56
IDFG	Whitebird Cr.	Whitebird Cr.	6/30/02-7/1/03	1	1	1	4	5	24	10	8	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	56
ODFW	Minam R.	Minam R.	10/30/03-6/3/04	0	0	0	1	8	22	3	8	10	0	1	0	1	0	0	0	0	0	0	0	0	0	0	54
IDFG	Lemhi R. Weir	Lemhi R. Weir	4/29/03-5/25/04	0	2	0	2	2	7	8	19	7	2	1	0	0	0	0	0	0	0	0	0	0	0	0	50
NPT	Secesh R.	Secesh R.	6/9/01-4/29/04	1	2	0	3	11	21	1	6	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	46
IDFG	Brushy Fk. Cr.	Brushy Fk. Cr.	8/4/01-7/25/02	0	1	2	5	21	4	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	34
IDFG	Red R. Trap	Red R. Trap	5/29/02-5/19/04	0	0	0	0	5	4	6	18	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	34
IDFG	Sulfer Cr.	Sulfer Cr.	7/31/02-8/8/03	0	0	3	1	7	22	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	34
NPT	Lake Cr.	Lake Cr.	7/8/02-4/28/04	2	1	1	0	5	20	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	33
IDFG	Moose Cr. (Selway R.)	Moose Cr. (Selway R.)	8/2-8/5/02	1	1	0	4	20	4	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	32
IDFG	Lick Cr.	Lick Cr.	8/13/01-8/21/03	1	1	2	0	6	16	3	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	30
IDFG	SALMF2	SALMF2	8/10-8/11/03	0	1	0	2	3	20	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	28
IDFG	Boulder Cr.	Boulder Cr.	8/31-9/1/03	1	3	2	2	8	8	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	26
IDFG	Clear Cr.	Clear Cr.	3/13-4/18/04	12	6	1	0	4	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	25
IDFG	S.Fk. Salmon R.	S.Fk. Salmon R.	8/16/01-8/24/02	1	0	0	1	4	11	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	18
ODFW	S.Fk. Catherine Cr.	S.Fk. Catherine Cr.	6/25-7/1/03	0	0	0	0	6	6	0	2	1	0	0	0	1	1	0	0	0	0	0	0	0	0	0	17
IDFG	BIG2C	BIG2C	8/16/02-8/21/03	0	0	0	0	4	9	1	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	16
IDFG	Gedney Cr.	Gedney Cr.	7/23/01-7/28/03	0	2	0	1	12	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	16
IDFG	Loon Cr.	Loon Cr.	8/9/02-8/8/03	0	1	0	1	3	10	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	16
IDFG	Middle Fk. Salmon R.	Middle Fk. Salmon R.	8/19-8/20/02	0	2	0	0	1	10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	13
IDFG	HUNGC	HUNGC	7/14/03	1	2	0	0	7	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	12
IDFG	Lower S.Fk. Salmon R. Trap	L.S.Fk. Salmon R. Trap	7/22-9/27/02	0	0	0	0	1	8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	9
NMFS	Lower Granite Dam	LGR - Release below Fac.	4/21/00-6/7/02	0	0	0	0	2	3	1	1	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	9
IDFG	Herd Cr.	Herd Cr.	8/12/02-8/11/03	0	0	0	0	1	2	0	1	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	5
IDFG	Bear Valley Cr.	Bear Valley Cr.	7/28/01-7/25/02	0	0	0	0	1	2	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4
IDFG	Valley Cr.	Valley Cr.	8/5-8/6/03	0	0	0	0	0	0	1	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	3
IDFG	West Fk. Chamberlain Cr.	West Fk. Chamberlain Cr.	7/24/01-8/20/02	0	0	1	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3
NMFS	Lower Granite Dam	LGR - Barge Transport	5/28-6/5/04	0	0	0	0	0	0	0	0	1	2	0	0	0	0	0	0	0	0	0	0	0	0	0	3
IDFG	West Fk. Gedney Cr.	West Fk. Gedney Cr.	8/4/02	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2
COE	McNary Dam	MCN - Release to river	6/5/02	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
IDFG	Crooked R. Trap	Crooked R. Trap	7/2/02	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
IDFG	Elk Cr.	Elk Cr.	7/26/02	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
IDFG	Marsh Cr.	Marsh Cr.	8/3/01	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
IDFG	Potlatch R.			0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
IDFG	Rush Cr.	Rush Cr.	8/22/03	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
IDFG	Secesh R.	Secesh R.	8/25/01	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
ODFW	N.Fk. Catherine Cr.	N.Fk. Catherine Cr.	6/27/01	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
SHOBAN	East Fk. Salmon R. Weir	East Fk. Salmon R. Trap	5/5/03	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
SHOBAN	West Fk. Yankee Fk.	West Fk. Yankee Fk.	5/23/03	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
																										Total	11,403

Table 9. Hatchery Sockeye PIT-tag detections, by release site detected weekly at LGR, 2004.

				WEEK																					
Organization	Tag Site	Release Site	Release Dates	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21-31	Total
IDFG	Redfish Lake Cr. Trap	Redfish Lake Cr. Trap	5/11/02-6/16/04	0	0	0	0	1	68	70	136	82	50	57	30	16	1	0	0	0	0	0	0	0	511
IDFG	Sawtooth Hat.			0	0	0	0	0	76	27	24	5	2	5	0	0	0	0	0	0	0	0	0	0	139
IDFG	Sawtooth Hat.	Pettit Lake	10/6/2003	0	0	0	0	0	20	46	30	6	1	2	1	0	0	0	0	0	0	0	0	0	106
IDFG	Sawtooth Hat.	Redfish Lake	10/7/2003	0	0	0	0	0	9	23	35	8	9	10	2	0	0	0	0	0	0	0	0	0	96
IDFG	Sawtooth Hat.	Sawtooth Hat.	5/13/04	0	0	0	0	0	0	0	19	0	0	0	0	0	0	0	0	0	0	0	0	0	19
SHOBAN	Pettit Lake Cr.	Pettit Lake Cr.	5/6/04	0	0	0	0	0	11	4	4	0	0	0	0	0	0	0	0	0	0	0	0	0	19
																								Total	586

Table 10. Wild Sockeye PIT-tag detections, by tag and release site detected weekly at LGR, 2004.

				WEEK																					
Organization	Tag Site	Release Site	Release Dates	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21-31	Total
IDFG	Redfish Lake Cr. Trap	Redfish Lake Cr. Trap	4/15-6/2/04	0	0	0	0	7	72	52	54	15	11	1	1	0	0	0	0	0	0	0	0	0	213
SHOBAN	Pettit Lake Cr.	Pettit Lake Cr.	5/6/2004	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2
																								Total	215

Table 11. Hatchery Coho PIT-tag detections, by release site detected weekly at LGR, 2004.

				WEEK																					
Organization	Tag Site	Release Site	Release Dates	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21-31	Total
NPT	Eagle Cr.			0	5	6	17	48	351	192	220	30	5	3	0	0	0	0	0	0	0	0	0	0	877
NPT	Kooskia National Fish Hat.	Kooskia NFH	4/27/04	0	0	0	0	1	81	120	432	86	12	11	2	0	0	0	0	0	0	0	0	0	745
NPT	Clearwater Hat.	S. Fk. Clearwater R.	7/23-7/24/03	0	0	0	0	0	0	0	6	5	14	27	14	13	4	4	0	0	0	0	0	0	87
NPT	Clearwater Hat.	O'Hara Cr.	7/22/03	0	0	0	0	0	1	3	12	5	2	3	2	1	0	0	0	0	0	0	0	0	29
NPT	Clearwater Hat.	Eldorado Cr.	7/8/02	0	0	0	0	0	0	0	1	4	5	0	1	0	0	0	0	0	0	0	0	0	11
NPT	Clearwater Hat.	Meadow Cr.	7/8/02	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	2
NPT	Clearwater Hat.	S. Fk. Clearwater R.	7/8/02	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	2
USFWS	Eagle Cr.	Potlatch R.	3/11/03	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
																								Total	1,754