

**SMOLT MONITORING AT THE HEAD OF LOWER GRANITE  
RESERVOIR AND LOWER GRANITE DAM**

**Annual Report  
2006 Operations**

**By:**

**Edwin W. Buettner, Senior Fisheries Research Biologist**

**and**

**Jessica L. Buelow, Senior Fisheries Technician**

**Idaho Department of Fish and Game  
PO Box 25  
Boise, ID 83707**

**Funded by**

**U.S. Department of Energy  
Bonneville Power Administration  
Division of Fish and Wildlife  
Pat Poe, Project Manager  
Contract No. 00003992  
Project No. 87-127-00**

**Smolt Monitoring by Federal & Non-Federal Agencies  
Administered by Pacific States Marine Fisheries Commission**

**IDFG 08-141  
December 2008**

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## ABSTRACT

This project monitored the daily passage of Chinook salmon *Oncorhynchus tshawytscha*, steelhead trout *O. mykiss*, and sockeye salmon *O. nerka* smolts during the 2006 spring out-migration at migrant traps on the Snake River and Salmon River.

In 2006 fish management agencies released significant numbers of hatchery Chinook salmon and steelhead trout above Lower Granite Dam that were not marked with a fin clip or coded-wire tag. Generally, the age-1 and older hatchery fish were distinguishable from wild fish by the occurrence of fin erosion. Age-0 Chinook salmon are more difficult to distinguish between wild and non-ad clipped hatchery fish and therefore are classified as unknown rearing.

The total annual hatchery spring/summer Chinook salmon catch at the Snake River trap was 12.4 times greater in 2006 than in 2005. The wild spring/summer Chinook catch in 2006 was 5.5 times greater than the previous year. Hatchery steelhead trout catch in 2006 was 44% of the catch in 2005. Wild steelhead trout catch in 2006 was 36% of the catch in the previous year. The Snake River trap collected 291 age-0 Chinook salmon of unknown rearing. During 2006, the Snake River trap captured 474 hatchery and 205 wild/natural sockeye salmon and 49 coho salmon *O. kisutch* of unknown rearing. Differences in trap catch between years are due to fluctuations not only in smolt production, but also differences in trap efficiency and duration of trap operation associated with flow. Trap operations began on March 5 and were terminated on May 17. The trap was out of operation for a total of nine day due to high flows and heavy debris.

In 2006, hatchery Chinook salmon catch at the Salmon River trap was 71% and wild Chinook salmon catch was 69% of the respective catches in 2005. In 2006, hatchery steelhead trout catch was 47% and wild steelhead trout catch was 108% of the respective catches from the previous year. Trap operations began on March 5 and were terminated on May 14 due to high flows. There were 10 days when the trap was taken out of service because of high flows and debris.

Travel times (d) and migration rates (km/d) through Lower Granite Reservoir for PIT-tagged Chinook salmon and steelhead trout marked at the Snake River trap were calculated. Statistical analysis of 2006 data was unable to detect a significant relation between migration rate and inflow to Lower Granite Reservoir for both hatchery and wild Chinook salmon. The inability to detect a migration rate flow relation was likely due to the relatively low flow variation during trap operations. During much of spring 2006, inflow was very high with minimal fluctuation throughout the out migration. In this type of situation the migration rate data is spread over a narrow range of 5-kcfs discharge intervals as was observed this year. For steelhead trout tagged at the Snake River trap, statistical analysis detected a significant relation between migration rate and lower Granite Reservoir inflow. For hatchery and wild steelhead trout, there was a 1.5-fold and a 1.8-fold increase in migration rate, respectively, between Lower Granite inflow of 50 to 100 kcfs.

Travel time and migration rate to Lower Granite Dam for fish marked at the Salmon River trap were calculated. Statistical analysis of the 2006 data was unable to detect a significant relation between migration rate and Lower Granite Reservoir inflow for hatchery Chinook salmon, wild Chinook salmon, hatchery steelhead trout, and wild steelhead trout. The inability to detect a migration rate flow relation was likely due to the relatively low variation in flow during trap operations. During much of spring 2006, inflow was very high with minimal fluctuation throughout the out migration. In this type of situation the migration rate data is spread over a narrow range of 5-kcfs flow intervals as was observed this year.

Fish tagged with passive integrated transponder (PIT) tags at the Snake River and Salmon River traps were interrogated at four dams with PIT tag detection systems (Lower Granite, Little Goose, Lower Monumental and McNary dams). Because of the addition of the fourth interrogation site (Lower Monumental) in 1993 and the installation of the Removable Spillway Weir at Lower Granite Dam in 2001, caution must be used in comparing cumulative interrogation data. Cumulative interrogations at the four dams for fish marked at the Snake River trap were 73% for hatchery Chinook, 81% for wild Chinook, 79% for hatchery steelhead, and 81% for wild steelhead. Cumulative interrogations at the four dams for fish marked at the Salmon River trap were 65% for hatchery Chinook, 78% for wild Chinook salmon, 74% for hatchery steelhead trout, and 80% for wild steelhead trout.

Authors:

Edwin W. Buettner  
Senior Fisheries Research Biologist

Jessica L. Buelow  
Senior Fisheries Technician

## INTRODUCTION

The Pacific Northwest Electric Power Planning and Conservation Act of 1980 (P.L. 96-501) directed the Northwest Power Planning Council (NWPPC) to develop programs to mitigate for fish and wildlife losses on the Columbia River system resulting from hydroelectric projects. Section 4(h) of the Act explicitly gives the Bonneville Power Administration (BPA) the authority and responsibility to use its resources "to protect, mitigate, and enhance fish and wildlife to the extent affected by the development and operation of any hydroelectric project on the Columbia River system."

Water storage and regulation for hydroelectric generation severely reduces water velocity necessary for downstream migration of juvenile steelhead trout *Oncorhynchus mykiss* and Chinook salmon *O. tshawytscha*. In response to the fishery agencies and Indian tribe's recommendations for migration flows, in 1982 the NWPPC Columbia River Basin Fish and Wildlife Program established a "water budget" for augmenting spring flows. In 1992 Snake River spring/summer and fall Chinook salmon were listed as threatened under the federal Endangered Species Act of 1973 (ESA; 16 U.S.C. 1531 et seq.). The National Marine Fisheries Service (NMFS) developed a Biological Opinion (BiOp) for the Federal Columbia River Power System which established flow measures for the Snake River, replacing the "water budget." In spring 2006, the Federal Columbia River Power System was operated according to the 2004 BiOp. The 2004 BiOp reasonable and prudent actions described in Sections 9.6.1 and 9.6.5.3.5.1 required monitoring and evaluation of the smolt out-migration. The NMFS established a Technical Management Team (TMT) to oversee implementation of BiOp measures. The TMT utilizes out-migration monitoring data provided by the Columbia Basin Smolt Monitoring Project (SMP) as a basis for recommending measures within the flexibility provided by the BiOp to increase smolt survival.

Smolt monitoring is a key component of BiOp implementation under all flow conditions and becomes critical when low flow conditions reduce migration rates. In years of low flow (drought years), knowledge of when most smolts have left tributaries and entered areas that can be affected by releases of stored water allows managers to make informed decisions regarding implementation of measures within the BiOp. Eight low-flow years (1987, 1988, 1990, 1991, 1992, 1994, 2001, and 2004) have occurred during this smolt-monitoring project. The indications are that judicious use of the available reservoir storage volume can greatly enhance the timing and migration rate of juvenile anadromous fish.

The Idaho Department of Fish and Game (IDFG) as part of SMP, monitors the daily passage of smolts at the head of Lower Granite Reservoir. The IDFG smolt monitoring project also collects other useful data on relative species composition, hatchery and wild ratios, travel time, and migration rate. By monitoring smolt passage at the head of Lower Granite Reservoir and Lower Granite Dam, migration rates (km/d) under various riverine and reservoir conditions can be estimated and compared. It is possible to determine the relative abundance of hatchery and wild stocks, which can be used to document wild stock rebuilding progress. The SMP's information is complementary to and utilized by other Snake and Columbia River research and management projects.

Information provided by this project is used for in-season management decisions relative to flow augmentation, facility power operations, fish collection and transportation programs, and spill operations in the Federal Columbia River Power System (FCRPS) to maximize smolt survival. In addition, this project provides groups of PIT-tagged fish which are used to estimate

in-river smolt survivals and smolt-to-adult return rates. Results of monitoring the 2006 smolt outmigration are reported here.

## **OBJECTIVES**

1. Provide daily trap catch data at the head of Lower Granite Reservoir for TMT's use in implementing the NMFS Biological Opinion.
2. Provide an interrogation site for PIT-tagged smolts, marked by other projects, at the end of their migration in a riverine environment and the beginning of their migration in a reservoir environment.
3. Determine riverine travel time from the point of release to the smolt traps (index sites) at the upper end of Lower Granite Reservoir for PIT-tagged smolts.
4. Determine reservoir travel time from the head of lower Granite Reservoir to Lower Granite Dam using PIT-tagged smolts marked at the traps and PIT-tagged smolts passing the traps from upriver hatchery releases and rearing areas.
5. Determine cumulative interrogation rate at Lower Granite, Little Goose, Lower Monumental, and McNary dams during the spring out-migration period for PIT-tagged hatchery and wild spring/summer Chinook salmon, and hatchery and wild steelhead trout.
6. Correlate smolt migration rate with river flow for fish moving in riverine and reservoir environments.
7. Determine trap efficiency for each species at each trap over a range of discharges.

## **METHODS**

### **Releases of Hatchery-Produced Smolts**

Anadromous hatchery release information was reported for spring released hatchery smolts, which contributed to the 2006 out-migration in the Snake River drainage upstream of Lower Granite Dam. Summer and fall releases of Chinook salmon and steelhead trout were not included. This information included species, number released, date, release location, number PIT tagged, and hatchery of origin. Not all hatchery produced fish were fin clipped in 2006.

### **Smolt Monitoring Traps**

During the 2006 out-migration, two smolt-monitoring traps were operated to monitor the passage of juvenile Chinook salmon and steelhead trout. A dipper trap (Mason 1966) was located on the Snake River near Lewiston, Idaho. A scoop trap (Raymond and Collins 1974) was located on the Salmon River, near Slate Creek, Idaho (Figure 1). Weekly PIT tag quotas for hatchery and wild Chinook salmon were 600 each. Weekly PIT tag quotas for hatchery and wild steelhead trout were 600 and 200, respectively. Smolts were captured, examined, and

enumerated daily at the traps and released back into the river. Fork lengths of up to 100 smolts for each species, run, and rearing-type were measured daily to the nearest millimeter. Up to 2,000 fish were examined daily for brands or marks at the Snake River trap. No branded fish were released in the Salmon River basin and therefore fish were not examined for brands at the Salmon River trap. Smolts were anesthetized with tricaine methanesulfonate (MS-222) before handling and allowed to recover before being returned to the river.

In 2006, the Comparative Survival Study group requested this SMP to assist their study by PIT tagging (Prentice et al. 1987) all wild Chinook in excess of SMP needs. To comply with this request, sampling regimes and PIT tag quotas were adjusted at this project's collection sites. Sampling periods were expanded from the normal five day a week sample period to seven days a week. Funding and PIT tags were made available from the Comparative Survival Study for this task. Tag quotas for wild Chinook were increased at the Snake River trap by 2,000 and by 5,000 at the Salmon River trap. The Clearwater River trap was operated to increase CSS wild numbers and tag quotas of 3,250 wild Chinook and 1,400 wild steelhead were established at that trap.

Water temperature (°C) and turbidity (m) were recorded daily at each trap using a centigrade thermometer and 20 cm Secchi disk. Snake River discharge was measured at the U.S. Geological Survey (USGS) Anatone gauge (#13334300), 44.4 km upstream from the Snake River trap. Salmon River discharge was measured at the USGS White Bird gauge (#13317000), 16.6 km downstream from the Salmon River trap.

### **Snake River Trap**

The Snake River trap was positioned approximately 40 m downstream from the Interstate Bridge between Lewiston, Idaho and Clarkston, Washington. The trap was attached to bridge piers just east of the drawbridge span by steel cables. This location is at the head of Lower Granite Reservoir, 0.5 km upstream from the convergence of the Snake and Clearwater arms. River width and depth at this location are approximately 260 m and 12 m, respectively.

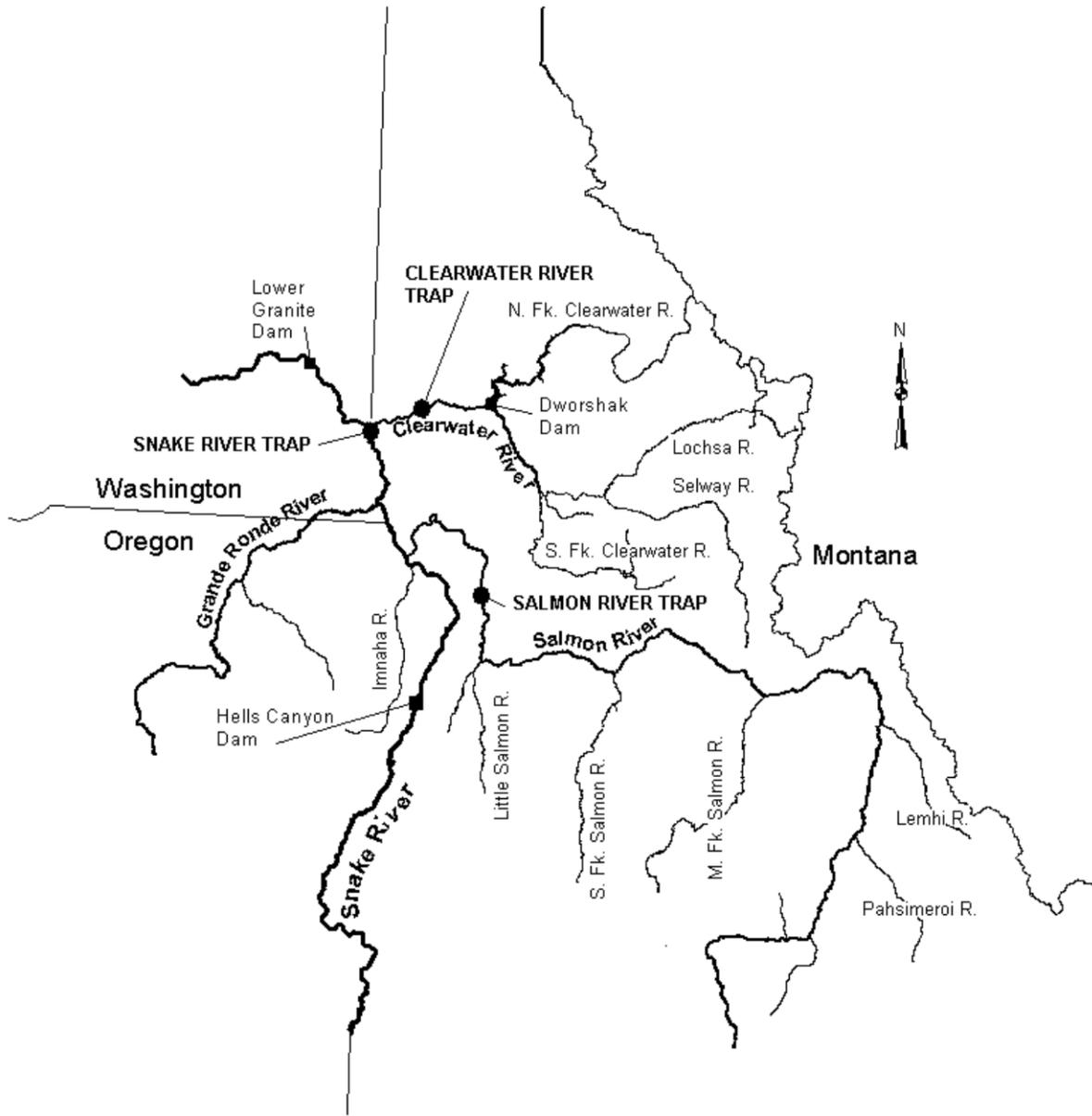


Figure 1. Map of study area

Chinook salmon and steelhead trout smolts were PIT tagged at the Snake River trap to estimate travel time from the head of Lower Granite Reservoir to Lower Granite Dam. Median travel time of the daily PIT-tagged release groups was converted to migration rate. Migration rate was correlated with the mean Lower Granite Reservoir inflow for the number of days equal to the median travel time to determine how changes in discharge affected smolt migration rate through Lower Granite Reservoir.

Snake River trap operations began on March 5 and continued through May 17. The Snake River trap was out of operation for a total of nine days during the 2006 season. All fish captured in the Snake River trap were passively interrogated for PIT tags as they entered the live well. Interrogation and tagging information was sent daily to the PTAGIS Data Center (managed by Pacific States Marine Fisheries Commission).

The PIT tag interrogation system on the Snake River trap was converted to the 134 kHz frequency in 2000. The interrogation system consists of an 8-inch PVC pipe with two interrogation coils (D-4 and D-6). Each coil is connected to an exciter card and a PIT tag reader. Exact date and time of capture are recorded for each PIT-tagged fish. Coil efficiency tests were conducted on the dipper trap interrogation system. Test tags were sent through the system. Reader efficiency ranged between 90% and 100% for both readers combined.

### **Salmon River Trap**

The Salmon River trap was located at rkm 103, approximately 17 km upstream from the previous trapping location and 1.6 km downstream from Slate Creek. The scoop trap was operated immediately downstream of the upper U.S. Highway 95 bridge at Twin Bridges. This location was chosen to allow the trap to be operated through a wider range of discharge. River width at this location is approximately 90 m and varies with discharge.

Chinook salmon and steelhead trout juveniles were tagged with PIT tags at the Salmon River trap to estimate smolt travel time from the lower portion of the Salmon River to Lower Granite Dam. Median travel time for the daily PIT-tagged release groups was converted to migration rate. Migration rate was correlated with mean Lower Granite Reservoir inflow for the median travel time to determine how changes in discharge affected smolt migration rate through the Lower Salmon River and Lower Granite Reservoir.

Trap operations began on March 5 and continued through May 14 when operations were terminated for the season. The Salmon River trap was out of operation for ten days during the 2006 season due to high flows and debris. All fish were interrogated for PIT tags as they were removed from the live well. The tagging and interrogation files were sent to the PTAGIS Data Center daily.

The Salmon River trap PIT tag interrogation system was converted to the 134 kHz frequency in 2000. The interrogation system consists of a 4-inch PVC pipe with two loop antennas attached to two PIT tag readers (D-8). Coil efficiency tests were conducted on the Salmon River trap interrogation system in 2005. Reader efficiency was calculated at 100% efficiency for both readers combined.

### **Trap Efficiency**

Trap efficiency is the proportion of the migration run that is sampled. Since trap efficiency may change as river discharge changes, efficiency has been estimated several times

through the range of discharge at which the trap was operated. A linear regression equation (Ott 1977) describing the relation of trap efficiency and discharge was derived to estimate efficiency at any given discharge. During the 2006 trap operations, trap efficiencies were not calculated for either of the smolt traps. Previous trap efficiency estimates are reported in Buettner (1991).

### **Travel Time and Migration Rates**

Migration statistics were calculated for hatchery release groups from release sites to traps. Travel time and migration rates to the traps were calculated using median arrival times at the Snake and Salmon River traps. Median arrival (or passage) date is the date the 50<sup>th</sup> percentile fish arrived at the trap or collection facility. Smolts were PIT tagged at the Snake River trap to determine travel time from the head of Lower Granite Reservoir to Lower Granite Dam. Smolts were PIT tagged at the Salmon River trap to determine travel time in a free-flowing section of river plus Lower Granite Reservoir. Distances from selected release points to recovery locations are listed in Table 1. Individual arrival times at the Lower Granite collection facility were determined for each release group. A minimum recapture number, sufficient for use in travel time and migration rate estimates, was derived from an empirical distribution function of the travel time for each individual release group (Steinhorst et al. 1988). If recapture numbers were less than six or less than the number derived from the empirical distribution function, the daily data were combined with another day's data or the data were not used. If they were combined, they were added to daily data from an adjacent release day that had similar discharge and travel time.

Smolt migration rate/inflow relations through Lower Granite Reservoir were investigated using linear regression analysis after both variables were stratified into 5 kcfs discharge intervals (Mosteller and Tukey 1977) and log (ln) transformed (Zar 1984). A P-value  $\leq 0.05$  was used to determine significance. This analysis was performed for the PIT-tagged hatchery Chinook salmon, wild Chinook salmon, hatchery steelhead trout, and wild steelhead trout groups marked at the Snake and Salmon River traps.

### **Interrogation Rates of PIT-Tagged Fish**

Interrogation rates of PIT-tagged fish marked at the head of Lower Granite Reservoir to Lower Granite Dam, Little Goose Dam, Lower Monument Dam, and McNary Dam collection facilities included data from 1987 to 2006 for the Snake River trap, 1989 to 1995 for the Clearwater River trap, and 1993 to 2006 for the Salmon River trap. The data have been examined to ensure that multiple interrogations within a dam and between dams have been removed.

Table 1. River mile and kilometer location for the Snake River drainage.

Drainage / Release Site	Mouth of Columbia River		Mouth of Snake River		Lower Granite Dam		Snake River trap site		Clearwater River trap site		Salmon River trap site	
	mi	km	mi	km	mi	km	mi	km	mi	km	mi	km
<b>Clearwater River Drainage</b>												
American River	601	967	277	445	169	272	—	—	131	211	—	—
Big Canyon Creek ACC <sup>a</sup> Facility	499	803	175	281	67	108	—	—	29	47	—	—
Clear Creek	541	870	216	348	109	175	—	—	71	114	—	—
Clearwater River	464	746	139	224	32	51	—	—	-6	-10	—	—
Clearwater River Smolt Trap	470	756	145	234	38	61	—	—	—	—	—	—
Crooked River	597	960	272	438	165	265	—	—	127	204	—	—
Dworshak National Fish Hatchery	504	811	180	289	72	116	—	—	34	55	—	—
Kooskia National Fish Hatchery	541	871	217	349	109	176	—	—	71	115	—	—
Lapwai Creek	475	765	151	243	43	70	—	—	6	9	—	—
Lochsa River	561	903	237	381	129	208	—	—	91	147	—	—
Lolo Creek	518	833	193	311	86	138	—	—	48	77	—	—
Meadow Creek, Selway River	580	934	256	412	149	239	—	—	111	178	—	—
Meadow Creek, SF Clearwater	571	919	247	397	139	224	—	—	101	163	—	—
Mill Creek, SF Clearwater	570	918	246	396	139	223	—	—	101	162	—	—
Newsome Creek	590	950	266	428	158	255	—	—	121	194	—	—
Nez Perce Tribal Hatchery	487	784	163	262	55	89	—	—	17	28	—	—
N Lapwai Valley ACC <sup>b</sup> Pond	476	766	152	244	44	71	—	—	6	10	—	—
Papoose Creek	626	1008	302	486	194	313	—	—	157	252	—	—
Potlatch River	478	770	154	248	47	75	—	—	9	14	—	—
Powell Rearing Pond/Walton Creek	631	1016	307	494	199	321	—	—	162	260	—	—
Red River	601	967	277	445	169	272	—	—	131	211	—	—
Red River Rearing Pond	618	994	293	472	186	299	—	—	148	238	—	—
Selway River	561	903	237	381	129	208	—	—	91	147	—	—
<b>Salmon River Drainage</b>												
Alturas Lake	913	1469	588	947	481	774	449	722	—	—	336	541
Bear Valley Creek	816	1314	492	792	385	619	352	567	—	—	240	386
East Fork Salmon River	856	1377	531	855	424	682	391	630	—	—	279	449
East Fork Salmon River Trap	874	1406	549	884	442	711	409	659	—	—	297	478
East Fork Salmon River Weir	874	1407	550	885	442	712	410	660	—	—	298	479
East Fork South Fork Salmon River	684	1100	359	578	252	405	219	353	—	—	107	172
Hazard Creek	619	996	295	474	187	301	155	249	—	—	42	68
Johnson Creek	698	1124	374	602	267	429	234	377	—	—	122	196
Johnson Creek Trap	703	1131	378	609	271	436	239	384	—	—	126	203
Knox Bridge	716	1152	391	630	284	457	252	405	—	—	139	224
Lemhi River	771	1241	447	719	339	546	307	494	—	—	194	313
Lemhi River Weir	802	1290	477	768	370	595	337	543	—	—	225	362

Table 1. Continued.

Drainage / Release Site	Mouth of Columbia River		Mouth of Snake River		Lower Granite Dam		Snake River trap site		Clearwater River trap site		Salmon River trap site	
	mi	km	mi	km	mi	km	mi	km	mi	km	mi	km
<b>Salmon River Drainage Continued</b>												
Little Salmon River	600	965	275	443	168	270	135	218	—	—	23	37
Lower S Fork Salmon River Trap	646	1040	322	518	214	345	182	293	—	—	70	112
Marsh Creek Trap	823	1325	499	803	391	630	359	578	—	—	247	397
Middle Fork Salmon River	711	1144	386	622	279	449	247	397	—	—	134	216
North Fork Salmon River	749	1206	425	684	318	511	285	459	—	—	173	278
Pahsimeroi Pond	823	1325	499	803	391	630	359	578	—	—	247	397
Pahsimeroi River	816	1314	492	792	385	619	352	567	—	—	240	386
Pahsimeroi River Trap	818	1316	493	794	386	621	354	569	—	—	241	388
Pettit Lake	908	1462	584	940	477	767	444	715	—	—	332	534
Pettit Lake Creek	907	1460	583	938	475	765	443	713	—	—	331	532
Rapid River Hatchery	608	978	283	456	176	283	144	231	—	—	31	50
Rapid River Trap	608	979	284	457	176	284	144	232	—	—	32	51
Rapid River, Little Salmon River	604	972	280	450	172	277	140	225	—	—	27	44
Redfish Lake	898	1445	574	923	466	750	434	698	—	—	321	517
Redfish Lake Creek	895	1440	570	918	463	745	431	693	—	—	318	512
Redfish Lake Creek Trap	897	1443	572	921	465	748	432	696	—	—	320	515
Salmon River	513	825	188	303	81	130	48	78	—	—	-64	-103
Salmon River Smolt Trap	577	928	252	406	145	233	112	181	—	—	—	—
Sawtooth Hatchery	896	1442	572	920	464	747	432	695	—	—	319	514
Sawtooth Trap	896	1442	572	920	464	747	432	695	—	—	319	514
Secesh River	683	1099	359	577	251	404	219	352	—	—	106	171
Slate Creek	578	931	254	409	147	236	114	184	—	—	2	3
South Fork Salmon River	646	1040	322	518	214	345	182	293	—	—	70	112
South Fork Salmon River Trap	718	1155	393	633	286	460	254	408	—	—	141	227
South Fork Salmon River Weir	715	1151	391	629	283	456	251	404	—	—	139	223
Squaw Creek Acclimation Pond	864	1390	539	868	432	695	400	643	—	—	287	462
Squaw Creek, Salmon River	863	1389	539	867	431	694	399	642	—	—	286	461
Stolle Pond	724	1165	400	643	292	470	260	418	—	—	147	237
Valley Creek	891	1434	567	912	459	739	427	687	—	—	314	506
White Bird Creek	566	911	242	389	134	216	102	164	—	—	—	—
Yankee Fork Salmon River	880	1416	556	894	448	721	416	669	—	—	303	488
<b>Snake River Drainage</b>												
Asotin Creek	470	756	145	234	38	61	6	9	—	—	—	—
Big Sheep Creek	552	889	228	367	121	194	88	142	—	—	—	—
Captain John Rapid ACC <sup>a</sup> Pond	506	815	163	263	56	90	24	38	—	—	—	—
Catherine Creek ACC <sup>a</sup> Pond	667	1073	342	551	235	378	203	326	—	—	—	—
Cottonwood ACC <sup>a</sup> Pond	521	839	197	317	89	144	57	92	—	—	—	—
Deer Creek / Big Canyon Facility	586	943	262	421	154	248	122	196	—	—	—	—
Grande Ronde River	493	793	168	271	61	98	29	46	—	—	—	—
Grande Ronde River ACC <sup>a</sup> Pond	692	1113	367	591	260	418	227	366	—	—	—	—

Table 1. Continued.

Drainage / Release Site	Mouth of Columbia River		Mouth of Snake River		Lower Granite Dam		Snake River trap site		Clearwater River trap site		Salmon River trap site	
	mi	km	mi	km	mi	km	mi	km	mi	km	mi	km
<i>Snake River Drainage Continued</i>												
Hells Canyon Dam	571	919	247	397	139	224	107	172	—	—	—	—
Imnaha River	516	830	191	308	84	135	52	83	—	—	—	—
Imnaha Trap	520	837	196	315	88	142	56	90	—	—	—	—
Imnaha River ACC <sup>a</sup> Pond	562	904	237	382	130	209	98	157	—	—	—	—
Little Sheep Creek Facility	544	875	219	353	112	180	80	128	—	—	—	—
Lookingglass Creek	580	933	255	411	148	238	116	186	—	—	—	—
Lostine River	600	966	276	444	168	271	136	219	—	—	—	—
Lostine River ACC <sup>a</sup> Pond	613	987	289	465	181	292	149	240	—	—	—	—
Lower Granite Dam	432	695	107	173	—	—	-32	-52	—	—	—	—
Pittsburg landing ACC <sup>a</sup> Facility	539	868	215	346	107	173	75	121	—	—	—	—
Snake River	324	522	—	—	-107	-173	-140	-225	—	—	—	—
Snake River Smolt Trap	464	747	140	225	32	52	—	—	—	—	—	—
Wallowa Hatchery	614	988	290	466	182	293	150	241	—	—	—	—
Wallowa River	574	924	250	402	142	229	110	177	—	—	—	—

<sup>a</sup> Acclimation

## RESULTS AND DISCUSSION

### Hatchery Releases

#### **Chinook Salmon**

Spring Chinook salmon released into the Snake River drainage upstream of Lower Granite Dam were reared at five locations in Idaho and one in Oregon (Table 2). A total of 8,242,123 age-1 spring Chinook salmon smolts were released at 11 locations in Idaho and 929,857 were released at five locations in Oregon during 2006

Summer Chinook salmon released into the Snake River drainage upstream of Lower Granite Dam were reared at two locations in Idaho (Table 2). A total of 2,258,665 summer Chinook salmon were released at three locations in Idaho during 2006.

Fall Chinook salmon released into the Snake River drainage upstream of Lower Granite Dam were reared at two locations in Idaho, two locations in Oregon, and one location in Washington (Table 2). A total of 279,355 age-1 fall Chinook salmon were released at two locations in Idaho and 151,122 were released at one location in Washington. A total of 1,926,312 age-0 fall Chinook were released from seven locations in Idaho. A total of 1,557,562 age-0 fall Chinook salmon were released from three locations in Washington during 2006.

#### **Steelhead Trout**

Steelhead trout released into the Snake River drainage upstream of Lower Granite Dam were reared at five locations in Idaho, two in Oregon, and one in Washington (Table 3). A total of 7,279,624 steelhead trout smolts were released at 33 locations in Idaho, and 1,578,786 were released at five locations in Oregon during 2006. A total of 169,390 steelhead trout smolts were released at one location in Washington during 2006. Fall releases of steelhead trout were not included in this report.

#### **Coho and Sockeye Salmon**

Hatchery coho salmon released into the Snake River drainage upstream of Lower Granite Dam were reared at one location in Idaho and one location in Oregon (Table 4). A total of 698,522 coho smolts were released at three locations in Idaho during 2006. Summer and fall releases of coho salmon have not been included in this report.

Hatchery sockeye salmon that contributed to the 2006 out-migration were reared at one location in Idaho (Table 4). A total of 72,108 sockeye salmon were released at three locations during October 2005 and 86,052 sockeye salmon were released at two locations during 2006.

Table 2. Hatchery Chinook salmon released into the Snake River system upriver from Lower Granite Dam contributing to the 2006 out-migration.

<b>Drainage Release Site</b>	<b>Hatchery</b>	<b>Stock</b>	<b>Release Date</b>	<b>No. Released (No. PIT Tagged)</b>
<b>Clearwater River</b>				
Walton Creek	Clearwater	Spring	03/22/06	423,633 (15,274)
North Fork Clearwater River	Dworshak	Spring	03/27/06	1,007,738 (97,254)
Crooked River Trap	Clearwater	Spring	03/27/06	608,472 (15,278)
Red River Rearing Ponds	Clearwater	Spring	03/30/06	423,603 (15,273)
Crooked River Ponds	Clearwater	Spring	04/03/06	140,989 (300)
Kooskia National Fish Hatchery	Kooskia NFH	Spring	04/03/06	637,334 (800)
Selway River Near Meadow Creek	Clearwater	Spring	04/03/06	317,382
			<b>Drainage Total</b>	<b>3,559,151 (144,179)</b>
Big Canyon Creek	Lyons Ferry	Fall 1+	04/13/06	129,798 (4,991)
			<b>Drainage Total</b>	<b>129,798 (4,991)</b>
Big Canyon Creek	Lyons Ferry	Fall 0+	05/26/06	504,706 (58,359)
Nez Perce Tribal Hatchery – Site 1705	Nez Perce Tribe	Fall 0+	06/08/06	432,097 (3,007)
North Lapwai Valley	Nez Perce Tribe	Fall 0+	05/17/06	199,746
South Fork Clearwater @ Lukes Gulch	Nez Perce Tribe	Fall 0+	06/13/06	25,391 (4,872)
Selway River @ Cedar Flats	Nez Perce Tribe	Fall 0+	06/13/06	25,774 (4,900)
Big Canyon Creek	Dworshak	Fall 0+	06/19/06	150,374 (109,506)
			<b>Drainage Total</b>	<b>1,338,088 (180,644)</b>

Table 2. Continued.

<b>Drainage Release Site</b>	<b>Hatchery</b>	<b>Stock</b>	<b>Release Date</b>	<b>No. Released (No. PIT Tagged)</b>
<b>Salmon River</b>				
Pahsimeroi Ponds	Pahsimeroi	Summer	03/13/06	1,073,951 (497)
Johnson Creek	McCall	Summer	03/13/06	90,450 (12,058)
Rapid River Hatchery	Rapid River	Spring	03/15/06	2,530,528 (96,975)
Little Salmon River @ Pollock Bridge	Rapid River	Spring	03/16/06	200,000
South Fork Salmon @ Knox Bridge	McCall	Summer	03/20/06	1,094,264 (51,896)
Sawtooth Hatchery	Sawtooth	Spring	04/19/06	1,552,444 (1,195)
			<b>Drainage Total</b>	<b>6,541,637 (162,621)</b>
<b>Snake River</b>				
Lostine Acclimation Pond	Lookingglass	Spring	03/10/06	245,754 (14,242)
Snake River @ Hells Canyon Dam	Rapid River	Spring	03/14/06	400,000
Lookingglass Hatchery	Lookingglass	Spring	03/17/06	147,420 (1,187)
Imnaha River	Lookingglass	Spring	03/21/06	448,268 (20,632)
Grande Ronde Acclimation Pond	Lookingglass	Spring	03/27/06	19,151 (498)
Catherine Creek Acclimation Pond	Lookingglass	Spring	03/27/06	69,264 (20,963)
			<b>Drainage Total</b>	<b>1,329,857 (57,522)</b>
Snake River @ Pittsburg Landing	Lyons Ferry	Fall 1+	04/05/06	149,557 (4,993)
Snake River @ Captain John Rapid	Lyons Ferry	Fall 1+	04/12/06	151,122 (4,884)
			<b>Drainage Total</b>	<b>300,679 (9,877)</b>
Snake River @ Hells Canyon Dam	Oxbow	Fall 0+	05/02/06	191,139 (12,083)
Snake River @ Couse Creek	Dworshak	Fall 0+	05/15/06	229,097 (229,063)
Snake River @ Pittsburg Landing	Umatilla	Fall 0+	05/23/06	397,085 (24,162)
Captain John's Rapid	Lyons Ferry	Fall 0+	05/29/06	506,972 (3,487)
Snake River @ Couse Creek	Lyons Ferry	Fall 0+	05/30/06	200,820 (15,581)
Snake River @ Couse Creek	Lyons Ferry	Fall 0+	06/22/06	211,508 (10,874)
Grande Ronde Near Cougar Creek	Lyons Ferry	Fall 0+	06/19/06	409,165 (25,369)
			<b>Drainage Total</b>	<b>2,145,786 (320,619)</b>
			<b>Grand Total</b>	<b>15,344,996 (880,453)</b>

Table 3. Hatchery steelhead trout released into the Snake River system upriver from Lower Granite Dam contributing to the 2006 out-migration.

<b>Drainage Release Site</b>	<b>Hatchery</b>	<b>Stock</b>	<b>Release Date</b>	<b>No. Released (No. PIT Tagged)</b>
<b>Clearwater River</b>				
Clear Creek	Dworshak	B	04/10/06	309,661
South Fork Clearwater River @ Red House Hole	Dworshak	B	04/10/06	380,279
Crooked River Ponds	Clearwater	B	04/11/06	75,175 (300)
Crooked River Trap	Clearwater	B	04/11/06	150,081 (299)
Newsome Creek	Dworshak	B	04/11/06	99,168
American River	Dworshak	B	04/12/06	116,207
Red River Rearing Ponds	Clearwater	B	04/14/06	192,125 (7,253)
South Fork Clearwater River @ Red House Hole	Clearwater	B	04/17/06	289,508 (295)
Dworshak Hatchery	Dworshak	B	04/17/06	1,206,565 (1,494)
Red River Rearing Ponds	Clearwater	B	04/24/06	47,029
South Fork Clearwater River @ Meadow Creek	Clearwater	B	04/25/06	24,954 (1,297)
South Fork Clearwater River @ Mill Creek	Clearwater	B	04/25/06	24,954 (1,291)
Lolo Creek	Clearwater	B	04/26/06	50,020 (299)
			<b>Drainage Total</b>	<b>2,965,726 (4,982)</b>
<b>Salmon River</b>				
Little Salmon River	Hagerman	A	03/27/06	202,591 (300)
Hazard Creek	Niagara Springs	A	03/28/06	254,919 (300)
Little Salmon River	Hagerman	B	04/04/06	91,915 (286)
Hazard Creek	Niagara Springs	A	04/05/06	105,753 (299)
Pahsimeroi hatchery	Niagara Springs	A	04/07/06	894,638 (298)
Salmon River @ Sawtooth Weir	Hagerman	B	04/10/06	760,852 (295)
Squaw Creek	Magic Valley	B	04/10/06	93,472 (984)
Hazard Creek	Magic Valley	B	04/11/06	248,105 (300)
Salmon River @ Red Rock	Magic Valley	A	04/14/06	102,087 (300)
Salmon River @ Colston Corner	Magic Valley	A	04/17/06	110,235 (300)
Lemhi River	Magic Valley	A	04/18/06	74,534
Lemhi River @ Hayden Creek	Magic Valley	A	04/19/06	19,150 (299)

Table 3. Continued.

<b>Drainage Release Site</b>	<b>Hatchery</b>	<b>Stock</b>	<b>Release Date</b>	<b>No. Released (No. PIT Tagged)</b>
<b>Salmon River Continued</b>				
Lemhi River @ St. Charles Bridge	Magic Valley	A	04/19/06	47,008 (300)
Hayden Creek Hatchery	Magic Valley	A	04/19/06	46,866
Hayden Creek @ Basin Creek	Magic Valley	A	04/20/06	14,639
Salmon River @ McNabb Pt.	Magic Valley	A	04/20/06	137,098 (300)
Pahsimeroi hatchery	Magic Valley	A	04/21/06	31,759
Salmon River @Tunnel Rock	Magic Valley	A	04/24/06	41,004
East Fork Salmon River @ Dumpster	Magic Valley	B	04/24/06	237,711
Little Salmon River @ Stinky Springs	Niagara Springs	A	04/26/06	116,666
East Fork Salmon River	Hagerman	B	04/27/06	100,457 (297)
Salmon River @ Yankee Fork	Magic Valley	B	04/27/06	187,051
Salmon River @ Yankee Fork	Hagerman	B	05/01/06	238,116 (295)
West Fork Yankee Fork	Magic Valley	A	05/01/06	63,525
East Fork Salmon River Trap	Magic Valley	B	05/01/06	31,073
Yankee Fork Dredge Ponds	Magic Valley	A	05/01/06	32,075 (300)
Valley Creek	Magic Valley	A	05/02/06	30,599 (300)
			<b>Drainage Total</b>	<b>4,313,898 (5,753)</b>
Snake River				
Snake River @ Hells Canyon Dam	Niagara Springs	A	03/20/06	439,234 (299)
Cottonwood Acclimation Pond	Lyons Ferry	A	04/01/06	169,390
Spring Creek	Wallowa Hatchery	A	04/09/06	420,545 (5,349)
Big Sheep Creek	Irrigon	A	04/10/06	128,044 (300)
Little Sheep Acclimation Pond	Irrigon	A	04/12/06	151,860 (283)
Big Canyon Lower Acclimation Pond	Irrigon	A	04/12/06	187,757 (293)
Spring Creek	Wallowa Hatchery	A	04/29/06	165,263 (1,785)
Big Canyon Lower Acclimation Pond	Irrigon	A	05/02/06	86,083 (282)
			<b>Drainage Total</b>	<b>1,748,176 (8,591)</b>
			<b>Grand Total</b>	<b>9,027,800 (19,326)</b>

Table 4. Hatchery coho and sockeye salmon released into the Snake River system upstream from Lower Granite Dam contributing to the 2006 out-migration.

<b>Drainage Release Site</b>	<b>Species</b>	<b>Hatchery</b>	<b>Release Date</b>	<b>No. Released (No. PIT Tagged)</b>
<b>Clearwater River</b>				
Potlatch River	Coho	Eagle Creek	03/07/06	238,912 (1,500)
Lapwai Creek	Coho	Eagle Creek	03/10/06	267,088 (1,500)
Clear Creek	Coho	Dworshak	05/01/06	192,522 (1,500)
			<b>Drainage Total</b>	<b>698,522 (4,500)</b>
<b>Salmon River</b>				
Alturas Lake	Sockeye	Sawtooth	10/05/05	16,949 (1,007)
Pettit Lake	Sockeye	Sawtooth	10/05/05	15,289 (1,008)
Redfish Lake	Sockeye	Sawtooth	10/06/05	39,870 (1,006)
Above Sawtooth Water Intake	Sockeye	Sawtooth	05/04/06	39,622 (1,011)
Redfish Lake Creek Trap	Sockeye	Sawtooth	05/10/06	46,430 (1,011)
			<b>Drainage Total</b>	<b>158,160 (5,043)</b>

### Smolt Monitoring Traps

#### **Snake River Trap Operation**

The Snake River trap captured 16,230 hatchery and 2,764 wild age-1 Chinook salmon, 291 age-0 Chinook salmon of unknown rearing, 2,555 hatchery and 513 wild steelhead trout, 474 hatchery and 205 unknown rearing sockeye salmon, and 49 coho salmon of unknown rearing in 2006 (Table 5).

Hatchery Chinook salmon first arrived at the trap on March 17 (one fish). Significant numbers of fish were not trapped until April 2006 (317 fish). The daily catch fluctuated between zero and 1,234 fish per day (Figure 2). 0.3% (54) of the total season catch was collected in March, 67.5% (10,955) in April, and 32.2% (5221) in May.

Wild Chinook salmon first arrived at the trap on March 14 (4 fish). Significant numbers of fish were not trapped until April 21 (113 fish). The daily catch fluctuated between zero and 342 fish per day (Figure 2). Two percent (47) of the total season catch was collected in March, 76% (2,104) in April, and 22% (613) in May.

Physical characteristics were used to differentiate between age-0 Chinook salmon and older salmon. This year, 291 age-0 Chinook salmon were captured. Two percent (7) of the total season catch was collected in March, 18% (52) in April, and 80% (232) in May.

Hatchery steelhead trout first arrived at the trap on March 22 (one fish). Significant numbers of fish were not trapped until April 24 (295 fish). The daily catch fluctuated between zero and 315 fish per day (Figure 3). One percent (26) of the total season catch was collected in March, 51% (1,300) in April, and 48% (1,229) in May.

Wild steelhead trout first arrived at the trap on March 14 (one fish). The daily trap catch remained below 100 fish throughout the trapping season. The daily catch fluctuated between zero and 56 fish per day (Figure 3). 0.8% (4) of the total season catch was collected in March, 54% (277) in April, and 45.2% (232) in May.

Hatchery sockeye salmon first arrived at the trap on April 28 (one fish). The daily catch fluctuated between zero and 186 fish per day. Less than one percent (1 fish) of the total season catch was collected in April, and the remainder of the season catch (473 fish) was in May.

Sockeye salmon of unknown origin first arrived at the trap on April 22 (1 fish). The daily trap catch fluctuated between zero and 65 fish per day. Three percent (5) of the total season catch was collected in April, and 97% (200) in May.

Coho salmon of unknown rearing first arrived at the trap on April 3 (1 fish). The daily trap catch fluctuated between zero and 7 fish per day. Ninety percent (44) of the total season catch was collected in April, and 10% (5) in May.

Snake River discharge measured at the Anatone gauge ranged between 32.5 kcfs and 143.4 kcfs (Table 6). Water temperature at the Snake River trap ranged between 4.8°C and 16.1°C (Figure 4). Secchi disk transparency at the Snake River trap ranged between 0.3 m and 1.7 m (Figure 4).

### **Salmon River Trap Operations**

The Salmon River scoop trap captured 24,322 hatchery and 6,575 wild age-1 Chinook salmon, 1,632 hatchery and 338 wild steelhead trout, 6 hatchery sockeye salmon, and 7 sockeye salmon of unknown rearing in 2006 (Table 5).

Hatchery Chinook salmon first appeared on March 20 (28 fish). Significant numbers of fish were not trapped until April 2 (624 fish). The daily catch fluctuated between zero and 2,041 fish per day (Figure 5). Less than one percent (216) of the season total was captured in March, 97% (23,515) in April, and 2% (591) in May.

Wild Chinook salmon first appeared on March 6 (3 fish). Significant numbers of fish were not trapped until April 2 (230 fish). The daily catch fluctuated between zero and 1222 fish per day (Figure 5). Less than one percent (24) of the season total was captured in March, 99% (6,490) in April, and less than one percent (61) in May.

Hatchery steelhead trout first appeared at the trap on April 2 (two fish). Significant numbers of fish were not trapped until April 25 (359 fish). The daily catch fluctuated between zero and 359 fish per day (Figure 6). Seventy percent of the season total was captured in April (1,149), and 30% (483) in May.

Wild steelhead trout first appeared on April 4 (one fish). The daily trap catch remained below 100 fish throughout the trapping season. Daily catch fluctuated between zero and 63 fish

per day (Figure 6). Eighty percent (271) of the season total was captured in April, and 20% (67) in May.

Hatchery sockeye salmon first appeared at the trap on May 10 (four fish). The daily catch fluctuated between zero and 4 fish per day. One hundred percent (6) of the season total was captured in May.

Sockeye salmon of unknown rearing first appeared at the trap on May 6 (two fish). The daily catch fluctuated between zero and 2 fish per day. One hundred percent (7) of the season total was captured in May.

Salmon River discharge measured at the White Bird gauge ranged between 4.2 kcfs and 90.3 kcfs (Table 7). Water temperature at the Salmon River trap ranged between 3.3°C to 10.0°C (Figure 7). Secchi disk transparency at the Salmon River trap ranged between 0.3 m and 2.6 m (Figure 7).

From March 5 to March 31, the trap was operated at approximately 5 meters from the north shoreline. This is not the usual 10 meter location, which may explain the lower than average catch rates this year for March. The trap then fished at 10 meters until April 29 when it was moved to 30 meters due to high flows. Trapping was suspended for short periods of time during the season due to high flows and debris in the river. The trap was also pulled due to the Rapid River Hatchery's force release of spring Chinook. Trapping was suspended for the season on May 14.

Table 5. Historical catch of hatchery Chinook salmon (HC), wild Chinook salmon (WC), hatchery steelhead trout (HS), and wild steelhead trout (WS) collected at the Snake, Clearwater, and Salmon River traps for the out-migration years of 1997 through 2006.

Year	Species / Run	Snake River Trap	Clearwater River Trap	Salmon River Trap
2006	HC	16,230	10,641	24,322
	WC	2,764	514	6,575
	HS	2,555	3	1,632
	WS	513	24	338
2005	HC	1,307	16,388	34,107
	WC	501	2,016	9,534
	HS	5,846	11,341	3,440
	WS	1,416	1,456	314
2004	HC	3,849	29,694	32,038
	WC	1,473	1,290	7,567
	HS	8,698	7,930	2,480
	WS	1,972	1,035	248
2003	HC	3,395	21,342	35,897
	WC	1,386	1,005	9,339
	HS	7,319	9,257	3,101
	WS	1,252	464	319
2002	HC	7,252	4,985	43,168
	WC	1,458	627	5,548
	HS	12,578	5,652	3,284
	WS	2,591	524	395
2001	HC	636	No Data	10,388
	WC	94		2,274
	HS	4,300		4,079
	WS	926		488
2000	HC	5,566	No Data	22,175
	WC	2,214		3,373
	HS	8,777		2,290
	WS	1,364		336
1999	HC	15,327	No Data	23,180
	WC	6,411		5,079
	HS	7,271		2,554
	WS	1,050		228
1998	HC	3,487	No Data	10,852
	WC	1,063		1,459
	HS	8,001		1,218
	WS	1,116		112
1997	HC	1,543	No Data	2,280
	WC	898		1,065
	HS	1,600		1,267
	WS	196		66

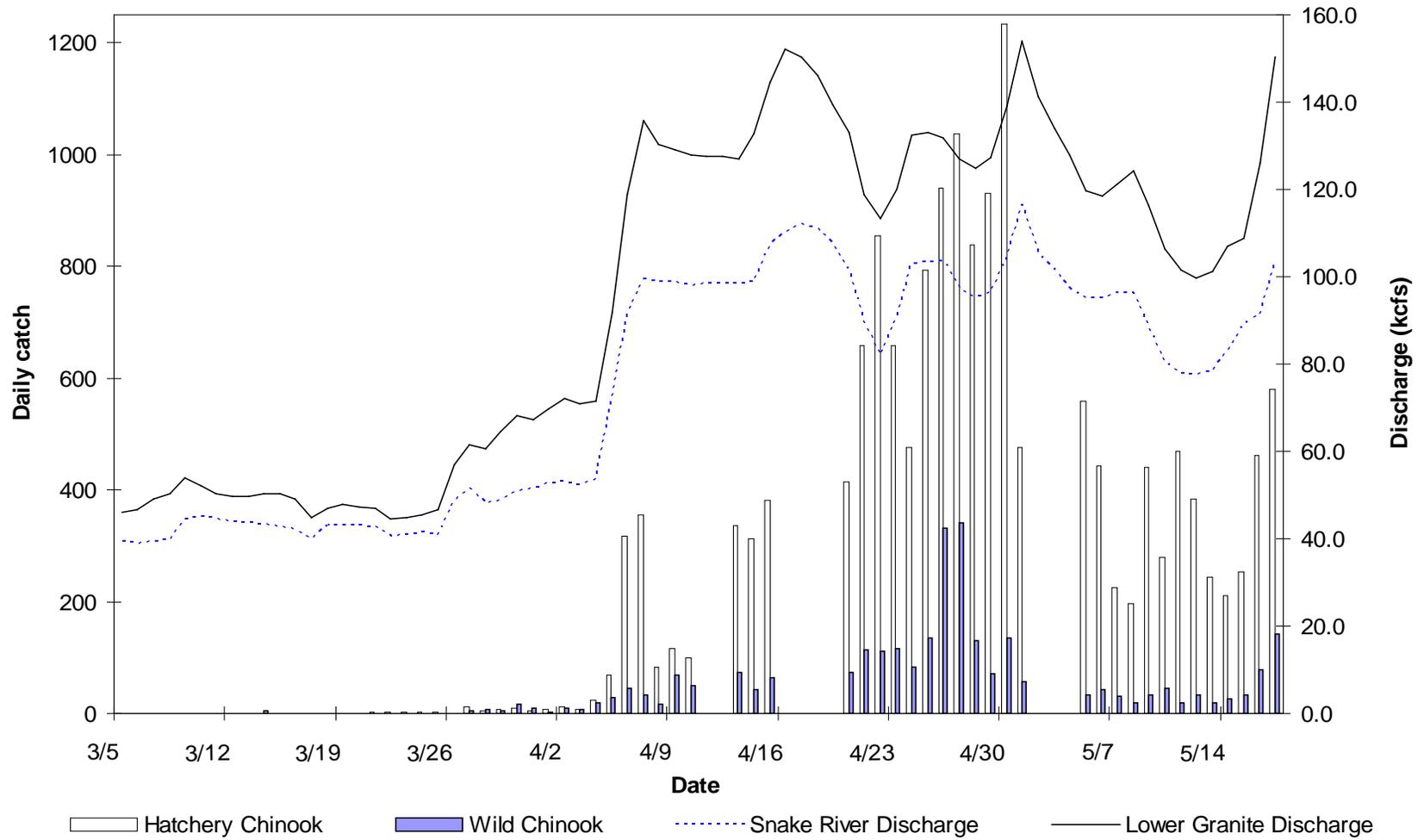


Figure 2. Snake River trap daily catch of hatchery Chinook salmon and wild Chinook salmon overlaid by Snake River and Lower Granite discharge, 2006.

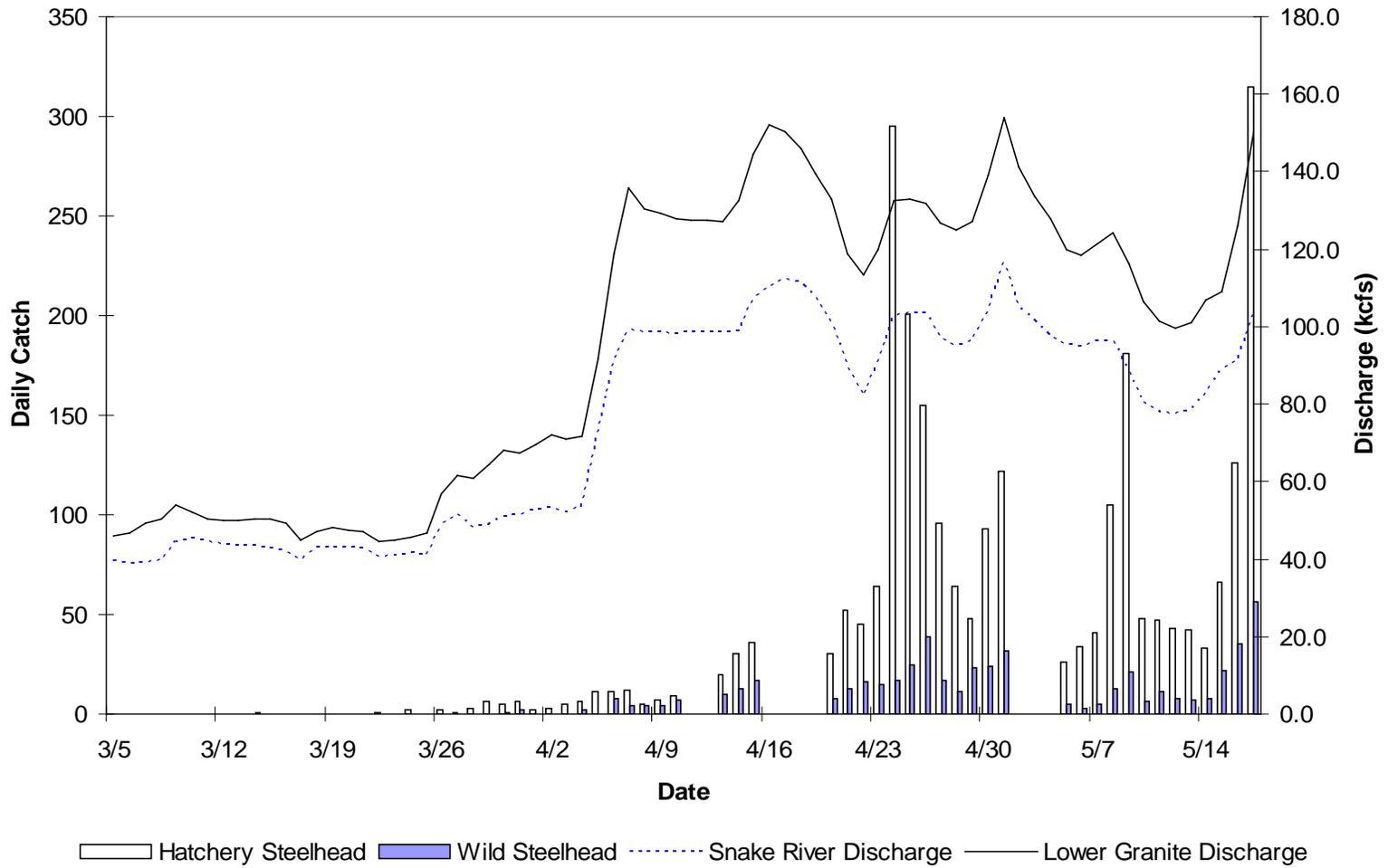


Figure 3. Snake River trap daily catch of hatchery steelhead trout and wild steelhead trout overlaid by Snake River and Lower Granite discharge, 2006.

Table 6. Monthly Snake River discharge at Anatone, Washington, and 2006 comparison with previous three years. Comparison data is reported as 2006 discharge minus annual interval discharge.

		<b>2006</b>	<b>2003</b>		<b>2004</b>		<b>2005</b>	
		<b>Discharge (cfs)</b>	<b>Discharge (cfs)</b>	<b>2006 Comparison (kcfs)</b>	<b>Discharge (cfs)</b>	<b>2006 Comparison (kcfs)</b>	<b>Discharge (cfs)</b>	<b>2006 Comparison (kcfs)</b>
March	Min	32,501	15,408	17.1	20,907	11.6	13,609	18.9
	Max	51,481	37,936	13.5	43,392	8.1	32,910	18.6
	Average	42,934	28,250	14.7	31,141	11.8	18,174	24.8
April	Min	52,297	30,722	21.6	23,597	28.7	21,688	30.6
	Max	112,137	43,349	68.8	41,914	70.2	36,842	75.3
	Average	92,658	36,830	55.8	29,607	63.1	26,282	66.4
May	Min	77,486	31,274	46.2	29,108	48.4	29,332	48.2
	Max	143,402	146,719	-3.3	71,257	72.1	98,915	44.5
	Average	103,770	55,989	47.8	48,553	55.2	60,560	43.2
June	Min	35,744	27,280	8.5	27,279	8.5	30,450	5.3
	Max	93,179	131,563	-38.4	66,920	26.3	66,950	26.2
	Average	65,836	62,639	3.2	45,472	20.4	40,896	24.9

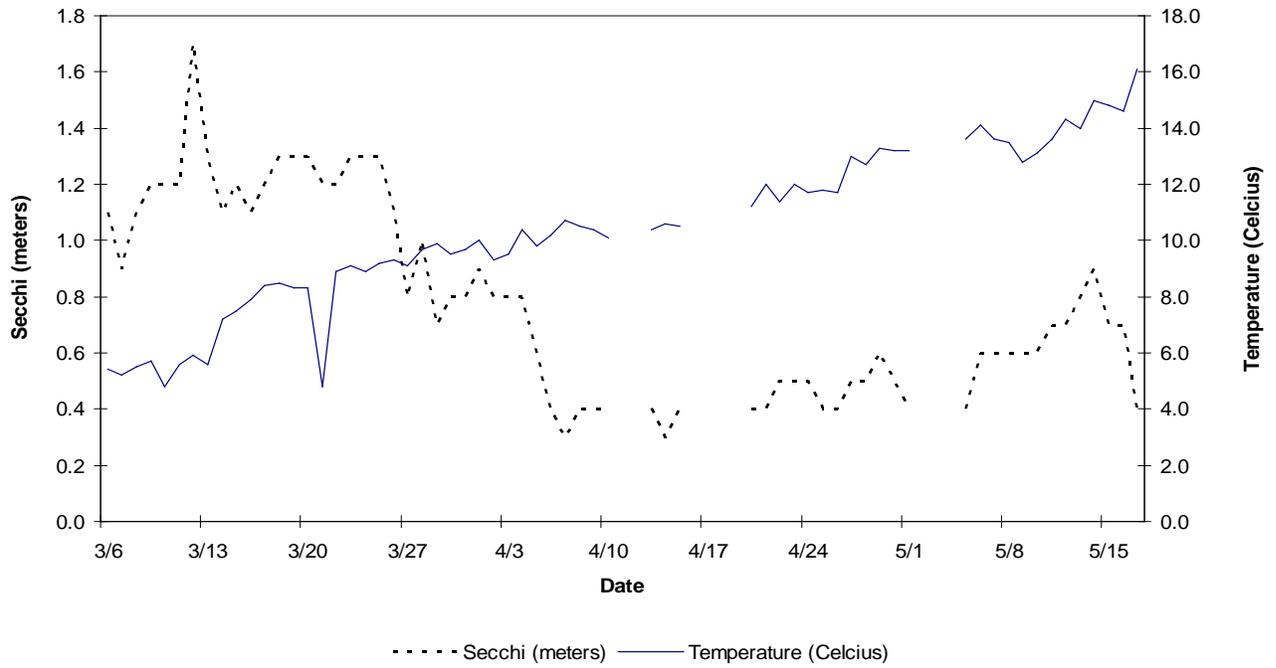


Figure 4. Daily river water temperature and Secchi disk transparency at the Snake River trap, 2006.

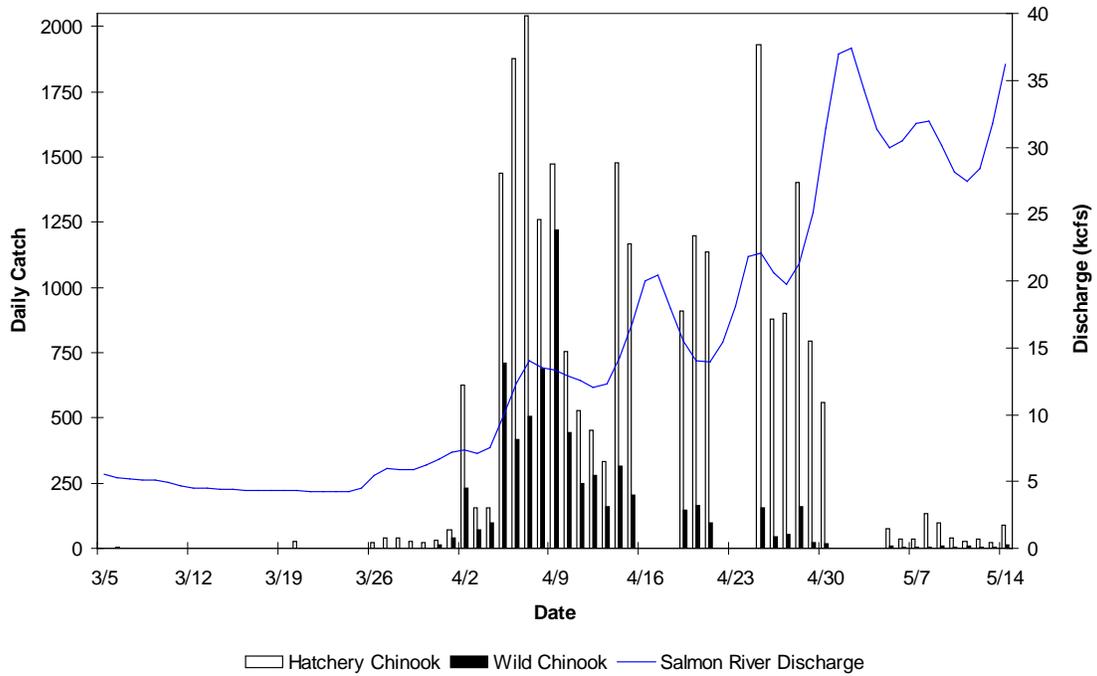


Figure 5. Salmon River trap daily catch of hatchery Chinook salmon and wild Chinook salmon overlaid by Salmon River discharge, 2006.

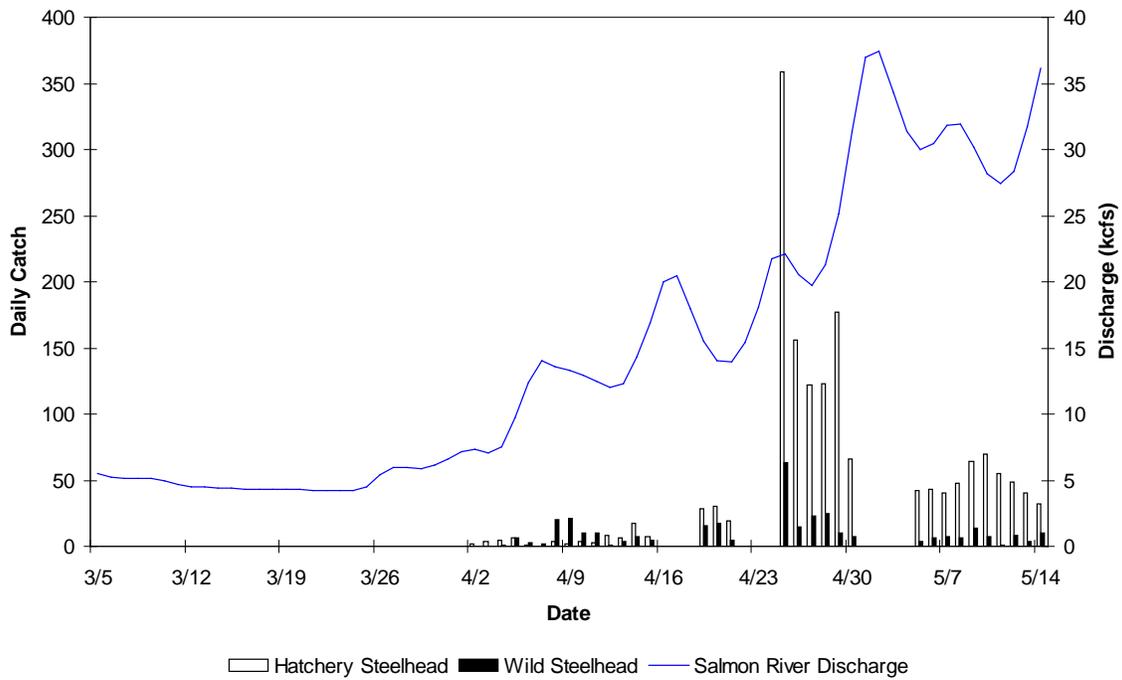


Figure 6. Salmon River trap daily catch of hatchery steelhead trout and wild steelhead trout overlaid by Salmon River discharge, 2006.

Table 7. Monthly Salmon River discharge at White Bird, Idaho, and 2006 comparison with previous three years. Comparison data is reported as 2006 discharge minus annual interval discharge.

		2006	2003		2004		2005	
		Discharge (cfs)	Discharge (cfs)	2006 Comparison (kcfs)	Discharge (cfs)	2005 Comparison (kcfs)	Discharge (cfs)	2005 Comparison (kcfs)
March	Min	4,212	3,765	0.4	3,554	0.7	3,596	0.6
	Max	7,008	9,433	-2.4	10,632	-3.6	7,100	-0.1
	Average	5,088	6,286	-1.2	6,071	-1.0	4,457	0.6
April	Min	7,103	7,255	-0.2	8,632	-1.5	4,985	2.1
	Max	31,405	18,041	13.4	14,932	16.5	15,953	15.5
	Average	15,687	12,173	3.5	11,688	4.0	8,140	7.5
May	Min	27,445	12,588	14.9	13,980	13.5	13,043	14.4
	Max	90,333	90,290	0.0	36,523	53.8	46,867	43.5
	Average	48,947	30,156	18.8	24,558	24.4	27,653	21.3

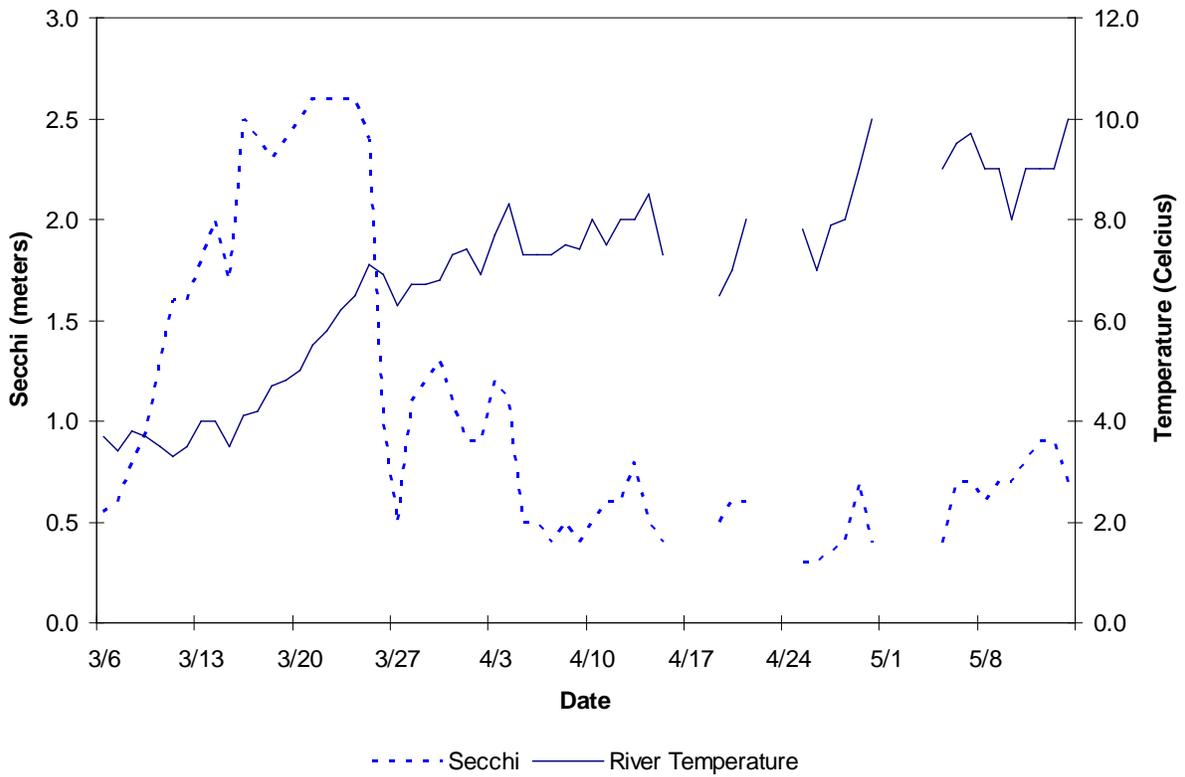


Figure 7. Daily river water temperature and Secchi disk transparency at the Salmon River trap, 2006.

## Travel Time and Migration Rates

### **Release Sites to Snake River Trap**

**Hatchery Spring Chinook Salmon**—In 2006, two hundred and seventy-nine PIT-tagged hatchery spring Chinook salmon were interrogated at the Snake River trap (Table 8). Fourteen were from the Catherine Creek Pond (median travel time 30.8 d), two were from the Dworshak National Fish Hatchery (median travel time 20.6 d), nine were from the Grande Ronde River Trap (median travel time 11.3 d), sixty-five were from the Imnaha River Weir (median travel time 30.2 d), six were from the Lookingglass Hatchery (median travel time 190.16 d for four fall tagged fish and 38.59 d for two spring tagged fish), twenty-seven were from Lostine River pond (median travel time 41.32 d), one hundred fifty-five were from Rapid River Hatchery (median travel time 41.88 d), and one from the Yankee Fork Salmon River (travel time 8.88 d).

**Wild Spring Chinook Salmon**—In 2006, eighteen PIT-tagged wild spring Chinook salmon were interrogated at the Snake River trap (Table 8). one was from Bear Valley creek (travel time 290.12 d), one was from Big Creek (travel time 256.29 d), two were from Elk Creek (median travel time 268.25 d), one was from Herd Creek (travel time 231.37 d), one was from the Lemhi River Weir (travel time 148.31 d), one was from Lookingglass Creek (travel time 256.68 d), two were from Lostine River (travel time for one fall tagged fish was 117.64 d and travel time for one spring tagged fish was 25.61 d), one was from Marsh Creek Trap (travel time 295.33 d), one was from Minam Creek (travel time 199.05 d), one was from East Fork Salmon River Trap (travel time 13.90 d), five were from the Sawtooth trap (travel time for one fall tagged fish was 184.8 d and median travel time for four spring tagged fish was 35.83 d), and one was from Sulphur Creek (travel time 270.49 d).

**Hatchery Summer Chinook Salmon**—In 2006, ninety-eight PIT-tagged hatchery summer Chinook salmon were interrogated at the Snake River trap (Table 8). Thirteen were from Johnson Creek (median travel time 61.97 d), eighty-four were from Knox Bridge (median travel time 38.8 d), and one was from Pahsimeroi Pond (travel time 34.35).

**Wild Summer Chinook Salmon**—In 2006, twenty-eight PIT-tagged wild summer Chinook salmon were interrogated at the Snake River trap (Table 8). Three were from the Imnaha River trap (median travel time for two fall tagged fish was 193.11 d and 15.85 d for one spring tagged fish), eleven were from Johnson Creek trap (median travel time for five fall tagged fish was 198.79 d and 22.38 d for six spring tagged fish), six were from Pahsimeroi River trap (median travel time 11.43 d), one was from the South Fork Salmon River (travel time 260.39 d), three were from the Secesh River trap (median travel time 191.33 d), and four were from the South Fork of the Salmon River Trap (median travel time for two fall tagged fish was 216.90 d and 36.45 d for two spring tagged fish).

**Hatchery Fall Chinook Salmon**—In 2006, one-hundred and four PIT-tagged hatchery fall Chinook salmon were interrogated at the Snake River trap (Table 8). One was from the Captain John Rapids Acclimation Pond (travel time 8.31 d), twenty-three came from Pittsburg Landing Acclimation Facility (median travel time 0.7 d), fifty-eight came from Snake River, Clearwater to Salmon River (median travel time 0.54 d) and twenty-two were from the Snake River Salmon River to Hells Canyon (median travel time 7.52 d).

**Hatchery Unknown Run Chinook Salmon**—In 2006, six PIT-tagged hatchery unknown run Chinook salmon were interrogated at the Snake River trap (table 8). All six were from the Salmon River trap (median travel time 10.37 d).

**Wild Unknown Run Chinook Salmon**—In 2006, eleven PIT-tagged wild unknown run Chinook salmon were interrogated at the Snake River trap (Table 8). All eleven were from the Salmon River trap (median travel time 16.61 d).

**Hatchery Summer Steelhead Trout**—In 2006, ten hatchery summer steelhead trout were interrogated at the Snake River trap (Table 8). Five were from the Grande Ronde River Trap (median travel time 0.85 d), one was from the Lemhi River weir (travel time 11.15 d), one was from the Salmon River trap (travel time 2.28 d), one was from the Squaw Creek Acclimation Pond (travel time 3.87 d), and two were from the Wallowa Hatchery (median travel time 8.05 d).

**Wild Summer Steelhead Trout**—In 2006, five wild summer steelhead trout were interrogated at the Snake River trap (Table 8). One was from Catherine Creek (travel time 6.19 d), two were from the Imnaha River trap (median travel time 7.36 d), and two were from the Salmon River Trap (median travel time 2.47 d).

**Hatchery Sockeye Salmon**—In 2006, twenty hatchery sockeye salmon were interrogated at the Snake River trap (Table 8). One was from Alturas Lake Creek (travel time 4.63 d), one was from Alturas Lake (travel time 223.99 d), one was from Pettit Lake (travel time 223.12 d), seven were from Redfish Lake Creek trap (median travel time 6.43 d), and ten were from Sawtooth trap (median travel time 5.14 d).

**Wild Sockeye Salmon**—In 2006, two wild sockeye salmon were interrogated at the Snake River trap (Table 8). One was from Redfish Lake Creek Trap (travel time 6.98 d) and one was from Pettit Lake Creek (travel time 9.31 d).

### **Release Sites to Salmon River Trap**

**Hatchery Spring Chinook Salmon**—In 2006, 411 hatchery spring Chinook salmon were interrogated at the Salmon River trap (Table 9). They were all from the Rapid River Hatchery (median travel time 21.07 d).

**Wild Spring Chinook Salmon**—In 2006, forty-two wild spring Chinook salmon were interrogated at the Salmon River trap (Table 9). One was from Bear Valley Creek (travel time 255.14 d), five were from Big Creek (median travel time 235.20 d), one was from Camas Creek (travel time 259.28 d), three were from West Fork Chamberlain Creek (median travel time 231.95 d), one was from Elk Creek (travel time 252.24 d), two were from Herd Creek (median travel time 240.15 d), six were from the Lemhi River (median travel time for five fall tagged fish was 161.23 d and travel time for one spring tagged fish was 27.92 d), seven were from the Lemhi River Weir (median travel time was 163.46 d for six fall tagged fish and the travel time was 15.3 d for one spring tagged fish), one was from the Marsh Creek (travel time 251.32 d), four were from Marsh Creek Trap (median travel time 199.70 d), two were from the East Fork Salmon River Trap (median travel time 205.09 d), and nine were from the Sawtooth trap (median travel time for five fall tagged fish was 189.87 d and 13.54 d for four spring tagged fish).

**Hatchery Summer Chinook Salmon**—In 2006, two-hundred eighty-five hatchery summer Chinook salmon were interrogated at the Salmon River Trap (Table 9). Seventeen were from Johnson Creek (median travel time 24.79 d), two-hundred sixty-seven were from

Knox Bridge (median travel time 17.83 d), and one was from the Pahsimeroi Pond (travel time 27.08 d).

**Wild Summer Chinook Salmon**—In 2006, sixty wild summer Chinook salmon were interrogated at the Salmon River trap (Table 9). Twenty-seven were from the Johnson Creek trap (median travel time for twenty fall tagged fish was 192.89 d and 13.95 for seven spring tagged fish), two were from Lake Creek (median travel time 235.50 d), eleven were from the Pahsimeroi River trap (median travel time for four fall tagged fish was 177.28 d and 6.34 d for seven spring tagged fish), four were from the Secesh River (median travel time 218.17 d), seven were from the Secesh River Trap (median travel time 187.94 d), and nine were from the South Fork Salmon River trap (median travel time was 229.21 d for six fall tagged fish and 15.08 d for three spring tagged fish).

**Wild Summer Steelhead Trout**—In 2006, one wild summer steelhead trout was interrogated at the Salmon River trap (Table 9). The fish was from the Secesh River trap (travel time 187.20 d).

**Hatchery Summer Sockeye Salmon**—In 2006, one hatchery summer sockeye was interrogated at the Salmon River trap (Table 9). The fish was from the Sawtooth River trap (travel time 3.88 d).

Table 8. Travel time, separated by species, run and rearing type, from the point of release to the Snake River trap, 2006.

Species/Run/Rearing	Release Site	Distance From Release Site To Trap (km)	Number Of Recaptures	Minimum Travel Time (days)	Maximum Travel Time (days)	Median Travel Time (days)
Chinook / Spring / Hatchery <sup>a</sup>	Lookingglass Hatchery	186	4	174.19	220.85	190.16
Chinook / Spring / Hatchery <sup>b</sup>	Catherine Creek Pond	326	14	28.36	34.43	30.79
	Dworshak National Fish Hatchery	64	2	7.08	34.10	20.59
	Grande Ronde River Trap	48	9	1.57	32.32	11.28
	Imnaha River Weir	157	65	2.58	55.52	30.21
	Lookingglass Hatchery	186	2	38.59	38.59	38.59
	Lostine River Pond	240	27	8.10	67.34	41.32
	Rapid River Hatchery	231	155	19.42	60.80	41.88
	Yankee Fork	683	1	8.88	8.88	-
Chinook / Spring / Wild <sup>a</sup>	Bear Valley Creek	580	1	290.12	290.12	-
	Big Creek	481	1	256.29	256.29	-
	Elk Creek	583	2	265.37	271.13	268.25
	Herd Creek	647	1	231.37	231.37	-
	Lemhi River Weir	543	1	148.31	148.31	-
	Lookingglass Creek	184	1	256.68	256.68	-
	Lostine River	222	1	117.64	117.64	-
	Marsh Creek Trap	578	1	295.33	295.33	-
	Minam Creek	193	1	199.05	199.05	-
	Sawtooth Trap	695	1	184.80	184.80	-
	Sulphur Creek, Middle Fork Salmon River	552	1	270.49	270.49	-
Chinook / Spring / Wild <sup>b</sup>	Lostine River	222	1	25.61	25.61	-
	East Fork Salmon River Trap	659	1	13.90	13.90	-
	Sawtooth Trap	695	4	25.63	39.95	35.83
Chinook / Summer / Hatchery	Johnson Creek	386	13	42.27	64.76	61.97
	Knox Bridge	405	84	15.29	56.78	38.80
	Pahsimeroi Pond	578	1	34.35	34.35	-
Chinook / Summer / Wild <sup>a</sup>	Imnaha River Trap	90	2	183.88	202.35	193.11
	Johnson Creek Trap	384	5	169.84	250.57	198.79
	South Fork Salmon River	293	1	260.39	260.39	-
	Secesh River Trap	359	3	181.54	232.41	191.33
	South Fork Salmon River Trap	408	2	214.73	219.07	216.90

Table 8. Continued.

Species/Run/Rearing	Release Site	Distance From Release Site To Trap (km)	Number Of Recaptures	Minimum Travel Time (days)	Maximum Travel Time (days)	Median Travel Time (days)
Chinook / Summer / Wild <sup>b</sup>	Imnaha River Trap	90	1	15.85	15.85	-
	Johnson Creek Trap	384	6	9.80	46.82	22.38
	Pahsimeroi River Trap	569	6	4.98	21.09	11.43
	South Fork Salmon River Trap	408	2	27.12	45.77	36.45
Chinook / Fall / Hatchery	Captain John Rapids Acclimation Pond	38	1	8.31	8.31	-
	Pittsburg Landing Acclimation Facility	121	23	-11.02	2.00	0.70
	Snake River Clearwater to Salmon River	28	58	0.49	1.52	0.54
	Snake River Salmon River to Hells Canyon	170	22	2.26	14.80	7.52
Chinook / Unknown / Hatchery	Salmon Trap	181	6	2.87	19.09	10.37
Chinook / Unknown / Wild	Salmon Trap	181	11	2.19	33.66	16.61
Steelhead / Summer / Hatchery	Grande Ronde River Trap	48	5	0.11	22.61	0.85
	Lemhi River Weir	545	1	11.15	11.15	-
	Salmon Trap	181	1	2.28	2.28	-
	Snake River Trap	0	2	-0.04	0.00	-0.02
	Squaw Creek Acclimation Pond	643	1	3.87	3.87	-
Wallowa Hatchery	241	2	4.21	11.88	8.05	
Steelhead / Summer / Wild	Catherine Creek	310	1	6.19	6.19	-
	Imnaha River Trap	90	2	2.82	11.90	7.36
	Salmon Trap	181	2	1.92	3.03	2.47
Sockeye / Summer / Hatchery <sup>a</sup>	Alturas Lake	722	1	223.99	223.99	-
	Pettit Lake	715	1	223.12	223.12	-
Sockeye / Summer / Hatchery <sup>b</sup>	Alturas Lake Creek	711	1	4.63	4.63	-
	Redfish Lake Creek Trap	696	7	5.86	6.90	6.43
	Sawtooth Trap	695	10	4.67	6.95	5.14
Sockeye / Summer / Wild	Redfish Lake Creek Trap	696	1	6.98	6.98	-
	Pettit Lake Creek	713	1	9.31	9.31	-

<sup>a</sup> Fish were tagged in the Fall.

<sup>b</sup> Fish were tagged in the Spring.

Table 9. Travel time, separated by species, run and rearing type, from the point of release to the Salmon River trap, 2006.

Species/Run/Rearing	Release Site	Distance From Release Site To Trap (km)	Number Of Recaptures	Minimum Travel Time (days)	Maximum Travel Time (days)	Median Travel Time (days)
Chinook / Spring / Hatchery	Rapid River Hatchery	50	411	3.05	56.02	21.07
Chinook / Spring / Wild <sup>a</sup>	Bear Valley Creek	399	1	255.14	255.14	-
	Big Creek, Middle Fork Salmon River	300	5	229.36	253.18	235.20
	Camas Creek, Middle Fork Salmon River	297	1	259.28	259.28	-
	West Fork Chamberlain Creek	205	3	230.21	235.10	231.95
	Elk Creek	402	1	252.24	252.24	-
	Herd Creek	466	2	239.06	241.25	240.15
	Lemhi River	381	5	131.94	286.16	161.23
	Lemhi River Weir	362	6	132.97	179.06	163.46
	Marsh Creek	398	1	251.32	251.32	-
	Marsh Creek Trap	397	4	184.20	256.12	199.70
	East Fork Salmon River Trap	478	2	185.29	224.90	205.09
Sawtooth Trap	514	5	158.82	272.91	189.87	
Chinook / Spring / Wild <sup>b</sup>	Lemhi River	381	1	27.92	27.92	-
	Lemhi River Weir	362	1	15.30	15.30	-
	Sawtooth Trap	514	4	6.88	15.63	13.54
Chinook / Summer / Hatchery	Johnson Creek	196	17	6.93	52.79	24.79
	Knox Bridge	224	267	3.93	51.79	17.83
	Pahsimeroi Pond	397	1	27.08	27.08	-
Chinook / Summer / Wild <sup>a</sup>	Johnson Creek Trap	203	20	148.83	224.93	192.89
	Lake Creek	218	2	218.18	252.82	235.50
	Pahsimeroi River Trap	388	4	159.01	203.86	177.28
	Secesh River	201	4	204.24	248.94	218.17
	Secesh River Trap	178	7	167.16	229.10	187.94
	South Fork Salmon River Trap	227	6	194.98	257.95	229.21
Steelhead / Summer / Wild	Secesh River Trap Fall	178	1	187.20	187.20	-
Sockeye / Summer / Hatchery	Sawtooth Trap	514	1	3.88	3.88	-

<sup>a</sup> Fish were tagged in the Fall.

<sup>b</sup> Fish were tagged in the Spring.

## **Snake River Trap to Lower Granite Dam**

A removable spillway weir (RSW) was installed at Lower Granite Dam in 2001. When the RSW is operated there is a significant increase in the number of smolts that pass the facility by spill, thus reducing the number of smolts passing via the collection facility and juvenile PIT tag interrogation system. Therefore, when the RSW is in operation there are fewer PIT tag interrogations observed at Lower Granite Dam. The RSW was operated for fish passage during the spring 2006 outmigration season. At Lower Granite Dam, 20 kcfs instantaneous spill was initiated from April 3-June 20 and exceeded that level through most of the spring period when inflow exceeded powerhouse capacity by more than 20 kcfs.

Spring flows in the Snake River were very high during most of the out migration, exceeding 100 kcfs with little fluctuation. Because of the relatively uniform flows much of the migration rate data falls within a few discharge intervals making it difficult for a regression analysis to detect a within year relation between migration rate and discharge (Table 10 and Table 12).

**Hatchery Chinook Salmon PIT Tag Groups**—Sufficient numbers of hatchery spring/summer Chinook salmon (4,939 individual fish) were PIT tagged at the Snake River trap to provide 29 daily release groups for median migration rate calculations through Lower Granite Reservoir from April 5 through May 17 (Appendix A, Table 1). Median travel time ranged from 19.4 to 1.6 d (2.7 km/d to 32.7 km/d migration rate).

Migration rate data stratified by 5 kcfs flow groups were used in the regression analysis (Table 10). Linear regression analysis was unable to detect a significant relation between migration rate from the Snake River trap to Lower Granite Dam and average Lower Granite Reservoir inflow for PIT-tagged hatchery Chinook salmon groups (Table 11). A factor that may have contributed to the inability to detect a relation was that 71% of the data occurred in just three consecutive 5-kcfs flow intervals.

**Wild Chinook Salmon PIT Tag Groups**—Sufficient numbers of wild Chinook salmon (2,440 individual fish) were PIT tagged at the Snake River trap to provide 29 daily release groups for median migration rate calculations through Lower Granite Reservoir from April 8 through May 16 (Appendix A, Table 2). Median travel time ranged from 9.6 to 1.7 d (5.4 km/d to 29.2 km/d migration rate).

Migration rate data stratified by 5 kcfs flow groups were used in the regression analysis (Table 10). Linear regression analysis was unable to detect a significant relation between migration rate from the Snake River trap to Lower Granite Dam and average Lower Granite Reservoir inflow for PIT-tagged wild Chinook salmon groups (Table 11). The inability to detect a relation is probably due to lack of sufficient data with eighty one percent of the data occurred over just four consecutive 5-kcfs flow intervals.

**Hatchery Steelhead Trout PIT Tag Groups**—Sufficient numbers of hatchery steelhead trout (2,073 individual fish) were PIT tagged at the Snake River trap to provide 28 daily release groups for median migration rate calculations through Lower Granite Reservoir from April 7 through May 17 (Appendix A, Table 3). Median travel time ranged from 1.9 to 1.3 d (26.8 km/d to 40.4 km/d migration rate).

Migration rate data stratified by 5 kcfs flow groups were used in the regression analysis (Table 10). Linear regression analysis detected a significant relation between migration rate from the Snake River trap to Lower Granite Dam and average Lower Granite Reservoir inflow for PIT tagged hatchery steelhead trout groups (Table 11). The equation shows that as flow increases, migration rate increases.

**Wild Steelhead Trout PIT Tag Groups**—Sufficient numbers of wild steelhead trout (226 individual fish) were PIT tagged at the Snake River trap to provide 12 daily release groups for median migration rate calculations through Lower Granite Reservoir from April 21 through May 17 (Appendix A, Table 4). Median travel time ranged from 1.7 to 1.1 d (30.2 km/d to 44.9 km/d migration rate).

Migration rate data stratified by 5 kcfs flow groups were used in the regression analysis (Table 10). Linear regression analysis detected a significant relation between migration rate from the Snake River trap to Lower Granite Dam and average Lower Granite Reservoir inflow for PIT-tagged wild steelhead trout groups (Table 11). The equation shows that as flow increases, migration rate increases.

### **Salmon River Trap to Lower Granite Dam**

**Hatchery Chinook Salmon PIT Tag Groups**—Sufficient numbers of hatchery Chinook salmon (3,268 individual fish) were PIT tagged at the Salmon River trap to provide 31 daily release groups for median migration rate calculations through Lower Granite Reservoir from March 27 through May 14 (Appendix A, Table 5). Median travel time ranged from 36.6 to 4.0 d (6.4 km/d to 58.8 km/d migration rate).

Migration rate data stratified by 5 kcfs flow groups were used in the regression analysis (Table 12). Linear regression analysis was unable to detect a significant relation between migration rate from the Salmon River trap to Lower Granite Dam and average Lower Granite Reservoir inflow for PIT-tagged hatchery Chinook salmon groups (Table 11). The inability to detect a relation is probably due to lack of sufficient data with eighty three percent of the data occurred over just two consecutive 5-kcfs flow intervals.

**Wild Chinook Salmon PIT Tag Groups**—Sufficient numbers of wild Chinook salmon (5,518 individual fish) were PIT tagged at the Salmon River trap to provide 23 daily release groups for median migration rate calculations through Lower Granite Reservoir from April 12 through April 29 (Appendix A, Table 6). Median travel time ranged from 23.1 to 8.1 d (10.1 km/d to 28.7 km/d migration rate).

Migration rate data stratified by 5 kcfs flow groups were used in the regression analysis (Table 12). Linear regression analysis was unable to detect a significant relation between migration rate from the Salmon River trap to Lower Granite Dam and average Lower Granite Reservoir inflow for PIT-tagged wild Chinook salmon groups (Table 11). The inability to detect a relation is probably due to a lack of sufficient data with one hundred percent of the data occurred over just three consecutive 5-kcfs flow intervals.

**Hatchery Steelhead Trout PIT Tag Groups**—Sufficient numbers of hatchery steelhead trout (1,167 individual fish) were PIT tagged at the Salmon River trap to provide 19 daily release groups for median migration rate calculations through Lower Granite Reservoir from April 14 through May 14 (Appendix A, Table 7). Median travel time ranged from 14.8 to 2.8 d (15.8 km/d to 84.0 km/d migration rate).

Migration rate data stratified by 5 kcfs flow groups were used in the regression analysis (Table 12). The linear regression analysis was unable to detect a significant relation between migration rate from the Salmon River trap to Lower Granite Dam and average Lower Granite Reservoir inflow for PIT-tagged hatchery steelhead trout groups marked at the Salmon River trap (Table 11).

**Wild Steelhead Trout PIT Tag Groups**—Sufficient numbers (120 individual fish) of wild steelhead trout were PIT tagged at the Salmon River trap to provide four daily release groups for median migration rate calculations through Lower Granite Reservoir from April 20 through April 28 (Appendix A, Table 8). Median travel time ranged from 4.5 to 3.0 d (52.3 km/d to 77.4 km/d migration rate).

Migration rate data stratified by 5 kcfs flow groups were calculated (Table 12). There was not enough release groups (four) to perform a regression analysis.

**Interrogation of PIT-Tagged Fish**—Cumulative interrogation data generally are not directly comparable between years. Changes in the amount, duration, and timing of spill results in changes in fish collection efficiency at the dams and therefore PIT tag interrogation rate. A fourth collection facility in the system, Lower Monumental Dam became operational in 1993, and total interrogations are likely to be greater beginning in 1993 than in previous years under similar spill conditions. A removable spillway weir (RSW) was installed at Lower Granite Dam in 2001, tested in 2002, and was operational for the 2006 spring outmigration. The RSW increased spillway passage efficiency and therefore reduced the number of fish collected and detected at a given spill level. Any comparison in trends of cumulative detection at dams must be done cautiously, in a manner that incorporates changes in collection efficiency.

After combining data from consecutive release days to remove groups with small sample size when necessary, mean percent interrogation of Snake River trap hatchery Chinook salmon daily PIT tag release groups at Lower Granite Dam was 27.0% and ranged between 17.8% and 41.7% for hatchery fish (Appendix B, Table 1). The mean for wild Chinook salmon was 30.8% and ranged from 16.7% to 45.0% (Appendix B, Table 2). Seasonal cumulative interrogation rate of PIT-tagged hatchery Chinook salmon to Lower Granite, Little Goose, Lower Monumental, and McNary dams ranged between 49.5% and 85.0%, and averaged 73.1% and wild Chinook salmon ranged from 57.9% to 94.4% and averaged 80.5% (Table 13).

Percent interrogation of Salmon River trap hatchery Chinook salmon daily PIT tag release groups at Lower Granite Dam, after combining data from consecutive release days to remove groups with small sample size when necessary, ranged from 13.5% to 34.4% and averaged 26.6% (Appendix B, Table 5). Wild Chinook salmon ranged from 20.3% to 38.9% and averaged 30.4% (Appendix B, Table 6). Seasonal cumulative interrogation rate of PIT-tagged hatchery Chinook salmon to Lower Granite, Little Goose, Lower Monumental, and McNary dams ranged between 46.4% and 77.9% and averaged 65.4% (Table 13). Wild Chinook salmon cumulative interrogation rates ranged between 59.5% and 85.7% and averaged 78.0% (Table 13).

Percent interrogation of Snake River trap hatchery steelhead trout and wild steelhead trout daily PIT tag release groups at Lower Granite Dam, after combining data from consecutive release days to remove groups with small sample size when necessary, ranged from 10.2% to 60.0% for hatchery fish and averaged 34.8% (Appendix B, Table 3). Wild steelhead trout ranged from 18.2% to 72.3% and averaged 30.3% (Appendix B, Table 4). Seasonal cumulative

interrogation rate of PIT-tagged hatchery steelhead trout to Lower Granite, Little Goose, Lower Monumental, and McNary dams ranged between 61.9% and 100% and averaged 79.3% (Table 13). Wild steelhead trout cumulative interrogation rates ranged between 38.2% and 100% and averaged 81.1% (Table 13).

Percent interrogation of Salmon River trap hatchery steelhead trout daily PIT tag release groups at Lower Granite Dam, after combining data from consecutive release to remove groups with small sample size days when necessary, ranged from 20.6% to 87.5% and averaged 35.7% (Appendix B, Table 7). Wild steelhead trout ranged from 32.0% to 43.8% and averaged 30.8% (Appendix B Table 8). Seasonal cumulative interrogation rate of PIT-tagged hatchery steelhead trout to Lower Granite, Little Goose, Lower Monumental, and McNary dams ranged between 55.9% and 86.4% and averaged 74.4% (Table 13). Wild steelhead trout ranged from 60.0% to 100% and averaged 80.0 % (Table 13).

Table 10. Migration rates (km/day) stratified by 5 kcfs intervals from the Snake River trap to Lower Granite Dam, 2006

Discharge Interval	Hatchery Chinook		Wild Chinook		Hatchery Steelhead		Wild Steelhead	
	Migration Rate (km/day)	Number Recaptured						
100-105	15.01	74	14.68	19	30.31	57		
105-110	14.59	65	17.75	32	30.90	90	30.24	7
110-115	19.55	62	22.72	8	31.11	15		
115-120			13.55	24	30.68	68	33.98	21
120-125			10.66	69	30.72	59		
125-130	10.39	390	12.60	414	33.52	143	36.11	29
130-135	7.77	211	12.95	52	34.56	154	38.33	30
135-140	8.93	345	13.14	111				
140-145	6.95	79	10.07	44	34.13	7		
145-150	31.96	50	29.93	26	38.59	86	44.94	6
150-155								
155-160					38.25	37	40.36	10
160-165	30.17	58						

Table 11. Linear regression statistics for migration rate/discharge relations by species rearing type and trap using data stratifies by 5-kcfs intervals, 2006.

Species	Trap	N	Intercept	Slope	r <sup>2</sup>	P
Hatchery Chinook	Snake	9	0.551	1.329	0.024	0.691
	Salmon	6	-4.952	2.455	0.504	0.114
Wild Chinook	Snake	10	-0.107	0.960	0.002	0.914
	Salmon	3	4.743	7.029	0.313	0.622
Hatchery Steelhead	Snake	10	0.560	0.086	0.840	<0.001
	Salmon	8	1.103	0.927	0.191	0.279
Wild Steelhead	Snake	6	0.804	0.205	0.793	0.017
	Salmon	3	3.165	0.919	0.992	0.180

Table 12. Migration rates (km/day) stratified by 5 kcfs intervals from the Salmon River trap to Lower Granite Dam, 2006.

Discharge Interval	Hatchery Chinook		Wild Chinook		Hatchery Steelhead		Wild Steelhead	
	Migration Rate (km/day)	Number Recaptured						
105-110	44.05	61			44.93	69		
110-115	25.43	28			42.49	28		
115-120	15.40	36			71.21	28		
120-125	8.52	22	10.70	91	41.00	16	52.30	6
125-130	14.81	270	21.07	169	55.48	90	65.99	29
130-135	16.27	465	15.54	1424	40.38	78		
135-140					57.39	92	77.40	8
140-145					77.20	20		

Table 13. Interrogations of PIT-tagged fish from the Snake River trap, 1987-2006; Clearwater River trap, 1989-1995; and Salmon River trap 1993-2006, at downstream collection facilities.

Site	Year	Species <sup>a</sup>	Number Interrogated / Site									Grand Total Ints	Total % Obs.
			No. Tagged	Ints at Lower Granite	% GRJ	Ints at Little Goose	% GOJ	Ints at Lower Monumental	% LMJ	Ints at McNary	% MCJ		
Snake	2006	CH	5,003	1,349	27.0%	1,532	30.6%	557	11.1%	219	4.4%	3,657	73.1%
	2005	CH	622	320	51.4%	178	28.6%	14	2.3%	12	1.9%	524	84.2%
	2004	CH	2,127	1,077	50.6%	522	24.5%	94	4.4%	53	2.5%	1,746	82.1%
	2003	CH	2,047	557	27.2%	470	23.0%	123	6.0%	173	8.5%	1,323	64.6%
	2002	CH	1,901	391	20.6%	428	22.5%	346	18.2%	2	0.1%	1,167	61.4%
	2001	CH	413	291	70.5%	51	12.3%	8	1.9%	4	1.0%	354	85.7%
	2000	CH	3,963	1,179	29.8%	677	17.1%	188	4.7%	195	4.9%	2,239	56.5%
	1999	CH	4,268	997	23.4%	1,515	35.5%	516	12.1%	206	4.8%	3,234	75.8%
	1998	CH	2,303	1,077	46.8%	510	22.2%	192	8.3%	71	3.1%	1,850	80.3%
	1997	CH	—	—	—	—	—	—	—	—	—	—	—
	1996	CH	1,450	497	34.3%	259	17.9%	189	13.0%	40	2.8%	985	67.9%
	1995	CH	3,927	1,646	41.9%	643	16.4%	430	11.0%	153	3.9%	2,872	73.1%
	1994	CH	2,844	885	31.1%	332	11.7%	223	7.8%	329	11.6%	1,769	62.2%
	1993	CH	3,203	1,336	41.7%	494	15.4%	246	7.7%	134	4.2%	2,210	69.0%
	1992	CH	410	166	40.5%	83	20.2%	—	0.0%	48	11.7%	297	72.4%
Snake	2006	CW	2,661	819	30.8%	983	36.9%	265	10.0%	75	2.8%	2,142	80.5%
	2005	CW	339	166	49.0%	124	36.6%	7	2.1%	3	0.9%	300	88.5%
	2004	CW	1,389	757	54.5%	277	19.9%	27	1.9%	8	0.6%	1,069	76.9%
	2003	CW	1,311	399	30.4%	327	24.9%	125	9.5%	90	6.9%	941	71.8%
	2002	CW	1,393	294	21.1%	448	32.2%	207	14.9%	1	0.1%	950	68.2%
	2001	CW	43	26	60.5%	3	7.0%	—	0.0%	1	2.3%	30	69.8%
	2000	CW	1,989	550	27.7%	480	24.1%	144	7.2%	112	5.6%	1,286	64.7%
	1999	CW	3,624	804	22.2%	1,515	41.8%	567	15.6%	121	3.3%	3,007	83.0%
	1998	CW	961	442	46.0%	190	19.8%	89	9.3%	42	4.4%	763	79.4%
	1997	CW	—	—	—	—	—	—	—	—	—	—	—
	1996	CW	842	269	31.9%	190	22.6%	119	14.1%	40	4.8%	618	73.4%
	1995	CW	2,067	1,023	49.5%	366	17.7%	216	10.5%	68	3.3%	1,673	80.9%
	1994	CW	934	354	37.9%	95	10.2%	82	8.8%	83	8.9%	614	65.7%
	1993	CW	1,125	576	51.2%	150	13.3%	57	5.1%	46	4.1%	829	73.7%
Snake	1992	CU	615	249	40.5%	106	17.2%	—	0.0%	72	11.7%	427	69.4%
	1991	CU	2,131	929	43.6%	409	19.2%	—	0.0%	115	5.4%	1,453	68.2%
	1990	CU	2,245	956	42.6%	310	13.8%	—	0.0%	180	8.0%	1,446	64.4%
	1989	CU	6,222	2,384	38.3%	1,367	22.0%	—	0.0%	482	7.7%	4,233	68.0%
	1988	CU	3,767	1,237	32.8%	543	14.4%	—	0.0%	299	7.9%	2,079	55.2%
	1987 <sup>b</sup>	CU	3,275	1,067	32.6%	338	10.3%	—	0.0%	308	9.4%	1,713	52.3%
Snake	2006	SH	2,148	748	34.8%	717	33.4%	225	10.5%	14	0.7%	1,704	79.3%
	2005	SH	3,356	2,273	67.7%	803	23.9%	67	2.0%	7	0.2%	3,150	93.9%
	2004	SH	4,843	3,497	72.2%	767	15.8%	101	2.1%	14	0.3%	4,379	90.4%
	2003	SH	4,177	1,282	30.7%	881	21.1%	508	12.2%	86	2.1%	2,757	66.0%
	2002	SH	5,031	1,200	23.9%	875	17.4%	818	16.3%	2	0.0%	2,895	57.5%
	2001	SH	3,156	2,082	66.0%	115	3.6%	24	0.8%	6	0.2%	2,227	70.6%
	2000	SH	3,717	2,122	57.1%	342	9.2%	203	5.5%	41	1.1%	2,708	72.9%
	1999	SH	3,990	1,185	29.7%	1,175	29.4%	537	13.5%	89	2.2%	2,986	74.8%
	1998	SH	4,274	2,230	52.2%	640	15.0%	303	7.1%	61	1.4%	3,234	75.7%
	1997	SH	1,459	750	51.4%	328	22.5%	123	8.4%	12	0.8%	1,213	83.1%
	1996	SH	1,363	675	49.5%	247	18.1%	139	10.2%	24	1.8%	1,085	79.6%
	1995	SH	2,244	1,477	65.8%	236	10.5%	165	7.4%	19	0.8%	1,897	84.5%
	1994	SH	3,239	1,298	40.1%	216	6.7%	112	3.5%	40	1.2%	1,666	51.4%
	1993	SH	2,521	1,925	76.4%	235	9.3%	63	2.5%	13	.5%	2,236	88.7%
	1992	SH	3,904	1,496	38.3%	227	5.8%	—	0.0%	30	0.8%	1,753	44.9%
	1991	SH	2,577	2,032	78.9%	268	10.4%	—	0.0%	11	0.4%	2,311	89.7%
	1990	SH	3,112	2,272	73.0%	282	9.1%	—	0.0%	33	1.1%	2,587	83.1%
	1989	SH	2,525	1,773	70.2%	268	10.6%	—	0.0%	35	1.4%	2,076	82.2%
	1988	SH	1,743	1,069	61.3%	190	10.9%	—	0.0%	12	0.7%	1,271	72.9%
	1987	SH	827	324	39.2%	52	6.3%	—	0.0%	6	0.7%	382	46.2%
Snake	2006	SW	502	152	30.3%	192	38.2%	56	11.2%	7	1.4%	407	81.1%
	2005	SW	1,357	911	67.1%	325	23.9%	22	1.6%	1	0.1%	1,259	92.8%
	2004	SW	1,923	1,457	75.8%	253	13.2%	19	1.0%	2	0.1%	1,731	90.0%

Table 13. Continued.

Site	Year	Species <sup>a</sup>	Number Interrogated / Site									Grand Total Ints	Total % Obs.
			No. Tagged	Ints at Lower Granite	% GRJ	Ints at Little Goose	% GOJ	Ints at Lower Monumental	% LMJ	Ints at McNary	% MCJ		
Snake	2003	SW	1,208	397	32.9%	300	24.8%	77	6.4%	32	2.6%	806	66.7%
	2002	SW	2,518	639	25.4%	472	18.7%	439	17.4%	1	0.0%	1,551	61.6%
	2001	SW	884	716	81.0%	56	6.3%	14	1.6%	1	0.1%	787	89.0%
	2000	SW	1,312	5879	44.9%	214	16.3%	105	8.0%	28	2.1%	936	71.3%
	1999	SW	923	254	27.5%	304	32.9%	111	12.0%	19	2.1%	688	74.5%
	1998	SW	1,088	624	57.4%	154	14.2%	81	7.4%	8	0.7%	867	79.7%
	1997	SW	148	82	55.4%	38	25.7%	6	4.1%	1	0.7%	127	85.8%
	1996	SW	655	293	44.7%	137	20.9%	67	10.2	12	1.8%	509	77.7%
	1995	SW	1,537	967	62.9%	195	12.7%	122	7.9%	13	0.8%	1,297	84.4%
	1994	SW	2,840	1,546	54.4%	319	11.2%	158	5.6%	51	1.8%	2,074	73.0%
	1993	SW	2,867	1,982	69.1%	267	9.3%	133	4.6%	32	1.1%	2,414	84.2%
	1992	SW	2,538	1,511	59.5%	307	12.1%	—	0.0%	31	1.2%	1,849	72.9%
	1991	SW	3,549	2,266	63.8%	625	17.6%	—	0.0%	66	1.9%	2,957	83.3%
	1990	SW	3,078	2,016	65.5%	356	11.6%	—	0.0%	60	1.9%	2,432	79.0%
	1989	SW	1,798	1,170	65.1%	240	13.3%	—	0.0%	52	2.9%	1,462	81.3%
	1988	SW	1,186	698	58.9%	166	14.0%	—	0.0%	20	1.7%	884	74.5%
1987	SW	464	229	49.4%	48	10.3%	—	0.0%	8	1.7%	285	61.4%	
Clearwater	1995	CH	2,467	950	38.5%	414	16.8%	269	10.9%	109	4.4%	1,742	70.6%
	1994	CH	1,998	500	25.0%	192	9.6%	188	9.4%	247	12.4%	1,127	56.4%
	1993	CH	1,624	553	34.1%	193	11.9%	106	6.5%	77	4.7%	929	57.2%
	1992	CH	5,200	1,654	31.8%	745	14.3%	—	0.0%	429	8.3%	2,828	54.4%
Clearwater	1995	CW	1,051	464	44.1%	173	16.5%	88	8.4%	37	3.5%	762	72.5%
	1994	CW	761	308	40.5%	94	12.4%	81	10.6%	41	5.4%	524	68.9%
	1993	CW	298	134	45.0%	43	14.4%	25	8.4%	18	6.0%	220	73.8%
	1992	CU	1,461	502	34.4%	202	13.8%	—	0.0%	136	9.3%	840	57.5%
	1991	CU	3,943	1,483	37.6%	668	16.9%	—	0.0%	235	6.0%	2,386	60.5%
	1990	CU	4,242	1,359	32.0%	674	15.9%	—	0.0%	281	6.6%	2,314	54.6%
1989	CU	2,441	756	31.0%	452	18.5%	—	0.0%	140	5.7	1,348	55.2%	
Clearwater	1995	SH	867	602	69.4%	69	8.0%	56	6.5%	3	0.3%	730	84.2%
	1994	SH	1,250	729	58.3%	119	9.5%	30	2.4%	10	0.8%	888	71.0%
	1993	SH	1,102	813	73.8%	79	7.2%	24	2.2%	6	0.5%	922	83.7%
	1992	SH	1,567	823	52.5%	118	7.5%	—	0.0%	6	0.4%	947	60.4%
	1991	SH	1,215	926	76.2%	89	7.3%	—	0.0%	3	0.2%	1,018	83.8%
	1990	SH	1,228	880	71.7%	63	5.1%	—	0.0%	10	0.8%	953	77.6%
	1989	SH	290	173	59.7%	16	5.5%	—	0.0%	2	0.7%	191	65.9%
Clearwater	1995	SW	268	157	58.6%	40	14.9%	16	6.0%	1	0.4%	214	79.9%
	1994	SW	1,297	421	32.5%	150	11.6%	106	8.2%	24	1.9%	701	54.0%
	1993	SW	849	560	66.0%	106	12.5%	58	6.8%	9	1.1%	733	86.3%
	1992	SW	2,996	1,599	53.4%	477	15.9%	—	0.0%	113	3.8%	2,189	73.1%
	1991	SW	1,300	767	59.0%	126	9.7%	—	0.0%	22	1.7%	915	70.4%
	1990	SW	727	409	56.3%	102	14.0%	—	0.0%	28	3.9%	539	74.1%
	1989	SW	104	53	51.0%	16	15.4%	—	0.0%	3	2.9%	72	69.2%
Salmon	2006	CH	3,395	903	26.6%	834	24.6%	344	10.1%	141	4.2%	2,222	65.4%
	2005	CH	4,837	2,490	51.5%	821	17.0%	89	1.8%	56	1.2%	3,456	71.4%
	2004	CH	4,187	2,033	48.6%	641	15.3%	87	2.1%	67	1.6%	2,828	67.5%
	2003	CH	4,492	1,120	24.9%	576	12.8%	97	2.2%	365	8.1%	2,158	48.0%
	2002	CH	5,049	853	16.9%	818	16.2%	892	17.7%	5	0.1%	2,568	50.9%
	2001	CH	4,564	2,740	60.0%	519	11.4%	99	2.2%	37	0.8%	3,395	74.4%
	2000	CH	4,804	1,486	30.9%	708	14.7%	214	4.5%	230	4.8%	2,638	54.9%
	1999	CH	5,611	1,128	20.1%	1,551	27.6%	604	10.8%	240	4.3%	3,523	62.8%
	1998	CH	3,025	1,098	36.3%	565	18.7%	201	6.6%	87	2.9%	1,951	64.5%
	1997	CH	—	—	—	—	—	—	—	—	—	—	—
	1996	CH	2,554	618	24.2%	343	13.4%	258	10.1%	67	2.6%	1,286	50.4%
	1995	CH	5,074	1,777	35.0%	757	14.9%	531	10.5%	186	3.7%	3,251	64.1%
	1994	CH	3,633	870	23.9%	322	8.9%	258	7.1%	358	9.9%	1,808	49.8%
	1993	CH	3,138	1,144	36.5%	385	12.3%	233	7.4%	157	5.0%	1,919	61.2%
Salmon	2006	CW	5,611	1,707	30.4%	1,907	34.0%	611	10.9%	154	2.7%	4,379	78.0%
	2005	CW	9,478	6,195	65.4%	1,108	11.7%	87	0.9%	36	0.4%	7,426	78.3%
	2004	CW	7,291	3,334	45.7%	1,225	16.8%	331	4.5%	182	2.5%	5,072	69.6%
	2003	CW	9,242	3,130	33.9%	1,459	15.8%	276	3.0%	799	8.6%	5,664	61.3%
	2002	CW	5,467	1,082	19.8%	1,358	24.8%	773	14.1%	1	0.0%	3,214	58.8%

Table 13. Continued.

Site	Year	Species <sup>a</sup>	Number Interrogated / Site									Grand Total Ints	Total % Obs.
			No. Tagged	Ints at Lower Granite	% GRJ	Ints at Little Goose	% GOJ	Ints at Lower Monumental	% LMJ	Ints at McNary	% MCJ		
Salmon	2001	CW	1,899	1,385	72.9%	174	9.2%	18	0.9%	4	0.2%	1,581	83.3%
	2000	CW	2,069	654	31.6%	494	23.9%	163	7.9%	103	5.0%	1,414	68.3%
	1999	CW	3,628	833	23.0%	1,500	41.3%	421	11.6%	125	3.4%	2,879	79.4%
	1998	CW	1,416	657	46.4%	305	21.5%	105	7.4%	70	4.9%	1,137	80.3%
	1997	CW	—	—	—	—	—	—	—	—	—	—	—
	1996	CW	1,425	381	26.7%	289	20.3%	181	12.7%	31	2.2%	882	61.9%
	1995	CW	3,937	1,790	45.5%	689	17.5%	366	9.3%	122	3.1%	2,967	75.4%
	1994	CW	2,913	1,113	38.2%	287	9.9%	188	6.5%	202	6.9%	1,790	61.4%
	1993	CW	2,169	1,112	51.3%	286	13.2%	125	5.8%	91	4.2%	1,614	74.4%
Salmon	2006	SH	1,225	437	35.7%	367	30.0%	96	7.8%	12	1.0%	912	74.4%
	2005	SH	2,625	1,511	57.6%	541	20.6%	31	1.2%	6	0.2%	2,089	79.6%
	2004	SH	2,241	1,493	66.6%	261	11.6%	30	1.3%	9	0.4%	1,793	80.0%
	2003	SH	2,444	592	24.2%	442	18.1%	299	12.2%	58	2.4%	1,391	56.9%
	2002	SH	2,060	331	16.1%	272	13.2%	325	15.8%	1	0.0%	929	45.1%
	2001	SH	3,152	2,244	71.2%	81	2.6%	24	0.8%	2	0.1%	2,351	74.6%
	2000	SH	2,130	1,209	56.8%	153	7.2%	70	3.3%	21	1.0%	1,453	68.2%
	1999	SH	2,266	718	31.7%	614	27.1%	214	9.4%	32	1.4%	1,578	69.6%
	1998	SH	1,117	608	54.4%	158	14.2%	76	6.8%	7	0.6%	849	76.0%
	1997	SH	1,252	627	50.1%	213	17.0%	118	9.4%	1	0.1%	960	76.6%
	1996	SH	1,410	598	42.4%	205	14.5%	140	9.9%	24	1.7%	967	68.6%
	1995	SH	1,556	937	60.2%	190	12.2%	118	7.6%	14	0.9%	1,259	80.9%
	1994	SH	2,596	1,001	38.6%	164	6.3%	70	2.7%	36	1.4%	1,271	49.0%
	1993	SH	1,641	1,203	73.3%	112	6.8%	44	2.7%	13	0.8%	1,372	83.6%
Salmon	2006	SW	305	94	30.8%	113	37.0%	35	11.5%	2	0.7%	244	80.0%
	2005	SW	314	177	56.4%	72	22.9%	5	1.6%	1	0.3%	255	81.2%
	2004	SW	239	147	61.5%	39	16.3%	3	1.3%	0	0.0%	189	79.1%
	2003	SW	312	101	32.4%	45	14.4%	16	5.1%	12	3.8%	174	55.8%
	2002	SW	390	97	24.9%	71	18.2%	43	11.0%	0	0.0%	211	54.1%
	2001	SW	485	366	75.5%	19	3.9%	4	0.8%	5	1.0%	394	81.2%
	2000	SW	336	141	42.0%	56	16.7%	18	5.4%	5	1.5%	220	65.5%
	1999	SW	227	56	24.7%	75	33.0%	27	11.9%	5	2.2%	163	71.8%
	1998	SW	112	56	50.0%	13	11.6%	10	8.9%	1	0.9%	80	71.4%
	1997	SW	59	38	64.4%	6	10.2%	5	8.5%	0	0.0%	49	83.1%
	1996	SW	251	112	44.6%	49	19.5%	21	8.4%	1	0.4%	183	72.9%
	1995	SW	435	251	57.7%	59	13.6%	32	7.4%	1	0.2%	343	78.9%
	1994	SW	532	260	48.9%	44	8.3%	32	6.0%	10	1.9%	346	65.0%
1993	SW	902	575	63.7%	73	8.1%	36	4.0%	5	0.6%	689	76.4%	

<sup>c</sup> CH = Hatchery Chinook, CW = wild Chinook, CU = unknown Chinook, SH = hatchery steelhead, SW = wild steelhead.

<sup>d</sup> Bias may exist as only "quality" fish were tagged.

## SUMMARY

Hatchery spring/summer Chinook salmon releases above Lower Granite Dam for 2006 were 127% of the previous year's release. Hatchery fall Chinook salmon releases were 71% of the previous year. Hatchery steelhead trout releases were 104% of 2005 numbers. Hatchery sockeye releases were 61% of 2005 numbers. Hatchery coho releases were 84% of last year's. Hatchery production of spring/summer Chinook salmon in the Clearwater River drainage was 138%, the Snake River and non-Idaho tributaries 103%, and the Salmon River drainage 126% of 2005 production. Hatchery production of steelhead trout in the Clearwater River drainage was 109%, the Snake River and non-Idaho tributaries was 104%, and the Salmon River was 100% of last year's total. Hatchery production of Chinook salmon and steelhead trout released above Lower Granite Dam was 15,349,631 and 8,997,352, respectively, in 2006. Significant numbers of hatchery sockeye salmon (158,160) and hatchery coho salmon (698,522) were released for migration year 2006.

The Snake River trap was operated on the east side of the river from March 5 through May 17, 2006 and was out of operation for nine day during this period due to high flow and debris. The Snake River trap captured 16,230 age-1 hatchery and 2,764 wild Chinook salmon, 291 age-0 Chinook salmon of unknown rearing, 2,555 hatchery and 513 wild steelhead trout, 474 hatchery sockeye, 205 sockeye of unknown rearing, and 49 coho of unknown rearing.

The Salmon River trap was operated on the east side of the river from March 6 through May 17, 2005 and was out of operation for 10 days during this period due to mechanical problems or high flow and debris. The Salmon River trap captured 24,322 age-1 hatchery and 6,575 wild Chinook salmon, 1,632 hatchery and 338 wild steelhead trout, six hatchery sockeye salmon, and seven sockeye salmon of unknown rearing.

Significant migration rate flow relations were detected for hatchery steelhead, and wild steelhead released from the Snake River trap to Lower Granite Dam. Statistical analysis could not detect a significant relation between migration rate and flow for either hatchery or wild Chinook salmon due to a lack of data. The inability to detect a migration rate flow relation could be due to a lack of data over a wide enough range of 5-kcfs flow intervals.

Statistical analysis of the 2006 Salmon River trap data was unable to detect a significant relation between migration rate and Lower Granite Reservoir inflow for hatchery Chinook salmon, wild Chinook salmon, hatchery steelhead trout, and wild steelhead trout. The inability to detect a migration rate flow relation is probably due to relatively uniform flows throughout most of the spring outmigration. For each species and rearing group analyzed, 70% to 100% of the data is spread over just two to four consecutive Lower Granite Reservoir inflow intervals.

In all instances where the migration rate/discharge relation was significant, the same trend was seen; as discharge increased, migration rate increased.

The four-dam interrogation rates for 2006 must be compared with caution due to the addition of a new collection facility at Lower Monumental Dam in 1993 and the RSW at Lower Granite Dam in 2001. Since the installation and operation of the RSW at Lower Granite Dam, interrogation rates at Lower Granite Dam have decreased and interrogation rates at the three downstream collector dams on the Snake River have increased.

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## **APPENDICES**

Appendix A. Table 1. PIT-tagged hatchery Chinook salmon travel time with 95% confidence intervals from the Snake River Trap to Lower Granite Dam, 2006.

Release Date	Median Travel Time	Lower Confidence Interval <sup>a</sup>	Upper Confidence Interval <sup>a</sup>	Minimum Travel Time	Maximum Travel Time	Number Recaptured	Number Tagged	Percent Recaptured	Mean Discharge	Migration Rate (km/day)
03/29/06 <sup>b</sup>	15.95	0.00	0.00	11.57	20.32	2	8	25.00%	101.9	3.2
03/30/06 <sup>b</sup>	11.26	0.00	0.00	3.44	19.07	2	10	20.00%	96.1	4.6
04/01/06 <sup>b</sup>	32.19	0.00	0.00	30.38	33.99	2	6	33.33%	124.1	1.6
04/02/06 <sup>b</sup>	15.62	0.00	0.00	6.80	39.73	4	11	36.36%	120.9	3.3
04/03/06 <sup>b</sup>	4.48	0.00	0.00	4.48	4.48	1	6	16.67%	97.8	11.5
04/04/06 <sup>b</sup>	20.58	0.00	0.00	2.97	27.65	3	20	15.00%	127.4	2.5
04/05/06	17.19	2.82	35.23	2.80	35.23	15	63	23.81%	130.3	3.0
04/06/06	6.60	20.65	21.18	1.32	32.40	63	298	21.14%	128.0	7.8
04/07/06	10.54	17.91	24.38	1.66	34.76	37	163	22.70%	135.9	4.9
04/08/06	16.66	14.97	15.02	6.37	27.53	19	81	23.46%	132.5	3.1
04/09/06	19.44	27.21	27.45	3.04	29.12	19	107	17.76%	131.9	2.7
04/10/06	11.39	20.96	5.43	2.97	26.31	20	97	20.62%	135.6	4.5
04/13/06	7.43	6.18	5.47	1.35	26.62	79	329	24.01%	140.6	6.9
04/14/06	8.79	21.00	13.26	3.03	28.33	37	155	23.87%	135.0	5.9
04/15/06	7.83	9.67	7.73	1.50	24.59	100	368	27.17%	135.2	6.6
04/20/06	6.15	4.28	5.66	1.72	18.28	106	396	26.77%	126.0	8.4
04/21/06	6.49	4.31	3.29	2.58	19.40	55	150	36.67%	125.2	7.9
04/22/06	5.45	2.45	6.66	2.07	10.63	46	158	29.11%	126.2	9.5
04/23/06	6.45	7.20	11.42	1.58	21.61	50	120	41.67%	128.0	8.0
04/24/06	5.28	12.51	5.46	1.78	13.08	39	131	29.77%	129.4	9.8
04/25/06	5.03	4.74	2.36	2.31	18.44	58	149	38.93%	130.5	10.2
04/26/06	5.58	7.92	5.98	2.57	12.01	30	101	29.70%	135.0	9.3
04/27/06	4.30	4.97	2.24	2.24	8.44	33	100	33.00%	134.4	12.0
04/30/06	5.22	5.22	7.72	1.53	13.60	93	296	31.42%	135.9	9.9
05/01/06	3.98	5.14	6.16	1.63	11.91	95	295	32.20%	135.3	13.0
05/07/06	3.50	3.83	3.50	1.58	7.76	39	103	37.86%	114.0	14.7
05/08/06	4.09	3.04	4.55	2.26	8.05	28	97	28.87%	109.6	12.6
05/09/06	3.21	3.42	3.57	1.92	5.34	37	101	36.63%	106.0	16.1
05/10/06	3.75	2.83	4.69	2.39	6.08	26	100	26.00%	103.1	13.8
05/11/06	3.65	3.75	3.65	2.39	5.48	25	95	26.32%	103.6	14.1
05/12/06	2.97	2.56	2.65	1.80	6.37	23	99	23.23%	104.2	17.4
05/14/06	1.86	1.84	1.50	1.45	3.76	23	108	21.30%	114.0	27.7
05/15/06	1.58	1.99	1.49	1.32	3.07	31	124	25.00%	128.5	32.7
05/16/06	1.61	2.37	1.48	1.13	2.83	51	236	21.61%	147.1	32.0
05/17/06	1.71	2.42	2.60	1.11	3.38	58	319	18.18%	163.4	30.2
<b>Totals</b>				<b>1.11</b>	<b>35.23</b>	<b>1335</b>	<b>4939</b>	<b>27.03%</b>		

- a. Confidence intervals calculated with nonparametric statistics.  
b. Not used in statistical analysis because analysis showed too few recaptures.

Appendix A. Table 2. PIT-tagged wild Chinook salmon travel time with 95% confidence intervals from the Snake River Trap to Lower Granite Dam, 2006.

Release Date	Median Travel Time	Lower Confidence Interval <sup>a</sup>	Upper Confidence Interval <sup>a</sup>	Minimum Travel Time	Maximum Travel Time	Number Recaptured	Number Tagged	Percent Recaptured	Mean Discharge	Migration Rate (km/day)
03/29/06 <sup>b</sup>	8.04	0.00	0.00	6.56	6.56	4	3	133.33%	77.2	6.4
03/30/06 <sup>b</sup>	5.98	0.00	0.00	5.56	15.67	2	16	12.50%	73.1	8.6
03/31/06 <sup>b</sup>	5.61	0.00	0.00	2.80	9.16	3	10	30.00%	80.3	9.2
04/01/06 <sup>b</sup>	11.48	0.00	0.00	3.62	34.87	2	3	66.67%	106.1	4.5
04/02/06 <sup>b</sup>	11.64	0.00	0.00	9.39	13.57	4	8	50.00%	112.6	4.4
04/04/06	5.52	22.02	8.52	4.94	21.73	6	19	31.58%	115.1	9.4
04/05/06	7.53	32.03	12.77	2.56	22.02	8	29	27.59%	124.0	6.9
04/06/06	4.02	1.78	14.80	2.73	32.03	7	43	16.28%	128.4	12.8
04/07/06	5.58	7.18	11.62	1.78	14.87	7	23	30.43%	129.3	9.3
04/08/06	6.10	6.10	6.15	1.88	11.62	11	17	64.71%	128.9	8.5
04/09/06	9.58	16.48	4.40	3.58	15.40	16	66	24.24%	127.8	5.4
04/10/06	4.88	2.19	3.75	4.40	20.28	17	47	36.17%	131.2	10.6
04/13/06	5.31	3.53	7.94	1.83	19.40	11	74	14.86%	142.1	9.7
04/14/06	4.77	3.17	4.04	2.28	10.45	16	41	39.02%	144.1	10.8
04/15/06	5.38	5.38	2.32	1.77	22.93	17	62	27.42%	144.2	9.6
04/20/06	5.50	7.72	4.29	2.32	11.68	32	73	43.84%	126.0	9.4
04/21/06	5.40	9.11	7.56	2.46	10.74	43	111	38.74%	124.9	9.6
04/22/06	4.82	6.79	3.39	1.84	19.80	35	110	31.82%	126.2	10.7
04/23/06	4.23	4.26	3.52	1.87	9.94	36	116	31.03%	128.8	12.2
04/24/06	4.13	2.41	18.26	2.09	8.45	51	81	62.96%	129.8	12.5
04/25/06	3.82	3.72	7.70	1.89	18.26	98	133	73.68%	128.7	13.5
04/26/06	4.11	3.05	2.52	1.81	11.47	103	316	32.59%	130.0	12.6
04/27/06	3.95	3.73	5.33	1.70	15.00	35	331	10.57%	134.4	13.1
04/28/06	3.59	8.57	8.14	1.58	13.84	21	125	16.80%	137.2	14.4
04/29/06	4.59	4.65	4.48	2.05	8.79	47	69	68.12%	137.2	11.2
04/30/06	3.53	2.75	1.73	1.76	11.78	22	134	16.42%	139.2	14.6
05/01/06	3.53	3.40	2.01	1.49	13.26	21	54	38.89%	135.3	14.6
05/05/06	3.43	2.86	2.32	2.01	12.74	18	33	54.55%	120.9	15.0
05/06/06	3.76	2.20	1.76	1.75	6.04	10	40	25.00%	117.4	13.7
05/07/06	3.13	3.55	2.50	1.76	7.59	8	27	29.63%	117.1	16.5
05/08/06	3.71	5.46	3.31	2.50	5.65	13	18	72.22%	109.6	13.9
05/09/06	2.74	4.72	2.79	2.24	8.25	13	32	40.63%	106.0	18.8
05/10/06	3.72	5.43	5.18	2.10	5.02	8	45	17.78%	103.1	13.9
05/11/06	3.38	1.80	3.40	2.04	5.45	11	19	57.89%	102.3	15.3
05/12/06 <sup>b</sup>	2.83	0.00	0.00	1.80	4.37	3	32	9.38%	104.2	18.3
05/13/06	2.17	2.85	3.64	2.81	3.07	6	19	31.58%	105.7	23.7
05/14/06	2.27	1.55	2.55	1.61	3.64	8	26	30.77%	114.0	22.7
05/15/06	1.81	3.34	3.44	1.44	2.64	18	29	62.07%	128.5	28.4
05/16/06	1.72	1.63	1.86	1.45	5.16	26	78	33.33%	147.1	29.9
05/17/06 <sup>b</sup>	4.40	0.00	0.00	1.39	2.86	1	138	0.72%	173.5	11.7
<b>Totals</b>				<b>1.44</b>	<b>2.64</b>	<b>6.00</b>	<b>2440</b>	<b>0.25%</b>		

<sup>a</sup> Confidence intervals calculated with nonparametric statistics.

<sup>b</sup> Not used in statistical analysis because analysis showed too few recaptures.

Appendix A. Table 3. PIT-tagged hatchery steelhead trout travel time with 95% confidence intervals from the Snake River Trap to Lower Granite Dam, 2006.

Release Date	Median Travel Time	Lower Confidence Interval <sup>a</sup>	Upper Confidence Interval <sup>a</sup>	Minimum Travel Time	Maximum Travel Time	Number Recaptured	Number Tagged	Percent Recaptured	Mean Discharge	Migration Rate (km/day)
03/28/06 <sup>b</sup>	11.15	0.00	0.00	7.35	14.95	2	3	66.67%	85.2	4.6
03/29/06 <sup>b</sup>	4.19	0.00	0.00	3.03	11.45	5	6	83.33%	68.4	12.3
03/30/06 <sup>b</sup>	3.66	0.00	0.00	2.65	6.22	4	5	80.00%	69.7	14.1
03/31/06 <sup>b</sup>	3.96	0.00	0.00	3.96	3.96	1	6	16.67%	70.3	13.0
04/02/06 <sup>b</sup>	2.85	0.00	0.00	2.85	2.85	1	3	33.33%	76.7	18.1
04/03/06 <sup>b</sup>	2.42	0.00	0.00	2.42	2.42	1	5	20.00%	78.1	21.3
04/04/06 <sup>b</sup>	2.54	0.00	0.00	1.76	23.47	5	6	83.33%	104.5	20.3
04/05/06 <sup>b</sup>	2.49	0.00	0.00	1.50	3.57	5	11	45.45%	115.5	20.7
04/06/06 <sup>b</sup>	2.26	0.00	0.00	2.26	2.26	1	10	10.00%	128.3	22.8
04/07/06	1.43	1.20	1.49	1.20	2.08	6	10	60.00%	133.1	36.0
04/08/06 <sup>b</sup>	3.32	0.00	0.00	3.32	3.32	1	5	20.00%	128.8	15.5
04/09/06 <sup>b</sup>	1.40	0.00	0.00	1.33	2.22	3	7	42.86%	128.5	36.8
04/10/06 <sup>b</sup>	13.88	0.00	0.00	1.20	19.60	3	9	33.33%	132.8	3.7
04/13/06	1.62	4.12	1.70	1.18	9.98	10	20	50.00%	134.7	31.9
04/14/06	1.51	1.77	1.78	1.36	7.48	7	30	23.33%	143.0	34.1
04/15/06	1.28	1.38	1.12	1.05	4.53	14	35	40.00%	148.2	40.4
04/20/06	1.80	1.73	1.79	1.05	11.17	13	30	43.33%	121.7	28.7
04/21/06	1.93	3.51	1.33	1.23	15.51	26	51	50.98%	117.4	26.8
04/22/06	1.74	22.56	1.52	1.32	22.56	22	44	50.00%	121.9	29.6
04/23/06	1.68	1.55	1.36	1.10	24.30	26	60	43.33%	128.4	30.7
04/24/06	1.62	2.26	2.33	1.13	19.54	48	127	37.80%	132.4	31.8
04/25/06	1.39	14.03	1.21	1.07	23.35	62	126	49.21%	132.4	37.2
04/26/06	1.35	1.25	2.95	0.96	8.31	61	150	40.67%	129.4	38.3
04/27/06	1.86	1.59	5.42	1.17	12.62	31	75	41.33%	126.3	27.8
04/28/06	1.51	2.30	1.64	1.23	9.24	28	58	48.28%	130.4	34.1
04/30/06	1.30	1.63	1.63	0.89	10.79	26	88	29.55%	146.4	39.7
05/01/06	1.33	1.64	2.15	0.84	10.34	34	113	30.09%	147.6	38.8
05/05/06	1.70	1.35	3.87	1.33	9.79	13	25	52.00%	119.8	30.3
05/06/06	1.52	1.98	1.42	1.10	3.43	11	31	35.48%	121.3	34.0
05/07/06	1.62	1.47	1.62	1.19	6.74	13	38	34.21%	120.6	31.9
05/08/06	1.50	1.60	2.12	1.20	19.68	29	98	29.59%	115.7	34.4
05/09/06	1.67	1.37	4.90	1.29	26.98	72	174	41.38%	108.1	30.9
05/10/06	1.79	1.41	1.57	1.34	20.20	18	45	40.00%	102.5	28.8
05/11/06	1.65	1.48	1.34	1.33	14.55	19	44	43.18%	100.7	31.2
05/12/06	1.68	1.67	1.50	1.40	6.49	20	39	51.28%	102.6	30.8
05/13/06	1.66	1.85	1.88	1.42	5.52	18	40	45.00%	105.7	31.1
05/14/06	1.66	2.29	2.60	1.44	4.00	15	32	46.88%	114.0	31.1
05/15/06	1.61	1.64	1.39	1.22	8.12	25	64	39.06%	128.5	32.0
05/16/06	1.54	1.59	1.67	0.92	7.98	12	118	10.17%	147.1	33.5
05/17/06	1.35	1.85	1.27	1.01	10.90	37	308	12.01%	157.6	38.3
<b>Totals</b>				<b>0.84</b>	<b>26.98</b>	<b>716</b>	<b>2073</b>	<b>34.54%</b>		

<sup>a</sup> Confidence intervals calculated with nonparametric statistics.

<sup>b</sup> Not used in statistical analysis because analysis showed too few recaptures.

Appendix A. Table 4. PIT-tagged wild steelhead trout travel time with 95% confidence intervals from the Snake River Trap to Lower Granite Dam, 2006.

Release Date	Median Travel Time	Lower Confidence Interval <sup>a</sup>	Upper Confidence Interval <sup>a</sup>	Minimum Travel Time	Maximum Travel Time	Number Recaptured	Number Tagged	Percent Recaptured	Mean Discharge	Migration Rate (km/day)
03/31/06 <sup>b</sup>	2.31	0.00	0.00	2.31	2.31	1	2	50.00%	69.7	22.4
04/06/06 <sup>b</sup>	2.25	0.00	0.00	1.50	3.01	2	8	25.00%	128.3	22.9
04/08/06 <sup>b</sup>	1.39	0.00	0.00	1.38	2.34	3	4	75.00%	129.8	37.0
04/09/06 <sup>b</sup>	1.61	0.00	0.00	1.61	1.61	1	4	25.00%	128.2	32.0
04/10/06 <sup>b</sup>	1.47	0.00	0.00	1.28	1.67	2	7	28.57%	127.7	35.0
04/13/06 <sup>b</sup>	1.77	0.00	0.00	1.58	3.26	3	10	30.00%	134.7	29.2
04/15/06 <sup>b</sup>	1.08	0.00	0.00	1.04	1.61	5	17	29.41%	148.2	47.9
04/20/06 <sup>b</sup>	1.98	0.00	0.00	1.57	2.39	2	8	25.00%	121.7	26.1
04/21/06	1.54	1.41	1.59	1.34	5.16	8	13	61.54%	117.4	33.5
04/22/06 <sup>b</sup>	4.47	0.00	0.00	1.59	9.30	3	15	20.00%	126.1	11.5
04/23/06 <sup>b</sup>	1.57	0.00	0.00	1.41	1.59	3	15	20.00%	128.4	32.8
04/24/06	1.43	1.44	1.08	1.08	1.86	6	17	35.29%	132.7	36.0
04/25/06	1.36	1.33	1.32	1.24	1.92	18	25	72.00%	132.4	38.1
04/26/06	1.46	1.46	7.14	1.18	7.14	10	39	25.64%	129.4	35.4
04/27/06	1.43	1.41	1.38	1.26	2.06	11	16	68.75%	125.9	36.2
04/28/06	1.40	1.57	1.85	1.17	1.85	8	11	72.73%	126.1	36.9
04/29/06	1.24	1.26	1.36	1.10	1.36	6	22	27.27%	133.2	41.5
04/30/06 <sup>b</sup>	1.17	0.00	0.00	1.01	3.76	5	24	20.83%	146.4	44.1
05/01/06	1.15	1.28	0.91	0.91	4.51	6	31	19.35%	147.6	44.9
05/05/06 <sup>b</sup>	1.44	0.00	0.00	1.15	1.73	2	5	40.00%	119.1	35.8
05/08/06	1.59	1.60	2.31	1.27	2.35	6	13	46.15%	115.7	32.5
05/09/06	1.71	1.82	1.59	1.36	3.17	7	21	33.33%	108.1	30.2
05/10/06 <sup>b</sup>	1.54	0.00	0.00	1.49	1.60	3	6	50.00%	102.5	33.6
05/11/06 <sup>b</sup>	2.52	0.00	0.00	2.52	2.52	1	11	9.09%	102.3	20.5
05/12/06 <sup>b</sup>	1.54	0.00	0.00	1.48	2.83	5	7	71.43%	102.6	33.5
05/13/06 <sup>b</sup>	1.54	0.00	0.00	1.42	1.66	4	7	57.14%	105.7	33.4
05/15/06	1.44	1.56	1.44	1.40	2.09	6	22	27.27%	117.6	35.8
05/16/06 <sup>b</sup>	1.26	0.00	0.00	1.10	1.60	5	34	14.71%	138.3	40.9
05/17/06	1.28	1.36	1.34	0.97	1.37	10	55	18.18%	157.6	40.4
<b>Totals</b>				<b>0.91</b>	<b>4.51</b>	<b>58</b>	<b>226</b>	<b>25.66%</b>		

<sup>a</sup> Confidence intervals calculated with nonparametric statistics.

<sup>b</sup> Not used in statistical analysis because analysis showed too few recaptures.

Appendix A. Table 5. PIT-tagged hatchery Chinook salmon travel time with 95% confidence intervals from the Salmon River Trap to Lower Granite Dam, 2006.

Release Date	Median Travel Time	Lower Confidence Interval <sup>a</sup>	Upper Confidence Interval <sup>a</sup>	Minimum Travel Time	Maximum Travel Time	Number Recaptured	Number Tagged	Percent Recaptured	Mean Discharge	Migration Rate (km/day)
03/20/06 <sup>b</sup>	40.29	0.00	0.00	34.29	47.20	5	28	17.86%	101.983	5.8
03/22/06 <sup>b</sup>	30.34	0.00	0.00	30.34	30.34	1	2	50.00%	99.281	7.7
03/23/06 <sup>b</sup>	38.17	0.00	0.00	38.17	38.17	1	1	100.00%	107.215	6.1
03/26/06 <sup>b</sup>	34.93	0.00	0.00	34.58	42.61	3	21	14.29%	112.342	6.7
03/27/06	36.55	31.70	39.50	23.45	41.25	9	40	22.50%	116.218	6.4
03/28/06	33.67	23.52	35.53	17.72	40.10	11	39	28.21%	116.566	6.9
03/29/06	36.24	22.72	43.40	22.72	43.40	8	27	29.63%	119.519	6.4
03/30/06 <sup>b</sup>	28.22	0.00	0.00	20.43	32.50	4	22	18.18%	117.576	8.3
03/31/06	34.82	24.60	39.33	24.60	39.33	6	30	20.00%	122.478	6.7
04/01/06	25.26	17.54	30.22	8.00	47.35	16	66	24.24%	121.054	9.2
04/02/06	31.94	27.80	35.34	9.51	38.46	22	89	24.72%	125.836	7.3
04/03/06	29.62	22.55	31.74	21.78	41.19	12	46	26.09%	127.497	7.9
04/04/06	26.36	23.22	31.61	4.30	42.44	36	135	26.67%	127.870	8.9
04/05/06	26.08	22.75	29.45	12.52	42.03	22	116	18.97%	130.915	9.0
04/06/06	26.63	24.41	30.76	15.12	36.73	32	119	26.89%	132.786	8.8
04/07/06	25.42	22.29	31.10	14.68	39.17	27	95	28.42%	133.285	9.2
04/10/06	19.58	12.95	24.25	8.60	36.78	23	89	25.84%	132.138	11.9
04/11/06	20.80	18.99	22.81	5.97	36.31	52	157	33.12%	133.736	11.2
04/12/06	17.51	14.48	20.22	6.29	37.84	37	131	28.24%	132.605	13.3
04/13/06	14.63	11.51	20.80	3.51	27.59	32	126	25.40%	132.856	16.0
04/14/06	15.57	12.88	18.08	5.03	32.31	33	97	34.02%	133.229	15.0
04/19/06	15.88	12.72	19.09	5.42	28.74	40	155	25.81%	130.365	14.7
04/20/06	16.77	15.40	17.42	3.91	27.57	71	253	28.06%	128.694	13.9
04/21/06	13.56	9.52	15.37	4.18	26.78	66	192	34.38%	129.587	17.2
04/25/06	12.56	11.90	13.88	4.36	22.55	98	312	31.41%	130.236	18.6
04/26/06	11.73	10.55	14.02	5.45	21.34	51	180	28.33%	130.031	19.9
04/27/06	13.52	10.23	16.84	6.52	22.45	33	110	30.00%	125.527	17.3
04/30/06	9.61	8.55	12.47	4.80	16.09	30	147	20.41%	127.491	24.3
05/05/06	10.16	7.80	11.54	6.96	14.62	20	73	27.40%	111.327	23.0
05/06/06 <sup>b</sup>	7.90	0.00	0.00	6.16	13.95	5	33	15.15%	110.490	29.6
05/07/06	6.99	2.40	10.57	2.40	10.57	7	34	20.59%	109.600	33.4
05/08/06	4.59	3.47	5.92	2.72	8.50	33	132	25.00%	108.217	50.9
05/09/06	7.41	6.21	7.70	5.85	9.36	13	96	13.54%	108.388	31.5
05/10/06	7.42	5.63	10.49	5.63	10.49	8	37	21.62%	112.650	31.5
05/11/06	5.13	4.31	6.58	4.31	6.58	8	26	30.77%	107.383	45.5
05/12/06	5.05	3.64	6.51	3.64	6.51	8	33	24.24%	115.533	46.2
05/13/06 <sup>b</sup>	4.21	0.00	0.00	3.79	4.64	2	22	9.09%	118.720	55.4
05/14/06	3.97	3.63	4.49	2.54	5.98	18	86	20.93%	131.440	58.8
<b>Totals</b>				<b>2.40</b>	<b>47.35</b>	<b>882</b>	<b>3268</b>	<b>26.99%</b>		

<sup>a</sup> Confidence intervals calculated with nonparametric statistics.

<sup>b</sup> Not used in statistical analysis because analysis showed too few recaptures.

Appendix A. Table 6. PIT-tagged wild Chinook salmon travel time with 95% confidence intervals from the Salmon River Trap to Lower Granite Dam, 2006.

Release Date	Median Travel Time	Lower Confidence Interval <sup>a</sup>	Upper Confidence Interval <sup>a</sup>	Minimum Travel Time	Maximum Travel Time	Number Recaptured	Number Tagged	Percent Recaptured	Mean Discharge	Migration Rate (km/day)
03/06/06 <sup>b</sup>	35.25	0.00	0.00	35.25	35.25	1	3	33.33%	65.683	6.6
03/28/06 <sup>b</sup>	23.75	0.00	0.00	23.75	23.75	1	2	50.00%	111.108	9.8
03/31/06 <sup>b</sup>	28.10	0.00	0.00	20.51	35.23	5	14	35.71%	119.528	8.3
04/01/06	23.12	13.43	36.55	7.31	42.85	13	39	33.33%	120.113	10.1
04/02/06	21.63	18.46	24.71	5.16	45.62	64	226	28.32%	122.304	10.8
04/03/06	21.64	10.88	28.58	6.23	43.12	14	69	20.29%	124.943	10.8
04/04/06	21.12	16.91	24.51	6.12	42.96	34	94	36.17%	127.395	11.1
04/05/06	21.15	18.37	22.10	3.37	43.28	190	695	27.34%	130.132	11.0
04/06/06	20.56	18.43	22.32	3.75	47.37	116	409	28.36%	131.727	11.4
04/07/06	16.62	15.65	19.36	4.16	42.11	150	496	30.24%	132.644	14.1
04/08/06	15.28	13.37	16.28	4.15	40.41	207	672	30.80%	132.463	15.3
04/09/06	18.38	15.21	19.49	5.05	39.00	121	403	30.02%	132.263	12.7
04/10/06	17.23	16.09	18.28	4.62	37.82	142	437	32.49%	132.433	13.6
04/11/06	16.05	13.77	18.05	5.81	37.09	87	245	35.51%	132.706	14.6
04/12/06	15.00	12.54	16.27	4.44	44.23	81	274	29.56%	133.025	15.6
04/13/06	10.78	9.67	14.34	3.25	42.43	55	153	35.95%	134.108	21.7
04/14/06	11.86	9.93	13.17	3.29	35.65	100	309	32.36%	134.377	19.7
04/15/06	11.86	9.71	15.09	4.37	39.46	57	188	30.32%	133.938	19.7
04/19/06	10.82	9.70	12.38	3.91	29.55	45	144	31.25%	128.300	21.6
04/20/06	9.87	8.49	10.59	4.70	27.40	53	159	33.33%	127.291	23.7
04/21/06	9.07	8.24	12.35	4.78	27.40	37	95	38.95%	126.720	25.8
04/25/06	8.14	7.08	12.00	3.91	24.47	44	151	29.14%	134.622	28.7
04/26/06	8.62	6.42	13.07	5.04	23.35	13	44	29.55%	132.640	27.1
04/27/06	9.79	5.93	17.86	5.67	22.85	10	37	27.03%	130.391	23.9
04/28/06	9.29	8.25	9.79	3.49	21.46	43	155	27.74%	130.740	25.1
04/29/06	8.65	7.43	15.47	7.43	15.47	8	24	33.33%	130.690	27.0
04/30/06 <sup>b</sup>	8.16	0.00	0.00	3.36	16.50	5	17	29.41%	131.067	28.6
05/06/06 <sup>b</sup>	6.52	0.00	0.00	5.74	7.31	2	4	50.00%	111.125	35.8
05/07/06 <sup>b</sup>	8.23	0.00	0.00	8.23	8.23	1	6	16.67%	109.600	28.4
05/11/06 <sup>b</sup>	5.59	0.00	0.00	5.25	6.72	3	6	50.00%	113.529	41.8
05/12/06 <sup>b</sup>	4.98	0.00	0.00	4.48	5.48	2	5	40.00%	115.533	46.9
05/14/06 <sup>b</sup>	3.51	0.00	0.00	3.25	3.78	3	14	21.43%	131.440	66.5
<b>Totals</b>				<b>3.25</b>	<b>47.37</b>	<b>1684</b>	<b>5518</b>	<b>30.52%</b>		

<sup>a</sup> Confidence intervals calculated with nonparametric statistics.

<sup>b</sup> Not used in statistical analysis because analysis showed too few recaptures.

Appendix A. Table 7. PIT-tagged hatchery steelhead trout travel time with 95% confidence intervals from the Salmon River Trap to Lower Granite Dam, 2006.

Release Date	Median Travel Time	Lower Confidence Interval <sup>a</sup>	Upper Confidence Interval <sup>a</sup>	Minimum Travel Time	Maximum Travel Time	Number Recaptured	Number Tagged	Percent Recaptured	Mean Discharge	Migration Rate (km/day)
04/04/06 <sup>b</sup>	21.61	0.00	0.00	4.16	39.06	2	5	40.00%	127.6	10.8
04/05/06 <sup>b</sup>	11.85	0.00	0.00	2.58	21.12	2	6	33.33%	130.4	19.7
04/06/06 <sup>b</sup>	5.02	0.00	0.00	5.02	5.02	1	1	100.00%	128.3	46.6
04/08/06 <sup>b</sup>	19.06	0.00	0.00	19.06	19.06	1	3	33.33%	132.2	12.3
04/12/06 <sup>b</sup>	8.75	0.00	0.00	6.52	19.12	3	8	37.50%	137.1	26.7
04/13/06 <sup>b</sup>	11.39	0.00	0.00	2.93	19.85	2	5	40.00%	134.1	20.5
04/14/06	14.76	2.78	19.34	2.78	19.34	7	17	41.18%	132.9	15.8
04/15/06 <sup>b</sup>	16.01	0.00	0.00	16.01	16.01	1	6	16.67%	134.5	14.6
04/19/06	3.10	2.57	6.33	2.31	12.57	12	27	44.44%	126.2	75.4
04/20/06	5.77	3.52	10.67	2.23	15.63	13	30	43.33%	126.0	40.5
04/21/06 <sup>b</sup>	7.88	0.00	0.00	6.41	19.00	4	15	26.67%	125.4	29.6
04/25/06	5.66	4.32	6.46	1.93	23.38	64	202	31.68%	133.8	41.3
04/26/06	4.26	3.73	5.40	2.19	22.34	65	156	41.67%	130.0	54.8
04/27/06	4.78	3.38	5.70	2.62	29.93	37	92	40.22%	135.5	48.9
04/28/06	3.85	3.52	5.18	2.07	19.10	31	116	26.72%	137.2	60.7
04/29/06	3.53	2.47	5.64	1.79	17.62	24	54	44.44%	139.0	66.2
04/30/06	3.03	2.76	5.23	1.80	14.56	20	57	35.09%	142.0	77.2
05/05/06	9.13	3.34	12.71	2.38	14.78	17	41	41.46%	111.6	25.6
05/06/06	3.58	2.48	11.90	2.08	12.73	11	41	26.83%	117.4	65.2
05/07/06	2.78	2.23	8.62	1.84	19.32	10	34	29.41%	117.1	84.0
05/08/06	3.40	1.91	6.54	1.88	7.98	11	44	25.00%	112.2	68.6
05/09/06	4.54	2.95	8.58	2.43	23.13	23	55	41.82%	105.3	51.5
05/10/06	6.15	3.27	7.35	2.31	15.14	26	58	44.83%	107.3	38.0
05/11/06	5.04	3.67	7.18	2.73	19.13	20	44	45.45%	107.4	46.4
05/12/06	5.70	3.05	8.32	2.25	16.01	16	39	41.03%	122.6	41.0
05/13/06	3.74	2.47	12.40	2.47	12.40	7	34	20.59%	118.7	62.4
05/14/06	4.13	2.54	12.26	2.54	12.26	7	26	26.92%	131.4	56.6
<b>Totals</b>				<b>1.79</b>	<b>29.93</b>	<b>421</b>	<b>1167</b>	<b>36.08%</b>		

<sup>a</sup> Confidence intervals calculated with nonparametric statistics.

<sup>b</sup> Not used in statistical analysis because analysis showed too few recaptures.

Appendix A. Table 8. PIT-tagged wild steelhead trout travel time with 95% confidence intervals from the Salmon River Trap to Lower Granite Dam, 2006.

Release Date	Median Travel Time	Lower Confidence Interval <sup>a</sup>	Upper Confidence Interval <sup>a</sup>	Minimum Travel Time	Maximum Travel Time	Number Recaptured	Number Tagged	Percent Recaptured	Mean Discharge	Migration Rate (km/day)
04/05/06 <sup>b</sup>	3.70	0.00	0.00	3.70	3.70	1	6	16.67%	121.2	63.1
04/06/06 <sup>b</sup>	9.87	0.00	0.00	9.87	9.87	1	3	33.33%	132.1	23.7
04/08/06 <sup>b</sup>	7.58	0.00	0.00	3.45	12.75	4	19	21.05%	133.2	30.8
04/09/06 <sup>b</sup>	7.04	0.00	0.00	7.04	7.04	1	3	33.33%	133.5	33.2
04/10/06 <sup>b</sup>	3.85	0.00	0.00	3.15	16.06	4	10	40.00%	128.5	60.7
04/11/06 <sup>b</sup>	3.94	0.00	0.00	2.95	5.29	3	10	30.00%	131.8	59.2
04/13/06 <sup>b</sup>	3.42	0.00	0.00	3.42	3.42	1	4	25.00%	139.0	68.2
04/14/06 <sup>b</sup>	5.50	0.00	0.00	5.50	5.50	1	7	14.29%	144.1	42.5
04/15/06 <sup>b</sup>	16.29	0.00	0.00	16.29	16.29	1	5	20.00%	134.5	14.3
04/19/06 <sup>b</sup>	3.34	0.00	0.00	3.02	9.18	4	15	26.67%	126.2	70.0
04/20/06	4.47	2.31	8.04	2.31	8.04	6	16	37.50%	123.5	52.3
04/21/06 <sup>b</sup>	3.17	0.00	0.00	2.94	3.40	2	5	40.00%	121.1	73.6
04/25/06 <sup>b</sup>	3.60	2.64	5.16	1.98	16.07	22	63	34.92%	128.7	64.9
04/26/06 <sup>b</sup>	8.08	0.00	0.00	2.59	25.88	5	15	33.33%	134.1	28.9
04/27/06	3.37	2.54	5.63	2.54	5.63	7	16	43.75%	129.5	69.4
04/28/06	3.02	2.49	8.34	2.49	8.34	8	25	32.00%	136.2	77.4
04/29/06 <sup>b</sup>	2.97	0.00	0.00	2.59	3.36	2	9	22.22%	140.4	78.5
04/30/06 <sup>b</sup>	3.37	0.00	0.00	2.12	6.56	3	7	42.86%	142.0	69.4
05/05/06 <sup>b</sup>	4.55	0.00	0.00	3.59	5.51	2	3	66.67%	117.8	51.3
05/06/06 <sup>b</sup>	6.51	0.00	0.00	5.28	7.75	2	6	33.33%	111.1	35.9
05/07/06 <sup>b</sup>	4.09	0.00	0.00	4.09	4.09	1	6	16.67%	114.0	57.1
05/08/06 <sup>b</sup>	4.65	0.00	0.00	4.65	4.65	1	6	16.67%	108.2	50.2
05/09/06 <sup>b</sup>	2.99	0.00	0.00	2.54	5.10	4	14	28.57%	106.0	78.2
05/10/06 <sup>b</sup>	7.37	0.00	0.00	5.59	9.14	2	7	28.57%	112.7	31.7
05/12/06 <sup>b</sup>	3.64	0.00	0.00	3.45	3.83	2	7	28.57%	108.6	64.2
05/13/06 <sup>b</sup>	2.48	0.00	0.00	2.48	2.48	1	4	25.00%	105.7	94.3
05/14/06 <sup>b</sup>	3.54	0.00	0.00	2.52	5.74	3	10	30.00%	131.4	66.0
<b>Totals</b>				<b>1.98</b>	<b>16.07</b>	<b>43</b>	<b>120</b>	<b>35.83%</b>		

<sup>a</sup> Confidence intervals calculated with nonparametric statistics.

<sup>b</sup> Not used in statistical analysis because analysis showed too few recaptures.

Appendix B. Table 1. PIT-tagged hatchery Chinook salmon interrogations at Lower Granite (GRJ), Little Goose (GOJ), Lower Monumental (LMJ), and McNary (MCJ) dams from the Snake River Trap, 2006.

Date	Number Released	Ints GRJ	% GRJ	Ints GOJ	% GOJ	Ints LMJ	% LMJ	Ints MCJ	% MCJ	Grand Total Ints	Total % Obs.
03/28/06	4	0	0.00%		0.00%	1	25.00%	1	25.00%	2	50.00%
03/29/06	8	2	25.00%	1	12.50%	2	25.00%	1	12.50%	6	75.00%
03/30/06	10	2	20.00%	1	10.00%		0.00%		0.00%	3	30.00%
03/31/06	4	0	0.00%	1	25.00%	1	25.00%	1	25.00%	3	75.00%
04/01/06	6	2	33.33%		0.00%	1	16.67%	2	33.33%	5	83.33%
04/02/06	11	4	36.36%	3	27.27%	1	9.09%		0.00%	8	72.73%
04/03/06	6	1	16.67%	3	50.00%		0.00%	1	16.67%	5	83.33%
04/04/06	20	3	15.00%	7	35.00%	2	10.00%	3	15.00%	15	75.00%
04/05/06	63	15	23.81%	27	42.86%	7	11.11%	2	3.17%	51	80.95%
04/06/06	298	63	21.14%	103	34.56%	34	11.41%	19	6.38%	219	73.49%
04/07/06	163	37	22.70%	60	36.81%	16	9.82%	8	4.91%	121	74.23%
04/08/06	81	19	23.46%	22	27.16%	8	9.88%	2	2.47%	51	62.96%
04/09/06	107	19	17.76%	41	38.32%	19	17.76%	4	3.74%	83	77.57%
04/10/06	96	20	20.83%	39	40.63%	18	18.75%	2	2.08%	79	82.29%
04/13/06	330	79	23.94%	119	36.06%	42	12.73%	20	6.06%	260	78.79%
04/14/06	155	37	23.87%	61	39.35%	22	14.19%	5	3.23%	125	80.65%
04/15/06	368	100	27.17%	138	37.50%	38	10.33%	17	4.62%	293	79.62%
04/20/06	396	106	26.77%	141	35.61%	54	13.64%	15	3.79%	316	79.80%
04/21/06	150	55	36.67%	43	28.67%	12	8.00%	9	6.00%	119	79.33%
04/22/06	158	46	29.11%	63	39.87%	15	9.49%	4	2.53%	128	81.01%
04/23/06	120	50	41.67%	37	30.83%	10	8.33%	5	4.17%	102	85.00%
04/24/06	131	39	29.77%	45	34.35%	10	7.63%	4	3.05%	98	74.81%
04/25/06	149	58	38.93%	31	20.81%	15	10.07%	6	4.03%	110	73.83%
04/26/06	101	30	29.70%	30	29.70%	15	14.85%	3	2.97%	78	77.23%
04/27/06	100	33	33.00%	29	29.00%	10	10.00%	5	5.00%	77	77.00%
04/30/06	292	93	31.85%	83	28.42%	29	9.93%	15	5.14%	220	75.34%
05/01/06	295	95	32.20%	84	28.47%	29	9.83%	17	5.76%	225	76.27%
05/07/06	103	39	37.86%	20	19.42%	13	12.62%	2	1.94%	74	71.84%
05/08/06	96	28	29.17%	19	19.79%	11	11.46%	2	2.08%	60	62.50%
05/09/06	101	37	36.63%	16	15.84%	16	15.84%	1	0.99%	70	69.31%
05/10/06	100	26	26.00%	24	24.00%	9	9.00%	4	4.00%	63	63.00%
05/11/06	95	25	26.32%	18	18.95%	8	8.42%	1	1.05%	52	54.74%
05/12/06	99	23	23.23%	14	14.14%	10	10.10%	2	2.02%	49	49.49%
05/14/06	108	23	21.30%	18	16.67%	15	13.89%	5	4.63%	61	56.48%
05/15/06	124	31	25.00%	36	29.03%	9	7.26%	4	3.23%	80	64.52%
05/16/06	236	51	21.61%	66	27.97%	13	5.51%	11	4.66%	141	59.75%
05/17/06	319	58	18.18%	89	27.90%	42	13.17%	16	5.02%	205	64.26%

Appendix B. Table 2. PIT-tagged wild Chinook salmon interrogations at Lower Granite (GRJ), Little Goose (GOJ), Lower Monumental (LMJ), and McNary (MCJ) dams from the Snake River Trap, 2006.

Date	Number Tagged	Ints GRJ	% GRJ	Ints GOJ	% GOJ	Ints LMJ	% LMJ	Ints MCJ	% MCJ	Grand Total Ints	Total % Obs.
03/28/06	8	0	0.00%	4	50.00%	1	12.50%		0.00%	5	62.50%
03/29/06	3	1	33.33%		0.00%	2	66.67%		0.00%	3	100.00%
03/30/06	16	4	25.00%	6	37.50%	2	12.50%		0.00%	12	75.00%
03/31/06	10	2	20.00%	3	30.00%	1	10.00%	1	10.00%	7	70.00%
04/01/06	3	3	100.00%		0.00%		0.00%		0.00%	3	100.00%
04/02/06	8	2	25.00%	3	37.50%	1	12.50%	1	12.50%	7	87.50%
04/03/06	7	0	0.00%	3	42.86%	1	14.29%	1	14.29%	5	71.43%
04/04/06	19	4	21.05%	7	36.84%	3	15.79%	1	5.26%	15	78.95%
04/05/06	29	6	20.69%	12	41.38%	4	13.79%		0.00%	22	75.86%
04/06/06	43	8	18.60%	21	48.84%	5	11.63%	1	2.33%	35	81.40%
04/07/06	23	7	30.43%	8	34.78%	4	17.39%		0.00%	19	82.61%
04/08/06	17	7	41.18%	6	35.29%	2	11.76%		0.00%	15	88.24%
04/09/06	66	11	16.67%	26	39.39%	10	15.15%	2	3.03%	49	74.24%
04/10/06	47	16	34.04%	15	31.91%	6	12.77%		0.00%	37	78.72%
04/13/06	74	17	22.97%	32	43.24%	10	13.51%	3	4.05%	62	83.78%
04/14/06	41	11	26.83%	13	31.71%	6	14.63%	5	12.20%	35	85.37%
04/15/06	62	16	25.81%	24	38.71%	7	11.29%	1	1.61%	48	77.42%
04/20/06	73	17	23.29%	30	41.10%	10	13.70%	5	6.85%	62	84.93%
04/21/06	111	32	28.83%	41	36.94%	15	13.51%	2	1.80%	90	81.08%
04/22/06	110	43	39.09%	44	40.00%	8	7.27%	4	3.64%	99	90.00%
04/23/06	116	35	30.17%	52	44.83%	16	13.79%	4	3.45%	107	92.24%
04/24/06	81	36	44.44%	31	38.27%	3	3.70%	2	2.47%	72	88.89%
04/25/06	133	51	38.35%	49	36.84%	13	9.77%	3	2.26%	116	87.22%
04/26/06	316	98	31.01%	120	37.97%	27	8.54%	7	2.22%	252	79.75%
04/27/06	331	103	31.12%	124	37.46%	23	6.95%	7	2.11%	257	77.64%
04/28/06	125	35	28.00%	51	40.80%	9	7.20%	1	0.80%	96	76.80%
04/29/06	67	21	31.34%	27	40.30%	7	10.45%	2	2.99%	57	85.07%
04/30/06	134	47	35.07%	50	37.31%	13	9.70%	2	1.49%	112	83.58%
05/01/06	54	22	40.74%	16	29.63%	4	7.41%	2	3.70%	44	81.48%
05/05/06	33	21	63.64%	5	15.15%	1	3.03%	1	3.03%	28	84.85%
05/06/06	40	18	45.00%	10	25.00%	4	10.00%		0.00%	32	80.00%
05/07/06	27	10	37.04%	9	33.33%	2	7.41%	1	3.70%	22	81.48%
05/08/06	18	8	44.44%	5	27.78%	3	16.67%	1	5.56%	17	94.44%
05/09/06	32	13	40.63%	12	37.50%	4	12.50%		0.00%	29	90.63%
05/10/06	44	13	29.55%	11	25.00%	3	6.82%		0.00%	27	61.36%
05/11/06	19	8	42.11%	2	10.53%	3	15.79%		0.00%	13	68.42%
05/12/06	32	11	34.38%	7	21.88%	2	6.25%	1	3.13%	21	65.63%
05/13/06	19	3	15.79%	5	26.32%	3	15.79%		0.00%	11	57.89%
05/14/06	26	6	23.08%	14	53.85%	4	15.38%		0.00%	24	92.31%
05/15/06	29	8	27.59%	9	31.03%	3	10.34%		0.00%	20	68.97%
05/16/06	77	18	23.38%	31	40.26%	4	5.19%	6	7.79%	59	76.62%
05/17/06	138	26	18.84%	45	32.61%	16	11.59%	8	5.80%	95	68.84%

Appendix B. Table 3. PIT-tagged hatchery steelhead trout interrogations at Lower Granite (GRJ), Little Goose (GOJ), Lower Monumental (LMJ), and McNary (MCJ) dams from the Snake River Trap, 2006.

Date	Number Tagged	Ints GRJ	% GRJ	Ints GOJ	% GOJ	Ints LMJ	% LMJ	Ints MCJ	% MCJ	Grand Total Ints	Total % Obs.
03/28/06	3	2	66.67%	0	0.00%	0	0.00%	0	0.00%	2	66.67%
03/29/06	6	5	83.33%	0	0.00%	0	0.00%	0	0.00%	5	83.33%
03/30/06	5	4	80.00%	0	0.00%	0	0.00%	0	0.00%	4	80.00%
03/31/06	6	1	16.67%	3	50.00%	1	16.67%	0	0.00%	5	83.33%
04/01/06	2	0	0.00%	1	50.00%	1	50.00%	0	0.00%	2	100.00%
04/02/06	3	1	33.33%	2	66.67%	0	0.00%	0	0.00%	3	100.00%
04/03/06	5	1	20.00%	2	40.00%	0	0.00%	0	0.00%	3	60.00%
04/04/06	6	5	83.33%	0	0.00%	1	16.67%	0	0.00%	6	100.00%
04/05/06	11	5	45.45%	2	18.18%	2	18.18%	0	0.00%	9	81.82%
04/06/06	10	1	10.00%	6	60.00%	1	10.00%	0	0.00%	8	80.00%
04/07/06	10	6	60.00%	2	20.00%	0	0.00%	0	0.00%	8	80.00%
04/08/06	5	1	20.00%	1	20.00%	2	40.00%	0	0.00%	4	80.00%
04/09/06	7	3	42.86%	3	42.86%	1	14.29%	0	0.00%	7	100.00%
04/10/06	9	3	33.33%	3	33.33%	2	22.22%	0	0.00%	8	88.89%
04/13/06	19	10	52.63%	3	15.79%	2	10.53%	0	0.00%	15	78.95%
04/14/06	29	7	24.14%	12	41.38%	8	27.59%	0	0.00%	27	93.10%
04/15/06	35	14	40.00%	12	34.29%	4	11.43%	0	0.00%	30	85.71%
04/20/06	30	13	43.33%	10	33.33%	3	10.00%	1	3.33%	27	90.00%
04/21/06	50	26	52.00%	10	20.00%	6	12.00%	0	0.00%	42	84.00%
04/22/06	44	22	50.00%	10	22.73%	2	4.55%	0	0.00%	34	77.27%
04/23/06	60	26	43.33%	28	46.67%	1	1.67%	0	0.00%	55	91.67%
04/24/06	127	48	37.80%	44	34.65%	9	7.09%	1	0.79%	102	80.31%
04/25/06	125	62	49.60%	27	21.60%	18	14.40%	1	0.80%	108	86.40%
04/26/06	150	61	40.67%	47	31.33%	13	8.67%	0	0.00%	121	80.67%
04/27/06	75	31	41.33%	17	22.67%	6	8.00%	0	0.00%	54	72.00%
04/28/06	58	28	48.28%	17	29.31%	3	5.17%	0	0.00%	48	82.76%
04/30/06	88	26	29.55%	42	47.73%	7	7.95%	0	0.00%	75	85.23%
05/01/06	113	34	30.09%	50	44.25%	8	7.08%	0	0.00%	92	81.42%
05/05/06	25	13	52.00%	6	24.00%	2	8.00%	0	0.00%	21	84.00%
05/06/06	31	11	35.48%	10	32.26%	1	3.23%	1	3.23%	23	74.19%
05/07/06	38	13	34.21%	11	28.95%	5	13.16%	0	0.00%	29	76.32%
05/08/06	99	29	29.29%	38	38.38%	12	12.12%	1	1.01%	80	80.81%
05/09/06	174	72	41.38%	57	32.76%	15	8.62%	0	0.00%	144	82.76%
05/10/06	45	18	40.00%	13	28.89%	6	13.33%	0	0.00%	37	82.22%
05/11/06	44	19	43.18%	13	29.55%	6	13.64%	0	0.00%	38	86.36%
05/12/06	39	20	51.28%	13	33.33%	4	10.26%	0	0.00%	37	94.87%
05/13/06	40	18	45.00%	10	25.00%	8	20.00%	0	0.00%	36	90.00%
05/14/06	32	15	46.88%	8	25.00%	6	18.75%	0	0.00%	29	90.63%
05/15/06	64	25	39.06%	16	25.00%	9	14.06%	1	1.56%	51	79.69%
05/16/06	118	12	10.17%	42	35.59%	18	15.25%	1	0.85%	73	61.86%
05/17/06	308	37	12.01%	126	40.91%	32	10.39%	7	2.27%	202	65.58%

Appendix B. Table 4. PIT-tagged wild steelhead trout interrogations at Lower Granite (GRJ), Little Goose (GOJ), Lower Monumental (LMJ), and McNary (MCJ) dams from the Snake River Trap, 2006.

Date	Number Tagged	Ints GRJ	% GRJ	Ints GOJ	% GOJ	Ints LMJ	% LMJ	Ints MCJ	% MCJ	Grand Total Ints	Total % Obs.
03/31/06	2	1	50.00%		0.00%		0.00%		0.00%	1	50.00%
04/04/06	2		0.00%		0.00%	2	100.00%		0.00%	2	100.00%
04/06/06	8	2	25.00%	5	62.50%		0.00%		0.00%	7	87.50%
04/07/06	2		0.00%	1	50.00%	1	50.00%		0.00%	2	100.00%
04/08/06	4	3	75.00%	1	25.00%		0.00%		0.00%	4	100.00%
04/09/06	4	1	25.00%	2	50.00%		0.00%		0.00%	3	75.00%
04/10/06	7	2	28.57%	4	57.14%	1	14.29%		0.00%	7	100.00%
04/13/06	10	3	30.00%	6	60.00%		0.00%	1	10.00%	10	100.00%
04/14/06	13		0.00%	8	61.54%	2	15.38%		0.00%	10	76.92%
04/15/06	17	5	29.41%	11	64.71%	1	5.88%		0.00%	17	100.00%
04/20/06	8	2	25.00%	3	37.50%	1	12.50%		0.00%	6	75.00%
04/21/06	13	8	61.54%	3	23.08%	1	7.69%		0.00%	12	92.31%
04/22/06	15	3	20.00%	10	66.67%	2	13.33%		0.00%	15	100.00%
04/23/06	15	3	20.00%	5	33.33%	2	13.33%	1	6.67%	11	73.33%
04/24/06	17	6	35.29%	8	47.06%		0.00%	1	5.88%	15	88.24%
04/25/06	25	18	72.00%	5	20.00%	1	4.00%	1	4.00%	25	100.00%
04/26/06	39	10	25.64%	17	43.59%	7	17.95%		0.00%	34	87.18%
04/27/06	16	11	68.75%	3	18.75%	1	6.25%		0.00%	15	93.75%
04/28/06	11	8	72.73%	1	9.09%	1	9.09%		0.00%	10	90.91%
04/29/06	22	6	27.27%	9	40.91%	3	13.64%	1	4.55%	19	86.36%
04/30/06	24	5	20.83%	14	58.33%	4	16.67%		0.00%	23	95.83%
05/01/06	31	6	19.35%	16	51.61%	3	9.68%		0.00%	25	80.65%
05/05/06	5	2	40.00%	3	60.00%		0.00%		0.00%	5	100.00%
05/06/06	3		0.00%	1	33.33%	1	33.33%		0.00%	2	66.67%
05/07/06	5		0.00%	4	80.00%	1	20.00%		0.00%	5	100.00%
05/08/06	13	6	46.15%	4	30.77%	2	15.38%		0.00%	12	92.31%
05/09/06	21	7	33.33%	7	33.33%	3	14.29%		0.00%	17	80.95%
05/10/06	6	3	50.00%	1	16.67%	2	33.33%		0.00%	6	100.00%
05/11/06	11	1	9.09%	3	27.27%	3	27.27%		0.00%	7	63.64%
05/12/06	7	5	71.43%	1	14.29%		0.00%		0.00%	6	85.71%
05/13/06	7	4	57.14%		0.00%		0.00%	1	14.29%	5	71.43%
05/14/06	8		0.00%	3	37.50%	1	12.50%		0.00%	4	50.00%
05/15/06	22	6	27.27%	9	40.91%	1	4.55%		0.00%	16	72.73%
05/16/06	34	5	14.71%	7	20.59%		0.00%	1	2.94%	13	38.24%
05/17/06	55	10	18.18%	17	30.91%	9	16.36%		0.00%	36	65.45%

Appendix B. Table 5. PIT-tagged hatchery Chinook salmon interrogations at Lower Granite (GRJ), Little Goose (GOJ), Lower Monumental (LMJ), and McNary (MCJ) dams from the Salmon River Trap, 2006.

Date	Number Tagged	Ints GRJ	% GRJ	Ints GOJ	% GOJ	Ints LMJ	% LMJ	Ints MCJ	% MCJ	Grand Total Ints	Total % Obs.
03/20/06	28	5	17.86%	4	14.29%	2	7.14%	2	7.14%	13	46.43%
03/22/06	2	1	50.00%		0.00%		0.00%		0.00%	1	50.00%
03/23/06	1	1	100.00%		0.00%		0.00%		0.00%	1	100.00%
03/26/06	19	3	15.79%	6	31.58%	1	5.26%		0.00%	10	52.63%
03/27/06	40	9	22.50%	11	27.50%	2	5.00%	3	7.50%	25	62.50%
03/28/06	39	11	28.21%	7	17.95%	4	10.26%	2	5.13%	24	61.54%
03/29/06	27	8	29.63%	9	33.33%	3	11.11%		0.00%	20	74.07%
03/30/06	22	4	18.18%	7	31.82%	1	4.55%		0.00%	12	54.55%
03/31/06	30	6	20.00%	8	26.67%	6	20.00%	2	6.67%	22	73.33%
04/01/06	66	16	24.24%	23	34.85%	6	9.09%	1	1.52%	46	69.70%
04/02/06	89	22	24.72%	31	34.83%	7	7.87%		0.00%	60	67.42%
04/03/06	46	12	26.09%	10	21.74%	2	4.35%		0.00%	24	52.17%
04/04/06	135	36	26.67%	25	18.52%	7	5.19%	7	5.19%	75	55.56%
04/05/06	116	22	18.97%	41	35.34%	12	10.34%	6	5.17%	81	69.83%
04/06/06	119	32	26.89%	25	21.01%	11	9.24%	4	3.36%	72	60.50%
04/07/06	95	27	28.42%	20	21.05%	9	9.47%	4	4.21%	60	63.16%
04/10/06	89	23	25.84%	30	33.71%	6	6.74%	2	2.25%	61	68.54%
04/11/06	157	52	33.12%	38	24.20%	15	9.55%	4	2.55%	109	69.43%
04/12/06	131	37	28.24%	44	33.59%	14	10.69%	7	5.34%	102	77.86%
04/13/06	126	32	25.40%	36	28.57%	14	11.11%	8	6.35%	90	71.43%
04/14/06	97	33	34.02%	24	24.74%	11	11.34%	6	6.19%	74	76.29%
04/19/06	155	40	25.81%	37	23.87%	25	16.13%	6	3.87%	108	69.68%
04/20/06	253	71	28.06%	68	26.88%	25	9.88%	11	4.35%	175	69.17%
04/21/06	192	66	34.38%	54	28.13%	22	11.46%	3	1.56%	145	75.52%
04/25/06	312	98	31.41%	59	18.91%	24	7.69%	16	5.13%	197	63.14%
04/26/06	180	51	28.33%	34	18.89%	23	12.78%	12	6.67%	120	66.67%
04/27/06	110	33	30.00%	19	17.27%	10	9.09%	7	6.36%	69	62.73%
04/30/06	147	30	20.41%	36	24.49%	18	12.24%	9	6.12%	93	63.27%
05/05/06	73	20	27.40%	14	19.18%	8	10.96%	3	4.11%	45	61.64%
05/06/06	33	5	15.15%	9	27.27%	3	9.09%		0.00%	17	51.52%
05/07/06	34	7	20.59%	9	26.47%	2	5.88%	2	5.88%	20	58.82%
05/08/06	132	33	25.00%	23	17.42%	20	15.15%	3	2.27%	79	59.85%
05/09/06	96	13	13.54%	23	23.96%	10	10.42%	3	3.13%	49	51.04%
05/10/06	37	8	21.62%	11	29.73%	4	10.81%	1	2.70%	24	64.86%
05/11/06	26	8	30.77%	3	11.54%	3	11.54%		0.00%	14	53.85%
05/12/06	33	8	24.24%	5	15.15%	3	9.09%	2	6.06%	18	54.55%
05/13/06	22	2	9.09%	9	40.91%	1	4.55%		0.00%	12	54.55%
05/14/06	86	18	20.93%	22	25.58%	10	11.63%	5	5.81%	55	63.95%

Appendix B. Table 6. PIT-tagged wild Chinook salmon interrogations at Lower Granite (GRJ), Little Goose (GOJ), Lower Monumental (LMJ), and McNary (MCJ) dams from the Salmon River trap, 2006.

Date	Number Tagged	Ints GRJ	% GRJ	Ints GOJ	% GOJ	Ints LMJ	% LMJ	Ints MCJ	% MCJ	Grand Total Ints	Total % Obs.
03/06/06	3	1	33.33%	2	66.67%		0.00%		0.00%	3	100.00%
03/07/06	2	0	0.00%	1	50.00%		0.00%		0.00%	1	50.00%
03/26/06	1	0	0.00%		0.00%		0.00%	1	100.00%	1	100.00%
03/28/06	2	1	50.00%	1	50.00%		0.00%		0.00%	2	100.00%
03/31/06	14	5	35.71%	5	35.71%	2	14.29%		0.00%	12	85.71%
04/01/06	39	13	33.33%	13	33.33%	6	15.38%	1	2.56%	33	84.62%
04/02/06	226	64	28.32%	80	35.40%	31	13.72%	2	0.88%	177	78.32%
04/03/06	69	14	20.29%	26	37.68%	8	11.59%		0.00%	48	69.57%
04/04/06	94	34	36.17%	25	26.60%	12	12.77%	1	1.06%	72	76.60%
04/05/06	694	190	27.38%	250	36.02%	77	11.10%	21	3.03%	538	77.52%
04/06/06	409	116	28.36%	136	33.25%	50	12.22%	16	3.91%	318	77.75%
04/07/06	496	150	30.24%	167	33.67%	54	10.89%	22	4.44%	393	79.23%
04/08/06	672	207	30.80%	239	35.57%	79	11.76%	22	3.27%	547	81.40%
04/09/06	403	121	30.02%	129	32.01%	46	11.41%	11	2.73%	307	76.18%
04/10/06	437	142	32.49%	138	31.58%	42	9.61%	7	1.60%	329	75.29%
04/11/06	245	87	35.51%	82	33.47%	27	11.02%	4	1.63%	200	81.63%
04/12/06	274	81	29.56%	86	31.39%	36	13.14%	8	2.92%	211	77.01%
04/13/06	153	55	35.95%	51	33.33%	18	11.76%	4	2.61%	128	83.66%
04/14/06	309	100	32.36%	113	36.57%	31	10.03%	8	2.59%	252	81.55%
04/15/06	187	57	30.48%	66	35.29%	15	8.02%	5	2.67%	143	76.47%
04/19/06	144	45	31.25%	59	40.97%	12	8.33%	1	0.69%	117	81.25%
04/20/06	159	53	33.33%	48	30.19%	20	12.58%	3	1.89%	124	77.99%
04/21/06	95	37	38.95%	30	31.58%	7	7.37%	1	1.05%	75	78.95%
04/25/06	150	44	29.33%	50	33.33%	13	8.67%	2	1.33%	109	72.67%
04/26/06	44	13	29.55%	13	29.55%	8	18.18%	1	2.27%	35	79.55%
04/27/06	37	10	27.03%	9	24.32%		0.00%	3	8.11%	22	59.46%
04/28/06	154	43	27.92%	51	33.12%	8	5.19%	9	5.84%	111	72.08%
04/29/06	24	8	33.33%	9	37.50%	2	8.33%	1	4.17%	20	83.33%
04/30/06	17	5	29.41%	8	47.06%		0.00%		0.00%	13	76.47%
05/05/06	6	0	0.00%	2	33.33%	2	33.33%		0.00%	4	66.67%
05/06/06	4	2	50.00%	1	25.00%		0.00%		0.00%	3	75.00%
05/07/06	6	1	16.67%	2	33.33%		0.00%		0.00%	3	50.00%
05/08/06	5	0	0.00%	4	80.00%		0.00%		0.00%	4	80.00%
05/09/06	7	0	0.00%	3	42.86%	2	28.57%		0.00%	5	71.43%
05/11/06	6	3	50.00%		0.00%	2	33.33%		0.00%	5	83.33%
05/12/06	5	2	40.00%	1	20.00%		0.00%		0.00%	3	60.00%
05/14/06	14	3	21.43%	7	50.00%	1	7.14%		0.00%	11	78.57%

Appendix B. Table 7. PIT-tagged hatchery steelhead trout interrogations at Lower Granite (GRJ), Little Goose (GOJ), Lower Monumental (LMJ), and McNary (MCJ) dams from the Salmon River trap, 2006

Date	Number Tagged	Ints GRJ	% GRJ	Ints GOJ	% GOJ	Ints LMJ	% LMJ	Ints MCJ	% MCJ	Grand Total Ints	Total % Obs.
04/03/06	4		0.00%	2	50.00%		0.00%		0.00%	2	50.00%
04/04/06	5	2	40.00%	1	20.00%		0.00%		0.00%	3	60.00%
04/05/06	6	2	33.33%	1	16.67%	1	16.67%		0.00%	4	66.67%
04/06/06	1	1	100.00%		0.00%		0.00%		0.00%	1	100.00%
04/08/06	3	1	33.33%	1	33.33%		0.00%		0.00%	2	66.67%
04/12/06	8	3	37.50%	3	37.50%		0.00%		0.00%	6	75.00%
04/13/06	5	2	40.00%	1	20.00%		0.00%		0.00%	3	60.00%
04/14/06	17	7	87.50%	5	29.41%	1	5.88%		0.00%	13	76.47%
04/15/06	6	1	20.00%	1	16.67%	2	33.33%		0.00%	4	66.67%
04/19/06	27	12	44.44%	7	25.93%	2	7.41%	1	3.70%	22	81.48%
04/20/06	30	13	43.33%	7	23.33%		0.00%		0.00%	20	66.67%
04/21/06	15	4	26.67%	6	40.00%	1	6.67%	1	6.67%	12	80.00%
04/25/06	202	64	31.68%	86	42.57%	13	6.44%	2	0.99%	165	81.68%
04/26/06	156	65	41.67%	43	27.56%	14	8.97%	1	0.64%	123	78.85%
04/27/06	92	37	40.22%	27	29.35%	6	6.52%	1	1.10%	71	77.17%
04/28/06	116	31	26.72%	52	44.83%	7	6.03%		0.00%	90	77.59%
04/29/06	54	24	44.44%	13	24.07%	3	5.56%	1	1.85%	41	75.93%
04/30/06	57	20	35.09%	21	36.84%	3	5.26%		0.00%	44	77.19%
05/05/06	41	17	41.46%	6	14.63%	3	7.32%	1	2.44%	27	65.85%
05/06/06	41	11	26.83%	5	12.20%	8	19.51%		0.00%	24	58.54%
05/07/06	34	10	29.41%	9	26.47%		0.00%		0.00%	19	55.88%
05/08/06	44	11	25.00%	8	18.18%	3	6.82%	3	6.82%	25	56.82%
05/09/06	55	23	41.82%	10	18.18%	7	12.73%		0.00%	40	72.73%
05/10/06	58	26	44.83%	17	29.31%	7	12.07%		0.00%	50	86.21%
05/11/06	44	20	45.45%	11	25.00%	6	13.64%	1	2.27%	38	86.36%
05/12/06	39	16	41.03%	6	15.38%	6	15.38%		0.00%	28	71.79%
05/13/06	34	7	20.59%	9	26.47%	3	8.82%		0.00%	19	55.88%
05/14/06	26	7	26.92%	9	34.62%		0.00%		0.00%	16	61.54%

Appendix B. Table 8. PIT-tagged wild steelhead trout interrogations at Lower Granite (GRJ), Little Goose (GOJ), Lower Monumental (LMJ), and McNary (MCJ) dams from the Salmon River trap, 2006

Date	Number Tagged	Ints GRJ	% GRJ	Ints GOJ	% GOJ	Ints LMJ	% LMJ	Ints MCJ	% MCJ	Grand Total Ints	Total % Obs.
04/04/06	1		0.00%	1	100.00%		0.00%		0.00%	1	100.00%
04/05/06	6	1	16.67%	2	33.33%	2	33.33%		0.00%	5	83.33%
04/06/06	3	1	33.33%	1	33.33%	1	33.33%		0.00%	3	100.00%
04/07/06	2		0.00%	1	50.00%		0.00%		0.00%	1	50.00%
04/08/06	19	4	21.05%	10	52.63%	2	10.53%		0.00%	16	84.21%
04/09/06	3	1	33.33%	2	66.67%		0.00%		0.00%	3	100.00%
04/10/06	10	4	40.00%	2	20.00%	3	30.00%		0.00%	9	90.00%
04/11/06	10	3	30.00%	5	50.00%	2	20.00%		0.00%	10	100.00%
04/12/06	1		0.00%	1	100.00%		0.00%		0.00%	1	100.00%
04/13/06	4	1	25.00%	3	75.00%		0.00%		0.00%	4	100.00%
04/14/06	7	1	14.29%	5	71.43%	1	14.29%		0.00%	7	100.00%
04/15/06	5	1	20.00%	3	60.00%		0.00%		0.00%	4	80.00%
04/19/06	14	4	28.57%	6	42.86%		0.00%	1	7.14%	11	78.57%
04/20/06	16	6	37.50%	5	31.25%	2	12.50%		0.00%	13	81.25%
04/21/06	5	2	40.00%	2	40.00%		0.00%		0.00%	4	80.00%
04/25/06	63	22	34.92%	21	33.33%	7	11.11%	1	1.59%	51	80.95%
04/26/06	15	5	33.33%	6	40.00%	3	20.00%		0.00%	14	93.33%
04/27/06	16	7	43.75%	4	25.00%	3	18.75%		0.00%	14	87.50%
04/28/06	25	8	32.00%	9	36.00%	3	12.00%		0.00%	20	80.00%
04/29/06	9	2	22.22%	4	44.44%		0.00%		0.00%	6	66.67%
04/30/06	7	3	42.86%	2	28.57%	1	14.29%		0.00%	6	85.71%
05/05/06	3	2	66.67%		0.00%		0.00%		0.00%	2	66.67%
05/06/06	6	2	33.33%	3	50.00%		0.00%		0.00%	5	83.33%
05/07/06	6	1	16.67%	2	33.33%		0.00%		0.00%	3	50.00%
05/08/06	6	1	16.67%	1	16.67%		0.00%		0.00%	2	33.33%
05/09/06	14	4	28.57%	4	28.57%	2	14.29%		0.00%	10	71.43%
05/10/06	7	2	28.57%	1	14.29%	2	28.57%		0.00%	5	71.43%
05/11/06	1		0.00%		0.00%	1	100.00%		0.00%	1	100.00%
05/12/06	7	2	28.57%	4	57.14%		0.00%		0.00%	6	85.71%
05/13/06	4	1	25.00%		0.00%		0.00%		0.00%	1	25.00%
05/14/06	10	3	30.00%	3	30.00%		0.00%		0.00%	6	60.00%

**Prepared by:**

Edwin W. Buettner  
Senior Fisheries Research Biologist

Jessica L. Buelow  
Senior Fisheries Technician

**Approved by:**

IDAHO DEPARTMENT OF FISH AND GAME

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Edward B. Schriever, Chief  
Bureau of Fisheries

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Pete Hassemer  
Anadromous Fisheries Manager