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

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TABLE OF CONTENTS

	Page
ABSTRACT	1
INTRODUCTION	3
OBJECTIVES	4
METHODS	5
Releases of Hatchery-Produced Smolts	5
Smolt Monitoring Traps	5
Snake River Trap	5
Clearwater Trap	7
Salmon River Trap	8
Trap Efficiency	8
Travel Time and Migration Rates	9
Interrogation Rates of PIT-Tagged Fish	9
RESULTS ANDDISCUSSION	11
Hatchery Releases	11
Chinook Salmon	11
Steelhead Trout	11
Smolt Monitoring Traps	11
Snake River Trap Operation	11
Clearwater River Trap Operation	21
Salmon River Trap Operation	26
Travel Time and Migration Rates	30
Release Sites to Snake River Trap	30
Hatchery Chinook Salmon	30
Wild Chinook Salmon	30
Hatchery Steelhead Trout	30
Wild Steelhead Trout	32
Sockeye Salmon	32
Release Sites to the Clearwater River Trap	32
Hatchery Chinook Salmon	32
Wild Chinook Salmon	32
Hatchery Steelhead Trout	32
Wild Steelhead Trout	33
Release Sites to the Salmon River Trap	33
Hatchery Chinook Salmon	33
Wild Chinook Salmon	33
Hatchery Steelhead Trout	33
Wild Steelhead Trout	33
Sockeye Salmon	33
Head of Lower Granite Reservoir to Lower Granite Dam	33
Hatchery Chinook Salmon PIT Tag Groups	34
Wild Chinook Salmon PIT Tag Groups	38
Hatchery Steelhead Trout PIT Tag Groups	41
Wild Steelhead Trout PIT Tag Groups	43
Age 0 Chinook Salmon Migration Rate and Interrogation Rate	44
Interrogation Rate of PIT-Tagged Fish	44
SUMMARY	50
LITERATURECITED	52

ABSTRACT

This project monitored the daily passage of chinook salmon *Uncorhynchus tshawytscha* and steelhead trout 0. *mykiss* smolts during the 1994 spring outmigration at migrant traps on the Snake River, Clearwater River, and Salmon River. The 1994 snowpack was among the lowest since the beginning of the present drought, and the subsequent runoff was very poor.

All hatchery chinook salmon released above Lower Granite Dam were marked with a fin clip in 1994. Total annual (hatchery + wild) chinook salmon catch at the Snake River trap was 1.5 times greater than in 1993. The trap captured 1,462 wild age 1 chinook salmon, which was only 54% of 1993. Hatchery and wild steelhead trout catches were similar to 1993. Differences in trap catch between years is due to fluctuations not only in smolt production, but also differences in trap efficiency and trap operation duration. For the third year, operations at the Snake River trap were extended through the end of July to collect summer-migrating age 0 chinook. The differentiation of age 0 chinook from spring and summer chinook (age 1) using physical characteristics was again employed in 1994. The Snake River trap collected 30 age 0 chinook salmon.

Hatchery chinook salmon catch at the Clearwater River trap was 3.5 times higher than in 1993, and wild chinook salmon catch was 4.2 times higher. The higher trap catch was associated with increased operation of the trap due to low flows. Hatchery steelhead trout trap catch was less than half of 1993 numbers because the trap was fishing near the north shore during the majority of the hatchery steelhead movement due to flow augmentations from Dworshak. Wild steelhead trout trap catch was 2 times higher than in 1993. Age 0 chinook salmon catch was 21 fish, which was about the same as the previous year.

The Salmon River trap was operated for about a month longer in 1994 than in 1993 due to extremely low flows. Hatchery chinook salmon catch was 1.4 times greater in 1994 than the previous year. Wild chinook salmon catch was slightly less in 1994. The 1994 hatchery steelhead trout collection did not change significantly from 1993 numbers. Wild steelhead trout collection in 1994 was 59% of the 1993 catch.

Fish tagged with Passive Integrated Transponder (PIT) tags at the Snake River trap *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, cumulative interrogation data is not comparable with the prior five years (1988-1992). Cumulative interrogations at the four dams for fish marked at the Snake River trap were 62% for hatchery chinook, 66% for wild chinook, 51% for hatchery steelhead, and 73% for wild steelhead. Cumulative interrogations at the four dams for fish PIT-tagged at the Clearwater River trap was 57% for hatchery chinook salmon, 69% for wild chinook salmon, 71% for hatchery steelhead trout, and 54% for wild steelhead trout. Cumulative interrogations at the four dams for fish marked at the Salmon River trap were 50% for hatchery chinook salmon, 50% for wild chinook salmon, 49% for hatchery steelhead trout, and 65% for wild steelhead trout.

LIST OF TABLES

		Page
Table 1.	River mile and kilometer location for the Snake River drainage	10
Table 2.	Hatchery chinook salmon released into the Snake River system upriver from Lower Granite Dam contributing to the 1994 outmigration	12
Table 3.	Hatchery steelhead trout released into the Snake River system upriver from Lower Granite Dam contributing to the 1994 outmigration	15
Table 4.	Migration rates (km/d), stratified by 5-kcfs intervals from the Snake River trap to Lower Granite Dam, 1994	35
Table 5.	Linear regression statistics for migration rate/ discharge relation by species, rearing type, and trap, using data stratified by 5-kcfs intervals, 1994	36
Table 6.	Migration rates (km/d), stratified by 5-kcfs intervals from the Clearwater River trap to Lower Granite Dam, 1994	37
Table 7.	Migration rates (km/d), stratified by 5-kcfs intervals from the Salmon River trap to Lower Granite Dam, 1994	40
Table 8.	Interrogations of PIT-tagged fish from the Snake River trap, 1987-1994; Clearwater River trap, 1989-1994; and Salmon River trap, 1993-1994 at downstream collection facilities	46

LIST OF FIGURES

Figure 1.	Map of study area	6
Figure 2.	Snake River trap daily catch of hatchery chinook salmon and wild chinook salmon overlaid by Snake River discharge, 1994	19
Figure 3.	Snake River trap daily catch of hatchery steelhead trout and wild steelhead trout overlaid by Snake River discharge, 1994	20
Figure 4.	Daily temperature and secchi disk transparency at the Snake River trap, 1994	22
Figure 5.	Clearwater River trap daily catch of hatchery chinook salmon and wild chinook salmon overlaid by Clearwater River discharge, 1994	23

LIST OF FIGURES (Cont.)

		Page
Figure 6.	Clear-water River trap daily catch of hatchery steelhead trout and wild steelhead trout overlaid by Clearwater River discharge, 1994	25
Figure 7.	Daily temperature and Secchi disk transparency at the Clearwater River trap, 1994	27
Figure 8.	Salmon River trap daily catch of hatchery chinook salmon and wild chinook salmon overlaid by Salmon River discharge, 1994	28
Figure 9.	Salmon River trap daily catch of hatchery steelhead trout and wild steelhead trout overlaid by Salmon River discharge, 1994	29
Figure 10.	Daily temperature and Secchi disk transparency at the Salmon River trap, 1994	31
Figure 11.	Chinook salmon migration rate/discharge relations for Snake River trap PIT tag groups, 1988-1994 . . .	39
Figure 12.	Hatchery steelhead migration rate/discharge relations for Snake River trap PIT tag groups, 1988-1994	42

Travel time (d) and migration rate (km/d) through Lower Granite Reservoir for PIT-tagged chinook salmon and steelhead trout marked at the head of the reservoir were affected by discharge. For fish tagged at the Snake River trap, statistical analysis of five years of data showed that a two-fold increase in discharge increased migration rate by 2.3 times for hatchery chinook salmon, 3.0 times for hatchery steelhead trout, and 2.1 times for wild steelhead. Not enough data were available in 1994 for wild chinook salmon to develop a migration rate/discharge relation. In 1993, a two-fold increase in discharge increased migration rate by 4.1 times for wild chinook.

Hatchery chinook salmon marked at the Clearwater River trap in 1994 migrated two times faster with a two-fold increase in discharge. Not enough wild chinook salmon were tagged at the Clearwater River trap to conduct an analysis. The statistical analysis could not detect a relation between migration rate and discharge for hatchery steelhead trout in 1994. A two-fold increase in discharge increased migration rate by 2.1 times for wild steelhead trout.

For fish marked at the Salmon River trap a two-fold increase in discharge increased migration rate by 2.0 times for hatchery chinook salmon, 2.0 times for wild chinook salmon, 4.0 times for hatchery steelhead trout, and 2.4 times for wild steelhead trout.

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INTRODUCTION

The Pacific Northwest Electric Power Planning and Conservation Act of 1980 (P.L. 96-501) directed the Northwest Power Planning Council (NPPC) 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 flows necessary for downstream migration of juvenile steelhead trout *Oncorhpchus mykiss* and chinook salmon *0. tshawytscha.* In response to the fishery agencies and Indian tribes' recommendations for migration flows, the NPPC Columbia River Basin Fish and Wildlife Program proposed a "water budget" for augmenting spring flows.

The Northwest Power Planning Council's water budget in the Columbia's Snake River tributary is 1.19 million acre-feet of stored water for use between April 15 and June 15 to enhance the smolt migration. This is the fourth year since the establishment of the water budget that over a million acre-feet of water were made available. In the past, only about a third of the requested 1.19 million acre-feet has been provided.

To provide information to the Fish Passage Center (FPC) on smolt movement prior to arrival at the lower Snake River reservoirs, the Idaho Department of Fish and Game (IDFG) monitors the daily passage of smolts at the head of Lower Granite Reservoir. This information allows the FPC to request the limited Snake River water budget for optimal use to provide improved passage and migration conditions.

Smolt monitoring is beneficial for water budget management 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 the most timely use of the limited water budget resource. Six low-flow years (1987, 1988, 1990, 1991, 1992, 1994) have occurred during this smolt monitoring project. The indications are that judicious use of the water budget can greatly enhance the timing and migration rate of juvenile chinook salmon and steelhead trout.

The IDFG smolt monitoring project also collects other useful data on relative species composition, hatchery and wild steelhead trout ratios, travel time, and migration rate. All age 0 chinook are tagged with Passive Integrated Transponder (PIT) tags to determine migration rate through Lower Granite Reservoir and cumulative interrogation rate (Prentice et al. 1987). All wild steelhead trout smolts are tagged with PIT tags to determine timing of wild adult steelhead trout one and two years later as they return to spawn. By monitoring smolt passage at the head of Lower Granite Reservoir and at Lower Granite Dam, migration rates (km/d) under various riverine and reservoir conditions can be estimated

and compared. Monitoring sites on both the Snake and Clear-water arms of Lower Granite Reservoir and on the Salmon River permit migration timing to be determined for smolts from each drainage. It is possible to determine the relative abundance of hatchery and wild stocks of steelhead trout which can be used to document wild stock rebuilding progress. This smolt monitoring program's information is complementary to other Snake and Columbia River NPPC-supported projects.

OBJECTIVES

1. Provide daily trap catch data at the head of Lower Granite Reservoir for water budget and fish transportation management purposes.

2. Determine riverine travel time from the point of release to the smolt traps (index sites) at the upper end of Lower Granite Reservoir for freeze branded and PIT-tagged smolts.

3. Provide an interrogation site for PIT-tagged smolts, marked on other projects, at the end of their migration in a riverine environment and the beginning of their migration in a reservoir environment.

4. Determine reservoir travel time for hatchery spring/summer chinook salmon, wild spring/summer chinook salmon, age 0 chinook salmon, hatchery steelhead trout, and wild steelhead trout 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 outmigration period for PIT-tagged hatchery and wild spring/summer chinook salmon, age 0 chinook salmon, 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.

8. PIT tag all age 0 chinook collected in the Snake River trap and determine travel time and cumulative interrogation rate.

9. Evaluate timing of returning adult wild and natural steelhead crossing Lower Granite Dam.

METHODS

Releases of Hatcherv-Produced Smolts

Anadromous hatchery release information was reported for hatchery smolts which contributed to the 1994 outmigration in the Snake River drainage, upstream of Lower Granite Dam. This information included species, number released, date, release location, number PIT-tagged, number freeze branded, and associated brand.

Smolt Monitorins Traps

During the 1994 outmigration, three smolt monitoring traps were operated to monitor the passage of juvenile chinook salmon and steelhead trout. One scoop trap (Raymond and Collins 1974) was located on the Clearwater River, near Lewiston, Idaho. A second scoop trap was located on the Salmon River near White Bird, Idaho. A new trap site for the Salmon River trap was under construction 17 km upstream but was not completed for the 1994 field season. The new trap site will allow the trap to be operated at higher discharge levels. The third trap, a dipper trap (Mason 1966), was located on the Snake River near Lewiston, Idaho (Figure 1). Smolts were captured, examined, and enumerated daily at the traps and released back to the river. Fork length of up to 100 smolts for each species were measured to the nearest millimeter, and up to 2,000 fish were examined for hatchery brands. Smolts were anesthetized before handling with tricaine methanesulfonate (MS-222). These fish were allowed to recover from the anesthesia before being returned to the river.

Water temperature (°C) and turbidity (m) were recorded daily at each trap using a centigrade thermometer and 20 cm Secchi disk. The Snake River discharge was measured at the U.S. Geological Survey (USGS) Anatone gauge (#13334300), 44.4 km upstream from the Snake River trap. Clearwater River discharge was measured at the USGS Spalding gauge (#13342500), 8.8 km upstream from the Clearwater River trap. Salmon River discharge was measured at the USGS White Bird gauge (#13317000), 1.6 km upstream 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.

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. Up to 100 hatchery chinook salmon, 75

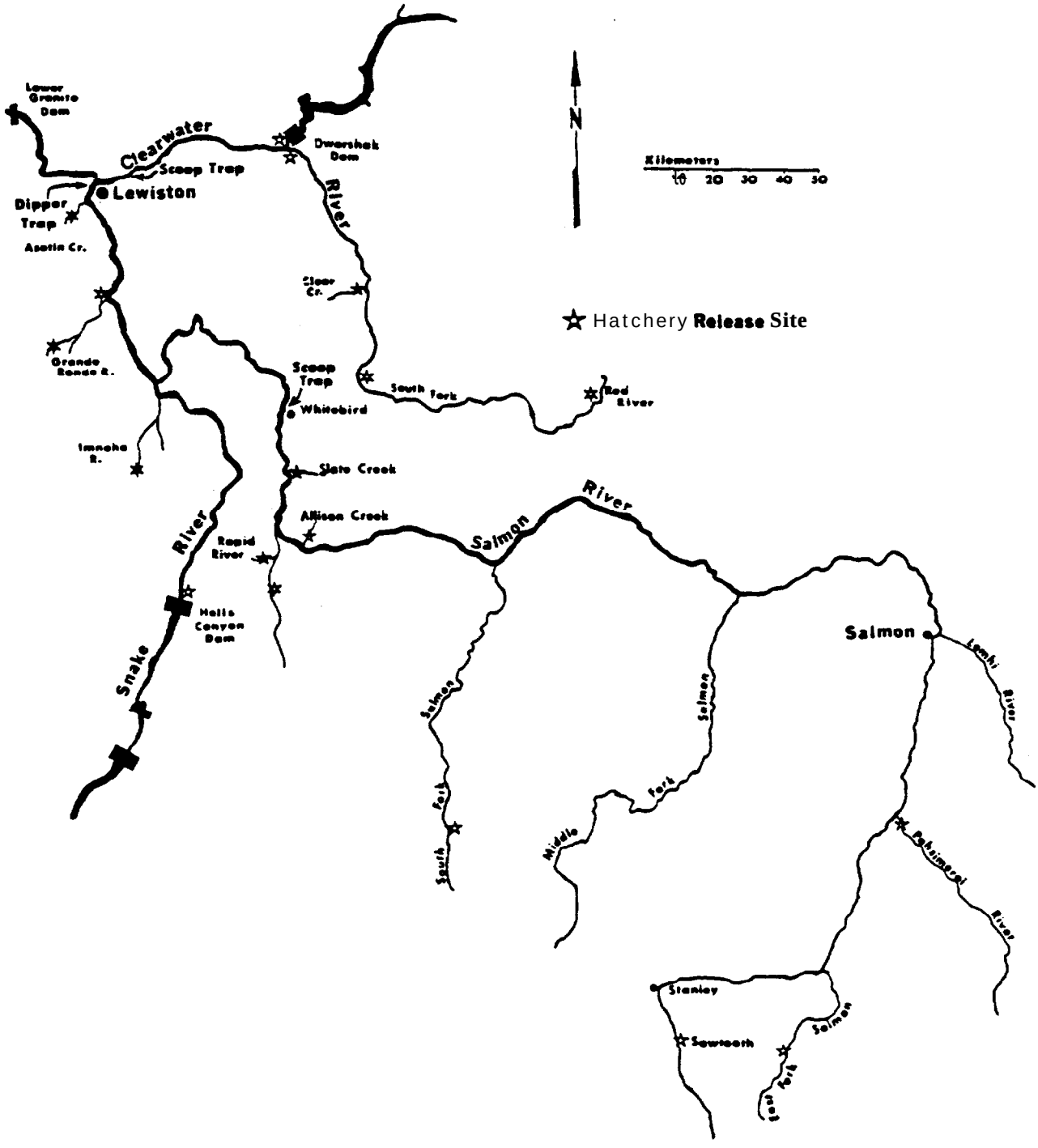

Figure 1. **Map** of study area.

wild chinook salmon, 60 hatchery steelhead trout, all wild steelhead trout, and all age 0 chinook salmon were PIT-tagged daily, when available. Median travel time of the daily PIT-tagged release groups was converted to migration rate. Migration rate was correlated with mean Lower Granite Reservoir inflow discharge 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 operation began on March 14 and continued through July 19, 1994. The Snake River trap was not in operation for a total of 2 days during the 1994 season due to mechanical failure or heavy debris loads. All fish captured in the Snake River trap were passively interrogated for PIT tags as they entered the live well. The interrogation and tagging information was sent to the PTAGIS Data Center (managed by Pacific States Marine Fisheries Commission) daily.

The PIT tag interrogation system on the Snake River trap 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. The system does not have the capability to provide exact time of capture. Since it is checked once daily, the interrogation time is set to 00:00 h. Coil efficiency tests were conducted on the dipper trap interrogation system. Six hundred forty-five test tags were sent through the system. The reading efficiency was calculated to be 99.2% for both coils combined.

Clearwater River Trap

The Clearwater River scoop trap was located 10 km upstream from the convergence of the Clearwater River and Snake River arms of Lower Granite Reservoir (4.5 km upstream from slack water). The river channel at this location forms a gentle bend and is 150 to 200 m wide and 4 m to 7 m deep, depending on discharge.

Chinook salmon and steelhead trout smolts were PIT-tagged at the Clearwater River trap to estimate travel time from the head of Lower Granite Reservoir to Lower Granite Dam for Clearwater River fish. Up to 100 hatchery chinook salmon, 75 wild chinook salmon, 60 hatchery steelhead trout, all wild steelhead trout, and all age 0 chinook salmon were PIT-tagged daily, when available. Median travel time of the daily PIT-tagged release groups were converted to migration rate. Migration rate was correlated with mean Lower Granite Reservoir inflow discharge for the median travel time to determine how changes in discharge affected smolt migration rate through Lower Granite Reservoir.

Trap operation began March 14 and continued through July 28 when operations were terminated for the year. Operations were temporarily suspended for two days during the season due to mechanical failure. All fish were interrogated for PIT tags as the fish were removed from the live well. The tagging and interrogation files were sent to the PTAGIS Data Center daily.

The PIT tag interrogation system on the Clearwater River trap consists of a 4-inch PVC pipe with two interrogation coils (D-O and D-2). Each coil is attached to an exciter card and a PIT tag reader. This system

is battery-powered. Coil efficiency tests were conducted on the Clear-water River trap interrogation system in 1994. Five hundred test tags were sent through the system. Reading efficiency was calculated to be 98.0% for both coils combined. `

Salmon River Trap

The Salmon River scoop trap was located 1.5 km downstream from the mouth of White Bird Creek (rkm 86.6) between a rock island and the western shore, and immediately over a rock shelf. This location was chosen because juvenile migrants are concentrated both vertically and horizontally due to the morphology of the site, thus making them more vulnerable to capture. River width at this location is approximately 70 m and depth ranges from 1.5 m at 4 kcfs to 5.0 m at 25 kcfs.

Chinook salmon and steelhead trout juveniles were tagged with PIT tags at the Salmon River trap to estimate travel time from the trap to Lower Granite Dam for Salmon River fish. Up to 100 hatchery chinook salmon, 75 wild chinook salmon, 60 hatchery steelhead, and all wild steelhead were PIT-tagged daily, when available. Median travel time of 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 Lower Granite Reservoir.

Trap operation began on March 16 and continued uninterrupted until June 16 when operations were terminated for the season. 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 PIT tag interrogation system on the Salmon River trap consists of a 4-inch PVC pipe with two interrogation coils. Each coil is connected to an exciter card (D-8) which is in turn, attached to a single PIT tag reader. The reader is connected to a personal computer that contains software which places a date and time stamp with each PIT tag code interrogated. The system is battery-powered.

Coil efficiency tests were conducted on the Salmon River trap interrogation system in 1994. Two hundred fifty test tags were sent through the system. Reading efficiency was calculated to be 98.8% for both coils combined.

Trap Efficiency

Trap efficiency is the proportion of the migration run being 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 1994 trap operations, trap efficiencies were not calculated for any of the smolt traps. Previous trap efficiency estimates are reported by Buettner (1991).

Travel Time and Misration 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 River, Clearwater River, and Salmon River traps. Median arrival (or passage) date is the date the 50th percentile fish arrived at the trap or collection facility. Smolts were PIT-tagged at the Snake and Clearwater River traps 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 migration rate in a free-flowing section of river plus Lower Granite Reservoir. Distances from release point to recovery location are listed in Table 1. Individual arrival times at the Lower Granite collection facility were determined for each daily release group. A minimum recapture number, sufficient for use in travel time and migration rate estimations, 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 five 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/discharge 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). The 0.05 level was used to determine significance. This analysis was performed for the PIT-tagged hatchery spring/summer chinook salmon, wild spring/summer chinook salmon, hatchery steelhead trout, and wild steelhead trout groups marked at the Snake, Clearwater, or Salmon River traps.

Themigration rate/discharge relations for PIT-tagged chinook salmon, hatchery steelhead trout, and wild steelhead trout were individually examined from 1988 to 1994 using analysis of covariance to determine if there were groups of years with common slopes and intercepts. Plots are used to help identify years that differ when non-homogeneous slopes between years are found. Subsequent analyses were run, without these years, to determine if common slopes and intercepts existed for a smaller subset of years. Also, the analysis of variance was used to determine if there was a sufficient overlap in the covariate (discharge) between years to continue the analysis (Ostle and Mensing 1975). If the final hypothesis of common intercepts was not rejected, then a significant difference in the migration rate/discharge relations between years was not detected and the yearly data were pooled. After pooling, linear regression was used to find the best-fitting equation to describe the relation between migration rate and discharge for an individual species over several years.

Interrwation 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 Monumental,

Table 1. River mile & kilometer location for the Snake River Drainage.

	Mouth of Columbia R.		Mouth of Snake River		Lower Granite Dam		Snake River trap site		Clearwater R. trap site		Salmon River trap site	
	mi	km	mi	km	mi	km	mi	km	mi	km	mi	km
Asotin Creek Rel. Site	470.3	756.7	146.0	234.9	38.5	61.9	6.4	10.3	--	--	--	--
Big Canyon Creek	585.9	942.7	261.6	420.9	154.1	247.9	122.0	196.3	--	--	--	--
Catherine Creek	636.9	1024.8	312.6	503.0	205.1	330.0	173.0	278.4	--	--	--	--
Clearwater R. trap site	470.0	756.2	145.7	234.4	38.2	61.5	--	--	0.0	0.0	--	--
Cottonwood Creek	521.7	839.4	197.4	317.6	89.9	144.6	57.8	93.0	--	--	--	--
Crooked River	604.3	972.3	280.0	450.5	172.5	277.6	--	--	134.3	216.0	--	--
Deer Creek	504.3	811.4	180.0	289.6	72.5	116.7	40.4	65.0	--	--	--	--
Dworshak NFH	504.3	811.4	180.0	289.6	72.5	116.6	--	--	34.3	55.2	--	--
E.F. Salmon @ trap site	873.6	1405.6	549.3	883.8	441.8	710.9	409.7	659.2	--	--	307.9	495.4
Grande Ronde R. Mouth	493.0	793.2	168.7	271.4	61.2	98.5	29.1	46.8	--	--	--	--
Hazard Creek	618.7	995.5	294.4	473.7	186.9	300.7	154.8	249.1	--	--	53.0	85.3
Hells Canyon Dam	571.3	919.2	247.0	397.4	139.5	224.5	107.4	172.8	--	--	--	--
Highway 95 Boat Launch	473.2	761.4	148.9	239.6	41.5	66.8	--	--	3.2	5.1	--	--
Imnaha Coll. Facility	565.6	910.2	241.3	388.3	133.8	215.4	101.7	163.6	--	--	--	--
Imnaha River Mouth	516.0	830.3	191.7	309.1	84.2	135.7	52.1	83.8	--	--	--	--
Kooskia NFH	541.6	871.4	217.3	349.6	109.8	176.7	--	--	71.5	115.0	--	--
Little Sheep Creek	553.8	891.1	229.5	369.3	122.0	196.3	89.9	144.6	--	--	--	--
Lookingglass Creek	580.4	933.9	256.1	412.1	148.6	239.1	116.5	187.4	--	--	--	--
Lower Granite Dam	431.8	694.8	107.5	173.0	0.0	0.0	32.1	51.6	38.3	61.5	133.9	215.4
Lower Monumental Dam	365.9	588.7	41.6	66.9	65.9	106.0	98.0	157.7	--	--	181.2	291.5
Pahsimeroi Hatchery	817.5	1315.4	493.2	793.6	385.7	620.6	353.6	568.9	--	--	251.8	405.1
Rapid River Hatchery	605.8	974.7	281.5	452.9	174.0	280.0	141.9	228.3	--	--	40.1	64.5
Red River Rearing Pond	618.0	994.4	293.7	472.6	186.2	299.6	--	--	148.0	238.1	--	--
Salmon River Mouth	512.5	824.6	188.2	302.8	80.7	129.8	48.6	78.2	--	--	53.2	85.6
Salmon River trap site	565.7	910.2	241.4	388.4	133.9	215.4	101.8	163.8	--	--	0.0	0.0
Sawtooth Hatchery	896.7	1444.2	573.3	922.4	465.8	749.5	433.7	697.8	--	--	331.9	534.0
Snake River Mouth	324.3	521.8	0.0	0.0	107.5	172.9	139.6	224.6	145.7	234.5	241.4	388.4
Snake River trap site	463.9	746.4	139.6	224.6	32.1	51.6	0.0	0.0	--	--	101.8	163.8
S.F. Salmon @ Knox Bridge	719.7	1158.0	395.4	636.2	287.9	463.2	255.8	411.6	--	--	154.0	247.8
Spring Creek	614.4	988.6	290.1	466.8	182.6	293.8	150.5	242.2	--	--	--	--
Wildcat Creek	546.2	878.8	221.9	357.0	114.4	184.3	82.3	132.4	--	--	--	--

and McNary Dam collection facilities included data from 1988 to 1994 for the Snake River trap, 1989 to 1994 for the Clear-water River trap, and 1993 to 1994 for the Salmon River trap. The data **have** been examined to ensure that multiple interrogations within a dam and between dams have been removed.

RESULTS AND DISCUSSION

Hatchery Releases

Chinook Salmon

Chinook salmon released into the Snake River drainage upstream from Lower Granite Dam were reared at ten locations in Idaho and one in Oregon. The Washington Department of Fish and Wildlife did not release any juvenile chinook salmon in the Snake River drainage upstream from Lower Granite Dam that contributed to the 1994 outmigration. A total of 8,049,403 chinook salmon smolts were released at 19 locations in Idaho and 2 locations in Oregon (Table 2).

During the late summer and fall of 1993, seven groups of chinook salmon juveniles (280,809 chinook salmon) were released from Idaho hatcheries. All other chinook salmon releases for the 1994 outmigration occurred in the spring of 1994 (Table 2).

Steelhead Trout

Steelhead trout were reared at five locations in Idaho, one in Washington, and one in Oregon for release into the Snake River drainage upstream from Lower Granite Dam. A total of 9,351,931 steelhead trout smolts were released at 21 locations in Idaho, 6 locations in Oregon, and 3 locations in Washington (Table 3). Fall releases of steelhead trout juveniles have not been included in this total.

Smolt Monitorins Traps

Snake River Trap Operation

The Snake River trap captured 22,342 hatchery and 1,471 wild age 1 chinook salmon, 55 age 0 chinook salmon, 31,662 hatchery steelhead trout, 3,439 wild steelhead trout, and 260 sockeye/kokanee salmon *Oncorhynchus nerka.*

The 1994 outmigration year was the second migration season that all hatchery chinook salmon produced in Idaho were marked. To compare 1994 data with previous years data, total catch of hatchery and wild chinook salmon was added together. Total catch of chinook salmon (hatchery + wild) was 23,804 in 1994 (low flow year). The 1994 catch of chinook salmon was

Table 2. Hatchery chinook salmon released into the Snake River system upriver from Lower Granite Dam contributing to the 1994 outmigration.

Release Site (hatchery)	stock	Release date	No. released (No. branded) [No. Pit tagged1	Brand
Salmon River				
South Fork Salmon River @ Knox Bridge (McCall)	Summer	4/9-13	1,060,163 [5,100]	
Pahsimeroi River (Pahsimeroi)	Summer	4/8-12	130,510 [1,000]	
Rapid River (Rapid River)	Spring	4/8-25	2,547,642 [3,001]	
East Fork Salmon River (Sawtooth)	Spring	4/8	12,368 [500]	
Sawtooth Weir (Sawtooth)	Spring	4/9-13	141,545 [3,501]	
Upper Salmon River (Sawtooth)	Spring	4/9	72,300 [1,000]	
	Drainage Total		3,964,528	
Snake River and Non-Idaho Tributaries				
Hells Canyon (Rapid River) (Lookingglass)	Spring	4/20-21	380,504 [250]	
		4/12	84,050	
Imnaha River @ River Km. 74.2 (Lookingglass)	Spring	4/10	438,699 [2,993]	
Lookingglass Cr. @ R.Km. 3.5 (Lookingglass)	Spring	4/10-12	614,990	
			(20,292) [499]	LA-J-2
			(20,294) [501]	RA-J-2
			(20,501) [500]	LA-J-4
			(20,895) [497]	RA-J-4
		5/06	150,233	
	Drainage Total		1,668,476	

Table 2. Continued.

Release site (hatchery)	Stock	Release date	No. released (No. branded) [No. PIT tagged1	Brand
Clearwater River				
Clear Creek (Kooskia NFH)	Spring	4/18	305,813	
North Fork Clearwater @ Dworshak (Dworshak NFH)	Spring	4/8	69,642 (22,664) (18,226) (18,976) [6,000]	 RA-u- 1 RA-U-2 RA-u-3
		4/14-15	1,049,477 [2,400]	
		4/22	84,654 (22,315) (30,663) (24,799) [6,000]	 m-u-1 RD-u-2 RD-u-3
		5/6	74,500 (19,630) (21,377) (20,405) [6,000]	 RD-T-1 RD-T-2 RD-T-3
Upper Meadow Creek (Clearwater)	Spring	7/20/93	54,100	
Lower Meadow Creek (Clearwater)	Spring	7/22/93	59,600	
Papoose Creek (Clearwater)	Spring	4/13-15	77,170 [1,009]	
Walton Creek (Clearwater)	Spring	4/14	55,745 [500]	
White Sands Creek (Clear-water)	Spring	8/4-5/93	79,988 [1,003]	
Squaw Creek (Clearwater)	Spring	8/5-6/93	12,000 [1,000]	
Pete King Creek (Clearwater)	Spring	8/5-6/93	12,000 [1,000]	
Big Flat Creek (Clear-water)	Spring	8/5-6/93	40,875 [1,000]	
Walton Creek (Powell)	Spring	4/8-13	144,823 [1,000]	

Table 2. Continued

Release site (hatchery)	Stock	Release date	No. released (No. branded) [No. PIT tagged]	Brand
Upper Crooked River (Crooked River)	Spring	4/8-14	273,766	
Red River (Red River)	Spring	10/12/93	22,246 [1,000]	
	Drainage Total		2,416,399	
	GRANDTOTAL		8,049,403	

Table 3. Hatchery steelhead trout released into the Snake River system upriver from Lower Granite Dam contributing to the 1994 outmigration.

Release site (hatchery)	stock	Release date	No. released (No. branded) [No. Pit tagged]	Brand
Salmon River				
L. Salmon River @ Hazard Creek (Magic Valley) (Hagerman NFH)	B	4/22-28	238,725 [300]	
	A	4/25	328,163 [200]	
L. Salmon River @ Warm Springs Bdg. (Magic Valley)	A	4/23-27	467,550 [200]	
North Fork Salmon River (Niagara Springs)	A	4/14-15	134,979 [200]	
East Fork Salmon River (Magic Valley)	B	4/11-16	517,180 [600]	
Bruno Landing (Hagerman NFH)	A	4/12	182,083 [100]	
Lemhi River (Hager-man NFH)	A	4/06	235,788 [200]	
Pahsmeroi River (Magic Valley)	A	4/16-22	484,440 [301]	
(Niagara Springs)	A	4/10-12	379,948 [316]	
Salmon River @ Challis (Niagara Springs)	A	4/13	199,962 [200]	
Salmon River @ Sawtooth Weir (Hagerman NFH)	A	4/15 & 29	773,134 [602]	
Salmon River @ Slate Creek (Magic Valley)	B	4/12-20	211,355 [300]	
Salmon River @ Hammer Creek (Niagara Springs)	A	5/2-5	193,022 [300]	
Salmon River @ Pine Bar Rapids (Niagara Springs)	A	4/19	21,070	
		Drainage Total	4,367,399	

Table 3. Continued.

Release site (hatchery)	Stock	Release date	No. released (No. branded) [No. Pit tagged1	Brand
Snake River and Non-Idaho Tributaries				
Hells Canyon (Niagara Springs)	A	4/16-18 & 4/25-5/1	265,835 [202] 343,280 [200]	
Catherine Creek @ R.Km. 28.8 (Irrigon)	A	4/18	62,556	
Spring Creek @ R.Km. 1.6 (Irrigon)	A	4/18	494,342 (19,911) [243] (19,735) [248]	LA-A-1 RA-A-1
		5/2	211,635	
Little Sheep Creek @ R.Km. 24 (Irrigon)	A	4/18	300,774 (20,339) [534] (19,246) [488] (17,900) (19,893) [495]	LA-A-2 RA-A-2 LA-A-4 PA-A-4
Deer Creek @ R.Km. 0.16 (Irrigon)	A	4/22	155,751 [993]	
Imnaha River @ R.Km. 26.1 (Irrigon)	A	4/26	49,767	
Grande Ronde River @ R.Km. 256 (Irrigon)	A	4/13-15	200,806	
Grande Ronde River @ R.Km. 46.4 (Lyons Ferry)	A	4/08-27	273,000	
Asotin Creek R.Km. 0.8 (Lyons Ferry)	A	4/25-26	30,460	
Wildcat Creek R.Km. 1.6 (Lyons Ferry)	A	4/26-27	49,508	
		Drainage Total	2,437,714	

Table 3. continued.

Release site (hatchery)	stock	Release date	No. released (No. branded) [No. Pit tagged1	Brand
Clearwater River				
Clearwater River (Dworshak NFH)	B	5/2-6	1,153,417 (9,545) (8,758) (9,001) (8,894) [3,810]	 RD-T-1 RD-T-3 LD-T-1 LA-T-3
Clear Creek (Dworshak NFH)	B	4/21	349,633 (729) [249]	 RA-T-2
(Clearwater)	B	5/3	153,860 [300]	
South Fork Clearwater River @ R.Km 14.0 (Dworshak NFH)	B	4/18-22	97,429	
Crooked River (Clearwater)	B	4/29-5/3	176,016 [5,768]	
South Fork Clearwater River @ Mill Creek (Clearwater)	B	4/25-26	185,067 [200]	
Cottonwood Creek (Dworshak NFH)	B	4/18-22	86,951	
(Clearwater)	B	4/25	103,696 [200]	
Button Beach (Dworshak NFH)	B	4/20-25	136,447	
South Fork Clearwater River @ R.Km. 28.8 (Clearwater)	B	4/25-26	104,302 [199]	
		Drainage Total	2,546,818	
		GRAND TOTAL	9,351,931	

about 1.3 times greater than in 1993 (trap out of operation for 32 d), nearly 13 times greater than in 1992 (low flow year), 6 times greater than in 1991 (low flow year), but nearly 26% less than the record catch of 32,131 in 1989 (near-normal flow year).

Hatchery chinook salmon first arrived at the trap on April 7. Peak passage of hatchery chinook began on April 19 and continued through April 30 (Figure 2). There was a minor peak in passage that began on May 7 and continued through May 17. Peaks in hatchery chinook salmon passage were associated with increases in Snake River discharge. The 1994 total catch of hatchery chinook salmon was 1.5 times greater than in 1993. Nearly 90% of the total catch of hatchery chinook salmon was captured in April, 10% in May, and less than 1% in June.

Wild chinook salmon passage timing was similar to that of hatchery chinook salmon. Peak passage of wild chinook salmon began on April 19 and concluded on April 30. There was a minor peak in passage that began on May 7 and lasted until May 15. Peaks in wild chinook salmon passage were associated with increases in Snake River discharge. The 1994 total catch of wild chinook salmon was 45.5% less than in 1993. Less than 1% of the total catch of wild chinook salmon was captured in March, 72% in April, 25.2% in May, and 1.7% in June. Wild chinook salmon passage had virtually ended by June 10.

Both hatchery and wild chinook salmon outmigrated several weeks earlier in 1994 than in 1993. The difference in migrational timing between the two years can probably be attributed to the early spring runoff of low elevation snow in 1994.

Physical characteristics were used to differentiate between age 0 chinook salmon and other chinook salmon. Peak trap catch of age 0 chinook salmon was during May and June when 90% of the season total was collected. Capture of age 0 chinook had virtually ceased by the end of June. The lack of age 0 chinook salmon in the Snake River trap catch was due to either a lack of fish movement or low water velocities reducing trap efficiency.

There was one major peak in hatchery steelhead trout passage. The peak began on April 19 and subsided on May 21 (Figure 3). During the period of peak passage, 30,328 hatchery steelhead trout, or 96% of the season total, were collected. Following the period of peak passage, hatchery steelhead trout were collected at a rate of less than 100 per day throughout the remainder of the migration season. Analysis of catch by month revealed that less than 1% of the season total was collected in March, 37% in April, 61% in May, 1.9% in June, and only 0.6% in July. The hatchery steelhead trout catch in 1994 was nearly 10% less than in 1993, 1.5 times greater than in 1992, 1.7 times greater than in 1991, and 1.4 times higher than in 1989 (near-normal flow year).

Wild steelhead trout passage timing was similar to hatchery steelhead trout passage (Figure 3). Peak passage began on April 19 and concluded on May 19. Ninety-four percent of the total catch for the season was collected during this period of major movement. Major movement periods of hatchery and wild steelhead trout were associated with increases in discharge. The relationship between discharge and passage has been observed in past migration seasons. Less than 1% of the total catch of wild steelhead trout was collected in March, 55% in April, 44% in May, and 1%

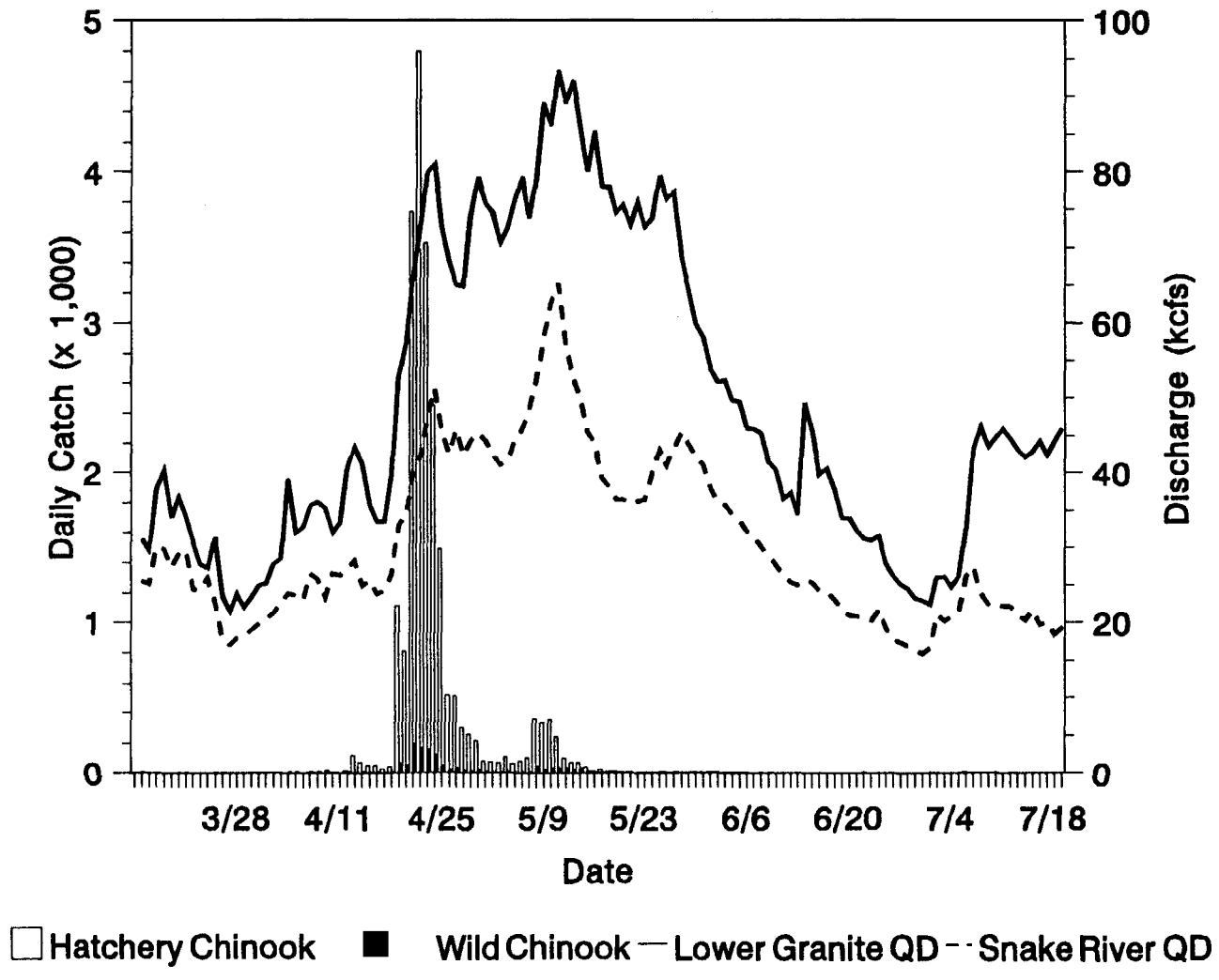

Figure 2. Snake River trap daily catch of hatchery chinook salmon and wild chinook salmon overlaid by Snake River discharge, 1994.

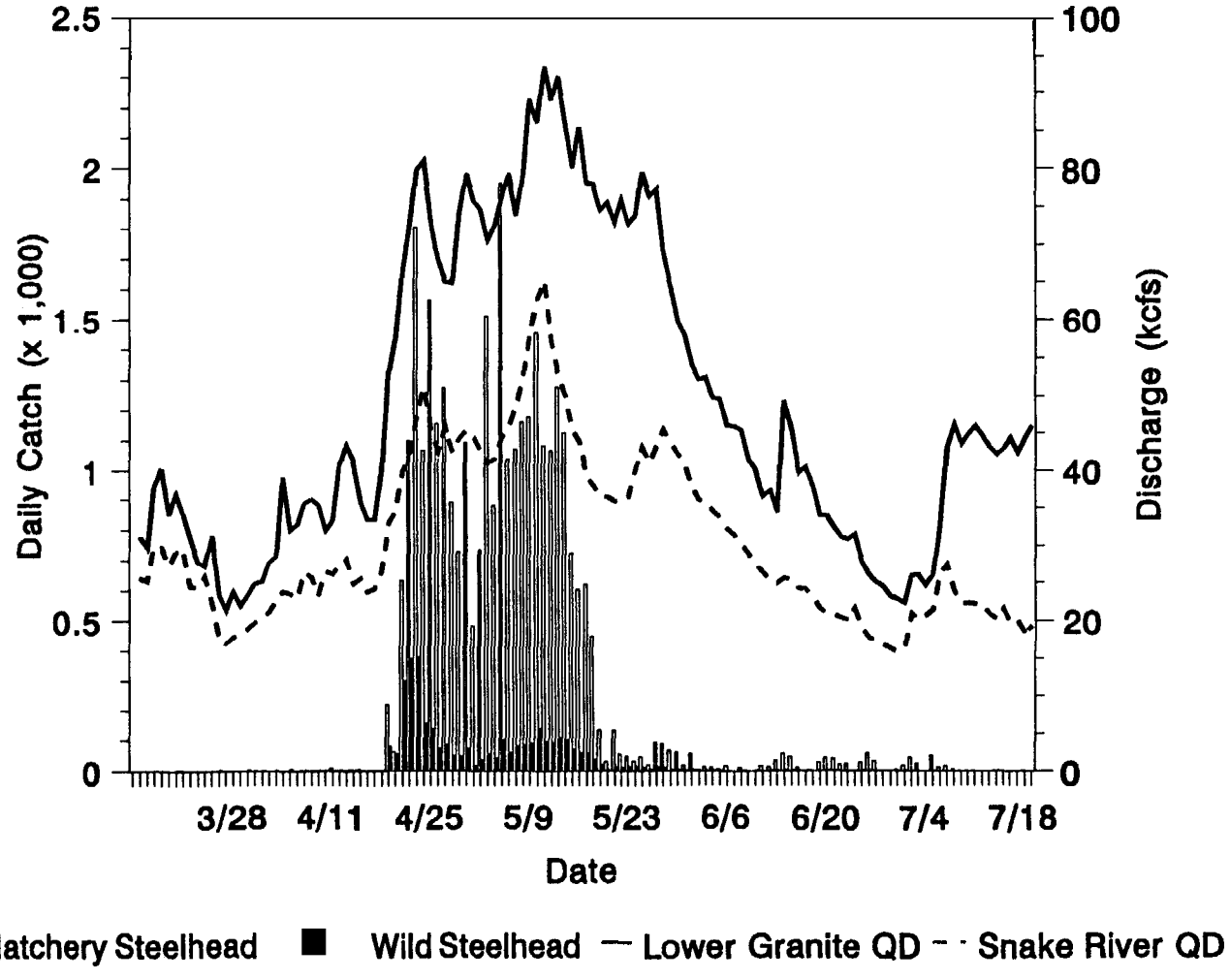

Figure 3. Snake River trap daily catch of hatchery steelhead trout and wild steelhead trout overlaid by Snake River discharge, 1994.

in June. Snake River trap catch for wild steelhead trout was 1.1 times greater than the 1993 total of 3,046. The 1994 trap catch of wild steelhead trout was 1.3 times greater than in 1992, 17% less than in 1991, and 1.6 times greater than in 1989.

Snake River discharge, measured at the Anatone gauge, ranged from 17.0 kcfs to 30.0 kcfs (March). The average discharge in March of 23.6 kcfs was 14.3 kcfs lower than in 1993, 1.8 kcfs higher than in 1992, 5.5 kcfs lower than in 1991, and 16.8 kcfs lower than in 1989. The average April discharge was 31.9 kcfs, with a peak of 51.3 kcfs on April 24. The April average discharge was 18.0 kcfs lower than in 1993, 7.3 kcfs higher than in 1992, 11.8 kcfs greater than in 1991, but 26.6 kcfs lower than in 1989. The average May discharge was 44.9 kcfs, which was 40.8 kcfs lower than in 1993, 12.2 kcfs greater than in 1992, similar to 1991, and 7.2 kcfs lower than in 1989. Flows were moderate at the beginning of June, but slowly decreased throughout the month. Average discharge for June was 25.2 kcfs, which was 49.6 kcfs lower than in 1993, 8.3 kcfs greater than in 1992, 23.3 kcfs lower than in 1991, and 19.6 kcfs lower than in 1989. July average discharge was 19.9 kcfs. Flows were at 16.5 kcfs at the beginning of July and fluctuated throughout the month. Flows were at 12.6 kcfs at the end of the month.

Water temperature in the Snake River at the trap steadily increased throughout the sampling season (Figure 4). By the end of the season, July 19, water temperature had risen to 21.0°C. Water temperatures in 1994 were virtually the same as experienced in the early portion of the 1993 outmigration. However, water temperatures in the latter portion of the 1994 season were generally 2°C to 3°C warmer than what was experienced during the same period in the 1993 field season.

Secchi disk transparency measurements were taken daily at the Snake River trap. Transparencies fluctuated throughout the trapping season and ranged from 0.6 m to 3.0 m (Figure 4).

Clearwater River Trap Operation

The Clearwater River trap caught 32,789 age 1 hatchery chinook salmon, 1,343 age 1 wild chinook salmon, 31 age 0 chinook salmon, 4,615 hatchery steelhead trout, 1,798 wild steelhead trout, and 156 sockeye/kokanee salmon in 1994. As mentioned previously, total catch of hatchery and wild chinook salmon **was** added together. The total chinook salmon catch (hatchery + wild) was 34,132. The total chinook salmon trap catch for 1994 was 3.4 times greater than in 1993, 60% less than the total catch in 1992, nearly 14% less than in 1991, but 3.4 times greater than the total catch in 1989 (lowest trap catch on record).

There was one large peak in passage of hatchery chinook salmon (Figure 5). Numbers of hatchery chinook salmon collected at the Clearwater River trap began to increase on April 9 (>100/d). Numbers of hatchery chinook salmon collected at the trap remained high until the Clearwater River trap was moved out of the thalweg due to high discharge on April 24. After the trap was moved, catch rates dropped to less than 50 hatchery chinook per day. The Clearwater River trap was moved back into the thalweg at the end of May. Any additional peaks in hatchery chinook salmon passage

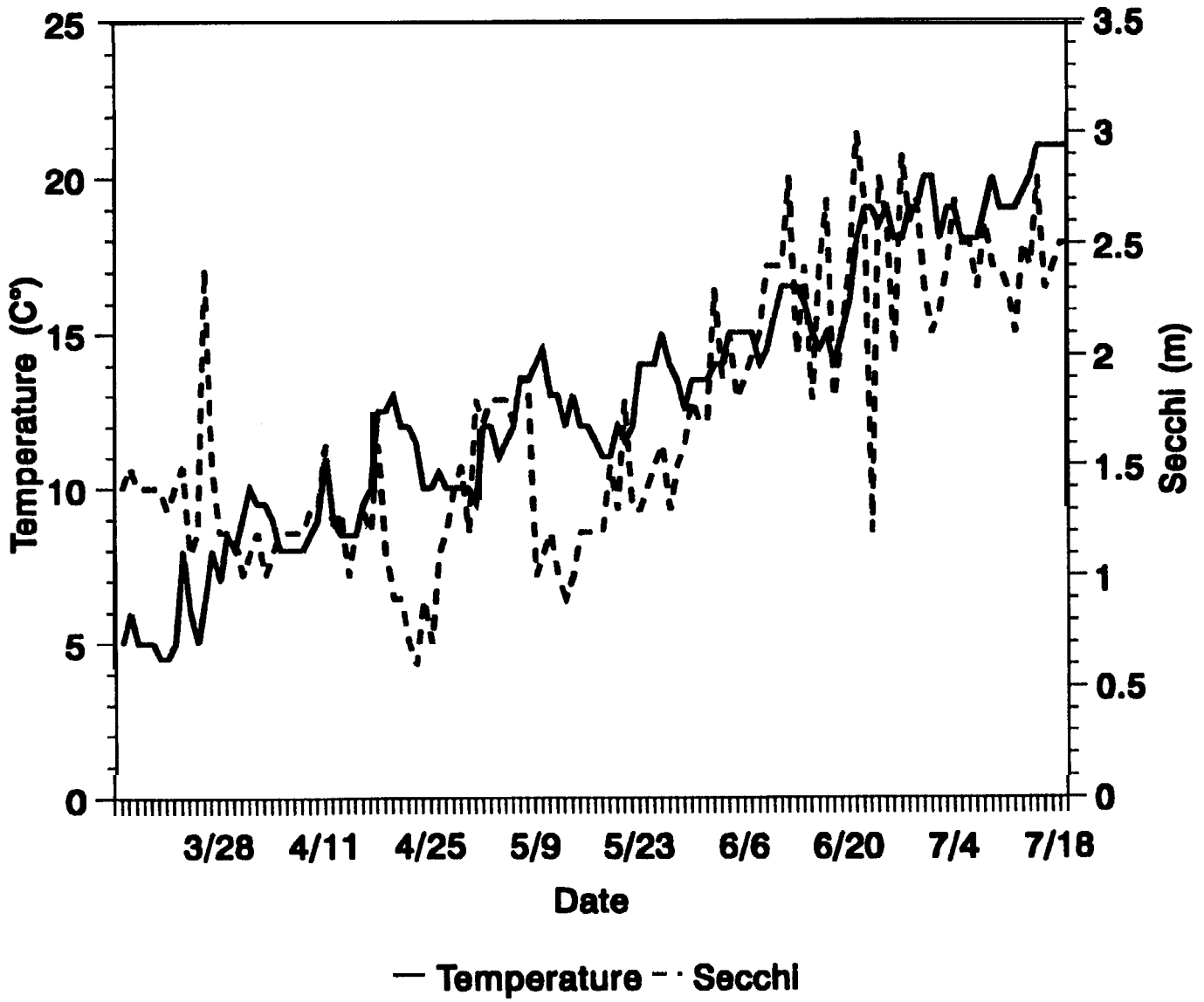

Figure 4. Daily temperature and secchi disk transparency at the Snake River trap, 1994.

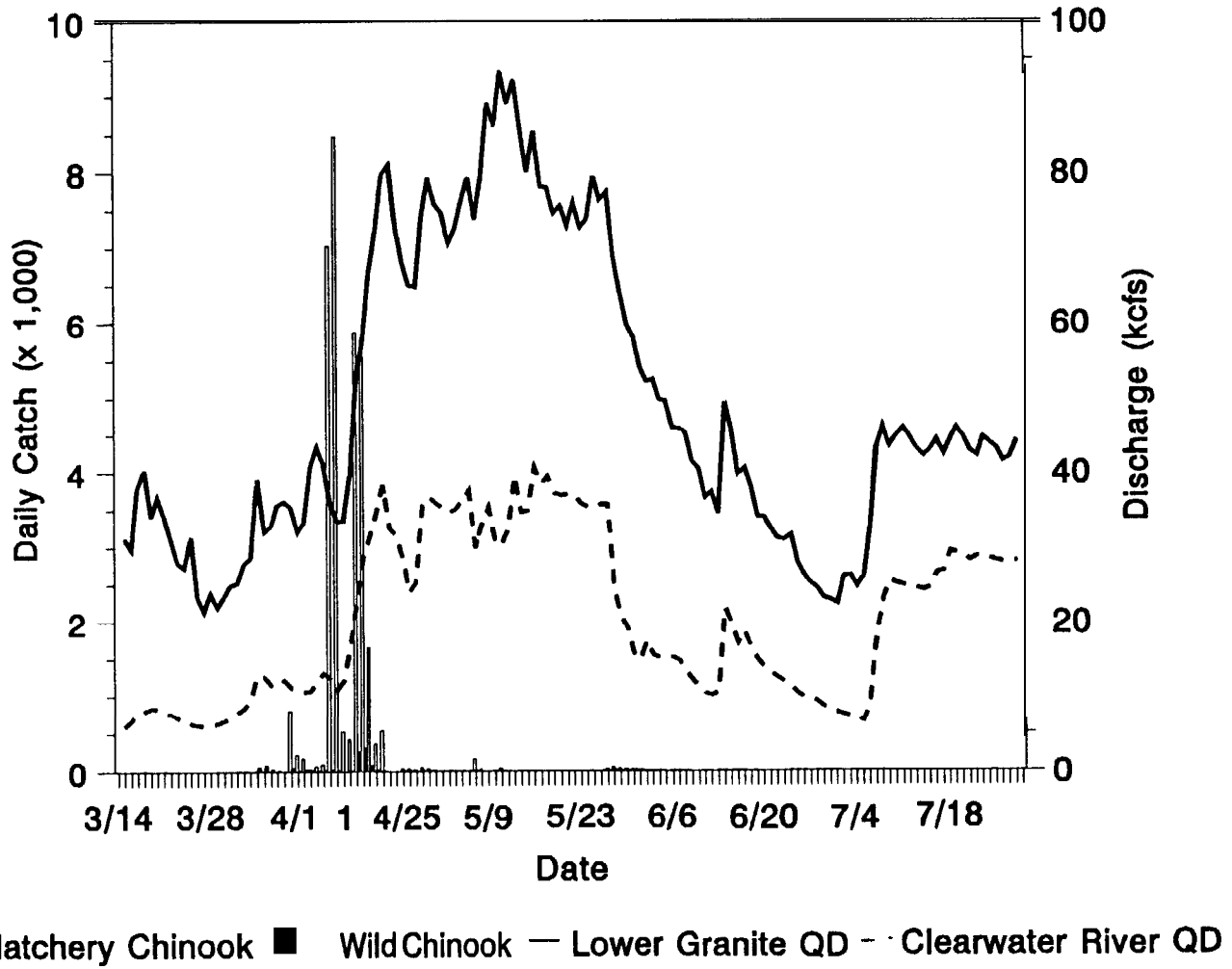

Figure 5. Clearwater River trap daily catch of hatchery chinook salmon and wild chinook salmon overlaid by Clearwater River discharge, 1994.

that might have occurred in late April and May were not detected due to the location of the trap. Less than 1% of the 1994 total catch was captured in March, 98.3% in April, 1.4% in May, and less than 1% in both June and July.

Wild chinook salmon began arriving at the trap in mid-March. Numbers remained low (<10/d) until April 4. Wild chinook salmon passage timing was similar to that of hatchery chinook salmon (Figure 5). Peak passage began on April 4 and ended at an unknown date for reasons previously mentioned. Less than 1% of the total catch of wild chinook salmon were collected in March, 82.9% in April, 8.3% in May, 7.1% in June, and 1.3% in July. The 1994 total catch of wild chinook salmon was 4.2 times greater than in 1993.

Peak passage of age 0 chinook salmon occurred in June and July. About 5% of the season total catch was captured in May, 38% in June and 57% in July.

There were two major peaks of hatchery steelhead trout passage. The first peak began on April 19 and lasted until April 29. This peak was due to movement of smolts outplanted in the Clearwater River drainage by Dworshak National and Clearwater fish hatcheries. The second peak began on May 3 and ended May 8 (Figure 6). The second peak consisted mainly of smolts released by Dworshak National Fish Hatchery into the mainstem Clearwater River (Figure 6). The 1994 hatchery steelhead trout trap catch was about 54% less than the 1993 catch. The large difference in total catch between 1994 and 1993 was due to trap location. In 1994, the majority of hatchery steelhead trout outmigrated when the trap was not operating in the thalweg of the river. There were no hatchery steelhead trout captured in March, 42.9% in April, 53.8% in May, 2.4% in June, and less than 1% in July. The 1994 total trap catch of hatchery steelhead trout was 54.4% less than in 1993, 35.4% less than in 1992, 50% less than in 1991, but 4.1 times greater than in 1989.

Wild steelhead trout were present in the trap catch in low numbers (<12/d) from March 19 until April 19 when numbers of wild steelhead trout collected increased to 704. Numbers of wild steelhead trout collected remained high until the trap was moved out of the thalweg three days later due to high discharge. Following the move, catch rates for wild steelhead trout decreased dramatically (Figure 6). Daily collections of wild steelhead trout remained low (<30/d) throughout the remainder of the field season. The.timing of the 1994 wild steelhead trout outmigration was similar to the timing observed in the 1993 outmigration. One wild steelhead trout was captured in March, 95.4% were collected in April, 4% in May, and less than 1% in both June and July. The 1994 total trap catch of wild steelhead trout was about two times greater than in 1993, nearly 49% less than in 1992, 2.2 times greater than in 1991, and 12.7 times greater than in 1989.

Clearwater River discharge, measured at the Spalding gauge, ranged from 4.7 kcfs to 10.9 kcfs (March). Discharge averaged 7.1 kcfs for the month of March, which was the lowest average discharge recorded for that month in the past seven years. Discharge began to increase in April and ranged from 7.8 kcfs to 38.4 kcfs. The average April discharge of 19.2 kcfs was about the same as in 1993, but 3.0 kcfs greater than in 1992 and 1991. The average April discharge was 29.9 kcfs in 1989. May discharge ranged from 15.7 kcfs to 40.6 kcfs. The average May discharge of 33.5

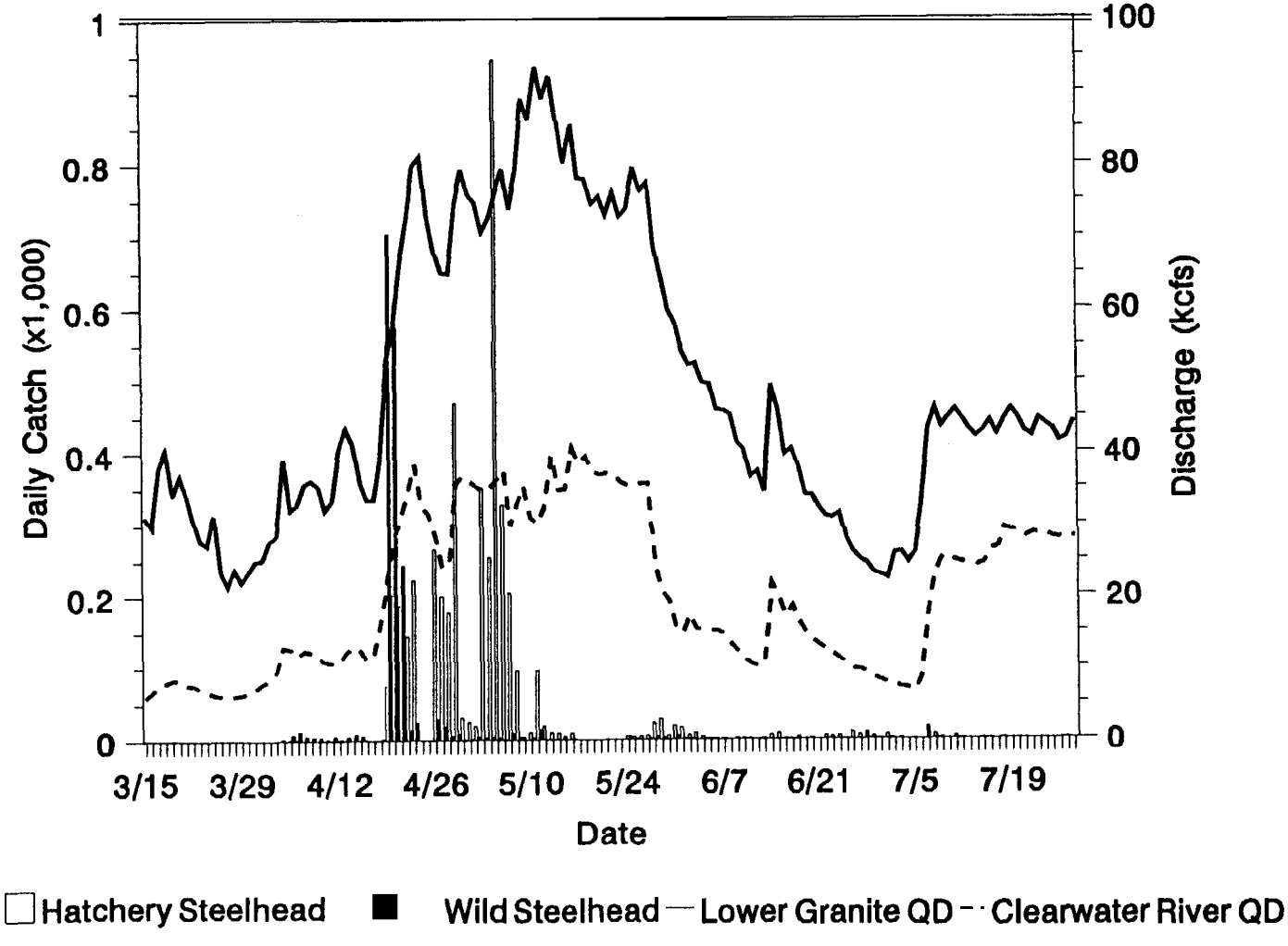

Figure 6. Clearwater River trap daily catch of hatchery steelhead trout and wild steelhead trout overlaid by Clearwater River discharge, 1994.

kcfs was 14.0 kcfs lower than in 1993, 4.3 kcfs greater than in 1992, 4.5 kcfs less than in 1991, and about the same as in 1989.

Water temperature measured at the Clearwater River trap was 7°C at the beginning of the season and gradually increased to 19°C by the end of the first week of July (Figure 7). Water temperatures decreased throughout the remainder of the field season due to releases of large quantities (15-20 kcfs) of cool water from Dworshak Reservoir.

Secchi disk transparency measurements were taken daily at the Clearwater River trap. Transparencies fluctuated throughout the trapping season and ranged from 0.5 m to 3.0 m (Figure 7).

Salmon River Trap Operation

The Salmon River trap captured 38,902 age 1 hatchery chinook salmon, 4,774 age 1 wild chinook salmon, 7,383 hatchery steelhead trout, 564 wild steelhead trout, and 17 sockeye/kokanee.

Small numbers (<5/d) of hatchery chinook salmon were collected daily during the latter part of March. Catch numbers increased significantly on April 10 due to the arrival of the Rapid River Hatchery release. Collection remained high (>100/d) until May 12 when the catch rate dropped to 39 hatchery chinook salmon. Daily trap catch of hatchery chinook salmon remained low (<50/d) for the remainder of the trapping season (Figure 8). The timing of the hatchery chinook salmon outmigration in 1994 was similar to the timing observed in 1993. Less than 1% of the total catch of hatchery chinook salmon was captured in March, 92.2% was collected in April, 7.5% in May, and less than 1% in June. The 1994 total catch of hatchery chinook salmon was about 1.4 times greater than in 1993.

Wild chinook salmon began arriving at the Salmon River trap in low numbers (<10/d) in mid-March. There were two major peaks in chinook passage (Figure 8). The first peak began on March 30 and reached its maximum on April 11. The second began on April 16 and peaked on April 19. The timing of the wild chinook salmon outmigration in 1994 was similar to that observed in 1993. Less than 1% of the total catch of wild chinook salmon was collected in March, 76.9% was captured in April, 16.5% in May, and 5.6% in June. The 1994 total catch of wild chinook salmon was about 7% less than what was realized in 1993.

Two major peaks of hatchery steelhead trout passage were observed at the Salmon River trap in 1994. The first began on April 19 and peaked on April 28 (Figure 9). The second began on May 18 and peaked on May 23. The first peak in passage of hatchery steelhead trout was similar to what was experienced in 1993. The second peak cannot be compared to the 1993 data. The 1993 trapping operations were terminated a month earlier than in 1994. There were no hatchery steelhead trout collected in March. About 46% of the season total was collected in April, 50.4% in May, and 3.4% in June. The 1994 total catch of hatchery steelhead trout was virtually the same as in 1993.

Wild steelhead trout began to arrive in small numbers (<5/d) at the beginning of April. Wild steelhead trout passage began to increase on

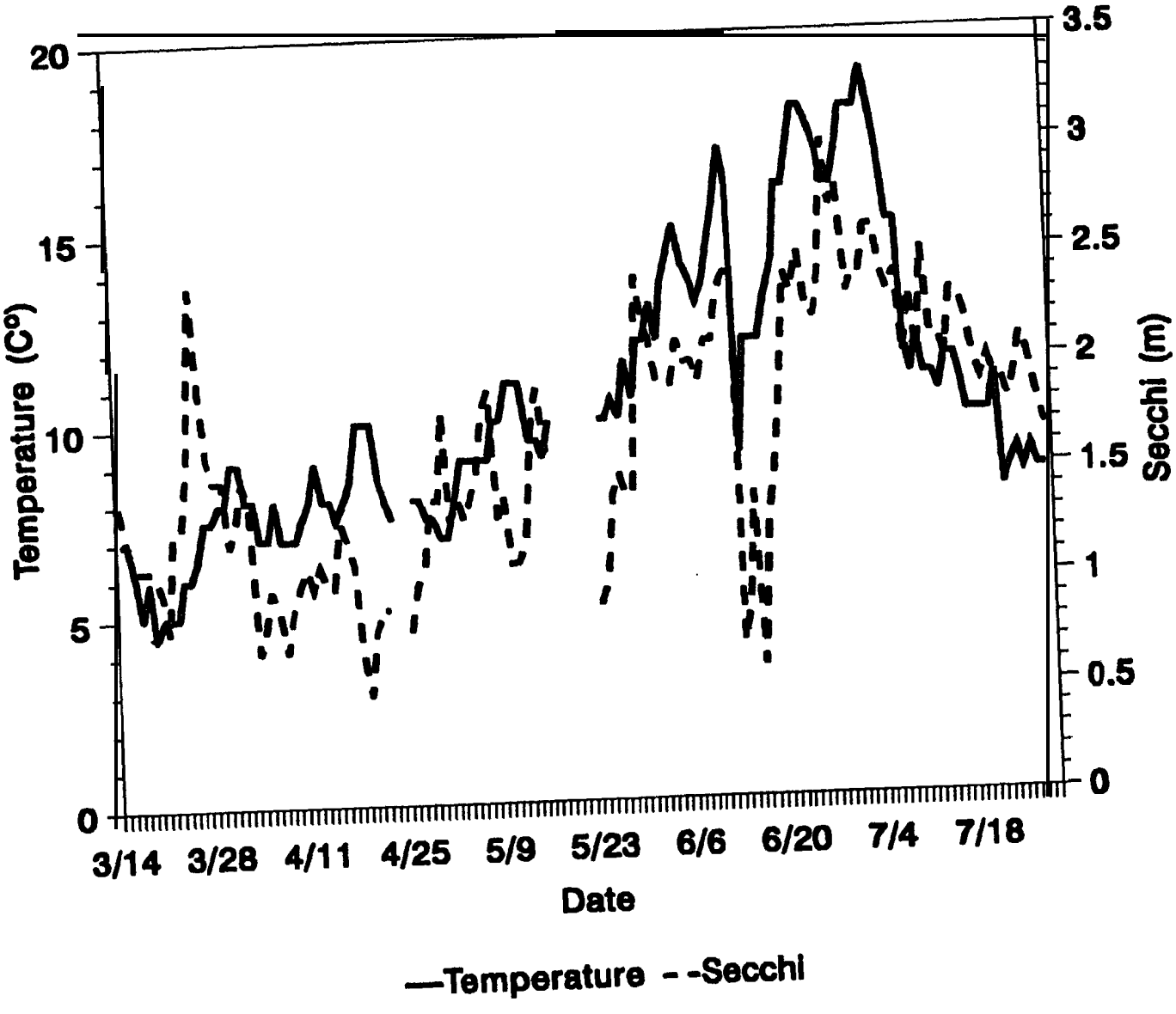

Figure 7. Daily temperature and secchi disk transparency at the Clearwater River trap, 1994.

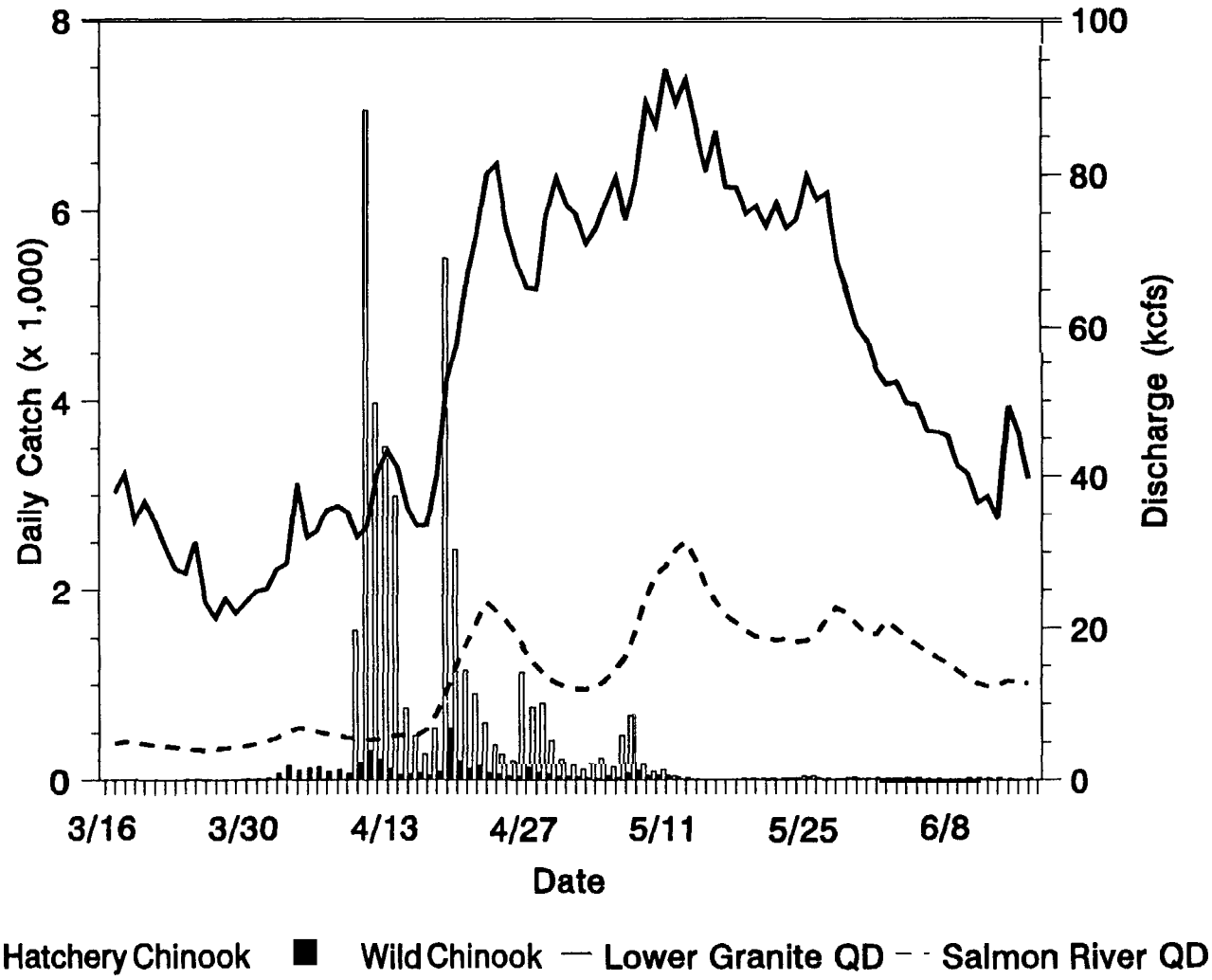

Figure 8. Salmon River trap daily catch of hatchery chinook salmon and wild chinook salmon overlaid by Salmon River discharge, 1994.

APPENDIX A

Travel time to Lower Granite Dam for fish PIT-tagged at Smolt Monitoring Project traps on the Snake, Salmon, and Clewarwater rivers, 1994.

Table A-l. PIT-tagged hatchery chinook salmon travel time, with 95% confidence intervals, from the Snake River trap to Lower Granite Dam, 1994.

Release date	Median travel time (day)	Confidence Interval [a] Upper	Lower	Number captured	Percent captured (%)	Mean discharge (kcfs)
4/13	10.53	9.46	12.00	38	37.6	50.55
4/14	9.59	7.32	11.55	20	29.4	51.27
4/15	9.11	6.81	10.55	17	36.2	52.39
4/16	10.18	6.36	12.18	12	37.5	58.95
4/19	6.37	5.44	8.19	47	39.2	68.32
4/20	6.99	5.54	8.30	43	43.0	71.14
4/21	7.93	5.93	10.26	40	40.0	71.27
4/22	8.49	6.59	10.74	45	45.0	72.25
4/23	8.84	7.53	13.59	42	38.5	73.42
4/24	10.97	6.77	13.50	34	34.3	72.61
4/25	10.10	8.69	12.57	39	39.0	71.77
4/26	10.48	8.78	11.23	42	42.4	72.10
4/27	10.63	9.49	11.73	37	36.6	73.27
4/28	9.40	7.89	10.70	47	35.1	74.13
4/29	9.03	7.84	10.15	46	41.4	75.13
4/30	7.83	7.47	8.52	35	34.7	75.24
5/1	7.16	6.09	8.29	31	39.7	74.67
5/2	7.49	6.29	8.04	23	32.9	75.14
5/3	6.23	5.50	7.24	18	30.5	75.23
5/4	5.60	4.83	6.13	31	31.0	78.32
5/5	5.21	4.62	5.68	24	38.1	79.48
5/6	4.81	3.93	6.28	12	14.8	81.48
5/7	4.10	3.40	4.56	25	24.3	82.02
5/8	3.25	2.67	4.04	28	27.2	84.77
5/9	3.78	2.95	5.76	21	21.6	89.40
5/10	5.29	3.01	7.74	13	11.9	89.30
5/11	4.36	3.70	7.36	16	16.2	90.10
5/12	4.31	3.81	8.36	13	12.9	86.75
5/13	6.28	5.11	9.27	10	14.7	83.22
5/14	6.30	6.05	8.06	13	19.4	80.28
[b]5/15	8.15	0.00	0.00	5	12.8	77.51
[b]5/16	5.18	0.00	0.00	2	15.4	78.26
[b]5/17	4.58	3.13	6.11	9	33.3	75.76
[b]5/18	6.76	0.00	0.00	1	14.3	74.74
[b]5/19	9.95	0.00	0.00	2	22.2	74.70
[b]5/20	2.85	0.00	0.00	1	50.0	74.77
[b]5/21	6.27	0.00	0.00	1	25.0	75.17
[b]5/28	12.13	0.00	0.00	1	33.3	53.81
[b]5/30	5.17	0.00	0.00	1	50.0	55.26
[b]7/6	11.17	0.00	0.00	1	100.0	43.03

'Confidence intervals calculated with nonparametric statistics.
"Not used in statistical analysis because analysis showed too few recaptures.

Table A-2. PIT-tagged wild chinook salmon travel time, with 95% confidence intervals, from the Snake River trap to Lower Granite Dam, 1994.

Release date	Median travel time (day)	Confidence Interval [a] Upper	Lower	Number captured	Percent captured (%)	Mean discharge (kcfs)
[b]4/14	8.23	0.00	0.00	3	50.0	45.09
[b]4/15	7.21	0.00	0.00	2	66.7	45.64
[b]4/16	9.41	0.00	0.00	1	33.3	57.41
4/19	5.87	5.14	6.56	45	62.5	68.32
4/20	5.44	4.50	5.71	27	50.9	71.42
4/21	5.21	4.68	6.55	39	53.4	74.46
4/22	5.71	5.28	6.66	32	44.4	73.15
4/23	6.42	5.58	7.37	28	47.5	71.92
4/24	6.49	5.71	8.27	26	47.3	71.00
4/25	6.86	4.83	10.22	21	48.8	71.43
4/26	6.83	4.82	11.31	14	58.3	71.69
4/27	7.87	6.19	10.75	18	46.2	72.10
4/28,29,30-5/1,2	7.10	6.12	8.19	25	39.7	74.73
[b]5/3	7.31	0.00	0.00	2	25.0	77.21
[b]5/4	5.62	0.00	0.00	3	42.9	78.32
[b]5/5	5.46	0.00	0.00	2	50.0	79.48
[b]5/6	4.76	0.00	0.00	4	66.7	81.48
[b]5/7	3.46	0.00	0.00	2	28.6	80.67
[b]5/8	4.68	3.41	6.32	9	36.0	87.34
[b]5/9	4.39	0.00	0.00	5	25.0	89.40
[b]5/10	4.71	0.00	0.00	5	13.2	89.30
[b]5/11	4.75	0.00	0.00	5	12.5	88.08
[b]5/12	5.06	4.19	5.82	9	24.3	86.48
[b]5/13	8.30	0.00	0.00	1	4.0	81.16
[b]5/14	6.12	4.14	8.73	7	20.6	80.28
[b]5/15	3.72	0.00	0.00	1	11.1	80.33
[b]5/17	4.31	0.00	0.00	1	20.0	76.47
[b]5/18	5.71	0.00	0.00	1	11.1	74.90
[b]5/19	4.15	0.00	0.00	2	100.0	74.70
[b]5/20	26.78	0.00	0.00	2	50.0	56.83
[b]5/22	21.71	0.00	0.00	1	33.3	54.30
[b]5/24	4.75	0.00	0.00	1	20.0	75.10
[b]5/25	5.22	0.00	0.00	2	25.0	73.20
[b]5/27	53.34	0.00	0.00	1	14.3	40.65
[b]5/28	4.92	0.00	0.00	1	11.1	60.96
[b]6/2	5.92	0.00	0.00	1	100.0	49.27
[b]6/3	6.08	0.00	0.00	1	25.0	48.13
[b]6/4	38.68	0.00	0.00	1	100.0	36.13
[b]6/5	23.80	0.00	0.00	1	20.0	36.96
[b]6/6	43.02	0.00	0.00	1	25.0	36.49
[b]6/15	9.77	0.00	0.00	1	50.0	35.74
[b]7/1	Il.71	0.00	0.00	1	100.0	35.52

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

Table A-3. PIT-tagged hatchery steelhead travel time, with 95% confidence intervals, from the Snake River trap to Lower Granite Dam, 1994.

Release date	Median travel time (day)	Confidence Interval [a] Upper	Lower	Number captured	Percent captured (%)	Mean discharge (kcfs)
4/13,14,15,16	7.13	5.09	9.75	13	72.2	42.03
4/19	4.25	3.38	6.15	44	80.0	62.28
4/20	4.05	3.10	4.85	45	76.3	69.03
4/21	4.18	3.32	5.07	49	84.5	74.88
4/22	4.14	3.52	5.68	45	73.8	76.45
4/23	3.77	3.08	4.64	46	74.2	75.43
4/24	4.45	3.69	5.15	46	76.7	71.72
4/25	4.12	3.04	6.73	50	73.5	67.67
4/26	4.31	3.75	6.03	56	82.4	68.05
4/27	3.53	3.03	4.13	64	84.2	70.83
4/28	5.67	3.63	7.91	48	78.7	73.22
4/29	2.91	2.14	3.75	49	74.2	76.43
4/30	4.49	3.25	6.32	42	71.2	75.05
5/1	3.70	2.91	5.08	46	75.4	73.38
5/2	4.61	2.97	5.87	40	65.6	74.62
5/3	3.33	2.84	4.46	41	67.2	73.07
5/4	3.58	2.93	4.81	46	75.4	75.42
5/5	3.03	2.75	3.66	37	58.7	76.40
5/6	3.04	2.73	3.73	43	67.2	77.40
5/7	3.21	2.64	3.54	39	63.9	80.67
5/8	2.74	2.47	3.26	25	43.1	84.77
5/9	2.44	1.79	2.97	29	47.5	87.60
5/10	4.05	2.72	5.31	14	23.3	90.15
5/11	3.70	2.74	8.92	13	19.7	90.10
5/12	3.89	2.12	7.77	6	9.8	86.75
5/13	4.50	2.60	13.15	8	13.6	84.28
5/14	5.73	3.68	10.45	9	13.2	80.28
5/15	5.41	3.76	11.97	10	15.6	79.16
5/16	4.82	3.77	6.66	15	25.0	78.26
5/17	3.77	3.12	5.75	15	22.1	76.47
5/18	5.08	3.08	6.83	17	28.3	75.34
5/19	6.18	4.70	7.10	14	20.0	74.22
5/20	4.77	3.76	5.16	9	31.0	74.16
5/21	3.93	3.67	4.83	24	38.7	73.83
5/22,23,24	3.98	2.85	5.92	29	23.0	75.55
5/25,27	5.02	3.72	6.98	35	27.8	65.62
[b]5/26	3.19	0.00	0.00	2	33.3	74.10
5/28,29,30	5.85	4.97	9.84	35	18.7	56.77
[b]5/31	22.50	0.00	0.00	2	10.5	42.92
[b]6/1	21.60	4.14	35.75	11	19.6	42.23
[b]6/2	3.23	0.00	0.00	1	25.0	51.40
[b]6/3	21.29	0.00	0.00	3	21.4	40.66
[b]6/4	4.87	0.00	0.00	1	7.7	47.28
[b]6/6	24.34	0.00	0.00	4	25.0	35.86
[b]6/11	19.88	0.00	0.00	4	25.0	33.23
[b]6/12	10.60	0.00	0.00	2	14.3	37.82
[b]6/13	9.68	3.07	41.73	6	17.1	37.87
[b]6/14	22.77	9.91	39.26	7	13.0	31.07
[b]6/15	24.03	0.00	0.00	5	10.9	31.44
[b]6/16	32.13	0.00	0.00	3	25.0	34.45
[b]6/19	5.19	0.00	0.00	5	18.5	32.44

Table A-3. Continued.

Release date	Median travel time (day)	Confidence Interval [a] Upper	Lower	Number captured	Percent captured (%)	Mean discharge (kcfs)
[b]6/20	26.83	0.00	0.00	2	4.7	33.63
[b]6/21	4.17	0.00	0.00	1	2.5	31.45
[b]6/22	16.62	0.00	0.00	3	15.8	28.86
[b]6/23	15.00	0.00	0.00	1	4.3	27.57
[b]6/25	19.24	0.00	0.00	3	11.1	32.58
[b]6/26	12.10	10.48	15.68	6	10.2	26.93
[b]6/27	20.14	10.04	27.79	8	26.7	34.71
[b]7/1	12.83	0.00	0.00	2	10.5	36.10
[b]7/2	14.12	4.84	26.58	8	17.8	37.99
[b]7/3	13.14	4.53	21.36	6	28.6	37.02
[b]7/5	9.80	2.98	21.96	8	16.7	41.22
[b]7/6	2.26	0.00	0.00	1	10.0	38.00
[b]7/7	15.99	0.00	0.00	5	33.3	43.92
[b]7/8	14.15	0.00	0.00	2	28.6	44.10

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

Table A-4. PIT-tagged wild steelhead trout travel time, with 95% confidence intervals, from the Snake River trap to Lower Granite Dam, 1994.

Release date	Median travel time (day)	Confidence Interval[a] Upper	Lower	Number captured	Percent captured (%)	Mean discharge (kcfs)
4/13,14,15,16	6.13	4.49	8.78	11	78.6	39.43
4/19	3.47	3.26	4.27	61	74.4	58.97
4/20	3.45	2.78	3.57	38	66.7	65.43
4/21	3.35	3.20	3.59	186	72.4	72.83
4/22	3.26	3.02	3.42	222	73.5	77.67
4/23	3.09	2.56	4.05	42	63.6	77.87
4/24	3.54	2.75	4.10	41	70.7	71.72
4/25	3.67	3.50	4.34	91	71.7	67.67
4/26	3.74	3.46	4.33	56	73.7	68.05
4/27	3.91	3.34	4.26	71	83.5	70.83
4/28	3.30	2.68	3.61	36	70.6	72.77
4/29	2.95	2.64	3.62	38	77.6	76.43
4/30	3.48	3.04	4.40	51	68.0	76.53
5/1	3.34	2.63	5.34	16	88.9	73.67
5/2	2.73	2.50	3.71	26	74.3	72.57
5/3	3.39	3.11	4.07	41	71.9	73.07
5/4	3.15	2.57	3.90	25	62.5	75.97
5/5	3.38	2.98	3.91	71	69.6	76.40
5/6	2.93	2.67	3.41	38	63.3	77.40
5/7	2.62	2.47	3.02	54	66.7	80.67
5/8	2.62	2.46	3.01	52	63.4	84.77
5/9	2.53	2.26	2.86	52	56.5	89.53
5/10	3.32	2.81	3.59	49	34.3	89.50
5/11	3.23	2.64	4.54	24	25.5	91.50
5/12	4.31	3.23	6.07	42	35.9	86.75
5/13	3.65	2.64	4.70	9	8.1	85.85
5/14	3.69	3.39	4.71	23	22.3	82.33
5/15	4.97	3.96	6.09	13	18.8	79.16
5/16	3.80	3.19	5.13	17	27.9	78.95
5/17	3.62	2.69	4.93	12	20.3	76.47
5/18	3.73	2.78	6.25	9	23.1	75.20
[b]5/19	3.82	0.00	0.00	5	23.8	74.70
[b]5/20	11.08	0.00	0.00	1	14.3	72.42
[b]5/21	4.60	2.98	13.13	7	58.3	74.94
[b]5/22	3.20	2.73	4.40	7	53.8	74.13
[b]5/23	2.94	2.73	32.25	7	43.8	75.30
[b]5/24	5.37	0.00	0.00	4	25.0	75.10
[b]5/25	10.03	0.00	0.00	2	16.7	64.23
[b]5/26	5.84	0.00	0.00	3	42.9	67.40
[b]5/27	4.15	0.00	0.00	3	21.4	67.53
[b]5/28	2.90	0.00	0.00	5	41.7	64.27
[b]5/29	4.88	0.00	0.00	1	20.0	57.64
[b]5/30	17.23	0.00	0.00	1	20.0	46.92
[b]6/1	23.31	0.00	0.00	2	50.0	41.74
[b]6/4	4.18	0.00	0.00	1	100.0	47.77
[b]6/16	31.94	0.00	0.00	1	100.0	34.45
[b]7/2	16.79	0.00	0.00	1	100.0	38.99

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

Table A-5. PIT-tagged hatchery chinook salmon travel time, with 95% confidence intervals, from the Clearwater River trap to Lower Granite Dam, 1994.

Release date	Median travel time (day)	Confidence Interval [a] Lower	Upper	Number captured	Percent captured (%)	Mean discharge (kcfs)
[b]4/5	16.63	0.00	0.00	3	42.9	40.11
[b]4/6	14.46	0.00	0.00	3	37.5	37.56
[b]4/8	14.05	0.00	0.00	1	100.0	41.54
4/9	22.03	15.56	25.66	26	25.7	54.66
4/10	24.65	14.56	31.48	22	20.2	58.43
4/11	23.81	16.68	28.67	24	25.5	59.53
4/12,13	14.23	11.78	18.56	25	26.6	55.57
4/14	12.97	10.51	17.52	22	26.2	56.51
4/15	13.95	11.34	18.50	31	31.0	58.80
4/16	17.72	10.46	22.48	26	25.2	64.55
4/17	20.14	13.57	22.63	31	31.0	67.81
4/18	14.42	10.57	19.55	32	32.3	67.84
4/19	17.06	13.03	19.21	43	40.2	70.81
4/20	19.36	18.13	19.65	28	28.6	72.79
4/21	18.29	14.45	20.46	21	21.0	73.64
4/22	17.55	16.65	18.49	24	23.8	74.89
4/23	16.70	15.32	17.53	27	28.1	75.05
4/26,27,28	11.12	10.14	13.74	20	23.3	73.27
4/29,30-5/1	11.34	9.70	12.28	23	24.2	77.84
[b]5/2	9.05	0.00	0.00	1	12.5	77.91
[b]5/3	5.55	0.00	0.00	1	14.3	75.23
[b]5/4	5.58	0.00	0.00	1	7.7	78.32
[b]5/5	15.17	0.00	0.00	2	33.3	82.65
[b]5/7	5.60	3.42	12.14	15	16.5	85.08
[b]5/8	9.22	0.00	0.00	5	21.7	86.68
[b]5/10	9.04	0.00	0.00	4	44.4	85.31
[b]5/11	8.07	5.24	8.38	9	23.7	85.21
[b]5/12	7.12	0.00	0.00	1	14.3	84.04
[b]5/27	4.52	0.00	0.00	4	17.4	65.62
[b]5/28	8.11	5.98	17.43	7	16.3	57.38
[b]5/29	6.61	4.69	14.26	6	19.4	55.76
[b]5/31	6.91	0.00	0.00	3	10.7	51.67
[b]6/1	18.66	0.00	0.00	4	20.0	43.78
[b]6/2	44.3s	0.00	0.00	2	25.0	37.31
[b]6/3	48.76	0.00	0.00	1	33.3	37.83
[b]6/4	4.35	0.00	0.00	2	66.7	47.77

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

Table A-6. PIT-tagged wild chinook salmon travel time, with 95% confidence intervals, from the Clearwater River trap to Lower Granite Dam, 1994.

Release date	Median travel time (day)	Confidence Interval [a] Lower	Upper	Number captured	Percent captured (%)	Mean discharge (kcfs)
[b]4/5	16.67	16.46	17.78	42	53.2	40.11
[b]4/6	15.66	14.63	17.61	16	42.1	40.62
[b]4/7	15.05	13.20	18.53	10	62.5	41.14
[b]4/8	16.61	0.00	0.00	4	80.0	47.91
[b]4/9	14.11	13.12	15.18	22	51.2	44.11
[b]4/10	12.23	11.03	15.78	9	56.2	42.51
[b]4/11	12.18	11.59	13.55	16	51.6	45.86
[b]4/12	11.80	10.59	18.43	7	50.0	49.73
[b]4/13	10.15	0.00	0.00	3	50.0	47.63
[b]4/14	9.71	7.02	15.30	8	50.0	51.27
[b]4/15	9.56	0.00	0.00	1	11.1	55.25
[b]4/16	19.91	0.00	0.00	2	66.7	65.52
[b]4/18	7.44	0.00	0.00	3	60.0	64.24
[b]4/19	9.07	7.02	10.36	37	46.8	68.42
[b]4/20	11.61	8.12	16.66	33	42.9	71.42
[b]4/21	11.46	8.64	14.81	27	36.0	72.68
[b]4/22	11.57	9.48	15.17	10	45.5	73.18
[b]4/23	11.43	0.00	0.00	5	62.5	73.27
[b]4/26	16.52	0.00	0.00	2	40.0	77.11
[b]4/27	12.46	0.00	0.00	3	42.9	73.76
[b]4/29	10.42	0.00	0.00	3	37.5	75.53
[b]4/30	10.58	0.00	0.00	4	80.0	77.84
[b]5/3	16.76	0.00	0.00	2	66.7	81.34
[b]5/4	8.36	0.00	0.00	2	66.7	81.17
[b]5/5	5.93	0.00	0.00	1	25.0	80.58
[b]5/7	2.63	0.00	0.00	1	20.0	80.67
[b]5/11	7.82	0.00	0.00	2	20.0	85.21
[b]5/12	13.31	0.00	0.00	2	66.7	79.51
[b]5/27	7.96	0.00	0.00	3	37.5	60.83
[b]5/28	7.31	6.83	8.30	6	37.5	58.47
[b]5/29	6.71	0.00	0.00	3	30.0	55.76
[b]5/30	41.53	0.00	0.00	2	50.0	37.97
[b]5/31	49.45	0.00	0.00	2	11.1	38.46
[b]6/1	38.95	0.00	0.00	3	23.1	36.72
[b]6/2	12.38	0.00	0.00	1	16.7	44.23
[b]6/4	35.09	0.00	0.00	2	40.0	35.15
[b]6/7	34.20	0.00	0.00	5	100.0	34.51
[b]6/8	8.74	0.00	0.00	1	33.3	41.10
[b]6/15	17.15	0.00	0.00	1	10.0	31.15
[b]6/16	17.24	0.00	0.00	1	33.3	29.99
[b]7/7	6.98	0.00	0.00	1	6.2	44.47

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

Table A-7. PIT-tagged hatchery steelhead trout travel time, with 95% confidence intervals, from the Clearwater River trap to Lower Granite Dam, 1994.

Release date	Median travel time (day)	Confidence Interval [a] Lower	Upper	Number captured	Percent captured (%)	Mean discharge (kcfs)
[b]4/12	4.54	0.00	0.00	1	100.0	38.90
[b]4/16	4.55	0.00	0.00	1	100.0	43.44
4/19	5.83	3.89	7.41	48	78.7	68.32
4/20	5.21	4.09	5.98	38	64.4	71.42
4/21	6.39	4.89	7.16	43	71.7	73.40
4/22	5.52	4.52	6.95	41	68.3	73.15
4/23	6.26	4.54	8.02	56	94.9	71.92
4/26	6.55	4.76	9.51	44	73.3	71.69
4/27	6.54	4.52	9.13	48	81.4	72.04
4/28	7.55	5.36	10.70	41	67.2	73.49
4/29	7.35	4.56	8.45	50	80.6	74.73
4/30	7.58	3.82	8.21	22	71.0	75.24
5/1	7.38	4.86	8.20	18	78.3	74.67
5/2	6.70	5.02	8.23	13	68.4	75.14
5/3	6.18	4.68	7.07	40	66.7	75.23
5/4	5.41	4.75	6.49	38	63.3	76.16
5/5	4.79	4.06	5.23	44	73.3	79.48
5/6	4.25	3.48	6.52	34	56.7	80.32
[b]5/7	4.59	3.95	5.50	37	60.7	84.30
[b]5/8	4.30	3.37	6.81	25	41.0	86.92
[b]5/9	5.57	0.00	0.00	1	25.0	89.27
[b]5/10	10.61	0.00	0.00	2	20.0	83.44
[b]5/11	7.35	3.12	14.19	7	11.3	86.26
[b]5/12	6.39	0.00	0.00	3	16.7	85.07
[b]5/25	7.18	0.00	0.00	1	25.0	69.11
[b]5/26	3.99	0.00	0.00	1	20.0	71.65
[b]5/27	27.85	0.00	0.00	2	33.3	46.00
[b]5/28	3.77	2.58	58.10	7	31.8	62.70
[b]5/29	5.98	0.00	0.00	5	17.2	56.77
[b]5/30	51.90	0.00	0.00	2	33.3	39.13
[b]5/31	6.50	3.13	42.19	6	31.6	51.67
[b]6/1	3.90	0.00	0.00	4	25.0	52.05
[b]6/2	14.86	0.00	0.00	2	33.3	44.37
[b]6/3	6.10	0.00	0.00	1	12.5	48.13
[b]6/13	3.00	0.00	0.00	1	50.0	43.13
[b]6/15	34.08	0.00	0.00	2	25.0	35.07
[b]7/7	22.72	0.00	0.00	2	12.5	43.77
[b]7/8	13.87	0.00	0.00	1	16.7	44.10

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

Table A-8. PIT-tagged wild steelhead trout travel time, with 95% confidence intervals, from the Clearwater River trap to Lower Granite Dam, 1994.

Release date	Median travel time (day)	Confidence Interval [a] Upper	Lower	Number captured	Percent captured (%)	Mean discharge (kcfs)
4/5,6,7,8	9.29	8.17	12.87	15	51.7	36.71
4/9,11,12,13,14	7.19	6.43	8.91	20	80.0	38.26
4/19	4.32	4.19	4.46	469	66.7	62.28
4/20	4.78	4.19	5.18	94	64.4	71.42
4/21	4.64	4.14	5.06	137	62.0	74.46
4/22,23	4.47	3.10	7.14	21	58.3	75.43
4/26,27,28	4.37	3.54	5.63	28	52.8	68.05
4/29	2.92	2.53	11.04	8	88.9	76.43
[b]4/30	3.48	0.00	0.00	1	100.0	76.53
[b]5/1	8.92	0.00	0.00	1	100.0	76.77
[b]5/2	3.56	0.00	0.00	3	60.0	73.45
[b]5/3	5.85	0.00	0.00	3	100.0	75.23
[b]5/4	5.64	0.00	0.00	4	100.0	78.32
[b]5/5	5.46	0.00	0.00	2	66.7	79.48
[b]5/7	3.05	2.52	4.18	6	75.0	80.67
[b]5/8	4.37	0.00	0.00	2	50.0	86.92
[b]5/10	3.36	0.00	0.00	1	33.3	89.50
[b]5/11	5.90	0.00	0.00	2	14.3	87.63
[b]5/28	6.12	0.00	0.00	1	25.0	59.48
[b]5/31	51.31	0.00	0.00	2	40.0	38.73
[b]6/7	42.58	0.00	0.00	1	100.0	36.48
[b]6/16	8.28	0.00	0.00	1	100.0	35.02

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

Table A-9. PIT-tagged hatchery chinook salmon travel time, with 95% confidence intervals, from the Salmon River trap to Lower Granite Dam, 1994.

Release date	Median travel time (day)	Confidence Interval [a] Upper	Lower	Number captured	Percent captured (%)	Mean discharge (kcfs)
[b]3/31	31.73	0.00	0.00	2	50.0	48.76
[b]4/1	18.68	0.00	0.00	4	80.0	35.70
[b]4/2	19.17	0.00	0.00	3	75.0	37.41
[b]4/6	17.10	0.00	0.00	1	100.0	42.48
4/10	15.47	13.55	18.96	33	32.4	49.54
4/11	13.55	12.44	15.72	39	39.0	50.79
4/12	14.19	13.09	17.82	39	39.0	53.61
4/13	11.70	10.70	14.67	32	32.0	53.09
4/14	14.48	10.56	17.90	34	34.0	57.11
4/15	11.05	9.79	11.69	30	30.0	56.85
4/16	13 .55	12.10	15.68	39	38.6	61.55
4/17	10.34	8.67	13.75	24	24.0	62.41
4/18	12.39	10.58	14.72	46	46.0	66.22
4/19	11.57	9.64	15.72	34	34.3	69.51
4/20	11.75	10.65	15.16	35	33.7	71.42
4/21	15.12	12.22	18.67	36	36.4	72.89
4/22	14.53	11.68	15.72	34	34.3	73.74
4/23	1.5.49	11.91	17.23	33	39.3	73.85
4/24	15.99	13.53	19.06	29	24.4	74.76
4/25	15.13	13.52	17.92	23	22.8	74.34
4/26	14.43	12.49	15.51	20	20.0	74.45
4/27	13.54	12.60	16.48	19	18.8	75.74
4/28	12.69	10.82	14.01	22	22.2	76.56
4/29	12.03	10.81	13.40	23	22.8	77.54
4/30	11.35	10.57	13.96	25	25.0	77.84
5/1	10.05	8.49	12.05	11	10.9	77.70
5/2	8.61	7.43	10.53	13	12.9	77.91
5/3	8.47	7.63	12.76	16	15.8	78.33
5/4	8.96	6.75	10.23	16	16.3	82.04
5/5	7.64	6.42	9.60	13	13.0	83.24
5/6	6.29	5.64	7.27	15	15.0	83.47
5/7	6.83	6.01	8.37	16	16.7	86.09
5/8	7.45	5.49	8.77	11	11.3	87.81
5/9	7.17	5.04	9.20	13	12.7	87.94
5/10	9.26	6.18	12.39	13	14.4	85.31
5/11	8.88	6.91	10.31	18	17.3	84.02
[b]5/12	10.14	0.00	0.00	5	12.8	81.12
[b]5/13	18.85	0.00	0.00	2	20.0	75.18
[b]5/14	16.78	0.00	0.00	1	7.7	75.19
[b]5/16	8.95	0.00	0.00	1	16.7	76.29
[b]5/18	15.36	0.00	0.00	1	25.0	70.73
[b]5/19	8.02	0.00	0.00	1	9.1	75.12
[b]5/20	14.84	0.00	0.00	3	21.4	67.54
[b]5/21	11.91	0.00	0.00	1	7.1	69.42
[b]5/22	13.10	0.00	0.00	1	5.9	66.52
[b]5/23	13.03	0.00	0.00	3	15.8	64.50
[b]5/24	9.21	0.00	0.00	3	13.6	67.96
[b]5/25	10.55	0.00	0.00	4	11.1	62.91
[b]5/26	9.89	7.28	22.05	6	14.3	61.26
[b]5/27	10.22	0.00	0.00	1	9.1	58.58
[b]5/28	7.32	0.00	0.00	1	12.5	58.47
[b]5/29	48.16	0.00	0.00	2	13.3	39.12
[b]5/30	27.60	5.95	58.26	6	25.0	41.55
[b]5/31	16.68	0.00	0.00	4	25.0	45.74

Table A-9. Continued.

Release date	Median travel time (day)	Confidence Interval [a] Upper	Lower	Number captured	Percent captured (%)	Mean discharge (kcfs)
[b]6/1	32.26	0.00	0.00	1	10.0	37.18
[b]6/3	38.07	0.00	0.00	2	20.0	36.08
[b]6/4	44.97	0.00	0.00	2	13.3	37.07
[b]6/5	38.01	0.00	0.00	1	7.1	35.77
[b]6/7	33.38	0.00	0.00	1	50.0	34.20
[b]6/9	27.85	0.00	0.00	1	20.0	32.30
[b]6/13	28.04	0.00	0.00	1	20.0	33.09
[b]6/14	15.41	0.00	0.00	1	25.0	34.03
[b]6/15	23.82	0.00	0.00	1	33.3	31.44

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

Table A-10. PIT-tagged wild chinook salmon travel time, with 95% confidence intervals, from the Salmon River trap to Lower Granite Dam, 1994.

Release date	Median travel time (day)	Confidence Interval [a] Upper	Lower	Number captured	Percent captured (%)	Mean discharge (kcfs)
3/31	20.57	16.18	25.50	9	60.0	36.23
4/1	21.14	18.21	21.74	11	55.0	38.21
4/2	20.17	19.48	21.50	38	54.3	38.86
4/3	19.17	18.30	21.23	41	54.7	39.45
4/4	18.37	17.61	19.39	39	52.0	40.06
4/5	17.16	15.62	17.98	41	55.4	40.11
4/6	16.62	15.77	17.46	40	53.3	42.48
4/7	16.33	15.27	16.82	41	54.7	43.08
4/8	14.85	14.19	15.41	33	44.0	43.58
4/9	13.83	12.58	14.72	41	61.2	44.11
4/10	14.48	13.38	15.96	33	44.0	47.29
4/11	11.32	10.74	13.01	13	40.6	43.46
4/12	13.14	11.27	15.56	17	43.6	52.13
4/13	10.64	9.47	11.64	26	57.8	50.55
4/14	10.61	9.83	11.40	30	51.7	53.97
4/15	9.52	8.45	10.19	31	50.0	55.25
4/16	8.52	8.06	9.38	33	45.2	57.41
4/17	7.99	7.21	8.77	30	55.6	60.40
4/18	8.32	7.37	9.72	32	43.2	65.31
4/19	8.67	7.54	10.73	40	46.0	68.42
4/20	10.02	7.43	11.75	31	42.5	70.21
4/21	11.80	10.17	14.68	38	50.7	72.84
4/22	10.35	8.83	14.05	34	43.6	73.30
4/23	13.89	11.65	16.66	33	43.4	73.85
4/24	14.33	10.02	15.48	25	41.0	73.42
4/25	13.61	11.37	16.64	12	27.3	73.29
4/26	13.33	7.73	15.53	10	30.3	73.32
4/27	12.55	10.66	13.53	31	41.3	74.94
4/28	11.41	10.45	12.30	34	45.9	74.55
4/29	11.80	10.51	12.54	22	33.3	77.54
4/30	11.57	9.64	19.46	12	28.6	79.13
5/1	9.71	8.41	11.17	18	45.0	77.70
5/2,3,4	7.48	6.81	9.33	22	31.4	77.21
5/5,6	6.62	6.25	7.75	20	31.2	82.41
5/7,8	8.41	6.26	11.22	27	18.9	86.06
5/9,10,11,12	9.72	7.32	12.17	27	15.4	83.17
[b]5/13	12.74	4.69	55.81	6	26.1	78.77
[b]5/14	12.83	0.00	0.00	2	12.5	77.55
[b]5/16	55.76	0.00	0.00	2	22.2	47.27
[b]5/17	17.69	0.00	0.00	2	28.6	69.08
[b]5/18	20.20	0.00	0.00	1	33.3	65.53
[b]5/20	7.78	0.00	0.00	1	25.0	75.47
[b]5/21	40.08	0.00	0.00	2	18.2	47.44
[b]5/22	7.35	0.00	0.00	2	50.0	74.87
[b]5/23	10.18	0.00	0.00	3	16.7	68.43
[b]5/24	9.24	0.00	0.00	3	17.6	67.96
[b]5/25	10.23	5.81	15.28	8	30.8	64.23
[b]5/26	9.58	0.00	0.00	1	5.0	61.26
[b]5/27	11.83	8.18	44.97	7	35.0	56.48
[b]5/28	11.61	0.00	0.00	2	14.3	53.81
[b]5/29	32.37	0.00	0.00	4	22.2	40.64
[b]5/30	41.77	0.00	0.00	3	27.3	37.97
[b]5/31	33.38	0.00	0.00	2	12.5	37.81
[b]6/1	21.89	0.00	0.00	3	16.7	42.23
[b]6/2	36.77	0.00	0.00	2	14.3	36.07

Table A-10. Continued.

Release date	Median travel time (day)	Confidence Interval [a] Upper	Lower	Number captured	Percent captured (%)	Mean discharge (kcfs)
b6/3	43.20	0.00	0.00	5	31.2	36.97
[b]6/4	33.14	0.00	0.00	5	20.8	34.57
[b]6/5	17.81	0.00	0.00	1	4.2	40.05
[b]6/6	14.64	0.00	0.00	4	28.6	40.53
[b]6/7	32.39	0.00	0.00	3	21.4	33.91
[b]6/8	39.38	0.00	0.00	3	33.3	35.65
[b]6/9	38.23	0.00	0.00	1	11.1	35.39
[b]6/10	28.79	0.00	0.00	4	23.5	32.84
[b]6/11	22.86	0.00	0.00	3	20.0	32.14
[b]6/12	43.12	0.00	0.00	2	10.5	36.69
[b]6/13	27.33	8.07	46.93	7	30.4	32.66
[b]6/15	12.77	0.00	0.00	1	11.1	33.58
[b]6/16	25.16	0.00	0.00	4	22.2	31.89

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

Table A-11. PIT-tagged hatchery steelhead travel time, with 95% confidence intervals, from the Salmon River trap to Lower Granite Dam, 1994.

Release date	Median travel time (day)	Confidence Interval [a] Upper	Lower	Number captured	Percent captured (%)	Mean discharge (kcfs)
4/19	6.56	5.61	8.48	43	70.5	68.96
4/20	4.80	4.64	11.76	9	69.2	71.42
4/21	6.42	5.03	7.99	48	82.8	73.40
4/22	7.62	6.10	10.65	45	68.2	72.25
4/23	7.36	5.83	10.04	46	73.0	72.26
4/24	7.74	5.59	10.06	45	72.6	72.62
4/25	8.11	5.73	10.92	40	66.7	71.83
4/26	6.26	4.75	9.85	45	73.8	71.20
4/27	10.84	8.14	12.19	44	64.7	73.27
4/28	7.56	6.23	9.67	43	70.5	73.49
4/29	7.65	6.26	9.20	34	55.7	75.30
4/30	9.43	6.86	9.78	37	60.7	75.67
5/1	6.89	6.65	8.72	37	61.7	74.67
5/2	8.04	6.79	8.64	49	71.0	76.89
5/3	6.85	5.11	8.24	32	53.3	77.21
5/4	5.83	4.87	7.75	36	60.0	78.32
5/5	5.94	5.18	7.19	33	55.0	80.58
5/6	6.29	4.21	8.06	29	48.3	83.47
5/7	4.95	4.29	7.98	24	40.0	84.30
5/8,9,10	6.06	4.74	9.75	34	26.8	88.13
5/11,12,13	7.75	5.76	12.18	26	14.9	82.85
5/14,15	10.66	5.81	38.79	15	16.1	76.91
[b]5/16	38.57	0.00	0.00	3	18.8	54.63
5/17,18,19,20	6.87	5.79	7.82	28	23.0	74.96
5/21,22,23,24	8.32	7.11	12.59	54	21.7	71.54
5/25,26,27	7.28	5.89	26.38	43	21.0	65.49
[b]5/28	10.14	6.76	56.44	9	16.1	55.45
5/29,30	17.64	5.99	29.16	19	17.8	46.52
5/31-6/1,2,3	23.30	16.55	28.82	36	21.7	41.74
[b]6/4	24.35	15.72	44.18	12	22.2	38.01
[b]6/5	28.10	0.00	0.00	3	11.1	35.05
[b]6/6	16.51	0.00	0.00	2	20.0	39.49
[b]6/7	41.19	0.00	0.00	2	20.0	36.06
[b]6/8	41.07	0.00	0.00	1	9.1	36.02
[b]6/11	5.04	0.00	0.00	1	11.1	40.64
[b]6/14	24.71	0.00	0.00	1	50.0	32.16
[b]6/15	'7.91	0.00	0.00	2	33.3	36.88
[b]6/16	8.32	0.00	0.00	1	10.0	35.02

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

Table A-12. PIT-tagged wild steelhead travel time, with 95% confidence intervals, from the Salmon River trap to Lower Granite Dam, 1994.

Release date	Median travel time (day)	Confidence Interval [a] Upper	Lower	Number captured	Percent captured (%)	Average discharge (kcfs)
[b]4/3	17.80	0.00	0.00	1	100.0	37.94
[b]4/7	20.10	0.00	0.00	1	100.0	49.55
[b]4/12	8.08	0.00	0.00	1	100.0	40.08
[b]4/16	9.36	0.00	0.00	1	50.0	57.41
4/18	6.78	3.62	8.16	7	87.5	64.24
4/19	4.55	4.23	5.26	26	81.2	65.78
4/20	5.18	3.73	6.84	14	58.3	71.42
4/21	4.36	3.69	6.25	20	60.6	74.88
4/22	4.11	3.59	6.78	22	62.9	76.45
4/23	4.88	4.39	7.22	24	77.4	73.34
4/24	6.36	4.65	9.04	16	76.2	71.00
4/25,26	6.50	4.35	13.78	14	82.4	71.69
4/27,28	7.39	5.33	10.75	21	53.8	72.04
4/29,30-5/1	7.13	5.95	9.45	17	68.0	74.73
5/2,4,5,6,7	4.51	3.53	5.21	23	65.7	84.30
5/8	4.08	3.63	4.49	20	31.2	86.92
[b]5/9	4.34	0.00	0.00	1	14.3	89.40
[b]5/10	3.62	0.00	0.00	3	50.0	90.15
[b]5/11	11.89	0.00	0.00	2	25.0	81.71
[b]5/12	4.68	0.00	0.00	3	21.4	86.48
[b]5/14	7.23	0.00	0.00	1	33.3	79.60
[b]5/16	4.32	0.00	0.00	1	33.3	78.95
[b]5/18	9.29	0.00	0.00	1	11.1	75.43
[b]5/19	5.03	0.00	0.00	1	25.0	74.30
[b]5/21	6.00	0.00	0.00	1	20.0	75.17
[b]5/22	4.76	0.00	0.00	2	18.2	75.62
[b]5/23	6.51	0.00	0.00	2	12.5	73.21
[b]5/24	6.87	0.00	0.00	1	11.1	71.37
[b]5/25	10.86	0.00	0.00	1	16.7	62.91
[b]5/26	5.24	0.00	0.00	1	16.7	69.28
[b]5/27	7.80	0.00	0.00	1	10.0	60.83
[b]5/28	25.95	0.00	0.00	2	100.0	45.38
[b]5/29	54.19	0.00	0.00	1	100.0	39.67
[b]5/30	6.57	0.00	0.00	2	66.7	53.64
[b]5/31	51.41	0.00	0.00	2	40.0	38.73
[b]6/1	20.93	0.00	0.00	1	16.7	42.76
[b]6/2	18.84	0.00	0.00	1	50.0	42.72
[b]6/4	17.16	0.00	0.00	1	25.0	41.60

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

APPENDIX B

Interrogations at Lower Granite, Little Goose, Lower Monumental, and McNary dams of fish PIT-tagged at Smolt Monitoring Project traps on the Snake, Salmon, and Clearwater rivers, 1994.

Table B-l. PIT-tagged hatchery chinook salmon interrogations at Lower Granite, Little Goose, Lower Monumental and McNary dams from the Snake River trap, 1994.

Date	Number tagged	Int. at Lower Granite	%	Int. at Little Goose	%	Int. at Lower Monumental	%	Int. at McNary	%	Total int.	Total %
4/13	101	38	37.6	23	22.8	15	14.9	9	8.9	85	84.2
4/14	68	20	29.4	9	13.2	12	17.6	6	8.8	47	69.1
4/15	47	17	36.2	9	19.1	3	6.4	3	6.4	32	68.1
4/16	32	12	37.5	5	15.6	5	15.6	0	0.0	22	68.8
4/19	120	47	39.2	13	10.8	12	10.0	8	6.7	80	66.7
4/20	100	43	43.0	16	16.0	6	6.0	9	9.0	74	74.0
4/21	100	40	40.0	12	12.0	12	12.0	13	13.0	77	77.0
4/22	100	45	45.0	7	7.0	10	10.0	7	7.0	69	69.0
4/23	109	42	38.5	12	11.0	7	6.4	11	10.1	72	66.1
4/24	99	34	34.3	10	10.1	5	5.1	13	13.1	62	62.6
4/25	100	39	39.0	5	5.0	9	9.0	14	14.0	67	67.0
4/26	99	42	42.4	8	8.1	5	5.1	10	10.1	65	65.7
4/27	101	37	36.6	8	7.9	7	6.9	10	9.9	62	61.4
4/28	134	47	35.1	14	10.4	12	9.0	13	9.7	86	64.2
4/29	111	46	41.4	7	6.3	3	2.7	22	19.8	78	70.3
4/30	101	35	34.7	10	9.9	10	9.9	11	10.9	66	65.3
5/1	78	31	39.7	5	6.4	6	7.7	10	12.8	52	66.7
5/2	70	23	32.9	8	11.4	9	12.9	9	12.9	49	70.0
5/3	59	18	30.5	5	8.5	2	3.4	6	10.2	31	52.5
5/4	100	31	31.0	10	10.0	6	6.0	15	15.0	62	62.0
5/5	63	24	38.1	7	11.1	4	6.3	9	14.3	44	69.8
5/6	81	12	14.8	10	12.3	7	8.6	10	12.3	39	48.1
5/7	103	25	24.3	11	10.7	6	5.8	10	9.7	52	50.5
5/8	103	28	27.2	11	10.7	11	10.7	16	15.5	66	64.1
5/9	97	21	21.6	10	10.3	5	5.2	21	21.6	57	58.8
5/10	109	12	11.0	13	11.9	8	7.3	18	16.5	51	46.8
5/11	99	16	16.2	17	17.2	4	4.0	11	11.1	48	48.5
5/12	101	11	10.9	18	17.8	4	4.0	7	6.9	40	39.6
5/13	68	12	17.6	16	23.5	2	2.9	8	11.8	38	55.9
5/14	67	13	19.4	5	7.5	4	6.0	8	11.9	30	44.8
5/15	39	5	12.8	8	20.5	7	17.9	5	12.8	25	64.1
5/16	13	2	15.4	2	15.4	0	0.0	1	7.7	5	38.5
5/17	27	9	33.3	4	14.8	2	7.4	3	11.1	18	66.7

Table B-l. Continued.

Date	Number tagged	Int. at Lower Granite	%	Int. at Little Goose	%	Int. at Lower Monumental	%	Int. at McNary	%	Total int.	Total %
5/18	7	1	14.3	0	0.0	0	0.0	2	28.6	3	42.9
5/19	9	2	22.2	1	11.1	1	11.1	0	0.0	4	44.4
5/20	2	1	50.0	0	0.0	0	0.0	0	0.0	1	50.0
5/21	4	1	25.0	0	0.0	1	25.0	0	0.0	2	50.0
5/23	2	0	0.0	2	100.0	0	0.0	0	0.0	2	100.0
5/25	2	0	0.0	0	0.0	0	0.0	1	50.0	1	50.0
5/27	1	0	0.0	0	0.0	1	100.0	0	0.0	1	100.0
5/28	3	1	33.3	0	0.0	0	0.0	0	0.0	1	33.3
5/29	1	0	0.0	1	100.0	0	0.0	0	0.0	1	100.0
5/30	2	1	50.0	0	0.0	0	0.0	0	0.0	1	50.0
7/6	1	1	100.0	0	0.0	0	0.0	0	0.0	1	100.0
Total	2,833	885		332		223		329		1,769	

Table B-2. PIT-tagged wild chinook salmon interrogations at Lower Granite, Little Goose, Lower Monumental and McNary dams from the Snake River trap, 1994.

Date	Number tagged	Int. at Lower Granite	%	Int. at Little Goose	%	Int. at Lower Monumental	%	Int. at McNary	%	Total int.	Total %
4/13	4	0	0.0	1	25.0	0	0.0	0	0.0	1	25.0
4/14	6	3	50.0	2	33.3	0	0.0	1	16.7	6	100.0
4/15	3	2	66.7	0	0.0	0	0.0	1	33.3	3	100.0
4/16	3	1	33.3	1	33.3	0	0.0	0	0.0	2	66.7
4/19	72	45	62.5	3	4.2	6	8.3	4	5.6	58	80.6
4/20	53	27	50.9	6	11.3	3	5.7	5	9.4	41	77.4
4/21	73	39	53.4	6	8.2	7	9.6	7	9.6	59	80.8
4/22	72	32	44.4	7	9.7	12	16.7	4	5.6	55	76.4
4/23	59	28	47.5		11.9	7	11.9	4	6.8	46	78.0
4/24	55	26	47.3	1	1.8	7	12.7	4	7.3	38	69.1
4/25	43	21	48.8	4	9.3	2	4.7	1	2.3	28	65.1
4/26	24	14	58.3	4	16.7	1	4.2	1	4.2	20	83.3
4/27	39	18	46.2	3	7.7	6	15.4	4	10.3	31	79.5
4/28,29 30- 5/1,2	63	25	39.7	7	11.1	10	15.9	7	11.1	49	77.8
5/3	8	2	25.0	0	0.0	0	0.0	1	12.5	3	37.5
5/4	7	3	42.9	0	0.0	1	14.3	0	0.0	4	57.1
5/5	4	2	50.0	1	25.0	0	0.0	0	0.0	3	75.0
5/6	6	4	66.7	0	0.0	0	0.0	0	0.0	4	66.7
5/7	7	2	28.6	1	14.3	0	0.0	2	28.6	5	71.4
5/8	25	9	36.0	1	4.0	0	0.0	4	16.0	14	56.0
5/9	20	5	25.0	2	10.0	2	10.0	5	25.0	14	70.0
5/10	38	5	13.2	6	15.8	1	2.6	8	21.1	20	52.6
5/11	40	5	12.5	5	12.5	4	10.0	8	20.0	22	55.0
5/12	37	8	21.6	7	18.9	3	8.1	3	8.1	21	56.8
5/13	25	2	8.0	6	24.0	2	8.0	2	8.0	12	48.0
5/14	34	7	20.6	4	11.8	0	0.0	2	5.9	13	38.2
5/15	9	1	11.1	1	11.1	0	0.0	0	0.0	2	22.2
5/16	2	0	0.0	1	50.0	0	0.0	0	0.0	1	50.0
5/17	5	1	20.0	0	0.0	1	20.0	0	0.0	2	40.0
5/18	9	1	11.1	2	22.2	2	22.2	3	33.3	8	88.9
5/19	2	2	100.0	0	0.0	0	0.0	0	0.0	2	100.0
5/20	4	2	50.0	1	25.0	0	0.0	1	25.0	4	100.0
5/21	2	0	0.0	1	50.0	0	0.0	0	0.0	1	50.0
5/22	3	1	33.3	0	0.0	2	66.7	0	0.0	3	100.0
5/24	5	1	20.0	0	0.0	0	0.0	0	0.0	1	20.0
5/25	8	2	25.0	3	37.5	0	0.0	1	12.5	6	75.0

Table B-2. Continued

Date	Number tagged	Int. at Lower Granite	%	Int. at Little Goose	%	Int. at Lower Monumental	%	Int. at McNary	%	Total int.	Total %
5/27	7	1	14.3	1	14.3	2	28.6	0	0.0	4	57.1
5/28	9	1	11.1	1	11.1	1	11.1	0	0.0	3	33.3
6/1	5	0	0.0	0	0.0	1	20.0	0	0.0	1	20.0
6/2	1	1	100.0	0	0.0	0	0.0	0	0.0	1	100.0
6/3	4	1	25.0	1	25.0	0	0.0	0	0.0	2	50.0
6/4	1	1	100.0	0	0.0	0	0.0	0	0.0	1	100.0
6/5	5	1	20.0	0	0.0	0	0.0	0	0.0	1	20.0
6/6	4	1	25.0	0	0.0	0	0.0	0	0.0	1	25.0
7/1	1	1	100.0	0	0.0	0	0.0	0	0.0	1	100.0
7/6	2	0	0.0	0	0.0	1	50.0	0	0.0	1	50.0
Total	908	354		97		84		83		618	

Table B-3. PIT-tagged hatchery steelhead interrogations at Lower Granite, Little Goose, Lower Monumental, and McNary dams from the Snake River trap, 1994.

Date	Number tagged	Int. at Lower Granite	%	Int. at Little Goose	%	Int. at Lower Monumental	%	Int. at McNary	%	Total int.	Total %
4/13,14 15,16	18	13	72.2	0	0.0	1	5.6	0	0.0	14	77.8
4/19	55	44	80.0	3	5.5	2	3.6	0	0.0	49	89.1
4/20	59	45	76.3	5	8.5	2	3.4	1	1.7	53	89.8
4/21	58	49	84.5	1	1.7	0	0.0	0	0.0	50	86.2
4/22	61	45	73.8	6	9.8	3	4.9	1	1.6	55	90.2
4/23	62	46	74.2	4	6.5	3	4.8	0	0.0	53	85.5
4/24	60	46	76.7	4	6.7	2	3.3	0	0.0	52	86.7
4/25	68	50	73.5	4	5.9	5	7.4	0	0.0	59	86.8
4/26	68	56	82.4	7	10.3	0	0.0	0	0.0	63	92.6
4/27	76	64	84.2	6	7.9	4	5.3	0	0.0	74	97.4
4/28	61	48	78.7	4	6.6	2	3.3	0	0.0	54	88.5
4/29	66	49	74.2	6	9.1	4	6.1	0	0.0	59	89.4
4/30	59	42	71.2	4	6.8	2	3.4	0	0.0	48	81.4
5/1	61	46	75.4	1	1.6	5	8.2	1	1.6	53	86.9
5/2	61	40	65.6	3	4.9	2	3.3	1	1.6	46	75.4
5/3	61	41	67.2	3	4.9	2	3.3	0	0.0	46	75.4
5/4	61	46	75.4	2	3.3	1	1.6	1	1.6	50	82.0
5/5	63	37	58.7	6	9.5	2	3.2	0	0.0	45	71.4
5/6	64	43	67.2	3	4.7	2	3.1	1	1.6	49	76.6
5/7	61	39	63.9	0	0.0	2	3.3	1	1.6	42	68.9
5/8	58	25	43.1	7	12.1	3	5.2	1	1.7	36	62.1
5/9	61	29	47.5	6	9.8	1	1.6	3	4.9	39	63.9
5/10	60	14	23.3	10	16.7	2	3.3	0	0.0	26	43.3
5/11	66	13	19.7	6	9.1	9	13.6	2	3.0	30	45.5
5/12	61	6	9.8	6	9.8	5	8.2	6	9.8	23	37.7
5/13	59	8	13.6	13	22.0	6	10.2	1	1.7	28	47.5
5/14	68	9	13.2	11	16.2	4	5.9	1	1.5	25	36.8
5/15	64	10	15.6	12	18.8	4	6.2	1	1.6	27	42.2
5/16	60	15	25.0	7	11.7	0	0.0	2	3.3	24	40.0
5/17	68	15	22.1	4	5.9	3	4.4	3	4.4	25	36.8
5/18	60	17	28.3	8	13.3	2	3.3	1	1.7	28	46.7
5/19	70	14	20.0	11	15.7	4	5.7	5	7.1	34	48.6
5/20	29	9	31.0	1	3.4	2	6.9	0	0.0	12	41.4
5/21	62	24	38.7	4	6.5	1	1.6	5	8.1	34	54.8
5/22,23,24	126	29	23.0	11	8.7	4	3.2	0	0.0	44	34.9
5/25,27	126	35	27..8	10	7.9	2	1.6	1	0.8	48	38.1
5/26	6	2	33.3	0	0.0	1	16.7	0	0.0	3	50.0

Table B-3. Continued

Date	Number tagged	Int. at Lower Granite	%	Int. at Little Goose	%	Int. at Lower Monumental	%	Int. at McNary	%	Total int.	Total %
5/28	60	10	16.7	5	8.3	1	1.7	0	0.0	16	26.7
5/29	66	13	19.7	3	4.5	3	4.5	0	0.0	19	28.8
5/30	61	10	16.4	2	3.3	2	3.3	1	1.6	15	24.6
5/31	19	2	10.5	0	0.0	1	5.3	0	0.0	3	15.8
6/1	56	8	14.3	0	0.0	1	1.8	0	0.0	9	16.1
6/2	4	1	25.0	0	0.0	1	25.0	0	0.0	2	50.0
6/3	14	3	21.4	0	0.0	0	0.0	0	0.0	3	21.4
6/4	13	2	15.4	0	0.0	1	7.7	0	0.0	3	23.1
6/6	16	4	25.0	0	0.0	3	18.8	0	0.0	7	43.8
6/8	8	1	12.5	0	0.0	0	0.0	0	0.0	1	12.5
6/11	16	4	25.0	0	0.0	0	0.0	0	0.0	4	25.0
6/12	14	2	14.3	0	0.0	0	0.0	0	0.0	2	14.3
6/13	35	7	20.0	0	0.0	1	2.9	0	0.0	8	22.9
6/14	54	8	14.8	1	1.9	2	3.7	0	0.0	11	20.4
6/15	46	6	13.0	1	2.2	0	0.0	0	0.0	7	15.2
6/16	12	3	25.0	0	0.0	0	0.0	0	0.0	3	25.0
6/19	27	5	18.5	1	3.7	0	0.0	0	0.0	6	22.2
6/20	43	4	9.3	0	0.0	0	0.0	0	0.0	4	9.3
6/21	40	0	0.0	1	2.5	0	0.0	0	0.0	1	2.5
6/22	19	3	15.8	0	0.0	0	0.0	0	0.0	3	15.8
6/23	23	1	4.3	0	0.0	0	0.0	0	0.0	1	4.3
6/25	27	3	11.1	0	0.0	0	0.0	0	0.0	3	11.1
6/26	59	6	10.2	1	1.7	0	0.0	0	0.0	7	11.9
6/27	30	8	26.7	0	0.0	0	0.0	0	0.0	8	26.7
7/1	19	2	10.5	0	0.0	0	0.0	0	0.0	2	10.5
7/2	45	8	17.8	4	8.9	0	0.0	0	0.0	12	26.7
7/3	21	6	28.6	0	0.0	0	0.0	0	0.0	6	28.6
7/5	48	8	16.7	0	0.0	0	0.0	0	0.0	8	16.7
7/6	10	1	10.0	0	0.0	0	0.0	0	0.0	1	10.0
7/7	15	6	40.0	0	0.0	0	0.0	0	0.0	6	40.0
7/8	7	2	28.6	0	0.0	0	0.0	0	0.0	2	28.6
Total	3,234	1,310		218		115		40		1,683	

Table B-4. PIT-tagged wild steelhead trout interrogations at Lower Granite, Little Goose, Lower Monumental, and McNary dams from the Snake River trap, 1994.

Date	Number tagged	Int. at Lower Granite	%	Int. at Little Goose	%	Int. at Lower Monumental	%	Int. at McNary	%	Total int.	Total %
4/13,14,15 16	14	11	78.6	1	7.1	1	7.1	1	7.1	100.0	
4/19	82	61	74.4	8	9.8	8	9.8	0	0.0	77	93.9
4/20	57	38	66.7	6	10.5	5	8.8	0	0.0	49	86.0
4/21	257	186	72.4	34	13.2	10	3.9	2	0.8	232	90.3
4/22	302	222	73.5	33	10.9	12	4.0	3	1.0	270	89.4
4/23	66	42	63.6	3	4.5	9	13.6	1	1.5	55	83.3
4/24	58	41	70.7	8	13.8	3	5.2	0	0.0	52	89.7
4/25	127	91	71.7	10	7.9	11	8.7	1	0.8	113	89.0
4/26	76	56	73.7	5	6.6	4	5.3	2	2.6	67	88.2
4/27	85	71	83.5	3	3.5	3	3.5	0	0.0	77	90.6
4/28	51	36	70.6	4	7.8	3	5.9	0	0.0	43	84.3
4/29	49	38	77.6	4	8.2	1	2.0	1	2.0	44	89.8
4/30	75	51	68.0	8	10.7	3	4.0	3	4.0	65	86.7
5/1	18	16	88.9	1	5.6	0	0.0	0	0.0	17	94.4
5/2	35	26	74.3	2	5.7	2	5.7	0	0.0	30	85.7
5/3	57	41	71.9	6	10.5	2	3.5	1	1.8	50	87.7
5/4	40	25	62.5	3	7.5	0	0.0	0	0.0	28	70.0
5/5	102	71	69.6	6	5.9	4	3.9	1	1.0	82	80.4
5/6	60	38	63.3	5	8.3	7	11.7	3	5.0	53	88.3
5/7	81	54	66.7	6	7.4	5	6.2	0	0.0	65	80.2
5/8	82	52	63.4	6	7.3	2	2.4	2	2.4	62	75.6
5/9	92	52	56.5	8	8.7	3	3.3	2	2.2	65	70.7
5/10	143	49	34.3	23	16.1	13	9.1	8	5.6	93	65.0
5/11	94	24	25.5	18	19.1	5	5.3	2	2.1	49	52.1
5/12	117	30	25.6	15	12.8	16	13.7	4	3.4	65	55.6
5/13	111	21	18.9	23	20.7	8	7.2	4	3.6	56	50.5
5/14	103	23	22.3	18	17.5	4	3.9	4	3.9	49	47.6
5/15	69	13	18.8	15	21.7	1	1.4	4	5.8	33	47.8
5/16	61	17	27.9	10	16.4	7	11.5	0	0.0	34	55.7
5/17	59	12	20.3	10	16.9	2	3.4	0	0.0	24	40.7
5/18	39	9	23.1	3	7.7	2	5.1	2	5.1	16	41.0
5/19	21	5	23.8	5	23.8	0	0.0	0	0.0	10	47.6
5/20	7	1	14.3	1	14.3	2	28.6	0	0.0	4	57.1

Table B-4. Continued.

Date	Number tagged	Int. at Lower Granite	%	Int. at Little Goose	%	Int. at Lower Monumental	%	Int. at McNary	%	Total int.	Total %
5/21	12	7	58.3	1	8.3	0	0.0	0	0.0	8	66.7
5/22	13	7	53.8	1	7.7	0	0.0	0	0.0	8	61.5
5/23	16	6	37.5	0	0.0	1	6.2	0	0.0	7	43.8
5/24	16	4	25.0	1	6.2	0	0.0	0	0.0	5	31.2
5/25	12	2	16.7	0	0.0	1	8.3	0	0.0	3	25.0
5/26	7	3	42.9	0	0.0	0	0.0	0	0.0	3	42.9
5/27	14	3	21.4	5	35.7	1	7.1	0	0.0	9	64.3
5/28	12	5	41.7	0	0.0	0	0.0	0	0.0	5	41.7
5/29	5	1	20.0	1	20.0	0	0.0	0	0.0	2	40.0
5/30	5	1	20.0	0	0.0	0	0.0	0	0.0	1	20.0
6/1	4	1	25.0	1	25.0	0	0.0	0	0.0	2	50.0
6/4	1	1	100.0	0	0.0	0	0.0	0	0.0	1	100.0
6/8	1	0	0.0	1	100.0	0	0.0	0	0.0	1	100.0
6/16	1	1	100.0	0	0.0	0	0.0	0	0.0	1	100.0
7/2	1	1	100.0	0	0.0	0	0.0	0	0.0	1	100.0
Total	2,810	1,566		322		161		51		2,100	

Table B-5. PIT-tagged hatchery chinook salmon interrogations at Lower Granite, Little Goose, Lower Monumental and McNary dams from the Clearwater River trap, 1994.

Date	Number tagged	Int. at Lower Granite	%	Int. at Little Goose	%	Int. at Lower Monumental	%	Int. at McNary	%	Total int.	Total %
4/5	7	3	42.9	2	28.6	0	0.0	1	14.3	6	85.7
4/6	8	3	37.5	1	12.5	0	0.0	0	0.0	4	50.0
4/8	1	1	100.0	0	0.0	0	0.0	0	0.0	1	100.0
4/9	101	26	25.7	12	11.9	15	14.9	8	7.9	61	60.4
4/10	109	22	20.2	9	8.3	11	10.1	10	9.2	52	47.7
4/11	94	24	25.5	10	10.6	7	7.4	10	10.6	51	54.3
4/12,13	94	25	26.6	13	13.8	12	12.8	12	12.8	62	65.6
4/14	84	22	26.2	9	10.7	13	15.5	9	10.7	53	63.1
4/15	100	31	31.0	5	5.0	11	11.0	15	15.0	62	62.0
4/16	103	26	25.2	7	6.8	14	13.6	17	16.5	64	62.1
4/17	100	31	31.0	9	9.0	9	9.0	15	15.0	64	64.0
4/18	99	32	32.3	10	10.1	8	8.1	13	13.1	63	63.6
4/19	107	43	40.2	12	11.2	10	9.3	14	13.1	79	73.8
4/20	98	28	28.6	5	5.1	7	7.1	16	16.3	56	57.1
4/21	100	21	21.0	9	9.0	12	12.0	14	14.0	56	56.0
4/22	101	24	23.8	8	7.9	3	3.0	18	17.8	53	52.5
4/23	96	27	28.1	6	6.2	5	5.2	17	17.7	55	57.3
4/26,27,28	86	20	23.3	13	15.1	8	9.3	11	12.8	52	60.5
4/29,30-5/1	95	23	24.2	15	15.8	6	6.3	7	7.4	51	53.7
5/2	8	1	12.5	0	0.0	2	25.0	1	12.5	4	50.0
5/3	7	1	14.3	1	14.3	2	28.6	1	14.3	5	71.4
5/4	13	1	7.7	1	7.7	1	7.7	3	23.1	6	46.2
5/5	6	2	33.3	0	0.0	0	0.0	2	33.3	4	66.7
5/6	3	0	0.0	0	0.0	0	0.0	3	100.0	3	100.0
5/7	91	15	16.5	10	11.0	6	6.6	11	12.1	42	46.2
5/8	23	5	21.7	3	13.0	1	4.3	2	8.7	11	47.8
5/10	9	4	44.4	2	22.2	1	11.1	0	0.0	7	77.8
5/11	38	9	23.7	5	13.2	1	2.6	3	7.9	18	47.4
5/12	7	1	14.3	0	0.0	1	14.3	2	28.6	4	57.1
5/25	7	0	0.0	1	14.3	0	0.0	1	14.3	2	28.6
5/26	5	0	0.0	1	20.0	1	20.0	0	0.0	2	40.0
5/27	23	4	17.4	2	8.7	2	8.7	2	8.7	10	43.5
5/28	43	7	16.3	3	7.0	5	11.6	3	7.0	18	41.9
5/29	31	6	19.4	0	0.0	7	22.6	1	3.2	14	45.2
5/30	25	1	4.0	2	8.0	1	4.0	1	4.0	5	20.0
5/31	28	3	10.7	4	14.3	3	10.7	2	7.1	12	42.9

Table B-5. Continued

Date	Number tagged	Int. at Lower Granite	%	Int. at Little Goose	%	Int. at Lower Monumental	%	Int. at McNary	%	Total int.	Total %
6/1	20	4	20.0	2	10.0	1	5.0	1	5.0	8	40.0
6/2	8	2	25.0	0	0.0	1	12.5	1	12.5	4	50.0
6/3	3	1	33.3	0	0.0	2	66.7	0	0.0	3	100.0
6/4	3	2	66.7	0	0.0	0	0.0	0	0.0	2	66.7
6/6	2	0	0.0	1	50.0	0	0.0	0	0.0	1	50.0
Total	1,986	501		193		189		247		1,130	

Table B-6. PIT-tagged wild chinook salmon interrogations at Lower Granite, Little Goose, Lower Monumental, and McNary dams from the Clearwater River trap, 1994.

Date	Number tagged	Int. at Lower Granite	%	Int. at Little Goose	%	Int. at Lower Monumental	%	Int. at McNary	%	Total int.	Total %
4/5	79	42	53.2	12	15.2	7	8.9	3	3.8	64	81.0
4/6	38	16	42.1	9	23.7	8	21.1	1	2.6	34	89.5
4/7	16	10	62.5	3	18.8	2	12.5	0	0.0	15	93.8
4/8	5	4	80.0	0	0.0	0	0.0	1	20.0	5	100.0
4/9	43	22	51.2	5	11.6	4	9.3	3	7.0	34	79.1
4/10	16	9	56.2	3	18.8	1	6.2	0	0.0	13	81.2
4/11	31	16	51.6	3	9.7	6	19.4	2	6.5	27	87.1
4/12	14	7	50.0	3	21.4	2	14.3	1	7.1	13	92.9
4/13	6	3	50.0	1	16.7	1	16.7	0	0.0	5	83.3
4/14	16	8	50.0	4	25.0	0	0.0	2	12.5	14	87.5
4/15	9	1	11.1	2	22.2	2	22.2	0	0.0	5	55.6
4/16	3	2	66.7	0	0.0	0	0.0	0	0.0	2	66.7
4/18	5	3	60.0	0	0.0	1	20.0	0	0.0	4	80.0
4/19	79	37	46.8	6	7.6	14	17.7	7	8.9	64	81.0
4/20	77	33	42.9	4	5.2	10	13.0	3	3.9	50	64.9
4/21	75	27	36.0	14	18.7	9	12.0	6	8.0	56	74.7
4/22	22	10	45.5	3	13.6	2	9.1	1	4.5	16	72.7
4/23	8	5	62.5	1	12.5	0	0.0	1	12.5	7	87.5
4/26	5	2	40.0	2	40.0	0	0.0	0	0.0	4	80.0
4/27	7	3	42.9	2	28.6	0	0.0	1	14.3	6	85.7
4/29	8	3	37.5	1	12.5	2	25.0	1	12.5	7	87.5
4/30	5	4	80.0	0	0.0	0	0.0	1	20.0	5	100.0
5/2	3	0	0.0	1	33.3	0	0.0	0	0.0	1	33.3
5/3	3	2	66.7	0	0.0	0	0.0	1	33.3	3	100.0
5/4	3	2	66.7	0	0.0	1	33.3	0	0.0	3	100.0
5/5	4	1	25.0	1	25.0	0	0.0	1	25.0	3	75.0
5/6	2	0	0.0	0	0.0	0	0.0	1	50.0	1	50.0
5/7	5	1	20.0	1	20.0	2	40.0	1	20.0	5	100.0
5/10	5	0	0.0	2	40.0	0	0.0	1	20.0	3	60.0
5/11	10	2	20.0	3	30.0	1	10.0	1	10.0	7	70.0
5/12	3	2	66.7	0	0.0	0	0.0	0	0.0	2	66.7
5/27	8	3	37.5	2	25.0	0	0.0	0	0.0	5	62.5
5/28	16	6	37.5	0	0.0	1	6.2	0	0.0	7	43.8
5/29	10	3	30.0	0	0.0	1	10.0	0	0.0	4	40.0
5/30	4	2	50.0	0	0.0	0	0.0	0	0.0	2	50.0
5/31	18	2	11.1	1	5.6	2	11.1	0	0.0	5	27.8
6/1	13	3	23.1	0	0.0	1	7.7	0	0.0	4	30.8

Table B-6. Continued.

Date	Number tagged	Int. at Lower Granite	%	Int. at Little Goose	%	Int. at Lower Monumental	%	Int. at McNary	%	Total int.	Total %
6/2	6	1	16.7	0	0.0	2	33.3	0	0.0	3	50.0
6/3	3	0	0.0	0	0.0	1	33.3	1	33.3	2	66.7
6/4	5	2	40.0	1	20.0	0	0.0	0	0.0	3	60.0
6/6	5	0	0.0	2	40.0	0	0.0	0	0.0	2	40.0
6/7	5	5	100.0	0	0.0	0	0.0	0	0.0	5	100.0
6/8	3	1	33.3	0	0.0	0	0.0	0	0.0	1	33.3
6/10	2	1	50.0	0	0.0	0	0.0	0	0.0	1	50.0
6/13	2	0	0.0	1	50.0	0	0.0	0	0.0	1	50.0
6/15	10	1	10.0	1	10.0	1	10.0	0	0.0	3	30.0
6/16	3	1	33.3	0	0.0	0	0.0	0	0.0	1	33.3
6/27	2	1	50.0	0	0.0	0	0.0	0	0.0	1	50.0
7/7	16	1	6.2	0	0.0	0	0.0	0	0.0	1	6.2
7/23	2	1	50.0	0	0.0	0	0.0	0	0.0	1	50.0
Total	738	311		94		84		41		530	

Table B-7. PIT-tagged hatchery steelhead interrogations at Lower Granite, Little Goose, Lower Monumental, and McNary dams from the Clearwater River trap, 1994.

Date	Number tagged	Int. at Lower Granite	%	Int. at Little Goose	%	Int. at Lower Monumental	%	Int. at McNary	%	Total int.	Total %
4/12	1	1	100.0	0	0.0	0	0.0	0	0.0	1	100.0
4/16	1	1	100.0	0	0.0	0	0.0	0	0.0	1	100.0
4/19	61	47	77.0	6	9.8	1	1.6	2	3.3	56	91.8
4/20	59	38	64.4	11	18.6	4	6.8	0	0.0	53	89.8
4/21	60	43	71.7	5	8.3	5	8.3	0	0.0	53	88.3
4/22	60	41	68.3	8	13.3	1	1.7	0	0.0	50	83.3
4/23	59	56	94.9	1	1.7	1	1.7	0	0.0	58	98.3
4/26	60	44	73.3	4	6.7	1	1.7	1	1.7	50	83.3
4/27	59	48	81.4	3	5.1	1	1.7	0	0.0	52	88.1
4/28	61	41	67.2	5	8.2	1	1.6	2	3.3	49	80.3
4/29	62	50	80.6	7	11.3	0	0.0	0	0.0	57	91.9
4/30	31	22	71.0	4	12.9	2	6.5	0	0.0	28	90.3
5/1	23	18	78.3	0	0.0	0	0.0	0	0.0	18	78.3
5/2	19	13	68.4	3	15.8	0	0.0	0	0.0	16	84.2
5/3	60	40	66.7	5	8.3	1	1.7	0	0.0	46	76.7
5/4	60	38	63.3	3	5.0	2	3.3	0	0.0	43	71.7
5/5	60	44	73.3	3	5.0	0	0.0	1	1.7	48	80.0
5/6	60	33	55.0	5	8.3	0	0.0	0	0.0	38	63.3
5/7	61	37	60.7	4	6.6	1	1.6	1	1.6	43	70.5
5/8	61	25	41.0	11	18.0	1	1.6	1	1.6	38	62.3
5/9	4	1	25.0	1	25.0	0	0.0	1	25.0	3	75.0
5/10	10	2	20.0	0	0.0	0	0.0	0	0.0	2	20.0
5/11	62	7	11.3	15	24.2	6	9.7	0	0.0	28	45.2
5/12	18	3	16.7	6	33.3	1	5.6	0	0.0	10	55.6
5/25	4	1	25.0	0	0.0	0	0.0	0	0.0	1	25.0
5/26	5	1	20.0	0	0.0	0	0.0	0	0.0	1	20.0
5/27	6	1	16.7	1	16.7	0	0.0	0	0.0	2	33.3
5/28	22	7	31.8	1	4.5	1	4.5	0	0.0	9	40.9
5/29	29	5	17.2	1	3.4	1	3.4	0	0.0	7	24.1
5/30	6	2	33.3	0	0.0	0	0.0	0	0.0	2	33.3
5/31	19	6	31.6	2	10.5	0	0.0	0	0.0	8	42.1
6/1	16	4	25.0	1	6.2	0	0.0	0	0.0	5	31.2
6/2	6	2	33.3	1	16.7	1	16.7	0	0.0	4	66.7
6/3	8	1	12.5	0	0.0	0	0.0	0	0.0	1	12.5

Table B-7. Continued.

Date	Number tagged	Int. at Lower Granite	%	Int. at Little Goose	%	Int. at Lower Monumental	%	Int. at McNary	%	Total int.	Total %
6/5	2	0	0.0	1	50.0	0	0.0	0	0.0	1	50.0
6/7	2	0	0.0	1	50.0	0	0.0	0	0.0	1	50.0
6/13	2	1	50.0	0	0.0	0	0.0	0	0.0	1	50.0
6/15	8	2	25.0	0	0.0	0	0.0	1	12.5	3	37.5
7/7	16	2	12.5	0	0.0	0	0.0	0	0.0	2	12.5
7/8	6	1	16.7	0	0.0	0	0.0	0	0.0	1	16.7
Total	1,229	729		119		32		10		890	

Table B-8. PIT-tagged wild steelhead trout interrogations at Lower Granite, Little Goose, Lower Monumental, and McNary dams from the Clearwater River trap, 1994.

Date	Number tagged	Int. at Lower Granite	%	Int. at Little Goose	%	Int. at Lower Monumental	%	Int. at McNary	%	Total int.	Total %
4/5,6,7,8	29	15	51.7	5	17.2	2	6.9	0	0.0	22	75.9
4/9,10,11 12,13,14	27	20	74.1	1	3.7	3	11.1	0	0.0	24	88.9
4/15	1	0	0.0	0	0.0	1	100.0	0	0.0	1	100.0
4/18	2	2	100.0	0	0.0	0	0.0	0	0.0	2	100.0
4/19	703	468	66.6	79	11.2	60	8.5	14	2.0	621	88.3
4/20	146	94	64.4	18	12.3	7	4.8	6	4.1	125	85.6
4/21	221	137	62.0	35	15.8	14	6.3	2	0.9	188	85.1
4/22,23	36	21	58.3	4	11.1	2	5.6	0	0.0	27	75.0
4/26,27,28	53	28	52.8	3	5.7	10	18.9	0	0.0	41	77.4
4/29	9	8	88.9	0	0.0	1	11.1	0	0.0	9	100.0
4/30	1	1	100.0	0	0.0	0	0.0	0	0.0	1	100.0
5/1	1	1	100.0	0	0.0	0	0.0	0	0.0	1	100.0
5/2	5	3	60.0	0	0.0	0	0.0	0	0.0	3	60.0
5/3	3	3	100.0	0	0.0	0	0.0	0	0.0	3	100.0
5/4	4	4	100.0	0	0.0	0	0.0	0	0.0	4	100.0
5/5	3	2	66.7	1	33.3	0	0.0	0	0.0	3	100.0
5/6	1	0	0.0	0	0.0	1	100.0	0	0.0	1	100.0
5/7	8	6	75.0	0	0.0	0	0.0	0	0.0	6	75.0
5/8	4	2	50.0	0	0.0	0	0.0	0	0.0	2	50.0
5/10	3	1	33.3	0	0.0	0	0.0	1	33.3	2	66.7
5/11	14	1	7.1	2	14.3	4	28.6	1	7.1	8	57.1
5/27	2	0	0.0	0	0.0	1	50.0	0	0.0	1	50.0
5/28	4	1	25.0	1	25.0	0	0.0	0	0.0	2	50.0
5/31	5	2	40.0	1	20.0	0	0.0	0	0.0	3	60.0
6/2	1	0	0.0	0	0.0	1	100.0	0	0.0	1	100.0
6/7	1	1	100.0	0	0.0	0	0.0	0	0.0	1	100.0
Total	1,287	821		150		107		24		1,102	

Table B-9. PIT-tagged hatchery chinook salmon interrogations at Lower Granite, Little Goose, Lower Monumental, and McNary dams from the Salmon River trap, 1994.

Date	Number tagged	Int. at Lower Granite	%	Int. at Little Goose	%	Int. at Lower Monumental	%	Int. at McNary	%	Total int.	Total %
3/31	4	2	50.0	0	0.0	0	0.0	0	0.0	2	50.0
4/1	5	4	80.0	0	0.0	1	20.0	0	0.0	5	100.0
4/2	4	3	75.0	0	0.0	0	0.0	0	0.0	3	75.0
4/6	1	1	100.0	0	0.0	0	0.0	0	0.0	1	100.0
4/10	102	33	32.4	7	6.9	12	11.8	4	3.9	56	54.9
4/11	100	39	39.0	11	11.0	8	8.0	6	6.0	64	64.0
4/12	100	39	39.0	8	8.0	9	9.0	10	10.0	66	66.0
4/13	100	32	32.0	11	11.0	8	8.0	7	7.0	58	58.0
4/14	100	34	34.0	10	10.0	9	9.0	3	3.0	56	56.0
4/15	100	30	30.0	6	6.0	11	11.0	2	2.0	49	49.0
4/16	101	39	38.6	3	3.0	10	9.9	7	6.9	59	58.4
4/17	100	24	24.0	8	8.0	8	8.0	5	5.0	45	45.0
4/18	100	46	46.0	6	6.0	5	5.0	2	2.0	59	59.0
4/19	99	34	34.3	8	8.1	10	10.1	6	6.1	58	58.6
4/20	104	35	33.7	6	5.8	7	6.7	9	8.7	57	54.8
4/21	99	36	36.4	3	3.0	8	8.1	16	16.2	63	63.6
4/22	99	34	34.3	5	5.1	6	6.1	11	11.1	56	56.6
4/23	84	33	39.3	7	8.3	6	7.1	5	6.0	51	60.7
4/24	119	29	24.4	6	5.0	6	5.0	17	14.3	58	48.7
4/25	101	23	22.8	10	9.9	7	6.9	16	15.8	56	55.4
4/26	100	20	20.0	7	7.0	3	3.0	9	9.0	39	39.0
4/27	101	19	18.8	4	4.0	5	5.0	18	17.8	46	45.5
4/28	99	22	22.2	7	7.1	4	4.0	15	15.2	48	48.5
4/29	101	23	22.8	10	9.9	8	7.9	7	6.9	48	47.5
4/30	100	25	25.0	12	12.0	8	8.0	12	12.0	57	57.0
5/1	101	11	10.9	14	13.9	4	4.0	16	15.8	45	44.6
5/2	101	13	12.9	9	8.9	9	8.9	15	14.9	46	45.5
5/3	101	16	15.8	14	13.9	8	7.9	18	17.8	56	55.4
5/4	98	16	16.3	11	11.2	7	7.1	14	14.3	48	49.0
5/5	100	13	13.0	6	6.0	7	7.0	17	17.0	43	43.0
5/6	100	15	15.0	13	13.0	10	10.0	15	15.0	53	53.0
5/7	96	16	16.7	9	9.4	10	10.4	14	14.6	49	51.0
5/8	97	11	11.3	14	14.4	8	8.2	15	15.5	48	49.5
5/9	102	13	12.7	13	12.7	7	6.9	9	8.8	42	41.2
5/10	90	13	14.4	7	7.8	5	5.6	10	11.1	35	38.9
5/11	104	18	17.3	16	15.4	3	2.9	12	11.5	49	47.1

Table B-9. Continued.

Date	Number tagged	Int. at Lower Granite	%	Int. at Little Goose	%	Int. at Lower Monumental	%	Int. at McNary	%	Total int.	Total %
5/12	39	5	12.8	10	25.6	5	12.8	2	5.1	22	56.4
5/13	10	2	20.0	3	30.0	1	10.0	0	0.0	6	60.0
5/14	13	1	7.7	2	15.4	0	0.0	1	7.7	4	30.8
5/15	9	0	0.0	3	33.3	1	11.1	1	11.1	5	55.6
5/16	6	1	16.7	0	0.0	1	16.7	0	0.0	2	33.3
5/17	5	0	0.0	0	0.0	1	20.0	0	0.0	1	20.0
5/18	4	1	25.0	0	0.0	1	25.0	0	0.0	2	50.0
5/19	11	1	9.1	2	18.2	0	0.0	1	9.1	4	36.4
5/20	14	3	21.4	0	0.0	2	14.3	0	0.0	5	35.7
5/21	14	1	7.1	0	0.0	1	7.1	2	14.3	4	28.6
5/22	17	1	5.9	3	17.6	3	17.6	1	5.9	8	47.1
5/23	19	4	21.1	1	5.3	0	0.0	1	5.3	6	31.6
5/24	22	3	13.6	1	4.5	0	0.0	0	0.0	4	18.2
5/25	36	4	11.1	4	11.1	3	8.3	2	5.6	13	36.1
5/26	42	6	14.3	2	4.8	1	2.4	2	4.8	11	26.2
5/27	11	1	9.1	0	0.0	0	0.0	1	9.1	2	18.2
5/28	8	1	12.5	2	25.0	0	0.0	0	0.0	3	37.5
5/29	15	2	13.3	1	6.7	3	20.0	0	0.0	6	40.0
5/30	24	6	25.0	1	4.2	0	0.0	2	8.3	9	37.5
5/31	16	3	18.8	2	12.5	0	0.0	0	0.0	5	31.2
6/1	10	1	10.0	0	0.0	0	0.0	0	0.0	1	10.0
6/3	10	2	20.0	1	10.0	0	0.0	0	0.0	3	30.0
6/4	15	2	13.3	3	20.0	1	6.7	0	0.0	6	40.0
6/5	14	1	7.1	1	7.1	0	0.0	0	0.0	2	14.3
6/7	2	1	50.0	0	0.0	0	0.0	0	0.0	1	50.0
6/9	5	1	20.0	0	0.0	0	0.0	0	0.0	1	20.0
6/13	5	2	40.0	1	20.0	0	0.0	0	0.0	3	60.0
6/14	4	1	25.0	0	0.0	0	0.0	0	0.0	1	25.0
6/15	3	1	33.3	0	0.0	0	0.0	0	0.0	1	33.3
Total	3,616	872		324		261		358		1,815	

Table B-10. PIT-tagged wild chinook salmon interrogations at Lower Granite, Little Goose, Lower Monumental, and McNary dams from the Salmon River trap, 1994.

Date	Number tagged	Int. at Lower Granite	%	Int. at Little Goose	%	Int. at Lower Monumental	%	Int. at McNary	%	Total int.	Total %
3/31	15	9	60.0	2	13.3	1	6.7	0	0.0	12	80.0
4/1	20	11	55.0	1	5.0	3	15.0	1	5.0	16	80.0
4/2	70	38	54.3	8	11.4	6	8.6	2	2.9	54	77.1
4/3	75	41	54.7	8	10.7	5	6.7	4	5.3	58	77.3
4/4	75	39	52.0		9.3	7	9.3	1	1.3	54	72.0
4/5	74	41	55.4		9.5	6	8.1	2	2.7	56	75.7
4/6	75	40	53.3	4	5.3	6	8.0	5	6.7	55	73.3
4/7	75	41	54.7	14	18.7	3	4.0	1	1.3	59	78.7
4/8	75	33	44.0	15	20.0	7	9.3	2	2.7	57	76.0
4/9	67	41	61.2	7	10.4	2	3.0	4	6.0	54	80.6
4/10	75	33	44.0	11	14.7	6	8.0	4	5.3	54	72.0
4/11	32	13	40.6	4	12.5	1	3.1	2	6.2	20	62.5
4/12	39	17	43.6	5	12.8	7	17.9	0	0.0	29	74.4
4/13	45	26	57.8	9	20.0	2	4.4	2	4.4	39	86.7
4/14	58	30	51.7	7	12.1	5	8.6	3	5.2	45	77.6
4/15	62	31	50.0	4	6.5	6	9.7	3	4.8	44	71.0
4/16	73	33	45.2	12	16.4	3	4.1	6	8.2	54	74.0
4/17	54	30	55.6	6	11.1	3	5.6	1	1.9	40	74.1
4/18	74	32	43.2	9	12.2	4	5.4	6	8.1	51	68.9
4/19	87	40	46.0	13	14.9	8	9.2	4	4.6	65	74.7
4/20	73	30	41.1	9	12.3	5	6.8	8	11.0	52	71.2
4/21	75	38	50.7	4	5.3	10	13.3	7	9.3	59	78.7
4/22	78	34	43.6	7	9.0	5	6.4	6	7.7	52	66.7
4/23	76	33	43.4	4	5.3	2	2.6	11	14.5	50	65.8
4/24	61	25	41.0	5	8.2	2	3.3	7	11.5	39	63.9
4/25	44	12	27.3	4	9.1	1	2.3	4	9.1	21	47.7
4/26	33	10	30.3	2	6.1	2	6.1	5	15.2	19	57.6
4/27	75	31	41.3	5	6.7	6	8.0	5	6.7	47	62.7
4/28	74	34	45.9	5	6.8	0	0.0	11	14.9	50	67.6
4/29	66	22	33.3	5	7.6	3	4.5	4	6.1	34	51.5
4/30	42	12	28.6	0	0.0	3	7.1	6	14.3	21	50.0

Table B-10. Continued.

Date	Number tagged	Int. at Lower Granite	%	Int. at Little Goose	%	Int. at Lower Monumental	%	Int. at McNary	%	Total int.	Total %
5/1	40	18	45.0	3	7.5	3	7.5	6	15.0	30	75.0
5/2,3,4	70	22	31.4	4	5.7	8	11.4	4	5.7	38	54.3
5/5,6	64	20	31.3	5	7.8	3	4.7	11	17.2	39	60.9
5/7,8	143	27	18.9	17	11.9	8	5.6	23	16.1	7s	52.4
5/9,10,11, 12	175	27	15.4	25	14.3	14	8.0	19	10.9	85	48.6
5/13	23	6	26.1	1	4.3	1	4.3	1	4.3	9	39.1
5/14	16	2	12.5	5	31.2	0	0.0	1	6.2	8	50.0
5/15	7	0	0.0	1	14.3	1	14.3	0	0.0	2	28.6
5/16	9	2	22.2	0	0.0	0	0.0	1	11.1	3	33.3
5/17	7	2	28.6	3	42.9	0	0.0	0	0.0	5	71.4
5/18	3	1	33.3	0	0.0	0	0.0	0	0.0	1	33.3
5/19	4	0	0.0	2	50.0	0	0.0	1	25.0	3	75.0
5/20	4	1	25.0	0	0.0	0	0.0	0	0.0	1	25.0
5/21	11	2	18.2	0	0.0	1	9.1	1	9.1	4	36.4
5/22	4	2	50.0	0	0.0	0	0.0	1	25.0	3	75.0
5/23	18	3	16.7	0	0.0	3	16.7	1	5.6	7	38.9
5/24	17	3	17.6	2	11.8	1	5.9	0	0.0	6	35.3
5/25	26	8	30.8	3	11.5	1	3.8	1	3.8	13	50.0
5/26	20	1	5.0	1	5.0	1	5.0	1	5.0	4	20.0
5/27	20	7	35.0	1	5.0	3	15.0	0	0.0	11	55.0
5/28	14	2	14.3	0	0.0	1	7.1	0	0.0	3	21.4
5/29	18	4	22.2	1	5.6	1	5.6	1	5.6	7	38.9
5/30	11	3	27.3	1	9.1	0	0.0	0	0.0	4	36.4
5/31	16	3	18.8	1	6.2	1	6.2	1	6.2	6	37.5
6/1	18	3	16.7	2	11.1	2	11.1	0	0.0	7	38.9
6/2	14	2	14.3	0	0.0	2	14.3	0	0.0	4	28.6
6/3	16	5	31.2	0	0.0	1	6.2	1	6.2	7	43.8
6/4	24	S	20.8	2	8.3	1	4.2	0	0.0	8	33.3
6/5	24	1	4.2	3	12.5	2	8.3	0	0.0	6	25.0
6/6	14	S	35.7	1	7.1	0	0.0	0	0.0	6	42.9

Table B-10. Continued.

Date	Number tagged	Int. at Lower Granite	%	Int. at Little Goose	%	Int. at Lower Monumental	%	Int. at McNary	%	Total int.	Total %
6/7	14	4	28.6	0	0.0	0	0.0	0	0.0	4	28.6
6/8	9	3	33.3	0	0.0	0	0.0	0	0.0	3	33.3
6/9	9	1	11.1	0	0.0	0	0.0	0	0.0	1	11.1
6/10	17	4	23.5	0	0.0	1	5.9	0	0.0	5	29.4
6/11	15	3	20.0	1	6.7	1	6.7	0	0.0	5	33.3
6/12	19	2	10.5	0	0.0	0	0.0	0	0.0	2	10.5
6/13	23	6	26.i	i	4.3	2	8.7	0	0.0	9	39.1
6/14	13	0	0.0	1	7.7	0	0.0	0	0.0	1	7.7
6/15	9	3	33.3	0	0.0	0	0.0	0	0.0	3	33.3
6/16	18	4	22.2	1	5.6	0	0.0	0	0.0	5	27.8
Total	2,913	1,117		291		193		202		1,803	

Table B-11. PIT-tagged hatchery steelhead trout interrogations at Lower Granite, Little Goose, Lower Monumental, and *McNary* dams from the Salmon River trap, 1994.

Date	Number tagged	Int. at Lower Granite	%	Int. at Little Goose	%	Int. at Lower Monumental	%	Int. at McNary	%	Total int.	Total %
4/19	61	43	70.5	4	6.6	4	6.6	1	1.6	52	85.2
4/20	13	9	69.2	1	7.7	1	7.7	0	0.0	11	84.6
4/21	58	48	82.8	1	1.7	2	3.4	0	0.0	51	87.9
4/22	66	4s	68.2	6	9.1	S	7.6	0	0.0	56	84.8
4/23	63	46	73.0	0	0.0	2	3.2	0	0.0	48	76.2
4/24	62	45	72.6	2	3.2	0	0.0	0	0.0	47	75.8
4/25	60	40	66.7	0	0.0	4	6.7	3	5.0	47	78.3
4/26	61	45	73.8	4	6.6	1	1.6	0	0.0	so	82.0
4/27	68	44	64.7	5	7.4	0	0.0	0	0.0	49	72.1
4/28	61	43	70.5	4	6.6	0	0.0	0	0.0	47	77.0
4/29	61	34	55.7	6	9.8	1	1.6	0	0.0	41	67.2
4/30	61	37	60.7	3	4.9	1	1.6	2	3.3	43	70.5
5/1	60	37	61.7	3	5.0	2	3.3	0	0.0	42	70.0
5/2	69	49	71.0	2	2.9	2	2.9	1	1.4	54	78.3
5/3	60	32	53.3	6	10.0	1	1.7	0	0.0	39	65.0
5/4	60	36	60.0	2	3.3	4	6.7	2	3.3	44	73.3
5/5	60	33	55.0	4	6.7	1	1.7	0	0.0	38	63.3
5/6	60	29	48.3	5	8.3	2	3.3	0	0.0	36	60.0
5/7	60	24	40.0	4	6.7	0	0.0	4	6.7	32	53.3
5/8,9,10	127	34	26.8	21	16.5	5	3.9	1	0.8	61	48.0
5/11,12,13	174	26	14.9	28	16.1	8	4.6	8	4.6	70	40.2
5/14,15	93	14	15.1	13	14.0	2	2.2	0	0.0	29	31.2
5/16	16	3	18.8	0	0.0	0	0.0	1	6.2	4	25.0
S/17,18, 19,20	122	28	23.0	6	4.9	3	2.5	3	2.5	40	32.8
5/21,22, 23,24	249	54	21.7	10	4.0	7	2.8	7	2.8	78	30.8
5/25,26,27	205	42	20.5	8	3.9	4	1.9	2	1.0	56	27.3
5/28	56	9	16.1	2	3.6	1	1.8	0	0.0	12	21.4
5/29,30	107	18	16.8	5	4.7	2	1.9	1	0.9	26	24.3
S/31-6/1, 2,3	166	33	19.9	9	5.4	5	3.0	1	0.6	48	28.9
6/4	54	12	22.2	1	1.9	1	1.9	0	0.0	14	25.9

Table B-11. Continued.

Date	Number tagged	Int. at Lower Granite	%	Int. at Little Goose	%	Int. at Lower Monumental	%	Int. at McNary	%	Total int.	Total %
6/5	27	3	11.1	1	3.7	0	0.0	0	0.0	4	14.8
6/6	10	2	20.0	0	0.0	0	0.0	0	0.0	2	20.0
6/7	10	2	20.0	0	0.0	0	0.0	0	0.0	2	20.0
6/8	11	1	9.1	0	0.0	0	0.0	0	0.0	1	9.1
6/11	9	1	11.1	0	0.0	1	11.1	0	0.0	2	22.2
6/13	7	0	0.0	1	14.3	0	0.0	0	0.0	1	14.3
6/14	2	1	50.0	0	0.0	0	0.0	0	0.0	1	50.0
6/15	6	2	33.3	0	0.0	0	0.0	0	0.0	2	33.3
Total	2,575.	1,004		167		72		37		1,280'	

Table B-12. PIT-tagged wild steelhead trout interrogations at Lower Granite, Little Goose, Lower Monumental, and McNary dams from the Salmon River trap, 1994.

Date	Number tagged	Int. at Lower Granite	%	Int. at Little Goose	%	Int. at Lower Monumental	%	Int. at McNary	%	Total int.	Total %
4/3	1	1	100.0	0	0.0	0	0.0	0	0.0	1	100.0
4/4	1	0	0.0	0	0.0	1	100.0	0	0.0	1	100.0
4/6	1	0	0.0	1	100.0	0	0.0	0	0.0	1	100.0
4/7	1	1	100.0	0	0.0	0	0.0	0	0.0	1	100.0
4/12	1	1	100.0	0	0.0	0	0.0	0	0.0	1	100.0
4/16	2	1	50.0	0	0.0	1	50.0	0	0.0	2	100.0
4/18	8	7	87.5	0	0.0	0	0.0	0	0.0	7	87.5
4/19	32	26	81.2	3	9.4	0	0.0	1	3.1	30	93.8
4/20	24	14	58.3	5	20.8	1	4.2	0	0.0	20	83.3
4/21	33	20	60.6	7	21.2	1	3.0	1	3.0	29	87.9
4/22	35	22	62.9	2	5.7	3	8.6	0	0.0	27	77.1
4/23	31	24	77.4	0	0.0	1	3.2	0	0.0	2s	80.6
4/24	21	16	76.2	1	4.8	2	9.5	0	0.0	19	90.5
4/25,26	17	14	82.4	0	0.0	2	11.8	0	0.0	16	94.1
4/28	39	21	53.8	0	0.0	3	7.7	1	2.6	25	64.1
4/29,30-5/1	25	17	68.0	1	4.0	2	8.0	1	4.0	21	84.0
5/2,5,6,7	35	23	65.7	1	2.9	1	2.9	0	0.0	25	71.4
5/8	64	20	31.2	11	17.2	5	7.8	1	1.6	37	57.8
5/9	7	1	14.3	3	42.9	1	14.3	0	0.0	S	71.4
5/10	6	3	50.0	0	0.0	2	33.3	0	0.0	5	83.3
5/11	8	2	25.0	2	25.0	0	0.0	1	12.5	5	62.5
5/12	14	3	21.4	3	21.4	0	0.0	0	0.0	6	42.9
5/14	3	1	33.3	0	0.0	0	0.0	0	0.0	1	33.3
5/16	3	1	33.3	0	0.0	0	0.0	0	0.0	1	33.3
5/17	1	0	0.0	1	100.0	0	0.0	0	0.0	1	100.0
5/18	9	1	11.1	1	11.1	0	0.0	0	0.0	2	22.2
5/19	4	1	25.0	0	0.0	0	0.0	0	0.0	1	25.0
5/20	3	0	0.0	0	0.0	1	33.3	0	0.0	1	33.3
5/21	5	1	20.0	0	0.0	1	20.0	0	0.0	2	40.0
5/22	11	2	18.2	1	9.1	0	0.0	0	0.0	3	27.3
5/23	16	2	12.5	0	0.0	2	12.5	1	6.2	5	31.2
5/24	9	1	11.1	0	0.0	1	11.1	0	0.0	2	22.2

Table B-12. Continued.

Date	Number tagged	Int. at Lower Granite	%	Int. at Little Goose	%	Int. at Lower Monumental	%	Int. at McNary	%	Total int.	Total %
5/25	6	1	16.7	0	0.0	1	16.7	0	0.0	2	33.3
5/26	6	1	16.7	1	16.7	1	16.7	2	33.3	5	83.3
5/27	10	1	10.0	0	0.0	0	0.0	0	0.0	1	10.0
5/28	2	2	100.0	0	0.0	0	0.0	0	0.0	2	100.0
5/29	1	1	100.0	0	0.0	0	0.0	0	0.0	1	100.0
5/30	3	2	66.7	0	0.0	0	0.0	0	0.0	2	66.7
5/31	5	2	40.0	0	0.0	0	0.0	0	0.0	2	40.0
6/1	6	1	16.7	0	0.0	0	0.0	1	16.7	2	33.3
6/2	2	1	50.0	0	0.0	0	0.0	0	0.0	1	50.0
6/4	4	1	25.0	0	0.0	0	0.0	0	0.0	1	25.0
Total	515	260		44		33		10		347	