Research related to transportation of juvenile salmonids on the Columbia and Snake Rivers, 1996

Coastal Zone and Estuarine Studies Division

Northwest Fisheries Science Center

National Marine Fisheries Service

Seattle, Washington

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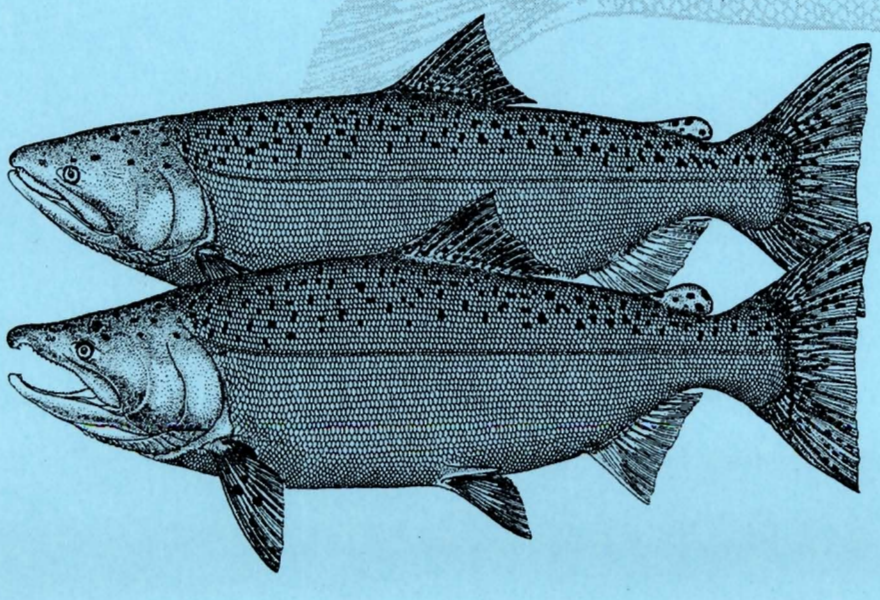

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CONTENTS

EXECUTIVE SUMMARY

In 1996, the National Marine Fisheries Service (NMFS) continued two principal research projects related to smolt transportation: an assessment of survival benefits for steelhead smolts released at Tongue Point in the upper estuary vs. those released at Skamania Light, the standard release site, and an evaluation of transportation vs. inriver migration of spring/summer chinook salmon smolts at Lower Granite Dam. We also continued to monitor the prevalence of marine mammal abrasions on adult spring/summer chinook salmon at Lower Granite Dam.

Estuarine Release-Site Study

We completed the 3-year smolt marking phase of this study in spring 1994 and are now in the adult recovery phase. Adult returns for the 1992 smolt marking year were completed, and we also recovered age-3-ocean steelhead from the second year of smolt marking in 1993 and age-2-ocean steelhead from the third year of smolt marking in 1994. Adult returns for all 3 study years were much lower than expected, with total adult returns for the 1992 study year of only 82 fish from the Tongue Point release (0.15% of the juveniles released) and 98 fish from the Skamania Light release (0.16% of the juveniles released). Results for the 1992 study year did not show a difference in return rates between the Tongue Point and Skamania Light releases. The ratio between the two was 0.91, with a 95% confidence interval of (0.42, 5.51). For the 1993 study year, preliminary adult returns totaled only 99 (0.16% of the juveniles released) and 130 (0.20% of the juveniles released) fish from the Tongue Point and Skamania Light releases, respectively. For the 1994 study year, preliminary adult returns total 118 (0.20% of the juveniles released) fish

for the Tongue Point release and 46 (0.07% of the juveniles released) fish for the Skamania Light release. When adult returns are complete, these low adult return rates may preclude any meaningful statistical analysis.

Spring/Summer Chinook Salmon Transportation Study--Lower Granite Dam

In spring 1996, we continued a new 3-year marking study initiated in 1995 to evaluate transportation vs. inriver migration of spring/summer chinook salmon smolts at Lower Granite Dam. The study was designed to compare survival to adulthood between smolts transported to below Bonneville Dam and those allowed to migrate downstream volitionally from the Lower Granite Dam tailrace under improved inriver survival conditions called for in the NMFS Biological Opinion.

From 8 April through 18 June, we PIT tagged and freeze-branded 110,492 yearling smolts at Lower Granite Dam. Of this total, 44,024 were transported and released below Bonneville Dam, while 66,468 were released into the Lower Granite Dam tailrace. Post-marking delayed mortality (24 hour) averaged 1.8% for the period. Inriver migrating fish collected at downstream dams were returned to the river using PIT-tag diversion systems (slide gates). We also recovered spring/summer chinook salmon jacks from smolts tagged in 1995: 27 that were transported from Lower Granite Dam and 29 that were released into the Lower Granite Dam tailrace. An additional three jacks returned from fish groups which were released into the Lower Granite Dam tailrace but were subsequently transported from Little Goose Dam.

Marine Mammal Abrasions--Lower Granite Dam

We continued to observe high abrasion levels from marine mammal teeth and claws on adult spring/summer chinook salmon sampled at Lower Granite Dam in 1995. Prevalence of abrasions was 16.4% on adults examined, with open wounds occurring on about 36.4% of the fish with abrasions.

ESTUARINE RELEASE-SITE STUDY

Introduction

A growing body of evidence suggests that survival of juvenile salmonids can be enhanced by releasing them into upper areas of estuaries rather than farther upstream in freshwater areas. In Scandinavian countries, releases of hatchery-reared Atlantic salmon (*Salmo salar*) smolts directly into estuarine waters have resulted in increased survival compared to similar releases in fresh water (Gunnerod et al. 1988). Macdonald et al. (1988) and Levings et al. (1989) speculated that increased survival of salmonid juveniles released into estuarine areas was related to decreased predation and stress, increased food availability, and ease of osmoregulation in the estuary. In a 5-year study, Solazzi et al. (1991) released hatchery-reared coho salmon (*O. kisutch*) immediately below Bonneville Dam (control), at Tongue Point (upper intrusion of salt water in the estuary), and at several locations offshore in the Columbia River plume. They reported a smolt-to-adult survival rate 1.6 times higher for fish released at Tongue Point than for the control group.

Smolts transported from the Snake River to the Skamania Light release site immediately below Bonneville Dam, must migrate approximately 150 km through the lower Columbia River before arriving at the estuary. Although the river is free-flowing in this reach, the area is known to harbor large numbers of predators, primarily northern squawfish (*Ptychocheilus oregonensis*) and various avian species. The studies mentioned above suggest that mortality from predation alone may be of sufficient magnitude to warrant the additional transport distance.

In spring 1992, we began a 3-year study to determine if marked hatchery and wild steelhead smolts, transported by barge and released in the upper estuary at Tongue Point, would

return as adults to Lower Granite Dam in significantly greater numbers than those transported by barge and released at the traditional release site near Skamania Light. In spring 1993, we marked steelhead smolts for the second year of study, and in spring 1994, we marked steelhead smolts for the third and final year of this study. Spring/summer chinook salmon smolts were not included in the present study because it was not feasible to mark the tremendously large numbers of this species required to detect small differences in survival. Depending upon the results of the study for steelhead, spring/summer chinook salmon may be tested in the future.

In 1996, we recovered age-3-ocean adult steelhead from the 1993 study year and age-2-ocean adult steelhead from the 1994 study year. Results of these efforts are reported here.

Methods

We will continue to recover adults in each of 3 years following each juvenile release year, with Lower Granite Dam as the primary evaluation point. Statistical analyses of the results will be conducted with the methods described by Harmon et al. (1996).

Results and Discussion

Adult Recoveries and Data Analysis

Adult returns to Lower Granite Dam from steelhead smolts marked for the release-site study in 1992, 1993, and 1994 are presented in Table 1 (Appendix Tables 1.0 through 6.8). Adult returns for the 1992 study year were much lower than expected. A total of 82 fish from Tongue Point releases (0.15% of the release) and 98 fish from Skamania Light releases (0.16% of

Table 1. Preliminary summary of recovered adult steelhead marked at Lower Granite Dam in 1992, 1993, and 1994 and transported to either Tongue Point or below Bonneville Dam (recoveries through January 1997). Numbers in parentheses represent fish that were jaw-tagged at the dams and subsequently recovered upstream.

Group	Number released	Observed adult returns: Ocean-age	River fishery	Indian fishery	Lower Granite Dam N		Lower Granite Dam %	Hatcheries	Other	Total N	Total %
1992 Tongue Point	55,366	1	14	2	32	(11)	0.06	2	1	40	0.07
		2	8	4	46	(5)	0.08	0	1	54	0.10
		3	2	0	4	(1)	0.01	0	0	5	0.01
		Total	24	6	82	(17)	0.15	2	2	99*	0.18
1992 Bonneville	60,577	1	8	1	32	(6)	0.05	0	0	35	0.06
		2	24	3	62	(12)	0.10	2	0	79	0.13
		3	0	0	4	(1)	0.01	3	0	6	0.01
		Total	32	4	98	(19)	0.16	5	0	120*	0.20
1993 Tongue Point	62,348	1	9	1	35	(7)	0.06	6	0	44	0.07
		2	14	0	63	(17)	0.10	13	0	73	0.12
		3	0	0	1	(0)	0.00	0	0	1	0.00
		Total	23	1	99	(24)	0.16	19	0	118*	0.19
1993 Bonneville	65,987	1	8	2	47	(9)	0.07	5	0	53	0.08
		2	20	2	81	(28)	0.12	15	0	90	0.14
		3	0	0	2	(0)	0.00	1	0	3	0.00
		Total	28	4	130	(37)	0.20	21	0	146*	0.22
1994 Tongue Point	60,016	1	13	0	65	(21)	0.11	10	0	67	0.11
		2	5	0	53	(4)	0.09	0	0	54	0.09
		Total	18	0	118	(25)	0.20	10	0	121*	0.20
1994 Bonneville	68,314	1	5	1	25	(5)	0.04	8	0	34	0.05
		2	0	2	21	(0)	0.03	0	0	23	0.03
		Total	5	3	46	(5)	0.07	8	0	57*	0.08

* Fish captured more than once were only counted once in totals.

the release) were recovered. We constructed 95% confidence intervals (CI) around the mean Tongue Point/Skamania Light adult return ratio (T/S) (Harmon et al. 1996): T/S was 0.91, with a 95% CI of (0.42, 5.51). There were no detectable differences in return rates between fish released at the two release sites. To date, adult returns from the 1993 study year total 99 fish from the Tongue Point releases (0.16% of the release) and 130 fish from the Skamania Light releases (0.20% of the release). Age-1- and age-2-ocean adult returns from the 1994 study year total 118 fish from the Tongue Point releases (0.20% of the release) and only 46 fish from the Skamania Light releases (0.07% of the release).

These adult returns rates were much lower than expected for all study years, but were consistent with the overall poor adult returns observed for both steelhead and spring/summer chinook salmon from the same smolt migration years. Low river flows and warmer-than-normal water temperatures during spring 1992 may have contributed to the abysmal adult returns for that study year. However, we believe that periodic, exceptionally unfavorable estuary and/or early-ocean conditions (Ware and Thomson 1991, Beamish and Bouillon 1993, Lawson 1993, Hsieh et al. 1995, Roemmich and McGowan 1995) continued as the primary causative factors of poor adult returns, as posited by Achord et al. (1992) and Harmon et al. (1996).

To complete the release-site study, we will continue recovering adult steelhead at Lower Granite Dam. Complete adult returns for the 3-year smolt marking study will be available in spring 1998.

TRANSPORTATION VS. INRIVER MIGRATION OF PIT-TAGGED SPRING/SUMMER CHINOOK SALMON SMOLTS--LOWER GRANITE DAM

Introduction

Research to evaluate the effects of transporting juvenile salmonids around dams began over 25 years ago. Evaluations of transported spring/summer chinook salmon (*Oncorhynchus tshawytscha*) and steelhead (*O. mykiss*) have been conducted from various Snake River dams from 1968 through 1980. In addition, transportation of summer/fall chinook salmon and steelhead smolts was evaluated at McNary Dam on the Columbia River from 1978 through 1983.

Based upon adult returns, results of these transportation studies have varied by species. For summer/fall chinook salmon (subyearlings) and steelhead, results consistently showed that significantly more marked/transported fish returned to the point of release than did marked fish released to migrate inriver. However, for spring/summer chinook salmon (yearling smolts), study results were less consistent. Results from the earliest studies, during 1968-73, demonstrated conclusively that significantly more marked fish that were transported returned to the point of marking than did marked fish released to migrate inriver (Ebel et al. 1973, Slatick et al. 1975, Ebel 1980). However, most studies conducted during 1975-80 yielded inconclusive results because very low numbers of marked adults returned from either group (Park 1985).

Matthews (1992) postulated that severe physical trauma suffered by many smolts during collection and marking was a primary cause of low returns of spring/summer chinook salmon adults during the 1975-80 studies. From 1981 through 1984, the COE and fisheries agencies addressed this problem by improving many features of the smolt collection and bypass systems at

dams, particularly at Lower Granite Dam. In addition, the preanesthetic system of handling and marking smolts (Matthews et al. 1986) was introduced at Lower Granite Dam in 1983. This system virtually eliminated the major physical trauma associated with the handling and marking process. All indications suggest that the modifications and improvements increased survival substantially.

A study to reevaluate smolt transportation of yearling chinook salmon migrants from the Snake River after substantial modifications to collection and bypass facilities were made was initiated at Lower Granite Dam in 1986. Spring/summer chinook salmon smolts were marked with CWTs and freeze brands in 1986 and 1989 at Lower Granite Dam. Approximately one-half of the marked smolts were placed in barges at Lower Granite Dam, and the remainder were trucked to a release site downstream from Little Goose Dam to continue their inriver migration. Although significantly more barged fish returned as adults than those that migrated inriver, concern was expressed that the studies were compromised by transporting the inriver fish to below Little Goose Dam. The studies were further criticized because a small fraction of inriver migrating fish were inadvertently transported from McNary Dam and because inriver migration conditions were not considered optimal. Thus, inriver migrating fish were not afforded the full opportunity to remain inriver and survive at the highest rates possible.

Since 1989, a succession of low-flow years and ongoing construction and operation of a new bypass and collection system at Lower Monumental Dam have impeded further attempts to conduct conventional transportation research (using CWTs and freeze brands) from Lower Granite Dam. However, a major fish-marking technology advance, the passive integrated transponder (PIT) tag (Prentice et al. 1990), along with recently developed PIT-tag diversion

systems (Matthews et al. 1990, 1992; Achord et al. 1992; Harmon et al. 1995) installed at collector dams downstream from Lower Granite Dam, have provided the opportunity to conduct contemporary transportation studies directly from Lower Granite Dam. The combination of these technologies allows release of inriver-migrating study fish directly into the Lower Granite Dam tailrace because a high percentage of the fish collected inadvertently at any downstream dam can now be returned to the river rather than transported. Furthermore, the collection history and final disposition of each inriver migrating fish will be recorded, so that individual records of fish inadvertently transported from any downstream dam can be eliminated or separated from the analysis.

The primary objective of this study is to compare adult returns to Lower Granite Dam between PIT-tagged spring/summer chinook salmon smolts transported from Lower Granite Dam to below Bonneville Dam and those allowed to migrate inriver from the tailrace of the dam under optimal conditions for inriver survival. In addition, the number of PIT-tagged fish released in-river will allow smolt-survival estimations between the Lower Granite and McNary Dam tailraces using the Single-Release Model (Iwamoto et al. 1994). This study requires tagging spring/summer chinook salmon smolts for a minimum of 3 years, not necessarily in succession. Here we report tagging results and other data derived from inriver-migrating study fish during the second study year in 1996, and jack returns from the initial study year of 1995. Adult return data will be reported as acquired in ensuing years.

Methods

Smolt Sampling and Tagging

During spring 1996, we tagged spring/summer chinook salmon smolts at Lower Granite Dam for the second year of a 3-year transportation study. We marked fish externally with freeze brands and internally with modified PIT tags following the methodology described by Marsh et al. (1996). We loaded some fish onto barges or trucks for transport and release below Bonneville Dam and released others directly into the Lower Granite Dam tailrace to continue their seaward migration.

For the initial tagging year (1995), we designed the study to test a minimum transport-to-inriver adult return survival ratio (T/I) of 1.3. For that year, Muir et al. (1996) estimated inriver survival from Lower Granite Dam tailrace to McNary Dam tailrace to be approximately 70%. If the per project survival rate remained at this level through the three remaining dams and reservoirs, a T/I of approximately 1.8 would be expected for adults returning to Lower Granite Dam. Based on this information, we adjusted the study design in 1996 to test a minimum T/I of 1.5.

We calculated the numbers of marked fish required in both study groups using the following notation:

N_i = number of tagged inriver migrants

N_t = number of tagged transported fish

n_i = number of inriver migrants recovered as adults

n_t = number of transported fish recovered as adults

$p_i = n_i/N_i$ = proportion of inriver migrants returning as adults

$p_t = n_t/N_t$ = proportion of transported fish returning as adults

The T/I ratio was estimated by

$$R = p_t / p_i ,$$

the variance of R was given by

$$V(R) \approx R^2 \left(\frac{1}{n_i} + \frac{1}{n_t}\right) ,$$

and the relative variance by

$$RV = \frac{V(R)}{R^2} \approx \frac{1}{n_i} + \frac{1}{n_t} .$$

The value for RV is the square of the coefficient of variation (CV). The sample sizes were then calculated by inserting the desired CV into this equation. The CV specifies the standard error as a percent of the ratio itself.

To maximize precision for a given total sample size, we allocated numbers to provide about equal numbers of expected adults returning in the transport and inriver migrant groups (i.e., $n_i = n_t$). By specifying the value of RV, the required number of returning adults was obtained from

$$RV \approx 1/n_i + 1/n_t = 2/n,$$

where $n = n_i = n_t$, and n was estimated from $n \approx 2/RV$. For spring chinook salmon, we desired a CV of 15.0% (S.E. = 0.23) , and the number required in each returning group was

$$n \approx 2/RV - 2/(0.15)^2 = 2/0.0225 = 90.$$

We estimated a minimum adult return of transported fish to Lower Granite Dam of 0.2% for the 1996 smolt outmigration; thus the required number of releases in this group was given as

$$N_t \approx n_t/p_t = 90/0.002 = 45{,}000.$$

If R is 1.5, then the number of inriver migrants (N_i) was given as

$$N_i \approx N_t(1.5) = 45{,}000(1.5) = 67{,}500.$$

Thus, the total numbers of PIT-tagged spring chinook salmon required were 45,000 transports and 67,500 inriver migrants. In addition to marking with the PIT tag, we also marked transport and inriver migrants with freeze brands in 5,000- and 7,500-fish release lots, respectively, to assure identification of adult returns, even if PIT tags were not reliably detected.

The basic collection and handling methodology followed that described by Marsh et al. (1996). However, because the spring/summer chinook salmon-to-steelhead ratio was expected to be about 4-5 times smaller in 1996 than in 1995, we made two adjustments to our methodology in 1996. To avoid incidental handling of an excessive number of steelhead in order to mark the required number of spring/summer chinook salmon, we installed a small wet-separator in the flume leading to our sample raceways. This unit automatically separated fish by size, removing the larger steelhead and thus decreasing the number of fish that required handling. We utilized the separator only during the hours that we were tagging fish (4-10 hours per day). During the rest of the collection period, the separator was removed from the flume and all of the fish were collected.

To further decrease the number of handled steelhead, we installed a temporary bypass line between the preanesthesia tanks and a collection raceway. Our ability to finely control the movement of fish from the sample raceway to the preanesthesia tanks allowed us, with the use of a manually operated gate, to bypass steelhead directly back to a raceway while collecting chinook salmon for marking. Utilizing this method, we bypassed 60-80% of the steelhead back to a raceway without anesthetizing and handling them in the sorting trailer.

Inriver Migration

Marsh et al. (1996) provided details on how inriver study fish were tracked as they passed through the collection systems at dams downstream from Lower Granite Dam during this study.

Prior to 5 June 1996, all fish (tagged and nontagged) collected at McNary Dam were bypassed to the river after passing through PIT-tag detectors; no fish were transported from McNary Dam during this time. On 5 June, collection and transport operations began at McNary Dam, and the PIT-tag diversion system was used thereafter to return PIT-tagged fish back to the river.

Adult Recoveries and Data Analysis

We will recover adults in each of 3 years following tagging as juveniles. Details of this procedure were described by Marsh et al. (1996).

Results and Discussion

Smolt Sampling and Tagging

We PIT tagged and freeze-branded fish from 8 April through 18 June. During this period, we tagged 115,602 yearling spring/summer chinook salmon (Table 2 and Appendix

Table 2. Numbers of wild and hatchery spring/summer chinook salmon smolts PIT tagged and released inriver at Lower Granite Dam or transported below Bonneville Dam, 1996.

	Hatchery		Wild		Unknown		
	number	percent	number	percent	number	percent	Totals
Released inriver							
tagged	52,925	79.6	13,451	20.2	92	0.1	66,468
released	52,159	79.9	13,027	20.0	90	0.1	65,276
Transported							
tagged	35,925	81.6	8,066	18.3	33	0.1	44,024
released	35,858	81.6	8,048	18.3	32	0.1	43,938

Tables 7.0 through 9.0), or 19.7% of the total yearling spring/summer chinook salmon collected at Lower Granite Dam in 1995. However, during barge loading operations on 25 April, an unknown fraction of the transport group marked on 24 April were inadvertently released to the river. We therefore removed records from this day of tagging (2,979 inriver fish and 2,131 transport fish), leaving 110,492 fish marked for the transportation study in 1996. The number of fish tagged daily ranged from 15 to 7,247. Of the totals tagged, 65,276 were released into the Lower Granite Dam tailrace and 43,938 were transported to below Bonneville Dam. Hatchery and wild fish proportions were nearly identical between the two treatment groups.

Based on mortality counts from the inriver holding tank, post-marking delayed mortality (24 hour) averaged 1.8% over the entire tagging season. This value is exceptionally low, considering that we tagged virtually every fish sampled. We rejected for tagging only a few fish that were either very severely injured or exhibited obvious symptoms of gross bacterial kidney disease. By tracking each fish's unique PIT-tag code, we determined the condition of each mortality as recorded when the fish was still alive during tagging. Descaling appeared to have the largest impact on post-marking delayed mortality: when tagged, 10.2% of all fish were recorded as descaled; however, 27.8% of the delayed mortalities were recorded as descaled during tagging.

Our inability to efficiently recover post-marking mortalities from the transport holding raceways introduced a small bias into the study. We collected and removed from the inriver data set the records from virtually all mortalities of fish marked for the inriver releases, but only an unknown fraction of those from mortalities of fish marked for transport. Assuming that marked transport fish experienced the same delayed mortality rate prior to release as marked inriver fish,

approximately 830 (1.8%) marked transport fish that we recorded as released alive were actually released postmortem. This bias will slightly skew the adult return T/I downward.

We recorded fork lengths on all of the fish during tagging. During the course of our marking, we encountered fish that were obviously of hatchery origin, but had partial or no fin clips. Because there were a large number of these fish, we recorded all unclipped fish greater than 110 mm as of unknown rearing type. At the end of the tagging season, we retrieved all data from the Pacific States Marine Fisheries Commission PIT-tag database that pertained to wild fish tagged in their natal streams and subsequently captured and remeasured at a collector dam. We plotted the length distributions of known hatchery fish we marked for this study and the lengths of known wild fish captured at a collector dam from the database. By comparing the plots, we found that they intersected at 123 mm. At this intersection point, approximately 6% of each group would possibly be mis-identified. Using these plots, we re-classified the rearing type of unknown fish that were 123 mm or smaller as wild-rearing types, and all unknown fish that were 124 mm or larger as hatchery-rearing types. Any fish of unknown rearing history that did not have a length record were left as an unknown rearing type. Based on this re-classification, we compared the fish lengths and found that the proportions of hatchery and wild rearing types were virtually identical in the two treatments (Table 3).

Inriver Migration

As inriver study fish continued their seaward migration, some were recollected at dams downstream from Lower Granite Dam. We included the inriver fish marked on 24 April in

Table 3. Mean fork lengths (fl.)(mm) by brand groups of spring/summer chinook salmon PIT tagged at Lower Granite Dam, 1996. Inriver and transport brand groups are paired chronologically.

Inriver brand	Hatchery fl.	Hatchery number	Wild fl.	Wild number	Transport brand	Hatchery fl.	Hatchery number	Wild fl.	Wild number
LA-π-1	140	3,345	108	4,262	RA-2-1	140	2,571	110	2,519
LA-π-2	139	3,904	109	3,615	RA-2-2	139	2,924	110	2,061
LA-π-3	137	5,091	108	2,455	RA-2-3	138	3,456	110	1,552
LA-π-4	136	6,695	110	794	RA-2-4	138	4,589	109	494
LA-PP-1	138	6,891	112	593	RA-4-2	138	4,619	111	364
LA-PP-2	140	7,339	112	556	RA-4-3	140	4,666	111	311
LA-F-3	139	6,855	111	616	RA-4-4	137	4,485	110	475
LA-F-4	143	6,754	112	400	RA-Y-1	140	4,755	111	258
LA-RT-1	139	6,367	110	1,002	RA-Y-2	141	4,395	112	618
LA-RT-1	144	1,017	110	198	RA-Y-3	144	679	113	144
Totals or Averages	139	54,258	109	14,491		139	37,139	110	8,796

determining the outmigration characteristics reported here (the transport fish from that day's marking which were inadvertently released were not used).

Of the 68,231 inriver fish released, 38,076 (58.3%) were detected at least once at a downstream collector dam (Table 4 and Appendix Table 10.0). As expected, the largest number of first-time detections occurred at Little Goose Dam.

Table 5 (Appendix Tables 11.0 through 13.0) shows total numbers and ultimate dispositions of inriver fish detected at each dam. We removed records from the inriver data set of fish that were detected at a dam but not detected later on a return-to-the-river detector coil at that dam. At the end of the smolt migration, we obtained information from COE project river from raceways. During these periods, we added back to the inriver data set fish whose final detections were on coils leading to raceways at each dam. At each dam, any fish detected exiting the fish and debris separator but not detected elsewhere was removed from the inriver data set. Fish whose final detections were on coils leading to sampling rooms were also removed from the inriver data set.

While greatly improved over last year, the PIT-tag diversion system at Little Goose Dam again returned PIT-tagged fish to the river with the lowest efficiency of the three diversion systems located at collector dams downstream from Lower Granite Dam. By comparing total facility detections with post-diversion detections on coils leading to the river, we determined that 6.5% of the fish collected at Little Goose Dam were not diverted back to the river, and we removed records from these fish from the inriver data set. Using the same method at Lower Monumental Dam, we determined that 6.2% of the collected fish fell into this category. We added records back to the inriver data set from fish detected on coils leading to raceways during

Table 4. Numbers and percentages of spring/summer chinook salmon smolts PIT tagged and released at Lower Granite Dam in spring 1996 and subsequently detected at Little Goose, Lower Monumental, and McNary Dams. Percentages are based on the total numbers of inriver fish released.

Dam	First detections	Second detections	Third detections
Little Goose Dam			
Number detected	19,869	*1	
% of release	30.4	< 0.01	
Lower Monumental Dam			
Numbers detected	14,316	6,250	
% of release	21.9	9.6	
McNary Dam			
Numbers detected	3,891	3,955	918
% of release	6.0	6.1	1.4
Totals			
Numbers detected	38,076	10,206	918
% of release	58.3	15.6	1.4

* Note: This fish was observed at Lower Monumental Dam on 15 May, at Bonneville Dam on 22 May, and then was observed at Little Goose on 20 September.

Table 5. Final disposition of PIT-tagged spring/summer chinook salmon smolts released at Lower Granite Dam in spring 1996 and subsequently detected at Little Goose, Lower Monumental, and McNary Dams (includes definitions for final dispositions).

Final disposition*	Number of smolts		
	Little Goose Dam	Lower Monumental Dam	McNary Dam
River	18,586	19,284	8,751
Bypassed	1	434	0
Sample	217	122	10
Transported	1,026	686	3
Unknown	42	42	0
Totals			
Observed	19,870	20,566	8,764
Removed from study	1,285	850	13
% removed from study	6.5	4.1	0.1
To river	18,587	19,718	8,751

* Definitions:

Disposition	Last coil observation	Special circumstances	Ultimate destination	Study status
River	Diversion or river return		River	Retained
Bypassed	Raceway	Raceway emptied to river	River	Retained
Sample	Sample		Unknown	Removed
Transported	Raceway		Barge/Truck	Removed
Unknown	Separator		Unknown	Removed

periods when all fish were returned to the river at both dams. At Lower Monumental Dam, a large number of fish were not diverted to the river as a result of equipment failure during one 12-hour period in mid-May. However, fish collected in the raceways during that period were subsequently returned to the river. After adding these fish back into the inriver data set, the loss of fish at Lower Monumental Dam was only 4.1% of the collected fish. There were no significant changes in the number of fish removed from the inriver data set at Little Goose Dam. Since all fish were returned to the river at McNary Dam prior to 5 June, very few records of the inriver study fish collected at this dam required removal from the inriver data set.

From 9 April through 19 June, we released 68,231 PIT-tagged spring/summer chinook salmon smolts into the Lower Granite Dam tailrace. Based upon detections at John Day and Bonneville Dams, we preliminarily estimated that approximately 58% of these fish survived to the McNary Dam tailrace. If no mortality occurs to transported fish compared to inriver fish, the adult return T/I should approximate the inverse of inriver survival ($1/\hat{S}$). Assuming proportional survival through the remaining three dams and reservoirs, the adult return T/I for the above period should approximate 2.6.

Matthews et al. (1992) reported a 1.6 T/I for spring/summer chinook salmon marked to evaluate transportation from Lower Granite Dam in 1986, a year with Snake and Columbia River spill and flow volumes somewhat similar to those in 1995. In this study, inriver migrants were trucked for release below Little Goose Dam, leaving six dams and reservoirs in the migration path of these fish. If inriver survival were proportionally the same through the six hydroprojects in 1986 as measured through the four hydroprojects in 1995, then the expected T/I for 1986 would have been approximately 1.7, nearly the same as the value observed and reported.

Adult Recoveries and Data Analysis - 1995 Study Year

At Lower Granite Dam in 1996, we recovered jack spring/summer chinook salmon from the 1995 study year (Appendix Tables 14.0 through 19.0). The first jack arrived at Lower Granite Dam on 8 May and the last arrived on 19 July.

In total, we recovered 59 jacks during 1996, with 30 of these recovered between 26 May and 4 June. Of the 59 jacks, 27 were transported as smolts from Lower Granite Dam and 29 had been released as smolts into the tailrace of Lower Granite Dam to migrate inriver to the ocean. The remaining three jacks were released as smolts into the tailrace of Lower Granite Dam, but when collected at a downstream dam were either not observed on PIT-tag detectors leading back to the river or were observed on PIT-tag detectors leading to transportation. Because of this, we assumed that these jacks were transported from that dam, and we removed their records from the inriver study group.

Six of the 59 jacks fell back across Lower Granite Dam and subsequently reascended the adult ladder. Of these six fallbacks, four were from the inriver group and two were from the transported group.

We found that the modified PIT tag (containing a blank CWT) (Marsh et al. 1996) performed as expected. All study jacks were detected as they passed through the CWT detector and were diverted into the adult trap located in the Lower Granite Dam fish ladder. Also, every PIT-tagged jack was detected on both the in-ladder PIT-tag detectors in the trap and later with a hand-held detector during a physical inspection.

Prior to release back to the ladder, we examined each jack for marks and injuries,

recorded its fork length, and applied a numbered jaw tag. We also examined each jack for a freeze brand. Freeze brands were legible on all of the study jacks.

Of the 59 jacks observed at Lower Granite Dam, 38 were recovered from various hatcheries (Appendix Tables 14.0 through 19.0) upstream from the dam. In addition, one jack was illegally caught by a fisherman. All study jacks collected upstream from Lower Granite Dam had been detected and observed as they passed the dam.

MARINE MAMMAL ABRASIONS-LOWER GRANITE DAM

We continued to monitor the prevalence of marine mammal tooth and claw abrasions on adult spring/summer chinook salmon at Lower Granite Dam during 1996. Prevalence averaged 16.4% on adults examined, with 36.4% of the abrasions consisting of open wounds of varying severity (Table 6). As in the past, abrasion prevalence was generally higher during the early portion of the run (Matthews et al. 1992; Achord et al. 1992; Harmon et al. 1993, 1995, 1996). With the levels of abrasions observed, it is quite likely that marine mammals continue to negatively affect depressed runs of Snake River spring/summer chinook salmon.

Table 6. Weekly prevalence (24 April to 17 August) of marine mammal tooth and claw abrasions on adult spring/summer chinook salmon at Lower Granite Dam in 1996.

Date		Sample size		Incidence (%)
24-28 April		4		25.0
29 April - 5 May		15		13.3
6-12 May		71		31.0
13-19 May		229		22.3
20-26 May		286		22.0
27 May - 2 June		558		17.9
3-9 June		421		15.0
10-16 June		142		17.6
17-23 June		217		12.9
24-30 June		271		14.8
1-7 July		215		9.3
8-14 July		123		8.9
15-21 July		60		10.0
22-28 July		17		5.9
29 July - 4 August		13		7.7
5-11 August		9		0.0
12-17 August		1		0.0
	Total	2652	Average	16.4*

* Open wounds were associated with 36.4% of the abrasions.

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Appendix

Data Tables

Appendix Table 1.0.--Summary of all recoveries of adult steelhead transported as juveniles by barge from Lower Granite Dam to Tongue Point in 1992.

Master File Date : 12 December 1996
RELEASE GROUPS INCLUDED: 9207A 9207B 9207C 9207D 9207E 9207F

1992 L.GRANITE LGR RELEASE SITE TONGUE POINT

STEELHEAD

Brands Used: RAL 1 RASU1 RASU2 RASU3 RASU4 RAZ 1
Wire Codes Used: 232445 232447 232448 232449 232450 232444

NUMBER RELEASED: 55366

RECOVERY AREA	YEAR OF RETURN 1992	1993	1994	1995	1996	TOTAL	% RETURN
RIVER SYSTEM TRAPS							
LOWER GRANITE TRAP	0	32	46	4	0	82	0.148
OCEAN FISHERIES							
BRITISH COLUMBIA	0	0	1	0	0	1	0.002
RIVER SPORT							
COLUMBIA R. BELOW SNAKE R.	0	2	0	0	0	2	0.004
SNAKE R.	0	8	4	1	0	13	0.023
CLEARWATER R.	0	4	1	0	0	5	0.009
OTHER RIVERS	0	0	3	1	0	4	0.007
RIVER COMMERCIAL	0	0	0	0	0	0	0.000
INDIAN FISHERIES							
FALL INDIAN NET	0	2	4	0	0	6	0.011
HATCHERIES							
DESCHUTES R. HATCHERIES	1	0	0	0	0	1	0.002
SAWTOOTH H. AND TRAP	0	1	0	0	0	1	0.002
BIG CANYON TRAP	0	1	0	0	0	1	0.002
STREAM SURVEY	0	1	0	0	0	1	0.002
TOTALS	1	51	59	6	0	117	0.211
PERCENT OF RECOVERY %	0.9	43.6	50.4	5.1	0.0		

Appendix Table 1.1.--Recoveries of adult steelhead transported as juveniles by barge from Lower Granite Dam to Tongue Point on 4 May 1992.

Master File Date : 12 December 1996
RELEASE GROUPS INCLUDED: 9207A

1992 L.GRANITE | LGR RELEASE SITE | TONGUE POINT

STEELHEAD

Brands Used: RAL 1
Wire Codes Used: 232445

NUMBER RELEASED: 9199

RECOVERY AREA RETURN	YEAR OF RETURN 1992	1993	1994	1995	1996	1997	TOTAL	%
RIVER SYSTEM TRAPS								
LOWER GRANITE TRAP	0	12	20	0	0	0	32	0.348
OCEAN FISHERIES								
BRITISH COLUMBIA	0	0	1	0	0	0	1	0.011
RIVER SPORT								
SNAKE R.	0	4	2	1	0	0	7	0.076
CLEARWATER R.	0	2	0	0	0	0	2	0.022
OTHER RIVERS	0	0	1	1	0	0	2	0.022
RIVER COMMERCIAL	0	0	0	0	0	0	0	0.000
INDIAN FISHERIES								
FALL INDIAN NET	0	0	2	0	0	0	2	0.022
HATCHERIES								
BIG CANYON TRAP	0	1	0	0	0	0	1	0.011
STREAM SURVEY	0	0	0	0	0	0	0	0.000
TOTALS	0	19	26	2	0	0	47	0.511
PERCENT OF RECOVERY %	0.0	40.4	55.3	4.3	0.0	0.0		

Appendix Table 1.2.--Recoveries of adult steelhead transported as juveniles by barge from Lower Granite Dam to Tongue Point on 10 May 1992

Master File Date : 12 December 1996
RELEASE GROUPS INCLUDED: 9207B

1992 L.GRANITE | LGR RELEASE SITE | TONGUE POINT

STEELHEAD

Brands Used: RASU1
Wire Codes Used: 232447

NUMBER RELEASED: 9418

RECOVERY AREA RETURN	YEAR OF RETURN 1992	1993	1994	1995	1996	1997	TOTAL	%
RIVER SYSTEM TRAPS								
LOWER GRANITE TRAP	0	4	9	0	0	0	13	0.138
OCEAN FISHERIES	0	0	0	0	0	0	0	0.000
RIVER SPORT								
COLUMBIA R. BELOW SNAKE R.	0	2	0	0	0	0	2	0.021
SNAKE R.	0	2	0	0	0	0	2	0.021
CLEARWATER R.	0	0	1	0	0	0	1	0.011
RIVER COMMERCIAL	0	0	0	0	0	0	0	0.000
INDIAN FISHERIES								
FALL INDIAN NET	0	0	1	0	0	0	1	0.011
HATCHERIES	0	0	0	0	0	0	0	0.000
STREAM SURVEY	0	1	0	0	0	0	1	0.011
TOTALS	0	9	11	0	0	0	20	0.212
PERCENT OF RECOVERY %	0.0	45.0	55.0	0.0	0.0	0.0		

Appendix Table 1.3.--Recoveries of adult steelhead transported as juveniles by barge from Lower Granite Dam to Tongue Point on 12 May 1992.

Master File Date : 12 December 1996
RELEASE GROUPS INCLUDED: 9207C

1992 L.GRANITE | LGR RELEASE SITE | TONGUE POINT

STEELHEAD

Brands Used: RASU2
Wire Codes Used: 232448

NUMBER RELEASED: 9137

RECOVERY AREA RETURN	YEAR OF RETURN 1992	1993	1994	1995	1996	1997	TOTAL	%
RIVER SYSTEM TRAPS								
LOWER GRANITE TRAP	0	3	2	1	0	0	6	0.066
OCEAN FISHERIES	0	0	0	0	0	0	0	0.000
RIVER SPORT								
SNAKE R.	0	0	1	0	0	0	1	0.011
OTHER RIVERS	0	0	1	0	0	0	1	0.011
RIVER COMMERCIAL	0	0	0	0	0	0	0	0.000
INDIAN FISHERIES								
FALL INDIAN NET	0	0	1	0	0	0	1	0.011
HATCHERIES	0	0	0	0	0	0	0	0.000
STREAM SURVEY	0	0	0	0	0	0	0	0.000
TOTALS	0	3	5	1	0	0	9	0.099
PERCENT OF RECOVERY %	0.0	33.3	55.6	11.1	0.0	0.0		

Appendix Table 1.4.--Recoveries of adult steelhead transported as juveniles by barge from Lower Granite Dam to Tongue Point on 16 May 1992.

Master File Date : 12 December 1996
RELEASE GROUPS INCLUDED: 9207D

1992 L.GRANITE LGR RELEASE SITE TONGUE POINT

STEELHEAD

Brands Used: RASU3
Wire Codes Used: 232449

NUMBER RELEASED: 9118

RECOVERY AREA RETURN	YEAR OF RETURN 1992	1993	1994	1995	1996	1997	TOTAL	%
RIVER SYSTEM TRAPS								
LOWER GRANITE TRAP	0	5	7	1	0	0	13	0.143
OCEAN FISHERIES	0	0	0	0	0	0	0	0.000
RIVER SPORT								
SNAKE R.	0	2	0	0	0	0	2	0.022
OTHER RIVERS	0	0	1	0	0	0	1	0.011
RIVER COMMERCIAL	0	0	0	0	0	0	0	0.000
INDIAN FISHERIES								
FALL INDIAN NET	0	2	0	0	0	0	2	0.022
HATCHERIES								
SAWTOOTH H. AND TRAP	0	1	0	0	0	0	1	0.011
STREAM SURVEY	0	0	0	0	0	0	0	0.000
TOTALS	0	10	8	1	0	0	19	0.208
PERCENT OF RECOVERY %	0.0	52.6	42.1	5.3	0.0	0.0		

Appendix Table 1.5.--Recoveries of adult steelhead transported as juveniles by barge from Lower Granite Dam to Tongue Point on 18 May 1992.

Master File Date : 12 December 1996
RELEASE GROUPS INCLUDED: 9207E

1992 L.GRANITE | LGR RELEASE SITE | TONGUE POINT

STEELHEAD

Brands Used: RASU4
Wire Codes Used: 232450

NUMBER RELEASED: 9220

RECOVERY AREA RETURN	YEAR OF RETURN 1992	1993	1994	1995	1996	1997	TOTAL	%
RIVER SYSTEM TRAPS								
LOWER GRANITE TRAP	0	5	6	2	0	0	13	0.141
OCEAN FISHERIES	0	0	0	0	0	0	0	0.000
RIVER SPORT								
SNAKE R.	0	0	1	0	0	0	1	0.011
CLEARWATER R.	0	1	0	0	0	0	1	0.011
RIVER COMMERCIAL	0	0	0	0	0	0	0	0.000
INDIAN FISHERIES	0	0	0	0	0	0	0	0.000
HATCHERIES								
DESCHUTES R. HATCHERIES	1	0	0	0	0	0	1	0.011
STREAM SURVEY	0	0	0	0	0	0	0	0.000
TOTALS	1	6	7	2	0	0	16	0.174
PERCENT OF RECOVERY %	6.3	37.5	43.8	12.5	0.0	0.0		

Appendix Table 1.6.--Recoveries of adult steelhead transported as juveniles by barge from Lower Granite Dam to Tongue Point on 22 May 1992.

Master File Date : 12 December 1996
RELEASE GROUPS INCLUDED: 9207F

1992 L.GRANITE LGR RELEASE SITE TONGUE POINT

STEELHEAD

Brands Used: RAZ 1
Wire Codes Used: 232444

NUMBER RELEASED: 9274

RECOVERY AREA RETURN		YEAR OF RETURN 1992	1993	1994	1995	1996	1997	TOTAL	%
RIVER SYSTEM TRAPS LOWER GRANITE TRAP		0	3	2	0	0	0	5	0.054
OCEAN FISHERIES		0	0	0	0	0	0	0	0.000
RIVER SPORT CLEARWATER R.		0	1	0	0	0	0	1	0.011
RIVER COMMERCIAL		0	0	0	0	0	0	0	0.000
INDIAN FISHERIES		0	0	0	0	0	0	0	0.000
HATCHERIES		0	0	0	0	0	0	0	0.000
STREAM SURVEY		0	0	0	0	0	0	0	0.000
TOTALS		0	4	2	0	0	0	6	0.065
PERCENT OF RECOVERY	%	0.0	66.7	33.3	0.0	0.0	0.0		

Appendix Table 2.0.--Summary of all recoveries of adult steelhead transported as juveniles by barge from Lower Granite Dam to below Bonneville Dam in 1992.

Master File Date : 12 December 1996
RELEASE GROUPS INCLUDED: 9208A 9208B 9208C 9208D 9208E 9208F

1992 L.GRANITE LGR RELEASE SITE BELOW BONNEVILLE

STEELHEAD

Brands Used: LAF 1 LAF 3 LAF 4 LAV 1 LAV 2 LAV 3
Wire Codes Used: 232419 232417 232418 232420 232421 232422

NUMBER RELEASED: 60577

RECOVERY AREA RETURN	YEAR OF RETURN 1992	1993	1994	1995	1996	1997	TOTAL	%
RIVER SYSTEM TRAPS								
LOWER GRANITE TRAP	0	32	62	4	0	0	98	0.162
OCEAN FISHERIES	0	0	0	0	0	0	0	0.000
RIVER SPORT								
COLUMBIA R. BELOW SNAKE R.	0	2	2	0	0	0	4	0.007
SNAKE R.	0	6	8	0	0	0	14	0.023
CLEARWATER R.	0	0	4	0	0	0	4	0.007
OTHER RIVERS	0	0	10	0	0	0	10	0.017
RIVER COMMERCIAL	0	0	0	0	0	0	0	0.000
INDIAN FISHERIES								
FALL INDIAN NET	0	1	3	0	0	0	4	0.007
HATCHERIES								
DWORSHAK H.	0	0	0	2	0	0	2	0.003
PAHSIMEROI H.	0	0	1	0	0	0	1	0.002
KOOSKIA H.	0	0	0	1	0	0	1	0.002
DESCHUTES R. HATCHERIES	0	0	1	0	0	0	1	0.002
STREAM SURVEY	0	0	0	0	0	0	0	0.000
TOTALS	0	41	91	7	0	0	139	0.229
PERCENT OF RECOVERY %	0.0	29.5	65.5	5.0	0.0	0.0		

Appendix Table 2.1.--Recoveries of adult steelhead transported as juveniles by barge from Lower Granite Dam to below Bonneville Dam on 4 May 1992.

Master File Date : 12 December 1996
RELEASE GROUPS INCLUDED: 9208A

1992 L.GRANITE LGR RELEASE SITE BELOW BONNEVILLE

STEELHEAD

Brands Used: LAF 1
Wire Codes Used: 232419

NUMBER RELEASED: 9740

RECOVERY AREA RETURN	1992	YEAR OF RETURN 1993	1994	1995	1996	1997	TOTAL	%
RIVER SYSTEM TRAPS								
LOWER GRANITE TRAP	0	12	22	2	0	0	36	0.370
OCEAN FISHERIES	0	0	0	0	0	0	0	0.000
RIVER SPORT								
COLUMBIA R. BELOW SNAKE R.	0	0	1	0	0	0	1	0.010
SNAKE R.	0	4	1	0	0	0	5	0.051
OTHER RIVERS	0	0	4	0	0	0	4	0.041
RIVER COMMERCIAL	0	0	0	0	0	0	0	0.000
INDIAN FISHERIES								
FALL INDIAN NET	0	0	1	0	0	0	1	0.010
HATCHERIES								
KOOSKIA H.	0	0	0	1	0	0	1	0.010
STREAM SURVEY	0	0	0	0	0	0	0	0.000
TOTALS	0	16	29	3	0	0	48	0.493
PERCENT OF RECOVERY %	0.0	33.3	60.4	6.3	0.0	0.0		

Appendix Table 2.2.--Recoveries of adult steelhead transported as juveniles by barge from Lower Granite Dam to below Bonneville Dam on 10 May 1992.

Master File Date : 12 December 1996
RELEASE GROUPS INCLUDED: 9208B

1992 L.GRANITE LGR RELEASE SITE BELOW BONNEVILLE

STEELHEAD

Brands Used: LAF 3
Wire Codes Used: 232417

NUMBER RELEASED: 10285

RECOVERY AREA RETURN	YEAR OF RETURN 1992	1993	1994	1995	1996	1997	TOTAL	%
RIVER SYSTEM TRAPS								
LOWER GRANITE TRAP	0	11	25	1	0	0	37	0.360
OCEAN FISHERIES	0	0	0	0	0	0	0	0.000
RIVER SPORT								
COLUMBIA R. BELOW SNAKE R.	0	1	1	0	0	0	2	0.019
SNAKE R.	0	2	6	0	0	0	8	0.078
CLEARWATER R.	0	0	2	0	0	0	2	0.019
OTHER RIVERS	0	0	4	0	0	0	4	0.039
RIVER COMMERCIAL	0	0	0	0	0	0	0	0.000
INDIAN FISHERIES	0	0	0	0	0	0	0	0.000
HATCHERIES								
NWORSHAK H.	0	0	0	2	0	0	2	0.019
PAHSIMEROI H.	0	0	1	0	0	0	1	0.010
STREAM SURVEY	0	0	0	0	0	0	0	0.000
TOTALS	0	14	39	3	0	0	56	0.544
PERCENT OF RECOVERY %	0.0	25.0	69.6	5.4	0.0	0.0		

Appendix Table 2.3.--Recoveries of adult steelhead transported as juveniles by barge from Lower Granite Dam to below Bonneville Dam on 12 May 1992.

Master File Date : 12 December 1996
RELEASE GROUPS INCLUDED: 9208C

1992 L.GRANITE LGR RELEASE SITE BELOW BONNEVILLE

STEELHEAD

Brands Used: LAF 4
Wire Codes Used: 232418

NUMBER RELEASED: 10149

RECOVERY AREA RETURN		YEAR OF RETURN 1992	1993	1994	1995	1996	1997	TOTAL	%
RIVER SYSTEM TRAPS									
LOWER GRANITE TRAP		0	5	11	1	0	0	17	0.168
OCEAN FISHERIES		0	0	0	0	0	0	0	0.000
RIVER SPORT									
SNAKE R.		0	0	1	0	0	0	1	0.010
CLEARWATER R.		0	0	2	0	0	0	2	0.020
RIVER COMMERCIAL		0	0	0	0	0	0	0	0.000
INDIAN FISHERIES									
FALL INDIAN NET		0	1	1	0	0	0	2	0.020
HATCHERIES		0	0	0	0	0	0	0	0.000
STREAM SURVEY		0	0	0	0	0	0	0	0.000
TOTALS		0	6	15	1	0	0	22	0.217
PERCENT OF RECOVERY	%	0.0	27.3	68.2	4.5	0.0	0.0		

Appendix Table 2.4.--Recoveries of adult steelhead transported as juveniles by barge from Lower Granite Dam to below Bonneville Dam on 16 May 1992.

Master File Date : 12 December 1996
RELEASE GROUPS INCLUDED: 9208D

1992 L.GRANITE | LGR RELEASE SITE | BELOW BONNEVILLE

STEELHEAD

Brands Used: LAV 1
Wire Codes Used: 232420

NUMBER RELEASED: 10073

RECOVERY AREA RETURN	YEAR OF RETURN 1992	1993	1994	1995	1996	1997	TOTAL	%
RIVER SYSTEM TRAPS LOWER GRANITE TRAP	0	0	3	0	0	0	3	0.030
OCEAN FISHERIES	0	0	0	0	0	0	0	0.000
RIVER SPORT OTHER RIVERS	0	0	1	0	0	0	1	0.010
RIVER COMMERCIAL	0	0	0	0	0	0	0	0.000
INDIAN FISHERIES	0	0	0	0	0	0	0	0.000
HATCHERIES	0	0	0	0	0	0	0	0.000
STREAM SURVEY	0	0	0	0	0	0	0	0.000
TOTALS	0	0	4	0	0	0	4	0.040
PERCENT OF RECOVERY %	0.0	0.0	100.0	0.0	0.0	0.0		

Appendix Table 2.5.--Recoveries of adult steelhead transported as juveniles by barge from Lower Granite Dam to below Bonneville Dam on 18 May 1992.

Master File Date : 12 December 1996
RELEASE GROUPS INCLUDED: 9208E

1992 L.GRANITE | LGR RELEASE SITE | BELOW BONNEVILLE

STEELHEAD

Brands Used: LAV 2
Wire Codes Used: 232421

NUMBER RELEASED: 10112

RECOVERY AREA RETURN	YEAR OF RETURN 1992	1993	1994	1995	1996	1997	TOTAL	%
RIVER SYSTEM TRAPS								
LOWER GRANITE TRAP	0	3	1	0	0	0	4	0.040
OCEAN FISHERIES	0	0	0	0	0	0	0	0.000
RIVER SPORT								
COLUMBIA R. BELOW SNAKE R.	0	1	0	0	0	0	1	0.010
OTHER RIVERS	0	0	1	0	0	0	1	0.010
RIVER COMMERCIAL	0	0	0	0	0	0	0	0.000
INDIAN FISHERIES								
FALL INDIAN NET	0	0	1	0	0	0	1	0.010
HATCHERIES								
DESCHUTES R. HATCHERIES	0	0	1	0	0	0	1	0.010
STREAM SURVEY	0	0	0	0	0	0	0	0.000
TOTALS	0	4	4	0	0	0	8	0.079
PERCENT OF RECOVERY %	0.0	50.0	50.0	0.0	0.0	0.0		

Appendix Table 2.6.--Recoveries of adult steelhead transported as juveniles by barge from Lower Granite Dam to below Bonneville Dam on 22 May 1992.

Master File Date : 12 December 1996
RELEASE GROUPS INCLUDED: 9208F

1992 L.GRANITE LGR RELEASE SITE BELOW BONNEVILLE

STEELHEAD

Brands Used: LAV 3
Wire Codes Used: 232422

NUMBER RELEASED: 10218

RECOVERY AREA RETURN	YEAR OF RETURN 1992	1993	1994	1995	1996	1997	TOTAL	%
RIVER SYSTEM TRAPS LOWER GRANITE TRAP	0	1	0	0	0	0	1	0.010
OCEAN FISHERIES	0	0	0	0	0	0	0	0.000
RIVER SPORT	0	0	0	0	0	0	0	0.000
RIVER COMMERCIAL	0	0	0	0	0	0	0	0.000
INDIAN FISHERIES	0	0	0	0	0	0	0	0.000
HATCHERIES	0	0	0	0	0	0	0	0.000
STREAM SURVEY	0	0	0	0	0	0	0	0.000
TOTALS	0	1	0	0	0	0	1	0.010
PERCENT OF RECOVERY %	0.0	100.0	0.0	0.0	0.0	0.0		

Appendix Table 3.0.--Summary of all recoveries of adult steelhead transported as juveniles by barge from Lower Granite Dam to Tongue Point in 1993.

Master File Date : 12 December 1996
RELEASE GROUPS INCLUDED: 9301A 9301B 9301C 9301D 9301E 9301F 9301G

1993 L.GRANITE LGR RELEASE SITE TONGUE POINT

STEELHEAD

Brands Used: RAPI1 RAPI2 RAPI3 RAPI4 RAP 1 RAP 2 RAP 3
Wire Codes Used: 232960 232961 232962 232963 233001 233002 233003

NUMBER RELEASED: 62819

RECOVERY AREA	YEAR OF RETURN 1993	1994	1995	1996	1997	TOTAL	% RETURN
RIVER SYSTEM TRAPS							
LOWER GRANITE TRAP	0	35	63	1	0	99	0.158
OCEAN FISHERIES							
WASHINGTON	0	0	1	0	0	1	0.002
RIVER SPORT							
COLUMBIA R. BELOW SNAKE R.	0	3	2	0	0	5	0.008
SNAKE R.	0	3	11	0	0	14	0.022
CLEARWATER R.	0	0	1	0	0	1	0.002
OTHER RIVERS	0	3	0	0	0	3	0.005
RIVER COMMERCIAL	0	0	0	0	0	0	0.000
INDIAN FISHERIES							
FALL INDIAN NET	0	1	0	0	0	1	0.002
HATCHERIES							
DWORSHAK H.	0	0	8	0	0	8	0.013
PAHSIMEROI H.	0	1	1	0	0	2	0.003
DESCHUTES R. HATCHERIES	0	2	0	0	0	2	0.003
WALLOWA H.	0	0	3	0	0	3	0.005
SAWTOOTH H. AND TRAP	0	2	0	0	0	2	0.003
IMNAHA RIVER TRAP	0	0	1	0	0	1	0.002
BIG SHEEP CR. TRAP	0	1	0	0	0	1	0.002
STREAM SURVEY	0	0	0	0	0	0	0.000
TOTALS	0	51	91	1	0	143	0.228
PERCENT OF RECOVERY %	0.0	35.7	63.6	0.7	0.0		

Appendix Table 3.1.--Recoveries of adult steelhead transported as juveniles by barge from Lower Granite Dam to Tongue Point on 16 May 1993.

Master File Date : 12 December 1996
RELEASE GROUPS INCLUDED: 9301A

1993 L.GRANITE LGR RELEASE SITE TONGUE POINT

STEELHEAD

Brands Used: RAPI1
Wire Codes Used: 232960

NUMBER RELEASED: 9032

RECOVERY AREA	YEAR OF RETURN 1993	1994	1995	1996	1997	TOTAL	% RETURN
RIVER SYSTEM TRAPS							
LOWER GRANITE TRAP	0	6	6	0	0	12	0.133
OCEAN FISHERIES	0	0	0	0	0	0	0.000
RIVER SPORT							
COLUMBIA R. BELOW SNAKE R.	0	0	1	0	0	1	0.011
SNAKE R.	0	1	0	0	0	1	0.011
RIVER COMMERCIAL	0	0	0	0	0	0	0.000
INDIAN FISHERIES							
FALL INDIAN NET	0	1	0	0	0	1	0.011
HATCHERIES							
DWORSHAK H.	0	0	2	0	0	2	0.022
WALLOWA H.	0	0	1	0	0	1	0.011
STREAM SURVEY	0	0	0	0	0	0	0.000
TOTALS	0	8	10	0	0	18	0.199
PERCENT OF RECOVERY %	0.0	44.4	55.6	0.0	0.0		

Appendix Table 3.2.--Recoveries of adult steelhead transported as juveniles by barge from Lower Granite Dam to Tongue Point on 18 May 1993.

Master File Date : 12 December 1996
RELEASE GROUPS INCLUDED: 9301B

1993 L.GRANITE LGR RELEASE SITE TONGUE POINT

STEELHEAD

Brands Used: RAPI2
Wire Codes Used: 232961

NUMBER RELEASED: 9074

RECOVERY AREA	YEAR OF RETURN 1993	1994	1995	1996	1997	TOTAL	% RETURN
RIVER SYSTEM TRAPS							
LOWER GRANITE TRAP	0	8	6	0	0	14	0.154
OCEAN FISHERIES	0	0	0	0	0	0	0.000
RIVER SPORT							
SNAKE R.	0	1	0	0	0	1	0.011
OTHER RIVERS	0	2	0	0	0	2	0.022
RIVER COMMERCIAL	0	0	0	0	0	0	0.000
INDIAN FISHERIES	0	0	0	0	0	0	0.000
HATCHERIES							
DWORSHAK H.	0	0	2	0	0	2	0.022
PAHSIMEROI H.	0	1	1	0	0	2	0.022
STREAM SURVEY	0	0	0	0	0	0	0.000
TOTALS	0	12	9	0	0	21	0.231
PERCENT OF RECOVERY %	0.0	57.1	42.9	0.0	0.0		

Appendix Table 3.3.--Recoveries of adult steelhead transported as juveniles by barge from Lower Granite Dam to Tongue Point on 23 May 1993.

Master File Date : 12 December 1996
RELEASE GROUPS INCLUDED: 9301C

1993 L.GRANITE LGR RELEASE SITE TONGUE POINT

STEELHEAD

Brands Used: RAPI3
Wire Codes Used: 232962

NUMBER RELEASED: 9103

RECOVERY AREA	YEAR OF RETURN 1993	1994	1995	1996	1997	TOTAL	% RETURN
RIVER SYSTEM TRAPS							
LOWER GRANITE TRAP	0	2	4	1	0	7	0.077
OCEAN FISHERIES	0	0	0	0	0	0	0.000
RIVER SPORT	0	0	0	0	0	0	0.000
RIVER COMMERCIAL	0	0	0	0	0	0	0.000
INDIAN FISHERIES	0	0	0	0	0	0	0.000
HATCHERIES							
DWORSHAK H.	0	0	3	0	0	3	0.033
BIG SHEEP CR. TRAP	0	1	0	0	0	1	0.011
STREAM SURVEY	0	0	0	0	0	0	0.000
TOTALS	0	3	7	1	0	11	0.121
PERCENT OF RECOVERY %	0.0	27.3	63.6	9.1	0.0		

Appendix Table 3.4.--Recoveries of adult steelhead transported as juveniles by barge from Lower Granite Dam to Tongue Point on 25 May 1993.

Master File Date : 12 December 1996
RELEASE GROUPS INCLUDED: 9301D

1993 L.GRANITE | LGR RELEASE SITE | TONGUE POINT

STEELHEAD

Brands Used: RAPI4
Wire Codes Used: 232963

NUMBER RELEASED: 9022

RECOVERY AREA	YEAR OF RETURN 1993	1994	1995	1996	1997	TOTAL	% RETURN
RIVER SYSTEM TRAPS							
LOWER GRANITE TRAP	0	6	1	0	0	7	0.078
OCEAN FISHERIES	0	0	0	0	0	0	0.000
RIVER SPORT							
COLUMBIA R. BELOW SNAKE R.	0	1	0	0	0	1	0.011
OTHER RIVERS	0	1	0	0	0	1	0.011
RIVER COMMERCIAL	0	0	0	0	0	0	0.000
INDIAN FISHERIES	0	0	0	0	0	0	0.000
HATCHERIES							
DESCHUTES R. HATCHERIES	0	1	0	0	0	1	0.011
WALLOWA H.	0	0	1	0	0	1	0.011
SAWTOOTH H. AND TRAP	0	2	0	0	0	2	0.022
STREAM SURVEY	0	0	0	0	0	0	0.000
TOTALS	0	11	2	0	0	13	0.144
PERCENT OF RECOVERY %	0.0	84.6	15.4	0.0	0.0		

Appendix Table 3.5.--Recoveries of adult steelhead transported as juveniles by barge from Lower Granite Dam to Tongue Point on 29 May 1993.

Master File Date : 12 December 1996
RELEASE GROUPS INCLUDED: 9301E

1993 L.GRANITE LGR RELEASE SITE TONGUE POINT

STEELHEAD

Brands Used: RAP 1
Wire Codes Used: 233001

NUMBER RELEASED: 9081

RECOVERY AREA	YEAR OF RETURN 1993	1994	1995	1996	1997	TOTAL	% RETURN
RIVER SYSTEM TRAPS							
LOWER GRANITE TRAP	0	7	19	0	0	26	0.286
OCEAN FISHERIES	0	0	0	0	0	0	0.000
RIVER SPORT							
COLUMBIA R. BELOW SNAKE R.	0	1	0	0	0	1	0.011
SNAKE R.	0	0	6	0	0	6	0.066
RIVER COMMERCIAL	0	0	0	0	0	0	0.000
INDIAN FISHERIES	0	0	0	0	0	0	0.000
HATCHERIES							
DWORSHAK H.	0	0	1	0	0	1	0.011
STREAM SURVEY	0	0	0	0	0	0	0.000
TOTALS	0	8	26	0	0	34	0.374
PERCENT OF RECOVERY %	0.0	23.5	76.5	0.0	0.0		

Appendix Table 3.6.--Recoveries of adult steelhead transported as juveniles by barge from Lower Granite Dam to Tongue Point on 1 Jun 1993.

Master File Date : 12 December 1996
RELEASE GROUPS INCLUDED: 9301F

1993 L.GRANITE | LGR RELEASE SITE | TONGUE POINT

STEELHEAD

Brands Used: RAP 2
Wire Codes Used: 233002

NUMBER RELEASED: 9111

RECOVERY AREA		YEAR OF RETURN 1993	1994	1995	1996	1997	TOTAL	% RETURN
RIVER SYSTEM TRAPS								
LOWER GRANITE TRAP		0	2	5	0	0	7	0.077
OCEAN FISHERIES		0	0	0	0	0	0	0.000
RIVER SPORT								
CLEARWATER R.		0	0	1	0	0	1	0.011
RIVER COMMERCIAL		0	0	0	0	0	0	0.000
INDIAN FISHERIES		0	0	0	0	0	0	0.000
HATCHERIES								
IMNAHA RIVER TRAP		0	0	1	0	0	1	0.011
STREAM SURVEY		0	0	0	0	0	0	0.000
TOTALS		0	2	7	0	0	9	0.099
PERCENT OF RECOVERY	%	0.0	22.2	77.8	0.0	0.0		

Appendix Table 3.7.--Recoveries of adult steelhead transported as juveniles by barge from Lower Granite Dam to Tongue Point on 4 Jun 1993.

Master File Date : 12 December 1996
RELEASE GROUPS INCLUDED: 9301G

1993 L.GRANITE LGR RELEASE SITE TONGUE POINT

STEELHEAD

Brands Used: RAP 3
Wire Codes Used: 233003

NUMBER RELEASED: 8396

RECOVERY AREA	YEAR OF RETURN 1993	1994	1995	1996	1997	TOTAL	% RETURN
RIVER SYSTEM TRAPS							
LOWER GRANITE TRAP	0	4	22	0	0	26	0.310
OCEAN FISHERIES							
WASHINGTON	0	0	1	0	0	1	0.012
RIVER SPORT							
COLUMBIA R. BELOW SNAKE R.	0	1	1	0	0	2	0.024
SNAKE R.	0	1	5	0	0	6	0.071
RIVER COMMERCIAL	0	0	0	0	0	0	0.000
INDIAN FISHERIES	0	0	0	0	0	0	0.000
HATCHERIES							
DESCHUTES R. HATCHERIES	0	1	0	0	0	1	0.012
WALLOWA H.	0	0	1	0	0	1	0.012
STREAM SURVEY	0	0	0	0	0	0	0.000
TOTALS	0	7	30	0	0	37	0.441
PERCENT OF RECOVERY %	0.0	18.9	81.1	0.0	0.0		

Appendix Table 4.0.--Summary of all recoveries of adult steelhead transported as juveniles by barge from Lower Granite Dam to below Bonneville Dam in 1993

Master File Date : 12 December 1996
RELEASE GROUPS INCLUDED: 9302A 9302B 9302C 9302D 9302E 9302F 9302G

1993 L.GRANITE LGR RELEASE SITE BELOW BONNEVILLE

STEELHEAD

Brands Used: LA3 1 LA3 2 LA3 3 LA3 4 LA2 1 LA2 2 LA2 3
Wire Codes Used: 233005 233006 233011 233012 233013 233014 233015

NUMBER RELEASED: 68962

RECOVERY AREA	YEAR OF RETURN 1993	1994	1995	1996	1997	TOTAL	% RETURN
RIVER SYSTEM TRAPS							
LOWER GRANITE TRAP	0	47	81	2	0	130	0.189
OCEAN FISHERIES	0	0	0	0	0	0	0.000
RIVER SPORT							
COLUMBIA R. BELOW SNAKE R.	0	0	1	0	0	1	0.001
SNAKE R.	0	5	15	0	0	20	0.029
CLEARWATER R.	0	1	2	0	0	3	0.004
OTHER RIVERS	0	2	2	0	0	4	0.006
RIVER COMMERCIAL	0	0	0	0	0	0	0.000
INDIAN FISHERIES							
FALL INDIAN NET	0	2	2	0	0	4	0.006
HATCHERIES							
DWORSHAK H.	0	0	12	0	0	12	0.017
KAHSIMEROI H.	0	1	0	0	0	1	0.001
DESCHUTES R. HATCHERIES	0	0	1	0	0	1	0.001
SAWTOOTH H. AND TRAP	0	2	1	0	0	3	0.004
IMNAHA RIVER TRAP	0	0	1	0	0	1	0.001
BIG SHEEP CR. TRAP	0	1	0	0	0	1	0.001
BIG CANYON TRAP	0	1	0	0	0	1	0.001
HATCHERIES (GENERAL)	0	0	0	1	0	1	0.001
STREAM SURVEY	0	0	0	0	0	0	0.000
TOTALS	0	62	118	3	0	183	0.265
PERCENT OF RECOVERY %	0.0	33.9	64.5	1.6	0.0		

Appendix Table 4.1.--Recoveries of adult steelhead transported as juveniles by barge from Lower Granite Dam to below Bonneville Dam on 16 May 1993.

Master File Date : 12 December 1996
RELEASE GROUPS INCLUDED: 9302A

1993 L.GRANITE LGR RELEASE SITE BELOW BONNEVILLE

STEELHEAD

Brands Used: LA3 1
Wire Codes Used: 233005

NUMBER RELEASED: 10009

RECOVERY AREA	YEAR OF RETURN 1993	1994	1995	1996	1997	TOTAL	% RETURN
RIVER SYSTEM TRAPS							
LOWER GRANITE TRAP	0	6	17	0	0	23	0.230
OCEAN FISHERIES	0	0	0	0	0	0	0.000
RIVER SPORT							
SNAKE R.	0	2	1	0	0	3	0.030
CLEARWATER R.	0	0	2	0	0	2	0.020
OTHER RIVERS	0	1	1	0	0	2	0.020
RIVER COMMERCIAL	0	0	0	0	0	0	0.000
INDIAN FISHERIES	0	0	0	0	0	0	0.000
HATCHERIES							
DWORSHAK H.	0	0	7	0	0	7	0.070
STREAM SURVEY	0	0	0	0	0	0	0.000
TOTALS	0	9	28	0	0	37	0.370
PERCENT OF RECOVERY %	0.0	24.3	75.7	0.0	0.0		

Appendix Table 4.2.--Recoveries of adult steelhead transported as juveniles by barge from Lower Granite Dam to below Bonneville Dam on 18 May 1993.

Master File Date : 12 December 1996
RELEASE GROUPS INCLUDED: 9302B

1993 L.GRANITE LGR RELEASE SITE BELOW BONNEVILLE

STEELHEAD

Brands Used: LA3 2
Wire Codes Used: 233006

NUMBER RELEASED: 10086

RECOVERY AREA	YEAR OF RETURN 1993	1994	1995	1996	1997	TOTAL	% RETURN
RIVER SYSTEM TRAPS							
LOWER GRANITE TRAP	0	1	0	0	0	1	0.010
OCEAN FISHERIES	0	0	0	0	0	0	0.000
RIVER SPORT	0	0	0	0	0	0	0.000
RIVER COMMERCIAL	0	0	0	0	0	0	0.000
INDIAN FISHERIES	0	0	0	0	0	0	0.000
HATCHERIES							
BIG SHEEP CR. TRAP	0	1	0	0	0	1	0.010
STREAM SURVEY	0	0	0	0	0	0	0.000
TOTALS	0	2	0	0	0	2	0.020
PERCENT OF RECOVERY %	0.0	100.0	0.0	0.0	0.0		

Appendix Table 4.3.--Recoveries of adult steelhead transported as juveniles by barge from Lower Granite Dam to below Bonneville Dam on 22 May 1993.

Master File Date : 12 December 1996
RELEASE GROUPS INCLUDED: 9302C

1993 L.GRANITE LGR RELEASE SITE BELOW BONNEVILLE

STEELHEAD

Brands Used: LA3 3
Wire Codes Used: 233011

NUMBER RELEASED: 9885

RECOVERY AREA		YEAR OF RETURN 1993	1994	1995	1996	1997	TOTAL	% RETURN
RIVER SYSTEM TRAPS								
LOWER GRANITE TRAP		0	4	7	1	0	12	0.121
OCEAN FISHERIES		0	0	0	0	0	0	0.000
RIVER SPORT								
SNAKE R.		0	0	4	0	0	4	0.040
CLEARWATER R.		0	1	0	0	0	1	0.010
RIVER COMMERCIAL		0	0	0	0	0	0	0.000
INDIAN FISHERIES		0	0	0	0	0	0	0.000
HATCHERIES								
DWORSHAK H.		0	0	2	0	0	2	0.020
STREAM SURVEY		0	0	0	0	0	0	0.000
TOTALS		0	5	13	1	0	19	0.192
PERCENT OF RECOVERY	%	0.0	26.3	68.4	5.3	0.0		

Appendix Table 4.4.--Recoveries of adult steelhead transported as juveniles by barge from Lower Granite Dam to below Bonneville Dam on 24 May 1993.

Master File Date : 12 December 1996
RELEASE GROUPS INCLUDED: 9302D

1993 L.GRANITE LGR RELEASE SITE BELOW BONNEVILLE

STEELHEAD

Brands Used: LA3 4
Wire Codes Used: 233012

NUMBER RELEASED: 10048

RECOVERY AREA	YEAR OF RETURN 1993	1994	1995	1996	1997	TOTAL	% RETURN
RIVER SYSTEM TRAPS							
LOWER GRANITE TRAP	0	16	15	1	0	32	0.318
OCEAN FISHERIES	0	0	0	0	0	0	0.000
RIVER SPORT							
SNAKE R.	0	1	1	0	0	2	0.020
RIVER COMMERCIAL	0	0	0	0	0	0	0.000
INDIAN FISHERIES							
FALL INDIAN NET	0	1	0	0	0	1	0.010
HATCHERIES							
PAHSIMEROI H.	0	1	0	0	0	1	0.010
SAWTOOTH H. AND TRAP	0	1	0	0	0	1	0.010
STREAM SURVEY	0	0	0	0	0	0	0.000
TOTALS	0	20	16	1	0	37	0.368
PERCENT OF RECOVERY %	0.0	54.1	43.2	2.7	0.0		

Appendix Table 4.5.--Recoveries of adult steelhead transported as juveniles by barge from Lower Granite Dam to below Bonneville Dam on 29 May 1993.

Master File Date : 12 December 1996
RELEASE GROUPS INCLUDED: 9302E

1993 L.GRANITE LGR RELEASE SITE BELOW BONNEVILLE

STEELHEAD

Brands Used: LA2 1
Wire Codes Used: 233013

NUMBER RELEASED: 10097

RECOVERY AREA		YEAR OF RETURN 1993	1994	1995	1996	1997	TOTAL	% RETURN
RIVER SYSTEM TRAPS								
LOWER GRANITE TRAP		0	11	15	0	0	26	0.258
OCEAN FISHERIES		0	0	0	0	0	0	0.000
RIVER SPORT								
SNAKE R.		0	1	3	0	0	4	0.040
OTHER RIVERS		0	1	0	0	0	1	0.010
RIVER COMMERCIAL		0	0	0	0	0	0	0.000
INDIAN FISHERIES								
FALL INDIAN NET		0	1	1	0	0	2	0.020
HATCHERIES								
DWORSHAK H.		0	0	1	0	0	1	0.010
SAWTOOTH H. AND TRAP		0	1	0	0	0	1	0.010
BIG CANYON TRAP		0	1	0	0	0	1	0.010
STREAM SURVEY		0	0	0	0	0	0	0.000
TOTALS		0	16	20	0	0	36	0.357
PERCENT OF RECOVERY	%	0.0	44.4	55.6	0.0	0.0		

Appendix Table 4.6.--Recoveries of adult steelhead transported as juveniles by barge from Lower Granite Dam to below Bonneville Dam on 31 May 1993.

Master File Date : 12 December 1996
RELEASE GROUPS INCLUDED: 9302F

1993 L.GRANITE | LGR RELEASE SITE | BELOW BONNEVILLE

STEELHEAD

Brands Used: LA2 2
Wire Codes Used: 233014

NUMBER RELEASED: 10213

RECOVERY AREA	YEAR OF RETURN 1993	1994	1995	1996	1997	TOTAL	% RETURN
RIVER SYSTEM TRAPS							
LOWER GRANITE TRAP	0	3	12	0	0	15	0.147
OCEAN FISHERIES	0	0	0	0	0	0	0.000
RIVER SPORT							
SNAKE R.	0	0	2	0	0	2	0.020
RIVER COMMERCIAL	0	0	0	0	0	0	0.000
INDIAN FISHERIES	0	0	0	0	0	0	0.000
HATCHERIES							
DWORSHAK H.	0	0	2	0	0	2	0.020
DESCHUTES R. HATCHERIES	0	0	1	0	0	1	0.010
STREAM SURVEY	0	0	0	0	0	0	0.000
TOTALS	0	3	17	0	0	20	0.196
PERCENT OF RECOVERY %	0.0	15.0	85.0	0.0	0.0		

Appendix Table 4.7.--Recoveries of adult steelhead transported as juveniles by barge from Lower Granite Dam to below Bonneville Dam on 4 Jun 1993.

Master File Date : 12 December 1996
RELEASE GROUPS INCLUDED: 9302G

1993 L.GRANITE LGR RELEASE SITE BELOW BONNEVILLE

STEELHEAD

Brands Used: LA2 3
Wire Codes Used: 233015

NUMBER RELEASED: 8624

RECOVERY AREA	1993	YEAR OF RETURN 1994	1995	1996	1997	TOTAL	% RETURN
RIVER SYSTEM TRAPS							
LOWER GRANITE TRAP	0	6	15	0	0	21	0.244
OCEAN FISHERIES	0	0	0	0	0	0	0.000
RIVER SPORT							
COLUMBIA R. BELOW SNAKE R.	0	0	1	0	0	1	0.012
SNAKE R.	0	1	4	0	0	5	0.058
OTHER RIVERS	0	0	1	0	0	1	0.012
RIVER COMMERCIAL	0	0	0	0	0	0	0.000
INDIAN FISHERIES							
FALL INDIAN NET	0	0	1	0	0	1	0.012
HATCHERIES							
SAWTOOTH H. AND TRAP	0	0	1	0	0	1	0.012
IMNAHA RIVER TRAP	0	0	1	0	0	1	0.012
HATCHERIES (GENERAL)	0	0	0	1	0	1	0.012
STREAM SURVEY	0	0	0	0	0	0	0.000
TOTALS	0	7	24	1	0	32	0.371
PERCENT OF RECOVERY %	0.0	21.9	75.0	3.1	0.0		

Appendix Table 5.0.--Summary of all recoveries of adult steelhead transported as juveniles by barge from Lower Granite Dam to Tongue Point in 1994.

Master File Date : 12 December 1996
RELEASE GROUPS INCLUDED: 9401A 9401B 9401C 9401D 9401E 9401F 9401G 9401H

1994 L.GRANITE LGR RELEASE SITE TONGUE POINT

STEELHEAD

Brands Used:	RAV 1	RAV 2	RAV 3	RAV 4	RAPP1	RAPP2	RASU2	RASU3
Wire Codes Used:	233004	232357	232424	232437	232439	232441	232443	233017

NUMBER RELEASED: 60036

RECOVERY AREA	YEAR OF RETURN 1994	1995	1996	1997	TOTAL	% RETURN
RIVER SYSTEM TRAPS						
LOWER GRANITE TRAP	0	65	53	0	118	0.197
OCEAN FISHERIES	0	0	0	0	0	0.000
RIVER SPORT						
SNAKE R.	0	13	4	0	17	0.028
CLEARWATER R.	0	0	1	0	1	0.002
RIVER COMMERCIAL	0	0	0	0	0	0.000
INDIAN FISHERIES	0	0	0	0	0	0.000
HATCHERIES						
DWORSHAK H.	0	5	0	0	5	0.008
PAHSIMEROI H.	0	1	0	0	1	0.002
DESCHUTES R. HATCHERIES	0	1	0	0	1	0.002
WALLOWA H.	0	1	0	0	1	0.002
SAWTOOTH H. AND TRAP	0	2	0	0	2	0.003
STREAM SURVEY	0	0	0	0	0	0.000
TOTALS	0	88	58	0	146	0.243
PERCENT OF RECOVERY %	0.0	60.3	39.7	0.0		

Appendix Table 5.1.--Recoveries of adult steelhead transported as juveniles by barge from Lower Granite Dam to Tongue Point on 16 May 1994.

Master File Date : 12 December 1996
RELEASE GROUPS INCLUDED: 9401A

1994 L.GRANITE LGR RELEASE SITE TONGUE POINT

STEELHEAD

Brands Used: RAV 1
Wire Codes Used: 233004

NUMBER RELEASED: 9302

RECOVERY AREA	YEAR OF RETURN 1994	1995	1996	1997	TOTAL	% RETURN
RIVER SYSTEM TRAPS						
LOWER GRANITE TRAP	0	18	13	0	31	0.333
OCEAN FISHERIES	0	0	0	0	0	0.000
RIVER SPORT						
SNAKE R.	0	3	0	0	3	0.032
RIVER COMMERCIAL	0	0	0	0	0	0.000
INDIAN FISHERIES	0	0	0	0	0	0.000
HATCHERIES						
DWORSHAK H.	0	1	0	0	1	0.011
DESCHUTES R. HATCHERIES	0	1	0	0	1	0.011
SAWTOOTH H. AND TRAP	0	1	0	0	1	0.011
STREAM SURVEY	0	0	0	0	0	0.000
TOTALS	0	24	13	0	37	0.398
PERCENT OF RECOVERY %	0.0	64.9	35.1	0.0		

Appendix Table 5.2.--Recoveries of adult steelhead transported as juveniles by barge from Lower Granite Dam to Tongue Point on 18 May 1994.

Master File Date : 12 December 1996
RELEASE GROUPS INCLUDED: 9401B

1994 L.GRANITE | LGR RELEASE SITE | TONGUE POINT

STEELHEAD

Brands Used: RAV 2
Wire Codes Used: 232357

NUMBER RELEASED: 8796

RECOVERY AREA		YEAR OF RETURN 1994	1995	1996	1997	TOTAL	% RETURN
RIVER SYSTEM TRAPS							
LOWER GRANITE TRAP		0	10	7	0	17	0.193
OCEAN FISHERIES		0	0	0	0	0	0.000
RIVER SPORT							
SNAKE R.		0	1	0	0	1	0.011
RIVER COMMERCIAL		0	0	0	0	0	0.000
INDIAN FISHERIES		0	0	0	0	0	0.000
HATCHERIES							
DWORSHAK H.		0	4	0	0	4	0.045
WALLOWA H.		0	1	0	0	1	0.011
STREAM SURVEY		0	0	0	0	0	0.000
TOTALS		0	16	7	0	23	0.261
PERCENT OF RECOVERY	%	0.0	69.6	30.4	0.0		

Appendix Table 5.3.--Recoveries of adult steelhead transported as juveniles by barge from Lower Granite Dam to Tongue Point on 22 May 1994.

Master File Date : 12 December 1996
RELEASE GROUPS INCLUDED: 9401C

1994 L.GRANITE | LGR RELEASE SITE | TONGUE POINT

STEELHEAD

Brands Used: RAV 3
Wire Codes Used: 232424

NUMBER RELEASED: 9140

RECOVERY AREA	YEAR OF RETURN 1994	1995	1996	1997	TOTAL	% RETURN
RIVER SYSTEM TRAPS						
LOWER GRANITE TRAP	0	11	9	0	20	0.219
OCEAN FISHERIES	0	0	0	0	0	0.000
RIVER SPORT						
SNAKE R.	0	1	0	0	1	0.011
RIVER COMMERCIAL	0	0	0	0	0	0.000
INDIAN FISHERIES	0	0	0	0	0	0.000
HATCHERIES						
PAHSIMEROI H.	0	1	0	0	1	0.011
SAWTOOTH H. AND TRAP	0	1	0	0	1	0.011
STREAM SURVEY	0	0	0	0	0	0.000
TOTALS	0	14	9	0	23	0.252
PERCENT OF RECOVERY %	0.0	60.9	39.1	0.0		

Appendix Table 5.4.--Recoveries of adult steelhead transported as juveniles by barge from Lower Granite Dam to Tongue Point on 24 May 1994.

Master File Date : 12 December 1996
RELEASE GROUPS INCLUDED: 9401D

1994 L.GRANITE | LGR RELEASE SITE | TONGUE POINT

STEELHEAD

Brands Used: RAV 4
Wire Codes Used: 232437

NUMBER RELEASED: 9041

RECOVERY AREA		YEAR OF RETURN 1994	1995	1996	1997	TOTAL	% RETURN
RIVER SYSTEM TRAPS							
LOWER GRANITE TRAP		0	6	9	0	15	0.166
OCEAN FISHERIES		0	0	0	0	0	0.000
RIVER SPORT							
SNAKE R.		0	3	2	0	5	0.055
RIVER COMMERCIAL		0	0	0	0	0	0.000
INDIAN FISHERIES		0	0	0	0	0	0.000
HATCHERIES		0	0	0	0	0	0.000
STREAM SURVEY		0	0	0	0	0	0.000
TOTALS		0	9	11	0	20	0.221
PERCENT OF RECOVERY	%	0.0	45.0	55.0	0.0		

Appendix Table 5.5.--Recoveries of adult steelhead transported as juveniles by barge from Lower Granite Dam to Tongue Point on 29 May 1994.

Master File Date : 12 December 1996
RELEASE GROUPS INCLUDED: 9401E

1994 L.GRANITE | LGR RELEASE SITE | TONGUE POINT

STEELHEAD

Brands Used: RAPP1
Wire Codes Used: 232439

NUMBER RELEASED: 8767

RECOVERY AREA	YEAR OF RETURN 1994	1995	1996	1997	TOTAL	% RETURN
RIVER SYSTEM TRAPS						
LOWER GRANITE TRAP	0	11	11	0	22	0.251
OCEAN FISHERIES	0	0	0	0	0	0.000
RIVER SPORT						
SNAKE R.	0	4	2	0	6	0.068
CLEARWATER R.	0	0	1	0	1	0.011
RIVER COMMERCIAL	0	0	0	0	0	0.000
INDIAN FISHERIES	0	0	0	0	0	0.000
HATCHERIES	0	0	0	0	0	0.000
STREAM SURVEY	0	0	0	0	0	0.000
TOTALS	0	15	14	0	29	0.331
PERCENT OF RECOVERY %	0.0	51.7	48.3	0.0		

Appendix Table 5.6.--Recoveries of adult steelhead transported as juveniles by barge from Lower Granite Dam to Tongue Point on 31 May 1994.

Master File Date : 12 December 1996
RELEASE GROUPS INCLUDED: 9401F

1994 L.GRANITE | LGR RELEASE SITE | TONGUE POINT

STEELHEAD

Brands Used: RAPP2
Wire Codes Used: 232441

NUMBER RELEASED: 4900

RECOVERY AREA		YEAR OF RETURN 1994	1995	1996	1997	TOTAL	% RETURN
RIVER SYSTEM TRAPS							
LOWER GRANITE TRAP		0	5	0	0	5	0.102
OCEAN FISHERIES		0	0	0	0	0	0.000
RIVER SPORT							
SNAKE R.		0	1	0	0	1	0.020
RIVER COMMERCIAL		0	0	0	0	0	0.000
INDIAN FISHERIES		0	0	0	0	0	0.000
HATCHERIES		0	0	0	0	0	0.000
STREAM SURVEY		0	0	0	0	0	0.000
TOTALS		0	6	0	0	6	0.122
PERCENT OF RECOVERY	%	0.0	100.0	0.0	0.0		

Appendix Table 5.7.--Recoveries of adult steelhead transported as juveniles by barge from Lower Granite Dam to Tongue Point on 2 Jun 1994.

Master File Date : 12 December 1996
RELEASE GROUPS INCLUDED: 9401G

1994 L.GRANITE | LGR RELEASE SITE | TONGUE POINT

STEELHEAD

Brands Used: RASU2
Wire Codes Used: 232443

NUMBER RELEASED: 7054

RECOVERY AREA	YEAR OF RETURN 1994	1995	1996	1997	TOTAL	% RETURN
RIVER SYSTEM TRAPS						
LOWER GRANITE TRAP	0	4	2	0	6	0.085
OCEAN FISHERIES	0	0	0	0	0	0.000
RIVER SPORT	0	0	0	0	0	0.000
RIVER COMMERCIAL	0	0	0	0	0	0.000
INDIAN FISHERIES	0	0	0	0	0	0.000
HATCHERIES	0	0	0	0	0	0.000
STREAM SURVEY	0	0	0	0	0	0.000
TOTALS	0	4	2	0	6	0.085
PERCENT OF RECOVERY %	0.0	66.7	33.3	0.0		

Appendix Table 5.8.--Recoveries of adult steelhead transported as juveniles by barge from Lower Granite Dam to Tongue Point on 4 Jun 1994.

Master File Date : 12 December 1996
RELEASE GROUPS INCLUDED: 9401H

1994 L.GRANITE | LGR RELEASE SITE | TONGUE POINT

STEELHEAD

Brands Used: RASU3
Wire Codes Used: 233017

NUMBER RELEASED: 3036

RECOVERY AREA	YEAR OF RETURN 1994	1995	1996	1997	TOTAL	% RETURN
RIVER SYSTEM TRAPS LOWER GRANITE TRAP	0	0	2	0	2	0.066
OCEAN FISHERIES	0	0	0	0	0	0.000
RIVER SPORT	0	0	0	0	0	0.000
RIVER COMMERCIAL	0	0	0	0	0	0.000
INDIAN FISHERIES	0	0	0	0	0	0.000
HATCHERIES	0	0	0	0	0	0.000
STREAM SURVEY	0	0	0	0	0	0.000
TOTALS	0	0	2	0	2	0.066
PERCENT OF RECOVERY %	0.0	0.0	100.0	0.0		

Appendix Table 6.0.--Summary of all recoveries of adult steelhead transported as juveniles by barge from Lower Granite Dam to below Bonneville Dam in 1994

Master File Date : 12 December 1996
RELEASE GROUPS INCLUDED: 9402A 9402B 9402C 9402D 9402E 9402F 9402G 9402H

1994 L.GRANITE LGR RELEASE SITE BELOW BONNEVILLE

STEELHEAD

Brands Used: LAF 1 LAF 2 LAF 3 LAF 4 LAS 1 LAS 2 LAAN2 LAAN3
Wire Codes Used: 233016 232356 232423 232436 232438 232440 232442 233018

NUMBER RELEASED: 68314

RECOVERY AREA	YEAR OF RETURN 1994	1995	1996	1997	TOTAL	% RETURN
RIVER SYSTEM TRAPS						
LOWER GRANITE TRAP	0	25	21	0	46	0.067
OCEAN FISHERIES	0	0	0	0	0	0.000
RIVER SPORT						
SNAKE R.	0	4	0	0	4	0.006
CLEARWATER R.	0	1	0	0	1	0.001
RIVER COMMERCIAL	0	0	0	0	0	0.000
INDIAN FISHERIES						
FALL INDIAN NET	0	1	2	0	3	0.004
HATCHERIES						
DWORSHAK H.	0	1	0	0	1	0.001
PAHSIMEROI H.	0	1	0	0	1	0.001
DESCHUTES R. HATCHERIES	0	3	0	0	3	0.004
WALLOWA H.	0	1	0	0	1	0.001
IMNAHA RIVER TRAP	0	2	0	0	2	0.003
STREAM SURVEY	0	0	0	0	0	0.000
TOTALS	0	39	23	0	62	0.091
PERCENT OF RECOVERY %	0.0	62.9	37.1	0.0		

Appendix Table 6.1.--Recoveries of adult steelhead transported as juveniles by barge from Lower Granite Dam to below Bonneville Dam on 16 May 1994.

Master File Date : 12 December 1996
RELEASE GROUPS INCLUDED: 9402A

1994 L.GRANITE LGR RELEASE SITE BELOW BONNEVILLE

STEELHEAD

Brands Used: LAF 1
Wire Codes Used: 233016

NUMBER RELEASED: 10080

RECOVERY AREA	YEAR OF RETURN 1994	1995	1996	1997	TOTAL	% RETURN
RIVER SYSTEM TRAPS						
LOWER GRANITE TRAP	0	3	4	0	7	0.069
OCEAN FISHERIES	0	0	0	0	0	0.000
RIVER SPORT	0	0	0	0	0	0.000
RIVER COMMERCIAL	0	0	0	0	0	0.000
INDIAN FISHERIES	0	0	0	0	0	0.000
HATCHERIES						
DESCHUTES R. HATCHERIES	0	2	0	0	2	0.020
STREAM SURVEY	0	0	0	0	0	0.000
TOTALS	0	5	4	0	9	0.089
PERCENT OF RECOVERY %	0.0	55.6	44.4	0.0		

Appendix Table 6.2.--Recoveries of adult steelhead transported as juveniles by barge from Lower Granite Dam to below Bonneville Dam on 18 May 1994.

Master File Date : 12 December 1996
RELEASE GROUPS INCLUDED: 9402B

1994 L.GRANITE | LGR RELEASE SITE | BELOW BONNEVILLE

STEELHEAD

Brands Used: LAF 2
Wire Codes Used: 232356

NUMBER RELEASED: 9965

RECOVERY AREA		YEAR OF RETURN 1994	1995	1996	1997	TOTAL	% RETURN
RIVER SYSTEM TRAPS							
LOWER GRANITE TRAP		0	1	4	0	5	0.050
OCEAN FISHERIES		0	0	0	0	0	0.000
RIVER SPORT							
SNAKE R.		0	1	0	0	1	0.010
RIVER COMMERCIAL		0	0	0	0	0	0.000
INDIAN FISHERIES		0	0	0	0	0	0.000
HATCHERIES							
DWORSHAK H.		0	1	0	0	1	0.010
STREAM SURVEY		0	0	0	0	0	0.000
TOTALS		0	3	4	0	7	0.070
PERCENT OF RECOVERY	%	0.0	42.9	57.1	0.0		

Appendix Table 6.3.--Recoveries of adult steelhead transported as juveniles by barge from Lower Granite Dam to below Bonneville Dam on 22 May 1994.

Master File Date : 12 December 1996
RELEASE GROUPS INCLUDED: 9402C

1994 L.GRANITE | LGR RELEASE SITE | BELOW BONNEVILLE

STEELHEAD

Brands Used: LAF 3
Wire Codes Used: 232423

NUMBER RELEASED: 10282

RECOVERY AREA		YEAR OF RETURN 1994	1995	1996	1997	TOTAL	% RETURN
RIVER SYSTEM TRAPS LOWER GRANITE TRAP		0	2	3	0	5	0.049
OCEAN FISHERIES		0	0	0	0	0	0.000
RIVER SPORT		0	0	0	0	0	0.000
RIVER COMMERCIAL		0	0	0	0	0	0.000
INDIAN FISHERIES		0	0	0	0	0	0.000
HATCHERIES		0	0	0	0	0	0.000
STREAM SURVEY		0	0	0	0	0	0.000
TOTALS		0	2	3	0	5	0.049
PERCENT OF RECOVERY	%	0.0	40.0	60.0	0.0		

Appendix Table 6.4.--Recoveries of adult steelhead transported as juveniles by barge from Lower Granite Dam to below Bonneville Dam on 24 May 1994.

Master File Date : 12 December 1996
RELEASE GROUPS INCLUDED: 9402D

1994 L.GRANITE | LGR RELEASE SITE | BELOW BONNEVILLE

STEELHEAD

Brands Used: LAF 4
Wire Codes Used: 232436

NUMBER RELEASED: 10143

RECOVERY AREA		YEAR OF RETURN 1994	1995	1996	1997	TOTAL	% RETURN
RIVER SYSTEM TRAPS							
LOWER GRANITE TRAP		0	9	6	0	15	0.148
OCEAN FISHERIES		0	0	0	0	0	0.000
RIVER SPORT							
SNAKE R.		0	1	0	0	1	0.010
RIVER COMMERCIAL		0	0	0	0	0	0.000
INDIAN FISHERIES							
FALL INDIAN NET		0	1	0	0	1	0.010
HATCHERIES							
PAHSIMEROI H.		0	1	0	0	1	0.010
WALLOWA H.		0	1	0	0	1	0.010
IMNAHA RIVER TRAP		0	1	0	0	1	0.010
STREAM SURVEY		0	0	0	0	0	0.000
TOTALS		0	14	6	0	20	0.197
PERCENT OF RECOVERY	%	0.0	70.0	30.0	0.0		

Appendix Table 6.5.--Recoveries of adult steelhead transported as juveniles by barge from Lower Granite Dam to below Bonneville Dam on 29 May 1994.

Master File Date : 12 December 1996
RELEASE GROUPS INCLUDED: 9402E

1994 L.GRANITE LGR RELEASE SITE BELOW BONNEVILLE

STEELHEAD

Brands Used: LAS 1
Wire Codes Used: 232438

NUMBER RELEASED: 9963

RECOVERY AREA		YEAR OF RETURN 1994	1995	1996	1997	TOTAL	% RETURN
RIVER SYSTEM TRAPS							
LOWER GRANITE TRAP		0	6	2	0	8	0.080
OCEAN FISHERIES		0	0	0	0	0	0.000
RIVER SPORT							
CLEARWATER R.		0	1	0	0	1	0.010
RIVER COMMERCIAL		0	0	0	0	0	0.000
INDIAN FISHERIES							
FALL INDIAN NET		0	0	1	0	1	0.010
HATCHERIES							
IMNAHA RIVER TRAP		0	1	0	0	1	0.010
STREAM SURVEY		0	0	0	0	0	0.000
TOTALS		0	8	3	0	11	0.110
PERCENT OF RECOVERY	%	0.0	72.7	27.3	0.0		

Appendix Table 6.6.--Recoveries of adult steelhead transported as juveniles by barge from Lower Granite Dam to below Bonneville Dam on 31 May 1994.

Master File Date : 12 December 1996
RELEASE GROUPS INCLUDED: 9402F

1994 L.GRANITE | LGR RELEASE SITE | BELOW BONNEVILLE

STEELHEAD

Brands Used: LAS 2
Wire Codes Used: 232440

NUMBER RELEASED: 6303

RECOVERY AREA	YEAR OF RETURN 1994	1995	1996	1997	TOTAL	% RETURN
RIVER SYSTEM TRAPS						
LOWER GRANITE TRAP	0	0	1	0	1	0.016
OCEAN FISHERIES	0	0	0	0	0	0.000
RIVER SPORT	0	0	0	0	0	0.000
RIVER COMMERCIAL	0	0	0	0	0	0.000
INDIAN FISHERIES	0	0	0	0	0	0.000
HATCHERIES						
DESCHUTES R. HATCHERIES	0	1	0	0	1	0.016
STREAM SURVEY	0	0	0	0	0	0.000
TOTALS	0	1	1	0	2	0.032
PERCENT OF RECOVERY %	0.0	50.0	50.0	0.0		

Appendix Table 6.7.--Recoveries of adult steelhead transported as juveniles by barge from Lower Granite Dam to below Bonneville Dam on 2 Jun 1994.

Master File Date : 12 December 1996
RELEASE GROUPS INCLUDED: 9402G

1994 L.GRANITE LGR RELEASE SITE BELOW BONNEVILLE

STEELHEAD

Brands Used: LAAN2
Wire Codes Used: 232442

NUMBER RELEASED: 8176

RECOVERY AREA	YEAR OF RETURN 1994	1995	1996	1997	TOTAL	% RETURN
RIVER SYSTEM TRAPS						
LOWER GRANITE TRAP	0	4	1	0	5	0.061
OCEAN FISHERIES	0	0	0	0	0	0.000
RIVER SPORT						
SNAKE R.	0	2	0	0	2	0.024
RIVER COMMERCIAL	0	0	0	0	0	0.000
INDIAN FISHERIES						
FALL INDIAN NET	0	0	1	0	1	0.012
HATCHERIES	0	0	0	0	0	0.000
STREAM SURVEY	0	0	0	0	0	0.000
TOTALS	0	6	2	0	8	0.098
PERCENT OF RECOVERY %	0.0	75.0	25.0	0.0		

AppendixTable 7.0. Total spring/summer chinook salmon collected and tagged at Lower Granite Dam in spring 1996.

	Collection			Tagged									Total	Post-tagging mortality							
				In-river				Transports				Total	percentage	In-river				Transports			
Date	H	W	T	H	W	U	T	H	W	U	T	tagged	tagged*	H	W	U	T	H	W	U	T
8-Apr	4	84	88	2	9	0	11	2	4	0	6	17	19.3%	0	0	0	0	0	0	0	0
9-Apr	20	164	184	12	15	0	27	7	10	0	17	44	23.9%	0	0	0	0	0	0	0	0
10-Apr	44	272	316	34	11	0	45	21	9	0	30	75	23.7%	0	0	0	0	0	0	0	0
11-Apr	60	472	532	54	21	0	75	29	20	0	49	124	23.3%	0	0	0	0	1	1	0	2
12-Apr	120	752	872	68	48	1	117	48	31	0	79	196	22.5%	0	1	0	1	0	0	0	0
13-Apr	160	1,080	1,240	94	64	0	158	67	39	0	106	264	21.3%	0	1	0	1	0	0	0	0
14-Apr	340	2,160	2,500	93	119	0	212	70	80	0	150	362	14.5%	0	4	0	4	0	0	0	0
15-Apr	500	1,300	1,800	210	210	1	421	131	172	1	304	725	40.3%	8	6	0	14	0	0	0	0
16-Apr	2,150	2,775	4,925	427	524	5	956	349	249	1	599	1,555	31.6%	7	18	1	26	0	0	0	0
17-Apr	5,025	5,400	10,425	736	789	0	1,525	509	664	0	1,173	2,698	25.9%	11	31	0	42	0	0	0	0
18-Apr	6,400	5,100	11,500	621	613	1	1,235	344	417	6	767	2,002	17.4%	5	18	0	23	0	2	0	2
19-Apr	4,500	3,800	8,300	562	989	4	1,555	492	442	9	943	2,498	30.1%	7	26	0	33	1	2	0	3
20-Apr	7,650	8,250	15,900	941	1,579	8	2,528	932	742	2	1,676	4,204	26.4%	53	108	0	161	3	1	0	4
21-Apr	6,700	9,000	15,700	705	1,214	0	1,919	665	611	0	1,276	3,195	20.4%	16	40	0	56	1	4	0	5
22-Apr	2,500	3,700	6,200	611	609	1	1,221	517	435	1	953	2,174	35.1%	14	22	0	36	0	0	0	0
23-Apr	3,500	3,300	6,800	1,160	652	2	1,814	796	481	0	1,277	3,091	45.5%	19	26	0	45	0	0	0	0
24-Apr	7,800	4,400	12,200	**	**	**	**	**	**	**	**	**	**	**	**	**	**	**	**	**	**
25-Apr	9,900	6,500	16,400	1,507	845	6	2,358	1,092	520	2	1,614	3,972	24.2%	15	24	0	39	0	0	0	0
26-Apr	22,400	7,700	30,100	1,595	604	9	2,208	1,206	398	0	1,604	3,812	12.7%	23	18	0	41	3	1	0	4
27-Apr	13,500	4,350	17,850	747	325	13	1,085	485	124	1	610	1,695	9.5%	9	5	0	14	2	0	0	2
28-Apr	9,300	1,950	11,250	1,625	233	7	1,865	1,011	159	0	1,170	3,035	27.0%	20	3	0	23	0	0	0	0
29-Apr	16,950	2,400	19,350	2,465	330	5	2,800	1,595	165	2	1,762	4,562	23.6%	55	7	0	62	0	0	0	0
30-Apr	11,850	2,100	13,950	1,107	91	0	1,198	703	63	0	766	1,964	14.1%	20	1	0	21	0	0	0	0
1-May	9,600	1,500	11,100	1,331	152	0	1,483	1,127	60	0	1,187	2,670	24.1%	35	4	0	39	0	0	0	0
2-May	13,650	2,700	16,350	2,440	215	2	2,657	1,683	159	1	1,843	4,500	27.5%	30	3	0	33	4	4	0	8
3-May	17,700	1,950	19,650	1,872	158	0	2,030	1,245	84	0	1,329	3,359	17.1%	12	5	0	17	9	1	0	10
4-May	18,450	1,050	19,500	1,275	104	0	1,379	1,018	70	0	1,088	2,467	12.7%	16	2	0	18	1	0	0	1
5-May	10,200	1,500	11,700	2,209	174	1	2,384	1,422	96	3	1,521	3,905	33.4%	43	3	0	46	0	0	0	0
6-May	9,000	600	9,600	2,208	119	1	2,328	1,179	51	0	1,230	3,558	37.1%	27	1	0	28	0	0	0	0
7-May	9,150	1,200	10,350	1,365	118	0	1,483	786	65	0	851	2,334	22.6%	28	5	0	33	0	0	0	0
8-May	9,000	750	9,750	227	13	0	240	127	6	0	133	373	3.8%	6	1	0	7	0	0	0	0
9-May	3,900	0	3,900	1,361	116	1	1,478	779	82	0	861	2,339	60.0%	12	1	0	13	6	0	0	6
10-May	4,200	750	4,950	2,874	228	0	3,102	1,885	143	1	2,029	5,131	103.7%	49	6	0	55	26	1	0	27
11-May	10,350	750	11,100	4,045	310	0	4,355	2,432	236	0	2,668	7,023	63.3%	56	8	0	64	1	0	0	1
12-May	24,750	2,550	27,300	4,088	381	2	4,471	2,524	250	2	2,776	7,247	26.5%	70	10	0	80	8	0	1	9
13-May	24,300	2,550	26,850	2,810	132	17	2,959	1,588	58	0	1,646	4,605	17.2%	32	6	1	39	1	1	0	2
14-May	31,350	2,850	34,200	1,438	92	0	1,530	1,023	44	0	1,067	2,597	7.6%	10	3	0	13	0	0	0	0
15-May	24,300	2,400	26,700	1,410	72	0	1,482	1,772	110	0	1,882	3,364	12.6%	15	1	0	16	0	0	0	0
16-May	24,750	3,900	28,650	844	74	0	918	654	47	0	701	1,619	5.7%	5	0	0	5	0	0	0	0
17-May	21,000	2,700	23,700	546	67	0	613	476	64	0	540	1,153	4.9%	4	0	0	4	0	0	0	0

Appendix Table 7.0. Continued.

Date	Collection			Tagged								Total tagged	Total percentage tagged*	Post-tagging mortality							
				In-river				Transports						In-river				Transports			
	H	W	T	H	W	U	T	H	W	U	T			H	W	U	T	H	W	U	T
18-May	14,250	4,500	18,750	2,340	462	5	2,807	1,298	196	0	1,494	4,301	22.9%	22	2	0	24	0	0	0	0
19-May	10,050	3,300	13,350	1,129	218	0	1,347	691	157	0	848	2,195	16.4%	1	1	0	2	0	0	0	0
20-May	6,900	2,400	9,300	236	104	0	340	174	69	0	243	583	6.3%	0	0	0	0	0	0	0	0
21-May	3,750	800	4,550	92	13	0	105	50	15	0	65	170	3.7%	2	0	0	2	0	0	0	0
22-May	2,967	483	3,450	101	9	0	110	72	7	0	79	189	5.5%	0	0	0	0	0	0	0	0
23-May	1,650	263	1,913	75	8	0	83	52	8	0	60	143	7.5%	0	0	0	0	0	0	0	0
24-May	1,600	240	1,840	79	7	0	86	55	8	0	63	149	8.1%	0	0	0	0	0	0	0	0
25-May	1,740	130	1,870	80	10	0	90	61	2	0	63	153	8.2%	0	0	0	0	0	0	0	0
26-May	1,800	100	1,900	0	0	0	0	0	0	0	0	--	--	0	0	0	0	0	0	0	0
27-May	1,140	110	1,250	56	3	0	59	29	3	0	32	91	7.3%	0	0	0	0	0	0	0	0
28-May	1,280	140	1,420	68	4	0	72	48	1	0	49	121	8.5%	0	0	0	0	0	0	0	0
29-May	3,380	260	3,640	191	14	0	205	126	8	0	134	339	9.3%	2	0	0	2	0	0	0	0
30-May	2,680	610	3,290	157	25	0	182	95	23	0	118	300	9.1%	0	1	0	1	0	0	0	0
31-May	1,530	500	2,030	92	19	0	111	59	8	0	67	178	8.8%	0	0	0	0	0	0	0	0
1-Jun	940	300	1,240	57	10	0	67	34	8	0	42	109	8.8%	1	0	0	1	0	0	0	0
2-Jun	1,075	400	1,475	0	0	0	0	0	0	0	0	--	--	0	0	0	0	0	0	0	0
3-Jun	750	300	1,050	46	9	0	55	24	9	1	34	89	8.5%	0	0	0	0	0	0	0	0
4-Jun	880	330	1,210	48	11	0	59	27	12	0	39	98	8.1%	1	0	0	1	0	0	0	0
5-Jun	980	370	1,350	57	13	0	70	34	10	0	44	114	8.4%	0	0	0	0	0	0	0	0
6-Jun	980	320	1,300	56	11	0	67	44	5	0	49	116	8.9%	1	0	0	1	0	0	0	0
7-Jun	1,090	560	1,650	69	21	0	90	45	16	0	61	151	9.2%	1	1	0	2	0	0	0	0
8-Jun	780	330	1,110	52	6	0	58	26	10	0	36	94	8.5%	1	0	0	1	0	0	0	0
9-Jun	650	175	825	0	0	0	0	0	0	0	0	--	--	0	0	0	0	0	0	0	0
10-Jun	380	390	770	25	6	0	31	14	5	0	19	50	6.5%	0	0	0	0	0	0	0	0
11-Jun	450	210	660	23	11	0	34	19	7	0	26	60	9.1%	1	1	0	2	0	0	0	0
12-Jun	220	210	430	10	11	0	21	10	3	0	13	34	7.9%	0	0	0	0	0	0	0	0
13-Jun	340	280	620	25	8	0	33	17	6	0	23	56	9.0%	1	0	0	1	0	0	0	0
14-Jun	140	230	370	12	8	0	20	10	4	0	14	34	9.2%	0	0	0	0	0	0	0	0
15-Jun	120	70	190	6	4	0	10	5	0	0	5	15	7.9%	0	0	0	0	0	0	0	0
16-Jun	90	80	170	0	0	0	0	0	0	0	0	--	--	0	0	0	0	0	0	0	0
17-Jun	68	56	124	11	5	0	16	8	3	0	11	27	21.8%	0	0	0	0	0	0	0	0
18-Jun	72	40	112	13	2	0	15	7	3	0	10	25	22.3%	0	0	0	0	0	0	0	0
Totals	461,745	125,196	586,941	52,925	13,451	92	66,468	35,925	8,066	33	44,024	110,492	18.8%	766	424	2	1,192	67	18	1	86

* Note: We were unable to break out the hatchery and wild percent tagged because not all hatchery fish were clipped. We determined which of the unclipped fish were wild and which were hatchery (see text) but the agencies which recorded the collection numbers classified all unclipped fish as wild fish.

**Note: All fish tagged for this day (2,979 inriver and 2,131 transport fish) were removed from the study because an unknown fraction of the transported fish were inadvertently released to the river during barge loading operations.

Appendix Table 8.0. Release numbers by date for yearling spring/summer chinook salmon tagged at Lower Granite Dam, 1996.

Release date	Number released							
	In-River				Transport			
	H	W	U	Total	H	W	U	Total
9-Apr	2	9	0	11	2	4	0	6
10-Apr	12	15	0	27	7	10	0	17
11-Apr	34	11	0	45	21	9	0	30
12-Apr	54	21	0	75	28	19	0	47
13-Apr	68	47	1	116	48	31	0	79
14-Apr	94	63	0	157	67	39	0	106
15-Apr	93	115	0	208	70	80	0	150
16-Apr	202	204	1	407	131	172	1	304
17-Apr	420	506	4	930	349	249	1	599
18-Apr	725	758	0	1,483	509	664	0	1,173
19-Apr	616	595	1	1,212	344	415	6	765
20-Apr	555	963	4	1,522	491	440	9	940
21-Apr	888	1,471	8	2,367	929	741	2	1,672
22-Apr	689	1,174	0	1,863	664	607	0	1,271
23-Apr	597	587	1	1,185	517	435	1	953
24-Apr	1,141	626	2	1,769	796	481	0	1,277
25-Apr	*	*	*	*	*	*	*	*
26-Apr	1,492	821	6	2,319	1,092	520	2	1,614
27-Apr	1,572	586	9	2,167	1,203	397	0	1,600
28-Apr	738	320	13	1,071	483	124	1	608
29-Apr	1,605	230	7	1,842	1,011	159	0	1,170
30-Apr	2,410	323	5	2,738	1,595	165	2	1,762
1-May	1,087	90	0	1,177	703	63	0	766
2-May	1,296	148	0	1,444	1,127	60	0	1,187
3-May	2,410	212	2	2,624	1,679	155	1	1,835
4-May	1,860	153	0	2,013	1,236	83	0	1,319
5-May	1,259	102	0	1,361	1,017	70	0	1,087
6-May	2,166	171	1	2,338	1,422	96	3	1,521
7-May	2,181	118	1	2,300	1,179	51	0	1,230
8-May	1,337	113	0	1,450	786	65	0	851
9-May	221	12	0	233	127	6	0	133
10-May	1,349	115	1	1,465	773	82	0	855
11-May	2,825	222	0	3,047	1,859	142	1	2,002
12-May	3,989	302	0	4,291	2,431	236	0	2,667
13-May	4,018	371	2	4,391	2,516	250	1	2,767
14-May	2,778	126	16	2,920	1,587	57	0	1,644

Appendix Table 8.0. Continued.

Release date	Number released							
	In-River				Transport			
	H	W	U	Total	H	W	U	Total
15-May	1,428	89	0	1,517	1,023	44	0	1,067
16-May	1,395	71	0	1,466	1,772	110	0	1,882
17-May	839	74	0	913	654	47	0	701
18-May	542	67	0	609	476	64	0	540
19-May	2,318	460	5	2,783	1,298	196	0	1,494
20-May	1,128	217	0	1,345	691	157	0	848
21-May	236	104	0	340	174	69	0	243
22-May	90	13	0	103	50	15	0	65
23-May	101	9	0	110	72	7	0	79
24-May	75	8	0	83	52	8	0	60
25-May	79	7	0	86	55	8	0	63
26-May	80	10	0	90	61	2	0	63
28-May	56	3	0	59	29	3	0	32
29-May	68	4	0	72	48	1	0	49
30-May	189	14	0	203	126	8	0	134
31-May	157	24	0	181	95	23	0	118
1-Jun	92	19	0	111	59	8	0	67
2-Jun	56	10	0	66	34	8	0	42
4-Jun	46	9	0	55	24	9	1	34
5-Jun	47	11	0	58	27	12	0	39
6-Jun	57	13	0	70	34	10	0	44
7-Jun	55	11	0	66	44	5	0	49
8-Jun	68	20	0	88	45	16	0	61
9-Jun	51	6	0	57	26	10	0	36
11-Jun	25	6	0	31	14	5	0	19
12-Jun	22	10	0	32	19	7	0	26
13-Jun	10	11	0	21	10	3	0	13
14-Jun	24	8	0	32	17	6	0	23
15-Jun	12	8	0	20	10	4	0	14
16-Jun	6	4	0	10	5	0	0	5
18-Jun	11	5	0	16	8	3	0	11
19-Jun	13	2	0	15	7	3	0	10
	52,159	13,027	90	65,276	35,858	8,048	32	43,938

*Note: All fish released on this day (2,955 inriver and 2,131 transport fish) were removed from the study because an unknown fraction of the transported fish were inadvertently released to the river during barge loading operations.

Appendix Table 9.0. Summary of spring/summer chinook salmon marked at Lower Granite Dam for the transport study, 1996.

Replicate number	Release site	Marking period	Release period	Brand position[a], symbol, and orientation[b]	Number released: Hatchery	Wild	Unknown	Total
1	Tailrace	04/09/96	04/21/96	LAπ1	3,301	4,136	17	7,454
	Bonneville	04/09/96	04/22/96	RA21	2,572	2,524	19	5,115
2	Tailrace	04/21/96	04/25/96	LAπ2	2,889	3,029	5	5,923
	Bonneville	04/22/96	04/25/96	RA22	2,401	1,872	1	4,274
3	Tailrace	04/25/96	04/29/96	LAπ3	4,097	1,774	33	5,904
	Bonneville	04/25/96	04/28/96	RA23	2,620	993	3	3,616
4	Tailrace	04/29/96	05/03/96	LAπ4	6,572	780	7	7,359
	Bonneville	04/28/96	05/02/96	RA24	4,594	495	2	5,091
5	Tailrace	05/03/96	05/06/96	LA-PP-1	6,822	581	3	7,406
	Bonneville	05/03/96	05/06/96	RA42	4,628	359	2	4,989
6	Tailrace	05/06/96	05/11/96	LA-PP-2	7,240	542	2	7,784
	Bonneville	05/06/96	05/11/96	RA43	4,680	310	2	4,992
7	Tailrace	05/11/96	05/13/96	LAF3	6,781	602	0	7,383
	Bonneville	05/11/96	05/13/96	RA44	4,495	476	2	4,973
8	Tailrace	05/13/96	05/16/96	LAF4	7,040	387	18	7,445
	Bonneville	05/13/96	05/16/96	RAY1	4,775	257	0	5,032
9	Tailrace	05/16/96	05/28/96	LA-RT-1	6,408	1,001	5	7,414
	Bonneville	05/16/96	05/27/96	RAY2	4,412	618	0	5,030
10	Tailrace	05/29/96	06/17/96	LA-RT-2	1,009	195	0	1,204
	Bonneville	05/28/96	06/17/96	RAY3	681	144	1	826
				Totals - Tailrace	52,159	13,027	90	65,276
				Bonneville	35,858	8,048	32	43,938
				Grand totals	88,017	21,075	122	109,214

[a] RA and LA (position) indicate right and left anterior sides of fish, respectively.

[b] Orientation refers to rotation of brand around its center point.

Appendix Table 10.0 Observations (detections) of yearling spring/summer chinook salmon released into the Lower Granite Dam tailrace, 1996.

Tagging file	Little Goose		Lower Monumental		McNary			Total			Total Obs	Total released
	1st Obs	2nd Obs	1st Obs	2nd Obs	1st Obs	2nd Obs	3rd Obs	1st Obs	2nd Obs	3rd Obs		
DMM96099.IR1	5	0	3	1	1	2	0	9	3	0	12	11
DMM96100.IR1	14	0	4	3	1	4	0	19	7	0	26	27
DMM96101.IR1	12	0	8	6	2	2	2	22	8	2	32	45
DMM96102.IR1	32	0	13	9	3	7	1	48	16	1	65	75
DMM96103.IR1	44	0	21	17	2	5	5	67	22	5	94	116
DMM96104.IR1	58	0	30	16	6	12	4	94	28	4	126	157
DMM96105.IR1	75	0	53	23	7	16	5	135	39	5	179	208
DMM96106.IR1	164	0	89	54	16	27	10	269	81	10	360	407
DMM96107.IR1	225	0	120	67	25	39	14	370	106	14	490	550
DMM96107.IR2	150	0	79	48	26	27	4	255	75	4	334	380
DMM96108.IR1	377	0	160	117	42	78	19	579	195	19	793	874
DMM96108.IR2	278	0	109	85	27	44	8	414	129	8	551	609
DMM96109.IR1	366	0	101	123	42	63	18	509	186	18	713	852
DMM96109.IR2	149	0	59	51	20	20	6	228	71	6	305	360
DMM96110.IR1	389	0	184	122	50	69	21	623	191	21	835	980
DMM96110.IR2	216	0	107	82	25	32	8	348	114	8	470	542
DMM96111.IR1	540	0	366	205	76	91	27	982	296	27	1,305	1,588
DMM96111.IR2	272	0	184	91	33	54	15	489	145	15	649	779
DMM96112.IR1	326	0	276	119	61	63	16	663	182	16	861	1,127
DMM96112.IR2	20	0	12	7	3	2	0	35	9	0	44	62
DMM96112.IR3	191	0	177	70	39	49	11	407	119	11	537	674
DMM96113.IR1	270	0	192	95	51	64	19	513	159	19	691	788
DMM96113.IR2	107	0	104	34	16	37	7	227	71	7	305	359
DMM96113.IR3	6	0	12	1	3	5	0	21	6	0	27	38
DMM96114.IR1	510	0	248	145	130	134	40	888	279	40	1,207	1,462
DMM96114.IR2	110	0	48	28	31	29	11	189	57	11	257	307
DMM96115.IR1	671	0	377	177	173	199	49	1,221	376	49	1,646	1,998
DMM96115.IR2	331	0	205	104	80	92	22	616	196	22	834	957
DMM96116.IR1	393	0	323	133	97	112	36	813	245	36	1,094	1,407
DMM96116.IR2	250	0	198	88	78	75	16	526	163	16	705	912
DMM96117.IR1	401	0	252	124	111	130	22	764	254	22	1,040	1,221
DMM96117.IR2	309	0	197	87	78	103	24	584	190	24	798	946
DMM96118.IR1	188	0	150	57	65	81	4	403	138	4	545	700
DMM96118.IR2	120	0	70	37	45	27	5	235	64	5	304	371
DMM96119.IR1	359	0	281	119	122	113	22	762	232	22	1,016	1,303
DMM96119.IR2	156	0	120	51	43	63	11	319	114	11	444	539
DMM96120.IR1	660	0	558	220	222	194	41	1,440	414	41	1,895	2,436
DMM96120.IR2	21	0	17	7	5	6	0	43	13	0	56	86
DMM96120.IR3	60	0	47	22	28	18	5	135	40	5	180	216
DMM96121.IR1	308	0	285	113	76	97	27	669	210	27	906	1,128
DMM96121.IR2	19	0	5	5	4	1	0	28	6	0	34	49
DMM96122.IR1	385	0	329	127	104	105	23	818	232	23	1,073	1,370
DMM96122.IR2	18	0	22	5	1	6	1	41	11	1	53	74
DMM96123.IR1	577	1	498	202	171	151	30	1,246	354	30	1,630	2,122
DMM96123.IR2	143	0	127	61	45	34	8	315	95	8	418	502
DMM96124.IR1	459	0	379	164	99	91	18	937	255	18	1,210	1,598
DMM96124.IR2	141	0	95	52	19	21	2	255	73	2	330	415
DMM96125.IR1	312	0	242	132	49	63	9	603	195	9	807	1,044
DMM96125.IR2	111	0	82	45	12	11	8	205	56	8	269	317
DMM96126.IR1	365	0	296	151	65	54	16	726	205	16	947	1,247
DMM96126.IR2	336	0	264	115	49	55	11	649	170	11	830	1,091
DMM96127.IR1	490	0	384	174	67	61	19	941	235	19	1,195	1,559
DMM96127.IR2	240	0	173	89	38	36	12	451	125	12	588	741
DMM96128.IR1	301	0	202	107	35	31	10	538	138	10	686	1,080
DMM96128.IR2	94	0	69	30	12	12	0	175	42	0	217	370
DMM96129.IR1	62	0	37	25	7	9	2	106	34	2	142	233
DMM96130.IR1	440	0	278	133	59	56	14	777	189	14	980	1,341
DMM96130.IR2	40	0	18	9	10	2	4	68	11	4	83	106
DMM96130.IR3	4	0	3	2	0	0	0	7	2	0	9	18
DMM96131.IR1	775	0	473	224	86	97	25	1,334	321	25	1,680	2,438
DMM96131.IR2	212	0	112	65	23	25	7	347	90	7	444	609

Appendix Table 10.0 Continued.

Tagging file	Little Goose 1st Obs	Little Goose 2nd Obs	Lower Monumental 1st Obs	Lower Monumental 2nd Obs	McNary 1st Obs	McNary 2nd Obs	McNary 3rd Obs	Total 1st Obs	Total 2nd Obs	Total 3rd Obs	Total Obs	Total released
DMM96132.IR1	719	0	505	219	109	107	34	1,333	326	34	1,693	2,472
DMM96132.IR2	525	0	376	152	83	80	17	984	232	17	1,233	1,819
DMM96133.IR1	607	0	475	146	118	101	13	1,200	247	13	1,460	2,451
DMM96133.IR2	516	0	356	141	84	83	18	956	224	18	1,198	1,940
DMM96134.IR1	476	0	423	120	129	79	15	1,028	199	15	1,242	2,136
DMM96134.IR2	166	0	158	46	39	20	4	363	66	4	433	784
DMM96135.IR1	282	0	287	69	89	63	10	658	132	10	800	1,397
DMM96135.IR2	27	0	30	10	9	7	0	66	17	0	83	120
DMM96136.IR1	302	0	239	82	71	49	10	612	131	10	753	1,289
DMM96136.IR2	23	0	30	6	14	4	0	67	10	0	77	177
DMM96137.IR1	241	0	165	74	32	20	3	438	94	3	535	867
DMM96137.IR2	9	0	9	4	1	0	0	19	4	0	23	46
DMM96138.IR1	149	0	141	37	16	17	3	306	54	3	363	609
DMM96139.IR1	374	0	409	89	59	47	5	842	136	5	983	1,836
DMM96139.IR2	208	0	211	56	26	25	3	445	81	3	529	947
DMM96140.IR1	207	0	190	55	34	16	3	431	71	3	505	1,012
DMM96140.IR2	76	0	75	15	8	5	3	159	20	3	182	333
DMM96141.IR1	62	0	76	14	15	7	0	153	21	0	174	329
DMM96141.IR2	1	0	3	0	0	1	0	4	1	0	5	11
DMM96142.IR1	15	0	10	3	3	2	1	28	5	1	34	103
DMM96143.IR1	6	0	14	0	7	1	0	27	1	0	28	110
DMM96144.IR1	8	0	15	0	2	2	0	25	2	0	27	83
DMM96145.IR1	6	0	19	0	3	2	0	28	2	0	30	86
DMM96146.IR1	8	0	13	2	2	2	0	23	4	0	27	90
DMM96148.IR1	7	0	3	0	3	1	0	13	1	0	14	59
DMM96149.IR1	9	0	13	2	1	0	0	23	2	0	25	72
DMM96150.IR1	26	0	29	4	2	2	0	57	6	0	63	203
DMM96151.IR1	45	0	21	10	1	1	0	67	11	0	78	181
DMM96152.IR1	27	0	13	3	3	0	0	43	3	0	46	111
DMM96153.IR1	10	0	8	2	1	1	0	19	3	0	22	66
DMM96155.IR1	8	0	9	2	0	0	0	17	2	0	19	55
DMM96156.IR1	7	0	6	2	0	0	0	13	2	0	15	58
DMM96157.IR1	4	0	11	1	0	0	0	15	1	0	16	70
DMM96158.IR1	3	0	5	0	0	0	0	8	0	0	8	66
DMM96159.IR1	19	0	7	3	5	0	0	31	3	0	34	88
DMM96160.IR1	11	0	7	0	2	0	0	20	0	0	20	57
DMM96162.IR1	3	0	10	1	0	1	0	13	2	0	15	31
DMM96163.IR1	2	0	1	0	0	1	0	3	1	0	4	32
DMM96164.IR1	0	0	5	0	1	1	0	6	1	0	7	21
DMM96165.IR1	8	0	3	3	0	0	1	11	3	1	15	32
DMM96166.IR1	2	0	1	1	2	1	0	5	2	0	7	20
DMM96167.IR1	4	0	1	0	1	0	0	6	0	0	6	10
DMM96169.IR1	3	0	3	1	0	0	1	6	1	1	8	16
DMM96170.IR1	1	0	4	0	0	0	0	5	0	0	5	15
	19,869	1	14,316	6,250	3,891	3,955	918	38,076	10,206	918	49,200	68,231

Appendix Table 11.0. Locations of observations (detections) of PIT-tagged spring/summer chinook salmon within the Little Goose Dam juvenile fish facility, 1996.

Obsdate	SepDiv	Div	Sep	SepSamp	Samp	SepRace	Race	Total obs.
12-Apr	1	0	0	0	0	0	0	1
13-Apr	8	0	0	0	1	0	0	9
14-Apr	11	0	0	0	0	0	0	11
15-Apr	17	0	0	1	0	0	4	22
16-Apr	8	0	0	0	0	2	2	12
17-Apr	16	0	0	0	0	0	1	17
18-Apr	23	0	0	2	0	0	2	27
19-Apr	41	0	0	0	0	1	3	45
20-Apr	76	0	0	0	0	0	3	79
21-Apr	110	0	1	3	0	0	3	117
22-Apr	251	0	1	6	0	1	14	273
23-Apr	372	5	0	2	0	0	20	399
24-Apr	836	5	2	6	1	6	106	962
25-Apr	948	5	0	9	1	5	52	1,020
26-Apr	768	5	2	4	0	2	39	820
27-Apr	1,235	6	2	10	0	3	63	1,319
28-Apr	172	1	0	1	1	1	9	185
29-Apr	144	0	0	0	0	1	11	156
30-Apr	141	0	1	0	0	2	8	152
1-May	194	1	0	1	0	5	13	214
2-May	352	1	1	3	0	2	9	368
3-May	563	5	0	1	0	13	17	599
4-May	336	0	1	4	1	9	14	365
5-May	290	0	1	5	0	4	10	310
6-May	217	0	0	3	0	7	10	237
7-May	284	0	2	6	0	7	4	303
8-May	301	1	1	13	0	9	6	331
9-May	167	0	13	2	0	89	11	282
10-May	344	0	1	6	1	36	18	406
11-May	409	0	0	6	1	1	17	434
12-May	540	0	0	1	0	2	13	556
13-May	944	4	2	16	0	2	14	984
14-May	921	5	1	3	0	4	21	955
15-May	1,162	8	0	8	0	5	52	1,235
16-May	1,391	7	1	8	0	2	52	1,461
17-May	1,540	7	0	14	0	9	46	1,616
18-May	853	10	1	7	1	2	28	902
19-May	519	0	2	2	0	0	23	546
20-May	352	1	0	0	0	1	16	370
21-May	257	0	1	0	0	3	31	292
22-May	199	0	0	14	0	1	5	219
23-May	141	1	0	2	1	0	1	146
24-May	183	0	0	2	0	1	3	189
25-May	213	0	0	4	0	0	3	220
26-May	144	0	1	2	0	0	1	148
27-May	90	0	0	4	0	1	2	97

Appendix Table 11.0. Continued.

Obsdate	SepDiv	Div	Sep	SepSamp	Samp	SepRace	Race	Total obs.
28-May	52	0	0	5	0	0	2	59
29-May	55	0	0	3	0	0	0	58
30-May	66	0	0	2	0	0	0	68
31-May	32	0	0	1	0	0	0	33
1-Jun	11	0	3	0	0	0	0	14
2-Jun	4	0	0	0	0	0	0	4
3-Jun	16	1	0	1	0	1	1	20
4-Jun	15	1	0	2	0	0	0	18
5-Jun	45	0	0	6	0	0	0	51
6-Jun	41	0	0	3	0	0	0	44
7-Jun	18	0	0	0	0	0	0	18
8-Jun	4	0	0	0	0	0	0	4
9-Jun	5	0	0	0	0	0	0	5
10-Jun	11	0	1	1	0	0	1	14
11-Jun	13	0	0	1	0	0	0	14
12-Jun	7	0	0	2	0	0	0	9
13-Jun	0	0	0	1	0	0	0	1
14-Jun	4	0	0	0	0	0	0	4
15-Jun	2	0	0	0	0	0	0	2
16-Jun	1	0	0	0	0	0	0	1
17-Jun	2	0	0	0	0	0	0	2
18-Jun	1	0	0	0	0	0	0	1
19-Jun	1	0	0	0	0	0	0	1
20-Jun	8	0	0	0	0	0	0	8
21-Jun	1	0	0	0	0	0	0	1
22-Jun	0	0	0	0	0	0	0	0
23-Jun	1	0	0	0	0	0	0	1
24-Jun	1	0	0	0	0	0	0	1
25-Jun	1	0	0	0	0	0	0	1
2-Jul	1	0	0	0	0	0	0	1
3-Jul	1	0	0	0	0	0	0	1
12-Jul	1	0	0	0	0	0	0	1
28-Aug	1	0	0	0	0	0	0	1
20-Sep	1	0	0	0	0	0	0	1
	18,506	80	42	209	9	240	784	19,830

Appendix Table 12.0. Locations of observations (detections) of PIT-tagged spring/summer chinook salmon within the Lower Monumental Dam juvenile fish facility, 1996.

Obsdate	SepDiv	Div	Sep	SepSamp	Samp	SepRace	Race	Total obs.
13-Apr	1	0	0	0	0	0	0	1
14-Apr	2	0	0	0	0	0	0	2
15-Apr	4	0	0	0	0	0	0	4
16-Apr	7	0	0	0	0	0	0	7
17-Apr	10	0	1	0	0	0	0	11
18-Apr	16	0	1	0	0	1	0	18
19-Apr	13	0	0	1	0	0	0	14
20-Apr	30	0	0	0	0	0	0	30
21-Apr	31	0	0	0	0	1	0	32
22-Apr	59	0	0	1	0	0	0	60
23-Apr	166	1	0	4	0	2	3	176
24-Apr	251	0	0	2	0	2	1	256
25-Apr	638	1	0	2	0	5	3	649
26-Apr	1,395	2	0	4	0	20	11	1,432
27-Apr	499	0	0	2	0	10	10	521
28-Apr	690	0	3	2	0	9	11	715
29-Apr	432	0	6	0	0	3	5	446
30-Apr	189	0	0	2	0	4	1	196
1-May	202	1	0	0	0	2	1	206
2-May	260	0	0	0	0	6	1	267
3-May	258	2	1	1	0	4	3	269
4-May	286	0	0	3	0	4	3	296
5-May	208	1	0	1	0	5	2	217
6-May	188	2	1	2	0	3	1	197
7-May	367	1	0	6	1	2	4	381
8-May	310	0	1	5	0	5	5	326
9-May	401	0	1	4	0	6	8	420
10-May	404	1	0	4	0	2	6	417
11-May	508	1	0	4	0	7	5	525
12-May	550	0	1	5	0	11	3	570
13-May	720	0	1	4	1	6	9	741
14-May	1,158	2	3	11	1	8	12	1,195
15-May	1,051	2	16	5	0	300	13	1,387
16-May	987	2	18	2	0	265	20	1,294
17-May	1,965	5	2	3	0	25	24	2,024
18-May	1,163	12	2	3	0	18	15	1,213
19-May	888	0	0	3	0	23	10	924
20-May	487	0	1	2	0	18	8	516
21-May	374	0	2	1	1	9	6	393
22-May	239	1	0	0	0	12	11	263
23-May	320	2	1	1	0	11	11	346
24-May	193	1	0	3	0	9	0	206
25-May	136	0	0	2	0	2	6	146
26-May	132	1	2	1	0	4	6	146
27-May	181	0	0	1	0	4	1	187

Appendix Table 12.0. Continued.

Obsdate	SepDiv	Div	Sep	SepSamp	Samp	SepRace	Race	Total obs.
28-May	205	0	0	3	0	2	2	212
29-May	158	0	0	3	0	2	1	164
30-May	123	0	0	2	0	2	0	127
31-May	76	0	0	0	0	0	1	77
1-Jun	44	0	0	1	0	0	0	45
2-Jun	21	0	0	1	0	5	1	28
3-Jun	36	0	0	1	0	4	1	42
4-Jun	24	0	0	3	0	1	2	30
5-Jun	25	0	0	1	0	0	0	26
6-Jun	31	0	0	2	0	1	0	34
7-Jun	27	0	0	0	0	0	0	27
8-Jun	28	0	0	0	0	0	1	29
9-Jun	7	0	0	0	0	0	1	8
10-Jun	21	0	0	0	0	0	0	21
11-Jun	12	0	0	0	0	0	0	12
12-Jun	3	0	0	0	0	0	0	3
13-Jun	5	0	0	0	0	0	0	5
14-Jun	2	0	0	1	0	1	0	4
15-Jun	7	0	0	0	0	0	1	8
16-Jun	2	0	0	0	0	0	0	2
17-Jun	2	0	0	0	0	0	0	2
19-Jun	1	0	0	0	0	0	0	1
20-Jun	0	0	0	0	5	0	0	5
21-Jun	1	0	0	0	0	0	0	1
22-Jun	6	0	0	0	0	0	0	6
24-Jun	2	0	0	0	0	0	0	2
30-Jun	1	0	0	0	0	0	0	1
1-Jul	1	0	0	0	0	0	0	1
7-Jul	1	0	0	0	0	0	0	1
8-Jul	1	0	0	0	0	0	0	1
12-Jul	1	0	0	0	0	0	0	1
11-Aug	1	0	0	0	0	0	0	1
	19,243	41	64	115	9	846	250	20,568

Appendix Table 13.0. Locations of observations (detections) of PIT-tagged spring/summer chinook salmon within the McNary Dam juvenile fish facility, 1996.

Obsdate	SepDiv	Div	SepDivSamp	DivSamp	Sep*	Samp*	SepRace*	SepDivRace*	Race*	Total obs.
19-Apr	3	0	0	0	0	0	0	0	0	3
20-Apr	6	0	0	0	0	0	0	0	0	6
21-Apr	1	0	0	0	0	0	0	0	0	1
22-Apr	3	0	0	0	0	0	0	0	0	3
23-Apr	2	1	0	0	0	0	0	0	0	3
24-Apr	7	1	0	0	0	0	0	0	0	8
25-Apr	32	0	1	0	0	0	0	0	0	33
26-Apr	109	3	3	0	0	0	0	0	0	115
27-Apr	367	7	5	0	0	0	0	0	0	379
28-Apr	183	5	0	0	1	0	0	0	0	189
29-Apr	22	0	0	0	38	0	0	0	0	60
30-Apr	50	0	0	0	119	0	0	0	0	169
1-May	132	2	0	0	357	0	0	0	0	489
2-May	74	0	0	0	196	0	6	0	0	276
3-May	45	0	0	0	146	0	0	0	0	191
4-May	18	0	0	0	68	0	0	0	0	86
5-May	16	0	0	0	49	0	1	0	0	66
6-May	29	0	0	0	53	0	0	0	0	82
7-May	59	1	2	0	55	0	0	0	0	117
8-May	143	1	1	0	1	0	0	0	0	146
9-May	180	2	7	0	1	0	0	0	0	190
10-May	195	1	12	0	0	0	0	0	0	208
11-May	251	4	5	0	2	0	0	0	0	262
12-May	266	1	2	0	2	0	0	0	0	271
13-May	317	2	8	0	3	0	0	0	0	330
14-May	339	2	3	0	1	0	0	25	0	370
15-May	309	2	9	0	5	0	0	0	0	325
16-May	531	13	9	0	19	0	0	0	0	572
17-May	450	6	8	0	3	0	0	0	0	467
18-May	333	3	5	0	2	0	0	0	0	343
19-May	473	9	7	0	0	0	0	0	0	489
20-May	417	2	11	0	0	0	0	0	0	430
21-May	498	4	15	0	9	0	0	0	0	526
22-May	492	7	10	0	15	0	0	1	0	525
23-May	302	7	1	1	4	0	0	0	0	315
24-May	110	4	0	0	4	0	0	0	0	118
25-May	52	2	4	0	3	1	0	0	0	62
26-May	68	2	0	0	2	0	0	0	0	72
27-May	34	8	2	1	1	0	0	0	0	46
28-May	46	3	0	0	2	0	0	0	0	51
29-May	53	1	0	0	1	0	0	0	0	55
30-May	55	1	0	0	0	0	0	0	0	56
31-May	36	1	0	0	0	0	0	0	0	37
1-Jun	29	0	0	0	0	0	0	0	0	29
2-Jun	18	0	0	0	0	0	0	0	0	18

Appendix Table 13.0. Continued.

Obsdate	SepDiv	Div	SepDivSamp	DivSamp	Sep*	Samp*	SepRace*	SepDivRace*	Race*	Total obs.
3-Jun	22	0	1	0	0	0	0	0	0	23
4-Jun	22	0	0	0	0	0	1	0	1	24
5-Jun	12	0	0	0	0	1	0	0	0	13
6-Jun	5	0	0	0	0	0	0	0	0	5
7-Jun	7	0	0	0	0	0	1	0	0	8
8-Jun	3	0	0	0	0	0	0	0	0	3
9-Jun	5	0	0	0	0	0	0	0	0	5
10-Jun	1	0	0	0	0	0	0	0	0	1
11-Jun	2	0	0	0	0	0	0	0	0	2
12-Jun	1	0	0	0	0	0	0	0	0	1
13-Jun	2	0	0	0	0	0	0	0	0	2
14-Jun	1	0	0	0	0	0	1	0	0	2
15-Jun	2	0	0	0	0	0	0	0	0	2
16-Jun	1	0	0	0	0	0	0	0	0	1
19-Jun	1	0	0	0	0	0	0	0	0	1
20-Jun	1	0	0	0	0	0	0	0	0	1
21-Jun	1	0	0	0	0	0	0	0	0	1
23-Jun	1	0	0	0	0	0	0	0	0	1
24-Jun	1	0	0	0	0	0	0	0	0	1
26-Jun	1	0	0	0	0	0	0	0	0	1
11-Jul	1	0	0	0	0	0	0	0	0	1
17-Jul	0	0	0	0	0	0	1	0	0	1
20-Jul	1	0	0	0	0	0	0	0	0	1
	7,249	108	131	2	1,162	2	11	26	1	8,691

* Note: Prior to 5 June 1996, all fish entering the McNary Dam juvenile fish facility were bypassed to the river. Transportation from McNary Dam began on 5 June.

Appendix Table 14.0. Total adult returns (hatchery and wild) to Lower Granite Dam from spring/summer chinook salmon smolts tagged as inriver migrants at Lower Granite Dam in spring 1995. The upstream recovery site and date is also provided for those fish that were recovered after leaving the Lower Granite Dam adult fish ladder.

Smolt release date	Number smolts released	Adult return date	PIT-tag code	Jaw tag number	Length: At smolt tagging (mm)	Length: At adult return (mm)	Upstream adult recovery: Date	Upstream adult recovery: Location[c]
04/11/95	470	05/26/96	225B68765D	T2106	-	540	07/08/96	RPDTRP
		05/29/96	225C7E5C64	T0170	139	510	07/04/96	RPDTRP
04/17/95	1,738	07/18/96	225D563066	T0201	-	410		NR
04/19/95	5,902	05/27/96	225B157B77	T0162	-	520	06/28/96	KOOS
		05/29/96	2241427C53	T0168	-	460		NR
		06/04/96	224160024F	T0186	-	450	07/06/96	RPDTRP
		06/20/96	22414E694F	T0193	118	490		NR
04/22/95	4,119	05/30/96	22603B1615	T0171	139	500	07/15/96	RPDTRP
04/23/95	3,850	06/24/96	22450E7E01	T0194	148	580	07/11/96	RPDTRP
04/24/95	2,996	05/30/96	226005053B	T0169	-	420	07/03/96	RPDTRP
		06/20/96	22460D0C51	T0192	-	510		NR
04/25/95	3,434	05/31/96	2247577E38	T0176	-	420		NR
		06/04/96	22493E603A	T2107	-	530	07/08/96	CROTRP
04/26/95	3,942	05/08/96	22606E575A	T0150	-	500	06/25/96	RPDTRP
		05/25/96	2246273E3F	T0160	-	500	06/28/96	KOOS
		05/27/96	22492F6E2A	T0163	-	490		NR
		05/31/96	2248623F44	T0174	-	500		NR
04/27/95	4,181	05/16/96	22467B1418	T2103	-	450	07/17/96	RPDTRP
04/28/95	4,560	05/18/96	22457D7234	T0156	-	460		NR
04/29/95	6,579	05/17/96	225F561F59	T0155	-	430		NR
04/30/95	6,052	05/15/96	2245541D51	T0153	-	480	07/01/96	RPDTRP
		05/16/96	2249360C4B	T0154	-	460		NR
		06/01/96	225E546A67	T0178	-	430		NR
05/01/95	7,679	05/29/96	225A523106	T0166	128	460	07/05/96	RPDTRP
05/02/95	6,112	06/26/96	225C0A344E	T0196	-	510	07/25/96	SALSFW
05/05/95	7,464	05/26/96	2251015D47	T0161	-	530	07/08/96	RPDTRP
		06/04/96	2249174760	T0188	-	490	06/25/96	DWOR
		06/04/96	2249550131	T0187	-	480	07/03/96	RPDTRP
		07/06/96	2250311A2C	T0199	-	510	07/30/96	SALSFW
05/06/95	3,986	06/11/96	225A53004C	T0190	-	500	07/02/96	DWOR
05/07/95	6,145	06/03/96	2251242A41	T0182	-	470	07/05/96	RPDTRP
05/08/95	4,305	06/04/96	226129144E	T0185	-	430		NR

[c] Recovery location abbreviatons: NR = Not recovered; CROTRP = Crooked River Trap; DWOR = Dworshak National Fish Hatchery; KOOS = Kooskia National Fish Hatchery; RPDTRP = Rapid River Trap; SALSFW = South Fork Salmon River Weir.

Appendix Table 15.0. Adult returns to Lower Granite Dam of hatchery spring/summer chinook salmon smolts tagged as inriver migrants at Lower Granite Dam in spring 1995. The upstream recovery site and date is also provided for those fish that were recovered after leaving the Lower Granite Dam adult fish ladder.

Smolt release date	Number smolts released	Adult return date	PIT-tag code	Jaw tag number	Length: At smolt tagging (mm)	Length: At adult return (mm)	Upstream adult recovery: Date	Upstream adult recovery: Location[a]
04/11/95	90	05/26/96	225B68765D	T2106	-	540	07/08/96	RPDTRP
		05/29/96	225C7E5C64	T0170	139	510	07/04/96	RPDTRP
04/19/95	3,735	05/27/96	225B157B77	T0162	-	520	06/28/96	KOOS
		05/29/96	2241427C53	T0168	-	460		NR
		06/04/96	224160024F	T0186	-	450	07/06/96	RPDTRP
04/22/95	3,012	05/30/96	22603B1615	T0171	139	500	07/15/96	RPDTRP
04/23/95	2,904	06/24/96	22450E7E01	T0194	148	580	07/11/96	RPDTRP
04/24/95	2,299	05/30/96	226005053B	T0169	-	420	07/03/96	RPDTRP
		06/20/96	22460D0C51	T0192	-	510		NR
04/25/95	2,752	05/31/96	2247577E38	T0176	-	420		NR
		06/04/96	22493E603A	T2107	-	530	07/08/96	CROTRP
04/26/95	3,477	05/08/96	22606E575A	T0150	-	500	06/25/96	RPDTRP
		05/25/96	2246273E3F	T0160	-	500	06/28/96	KOOS
		05/27/96	22492F6E2A	T0163	-	490		NR
		05/31/96	2248623F44	T0174	-	500		NR
04/27/95	3,470	05/16/96	22467B1418	T2103	-	450	07/17/96	RPDTRP
04/28/95	3,816	05/18/96	22457D7234	T0156	-	460		NR
04/29/95	5,670	05/17/96	225F561F59	T0155	-	430		NR
04/30/95	5,239	05/15/96	2245541D51	T0153	-	480	07/01/96	RPDTRP
		05/16/96	2249360C4B	T0154	-	460		NR
		06/01/96	225E546A67	T0178	-	430		NR
05/01/95	6,851	05/29/96	225A523106	T0166	128	460	07/05/96	RPDTRP
05/02/95	5,352	06/26/96	225C0A344E	T0196	-	510	07/25/96	SALSFW
05/05/95	6,263	05/26/96	2251015D47	T0161	-	530	07/08/96	RPDTRP
		06/04/96	2249174760	T0188	-	490	06/25/96	DWOR
		06/04/96	2249550131	T0187	-	480	07/03/96	RPDTRP
		07/06/96	2250311A2C	T0199	-	510	07/30/96	SALSFW
05/06/95	3,551	06/11/96	225A53004C	T0190	-	500	07/02/96	DWOR
05/07/95	5,494	06/03/96	2251242A41	T0182	-	470	07/05/96	RPDTRP
05/08/95	3,792	06/04/96	226129144E	T0185	-	430		NR

[a] Recovery location abbreviatons: NR = Not recovered; CROTRP = Crooked River Trap; DWOR = Dworshak National Fish Hatchery; KOOS = Kooskia National Fish Hatchery; RPDTRP = Rapid River Trap; SALSFW = South Fork Salmon River Weir.

Appendix Table 16.0. Adult returns to Lower Granite Dam of wild spring/summer chinook salmon smolts tagged as inriver migrants at Lower Granite Dam in spring 1995. The upstream recovery site and date is also provided for those fish that were recovered after leaving the Lower Granite Dam adult fish ladder.

Smolt release date	Number smolts released	Adult return date	PIT-tag code	Jaw tag number	Length		Upstream adult recovery	
					At smolt tagging (mm)	At adult return (mm)	Date	Location[a]
04/17/95	1,107	07/18/96	225D563066	T0201	-	410		NR
04/19/95	2,167	06/20/96	22414E694F	T0193	118	490		NR

[a] Recovery location abbreviaton: NR = Not recovered.

Appendix Table 17.0. Total adult returns (hatchery and wild) to Lower Granite Dam from spring/summer chinook salmon smolts tagged as transported fish at Lower Granite Dam in spring 1995. The upstream recovery site and date is also provided for those fish that were recovered after leaving the Lower Granite Dam adult fish ladder.

Smolt release date	Number smolts released	Adult return date	PIT-tag code	Jaw tag number	Length: At smolt tagging (mm)	Length: At adult return (mm)	Upstream adult recovery: Date	Upstream adult recovery: Location[a]
04/11/95	978	06/17/96	225E062232	T0191	-	490		NR
04/13/95	704	05/23/96	225D7A410D	T0158	-	510	08/10/96	RPDTRP
04/19/95	4,533	05/31/96	225C6E7932	T0175	-	510		NR
04/27/95	4,049	06/04/96	22467F554E	T0183	-	530	07/19/96	RPDTRP
04/28/95	4,081	05/28/96	2247690E7B	T0167	-	480	07/13/96	RPDTRP
04/29/95	6,635	05/18/96	2247225F1A	T2104	161	520		NR
05/01/95	6,260	06/04/96	225A5A2E64	T0189	-	490	07/15/96	RPDTRP
05/02/95	5,828	05/22/96	225B3C600C	T0157	150	470	07/02/96	RPDTRP
		05/29/96	225008222F	T0165	157	440	07/04/96	RPDTRP
05/03/95	2,972	05/18/96	225C293509	T2105	-	510		NR
		06/03/96	2250276F16	T0180	-	480	07/03/96	RPDTRP
		06/25/96	22501F296D	T0195	-	520	07/28/96	SALSFW
05/04/95	4,277	05/10/96	225A5E407A	T0151	-	450		NR
		06/02/96	2247236E50	T0177	-	500	08/10/96	RPDTRP
		07/01/96	225C114A6A	T0198	-	500		NR
05/05/95	4,371	06/02/96	2251334F11	T0179	-	440	07/11/96	RPDTRP
		06/03/96	225A545323	T0184	-	510		NR
		06/12/96	2261291260	T2108	-	530	07/02/96	CLWR
05/06/95	3,348	05/12/96	22494A7D2D	T0152	-	470	06/29/96	RPDTRP
05/08/95	3,492	05/27/96	22495B7F61	T0164	-	500	07/03/96	RPDTRP
05/10/95	2,502	05/24/96	22626F4A38	T0159	148	480		NR
		05/30/96	2261242066	T0172	145	530	07/04/96	RPDTRP
05/11/95	2,238	05/31/96	22627D5A4D	T0173	-	480	07/09/96	RPDTRP
05/14/95	1,505	07/19/96	2263152E16	T0202	-	600	08/09/96	SALSFW
05/16/95	500	06/15/96	2262043228	T0181	-	510	07/11/96	RPDTRP
05/17/95	883	07/07/96	2262457A62	T0200	-	560	08/02/96	SALSFW
05/27/95	603	06/28/96	2262527003	T0197	-	500	08/02/96	SALSFW

[a] Recovery location abbreviatons: NR = Not recovered; CLWR = Clearwater River; RPDTRP = Rapid River Trap; SALSFW = South Fork Salmon River Weir.

Appendix Table 18.0. Adult returns to Lower Granite Dam of hatchery spring/summer chinook salmon smolts tagged as transported fish at Lower Granite Dam in spring 1995. The upstream recovery site and date is also provided for those fish that were recovered after leaving the Lower Granite Dam adult fish ladder.

Smolt release date	Number smolts released	Adult return date	PIT-tag code	Jaw tag number	Length: At smolt tagging (mm)	Length: At adult return (mm)	Upstream adult recovery: Date	Upstream adult recovery: Location[a]
04/13/95	279	05/23/96	225D7A410D	T0158	-	510	08/10/96	RPDTRP
04/19/95	3,045	05/31/96	225C6E7932	T0175	-	510		NR
04/27/95	3,351	06/04/96	22467F554E	T0183	-	530	07/19/96	RPDTRP
04/28/95	3,450	05/28/96	2247690E7B	T0167	-	480	07/13/96	RPDTRP
04/29/95	5,809	05/18/96	2247225F1A	T2104	161	520		NR
05/01/95	5,554	06/04/96	225A5A2E64	T0189	-	490	07/15/96	RPDTRP
05/02/95	5,017	05/22/96	225B3C600C	T0157	150	470	07/02/96	RPDTRP
		05/29/96	225008222F	T0165	157	440	07/04/96	RPDTRP
05/03/95	2,623	05/18/96	225C293509	T2105	-	510		NR
		06/03/96	2250276F16	T0180	-	480	07/03/96	RPDTRP
		06/25/96	22501F296D	T0195	-	520	07/28/96	SALSFW
05/04/95	3,704	05/10/96	225A5E407A	T0151	-	450		NR
		06/02/96	2247236E50	T0177	-	500	08/10/96	RPDTRP
		07/01/96	225C114A6A	T0198	-	500		NR
05/05/95	3,857	06/02/96	2251334F11	T0179	-	440	07/11/96	RPDTRP
		06/03/96	225A545323	T0184	-	510		NR
		06/12/96	2261291260	T2108	-	530	07/02/96	CLWR
05/06/95	3,060	05/12/96	22494A7D2D	T0152	-	470	06/29/96	RPDTRP
05/08/95	3,070	05/27/96	22495B7F61	T0164	-	500	07/03/96	RPDTRP
05/10/95	2,208	05/24/96	22626F4A38	T0159	148	480		NR
		05/30/96	2261242066	T0172	145	530	07/04/96	RPDTRP
05/11/95	1,912	05/31/96	22627D5A4D	T0173	-	480	07/09/96	RPDTRP
05/14/95	1,289	07/19/96	2263152E16	T0202	-	600	08/09/96	SALSFW
05/16/95	393	06/15/96	2262043228	T0181	-	510	07/11/96	RPDTRP
05/17/95	672	07/07/96	2262457A62	T0200	-	560	08/02/96	SALSFW
05/27/95	397	06/28/96	2262527003	T0197	-	500	08/02/96	SALSFW

[a] Recovery location abbreviatons: NR = Not recovered; CLWR = Clearwater River; RPDTRP = Rapid River Trap; SALSFW = South Fork Salmon River Weir.

Appendix Table 19.0. Adult returns to Lower Granite Dam of wild spring/summer chinook salmon smolts tagged as transported fish at Lower Granite Dam in spring 1995. The upstream recovery site and date is also provided for those fish that were recovered after leaving the Lower Granite Dam adult fish ladder.

Smolt release date	Number smolts released	Adult return date	PIT-tag code	Jaw tag number	Length		Upstream adult recovery	
					At smolt tagging (mm)	At adult return (mm)	Date	Location[a]
04/11/95	764	06/17/96	225E062232	T0191	-	490		NR

[a] Recovery location abbreviatons: NR = Not recovered.