

**SOCKEYE SALMON TRANSPORTATION STUDIES AT
PRIEST RAPIDS DAM, COLUMBIA RIVER, 1989**

By

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Preliminary Report

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INTRODUCTION

In 1987 and 1988, the National Marine Fisheries Service (NMFS) marked sockeye salmon smolts (Oncorhynchus nerka) for a Grant County Public Utility District study to evaluate salmon transportation by truck and barge from Priest Rapids Dam to below Bonneville Dam. Smolts were collected from gatewells at Priest Rapids Dam and marked into three distinct release groups during both years. Two of the groups were transported for release below Bonneville Dam--one group directly by truck and the other by truck to McNary Dam and then by barge to below Bonneville Dam. The third group was released as an in-river control directly below Priest Rapids Dam. Details of the marking and release operations including numbers marked by release group were reported previously in Carlson et al. (1988, 1989). During 1989, the NMFS continued to monitor adult recoveries from this study. This report provides a preliminary update of these observations.

METHODS

Marked adult sockeye salmon were monitored from ocean fishing catches, Columbia River and tributary catches, Wenatchee and Okanogan River system spawning ground surveys, and trapping facilities in fish ladders at Bonneville and Priest Rapids Dams. The trapping facilities at both dams were operated throughout the adult migration. Details of Bonneville Dam trap operation were reported in Durkin et al. (1969).

All tabular mark-recovery information was checked for errors and entered into a centralized computer database at NMFS facilities at Pasco, Washington. Additionally, each coded wire tag (CWT) received from outside sources was verified for reading accuracy prior to entry into the database. Snouts recieved from spawning ground surveys were dissected for CWT removal and reading at the Lower Granite Dam NMFS facility.

RESULTS AND DISCUSSION

Observed recoveries of adult sockeye salmon marked as juveniles with CWTs in 1987-88 are listed by recovery area in Appendix Tables 1.0 through 6.2. Returns for both study years are incomplete. In 1989, 741 adults were recovered from all sources combined. Statistical procedures will not be applied to these data until returns are complete.

Adult recovery rates were highest for the trucked and trucked/barged groups and lowest for the control groups at all primary recovery sites (Table 1). For the respective groups, the recovery rates at Bonneville Dam were 0.77, 0.39, and 0.07%. At Priest Rapids Dam, they were 0.76, 0.50, and 0.23%, and on the spawning grounds 0.32, 0.25, and 0.09%. Return rates for the trucked group were similar to the high returns recorded for the same group for the 1985 study year, whereas the return rates for the control group were much lower (Carlson et al. 1988).

Carlson et al. (1988) also noted for the 1985 study year that return rates of trucked fish increased for marked groups of juveniles released as the outmigration season progressed, while return rates of control fish decreased. The same general trend is apparent for the 1987 study year. The reason for this phenomenon is unknown. However, the spawning ground surveys conducted in 1989 showed that the earlier releases in the 1987 study year were composed primarily of Wenatchee River fish whereas the later releases were composed primarily of Okanogan River fish (Table 2). As smolts, Wenatchee River fish arrive at Priest Rapids Dam earlier and are smaller than their Okanogan River counterparts. One could speculate that early in the season, the less physiologically developed Wenatchee River fish that were transported arrived at the ocean too early for all individuals to successfully adapt to seawater. On the other hand, later in the outmigration season, predation may take a heavier toll on control fish (Reiman et al. 1986), while this would have less affect on transported fish.

Table 1.--The observed return and rate () for transport and control lots of sockeye salmon marked and released as juveniles in 1987 that were recovered as adults at Bonneville Dam, Priest Rapids Dam, and the spawning grounds in 1988-89.

Release site	Release dates	Number and percent recovered		
		Bonneville Dam	Priest Rapids Dam	Spawning grounds
Priest Rapids Dam (control)	22 Apr-6 May	3 (0.07)	24 (0.56)	5 (0.12)
	7-14 May	3 (0.06)	11 (0.20)	7 (0.13)
	15-23 May	7 (0.13)	8 (0.15)	4 (0.08)
	24-25 May	1 (0.02)	2 (0.04)	2 (0.04)
	27 May-2 Jun	<u>2 (0.09)</u>	<u>12 (0.28)</u>	<u>4 (0.09)</u>
	Totals (average)	16 (0.07)	57 (0.23)	22 (0.09)
Bonneville Dam (truck & barge)	24 Apr-7 May	18 (0.35)	14 (0.28)	4 (0.08)
	8-21 May	14 (0.26)	14 (0.26)	7 (0.13)
	21-25 May	24 (0.46)	28 (0.54)	19 (0.36)
	25-27 May	22 (0.42)	41 (0.78)	14 (0.28)
	27 May-2 Jun	<u>17 (0.48)</u>	<u>26 (0.74)</u>	<u>16 (0.45)</u>
	Totals (average)	95 (0.39)	123 (0.50)	60 (0.25)
Bonneville Dam (truck only)	27 Apr-5 May	44 (0.88)	25 (0.50)	8 (0.16)
	6-17 May	30 (0.63)	24 (0.51)	5 (0.11)
	18-24 May	55 (1.05)	56 (1.07)	28 (0.54)
	24-26 May	35 (0.67)	62 (1.20)	28 (0.54)
	27 May-4 Jun	<u>21 (0.53)</u>	<u>17 (0.43)</u>	<u>8 (0.20)</u>
	Totals (average)	185 (0.77)	184 (0.76)	77 (0.32)

Table 2.--Numbers of adult sockeye salmon recovered from spawning ground surveys in 1989 in the Wenatchee and Okanogan River systems. Fish were marked as smolts at Priest Rapids Dam in 1987 for transportation research.

Release dates	Test group	Wenatchee River system	Okanogan River system	Total
22 Apr- 7 May	Control	7	0	7
24 Apr- 7 May	Truck/barge	4	0	4
27 Apr- 5 May	Truck	8	0	8
7 May-14 May	Control	6	1	7
8 May-21 May	Truck/barge	5	2	7
6 May-17 May	Truck	5	0	5
15 May-23 May	Control	1	3	4
21 May-25 May	Truck/barge	3	16	19
18 May-24 May	Barge	3	25	28
24 May-25 May	Control	0	2	2
25 May-27 May	Truck/barge	0	14	14
24 May-26 May	Truck	0	28	28
27 May- 2 Jun	Control	0	5	5
27 May- 2 Jun	Truck/barge	1	15	16
27 May- 4 Jun	Truck	2	6	8
	Totals	42	117	159

Returns of 1-ocean age adults from the 1988 study-year are few. Only six total recoveries have been entered into the database so far--two from each of the three groups. Returns of these fish should increase considerably next year.

SUMMARY

1. Returns of adult sockeye salmon marked as juveniles at Priest Rapids Dam for transport research purposes in 1987-88 are preliminary. So far, returns to recovery areas are highest for the trucked groups followed by the trucked/barged groups and lowest for the control groups.
2. Adult return rates for the trucked groups increased as the outmigration progressed, while adult return rates for control groups decreased. There is evidence from spawning ground recoveries that differences in stock performance may account for this observation.

LITERATURE CITED

- Carlson, C. D., S. Achord, G. M. Matthews, D. E. Weitkamp, R. P. Whitman, R. Raleigh, and D. Chapman.
 1988. Fish transportation studies Priest Rapids Dam, 1987. Public Utility District No. 2 of Grant County, Ephrata, Washington. 34 p. plus Appendix.
- Carlson, C. D., G. M. Matthews, D. E. Weitkamp, R. P. Whitman, R. Raleigh, and D. Chapman.
 1989. Fish transportation studies Priest Rapids Dam, 1988. Public Utility District No. 2 of Grant County, Ephrata, Washington. 26 p. plus Appendix.
- Durkin, J. T., W. J. Ebel, and J. R. Smith.
 1969. A device to detect magnetized wire tags in migrating adult coho salmon. J. Fish. Res. Board Can. 26:3083-3088.
- Reiman, B. E., A. A. Nigro, S. Vigg, H. L. Hansel, and D. E. Palmer.
 1986. Preliminary estimates of loss of juvenile anadromous salmonids to predators in John Day reservoir and development of a predation model. Interim Report to Bonneville Power Administration, Contracts DE-A179-82BP34796 and DE-A179-82BP35097, Portland, Oregon. 48 p. plus Appendix.

APPENDIX
Data Summaries

Appendix Table 1.0.--Summary of recoveries of adult sockeye salmon released as juveniles below Priest Rapids Dam in 1987.

Master File Date : 12 December 1989
 RELEASE GROUPS INCLUDED: 8703A 8703B 8703C 8703D 8703E

1987 P.RAPIDS TRANS CONTROL BELOW P.RAPIDS
SOCKEYE

Brands Used: LAW 1 LAW 2 LAW 3 LAW 4 LAZ 1
 Wire Codes Used: 232032 232035 232038 232041 232044

NUMBER RELEASED: 24490

RECOVERY AREA	1987	YEAR OF RETURN		TOTAL	% RETURN
		1988	1989		
RIVER SYSTEM TRAPS					
BONNEVILLE TRAP	0	0	16	16	0.065
MCNARY TRAP	0	0	0	0	0.000
LOWER GRANITE TRAP	0	0	0	0	0.000
PRIEST RAPIDS TRAP	0	0	57	57	0.233
OCEAN FISHERIES	0	0	0	0	0.000
RIVER SPORT					
COLUMBIA R. BELOW SNAKE R.	0	0	0	0	0.000
COLUMBIA R. ABOVE SNAKE R.	0	0	1	1	0.004
WENATCHEE R.	0	0	0	0	0.000
SNAKE R.	0	0	0	0	0.000
RIVER COMMERCIAL	0	0	0	0	0.000
INDIAN FISHERY	0	0	0	0	0.000
HATCHERIES	0	0	0	0	0.000
STREAM SURVEY					
OTHER STREAMS	0	0	22	22	0.090
TOTALS	0	0	96	96	0.392
PERCENT OF RECOVERY	%	0.0	0.0	100.0	

**Appendix Table 1.1--Recoveries of adult sockeye salmon released as juveniles below
Priest Rapids Dam from 22 April to 6 May 1987.**

Master File Date : 12 December 1989
RELEASE GROUPS INCLUDED: 8703A

1987 P.RAPIDS TRANS CONTROL BELOW P.RAPIDS
SOCKEYE

Brands Used: LAW 1
Wire Codes Used: 232032

NUMBER RELEASED: 4306

RECOVERY AREA	1987	YEAR OF RETURN		TOTAL	% RETURN
		1988	1989		
RIVER SYSTEM TRAPS					
BONNEVILLE TRAP	0	0	3	3	0.070
MCNARY TRAP	0	0	0	0	0.000
LOWER GRANITE TRAP	0	0	0	0	0.000
PRIEST RAPIDS TRAP	0	0	24	24	0.557
OCEAN FISHERIES	0	0	0	0	0.000
RIVER SPORT	0	0	0	0	0.000
RIVER COMMERCIAL	0	0	0	0	0.000
INDIAN FISHERY	0	0	0	0	0.000
HATCHERIES	0	0	0	0	0.000
STREAM SURVEY					
OTHER STREAMS	0	0	5	5	0.116
 TOTALS	 0	 0	 32	 32	 0.743
PERCENT OF RECOVERY	%	0.0	0.0	100.0	

**Appendix Table 1.2.--Recoveries of adult sockeye salmon released as juveniles below
Priest Rapids Dam from 7-14 May 1987.**

Master File Date : 12 December 1989
RELEASE GROUPS INCLUDED: 87038

**1987 P.RAPIDS TRANS CONTROL BELOW P.RAPIDS
SOCKEYE**

Brands Used: LAW 2
Wire Codes Used: 232035

NUMBER RELEASED: 5420

RECOVERY AREA	1987	YEAR OF RETURN		TOTAL	% RETURN
		1988	1989		
RIVER SYSTEM TRAPS					
BONNEVILLE TRAP	0	0	3	3	0.055
MCNARY TRAP	0	0	0	0	0.000
LOWER GRANITE TRAP	0	0	0	0	0.000
PRIEST RAPIDS TRAP	0	0	11	11	0.203
OCEAN FISHERIES	0	0	0	0	0.000
RIVER SPORT	0	0	0	0	0.000
RIVER COMMERCIAL	0	0	0	0	0.000
INDIAN FISHERY	0	0	0	0	0.000
HATCHERIES	0	0	0	0	0.000
STREAM SURVEY					
OTHER STREAMS	0	0	7	7	0.129
TOTALS	0	0	21	21	0.387
PERCENT OF RECOVERY	%	0.0	0.0	100.0	

**Appendix Table 1.3.--Recoveries of adult sockeye salmon released as juveniles below
Priest Rapids Dam from 15-23 May 1987.**

Master File Date : 12 December 1989
RELEASE GROUPS INCLUDED: 8703C

**1987 P. RAPIDS TRANS CONTROL BELOW P. RAPIDS
SOCKEYE**

Brands Used: LAW 3
Wire Codes Used: 232038

NUMBER RELEASED: 5349

RECOVERY AREA	1987	YEAR OF RETURN		TOTAL	% RETURN
		1988	1989		
RIVER SYSTEM TRAPS					
BONNEVILLE TRAP	0	0	7	7	0.131
MCNARY TRAP	0	0	0	0	0.000
LOWER GRANITE TRAP	0	0	0	0	0.000
PRIEST RAPIDS TRAP	0	0	8	8	0.150
OCEAN FISHERIES	0	0	0	0	0.000
RIVER SPORT	0	0	0	0	0.000
RIVER COMMERCIAL	0	0	0	0	0.000
INDIAN FISHERY	0	0	0	0	0.000
HATCHERIES	0	0	0	0	0.000
STREAM SURVEY					
OTHER STREAMS	0	0	4	4	0.075
TOTALS	0	0	19	19	0.355
PERCENT OF RECOVERY	%	0.0	0.0	100.0	

**Appendix Table 1.4.--Recoveries of adult sockeye salmon released as juveniles below
Priest Rapids Dam from 24-25 May 1987.**

Master File Date : 12 December 1989
RELEASE GROUPS INCLUDED: 8703D

**1987 P.RAPIDS TRANS CONTROL BELOW P.RAPIDS
SOCKEYE**

Brands Used: LAW 4
Wire Codes Used: 232041

NUMBER RELEASED: 5050

RECOVERY AREA	1987	YEAR OF RETURN		TOTAL	% RETURN
		1988	1989		
RIVER SYSTEM TRAPS					
BONNEVILLE TRAP	0	0	1	1	0.020
MCNARY TRAP	0	0	0	0	0.000
LOWER GRANITE TRAP	0	0	0	0	0.000
PRIEST RAPIDS TRAP	0	0	2	2	0.040
OCEAN FISHERIES	0	0	0	0	0.000
RIVER SPORT	0	0	0	0	0.000
RIVER COMMERCIAL	0	0	0	0	0.000
INDIAN FISHERY	0	0	0	0	0.000
HATCHERIES	0	0	0	0	0.000
STREAM SURVEY					
OTHER STREAMS	0	0	2	2	0.040
TOTALS	0	0	5	5	0.099
PERCENT OF RECOVERY	%	0.0	0.0	100.0	

**Appendix Table 1.5.--Recoveries of adult sockeye salmon released as juveniles below
Priest Rapids Dam from 27 May to 2 June 1987.**

Master File Date : 12 December 1989
RELEASE GROUPS INCLUDED: 8703E

**1987 P.RAPIDS TRANS CONTROL BELOW P.RAPIDS
SOCKEYE**

Brands Used: LAZ 1
Wire Codes Used: 232044

NUMBER RELEASED: 4365

RECOVERY AREA	1987	YEAR OF RETURN		TOTAL	% RETURN
		1988	1989		
RIVER SYSTEM TRAPS					
BONNEVILLE TRAP	0	0	2	2	0.046
MCNARY TRAP	0	0	0	0	0.000
LOWER GRANITE TRAP	0	0	0	0	0.000
PRIEST RAPIDS TRAP	0	0	12	12	0.275
OCEAN FISHERIES	0	0	0	0	0.000
RIVER SPORT					
COLUMBIA R. BELOW SNAKE R.	0	0	0	0	0.000
COLUMBIA R. ABOVE SNAKE R.	0	0	1	1	0.023
WENATCHEE R.	0	0	0	0	0.000
SNAKE R.	0	0	0	0	0.000
RIVER COMMERCIAL	0	0	0	0	0.000
INDIAN FISHERY	0	0	0	0	0.000
HATCHERIES	0	0	0	0	0.000
STREAM SURVEY					
OTHER STREAMS	0	0	4	4	0.092
TOTALS	0	0	19	19	0.435
PERCENT OF RECOVERY	%	0.0	0.0	100.0	

Appendix Table 2.0.--Summary of recoveries of adult sockeye salmon transported as juveniles by barge and released below Bonneville Dam in 1987.

Master File Date : 12 December 1989
 RELEASE GROUPS INCLUDED: 8705A 8705B 8705C 8705D 8705E

**1987 P. RAPIDS TRANS TEST/BARGE BELOW BONNEVILLE
 SOCKEYE**

Brands Used: RAY 1 RAY 2 RAY 3 RAY 4 RAH 1
 Wire Codes Used: 232033 232036 232039 232042 232045

NUMBER RELEASED: 24503

RECOVERY AREA	1987	YEAR OF RETURN		TOTAL	% RETURN
		1988	1989		
RIVER SYSTEM TRAPS					
BONNEVILLE TRAP	0	2	93	95	0.389
MCNARY TRAP	0	0	0	0	0.000
LOWER GRANITE TRAP	0	0	1	1	0.004
PRIEST RAPIDS TRAP	0	4	119	123	0.502
OCEAN FISHERIES	0	0	0	0	0.000
RIVER SPORT	0	0	0	0	0.000
RIVER COMMERCIAL	0	0	0	0	0.000
INDIAN FISHERY	0	0	0	0	0.000
HATCHERIES	0	0	0	0	0.000
STREAM SURVEY					
OTHER STREAMS	0	4	56	60	0.245
TOTALS	0	10	269	279	1.139
PERCENT OF RECOVERY	%	0.0	3.6	96.4	

**Appendix Table 2.1.--Recoveries of adult sockeye salmon transported as juveniles by
barge and released below Bonneville Dam from 24 April to 7 May
1987.**

Master File Date : 12 December 1989
RELEASE GROUPS INCLUDED: 8705A

**1987 P. RAPIDS TRANS TEST/BARGE BELOW BONNEVILLE
SOCKEYE**

Brands Used: RAY 1
Wire Codes Used: 232033

NUMBER RELEASED: 5093

RECOVERY AREA	1987	YEAR OF RETURN		TOTAL	% RETURN
		1988	1989		
RIVER SYSTEM TRAPS					
BONNEVILLE TRAP	0	0	18	18	0.353
MCNARY TRAP	0	0	0	0	0.000
LOWER GRANITE TRAP	0	0	0	0	0.000
PRIEST RAPIDS TRAP	0	1	13	14	0.275
OCEAN FISHERIES	0	0	0	0	0.000
RIVER SPORT	0	0	0	0	0.000
RIVER COMMERCIAL	0	0	0	0	0.000
INDIAN FISHERY	0	0	0	0	0.000
HATCHERIES	0	0	0	0	0.000
STREAM SURVEY					
OTHER STREAMS	0	0	4	4	0.079
TOTALS	0	1	35	36	0.707
PERCENT OF RECOVERY	%	0.0	2.8	97.2	

**Appendix Table 2.2.--Recoveries of adult sockeye salmon transported as juveniles by
barge and released below Bonneville Dam from 8-21 May 1987.**

Master File Date : 12 December 1989
RELEASE GROUPS INCLUDED: 8705B

**1987 P. RAPIDS TRANS TEST/BARGE BELOW BONNEVILLE
SOCKEYE**

Brands Used: RAY 2
Wire Codes Used: 232036

NUMBER RELEASED: 5434

RECOVERY AREA	1987	YEAR OF RETURN		TOTAL	% RETURN
		1988	1989		
RIVER SYSTEM TRAPS					
BONNEVILLE TRAP	0	0	14	14	0.258
MCNARY TRAP	0	0	0	0	0.000
LOWER GRANITE TRAP	0	0	0	0	0.000
PRIEST RAPIDS TRAP	0	1	13	14	0.258
OCEAN FISHERIES	0	0	0	0	0.000
RIVER SPORT	0	0	0	0	0.000
RIVER COMMERCIAL	0	0	0	0	0.000
INDIAN FISHERY	0	0	0	0	0.000
HATCHERIES	0	0	0	0	0.000
STREAM SURVEY					
OTHER STREAMS	0	1	6	7	0.129
TOTALS	0	2	33	35	0.644
PERCENT OF RECOVERY	%	0.0	5.7	94.3	

Appendix Table 2.3.--Recoveries of adult sockeye salmon transported as juveniles by barge and released below Bonneville Dam from 21-25 May 1987.

Master File Date : 12 December 1989
RELEASE GROUPS INCLUDED: 87050

**1987 P. RAPIDS TRANS TEST/BARGE BELOW BONNEVILLE
SOCKEYE**

Brands Used: RAY 3
Wire Codes Used: 232039

NUMBER RELEASED: 5216

RECOVERY AREA	1987	YEAR OF RETURN		TOTAL	% RETURN
		1988	1989		
RIVER SYSTEM TRAPS					
BONNEVILLE TRAP	0	1	23	24	0.460
MCNARY TRAP	0	0	0	0	0.000
LOWER GRANITE TRAP	0	0	0	0	0.000
PRIEST RAPIDS TRAP	0	0	28	28	0.537
OCEAN FISHERIES	0	0	0	0	0.000
RIVER SPORT	0	0	0	0	0.000
RIVER COMMERCIAL	0	0	0	0	0.000
INDIAN FISHERY	0	0	0	0	0.000
HATCHERIES	0	0	0	0	0.000
STREAM SURVEY					
OTHER STREAMS	0	1	18	19	0.364
TOTALS	0	2	69	71	1.361
PERCENT OF RECOVERY	%	0.3	2.8	97.2	

**Appendix Table 2.4.--Recoveries of adult sockeye salmon transported as juveniles by
barge and released below Bonneville Dam from 25-27 May 1987.**

Master File Date : 12 December 1989
RELEASE GROUPS INCLUDED: 8705D

**1987 P. RAPIDS TRANS TEST/BARGE BELOW BONNEVILLE
SOCKEYE**

Brands Used: RAY 4
Wire Codes Used: 232042

NUMBER RELEASED: 5239

RECOVERY AREA	1987	YEAR OF RETURN		TOTAL	% RETURN
		1988	1989		
RIVER SYSTEM TRAPS					
BONNEVILLE TRAP	0	0	22	22	0.420
MCNARY TRAP	0	0	0	0	0.000
LOWER GRANITE TRAP	0	0	0	0	0.000
PRIEST RAPIDS TRAP	0	2	39	41	0.733
OCEAN FISHERIES	0	0	0	0	0.000
RIVER SPORT	0	0	0	0	0.000
RIVER COMMERCIAL	0	0	0	0	0.000
INDIAN FISHERY	0	0	0	0	0.000
HATCHERIES	0	0	0	0	0.000
STREAM SURVEY					
OTHER STREAMS	0	1	13	14	0.267
TOTALS	0	3	74	77	1.470
PERCENT OF RECOVERY	%	0.0	3.9	96.1	

Appendix Table 2.5.--Recoveries of adult sockeye salmon transported as juveniles by barge and released below Bonneville Dam from 27 May to 2 June 1987.

Master File Date : 12 December 1989
RELEASE GROUPS INCLUDED: 8705E

**1987 P. RAPIDS TRANS TEST/BARGE BELOW BONNEVILLE
SOCKEYE**

Brands Used: RAH 1
Wire Codes Used: 232045

NUMBER RELEASED: 3524

RECOVERY AREA	1987	YEAR OF RETURN		TOTAL	% RETURN
		1988	1989		
RIVER SYSTEM TRAPS					
BONNEVILLE TRAP	0	1	16	17	0.482
MCNARY TRAP	0	0	0	0	0.000
LOWER GRANITE TRAP	0	0	1	1	0.023
PRIEST RAPIDS TRAP	0	0	26	26	0.738
OCEAN FISHERIES	0	0	0	0	0.000
RIVER SPORT	0	0	0	0	0.000
RIVER COMMERCIAL	0	0	0	0	0.000
INDIAN FISHERY	0	0	0	0	0.000
HATCHERIES	0	0	0	0	0.000
STREAM SURVEY					
OTHER STREAMS	0	1	15	16	0.454
TOTALS	0	2	58	60	1.703
PERCENT OF RECOVERY	%	0.0	3.3	96.7	

Appendix Table 3.0.--Summary of recoveries of adult sockeye salmon transported as juveniles by truck and released below Bonneville Dam in 1987.

Master File Date : 12 December 1989

RELEASE GROUPS INCLUDED: 8704A 8704B 8704C 8704D 8704E

**1987 P. RAPIDS TRANS TEST/TRUCK CORBETT STATION
SOCKEYE**

Brands Used: RAK 1 RAK 2 RAK 3 RAK 4 RAS 1
Wire Codes Used: 232034 232037 232040 232043 232046

NUMBER RELEASED: 24175

RECOVERY AREA	1987	YEAR OF RETURN		TOTAL	% RETURN
		1988	1989		
RIVER SYSTEM TRAPS					
BONNEVILLE TRAP	0	1	184	185	0.765
MCNARY TRAP	0	0	0	0	0.000
LOWER GRANITE TRAP	0	0	0	0	0.000
PRIEST RAPIDS TRAP	0	6	178	184	0.761
OCEAN FISHERIES	0	0	0	0	0.000
RIVER SPORT					
COLUMBIA R. BELOW SNAKE R.	0	0	0	0	0.000
COLUMBIA R. ABOVE SNAKE R.	0	0	1	1	0.004
WENATCHEE R.	0	0	0	0	0.000
SNAKE R.	0	0	0	0	0.000
RIVER COMMERCIAL	0	0	0	0	0.000
INDIAN FISHERY					
SUMMER INDIAN NET	0	0	2	2	0.008
HATCHERIES	0	0	0	0	0.000
STREAM SURVEY					
BIG WHITE SALMON R.	0	0	1	1	0.004
OTHER STREAMS	0	0	77	77	0.319
OTHER	0	0	1	1	0.004
TOTALS	0	7	444	451	1.866
PERCENT OF RECOVERY	%	0.0	1.6	98.4	

Appendix Table 3.1.--Recoveries of adult sockeye salmon transported as juveniles by truck and released below Bonneville Dam from 27 April to 5 May 1987.

Master File Date : 12 December 1989
RELEASE GROUPS INCLUDED: 8704A

1987 P. RAPIDS TRANS TEST/TRUCK CORBETT STATION
SOCKEYE

Brands Used: RAK 1
Wire Codes Used: 232034

NUMBER RELEASED: 5013

RECOVERY AREA	1987	YEAR OF RETURN		TOTAL	% RETURN
		1988	1989		
RIVER SYSTEM TRAPS					
BONNEVILLE TRAP	0	0	44	44	0.878
MCNARY TRAP	0	0	0	0	0.000
LOWER GRANITE TRAP	0	0	0	0	0.000
PRIEST RAPIDS TRAP	0	0	25	25	0.499
OCEAN FISHERIES	0	0	0	0	0.000
RIVER SPORT	0	0	0	0	0.000
RIVER COMMERCIAL	0	0	0	0	0.000
INDIAN FISHERY	0	0	0	0	0.000
HATCHERIES	0	0	0	0	0.000
STREAM SURVEY					
BIG WHITE SALMON R.	0	0	1	1	0.020
OTHER STREAMS	0	0	0	0	0.160
TOTALS	0	0	78	78	1.556
PERCENT OF RECOVERY	%	0.0	0.0	100.0	

Appendix Table 3.2.--Recoveries of adult sockeye salmon transported as juveniles by truck and released below Bonneville Dam from 6-17 May 1987.

Master File Date : 12 December 1989
RELEASE GROUPS INCLUDED: 87048

**1987 P. RAPIDS TRANS TEST/TRUCK CORBETT STATION
SOCKEYE**

Brands Used: RAK 2
Wire Codes Used: 232037

NUMBER RELEASED: 4743

RECOVERY AREA	1987	YEAR OF RETURN		TOTAL	% RETURN
		1988	1989		
RIVER SYSTEM TRAPS					
BONNEVILLE TRAP	0	0	30	30	0.633
MCNARY TRAP	0	0	0	0	0.000
LOWER GRANITE TRAP	0	0	0	0	0.000
PRIEST RAPIDS TRAP	0	0	24	24	0.506
OCEAN FISHERIES	0	0	0	0	0.000
RIVER SPORT	0	0	0	0	0.000
RIVER COMMERCIAL	0	0	0	0	0.000
INDIAN FISHERY	0	0	0	0	0.000
HATCHERIES	0	0	0	0	0.000
STREAK SURVEY					
OTHER STREAMS	0	0	5	5	0.105
TOTALS	0	0	59	59	1.244
PERCENT OF RECOVERY	%	0.0	0.0	100.0	

**Appendix Table 3.3.--Recoveries of adult sockeye salmon transported as juveniles by
truck and released below Bonneville Dam from 18-24 May 1987.**

Master File Date : 12 December 1989
RELEASE GROUPS INCLUDED: 8784C

**1987 P. RAPIDS TRANS TEST/TRUCK CORBETT STATION
SOCKEYE**

Brands Used: RAK 3
Wire Codes Used: 232040

NUMBER RELEASED: 5223

RECOVERY AREA	1987	YEAR OF RETURN		TOTAL	% RETURN
		1988	1989		
RIVER SYSTEM TRAPS					
BONNEVILLE TRAP	0	0	55	55	1.054
MCNARY TRAP	0	0	0	0	0.000
LOWER GRANITE TRAP	0	0	0	0	0.000
PRIEST RAPIDS TRAP	0	5	51	56	1.073
OCEAN FISHERIES	0	0	0	0	0.000
RIVER SPORT	0	0	0	0	0.000
RIVER COMMERCIAL	0	0	0	0	0.000
INDIAN FISHERY	0	0	0	0	0.000
HATCHERIES	0	0	0	0	0.000
STREAM SURVEY					
OTHER STREAMS	0	0	28	28	0.536
OTHER	0	0	1	1	0.019
TOTALS	0	5	135	140	2.682
PERCENT OF RECOVERY	%	0.0	3.6	96.4	

Appendix Table 3.4.--Recoveries of adult sockeye salmon transported as juveniles by truck and released below Bonneville Dam from 24-26 May 1987.

Master File Date : 12 December 1989
RELEASE GROUPS INCLUDED: 87040

1987 P. RAPIDS TRANS TEST/TRUCK CORBETT STATION
SOCKEYE

Brands Used: RAK 4
Wire Codes Used: 232043

NUMBER RELEASED: 5207

RECOVERY AREA	1987	YEAR OF RETURN		TOTAL	% RETURN
		1988	1989		
RIVER SYSTEM TRAPS					
BONNEVILLE TRAP	0	0	35	35	0.672
MCNARY TRAP	0	0	0	0	0.000
LOWER GRANITE TRAP	0	0	0	0	0.000
PRIEST RAPIDS TRAP	0	0	62	62	1.191
OCEAN FISHERIES	0	0	0	0	0.000
RIVER SPORT					
COLUMBIA R. BELOW SNAKE R.	0	0	0	0	0.000
COLUMBIA R. ABOVE SNAKE R.	0	0	1	1	0.019
WENATCHEE R.	0	0	0	0	0.000
SNAKE R.	0	0	0	0	0.000
RIVER COMMERCIAL	0	0	0	0	0.000
INDIAN FISHERY					
SUMMER INDIAN NET	0	0	1	1	0.019
HATCHERIES	0	0	0	0	0.000
STREAK SURVEY					
OTHER STREAMS	0	0	28	28	0.538
TOTALS	0	0	127	127	2.439
PERCENT OF RECOVERY	%	0.0	0.0	100.0	

Appendix Table 3.5.--Recoveries of adult sockeye salmon transported as juveniles by truck and released below Bonneville Dam from 27 May to 4 June 1987.

Master File Date : 12 December 1989
RELEASE GROUPS INCLUDED: 8704E

1987 P. RAPIDS TRANS TEST/TRUCK CORBETT STATION
SOCKEYE

Brands Used: RAS 1
Wire Codes Used: 232046

NUMBER RELEASED: 3992

RECOVERY AREA	1987	YEAR OF RETURN		TOTAL	% RETURN
		1988	1989		
RIVER SYSTEM TRAPS					
BONNEVILLE TRAP	0	1	20	21	0.526
MCNARY TRAP	0	0	0	0	0.000
LOWER GRANITE TRAP	0	0	0	0	0.000
PRIEST RAPIDS TRAP	0	1	16	17	0.426
OCEAN FISHERIES	0	0	0	0	0.000
RIVER SPORT	0	0	0	0	0.000
RIVER COMMERCIAL	0	0	0	0	0.000
INDIAN FISHERY					
SUMMER INDIAN NET	0	0	1	1	0.025
HATCHERIES	0	0	0	0	0.000
STREAM SURVEY					
OTHER STREAMS	0	0	8	8	0.200
TOTALS	0	2	45	47	1.177
PERCENT OF RECOVERY	%	0.0	4.3	95.7	

Appendix Table 4.0.--Summary of recoveries of adult sockeye salmon released as juveniles below Priest Rapids Dam in 1988.

Master File Date : 12 December 1989
 RELEASE GROUPS INCLUDED: 8811A 8811B 8811C 8811D 8811E

1988 P. RAPIDS TRANS CONTROL BELOW P. RAPIDS
 SOCKEYE

Brands Used: LAJ 1 LAJ 2 LAJ 3 LAJ 4 LAT 1
 Wire Codes Used: 232330 232333 232336 232339 232342

NUMBER RELEASED: 16079

RECOVERY AREA	1988	YEAR OF RETURN 1989	TOTAL	% RETURN
RIVER SYSTEM TRAPS				
BONNEVILLE TRAP	0	1	1	0.006
MCNARY TRAP	0	0	0	0.000
LOWER GRANITE TRAP	0	0	0	0.000
PRIEST RAPIDS TRAP	0	1	1	0.006
OCEAN FISHERIES	0	0	0	0.000
RIVER SPORT	0	0	0	0.000
RIVER COMMERCIAL	0	0	0	0.000
INDIAN FISHERY	0	0	0	0.000
HATCHERIES	0	0	0	0.000
STREAM SURVEY	0	0	0	0.000
TOTALS	0	2	2	0.011
PERCENT OF RECOVERY	%	0.0	100.0	

Appendix Table 4.1.--Recoveries of adult sockeye salmon released as juveniles below Priest Rapids Dam from 2-8 June 1988.

Master File Date : 12 December 1989
RELEASE GROUPS INCLUDED: 8811E

1988 P. RAPIDS TRANS CONTROL BELOW P. RAPIDS
SOCKEYE

Brands Used: LAT 1
Wire Codes Used: 232342

NUMBER RELEASED: 762

RECOVERY AREA	1988	YEAR OF RETURN 1989	TOTAL	% RETURN
RIVER SYSTEM TRAPS				
BONNEVILLE TRAP	0	1	1	0.131
MCNARY TRAP	0	0	0	0.000
LOWER GRANITE TRAP	0	0	0	0.000
PRIEST RAPIDS TRAP	0	1	1	0.131
OCEAN FISHERIES	0	0	0	0.000
RIVER SPORT	0	0	0	0.000
RIVER COMMERCIAL	0	0	0	0.000
INDIAN FISHERY	0	0	0	0.000
HATCHERIES	0	0	0	0.000
STREAM SURVEY	0	0	0	0.000
TOTALS	0	2	2	0.262
PERCENT OF RECOVERY	% 0.0	100.0		

Appendix Table 5.0.--Summary of recoveries of adult sockeye salmon transported as juveniles by barge and released below Bonneville Dam in 1988.

Master File Date : 12 December 1989
RELEASE GROUPS INCLUDED: 8812A 8812B 8812C

1988 P. RAPIDS

TRANS BARGE
SOCKEYE

BELOW BONNEVILLE

Brands Used: RAR 1 RAR 2 RAR 3
Wire Codes Used: 232331 232334 232337

NUMBER RELEASED: 10770

RECOVERY AREA	1988	YEAR OF RETURN 1989	TOTAL	% RETURN
RIVER SYSTEM TRAPS				
BONNEVILLE TRAP	0	2	2	0.019
MCNARY TRAP	0	0	0	0.000
LOWER GRANITE TRAP	0	0	0	0.000
PRIEST RAPIDS TRAP	0	0	0	0.000
OCEAN FISHERIES	0	0	0	0.000
RIVER SPORT	0	0	0	0.000
RIVER COMMERCIAL	0	0	0	0.000
INDIAN FISHERY	0	0	0	0.000
HATCHERIES	0	0	0	0.000
STREAM SURVEY	0	0	0	0.000
TOTALS	0	2	2	0.019
PERCENT OF RECOVERY	%	0.0	100.0	

Appendix Table 5.1.--Recoveries of adult sockeye salmon transported as juveniles by barge and released below Bonneville Dam from 17-27 May 1988.

Master File Date : 12 December 1989
RELEASE GROUPS INCLUDED: 8812C

1988 P. RAPIDS TRANS BARGE BELOW BONNEVILLE
SOCKEYE

Brands Used: RAR 3
Wire Codes Used: 232337

NUMBER RELEASED: 2139

RECOVERY AREA	1988	YEAR OF RETURN 1989	TOTAL	% RETURN
RIVER SYSTEM TRAPS				
BONNEVILLE TRAP	0	2	2	0.094
MCNARY TRAP	0	0	0	0.000
LOWER GRANITE TRAP	0	0	0	0.000
FRIEST RAPIDS TRAP	0	0	0	0.000
OCEAN FISHERIES	0	0	0	0.000
RIVER SPORT	0	0	0	0.000
RIVER COMMERCIAL	0	0	0	0.000
INDIAN FISHERY	0	0	0	0.000
HATCHERIES	0	0	0	0.000
STREAM SURVEY	0	0	0	0.000
TOTALS	0	2	2	0.094
PERCENT OF RECOVERY	%	0.0	100.0	

Appendix Table 6.0.--Summary of recoveries of adult sockeye salmon transported as juveniles by truck and released below Bonneville Dam in 1988.

Master File Date : 12 December 1989

RELEASE GROUPS INCLUDED: 8813A 8813B 8813C 8813D 8813E

**1988 P. RAPIDS TRANS TRUCK
SOCKEYE**

BELOW BONNEVILLE

Brands Used: RAV 1 RAV 2 RAV 3 RAV 4 RAL 1
Wire Codes Used: 232332 232335 232338 232341 232344

NUMBER RELEASED: 17731

RECOVERY AREA	1988	YEAR OF RETURN 1989	TOTAL	% RETURN
RIVER SYSTEM TRAPS				
BONNEVILLE TRAP	0	2	2	0.011
MCNARY TRAP	0	0	0	0.000
LOWER GRANITE TRAP	0	0	0	0.000
PRIEST RAPIDS TRAP	0	0	0	0.000
OCEAN FISHERIES	0	0	0	0.000
RIVER SPORT	0	0	0	0.000
RIVER COMMERCIAL	0	0	0	0.000
INDIAN FISHERY	0	0	0	0.000
HATCHERIES	0	0	0	0.000
STREAM SURVEY	0	0	0	0.000
TOTALS	0	2	2	0.011
PERCENT OF RECOVERY	%	0.0	100.0	

Appendix Table 6.1.--Recoveries of adult sockeye salmon transported as juveniles by truck and released below Bonneville Dam from 28 April to 2 May 1988.

Master File Date : 12 December 1989
RELEASE GROUPS INCLUDED: 8813A

1988 P. RAPIDS TRANS TRUCK BELOW BONNEVILLE
SOCKEYE

Brands Used: RAV 1
Wire Codes Used: 232332

NUMBER RELEASED: 5329

RECOVERY AREA	1988	YEAR OF RETURN 1989	TOTAL	% RETURN
RIVER SYSTEM TRAPS				
BONNEVILLE TRAP	0	1	1	0.019
MCNARY TRAP	0	0	0	0.000
LOWER GRANITE TRAP	0	0	0	0.000
PRIEST RAPIDS TRAP	0	0	0	0.000
OCEAN FISHERIES	0	0	0	0.000
RIVER SPORT	0	0	0	0.000
RIVER COMMERCIAL	0	0	0	0.000
INDIAN FISHERY	0	0	0	0.000
HATCHERIES	0	0	0	0.000
STREAM SURVEY	0	0	0	0.000
TOTALS	0	1	1	0.019
PERCENT OF RECOVERY	2	0.0	100.0	

Appendix Table 6.2.--Recoveries of adult sockeye salmon transported as juveniles by truck and released below Bonneville Dam from 10-14 May 1988.

Master File Date : 12 December 1989
RELEASE GROUPS INCLUDED: 8813C

1988 P. RAPIDS TRANS TRUCK BELOW BONNEVILLE
SOCKEYE

Brands Used: RAV 3
Wire Codes Used: 232338

NUMBER RELEASED: 5022

RECOVERY AREA	1988	YEAR OF RETURN 1989	TOTAL	% RETURN
RIVER SYSTEM TRAPS				
BONNEVILLE TRAP	0	1	1	0.020
MCNARY TRAP	0	0	0	0.000
LOWER GRANITE TRAP	0	0	0	0.000
PRIEST RAPIDS TRAP	0	0	0	0.000
OCEAN FISHERIES	0	0	0	0.000
RIVER SPORT	0	0	0	0.000
RIVER COMMERCIAL	0	0	0	0.000
INDIAN FISHERY	0	0	0	0.000
HATCHERIES	0	0	0	0.000
STREAM SURVEY	0	0	0	0.000
TOTALS	0	1	1	0.020
PERCENT OF RECOVERY	%	0.0	100.0	