Migrational Characteristics and Survival of Juvenile Salmonids Entering the Columbia River Estuary During 1983

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COASTAL ZONE AND ESTUARINE STUDIES

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ABSTRACT

Sampling of juvenile salmoids migrating into the Columbia River estuary was conducted in 1983 to evaluate behavior and survival and amass information important to restoration enhancement and protection of salmon. Beach and purse seines were fished at Jones Beach (RKm 75) in November and December 1982, late January - September 1983, and October through December 1983. In 1983, the total juvenile salmonid catch was 210,754 fish, of which 4.6% had marks. Summaries of mark recoveries with date ranges, average fork lengths, condition factors, and movement rates are presented as appendixes.

Updated evaluation of sampling efficiency changes in relation to river flow showed an average 11% decrease of catch for a 1000 m^3/s increase in flow. Catch adjustment for different river flows is important for comparisons between groups captured at different times.

Fall released hatchery fish generally migrated past Jones Beach in the fall, but large percentages of a few groups, often the smaller fish, overwintered in the river system upstream from Jones Beach and migrated the following spring.

Temporal distribution of spring and summer migrants in 1983 was similar to previous years. Peaks of migration past Jones Beach were 7-13 May for yearling chinook salmon; 14-20 May for coho salmon; 21-27 May for steelhead; and 4-20 May, 6-10 June, and 2-8 July for subyearling chinook salmon.

Increases of survival relative to control groups were observed for: coho and yearling chinook salmon groups released at a later than normal date, fall chinook salmon fed a high salt concentration diet, coho salmon

from Eagle Creek NFH reared at low density, and chinook salmon and steelhead transported downstream past dams.

Variation of adult recovery data among replicate mark groups showed a need for more in-depth documentation of rearing and release information prior to using adult recovery data to evaluate the significance of variations of juvenile catches.

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INTRODUCTION

To assist in evaluating salmonid fishery protection and enhancement activities in the Columbia River basin, the National Marine Fisheries Service (NMFS) began sampling the juvenile outmigrations entering the estuary at Jones Beach, Oregon, River Kilometer (RKm) 75 (Figure 1). Migrational behavior and comparative survival rates were evaluated. Sampling began in 1966 and continued annually through 1972[1/]; in 1977, sampling was reestablished with funds from the Pacific Northwest Regional Commission (PNRC) for 1977-1979 (Dawley et al. 1978, 1979, 1980). PNRC and NMFS funds were used to expand the 1980 sampling to examine juvenile migrations in the coastal waters of Washington and Oregon (Dawley et al. 1981; Miller et al. 1983). From 1981 to 1983, the Bonneville Power Administration (BPA) funded the project (Dawley et al. 1982, 1984). An extensive data base is required to understand catch patterns of experimental and control groups that vary with time and river flow. We believe the observations of survival trends must be examined on a system wide (Columbia River Basin) basis to diminish the variation between individual treatment groups.

OBJECTIVES

Current objectives were to provide an annual assessment of research and enhancement activities as outlined in portions of Sections 300, 400,

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1/ Sims, Carl W. August 1979. "Migrational characteristics of juvenile fall chinook salmon, Oncorhynchus tshawytscha, in the Columbia River." National Marine Fisheries Service, Coastal Zone and Estuarine Studies Division, 2725 Montlake Boulevard East, Seattle, WA 98112. Unpublished manuscript.

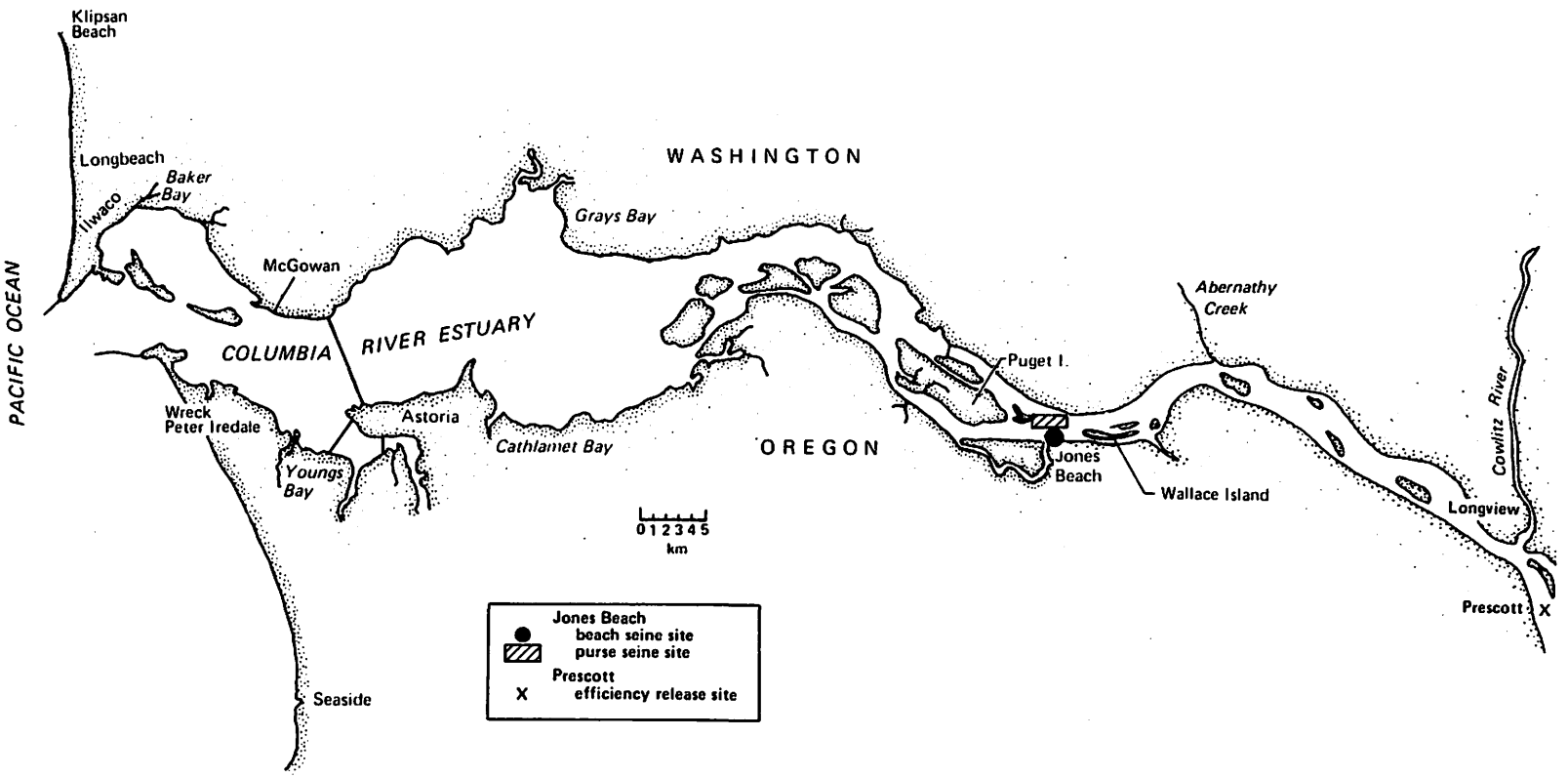

Figure 1.--Lower Columbia River and estuary; Jones Beach sampling site and Prescott release site are indicated at RKm 75 and 115, respectively.

and 700 of the Northwest Power Planning Council's Columbia River Basin Fish and Wildlife Program. The specific objectives were as follows:

1. Define migrational timing and movement rate from release location to the estuary for various stocks of salmonids.

2. Provide capture percentages for marked groups to estimate relative survival of juvenile migrants in relation to:

   a. Fish production at mitigation hatcheries.

   b. Juvenile bypass systems at dams.

   c. Transportation programs.

   d. Fish size, release site, and date.

   e. Survival to adulthood.

   f. River flows and electrical power production.

3. Amass information (examples listed below) on which NMFS and other agencies can partially base management and regulatory practices to expediently protect, enhance, and restore the fishery resources of the Columbia River.

   a. Examine stomach contents of tagged fish to determine the extent of inter- and intra-specific competition for food throughout the migration period and to relate stomach fullness to rate of survival to adulthood.

   b. Collect scales and tissue samples and make observations of disease incidence in order for other investigators to ascertain scale patterns prior to seawater entry, determine status of smoltification, and evaluate disease incidence following freshwater migration.

Objectives relating to relative survival were dependent on the number and types of marked groups released by fishery agencies. In 1983, marked

fish were released at various sites (Figure 2) for studies relating to fish size and release timing, nutrition, rearing density, stock composition, chemical prophylactics, passage at dams and through reservoirs, and transportation past dams. Data collected at Jones Beach were also used to improve the evaluation of the effects of river flow on sampling efficiency and survival of fall chinook salmon from hatchery release sites to the estuary.

This report describes sampling activities and results for fiscal years 1983 and 1984. Stomach content and fullness research will be presented in a separate report.

EXPERIMENTAL AREA AND METHODOLOGY

Beach and purse seines were used to sample juvenile salmonids at Jones Beach, Oregon, where the estuary is about 1.6 km wide with a 14-m deep central ship channel (Figure 3). Sampling procedures are described by Dawley et al. (1984).

Sampling was done during the spring and summer out-migration period (April-September) and the fall and winter out-migration period (November 1982-March 1983 and October-December 1983). Beach and purse seining efforts varied weekly (Appendix Tables A1 and A2) depending on the number of migrants present and the objectives for the sampling period. Efforts during the fall and winter of 1982-83 averaged seven beach seine sets and three purse seine sets/d, 5 d/week with a break from 14 December 1982 to 25 January 1982.[2/] In April 1983, effort was increased to eight to ten

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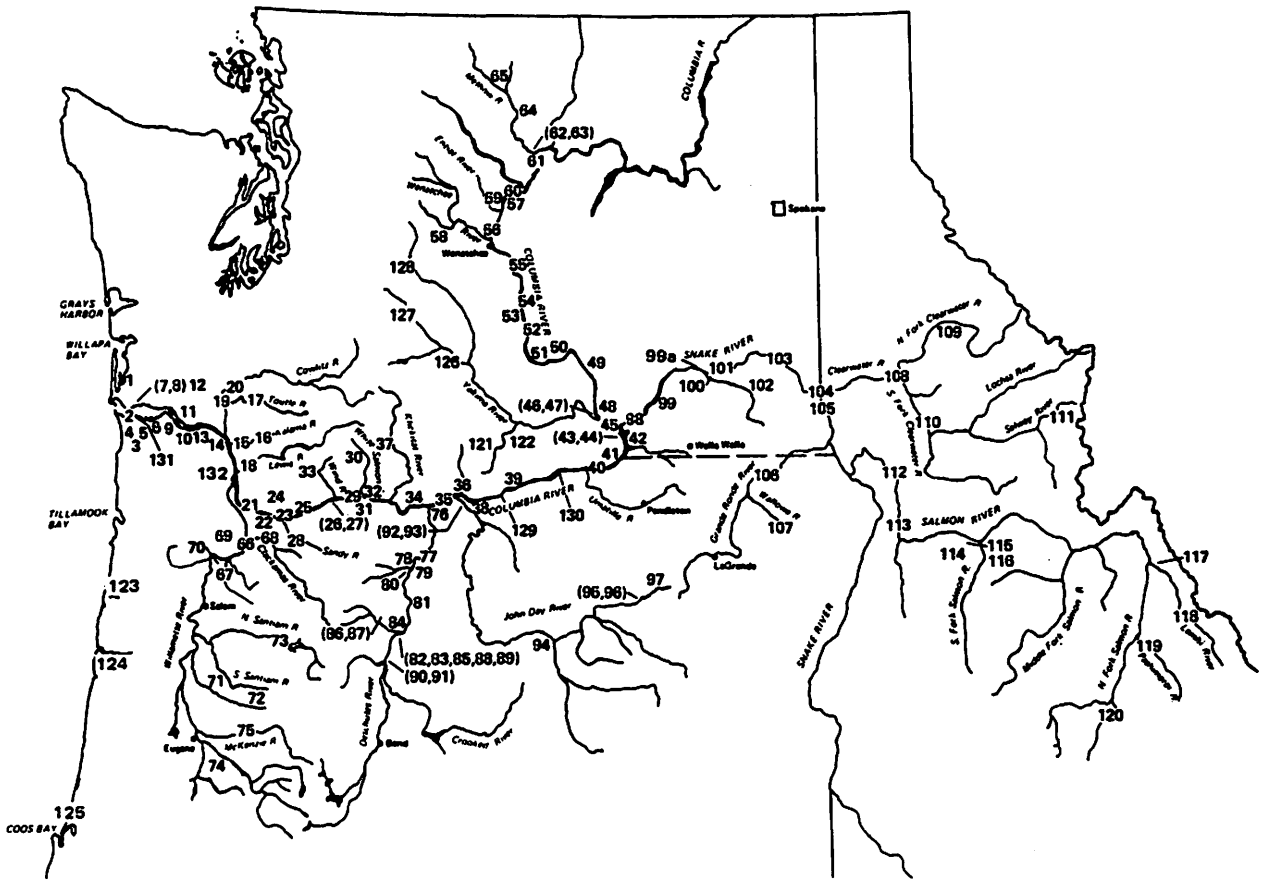
[2/]Juvenile sampling data obtained at Jones Beach in 1977 and 1978 indicated that few fish (two/set or less) would be captured from mid-December to February.



LEGEND

Release site	Rkm
LOWER COLUMBIA R & TRIBS.	
1. Chinook R Pd	11
2. Hammond Ore	13
3. Tucker Cr	29
4. Stavebolt Cr	34
5. Klaskanine R	37
6. Big Cr	49
7. Grays R@RM 13	57
8. Grays R@RM 21	68
9. Jones Beach	75
10. Beaver Terminal	84
11. Abernathy Cr	91
12. Elokomin R	94
13. Rainier Ore	109
14. Prescott Ore	115
15. Kalama R@RM 6	127
16. Kalama R@RM 15	141
17. Green R	160
18. Lewis R	163
19. Cowlitz R@RM 47	184
20. Cowlitz R@RM 50	189
21. Dalton Pt	206
22. Washougal R@RM 10	213
23. Skamania Light	219
24. Washougal R@RM 15	221
25. Beacon Rock	227
26. Blw Bonn D	230
27. Tanner Cr	231
28. Sandy R	235
29. Lit Wh Sal R@RM 2	261
30. Lit Wh Sal R@RM 5	268
31. Spring Cr Hat	269
32. Big Wh Rear Pd	273
33. Wind R	275
34. The Dalles D	306
35. John Day D	347
36. Towal Wash	351
37. Klickitat R	358
38. Blalock Shore	375
39. Patterson Slough	448
40. NcNary D	470
41. Port Kelly Wash	501
42. Walla Walla R@Mo	507
43. Casey Pd	516
44. Villiard Slough	521
MID COLUMBIA R & TRIBS.	
45. Pasco Wash	522
46. Yakima R@Mo	539
47. Richland Wash	540
48. Ringold Hat	568
49. Wh Bluffs	596
50. Vernita Brid	629
51. Pr Rapid Spaw Ch	639
52. Crab Cr	660
53. Wanapum D	669
54. Vantage Brid	674
55. Rock Island D	725
56. Rocky Reach D	761
57. Turtle Rock Pd	768
58. Icicle Cr	789
59. Entiat R	790
60. Chelan Hat	813
61. Wells Spaw Ch	828
62. Methow R@Mo	838
63. Pateros Ferry	839
64. Methow R@RM 28	893
65. Methow R@Hat	919
WILLAMETTE R & TRIBS.	
66. Willamette Falls	207
67. Molalla R	220
68. Clackamas R	247
69. Tualatin R@Scogg	304
70. Mill Cr	308
71. S Santiam@Spt Ld	411
72. S Santiam@Foster	416
73. N Santiam@Minto	452
74. M Fk William@Dexter	491
75. McKenzie@Leaburg	492
DESCHUTES R & TRIBS.	
76. Deschutes R@Mo	330
77. Sherars Falls-Mo	363
78. Deschutes@RM 43	395
79. Oak Springs Hat	404
80. Maupin Trap RM 50	408
81. WmSp R-Sher Fall	425
82. Dry Cr-Wm Sp R	446
83. Deschutes@RM 84	463
84. Warm Spring Trap	464
85. Pelton D-Wm Sp R	473
86. Warm Spring R	479
87. Warm Spring R@Hat	485
88. Deschutes@RM 100	489
89. Beaver Cr-Wm Sp R	494
90. Rnd Butte Ladder	503
91. Rnd Butte Hat	506
JOHN DAY R	
92. John Day R@Mo	349
93. John Day R@RM 16	374
94. John Day@Spray Ore	623
95. N Fk John D@RM 60	744
96. M Fk John D@RM 32	749
97. John D@Granite Cr	788
SNAKE R & TRIBS.	
98. Ice Harbor D	537
99. Fishhook Park	557
99a. Lyons Ferry	600
100. Texas Rapids	630
101. Lit Goose D	634
102. Tucannon R	691
103. Lo Granite D	693
104. Clarkston Wash	742
105. Asotin Wash	754
106. Grand Ronde R	793
107. Wallowa Hat	940
CLEARWATER R & TRIBS.	
108. N Fk Clearwater R	809
109. Clear Cr	868
110. S Fk Clearwater R	1003
111. Lochsa R	1026
SALMON R & TRIBS.	
112. Whitebird Trap	908
113. Riggins Trap	959
114. Rapid R Hat	967
115. Lit Sal R	974
116. S Fk Salmon R	1153
117. Lemhi R@Mo	1239
118. Lemhi R	1294
119. Pahsimeroi R	1311
120. Upper Salmon R	1446
YAKIMA R	
121. Status Cr	651
122. Dry Cr	681
OUTSIDE COLUMBIA RIVER BASIN	
123. Siletz R	
124. Yaquina Bay	
125. Coos Bay Ore	
YAKIMA R	
126. Nelson Sp Pd	734
127. Nile Sp Pd	773
128. Ellensburg	776
LOWER COLUMBIA RIVER	
129. Rock Cr	346
130. Biggs	735
131. Tongue Pt	28
132. Conf. E. Fort Lewis	146

Figure 2.--Release sites for marked fish in the Columbia River system. Index numbers correspond to location and Rkm as indicated on legend.

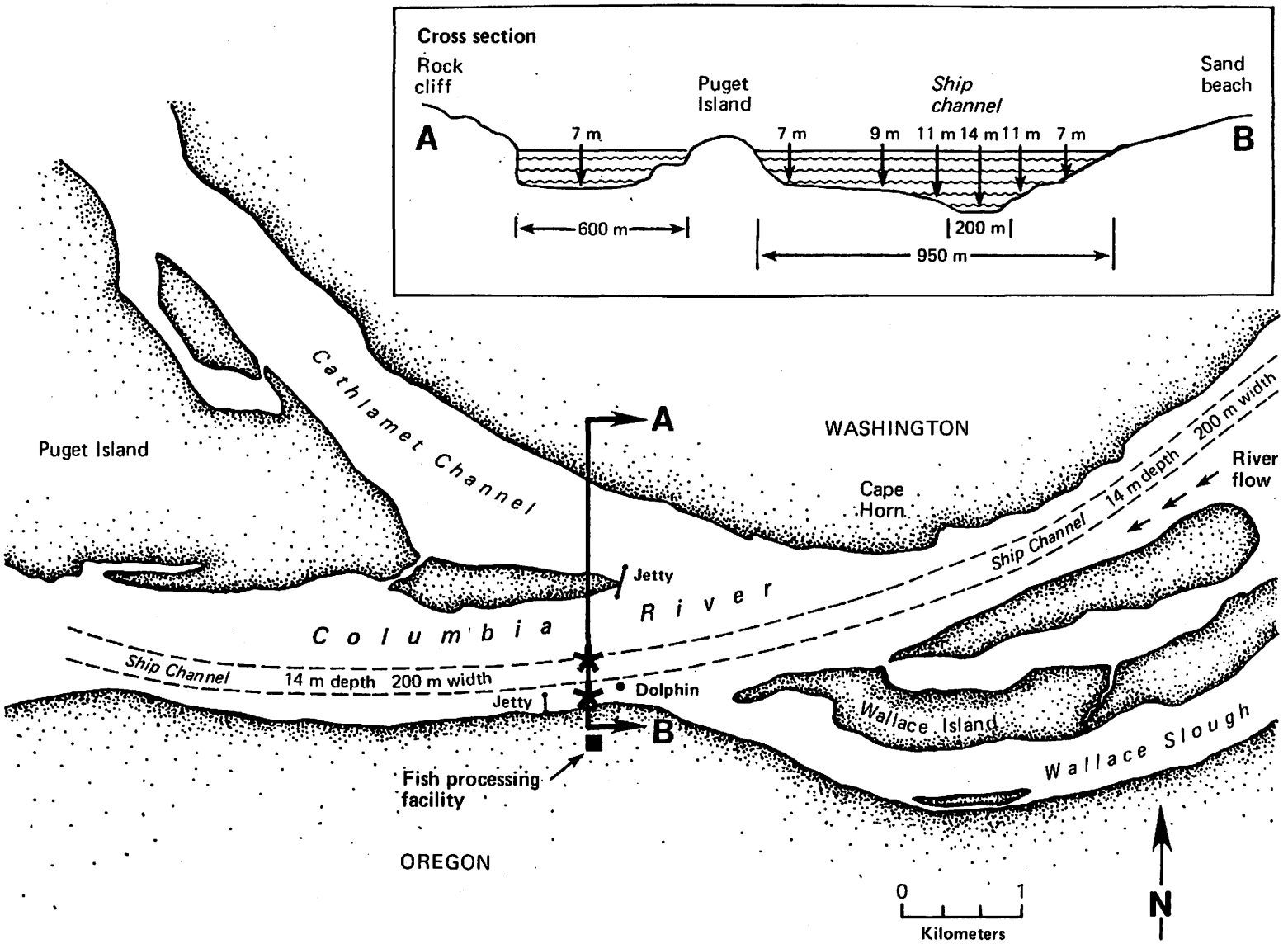


Figure 3.--Jones Beach sampling site. The beach and purse seining areas are denoted on the cross section by the two asterisks.

beach seine and three to five purse seine sets/d, 7 d/week. Purse seine effort was decreased to an average of three sets/d, 5 d/week in late June, and to 3 d/week in late July. From mid-August to mid-September, one or two purse seine sets were made each day, 1-2 d/week. Beach seine effort was decreased in July to eight sets/d, 5 d/week; further reductions in effort were made in late September. Sampling was terminated on 23 September; however, it was re-initiated on 14 October to observe the out-migration of juvenile chinook salmon released from various hatcheries in October and November. Three beach and two purse seine sets were made 3 d/week through 7 December 1983.

Physical Data

Secchi disc readings (cm) and surface water temperatures (± 0.5° C) were recorded daily. Average daily river flow at Bonneville Dam (± 0.1 thousand m^3/s) was obtained from the U.S. Army Corps of Engineers (CofE).3/

Fish Processing

If more than 100 fish were captured in a set, they were examined at a permanent processing facility on shore, otherwise they were processed at the sampling site. Fish were anesthetized with a 50 mg/l solution of benzocaine (varied with water temperature and fish size), enumerated by species, and examined for marks. Fork lengths were measured 3 d/week for all sockeye salmon, *Oncorhynchus nerka*, and chum salmon, *O. keta*, and 100 fish subsamples of coho salmon, *O. kisutch*; steelhead, *Salmo gairdneri*; yearling chinook salmon, *O. tshawytscha*; and subyearling chinook salmon.

3/ U.S. Army Corps of Engineers, NPD, Reservoir Control, 210 Custom House, Portland, OR 97208.

Chinook salmon were separated into subyearling and yearling categories on the basis of fork length; about a 4% error rate was observed, based on the percentage of misidentified tagged fish.

Records for marked fish catches include: species, fork length (± 0.5 mm), sampling gear, site, time of day, and date.

Salmonids with an excised adipose fin, indicating a coded wire tag (CWT), were passed through a magnetic tag detector to estimate tag retention for each species. Those fish containing tags were sacrificed for identification and weighed (± 0.005 g). In 1983, daily catch of tagged fish did not exceed the daily limit of 100 per species for either beach or purse seine, thus subsampling was unnecessary.

After processing, the remaining live fish were held in a raceway with circulating river water. During May, June, and July, NaCl (6 ppt) was added to reduce handling stress (Long et al. 1977); the water was recirculated and maintained at ambient river temperature. At the conclusion of sampling each day, fish were transferred by gravity flow to an amphibious holding tank, transported out of the sampling area, and released. When fish were processed at the sampling site, they were allowed to recover from the anesthetic and immediately transported out of the sampling area and released.

Biological Samples for Other Agencies

Scales from tagged fish were collected for personnel from Oregon Department of Fish and Wildlife (ODFW),[4/] University of Washington

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[4/]Ron Williams, ODFW, 303 Extension Hall, OSU, Corvallis, OR 97331 and Jeff Zake, 3150 E. Main St., Springfield, OR 97477.

(UW),[5] and Oregon State University (OSU).[6] Carcasses for gill tissue and blood sample extraction were provided to NMFS researchers studying smoltification.[7] Branded fish were provided to U.S. Fish and Wildlife Service (USFWS)[8] personnel for a bioenergetics study, and some unmarked fish to OSU[9] researchers for disease studies. The incidence of gas bubble disease was monitored during periods of high river flow.

Analysis Procedures

Mark Data Expansion

Expansions of data were made to standardize catches of marked fish groups (tags, brands, and excised fins) for all time periods. The expanded data (adjusted catch and percent) for each unique mark represented an effort of 10 beach seine sets or 5 purse seine sets daily.

(10/Eb) or (5/Ep) x T = A--number of fish with a unique mark, adjusted for designated day.

Where: 10 = Standard beach effort
5 = Standard purse effort
Eb = Actual beach sets--performed on the designated day.
Ep = Actual purse sets--performed on the designated day.
T = Tag--number of tags read with a unique code.

Estimates of recoveries for each unique mark on non-sampling days were an average of the adjusted catch from the closest sampling day before and

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[5]Dr. Steve Matthews, UW, College of Fisheries, Seattle, WA 98195.

[6]Joseph Fisher, School of Oceanography, OSU, Corvallis, OR 97331.

[7]Dr. Waldo Zaugg, NMFS, Star Rt., Cook, WA 98605.

[8]Dennis Rondorf, USFWS, National Fisheries Research Center, Willard Substation, Star Rt., Cook, WA 98605.

[9]Dr. J. L. Fryer, OSU, Department of Microbiology, Corvallis, OR 97331.

after. Adjustments for variation of sampling efficiency due to changes in river flow were not made except where noted in data analyses.

Movement Rates

Movement rates for marked fish were calculated using distance traveled and time between first date of release and the date of median fish recovery at Jones Beach. Seasonal average movement rates for each salmonid species were calculated using index groups from particular hatcheries to facilitate comparisons between river flow and migration rate.

Relative Survival

Relative survival estimates for mark groups given various treatments were made by comparing catch percentages of control and treatment groups.

$$\frac{(\%\ \text{catch treatment} - \%\ \text{catch control})}{\%\ \text{catch control}} \times 100 = \%\ \text{difference in survival}$$

To assess the statistical validity of estimated survival differences, the catch differences were evaluated in relation to catch differences observed between replicate groups previously captured. To simplify the evaluation an empirical power of the test curve was developed (Figure 4; Appendix Table A3). Catch ratios (no. caught/no. released) of replicate mark groups were averaged (U), then the percentage difference between this average and each individual catch ratio was calculated (Y) and plotted against the number of fish captured (X). The curve in Figure 4 represents the 95% confidence level ($P < 0.05$).

The empirical method was used for detecting significant differences between catch ratios for treatment and control groups. Differences were

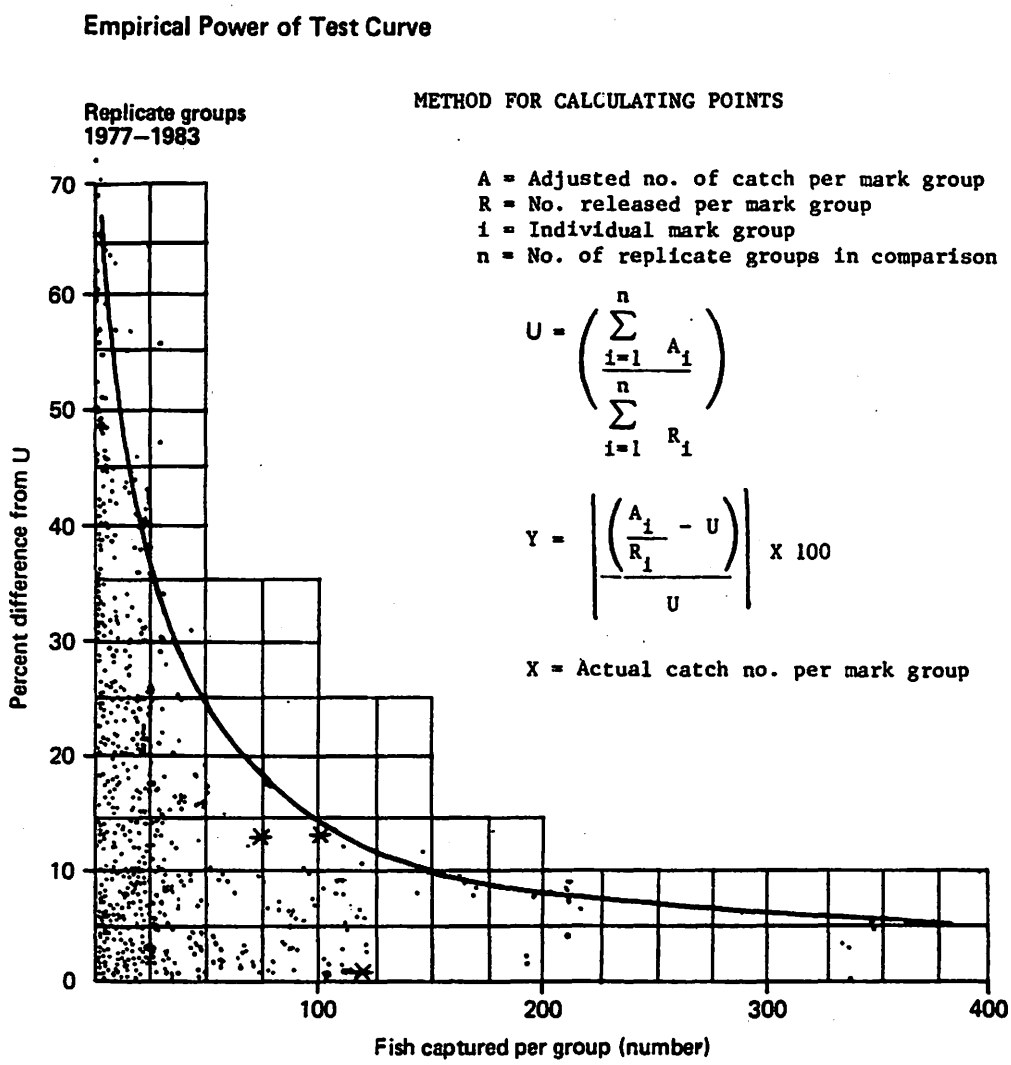

Figure 4.--Empirical power of the test curve, developed by comparing differences between catch percentages for replicate mark groups to number caught; * = treatment groups from example in text.

plotted on Figure 4 to discern if they were greater than those observed between replicate groups. If more than half of the plotted points fell outside the range of replicate group data, there were significant differences among the catches of treatment and control groups. For example, to evaluate the difference between two stocks of steelhead from Hagerman Hatchery released in the upper Salmon River, we have the following data:

Stock	Size (no./lb)	No. released	No. captured actual	No. captured adjusted	U	X	Y
A	2	38,800	74	109	0.00323	74	13
A	5	39,100	104	142		104	13
B	4	37,600	102	119		102	2

All data points fall inside the range of replicate groups (Figure 4); consequently, we conclude that there was no detectable difference in survival to the estuary for Stocks A and B, given the sample size. Statistical evaluation using the G statistic (Sokal and Rohlf 1981) provides a similar conclusion but takes longer to calculate and in some instances may provide erroneous conclusions due to adjustment of catches for sampling effort. The empirical evaluation accounts for variation that has affected previous sampling, including random variation; consequently, it provides a more precise evaluation (Efron and Morris 1975).

Survival to the Estuary for Fall Chinook Salmon

Survival of subyearling fall chinook salmon from the release site to the estuary was determined by comparing catch rates of fish from tagged groups released at the hatchery to those of branded fish transported and released 40 km upstream from Jones Beach, at Prescott, Oregon, (RKm 115). Tag groups utilized for this evaluation were the control for a salt diet study originating from Spring Creek National Fish Hatchery (USFWS) during

April and the control for a nutrition study originating from Bonneville Hatchery (ODFW) during May. Additional groups of 50,000 fish from similar populations at each hatchery were freeze branded, using procedures described by Mighell (1969). Each group of branded fish was transported in two lots and acclimated to Columbia River water. After 3 d, brand retention was evaluated, and fish were released in mid-river, coincidental with the passage of the tagged hatchery fish.

RESULTS

From January to December 1983, 1,666 beach seine and 599 purse seine sets were made; 137,081 subyearling chinook salmon, 19,848 yearling chinook salmon, 29,278 coho salmon, and 24,547 steelhead were captured (Appendix Tables A1 and A2). About 4.6% (9,799) of the salmonids captured were marked, of which 5,073 had CWT (Table 1). Tag retention was lowest for steelhead (80%) and highest for subyearling chinook salmon (96%). Catch percentages of marked fish groups were generally below 0.5%. Summary information for mark groups is presented in Appendix B.

In 1983, water temperatures at Jones Beach ranged from 5° C in March to 22° C in August, and secchi disk turbidity readings ranged from 22 to 130 cm (Appendix Table A4).

River flows were high from February through May (6.2 and 11.3 thousand m^3/s), similar to 1982. Peak flows subsided by mid-June, and the flow pattern after that was similar to the average for the moderate flow years, 1978-1981 (Figure 5).

Table 1.--Numbers of marked juvenile salmonids recovered at Jones Beach (RKm 75) in 1983.

Species	Coded wire tags (CWT)	Excised adipose fin w/no CWT a>	Brands	Excised fins	Total
	b>				
Chinook salmon - subyearling	2,167	93	385	373	3,018
Chinook salmon - yearling	441	43	806	526	1,816
Coho salmon	1,753	189	3	331	2,276
Steelhead	712	178	1,062	731	2,683
Sockeye salmon	0	0	6	0	6
Total	5,073	503	2,262	1,961	9,799

a> Tag retension, as measured from percentages of fish with excised adipose fin and no detectable magnetic tag, was lowest for steelhead (80%) and highest for subyearling chinook salmon (96%).

b> Additional CWT (303) and brands (292) were obtained from sampling a second 8-h shift (afternoon through evening) from 6 May to 29 May.

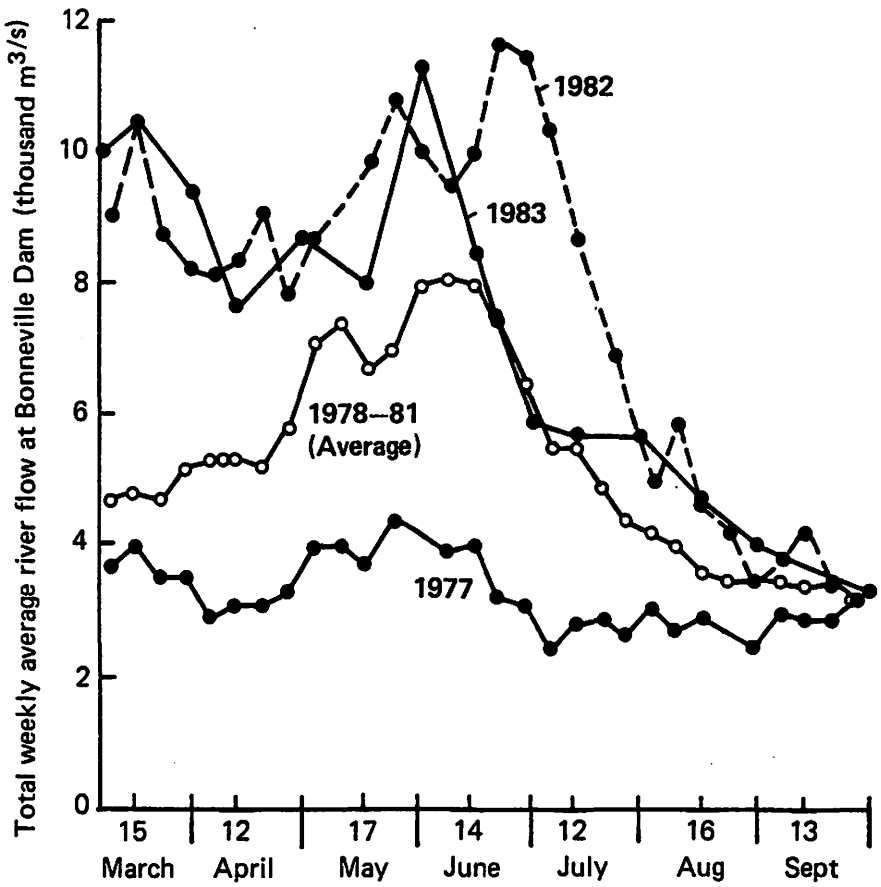

Figure 5.--Weekly average Columbia River flows for 1977, 1978-81 averaged, 1982, and 1983.

Variation in Catch Associated with River Flow

The assessment for effects of river flow on juvenile catch percentages was expanded to include data from 1977 to 1983. Two evaluations were made: (1) the ratio of subyearling chinook salmon captured to the number released from hatcheries each year was compared to seasonal average river flow using linear regression and (2) catch percentages from mark groups of similar fish released at different times were compared to differences of flow volumes at the time of recovery.

The first evaluation of the effects of river flow (Appendix Table A5) indicated that 77% of the variability of catch percentage between years was attributable to river flow. The linear relationship (Figure 6) was:

$$Y \text{ (catch percent)} = 0.045 \text{ X (flow)} + 0.614$$

$$r \text{ (correlation coefficient)} = -0.88$$

Using this equation, an increase in flow from 6,000 to 7,000 m^3/s results in a 13% decrease in catch. This evaluation assumes that: (a) survival for the subyearling chinook salmon population reared at hatcheries was the same for all years, (b) average river flow for the season appropriately represented the conditions encountered by most fish, and (c) wild fish populations were a constant percentage of the catch during all years.

The second evaluation involved comparisons of catch percentages of marked fish groups released at different times and river flows. Only groups which did not pass through the Snake or Columbia River dams, were of the same stock and size, and were released at the same site were used in the comparisons. The aggregation of data (Appendix Table A6) shows an inverse correlation between river flow and catch percentage in 30 of 38

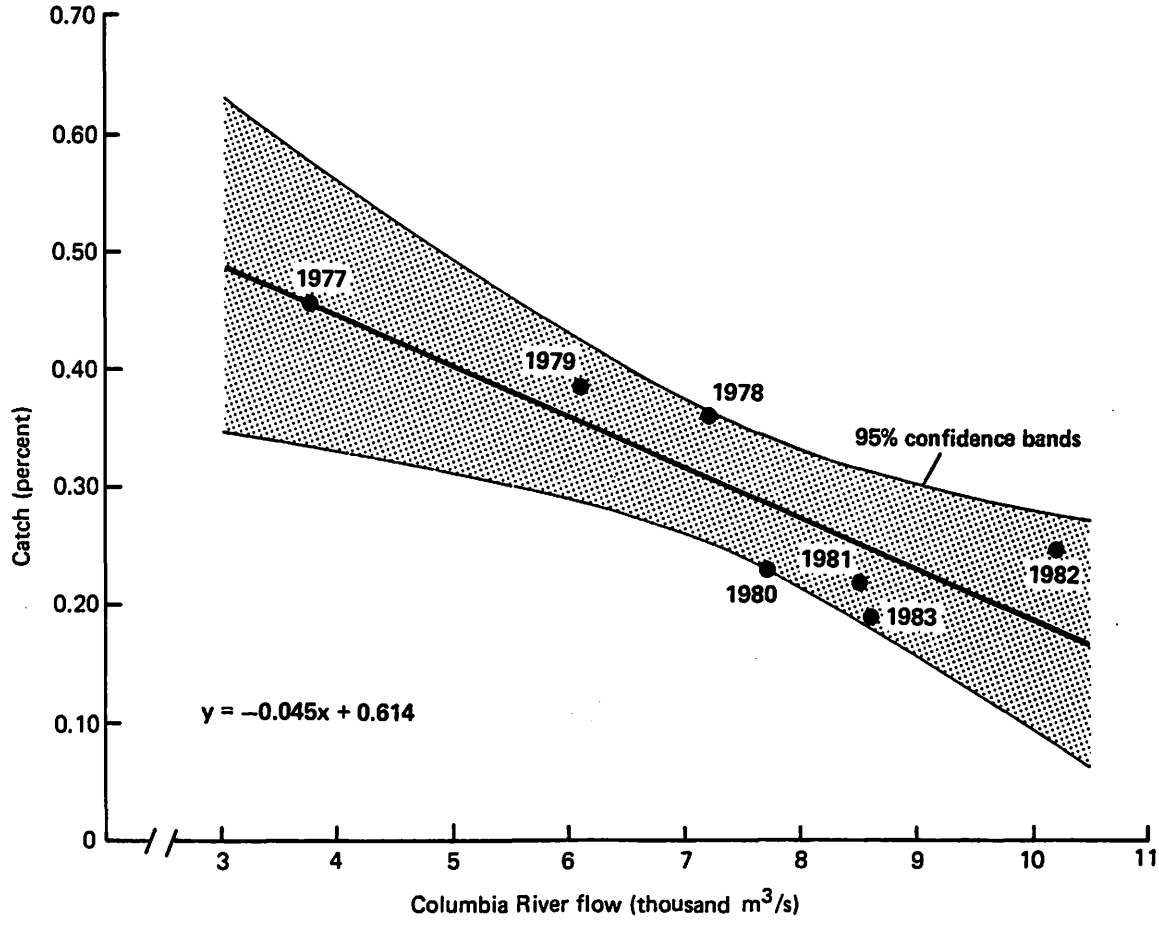

Figure 6.--Subyearling chinook salmon catch at Jones Beach as percent of total hatchery release number by year; plotted against seasonal average Columbia River flow at Bonneville Dam 1977-1983.

groups. Mean difference of catch percentage associated with a flow increase of 1,000 m^3/s, was 8.8% (SD 35%); variation was assumed to be linear over the range of flow volumes. Change of catch percentages less than 100% per 1,000 m^3/s were used in this analysis. We will refine this analysis in the project completion report by incorporating adult recovery data and an index of survival for tempering the variations between mark groups. We will differentiate effects for several different flow volume ranges, if possible.

Migrational Timing

Temporal distributions of salmonids migrating past Jones Beach in late 1982 and in 1983 are depicted in Figure 7 [catch per set (CPS) averages]. CPS averages throughout the sampling period are inflated or deflated in association with variations of river flow. Effort, total catch, and CPS for beach and purse seines are listed in Appendix Tables A1 and A2.

Fall Released Chinook Salmon and Steelhead

Attempts to decrease costs of rearing juveniles and increase adult returns prompted renewed efforts in the 1970s and 1980s to determine the effect of releasing salmonids during the fall (Smith 1979; Hansen et al. 1979). Preliminary recovery data indicated benefits in some instances (Smith and Zakel 1981) and none in others (Hansen 1982). Researchers were concerned that some of the fall released juveniles would overwinter in tributaries downstream from the release point and compete with wild stocks. Observations of residualism were made at the Pelton Ladder on the Deschutes River (Hart et al. 1980) and at Jones Beach (Dawley et al. 1978).

To examine the timing and relative success of the fall released fish, sampling at Jones Beach was extended into the fall, winter, and early

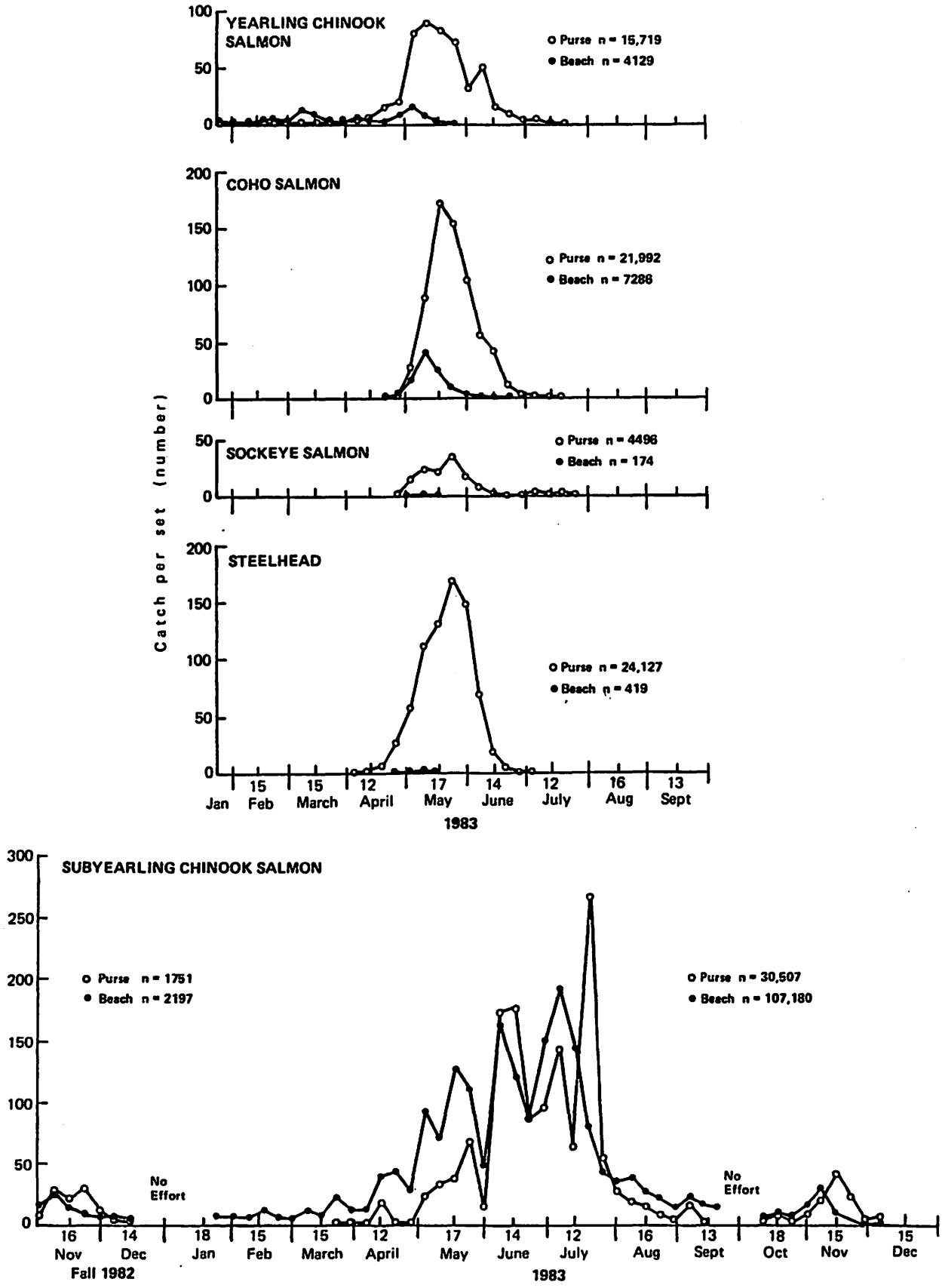

Figure 7.--Weekly catch per set averages for subyearling chinook, yearling chinook, coho, and sockeye salmon and steelhead caught by beach and purse seines at Jones Beach, 1983.

spring of 1978-79, 1981-82, and 1982-83. We found that most fish released in the fall migrated past Jones Beach before 15 December, and the remainder passed primarily in late February, March, and April (Appendix Table A7). However, it appears that large portions of a few groups overwintered upstream from Jones Beach and migrated during the spring. In 1982-83 when sampling effort was substantial throughout most of the migration period, catch data indicated that nearly 50% of the spring chinook salmon from the Big White Rearing Facility and the McKenzie Hatchery, and all from Dworshak NFH migrated in the spring. The smaller fish of most stocks showed the greatest tendency to migrate the following spring. Further evaluation of recovery percentages in relation to river flow, fish size, and stock will be presented in the project completion report.

Spring Released Hatchery Fish

In 1983, the dates of peak recovery for each species were similar to those for 1982 and were primarily influenced by hatchery release dates. Dates of peak migration at Jones Beach were: 7-13 May for yearling chinook salmon; 14-20 May for coho salmon; 21-27 May for steelhead; and 14-20 May, 6-10 June, and 2-8 July for subyearling chinook salmon. Movement rates and dates of passage for many hatchery release groups were obtained from mark recoveries (Appendix B).

Average movement rates for spring released fish were derived from a series of mark groups obtained in consecutive years. Movement rates for 1983 were similar to the years 1978-1982 (Table 2), but not all groups were represented. Correlation of movement rate to seasonal average river flow could only be made for subyearling chinook salmon, and that relationship

Table 2.--Average and range of migration rates for selected groups of marked juvenile salmon and steelhead from release site to Jones Beach, 1978-1981, 1982 and 1983.

	Chinook salmon						
	Subyearling				Yearling		
	a> 1977	1978-1981	1982	1983	1978-1981	1982	1983
Average Km/day	7	18	16	22	20	16	18
Range Km/day	2-27	2-48	2-41	4-31	5-46	8-25	10-24
No. mark group b>	10	49	12	3	41	9	5

	Coho salmon				Steelhead		
	1977	1978-1981	1982	1983	1978-1981	1982	1983
Average Km/day		19	14	17	33	36	35
Range Km/day		6-57	5-25	7-29	3-63	26-45	27-53
No. mark group b>		26	8	7	23	3	5

a> River flows were generally low for 1977, moderate for 1978-1981 and 1983, and high for 1982; averages for May-June were 3.8, 7.2, 6.1, 7.7, 8.5, 8.6 and 10.2 thousand m^3/s, respectively.

b> Marked groups representing large releases (>10,000) and released at similar sites 1977-1983; calculated date of median fish capture. Not all groups used as indicies were represented all years; several groups are missing for steelhead in 1982 and yearling and subyearling chinook in 1983.

(direct) was only evident when data from 1977, a very low flow year, were included. Movement rates for yearling fish groups in 1977 were not available because purse seine effort was not consistent through the migration period. Movement rates in relation to water flow will be further evaluated in the project completion report.

Wild Fish

Sockeye salmon, assumed to be wild fish, were recovered primarily in May and the first week of June (4,670 total). Branded fish from McNary Dam were recovered from 16 to 26 May; migration rates ranged from 30 to 50 km/day.

Chum salmon, also assumed to be from wild stocks, were recovered primarily in March, April, and May (18 total).

Individuals of the other anadromous salmonid species were identified as wild from marks only. Yearling chinook salmon were recovered from the John Day river (n = 5, 30 April-13 May, 123 mm mean fork length) and the Warm Springs River (n = 2, 2-5 June, 114 mm mean fork length). Subyearling chinook salmon were captured from the Lewis River (n = 245, 8 July-2 October, 86 mm mean fork length).

Size Characteristics

Temporal length distributions from subsamples of the catch throughout the migration period are shown in Figure 8. Mean condition factor was calculated for most tag groups (Appendix Table A8).

Relative Survival Between Groups

Differences in catch percentages between treatment and control groups were examined to detect survival differences during migration (from release

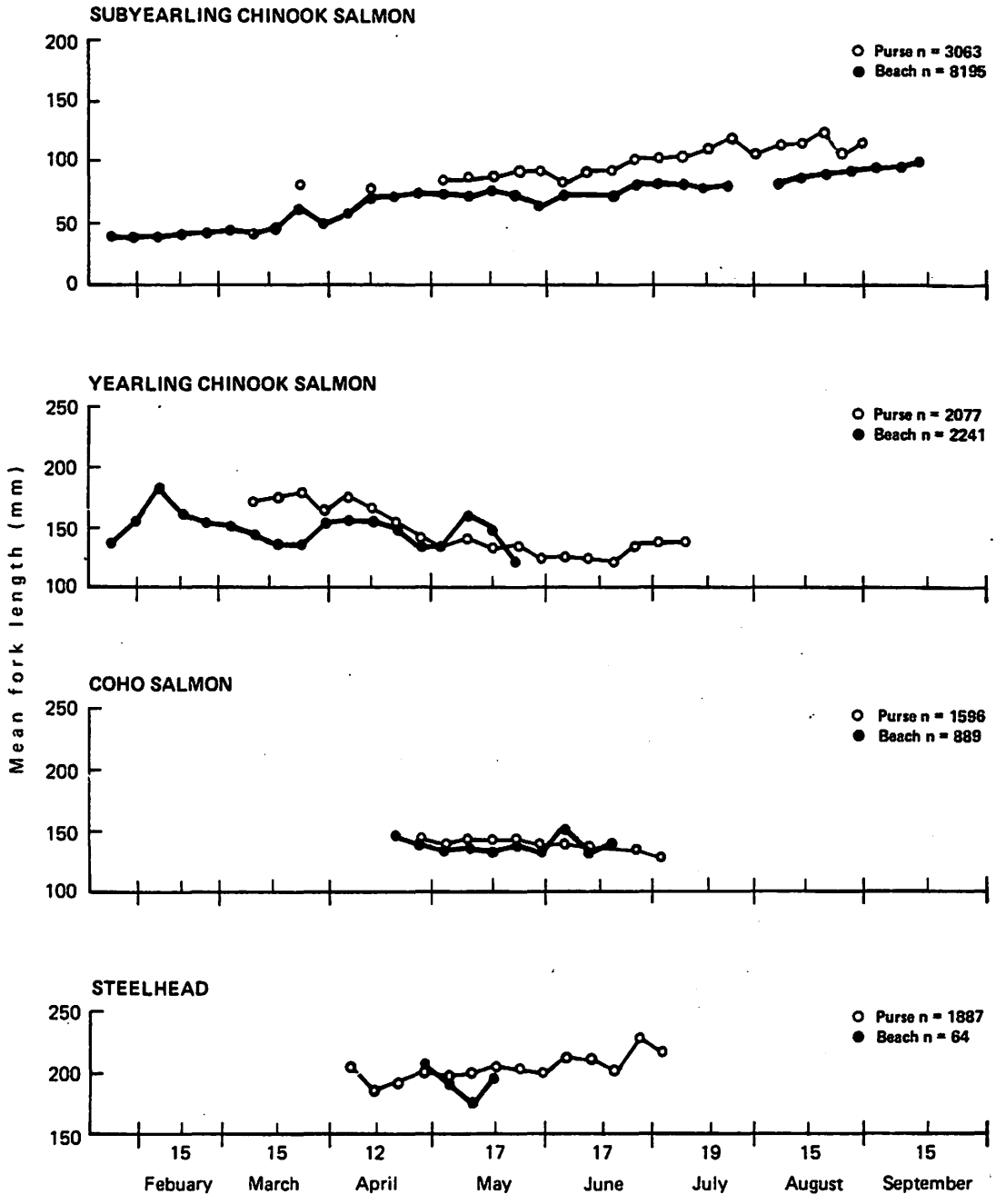

Figure 8.--Weekly mean fork lengths of subyearling chinook, yearling chinook, and coho salmon and steelhead caught in beach and purse seines at Jones Beach in 1982; n = number measured.

site to Jones Beach). The treatments examined were: variation of fish size, release timing, nutrition, rearing density, stock, chemical prophylactics, passage at dams and through reservoirs, and transportation past dams.

Effects of Fish Size and Release Timing

The numbers of fish recovered from studies on size at release were insufficient to detect significant differences between groups, Table 3.

Recovery percentages for delayed releases were consistently higher than for fish released at an earlier date (size of fish released was the same for both groups) Table 4. One group of Washougal Hatchery coho salmon showed the opposite trend, but river flow was higher for the delayed release. If catch percentage is adjusted, assuming a 9% decrease in catch percentage per 1,000 m^3/s flow increase (discussed earlier), the later release produced the greatest recovery percentage.

Decreased catch percentages were recorded for delayed releases of subyearling chinook salmon that were released at a larger size; however, no conclusions were drawn concerning relative survival differences due to a greater tendency for larger fish to migrate in midriver.

Effects of Nutrition

In previous years, estuarine recoveries of nutrition study fish have shown differences between OMP 2 and OMP 4 diet groups of fall chinook salmon from Bonneville Hatchery. In 1983, significant differences were not observed, but were observed between fall chinook salmon fed a diet with a high salt concentration and controls at Spring Creek Hatchery (Table 5). Coho salmon nutrition study groups have not shown significant differences in any year of estuarine sampling.

Table 3.--Jones Beach catch data for juvenile salmonids from size at release studies, 1983 and late 1982.

Release information					Jones Beach recovery information				
Site (source)	Treatment/ stock	Date	Size (no./lb)	No. rel. (thou)	No.	a> %	Date range (10-90%)	Mean fk.ln. (mm)	Movement rate (Km/d)
				Steelhead					
Sal. R. (Hagerman Hat.)	A stock	18-20 Apr	2	38.8	84	0.281	28 May-06 Jul	254	27
Sal. R. (Hagerman Hat.)	A stock	18-20 Apr	5	39.1	104	0.363	28 May-24 Jun	225	26
				Yearling chinook salmon					
McKen. R. (McKenzie H.)	Size&Time	08-18 Nov	7	32.0	13	0.088	27 Nov-01 Mar	-	-
McKen. R. (McKenzie H.)	Size&Time	08 Nov	11	32.3	9	0.046	26 Nov-11 Mar	-	-
McKen. R. (McKenzie H.)	Size&Time	08 Nov	16	31.9	11	0.072	02 Dec-20 Mar	-	-
McKen. R. (McKenzie H.)	Size&Time	14 Mar	4	36.2	9	0.057	18 Mar-18 Apr	200	58
McKen. R. (McKenzie H.)	Size&Time	14 Mar	6	32.1	4	0.023	03-25 Apr	158	14
McKen. R. (McKenzie H.)	Size&Time	14 Mar	10	30.0	14	0.095	21 Mar-23 Apr	171	12

a> Actual catch (purse seine plus beach seine) and adjusted percentage catch.

Table 4.--Jones Beach catch data for juvenile salmonids from time of release studies, 1983.

Release information					Jones Beach recovery information					
Site (source)	Treatment/ stock	Date	Size (no/lb)	No. rel. (thou)	No.	a> %	Date range (10-90%)	Mean fk.ln. (mm)	Mvmt. rate (km/d)	River flow ($1000m^3/s$)
				Coho salmon						
Bonneville Hat.	Production	02 May	15	26.9	22	0.081	06 - 22 May	144	17	9.3
Bonneville Hat.	Production	31 May	16	27.3	28	0.112	02 - 09 Jun	144	51	11.3
Washougal Hat.	Ocean Mgmt	15-30 Apr	18	50.9	40	0.081	26 Apr-19 May	144	7	8.7
Washougal Hat.	Density	27 May	19	303.0	185	0.074	30 May-13 Jun	134	29	11.3
				Chinook salmon						
Bonneville Hat.	Late Fall	16 Jun	80	100.3	111	0.168	23 Jun-17 Jul	93	10	6.3
Bonneville Hat.	Late Fall	01 Aug	44	99.0	39	0.130	11 Aug-10 Nov	106	10	4.7
Cowlitz Hat.	Fall	06-25 Jun	72	150.2	522	0.493	28 Jun-24 Aug	88	4	6.3
Cowlitz Hat.	Fall	02 Nov	20	146.4	30	0.131	03 - 15 Nov	128	39	4.1
Lit.Wh.Sal. Hat.	Subyr. Spr.	04 May	68	48.1	42	0.090	13 - 25 May	86	13	8.9
Lit.Wh.Sal. Hat.	Subyr. Spr.	24 Jun	44	46.1	44	0.194	08 Jun-12 Jul	110	15	6.3
Washougal Hat.	Fall	31 Aug	28	101.2	115	0.427	06 Sep-05 Oct	109	13	3.4
Washougal Hat.	Fall	11 Oct	23	100.6	68	0.449	16 Oct-06 Nov	119	15	3.1
Washougal Hat.	Fall	02 Nov	22	100.3	72	0.496	06 - 15 Nov	122	21	4.1

a> Actual catch (purse seine plus beach seine) and adjusted percentage catch.

Table 5.--Jones Beach catch data for juvenile salmonids from nutrition studies, in 1983.

Release information					Jones Beach[a] Recovery information				
Site(source)	Diet	Date (da/mo)	Size (no./lb)	No. rel. (thou.)	No.	%[b]	Date range (10-90%)	Mean fk.ln. (mm)	Movement rate (Km/d)
				Fall chinook salmon					
Spring Cr. H.	7% Salt	28 Apr	55	104.0	171	0.164	3 - 8 May	92	32
Spring Cr. H.	Control	28 Apr	55	101.0	136	0.134	3 - 9 May	91	31
Bonneville H.	OMP4	04 May	70	100.8	172	0.171	7 -13 May	83	30
Bonneville H.	Control	04 May	74	100.0	171	0.171	7 -14 May	83	30
				Coho salmon					
Sandy Hat.	Sal. Meal	29 Apr	17	109.5	67	0.061	12-21 May	143	9
Sandy Hat.	Abernathy	29 Apr	17	108.8	73	0.067	12-25 May	148	9
Sandy Hat.	OMP2	29 Apr	17	109.6	78	0.071	11-22 May	142	9

a> Actual catch (purse seine plus beach seine) and adjusted percent catch.
b> Number and percent include fish captured during the extended beach seine effort period in May; not comparable to recoveries from other years.

Effects of Rearing Density

In past years, estuarine recoveries of fish groups reared at different densities have not shown significant differences. This trend held true in 1983, except for coho salmon study groups from Eagle Creek Hatchery (Table 6). Catch percentages for these groups increased with decreased density, and the groups reared at low density were significantly different from the groups reared at high density. The 1982 catch percentages of Eagle Creek coho salmon reared at a low density were 13% greater than high density fish; however, the difference was not statistically significant at the 95% confidence level.

Effects of Stock Difference

Differences were observed between catches of tule stock and late fall stock (brights) chinook salmon released at Bonneville Hatchery and between catches of Wells stock and Wallowa stock steelhead released at Lyons Ferry. Greatest catch percentages were from tule and Wallowa stocks, respectively. Recovery numbers were insufficient to detect significant differences between other groups (Table 7).

Effects of Chemical Prophylactics

Numbers of spring chinook salmon recovered from a McKenzie Hatchery study examining effects of erythromycin were insufficient to detect differences between test and control groups.

Passage at Dams and Through Reservoirs

Catch percentages were used to estimate survival differences between fall chinook salmon groups (from Spring Creek Hatchery) released into the

Table 6.--Jones Beach catch data for juvenile salmonids from rearing density studies, 1983.

Release information					Juvenile catches at Jones Beach[a]				
Site(Source)	Date (da/mo)	Size (no./lb)	No. (thou.)	Rearing density	No.	%	Date range (10-90%)	Mean fk.ln. (mm)	Movement rate (km/d)
				Coho salmon					
				$lb/ft^3/in$ [b] (fish/water/avg.fk.len.)					
Eagle Cr. Hat.	04 May	13	41.2	0.15	68	0.187	17 May-03 Jun	154	7
		14	80.2	0.30	110	0.155	19 May-03 Jun	152	7
		15	123.3	0.45	154	0.135	18 May-07 Jun	150	7
				gal/min/pond [c]					
Willard Hat.	07 Jun	20	137.2	200	111	0.103	12 Jun-04 Jul	137	24
		20	135.3	400	112	0.099	12 Jun-03 Jul	135	25
		20	131.7	600	123	0.089	12 Jun-03 Jul	153	29
				lbs/gal/min (fish/water) [d]					
Cowlitz Hat.	03 May	20	52.1	9.2	80	0.161	07 May-26 Jun	137	7
		20	51.7	11.7	86	0.176	07 May-11 Jun	141	7
		17	52.1	14.3	71	0.152	06 May-26 Jun	141	9
		17	51.5	15.0	80	0.159	06 May-12 Jun	133	9
		17	51.1	16.0	72	0.145	05 May-13 Jun	141	10
		17	52.4	22.9	84	0.174	06 May-22 Jun	140	7
Washougal Hat.	27 May	19	39.8	6.0	29	0.085	31 May-08 Jun	133	31
		19	48.5	6.8	24	0.060	31 May-13 Jun	133	27
		19	59.3	8.8	30	0.071	30 May-13 Jun	138	29
		19	51.3	10.6	32	0.076	31 May-12 Jun	135	30
		19	52.0	12.5	32	0.073	30 May-13 Jun	135	27
		19	52.1	14.3	38	0.084	30 May-12 Jun	132	27
				Yearling chinook salmon					
				$lb/ft^3/in$ [e] (fish/water/avg.fk.len.)					
Kooskia Hat.	4-12 Apr	15	14.7	0.289	11	0.075	04 May-17 May	160	21
		13	8.0	0.075	4	0.050	04 May-18 May	161	25

a> Actual catch (beach plus purse seine) and adjusted percent catch with replicates combined.
b> Jamieson Holway, USFWS, Eagle Creek Hatchery, Rt. 1 Box 610, Estacada, OR 97203. Production density about 0.45 $lb/ft^3/in$.
c> Joe Banks, USFWS, Abernathy SCDC, 1440 Abernathy Road, Longview, WA 98632. Production density about 400 gal/min per pond.
d> Robert Foster, WDF, 115 General Admin. Bldg., Olympia, WA 98504. Production densities about 20, 18, and 14-18 lb/gal/min for Cowlitz, Lower Kalama and Washougal Hatcheries.
e> Ted Bjorn, U of I, Idaho Co-op Fish. Research, Moscow, ID. 83843. Production density about 0.3.

Table 7.--Jones Beach catch data for juvenile salmonids from stock comparison studies, 1983 and late 1982.

Release information					Jones Beach recovery information				
Site(source)	Stock	Date	Size (no./lb)	No. rel. (thou)	No.	a> %	Date range (10-90%)	Mean fk.ln. (mm)	Movement rate (Km/d)
				Chinook salmon					
Pr. Rapid Spaw Ch.	Production	24 May	84	204.1	141	0.096	11 Jun-19 Jul	97	24
Pr. Rapid Spaw Ch.	Wild	21 Jun	63	202.4	86	0.103	08 Jul-03 Nov	118	10
Bonneville Hat.	Tule	1 Nov	11	45.9	123	0.560	05 - 23 Nov	145	17
Bonneville Hat.	Late Fall	1 Nov	12	50.7	107	0.448	04 - 25 Nov	146	25
Bonneville Hat.	Tule	8 Mar	7	37.5	44	0.226	10 - 25 Mar	173	18
Bonneville Hat.	Late Fall	23 Mar	6	49.9	13	0.052	28 Mar-28 Apr	186	13
				Steelhead					
Lyons Ferry	Wallowa	1-20 May	4	54.6	68	0.104	13 May-15 Jun	222	19
Lyons Ferry	Wells	1-20 May	4	51.6	7	0.016	15 May-05 Jul	239	23
Up. Salmon R. (Hagerman Hat.)	A stock	18-20 Apr	5	39.1	104	0.363	28 May-24 Jun	225	26
E.FK. Salmon R. (Hagerman Hat.)	B stock	12-13 Apr	4	37.6	102	0.316	14 May-13 Jun	243	27

a> Actual catch (purse seine plus beach seine) and adjusted percentage catch.

juvenile fish bypass system at the Bonneville Dam Second Powerhouse and similar groups released in the tailrace (Appendix B). Beach seine sampling was extended to 16 h/d (20 sets) to ensure adequate sample size. Significant differences were not observed.

Recovery data from fish groups released by Public Utility Districts to test systems mortality are listed in Appendix B.

Effects of Transportation Past Dams

Mark recoveries from tranportation studies indicated that survival was increased for groups of hatchery reared chinook salmon and steelhead released downstream from dams (Table 8). One steelhead group transported upstream past two Snake River dams to Wallowa Hatchery did not show decreased survival over the control group that was released downstream at Lyons Ferry. This comparison may have been affected by the inadvertent transport of Wallowa Hatchery fish from Lower Granite and Little Goose Dams to a site downstream from Bonneville Dam.

Subyearling chinook salmon transported from McNary Dam to a site downstream from Bonneville Dam averaged a 28% increase in survival compared to controls that migrated through three reservoirs and dams (Appendix Table A9). Numbers of marked fish collected at Jones Beach were insufficient to detect a statistically significant difference between transport and control groups. In previous years, survival increases for subyearling chinook salmon transported from McNary Dam were substantially greater.

Survival to the Estuary for Fall Chinook Salmon

Survival rates for fall chinook salmon from Spring Creek and Bonneville Hatcheries following migration to the estuary were estimated to

Table 8.--Jones Beach recoveries of juvenile salmonids transported past dams and their controls in 1983; with estimates of survival increase from transportation.

Release information					Jones Beach recovery information						
Site(source) a>	Treatment/ stock	Date	Size (no./lb)	No. rel. (thou)	No.	% b>	Date range (10-90%)	Mean fk.ln. (mm)	Movement rate (Km/d)	No. dams bypassed	% increase survival
					Chinook salmon						
Col.R./Vernita Br.	Trans./Tule	02 Jun	100	100.2	47	0.078c>	16 Jun-22 Jul	117	16	-4	- 54
Bonneville Hat.	Control	16 Jun	80	100.3	111	0.168	23 Jun-17 Jul	93	10		
Bonneville Hat.	Control/Late Fall	23 Mar	6	49.9	13	0.052	28 Mar-28 Apr	186	13	3	
Umatilla R.	Transport	24 Mar-18 Apr	6	99.6	19	0.019	01-25 May	203	8		- 63
					Steelhead						
Methow (Wells Sp.Ch.)	Control	19-27 Apr	5	20.0	23	0.122	07-20 May	226	31		
Blw. Pr. Rapid D.	Transport	19-27 Apr	5	22.4	49	0.224	04-21 May	235	24	5	100
Wallowa H(Lyon Ferry)	Transport	9-13 May	5	65.0	174	0.305c>	15 May-20 Jun	217	53	-2	54
Lyons Ferry Hat.	Control	1-20 May	4	54.6	68	0.141	13 May-15 Jun	222	19		

a> Fish groups with 2 days or less between 1st and median fish recapture are not included.
b> Actual catch (purse seine plus beach seine) and adjusted percentage catch.
c> Some fish may have been transported past all dams by mass transportation project from Lower Granite, Little Goose, and McNary dams; estimated percentages of fish transport were for the day.

be 96 and 78%, respectively. Evaluation of the precision of annual survival estimates made for subyearling chinook salmon from 1978 to 1983 will be presented in the project completion report.

Juvenile Catches Compared to Adult Recoveries

The objectives of comparing juvenile catches to adult recoveries were: to discern if larger or smaller than average catches of a mark group indicate abnormal adult survival, to document the limits of sensitivity for predicting adult return rates, and to document the types of treatment groups from which juvenile catch rates may provide erroneous inferences of survival to adulthood.

Juvenile and adult recovery data for replicate groups were examined for consistency (138 sets of replicates, 338 groups total--Appendix Table A3). We found that the adult and juvenile catch percentages varied in the same direction (positive or negative) from their respective replicate averages (U, Figure 4) 59% of the time. The variation, assuming true replicates, should be random, and a large set of comparisons should have varied in the same direction about 50% of the time. Juvenile recoveries for 9 of the 138 sets of replicates showed significant differences at the 90% confidence level ($P < 0.10$). Adult recoveries varied in the same direction from U as juvenile recoveries in five of the nine instances. Two of these adult groups were also significantly different, which may indicate a survival difference that was detected at Jones Beach and manifested in adult recoveries.

There were 54 sets of replicates for which adult recoveries showed significant differences ($P < 0.10$) between groups. Thirty-three of these (61%) varied in the same direction from U as juvenile recoveries.

By definition of $P < 0.10$, there should be about 10% of the sets of true replicates which fall outside the boundaries of no difference between groups. The juvenile catch data were of this magnitude (7%), but adult recoveries were about four times higher than expected (39%). We have asked the respective fishery agencies for verification of the similarity of treatment for all sets of replicate groups which showed large variation in recovery percentages. We see no reason to suspect that juvenile data are not normally distributed with expected variation. Adult recoveries show greater than expected variation within sets of replicate groups. We will complete the juvenile adult recovery evaluation for treatment groups versus controls in the project completion report.

Incidental Catches

Non-salmonids comprised nearly 40% of the total catch (Appendix Tables A10 and A11). Adult and juvenile threespine stickleback, *Gasterosteus aculeatus*, and peamouth, *Mylocheilus caurinus*, were captured in large numbers year-round. Large catches of American shad, *Alosa sapidissima*, juveniles were obtained during their migration period (May through November). Seven eastern banded killifish, *Fundulus diaphanus*, were captured in the beach seine in 1983 (Ledgerwood and Rankis 1984); the Columbia River is not described as part of the normal geographical range for this species (Scott and Crossman 1973).

SUMMARY AND CONCLUSIONS

During fiscal year 1983, BPA and NMFS funded a study of juvenile salmonid migrants entering the Columbia River estuary. The general

objectives were to: (1) define migration timing and movement rates; (2) obtain catch percentages for marked groups to evaluate smolt survival to the estuary and subsequently compare to adult recoveries; and (3) amass information on which concepts may be developed to protect, enhance, and restore the salmonid resources of the Columbia River.

Beach and purse seines were used to sample at Jones Beach (RKm 75). Sampling was done during the spring and summer out-migration period (April-September) and the fall and winter out-migration period (November 1982-March 1983 and October-December 1983). Subsamples of fish tissues and observations of disease incidence were made for other researchers. Catches during the calendar year 1983 were: 137,081 subyearling chinook salmon, 19,848 yearling chinook salmon, 29,278 coho salmon, and 24,547 steelhead--about 4.6% of the total salmonids were marked fish.

Effects of River Flow

Catch data from 1983 were added to the evaluation of sampling efficiency in relation to river flow. Two evaluation methods were used: (1) comparison of annual catches of unmarked subyearling chinook salmon (as a percentage of the total number released from hatcheries) to seasonal river flow, 1977 to 1983 and (2) comparisons of catch percentages between years, in relation to river flow differences, for mark groups released downstream from Bonneville Dam (subyearling and yearling chinook and coho salmon and steelhead) from the same stock and fish size migrating about the same time of year during different years. From the two methods, we estimated that an increase of 1,000 m^3/s of river flow caused sampling efficiency to decrease about 11%.

Migrational Characteristics

Fall released fish groups generally migrated past Jones Beach in the fall; however, large portions of a few groups overwintered in the river system and migrated in the spring. The smallest fish from several groups overwintered prior to migration.

Spring released fish and identifiable wild stocks migrated into the estuary primarily during May, June, and July. Dates of peak migration at Jones Beach were: 7-13 May for yearling chinook salmon; 14-20 May for coho salmon; 21-27 May for steelhead; and 14-20 May,6-10 June, and 2-8 July for subyearling chinook salmon. Movement rates were similar to past years--average rates were 22, 18, 17, and 35 km/d for subyearling chinook, yearling chinook, and coho salmon and steelhead, respectively. Summary data are presented for each mark group, including: release information; number and percent captured, with and without expansion; dates of 10, 50, and 90% recovery; mean fork length of individuals recovered; average movement rate from release site to Jones Beach; and average condition factor of individuals recovered.

Relative Survival Between Groups

We compared catch percentages of treatment and control groups to identify survival differences following migration to the estuary. We found: (1) higher recovery percentages for all groups for which the release dates were delayed (size held constant between test and control), (2) a significant difference between fall chinook salmon groups fed a diet with high salt concentration (highest catch) and their controls (lowest catch) from Spring Creek NFH, (3) a significant difference between coho

salmon reared at a low density (highest catch) and those reared at a high density (lowest catch) from Eagle Creek NFH, and (4) higher recovery percentages (average 64%) for most groups released at sites downstream from dams compared to their counterparts that migrated through the dams and reservoirs. Estimates of survival to the estuary for fall chinook salmon from Spring Creek and Bonneville Hatcheries were 96 and 78%, respectively.

Juvenile Versus Adult Recoveries

Recoveries of replicate groups from juvenile sampling showed normal variation among groups, although adult recovery data for the same groups showed four times the expected variability. We have asked the fishery agencies for verification on the similarity of treatment for groups which showed large variations. Differences of catch percentages between replicates varied in the same direction, negative or positive, for both juvenile and adult data in 59% of the observations. Nine sets of replicate groups showed statistical differences in juvenile catches, five of which showed adult catches varied in the same direction from the mean of replicates and two with statistically significant differences.

Incidental Catches

Non-salmonids, mostly threespine stickleback, peamouth, and American shad comprised about 40% of the total catch. A total of seven eastern banded killifish were captured with beach seines in May, June, and July.

ACKNOWLEDGMENTS

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APPENDIX A

MISCELLANEOUS TABLES AND FIGURES

RELATING TO MIGRATION OF JUVENILE SALMONIDS

Table A1.--A summary of beach seine catches at Jones Beach, Oregon (RKm 75), 1 January - 31 December, 1983.

Date (Mo./Day)	No. sets	Chinook salmon subyearling Total catch (no.)	Chinook salmon subyearling Catch per set (no.)	Chinook salmon yearling Total catch (no.)	Chinook salmon yearling Catch per set (no.)	Coho salmon juvenile Total catch (no.)	Coho salmon juvenile Catch per set (no.)	Steelhead juvenile Total catch (no.)	Steelhead juvenile Catch per set (no.)
1/1 -1/21	0	-	-	-	-	-	-	-	-
1/22 -1/28	17	94	6	39	2	0	0	0	0
1/29 -2/4	35	246	7	23	1	0	0	0	0
2/5 -2/11	40	254	6	17	0	0	0	0	0
2/12 -2/18	40	470	12	69	2	0	0	0	0
2/19 -2/25	32	229	7	155	5	0	0	0	0
2/26 -3/4	36	171	5	116	3	0	0	0	0
3/5 -3/11	35	424	12	441	13	0	0	0	0
3/12 -3/18	30	226	8	260	9	0	0	0	0
3/19 -3/25	37	860	23	110	3	0	0	3	0
3/26 -4/1	38	495	13	52	1	2	0	1	0
4/2 -4/8	38	481	13	269	7	5	0	2	0
4/9 -4/15	39	1401	40	135	3	4	0	1	0
4/16 -4/22	50	2136	43	156	3	28	1	8	0
4/23 -4/29	57	1585	28	430	8	180	3	30	1
4/30 -5/6	70	6551	94	1107	16	1293	18	90	1
5/7 -5/13	70	4949	70	506	7	2845	41	141	2
5/14 -5/20	70	8998	129	112	2	1689	24	82	1
5/21 -5/27	69	7678	111	77	1	601	9	25	0
5/28 -6/3	67	3164	47	9	0	304	3	25	0
6/4 -6/10	70	11552	165	24	0	110	2	7	0
6/11 -6/17	70	8560	122	11	0	101	1	1	0
6/18 -6/24	67	6049	90	4	0	56	1	0	0
6/25 -7/1	64	9635	151	5	0	19	0	2	0
7/2 -7/8	46	8847	192	2	0	7	0	0	0
7/9 -7/15	61	9180	150	0	0	6	0	0	0
7/16 -7/22	49	3892	79	0	0	7	0	0	0
7/23 -7/29	40	1774	44	0	0	5	0	0	0
7/30 -8/5	38	1342	35	0	0	4	0	0	0
8/6 -8/12	40	1540	39	0	0	3	0	0	0
8/13 -8/19	37	983	27	0	0	4	0	0	0
8/20 -8/26	39	802	21	0	0	0	0	0	0
8/27 -9/2	40	574	14	0	0	2	0	0	0
9/3 -9/9	27	654	24	0	0	1	0	0	0
9/10 -9/16	34	565	17	0	0	0	0	0	0
9/17 -9/23	7	104	15	0	0	0	0	0	0
9/24 -9/30	0	-	-	-	-	-	-	-	-
10/1 -10/7	0	-	-	-	-	-	-	-	-
10/8 -10/14	3	21	7	0	0	0	0	0	0
10/15-10/21	9	93	10	0	0	0	0	0	0
10/22-10/28	8	62	8	0	0	0	0	0	0
10/29-11/4	9	142	16	0	0	2	0	0	0
11/5 -11/11	9	278	31	0	0	1	0	0	0
11/12-11/18	8	76	10	0	0	5	1	0	0
11/19-11/25	6	31	5	0	0	1	0	0	0
11/26-12/2	9	7	1	0	0	1	0	1	0
12/3 -12/9	6	5	1	0	0	0	0	0	0
12/10-12/31	0	-	-	-	-	-	-	-	-
Totals	1666	107180		4129		7286		419	

Table A2.--A summary of purse seine catches at Jones Beach, Oregon (RKm 75), 1 January - 31 December, 1983.

Date (Mo./Day)	No. sets	Chinook salmon subyearling Total catch (no.)	Chinook salmon subyearling Catch per set (no.)	Chinook salmon yearling Total catch (no.)	Chinook salmon yearling Catch per set (no.)	Coho salmon juvenile Total catch (no.)	Coho salmon juvenile Catch per set (no.)	Steelhead juvenile Total catch (no.)	Steelhead juvenile Catch per set (no.)
1/1 -1/21	0	-	-	-	-	-	-	-	-
1/22 -1/28	3	0	0	2	1	0	0	0	0
1/29 -2/4	16	0	0	3	0	0	0	0	0
2/5 -2/11	14	2	0	1	0	0	0	0	0
2/12 -2/18	15	2	0	7	0	0	0	0	0
2/19 -2/25	10	0	0	5	0	0	0	0	0
2/26 -3/4	11	0	0	3	0	0	0	0	0
3/5 -3/11	12	0	0	12	1	0	0	0	0
3/12 -3/18	8	0	0	10	1	0	0	0	0
3/19 -3/25	14	18	1	10	1	0	0	2	0
3/26 -4/1	14	1	0	30	2	0	0	5	0
4/2 -4/8	13	1	0	62	5	2	0	13	1
4/9 -4/15	15	291	19	112	7	1	0	46	3
4/16 -4/22	15	11	1	243	16	3	0	103	7
4/23 -4/29	25	24	1	506	20	96	4	650	26
4/30 -5/6	35	852	24	2840	81	989	28	1991	57
5/7 -5/13	34	1198	35	3102	91	3027	89	3748	110
5/14 -5/20	35	1314	38	2957	84	6045	173	4589	131
5/21 -5/27	35	2415	69	2554	73	5386	154	5865	168
5/28 -6/3	30	440	15	972	32	3112	104	4451	148
6/4 -6/10	28	4848	173	1419	51	1556	56	1929	69
6/11 -6/17	31	5495	177	483	16	1338	43	575	19
6/18 -6/24	17	1475	87	170	10	222	13	99	6
6/25 -7/1	24	2323	97	98	4	112	5	35	1
7/2 -7/8	18	2621	145	96	5	56	3	17	1
7/9 -7/15	12	766	64	11	1	16	1	2	0
7/16 -7/22	17	4543	267	11	1	17	1	5	0
7/23 -7/29	9	498	55	0	0	3	0	1	0
7/30 -8/5	9	255	28	0	0	3	0	1	0
8/6 -8/12	9	184	20	0	0	2	0	0	0
8/13 -8/19	9	143	16	0	0	1	0	0	0
8/20 -8/26	5	45	9	0	0	4	1	0	0
8/27 -9/2	4	18	5	0	0	0	0	0	0
9/3 -9/9	4	67	17	0	0	0	0	0	0
9/10 -9/16	2	4	2	0	0	0	0	0	0
9/17 -9/23	0	-	-	-	-	-	-	-	-
9/24 -9/30	0	-	-	-	-	-	-	-	-
10/1 -10/7	0	-	-	-	-	-	-	-	-
10/8 -10/14	2	6	3	0	0	0	0	0	0
10/15-10/21	6	47	8	0	0	0	0	0	0
10/22-10/28	6	20	3	0	0	0	0	0	0
10/29-11/4	7	60	9	0	0	0	0	0	0
11/5 -11/11	6	123	21	0	0	1	0	0	0
11/12-11/18	6	257	43	0	0	0	0	0	0
11/19-11/25	4	96	24	0	0	0	0	0	0
11/26-12/2	6	27	5	0	0	0	0	0	0
12/3 12/9	4	17	4	0	0	0	0	0	0
12/10-12/31	0	-	-	-	-	-	-	-	-
Totals	599	30507		15719		21992		24127	

Table A3.--Number and percent recovery of juveniles at Jones Beach and adults from mark groups which were identified as replicates or near replicates and used to empirically define variability plus.

REPLICATE GROUPS 1983

Mark (Loc Br Rot) (Ag/D1/D2)	Release Information: Site (source)	Release Information: Number	Release Information: Date (da/mo/yr)	Juvenile catch at Jones Beach a/ (no.)	Juvenile catch at Jones Beach a/ (%)	Adult Recoveries b/ (no.)	Adult Recoveries b/ (%)
	Subyearling chinook salmon						
07/27/27	Bonn. Hat.	50,000	04/May/83	82	0.164		
07/27/28		50,800		90	0.177		
07/27/29	• •	52,600	•	85	0.162		
07/27/30		47,400		86	0.181		
05/11/42	Spring Cr. Hat.	49,700	28/Apr/83	65	0.131		
05/11/43		51,300		71	0.138		
05/11/44	• •	51,700		82	0.159		
05/11/45		52,100		89	0.171		
RD U 3	Bonn. Dam	51,400	02-03/May/83	89	0.173		
RD U 1	(Sp. Cr. Hat.)	53,200		100	0.188		
LD U 3	• •	53,900		107	0.198		
LD U 1		52,800		107	0.203		
07/23/28	Willam River	28,900	26/Apr-19/May/83	17	0.059		
07/28/30	(Stayton Pd.)	24,000		24	0.100		
07/28/31		26,000		19	0.074		
07/28/32		26,200		15	0.057		
07/28/33		24,800		36	0.150		
07/28/34		26,800		16	0.060		
	Yearling chinook salmon						
07/23/63	Bonn. Hat.	45,900	01/Nov/82	123	0.268 c/		
07/25/46		51,600		123	0.238 c/		
07/25/48	• •	50,700		107	0.211 c/		
07/25/45		48,600		107	0.220 c/		
63/24/50	Cowlitz Hat.	8,300	01/Sep/82	1	0.012 c/		
63/26/03		51,200		15	0.029		
63/25/05	• •	73,000	04/Apr/83	18	0.025		
63/25/06		77,500		26	0.034		
	Coho salmon						
63/26/13	Cowlitz Hat.	10,900	03/May/83	19	0.174		
63/26/14		10,400		11	0.106		
63/26/15		10,400		26	0.250		
63/26/16		10,700		16	0.150		
63/26/17		10,000		12	0.120		
63/26/18	• •	10,000	•	8	0.080		
63/26/19		10,200		8	0.078		
63/26/20		10,100		19	0.188		
63/26/21		10,300		16	0.155		
63/26/22		10,500		21	0.200		
63/26/23	• •	10,600	•	24	0.226		
63/26/24		10,200		11	0.108		
63/26/25		10,300		14	0.136		
63/26/26		10,600		7	0.066		
63/26/27		10,400		15	0.144		
63/26/28	• •	10,200	•	19	0.186		
63/26/29		10,300		16	0.155		
63/26/30		10,400		17	0.163		
63/26/31		10,200		17	0.167		
63/26/32		10,600		17	0.160		
63/26/33	• •	10,500	•	21	0.200		
63/26/34		10,100		22	0.218		
63/26/35		10,600		11	0.104		
63/26/36		10,400		16	0.154		
63/26/37		10,500		10	0.095		
63/26/38	• •	10,500	•	17	0.162		
63/26/39		10,100		16	0.158		
63/26/40		10,200		15	0.147		
63/26/41		10,000		13	0.130		
63/26/42		10,700		19	0.178		
05/11/33	Eagle Cr. Hat.	60,500	04/May/83	78	0.129		
05/11/34		62,800		76	0.121		
05/11/35		40,900		45	0.110		
05/11/36		39,300		65	0.165		
05/11/37	• •	20,900	•	32	0.153		
05/11/38		20,300		36	0.177		
07/27/31	Sandy Hat.	54,700	29/Apr/83	32	0.059		
07/27/36		54,900		46	0.084		
07/27/32	• •	54,900	•	34	0.062		
07/27/35		54,600		33	0.060		
07/27/33	• •	54,100	•	36	0.066		
07/27/34		54,700		37	0.068		

Table A3.--cont.

Coho salmon

63/26/51	Washougal Hat.	8,000	27/May/83	7	0.087
63/26/52		7,900		3	0.038
63/26/53		8,000		4	0.050
63/26/54		8,000		7	0.087
63/26/55		7,900		8	0.101
63/26/57	" "	9,700	"	7	0.072
63/26/58		9,900		6	0.061
63/26/59		9,800		4	0.041
63/26/60		9,700		7	0.072
63/26/61	" "	9,900	"	5	0.050
63/26/62		9,900		5	0.050
63/26/63		9,900		10	0.101
63/27/01		9,700		3	0.031
63/27/02		10,000		7	0.070
63/27/03	" "	10,100	"	7	0.069
63/27/04		10,400		7	0.067
63/27/05		10,100		10	0.099
63/27/06		10,600		5	0.047
63/27/07		10,100		3	0.030
63/27/08	" "	10,400	"	3	0.029
63/27/09		10,300		9	0.087
63/27/10		10,400		8	0.077
63/27/11		10,400		5	0.048
63/27/12		10,500		7	0.067
63/27/13	" "	10,000	"	7	0.070
63/27/14		10,900		8	0.073
63/27/15		10,300		8	0.078
63/27/16		10,300		3	0.029
63/27/17		10,600		12	0.113
05/09/28	Willard Hat.	22,600	07/Jun/83	22	0.097
05/09/29		22,200		20	0.090
05/09/30		21,900		18	0.082
05/09/31		22,500		14	0.062
05/09/42		23,300		21	0.090
05/09/43		22,800		17	0.075
05/09/32	" "	23,300	"	16	0.069
05/09/33		20,800		16	0.077
05/09/38		22,200		19	0.085
05/09/39		21,900		23	0.105
05/09/40		20,500		17	0.083
05/09/41		23,000		32	0.139

Table A3.--cont.

Coho salmon

05/09/34	Willard Hat.	23,700	07/Jun/83	19	0.080
05/09/35		22,100		13	0.059
05/09/36		22,700		23	0.101
05/09/37		22,200		15	0.067
05/09/44		23,200		23	0.099
05/09/45		23,300		18	0.077

Steelhead

63/28/39% RA S 1	Lyons Ferry Hat.	33,000	09-13/May/83	96	0.291
63/28/40% RA S 2		32,000		78	0.244
RD KE 2	WHR.Falls/Rad.Butte	1,000	01/Jun/83	1	0.100
RD KE 3		1,000	06/Jun/83	1	0.100

Table A3.--cont.

REPLICATE GROUPS 1982

Release Information: Mark (Loc Dr Hot) (Ag/Dl/D2)	Site (source)	Number	Date (da/mo/yr)	Juvenile catch at Jones Beach a/ (no.)	(%)	Adult Recoveries b/ (no.)	(%)
Subyearling chinook salmon							
05/04/35	Lit.Wh.Sal.Hat.	101,300	02-03/Jun/82	121	0.119		
05/04/36		98,400		146	0.148		
07/23/30	Oxbow Hat.	52,300	04-25/Jun/82	45	0.086		
07/24/11		52,500		46	0.088		
05/10/53	Spring Cr. Hat.	43,100	15/Apr/82	68	0.157	3	0.007
05/10/54		48,500		71	0.146	12	0.025
05/10/55	" "	41,200	"	71	0.172	8	0.019
05/10/56		48,200		64	0.133	7	0.014
05/10/58	Abernathy SCDC	90,600	20/Apr-01/Jun/82	93	0.103	7	0.008
05/10/59		29,700		34	0.114	2	0.007
07/24/14	Bonn. Hat.	51,600	04/Jun/82	34	0.066		
07/24/15		52,400		50	0.095		
07/24/16	" "	52,500	"	45	0.086		
07/24/17		54,100		46	0.085		
05/08/51	Spring Cr. Hat.	46,700	08-13/Apr/82	48	0.103	8	0.017
05/10/57		102,300		105	0.103	10	0.010
LD T 1	Bonn. Dam Hat.	51,800	"	221	0.427		
RD T 1	(Bonn. Hat.)	54,400		199	0.366		
LD T 2	" "	52,900	"	215	0.406		
RD T 2		49,800		159	0.319		
Yearling chinook salmon							
07/25/25	N. Santiam R.	50,600	17/Mar/82	12	0.024		
07/25/26	(Marion Fks Hat.)	50,600		13	0.026		
07/25/27		49,500		26	0.053		
07/25/28	" "	50,000	18-22/Mar/82	14	0.028	1	0.002
07/25/29		49,400		22	0.044	0	0.000
07/25/30		49,200		20	0.041	2	0.004
63/23/09	Cowlitz Hat.	23,900	01/Apr/82	16	0.067	18	0.075
63/23/10		23,200		6	0.026	30	0.129

Table A3.--cont.

Release Information: Mark (Loc Dr Hot) (Ag/Dl/D2)	Site (source)	Number	Date (da/mo/yr)	Juvenile catch at Jones Beach a/ (no.)	(%)	Adult Recoveries b/ (no.)	(%)
Yearling chinook salmon							
63/23/11	Cowlitz Hat.	24,300	01/Apr/82	10	0.041	11	0.045
63/21/34		24,000		9	0.038	20	0.083
10/24/12& RD SU 4	S.FK. Salmon R. (McCall Hat.)	40,700	08-10/Apr/82	16	0.039		
10/24/13& RD SU 2		40,500		25	0.062		
Coho salmon							
05/10/35	Eagle Cr. Hat.	20,000	06/May/82	29	0.145	94	0.470
05/10/36		19,100		42	0.220	77	0.403
05/10/37	" "	42,600	"	68	0.160	176	0.413
05/10/38		42,400		77	0.182	178	0.420
05/10/39	" "	68,200	"	114	0.167	277	0.406
05/10/40		66,600		115	0.173	259	0.389
07/25/49	Sandy Hat.	23,900	30/Apr/82	31	0.129	188	0.783
07/25/57		28,100		43	0.153	180	0.641
07/25/50	" "	26,400	"	50	0.189	222	0.841
07/25/58		27,800		36	0.129	199	0.713
07/25/54	" "	27,600	"	46	0.167	187	0.678
07/25/51		27,200		34	0.125	166	0.608
07/25/55	" "	28,200	"	33	0.117	213	0.753
07/25/53		25,900		25	0.096	168	0.646
07/25/56	" "	27,600	"	43	0.156	190	0.688
07/25/52		26,800		36	0.134	241	0.896
63/24/20	Cowlitz Hat.	9,700	03/May/82	18	0.184	89	0.908
63/24/21		9,800		15	0.154	77	0.778
63/24/22		10,300		25	0.240	93	0.894
63/24/23		10,200		18	0.175	85	0.825
63/24/24		10,100		19	0.189	103	1.020
63/24/25	" "	10,500	"	13	0.124	145	1.381
63/24/26		10,400		15	0.143	110	1.048
63/24/27		10,400		15	0.144	114	1.096
63/24/28		10,500		18	0.171	106	1.010
63/24/29		10,400		11	0.106	116	1.115
63/24/30	Cowlitz Hat.	10,500	03/May/82	17	0.160	97	0.915
63/24/31		10,500		13	0.123	102	0.962
63/24/32		10,100		16	0.157	92	0.902
63/24/33		10,400		17	0.163	100	0.962
63/24/34		10,400		18	0.171	83	0.790

Coho salmon

63/24/35	Cowlitz Hat.	10,300	03/May/82	18	0.175	98	0.951
63/24/36		10,300		20	0.194	122	1.184
63/24/37		10,100		17	0.168	101	1.000
63/24/38		10,200		20	0.196	119	1.167
63/24/39		10,300		17	0.165	115	1.117
63/24/40	" "	10,500	"	24	0.226	143	1.362
63/24/41		10,600		16	0.150	135	1.243
63/24/42		10,600		17	0.159	133	1.243
63/24/43		10,400		22	0.219	142	1.381
63/24/44		10,700		22	0.206	122	1.140
63/24/45	" "	10,200	"	16	0.157	140	1.359
63/24/46		10,300		21	0.202	136	1.308
63/24/47		10,500		24	0.226	122	1.151
63/24/48		10,200		15	0.146	113	1.097
63/24/49		10,000		19	0.188	105	1.040
07/24/29	Cascade Hat.	27,700	25/May/82	25	0.090	111	0.401
07/24/33		26,200		30	0.106	121	0.429
63/25/13	Washougal Hat.	10,100	25/May/82	9	0.088	42	0.412
63/25/14		9,800		9	0.091	33	0.333
63/25/15		10,200		14	0.136	29	0.282
63/25/16		9,900		6	0.061	35	0.354
63/25/17		9,800		6	0.061	44	0.449
63/25/18	" "	10,100	"	6	0.059	38	0.376
63/25/19		10,100		8	0.079	39	0.386
63/25/20		10,000		4	0.040	37	0.366
63/25/21		10,200		4	0.039	43	0.422
63/25/22		10,200		12	0.117	37	0.359
63/25/23	" "	10,100	"	7	0.069	59	0.578
63/25/24		10,000		4	0.040	38	0.376
63/25/25		10,100		5	0.050	66	0.653
63/25/26		10,100		7	0.069	30	0.294
63/25/27		10,000		9	0.089	51	0.505
63/25/28	" "	10,100	"	9	0.089	61	0.604
63/25/29		10,100		12	0.118	42	0.412
63/25/30		10,100		10	0.099	60	0.594
63/25/31		10,000		4	0.040	47	0.470
63/25/32		9,900		3	0.030	58	0.586
63/25/33	" "	9,600	"	8	0.082	26	0.268
63/25/34		9,600		9	0.094	39	0.406
63/25/35		9,600		5	0.052	40	0.412
63/25/36		9,500		7	0.073	30	0.313
63/25/37		9,600		11	0.113	35	0.361

Table A3.--cont.

Coho salmon

63/25/38	Washougal Hat.	8,000	25/May/82	8	0.100	22	0.275
63/25/39		7,900		8	0.101	47	0.595
63/25/40		8,100		2	0.025	30	0.370
63/25/41		8,100		4	0.049	37	0.457
63/25/42		7,900		7	0.088	31	0.388

Steelhead

10/24/04	Pahsimeroi R.	40,100	09/Apr/82	56	0.139	160	0.398
10/24/50	(Niagara Spr.Hat.)	40,500		47	0.116	144	0.356

Table A3.--cont.

REPLICATE GROUPS 1981

Mark (Loc Br Hat) (Ag/D1/D2)	Release Information: Site (source)	Number	Date (da/mo/yr)	Juvenile catch at Jones Beach a/ (no.)	(%)	Adult Recoveries b/ (no.)	(%)
	Subyearling chinook salmon						
05/07/44	Abernathy SCDC	22,300	15-26/Apr/81	11	0.050	71	0.318
05/07/45		74,100		48	0.065	197	0.265
07/23/41	Bonn. Hat.	50,800	12/May/81	45	0.090	37	0.073
07/23/42		51,600		45	0.088	24	0.047
07/23/43	• •	53,200	•	59	0.112	30	0.056
07/23/44		51,800		55	0.107	59	0.114
07/23/45	• •	51,000	•	41	0.081	10	0.020
07/23/46		50,800		58	0.115	32	0.063
05/07/47	Lit.Wh.Sal.Hat.	183,400	04-05/Jun/81	117	0.065	12	0.007
05/08/49		52,400		43	0.083	1	0.002
05/08/50		13,300		4	0.031	1	0.007
05/07/43	Rock Creek	25,700	21-22/Apr/81	10	0.040	50	0.194
05/07/46	(Spring Cr. Hat.)	150,500		56	0.038	311	0.207
05/07/40	Spring Cr. Hat.	104,600	25/Mar/81	63	0.061	42	0.040
05/07/48		28,800		12	0.042	8	0.028
05/07/50	• •	13,700	•	9	0.066	1	0.007
05/07/51		15,300		8	0.053	6	0.039
05/07/41	• •	76,700	15/Apr/81	78	0.103	54	0.070
05/07/49		30,900		35	0.114	25	0.081
	Yearling chinook salmon						
10/22/21	Lemhi R.	50,000	08/Apr/81	7	0.015	10	0.020
10/22/22	(Hayden Pd.)	51,000		7	0.014	4	0.008
10/05/19	Kooskia Hat.	17,900	07/Apr/81	2	0.012	0	0.000
10/22/19		37,700		3	0.009	2	0.005
10/22/20		38,600	08/Apr/81	4	0.011	1	0.003
07/22/47	N. Santiam R.	49,900	05/Nov/80	4	0.009	8	0.016
07/22/48	(Marion Fks. Hat.)	49,900	06-07/Nov/80	5	0.011	11	0.022
07/22/51	• •	47,100	16-23/Mar/81	7	0.015	22	0.047
07/22/50		49,600	17-20/Mar/81	7	0.015	20	0.040
07/22/49		50,200	18-20/Mar/81	10	0.020	24	0.048
07/22/53	• •	42,200	16-24/Mar/81	10	0.025	27	0.064
07/22/52		39,600	23-24/Mar/81	10	0.026	34	0.086

Table A3.--cont.

	Yearling chinook salmon						
10/21/17	S. Fk. Salmon	40,400	06/Apr/81	17	0.043	34	0.084
10/21/18	(McCall Hat.)	40,800		18	0.045	d>	
10/21/28		47,600		19	0.040	25	0.052
07/22/18	McKenzie@Leaburg	32,300	05/Nov/81	1	0.003	23	0.071
07/22/21	(McKenzie Hat.)	37,900		4	0.011	17	0.045
07/22/17	• •	30,100	16/Mar/81	4	0.014	22	0.073
07/22/20		35,600		11	0.032	97	0.272
07/22/22		36,000		11	0.031	91	0.253
10/22/36	Rapid R. Hat.	49,000	12/Apr/81	3	0.007	d>	
10/22/37		44,200		7	0.016	2	0.005
10/22/38		51,900		10	0.020	1	0.002
05/08/22	Warm Sp. R.@Hat.	66,700	02/Apr/81	20	0.030	3	0.004
05/08/24		32,300		4	0.014	0	0.000
05/08/23	• •	170,100	09-16/Apr/81	48	0.029	10	0.006
05/08/25		85,900	09/Apr/81	16	0.019	3	0.003
	Coho salmon						
07/22/55	Bonn. Hat.	27,600	01/May/81	21	0.077	107	0.387
07/22/57		28,900		16	0.056	91	0.314
07/22/56	• •	27,300	•	20	0.074	91	0.333
07/22/58		28,000		12	0.044	90	0.321
07/22/59	• •	29,800	•	34	0.114	129	0.432
07/22/62		27,700		25	0.091	118	0.425
07/22/60	• •	28,100	•	17	0.061	116	0.413
07/22/63		29,600		18	0.061	112	0.378
07/22/61	Bonn. Hat.	29,700	01/May/81	20	0.067	119	0.400
07/23/01		28,800		22	0.077	113	0.391
07/21/27	Tanner Creek	24,900	06/May/81	24	0.098	118	0.474
07/21/30	(Cascade Hat.)	26,600		28	0.105	129	0.483
07/21/28	• •	27,900	08/Jun/81	21	0.076	267	0.957
07/21/31		26,000		25	0.097	185	0.709
07/21/29	• •	27,700	06/Jul/81	13	0.048	181	0.653
07/21/32		28,900		19	0.067	147	0.508
RA IY 1	Rock Island	5,000	24/May/81	2	0.041		
RA IY 2	(Turtle Rock Pd)	4,900	25/May/81	1	0.021		
LA IY 1	• •	5,000	27/May/81	2	0.040		
LA IY 2		4,900	28/May/81	1	0.021		

Table A3.--cont.

			Coho salmon				
LA IN 2	Rock Island	1,000	01/Jun/81	1	0.101		
LA IN 4	(Turtle Rock Pd)	1,000		1	0.101		
63/21/50	Washougal Hat.	51,700	30/Apr/81	45	0.088	366	0.707
63/22/02		51,900		46	0.089	226	0.435
63/21/51	• •	52,800	27/May/81	35	0.068	955	1.805
63/22/03		52,400		35	0.068	1521	2.901
			Steelhead				
10/22/41	Pahsimeroi R.	37,500	30/Mar/81	32	0.086	[illegible]	
10/22/42	(Niagara Sp. Hat.)	37,900		19	0.051	74	0.195
10/22/43		38,400	01/Apr/81	20	0.052	111	0.288
LA P 2	Clarkston	1,700	01/May/81	3	0.175		
LA S 1	(Lo Granite)	2,200		3	0.137		
LA P 3	• •	5,500	05-09/May/81	10	0.181		
LA S 2		6,800		13	0.191		

Table A3.--cont.

REPLICATE GROUPS 1980

Release Information				Juvenile catch at Jones Beach a/		Adult Recoveries b/	
Mark (Loc Br Hat) (Ag/D1/D2)	Site (source)	Number	Date (da/mo/yr)	(no.)	(%)	(no.)	(%)
			Subyearling chinook salmon				
07/21/33	Bonn. Hat.	50,400	27/May/80	12	0.024	17	0.034
07/21/34		49,900		14	0.029	24	0.048
07/21/35	• •	48,000	•	24	0.051	10	0.021
07/21/36		49,400		26	0.053	21	0.043
07/21/62	Skamania Lt.	50,100	27-28/May/80	21	0.042	21	0.042
07/21/63	(Oxbow Hat.)	53,000		20	0.039	32	0.060
05/06/48	Blw. Bonn. Dam	99,500	19/May/80	40	0.042	1104	1.109
05/06/49	(Spring Cr. Hat.)	99,700		31	0.033	1021	1.024
			Yearling chinook salmon				
LD IL 2	Methow R.@Mo.	15,000	05/May/80	5	0.034		
RD IL 2	(Leavenworth Hat.)	13,800		2	0.015		
LD F 1	• •	16,400	10/May/80	6	0.037		
RD F 1		15,200		2	0.014		
LD IY 1	• •	15,200	13/May/80	7	0.046		
RD IY 1		13,300		1	0.008		
LD IL 3	Pr. Rapid	15,200	20/May/80	5	0.033		
RD IL 3	(Leavenworth Hat.)	14,700		4	0.028		
LD F 2	• •	16,200	22/May/80	3	0.019		
RD F 2		15,400		13	0.084		
LD IY 2	• •	15,200	27/May/80	16	0.105		
RD IY 2		13,200		7	0.053		
LA FF 1%	Wh. Bluffs	32,600	24/Apr/80	13	0.040		
03/49/02	(Leavenworth Hat.)	32,600		13	0.040		
LA 3 1 %		35,400		16	0.046		
03/50/02		35,400		16	0.046		
LI IL 1	Richland	15,900	22/May/80	4	0.026		
RD IL 1	(Leavenworth Hat.)	13,600		6	0.044		
LD F 3	• •	16,200	26/May/80	6	0.037		
RD F 3		15,800		8	0.051		

Table A3.--cont.

Yearling chinook salmon

LD IY 3	Richland	15,400	29/May/80	10	0.065		
RD IY 3	(Leavenworth Hat.)	13,900		6	0.044		
LA PI 2	Icicle Creek	32,900	27/May/80	6	0.019		
LA PI 4	(Leavenworht Hat.)	43,000	01/May/80	4	0.013		
LA PI 1		32,700	24/Apr/80	4	0.013		
RA 9 1	Dalton Pt.	32,400	24/Apr/80	14	0.044		
RA IA 1	(Leavenworth Hat.)	32,900		22	0.068		
RA 9 2	• •	32,700	27/Apr/80	15	0.047		
RA IA 2		32,800		29	0.090		
07/20/43	Dexter	31,300	05/Nov/79	5	0.017	34	0.109
07/20/45	(Oakridge Hat.)	30,800		6	0.020	41	0.133
RA IA 3 1	Dalton Pt.	32,600	01/May/80	34	0.101		
03/54/02	(Leavenworht Hat.)	32,600		34	0.101		
RA 9 3		32,400		27	0.084		
07/20/18	Blw. Willam Fall	34,700	05-06/Nov/79	3	0.009	3	0.009
07/20/19	(S. Santiam Hat.)	35,000		4	0.012	6	0.017
07/20/20	Foster	33,000	•	2	0.007	20	0.061
07/20/21	(S. Santiam Hat.)	34,800		1	0.003	19	0.055
07/20/22		34,200		1	0.003	16	0.047
07/20/48	McKenzie Hat.	31,000	15/Mar/80	18	0.059	31	0.100
07/20/51		29,400		13	0.045	12	0.041
07/20/42	Dexter	30,700	10-11/Mar/80	20	0.066	294	0.957
07/20/44	(Oakridge Hat.)	30,700	10/Mar/80	25	0.082	265	0.862
07/19/49	Deschutes R.	28,100	14/Apr/80	15	0.054	0	0.000
07/19/50	(Rnd. Butte Hat.)	29,900		8	0.027	2	0.007
07/19/51		29,100	14-15/Apr/80	7	0.025	5	0.017
07/19/45	S. Santiam Hat.	29,400	14/Mar/80	23	0.079	49	0.167
07/19/46		29,900		19	0.065	15	0.050
07/19/47	Blw. Willam Fall	32,100	13-14/Mar/80	36	0.113	22	0.069
07/19/48	(S. Santiam Hat.)	28,500		30	0.107	47	0.165
10/21/25	Lemhi R.	40,100	01-03/Apr/80	2	0.005	18	0.045
10/21/26	(Hayden Cr. Pd.)	41,100	03-04/Apr/80	4	0.010	11	0.027

Coho salmon

07/20/31	Sandy Hat.	25,100	01/May/80	16	0.064	30	0.119
07/20/33		25,100		15	0.060	26	0.103
07/20/32	• •	25,500	•	16	0.063	30	0.117
07/20/34		25,200		17	0.068	48	0.190

Table A3.--cont.

Coho salmon

07/20/35	Sandy Hat.	25,900	01/May/80	12	0.047	40	0.154
07/20/36		24,400		20	0.083	46	0.188
07/20/37	• •	26,000	•	13	0.050	60	0.230
07/20/38		26,400		20	0.076	43	0.162
63/19/31	Toutle Hat.	38,600	07/May/80	43	0.112	213	0.552
63/20/58		39,400		31	0.080	132	0.334
LD 52 1	Rocky Reach Fore	24,100	13/May/80	7	0.029		
RD 52 1	(Turtle R. Pd.)	24,100		5	0.021		
LD 52 2	Rocky Reach Tail	25,400	•	10	0.040		
RD 52 2	(Turtle R. Pd.)	22,400		5	0.023		
LD IX 2	Rocky Reach Fore	27,100	16/May/80	5	0.019		
RD IX 2	(Turtle R. Pd.)	24,800		2	0.009		
LD IH 2	• •	24,900	19/May/80	8	0.033		
RD IH 2		27,200		3	0.012		
LD IH 3	Rocky Reach Tail	27,900	•	4	0.015		
RD IH 3	(Turtle R. Pd.)	25,400		6	0.024		
63/20/39	Washougal Hat.	99,600	08/May/80	82	0.084	685	0.687
63/20/40		98,600		68	0.070	688	0.697
63/20/37	• •	97,200	09/Jun/80	53	0.056	2400	2.467
63/20/38		97,800		65	0.068	2276	2.327
63/19/54	• •	106,700	07/Jul/80	126	0.119	4544	4.257
63/19/55		106,900		118	0.112	4409	4.121
05/03/59	Lit. Wh. Sal. R.	42,300	23/May/80	12	0.030	137	0.323
05/06/54	(Willard Hat.)	51,500		6	0.012	157	0.305
05/06/60	Blw. Bonn. Dam	33,700	24/May/80	3	0.009	74	0.219
05/06/50	(Willard Hat.)	47,900	25/May/80	8	0.018	117	0.244
05/06/55		51,400		18	0.036	123	0.239

Steelhead

RD X3 1	Pahsimeroi R.	5,400	04/Feb-27/Apr/80	1	0.019		
LA SU 1	(Dworshak Hat.)	5,000	23-27/Apr/80	1	0.020		
RD IU 2	Lemhi R.	10,500	22/Apr/80	2	0.019		
LA SU 4	(Dworshak Hat.)	10,100	24/Apr/80	2	0.020		
LA X3 3	Dworshak Hat.	10,100	29/Apr/80	2	0.020		
RA DT 3		9,700		2	0.021		
10/21/56	Pahsimeroi	49,900	06-16/Apr/80	26	0.054	241	0.483
10/21/57	(Niagara Sp. Hat.)	50,300	07-17/Apr/80	31	0.062	207	0.411

Table A3.--cont.

Mark (Loc Br Rot) (Ag/D1/D2)	Release Information: Site (source)	Number	Date (da/mo/yr)	Juvenile catch at Jones Beach a/ (no.)	(%)	Adult Recoveries b/ (no.)	(%)
	Steelhead						
LD Y 1	Wells D. Fore.	13,400	01/May/80	1	0.008		
RD Y 1	(Wells Spw. Ch.)	13,000		1	0.008		
LD Y 3	Wells D. Tail.	13,000	•	2	0.016		
RD Y 3	(Wells Spw. Ch.)	12,200		1	0.009		
LD K 3	Wells D. Fore.	14,300	03/May/80	1	0.007		
RK K 3	(Wells Spw. Ch.)	13,600		1	0.008		
LD K 2	Wells D. Tail.	13,100	•	2	0.016		
RD K 2	(Wells Spw. Ch.)	13,000		1	0.008		
LD IJ 3	Wells D. Fore.	13,100	05/May/80	1	0.008		
RD IJ 3	(Wells Spw. Ch.)	11,200		1	0.009		

Table A3.--cont.

REPLICATE GROUPS 1979

Mark (Loc Br Rot) (Ag/D1/D2)	Release Information: Site (source)	Number	Date (da/mo/yr)	Juvenile catch at Jones Beach a/ (no.)	(%)	Adult Recoveries b/ (no.)	(%)
	Subyearling chinook salmon						
LD IC 1	John Day D.	20,000	06/Jun/79	29	0.146		
LD IC 2	(Spring Cr. Hat.)	20,400		21	0.103		
LD IC 3		19,800		20	0.101		
LD IF 1	• •	19,600	05/Jun/79	19	0.097		
LD IF 2		20,100		6	0.030		
LD IF 3		20,200		15	0.074		
LD IK 1	• •	19,500	•	17	0.087		
LD IK 2		19,500		10	0.052		
LD IK 3		19,500		19	0.098		
LD PI 1	• •	21,200	06/Jun/79	17	0.081		
LD PI 2		20,200		24	0.119		
LD PI 3		19,600		22	0.113		
RD IC 1	• •	24,800	•	26	0.106		
RD IC 2		20,000		19	0.095		
RD IC 3		20,200		21	0.105		
RD PI 1	• •	20,100	•	30	0.150		
RD PI 2		20,300		23	0.114		
RD PI 3		20,100		21	0.105		
RD IF 1	• •	20,100	05/Jun/79	16	0.080		
RD IF 2		20,100		18	0.090		
RD IF 3		19,700		23	0.117		
RD IK 1	• •	21,500	•	30	0.140		
RD IK 2		20,700		33	0.160		
RD IK 3		19,000		28	0.149		
03/55/01	Big Wh. Pd.	28,500	26/Jun/79	25	0.088	1	0.004
03/56/01	(Spring Cr. Hat.)	34,700		17	0.049	2	0.006
03/57/01		36,300		11	0.031	0	0.000
05/04/34	Spring Cr. Hat.	95,500	20/Apr/79	196	0.206	d/	
05/04/44		135,500		281	0.208	d/	
05/04/48	Lit. Wh. Hat.	177,800	22/Jun/79	254	0.144	23	0.013
05/04/49		264,800		412	0.156	24	0.009

Table A3.--cont.

Yearling chinook salmon

10/04/15	Rapid R.	127,000	15/Mar-15/Apr/79	30	0.024	115	0.091
10/04/24	(Dworshak Hat.)	122,000		48	0.040	107	0.088
LD IH 1	Vantage Brid	49,800	11/May/79	85	0.172		
RD IZ 4	(Leavenworth Hat.)	55,900		94	0.168		
LD IZ 1	• •	62,600	12/May/79	95	0.152		
RK IZ 2		50,000		94	0.189		
RD IH 1	Wanapum D.	38,400	13/May/79	92	0.240		
RD IZ 1	(Leavenworth Hat.)	49,000		101	0.208		
LD IZ 2	• •	52,400	14/May/79	83	0.159		
RK IZ 3		62,500		100	0.160		
07/17/27	N. Santiam	43,900	06/Nov/78	10	0.023	11	0.025
07/17/28	(Marion Fks. Hat.)	48,900		8	0.016	25	0.051
05/03/52	Willard Hat.	35,500	01/Nov/78	5	0.006 c/	0	0.000
05/03/53		35,700		1	0.003	1	0.003
05/03/54		36,900		1	0.003	1	0.000
07/19/26	S. Santiam Hat.	31,500	07/Nov/78	4	0.013 c/	60	0.190
07/19/27		32,700		1	0.003c/39	0.119	
07/19/28		21,100		3	0.014	58	0.275
07/19/29	Blw. Willam Fall	32,600	•	6	0.018c/66	0.202	
07/19/30	(S. Santiam Hat.)	32,800		12	0.037	102	0.311
07/16/26	Mill Creek	51,500	08-09/Nov/78	9	0.017 c/	23	0.045
07/19/17	(Bonn. Hat.)	48,200		10	0.022	20	0.041
07/19/18		51,100		8	0.016	27	0.053
05/03/49	Lit. Wh. Hat.	31,100	19/Apr/79	20	0.065	20	0.064
05/03/50	(Willard Hat.)	31,200		12	0.039	24	0.077
05/03/51		32,900		10	0.032	30	0.091
07/17/25	N. Santiam	49,600	03-05/Apr/79	32	0.066	17	0.034
07/17/26	(Marion Fks. Hat.)	49,600		21	0.043	18	0.036
07/17/29		44,900		37	0.082	22	0.082
07/17/30	N. Santiam	48,100	03/Apr/79	29	0.060	168	0.349
07/17/31	(Marion Fks. Hat.)	49,300		35	0.071	250	0.507
07/17/32		50,600		37	0.073	219	0.433
07/17/47	Eagle Creek Hat.	46,200	01/Mar/79	39	0.086	19	0.041
07/17/48		48,200		50	0.104	48	0.099
07/19/19	S. Santiam R.	31,600	21/Mar/79	24	0.077	52	0.164
07/19/20	(Oakridge Hat.)	32,800		32	0.099	36	0.110
07/19/21		32,400		38	0.118	26	0.080

Table A3.--cont.

Yearling chinook salmon

07/19/22	Blw. Willam Fall	34,200	23/Mar/79	45	0.132	4	0.012
07/19/23	(Oakridge Hat.)	34,500		60	0.175	36	0.104
07/19/24		36,300		46	0.131	11	0.130
63/18/15	Cowlitz Hat.	22,900	23/Apr/79	34	0.148	634	2.760
63/18/16		24,400		36	0.147	590	2.409
63/18/17	• •	24,000	•	35	0.146	823	3.418
63/18/18		24,300		34	0.140	629	2.584

Coho salmon

07/19/08	Tanner Creek	27,900	07/May/79	18	0.065	144	0.515
07/19/11	(Cascade Hat.)	26,900		18	0.068	169	0.627
07/19/07	• •	27,100	•	37	0.137	299	1.101
07/19/10		25,900		32	0.124	344	1.327
07/19/09	Tanner Creek	24,500	06/Jul/79	50	0.204	192	0.781
07/19/12	(Cascade Hat.)	25,100		56	0.223	248	0.986
63/19/11	Toutle Hat.	42,400	07/May/79	46	0.109	540	1.273
63/19/12		34,600		40	0.117	476	1.372
63/19/13	• •	40,400	07/Jun/79	103	0.255	527	1.301
63/17/58		39,700		107	0.270	742	1.866
63/19/28	Toutle Hat.	39,700	06/Jul/79	109	0.275	299	0.752
63/19/29		41,100		96	0.234	349	0.848
63/19/23	Washougal Hat.	74,300	07/May/79	81	0.110	1022	1.374
63/19/24		80,600		87	0.109	1356	1.681
63/19/25	• •	73,000	07/Jun/79	120	0.166	703	0.963
63/19/26		82,800		119	0.145	1427	1.722
63/19/27	• •	81,000	06/Jul/79	197	0.244	1080	1.333
63/19/34		82,000		191	0.233	1006	1.226

Steelhead

RA Y 1 % WHLBWH	Blw. Bonn. Dam (Chelan Hat.)	23,300	28/Apr/79	38	00164	92	0.394
RA Y 2 % WHLBRD		24,300		21	0.087	77	0.399
RA Y 3 % WHLBUR		22,800		21	0.095	65	0.285

Table A3.--cont.

		Steelhead					
LA AN 13 WHLBYW	Icicle Creek (Chelan Hat.)	23,900	26/Apr/79	22	0.093	108	0.451
LA AN 24 WHLBRK		19,100		14	0.074	76	0.396
LA AN 35 WHLBLU		24,100		19	0.080	92	0.381
RA T 4	Blw. Bonn. Dam	20,700	17/May/79	90	0.434		
RA Y 4	(Tucannon Hat.)	22,000		68	0.308		
LD P 1	Wells Dam	10,000	04/May/79	2	0.021		
LD P 3	(Wells Spaw. Ch.)	10,000		1	0.010		
RD P 1	• •	10,000	•	4	0.041		
RD P 3		9,600		2	0.021		

Table A3.--cont.

REPLICATE GROUPS 1978

Release Information				Juvenile catch at Jones Beach a/		Adult Recoveries b/	
Mark (Loc Br Hat) (Ag/D1/D2)	Site (source)	Number	Date (da/mo/yr)	(no.)	(%)	(no.)	(%)
		Subyearling chinook salmon					
05/03/39	Spring Creek Hat.	49,900	18/Aug/78	6	.014	172	0.345
05/03/40		52,000		7	.014	235	0.451
05/03/41		50,500		6	.012	182	0.360
05/60/01	• •	98,100	18/Apr/78	153	.157	d>	
05/62/01		92,300		175	.191	d>	
05/03/43	Lit. Wh. Hat.	49,500	25/May/78	96	0.195	4	0.008
05/03/44		51,300		107	0.209	3	0.006
05/03/45		52,100		127	0.244	1	0.002
05/03/46	• •	49,800	•	114	0.230	5	0.010
05/03/47		49,400		99	0.202	4	0.008
05/03/48	• •	49,500	•	121	0.246	1	0.002
05/03/55	• •	39,300	12/Jul/78	15	0.039	15	0.038
05/03/56		40,100		18	0.046	11	0.027
05/03/57		39,100		28	0.072	17	0.043
05/03/42	• •	50,500	24/May/78	106	0.740	3	0.006
05/61/01		48,400		117	0.243	8	0.017
05/63/01		52,200		105	0.202	6	0.011
07/17/08	Abv. Willam Fall	50,900	31/May/78	44	0.087	43	0.084
07/17/10	(Stayton Pd.)	51,100	01/Jun/78	52	0.102	56	0.109
		Yearling Chinook Salmon					
09/16/27	S. Santiam Hat.	28,700	07/Nov/77	2	0.008	186	0.647
09/16/29		28,700		1	0.004	137	0.477
09/16/61	N. Santiam Hat.	48,600	13-14/Mar/78	17	0.036	17	0.035
09/16/62	(Marion Fks. Hat.)	45,900		22	0.049	18	0.039
09/16/63		50,200		17	0.034	18	0.036
09/17/01	• •	49,100	•	28	0.058	d>	
09/17/02		49,600		22	0.046	d>	
09/17/03		50,000		22	0.044	d>	
09/16/23	Blw. Willam Fall	26,900	•	30	0.113	294	1.092
09/16/24	(S. Santiam Hat.)	24,600		25	0.102	294	1.195

			Yearling chinook salmon				
63/16/01	Klickitat Hat.	144,800	31/Mar/78	73	0.051	d>	
63/16/02		146,300		76	0.053	d	
63/16/12	Cowlitz Hat.	28,200	08/Mar/78	34	0.122	1549	5.559
63/16/13		27,700		27	0.098	1074	3.869
63/17/09	• •	89,400	•	124	0.139	2882	3.223
63/17/10		87,900		109	0.125	3257	3.703
63/17/11	• •	58,200	•	77	0.133	3071	5.271
63/17/12		56,900		85	0.150	2943	5.166
63/17/17	• •	71,300	•	70	0.099	2683	3.763
63/17/18		69,400		64	0.093	2293	3.302
09/16/61	Minto	48,600	13-14/Mar/78	17	0.036	17	0.039
09/16/62	(Marion Fks.)	45,900		22	0.049	17	0.037
09/16/63		50,200		17	0.034	18	0.036
07/16/11	Rnd. Butte Hat.	46,400	31/May/78	33	0.072	d>	
07/16/12		46,200		34	0.074	d>	
09/16/30	Blw. Willam Fall	25,900	08/Nov/77	4	0.015	72	0.277
09/16/31	(S. Santiam Hat.)	29,000		3	0.010	95	0.327
WHRDLB RAL1	Blw. Bonn. Dam	37,000	09/May/78	26	0.070		
WHRDPK RAL2	(Kooskia Hat.)	36,900		22	0.060		
RAL3		35,400		20	0.056		
			Coho salmon				
LA ID 1	John Day Dam	31,400	09/May/78	33	0.105		
LA ID 2	(Carson Hat.)	31,500		37	0.119		
LA ID 3		32,300		22	0.069		
RA ID 1	• •	33,000	22/May/78	28	0.085		
RA ID 2		33,000		17	0.053		
RA ID 3		33,000		12	0.037		
LD IJ 1	Blw. Bonn. Dam	31,500	18/May/78	13	0.042		
LD IJ 2	(Carson Hat.)	33,100		17	0.053		
LD IJ 3		32,300		27	0.085		

Table A3.--cont.

REPLICATE GROUPS 1977

Release Information				Juvenile catch at Jones Reach a/		Adult Recoveries b/	
Mark (Loc Br Rot) (Ag/D1/D2)	Site (source)	Number	Date (da/mo/yr)	(no.)	(%)	(no.)	(%)
			Subyearling chinook salmon				
05/44/01	Spring Creek Hat.	96,700	08/Apr/77	216	0.223	d>	
05/45/01		95,800		207	0.216	d>	
05/49/01RD U 1		75,800		215	0.284	d>	
05/41/01	Big Wh. Pd.	87,700	18/Apr/77	358	0.409	219	0.250
05/42/01	(Spring Creek Hat.)	91,400		333	0.366	159	0.174
09/16/06	Blw. Willam Fall	92,000	02-04/Apr/77	238	0.259	27	0.029
09/16/11	(Aumsville Pd.)	46,400		143	0.309	17	0.037
09/16/07		43,500		123	0.284	17	0.039
09/16/12	Abv. Willam Fall	44,600	•	106	0.239	19	0.043
09/16/13	(Aumsville Pd.)	43,100		103	0.239	20	0.046
			Yearling chinook salmon				
13/09/11	Cowlitz Hat.	88,000	08/Mar/77	44	0.050	2586	2.937
13/09/12		88,600		36	0.041	3118	3.516
13/09/14	• •	61,700	•	31	0.051	3361	5.440
13/11/04		61,600		24	0.039	2615	4.241
13/13/01	• •	28,700	•	12	0.042	1392	4.842
13/13/04		27,900		12	0.043	1967	7.033
09/16/02	Rnd. Butte Hat.	29,400	02/May/77	2	0.007	0	0.000
09/16/01		31,700		2	0.007	2	0.006
			Coho salmon				
05/20/04	Willard Hat.	88,300	02-04/May/77	20	0.023	d>	
05/21/04		93,800		21	0.024	d>	
06/05/14	Sandy Hat.	24,800	27/Apr/77	8	0.034	421	1.671
06/06/01		25,800		7	0.028	341	1.321
06/05/15	Sandy Hat.	24,400	27/Apr/77	8	0.034	418	1.708
06/06/03		22,800		6	0.027	339	1.483
06/06/02	• •	20,100	•	6	0.030	382	1.897
06/06/04		23,400		10	0.044	459	1.960
LA XJ 1	Pasco	16,600	01/May/77	3	0.019		
RA XJ 1	(Turtle Rock Pd.)	16,600		1	0.007		

Table A.--cont.

Steelhead

10/13/07	Blw. Bonn. Dam	17,000	21/May/77	4	0.024	10	0.059
10/13/09	(Dworshak Hat.)	17,300		3	0.017	20	0.116
10/13/11	Clearwater R.	57,200	20-21/Apr/77	7	0.016	52	0.124
10/13/13	(Dworshak Hat.)	31,100		5	0.016	38	0.122
10/02/36	Pahsimeroi R.	55,400	05-10/Apr/77	2	0.004	9	0.016
10/02/35	(Niagra Sp. Hat.)	59,300		5	0.010	9	0.015

a/ Actual catch and percent of number released for beach seine and purse seine combined.

b/ Observed recoveries from ocean and river fisheries plus escapement; preliminary data.

c/ Includes fall catch as well as spring catch.

d/ Not used for adult recovery comparison due to probable survival difference is salt water due to treatment.

Table A4.--Weekly mean water temperatures and secchi disk readings at Jones Beach plus river flow and spillway rates at Bonneville Dam, 1983.

Date (mo./day)	Water temp. (°C)	Secchi Z_{SD} (cm)	River Flow a/ Total ($1000m^3/s$)	River Flow a/ Spill ($1000m^3/s$)
1/26- 1/28	6	30	5.8	0.0
1/29- 2/4	6	60	6.2	0.0
2/5 - 2/11	5	76	6.5	0.0
2/12- 2/18	6	42	6.4	0.0
2/19- 2/25	7	40	8.2	0.7
2/26- 3/4	7	47	9.2	3.1
3/5 - 3/11	8	59	9.9	4.7
3/12- 3/18	8	45	10.4	5.1
3/19- 3/25	8	59	10.0	5.1
3/26- 4/1	8	59	9.4	2.8
4/2 - 4/8	9	44	8.5	1.7
4/9 - 4/15	9	58	7.6	1.9
4/16- 4/22	11	74	6.6	0.3
4/23- 4/29	12	67	9.1	1.6
4/30- 5/6	12	72	8.7	1.1
5/7 - 5/13	12	67	9.3	1.8
5/14- 5/20	13	69	8.0	3.4
5/21- 5/27	16	67	8.9	3.4
5/28- 6/3	17	71	11.3	4.3
6/4 - 6/10	16	72	9.9	4.3
6/11- 6/17	17	66	8.5	3.9
6/18- 6/24	16	70	7.2	2.2
6/25- 7/1	17	96	5.9	0.6
7/2 - 7/8	18	78	6.3	2.5
7/9 - 7/15	18	71	5.7	1.8
7/16- 7/22	19	64	6.7	2.7
7/23- 7/29	20	75	6.0	1.8
7/30- 8/5	21	103	5.7	0.9
8/6 - 8/12	21	97	5.1	0.2
8/13- 8/19	21	97	4.7	0.0
8/20- 8/26	22	91	4.5	0.0
8/27- 9/2	21	100	4.0	0.0
9/3 - 9/9	19	97	3.6	0.0
9/10- 9/16	19	--	3.4	0.0
9/17- 9/23	18	--	3.7	0.0
9/24- 9/30	--	--	3.3	0.0
10/1 -10/7	--	--	3.3	0.0
10/8 -10/14	15	130	3.4	0.0
10/15-10/21	15	112	3.7	0.0
10/22-10/28	14	125	3.1	0.0
10/29-11/04	14	72	3.5	0.0
11/5 -11/11	12	38	4.1	0.0
11/12-11/18	12	22	4.2	0.0
11/19-11/25	11	45	5.5	0.0
11/26-12/2	9	72	5.6	0.0
12/3 -12/9	6	80	5.7	0.0

a/ $1000\ m^3/s = 35{,}300\ ft^3/s$

Table A5.--Annual number of fall chinook salmon reared, numbers and percent of fall chinook salmon catches at Jones Beach, and seasonal average river flows from 1977-1983.

	1977	1978	1979	1980	1981	1982	1983
No. released from hatcheries (millions)[a/]	82.3	75.7	81.1	63.1	66.4	64.5	63.9
No. captured at Jones Beach (thousands)[b/]	381	263	303	131	139	154	122
Percent captured[c/]	0.46	0.36	0.39	0.23	0.22	0.25	0.19
River flow $\left[\frac{\text{thou } m^3}{s}\right]$ [d/]	3.8	7.2	6.1	7.7	8.5	10.2	8.6

a/ Data obtained from Idaho Department of Fish and Game, Oregon Department of Fish and Wildlife, U.S. Fish and Wildlife Service, and Washington Department of Fisheries. Only fish released upstream of Jones Beach included, those from Priest Rapids spawning channel, Ringold, Wells spawning channel, and Hagerman Hatchery omitted as these groups are almost exclusively purse seine captured.

b/ The following adjustment of catches was used to standardize effort levels between years; (weekly average beach seine catch per set from 9 April to 30 September) X 70 sets per week. Catch per set numbers are listed for 1977-1981 in Dawley et al. 1982 (Appendix Table A6), and for 1982, in Dawley et. al. 1984 and for 1983 Appendix Table

c/ A constant percentage of wild fish within the catch each year was assumed and the error from not including an estimated number was ignored.

d/ Average river flow at Bonneville Dam during May and June.

Table A6.--Mark groups used to evaluate effects of flow on catch percentage at Jones Beach.

Release site b/	Stock or treatment	1977a/ Catch (no.)	1977a/ Catch (%) c/	1977a/ Flow d/ (kcfs)	1978 Catch (no.)	1978 Catch (%)	1978 Flow (kcfs)	1979 Catch (no.)	1979 Catch (%)	1979 Flow (kcfs)	1980 Catch (no.)	1980 Catch (%)	1980 Flow (kcfs)	1981 Catch (no.)	1981 Catch (%)	1981 Flow (kcfs)	1982 Catch (no.)	1982 Catch (%)	1982 Flow (kcfs)	1983 Catch (no.)	1983 Catch (%)	1983 Flow (kcfs)
Subyearling chinook salmon																						
Bonneville Hat.	Brights 35-44/lb	-	-	-	-	-	-	-	-	-	-	-	-	58	0.16	5.1	91	0.20	5.9	39	0.13	4.7
Bonneville Hat.	Well water production	409	0.47g/	3.7	-	-	-	128	0.17	7.6	-	-	-	148	0.12	6.9	262	0.25	8.7	87	0.09	9.3
Bonneville Hat.	Tanner Cr. production	-	-	-	-	-	-	499	0.21	6.8	-	-	-g/	57	0.09	6.6	182	0.19	10.0	-	-	-
Cowlitz Hat.	Production	-	-	- f/	311	0.42	6.4	278	0.37	3.3	-	-	-	689	0.38	7.2	659	0.38	6.9	522	0.49	6.3
Kalama Falls Hat.	Production	697	0.72	2.6	541	0.63	4.2	2229	1.43	3.4	163	0.24	4.9	175	0.12	10.1	185	0.15	10.4			
Lwr. Kalama F. Hat.	Production	-	-	-	136	0.14	7.3	-	-	-	209	0.20	8.4	175	0.13	9.9	191	0.16	11.5			
Sp.Cr.Hat.@Blw.Bonn.D.	79-83/lb	304	0.63	4.0	201	0.25	7.8	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Toutle Hat.	Production	606	0.74	3.1	457	0.56	5.7	866	0.82	3.6	-	-	-	-	-	-	-	-	-	-	-	-
Washougal Hat.	Production	188	0.23	2.7	212	0.27	5.3	885	0.44	4.4	609	0.33	4.5	417	0.24	7.2	427	0.37	8.7	-	-	-
Yearling chinook salmon																						
Bonneville Hat.	Tule	-	-	-	-	-	-	105	0.39	5.7	52	0.22	3.8	-	-	-	52	0.44	8.2	44	0.23	10.4
Bonneville Hat.	Brights	-	-	-	-	-	-	62	0.40	5.7	70	0.32	3.8	-	-	-	48	0.35	8.7	13	0.05	8.5
Carson Hat.	Production	-	-	-	-	-	-	28	0.09	7.6	95	0.07	8.0	-	-	-	-	-	-	-	-	-
Cowlitz Hat.	Density/erythromycin/tim.	-	-	-	590	0.38	6.5	139	0.19	5.1	-	-	-	-	-	-	42	0.06	8.3	55	0.05	7.6
Dexter Pond @ Dexter	Graded small	-	-	-	-	-	-	40	0.18	5.1	18	0.13	4.0	-	-	-	6	0.04	9.1	-	-	-
Dexter Pond @ Dexter	Graded medium	-	-	-	-	-	-	50	0.28	5.1	20	0.15	4.0	14	0.12	4.3	5	0.03	9.1	-	-	-
Eagle Creek Hat.	Production	-	-	-	80	0.07	7.4	39	0.11	6.9	-	-	-	-	-	-	-	-	-	-	-	-
Marion Fk.Hat.@Minto	Carson stock	-	-	-	56	0.06	6.5	90	0.08	7.6	-	-	-	24	0.03	5.4	51	0.04	8.7	-	-	-
Marion Fk.Hat.@Minto	Santiam stock 12-17/lb	-	-	-	72	0.08	6.7	101	0.09	7.6	-	-	-	27	0.05	5.4	56	0.05	7.8	-	-	-
Marion Fk.Hat.@Minto	Santiam stock 19-20/lb	-	-	-	-	-	-	29	0.08	7.6	-	-	-	7	0.03	6.9	-	-	-	-	-	-
McKenzie Hat.	Graded medium	-	-	-	-	-	-	-	-	-	13	0.08	4.0	11	0.08	4.3	2	0.01	8.7	-	-	-
McKenzie Hat.	Graded large	-	-	-	-	-	-	-	-	-	18	0.15	4.0	11	0.08	4.9	2	0.01	7.8	-	-	-
McKenzie Hat.	Ungraded	-	-	-	-	-	-	-	-	-	13	0.11	4.0	4	0.03	4.6	4	0.03	8.1	-	-	-
Oakridge Hat.@Dexter	Graded large	-	-	-	-	-	-	36	0.30	5.7	15	0.15	3.8	12	0.10	4.6	8	0.09	8.1	-	-	-
Oakridge Hat.@Dexter	Ungraded	-	-	-	-	-	-	32	0.17	5.1	25	0.20	4.0	9	0.06	5.4	7	0.08	8.2	-	-	-
S. Santiam Hat.	Time and site	-	-	-	11	0.12	7.2	-	-	-	42	0.18	3.8	-	-	-	-	-	-	-	-	-
Below Willam Fall. (S. Santiam Hat.)	Time and site	-	-	-	67	0.24	7.2	-	-	-	64	0.27	3.8	-	-	-	-	-	-	-	-	-
Coho salmon																						
Cascade Hat.	May release	-	-	-	-	-	-	36	0.08	6.9	13	0.08	6.8	52	0.11	6.1	-	-	-	-	-	-
Cascade Hat.	June release	-	-	-	-	-	-	41	0.15	5.0	-	-	-	46	0.10	10.8	-	-	-	-	-	-
Cascade Hat.	July release	-	-	-	-	-	-	109	0.45	3.6	-	-	-	32	0.13	7.1	-	-	-	-	-	-
Cowlitz Hat.	Density(11.6-11.7lb/gal/min)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	82	0.15	10.8	86	0.18	8.9
Eagle Creek Hat.	Density/production	-	-	-	95	0.17	7.9	128	0.22	5.6	-	-	-	378	0.20	9.9	439	0.18	10.0	332	0.15	8.0
Lower Kalama Hat.	Density(11-11.5/lb/gal/min)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	89	0.17	9.9	53	0.10	9.3
Sandy Hat.	Nutriton(Combined groups)	-	-	-	195	0.08	7.4	113	0.13	6.9	129	0.13	6.8	205	0.09	6.5	367	0.15	9.9	218	0.07	8.0
Toutle Hat.	May release	-	-	-	-	-	-	86	0.14	6.9	74	0.19	6.8	-	-	-	-	-	-	-	-	-
Washougal Hat.	Apr./May (14-18/lb/gal/min)	-	-	-	-	-	-	168	0.14	7.3	150	0.14	6.8	91	0.11	6.1	-	-	-	40	0.08	8.7
Washougal Hat.	Late May&early June/density	-	-	-	-	-	-	239	0.17	5.0	-	-	- g/	70	0.09	10.1	217	0.09	10.0	185	0.07	11.3
Washougal Hat.	July release	-	-	-	-	-	-	388	0.57	3.6	244	0.26	4.9	-	-	-	-	-	-	-	-	-

NOTE: For adult comparisons, density combined and nutrition combined groups cannot be used for adult variance comparisons.

a/ Inconsistent purse seine effort in 1977 consequently yearling fish not used for evaluation. Catch adjustments were made for subyearling fish to equate with other years (8%, 11%, 8%, 12%, and 15% increase respectively for Bonneville, Kalama Falls, Spring Creek fish released downstream of Bonneville, Toutle and Washougal hatchery fish); obtained from average purse seine contribution to those groups from 1978-1983.

b/ Only groups released downstream of Bonneville were used due to variation in survival associated with changing spill to turbine discharge rate at dams; only groups of the same stock released at the same size from the same site. Assumed no effect from Willamette Falls or Willamette River flow on survival or catch percentage. Groups with rapid movement rates were not used due to variable catch rates. Treatment groups with no statistical difference (trend over the years) were combined into one observation per year.

c/ Adjusted percent catch all years.

d/ Seven day average of total river flow at Bonneville Dam during the week of median fish recapture for all years.

e/ Did not use 1980 due to effects of Mount St. Helens.

f/ Abnormally low catches.

g/ Diseased fish; poor survival to estuary.

Table A7.--Catches of marked juvenile salmonids at Jones Beach (Rkm 75), released in fall and late summer 1977-1983.

Release information a/							Recovery information									
							Fall					Winter/Spring				
Mark code	Source	Site	Treatment stock	No. (thou)	Date b/	Size (no./lb)	Gear code	Catch c/ (no.)	Adj. (no.)	%	Date range d/	Catch (no.)	Adj. (no.)	%	Date range d/
1977 e/															
631715	Cowlitz	@ Hat.		84.4	28 Se 77	12	B	0	0	0	---	1	1	0.002	03 Ap
							P	-	-	-		0	0	0	
091627	S.Santiam	@ Hat.		28.7	07 No 77	13	B	0	0	0	---	1	2	0.008	11 Ap-02 My
							P	-	-	-		1	1	0.005	
091628 & 29	S.Santiam	@ Hat.		56.3	07 No 77	11	B	0	0	0	---	0	0	0	28 Ap
							P	-	-	-		1	1	0.005	
091630, 31-32	S.Santiam	@ Hat.		84.5	08 No 77	11	B	0	0	0	---	7	13	0.015	27 Mr-28 Ap
							P	-	-	-		8	12	0.014	
1978															
071656 & 59	Bonneville	@ Bonn.	Tule	88.7	30 Oc 78	13	B	19	95	0.107	06 No-12 De	10	28	0.032	20 Mr-12 Ap
							P	1	7	0.008		0	0	0	
071658 & 60	Bonneville	@ Bonn.	Bright	89.2	30 Oc 78	22	B	22	79	0.089	06 No-17 No	10	44	0.049	15 Fe-03 My
							P	8	32	0.036		0	0	0	
071626, 1917-18	Bonneville	@ Mill Cr.		150.8	8-9 No 78	23	B	0	0	0	13 De	17	62	0.041	05 Mr-04 My
							P	1	8	0.015		9	33	0.022	
071737	Dexter	@ Dexter	Tule	23.0	07 No 78	7	B	0	0	0	27 No-05 De	0	0	0	22 Mr-05 Ap
							P	3	30	0.131		2	15	0.067	
631747	K. Falls	@ Hat.		140.9	15 Se 78	34	B	101	368	0.261	20 Se-08 No	8	16	0.012	02 Ap-21 Ap
							P	0	0	0		0	0	0	
050352, 53-54	Lewis	@ Lewis	F.Chin.	108.2	01 No 78	39	B	3	18	0.051	12 De	4	35	0.032	15 Fe-04 Ap
							P	0	0	0		0	0	0	
071727	Marion FKS	@ Minto	Carson	92.9	06 No 78	23	B	0	0	0	---	0	0	0	28 Mr-11 Jn
							P	0	0	0		18	34	0.037	
071738	Oakridge	@ Dexter		24.0	07 No 78	8	B	0	0	0	04-05 De	1	3	0.011	29 Mr-30 Mr
							P	2	15	0.063		0	0	0	
071739	Oakridge	@ Dexter		28.9	07 No 78	15	B	0	0	0	---	1	8	0.029	18 Mr-18 Ap
							P	0	0	0		1	3	0.004	
071740	Oakridge	@ Dexter		29.4	07 No 78	25	B	0	0	0	---	1	3	0.010	06 Ap-01 My
							P	0	0	0		1	1	0.004	
100328	Red R.	SFK Clearwater		37.0	21 Se 78	34	B	0	0	0	---	0	0	0	03 My-06 Jn
							P	0	0	0		6	7	0.019	
071926, 27-28	S.Santiam	@ Hat.	William	85.4	07 No 78	8	B	0	0	0	05 De	3	30	0.035	27 Fe-02 My
							P	3	23	0.044		2	2	0.002	
071929 & 30	S.Santiam	Blw.Willam Fall		65.4	07 No 78	8	B	1	15	0.046	10 No-05 De	5	10	0.015	04 Ap-30 Ap
							P	5	50	0.076		5	7	0.011	
1979 f/															
071735	Bonneville	@ Hat.	Brights	51.2	20 No 79	12	B	-	-	-	---	4	7	0.013	23 My-17 My
							P	-	-	-		1	1	0.003	
071914	Bonneville	@ Hat.	Tule	48.7	20 No 79	9	B	-	-	-	---	3	15	0.031	09-30 Mr
							P	-	-	-		0	0		
631942	Cowlitz	@ Hat.		23.4	16 Oc 79	85	B	-	-	-	---	9	21	0.015	09 Mr-23 Ap
							P	-	-	-		0	0	0	
631951	Cowlitz	@ Hat.		7.8	16 Oc 79	85	B	-	-	-	---	6	21	0.194	11 Mr-05 My
							P	-	-	-		2	5	0.048	
072049	McKenzie	@ Lenburg		31.6	09 No 79	6	B	-	-	-	---	1	3	0.009	27 Mr
							P	-	-	-		0	0	0	
072050	McKenzie	@ Lenburg		28.4	09 N0 79	7	B	-	-	-	---	1	4	0.014	11 Mr-15 Ap
							P	-	-	-		1	2	0.007	
072052	McKenzie	@ Lenburg		33.8	09 No 79	15	B	-	-	-	---	3	8	0.022	19 Mr-30 Ap
							P	-	-	-		0	0	0	
631920	Lewis	Speelyai		51.7	05 Se 79	28	B	18	81	0.156	11-25 Se	1	2	0.004	27 Ap
							P					0	0	0	
072047	Oakridge	@ Dexter	Large	31.3	05 No 79	9	B	-	-	-	---	2	3	0.011	24 Mr-02 Ap
							P	-	-	-		0	0	0	
072045	Oakridge	@ Dexter	Ungraded	30.9	05 No 79	14	B	-	-	-	---	3	7	0.022	24 Mr-23 Ap
							P	-	-	-		3	3	0.011	
072043	Oakridge	@ Dexter	Medium	31.3	05 No 79	16	B	-	-	-	---	4	11	0.036	12 Mr-09 Ap
							P	-	-	-		1	2	0.006	
072041	Oakridge	@ Dexter	Small	30.8	05 No 79	29	B	-	-	-	---	2	4	0.014	18 Mr-25 Mr
							P	-	-	-		0	0	0	
071943	Oakridge	@ Foster		32.0	7-8 No 79	9	B	-	-	-	---	4	9	0.028	26 Mr-27 My
							P	-	-	-		1	1	0.004	
071944	Oakridge	@ Blw.Will.Fall		34.8	08 No 79	10	B	-	-	-	---	2	4	0.012	02 Ap-04 Ap
							P	-	-	-		2	7	0.020	
102112	Red Riv.	@ S.FK.Clearwater		43.8	25-7 Se 79	27	B	-	-	-	---	1	1	0.003	03 My-08 Jn
							P	-	-	-		5	7	0.022	
072020-22	S.Santiam	@ Foster		102.0	5-6 No 79	9	B	-	-	-	---	0	0	0	14 Ap-22 Ap
							P	-	-	-		4	8	0.008	
072018% 19	S.Santiam	@ Blw.Will.Fall		69.8	5-6 No 79	9	B	-	-	-	---	5	9	0.013	19 Mr-18 Ap
							P	-	-	-		2	6	0.007	
1980 f/															
071734	Bonn. Hat.	@ Hat.	Brights	51.3	05 No 80	14	B	-	-	-	---	1	4	0.007	13 Mr
							P	-	-	-		0	0	0	
072247% 48	Marion FKs	@ M. Carson		100.0	05 No 80	20	B	-	-	-	---	0	0	0	11 Ap-23 My
							P	-	-	-		9	18	0.018	
072218	McKenzie	@ Leaburg		32.4	05 No 80	11	B	-	-	-	---	0	0	0	31 Mr-01 Ap
							P	-	-	-		1	2	0.006	
072221	McKenzie	@ Leaburg		37.9	05 No 80	15	B	-	-	-	---	0	0	0	06 Ap-21 Ap
							P	-	-	-		4	9	0.024	
072306	Oakridge H.	@ Dexter		30.1	5-6 No 80	28	B	-	-	-	---	0	0	0	31 Mr
							P	-	-	-		1	2	0.006	
072224	Oakridge H.	@ Dexter		27.1	5-6 No 80	11	B	-	-	-	---	0	0	0	31 Mr
							P	-	-	-		1	2	0.006	
102127	Red Riv.	@ S.FK.Clearwater		49.5	16 Se 80	25	B	-	-	-	---	0	0	0	05 My-05 Jn
							P	-	-	-		6	9	0.017	
050820% 21	Warm Spr. Hat.	@ Hat.		54.7	01 No 80	9	B	-	-	-	---	0	0	0	13 Ap-01 My
							P	-	-	-		2	4	0.007	

Table A7.--Cont.

1981 g/																	
072138% 39	Bonn. Hat.	@ Hat.	Tule	101.6	09 No 81	10	B	-	-	-	11 - 18 No	0	0	0	07 Mr-07 Ap
							P	8	42	0.041		9	41	0.040	
072141% 42	Bonn. Hat.	@ Hat.	Brights (McKen. Stk.)	100.5	09 No 81	10	B	-	-	-	11 - 13 No	0	0	0	25 - 29 Mr
							P	6	33	0.033		2	11	0.011	
072237	Dexter	@ Dexter	Ungraded	29.4	05 No 81	4	B	-	-	-	16 No-03 De	0	0	0	28 - 29 Mr
							P	12	45	0.154		1	3	0.011	
072523, 24	Marion Fks.	@ Minto		92.3	03 No 81	24	B	-	-	-	---	0	0	0	25 Ap-23 My
							P	0	0	0		7	9	0.010	
072223	McKenzie	@ Leaburg	Ungraded	31.1	05 No 81	8	B	-	-	-	16 - 30 No	0	0	0	---
							P	9	42	0.135		0	0	0	
072517	McKenzie	@ Leaburg	Large	31.1	05 No 81	5	B	-	-	-	16 - 19 No	0	0	0	---
							P	11	44	0.140		0	0	0	
072519	McKenzie	@ Leaburg	Medium (Oakridge Stk.)		05 No 81	18	B	-	-	-	---	0	0	0	28 - 29 Mr
							P	0	0	0		2	7	0.018	
072418	Oakridge	@ Dexter	Large	31.7	05 No 81	6	B	-	-	-	25 - 27 No	0	0	0	---
							P	3	16	0.051		0	0	0	
072308	Oakridge	@ Dexter	Ungraded	29.7	05 No 81	9	B	-	-	-	---	3	18	0.060	12 Mr-01 Ap
							P	0	0	0		2	5	0.017	
072423	Oakridge	@ Dexter	Medium	31.7	05 No 81	19	B	-	-	-	---	0	0	0	14 Mr-03 Ap
							P	0	0	0		3	13	0.041	
072347	Rd. Butte Hat.	@ Hat.		44.2	05 Oc 81	6	B	-	-	-	26 No-03 De	0	0	0	---
							P	2	13	0.028		0	0	0	
072349	Rd. Butte Hat.	@ Hat.		26.9	05 Oc 81	11	B	-	-	-	---	0	0	0	05 My
							P	0	0	0		1	1	0.004	
1982																	
072363	Bonn. Hat.	@ Hat.	Tule/Well	45.9	01 No 82	11	B	115	236	0.514	05-23 No	4	8	0.018	13 - 29 Mr
							P	4	9	0.020		0	0	0	
072546	Bonn. Hat.	@ Hat.	Tule/Tanner	51.6	01 No 82	12	B	100	207	0.401	03-28 No	5	5	0.010	27 Ja-08 Mr
							P	18	41	0.079		0	0	0	
072548	Bonn. Hat.	@ Hat.	Bright/Well	50.7	01 No 82	12	B	97	209	0.412	04-25 No	2	2	0.004	17 Fe-03 Mr
							P	8	19	0.037		0	0	0	
072545	Bonn. Hat.	@ Hat.	Bright/Tanner	48.6	01 No 82	12	B	94	228	0.445	03-28 No	0	0	0	---
							P	13	25	0.051		0	0	0	
0509528 53, RA PI 1,2,4	Cowlitz Hat.	@ Big White		295.9	21 No 82	30	B	12	33	0.011	26 No-06 De	7	17	0.006	27 Ja-05 My
							P	4	6	0.002 i/		3	6	0.002	
6324508 2603	Cowlitz Hat.	@ Hat.		59.5	01 Se 82	30	B	8	17	0.033	03 No-19 No	7	12	0.020	26 Ja-22 Ap
							P	0		0		1	3	0.005	
LD SU 3	Dworshak Hat.	@ Hat.		28.1	16 De 82	12	B	0		0	---	0	0	0	24 Mr-05 My
							P	0		0		5	9	0.032	
072521	McKenzie Hat.	@ Leaburg	Ungraded	32.3	08 No 82	11	B	0	0	0	26 No	7	9	0.029	11 Mr
							P	2	5	0.014		0	0	0	
072719	McKenzie Hat.	@ Leaburg	Large	32.0	08 No 82	7	B	2	5	0.014	30 No-10 De	9	11	0.033	26 Ja-10 Mr
							P	2	5	0.014		0	0	0	
071721	McKenzie Hat.	@ Leaburg	Medium	31.9	08 No 82	16	B	2	5	0.014	30 No-09 De	7	15	0.045	12 - 28 Mr
							P	1	2	0.007		1	1	0.003	
072715	Rnd. Butte Hat.	@ Hat.	Norm.Incu.	56.2	11 Oc 82	24	B	0	0	0	---	0	0	0	25 - 30 Ap
							P	0	0	0		2	2	0.004	
072520	Rnd. Butte Hat.	@ Hat.	Fast.Incu.	26.8	11 Oc 82	6	B	0	0	0	06 No-10 De	0	0	0	---
							P	2	4	0.016		0	0	0	
1983 h/																	
632610	Cowlitz Hat.	@ Hat.	F. Chin.	146.4	02 No 83	20	B	23	177	0.121	04 - 18 No	-	-	-	---
							P	7	14	0.010		-	-	-	
101320	Eagle Cr. Hat.	@ Hat.	Stress	36.4	17 Oc 83	9	B	2	3	0.008	02 No-22 No	-	-	-	---
							P	3	16	0.044		-	-	-	
101321	Eagle Cr. Hat.	@ Hat.	Control	36.6	17 Oc 83	8	B	1	2	0.004	10 No-11 No	-	-	-	---
							P	0	0	0		-	-	-	
101322	Eagle Cr. Hat.	@ Hat.	Control	35.8	17 Oc 83	8	B	1	2	0.006	08 No-22 No	-	-	-	---
							P	2	11	0.031		-	-	-	
101323	Eagle Cr. Hat.	@ Hat.	Control	38.5	17 Oc 83	9	B	0	0	0	02 No-22 No	-	-	-	---
							P	2	10	0.025		-	-	-	
072843	Rnd.Butte Hat.	@ Hat.	Norm.Incub.	53.6	06 Oc 83	14	B	1	2	0.003	10 No	-	-	-	---
							P	0	0	0		-	-	-	
072837	Rnd.Butte Hat.	@ Hat.	Fast Incub.	28.2	06 Oc 83	6	B	2	13	0.047	24 Oc-07 No	-	-	-	---
							P	1	2	0.005		-	-	-	
632259	Washougal Hat.	@ Hat.	F. Chin.	101.2	31 Au 83	28	B	101	280	0.276	06 Se-05 Oc	-	-	-	---
							P	15	153	0.151		-	-	-	
632239	Washougal Hat.	@ Hat.	F. Chin.	100.6	11 Oc 83	23	B	39	307	0.305	16 Oc-06 No	-	-	-	---
							P	29	145	0.144		-	-	-	
632238	Washougal Hat.	@ Hat.	F. Chin.	100.3	02 No 83	22	B	71	495	0.494	06 - 15 No	-	-	-	---
							P	1	2	0.002		-	-	-	

a/ Only groups with recoveries at Jones Beach are listed.

b/ Two letter abbreviation for months Se, Oc, No, De, Ja, Fe, Mr, Ap, My, Jn represent September through June.

c/ B = beach seine and P = purse seine.

d/ Range of dates for beach and purse seine recoveries combined.

e/ No purse (low BS effort).

f/ No fall and winter sampling.

g/ No fall and winter beach seine.

h/ No winter and spring sampling.

i/ Does not include adjustment for nonfishing period.

Table A8.--Condition factor, K(g/mm^3), for major fish groups captured at Jones Beach in 1983.

Source	No. measured	Tag Ag/Di/D2 a>	Descriptor	Mean weight (g)	Mean length (mm)	Mean Condition factor K(g/mm^3 X 10^{-6}) b>
			Subyearling chinook salmon			
Bonneville Hat.	44	07/27/27	Diet OMP 4	5.4	81.1	9.9
" "	49	/28	" "	6.5	86.0	9.9
" "	40	/29	Diet OMP 2	5.9	84.0	9.7
" "	46	/30	" "	5.8	83.7	9.7
" "	178	07/27/27-30	Diets combined	5.9	83.7	9.8
" "	47	07/28/26	Late fall@Vernita Br.	14.1	108.1	10.2
" "	108	07/28/27	Late fall@Bonn. Hat.	8.2	92.1	10.1
" "	35	07/28/28	Late fall Aug. rel.	15.0	111.3	10.6
Cowlitz Hat.	508	63/25/03	Production	7.7	89.7	10.3
" "	30	63/26/10	November release	21.9	125.5	10.5
Hagerman Hat.	27	10/25/15	Subyearing spring chinook	23.2	133.6	9.6
Lewis Hat.	117	63/27/37	Wild stock / small	6.3	82.3	10.8
" "		/38	Wild stock / large	6.3	83.2	10.6
Lit. Wh. Sal. Hat.	40	05/11/41	Subyearing spring chinook	6.7	88.6	9.6
" "	42	/39	Subyearing spring chinook	13.7	110.8	10.2
Pr.Rapid spaw ch.	139	63/26/11	Production	10.5	101.4	9.6
" "	85	/12	Wild stock	15.3	113.9	10.2
Round Butte Hat.	45	07/28/36	Subyearing spring chinook	26.9	135.3	10.8
Spring Cr. Hat.	52	05/11/42	Diet control	8.3	92.0	10.2
" "	58	/43	" "	7.7	92.5	9.8
" "	54	/44	Diet 7 % salt	8.1	92.9	9.8
" "	78	05/11/45	" "	7.9	93.3	9.8
" "	240	05/11/42-45	Diets combined	8.0	92.7	9.9
Stayton Pond	12	07/23/28	Contribution	6.4	85.2	9.7
" "	13	07/28/30	"	7.7	87.9	10.3
" "	15	/31	"	6.8	88.0	9.7
" "	11	/32	"	6.6	86.3	10.2
" "	26	/33	"	7.2	86.8	10.1
" "	11	/34	"	6.7	86.2	10.2
Washougal Hat.	105	63/22/59	September release	13.8	110.5	10.1
" "	67	/39	October release	17.8	121.3	9.9
" "	70	/38	November release	18.8	122.5	10.1
			Coho salmon			
Bonneville Hat.	22	07/26/06	02 May release	26.3	141.5	9.1
" "	28	/07	31 May release	27.4	144.0	9.1
Cascade Hat.	21	07/27/47	Ocean control	25.8	141.4	9.0
Cowlitz Hat.	83	63/26/13-17	Density 22.9 lb/gal/min	25.1	142.8	8.7
" "	71	/18-22	" 16.0 "	24.9	140.8	8.8
" "	78	/38-42	" 15.0 "	24.5	140.3	8.7
" "	72	/23-27	" 14.3 "	29.0	144.8	8.9
" "	85	/28-32	" 11.7 "	24.1	139.6	8.8
" "	81	/33-37	" 9.0 "	24.0	139.0	8.8
Eagle Cr. Hat.	78	05/11/33,34	Density .45 lb/ft /in	32.4	153.1	8.9
" "	76	/34	" "	31.7	150.7	9.2
" "	45	/35,36	" .30 "	32.5	153.0	9.0
" "	65	/36	" "	33.7	154.6	9.0
" "	32	/37,38	" .15 "	36.0	156.8	9.3
" "	36	05/11/38	" "	34.9	156.3	9.1
" "	332	05/11/33-38	Densities combined	33.1	153.5	9.0
Lo. Kalama Hat.	53	63/26/05	Density 11.5 lb/gal/min	25.8	140.0	9.4
Sandy Hat.	32	07/27/31	Diet OP2	25.7	143.5	8.6
" "	45	/36	" "	27.0	144.6	8.8
" "	34	/32	Diet vac. salmon meal	25.0	142.2	8.6

Table A8.--continued

" "	33	/35	" "	24.9	143.1	8.4
" "	35	/33	Diet Abernathy	27.9	145.2	9.1
" "	38	/34	" "	27.8	146.3	8.8
Speelyai Hat.	32	63/27/35	Ocean management	22.9	136.6	8.9
Washougal Hat.	39	63/26/45	Ocean management	26.3	142.4	9.1
" "	29	/51-55	Density 6.0 lb/gal/min	22.3	134.5	9.2
" "	24	/56-60	" 6.8 "	22.0	133.4	9.2
" "	30	63/26/61-63 &63/27/01-02	" 8.8 "	23.3	136.9	9.1
" "	32	63/27/03-07	" 10.6 "	22.6	134.9	9.1
" "	32	/08-12	" 12.5 "	22.4	134.8	9.1
" "	38	/13-17	" 14.3 "	21.5	131.8	9.2
Willard Hat.	38	05/09/36,37	Density 200 gpm/pd	23.9	136.6	9.3
" "	41	/44,45	" " "	23.9	136.8	9.2
" "	32	/34,35	" " "	25.4	139.7	9.3
" "	39	/28,29	" 400 "	22.9	135.9	9.2
" "	37	/42,43	" " "	24.2	137.3	9.3
" "	31	/30,31	" " "	23.1	134.9	9.3
" "	49	/40,41	" 600 "	22.8	135.1	9.2
" "	31	/32,33	" " "	26.0	140.1	9.4
" "	41	05/09/38,39	" 600 "	24.3	135.9	9.5
" "	339	/28-45	Densities combined	23.9	136.7	9.3
			Yearling chinook salmon			
Bonneville Hat.	19	07/27/41	Late falls @ Umatilla R.	74.8	198.1	9.5
" "	5	07/25/47	Late falls control	45.9	164.2	10.4
" "	19	07/27/01	Tule	45.1	158.5	10.1
Cowlitz Hat.	11	63/25/05	Progeny of late adult	46.9	163.6	10.0
" "	21	/06	Progeny of early adult	42.5	157.6	10.4
" "	4	63/26/09	Progeny of mid adult	63.2	180.5	10.4
Leavenworth Hat.	49	05/13/38	Yakima River @ Nile spring	29.8	148.0	9.1
" "	70	/39	Yakima River @ Ellensburg	31.9	148.4	9.5
McCall Hat.	38	10/24/58	Hatchery evaluation	25.5	140.8	8.9
Round Butte Hat.	16	07/27/16	" "	38.7	158.6	9.6
" "	12	/17	" "	40.5	160.0	9.7
" "	12	/14	" "	49.2	170.8	9.6
Sawtooth Hat.	20	10/24/08 & 10/25/35	" "	28.5	147.5	8.8
			Steelhead			
Dworshak Hat.	46	05/13/49	Progeny 1 salt	86.4	217.1	8.4
" "	85	/50	Progeny 2 salt	89.3	218.4	8.4
" "	66	/51	Progeny 3 salt	86.4	215.9	8.4
" "	34	/52	Progeny control	91.1	218.4	8.6
" "	16	23/16/38	Homing	61.3	203.1	7.2
" "	44	/16	Homing	67.8	202.1	8.1
" "	42	/19	Homing	71.2	203.4	8.3
" "	35	05/13/20	Homing	78.5	210.5	8.3
" "	12	/18	Homing @ dn. st. Bonn. Dam	76.4	205.6	8.6
Hagerman Hat.	63	05/13/33	A stock	161.1	268.2	8.0
" "	72	/34	" "	96.3	230.1	7.7
" "	75	10/24/60	B stock	124.5	248.3	7.8
Wallowa Hat.	27	63/28/38	@ Lyons Ferry	101.8	232.9	8.0
" "	24	/39	Wallowa Hat.	73.7	210.0	7.8
" "	14	/40	" "	91.4	223.6	8.0

a> Similiar or replicate tag groups combined.
b> Individual fish were weighed ± 0.005g (W) and measured ± 0.5mm (fork length, L); condition factor, K, was calculated for each individual according to the formula $K = W/L^3$. The mean K for the intire tag group is presented.

Table A9.--Jones Beach recoveries of subyearling chinook salmon transported from McNary Dam to downstream of Bonneville Dam and their controls in 1983; with estimates of survival increase from transportation.

Release information: Mark or Brand (Ag/D1/D2) (Loc. Brand Rot.)	date	no.	Recovery information: no.	%	Combined % a>	b>	Average survival increase from transportation (Combined Dates) %	
McNary Dam								
Tail race (control)								
LA 7T 1,3 & LD 7T 1 & 23/16/23	16 - 30 June	11,675	4	0.060	-			
LA 2L 1,3 & LD 2L 1 & 23/16/27	8 - 15 July	15,010	10	0.153				
LA 2T 1,3 & LD 2T 1 & 23/16/30	20 - 27 July	14,690	0	0.0		0.057		
LA 2X 1,3 & 23/16/33	29 Jul-5 Aug	10,601	0	0.0	-			
LA and LD 7S 1,3 & 23/16/24	12 Aug-2 Sep	17,292	0	0.0				
Blw. Bonneville Dam								
(Truck transport past 3 dams)								
No Marks	16 - 30 June	0	-	-	-		- -	-
RA IJ 1 & 23/16/25	7 - 14 July	15,097	3	0.038			- 75	
RA IJ 3 & 23/16/28	19 - 25 July	13,973	5	0.066		0.088	>100	54
RA IJ 2 & 23/16/31	30 Jul-2 Aug	6,210	8	0.258	-		>100	-
No Marks	12 Aug-2 Sep	0	-	-			- -	
Blw. Bonneville Dam								37
(Barge transport past 3 dams)								
No Marks	16 - 30 June	0	-	-	-		- -	-
RA 3 1 & 23/16/26	10 - 15 July	15,040	7	0.073			- 54	
RA 3 3 & 23/16/29	18 - 26 July	15,230	3	0.039		0.069	>100	22
RA 3 2 & 23/16/32	28 Jul-1 Aug	8,590	3	0.116	-		>100	-
No Marks	12 Aug-2Sep	0	-	-			- -	

a/ Numbers recovered are actual catch; % represent adjusted catch/no. released.
b/ catch/ no. released x 100.

Table A10.--Catch composition by month of beach seine samples at Jones Beach, Oregon (Rkm 75), January through December, 1983.

Months:	Jan	Feb	March	April	May	June	July	Aug	Sept	Oct	Nov	Dec	Total
No. sets:	23	148	161	202	306	291	206	177	84	24	35	9	1,666
Species													
Chinook-subyearling													
Oncorhynchus tshawytscha	155	1,179	2,094	6,153	29,596	35,000	25,724	4,993	1,571	187	521	7	107,180
Chinook-yearling													
Oncorhynchus tshawytscha	45	291	934	1,233	1,579	45	2						4,129
Coho-juvenile													
Oncorhynchus kisutch			2	283	6,406	545	26	13	1		10		7,286
Sockeye-juvenile													
Oncorhynchus nerka		1	5	4	129	8	26	1					174
Steelhead-juvenile													
Salmo gairdneri			4	53	349	12	1					1	420
Chum-juvenile													
Oncorhynchus keta			6	5	5	1							17
Coastal cutthroat													
Salmo clarki		1	11	153	61	3	14	46	49	16	14	1	369
Threespine stickleback													
Gasterosteus aculeatus	2,473	9,206	18,785	9,673	4,090	9,873	4,132	8,785	7,735	12,704	13,845	710	102,011
American shad-juv.-sub.													
Alosa sapidissima						1	57	3,306	6,150	2,327	2,134	11	13,986
American shad-juv.-year.													
Alosa sapidissima	1			5	1,219	1,617	83	10	1				2,936
Eulachon													
Thaleichthys pacificus	236	383	28	1							1		649
Starry flounder													
Platichthys stellatus	36	157	244	93	58	39	81	139	103	85	145	3	1,183
Carp													
Cyprinus carpio	1	16	34	24	44	22	2	4					147
Sucker													
Catostomus sp.	1	2	17	18	32	38	77	229	86	49	4		553
Crappie													
Pomoxis sp.	1		1	8	21	13	4	5		1	5		59
Largemouth bass													
Micropterus salmoides			1	1	2	1		6	1		1		13
Bluegill													
Lepomis macrochirus					2								2
Peamouth													
Mylocheilus caurinus	113	520	277	693	2,728	2,132	1,054	2,384	634	258	2,179	13	12,985
Northern squawfish													
Ptychocheilus oregonensis				3	211	276	189	149	49	1	2		880
Mountain whitefish													
Prosopium williamsoni			2	1	7	35	57	33	5	1			141
Sculpin													
Cottus sp.	8	26	22	2	12	18	23	13	2		72		198
Yellow perch													
Perca flavescens		2	9	8	6	5	16	2	1		3	1	53
Redside shiner													
Richardsonius balteatus					1			1					2
Pacific lamprey													
Lampetra tridentata	2	1		2	4	3							12
Sand roller													
Percopsis transmontana					1		1	1	2		1		6
White sturgeon													
Acipenser transmontanus					2	14	31	24	4				75
Walleye													
Stizostedion vitreum													0
Dace													
Rhinichthys sp.							2		1				3
Killfish													
~~*Fundulus diaphanus*~~					~~1~~	~~1~~	~~5~~						7
Goldfish													
Carassin auratus					1								1
Catfish													
Ictalurus sp.													0
Chinook-adult													
Oncorhynchus tshawytscha			1	18	8	18	1	8	10				64
Chinook-jack													
Oncorhynchus tshawytscha	1				6	141	30	5	19				202
Coho-adult													
Oncorhynchus kisutch									1	1			2
Coho-jack													
Oncorhynchus kisutch							1		1				2
Steelhead-adult													
Salmo gairdneri	4	12	8	3	8	15	8	2	6				66
Sockeye-adult													
Oncorhynchus nerka						97	20	1					118
American shad-adult													
Alosa sapidissima					1	3	2						6

Table A11.--Catch composition by month of purse seine samples at Jones Beach, Oregon (Rkm 75), January through December, 1983.

Months:	Jan	Feb	March	April	May	June	July	Aug	Sept	Oct	Nov	Dec	Total
No. sets:	7	53	54	76	149	111	60	35	7	16	25	6	599
Species													
Chinook-subyearling													
Oncorhynchus tshawytscha		4	19	330	6,005	14,043	8,737	637	79	84	550	19	29,901
Chinook-yearling													
Oncorhynchus tshawytscha	5	13	52	1,104	11,946	2,478	121						15,719
Coho-juvenile													
Oncorhynchus kisutch				130	16,575	5,175	101	9	1		1		21,992
Sockeye-juvenile													
Oncorhynchus nerka				46	3,869	404	174	2				1	4,496
Steelhead-juvenile													
Salmo gairdneri			5	1,082	19,056	3,956	27	1					24,127
Chum-juvenile													
Oncorhynchus keta				1									1
Coastal cutthroat													
Salmo clarki			1	37	90	12	2	1				1	144
Threespine stickleback													
Gasterosteus aculeatus	28	13	11	22	62	67	38	25	66	24	576	113	1,045
American shad-juv.-suby.													
Alosa sapidissima					1			15	9	450	1,467	86	2,028
American shad-juv.-year.													
Alosa sapidissima	1				22	33	11	1		2			70
Eulachon													
Thaleichthys pacificus	1,370	813	63										2,246
Starry flounder													
Platichthys stellatus			5		1	5	1		1		2		15
Carp													
Cyprinus carpio		5		2	3	1							11
Sucker													
Catostomus sp.		1			10	5							16
Crappie													
Pomoxis sp.				1	1							1	3
Largemouth bass													
Micropterus salmonides								1					1
Bluegill													
Lepomis macrochirus													0
Peamouth													
Mylocheilus caurinus	6	15	24	60	1,331	2,831	237	51	1	8	201	1	4,766
Northern squawfish													
Ptychocheilus oregonensis					9	11	11	1					32
Mountain whitefish													
Prosopium williamsoni													0
Sculpin													
Cottus sp.											6		6
Yellow perch													
Perca flavescens			1										1
Pacific lamprey													
Lampetra tridentata	1	2	4	1	7	1					4		20
Redside shiner													
Richardsonius balteatus													0
White sturgeon													
Acipenser transmontanus													0
Chinook-adult													
Oncorhynchus tshawytscha					1								1
Chinook-jack													
Oncorhynchus tshawytscha						4	1	1					6
Coho-adult													
Oncorhynchus kisutch													0
Steelhead-adult													
Salmo gairdneri	1	4	11	7	16	7	1				1		48
Sockeye-adult													
Oncorhynchus nerka							1						1
American shad-adult													
Alosa sapidissima					16	14	53	14	1	1	3		102

APPENDIX B

MARK RELEASE AND CAPTURE INFORMATION

COLUMBIA RIVER ESTUARY, JONES BEACH (RKm 75)

FOR 1983

Sockeye salmon

Coho salmon

Yearling chinook salmon

Steelhead

Subyearling chinook salmon

LEGEND

MARK - Binary wire tag: recaptures are listed with a six digit number, the first two digits being agency code; second two-data one; and third two-data two.
NO TAG: represents fish with excised adapose fin with no detectable tag.
LET GO: represents fish with excised adapose fin with a detectable tag.
BLNK TAG: represents fish with a blank tag.

Brand: the first two letters indicate location on fish, the next one or two characters indicate the configuration of the brand and the final number indicates rotation of the brand; e.g.: LA K 2. Codes for location, brand, and rotation are listed on the following page.

Clip: recaptures with clips exclusively are indicated by the common letter abbreviations listed on the following page.

*: Asterisk indicates that other marks are associated with this fish group and are listed in OTHER MARKS.

NO. MKD THOUS - thousands of fish released with observable mark.
RELEASE DATE - day, month, year
RECAPT. SITE LOCATION - example: C075.0S

C-Columbia River
075.0-Distance from mouth of River in km
S-South, Middle , North part of river cross section or X swing shift beach seining at the south site.

GEAR CODE - B for beach seine; P for purse seine.
RECAPTURES - recapture number, ACTUAL and ADJUSTED (to represent 7 day/wk fishing effort, 10 sets/day for the beach seine and 5 sets/day for the purse seine). Recapture rates (%) = (RECAPT. NO./NO. MKD) x 100.
RECAPTURE DATE/MED. FISH - date on which the median fish was recaptured, using the adjusted catch figures.
AVG. LEN. - average fork length in mm of the fish captured on or within 3 days before and after the date of median fish recapture.
MVMT RATE - movement rate is the distance from release point to recapture point divided by the number of days from 1st day of release to date of median fish recapture.

OTHER MARKS - secondary marks on the same fish group will be listed but NO. MKD is only accurate for primary mark.

Abbreviations: abbreviated terms used in HATCH/ORIGIN, RELEASE SITE and PURPOSE OF RELEASE are listed on the following page.

LEGEND Cont.

TAGS

Color	Abbr.
Red	RD
Green	GN
Blue	BL
Gray	GY
Brown	BR
Yellow	YW
Oxide Yellow	XY
Oxide Red	XR
Light Blue	LB
Light Green	LG
Pink	PK
Purple	PU
Orange	OR
Tan	TN
White	WH
Black	BK
Oxide Brown	XB
Chrome Yellow	CY
Medium Green	MG
Gold	GD
Dark Green	DG
Dark Red	DR
Medium Orange	MO
Mixed	MX
Metallic Grey	GM

Rare Earth (element)	Abbr.
Cerium	CE
Dysprosium	DY
Erbium	ER
Gadolinium	GD
Holmium	HO
Lanthanum	LA
Neodymium	ND
Praseodymium	PR
Samarium	SM
Terbium	TB
Ytterbium	YB

BRANDS

Location	Abbr.
Left anterior	LA
Left dorsal	LD
Left posterior	LP
Right anterior	RA
Right dorsal	RD
Right posterior	RP

Brand	Abbr.
+	+
+O	+O
+F	+F
+J	+J
+K	+K
+L	+L
+N	+N
+P	+P
+R	+R
+T	+T
+U	+U
+Y	+Y
+Z	+Z
OO	OO
101	01
1-1	1-
10	10
12	12
13	13
17	17
2	2
2C	2C
2J	2J
2L	2L
2T	2T
2X	2X
3	3
3C	3C
3J	3J
3L	3L
3T	3T
3X	3X
4	4
5	5
52	52
9	9
	AN
	AR
	B1
	B2
	B4
	B8
	D
T	DT
E	E
C	EC
	EP
F	F

BRANDS

Brand	Abbr.
G	G
	GL
H	H
	HE
I+	I+
IC	IC
I△	ID
IF	IF
IH	IH
IJ	IJ
IK	IK
IL	IL
IM	IM
IN	IN
IR	IR
IS	IS
IT	IT
IU	IU
IV	IV
IX	IX
IY	IY
IZ	IZ
J	J
K	K
	KE
L	L
O	O
P	P
	PI
)(	PP
R	R
S	S
	SP
	SQ
	SU
T	T
	TI
	TT
U	U
U	UP
V	V
W	W
WG	WG
X3	X3
Y	Y
Z	Z

Rotation	Abbr.
0°-Upright	1
90° to right	2
180° to right	3
270° to right	4

CLIPS

Clips	Abbr.
Dorsal	DO
Adipose	AD
Anal	AN
Top Cau.	TC
Bottom Cau.	BC
Left Vent.	LV
Right Vent.	RV
Left Pect.	LP
Right Pect.	RP
Left Max.	LM
Right Max.	RM

ABBREVIATIONS FOR HATCH/ORIGIN, RELEASE SITE AND PURPOSE OF RELEASE

NOTE: use no periods
Above to Abv
Below to Blw
Bonneville to Bonn
Bridge to Brid
Channel to Ch
Chinook to Chin
Columbia to Col
Composition to Comp
Condition to Cond
Creek to Cr
Dam to D
East to E
Enteric Red Mouth to ERM
Entrance to Entr
Evaluation to Eval
Fall to F
Fork to Fk
Forks to Fks
Grading to Grad
Hatchery to Hat
Idaho to Id
Imprinting to Impr
Landing to Ld
Little to Lit
Lower to Lo
Mid-river to Mid R
Middle to M
Mouth to Mo
Niagara Springs Hatchery to Niagara Springs
North to N
Oregon to Ore
Oregon City Falls to OCF
Oregon Moist Pellet to OMP
Points to Pt
Priest to Pr
Production to Prod
Rapids to Rapid
Rearing to Rear
Release to Rel
Reservoir to Res
River to R
Round Butte to Rnd Butte
Salmon to Sal
Sportsman's Landing to Srt Ld
Salt Water to Sw
South to S
Spawning to Spaw
Springs to Spring
Stock to Stk
Survival to Surv
Tailrace to Tail
Transport to Trans
Vaccine to Vacc
Washington to Wash
West to W
Willamette to Willam

SOCKEYE SALMON

RELEASE AND RECAPTURE INFORMATION - COLUMBIA RIVER ESTUARY
REPORT DATE 2/16/84
SORT SEQUENCE : SPECIES,SOURCE,RELEASE KM(-),START RELEASE DATE,MARK, RECAPTURE SITE(-) (FINAL/SOURCE)

SPECIES: SOCKEYE

MARK	HATCH/ORIGIN	RELEASE SITE	RELEASE DATE	SIZE AT RELEASE MM /LB	NO. MKD THOUS	RECAPT. SITE R. KM	GEAR CODE	RECAPTURES ACTUAL NO.	%	ADJUSTED NO.	%	RECAPTURE DATE 10% TILE	MED. FISH	90% TILE	AVG LEN MM	MVMT RATE KM/DAY
	PURPOSE OF RELEASE		OTHER MARKS													
LA 15 1	MCNARY D	PORT KELLY ORE	10MY83		0.3	C075.0M	P	1	0.362	2	0.543	24MY	24MY	25MY83	106	30
	MCNARY EFFICIENCY															
RD 7U 1	MCNARY D	PORT KELLY ORE	17MY83		0.3	C075.0M	P	1	0.398	2	0.598	25MY	25MY	26MY83	112	53
	MCNARY EFFICIENCY															
RA J 1	MCNARY D	MCNARY TAIL	06MY83		0.8	C075.0M	P	1	0.130	2	0.195	16MY	16MY	17MY83	96	39
	MCNARY EFFICIENCY															
RA J 3	MCNARY D	MCNARY TAIL	09MY83		0.9	C075.0M	P	1	0.106	2	0.159	20MY	20MY	21MY83	0	36
	MCNARY EFFICIENCY															
LA J 1	MCNARY D	MCNARY TAIL	11MY83		0.4	C075.0M	P	2	0.556	2	0.556	18MY	18MY	24MY83	116	56
	MCNARY EFFICIENCY															

COHO SALMON

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SPECIES: COHO

MARK	HATCH/ORIGIN PURPOSE OF RELEASE	RELEASE SITE	RELEASE DATE OTHER MARKS	SIZE AT RELEASE MM	/LB	NO. MKD THOUS	RECAPT. SITE R. KM	GEAR CODE	RECAPTURES ACTUAL NO.	%	ADJUSTED NO.	%	RECAPTURE DATE 10% TILE	MED. FISH	90% TILE	AVG LEN MM	MVMT RATE KM/DAY
072606	BONNEVILLE HAT PRODUCTION	TANNER CR	02MY83		15	26.9	C075.OS	B	9	0.033	9	0.033	06MY	09MY	19MY83	142	22
							C075.OM	P	13	0.048	13	0.048	06MY	14MY	22MY83	145	13
072607	BONNEVILLE HAT PRODUCTION	TANNER CR	31MY83		16	27.3	C075.OS	B	3	0.011	3	0.011	02JN	04JN	05JN83	145	39
							C075.OM	P	25	0.092	28	0.101	02JN	03JN	09JN83	144	52
072747	CASCADE HAT OCEAN CONTROL	TANNER CR	24MY83		18	43.1	C075.OS	B	5	0.012	5	0.013	28MY	28MY	31MY83	136	39
							C075.OM	P	16	0.037	20	0.046	27MY	31MY	07JN83	142	22
632613	COWLITZ HAT POND LOADING(22.9 LBS/GAL/MIN)	COWLITZ RERM 50	03MY83		17	10.9	C075.OS	B	4	0.037	4	0.037	06MY	07MY	09MY83	138	29
							C075.OM	P	15	0.138	16	0.142	06MY	26MY	05JN83	146	5
632614	COWLITZ HAT POND LOADING(22.9 LBS/GAL/MIN)	COWLITZ RERM 50	03MY83		17	10.4	C075.OS	B	1	0.010	2	0.014	01JN	01JN	02JN83	128	4
							C075.OM	P	10	0.097	11	0.103	23MY	02JN	08JN83	141	4
632615	COWLITZ HAT POND LOADING(22.9 LBS/GAL/MIN)	COWLITZ RERM 50	03MY83		17	10.4	C075.OS	B	4	0.038	4	0.038	06MY	07MY	19MY83	147	29
							C075.OM	P	22	0.211	23	0.224	15MY	26MY	01JN83	136	5
632616	COWLITZ HAT POND LOADING(22.9 LBS/GAL/MIN)	COWLITZ RERM 50	03MY83		17	10.7	C075.OS	B	2	0.019	2	0.019	19MY	19MY	21MY83	141	7
							C075.OM	P	14	0.131	14	0.134	10MY	21MY	03JN83	139	6
632617	COWLITZ HAT POND LOADING(22.9 LBS/GAL/MIN)	COWLITZ RERM 50	03MY83		17	10.0	C075.OS	B	1	0.010	2	0.015	13MY	13MY	14MY83	135	11
							C075.OM	P	11	0.110	15	0.150	14MY	23MY	22JN83	141	6
632618	COWLITZ HAT POND LOADING(16.0 LBS/GAL/MIN)	COWLITZ RERM 50	03MY83		17	10.0	C075.OS	B	1	0.010	2	0.015	19MY	19MY	20MY83	139	7
							C075.OM	P	7	0.070	7	0.072	11MY	14MY	30MY83	141	10
632619	COWLITZ HAT POND LOADING(16.0 LBS/GAL/MIN)	COWLITZ RERM 50	03MY83		17	10.2	C075.OS	B	2	0.020	2	0.020	06MY	06MY	07MY83	140	38
							C075.OM	P	6	0.059	6	0.059	15MY	21MY	07JN83	145	6
632620	COWLITZ HAT POND LOADING(16.0 LBS/GAL/MIN)	COWLITZ RERM 50	03MY83		17	10.1	C075.OS	B	4	0.040	4	0.040	05MY	07MY	19MY83	139	29
							C075.OM	P	15	0.149	16	0.156	11MY	21MY	13JN83	140	6
632621	COWLITZ HAT POND LOADING(16.0 LBS/GAL/MIN)	COWLITZ RERM 50	03MY83		17	10.3	C075.OS	B	4	0.039	4	0.039	06MY	07MY	09JN83	153	29
							C075.OM	P	12	0.116	13	0.121	13MY	21MY	06JN83	146	6
632622	COWLITZ HAT POND LOADING(16.0 LBS/GAL/MIN)	COWLITZ RERM 50	03MY83		17	10.5	C075.OS	B	2	0.019	2	0.019	11MY	11MY	21MY83	152	14
							C075.OM	P	19	0.181	19	0.181	13MY	22MY	07JN83	136	6
632623	COWLITZ HAT POND LOADING(14.3 LBS/GAL/MIN)	COWLITZ RERM 50	03MY83		17	10.6	C075.OS	B	8	0.076	8	0.077	07MY	18MY	27MY83	135	8
							C075.OM	P	16	0.152	17	0.160	13MY	21MY	11JN83	146	6
632624	COWLITZ HAT POND LOADING(14.3 LBS/GAL/MIN)	COWLITZ RERM 50	03MY83		17	10.2	C075.OS	B	6	0.059	6	0.059	06MY	08MY	21MY83	131	23
							C075.OM	P	5	0.049	5	0.049	11MY	21MY	29MY83	146	6
632625	COWLITZ HAT POND LOADING(14.3 LBS/GAL/MIN)	COWLITZ RERM 50	03MY83		17	10.3	C075.OS	B	2	0.019	2	0.019	07MY	07MY	09MY83	152	29
							C075.OM	P	12	0.117	16	0.158	08MY	30MY	22JN83	139	4
632626	COWLITZ HAT POND LOADING(14.3 LBS/GAL/MIN)	COWLITZ RERM 50	03MY83		17	10.6	C075.OS	B	4	0.038	4	0.038	06MY	07MY	19MY83	141	29
							C075.OM	P	3	0.028	3	0.031	21MY	30MY	14JN83	150	4
632627	COWLITZ HAT POND LOADING(14.3 LBS/GAL/MIN)	COWLITZ RERM 50	03MY83		17	10.4	C075.OS	B	2	0.019	2	0.019	08MY	08MY	11MY83	145	23
							C075.OM	P	13	0.125	16	0.154	10MY	28MY	26JN83	141	5
632628	COWLITZ HAT POND LOADING(11.7 LBS/GAL/MIN)	COWLITZ RERM 50	03MY83		20	10.2	C075.OS	B	6	0.059	6	0.059	07MY	19MY	22MY83	153	7
							C075.OM	P	13	0.127	14	0.136	19MY	01JN	11JN83	135	4
632629	COWLITZ HAT POND LOADING(11.7 LBS/GAL/MIN)	COWLITZ RERM 50	03MY83		20	10.3	C075.OS	B	4	0.039	4	0.039	10MY	11MY	19MY83	143	14
							C075.OM	P	12	0.116	13	0.121	14MY	30MY	11JN83	141	4
632630	COWLITZ HAT POND LOADING(11.7 LBS/GAL/MIN)	COWLITZ RERM 50	03MY83		20	10.4	C075.OS	B	5	0.048	5	0.048	07MY	12MY	19MY83	145	13
							C075.OM	P	12	0.116	13	0.127	14MY	22MY	10JN83	152	6
632631	COWLITZ HAT POND LOADING(11.7 LBS/GAL/MIN)	COWLITZ RERM 50	03MY83		20	10.2	C075.OS	B	5	0.049	5	0.049	11MY	17MY	18MY83	138	8
							C075.OM	P	12	0.117	13	0.131	14MY	20MY	30MY83	137	7

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SPECIES: COHO

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632632	COWLITZ HAT	COWLITZ R@RM 50	03MY83		20	10.6	C075.0S	B	2	0.019	2	0.019	10MY	10MY	14MY83	137	16
	POND LOADING(11.7 LBS/GAL/MIN)						C075.0M	P	15	0.142	16	0.149	17MY	21MY	06JN83	139	6
632633	COWLITZ HAT	COWLITZ R@RM 50	03MY83		20	10.5	C075.0S	B	3	0.029	3	0.029	07MY	11MY	14MY83	130	14
	POND LOADING(9.2 LBS/GAL/MIN)						C075.0M	P	18	0.172	19	0.176	10MY	27MY	11JN83	133	5
632634	COWLITZ HAT	COWLITZ R@RM 50	03MY83		20	10.1	C075.0M	P	22	0.218	23	0.223	16MY	02JN	12JN83	133	4
	POND LOADING(9.2 LBS/GAL/MIN)																
632635	COWLITZ HAT	COWLITZ R@RM 50	03MY83		20	10.6	C075.0M	P	11	0.104	13	0.123	16MY	22MY	26JN83	139	6
	POND LOADING(9.2 LBS/GAL/MIN)																
632636	COWLITZ HAT	COWLITZ R@RM 50	03MY83		20	10.4	C075.0S	B	4	0.038	4	0.038	08MY	10MY	13MY83	137	16
	POND LOADING(9.2 LBS/GAL/MIN)						C075.0M	P	12	0.115	12	0.118	07MY	20MY	30MY83	136	7
632637	COWLITZ HAT	COWLITZ R@RM 50	03MY83		20	10.5	C075.0S	B	3	0.028	3	0.028	06MY	07MY	17MY83	136	20
	POND LOADING(9.2 LBS/GAL/MIN)						C075.0M	P	7	0.066	7	0.069	14MY	24MY	06JN83	138	5
632638	COWLITZ HAT	COWLITZ R@RM 50	03MY83		17	10.5	C075.0S	B	3	0.029	3	0.029	07MY	10MY	16MY83	135	16
	POND LOADING(15.0 LBS/GAL/MIN)						C075.0M	P	14	0.133	15	0.138	14MY	21MY	30MY83	138	6
632639	COWLITZ HAT	COWLITZ R@RM 50	03MY83		17	10.1	C075.0S	B	5	0.049	5	0.050	06MY	08MY	27MY83	134	23
	POND LOADING(15.0 LBS/GAL/MIN)						C075.0M	P	11	0.108	11	0.108	10MY	21MY	24MY83	138	6
632640	COWLITZ HAT	COWLITZ R@RM 50	03MY83		17	10.2	C075.0S	B	3	0.029	3	0.029	08MY	12MY	20MY83	136	13
	POND LOADING(15.0 LBS/GAL/MIN)						C075.0M	P	12	0.117	12	0.117	10MY	19MY	08JN83	148	7
632641	COWLITZ HAT	COWLITZ R@RM 50	03MY83		17	10.0	C075.0S	B	5	0.050	5	0.050	06MY	10MY	21MY83	138	16
	POND LOADING(15.0 LBS/GAL/MIN)						C075.0M	P	8	0.080	8	0.080	06MY	15MY	26MY83	140	10
632642	COWLITZ HAT	COWLITZ R@RM 50	03MY83		17	10.7	C075.0S	B	3	0.028	3	0.028	07MY	19MY	21MY83	141	7
	POND LOADING(15.0 LBS/GAL/MIN)						C075.0M	P	16	0.149	17	0.158	10MY	18MY	12JN83	137	8
051133	EAGLE CR HAT	CLACKAMAS R	04MY83	153	15	60.5	C075.0S	B	3	0.005	3	0.005	22MY	25MY	07JN83	156	8
	DENSITY FACTOR .45						C075.0M	P	75	0.124	80	0.133	18MY	27MY	02JN83	151	7
051134	EAGLE CR HAT	CLACKAMAS R	04MY83	152	15	62.8	C075.0S	B	4	0.006	4	0.006	18MY	19MY	19MY83	141	11
	DENSITY FACTOR .45						C075.0M	P	72	0.115	79	0.125	18MY	27MY	01JN83	149	7
051135	EAGLE CR HAT	CLACKAMAS R	04MY83	153	14	40.9	C075.0S	B	1	0.002	2	0.004	22MY	22MY	23MY83	146	10
	DENSITY FACTOR .30						C075.0M	P	44	0.107	49	0.118	21MY	28MY	03JN83	149	7
051136	EAGLE CR HAT	CLACKAMAS R	04MY83	155	14	39.3	C075.0S	B	1	0.003	2	0.004	19MY	19MY	20MY83	146	11
	DENSITY FACTOR .30						C075.0M	P	64	0.163	73	0.185	21MY	28MY	03JN83	154	7
051137	EAGLE CR HAT	CLACKAMAS R	04MY83	156	13	20.9	C075.0M	P	32	0.153	38	0.179	21MY	28MY	03JN83	154	7
	DENSITY FACTOR .15																
051138	EAGLE CR HAT	CLACKAMAS R	04MY83	157	13	20.3	C075.0M	P	36	0.178	39	0.190	17MY	27MY	03JN83	152	7
	DENSITY FACTOR .15																
632605	LO KALAMA HAT	KALAMA R@RM 6	04MY83		17	52.0	C075.0S	B	29	0.056	29	0.056	06MY	07MY	19MY83	140	17
	POND LOADING(11.5 LBS/GAL/MIN)						C075.0M	P	24	0.046	24	0.046	06MY	08MY	20MY83	143	13
072731	SANDY HAT	SANDY R	29AP83		17	54.7	C075.0S	B	7	0.013	7	0.013	06MY	18MY	22MY83	140	8
	OP 2 CONTROL						C075.0M	P	25	0.046	25	0.046	13MY	16MY	22MY83	142	9
072732	SANDY HAT	SANDY R	29AP83		17	54.9	C075.0S	B	6	0.011	6	0.011	07MY	13MY	19MY83	145	11
	VACUUM DRY SALMON MEAL						C075.0M	P	28	0.051	29	0.052	12MY	16MY	21MY83	141	9
072733	SANDY HAT	SANDY R	29AP83		16	54.1	C075.0S	B	5	0.009	5	0.009	06MY	18MY	19MY83	146	8
	ABERNATHY DIET						C075.0M	P	31	0.057	32	0.059	12MY	16MY	26MY83	145	9

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072734	SANDY HAT	SANDY R	29AP83		17	54.7	C075.0S	B	8	0.015	8	0.015	08MY	15MY	21MY83	144	10
	ABERNATHY DIET						C075.0M	P	29	0.053	29	0.053	14MY	18MY	25MY83	148	8
072735	SANDY HAT	SANDY R	29AP83		17	54.6	C075.0S	B	9	0.016	9	0.016	19MY	19MY	21MY83	133	8
	VACUUM DRY SALMON MEAL						C075.0M	P	24	0.044	24	0.044	09MY	15MY	22MY83	141	10
072736	SANDY HAT	SANDY R	29AP83		17	54.9	C075.0S	B	10	0.018	10	0.018	07MY	19MY	20MY83	146	8
	OP2 CONTROL						C075.0M	P	36	0.066	36	0.066	11MY	15MY	22MY83	143	10
632735	SPEELYAI	CONF E FK LEWIS	20JN83		20	51.0	C075.0S	B	16	0.031	18	0.035	22JN	23JN	25JN83	133	24
	OCEAN MGT						C075.0M	P	19	0.037	44	0.086	22JN	23JN	06JL83	140	24
632645	WASHOUGAL HAT	WASHOUGAL R@RM 15	15AP83-30AP83		18	50.9	C075.0S	B	22	0.043	23	0.046	26AP	06MY	19MY83	143	7
	OCEAN MGT						C075.0M	P	18	0.035	18	0.035	29AP	06MY	16MY83	146	7
632651	WASHOUGAL HAT	WASHOUGAL R@RM 15	27MY83		19	8.0	C075.0S	B	3	0.038	3	0.038	02JN	02JN	04JN83	131	24
	POND LOADING(6.0 LBS/GAL/MIN)						C075.0M	P	4	0.050	6	0.075	31MY	31MY	04JN83	133	37
632652	WASHOUGAL HAT	WASHOUGAL R@RM 15	27MY83		19	7.9	C075.0M	P	3	0.038	3	0.041	01JN	02JN	05JN83	136	24
	POND LOADING(6.0 LBS/GAL/MIN)																
632653	WASHOUGAL HAT	WASHOUGAL R@RM 15	27MY83		19	8.0	C075.0M	P	4	0.050	5	0.067	31MY	31MY	03JN83	134	37
	POND LOADING(6.0 LBS/GAL/MIN)																
632654	WASHOUGAL HAT	WASHOUGAL R@RM 15	27MY83		19	8.0	C075.0M	P	7	0.088	8	0.104	31MY	01JN	08JN83	134	29
	POND LOADING(6.0 LBS/GAL/MIN)																
632655	WASHOUGAL HAT	WASHOUGAL R@RM 15	27MY83		19	7.9	C075.0S	B	1	0.013	2	0.019	02JN	02JN	03JN83	122	24
	POND LOADING(6.0 LBS/GAL/MIN)						C075.0M	P	7	0.089	8	0.106	31MY	01JN	03JN83	136	29
632657	WASHOUGAL HAT	WASHOUGAL R@RM 15	27MY83		19	9.7	C075.0S	B	1	0.010	2	0.015	08JN	08JN	09JN83	140	12
	POND LOADING(6.8 LBS/GAL/MIN)						C075.0M	P	6	0.062	7	0.071	31MY	01JN	06JN83	136	29
632658	WASHOUGAL HAT	WASHOUGAL R@RM 15	27MY83		19	9.9	C075.0M	P	6	0.061	6	0.061	01JN	01JN	13JN83	128	29
	POND LOADING(6.8 LBS/GAL/MIN)																
632659	WASHOUGAL HAT	WASHOUGAL R@RM 15	27MY83		19	9.8	C075.0S	B	1	0.010	2	0.015	02JN	02JN	03JN83	128	24
	POND LOADING(6.8 LBS/GAL/MIN)						C075.0M	P	3	0.031	5	0.046	01JN	01JN	02JN83	133	29
632660	WASHOUGAL HAT	WASHOUGAL R@RM 15	27MY83		19	9.7	C075.0S	B	3	0.031	3	0.031	02JN	02JN	03JN83	134	24
	POND LOADING(6.8 LBS/GAL/MIN)						C075.0M	P	4	0.041	4	0.041	01JN	01JN	04JN83	133	29
632661	WASHOUGAL HAT	WASHOUGAL R@RM 15	27MY83		19	9.9	C075.0S	B	2	0.020	2	0.020	02JN	02JN	06JN83	132	24
	POND LOADING(8.8 LBS/GAL/MIN)						C075.0M	P	3	0.030	3	0.030	01JN	01JN	11JN83	137	29
632662	WASHOUGAL HAT	WASHOUGAL R@RM 15	27MY83		19	9.9	C075.0S	B	2	0.020	2	0.020	01JN	01JN	02JN83	136	29
	POND LOADING(8.8 LBS/GAL/MIN)						C075.0M	P	3	0.030	4	0.044	31MY	31MY	01JN83	138	37
632663	WASHOUGAL HAT	WASHOUGAL R@RM 15	27MY83		19	9.9	C075.0M	P	10	0.101	11	0.111	30MY	01JN	03JN83	138	29
	POND LOADING(8.8 LBS/GAL/MIN)																
632701	WASHOUGAL HAT	WASHOUGAL R@RM 15	27MY83		19	9.7	C075.0S	B	1	0.010	2	0.016	12JN	12JN	13JN83	148	9
	POND LOADING(8.8 LBS/GAL/MIN)						C075.0M	P	2	0.021	3	0.028	31MY	31MY	02JN83	136	37
632702	WASHOUGAL HAT	WASHOUGAL R@RM 15	27MY83		19	10.0	C075.0S	B	3	0.030	4	0.038	31MY	31MY	04JN83	131	37
	POND LOADING(8.8 LBS/GAL/MIN)						C075.0M	P	4	0.040	5	0.046	31MY	02JN	07JN83	141	24
632703	WASHOUGAL HAT	WASHOUGAL R@RM 15	27MY83		19	10.1	C075.0M	P	7	0.069	8	0.074	01JN	02JN	06JN83	138	24
	POND LOADING(10.6 LBS/GAL/MIN)																
632704	WASHOUGAL HAT	WASHOUGAL R@RM 15	27MY83		19	10.4	C075.0S	B	1	0.010	2	0.014	01JN	01JN	02JN83	133	29
	POND LOADING(10.6 LBS/GAL/MIN)						C075.0M	P	6	0.058	7	0.071	31MY	01JN	12JN83	136	29
632705	WASHOUGAL HAT	WASHOUGAL R@RM 15	27MY83		19	10.1	C075.0S	B	2	0.020	2	0.024	31MY	31MY	01JN83	135	37
	POND LOADING(10.6 LBS/GAL/MIN)						C075.0M	P	8	0.079	10	0.093	31MY	31MY	02JN83	131	37

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SPECIES: COHO

MARK	HATCH/ORIGIN PURPOSE OF RELEASE	RELEASE SITE	RELEASE DATE OTHER MARKS	SIZE AT RELEASE MM	/LB	NO. MKD THOUS	RECAPT. SITE R. KM	GEAR CODE	RECAPTURES ACTUAL NO.	%	ADJUSTED NO.	%	RECAPTURE DATE 10% TILE	MED. FISH	90% TILE	AVG LEN MM	MVMT RATE KM/DAY
632706	WASHOUGAL HAT POND LOADING(10.6 LBS/GAL/MIN)	WASHOUGAL R@RM 15	27MY83		19	10.6	C075.0M	P	5	0.047	6	0.060	31MY	31MY	04JN83	136	37
632707	WASHOUGAL HAT POND LOADING(10.6 LBS/GAL/MIN)	WASHOUGAL R@RM 15	27MY83		19	10.1	C075.0M	P	3	0.030	5	0.051	31MY	04JN	09JN83	138	18
632708	WASHOUGAL HAT POND LOADING(12.5 LBS/GAL/MIN)	WASHOUGAL R@RM 15	27MY83		19	10.4	C075.0S	B	1	0.010	2	0.014	01JN	01JN	02JN83	133	29
							C075.0M	P	2	0.019	3	0.026	31MY	31MY	07JN83	136	37
632709	WASHOUGAL HAT POND LOADING(12.5 LBS/GAL/MIN)	WASHOUGAL R@RM 15	27MY83		19	10.3	C075.0S	B	2	0.019	2	0.024	31MY	31MY	04JN83	140	37
							C075.0M	P	7	0.068	8	0.073	01JN	04JN	12JN83	138	18
632710	WASHOUGAL HAT POND LOADING(12.5 LBS/GAL/MIN)	WASHOUGAL R@RM 15	27MY83		19	10.4	C075.0M	P	8	0.077	10	0.094	30MY	01JN	13JN83	133	29
632711	WASHOUGAL HAT POND LOADING(12.5 LBS/GAL/MIN)	WASHOUGAL R@RM 15	27MY83		19	10.4	C075.0M	P	5	0.048	6	0.060	31MY	05JN	12JN83	137	16
632712	WASHOUGAL HAT POND LOADING(12.5 LBS/GAL/MIN)	WASHOUGAL R@RM 15	27MY83		19	10.5	C075.0S	B	2	0.019	2	0.019	01JN	01JN	04JN83	137	29
							C075.0M	P	5	0.048	6	0.060	31MY	31MY	01JN83	133	37
632713	WASHOUGAL HAT POND LOADING(14.3 LBS/GAL/MIN)	WASHOUGAL R@RM 15	27MY83		19	10.0	C075.0S	B	3	0.030	3	0.034	31MY	02JN	08JN83	122	24
							C075.0M	P	4	0.040	6	0.062	31MY	31MY	06JN83	137	37
632714	WASHOUGAL HAT POND LOADING(14.3 LBS/GAL/MIN)	WASHOUGAL R@RM 15	27MY83		19	10.9	C075.0S	B	1	0.009	2	0.014	05JN	05JN	06JN83	119	16
							C075.0M	P	7	0.064	8	0.073	30MY	01JN	12JN83	132	29
632715	WASHOUGAL HAT POND LOADING(14.3 LBS/GAL/MIN)	WASHOUGAL R@RM 15	27MY83		19	10.3	C075.0S	B	4	0.039	4	0.043	31MY	01JN	04JN83	132	29
							C075.0M	P	4	0.039	5	0.048	31MY	01JN	05JN83	129	29
632716	WASHOUGAL HAT POND LOADING(14.3 LBS/GAL/MIN)	WASHOUGAL R@RM 15	27MY83		19	10.3	C075.0M	P	3	0.029	4	0.035	31MY	01JN	01JN83	133	29
632717	WASHOUGAL HAT POND LOADING(14.3 LBS/GAL/MIN)	WASHOUGAL R@RM 15	27MY83		19	10.6	C075.0S	B	5	0.047	5	0.051	31MY	02JN	08JN83	136	24
							C075.0M	P	7	0.066	8	0.074	30MY	03JN	08JN83	135	21
050928	WILLARD HAT DENSITY 400 GPM/PD	LIT WH SAL R@RM 5	07JN83		20	22.6	C075.0S	B	2	0.009	2	0.009	16JN	16JN	18JN83	119	21
							C075.0M	P	20	0.089	21	0.092	12JN	13JN	30JN83	136	32
050929	WILLARD HAT DENSITY 400 GPM/PD	LIT WH SAL R@RM 5	07JN83		21	22.2	C075.0M	P	20	0.090	26	0.118	12JN	15JN	17JN83	136	24
050930	WILLARD HAT DENSITY 400 GPM/PD	LIT WH SAL R@RM 5	07JN83		20	21.9	C075.0S	B	2	0.009	2	0.009	15JN	15JN	17JN83	133	24
							C075.0M	P	16	0.073	22	0.100	13JN	16JN	18JN83	135	21
050931	WILLARD HAT DENSITY 400 GPM/PD	LIT WH SAL R@RM 5	07JN83		20	22.5	C075.0S	B	2	0.009	2	0.009	15JN	15JN	16JN83	141	24
							C075.0M	P	12	0.053	15	0.067	13JN	16JN	03JL83	133	21
050932	WILLARD HAT DENISTY 600 GPM/PD	LIT WH SAL R@RM 5	07JN83		20	23.3	C075.0S	B	1	0.004	2	0.006	15JN	15JN	16JN83	131	24
							C075.0M	P	15	0.064	17	0.071	13JN	14JN	03JL83	139	28
050933	WILLARD HAT DENSITY 600 GPM/PD	LIT WH SAL R@RM 5	07JN83		20	20.8	C075.0M	P	16	0.077	16	0.078	12JN	13JN	15JN83	141	32
050934	WILLARD HAT DENSITY 200 GPM/PD	LIT WH SAL R@RM 5	07JN83		20	23.7	C075.0S	B	5	0.021	5	0.022	14JN	17JN	22JN83	135	19
							C075.0M	P	14	0.059	20	0.083	13JN	16JN	18JN83	137	21
050935	WILLARD HAT DENSITY 200 GPM/PD	LIT WH SAL R@RM 5	07JN83		19	22.1	C075.0S	B	1	0.005	2	0.007	17JN	17JN	18JN83	150	19
							C075.0M	P	12	0.054	15	0.067	13JN	14JN	04JL83	141	28
050936	WILLARD HAT DENSITY 200 GPM/PD	LIT WH SAL R@RM 5	07JN83		20	22.7	C075.0S	B	4	0.018	4	0.018	13JN	14JN	17JN83	139	28
							C075.0M	P	19	0.084	23	0.101	12JN	14JN	19JN83	139	28
050937	WILLARD HAT DENISTY 200 GPM/PD	LIT WH SAL R@RM 5	07JN83		20	22.2	C075.0S	B	1	0.005	2	0.007	13JN	13JN	14JN83	130	32
							C075.0M	P	14	0.063	19	0.086	13JN	16JN	24JN83	134	21
050938	WILLARD HAT DENSITY 600 GPM/PD	LIT WH SAL R@RM 5	07JN83		19	22.2	C075.0S	B	2	0.009	2	0.009	14JN	14JN	15JN83	136	28

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050938	WILLARD HAT DENSITY 600 GPM/PD	LIT WH SAL R@RM 5	07JN83		19	22.2	C075.0M	P	17	0.077	19	0.085	12JN	14JN	17JN83	137	28
050939	WILLARD HAT DENSITY 600 GPM/PD	LIT WH SAL R@RM 5	07JN83		19	21.9	C075.0S	B	3	0.014	3	0.014	15JN	16JN	17JN83	123	21
							C075.0M	P	20	0.091	24	0.107	13JN	14JN	25JN83	136	28
050940	WILLARD HAT DENSITY 600 GPM/PD	LIT WH SAL R@RM 5	07JN83		21	20.5	C075.0S	B	1	0.005	2	0.007	16JN	16JN	17JN83	123	21
							C075.0M	P	16	0.078	18	0.086	13JN	13JN	18JN83	136	32
050941	WILLARD HAT DENSITY 600 GPM/PD	LIT WH SAL R@RM 5	07JN83		19	23.0	C075.0S	B	3	0.013	3	0.013	13JN	14JN	18JN83	133	28
							C075.0M	P	29	0.126	32	0.139	13JN	14JN	19JN83	134	28
050942	WILLARD HAT DENSITY 400 GPM/PD	LIT WH SAL R@RM 5	07JN83		19	23.3	C075.0S	B	2	0.009	3	0.013	17JN	17JN	18JN83	128	19
							C075.0M	P	19	0.081	21	0.091	13JN	14JN	18JN83	136	28
050943	WILLARD HAT DENSITY 400 GPM/PD	LIT WH SAL R@RM 5	07JN83		19	22.8	C075.0S	B	4	0.018	4	0.018	14JN	14JN	16JN83	131	28
							C075.0M	P	13	0.057	17	0.074	13JN	15JN	20JN83	140	24
050944	WILLARD HAT DENSITY 200 GPM/PD	LIT WH SAL R@RM 5	07JN83		19	23.2	C075.0S	B	3	0.013	3	0.013	15JN	17JN	19JN83	132	19
							C075.0M	P	20	0.086	28	0.119	13JN	16JN	19JN83	134	21
050945	WILLARD HAT DENSITY 200 GPM/PD	LIT WH SAL R@RM 5	07JN83		18	23.3	C075.0S	B	2	0.009	2	0.009	13JN	13JN	16JN83	127	32
							C075.0M	P	16	0.069	20	0.084	13JN	14JN	19JN83	140	28
NO TAG		NO RELEASE INFO					C075.0S	B	40	0.000			04MY	04MY	04JN83	141	
							C075.0M	P	149	0.000			11MY	27MY	16JN83	148	

YEARLING CHINOOK SALMON

RELEASE AND RECAPTURE INFORMATION - COLUMBIA RIVER ESTUARY
REPORT DATE 2/16/84
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SPECIES: YEARLING CHINOOK

MARK	HATCH/ORIGIN PURPOSE OF RELEASE	RELEASE SITE	RELEASE DATE OTHER MARKS	SIZE AT RELEASE MM	/LB	NO. MKD THOUS	RECAPT. SITE R. KM	GEAR CODE	RECAPTURES ACTUAL NO.	%	ADJUSTED NO.	%	RECAPTURE DATE 10% TILE	MED. FISH	90% TILE	AVG LEN MM	MVMT RATE KM/DAY
072741	BONNEVILLE HAT UPRIVER BRIGHTS	UMATILLA R@RM 2	24MR83-18AP83		6	99.6	C075.0M	P	19	0.019	19	0.019	01MY	14MY	25MY83	203	8
072363	BONNEVILLE HAT STOCK EVAL & TIMING	TANNER CR	01NO82		11	45.9	C075.0S	B	4	0.009	8	0.017	27JA	12MR	29MR83	151	0
072546	BONNEVILLE HAT TULE STOCK & TIMING	TANNER CR	01NO82		12	51.6	C075.0S	B	5	0.010	12	0.023	27JA	18FE	08MR83	107	0
072548	BONNEVILLE HAT STOCK EVAL & TIMING	TANNER CR	01NO82		12	50.7	C075.0S	B	2	0.004	3	0.005	17FE	03MR	03MR83	151	0
072701	BONNEVILLE HAT TIME,SIZE,STOCK ASSESSMENT	TANNER CR	08MR83		7	37.5	C075.0S	B	43	0.115	83	0.222	14MR	17MR	25MR83	173	17
							C075.0M	P	1	0.003	2	0.004	10MR	10MR	11MR83	194	78
072547	BONNEVILLE HAT	TANNER CR	23MR83		6	49.9	C075.0S	B	12	0.024	24	0.049	28MR	03AP	11APR3	188	14
							C075.0M	P	1	0.002	2	0.003	27AP	27AP	28AP83	164	4
RA +F 1	CARSON HAT BONN II PH BYPASS EVAL	BONN NEW P H	26AP83			1.0	C075.0S	B	1	0.039	2	0.149	02MY	02MY	03MY83	130	26
RA +J 1	CARSON HAT BONN II PH BYPASS EVAL	BONN NEW P H	26AP83			0.1	C075.0M	P	1	1.000	2	1.500	17JN	17JN	18JN83	126	3
RA +J 3	CARSON HAT BONN II PH BYPASS EVAL	BONN NEW P H	26AP83			0.1	C075.0M	P	1	1.000	2	1.500	04MY	04MY	05MY83	140	20
LA +F 1	CARSON HAT BONN II PH BYPASS EVAL	BONN NEW P H	27AP83			0.9	C075.0S	B	3	0.333	3	0.333	01MY	02MY	06MY83	141	32
LA +F 3	CARSON HAT BONN II PH BYPASS EVAL	BONN NEW P H	27AP83			0.1	C075.0M	P	1	1.000	2	1.500	04MY	04MY	05MY83	123	23
LA AN 1	CARSON HAT BONN II PH BYPASS EVAL	BONN NEW P H	27AP83			1.0	C075.0S	B	2	0.202	2	0.202	02MY	02MY	06MY83	129	32
RD +F 1	CARSON HAT BONN II PH BYPASS EVAL	BONN NEW P H	28AP83			0.9	C075.0S	B	1	0.118	2	0.176	03MY	03MY	04MY83	122	32
RD 4 1	CARSON HAT BONN II PH BYPASS EVAL	BONN NEW P H	28AP83			1.0	C075.0S	B	1	0.100	2	0.150	07MY	07MY	08MY83	118	18
							C075.0M	P	2	0.200	2	0.200	08MY	08MY	10MY83	126	16
RD AN 1	CARSON HAT BONN II PH BYPASS EVAL	BONN NEW P H	28AP83			1.0	C075.0S	B	1	0.100	2	0.150	05MY	05MY	06MY83	120	23
							C075.0M	P	1	0.100	2	0.150	06MY	06MY	07MY83	131	20
RA PI 1	COWLITZ HAT	BIG WH REAR PD	21NO82		30	171.5	C075.0S	B	1	0.001	2	0.001	25MR	25MR	26MR83	146	0
							C075.0M	P	1	0.001	2	0.001	05MY	05MY	06MY83	123	0
RA PI 4	COWLITZ HAT	BIG WH REAR PD	21NO82		30	124.4	C075.0S	B	6	0.005	15	0.012	27JA	30JA	14FE83	117	0
*			(050953;050952;051116)				C075.0M	P	1	0.001	2	0.001	16MR	16MR	17MR83	134	0
632462	COWLITZ HAT PRODUCTION	COWLITZ R@RM 50	24JN82-08JL82		90	199.2	C075.0S	B	1	0.001	2	0.001	25FE	25FE	26FE83	125	0
632450	COWLITZ HAT LATE REL PROD	COWLITZ R@RM 50	01SE82		28	8.3	C075.0S	B	1	0.012	2	0.024	25JA	26JA	27JA83	111	0
632603	COWLITZ HAT LATE REL PROD	COWLITZ R@RM 50	01SE82		31	51.2	C075.0S	B	6	0.012	11	0.021	10MR	16MR	19AP83	116	0
							C075.0M	P	1	0.002	2	0.003	22AP	22AP	23AP83	155	0
632505	COWLITZ HAT ADULT ARRIVAL TIMING-LATE	COWLITZ R@RM 50	04AP83		6	73.0	C075.0S	B	15	0.021	34	0.047	07AP	09AP	17AP83	166	23
							C075.0M	P	3	0.004	6	0.008	07AP	15AP	10MY83	215	10
632506	COWLITZ HAT ADULT ARRIVAL TIMING-EARLY	COWLITZ R@RM 50	04AP83		7	77.5	C075.0S	B	16	0.021	25	0.032	06AP	07AP	18AP83	146	38
							C075.0M	P	10	0.013	12	0.016	06AP	29AP	06JN83	197	5

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632609	COWLITZ HAT ADULT ARRIVAL TIMING-MID-LATE	COWLITZ R@RM 50	04AP83		6	58.3	C075.0S	B	6	0.010	10	0.018	07AP	07AP	15AP83	191	38
							C075.0M	P	5	0.009	11	0.019	06AP	16AP	24APR3	136	10
LD SU 3	DWORSHAK HAT LITTLE WHITE STK EVAL	N FK CLEARWATER	16DE82	166	12	28.1	C075.0M	P	5	0.018	9	0.031	24MR	22AP	06MY83	160	1
RD SU 3	DWORSHAK HAT LITTLE WHITE STK EVAL	N FK CLEARWATER	01AP83		7	18.2	C075.0M	P	7	0.038	8	0.044	26AP	10MY	28MY83	160	19
RA +Y 2	JOHN DAY R POPULATION EST TIMING MIGRATION	JOHN DAY R@RM 175	04AP83-08AP83	114		0.2	C075.0M	P	2	0.806	2	0.806	30AP	30AP	11MY83	114	21
LA +Y 3	JOHN DAY R POPULTION EST TIMING MIGRATION	JOHN DAY R@RM 175	10AP83-16AP83	112		0.4	C075.0M	P	3	0.701	3	0.701	30AP	04MY	13MY83	129	23
632460	KALAMA FALLS HA PRODUCTION	KALAMA R@RM 15	10JN82-02JL82		130	163.2	C075.0S	B	1	0.001	2	0.001	09MR	09MR	10MR83	110	0
RA T 1	KOOSKIA HAT DENSITY STUDY-KOOSKIA STK	CLEAR CR	04AP83-12AP83	155	15	14.7	C075.0M	P	11	0.075	11	0.075	04MY	11MY	17MY83	160	21
RA T 2	KOOSKIA HAT DENSITY STUDY-KOOSKIA STK	CLEAR CR	04AP83-12AP83	160	13	8.0	C075.0M	P	4	0.050	4	0.050	04MY	06MY	18MY83	161	25
LA IL 1	LEAVENWORTH PUD SYSTEMS MORTALITY	PATEROS FERRY	22AP83			44.7	C075.0M	P	33	0.074	35	0.077	16MY	22MY	27MY83	136	25
LA IL 2	LEAVENWORTH PUD SYSTEMS MORTALITY	PATEROS FERRY	26AP83			45.6	C075.0M	P	41	0.090	45	0.099	17MY	26MY	29MY83	134	25
LA I2 1	LEAVENWORTH PUD SYSTEMS MORTALITY	PATEROS FERRY	30AP83			45.8	C075.0M	P	41	0.089	48	0.104	21MY	26MY	31MY83	136	29
LA I2 2	LEAVENWORTH PUD SYSTEMS MORTALITY	PATEROS FERRY	04MY83			45.4	C075.0M	P	47	0.103	50	0.111	22MY	27MY	02JN83	136	33
051339	LEAVENWORTH YAKIMA INDIANS	YAKIMA R@ELLENSBUR	18AP83-22AP83 (LA7H1)			94.5	C075.0M	P	72	0.076	78	0.082	13MY	25MY	01JN83	146	19
LA 7H 1	LEAVENWORTH YAKIMA INDIANS	YAKIMA R@ELLENSBUR	18AP83-22AP83 (051339)			8.2	C075.0M	P	8	0.097	8	0.100	10MY	25MY	30MY83	136	19
051338	LEAVENWORTH YAKIMA INDIANS	NACHES R@NILE SP	20AP83 (LA3X1)			94.2	C075.0S	B	1	0.001	2	0.002	20MY	20MY	21MYR3	147	23
							C075.0M	P	51	0.054	52	0.056	13MY	19MY	26MY83	144	24
LA 3X 1	LEAVENWORTH YAKIMA INDIANS	NACHES R@NILE SP	20AP83 (051338)			9.9	C075.0M	P	5	0.050	5	0.050	08MY	13MY	18MY83	148	30
LA IY 1	LEAVENWORTH PUD SYSTEMS MORTALITY	ROCK ISLAND D	28AP83			24.9	C075.0M	P	47	0.188	50	0.200	18MY	24MY	28MY83	134	25
LA IV 1	LEAVENWORTH PUD SYSTEMS MORTALITY	ROCK ISLAND D	02MYR3			24.6	C075.0M	P	35	0.142	37	0.149	20MY	25MY	29MYR3	133	28
LA IY 2	LEAVENWORTH PUD SYSTEMS MORTALITY	ROCK ISLAND D	06MY83			22.2	C075.0M	P	33	0.149	38	0.170	22MY	27MY	30MY83	137	31

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MARK	HATCH/ORIGIN / PURPOSE OF RELEASE	RELEASE SITE	RELEASE DATE / OTHER MARKS	SIZE AT RELEASE MM	/LB	NO. MKD THOUS	RECAPT. SITE R. KM	GEAR CODE	RECAPTURES ACTUAL NO.	%	ADJUSTED NO.	%	RECAPTURE DATE 10% TILE	MED. FISH	90% TILE	AVG LEN MM	MVMT RATE KM/DAY
LA IV 2	LEAVENWORTH / PUD SYSTEMS MORTALITY	ROCK ISLAND D	08MY83			24.4	C075.0M	P	23	0.094	25	0.103	21MY	27MY	02JN83	132	34
LA IK 1	LEAVENWORTH / PUD SYSTEMS MORTALITY	PR RAPID RES	03MY83			8.3	C075.0M	P	22	0.265	24	0.284	19MY	23MY	30MY83	138	28
LA IR 1	LEAVENWORTH / PUD SYSTEMS MORTALITY	PR RAPID RES	05MY83			8.3	C075.0M	P	12	0.145	13	0.156	19MY	23MY	28MY83	140	31
LA IN 1	LEAVENWORTH / PUD SYSTEMS MORTALITY	PR RAPID RES	07MY83			8.5	C075.0M	P	11	0.130	12	0.138	21MY	23MY	31MY83	143	35
LA IR 2	LEAVENWORTH / PUD SYSTEMS MORTALITY	PR RAPID RES	09MY83			8.4	C075.0M	P	14	0.167	17	0.201	22MY	28MY	31MY83	133	30
LA IX 1	LEAVENWORTH / PUD SYSTEMS MORTALITY	PR RAPID RES	11MY83			8.2	C075.0M	P	11	0.134	12	0.145	25MY	27MY	30MY83	139	35
LA IX 2	LEAVENWORTH / PUD SYSTEMS MORTALITY	PR RAPID RES	13MY83			8.7	C075.0M	P	10	0.114	11	0.122	25MY	26MY	28MY83	144	43
LA IK 2	LEAVENWORTH / PUD SYSTEMS MORTALITY	PR RAPID RES	15MY83			8.0	C075.0M	P	12	0.150	12	0.153	27MY	30MY	02JN83	135	38
LA IN 2	LEAVENWORTH / PUD SYSTEMS MORTALITY	PR RAPID RES	17MY83			8.2	C075.0M	P	7	0.085	8	0.091	27MY	30MY	03JN83	130	43
LA IT 1	LEAVENWORTH / PUD EFFICIENCY	PORT KELLY WASH	08MY83			1.5	C075.0M	P	5	0.324	5	0.324	17MY	25MY	01JN83	134	25
LA IT 2	LEAVENWORTH / PUD EFFICIENCY	PORT KELLY WASH	10MY83			1.5	C075.0M	P	1	0.066	2	0.099	24MY	24MY	25MY83	134	30
LA IM 1	LEAVENWORTH / PUD EFFICIENCY	PORT KELLY WASH	12MY83			1.5	C075.0M	P	4	0.265	4	0.265	21MY	21MY	23MY83	151	47
LA IM 2	LEAVENWORTH / PUD EFFICIENCY	PORT KELLY WASH	14MY83			1.6	C075.0M	P	1	0.063	2	0.095	22MY	22MY	23MY83	152	53
RA 3C 1	LO GRANITE D / LO GRANITE EFFICIENCY	PORT WILMA WASH	12AP83			4.8	C075.0S	B	2	0.042	4	0.076	23AP	24AP	25APR3	120	56
							C075.0M	P	4	0.083	4	0.083	03MY	03MY	10MY83	129	32
LA 3C 1	LO GRANITE D / LO GRANITE EFFICIENCY	PORT WILMA WASH	14AP83			5.4	C075.0M	P	5	0.093	8	0.155	22AP	24AP	04MY83	142	67
RA 3C 3	LO GRANITE D / LO GRANITE EFFICIENCY	PORT WILMA WASH	18AP83			3.0	C075.0M	P	2	0.066	2	0.066	05MY	05MY	06MY83	134	30
LA 3C 3	LO GRANITE D / LO GRANITE EFFICIENCY	PORT WILMA WASH	20AP83			4.0	C075.0M	P	5	0.125	5	0.125	26AP	05MY	16MY83	131	44
RD 3C 1	LO GRANITE D / LO GRANITE EFFICIENCY	PORT WILMA WASH	22AP83			4.5	C075.0M	P	5	0.112	5	0.112	07MY	09MY	13MY83	138	39
LD 3C 1	LO GRANITE D / LO GRANITE EFFICIENCY	PORT WILMA WASH	26AP83			5.3	C075.0M	P	7	0.133	8	0.143	04MY	12MY	17MY83	128	42
RD 3C 3	LO GRANITE D / LO GRANITE EFFICIENCY	PORT WILMA WASH	28AP83			3.7	C075.0M	P	3	0.081	3	0.081	08MY	15MY	19MY83	132	39
LD 3C 3	LO GRANITE D / LO GRANITE EFFICIENCY	PORT WILMA WASH	30AP83			2.8	C075.0M	P	2	0.071	2	0.071	16MY	16MY	17MY83	134	42
RA 3L 1	LO GRANITE D / LO GRANITE EFFICIENCY	PORT WILMA WASH	02MY83			2.7	C075.0M	P	8	0.298	8	0.298	08MY	10MY	20MY83	130	83
LA 3L 1	LO GRANITE D / LO GRANITE EFFICIENCY	PORT WILMA WASH	04MY83			4.1	C075.0M	P	5	0.121	5	0.127	10MY	12MY	22MY83	114	83

REPORT DATE 2/16/84
SORT SEQUENCE : SPECIES,SOURCE,RELEASE KM(-),START RELEASE DATE,MARK, RECAPTURE SITE(-) (FINAL/SOURCE)

SPECIES: YEARLING CHINOOK

MARK	HATCH/ORIGIN / PURPOSE OF RELEASE	RELEASE SITE	RELEASE DATE / OTHER MARKS	SIZE AT RELEASE MM	/LB	NO. MKD THOUS	RECAPT. SITE R. KM	GEAR CODE	RECAPTURES ACTUAL NO.	%	ADJUSTED NO.	%	RECAPTURE DATE 10% TILE	MED. FISH	90% TILE	AVG LEN MM	MVMT RATE KM/DAY
RD 3L 1	LO GRANITE D / LO GRANITE EFFICIENCY	PORT WILMA WASH	06MY83			3.6	C075.0M	P	7	0.194	7	0.194	15MY	15MY	20MY83	123	74
RA F 1	LO GRANITE D	BLW BONN D	21AP83-23AP83			13.5	C075.0S	B	1	0.007	2	0.011	23AP	23AP	30APR3	126	19
*			(231621)				C075.0M	P	4	0.030	5	0.033	24AP	27AP	04MY83	125	26
RA F 2	LO GRANITE D	BLW BONN D	25AP83-27APR3			11.3	C075.0M	P	8	0.071	8	0.071	29AP	30AP	04MY83	128	31
*			(231621)														
231622	LO GRANITE D	BLW BONN D	29AP83-25MYR3			19.8	C075.0M	P	2	0.010	2	0.010	07MY	07MY	10MY83	138	19
*			(RAF3,4)														
RA F 3	LO GRANITE D	BLW BONN D	29AP83-05MY83			14.3	C075.0S	B	1	0.007	2	0.011	06MY	06MY	07MY83	132	22
*			(231622)				C075.0M	P	7	0.049	7	0.049	03MY	05MY	08MY83	130	26
RA F 4	LO GRANITE D	BLW BONN D	07MY83-25MY83			5.6	C075.0M	P	6	0.108	6	0.112	12MY	16MY	19MY83	140	17
*			(231622)														
102458	MCCALL HAT / HATCHERY EVAL	S FK SALMON R	04AP83-07AP83		20	84.9	C075.0S	B	1	0.001	2	0.002	23MY	23MY	24MY83	125	22
*			(RDT1)				C075.0M	P	38	0.045	42	0.050	14MY	25MY	07JN83	147	21
RD T 1	MCCALL HAT / HATCHERY EVAL	S FK SALMON R	04AP83-07AP83		20	24.9	C075.0S	B	1	0.004	2	0.006	07MY	07MY	08MY83	146	33
*			(102458)				C075.0M	P	18	0.072	18	0.073	13MY	23MY	07JN83	132	22
072521	MCKENZIE HAT / TIME OF RELEASE	MCKENZIE@LEABURG	01N082		11	32.3	C075.0S	B	7	0.022	12	0.036	15FE	04MR	11MRR3	213	1
072719	MCKENZIE HAT / LARGE SIZE FALL REL	MCKENZIE@LEABURG	08N082-18N082		7	32.0	C075.0S	B	9	0.028	20	0.063	26JA	25FE	01MRR3	185	1
072721	MCKENZIE HAT / MEDIUM SIZE FALL REL	MCKENZIE@LEABURG	08N082		16	32.3	C075.0S	B	7	0.022	16	0.051	25FE	03MR	20MRR3	143	1
							C075.0M	P	1	0.003	2	0.006	27MR	28MR	29MRR3	134	1
072522	MCKENZIE HAT / TIMING & SIZE	MCKENZIE@LEABURG	14MRR3	173	6	32.1	C075.0S	B	1	0.003	2	0.006	03AP	04AP	05APR3	159	20
							C075.0M	P	3	0.009	5	0.017	06AP	20AP	25APR3	157	11
072718	MCKENZIE HAT / LARGE SIZE SPRING REL	MCKENZIE@LEABURG	14MRR3	210	4	36.2	C075.0S	B	3	0.008	4	0.011	23MR	20MR	30MRR3	217	28
							C075.0M	P	6	0.017	17	0.046	18MR	20MR	19APR3	210	70
072720	MCKENZIE HAT / MEDIUM SIZE SPRING REL	MCKENZIE@LEABURG	14MRR3	156	10	30.0	C075.0S	B	3	0.010	5	0.015	05AP	05AP	18APR3	167	19
							C075.0M	P	11	0.037	24	0.080	21MR	21AP	23APR3	172	11
072724	MCKENZIE HAT / ERTHRAMYCIN FEEDING	MCKENZIE@LEABURG	14MRR3	169	7	29.1	C075.0S	B	4	0.014	6	0.021	05AP	07AP	09APR3	181	17
							C075.0M	P	3	0.010	8	0.029	05AP	16AP	18APR3	179	13
RA 13 1	MCNARY D / MCNARY EFFICIENCY	PORT KELLY WASH	22AP83			1.5	C075.0M	P	3	0.202	3	0.202	30AP	02MY	02MYR3	131	43
RA 7U 1	MCNARY D / MCNARY EFFICIENCY	PORT KELLY ORE	22AP83			1.5	C075.0M	P	2	0.135	2	0.135	02MY	02MY	03MYR3	134	43
RA 13 3	MCNARY D / MCNARY EFFICIENCY	PORT KELLY WASH	26AP83			1.5	C075.0M	P	3	0.202	5	0.302	04MY	04MY	05MYR3	135	53
RA 7U 3	MCNARY D / MCNARY EFFICIENCY	PORT KELLY ORE	26AP83			1.5	C075.0M	P	8	0.536	8	0.536	04MY	04MY	05MYR3	137	53
LA 13 1	MCNARY D / MCNARY EFFICIENCY	PORT KELLY WASH	23AP83			1.6	C075.0M	P	4	0.245	4	0.245	06MY	06MY	17MYR3	127	61
LA 7U 1	MCNARY D / MCNARY EFFICIENCY	PORT KELLY ORE	23AP83			1.6	C075.0M	P	3	0.184	3	0.193	07MY	07MY	17MYR3	127	53
LA 13 3	MCNARY D / MCNARY EFFICIENCY	PORT KELLY WASH	03MYR3			2.0	C075.0M	P	2	0.100	2	0.113	12MY	12MY	13MYR3	141	47

REPORT DATE 5/9/84
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SPECIES: YEARLING CHINOOK

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LA 7U 3	MCNARY D MCNARY EFFICIENCY	PORT KELLY ORE	03MY83			2.0	C075.0M	P	7	0.359	7	0.359	10MY	10MY	15MY83	140	61
RA +T 1	MCNARY D MCNARY EFFICIENCY	PORT KELLY ORE	05MY83			1.3	C075.0M	P	1	0.074	2	0.111	13MY	13MY	14MY83	130	53
RA 15 1	MCNARY D MCNARY EFFICIENCY	PORT KELLY ORE	05MY83			1.3	C075.0M	P	3	0.223	3	0.223	13MY	14MY	15MY83	129	47
RA +T 3	MCNARY D MCNARY EFFICIENCY	PORT KELLY ORE	07MY83			1.5	C075.0M	P	8	0.538	8	0.538	14MY	16MY	18MY83	131	47
RA 15 3	MCNARY D MCNARY EFFICIENCY	PORT KELLY ORE	07MY83			1.5	C075.0M	P	3	0.201	3	0.201	14MY	15MY	15MY83	128	53
LA +T 1	MCNARY D MCNARY EFFICIENCY	PORT KELLY WASH	10MY83			1.2	C075.0M	P	3	0.251	3	0.251	18MY	18MY	22MY83	128	53
LA 15 1	MCNARY D MCNARY EFFICIENCY	PORT KELLY ORE	10MY83			1.2	C075.0M	P	5	0.419	5	0.419	17MY	17MY	23MY83	148	61
LA +T 3	MCNARY D MCNARY EFFICIENCY	PORT KELLY WASH	13MY83			1.3	C075.0M	P	1	0.075	2	0.112	23MY	23MY	24MY83	130	43
LA 15 3	MCNARY D MCNARY EFFICIENCY	PORT KELLY ORE	13MY83			1.3	C075.0M	P	1	0.074	2	0.111	21MY	21MY	22MY83	135	53
RD 13 1	MCNARY D MCNARY EFFICIENCY	PORT KELLY WASH	17MY83			1.4	C075.0M	P	5	0.364	5	0.364	25MY	25MY	27MY83	136	53
RD 7U 1	MCNARY D MCNARY EFFICIENCY	PORT KELLY ORE	17MY83			1.4	C075.0M	P	2	0.145	3	0.218	26MY	26MY	27MY83	129	47
RD 13 3	MCNARY D MCNARY EFFICIENCY	PORT KELLY WASH	20MY83			1.0	C075.0M	P	1	0.095	2	0.143	28MY	28MY	29MY83	130	53
RD 7U 3	MCNARY D MCNARY EFFICIENCY	PORT KELLY ORE	20MY83			1.0	C075.0M	P	2	0.191	3	0.254	28MY	28MY	29MY83	119	53
LD 13 1	MCNARY D MCNARY EFFICIENCY	PORT KELLY WASH	24MY83			0.4	C075.0M	P	3	0.767	4	1.066	30MY	30MY	31MY83	137	71
LA 2 2	MCNARY D MCNARY SYSTEMS ANALYSIS	MCNARY D	18AP83			0.1	C075.0M	P	1	1.000	2	1.500	29AP	29AP	30AP83	155	36
LA IF 2	MCNARY D MCNARY SYSTEMS ANALYSIS	MCNARY D	18AP83			0.1	C075.0M	P	2	2.000	2	2.000	01MY	01MY	01JN83	222	30
RD IC 2	MCNARY D MCNARY SYSTEMS ANALYSIS	MCNARY D	18AP83			0.1	C075.0M	P	1	1.000	2	1.500	30AP	30AP	01MY83	116	33
LA 7C 3	MCNARY D MCNARY SYSTEMS ANALYSIS	MCNARY D	19AP83			0.1	C075.0M	P	1	1.000	2	1.500	10MY	10MY	11MY83	158	19
RA IC 3	MCNARY D MCNARY SYSTEMS ANALYSIS	MCNARY D	20AP83			0.1	C075.0M	P	1	1.000	2	1.500	29AP	29AP	32AP83	126	44
RA IF 3	MCNARY D MCNARY SYSTEMS ANALYSIS	MCNARY D	20AP83			0.1	C075.0M	P	3	3.000	3	3.000	29AP	29AP	30AP83	141	44
RA Y 1	MCNARY D MCNARY EFFICIENCY	MCNARY TAIL	23AP83			1.5	C075.0M	P	4	0.268	4	0.268	30AP	02MY	04MY83	132	44
RA Y 3	MCNARY D MCNARY EFFICIENCY	MCNARY TAIL	28AP83			1.6	C075.0M	P	3	0.189	3	0.189	05MY	05MY	06MY83	125	56
LA Y 1	MCNARY D MCNARY EFFICIENCY	MCNARY TAIL	01MY83			1.9	C075.0M	P	2	0.103	2	0.103	08MY	08MY	09MY83	129	56
LA Y 3	MCNARY D MCNARY EFFICIENCY	MCNARY TAIL	04MY83			3.0	C075.0M	P	3	0.100	3	0.100	10MY	11MY	11MY83	134	56

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SPECIES: YEARLING CHINOOK

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RA J 1	MCNARY D MCNARY EFFICIENCY	MCNARY TAIL	06MY83			2.2	C075.0M	P	3	0.138	4	0.161	12MY	12MY	13MY83	128	66
RA J 3	MCNARY D MCNARY EFFICIENCY	MCNARY TAIL	09MY83			2.0	C075.0M	P	5	0.248	5	0.248	15MY	17MY	17MY83	129	49
LA J 1	MCNARY D MCNARY EFFICIENCY	MCNARY TAIL	11MY83			1.7	C075.0M	P	4	0.241	4	0.241	18MY	19MY	19MY83	131	49
RD Y 1	MCNARY D MCNARY EFFICIENCY	MCNARY TAIL	18MY83			1.5	C075.0M	P	8	0.528	8	0.528	25MY	25MY	27MY83	142	56
LD T 4	PAHSIMEROI R HATCHERY EVAL	PAHSIMEROI R	10MR83		22	25.1	C075.0M	P	11	0.044	15	0.059	21AP	06MY	28MY83	137	22
RD 12 1 * 102318	RAPID R HAT HATCHERY EVAL	RAPID R HAT	18MR83-26MR83 (42,288 CWT102318 RELG		25	68.8	C075.0M	P	20	0.029	20	0.029	01MY	06MY	12MY83	125	18
	RAPID R HAT OFF SITE RELEASE EVAL	HELLS CANYON D	18MR83 (RD121)		27	40.3	C075.0M	P	1	0.002	2	0.004	06MY	06MY	07MY83	132	17
RD T 3 *	RAPID R HAT OFF SITE RELEASE EVAL	HELLS CANYON D	18MR83 (102717)		27	43.1	C075.0M	P	42	0.097	44	0.101	26AP	03MY	08MY83	123	18
072715	RND BUTTE HAT HATCHERY EVAL	DESCHUTES R@RM 100	11OC82		24	56.2	C075.0M	P	2	0.004	2	0.004	26AP	26AP	30AP83	132	0
072716	RND BUTTE HAT HATCHERY EVAL	DESCHUTES R@RM 100	03MR83-06MY83		12	48.5	C075.0S C075.0M	B P	2 14	0.004 0.029	2 18	0.004 0.038	28AP 20AP	28AP 25AP	01MY83 07MY83	144 159	7 8
072717	RND BUTTE HAT HATCHERY EVAL	DESCHUTES R@RM 100	03MR83-06MY83		12	24.9	C075.0M	P	12	0.048	18	0.072	02AP	25AP	05MY83	151	8
072714	RND BUTTE HAT YEARLING REL	DESCHUTES R@RM 100	21MR83		9	57.3	C075.0M	P	15	0.026	21	0.037	16AP	25AP	03MY83	167	12
LA KE 3	RND BUTTE HAT AFFECTS OF FALLS	WH R ABV FALLS	13JN83-24OC83			0.8	C075.0S C075.0M	B P	1 1	0.119 0.119	2 2	0.178 0.178	30JN 19JN	30JN 19JN	01JL83 20JN83	142 123	19 55
LA KE 4	RND BUTTE HAT AFFECTS OF FALLS	WH R ABV FALLS	17OC83	129	12	0.2	C075.0M	P	1	0.621	2	0.932	01JN	01JN	02JN83	107	-1
102408	SAWTOOTH HAT HATCHERY EVAL	UPPER SALMON R	29MR83 (COMBINED W/102535)		29	35.1	C075.0M	P	7	0.020	7	0.020	08MY	20MY	02JN83	152	26
102535 *	SAWTOOTH HAT HATCHERY EVAL	UPPER SALMON R	29MR83 (RDT2)		29	51.5	C075.0M	P	13	0.025	14	0.027	18MY	28MY	03JN83	152	23
RD T 2 *	SAWTOOTH HAT HATCHERY EVAL	UPPER SALMON R	29MR83 (102535)		29	26.5	C075.0M	P	10	0.038	11	0.043	03MY	18MY	31MY83	132	27
LA KE 1	WARM SPRING TRA WILD STOCK	WARM SPRING TRAP	16MY83-17MY83			0.1	C075.0M	P	2	2.273	2	2.557	02JN	05JN	05JN83	114	19

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SPECIES: YEARLING CHINOOK

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RD R 1	WHITEBIRD TRAP WHITEBIRD SCOOP TRAP	SALMON R@RM 53	06APR3-07APR3			1.8	C075.0M	P	4	0.225	4	0.225	29AP	04MY	04MYR3	133	30
RD R 2	WHITEBIRD TRAP WHITEBIRD SCOOP TRAP	SALMON R@RM 53	09APR3-11APR3			2.8	C075.0M	P	2	0.070	2	0.070	02MY	02MY	08MYR3	121	36
RD R 3	WHITEBIRD TRAP WHITEBIRD SCOOP TRAP	SALMON R@RM 53	12APR3-14APR3			3.0	C075.0M	P	2	0.066	2	0.066	11MY	11MY	24MYR3	142	29
RD R 4	WHITEBIRD TRAP WHITEBIRD SCOOP TRAP	SALMON R@RM 53	15APR3-17APR3			2.3	C075.0M	P	4	0.170	4	0.181	10MY	12MY	17MYR3	135	31
LD R 1	WHITEBIRD TRAP WHITEBIRD SCOOP TRAP	SALMON R@RM 53	18APR3-20APR3			1.2	C075.0M	P	1	0.082	2	0.123	14MY	14MY	15MYR3	133	32
LD R 2	WHITEBIRD TRAP WHITEBIRD SCOOP TRAP	SALMON R@RM 53	21APR3-23APR3			3.0	C075.0M	P	4	0.133	4	0.133	13MY	15MY	17MYR3	136	35
LD R 3	WHITEBIRD TRAP WHITEBIRD SCOOP TRAP	SALMON R@RM 53	24APR3-26APR3			0.4	C075.0M	P	1	0.248	2	0.372	10MY	10MY	11MYR3	113	52
RA R 1	WHITEBIRD TRAP WHITEBIRD SCOOP TRAP	SALMON R@RM 53	30APR3-02MYR3			0.6	C075.0M	P	1	0.158	2	0.237	19MY	19MY	20MYR3	135	44
RA R 2	WHITEBIRD TRAP WHITEBIRD SCOOP TRAP	SALMON R@RM 53	03MYR3-05MYR3			0.6	C075.0M	P	3	0.515	3	0.515	23MY	24MY	26MYR3	127	40
LA R 2	WHITEBIRD TRAP WHITEBIRD SCOOP TRAP	SALMON R@RM 53	15MYR3-17MYR3			0.1	C075.0M	P	3	2.439	3	2.439	25MY	25MY	26MYR3	131	83
LA IU 1	WINTHROP HAT MID-COL RATES & TIMING	METHOW R@HAT	13APR3			25.0	C075.0M	P	21	0.084	21	0.084	08MY	17MY	21MYR3	142	25
LA H 2		NO RELEASE INFO					C075.0M	P	1	0.000			26MY	26MY	27MYR3	141	
LA IC 1		NO RELEASE INFO					C075.0M	P	2	0.000			15MY	15MY	25MYR3	170	
LA K 2		NO RELEASE INFO					C075.0S	B	1	0.000			15MY	15MY	16MYR3	145	
LA SU 3		NO RELEASE INFO					C075.0S	B	1	0.000			18FE	18FE	19FEB3	168	
LD PI 2		NO RELEASE INFO					C075.0M	P	1	0.000			17MY	17MY	18MYR3	127	
ND TAG		NO RELEASE INFO					C075.0S C075.0M	B P	11 32	0.000 0.000			14MR 18AP	08AP 08MY	05MYR3 14JNB3	161 150	
RA + 1		NO RELEASE INFO					C075.0S	B	1	0.000			06MY	06MY	07MYR3	136	
RA IC 4		NO RELEASE INFO					C075.0M	P	1	0.000			01MY	01MY	02MYR3	113	
RA K 3		NO RELEASE INFO					C075.0S	B	1	0.000			11FE	11FE	12FEB3	145	
RA V 4		NO RELEASE INFO					C075.0S	B	4	0.000			18FE	21FE	02MRB3	145	
RD P 3		NO RELEASE INFO					C075.0M	P	1	0.000			04MY	04MY	05MYR3	122	

REPORT DATE 2/16/84
SORT SEQUENCE : SPECIES,SOURCE,RELEASE KM(-),START RELEASE DATE,MARK, RECAPTURE SITE(-) (FINAL/SOURCE)

SPECIES: YEARLING CHINOOK

MARK	HATCH/ORIGIN / PURPOSE OF RELEASE	RELEASE SITE	RELEASE DATE / OTHER MARKS	SIZE AT RELEASE MM	SIZE AT RELEASE /LB	NO. MKD THOUS	RECAPT. SITE R. KM	GEAR CODE	RECAPTURES ACTUAL NO.	RECAPTURES ACTUAL %	RECAPTURES ADJUSTED NO.	RECAPTURES ADJUSTED %	RECAPTURE DATE 10% TILE	RECAPTURE DATE MED. FISH	RECAPTURE DATE 90% TILE	AVG LEN MM	MVMT RATE KM/DAY
RD V 4		NO RELEASE INFO					C075.0S	B	1	0.000			21FE	22FE	23FEB3	185	

SPECIES: STEELHEAD

MARK	HATCH/ORIGIN / PURPOSE OF RELEASE	RELEASE SITE	RELEASE DATE / OTHER MARKS	SIZE AT RELEASE MM	SIZE AT RELEASE /LB	NO. MKD THOUS	RECAPT. SITE R. KM	GEAR CODE	RECAPTURES ACTUAL NO.	RECAPTURES ACTUAL %	RECAPTURES ADJUSTED NO.	RECAPTURES ADJUSTED %	RECAPTURE DATE 10% TILE	RECAPTURE DATE MED. FISH	RECAPTURE DATE 90% TILE	AVG LEN MM	MVMT RATE KM/DAY
231638	DWORSHAK HAT	N FK CLEARWATER	20AP83		7	33.2	C075.0M	P	16	0.048	17	0.050	02MY	15MY	01JN83	203	29
*	HOMING		(LAW1;231638)														
LA W 1	DWORSHAK HAT	N FK CLEARWATER	20AP83		7	33.2	C075.0M	P	48	0.145	52	0.157	04MY	15MY	28MY83	193	29
*	HOMING		(LAW1;231638)														
231616	DWORSHAK HAT	N FK CLEARWATER	03MY83		5	32.2	C075.0M	P	48	0.149	50	0.154	11MY	18MY	20MY83	208	49
*	HOMING		(LAW2;231616)														
231619	DWORSHAK HAT	N FK CLEARWATER	03MY83		6	32.0	C075.0S	B	1	0.003	2	0.005	24MY	24MY	25MY83	210	35
*	HOMING		(RAF3;231619)				C075.0M	P	41	0.128	45	0.140	12MY	22MY	30MY83	193	39
LA W 2	DWORSHAK HAT	N FK CLEARWATER	03MY83		5	32.2	C075.0S	B	1	0.003	2	0.005	22MY	22MY	23MY83	209	39
*	HOMING		(LAW2;231616)				C075.0M	P	35	0.109	39	0.120	10MY	13MY	28MY83	195	73
RA F 3	DWORSHAK HAT	N FK CLEARWATER	03MY83		6	32.0	C075.0M	P	48	0.150	50	0.155	10MY	18MY	28MY83	198	49
*	HOMING		(RAF3;231619)														
051349	DWORSHAK HAT	N FK CLEARWATER	18MY83		6	24.6	C075.0M	P	46	0.187	52	0.213	28MY	03JN	13JN83	215	46
	PROGENY STUDY-1 SALT																
051350	DWORSHAK HAT	N FK CLEARWATER	18MY83		5	30.0	C075.0M	P	87	0.290	103	0.342	26MY	03JN	11JN83	216	46
	PROGENY STUDY-2 SALT																
051351	DWORSHAK HAT	N FK CLEARWATER	18MY83		6	29.8	C075.0M	P	69	0.231	80	0.267	26MY	30MY	10JN83	211	61
	PROGENY STUDY-3 SALT																
051352	DWORSHAK HAT	N FK CLEARWATER	19MY83		6	32.6	C075.0M	P	36	0.111	46	0.141	28MY	03JN	28JN83	218	49
	PROGENY STUDY-CONTROL																
231620	DWORSHAK HAT	N FK CLEARWATER	25MY83		6	30.8	C075.0M	P	37	0.120	43	0.139	30MY	05JN	11JN83	208	67
*	HOMING		(RAF4;231620)														
RA F 4	DWORSHAK HAT	N FK CLEARWATER	25MY83		6	30.8	C075.0M	P	86	0.280	99	0.322	28MY	05JN	07JN83	206	67
*	HOMING		(RAF4;231620)														
231640	DWORSHAK HAT	BLW BONN D	23AP83		6	30.3	C075.0S	B	2	0.007	2	0.007	29AP	29AP	06MY83	227	26
*	HOMING		(RAF1;231640)														
RA F 1	DWORSHAK HAT	BLW BONN D	23AP83		6	30.3	C075.0S	B	4	0.013	5	0.015	24AP	27AP	05MY83	227	39
*	HOMING		(RAF1;231640)				C075.0M	P	45	0.148	58	0.190	24AP	25AP	12MY83	198	78
RA Z 1	DWORSHAK HAT	BLW BONN D	23AP83		6	28.7	C075.0S	B	2	0.007	2	0.007	26AP	26AP	07MY83	179	52
*	HOMING		(RAZ1;231639)				C075.0M	P	33	0.115	44	0.152	24AP	25AP	30AP83	198	78
231617	DWORSHAK HAT	BLW BONN D	06MY83		6	32.5	C075.0M	P	3	0.009	3	0.009	07MY	09MY	11MY83	219	52
*	HOMING		(RAF2;231617)														
RA F 2	DWORSHAK HAT	BLW BONN D	06MY83		6	32.5	C075.0S	B	7	0.022	7	0.022	08MY	08MY	13MY83	195	78
*	HOMING		(RAF2;231617)				C075.0M	P	93	0.286	94	0.291	07MY	07MY	16MY83	200	155
231618	DWORSHAK HAT	BLW BONN D	27MY83		6	31.9	C075.0M	P	12	0.038	18	0.056	28MY	28MY	29MY83	205	155
*	HOMING		(LAW3;231618)														
LA W 3	DWORSHAK HAT	BLW BONN D	27MY83		6	31.9	C075.0M	P	139	0.436	228	0.714	28MY	28MY	28MY83	196	155
*	HOMING		(LAW3;231618)														
++++++++																	
051333	HAGERMAN HAT	UPPER SALMON R	18AP83-20AP83		2	58.9	C075.0M	P	65	0.110	77	0.131	28MY	05JN	20JN83	259	29
*	A STOCK-LARGE		(RD121)														
051334	HAGERMAN HAT	UPPER SALMON R	18AP83-20AP83		5	59.5	C075.0M	P	75	0.126	102	0.172	28MY	07JN	22JN83	228	27
*	A STOCK-SMALL		(RD123)														
RD 12 1	HAGERMAN HAT	UPPER SALMON R	18AP83-20AP83		2	20.1	C075.0M	P	19	0.094	32	0.161	28MY	16JN	06JL83	242	23
*	A STOCK-LARGE		(051333)														
RD 12 3	HAGERMAN HAT	UPPER SALMON R	18AP83-20AP83		5	20.4	C075.0M	P	29	0.142	40	0.197	05JN	16JN	24JN83	216	23
*	A STOCK-SMALL		(051334)														

SPECIES: STEELHEAD

MARK	HATCH/ORIGIN / PURPOSE OF RELEASE	RELEASE SITE	RELEASE DATE / OTHER MARKS	SIZE AT RELEASE MM	SIZE AT RELEASE /LB	NO. MKD THOUS	RECAPT. SITE R. KM	GEAR CODE	RECAPTURES ACTUAL NO.	RECAPTURES ACTUAL %	RECAPTURES ADJUSTED NO.	RECAPTURES ADJUSTED %	RECAPTURE DATE 10% TILE	RECAPTURE DATE MED. FISH	RECAPTURE DATE 90% TILE	AVG LEN MM	MVMT RATE KM/DAY
102460	HAGERMAN HAT	E FK SALMON R	12AP83-13AP83		4	57.4	C075.0M	P	77	0.134	90	0.157	22MY	30MY	07JN83	249	27
*	B STOCK		(LD121)														
LD 12 1	HAGERMAN HAT	E FK SALMON R	12AP83-13AP83		4	19.8	C075.0M	P	25	0.126	29	0.146	14MY	23MY	13JN83	223	28
*	B STOCK		(102460)														
++++++++																	
RA 3L 1	LO GRANITE D	LIT GOOSE TAIL	09MY83			5.3	C075.0S	B	1	0.019	2	0.028	20MY	20MY	21MY83	175	51
	SURVIVAL/TRAVEL TIME						C075.0M	P	6	0.113	6	0.113	20MY	22MY	26MY83	201	43
LA 3L 1	LO GRANITE D	LIT GOOSE TAIL	10MY83			2.5	C075.0M	P	5	0.200	5	0.211	20MY	24MY	06JN83	209	40
	SURVIVAL/TRAVEL TIME																
RD 3L 1	LO GRANITE D	LIT GOOSE TAIL	11MY83			2.2	C075.0M	P	1	0.045	2	0.067	25MY	25MY	26MY83	270	40
	SURVIVAL/TRAVEL TIME																
RA 3L 2	LO GRANITE D	LIT GOOSE TAIL	17MY83			3.5	C075.0M	P	7	0.200	9	0.245	27MY	28MY	05JN83	215	51
	SURVIVAL/TRAVEL TIME																
LA 3L 2	LO GRANITE D	LIT GOOSE TAIL	18MY83			5.3	C075.0M	P	4	0.075	5	0.101	28MY	30MY	30MY83	206	47
	SURVIVAL/TRAVEL TIME																
RD 3L 2	LO GRANITE D	LIT GOOSE TAIL	19MY83			6.4	C075.0M	P	3	0.047	3	0.051	29MY	29MY	06JN83	192	56
	SURVIVAL/TRAVEL TIME																
RA 3L 3	LO GRANITE D	LIT GOOSE TAIL	23MY83			9.1	C075.0S	B	1	0.011	2	0.016	31MY	31MY	01JN83	172	70
	SURVIVAL/TRAVEL TIME						C075.0M	P	8	0.088	11	0.117	31MY	31MY	01JN83	193	70
LA 3L 3	LO GRANITE D	LIT GOOSE TAIL	24MY83			3.9	C075.0M	P	8	0.208	10	0.247	01JN	07JN	09JN83	198	40
	SURVIVAL/TRAVEL TIME																
RD 3L 3	LO GRANITE D	LIT GOOSE TAIL	26MY83			2.1	C075.0M	P	2	0.094	2	0.094	02JN	02JN	03JN83	200	80
	SURVIVAL/TRAVEL TIME																
RA 3L 4	LO GRANITE D	LIT GOOSE TAIL	30MY83			2.2	C075.0M	P	3	0.135	3	0.135	07JN	07JN	11JN83	226	70
	SURVIVAL/TRAVEL TIME																
LA 3L 4	LO GRANITE D	LIT GOOSE TAIL	31MY83			1.6	C075.0M	P	4	0.255	4	0.271	05JN	07JN	08JN83	189	80
	SURVIVAL/TRAVEL TIME																
RD 3L 4	LO GRANITE D	LIT GOOSE TAIL	01JN83			2.3	C075.0M	P	5	0.219	7	0.284	08JN	09JN	11JN83	190	70
	SURVIVAL/TRAVEL TIME																
LD 3L 4	LO GRANITE D	LIT GOOSE TAIL	02JN83			2.3	C075.0M	P	1	0.044	2	0.066	11JN	11JN	12JN83	212	62
	SURVIVAL/TRAVEL TIME																
LA 3J 1	LO GRANITE D	PORT KELLY WASH	13MY83			1.8	C075.0M	P	3	0.166	3	0.166	22MY	22MY	23MY83	214	47
	LO GRANITE/PORT KELLY REL																
RA 3J 1	LO GRANITE D	PORT KELLY ORE	13MY83			1.9	C075.0S	B	1	0.052	2	0.079	21MY	21MY	22MY83	262	53
	LO GRANITE/PORT KELLY REL						C075.0M	P	5	0.262	5	0.262	21MY	22MY	25MY83	206	47
LA 3J 2	LO GRANITE D	PORT KELLY WASH	20MY83			2.9	C075.0M	P	5	0.171	7	0.239	27MY	28MY	29MY83	207	53
	MCNARY EFFICIENCY																
RA 3J 2	LO GRANITE D	PORT KELLY ORE	20MY83			2.7	C075.0M	P	4	0.149	5	0.198	28MY	28MY	29MY83	193	53
	MCNARY EFFICIENCY																
LA 3J 3	LO GRANITE D	PORT KELLY WASH	27MY83			2.2	C075.0M	P	3	0.134	3	0.134	02JN	04JN	04JN83	218	53
	MCNARY EFFICIENCY																
RA 3J 3	LO GRANITE D	PORT KELLY ORE	27MY83			2.0	C075.0M	P	2	0.102	3	0.153	02JN	02JN	03JN83	226	71
	MCNARY EFFICIENCY																
LA 3J 4	LO GRANITE D	PORT KELLY ORE	04JN83			2.2	C075.0M	P	2	0.030	3	0.120	10JN	10JN	12JN83	215	71
	MCNARY EFFICIENCY																
RA 3J 4	LO GRANITE D	PORT KELLY WASH	04JN83			1.9	C075.0M	P	3	0.161	5	0.241	07JN	07JN	11JN83	198	86
	MCNARY EFFICIENCY																

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SPECIES: STEELHEAD

MARK	HATCH/ORIGIN / PURPOSE OF RELEASE	RELEASE SITE	RELEASE DATE / OTHER MARKS	SIZE AT RELEASE MM	/LB	NO. MKD THOUS	RECAPT. SITE R. KM	GEAR CODE	RECAPTURES ACTUAL NO.	%	ADJUSTED NO.	%	RECAPTURE DATE 10% TILE	MED. FISH	90% TILE	AVG LEN MM	MVMT RATE KM/DAY
632839	LYONS FERRY HAT	WALLOWA HAT	03MY83-13MY83		5	33.0	C075.0M	P	31	0.094	34	0.102	15MY	26MY	06JN83	213	51
*	BROOD STK SELECTION		(RAS1;632839)														
632840	LYONS FERRY HAT	WALLOWA HAT	09MY83-13MY83		5	32.0	C075.0M	P	22	0.069	25	0.077	22MY	28MY	07JN83	225	46
*	BROOD STK SELECTION		(RAS2;632840)														
RA S 1	LYONS FERRY HAT	WALLOWA HAT	09MY83-13MY83		5	33.0	C075.0M	P	65	0.197	71	0.214	18MY	23MY	05JN83	207	62
*	BROOD STK SELECTION		(RAS1;632839)														
RA S 2	LYONS FERRY HAT	WALLOWA HAT	09MY83-13MY83		5	32.0	C075.0S	B	1	0.003	2	0.005	18MY	18MY	10MY83	228	96
*	BROOD STK SELECTION		(RAS2;632840)				C075.0M	P	55	0.172	66	0.205	22MY	28MY	20JN83	225	46
632838	LYONS FERRY HAT	LYONS FERRY	01MY83-20MY83		4	54.6	C075.0M	P	27	0.049	30	0.055	13MY	29MY	07JN83	229	19
*	BROOD STK SELECTION		(LAS1;632838)														
LA S 1	LYONS FERRY HAT	LYONS FERRY	01MY83-20MY83		4	54.6	C075.0M	P	41	0.075	47	0.085	13MY	28MY	15JN83	217	19
*	BROOD STK SELECTION		(LAS1;632838)														
LD S 2	LYONS FERRY HAT	LYONS FERRY	01MY83-20MY83		4	51.4	C075.0M	P	7	0.014	8	0.016	15MY	24MY	05JL83	239	23
	BROOD STK SELECTION																
LA 7U 3	MCNARY D	PORT KELLY ORE	04MY83			1.2	C075.0M	P	2	0.173	2	0.195	11MY	12MY	12MY83	187	53
	MCNARY EFFICIENCY																
RA +T 1	MCNARY D	PORT KELLY WASH	06MY83			0.8	C075.0M	P	2	0.247	2	0.277	12MY	12MY	15MY83	220	71
	MCNARY EFFICIENCY																
RA 15 1	MCNARY D	PORT KELLY ORE	06MY83			0.8	C075.0M	P	1	0.123	2	0.184	14MY	14MY	15MY83	213	53
	MCNARY EFFICIENCY																
RA +T 3	MCNARY D	PORT KELLY WASH	09MY83			0.6	C075.0M	P	3	0.469	5	0.704	16MY	16MY	17MY83	181	61
	MCNARY EFFICIENCY																
RA 15 3	MCNARY D	PORT KELLY ORE	09MY83			0.6	C075.0M	P	1	0.157	2	0.235	16MY	16MY	17MY83	205	61
	MCNARY EFFICIENCY																
LA +T 1	MCNARY D	PORT KELLY WASH	11MY83			0.5	C075.0M	P	2	0.377	2	0.377	14MY	14MY	18MY83	193	142
	MCNARY EFFICIENCY																
LA 15 1	MCNARY D	PORT KELLY ORE	11MY83			0.5	C075.0M	P	2	0.377	2	0.377	18MY	18MY	19MY83	198	61
	MCNARY EFFICIENCY																
LA +T 3	MCNARY D	PORT KELLY ORE	14MY83			0.6	C075.0M	P	3	0.482	3	0.482	22MY	22MY	23MY83	225	53
	MCNARY EFFICIENCY																
LA 15 3	MCNARY D	PORT KELLY ORE	14MY83			0.6	C075.0M	P	4	0.643	4	0.643	21MY	22MY	03JN83	191	53
	MCNARY EFFICIENCY																
RD 13 1	MCNARY D	PORT KELLY WASH	18MY83			0.6	C075.0M	P	2	0.344	3	0.458	25MY	28MY	28MY83	221	43
	MCNARY EFFICIENCY																
RD 13 3	MCNARY D	PORT KELLY WASH	22MY83			1.2	C075.0M	P	3	0.250	5	0.375	29MY	29MY	30MY83	231	61
	MCNARY EFFICIENCY																
RD 7U 3	MCNARY D	PORT KELLY ORE	22MY83			1.2	C075.0M	P	1	0.084	2	0.126	29MY	29MY	30MY83	217	61
	MCNARY EFFICIENCY																
LD 13 1	MCNARY D	PORT KELLY WASH	25MY83			1.1	C075.0M	P	1	0.089	2	0.133	03JN	03JN	04JN83	209	47
	MCNARY EFFICIENCY																
LD 13 3	MCNARY D	PORT KELLY WASH	28MY83			0.8	C075.0M	P	1	0.125	2	0.187	03JN	03JN	04JN83	183	71
	MCNARY EFFICIENCY																
LD 7U 3	MCNARY D	PORT KELLY ORE	28MY83			1.0	C075.0M	P	1	0.098	2	0.146	03JN	03JN	04JN83	208	71
	MCNARY EFFICIENCY																
RD 15 3	MCNARY D	PORT KELLY ORE	03JN83			0.8	C075.0M	P	1	0.123	2	0.185	07JN	07JN	08JN83	231	107
	MCNARY EFFICIENCY																

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SPECIES: STEELHEAD

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LA Y 3	MCNARY D	MCNARY TAIL	03MY83			3.0	C075.0M	P	2	0.067	3	0.100	10MY	10MY	11MY83	185	56
	MCNARY EFFICIENCY																
RA J 1	MCNARY D	MCNARY TAIL	05MY83			2.9	C075.0M	P	8	0.280	8	0.280	11MY	11MY	14MY83	192	66
	MCNARY EFFICIENCY																
RA J 3	MCNARY D	MCNARY TAIL	07MY83			1.5	C075.0M	P	2	0.138	3	0.207	14MY	14MY	15MY83	169	56
	MCNARY EFFICIENCY																
LA J 1	MCNARY D	MCNARY TAIL	10MY83			1.7	C075.0M	P	5	0.296	5	0.296	16MY	17MY	23MY83	215	56
	MCNARY EFFICIENCY																
LA J 3	MCNARY D	MCNARY TAIL	13MY83			2.5	C075.0S	B	1	0.041	2	0.061	20MY	20MY	21MY83	207	56
	MCNARY EFFICIENCY						C075.0M	P	6	0.245	6	0.245	19MY	19MY	21MY83	188	66
RD Y 1	MCNARY D	MCNARY TAIL	17MY83			2.3	C075.0M	P	2	0.089	2	0.089	23MY	23MY	25MY83	241	66
	MCNARY EFFICIENCY																
RD Y 3	MCNARY D	MCNARY TAIL	20MY83			1.7	C075.0M	P	2	0.116	2	0.116	26MY	26MY	27MY83	213	66
	MCNARY EFFICIENCY																
LD Y 1	MCNARY D	MCNARY TAIL	24MY83			2.0	C075.0M	P	1	0.050	2	0.075	30MY	30MY	31MY83	197	66
	MCNARY EFFICIENCY																
LD Y 3	MCNARY D	MCNARY TAIL	26MY83			0.8	C075.0M	P	3	0.356	5	0.534	01JN	01JN	02JN83	204	66
	MCNARY EFFICIENCY																
RD J 1	MCNARY D	MCNARY TAIL	30MY83			1.3	C075.0M	P	4	0.304	4	0.323	04JN	05JN	07JN83	192	66
	MCNARY EFFICIENCY																
RD J 3	MCNARY D	MCNARY TAIL	01JN83			0.8	C075.0M	P	3	0.390	3	0.422	06JN	07JN	08JN83	200	66
	MCNARY EFFICIENCY																
102450	NIAGARA SPRINGS	PAHSIMEROI R	09AP82		3	40.5	C075.0M	P	2	0.005	3	0.007	02MY	20JN	20JN83	227	1
	VIRRIO VACC CONTROL																
LD 12 4	NIAGARA SPRINGS	PAHSIMEROI R	19AP83		3	20.8	C075.0M	P	2	0.010	2	0.011	06MY	12MY	12MY83	205	54
	HATCHERY EVAL																
RD 12 4	NIAGARA SPRINGS	HELLS CANYON D	20AP83		3	12.0	C075.0M	P	3	0.025	3	0.025	08MY	16MY	26MY83	224	32
	OFF SITE RELEASE EVAL																
RD KE 2	RND BUTTE HAT	WH R ABV FALLS	01JN83	183	6	1.0	C075.0M	P	1	0.097	2	0.145	12JN	12JN	13JN83	196	30
	AFFECTS OF FALLS																
RA KE 3	RND BUTTE HAT	WH R BLW FALLS	06JN83	183	6	1.0	C075.0M	P	1	0.097	2	0.146	11JN	11JN	12JN83	183	65
	AFFECTS OF FALLS																
621636	TURTLE ROCK PD	VAR WENATCHEE R LD	07AP83-11MY83		7	14.0	C075.0M	P	6	0.043	6	0.045	26MY	02JN	08JN83	215	13
	SKAMANIA STK EARLY RETURNS																
RA 17 1	WELLS SPAW CH	METHOW R@RM 31	19AP83-27AP83		5	20.0	C075.0M	P	23	0.115	24	0.122	07MY	15MY	28MY83	206	31
*	PUD TRANSPORT/CONTROL		(RA171;621561)														
RA 52 1	WELLS SPAW CH	DLW PR RAPID D	19AP83-27AP83		5	22.4	C075.0M	P	49	0.213	50	0.224	04MY	12MY	21MY83	205	24
*	PUD TRANSPORT/TEST		(RA521;621560)														

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SPECIES: STEELHEAD

MARK	HATCH/ORIGIN PURPOSE OF RELEASE	RELEASE SITE	RELEASE DATE OTHER MARKS	SIZE AT RELEASE MM	/LB	NO. MKD THOUS	RECAPT. SITE R. KM	GEAR CODE	RECAPTURES ACTUAL NO.	ACTUAL %	ADJUSTED NO.	ADJUSTED %	RECAPTURE DATE 10% TILE	MED. FISH	90% TILE	AVG LEN MM	MVMT RATE KM/DAY
LD R 3	WHITEBIRD TRAP WHITEBIRD SCOOP TRAP	SALMON R@RM 53	24AP83-26AP83			0.1	C075.0M	P	1	0.943	2	1.415	08MY	08MY	09MY83	167	60
RA R 1	WHITEBIRD TRAP WHITEBIRD SCOOP TRAP	SALMON R@RM 53	30AP83-02MY83			0.1	C075.0M	P	1	1.136	2	1.705	08MY	08MY	09MY83	171	104
RA R 2	WHITEBIRD TRAP WHITEBIRD SCOOP TRAP	SALMON R@RM 53	03MY83-05MY83			0.1	C075.0M	P	1	0.709	2	1.064	28MY	28MY	29MY83	210	33
RA R 3	WHITEBIRD TRAP WHITEBIRD SCOOP TRAP	SALMON R@RM 53	06MY83-08MY83			0.4	C075.0M	P	4	1.055	4	1.121	14MY	23MY	30MY83	197	49
RA R 4	WHITEBIRD TRAP WHITEBIRD SCOOP TRAP	SALMON R@RM 53	09MY83-11MY83			0.3	C075.0M	P	2	0.719	2	0.719	19MY	19MY	24MY83	220	83
LA R 2	WHITEBIRD TRAP WHITEBIRD SCOOP TRAP	SALMON R@RM 53	15MY83-17MY83			0.2	C075.0M	P	1	0.513	2	0.769	24MY	24MY	25MY83	203	93
++++++++++																	
BLANK		NO RELEASE INFO					C075.0M	P	6	0.000			23MY	28MY	13JN83	245	
LA 2 1		NO RELEASE INFO					C075.0M	P	1	0.000			25MY	25MY	26MY83	213	
LA AN 1		NO RELEASE INFO					C075.0M	P	1	0.000			10MY	10MY	11MY83	212	
LA AN 3		NO RELEASE INFO					C075.0M	P	1	0.000			23MY	23MY	24MY83	202	
LA PI 1		NO RELEASE INFO					C075.0M	P	2	0.000			27MY	28MY	28MY83	215	
LA PI 2		NO RELEASE INFO					C075.0M	P	1	0.000			28MY	28MY	29MY83	218	
LA PI 4		NO RELEASE INFO					C075.0M	P	1	0.000			28MY	28MY	29MY83	219	
LA SU 1		NO RELEASE INFO					C075.0M	P	1	0.000			28MY	28MY	29MY83	105	
LA SU 3		NO RELEASE INFO					C075.0M	P	1	0.000			05JN	05JN	06JN83	207	
LD 10 1		NO RELEASE INFO					C075.0M	P	2	0.000			05JN	05JN	07JN83	215	
LD 3L 1		NO RELEASE INFO					C075.0M	P	1	0.000			24MY	24MY	25MY83	183	
LD SU 4		NO RELEASE INFO					C075.0M	P	1	0.000			18MY	18MY	19MY83	226	
LET GO		NO RELEASE INFO					C075.0M	P	3	0.000			10MY	13MY	13MY83	192	
NO TAG		NO RELEASE INFO					C075.0S	B	2	0.000			10MY	10MY	24MY83	198	
							C075.0M	P	176	0.000			14MY	28MY	07JN83	222	
RA 2 3		NO RELEASE INFO					C075.0M	P	2	0.000			14MY	14MY	26MY83	0	
RA 7 2		NO RELEASE INFO					C075.0M	P	1	0.000			11MY	11MY	12MY83	190	
RA PI 2		NO RELEASE INFO					C075.0M	P	1	0.000			12MY	12MY	13MY83	227	

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RA SU 1		NO RELEASE INFO					C075.0M	P	5	0.000			07MY	07JN	07JN83	204	
RA T 1		NO RELEASE INFO					C075.0M	P	1	0.000			10MY	10MY	11MY83	191	
RA T 2		NO RELEASE INFO					C075.0M	P	2	0.000			12MY	12MY	13MY83	210	
RA U 2		NO RELEASE INFO					C075.0M	P	1	0.000			21MY	21MY	22MY83	201	
RA X 1		NO RELEASE INFO					C075.0M	P	1	0.000			17MY	17MY	18MY83	193	
RA X 2		NO RELEASE INFO					C075.0M	P	1	0.000			25MY	25MY	26MY83	204	
RD PI 1		NO RELEASE INFO					C075.0M	P	1	0.000			07MY	07MY	08MY83	[illegible]	
RD SU 1		NO RELEASE INFO					C075.0M	P	1	0.000			27JN	27JN	28JN83	201	
RD SU 3		NO RELEASE INFO					C075.0M	P	1	0.000			24MY	24MY	25MY83	227	

SUBYEARLING CHINOOK SALMON

RELEASE AND RECAPTURE INFORMATION - COLUMBIA RIVER ESTUARY
REPORT DATE 2/16/84
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SPECIES: SUB-YEAR CHINOOK

MARK	HATCH/ORIGIN / PURPOSE OF RELEASE	RELEASE SITE	RELEASE DATE / OTHER MARKS	SIZE AT RELEASE MM	/LB	NO. MKD THOUS	RECAPT. SITE R. KM	GEAR CODE	RECAPTURES ACTUAL NO.	%	ADJUSTED NO.	%	RECAPTURE DATE 10% TILE	MED. FISH	90% TILE	AVG LEN MM	MVMT RATE KM/DAY
072826	BONNEVILLE HAT	VERNITA BRID	02JN83		100	100.2	C075.OS	B	9	0.009	9	0.009	16JN	18JN	28JN83	86	35
	UPRIVER BRIGHT	TRANSPORT					C075.OM	P	38	0.038	69	0.069	19JN	16JL	22JL83	121	13
072727	BONNEVILLE HAT	TANNER CR	04MY83		72	50.0	C075.OX	B	38	0.076	38	0.076	07MY	09MY	12MY83	84	31
	OMP 4 SAL MEAL						C075.OS	B	39	0.078	39	0.078	07MY	10MY	13MY83	80	26
							C075.OM	P	5	0.010	5	0.010	07MY	08MY	10MY83	88	39
072728	BONNEVILLE HAT	TANNER CR	04MY83		68	50.8	C075.OX	B	41	0.081	41	0.081	07MY	09MY	11MY83	84	31
	OMP 4 SAL MEAL						C075.OS	B	44	0.087	44	0.087	07MY	09MY	12MY83	86	31
							C075.OM	P	5	0.010	5	0.010	07MY	08MY	30MY83	83	39
072729	BONNEVILLE HAT	TANNER CR	04MY83		74	52.6	C075.OX	B	45	0.086	45	0.086	07MY	09MY	12MY83	84	31
	OMP 2 CONTROL						C075.OS	B	37	0.070	37	0.071	07MY	09MY	13MY83	82	31
							C075.OM	P	3	0.006	3	0.006	07MY	08MY	21MY83	92	39
072730	BONNEVILLE HAT	TANNER CR	04MY83		73	47.4	C075.OX	B	39	0.082	39	0.083	07MY	10MY	12MY83	84	26
	OMP 2 CONTROL						C075.OS	B	43	0.091	43	0.091	08MY	10MY	13MY83	83	26
							C075.OM	P	4	0.008	4	0.008	07MY	07MY	07JN83	80	52
072827	BONNEVILLE HAT	TANNER CR	16JN83		80	100.3	C075.OS	B	75	0.075	91	0.091	23JN	29JN	11JL83	88	12
	UPRIVER BRIGHT	CONTROL					C075.OM	P	36	0.036	78	0.077	25JN	06JL	17JL83	98	8
072828	BONNEVILLE HAT	TANNER CR	01AU83		44	99.0	C075.OS	B	24	0.024	63	0.063	12AU	19AU	10NO83	104	9
	UPRIVER BRIGHT	LATE REL					C075.OM	P	15	0.015	67	0.067	11AU	15AU	08SE83	108	11
LA U 4	BONNEVILLE HAT	PRESCOTT ORE	12MY83-15MY83			51.1	C075.OX	B	26	0.051	26	0.051	14MY	15MY	17MY83	85	13
	JONES BEACH SURVIVAL STUDY						C075.OS	B	37	0.072	37	0.072	13MY	16MY	17MY83	84	10
							C075.OM	P	20	0.039	20	0.039	13MY	16MY	16MY83	84	10
632503	COWLITZ HAT	COWLITZ RERM 50	06JN83-25JN83		72	150.2	C075.OS	B	488	0.325	662	0.441	28JN	06JL	19JL83	88	4
	INDEX						C075.OM	P	34	0.023	78	0.052	28JN	10JL	24AU83	92	3
632610	COWLITZ HAT	COWLITZ RERM 50	02NO83		20	146.4	C075.OS	B	23	0.016	177	0.121	03NO	05NO	15NO83	127	38
	INDEX-DELAYED REL						C075.OM	P	7	0.005	14	0.010	03NO	04NO	05NO83	135	57
101320	EAGLE CR HAT	CLACKAMAS R	17OC83		9	36.4	C075.OS	B	2	0.005	3	0.008	10NO	10NO	11NO83	181	7
	U OF I-STRESS TEST						C075.OM	P	3	0.008	16	0.044	02NO	20NO	22NO83	188	5
101321	EAGLE CR HAT	CLACKAMAS R	17OC83		8	36.6	C075.OS	B	1	0.003	2	0.004	10NO	10NO	11NO83	197	7
	CONTROL																
101322	EAGLE CR HAT	CLACKAMAS R	17OC83		8	35.8	C075.OS	B	1	0.003	2	0.006	08NO	09NO	10NO83	205	7
	CONTROL						C075.OM	P	2	0.006	11	0.031	15NO	19NO	22NO83	189	5
101323	EAGLE CR HAT	CLACKAMAS R	17OC83		9	38.5	C075.OM	P	2	0.005	10	0.025	02NO	20NO	22NO83	184	5
	CONTROL																
102515	HAGERMAN HAT	CLEAR CR	14JN83		25	54.3	C075.OM	P	27	0.050	70	0.128	02JL	06JL	12JL83	133	36
*	AGE 0-BKD STUDY		(LDT1)														
632737	LEWIS R	LEWIS R	06JN83-11JN83	49		48.6	C075.OS	B	131	0.269	273	0.562	21JL	11AU	02OC83	91	1
	WILD STK-SEINED,TAGGED,&REL						C075.OM	P	1	0.002	2	0.003	08SE	08SE	09SE83	120	1
632738	LEWIS R	LEWIS R	06JN83-11JN83	59		48.5	C075.OS	B	106	0.219	155	0.319	12JL	21JL	23AU83	80	2
	WILD STK-SEINED,TAGGED,&REL						C075.OM	P	7	0.014	21	0.043	08JL	17JL	12AU83	78	2

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SPECIES: SUB-YEAR CHINOOK

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051141	LIT WH SAL HAT	LIT WH SAL RERM 2	04MY83		7	48.1	C075.OX	B	14	0.029	14	0.029	13MY	16MY	18MY83	85	16
	SUBYEAR REL SP CHINOOK						C075.OS	B	36	0.075	37	0.076	16MY	20MY	25MY83	87	12
							C075.OM	P	6	0.012	7	0.014	12MY	02JN	08JN83	102	6
051139	LIT WH SAL HAT	LIT WH SAL RERM 2	24JN83		44	46.1	C075.OM	P	44	0.096	89	0.194	02JL	06JL	12JL83	111	16
	SUBYEAR REL SP CHINOOK																
LA 7T 1	MCNARY D	MCNARY TAIL	16JN83			1.5	C075.OM	P	1	0.069	2	0.103	28JN	28JN	29JN83	94	33
*	JOHN DAY POOL EVAL		(231623)														
LA 7T 3	MCNARY D	MCNARY TAIL	22JN83			5.2	C075.OM	P	1	0.019	2	0.029	19JL	19JL	20JL83	120	15
*	JOHN DAY POOL EVAL		(231623)														
LD 7T 1	MCNARY D	MCNARY TAIL	30JN83			5.0	C075.OM	P	2	0.040	3	0.066	19JL	19JL	20JL83	117	21
*	JOHN DAY POOL EVAL		(231623)														
LA 2L 1	MCNARY D	MCNARY TAIL	08JL83			5.0	C075.OM	P	4	0.080	7	0.134	19JL	19JL	20JL83	115	36
*	MCNARY TRANS EVAL		(231627)														
LA 2L 3	MCNARY D	MCNARY TAIL	13JL83			5.0	C075.OM	P	3	0.060	6	0.117	21JL	21JL	23JL83	110	49
*	MCNARY TRANS EVAL		(231627)														
LD 2L 1	MCNARY D	MCNARY TAIL	15JL83			5.0	C075.OM	P	3	0.060	10	0.199	24JL	25JL	03AU83	117	39
*	MCNARY TRANS EVAL		(231627)														
RA IJ 1	MCNARY D	BONN TAIL	07JL83-14JL83			15.1	C075.OS	B	1	0.007	2	0.010	14JL	14JL	15JL83	100	22
*	MCNARY TRANS EVAL - TRUCK		(231625;RAIJ1)				C075.OM	P	2	0.013	4	0.028	12JL	22JL	23JL83	123	10
RA 3 1	MCNARY D	BONN TAIL	10JL83-15JL83			15.0	C075.OS	B	4	0.027	6	0.037	13JL	13JL	16JL83	98	52
*	MCNARY TRANS EVAL - BARGE		(231626;RA31)				C075.OM	P	3	0.020	5	0.033	14JL	14JL	20JL83	107	39
231629	MCNARY D	BONN TAIL	18JL83-26JL83			15.2	C075.OM	P	1	0.007	2	0.010	22JL	22JL	23JL83	108	39
*	MCNARY TRANS EVAL - BARGE		(231629;RA33)														
RA 3 3	MCNARY D	BONN TAIL	18JL83-26JL83			15.2	C075.OS	B	1	0.007	2	0.010	26JL	26JL	27JL83	103	20
*	MCNARY TRANS EVAL - BARGE		(231629;RA33)				C075.OM	P	1	0.007	2	0.010	22JL	22JL	23JL83	106	39
RA IJ 3	MCNARY D	BONN TAIL	19JL83-25JL83			14.0	C075.OM	P	5	0.036	9	0.066	21JL	21JL	22JL83	112	79
*	MCNARY TRANS EVAL - TRUCK		(231628;RAIJ3)														
RA 3 2	MCNARY D	BONN TAIL	28JL83-01AU83			8.6	C075.OM	P	3	0.035	10	0.116	01AU	04AU	06AU83	116	22
*	MCNARY TRANS EVAL - BARGE		(231632;RA32)														
231631	MCNARY D	BONN TAIL	30JL83-02AU83			6.2	C075.OM	P	2	0.032	4	0.064	31JL	01AU	02AU83	121	79
*	MCNARY TRANS EVAL - TRUCK		(231631;RAIJ2)														
RA IJ 2	MCNARY D	BONN TAIL	30JL83-02AU83			6.2	C075.OM	P	6	0.097	12	0.193	31JL	01AU	02AU83	113	79
*	MCNARY TRANS EVAL - TRUCK		(231631;RAIJ2)														
632611	PR RAPID SPAW C	PR RAPID SPAW CH	24MY83		84	204.1	C075.OS	B	13	0.006	14	0.007	16JN	17JN	30JN83	92	24
	INDEX-PROD						C075.OM	P	128	0.063	181	0.089	11JN	17JN	19JL83	97	24
632612	PR RAPID SPAW C	PR RAPID SPAW CH	21JN83		63	202.4	C075.OS	B	2	0.001	8	0.004	13JL	02NO	03NO83	172	4
	INDEX-"WILD"						C075.OM	P	84	0.042	201	0.099	08JL	20JL	29JL83	116	19
072836	RND BUTTE HAT	DESCHUTES RERM 100	24MY83		19	25.9	C075.OS	B	1	0.004	2	0.006	02JN	02JN	03JN83	132	46
	O AGE DATE						C075.OM	P	44	0.170	53	0.204	30MY	08JN	18JN83	136	28
072843	RND BUTTE HAT	DESCHUTES RERM 100	05OC83		14	53.6	C075.OS	B	1	0.002	2	0.003	10NO	10NO	11NO83	187	12
	SLOW INCUBATION																
072837	RND BUTTE HAT	DESCHUTES RERM 100	06OC83		6	28.2	C075.OS	B	2	0.007	13	0.047	23OC	06NO	08NO83	198	13
	FAST INCUBATION																

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072837	RND BUTTE HAT FAST INCUBATION	DESCHUTES R@RM 100	060C83	6		28.2	C075.0M	P	1	0.004	2	0.005	25OC	25OC	26OC83	207	22
051142	SPRING CR HAT SALT DIET CONTROL	SPRING CR HAT	28AP83	54		49.7	C075.0X	B	14	0.028	14	0.028	05MY	05MY	08MY83	86	28
							C075.0S	B	44	0.088	44	0.089	03MY	05MY	10MY83	91	28
							C075.0M	P	7	0.014	7	0.014	02MY	02MY	07MY83	94	40
051143	SPRING CR HAT SALT DIET CONTROL	SPRING CR HAT	28AP83	55		51.3	C075.0X	B	13	0.025	13	0.025	05MY	06MY	03MY83	89	24
							C075.0S	B	52	0.101	52	0.101	03MY	04MY	07MY83	91	32
							C075.0M	P	6	0.012	6	0.012	03MY	06MY	21MY83	89	24
051144	SPRING CR HAT 7% SALT DIET	SPRING CR HAT	28AP83	55		51.7	C075.0X	B	27	0.052	27	0.052	05MY	06MY	03MY83	91	24
							C075.0S	B	45	0.087	45	0.087	03MY	05MY	08MY83	92	28
							C075.0M	P	10	0.019	10	0.019	02MY	03MY	04MY83	93	39
051145	SPRING CR HAT 7% SALT DIET	SPRING CR HAT	28AP83	55		52.3	C075.0X	B	13	0.025	13	0.025	05MY	07MY	13MY83	89	22
							C075.0S	B	67	0.128	67	0.128	03MY	04MY	06MY83	91	32
							C075.0M	P	9	0.017	9	0.017	02MY	03MY	01JN83	93	39
RD U 3	SPRING CR HAT BONN P H EVAL/TEST 44'	BONN NEW P H	02MY83	63		51.4	C075.0X	B	50	0.097	50	0.097	06MY	08MY	10MY83	87	26
							C075.0S	B	34	0.066	34	0.066	06MY	07MY	10MY83	85	32
							C075.0M	P	5	0.010	0	0.000	04MY	04MY	24MY83	85	79
LD U 3	SPRING CR HAT BONN P H EVAL/TEST 45'	BONN NEW P H	03MY83	64		53.9	C075.0X	B	52	0.096	52	0.096	07MY	09MY	11MY83	86	26
							C075.0S	B	48	0.089	48	0.089	07MY	08MY	13MY83	85	32
							C075.0M	P	7	0.013	7	0.013	06MY	08MY	13MY83	88	32
RA +F 1	SPRING CR HAT BONN II PH BYPASS EVAL	BONN NEW P H	23MY83			1.0	C075.0M	P	1	0.100	2	0.150	26MY	26MY	27MY83	91	53
RA +F 3	SPRING CR HAT BONN II PH BYPASS EVAL	BONN NEW P H	23MY83			1.0	C075.0S	B	1	0.100	2	0.150	29MY	29MY	30MY83	79	26
RA +J 1	SPRING CR HAT BONN II PH BYPASS EVAL	BONN NEW P H	23MY83			1.0	C075.0S	B	1	0.100	2	0.150	01JN	01JN	02JN83	76	18
RA AN 1	SPRING CR HAT BONN II PH BYPASS EVAL	BONN NEW P H	23MY83			0.1	C075.0M	P	1	1.000	2	1.500	29MY	29MY	30MY83	82	26
LA +F 3	SPRING CR HAT BONN II PH BYPASS EVAL	BONN NEW P H	24MY83			1.0	C075.0S	B	1	0.101	2	0.151	29MY	29MY	30MY83	87	32
LA +J 1	SPRING CR HAT BONN II PH BYPASS EVAL	BONN NEW P H	24MY83			1.0	C075.0S	B	3	0.301	3	0.301	29MY	29MY	30MY83	86	32
							C075.0M	P	1	0.100	2	0.151	27MY	27MY	28MY83	94	53
LA +J 3	SPRING CR HAT BONN II PH BYPASS EVAL	BONN NEW P H	24MY83			1.0	C075.0S	B	1	0.100	2	0.150	30MY	30MY	31MY83	78	26
LD AN 1	SPRING CR HAT BONN II PH BYPASS EVAL	BONN NEW P H	24MY83			1.0	C075.0S	B	1	0.100	2	0.150	29MY	29MY	30MY83	80	32
RD 4 3	SPRING CR HAT BONN II PH BYPASS EVAL	BONN NEW P H	24MY83			1.0	C075.0S	B	2	0.206	3	0.309	29MY	29MY	30MY83	83	32
RD +F 3	SPRING CR HAT BONN II PH BYPASS EVAL	BONN NEW P H	25MY83			1.0	C075.0S	B	1	0.101	2	0.151	28MY	28MY	29MY83	78	53
RD +J 1	SPRING CR HAT BONN II PH BYPASS EVAL	BONN NEW P H	25MY83			1.0	C075.0S	B	1	0.102	2	0.152	30MY	30MY	31MY83	80	32
RD AN 1	SPRING CR HAT BONN II PH BYPASS EVAL	BONN NEW P H	25MY83			0.1	C075.0S	B	1	1.000	2	1.500	31MY	31MY	01JN83	80	26
RD AN 3	SPRING CR HAT BONN II PH BYPASS EVAL	BONN NEW P H	25MY83			1.0	C075.0S	B	1	0.097	2	0.145	30MY	30MY	31MY83	83	32

REPORT DATE 2/16/84
SORT SEQUENCE : SPECIES,SOURCE,RELEASE KM(-),START RELEASE DATE,MARK, RECAPTURE SITE(-) (FINAL/SOURCE)

SPECIES: SUB-YEAR CHINOOK

MARK	HATCH/ORIGIN PURPOSE OF RELEASE	RELEASE SITE	RELEASE DATE OTHER MARKS	SIZE AT RELEASE MM	/LB	NO. MKD THOUS	RECAPT. SITE R. KM	GEAR CODE	RECAPTURES ACTUAL NO.	%	ADJUSTED NO.	%	RECAPTURE DATE 10% TILE	MED. FISH	90% TILE	AVG LEN MM	MVMT RATE KM/DAY
RD U 1	SPRING CR HAT BONN P H EVAL/CONTROL	BLW BONN D	02MY83	63		53.2	C075.0X	B	40	0.075	40	0.075	06MY	08MY	10MY83	87	26
							C075.0S	B	52	0.098	52	0.098	06MY	08MY	17MY83	86	26
							C075.0M	P	8	0.015	8	0.015	06MY	06MY	07MY83	90	39
LD U 1	SPRING CR HAT BONN P H EVAL/CONTROL	BLW BONN D	03MY83	64		52.8	C075.0X	B	52	0.099	52	0.099	07MY	09MY	11MY83	86	26
							C075.0S	B	50	0.095	50	0.095	07MY	09MY	12MY83	87	26
							C075.0M	P	5	0.009	5	0.009	06MY	07MY	15MY83	83	39
RA U 2	SPRING CR HAT JONES BEACH SURVIVAL STUDY	PRESCOTT CRE	06MY83-09MY83	64		52.7	C075.0X	B	46	0.087	46	0.087	07MY	10MY	11MY83	86	10
							C075.0S	B	47	0.089	47	0.089	07MY	10MY	12MY83	84	10
							C075.0M	P	12	0.023	12	0.023	07MY	10MY	10MY83	84	10
072328	STAYTON PD CONTRIBUTION	VAR WILLAM R & TRI	26AP83-19MY83	79		28.3	C075.0X	B	5	0.017	5	0.017	07MY	12MY	14MY83	79	6
							C075.0S	B	9	0.031	9	0.032	07MY	14MY	20MY83	85	5
							C075.0M	P	3	0.010	3	0.010	15MY	15MY	07JN83	84	5
072830	STAYTON PD CONTRIBUTION	VAR WILLAM R & TRI	26AP83-19MY83	79		24.0	C075.0X	B	9	0.037	9	0.038	08MY	15MY	18MY83	84	5
							C075.0S	B	8	0.033	8	0.033	06MY	13MY	20MY83	85	4
							C075.0M	P	7	0.029	7	0.029	05MY	13MY	08JN83	84	5
072831	STAYTON PD CONTRIBUTION	VAR WILLAM R & TRI	26AP83-19MY83	79		26.0	C075.0X	B	3	0.012	3	0.012	08MY	15MY	16MY83	86	5
							C075.0S	B	12	0.046	12	0.047	07MY	14MY	20MY83	88	5
							C075.0M	P	4	0.015	4	0.015	06MY	07MY	15JN83	88	8
072832	STAYTON PD CONTRIBUTION	VAR WILLAM R & TRI	26AP83-19MY83	79		26.2	C075.0X	B	4	0.015	4	0.015	05MY	08MY	15MY83	80	7
							C075.0S	B	9	0.034	9	0.034	06MY	19MY	22MY83	85	4
							C075.0M	P	2	0.008	2	0.008	08MY	08MY	03JN83	83	7
072833	STAYTON PD CONTRIBUTION	VAR WILLAM R & TRI	26AP83-19MY83	79		24.8	C075.0X	B	10	0.040	10	0.040	05MY	08MY	17MY83	80	7
							C075.0S	B	14	0.057	14	0.057	08MY	18MY	26MY83	84	4
							C075.0M	P	12	0.048	13	0.053	08MY	13MY	10JN83	83	5
072834	STAYTON PD CONTRIBUTION	VAR WILLAM R & TRI	26AP83-19MY83	79		26.8	C075.0X	B	4	0.015	4	0.015	09MY	16MY	17MY83	83	4
							C075.0S	B	8	0.030	8	0.030	09MY	18MY	26MY83	87	4
							C075.0M	P	4	0.015	4	0.015	07MY	15MY	22MY83	93	5
632259	WASHOUGAL HAT DELAYED REL-SEPT	WASHOUGAL R@RM 15	31AU83	28		101.2	C075.0S	B	101	0.100	280	0.276	06SE	11SE	05OC83	106	13
							C075.0M	P	15	0.015	153	0.151	05SE	08SE	05OC83	114	18
632239	WASHOUGAL HAT DELAYED REL-OCT	WASHOUGAL R@RM 15	11OC83	23		100.6	C075.0S	B	39	0.039	307	0.305	19OC	24OC	06NO83	117	11
							C075.0M	P	29	0.029	145	0.144	16OC	17OC	23OC83	122	24
632238	WASHOUGAL HAT DELAYED REL-NOV	WASHOUGAL R@RM 15	02NO83	22		100.3	C075.0S	B	71	0.071	495	0.494	07NO	09NO	19NO83	122	21
							C075.0M	P	1	0.001	2	0.002	06NO	07NO	08NO83	141	29
LA R 1		NO RELEASE INFO					C075.0S	B	1	0.000			01JN	01JN	02JN83	70	
LET GO		NO RELEASE INFO					C075.0X	B	2	0.000			14MY	14MY	15MY83	0	
							C075.0S	B	1	0.000			31AU	31AU	01SE83	91	
							C075.0M	P	1	0.000			28JN	28JN	29JN83	85	
NO TAG		NO RELEASE INFO					C075.0X	B	22	0.000			05MY	08MY	13MY83	81	
							C075.0S	B	74	0.000			09MY	06SE	13NO83	107	
							C075.0M	P	19	0.000			01MY	01MY	22NO83	91	

APPENDIX C

SUMMARY OF EXPENDITURES -- FY 1983

Category	Cost $
Personnel	$238,286
Travel	1,997
Transportation	10,896
Rent and Utilities	8,042
Printing	157
Contract Services	21,251
Supplies and Materials	14,441
Equipment[a]	2,637
Support	94,293
Total	392,000

[a] Nonexpendable capitalized equipment--Evinrude Outboard Corp., 70 hp outboard motor.