CZES Coastal Zone and Estuarine Studies

A Study to Define the Migrational Characteristics of Chinook and Coho Salmon in the Columbia River Estuary and Associated Marine Waters

by
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DAWLEY

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SUMMARY

The National marine Fisheries Service (NMFS) and the Pacific Northwest Regional Commission (PNRC) cooperated in funding a study of the Columbia River estuary from 1977 through 1980. The objectives of this study were to: (1) define the migrational and behavioral characteristics of juvenile salmonids from site of release to and through the estuary, (2) assist in evaluating hatchery production techniques and procedures in the year of release, and (3) define and monitor the juvenile survival to the estuary for selected stocks and to compare this survival to adult returns to the hatchery and fishery. In addition, sampling for juvenile salmonids was conducted in the spring and summer of 1980 in an area of the ocean extending from Tillamook Bay, Oregon, to Copalis Head, Washington, and from 6 to 48 km offshore.

In 1980, beach seines and purse seines at River Kilometer (RKm) 75 and purse seines at RKm 16 and nearshore areas of the Pacific Ocean adjacent to the Columbia River mouth captured 120,203 subyearling chinook salmon; 18,388 yearling chinook salmon; 24,348 coho salmon; and 13,877 steelhead. Approximately 4.5% of the total fish captured were marked. Additionally, 2,714 juvenile salmonids, of which 97 were marked, were recaptured in the ocean sampling. These marked fish were used to obtain movement rates, recapture rates, survival estimates, and biological samples. Major results were as follows:

1. The peak of migration past RKm 75 for hatchery reared chinook and coho salmon and steelhead was during the first 2 weeks in May. Fluctuations in catch of the subyearling chinook salmon outmigration were directly attributable to the magnitude and timing of hatchery releases.

2. Wild stock yearling and subyearling chinook salmon migrated past

Jones Beach from late March to late June and late May through September, respectively.

3. Movement rates varied considerably between groups, but on the average were the same as in past years--11 to 32 km/day from release site to the estuary.

4. Transporting juvenile fall chinook salmon downstream past eight dams on the Columbia and Snake Rivers may have increased their survival by as much as 277%.

5. Fall chinook salmon from Bonneville Hatchery fed Oregon Moist Pellet (OMP) No. 4 appeared to survive at twice the rate as those fed OMP No. 2.

6. Based on Washougal chinook salmon and Willamette steelhead recoveries, smaller individuals within populations released from hatcheries may not have survived as well as larger individuals during their migration to the estuary.

7. A substantial decrease in catch rates in the estuary of all salmonids occurred after 19 May 1980, coincident with high turbidity which was created by the volcanic eruption of Mount St. Helens. The number of subyearling chinook salmon captured after 19 May 1980, was about 50% lower than in the comparable periods in 1978 and 1979, even though similar numbers of fish had been released from hatcheries. No dead or moribund fish were observed in 1980, but symptoms of gill irritation were observed during the period of high turbidity.

8. Most juveniles were actively feeding as they passed Jones Beach. Average stomach fullness was about 50%; individuals migrating during high turbidity showed a decrease in stomach fullness.

9. Catches of resident fish species, incidental to the research objectives, were as much as 100 times greater in late May and June than in similar periods in past years.

10. Greater than 95% of the juvenile salmonids caught in the nearshore area adjacent to the Columbia River mouth were subyearling chinook salmon.

11. In the offshore ocean area, steelhead were found only in late May and early June and to the north of the Columbia River. Chinook and coho salmon had a fairly uniform north-south distribution over the entire sampling area and were predominantly found from 6 to 25 km offshore.

INTRODUCTION

Natural runs of salmon, *Oncorhynchus* sp., in the Columbia River basin have decreased over the past 40 years as a result of hydroelectric development and poor forest management practices (Raymond 1979, Netboy 1980). This decline has necessitated increased salmon culture to assure adequate numbers of returning adults for the various fisheries. Hatcheries are now the primary source of salmon for the Columbia River, and in the late 1970s, annually produced about 100 million fall chinook salmon, *O. tshawytscha*, and 21 million spring and summer chinook salmon; 30 million coho salmon, *O. kisutch*, and 10 million steelhead, *Salmo gairdneri*.[1/] Even with hatchery production at this level, all management agencies agree that, in general, yields of Columbia River salmonids are deteriorating.

Hatchery procedures and facilities are continually being modified to improve both the efficiency of production and the quality of juveniles produced. Initial efforts to evaluate changes in hatchery procedures have been dependent upon adult contributions to the fishery and returns to the hatchery. Since salmonid life histories are complex, depending on both river and ocean habitats, adult returns, as a measure of hatchery success, may have overshadowed less significant, but possibly positive changes in hatchery culture techniques.

The NMFS, Northwest and Alaska Fisheries Center, Division of Coastal Zone and Estuarine Studies, with funding assistance from the Pacific Northwest Regional Commission, has developed procedures for sampling juvenile salmon and steelhead in the Columbia River estuary. This has enabled an early evaluation of hatchery releases. It provides the ability

[1/] Unpublished documents from NMFS, Environmental and Technical Services Div., P.O. Box 4332, Portland, OR 97208.

to: (1) define migrational and behavioral characteristics from the site of release to and through the estuary, (2) assist in evaluating hatchery production techniques and procedures in the year of release, and (3) define and monitor juvenile survival to the estuary for selected stocks and compare this survival to adult contributions to the fishery and returns to the hatchery. Part I of this report summarizes our estuary sampling activities from 1 October 1979 to 30 September 1980, and includes some analysis and discussion of data collected in juvenile sampling from 1966 to 1979.

The correlation between returns of precocious males and subsequent adult salmon returns suggests that success or failure of a year-class is determined within the first 6 months or so of release and is dependent not only on freshwater and estuarine survival, but also on early ocean survival. Unfortunately, little information about the early ocean life history of juvenile salmonids has been available. In 1980, NMFS systematically sampled juvenile salmonids in the ocean from Tillamook Bay, Oregon, to Copalis Head, Washington, to determine if sufficient numbers of juvenile salmonids could be captured to provide meaningful information on ocean distribution and behavior of the various stocks of fish. Part II of this report summarizes the ocean sampling work of 1980.

PART I: ESTUARY SAMPLING

Current State of Knowledge

Estuarine sampling for juvenile salmonids has been accomplished in several small river systems to evaluate movement behavior, residence times, and feeding behavior (Reimer 1973; Congleton 1978; Levy and Levings 1978; Healey 1980; and Mason 1974). The Columbia River estuarine sampling program is unique, however, in attempting to estimate survival of many different hatchery stocks and define various aspects of migratory behavior within a large river, with spring freshet water flows from 4 to 17 thousand cubic meters per second (cms).

Sampling procedures presently used for estuarine sampling were developed during past phases of this research project which began in 1966. Various trap designs, fyke nets, trawl nets, gill nets, and seine nets have been used at 33 different locations throughout the estuary. Extensive fishmarking programs by state and federal fishery agencies in recent years have provided the capability for estuarine assessment of migrational behavior and survival of identifiable hatchery and wild stocks.

Study Area

There were two primary sampling areas in the Columbia River: (1) the upper extreme of the estuary at Jones Beach, Oregon, RKm 75 and (2) near the lower margin of the estuary, in brackish water at McGowan, Washington, RKm 16. Additional sites were sampled in marine areas close to the Columbia River mouth (Figure 1).

Methods

Marked fish were released at many locations throughout the Columbia River system in 1980 (Figure 2). Estuarine recaptures from these groups

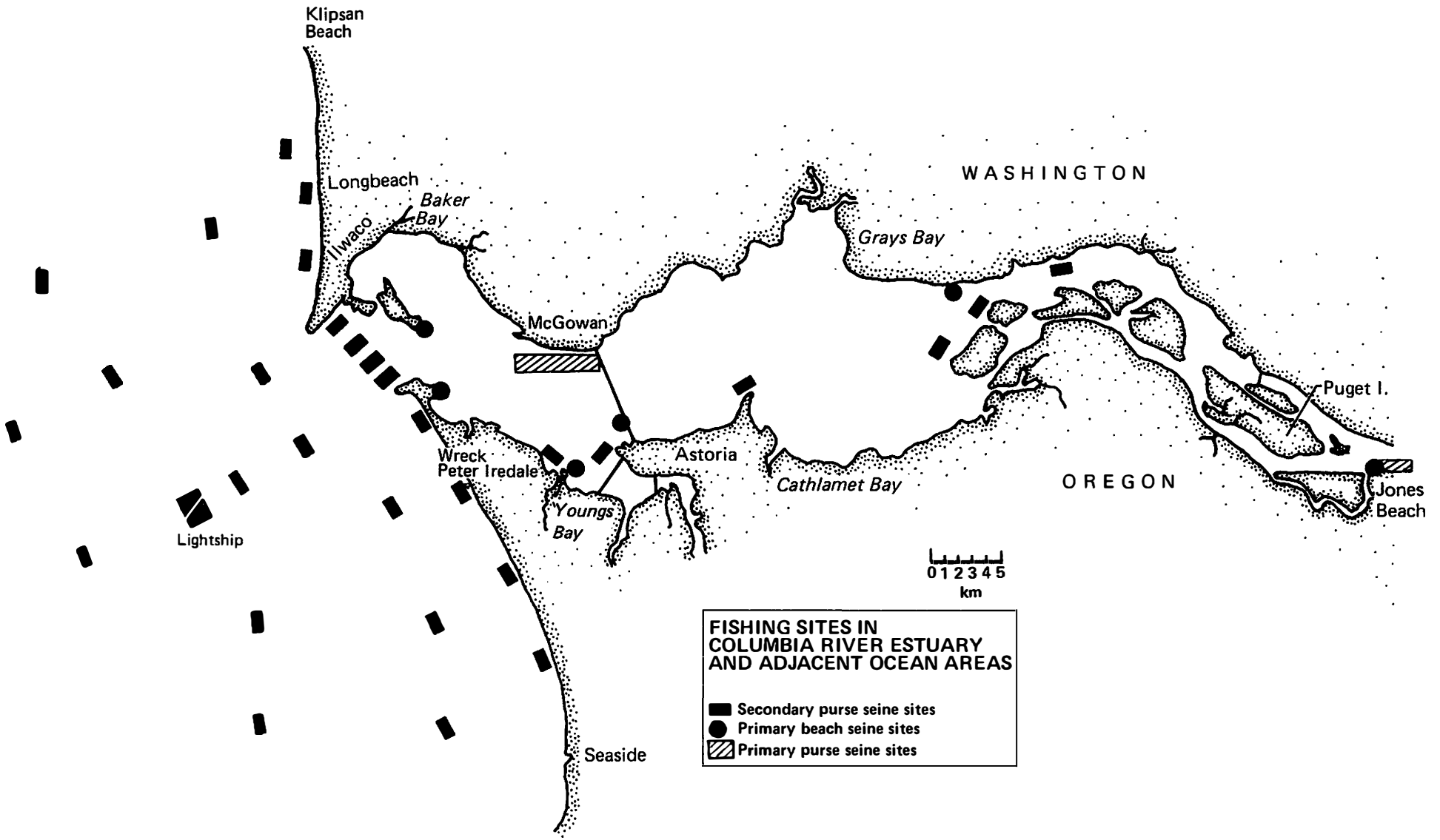

Figure 1.--The Columbia River estuary and adjacent Pacific Ocean showing sampling sites used in 1980.

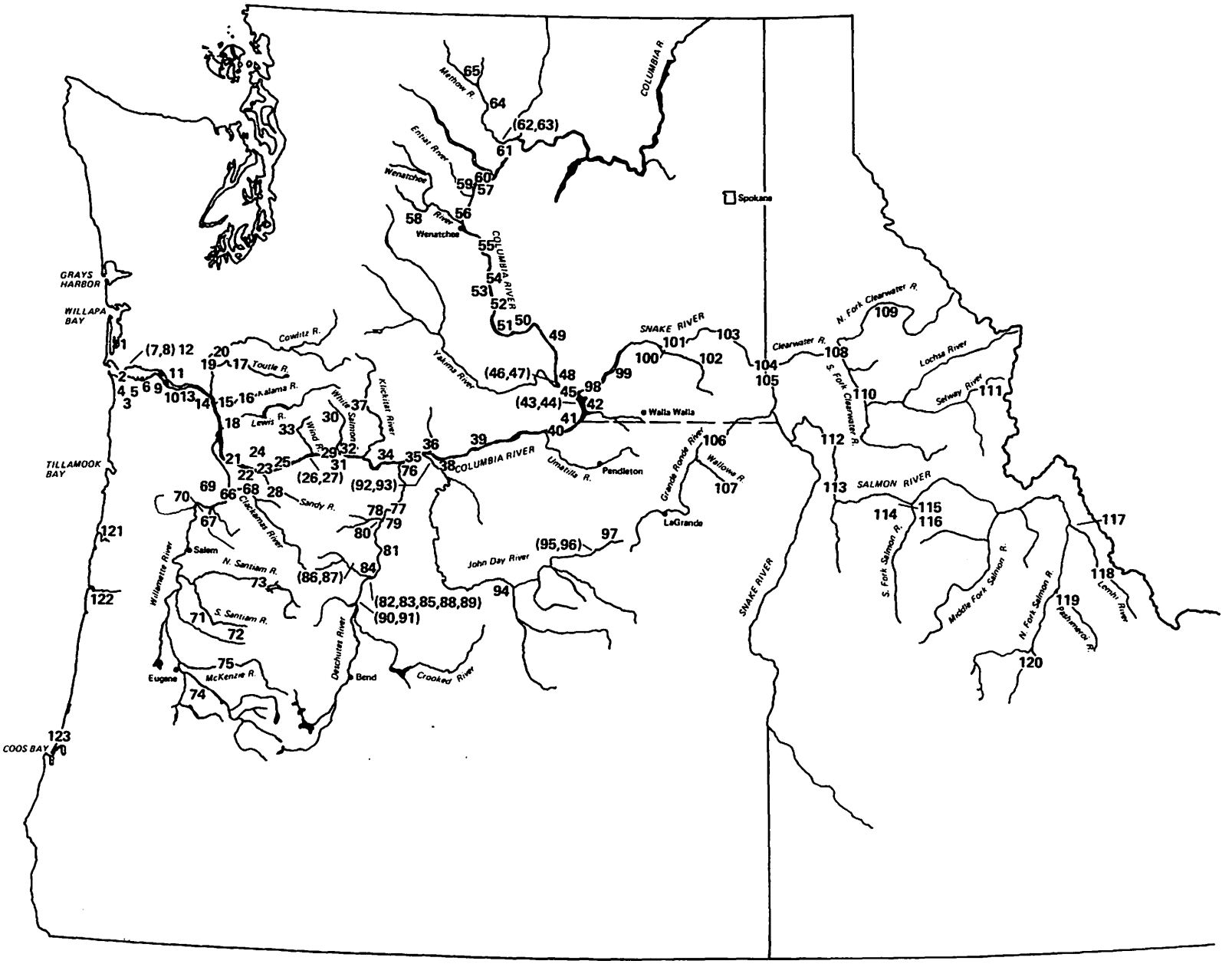

Figure 2.--Release locations of marked juvenile salmonids recaptured in 1980.

Figure 2 .--Cont.

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. Wahougal 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. McNary 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. Mollalla 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 Willam@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-WmSp 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
100. Texas Rapids	630
101. Lit Goose D	634
102. Tucannon R	691
103. Lo Granite D	693
104. Clarkston Wash	742
105. Asotin Id	754
106. Grand Ronde R	793
107. Wallowa Hat	940
CLEARWATER R & TRIBS	
108. N Fk Clearwater	809
109. Clear Cr	868
110. S Fk Clearwater	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
OUTSIDE COLUMBIA RIVER BASIN	
121. Siletz River	
122. Yaquina Bay	
123. Coos Bay Ore	

provided the majority of data to define migrational characteristics and estimate survival.

Sampling Procedures

Beach and purse seines were used to sample juvenile salmonids in shoreline areas and midriver areas at Jones Beach. Purse seines were used to sample at McGowan and at marine sites. The beach seine net was 95 m long, 5 m deep with 1- to 2-cm mesh size as described by Sims and Johnsen (1974), and the purse seine net was 206 m long and 11 m deep with 1- to 2-cm mesh size as described by Johnsen and Sims (1973).

In 1980, sampling began on 10 March at Jones Beach, 16 April at McGowan, and 11 June at marine sites and terminated in September. Sampling effort at Jones Beach varied weekly depending upon the number of migrants. Initial effort level was four sets/day and 3 days/week with the beach seine and two sets/day and 2 days/week with the purse seine. Effort in May and June was 10 sets/day with beach seine and three sets/day with the purse seine 6 days/week. From July to September the effort decreased to initial levels. Beach seine effort was decreased somewhat in the 2 weeks following the Mount St. Helens eruption. Sampling effort at McGowan and the ocean sites was dependent upon weather conditions and availability of vessels. Sampling generally began at sunrise and continued for 7 hours.

Catches of both marked and unmarked fish at Jones Beach were expanded to represent a standard effort--10 beach seine and 5 purse seine sets daily. Catches from McGowan and marine sites were not adjusted.

Sample Processing

Beach and purse seine catches at Jones Beach were examined at a permanent fish processing facility on shore. Fish taken at McGowan and the

marine sampling sites were processed on board the purse seine vessel. All fish were anesthetized with tricaine methanesulfonate (MS-222) or ethyl p-aminobenzoate (benzocaine), enumerated by species, and examined for identifying marks. Fork lengths were measured from a subsample of each species. Juvenile chinook salmon were separated into "subyearling" and "yearling" categories on the basis of fork length. Some overlap of length frequency curves occurred, but, in general, this method was satisfactory. After processing, all fish were allowed to recover from the effects of the anesthetic, transported out of the sampling area, and released back into the river.

Marks were recorded by species, fork length (mm), sampling gear, sampling site, time, and date. Salmonids with an excised adipose fin were passed through a magnetic wire tag detector to estimate tag retention rates for each species. Subsamples (no more than 100 fish per species per day) of coded wire tagged (CWT) fish were sacrificed for tag identification and the tag data expanded to represent the entire catch.

Portions of beach and purse seine catches at Jones Beach were freeze branded prior to release. Subsequent recaptures of these branded fish were used to determine rates of recapture for each species. About 80% of the daily catch of yearling chinook and coho salmon and steelhead and 40% of the subyearling chinook salmon were branded 3 days per week from 1 May to 23 June.

Biological Sample Collections

Biological samples were collected upon request for various research programs: (1) gill tissue samples were collected for adenosine triphosphatase (Na^+-K^+ ATPase) analysis by researchers from NMFS

smoltification study[2/], (2) scale samples were collected for researchers with Oregon Department of Fish and Wildlife (ODFW)[3/] and Washington Department of Game (WDG)[4/], and (3) stomach samples were collected for evaluation by our staff and WDG.

Fish sacrificed for tag identification provided most stomach samples. A relative fullness code, 1 to 7 (Terry 1976) was assigned to each stomach prior to preservation in a buffered 10% formaldehyde solution.

Water Quality Measurements

Surface water temperatures were measured daily at Jones Beach to ± 0.5°C. Water temperature, salinity, and conductivity measurements were made prior to each set at McGowan and the marine sites.

Migrational Timing

Definition of migrational timing at Jones Beach for subyearling chinook salmon was based upon beach seine catches. Migrational timing of yearling chinook salmon, coho salmon, and steelhead was based upon purse seine catches. It was recognized that sampling efficiency due to changes in water flow may have slightly affected temporal distribution curves, but it was considered to be minimal, and catch comparisons were made between 1978, 1979, and 1980.

Movement Rates

Movement rates of marked groups to the estuary were calculated using

2/ Earl Prentice, NMFS 2725 Montlake Blvd., Seattle, WA 98112

3/ Eugene M. Smith, ODFW, 3150 E. Main Street, Springfield, OR 97477; Gregory Concannon, ODFW, P.O. Box 182 Maupin, OR 97037; Harold Hansen, ODFW, 1733 Evelyn Street, Clackamas, OR 97015; and Sharon Murphy, ODFW, Oregon State University, Corvallis, OR 97331.

4/ John Loch, WDG, 1351 Kalama River Rd., Kalama, WA 98625.

distance and travel time from the first date of release at the hatchery to the date of recapture of the median fish at Jones Beach. Movement rates through the estuary were calculated using travel time and distance between Jones Beach (RKm 75) and McGowan (RKm 16) for the median fish recaptured at each site. Seasonal averages were calculated for each species, weighted by numbers recaptured at McGowan. Movement rates through the estuary and into the ocean were calculated for each marked group using the date of median fish recapture at Jones Beach and first recapture in marine water near the Columbia River mouth or offshore ocean sampling (see Part II).

Survival Estimates

Relative survival estimates between similar marked fish groups released by various fishery agencies were made by comparing recapture rates at Jones Beach. Three types of studies were assessed: (1) transporting fish around dams, (2) rearing fish at different densities, and (3) feeding fish different diets. Survival differences between large and small fish within individual mark groups were also examined by comparing the fork length distribution of the fish at the time of release from the hatchery to that of those captured at Jones Beach.

Survival of subyearling fall chinook salmon from release site to the estuary was calculated from estuarine recapture rates of groups released at the hatchery (tagged) and recapture rates of marked groups transported downstream and released above Jones Beach at Prescott, Oregon (RKm 115). Survival of hatchery releases tagged for the "Columbia River Fall Chinook Evaluation" (CRFCE)[6/] was determined in this manner. These releases

[5/] Bonneville Power Administration and NMFS cooperative study, Robert Vreeland, program coordinator, NMFS Environmental and Technical Services Div., P.O. Box 4332, Portland, Oregon, 97208.

included: Spring Creek National Fish Hatchery (NFH), April and May; Little White Salmon NFH, June; Bonneville Hatchery (ODFW), May; and Washougal Hatchery [Washington Department of Fisheries (WDF)] July. Groups of 75,000 to 250,000 fish tagged by researchers from CRFCE were released at the hatcheries. Groups of 25,000 fish from each population were freeze branded using procedures described by Mighell (1969). One half of each brand group was transported to Prescott, Oregon, (RKm 115) and held 4 days in a net-pen to acclimate to Columbia River water. Four days later the second half of the brand group was transported to Prescott, and both brand groups were released in midriver. The release was made during the period when tagged hatchery released fish were passing the estuary sampling site.

Effects from the eruption of Mount St. Helens in 1980 were examined by comparing Jones Beach catch rates between years for marked and unmarked fish groups.

Results and Discussion

Sampling at all sites in the estuary and in marine waters adjacent to the Columbia River mouth from March through September 1980 (1788 sets) provided a total sample of 120,203 subyearling chinook salmon; 18,388 yearling chinook salmon; 24,348 coho salmon; and 13,877 steelhead (Appendix Tables A1-A4). Mark recaptures included 5,614 CWT and 2,347 external marks which amounted to 4.5% of the total catch (Table 1). Recapture rates of marked fish groups were generally below 0.5% (Appendix Table A5). Tag retention rate was lowest for steelhead (84%) and highest for subyearling chinook salmon (93%). Multiple recapture of fish sampled at Jones Beach was less than 0.1%. Adjustments of recapture data for effects from multiple recapture were not made.

Table 1.--Recoveries of marked juvenile salmonids from the Columbia River estuary, 1980.

Species	Coded wire tags (CWT)	Ad clip (no CWT)	Brands	Fin clips	Total
Chinook salmon-subyearlings	3,067	232	552	0	3,851
Chinook salmon-yearlings	951	88	736	46	1,821
Coho salmon	1,015	131	74	146	1,366
Sockeye salmon	3	0	3	0	6
Steelhead	578	108	347	443	1,476
Totals	5,614	559	1712	635	8,520

Water flow in the Columbia River during 1980 was within the range of normal flow years--3,700 cms (130 kcfs) in March; 8,500 cms (300 kcfs) in June; and down to 2,800 cms (100 kcfs) by early September(Figure 3).6/

Water temperatures in 1980 at Jones Beach ranged from 6°C in March to 20°C in August (Figure 3) and were similar to temperature patterns observed in 1978 and 1979. Turbidity levels increased from about 7 to 2,800 Jackson Turbidity Units (JTU) on 19 May as a result of the 18 May eruption of Mount St. Helens. Levels subsided rapidly during the next 5 days and fluctuated between 34 to 130 JTU through 1980 (Table 2).7/

Size Characteristics

The length distributions for yearling chinook and coho salmon and steelhead over the migration period generally reflected the different populations passing Jones Beach. These distributions were very similar to those observed in 1978 and 1979 (Figure 4). Average fork lengths for subyearling chinook salmon increased progressively throughout the season from about 45 to 105 mm. The increase was mostly due to growth in hatcheries prior to release, as evidenced by size-at-release data provided by the fishery agencies and recaptures of marked fish within the catch (Appendix Table A5). In some cases growth did occur during migration as was observed in past years (Dawley et al. 1980).

Migrational Timing

Temporal distribution curves for migrating juvenile salmonids passing

6/ Water flow rates at Bonneville Dam; from U.S. Army Corps of Engineers, North Pacific Div., Reservoir Control Section, 210 Custom House, Portland, Oregon 97208.

7/ Measurements adjacent to or 8 km downstream from the mouth of the Cowlitz River; collected by NMFS, Habitat Investigations Task, Robert McConnell, P.O. Box 1051, Longview, Washington, 98632.

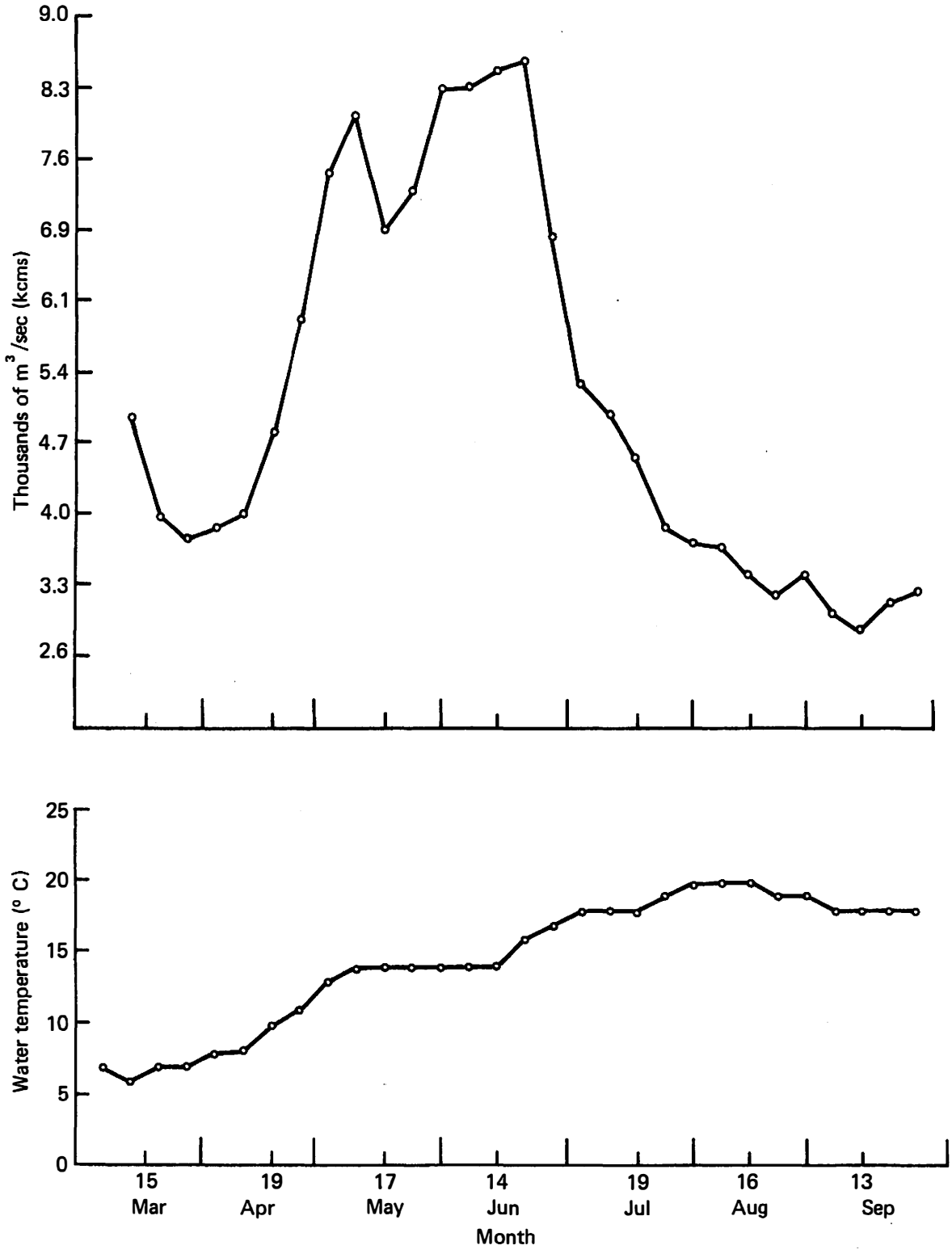

Figure 3.--Water flow at Bonneville Dam and temperature at Jones Beach during the spring and summer 1980.

Table 2.--Turbidity levels[a] in the Columbia River before and after the 18 May, 1980 eruption of Mt. St. Helens.

Date	Turbidity Level (Jackson Turbidity Units)
11 March	7.4
18 April	5.9
16 May	5.8
18 May	Flow of mud ash and debris into the Columbia River from the Cowlitz River.
19 May	2000-2800
20 May	430-500
23 May	62
12 June	105
20 June	60-130
18 July	34
25 August	34

a/ Measurments made at confluence of Cowlitz and Columbia Rivers (Rkm 109 or 3 km below). Data obtained by National Marine Fisheries Service, Prescott field station, P.O. Box 1051, Longview, Wa. 98632

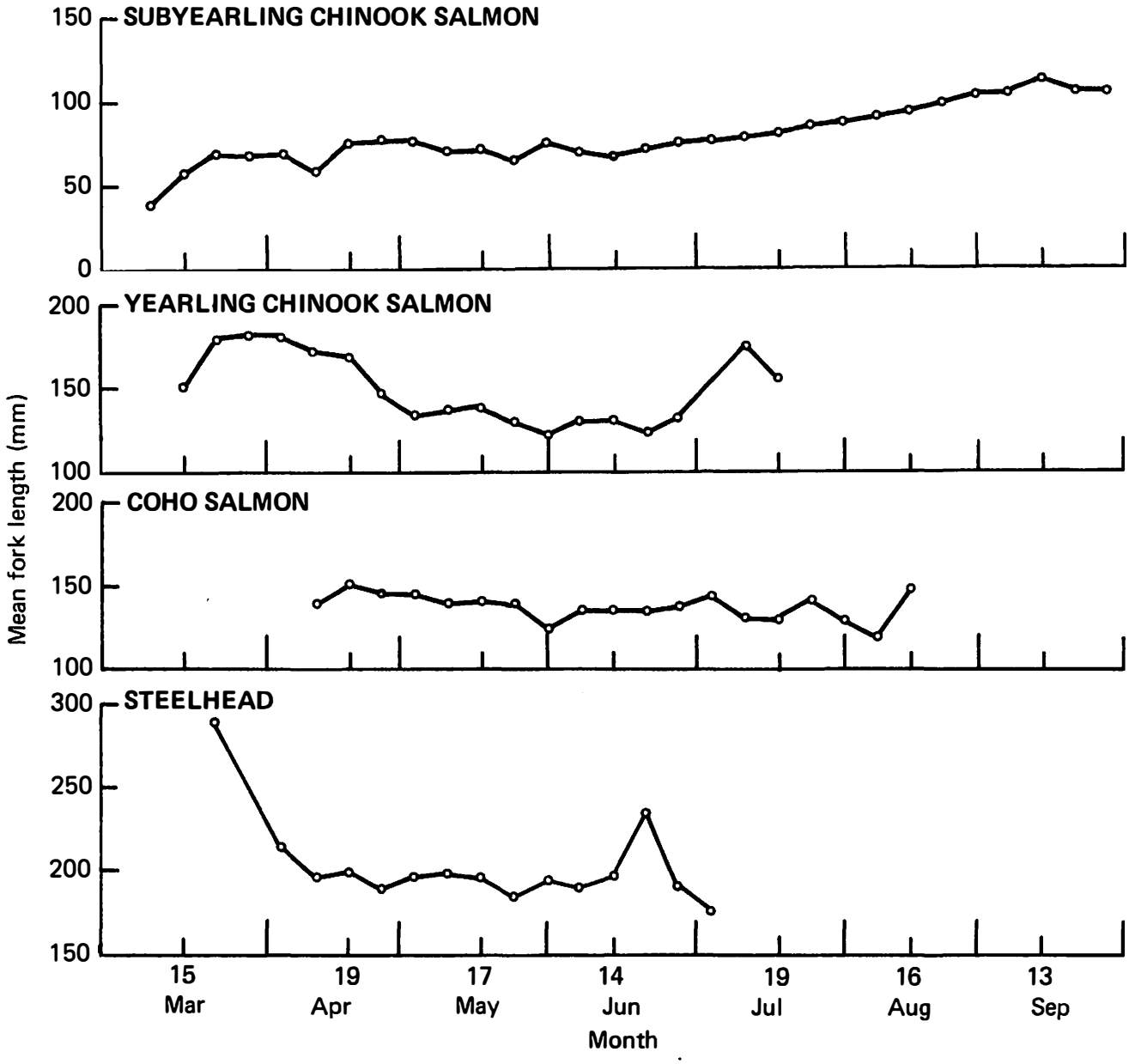

Figure 4.--Mean fork lengths of chinook and coho salmon and steelhead juveniles captured at Jones Beach, Oregon, 1980.

Jones Beach were similar to past years except for depressed catches from 19 May to early July, coincident with high turbidity created by the eruption of Mount St. Helens (Figure 5).

Subyearling chinook salmon 35 to 45 mm fork length were captured at a rate of 24/set at the start of beach seine sampling on 10 March (Appendix Table A1). Catch rates increased to 60/set in late March upon arrival of marked and unmarked fish at 60 to 85 mm fork length from Spring Creek NFH, released 10 March. From this point catches varied according to the different fish groups passing Jones Beach. Most groups were identifiable from marks and changes in size distribution of the catch. Peak catches occurred on 10 May (254/set) then declined to 174/set by 19 May as groups from Bonneville Hatchery (released 5 May) and Spring Creek NFH (released 9 May) moved past. A sudden drop to 46/set occurred on 22 May, the first day of sampling after the arrival of high turbidity. Catch rates were abnormally low for the following 6 weeks (54 to 103/set) compared to previous years during the same period (Figure 5). Groups passing during this period were released from Little White Salmon (16 June), Bonneville (22-28 May), Lower Kalama (6 June), Stayton Pond (28 April-21 June), Oxbow (27-28 May), and Klickitat (27 May) Hatcheries. Another peak in catch, 240/set, occurred on 6 July from fish released at Kalama Falls (13-24 June) and Washougal (30 June) Hatcheries. Catches steadily decreased through July to the end of sampling on 25 September when catches were 20/set.

Yearling chinook salmon were already passing Jones Beach on 10 March (20/set beach seine catch; Appendix Table A1). These fish were primarily from groups released in the fall of 1979 (Table 3). Marked groups released in March 1980 from Bonneville and Cowlitz Hatcheries and hatcheries in the

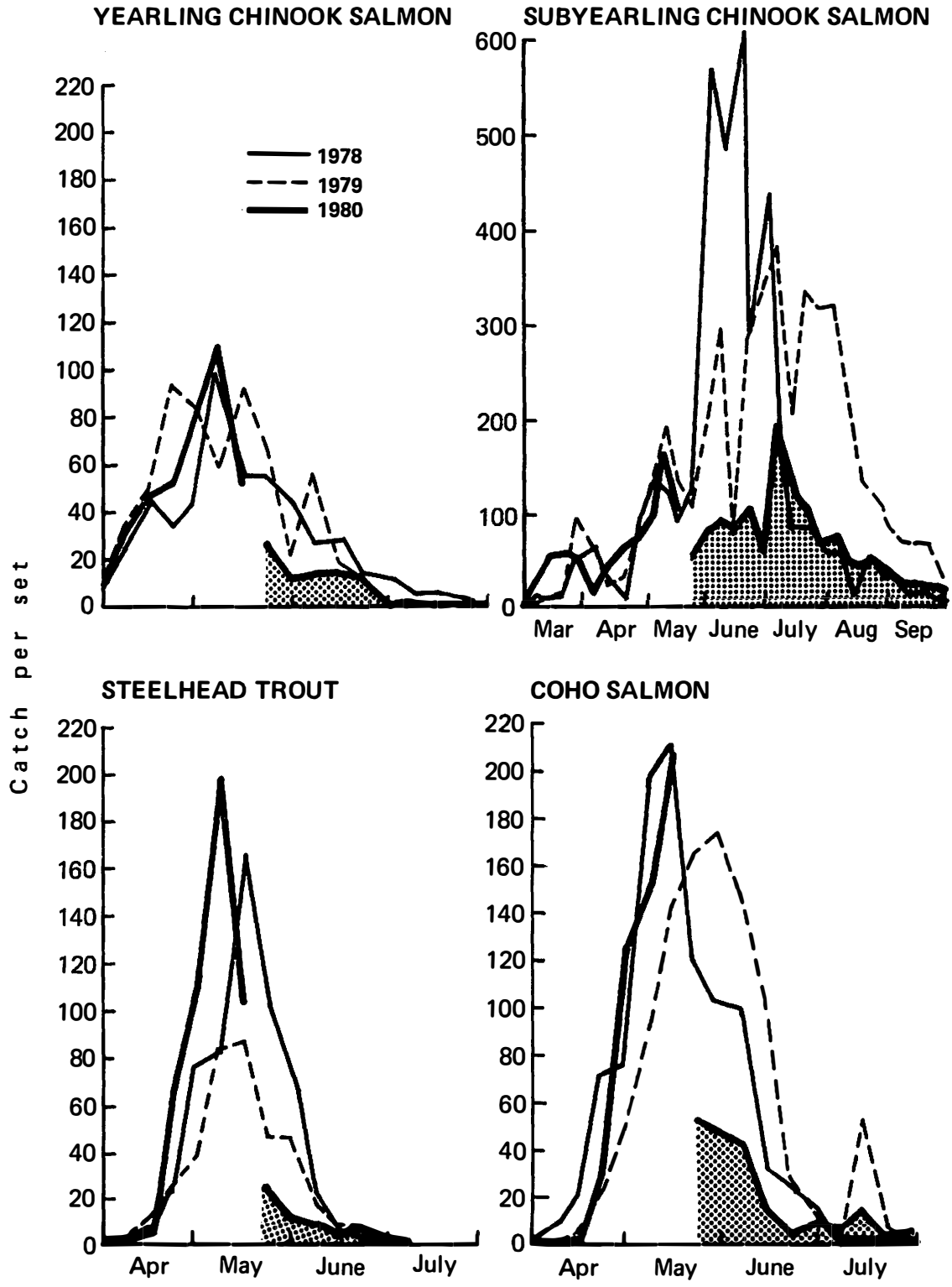

Figure 5.--Weekly catch per set averages for yearling chinook and coho salmon and steelhead (purse seine) and subyearling chinook salmon (beach seine) at Jones Beach, 1978-80. Shaded areas distinguish catches from highly turbid water following the 18 May 1980 Mount St. Helens eruption.

Table 3.--Dates and number of juvenile salmonids recaptured from groups released in 1979.

Release information				Individuals recaptured by month							
(Ag/D1/D2)	Site	Date (day/mo)	Size (#/lb)	Recaptures 1979	1980 M	A	M	J	J	A	S
			Chinook Salmon								
01/01/05	Lewis River-wild	15-30MY	300	52	0	0	0	1	0	0	0
05/04/21	Asotin	21MY	75mm	5	1	0	0	0	0	0	0
63/19/10	Lewis River-wild	25MY-08JN	250	112	0	1	0	0	0	0	0
07/19/40	John Day River-wild	07JN-01JL	50mm	0	0	0	0	1	0	0	0
63/18/54	Toutle (Green River @ Hat)	17JN	160	74	1	0	0	0	0	0	0
63/19/41	Toutle (Green River @ Hat)	17JN	-	822	1	0	0	0	0	0	0
63/19/57	Kalama Falls	22JN-13JL	180	2237	0	1	0	0	0	0	0
63/19/42	Cowlitz River	27JN-16OC	-	295	3	6	0	0	0	0	0
63/19/51	Cowlitz River	27JN-16OC	19	2	5	2	2	0	0	0	0
63/20/17	Priest Rapids	28JN	77	10	0	1	0	0	0	0	0
63/18/59	Lewis River-wild	13JL-26JL	200	107	1	1	0	0	0	0	0
63/19/20	Lewis River-wild	05SE	28	27	0	1	0	0	0	0	0
10/21/12	S. Fork Clearwater	25SE-27SE	-	0	0	0	11	2	0	0	0
07/17/35	Tanner creek	20NO	12	0	1	2	2	0	0	0	0
07/19/14	Tanner creek	20NO	9	0	3	0	1	0	0	0	0
07/20/18	Below Willam. Falls	05-06NO	9	0	1	2	0	0	0	0	0
07/20/19	Below Willam. Falls	05-06NO	8	0	2	2	0	0	0	0	0
07/20/20	S. Santiam @ Foster	05-06NO	9	0	0	2	0	0	0	0	0
07/20/21	S. Santiam @ Foster	05-06NO	-	0	0	1	0	0	0	0	0
07/20/22	S. Santiam @ Foster	05-06NO	10	0	0	1	0	0	0	0	0
07/20/41	Willam. @ Dexter	05NO	29	0	2	1	0	0	0	0	0
07/20/43	Willam. @ Dexter	05NO	16	0	4	1	0	0	0	0	0
07/20/45	Willam. @ Dexter	05NO	14	0	2	4	0	0	0	0	0
07/20/47	Willam. @ Dexter	05NO	9	0	1	1	0	0	0	0	0
07/19/43	S. Santiam @ Foster	07NO	9	0	4	1	0	0	0	0	0
07/19/44	Below Willam. Falls	08NO	10	0	0	4	0	0	0	0	0
07/20/49	McKenzie	09NO	6	0	1	0	0	0	0	0	0
07/20/50	McKenzie	09NO	7	0	1	1	0	0	0	0	0
07/20/52	McKenzie	09NO	15	0	2	1	0	0	0	0	0
07/18/30	Warm Springs	23SE-01DE	-	0	0	1	0	0	0	0	0
			Coho Salmon								
07/19/12	Bonneville	06JL	23	58	0	0	1	0	0	0	0
05/06/38	Yakima River	24-30OC	36	0	0	0	2	1	0	0	0
			Steelhead								
10/03/43	Pahsimeroi	19MR	6	12	0	0	1	0	0	0	0
05/04/39	Warm Springs Hatchery	10MY	15	29	0	1	2	2	0	0	0
09/16/36	Wallowa Hat.	30AP-12MY78 a/	8	13	0	1	0	0	0	0	0

a/ Mark group released in 1978 and recaptured in 1978 and 1980.

Willamette River basin began to appear on 17 March in beach seine catches and continued at a steady rate (15-20/set) until the third week in April. At that time beach seine catches of yearling chinook salmon declined, and purse seine catches increased (Appendix Table A2). This same behavioral change of yearling chinook salmon, shifting from shoreline to midriver migration in late April, had been observed in three previous years of sampling. Yearling chinook salmon from other hatcheries in the Columbia River basin produced a peak in purse seine catches of 175/set on 5 May. Catches decreased rapidly thereafter with a sharp drop in catch rate from 37 to 10/set at the arrival of heavy turbidity, 19 May; migration subsided by 1 July.

Wild chinook salmon marked in several Columbia River tributaries were recaptured at Jones Beach 1977-1980 (Table 4). Yearling fish (118 mm average fork length) migrated earlier in the season than most of the smaller subyearling fish (86 mm average fork length). Dates of median fish passage for wild yearling migrants were 20 June (4 fish) from the John Day River (about RKm 750); 11 May (4 fish) from the Deschutes River (about RKm 450) and 14 April (4 fish) from the Lewis River (about Rkm 163). Dates of median fish passage for wild subyearling migrants were 7 July (24 fish) from the Deschutes River and 8 August (990 fish) from the Lewis River.

Coho salmon catches increased rapidly from 27 April to a peak of 312/set on 16 May, then dropped dramatically from 270/set on 19 May to 57/set on 22 May and tailed off by mid-June (Appendix Table A2). A second small peak (38/set) was observed in mid-July from a Washougal Hatchery release. A few coho salmon were caught in late July and early August. Beach seine catches of coho salmon tended to represent only the early

Table 4.--Recaptures of marked wild chinook salmon stocks from the John Day, Deschutes, and Lewis Rivers, Jones Beach, Oregon, 1977-1980.

Year	Age	Recap. date of median fish	Range of recap. dates	Actual no. recap.	Mean fork lengths (mm)	Range of fork length (mm)
			JOHN DAY RIVER (approx. 750 km from Col. R. mouth)			
1977	0	-	-	-	-	-
	1	-	-	-	-	-
1978	0	-	-	-	-	-
	1	-	-	-	-	-
1979	0	-	-	-	-	-
	1	25JN	07MY - 28JN	3	113	110-115
1980	0	-	-	-	-	-
	1	05JN	05JN - 05JN	1	104	-
			DESCHUTES RIVER (450 km)			
1977	0	-	-	-	-	-
	1	-	-	-	-	-
1978	0	07JL	01JL - 04AU	7	109	95-125
	1	-	-	-	-	-
1979	0	08JL	01JN - 17AU	19	107	85-132
	1	04MY	04MY - 04MY	1	130	-
1980	0	09JL	17MY - 15JL	5	115	60-132
	1	12MY	09MY - 16MY	3	148	145-150
			LEWIS RIVER (163 km)			
1977	0	06SE	11JL - 29SE	45	110	88-128
	1	-	-	-	-	-
1978	0	03AU	24JL - 18SE	42	90	65-110
	1	-	-	-	-	-
1979	0	07AU	06JL - 26SE	539	82	55-125
	1	-	-	-	-	-
1980	0	07AU	25MY - 18SE	364	87	60-132
	1	14AP	17MR - 17JN	4	100	69-119

migrants (peak on 7 May @ 147/set, Appendix Table A1) similar to the observed behavior for yearling chinook salmon.

Steelhead migration into the estuary began about 15 April and increased rapidly between 22 and 29 April. The migration peaked during the week of 10 May (197/set) and rapidly decreased to about 10/set by 31 May (Appendix Table A2). A few steelhead were caught through June but none past 10 July. Abnormally small catches were evident between 20-22 May, less than 16/set, after which catch rates appeared to be consistent with the declining catch curve of that period (Figure 5).

Movement Rates

Movement rates for groups of marked juveniles between release site and Jones Beach varied from 1 to 233 km per day (Appendix Table A6). The extremes of the range were generally due to: (1) over winter residence, (2) arbitrary use of first date of release for rate calculations when fish were released over a range of dates, and (3) decreased distance of migration due to truck and barge transportation past dams on the Snake and Columbia Rivers. The apparent variability of movement rates between years was high, but this was somewhat a consequence of different mark groups involved in the measurement each year. The results, in general, reflected different movement rates for the major groups of migrants passing by Jones Beach (Table 5). Average movement rates during 1980 for subyearling and yearling chinook and coho salmon and steelhead were 19, 23, 17, and 29 km/day, respectively, and the 3-year (1978-80) averages were 19, 20, 14 and 27, respectively.

Movement rates from the release site to Jones Beach and through the estuary for chinook and coho salmon appeared to be faster than in 1978 or

Table 5.--Average and range of migration rates for selected groups of marked juvenile salmon and steelhead, 1978 - 1980.

	Chinook salmon						Coho salmon			Steelhead		
	Subyearling			Yearling								
	1978	1979	1980	1978	1979	1980	1978	1979	1980	1978	1979	1980
Release site to RKm 75[a]												
Average (km/day)	16	21	19	20	17	23	15	11	17	21	32	29
Range (km/day)	5-39	2-48	2-48	6-35	5-37	7-44	6-28	7-16	8-34	3-39	10-61	12-43
No. mark groups	13	14	10	11	13	10	6	6	7	7	6	4
RKm 75 to RKm 16[b]												
Average (km/day)	4[c]	11[c]	25	15	15	28	26	22	28	44	-	43
Range (km/day)	2-59	1-59	2->59	8-59	6-59	5->59	16-59	12-59	20-30	31-59	-	20->59
No. mark groups	14	9	33	8	5	38	4	3	8	3	0	24
RKm 75 to ocean[d]												
Average (km/day)	6	10	21	1	5	13	-	25	11	-	-	21
Range (km/day)	1-20	1-50	1-99	-	1-13	1-68	-	-	2-44	-	-	1-62
No. mark groups	23	31	26	1	10	18	0	1	12	-	0	10

a/ Averaged from mark groups which represent large releases 1978 - 1980; calculated using date of median fish recapture (Appendix Table A6).

b/ Averaged from mark groups recaptured in substantial numbers for 1978 and 79 but for all groups weighted by catch for 1980; calculated using dates of median fish recapture excluding periods with low effort (Appendix Table A5).

c/ Dates of median fish recapture at RKm 16 adjusted for effort.

d/ Averaged for all groups recaptured in the ocean, calculated from date of 1st recapture in the ocean (Appendix Table A7).

1979 (Table 5). Average rate of steelhead movement through the estuary was similar to past years.

Movement rates through the estuary from Jones Beach to the ocean were less than movement rates from upriver to Jones Beach (Table 5, Appendix Table A7). Variability between measurements was very high due to low numbers of fish recaptured in the ocean. Date of first ocean recapture was used for consistency of comparison between groups and between years, as often only one fish of a mark group was captured and ocean residency in the area of sampling had occurred for some mark groups (Dawley et al. 1980).

Survival Estimates

Within-year comparisons of recapture rates were made to determine survival for groups of marked fish involved in studies of transportation around dams, rearing density, diet, smolt survival to the estuary, and smolt size. Between-years comparisons were made to assess effects of Mount St. Helens.

Transport Around Dams.--The effect of transporting hatchery smolts downstream past one or more dams was evaluated for nine groups, and estimates of survival increase of transported versus nontransported fish ranged from a negative 24 to a positive 277% (Table 6). The transported subyearling chinook salmon group with a decreased survival (-24%) passed Jones Beach during the period of high turbidity following the Mount St. Helens eruption, whereas the comparison group from Spring Creek NFH passed prior to the eruption. The group with a 277% increase was made up of subyearling fall chinook salmon reared at Hagerman NFH, Idaho, and trucked below Bonneville Dam (RKm 230), whereas the comparison group migrated from Asotin, Idaho (RKm 754) through eight dams.

Table 6.--Recpature rates and relative survival for transported vs control salmonid groups[a/] intercepted at Jones Beach, Oregon, 1980.

Release information					Recapture information				Average survival increase from transport
Mark: Brand[b/] and/or tag no. (Aq/D1/D2)	Site	Date	Size (no/lb) or (mm)	No. (thou.)	Beach seine act.#	Purse seine act.#	Beach & purse adj.%[c/]	No.[d/] dams passed	
			Subyearling Chinook Salmon						
05/06/41	Spring Creek Hat	09MY	51/lb	61.8	23	32	0.110	1	-
05/06/48-49	barge below Bonn. Dam	19 MY	-	199.3	25	46	0.084	0	-24[e/]
05/06/27	Asotin, Id. (Hagerman Hat)	03JN	60/lb	58.4	0	6	0.022	8	-
05/05/28	trucked below Bonn. Dam	06-23 JN	59/lb	55.6	25	9	0.083	0	277
			Yearling Chinook Salmon						
07/19/45-46	S Santiam @ Foster	14MR	18/lb	59.5	15	27	0.182	1	-
07/19/47-48	trucked below Willam. Fal	13MR	6/lb	60.6	42	24	0.271	0	49
05/05/32	Kooskia Hat	16AP	-	61.3	0	14	0.044	8	-
05/05/29	barged below Bonn. Dam	23AP-05MY	10/lb	62.3	8	18	0.071	0	61
LA PI 1,2,4 & LA PP 2	Leavenworth Hat	24AP-01MY	-	195.5	0	30	0.032	7	-
LA PI 3 & LA PP 1, LA S 1	trucked to Wh. Bluffs	24AP-01MY	129mm	100.0	0	41	0.085	4	165
RA 9 1,2,3 & RA IK 1,2,3	trucked to Dalton Pt	24AP-01MY	129mm	196.0	52	87	0.115	0	259
LA S 2	Carson Hat	12MY	117mm	37.5	0	7	0.051	1	-
RA L 1,2	trucked to Dalton Pt	12&14MY	117mm	77.8	2	27	0.076	0	49
			Coho Salmon						
05/03/58-59 05/06/54	Willard Hat	14&23MY	-	136.9	7	14	0.031	1	-
05/06/50 & 55, 50	barged below Bonn. Dam	24&25MY	-	133.0	16	12	0.039	0	26
			Steelhead						
05/04/55	Dworshak Hat	29AP	7/lb	59.1	2	57	0.100	8	-
LD 4 1	barged below Bonn. Dam	29AP	6/lb	8.5	3	92	0.238	0	138

a/ Groups with low numbers released and low rates of recapture not included.

b/ Recapture data for brands includes data from associated tags (not listed).

c/ Adjustment based upon extrapolation to 7-day per week sampling and 10 sets per day, beach seine and 5 sets per day, purse seine; also 100% sacrifice of adipose clipped fish.

d/ Mass transport occuring from Lower Granite and Little Goose Dams on the Snake River between 3AP and 7JL (38% of chinook salmon and 79% of steelhead population were transported--estimate); and from McNary Dam on the Columbia River between 9AP and 5SE (10% of subyearling chinook salmon and 20% of yearling chinook salmon, also 40% of steelhead populations were transported--estimate).

e/ Transported groups passed through heavy turbidity from Mount St. Helens eruption, control group passed prior to eruption.

Rearing Density and Diet Studies.--Survival differences during freshwater migration were evaluated for all rearing density and diet study groups recaptured from 1977 to 1980. Bonneville Hatchery subyearling fall chinook salmon fed OMP No. 4 (fish protein base) were recaptured at a rate double that of salmon fed OMP No. 2 (soy protein base). This difference in recapture rate was significant ($P < 0.05$) according to G statistical analysis (Table 7).

Statistically significant differences in recapture rates were not found ($P > 0.05$) in either the Cowlitz Hatchery density rearing studies (yearling spring chinook salmon) or the Sandy Hatchery diet studies (coho salmon).

Migration from Hatchery to Estuary.--Subyearling fall chinook salmon trucked to Prescott, Oregon, and acclimated 4 days to Columbia River water before release provided a better comparison to hatchery groups than did those groups released immediately after transport. In all comparisons, recovery of the acclimated groups more closely approximated the purse seine to beach seine catch ratio of hatchery released groups. However, because hatchery and transported groups were affected unevenly by the high turbidity from Mount St. Helens, the survival estimates obtained in 1980 probably did not represent actual survival to Jones Beach.

Size of Smolts.--Observations from 1977 to date have indicated that smaller individuals within certain populations do not survive as well as larger individuals as determined by differences of length frequency distribution between fish measured at the hatchery and those recaptured at Jones Beach. Two examples follow.

Table 7.--Recaptures of fall chinook fed Oregon Moist Pellet (OMP) No. 2 vs OMP No. 4 at Bonneville Hatchery, 1980.

		Release information			Recapture information (RKm 75)		
Mark	Diet	Date	Size (No./lb)	No. (thous)	No. actual beach seine	No. actual purse seine	Actual percent
7/21/33	OMP # 2	27MY	70	50.5	12	0	0.024
34	"	"	69	50.0	14	0	0.029
35	OMP # 4	"	67	48.1	22	2	0.050
36	"	"	68	49.4	25	1	0.053

$G^2 = 8.46$

d.f. = 1 $0.001 < P < 0.005$

Summer steelhead were released in 1978 from hatcheries in the Willamette River basin with a mean fork length of 190 mm. Approximately 2 weeks later, 663 individuals, with a mean length of 200 mm, were trapped at Willamette Falls, about 250 km downstream from the release sites (Buchanan and Wade 1978; Buchanan et al. 1979). At Jones Beach, about 380 km downstream, 140 individuals, averaging 209 mm, were recaptured from beach and purse seines after an additional week of migration. Differential size selectivity at the Willamette Falls trap was found to be insignificant at this size range for steelhead.[8/] Size selectivity by seines at Jones Beach was unknown, however, the fork length distribution appeared to represent a sequential upward shift from release to Willamette Falls to Jones Beach (Figure 6). Growth during the migration period would not explain the 19 mm difference in mean fork length of the group in only 18 days. Other tests by Buchanan et al. (1979) appeared to discount growth as the cause of the observed shift in size.

In a second case, subyearling fall chinook salmon with an average fork length of 75 mm were released from Washougal Hatchery (RKm 221) in 1979, and about 6 days later averaged 83 mm fork length in catches at Jones Beach (146 km). Another fish group from the same population was released 11 days later at Prescott, Oregon (RKm 115). The fork length distribution of the individuals captured at Jones Beach, 40 km downstream, was similar to distributions at the hatchery with about a 3 mm upward shift, presumably due to growth during the 16-day period between those measurements (Figure 7). Gear selectivity at the size range of subyearling chinook salmon was

[8/] Size selectivity testing performed by biologists from Portland General Electric and reported by Buchanan, D., 1979.

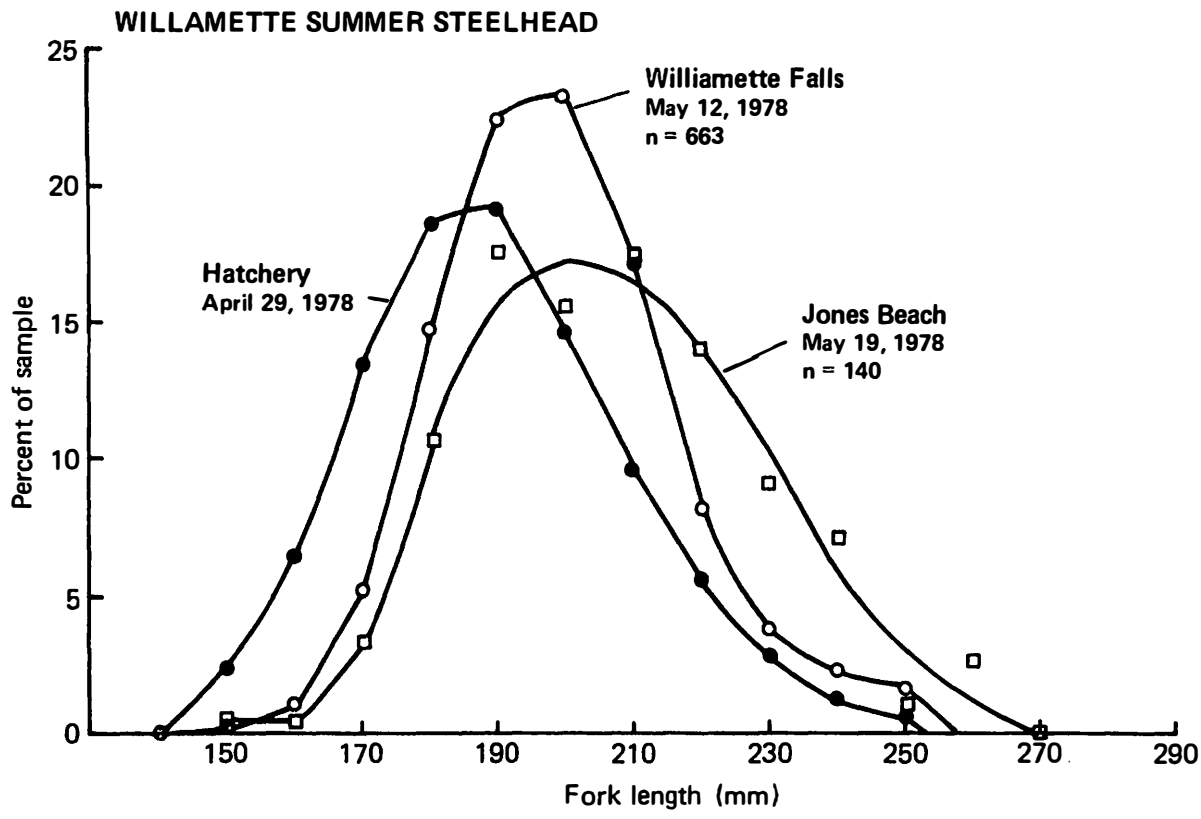

Figure 6.--Fork length measurements of Skamania summer steelhead smolts prior to hatchery release, from catches at Willamette Falls, and from catches at Jones Beach, 1978. Hatchery and Willamette Falls length frequencies from Buchanan et al. 1979.

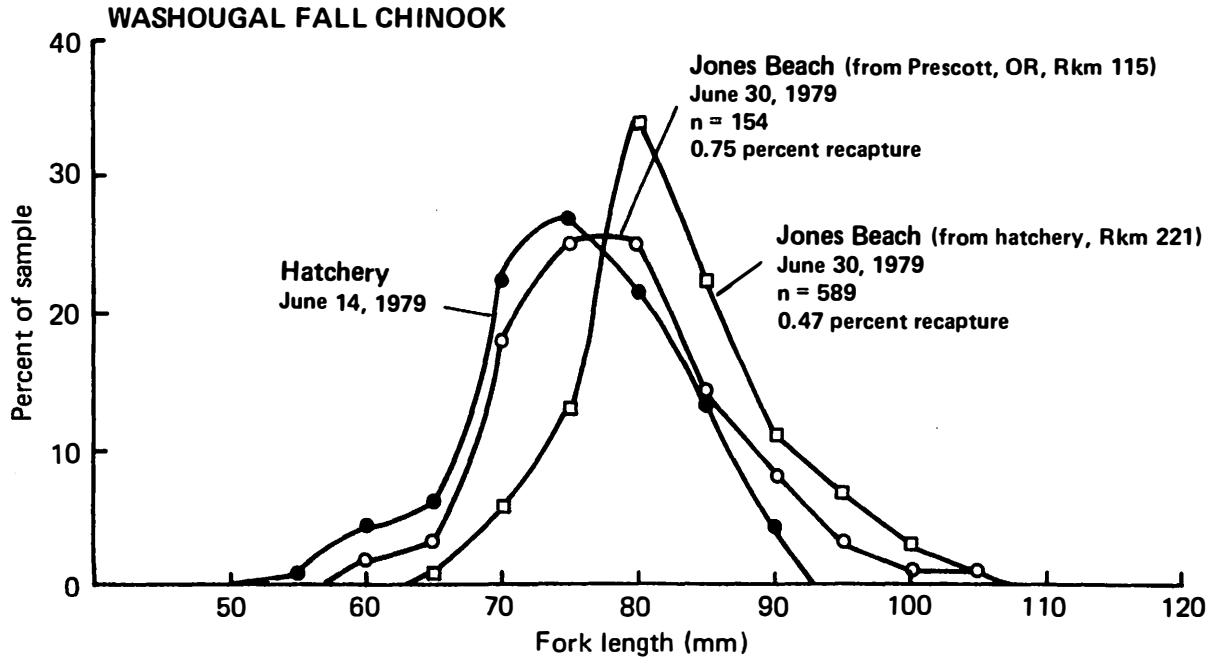

Figure 7.--Fork length measurements of subyearling fall chinook salmon prior to hatchery release at Washougal Hatchery and from catches at Jones Beach. One group recaptured at Jones Beach was released at the hatchery (RKm 221) and one at Prescott, Oregon (RKm 115), 11 days after the hatchery release.

biased toward smaller individuals. This tended to increase rather than decrease the proportion of small fish recaptured (Figure 8).

We assumed from these observations that many of the smaller fish are removed from the migrant population prior to seawater entry. Adult return percentages of fall chinook salmon to Abernathy Salmon Culture Development Center have substantiated that larger fish at release survive better (Fowler and Banks 1980; Fowler et al. 1980a, 1980b, 1980c).

Effects from Mount St. Helens.--Jones Beach catches of subyearling chinook salmon in 1980 (145,650 fish) were 55% lower than the average catch for the previous 3 years--373,249 in 1977; 284,267 in 1978; and 309,267 in 1979 (Dawley et al. 1978, 1979, 1980). In both 1978 and 1979, subyearling fall chinook salmon released from Bonneville and Little White Salmon Hatcheries produced substantial catch peaks at Jones Beach, during late May and June. After 19 May 1980, catches were depressed even though production releases of 18.6 million fish from these two hatcheries were similar to past years (Figure 9). The recovery rates of marked fish from these releases in 1980 (0.083 and 0.072% for Bonneville and Little White Salmon Hatcheries, respectively) were less than half of the 1978 and 1979 averages (0.169 and 0.280%, respectively) (Dawley et al. 1979, 1980).

While dead or moribund fish were not seen during any sampling activity, field observations of 15 juvenile salmonids captured on 28 May revealed that all had irritation of gill filaments, characterized by heavy mucus secretions laden with particulate matter. Normal appearing filaments of 14 fish were observed on 2 June. The particulate matter and mucus we observed may have been indicative of mortality which would have contributed to the decreased catch, as other researchers have found that suspended ash

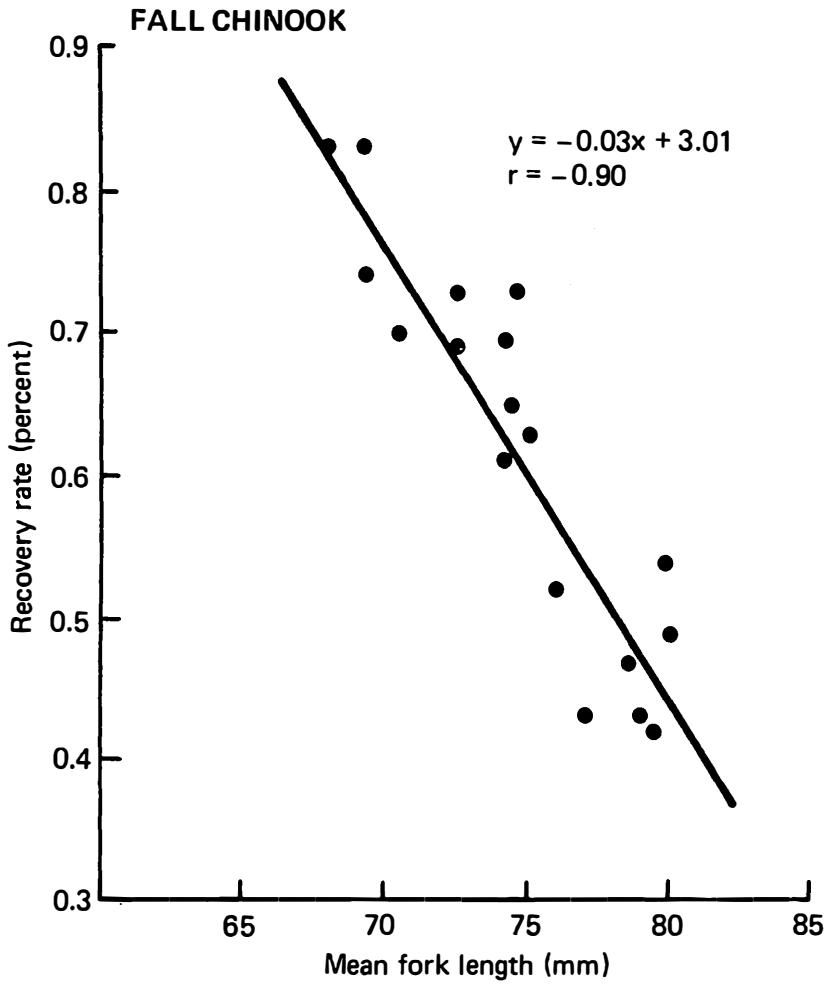

Figure 8.--Relationship of fork length to rate of beach seine recapture at Jones Beach, Oregon, for 18 groups of marked subyearling fall chinook salmon released at Beaver, Oregon, 6 June - 19 July 1968.

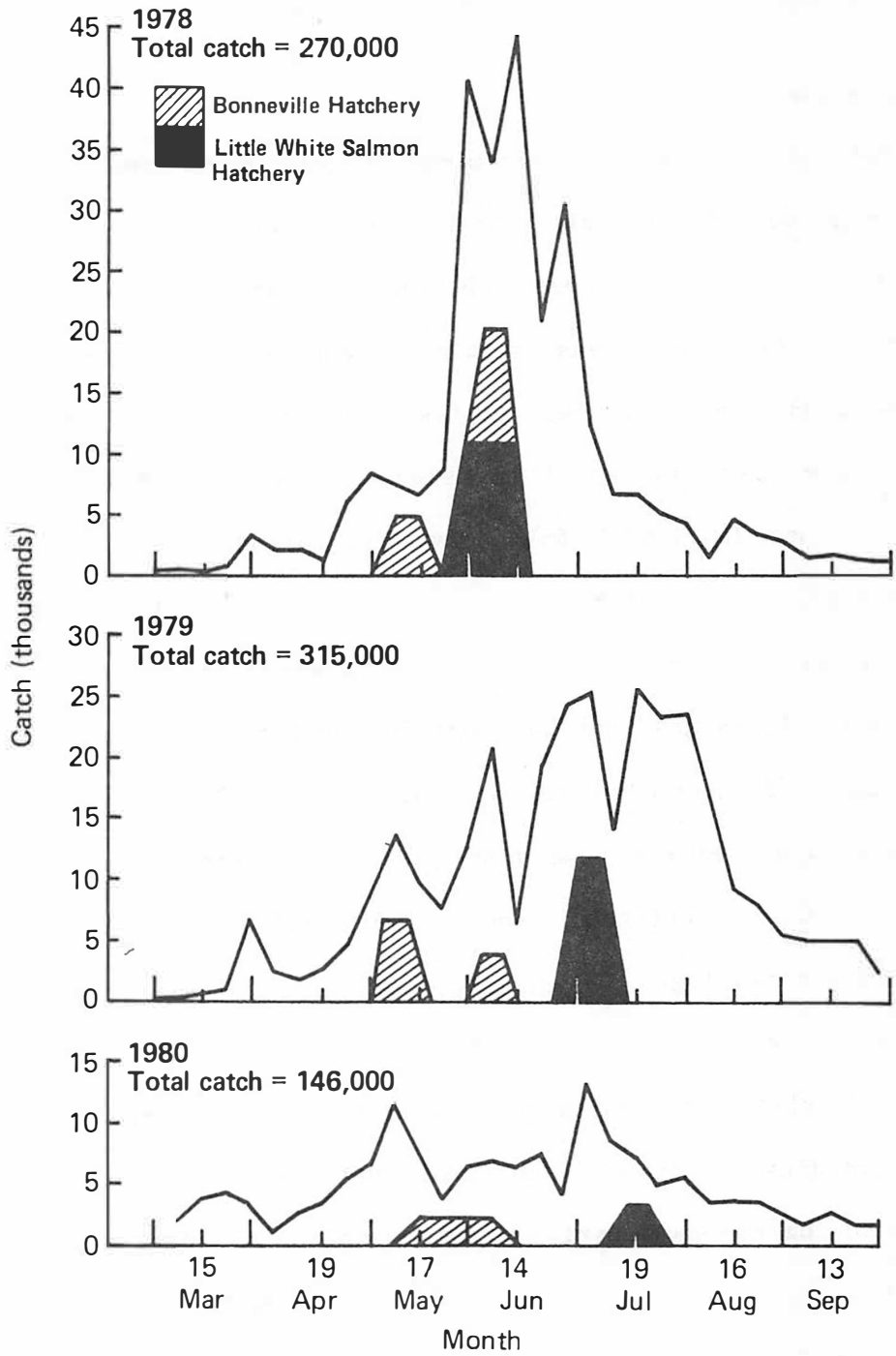

Figure 9.--Weekly beach seine catches of subyearling chinook salmon at Jones Beach 1978-80 with shaded area representing fish captured from Bonneville and Little White Salmon Hatcheries.

from Mount St. Helens on salmonid gills caused mortalities (Stober et al. 1980 and Newcomb and Flagg, manuscript in preparation).

Feeding Behavior

In 1980, stomach fullness measurements for subyearling chinook salmon indicated that most individuals passing RKm 75 were actively feeding (mean fullness 47%, n = 2072); these observations were similar to those by Craddock et al. (1976). Release site and stock variations appeared to have little effect on stomach fullness of fish captured in either beach or purse seine with the exception of fish released from Abernathy Creek 16 km upstream of Jones Beach (36% full, n = 48). High turbidities immediately after 19 May produced a substantial decrease in feeding activity. Mean gut fullness values for subyearling chinook salmon prior to the Mount St. Helens eruption (1-19 May, n = 148) was 74% full compared to the period of high turbidity (22 May-10 June, n = 350) 45% full (Figure 10). These observations suggested that the fish passing in late May were unable to locate food, their preferred food was unavailable, or the fish were stressed and not feeding.

Average stomach fullness value for yearling chinook salmon was 46%; (m = 577). Yearling chinook salmon released during March displayed a different feeding behavior from that of subyearling chinook salmon recaptured during the same period. For example, the initial yearling fish captured from Bonneville Hatchery were not feeding extensively (only a trace of food or empty stomachs found), feeding increased progressively over the period of recapture and the latest migrants had a stomach fullness of about 75%. This compared with subyearling fish from Spring Creek NFH that had a fairly even stomach fullness throughout the recapture period

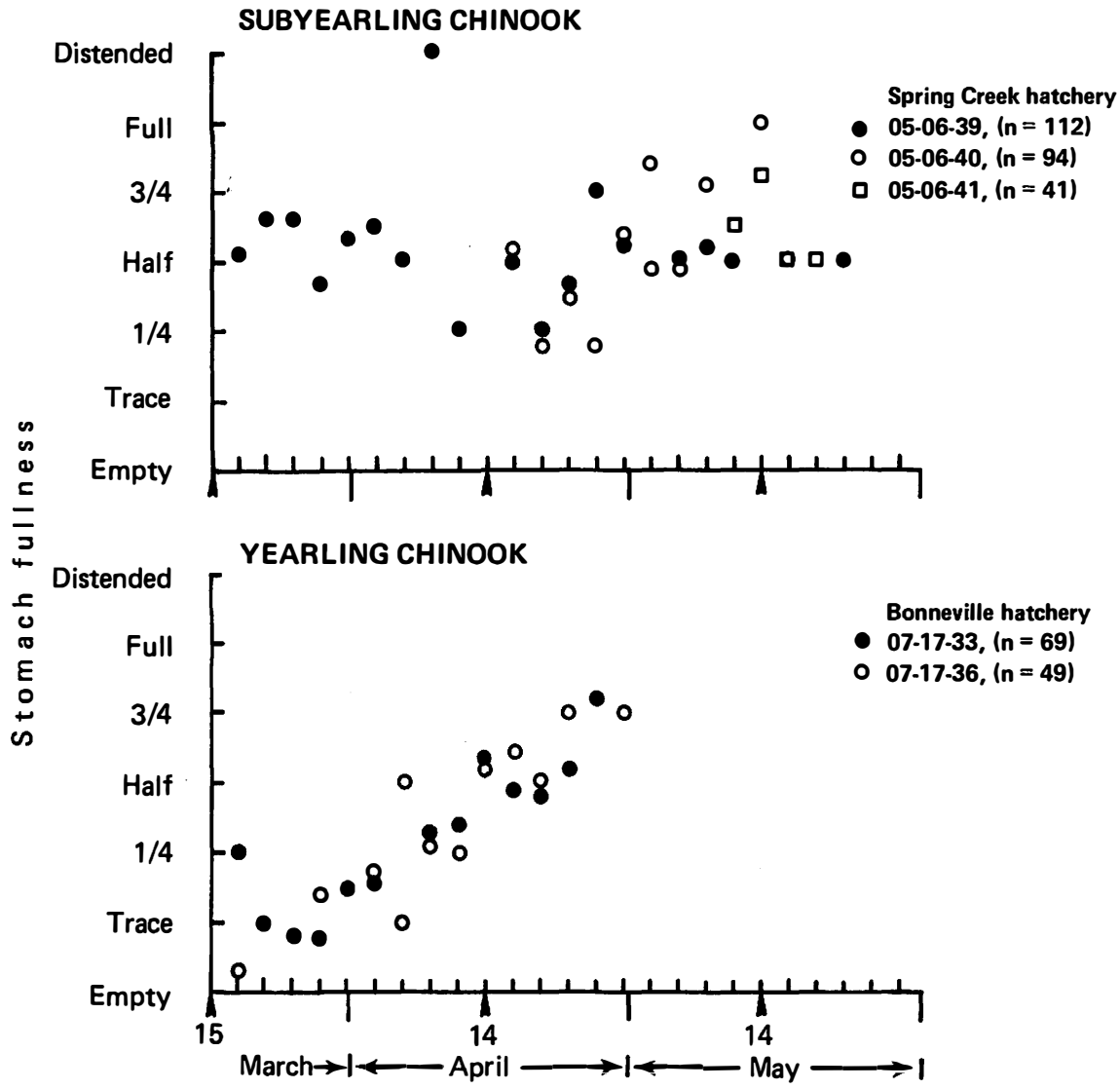

Figure 10.--Three-day mean fullness values for subyearling and yearling chinook salmon of Spring Creek and Bonneville Hatchery origin collected at Jones Beach, 1980.

(Figure 11). Too few tagged fish (n = 11) were recaptured after 19 May to provide meaningful data in relation to effects from Mount St. Helens.

Coho salmon and steelhead average stomach fullness values were 53 and 42%, respectively, with two notable exceptions: (1) Dworshak Hatchery steelhead barged below Bonneville Dam (RKm 230) and released on 29 April had an average fullness value of 24% (n = 64), and (2) Willard NFH coho salmon trucked to Beaver Terminal, Oregon (RKm 84), and released 22 May, into highly turbid water, had an average fullness value of 15% (n = 21). Effects from Mount St. Helens appeared to correlate with decreased feeding of coho salmon and steelhead during late May. A detailed examination and comparison of gut contents for 1979 and 1980 has yet to be completed.

Nearshore Ocean Recoveries

Between 1978-80, purse seine fishing was conducted in ocean waters within 24 km of the Columbia River mouth (Figure 1). Salmon ranged in abundance from 0 to 967 per set. Greater than 85% of the ocean sets were made in water depths of less than 9 m. In these shallow waters, subyearling chinook salmon comprised 95% of the juvenile salmonids caught (approximately 6,100 in 196 sets). The largest majority of these fish (5,740 in 116 sets) were caught in the surf zone in waters less than 4 m deep. Also within this surf line area were all sets with more than 50 subyearling chinook salmon.

Although salmon were caught in 187 of 196 sets inside of 9 m and in 114 of 116 sets inside of 3.7 m, distribution of juvenile chinook salmon within the surf line zone was not uniform. In most sets, average catches were small, 5-15 subyearling chinook salmon, however, 14 sets accounted for 4,187 salmon (180-967 per set). The fish to the south of the river

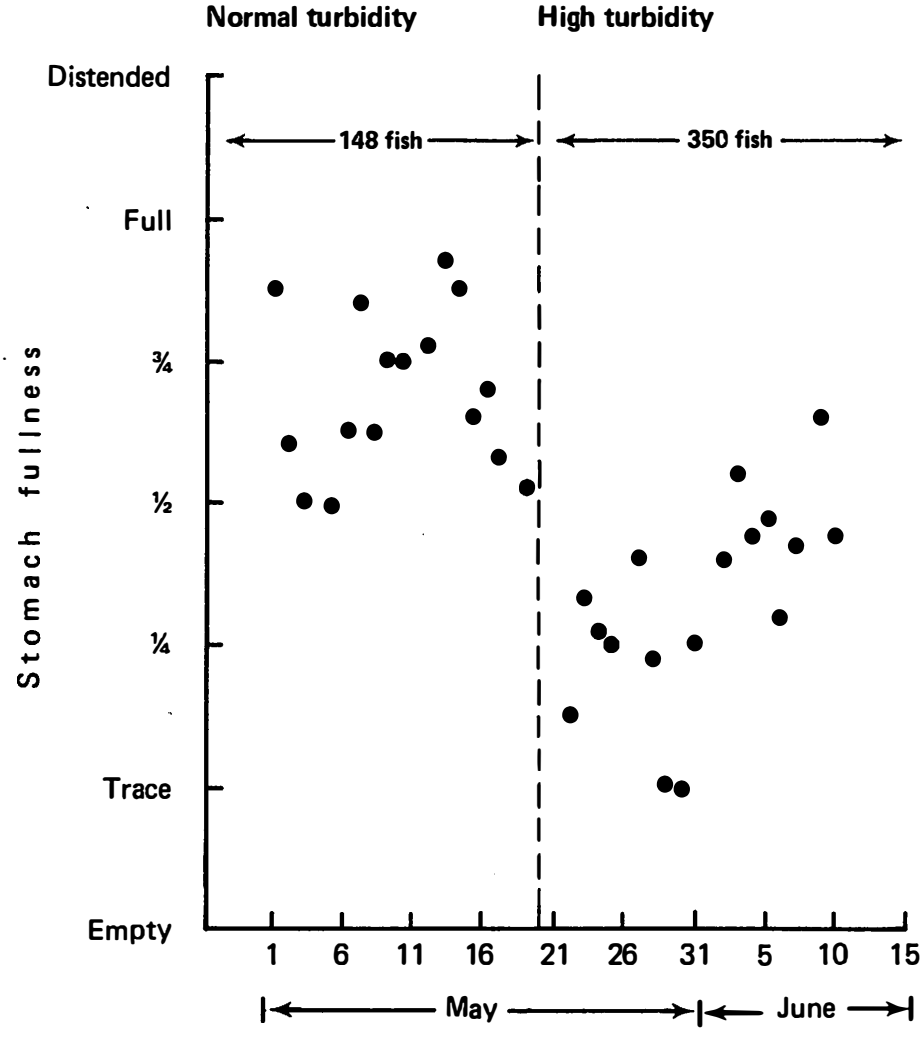

Figure 11.--Mean daily stomach fullness values for subyearling chinook salmon collected at Jones Beach, before and after arrival of highly turbid water from the 18 May 1980 Mount St. Helens eruption.

appeared to be more concentrated in the area between the South Jetty Observation Tower and the wreck of the Peter Iredale, with dwindling numbers south to Seaside, Oregon. To the north of the river, numbers were more evenly spread from North Head to Klipsan Beach, Washington.

The average size of the subyearling chinook salmon in the nearshore shallow waters ranged from 91 mm in May to 135 mm in September (Table 8). No subyearling chinook salmon smaller than 70 mm were captured. Few large (>140 mm) juvenile chinook salmon were captured in the nearshore surf line. On the basis of the offshore purse seining (discussed in Part II), it appeared that movement out of the surf zone was size dependent.

Incidental Catch

There was a significant increase in beach seine catches of several predator and scavenger fish species at Jones Beach in 1980, beginning with the arrival of heavy turbidity (Appendix Tables A8, A9). Catches of northern squawfish, *Ptychocheilus oregonensis*; prickly sculpin, *Cottus asper*; peamouth, *Mylocheilus caurinus*; and suckers, *Catostomus* sp., in late May and June were more than double those of past years (Figure 12). Field observations indicated that these fish were adults and not juvenile recruits. It was possible that this increase in catch resulted from fish being pushed out of the high temperature Toutle and Cowlitz Rivers just 34 km upstream from Jones Beach.

Catches of incidental species at RKm 16 and at marine sites near the river mouth (Appendix Tables A10 and A11) varied somewhat from past years but were not necessarily an accurate depiction of population abundance due to migratory behavior of the prevalent species: northern anchovy, *Engraulis mordax*; Pacific herring, *Clupea pallasii*; surf smelt, *Hypomesus pretiosus*; and longfin smelt, *Spirinchus thaelichthys*.

Table 8.--Mean fork length of subyearling chinook salmon from ocean catches within 24 km of the Columbia River mouth, 1978-80.

Date		Size (mm)	Number of fish measured
May	1978	-	-
	1979	91	27
	1980	-	-
Jun	1978	-	-
	1979	98	413
	1980	97	147
Jul	1978	109	703
	1979	112	171
	1980	111	243
Aug	1978	122	736
	1979	124	427
	1980	119	768
Sep	1978	133	47
	1979	135	108
	1980	-	-

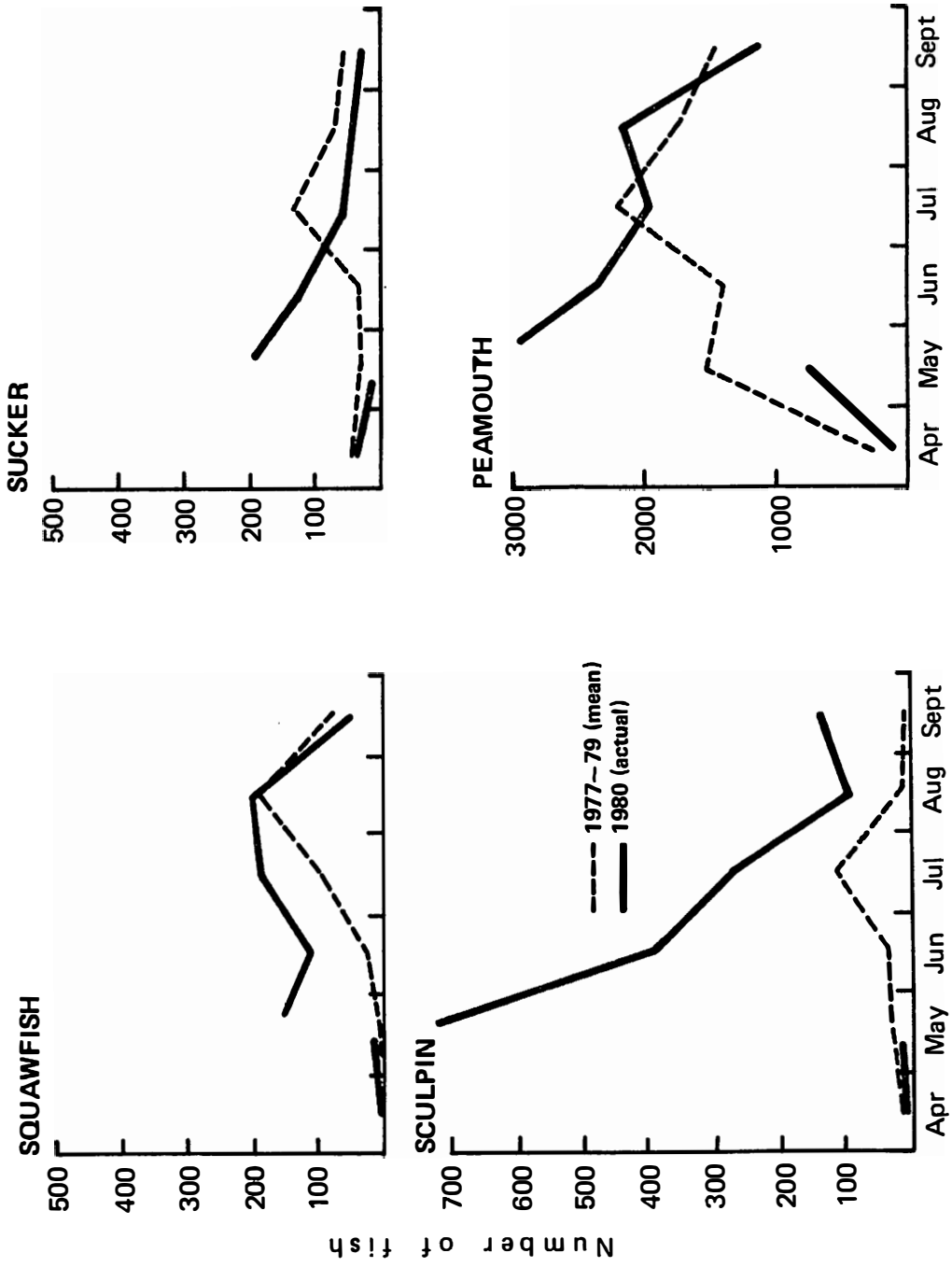

Figure 12.--Monthly beach seine catches of predator and scavenger species at Jones Beach for 1977-79 (3-year means), compared to 1980. The month of May 1980 is divided into catches before and after arrival of highly turbid water.

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PART II: OCEAN SAMPLING

Methods

Ten transects, located between Tillamook Bay, Oregon, and Copalis Head, Washington, (Figure 13), were chosen because of and named for readily identifiable shore landmarks. Each contained five sampling stations, the first located at the 30-m depth contour, with others extending seaward at 8-km intervals. Stations were chosen on the basis of a one-half hour running interval by the fishing vessel and not on the basis of fish populations. The latitude and longitude of each station was fixed using LORAN C.

A chartered 17-m commercial salmon drum seiner (F/V Flamingo) was used for sampling. The sampling net was a 495-m x 30-m purse seine. The body of the net was constructed of 32-mm knotted nylon web with 30 meshes of 127-mm knotted nylon hung along the bottom above the lead line. The bunt was made of 18-mm knotted nylon web. Based on its construction, the net was assumed to fish approximately 24 m deep (J. Jurkovich, NMFS, Northwest and Alaska Fishery Center, Seattle, personal communication).

Purse seining was conducted during three periods beginning 27 May, 4 July, and 28 August. One day of sampling time was allotted per transect. The number of sets per transect and the number of stations sampled varied depending upon weather, sea conditions, and travel time to the transect. The Flamingo worked out of Westport, Washington, for the northern transects, Astoria, Oregon, for the central transects, and Garibaldi, Oregon, for the southern transects.

Conductivity, salinity, and temperature measurements were taken at the surface and at 30 m at each sampling station with a Beckman RS5-3

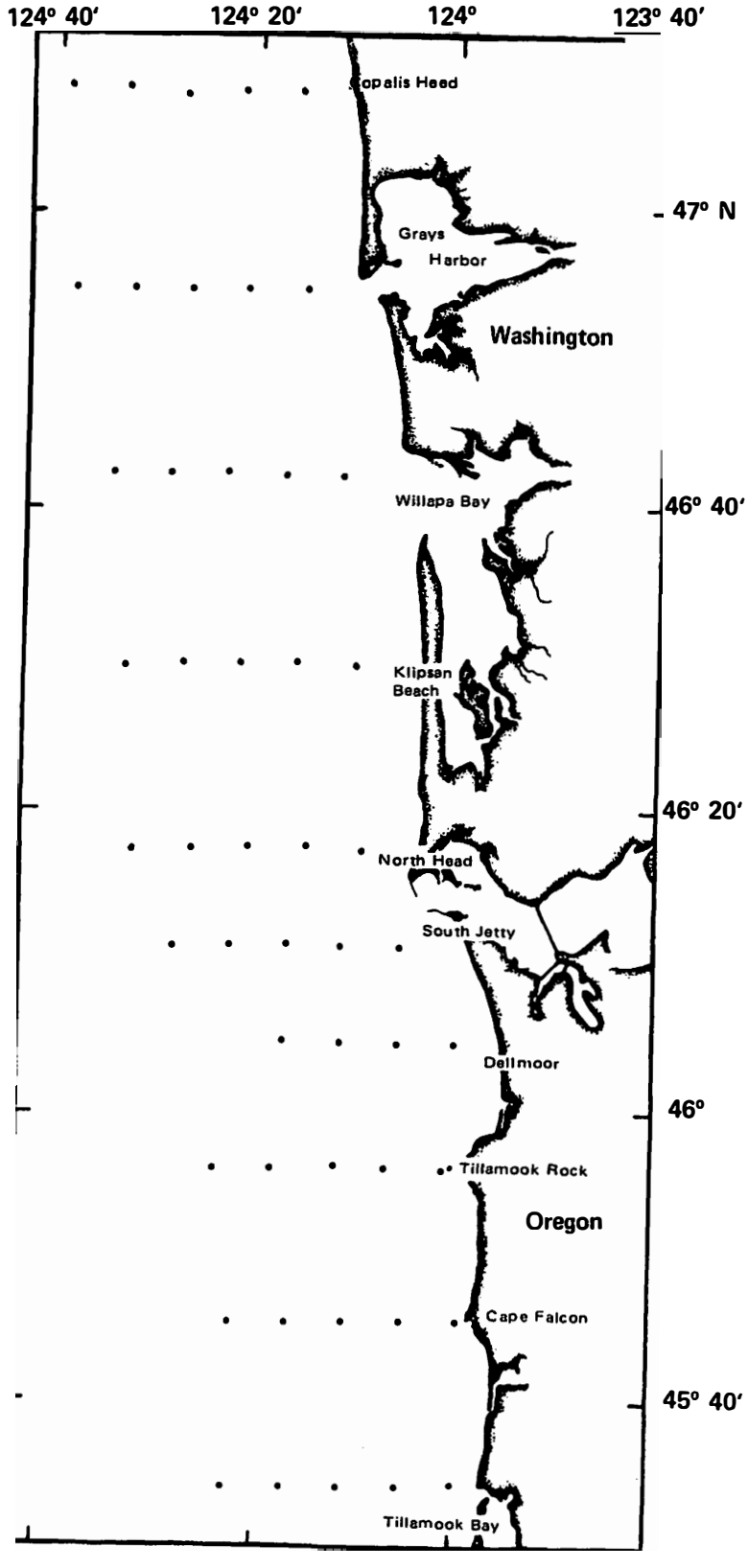

Figure 13.--Transects and stations sampled during offshore purse seining for juvenile salmonids, May-September, 1980.

salinometer[9/]. The purse seine was set with a 5-minute tow toward the south, closed, pursed, and juvenile salmonids dipnetted from the bunt. The procedure was repeated with a tow toward the north.

Fish were held in 114-liter plastic tubs with circulating seawater. All juvenile salmonids less than 50 cm in length were anesthetized with benzocaine, counted by species, measured to fork length, and examined for identifying marks. After processing, all fish not being kept were returned to a tub of circulating water and allowed to recover from the effects of the anesthetic before being returned to the sea.

All salmonids with clipped adipose fins were sacrificed for coded wire tag (CWT) identification. Heads from these fish were placed in vials containing a potassium hydroxide solution to free the CWT.

Chinook salmon from the Columbia River system are generally designated as spring, summer, or fall run fish. The designations refer to the period of the year that adults enter the river on their upstream spawning migration. In native populations, juveniles of spring run and Snake River summer run fish spend 1 year in fresh water and migrate to the sea as yearlings whereas juveniles of fall run and Columbia River summer run fish migrate to sea as subyearlings. In these populations, yearling fish are noticeably larger than subyearlings. With hatchery produced fish, however, size is no longer an accurate determinant between the two strains of fish. As no scales were taken on fish captured in the ocean, chinook salmon were considered together as a group. Differentiation between spring and fall strains of fish were only made where marked fish were recaptured with a known origin.

9/ Reference to trade names does not imply endorsement by the National Marine Fisheries Service, NOAA.

Results

A total of 233 purse seine sets were made on the three cruises; 70 sets during 27 May to 7 June, 77 sets 4 to 15 July, and 86 sets 28 August to 8 September. Catches of juvenile salmonids ranged from 1,739 on the first cruise to 250 on the second (Table 8). A total of 144 fish captured were previously marked either with CWT, cold brands, or fin clips (Table 9). With the exception of coho salmon from the Washougal Hatchery [Washington Department of Fisheries (WDF)], only a few tags from any particular marked group were caught (Appendix Tables A12-A14).

The logs from Cruises 1-3 are presented in Appendix B.

Distribution and Abundance

Fish abundance was lowest on Cruise 2 and the low catch was associated with water temperatures above those normally associated with salmonids (Table 10). Surface salinities averaged 27.3 °/oo, 29.1 °/oo, and 30.0 °/oo on Cruise 1-3, respectively. The range of salinities between stations was from 17.1 °/oo to 33.0 °/oo. No correlations between surface salinities and juvenile fish abundances were found.

Juvenile chinook salmon were predominantly found in the area adjacent to the Columbia River mouth on Cruise 1, but displayed a fairly uniform north-south distribution over the entire sampling area during Cruises 2 and 3 (Figures 14-16). The largest catches of chinook salmon were within 20 km of the shore; few fish were caught at the outer sampling sites. Considerably fewer chinook salmon were caught on Cruise 2 than on the other cruises. Yearling chinook salmon (based upon recaptured marks) had a fairly specific temporal and spatial distribution (Appendix Table A12). No yearling marked fish of Columbia River origin were captured on either

Table 8.--Purse seine catches of juvenile salmonids off the Washington-Oregon coast during three cruises; 27 May to 7 June, 4 to 15 July, and 28 August to 8 September 1980.

Species	Catch			
	Cruise 1	Cruise 2	Cruise 3	Total
Juvenile (<50 cm)				
Chinook salmon *Oncorhynchus tshawytscha*	467	183	549	1199
Coho salmon *O. kisutch*	858	56	241	1155
Sockeye salmon *O. nerka*	44	1	2	47
Chum salmon *O. keta*	6	2	25	33
Steelhead *Salmo gairdneri*	364	8	0	372
	1739	250	817	2806
Adult (>50 cm)				
Chinook salmon *O. tshawytscha*	87	41	164	292
Coho salmon *O. kisutch*	133	108	61	302
Pink salmon *O. gorbuscha*	0	0	1	1
Steelhead *S. gairdneri*	1	1	1	3
Cutthroat *S. clarki*	17	17	0	34
	238	167	227	632

Table 9.--Marked juvenile salmonids captured off Washington-Oregon coast, 1980.

Species (Brood year)	Coded Wire Tagged	Branded	Fin clipped
Chinook salmon (78)	22	16	12
Chinook salmon (79)	5	2	0
Coho salmon (78)	38	3	22
Steelhead (78 & 79)	3	8	13
	68	29	47

Table 10.--Average water temperature from Tillamook Bay, Oregon to Copalis Head, Washington, 1980.

	Cruise 1 27 May-7 June	Cruise 2 4 July-15 July	Cruise 3 28 August-8 September
Surface Temperature °C	12.3	15.2	13.4
range	11.1-13.2	14.2-16.2	10.6-14.7
30-m depth Temperature °C	8.6	9.1	8.2
range	8.1-10.9	7.5-12.5	7.4-10.4

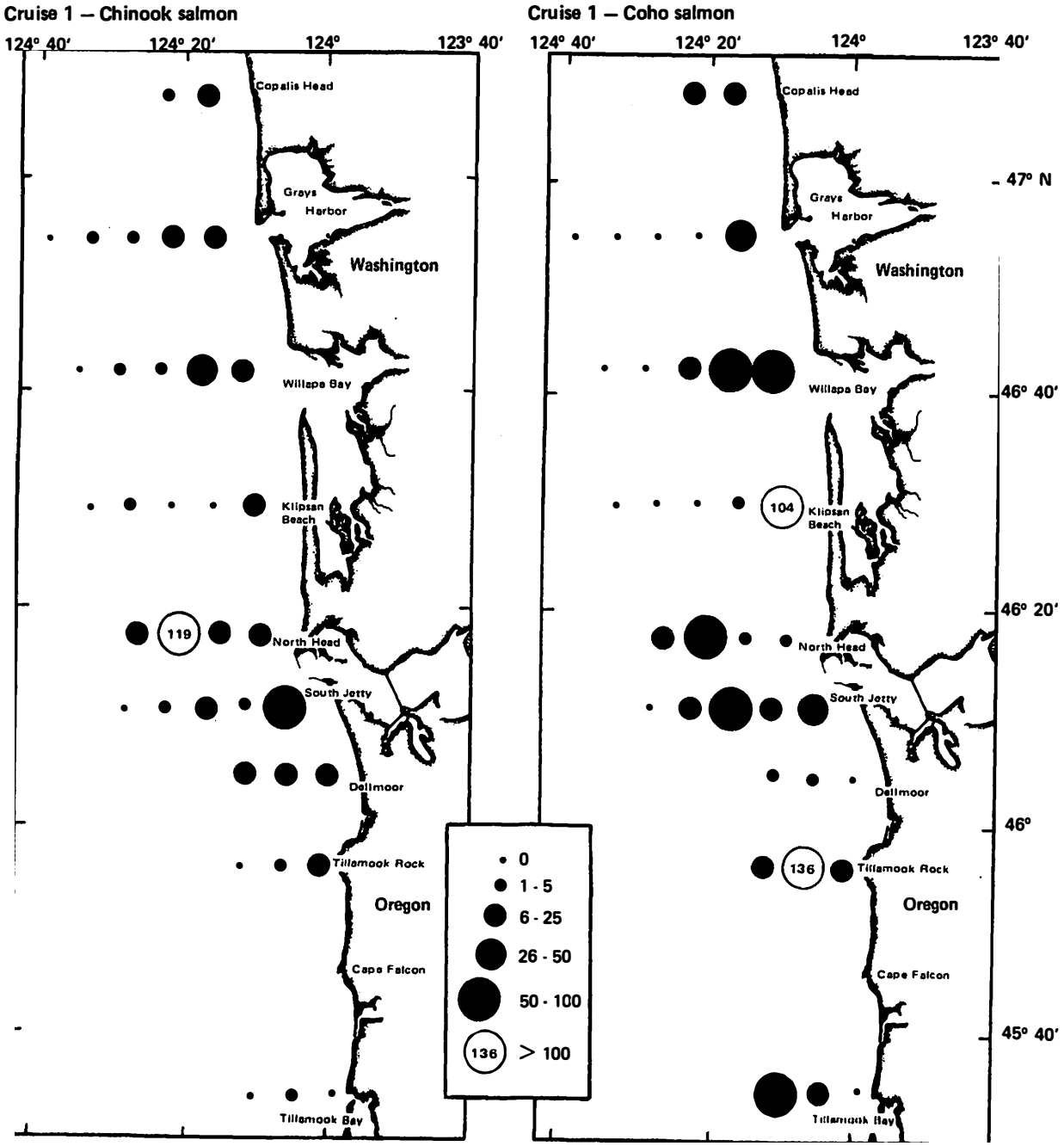

Figure 14.--Relative abundances of juvenile chinook and coho salmon taken by purse seine, 27 May-7 June, 1980.

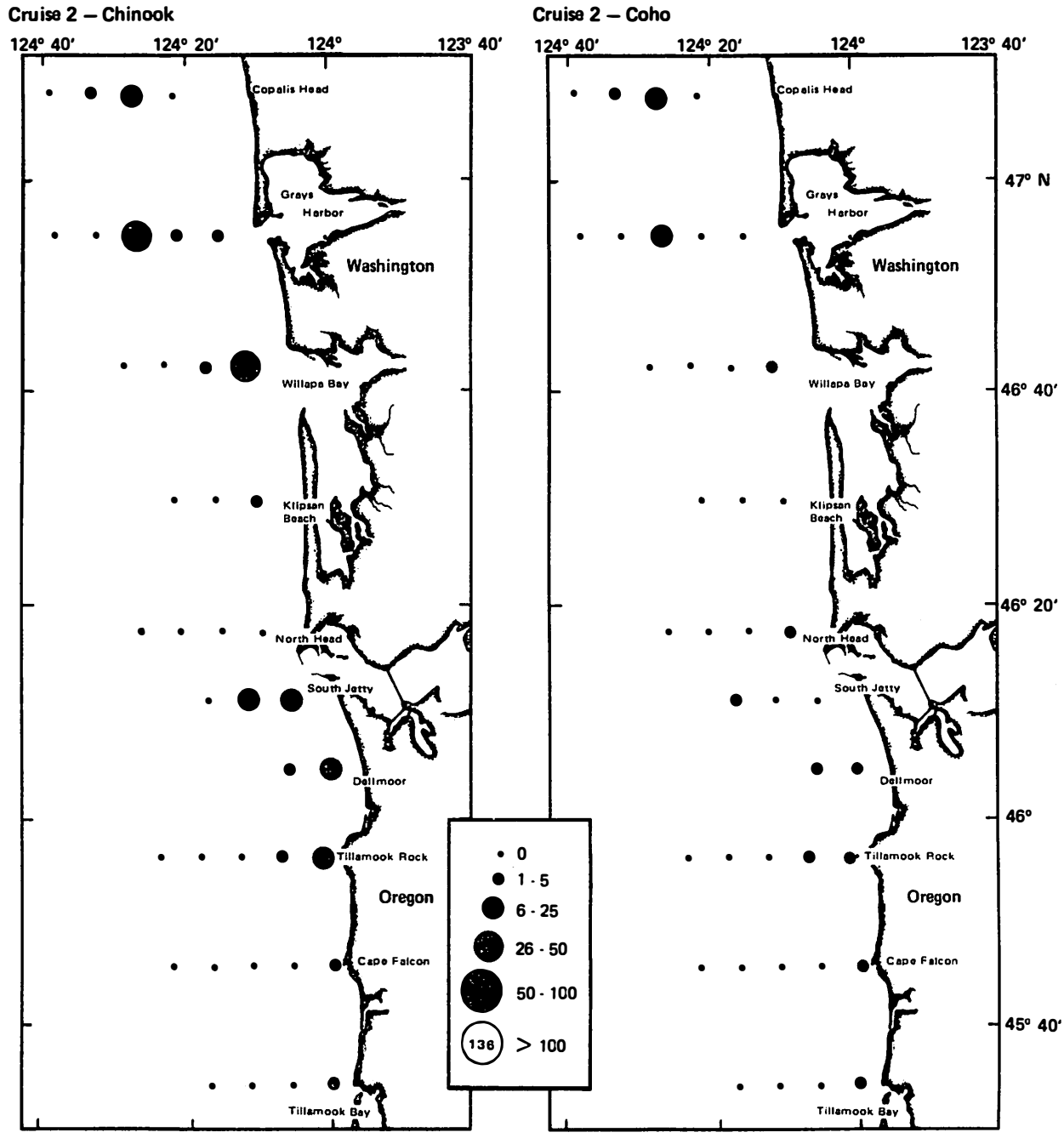

Figure 15.--Relative abundances of juvenile chinook and coho salmon taken by purse seine, 4-15 July, 1980.

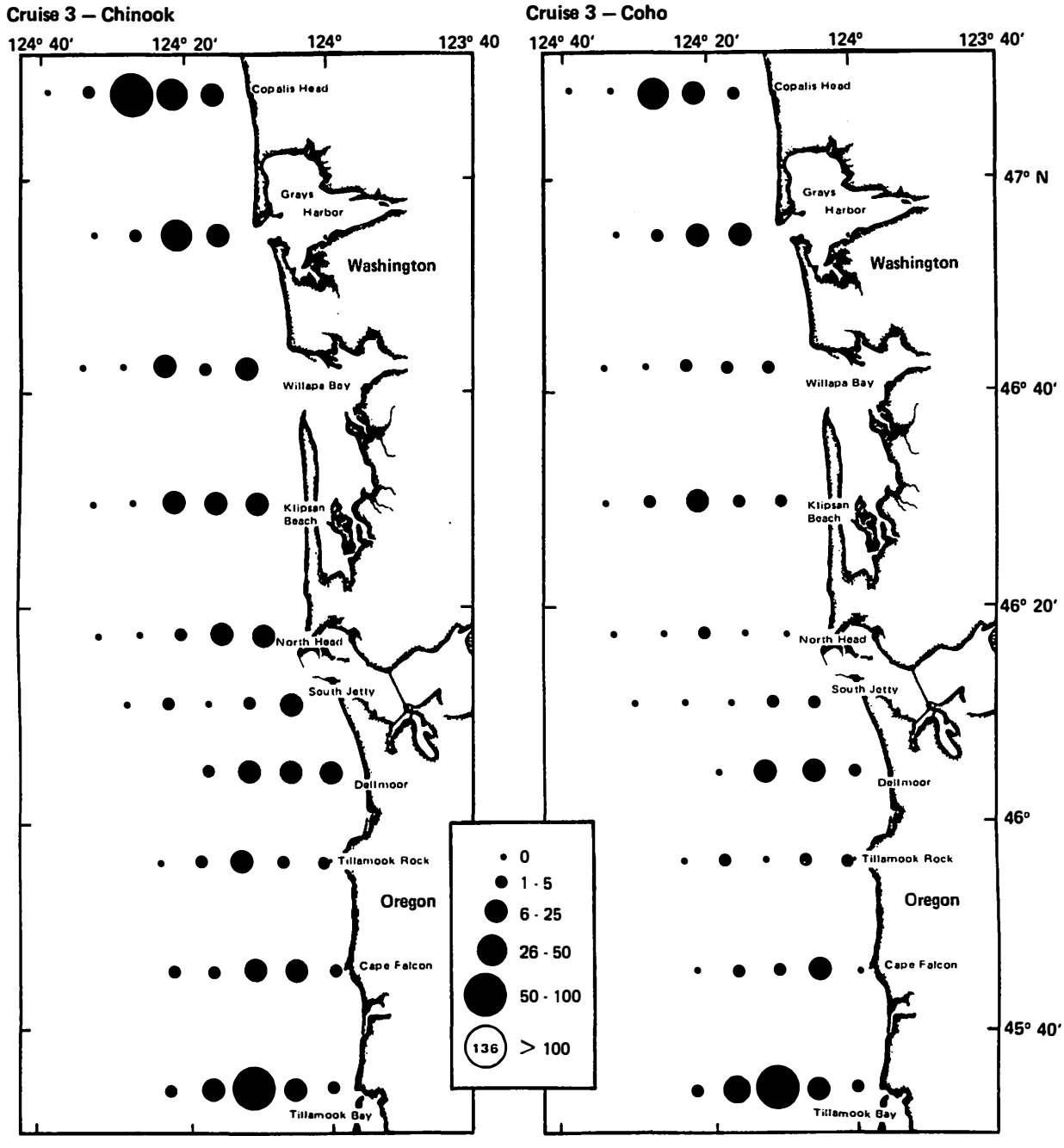

Figure 16--Relative abundances of juvenile chinook and coho salmon taken by purse seine, 28 August-8 September, 1980.

Cruise 2 or 3, and of the 31 marked fish captured on Cruise 1, 27 were located at and to the north of the Columbia River mouth.

Coho salmon had a fairly uniform north-south distribution over the entire sampling area on each of the three cruises, and few fish were found at distances greater than 20 km from the shore (Figures 14-16). Of the 38 tagged Columbia River coho salmon that were recaptured in the ocean, 22 were from releases at the Washougal Hatchery (Appendix Table A13). These fish had the same overall distribution as the unmarked fish and were found from the most southerly transect to the most northerly transect. The overall abundance of coho salmon varied considerably between cruises. Many more coho salmon were captured on Cruise 1 than on the other two cruises.

Coho and chinook salmon had the same general north-south and nearshore-offshore distribution. Most purse seine sets had a mix of the two species, although one species or the other was generally more abundant, indicating some aggregation by species.

The distribution of steelhead was comparatively restricted. On Cruise 1, more than 90% were captured 15 to 32 km offshore between Klipsan Beach and Grays Harbor, Washington (Figure 17). Abundance varied greatly between cruises. Only eight steelhead were caught on Cruise 2 and none on Cruise 3. Too few marked steelhead were recaptured for meaningful analysis (Appendix Table A14).

Effect of Direction of Set on Salmonid Catches

On Cruise 1, almost the entire catch of steelhead, 80% of the chinook salmon, and 76% of the coho salmon were taken in sets made toward the south (Figure 18). In addition, all marked steelhead and all but one marked spring chinook salmon were taken in south facing sets. There was no

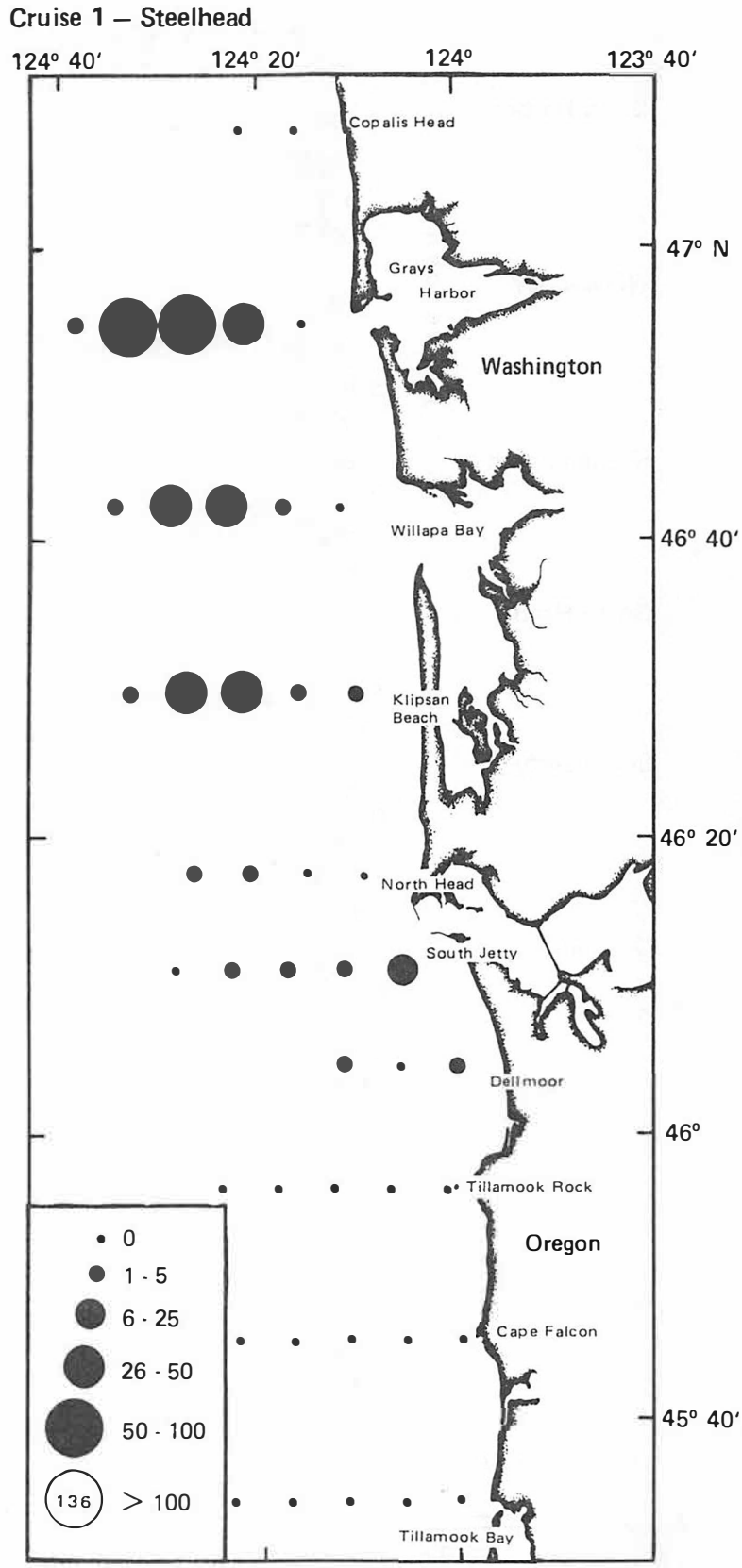

Figure 17.--Relative abundances of juvenile steelhead taken by purse seine, 27 May-7 June, 1980.

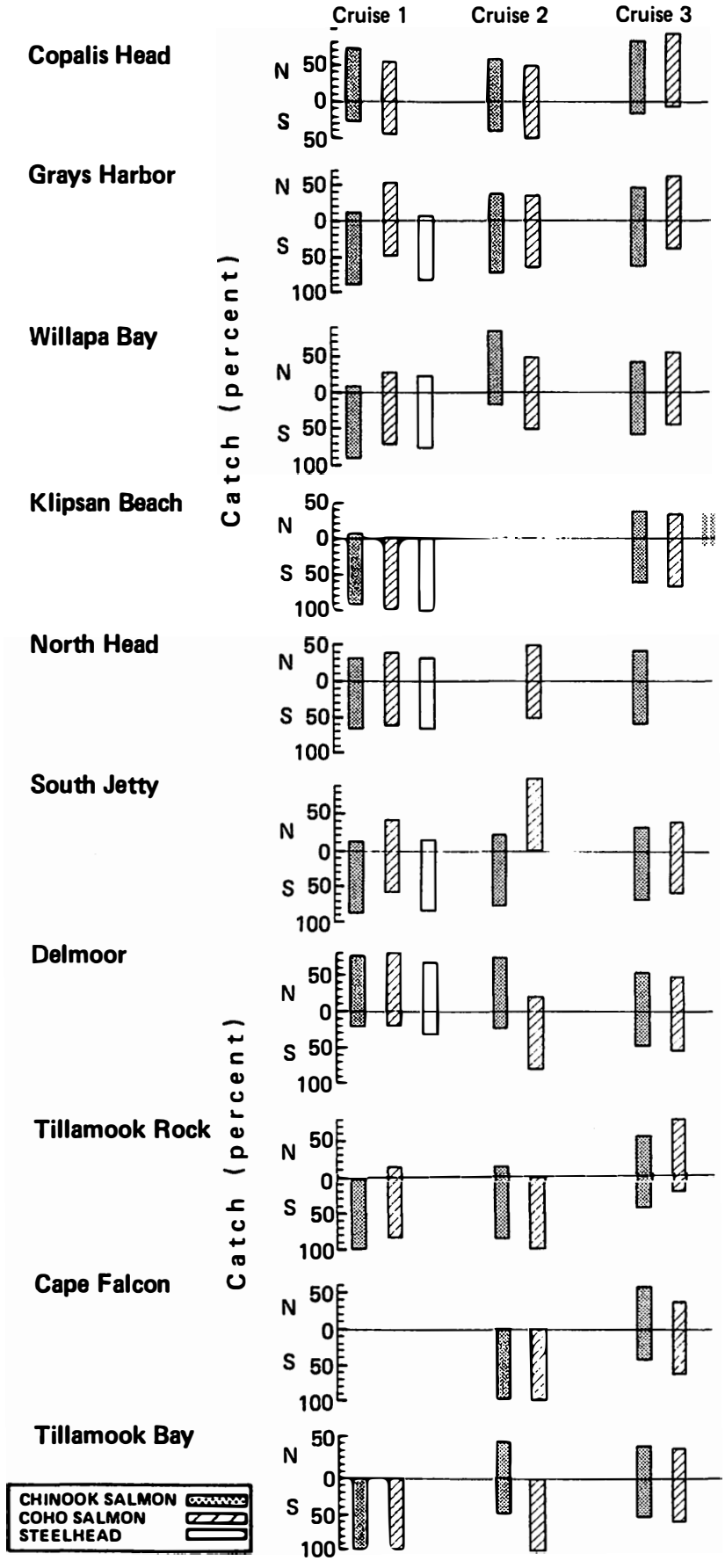

Figure 18.--Distribution of catch between north and south facing purse seine sets, 27 May-7 June (Cruise 1), 4-15 July (Cruise 2), 28 August-8 September (Cruise 3), 1980.

correlation on Cruises 2 and 3 between direction of seine set and abundance of salmonids caught, nor a correlation with marked fish captured.

Size Characteristics

Steelhead averaged 212 mm fork length on Cruise 1 with no or too few recoveries on the later cruises to estimate growth (Figure 19).

Coho salmon fork length averaged 172 mm on Cruise 1, 170 mm on Cruise 2, and 268 mm on Cruise 3 (Figure 19). There was a 55% increase in the size of fish captured between mid-July and early September.

Chinook salmon fork length averaged 166 mm on Cruise 1, 190 mm on Cruise 2, and 273 mm on Cruise 3 (Figure 19). Two distinct size classes were observed in the area between Willapa Bay and Copalis Head on Cruises 2 and 3. The smaller fish averaged 162 mm (35) and 177 mm (45), and the larger fish averaged 246 mm (25) and 288 mm (135) on Cruises 2 and 3, respectively. Marked spring chinook salmon were captured only on Cruise 1, so it was assumed that few were represented in the catch from Cruise 3. The size of subyearling Columbia River chinook salmon entering the estuary and ocean in the spring from the brood of the previous fall ranged from 70-110 mm. Thus the length of chinook salmon recaptured on Cruise 3 represented the growth these fish attained in 5 to 6 months.

Discussion

Distribution and Abundance

Juvenile salmonids were generally distributed within 32 km of the shore. This was the same as the distribution found for juvenile salmonids between 1964 to 1969 from Vancouver Island, B.C. to Yakutat, Alaska (Hartt 1980). Godfrey et al. (1975) sampled offshore waters in the North Pacific for juvenile coho salmon. They found some juveniles up to 450 km from

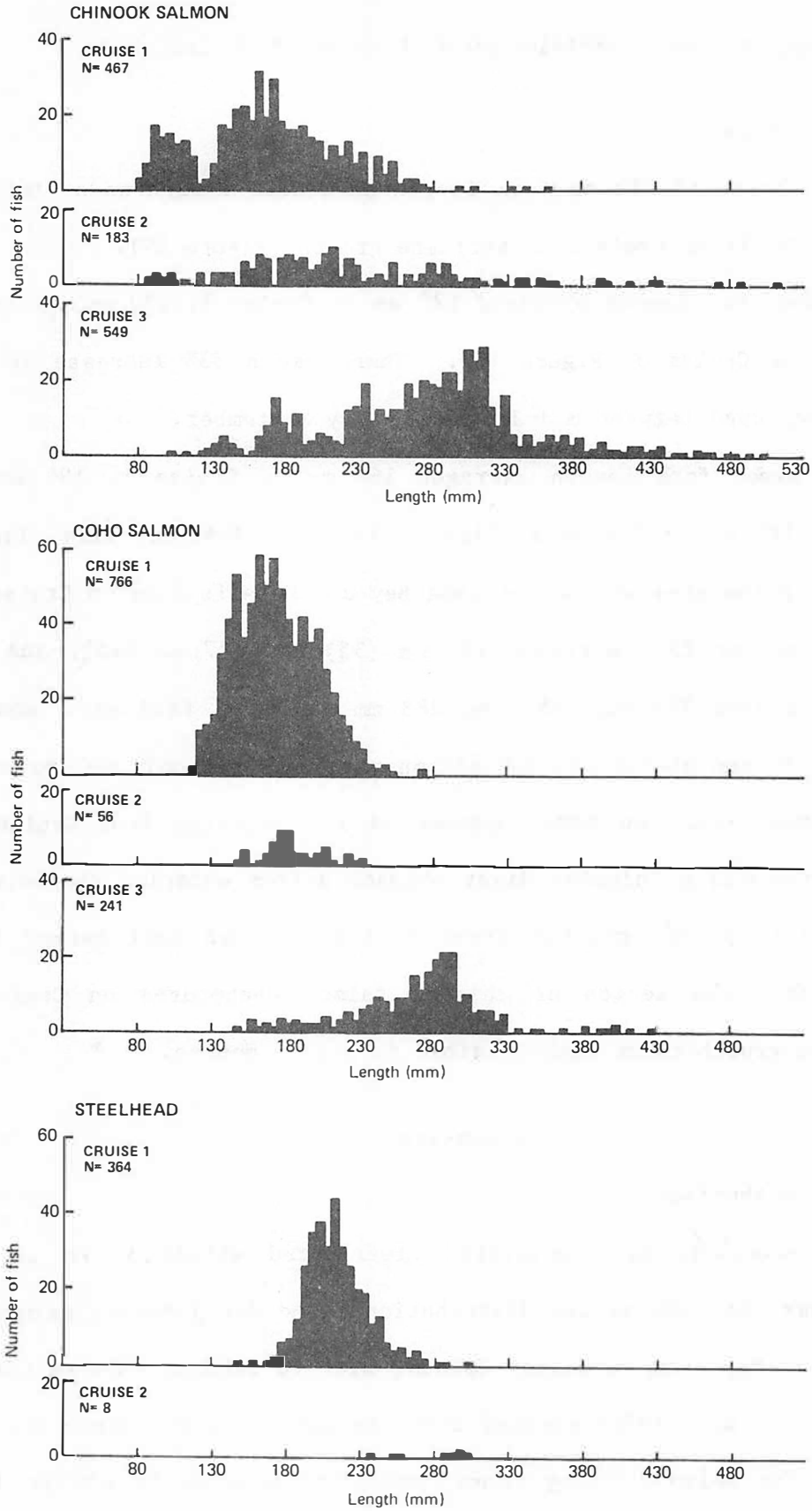

Figure 19.--Length distribution of juvenile salmonids captured by purse seine, 27 May-7 June (Cruise 1), 4-15 July (Cruise 2), 28 August-8 September (Cruise 3), 1980.

shore, but the greatest concentrations were nearer the west coast of Vancouver Island and southeast Alaska. Andrievskaya (1968, 1970) reported juvenile coho salmon 480 to 960 km from the shore but made no reference to relative distributions. Birman (1969) sampled the whole sea of Okhotsk but found juvenile chinook and coho salmon only close to the shore. Between 1962 to 1970, Major et al. (1978) sampled the open North Pacific Ocean for chinook salmon. Juveniles were found only within 480 km of the shore.

Although more than 2,700 juvenile salmonids were caught on the three cruises, not enough marked fish were captured to determine the relative abundance or distribution of any particular stock, with the possible exception of those from the Washougal Hatchery. This was due in part to the timing of the cruises and the effort necessary to sample a large enough area to determine general overall fish distribution. In the process of determining distribution, much effort was expended in sampling some distance offshore where no fish were located. Had sampling been conducted more intensively in areas where large fish abundances were found, the number of marked fish captured likely would have been considerably greater. In addition, the median date of passage for yearling chinook salmon and steelhead in the Columbia River estuary at Jones Beach, Oregon [River Kilometer 75 (RKm)] was 11 May, and the average travel time between Jones Beach and RKm 16 was 2 days. Thus entry of the median fish from these two species into the ocean was probably prior to 15 May. As Cruise 1 was not begun until the end of May, many of the marked fish of these species may already have moved out of the sampling area. On the basis of the distribution found for steelhead, this would seem to be a particularly strong possibility.

Approximately 1.7 million marked coho salmon were released into the Columbia River in 1980, and of these, approximately 35% were released from the Washougal Hatchery. The marked Washougal Hatchery fish were from Cowlitz Hatchery (WDF) stock fish. They were captured over the entire sampling area and their marks accounted for 58% of those recaptured. This greater proportion of marks recaptured from one hatchery and the distribution found may relate to a behavioral characteristic of the Cowlitz Hatchery stock. The largest catches in the ocean fishery of adult coho salmon of Columbia River origin have been off northern California to southern Oregon. The exception to this has been adult coho salmon of late run Cowlitz Hatchery stock. The adult tag returns from the ocean fishery for these fish have indicated their distribution to be primarily in the area between Tillamook Bay, Oregon, and Grays Harbor, Washington, (R. Lincoln, WDF, Olympia, personal communication). This is similar to what we found for the juveniles.

Migration Patterns and Growth

A northerly migration of steelhead was readily apparent from the catch distribution and direction of seine set. In addition, these fish were caught slightly farther offshore than the chinook and coho salmon. During the intensive sampling for juvenile salmonids between 1960 and 1969, Hartt et al. (1966, 1967a, 1967b, 1970, and 1972) found considerably fewer steelhead than salmon in the nearshore areas. Further evidence of an offshore and northerly migration has been provided by recaptures of two marked juvenile steelhead. On 14 July 1980, a marked steelhead released in the Pahsimeroi River, Idaho, between 7 and 17 April 1980, was recovered 1,050 kilometers west of the Queen Charlotte Islands in the Gulf of Alaska

by a Japanese research vessel (W. Pearcy, Oregon State University, Corvallis, Oregon, personal communication). This was a distance of 1,700 km from the Columbia River mouth. Also a steelhead marked off Kodiak, Alaska, in September 1958 was caught by a sportsman in the Alsea River in southern Oregon 17 months later (Hartt 1980). These two tag recoveries have indicated extensive migration of steelhead from the Columbia River and Oregon.

A northerly migration was also indicated for spring chinook salmon. Marked spring chinook salmon of Columbia River origin were caught only on south facing seine sets, were found almost exclusively from the Columbia River mouth to the north, and were captured only on Cruise 1. Additional evidence for a northerly migration has been that in all marking off the Washington coast by the WDF of small chinook salmon that have spent only one winter in the ocean, none has returned to hatcheries as a spring chinook salmon (R. Lincoln, WDF, Olympia, personal communication). If all spring chinook salmon migrated north, then the average length of the chinook salmon found on Cruise 3 represented the size obtainable by subyearlings in 5 to 6 months. One 271-mm marked fall chinook salmon (subyearling) was captured on 31 Aug 80. It was from a group with an average length of 80-90 mm at release on 1 June 80. This indicated a potential for growth of 1.9 mm per day. This was considerably higher than the 1.32 mm/day growth found by Healey (1980) in small (44-115 mm) chinook salmon from the Nanaimo estuary. Comparatively few small chinook salmon (<130 mm) were found in the sampling area. On the basis of large catches of small chinook salmon in shallow nearshore waters during NMFS purse seining operations in 1980 (Part I), it appeared that movement of fish into the sampling area was dependent upon size.

The decline in coho salmon abundance on Cruise 2 may have been related to migration. Hartt (1980) tagged a large number of juvenile coho salmon in July and August off the coast of Vancouver Island and southeast Alaska. Many returned to the Columbia River as adults. Many adult coho salmon from the Columbia River, as previously discussed, are caught in the southern Oregon and northern California fisheries. In addition, migration out of the study area by the early stocks reaching the ocean and replacement by others would account for the apparent lack of growth of coho salmon between Cruise 1 and 2. This apparent lack of growth was also reported for coho salmon in British Columbia by Phillips and Barraclough (1978). They found a relatively small increase in mean lengths between May and July, with June coho salmon often smaller than those of the other 2 months. There was no discussion of possible reasons for the apparent lack of growth.

Although migration out of the sampling area was likely the prime factor affecting the abundance of salmonids on Cruise 2, a contributing factor in the lower catches may have been related to water temperatures. During sampling for juvenile coho salmon in the North Pacific Ocean, Godfrey et al. (1975) caught the largest number of fish in waters between 8°-12°C (range 3°-16°C). Surface water temperatures on Cruise 2 averaged 15.2°C (Table 10) which was above those normally associated with salmonids. Some juveniles may have resided deeper in the water column to avoid the warmer water and thus were not as susceptible to the purse seine as those closer to the surface.

The initial results of the 1980 cruises were very promising. General distribution patterns of juvenile salmonids were defined and mark recaptures provided indications of migration by various stocks of fish.

More intensive sampling in areas and at times when fish are most abundant will be necessary to ascertain whether or not enough marked fish can be recaptured to determine relative differences in survival to the ocean between stocks of fish.

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APPENDIX A

Tables A1 - A14

Appendix Table A1.--Weekly beach seine catches of juvenile salmonids at Jones Beach, Oregon (RKm 75), 1980.

Sampling period (mo/day)	Days fished (No)	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 Total catch (No)	Coho salmon Catch per set (No)	Steelhead Total catch (No)	Steelhead Catch per set (No)
1/01 - 3/04	0	0	-	-	-	-	-	-	-	-
3/05 - 3/11	1	4	98	24	80	20	0	0	0	0
3/12 - 3/18	4	18	967	54	231	13	0	0	0	0
3/19 - 3/25	5	27	1631	60	412	15	1	0	0	0
3/26 - 4/01	5	34	1704	50	713	21	0	0	0	0
4/02 - 4/08	5	38	543	14	431	15	0	0	2	0
4/09 - 4/15	5	39	1440	37	714	18	5	0	2	0
4/16 - 4/22	5	39	2505	64	842	22	215	6	15	0
4/23 - 4/29	5	41	3239	79	492	12	776	19	16	0
4/30 - 5/06	6	45	4264	95	414	9	2315	52	52	1
5/07 - 5/13	6	56	9045	161	842	15	1778	32	59	1
5/14 - 5/20 a/	5	46	5164	112	118	2	500	11	21	0
5/21 - 5/27	5	22	1200	54	16	1	157	7	4	0
5/28 - 6/03	6	43	3734	87	9	0	190	4	89	2
6/04 - 6/10	6	54	5309	98	40	1	248	5	210	4
6/11 - 6/17	6	59	5272	89	15	0	40	1	90	2
6/18 - 6/24	6	58	5975	103	6	0	21	0	55	1
6/25 - 7/01	6	60	3417	57	12	0	4	0	21	0
7/02 - 7/08	4	38	7011	184	4	0	7	0	35	1
7/09 - 7/15	6	54	6532	121	2	0	22	0	28	1
7/16 - 7/22	5	48	4994	104	0	0	5	0	11	0
7/23 - 7/29	5	50	3522	70	1	0	1	0	5	0
7/30 - 8/05	5	41	3162	75	0	0	0	0	4	0
8/06 - 8/12	5	48	2279	48	0	0	0	0	0	0
8/13 - 8/19	5	48	2374	49	1	0	0	0	0	0
8/20 - 8/26	5	48	2396	50	0	0	0	0	0	0
8/27 - 9/02	4	37	1497	40	0	0	1	0	1	0
9/03 - 9/09	5	39	937	24	0	0	1	0	1	0
9/10 - 9/16	4	38	1240	33	0	0	0	0	1	0
9/17 - 9/23	5	29	596	21	0	0	0	0	0	0
9/24 - 9/30	2	11	224	20	0	0	0	0	0	0
10/01 - 12/31	0	0	-	-	-	-	-	-	-	-
Totals		1212	92,271		5,395		6,287		722	

a/ Mt. St. Helens volcanic eruption 18 May. High turbidity, logs, and debris arrived at sampling site on 19 May at 1300 hrs forcing some reduction of fishing effort in weeks following.

Appendix Table A2.--Weekly purse seine catches of juvenile salmonids at Jones Beach, Oregon (RKm 75), 1980.

Sampling period (mo/day)	Days fished (No)	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 Total catch (No)	Coho salmon Catch per set (No)	Steelhead Total catch (No)	Steelhead Catch per set (No)
1/01 - 3/11	0	0	-	-	-	-	-	-	-	-
3/12 - 3/18	2	4	3	1	7	2	0	0	0	0
3/19 - 3/25	3	5	5	1	20	3	0	0	1	0
3/26 - 4/01	4	7	6	1	43	6	0	0	0	0
4/02 - 4/08	5	11	3	0	134	12	1	0	3	0
4/09 - 4/15	5	15	183	12	527	35	4	0	16	1
4/16 - 4/22	5	15	176	11	742	49	32	2	110	7
4/23 - 4/29	5	19	19	1	1022	53	576	30	1260	66
4/30 - 5/06	6	19	231	12	1582	83	2393	125	2103	110
5/07 - 5/13	6	19	2850	150	2096	110	2893	152	3754	197
5/14 - 5/20	5	17	1359	80	906	53	3961	208	1772	104
5/21 - 5/27	5	15	392	26	377	25	819	54	399	26
5/28 - 6/03	5	15	289	18	175	11	721	48	170	11
6/04 - 6/10	5	22	724	32	334	15	895	41	237	8
6/11 - 6/17	6	19	1181	62	290	15	294	15	75	4
6/18 - 6/24	5	16	644	40	218	14	94	6	93	6
6/25 - 7/01	5	16	491	31	44	3	78	9	16	1
7/02 - 7/08	4	10	782	78	0	0	46	5	3	0
7/09 - 7/15	6	16	1178	74	1	0	234	15	1	0
7/16 - 7/22	5	14	585	42	2	0	24	2	0	0
7/23 - 7/29	4	6	285	48	0	0	3	0	0	0
7/30 - 8/05	4	8	368	46	1	0	2	0	0	0
8/06 - 8/12	4	7	324	46	0	0	1	0	0	0
8/13 - 8/19	3	8	237	30	0	0	1	0	0	0
8/20 - 8/26	3	7	122	17	0	0	0	0	0	0
8/27 - 9/02	2	4	43	11	0	0	0	0	0	0
9/03 - 9/09	2	4	47	12	0	0	0	0	0	0
9/10 - 9/16	2	4	215	54	0	0	0	0	0	0
9/17 - 9/23	1	1	41	41	0	0	0	0	0	0
9/24 - 9/30	1	2	17	8	0	0	0	0	0	0
10/01 - 12/31	0	0	-	-	-	-	-	-	-	-
Totals		329	12,300		8,370		13,071		10,004	

Appendix Table A3.-Weekly purse seine catches of juvenile salmonids in the lower Columbia River estuary (RKm 16), 1980.

Sampling period (mo/day)	Days fished (No)	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 Total catch (No)	Coho salmon Catch per set (No)	Steelhead Total catch (No)	Steelhead Catch per set (No)
1/01 - 4/15	0	0	-	-	-	-	-	-	-	-
4/16 - 4/22	4	10	1	0	88	10	7	0	6	1
4/23 - 4/29	4	17	5	0	212	13	145	9	45	3
4/30 - 5/06	5	9	23	3	1394	155	1448	161	1306	145
5/07 - 5/13	5	14	304	22	1863	133	2214	158	945	68
5/14 - 5/20	3	8	306	38	607	76	643	80	547	68
5/21 - 5/27	3	8	2554	319	237	30	156	20	232	29
5/28 - 6/03 a/	0	0	-	-	-	-	-	-	-	-
6/04 - 6/10 a/	0	0	-	-	-	-	-	-	-	-
6/11 - 6/17	1	4	289	72	20	6	76	19	40	10
6/18 - 6/24	5	20	3131	157	90	5	69	3	23	1
6/25 - 7/01	2	9	1002	111	57	6	20	2	7	1
7/02 - 7/08	2	4	397	99	3	1	3	1	0	0
7/09 - 7/15	5	22	2626	119	3	0	145	7	0	0
7/16 - 7/22	4	18	1682	93	0	0	58	3	0	0
7/23 - 7/29	3	13	723	56	0	0	0	0	0	0
7/30 - 8/05	1	5	365	73	5	1	0	0	0	0
8/06 - 8/12	2	5	118	23	1	0	0	0	0	0
8/13 - 8/19	2	8	136	18	1	0	0	0	0	0
8/20 - 8/26	2	5	50	10	0	0	0	0	0	0
8/27 - 9/02	1	1	12	12	0	0	0	0	0	0
9/03 - 12/31	0	0	-	-	-	-	-	-	-	-
Totals		180	13,724		4,581		4,984		3,151	

a/ No sets made due to engine failure of vessel.

Appendix Table A4.--Purse seine catches of juvenile salmonids from marine waters adjacent to the Columbia River estuary (within 24 km), 1980.

			Chinook salmon							
			Subyearling		Yearling		Coho salmon		Steelhead	
Date (mo./day)	No. of days fished	No. sets	Total catch (no.)	Catch per set (no.)	Total catch (no.)	Catch per set)no.)	Total catch (no.)	Catch per set (no.)	Total catch (no.)	Catch per set (no.)
6/11-6/17	1	4	67	17	0	0	0	0	0	0
6/18-6/24	0	0	0	0	0	0	0	0	0	0
6/25-7/01	2	8	80	10	5	1	4	0	0	0
7/02-7/08	1	3	21	7	8	2	0	0	0	0
7/09-7/15	0	0	0	0	0	0	0	0	0	0
7/16-7/22	1	5	171	34	5	1	0	0	0	0
7/23-7/29	2	10	63	6	8	1	0	0	0	0
7/30-8/05	2	10	57	6	4	0	1	0	0	0
8/06-8/12	1	5	182	36	0	0	0	0	0	0
8/13-8/19	3	12	802	67	5	0	1	0	0	0
8/20-8/26	2	10	85	7	7	1	0	0	0	0
Totals	15	67	1508	190	42	6	6	0	0	0

Appendix Table A5.--Mark, release and recapture information, Columbia River estuary, 1980. Includes ocean recaptures near the Columbia River mouth and off shore (see part II).

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 adipose fin with no detectable tag.
LET GO - represents fish with excised adipose fin with a detectable tag that were measured then released.
BLNK TAG - represents fish with a blank tag.

Brand: Recaptures are indicated as follows-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.

Secondary Mark: For any mark directly above an asterisk there is another associated mark which is listed in the remarks section.

RELEASE DATE - day, month, year
RECAPT. SITE LOCATION - examples: C075.0S; 4010.1S

C-Columbia River
075.0-Distance from mouth of River in km
S-South, Middle or North part of river cross section

40-Ocean
10-Coastal location (1-10 where Tillamook, Or.=1; Westport, Wa.=10)
.1-Distance from shore (.0-.5); where km=no. x 80
S-set facing South, or North

GEAR CODE - B for beach seine; P for purse seine.
RECAPTURES - Recapture numbers, actual and adjusted to 10 sets/day for the beach seine and 5 sets/day for the purse seine.

Recapture rates (%) of groups released prior to 1980 or over an extended period only represent 1980 recaptures where as "No. Marked" represent the total number released with the indicated mark.

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 about (3 days before and after) the median date.
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. Movement rate to all ocean sites computed as if recapured at RKm 0.

Appendix Table A5.--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

RELEASE AND RECAPTURE INFORMATION - COLUMBIA RIVER ESTUARY 1980

REPORT DATE 12/29/80

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

SPECIES: CHINOOK-OS

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 1ST FISH	MED. FISH	LAST FISH	AVG LEN MM	MVMT RATE KM/DAY
050646	ABERNATHY SCC	ABERNATHY CREEK	08AP80-14MY80		112.5	C075.OS	B	33	0.030	49	0.044	09AP	16MY	19MY	89	0
	HATCHERY CONT. 5%					C075.OM	P	9	0.009	18	0.016	09AP	16MY	03JL	127	0
						C016.ON	P	2	0.002			22MY	22MY	23MY	97	2
050644	ABERNATHY SCC	ABERNATHY CREEK	14MY80-08AP80		35.2	C075.OS	B	12	0.035	20	0.058	09AP	16MY	19MY	88	8
	HATCHERY CONT. 2 1/2%					C075.OM	P	6	0.018	11	0.033	16MY	17MY	17MY	107	5
						C016.ON	P	4	0.012			21MY	22MY	22MY	105	9
072160	BIG CREEK	BIG CREEK	13MY80-23MY80	77	143.4	C016.ON	P	5	0.004			20MY	23MY	18JL	88	3
	STOCK EVAL.					4005.0	P	4	0.003			17JN	17JN	12JL	90	1
072157	BONNEVILLE	TANNER CREEK	22MY80-28MY80	75	121.1	C075.OS	B	52	0.043	90	0.075	17MY	02JN	02JL	80	14
	STOCK EVAL.					C075.OM	P	4	0.004	11	0.010	24MY	25MY	03JN	80	52
						C016.ON	P	9	0.008			16JN	19JN	24JN	88	8
072133	BONNEVILLE	TANNER CK	27MY80	70	50.5	C075.OS	B	12	0.024	21	0.042	31MY	03JN	02JL	83	22
	NUTRITION STUDIES					C016.ON	P	2	0.004			20JN	20JN	02JL	87	9
072134	BONNEVILLE	TANNER CK	27MY80	69	50.0	C075.OS	B	14	0.029	23	0.047	31MY	03JN	11JN	82	22
	NUTRITION STUDIES					4005.0	P	1	0.003			17JN	17JN	17JN	87	11
072135	BONNEVILLE	TANNER CK	27MY80	67	48.1	C075.OS	B	22	0.046	37	0.077	31MY	03JN	11JN	83	22
	NURTITION STUDIES					C075.OM	P	2	0.005	4	0.009	03JN	04JN	16JN	70	19
						C016.ON	P	2	0.005			18JN	18JN	19JN	85	10
072136	BONNEVILLE	TANNER CK	27MY80	68	49.4	C075.OS	B	25	0.051	42	0.086	13MY	03JN	07JN	81	22
	NUTRITION STUDIES					C075.OM	P	1	0.003	5	0.010	31MY	31MY	31MY	82	39
						C016.ON	P	2	0.005			09JL	09JL	10JL	108	5
072207	BONNEVILLE	TANNER CREEK	30JN80	83	100.7	C075.OS	B	10	0.010	16	0.016	07JL	21JL	13AU	94	7
						C075.OM	P	28	0.028	89	0.089	07JL	14JL	13AU	96	11
						C016.ON	P	32	0.032			09JL	15JL	25JL	96	14
						4008.1N	P	1	0.001			21JL	21JL	21JL	100	10
LP U 3	BONNEVILLE	PRESCOTT, COL. R.	02JN80	82	26.0	C075.OS	B	41	0.158	54	0.207	31MY	05JN	14JN	83	13
	SURVIVAL AND EFFICIENCY															
LP U 4	BONNEVILLE	PRESCOTT, COL. R.	02JN80	78	26.3	C075.OS	B	22	0.084	31	0.117	03JN	04JN	19JN	82	20
	SURVIVAL AND EFFICIENCY(held 4 days)					C075.OM	P	4	0.016	10	0.037	03JN	03JN	03JN	81	40
RA T 1	CASCADE HAT	THE DALLES/FOREBAY	22JL80-07AU80		112.2	C075.OS	B	1	0.001	2	0.002	01AU	01AU	01AU	100	23
632159	COWLITZ	LOWER RIVERS	18JN80-19JN80	119	40.9	C075.OS	B	15	0.037	26	0.064	09JL	05AU	27AU	89	0
	TRUCK OUT OF VOLCANO AREA					C016.ON	P	11	0.027			24JN	10JL	17JL	75	2
						4005.0	P	2	0.005			13AU	13AU	13AU	103	1
632154	COWLITZ	LOWER RIVERS	03JN80-18JN80	129	114.1	C075.OS	B	64	0.057	103	0.090	03JL	15AU	17SE	98	0
	TRUCK OUT OF VOLCANO AREA					C075.OM	P	2	0.002	7	0.006	19AU	19AU	20AU	98	0
						C016.ON	P	36	0.032			18JN	16JL	19AU	78	1
						4005.0	P	2	0.002			21JL	21JL	21JL	90	1
072145	DESCHUTES R.	DESCHUTES R.	14AP80-06JN80	69	23.2	C075.OM	P	2	0.009	6	0.025	23JN	06JL	07JL	125	5
	WILD STOCK EVAL.															

SPECIES: CHINOOK-OS

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 1ST FISH	MED. FISH	LAST FISH	AVG LEN MM	MVMT RATE KM/DAY
072145	DESCHUTES R.	DESCHUTES R.	14AP80-06JN80	69		23.2	C016.0N	P	2	0.009			24JN	24JN	25JL	101	7
	WILD STOCK EVAL.						4005.0	P	1	0.005			14AU	14AU	14AU	125	4
072146	DESCHUTES R.	DESCHUTES R.	01AP80-06JN80	80		11.9	C075.0M	P	1	0.009	3	0.025	12JL	12JL	12JL	132	4
	WILD STOCK EVAL.						C016.0N	P	3	0.026			09JL	14JL	22JL	109	4
072147	DESCHUTES R.	DESCHUTES R.	01AP80-06JN80	73		5.2	C075.0M	P	2	0.039	4	0.081	17MY	14JL	15JL	108	3
	WILD STOCK EVAL.																
632005	ELOKOMIN	ELOKOMIN	01JN80		80	98.4	C075.0S	B	2	0.003	3	0.004	30JL	11SE	12SE	123	0
	STOCK EVAL.						C075.0M	P	1	0.002	4	0.004	07JL	07JL	07JL	113	1
							C016.0N	P	21	0.022			23JN	02JL	16JL	86	3
							4001.1S	P	1	0.002			31AU	31AU	31AU	271	1
632043	GRAYS RIVER	GRAYS RIVER HAT	01JN80-24JN80		80	37.5	C016.0N	P	3	0.009			23JN	09JL	14JL	79	1
	STOCK EVAL.																
050527	HAGERMAN NFH	ASOTIN	03JN80		60	58.4	C075.0M	P	6	0.011	13	0.023	17JN	24JN	01JL	111	32
	NMFS TRANSPORT STUDY						C016.0N	P	1	0.002			09JL	09JL	09JL	129	20
050528	HAGERMAN NFH	BELOW BONN. DAM	06JN80-23JN80		59	55.6	C075.0S	B	25	0.045	30	0.054	10JN	14JN	02JL	86	19
	NMFS TRUCK TRANSPORT STUDY						C075.0M	P	9	0.017	16	0.030	10JN	18JN	19JN	95	13
							C016.0N	P	6	0.011			16JN	19JN	27JN	99	16
LA AR 1	JOHN DAY DAM	BLALOCK SHORE	23JN80			0.3	C075.0M	P	1	0.314	3	0.902	14JL	14JL	14JL	100	14
	EFFICIENCY REL																
LD AR 1	JOHN DAY DAM	BLALOCK SHORE	27JN80			0.4	C016.0N	P	1	0.271			18JL	18JL	18JL	112	17
	EFFICIENCY REL						4005.0	P	1	0.271			21JL	21JL	21JL	114	15
RA I+ 1	JOHN DAY DAM	BLALOCK SHORE	10JL80			5.1	C075.0M	P	1	0.020	2	0.049	22JL	22JL	22JL	110	25
	EFFICIENCY REL						C016.0M	P	1	0.020			31JL	31JL	31JL	114	17
RD D 1	JOHN DAY DAM	BLALOCK SHORE	14JL80			1.7	C075.0M	P	1	0.060	3	0.188	21JL	20JL	21JL	110	50
	EFFICIENCY REL																
LA D 3	JOHN DAY DAM	BLALOCK SHORE	16JL80			2.0	C075.0M	P	1	0.051	4	0.220	25JL	25JL	25JL	110	33
	EFFICIENCY REL																
RA IT 1	JONES BEACH	JONES BEACH MIDRIV	01MY80	79		0.1	C075.0S	B	1	0.700	1	0.841	07MY	07MY	07MY	90	0
	MIGRATIONAL TIMING THROUGH ESTUARY																
LD IT 2	JONES BEACH	JONES BEACH SHORE	17MY80	69		0.9	C016.0N	P	1	0.108			23MY	23MY	23MY	87	10
	MIGRATIONAL TIMING THROUGH ESTUARY																
RA IT 3	JONES BEACH	JONES BEACH SHORE	27MY80	73		0.2	C075.0S	B	3	1.658	5	2.652	28MY	02JN	13JN	90	0
	MIGRATIONAL TIMING THROUGH ESTUARY																
RD IT 3	JONES BEACH	JONES BEACH SHORE	28MY80	73		0.3	C075.0S	B	1	0.330	1	0.469	05JN	05JN	05JN	77	0
	MIGRATIONAL TIMING THROUGH ESTUARY																
RP IT 3	JONES BEACH	JONES BEACH SHORE	29MY80	71		0.1	C075.0S	B	1	0.710	1	0.946	07JN	07JN	07JN	75	0
	MIGRATIONAL TIMING THROUGH ESTUARY																

SPECIES: CHINOOK-OS

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 1ST FISH	MED. FISH	LAST FISH	AVG LEN MM	MVMT RATE KM/DAY
632105	KALAMA FALLS H STOCK EVAL.	KALAMA FALLS H	13JN80-24JN80	115		100.4	C075.OS	B	159	0.159	228	0.228	16JN	11JL	08SE	77	2
							C075.OM	P	4	0.004	10	0.011	25JN	12JL	19AU	110	2
							C016.ON	P	17	0.017			19JN	15JL	29JL	82	4
							4005.O	P	1	0.001			13AU	13AU	13AU	95	2
072161	KLASKANINE H STOCK EVAL.	N. FORK KLASKANINE	04JN80	79		66.3	4005.O	P	1	0.002			17JN	17JN	17JN	93	2
631947	KLICKITAT STOCK EVAL.	KLICKITAT	27MY80	85		156.1	C075.OS	B	45	0.029	59	0.038	02JN	06JN	30JN	78	28
							C075.OM	P	19	0.013	43	0.028	02JN	12JN	30JL	86	18
							C016.ON	P	8	0.006			16JN	23JN	11JL	85	13
050643	L. WHT. SALMON COL. R. FALL CHIN. EVAL.	L. WHT. SAL. NFH	10JN80	101		162.6	C075.OS	B	86	0.053	102	0.063	14JN	19JN	07JL	76	21
							C075.OM	P	8	0.005	15	0.010	14JN	17JN	16JL	78	27
							C016.ON	P	41	0.026			18JN	24JN	14JL	80	17
LA U 3	L. WHT. SALMON SURVIVAL AND EFFICIENCY,HELD 4 DAY	PRESCOTT, COL. R.	16JN80	73		25.8	C075.OS	B	48	0.186	50	0.196	17JN	19JN	25JN	74	13
							C075.OM	P	2	0.008	3	0.014	17JN	17JN	18JN	75	40
							C016.ON	P	7	0.028			20JN	24JN	02JL	78	12
LA U 4	L. WHT. SALMON SURVIVAL AND EFFICIENCY	PRESCOTT, COL. R.	16JN80	74		24.7	C075.OS	B	72	0.292	76	0.308	18JN	19JN	24JN	75	13
							C075.OM	P	1	0.005	2	0.008	19JN	19JN	19JN	75	13
							C016.ON	P	3	0.013			24JN	24JN	02JL	71	12
010201	LEWIS R. WILD WILD STOCK EVAL.	LEWIS R. @ HAT.	01AP80-16AP80	45		26.0	C075.OS	B	11	0.043	16	0.060	14JN	27JL	04SE	93	1
							C016.ON	P	1	0.004			31JL	31JL	31JL	96	1
010202	LEWIS R. WILD WILD STOCK EVAL.	LEWIS R. @ HAT.	16AP80-29AP80	45		27.4	C075.OS	B	15	0.055	24	0.089	26JN	25JL	05SE	92	1
							C075.OM	P	1	0.004	4	0.014	19AU	19AU	19AU	104	1
							C016.ON	P	1	0.004			25JL	25JL	25JL	80	1
							4005.O	P	1	0.004			14AU	14AU	14AU	98	1
010205	LEWIS R. WILD WILD STOCK EVAL.	LEWIS R. @ HAT.	30AP80-09MY80	46		30.7	C075.OS	B	10	0.033	24	0.078	25MY	23JL	28AU	95	1
632123	LEWIS R. WILD WILD STOCK EVAL.	LEWIS R. @ HAT.	09MY80-29MY80	49		25.0	C075.OS	B	34	0.136	63	0.250	16JN	03AU	29AU	91	1
							C075.OM	P	3	0.012	11	0.046	12JL	14AU	15AU	105	1
							C016.ON	P	1	0.004			18JL	18JL	18JL	98	2
632124	LEWIS R. WILD WILD STOCK EVAL.	LEWIS R. @ HAT.	29MY80-04JN80	52		27.5	C075.OS	B	49	0.179	84	0.306	06JL	06AU	15SE	90	1
							C075.OM	P	2	0.008	7	0.025	22JL	01AU	01AU	90	1
							4005.O	P	1	0.004			13AU	13AU	13AU	104	2
632125	LEWIS R. WILD WILD STOCK EVAL.	LEWIS R. @ HAT.	05JN80-10JN80	55		25.6	C075.OS	B	56	0.219	89	0.346	28JN	15AU	18SE	95	1
							C075.OM	P	4	0.016	16	0.065	07JL	01AU	05AU	90	2
							C016.ON	P	1	0.004			25JL	25JL	25JL	87	3
							4005.O	P	1	0.004			13AU	13AU	13AU	96	2
632207	LEWIS R. WILD WILD STOCK EVAL.	LEWIS R. @ HAT.	11JN80-17JN80	56		26.2	C075.OS	B	69	0.264	114	0.435	03JL	12AU	16SE	94	1
							C075.OM	P	5	0.020	22	0.083	10JL	02AU	02SE	85	2
632208	LEWIS R. WILD WILD STOCK EVAL.	LEWIS R. @ HAT.	17JN80-25JN80	61		24.5	C075.OS	B	48	0.197	72	0.296	03JL	15AU	15SE	88	1
							C075.OM	P	2	0.009	8	0.032	11AU	12AU	19AU	74	2
							C016.ON	P	2	0.009			16JL	16JL	26AU	104	5

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							4005.0	P	1	0.005			22AU	22AU	22AU	117	2
	WILD STOCK EVAL.																
632214	LEWIS R. WILD	LEWIS R. @ HAT.	24JN80-07JL80	64		26.4	C075.0S	B	34	0.130	56	0.213	18JL	17AU	11SE	97	2
	WILD STOCK EVAL.						C075.0M	P	3	0.012	12	0.045	30JL	30JL	11AU	91	2
							C016.0N	P	1	0.004			31JL	31JL	31JL	94	4
							4005.0	P	1	0.004			14AU	14AU	14AU	95	3
632021	LEWIS R. HAT.	LEWIS RIVER	02JL80			63.0	C075.0S	B	165	0.246	261	0.389	07JL	03AU	15SE	88	3
	WILD STOCK EVAL. Hatchery reared 3 mo's						C075.0M	P	6	0.009	23	0.035	23JL	04AU	19AU	84	3
							C016.0N	P	2	0.003			15JL	15JL	19AU	75	10
632213	LEWIS R. WILD	LEWIS R. @ HAT.	07JL80-11JL80	68		14.0	C075.0S	B	17	0.122	26	0.186	22JL	19AU	15SE	91	2
	WILD STOCK EVAL.						C075.0M	P	1	0.008	4	0.025	13AU	13AU	13AU	97	2
632160	SPEELYAI	LEWIS R. @ HAT	15JL80		148	103.5	C075.0S	B	190	0.184	285	0.275	18JL	05AU	19SE	85	4
	WILD STOCK EVAL.						C075.0M	P	7	0.007	21	0.020	18JL	22JL	06AU	86	13
							4005.0	P	3	0.003			24JL	04AU	14AU	90	8
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632006	LOWER KALAMA	LOWER KALAMA @ HAT	06JN80		150	144.5	C075.0S	B	203	0.141	268	0.186	07JN	14JN	09SE	62	7
	STOCK EVAL.						C075.0M	P	6	0.005	12	0.009	07JN	08JN	05AU	65	26
							C016.0N	P	12	0.009			18JN	18JL	25AU	86	3
							4005.0	P	1	0.001			13AU	13AU	13AU	96	2
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LA I+ 2	MCNARY DAM	PORT KELLY (OR.)	23JN80			1.1	C075.0M	P	1	0.091	2	0.182	10JL	10JL	10JL	115	25
	EFFICIENCY REL																
LA I+ 3	MCNARY DAM	PORT KELLY (OR.)	26JN80			2.5	C075.0M	P	1	0.041	4	0.142	07JL	07JL	07JL	115	39
	EFFICIENCY REL																
RA AN 1	MCNARY DAM	PORT KELLY (OR.)	01JL80			2.6	C075.0M	P	1	0.039	6	0.232	15AU	15AU	15AU	145	9
	EFFICIENCY REL.						C016.0N	P	2	0.078			17JL	17JL	17JL	108	30
CE	MCNARY DAM	MCNARY TAILRACE	09JN80-14JL80			39.0	C016.0N	P	1	0.003			18JL	18JL	18JL	125	12
*	TAILRACE CONTROL		LA IF 1														
LA IF 1	MCNARY DAM	MCNARY TAILRACE	09JN80-14JL80			39.0	C075.0M	P	4	0.011	13	0.035	19JN	25JL	01AU	110	9
*	TAILRACE CONTROL		Cwt CE				C016.0N	P	5	0.013			19JN	15JL	25JL	125	13
CEDY	MCNARY DAM	MCNARY TAILRACE	16JL80-31JL80			45.6	C016.0N	P	1	0.003			26AU	26AU	26AU	128	11
*	TAILRACE CONTROL		LA IF 3														
LA IF 3	MCNARY DAM	MCNARY TAILRACE	16JL80-31JL80			45.6	C075.0M	P	2	0.005	9	0.020	30JL	04AU	05AU	115	21
*	TAILRACE CONTROL		Cwt CEDY														
RA IC 1	MCNARY DAM	BELOW BONN.	13JN80-17JL80			39.5	C075.0S	B	5	0.013	7	0.019	07JL	08JL	17JL	98	6
*	TRUCK TRANSPORT		(CWT LA)				C075.0M	P	35	0.089	100	0.255	06JL	10JL	17JL	95	6
							C016.0N	P	30	0.076			09JL	15JL	31JL	95	7
							4008.1N	P	1	0.003			12JL	12JL	12JL	94	7
							4005.0	P	1	0.003			21JL	21JL	21JL	97	6
HO	MCNARY DAM	BELOW BONN	18JL80-01AU80			40.7	C075.0M	P	1	0.003	4	0.010	06AU	06AU	06AU	110	8
*	TRUCK TRANSPORT		RA IC 3														
RA IC 3	MCNARY DAM	BELOW BONN	18JL80-01AU80			40.7	C075.0S	B	4	0.010	5	0.014	22JL	23JL	01AU	96	31
*	TRUCK TRANSPORT		Cwt HO				C075.0M	P	29	0.072	93	0.244	21JL	21JL	05AU	105	52
							C016.0N	P	10	0.025			25JL	28JL	31JL	102	21
++++++++																	
072162	OXBOW H	SKAMANIA LIGHT	27MY80-28MY80		100	50.2	C075.0S	B	20	0.040	31	0.061	02JN	04JN	26JN	77	19
	IMPRINT MCNARY, HOMING																

SPECIES: CHINOOK-OS

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072162	OXBOW H	SKAMANIA LIGHT	27MY80-28MY80		100	50.2	C075.0M	P	1	0.002	3	0.006	02JN	02JN	02JN	72	26
	IMPRINT MCNARY, HOMING						C016.0N	P	6	0.012			16JN	23JN	02JL	86	8
072163	OXBOW H	SKAMANIA LIGHT	27MY80-28MY80		100	53.1	C075.0S	B	17	0.033	27	0.051	02JN	04JN	23JN	79	19
	IMPRINT MCNARY,HOMING						C075.0M	P	3	0.006	9	0.017	03JN	08JL	09JL	82	4
							C016.0N	P	3	0.006			10JL	14JL	15JL	101	4
							4005.0	P	1	0.002			26JN	26JN	26JN	85	7
631948	PRIEST RAPIDS	PRIEST RAPIDS	20MY80-24JN80		88	110.1	C075.0S	B	1	0.001	1	0.002	28JN	28JN	28JN	115	14
	STOCK EVAL.						C075.0M	P	10	0.010	27	0.025	12JN	11JL	01AU	113	11
							C016.0N	P	10	0.010			14JL	17JL	29JL	100	11
							4005.0	P	2	0.002			21JL	21JL	22AU	115	10
050639	SPRING CRK NFH	SPRING CREEK NFH	10MR80	68	123	130.2	C075.0S	B	114	0.088	241	0.186	14MR	26MR	23MY	73	12
	HATCHERY CONTRIBUTION						C075.0M	P	3	0.003	5	0.004	15MY	05JN	10JN	116	2
							C016.0N	P	4	0.004			16MY	16MY	23MY	116	4
050640	SPRING CRK NFH	SPRING CREEK NFH	10AP80	77	83	77.7	C075.0S	B	96	0.124	152	0.196	16AP	24AP	17MY	81	14
	HATCHERY CONTRIBUTION						C075.0M	P	12	0.016	25	0.033	14AP	16AP	06MY	87	32
							C016.0N	P	2	0.003			20MY	20MY	21MY	107	6
050641	SPRING CRK NFH	SPRING CRK NFH	09MY80	90	51	61.8	C075.0S	B	23	0.038	29	0.048	12MY	14MY	19MY	90	38
	HATCHERY CONTRIBUTION						C075.0M	P	32	0.052	39	0.063	12MY	12MY	11JN	95	64
							C016.0N	P	9	0.015			20MY	22MY	23MY	97	19
050642	SPRING CRK NFH	SPRING CRK NFH	07AU80		19	23.1	C075.0S	B	3	0.013	5	0.022	12AU	14AU	15AU	129	27
	HATCHERY CONTRIBUTION						C075.0M	P	6	0.026	28	0.122	11AU	13AU	15AU	130	32
							4005.0	P	3	0.013			13AU	14AU	14AU	132	37
050648	SPRING CRK NFH	BARGE BELOW BONN.	19MY80			99.6	C075.0S	B	15	0.016	37	0.038	22MY	25MY	04JN	97	26
	NMFS HOMING,TEST #1						C075.0M	P	25	0.026	58	0.059	22MY	23MY	27MY	94	39
							C016.0N	P	1	0.002			18JN	18JN	18JN	133	7
							4006.3S	P	1	0.002			29MY	29MY	29MY	85	22
							4006.2S	P	1	0.002			29MY	29MY	29MY	99	22
050649	SPRING CRK NFH	BARGE BELOW BONN.	19MY80			99.7	C075.0S	B	10	0.011	23	0.024	23MY	25MY	02JN	93	26
	NMFS HOMING,TEST #2						C075.0M	P	21	0.022	49	0.049	22MY	23MY	27MY	96	39
							4006.1N	P	1	0.002			29MY	29MY	29MY	92	22
							4004.1N	P	1	0.002			27MY	27MY	27MY	99	28
RA U 1	SPRING CRK NFH	PRESCOTT, COL. R.	08AP80	77		24.5	C075.0S	B	18	0.074	32	0.133	09AP	11AP	15AP	77	13
	SURVIVAL AND EFFICIENCY						C075.0M	P	2	0.009	5	0.021	09AP	13AP	14AP	110	8
RA U 3	SPRING CRK NFH	PRESCOTT, COL. R.	21AP80	79	84	26.7	C075.0S	B	35	0.132	56	0.210	23AP	25AP	16MY	83	10
	SURVIVAL AND EFFICIENCY						C016.0N	P	1	0.004			22MY	22MY	22MY	98	3
RA U 4	SPRING CRK NFH	PRESCOTT, COL. R.	21AP80	79	84	26.9	C075.0S	B	21	0.079	37	0.137	18AP	24AP	22MY	78	13
	SURVIVAL AND EFFICIENCY,HELD 4 DAY						C075.0M	P	7	0.027	12	0.046	22AP	22AP	03MY	99	40
							C016.0N	P	2	0.008			22MY	22MY	22MY	97	3
RP U 4	SPRING CRK NFH	PRESCOTT, COL. R.	19MY80		51	14.0	C075.0S	B	11	0.079	26	0.189	23MY	25MY	02JN	88	7
	SURVIVAL AND EFFICIENCY,HELD 4 DAY						C075.0M	P	1	0.008	3	0.021	21MY	21MY	21MY	95	20
							C016.0N	P	1	0.008			21MY	21MY	21MY	104	49
RP U 1	SPRING CRK NFH	RAINIER COL. R.	20MY80		51	27.0	C075.0S	B	35	0.130	74	0.276	23MY	26MY	05JN	90	6
	SURVIVAL AND EFFICIENCY						C075.0M	P	2	0.008	5	0.019	22MY	21MY	22MY	92	34
							C016.0N	P	1	0.004			23MY	23MY	23MY	95	31

SPECIES: CHINOOK-OS

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072055	STAYTON POND EVAL. STAYTON POND REAR.	VARIOUS WILLAM R.&	28AP80-21JN80		100	282.0	C075.0S	B	21	0.008	32	0.012	07MY	16MY	24JN	79	13
							C075.0M	P	36	0.013	70	0.025	06MY	20MY	30JN	90	10
							C016.0N	P	27	0.010			09MY	21MY	27JN	96	12
							4005.0	P	1	0.001			17JN	17JN	17JN	102	6
632153	WASHOUGAL STOCK EVAL.	WASHOUGAL R.	30JN80		80	319.2	C075.0S	B	591	0.186	982	0.308	02JL	18JL	15SE	82	8
							C075.0M	P	18	0.006	77	0.025	02JL	25JL	05SE	91	6
							C016.0N	P	27	0.009			09JL	15JL	19AU	81	14
							4005.0	P	6	0.002			13AU	13AU	14AU	102	5
LD U 1	WASHOUGAL SURVIVAL AND EFFICIENCY,HELD 4 DAY	PRESCOTT, COL. R.	13JL80	78		14.0	C075.0S	B	61	0.436	80	0.569	14JL	17JL	29JL	80	10
							C075.0M	P	3	0.022	7	0.053	14JL	14JL	15JL	85	40
							C016.0N	P	3	0.022			16JL	18JL	28JL	83	20
							4005.0	P	1	0.008			24JL	24JL	24JL	93	10
010203	WEYCO POND COL R. F. CHIN EVAL	GRAYS RIVER	10JN80		64	97.8	C016.0N	P	16	0.017			16JN	19JN	02JL	92	6
							4005.0	P	1	0.002			26JN	26JN	26JN	87	4
632157		NO RELEASE INFO					C016.0N	P	1	0.000			11JL	11JL	11JL	77	
BLNK TAG		NO RELEASE INFO					C075.0S	B	2	0.000			03MY	04MY	06MY	92	
LET GO		NO RELEASE INFO					C075.0S	B	1	0.000			25MY	25MY	25MY	80	
							C075.0S	B	1	0.000			06JN	06JN	06JN	83	
							C075.0S	B	7	0.000			09JL	09JL	09JL	76	
							C075.0S	B	1	0.000			09JL	09JL	09JL	77	
							C075.0S	B	33	0.000			09JL	09JL	12JL	76	
							C075.0S	B	1	0.000			12JL	12JL	12JL	80	
							C075.0S	B	20	0.000			12JL	16AU	26AU	93	
							C075.0M	P	9	0.000			09JL	09JL	10JL	89	
							4004.1N	P	1	0.000			27MY	27MY	27MY	100	
NO TAG		NO RELEASE INFO					C075.0S	B	179	0.000			14MR	15JN	22SE	72	
							C075.0M	P	18	0.000			12MY	09JL	05SE	115	
							C016.0N	P	23	0.000			13MY	14JL	26AU	87	
							4005.0	P	1	0.000			22AU	22AU	22AU	104	
RA IL 1		NO RELEASE INFO					C075.0M	P	1	0.000			16JL	16JL	16JL	85	
RD U 3		NO RELEASE INFO					C075.0M	P	1	0.000			06JN	06JN	06JN	145	

RELEASE AND RECAPTURE INFORMATION - COLUMBIA RIVER ESTUARY 1980

REPORT DATE 12/29/80

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

SPECIES: CHINOOK-1S

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 1ST FISH	MED. FISH	LAST FISH	AVG LEN MM	MVMT RATE KM/DAY
034202	BIG CREEK HOMING	BIG CREEK @ HAT	23MY80		70	43.9	C016.ON	P	3	0.007			16JN	20JN	23JN	100	1
034002	BIG CREEK HOMING	COL.R. @ ASTORIA	12MY80-19MY80		75	49.5	C016.ON	P	1	0.003			22MY	22MY	22MY	90	0
071735	BONNEVILLE STOCK EVAL.	TANNER CREEK	20ND79		12	51.2	C075.OS	B	4	0.008	7	0.014	24MR	23AP	17MY	100	0
							C075.OM	P	1	0.002	1	0.003	29AP	29AP	29AP	141	0
071914	BONNEVILLE STOCK EVAL.	TANNER CREEK	20ND79		9	48.7	C075.OS	B	3	0.007	15	0.031	10MR	10MR	31MR	147	0
							C016.ON	P	1	0.003			01MY	01MY	01MY	150	0
071733	BONNEVILLE	TANNER CREEK	13MR80		7	49.3	C075.OS	B	53	0.108	113	0.230	18MR	30MR	25AP	184	9
							C075.OM	P	17	0.035	45	0.092	02AP	18AP	25AP	182	4
							C016.ON	P	4	0.009			24AP	28AP	30AP	166	5
							4003.1S	P	1	0.003			30MY	30MY	30MY	223	3
071736	BONNEVILLE STOCK EVAL.	TANNER CREEK	13MR80		6	48.1	C075.OS	B	42	0.088	78	0.162	18MR	07AP	28AP	186	6
							C075.OM	P	10	0.021	29	0.062	17MR	08AP	30AP	181	6
							C016.ON	P	1	0.003			24AP	24AP	24AP	204	5
050437	CARSON CONTROL	CARSON HAT	28AP80		19	82.1	C075.OS	B	27	0.033	35	0.043	05MY	08MY	12MY	129	20
							C075.OM	P	11	0.014	19	0.023	02MY	07MY	12MY	130	22
							C016.ON	P	14	0.018			08MY	12MY	19MY	143	18
							4006.3S	P	1	0.002			29MY	29MY	29MY	169	9
050438	CARSON ERYTHROMYCIN AS EGGS	CARSON HAT	28AP80		19	88.8	C075.OS	B	25	0.029	31	0.035	06MY	08MY	10MY	136	20
							C075.OM	P	25	0.029	47	0.053	05MY	06MY	12MY	132	25
							C016.ON	P	12	0.014			06MY	13MY	21MY	129	17
							4003.1S	P	1	0.002			04JN	04JN	04JN	160	7
							4006.3N	P	1	0.002			29MY	29MY	29MY	166	9
035702	CARSON	CARSON	12MY80	117		37.5	C075.OM	P	2	0.006	7	0.019	19MY	19MY	19MY	119	28
*	CONTROL		LA S 2				C016.ON	P	3	0.009			20MY	20MY	21MY	117	32
LA S 2	CARSON	CARSON	12MY80	117		37.5	C075.OM	P	5	0.014	12	0.033	15MY	18MY	19MY	122	33
*	CONTROL		CWT 035702,				C016.ON	P	9	0.025			21MY	21MY	22MY	125	29
035802	CARSON	DALTON PT.	12MY80	117		36.3	C016.ON	P	1	0.003			20MY	20MY	20MY	121	24
*	TEST #1 SINGLE IMPRINT		RA L 1														
RA L 1	CARSON	DALTON PT.	12MY80	117		36.3	C075.OS	B	2	0.006	4	0.012	16MY	19MY	19MY	122	19
*	TEST #1 SINGLE IMPRINT		CWT 035802,				C075.OM	P	16	0.045	32	0.088	16MY	17MY	19MY	126	26
							C016.ON	P	16	0.045			19MY	21MY	21MY	125	21
035902	CARSON	DALTON PT.	14MY80	117		41.5	C075.OM	P	1	0.003	3	0.009	19MY	19MY	19MY	121	26
*	TEST #2 SEQUENTIAL IMPRINT		RA L 2				C016.ON	P	3	0.008			20MY	21MY	22MY	113	27
RA L 2	CARSON	DALTON PT.	14MY80	117		41.5	C075.OM	P	10	0.025	20	0.050	16MY	17MY	23MY	116	44
*	TEST #2 SEQUENTIAL IMPRINT		CWT 035902,				C016.ON	P	9	0.022			19MY	21MY	21MY	125	27
RA L 3	CARSON	HAMMOND	15MY80	117		43.2	C016.ON	P	1	0.003			19MY	19MY	19MY	133	-0
*	TEST #3 SEQUENTIAL IMPRINT		CWT 036002,														
631942	COWLITZ NFH COL. RIVER FALL CHIN EVAL	COWLITZ RIVER	27JN79-16OC79		85	143.6	C075.OS	B	9	0.007	21	0.015	10MR	15MR	30AP	90	0

SPECIES: CHINOOK-1S

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 1ST FISH	MED. FISH	LAST FISH	AVG LEN MM	MVMT RATE KM/DAY
631951	COWLITZ RIVER COL RIVER FALL	COWLITZ RIVER CHIN EVAL	27JN79-16OC79		19	11.1	C075.OS	B	6	0.055	21	0.194	10MR	11MR	24AP	115	0
							C075.OM	P	2	0.019	5	0.049	18AP	19AP	05MY	129	0
							C016.ON	P	1	0.010			05MY	05MY	05MY	139	0
LA KE 2	DESCHUTES R. STOCK EVAL	DESCHUTES RIVER	09MR80-13MR80 CWT 072152,	103		0.7	C075.OM	P	1	0.137	2	0.228	09MY	09MY	09MY	150	6
LA KE 3	DESCHUTES R. STOCK EVAL	DESCHUTES RIVER	19MR80-28MR80 CWT 072152,	104		0.7	C075.OM	P	1	0.135	2	0.239	16MY	16MY	16MY	150	7
RA 13 2	DESCHUTES R. STOCK EVAL	DESCHUTES RIVER.	28AP80-09MY80 CWT 071846,	124		0.0	C075.OM	P	1	3.449	2	6.186	10MY	10MY	10MY	140	27
050421	HAGERMAN NFH	ASOTIN-SNAKE R.	21MY79	75	92	46.0	C075.OS	B	1	0.003	2	0.004	26MR	26MR	26MR	214	1
102125	HAYDEN CREEK	LEMHI R.	01AP80-03AP80		26	40.1	C075.OM	P	2	0.005	4	0.012	05MY	05MY	05MY	123	33
							C016.ON	P	5	0.013			30AP	06MY	13MY	123	33
102126	HAYDEN CREEK	LEMHI R.	03AP80-04AP80		26	41.2	C075.OM	P	4	0.010	8	0.019	02MY	04MY	16MY	127	36
							C016.ON	P	2	0.005			16MY	16MY	16MY	123	27
							4005.1S	P	1	0.003			28MY	28MY	28MY	160	21
LP HE 1	JOHN D/DESCHUTE	BLALOCK/WRM SPR TR (TWO SOURCE	23SE79-01MY80			0.2	C016.ON	P	2	0.939			08MY	08MY	09MY	160	0
LA HE 3	JOHN D/DESCHUTE JOHN DAY EFFICIENCY/WM	BLALOCK SHORE/WM S SP RIVER EV 348 W	18MR80-11MY80 CWT 072149			0.6	C075.OM	P	1	0.159	2	0.265	09MY	09MY	09MY	125	6
							C016.ON	P	1	0.159			13MY	13MY	13MY	145	6
RA HE 1	JOHN D/DESCHUTE JOHN DAY EFFICIENCY/WM	BLALOCK SHORE/WM S SP RIVER EV 309 W	18AP80-25AP80 CWT 072149			1.0	C075.OM	P	1	0.105	1	0.153	08MY	08MY	08MY	130	15
RA HE 3	JOHN D/DESCHUTE JOHN DAY EFFICIENCY/SM	BLALOCK SHORE/WM S SP RIVER EV 932 W	08MY80-23MY80 CWT 072149			2.0	C016.ON	P	1	0.050			16MY	16MY	16MY	145	45
RP HE 3	JOHN DAY DAM EFFICIENCY REL	BLALOCK MIDRIV.	10MY80			0.4	C016.ON	P	1	0.224			16MY	16MY	16MY	150	60
RA SP 1	JOHN DAY DAM EFFICIENCY REL	BLALOCK SHORE	21MY80			0.4	C016.ON	P	1	0.249			06MY	06MY	06MY	132	-23
071940	JOHN DAY R. WILD STOCK EVAL.	JOHN DAY R. MFK	07JN79-01JL79		50	8.0	C075.OM	P	1	0.013	2	0.021	05JN	05JN	05JN	104	0
631957	KALAMA FALLS H COL RIVER FALL	KALAMA FALLS H CHIN EVAL	22JN79-13JL79		180	209.7	C075.OS	B	1	0.001	2	0.001	15AP	15AP	15AP	105	0
050532	Kooskia NFH	Kooskia H	16AP80		22	61.3	C075.OM	P	14	0.023	27	0.044	29AP	04MY	23MY	123	44

SPECIES: CHINOOK-1S

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	PURPOSE OF RELEASE		OTHER MARKS														
050532	KOOSKIA NFH	KOOSKIA NFH	16AP80		22	61.3	C016.ON	P	5	0.009			01MY	06MY	06MY	121	42
050529	KOOSKIA NFH	BELOW BONN.DAM	23AP80-05MY80		22	62.3	C075.OS	B	8	0.013	10	0.017	06MY	07MY	09MY	128	11
	NMFS BARGE TRANSPORT STUDY						C075.OM	P	18	0.029	34	0.055	28AP	05MY	10MY	125	13
							C016.ON	P	18	0.029			02MY	08MY	20MY	125	14
LA P 1	L.GOOSE DAM	TEXAS RAPIDS LANDI	24AP80-02MY80			11.6	C075.OM	P	5	0.044	10	0.084	05MY	09MY	03JN	128	37
*	TAILRACE CONTROL		CWT ER				C016.ON	P	6	0.052			06MY	13MY	13MY	122	32
LA P 2	L.GOOSE DAM	TEXAS RAPIDS LANDI	06MY80-15MY80			6.6	C075.OM	P	3	0.046	5	0.083	10MY	16MY	23MY	115	55
*	TAILRACE CONTROL		CWT ER				C016.ON	P	1	0.016			13MY	13MY	13MY	121	87
LA P 3	L.GOOSE DAM	TEXAS RAPIDS LANDI	17MY80-30MY80			3.7	C075.OM	P	1	0.028	1	0.041	06JN	06JN	06JN	115	28
*	TAILRACE CONTROL		CWT ER														
LD IL 2	LEAVENWORTH	METHOW R. MOUTH	05MY80			15.0	C075.OM	P	5	0.034	9	0.057	27MY	05JN	11JN	145	25
	SYSTEMS TEST																
RD IL 2	LEAVENWORTH	METHOW R. MOUTH	05MY80			13.9	C075.OM	P	2	0.015	3	0.022	09JN	09JN	10JN	152	22
	SYSTEMS TEST																
LD F 1	LEAVENWORTH	METHOW R. MOUTH	10MY80			16.4	C075.OM	P	6	0.037	10	0.059	28MY	10JN	11JN	143	25
	SYSTEMS TEST																
RD F 1	LEAVENWORTH	METHOW R. MOUTH	10MY80			15.3	C075.OM	P	2	0.014	3	0.022	28MY	29MY	06JN	160	40
	SYSTEMS TEST																
LD IY 3	LEAVENWORTH	METHOW R. MOUTH	13MY80			15.3	C075.OM	P	7	0.046	13	0.088	28MY	11JN	14JN	146	26
	SYSTEMS TEST																
RD IY 3	LEAVENWORTH	METHOW R. MOUTH	13MY80			13.4	C075.OM	P	1	0.008	1	0.012	06JN	06JN	06JN	160	32
	SYSTEMS TEST																
036102	LEAVENWORTH	ICICLE RIVER @ HAT	24AP80-01MY80	129		96.6	C075.OM	P	1	0.002	2	0.002	12JN	12JN	12JN	155	15
*	HOMING,FALL CONTROL		LA PP 2				4007.1S	P	1	0.002			06JN	06JN	06JN	158	18
LA PI 1	LEAVENWORTH	ICICLE RIVER @ HAT	24AP80	129		32.8	C075.OM	P	4	0.013	10	0.030	16MY	20MY	27MY	125	27
*	HOMING,SPRING CONTROL		CWT 034602,				C016.ON	P	2	0.007			16MY	16MY	19MY	128	35
LA PP 2	LEAVENWORTH	ICICLE RIVER @ HAT	24AP80-01MY80	129		96.6	C075.OM	P	15	0.016	29	0.030	23MY	29MY	11JN	138	20
*	HOMING,FALL CONTROL		CWT 036102,				C016.ON	P	2	0.003			13MY	13MY	16MY	147	41
							4006.3S	P	1	0.002			29MY	29MY	29MY	135	22
							4006.3N	P	1	0.002			29MY	29MY	29MY	127	22
							4006.1S	P	1	0.002			29MY	29MY	29MY	142	22
LA PI 2	LEAVENWORTH	ICICLE RIVER @ HAT	27AP80	129		32.9	C075.OM	P	6	0.019	13	0.041	16MY	27MY	03JN	141	24
*	HOMING,SPRING CONTROL		CWT 034702,				C016.ON	P	1	0.004			16MY	16MY	16MY	150	41
LA PI 4	LEAVENWORTH	ICICLE RIVER @ HAT	01MY80			33.1	C075.OM	P	4	0.013	8	0.025	23MY	28MY	05JN	147	26
*	HOMING,SPRING CONTROL		CWT 035102,														
LD IL 3	LEAVENWORTH	PRIEST RAPIDS T.R.	20MY80			15.2	C075.OM	P	5	0.033	9	0.062	29MY	03JN	06JN	142	40
	SYSTEMS TEST																
RD IL 3	LEAVENWORTH	PRIEST RAPIDS T.R.	20MY80			14.8	C075.OS	B	1	0.007	1	0.008	27JN	27JN	27JN	180	15
	SYSTEMS TEST						C075.OM	P	3	0.021	7	0.047	27MY	29MY	03JN	120	62
LD F 2	LEAVENWORTH	PRIEST RAPIDS T.R.	22MY80			16.2	C075.OM	P	3	0.019	6	0.036	02JN	04JN	06JN	148	43
	SYSTEMS TEST																
RD F 2	LEAVENWORTH	PRIEST RAPIDS T.R.	22MY80			15.5	C075.OM	P	13	0.084	22	0.140	02JN	05JN	10JN	147	40
	SYSTEMS TEST																

SPECIES: CHINOOK-1S

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.	%	RECAPTURES ADJUSTED NO.	%	RECAPTURE DATE 1ST FISH	MED. FISH	LAST FISH	AVG LEN MM	MVMT RATE KM/DAY
LD IY 2	LEAVENWORTH SYSTEMS TEST	PRIEST RAPIDS T.R.	27MY80		15.3	C075.0M	P	16	0.105	25	0.162	05JN	07JN	11JN	139	51
RD IY 2	LEAVENWORTH SYSTEMS TEST	PRIEST RAPIDS T.R.	27MY80		13.2	C075.0M	P	7	0.053	11	0.082	05JN	06JN	07JN	147	56
034902	LEAVENWORTH	WHITE BLUFFS	24AP80	129	32.6	C016.0N	P	1	0.004			13MY	13MY	13MY	135	31
*	HOMING,CHANNEL	MIGRANTS TEST #1	LA PP 1			4005.1S	P	1	0.004			28MY	28MY	28MY	131	17
035002	LEAVENWORTH	WHITE BLUFFS	24AP80	129	35.4	C075.0M	P	1	0.003	2	0.005	15MY	15MY	15MY	131	25
*	HOMING,CHANNEL	MIGRANTS TEST #1	LA S 1			C016.0N	P	1	0.003			13MY	13MY	13MY	166	31
LA PP 1	LEAVENWORTH	WHITE BLUFFS	24AP80	129	32.6	C075.0M	P	13	0.040	26	0.079	08MY	17MY	28MY	140	23
*	HOMING,CHANNEL	MIGRANTS TEST #1	CWT 034902,			C016.0N	P	5	0.016			06MY	13MY	16MY	140	31
						4005.3S	P	1	0.004			28MY	28MY	28MY	162	17
LA S 1	LEAVENWORTH	WHITE BLUFFS	24AP80	129	35.4	C075.0M	P	15	0.043	28	0.078	09MY	16MY	11JN	145	24
*	HOMING,CHANNEL	MIGRANTS TEST #1	CWT 035002,			C016.0N	P	10	0.029			09MY	13MY	16MY	133	31
						4005.3N	P	1	0.003			28MY	28MY	28MY	120	17
LA PI 3	LEAVENWORTH	WHITE BLUFFS	01MY80		32.0	C075.0M	P	12	0.038	29	0.090	16MY	22MY	28MY	138	25
*	HOMING,CHANNEL	MIGRANTS TEST #1	CWT 034802,													
LD IL 1	LEAVENWORTH SYSTEMS TEST	RICHLAND	22MY80		15.9	C075.0M	P	4	0.026	10	0.064	27MY	30MY	06JN	141	58
RD IL 1	LEAVENWORTH SYSTEMS TEST	RICHLAND	22MY80		13.7	C075.0M	P	6	0.044	10	0.077	27MY	05JN	07JN	143	33
						4008.2S	P	1	0.008			05JN	05JN	05JN	153	38
LD F 3	LEAVENWORTH SYSTEMS TEST	RICHLAND	26MY80		16.3	C075.0M	P	6	0.037	10	0.065	02JN	05JN	06JN	148	47
RD F 3	LEAVENWORTH SYSTEMS TEST	RICHLAND	26MY80		15.8	C075.0M	P	8	0.051	13	0.081	05JN	05JN	06JN	143	47
LD IY 1	LEAVENWORTH SYSTEMS TEST	RICHLAND	29MY80		15.4	C075.0M	P	10	0.065	15	0.098	06JN	06JN	10JN	141	58
						C016.0N	P	1	0.007			20JN	20JN	20JN	150	24
RD IY 1	LEAVENWORTH SYSTEMS TEST	RICHLAND	29MY80		13.9	C075.0M	P	6	0.044	9	0.067	05JN	07JN	09JN	143	52
034302	LEAVENWORTH	DALTON PT.	24AP80	129	32.4	C016.0N	P	1	0.004			02MY	02MY	02MY	132	16
*	HOMING;PEN HOLDING TEST #3		RA 9 1													
RA 9 1	LEAVENWORTH	DALTON PT.	24AP80	129	32.4	C075.0S	B	5	0.016	7	0.021	29AP	05MY	08MY	135	12
*	HOMING;PEN HOLDING TEST #3		CWT 034302,			C075.0M	P	9	0.028	16	0.051	28AP	02MY	10MY	126	16
						C016.0N	P	5	0.016			07MY	09MY	19MY	133	13
RA IK 1	LEAVENWORTH	DALTON PT.	24AP80	129	33.0	C075.0S	B	8	0.025	12	0.036	01MY	05MY	07MY	133	12
*	HOMING,CHANNEL	MIGRANTS TEST #2	CWT 035202,			C075.0M	P	14	0.043	27	0.082	02MY	05MY	10MY	123	12
						C016.0N	P	12	0.037			05MY	07MY	16MY	124	15
RA 9 2	LEAVENWORTH	DALTON PT.	27AP80	129	32.7	C075.0S	B	9	0.028	14	0.043	01MY	04MY	09MY	138	19
*	HOMING,PEN HOLDING TEST #3		CWT 034402,			C075.0M	P	6	0.019	12	0.036	30AP	04MY	05MY	134	19
						C016.0N	P	4	0.013			06MY	08MY	12MY	140	17
RA IK 2	LEAVENWORTH	DALTON PT.	27AP80		32.8	C075.0S	B	23	0.071	33	0.102	03MY	06MY	08MY	128	15
*	HOMING,CHANNEL	MIGRANTS TEST #2	CWT 035302,			C075.0M	P	6	0.019	10	0.032	05MY	09MY	12MY	135	11
						C016.0N	P	7	0.022			05MY	07MY	13MY	133	19
035402	LEAVENWORTH	DALTON PT.	01MY80		32.6	C075.0M	P	2	0.007	4	0.013	05MY	05MY	06MY	138	33
*	HOMING,CHANNEL	MIGRANTS TEST #2	RA IK 3													
RA 9 3	LEAVENWORTH	DALTON PT.	01MY80		32.5	C075.0S	B	18	0.056	24	0.074	05MY	07MY	10MY	131	22
*	HOMING,PEN HOLDING TEST #3		CWT 034502,			C075.0M	P	9	0.028	18	0.056	05MY	05MY	08MY	131	33

SPECIES: CHINOOK-1S

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 1ST FISH	MED. FISH	LAST FISH	AVG LEN MM	MVMT RATE KM/DAY
	PURPOSE OF RELEASE		OTHER MARKS														
							C016.0N	P	6	0.019			05MY	06MY	16MY	134	38
RA IK 3	LEAVENWORTH	DALTON PT.	01MY80			32.6	C075.0S	B	24	0.074	31	0.095	05MY	07MY	12MY	133	22
*	HOMING,CHANNEL	MIGRANTS TEST #2	CWT 035402,				C075.0M	P	8	0.025	17	0.053	05MY	06MY	19MY	127	26
							C016.0N	P	7	0.022			08MY	09MY	21MY	133	24
							4006.3S	P	1	0.004			29MY	29MY	29MY	156	7
631920	LEWIS R. NFH	LEWIS R. @ HAT	05SE79	28		51.7	C075.0S	B	1	0.002	2	0.005	28AP	27AP	28AP	115	0
	COL. R. F. CH.	EVAL REARED 3 MONTH															
010105	LEWIS R. WILD	LEWIS RIVER	15MY79-30MY79	300		29.8	C075.0M	P	1	0.004	2	0.006	17JN	17JN	17JN	69	0
	WILDSTOCK SEINED TAG REL IN RIVER																
631910	LEWIS R. WILD	LEWIS RIVER	25MY79-08JN79	250		30.7	C075.0S	B	1	0.004	1	0.004	23AP	23AP	23AP	117	0
	WILDSTOCK SEINED TAG REL. IN RIVER																
631859	LEWIS R. WILD	LEWIS RIVER	13JL79-26JL79	200		23.4	C075.0S	B	2	0.009	5	0.022	17MR	17MR	29AP	110	0
	WILDSTOCK SEINED TAG REL. IN RIVER						4003.1S	P	1	0.005			30MY	30MY	30MY	160	0
LA IS 1	LO.GRANITE DAM	CLARKSTON	09AP80-18AP80			5.7	C075.0S	B	1	0.018	1	0.025	24AP	24AP	24AP	105	44
	FOREBAY RELEASE						C075.0M	P	1	0.018	1	0.027	29AP	29AP	29AP	110	33
LA IS 2	LO.GRANITE DAM	CLARKSTON	21AP80-06MY80			15.0	C075.0M	P	3	0.020	5	0.033	10MY	15MY	05JN	110	28
	FOREBAY RELEASE						C016.0N	P	1	0.007			13MY	13MY	13MY	132	33
LA 1S 3	LO.GRANITE DAM	CLARKSTON	09MY80-16MY80			3.0	C075.0M	P	1	0.033	2	0.079	03JN	03JN	03JN	150	27
	FOREBAY RELEASE						C016.0N	P	1	0.033			16MY	16MY	16MY	140	103
LA 1S 4	LO.GRANITE DAM	CLARKSTON	23MY80-02JN80			5.4	C075.0M	P	4	0.075	6	0.112	06JN	07JN	09JN	123	44
	FOREBAY RELEASE																
RA W 1	LO.GRANITE DAM	BEACON ROCK	20AP80-29AP80			16.2	C075.0M	P	12	0.074	22	0.136	25AP	28AP	06MY	115	19
*	BARGE RELEASE		CWT HOPR				C016.0N	P	4	0.025			30AP	01MY	07MY	125	19
RA W 2	LO.GRANITE DAM	BEACON ROCK	01MY80-10MY80			24.5	C075.0M	P	3	0.013	6	0.026	08MY	18MY	19MY	100	9
*	BARGE RELEASE		CWT'S 11191 HOPR, DYPR				C016.0N	P	6	0.025			08MY	09MY	20MY	121	26
RA 2C 1	LO.GRANITE DAM	DALTON POINT	08AP80-22AP80			11.9	C075.0S	B	1	0.009	1	0.011	23AP	23AP	23AP	110	9
*	TRUCK TRANSPORT #1		CWT CETB				C075.0M	P	1	0.009	2	0.021	25AP	25AP	25AP	105	8
RA 3L 1	LO.GRANITE DAM	DALTON POINT	08AP80-22AP80			12.1	C075.0M	P	1	0.009	2	0.020	25AP	25AP	25AP	135	8
*	TRUCK TRANSPORT #2		CWT ND				C016.0N	P	2	0.017			25AP	25AP	30AP	114	11
RA 3T 1	LO.GRANITE DAM	DALTON POINT	08AP80-22AP80			14.7	C075.0M	P	2	0.014	4	0.028	22AP	24AP	25AP	115	8
*	TRUCK TRANSPORT		CWT PRTB														
RA 2J 1	LO.GRANITE DAM	DALTON POINT	09AP80-22AP80			12.6	C075.0M	P	5	0.040	8	0.063	23AP	24AP	05MY	125	9
*	TRUCK TRANSPORT #3		CWT LAPR				C016.0N	P	1	0.008			28AP	28AP	28AP	115	10
RA 2C 3	LO.GRANITE DAM	DALTON POINT	23AP80-30AP80			11.8	C016.0N	P	1	0.009			05MY	05MY	05MY	135	16
*	TRUCK TRANSPORT #1		CWT CETB														
RA 2J 3	LO.GRANITE DAM	DALTON POINT	23AP80-30AP80			13.8	C075.0M	P	5	0.037	9	0.063	30AP	02MY	03MY	133	15
*	TRUCK TRANSPORT #3		CWT LAPR				C016.0N	P	5	0.037			28AP	01MY	01MY	125	24
RA 3L 3	LO.GRANITE DAM	DALTON POINT	23AP80-30AP80			14.4	C016.0N	P	2	0.014			30AP	30AP	01MY	135	27
*	TRUCK TRANSPORT #2		CWT ND														
RA 3T 3	LO.GRANITE DAM	DALTON POINT	23AP80-30AP80			15.1	C075.0M	P	2	0.014	4	0.026	28AP	29AP	01MY	107	22
*	TRUCK TRANSPORT		CWT PRTB				C016.0N	P	4	0.027			05MY	06MY	06MY	137	15

SPECIES: CHINOOK-1S

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.	ACTUAL %	ADJUSTED NO.	ADJUSTED %	RECAPTURE DATE 1ST FISH	MED. FISH	LAST FISH	AVG LEN MM	MVMT RATE KM/DAY
072049	MCKENZIE	MCKENZIE HATCHERY	09NO79		6	31.6	C075.0S	B	1	0.004	3	0.009	28MR	28MR	28MR	165	1
	GRADING AND PRODUCTION																
072050	MCKENZIE	MCKENZIE HATCHERY	09NO79		7	28.4	C075.0S	B	1	0.004	4	0.015	12MR	12MR	12MR	175	1
	GRADING AND PRODUCTION						C075.0M	P	1	0.004	2	0.008	15AP	15AP	15AP	140	1
072052	MCKENZIE	MCKENZIE HATCHERY	09NO79		15	33.8	C075.0S	B	3	0.009	8	0.023	20MR	30MR	07AP	140	1
	GRADING AND PRODUCTION																
072048	MCKENZIE	MCKENZIE HATCHERY	15MR80		3	31.1	C075.0S	B	2	0.007	6	0.018	24MR	24MR	24MR	176	52
	GRADING AND PRODUCTION						C075.0M	P	16	0.052	42	0.135	01AP	12AP	19MY	225	15
072051	MCKENZIE	MCKENZIE HATCHERY	15MR80		4	29.4	C075.0S	B	3	0.011	4	0.016	15AP	17AP	22AP	225	13
	GRADING AND PRODUCTION						C075.0M	P	10	0.034	28	0.096	01AP	13AP	03MY	223	14
							C016.0N	P	1	0.004			18AP	18AP	18AP	206	14
072053	MCKENZIE	MCKENZIE HATCHERY	15MR80		11	34.9	C075.0S	B	2	0.006	3	0.008	16AP	17AP	01MY	212	13
	GRADING AND PRODUCTION						C075.0M	P	11	0.032	25	0.071	09AP	19AP	03MY	161	12
							C016.0N	P	2	0.006			06MY	06MY	06MY	162	9
++++++++																	
LD IM 1	MCNARY DAM	PORT KELLY (OR.)	01MY80			0.6	C075.0M	P	1	0.157	2	0.261	09MY	09MY	09MY	140	53
	EFFICIENCY REL																
LD IM 2	MCNARY DAM	PORT KELLY (OR.)	05MY80			1.5	C075.0M	P	1	0.067	2	0.119	10MY	10MY	10MY	150	85
	EFFICIENCY REL						C016.0N	P	1	0.067			13MY	13MY	13MY	144	61
LD 3 1	MCNARY DAM	PORT KELLY (OR.)	06MY80			1.9	C075.0M	P	3	0.160	4	0.221	13MY	14MY	14MY	135	53
	EFFICIENCY REL						C016.0N	P	1	0.054			13MY	13MY	13MY	152	69
LD 3 2	MCNARY DAM	PORT KELLY (WA.)	07MY80			1.9	C075.0M	P	2	0.107	5	0.281	19MY	20MY	23MY	121	33
	EFFICIENCY REL																
LD 3 3	MCNARY DAM	PORT KELLY (OR.)	08MY80			1.4	C075.0M	P	1	0.071	2	0.125	16MY	16MY	16MY	137	53
	EFFICIENCY REL																
LD 3 4	MCNARY DAM	PORT KELLY (WA.)	09MY80			1.9	C075.0M	P	1	0.054	3	0.180	19MY	19MY	19MY	125	43
	EFFICIENCY REL																
LA 2X 4	MCNARY DAM	PORT KELLY (OR.)	15MY80			1.4	C075.0M	P	1	0.070	2	0.132	23MY	23MY	23MY	140	53
	EFFICIENCY REL																
LA ID 3	MCNARY DAM	PORT KELLY (WA.)	20MY80			1.4	C075.0M	P	3	0.221	6	0.475	27MY	27MY	28MY	126	61
	EFFICIENCY REL																
LA ID 4	MCNARY DAM	PORT KELLY (OR.)	21MY80-22MY80			1.9	C075.0M	P	2	0.108	4	0.193	28MY	28MY	28MY	115	61
	EFFICIENCY REL																
LA 5 1	MCNARY DAM	PORT KELLY (WA.)	23MY80			1.6	C075.0M	P	4	0.248	9	0.534	27MY	27MY	29MY	137	107
	EFFICIENCY REL																
LA 5 3	MCNARY DAM	PORT KELLY (WA.)	28MY80			1.2	C016.0N	P	1	0.087			21MY	21MY	21MY	147	-68
	EFFICIENCY REL																
LA 5 4	MCNARY DAM	PORT KELLY (OR.)	29MY80			1.1	C075.0M	P	1	0.096	2	0.158	05JN	05JN	05JN	135	61
	EFFICIENCY REL																
LA H 1	MCNARY DAM	MCNARY TAILRACE	08AP80-12MY80			32.5	C075.0M	P	25	0.077	48	0.150	25AP	06MY	19MY	132	14
*	TAILRACE CONTROL		CWT ERLA				C016.0N	P	7	0.022			06MY	13MY	21MY	158	13
							4009.2S	P	1	0.004			04JN	04JN	04JN	132	8
LA H 2	MCNARY DAM	MCNARY TAILRACE	14MY80-09JN80			14.1	C075.0M	P	7	0.050	15	0.106	23MY	27MY	03JN	132	30
*	TAILRACE CONTROL		CWT CEND				4007.1S	P	2	0.015			06JN	06JN	06JN	162	20
							4006.3S	P	2	0.015			29MY	29MY	29MY	135	30

SPECIES: CHINOOK-1S

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 1ST FISH	RECAPTURE DATE MED. FISH	RECAPTURE DATE LAST FISH	AVG LEN MM	MVMT RATE KM/DAY
RA 2 1	MCNARY DAM	BELOW BONNEVILLE	22AP80-18MY80			32.4	C075.0M	P	20	0.062	45	0.138	25AP	28AP	19MY	148	26
*	BARGE TRANSPORT		CWT ERPR				C016.0N	P	11	0.034			01MY	12MY	22MY	125	11
							4005.4S	P	1	0.004			07JN	07JN	07JN	200	5
RA 2 2	MCNARY DAM	BELOW BONNEVILLE	21MY80-30MY80			11.6	C075.0S	B	1	0.009	3	0.025	24MY	24MY	24MY	160	52
*	BARGE TRANSPORT		CWT LATB				C016.0N	P	1	0.009			21MY	21MY	21MY	110	214
							4005.3S	P	1	0.009			28MY	28MY	28MY	151	32
NDSM	MCNARY DAM	DALTON POINT	09AP80-12MY80			33.6	4004.1S	P	1	0.003			07JL	07JL	07JL	245	2
*	TRUCK TRANSPORT		RA V 1														
RA V 1	MCNARY DAM	DALTON POINT	09AP80-12MY80			33.6	C075.0S	B	4	0.012	8	0.023	21AP	21AP	22AP	153	11
*	TRUCK TRANSPORT		CWT NDSM				C075.0M	P	34	0.102	71	0.211	17AP	22AP	05JN	162	10
							C016.0N	P	7	0.021			21AP	06MY	16MY	140	7
							4003.1S	P	1	0.003			06JL	06JL	06JL	245	2
RA V 2	MCNARY DAM	DALTON POINT	14MY80-13JN80			7.3	C075.0M	P	22	0.302	42	0.572	23MY	23MY	23MY	138	15
*	TRUCK TRANSPORT		CWT DY				4003.2S	P	1	0.014			30MY	30MY	30MY	160	13
071943	OAK RIDGE H	S. SANTIAM,FOSTER	07NO79		9	32.0	C075.0S	B	4	0.013	9	0.028	26MR	28MR	28MR	155	0
	LOCATION TIME & SIZE OF RELEASE						C075.0M	P	1	0.004	1	0.005	23AP	23AP	23AP	166	0
071944	OAK RIDGE H	BELOW WILLAM. FALL	08NO79		10	34.8	C075.0S	B	2	0.006	4	0.013	03AP	04AP	04AP	142	0
	LOCATION TIME & SIZE OF RELEASE						C075.0M	P	2	0.006	7	0.021	03AP	04AP	04AP	152	0
072041	OAKRIDGE H	WILLAM @ DEXTER	05NO79		29	30.8	C075.0S	B	2	0.007	4	0.014	19MR	20MR	25MR	131	1
	GRADING AND PRODUCTION						C016.0N	P	1	0.004			25AP	25AP	25AP	139	1
072043	OAKRIDGE H	WILLAM @ DEXTER	05NO79		16	31.3	C075.0S	B	4	0.013	11	0.036	12MR	18MR	28MR	149	1
	GRADING AND PRODUCTION						C075.0M	P	1	0.004	2	0.006	09AP	09AP	09AP	170	1
072045	OAKRIDGE H	WILLAM @ DEXTER	05NO79		14	30.9	C075.0S	B	3	0.010	8	0.028	14MR	15MR	08AP	141	1
	GRADING AND PRODUCTION						C075.0M	P	3	0.010	7	0.022	08AP	13AP	23AP	150	1
072047	OAKRIDGE H	WILLAM @ DEXTER	05NO79		9	31.3	C075.0S	B	2	0.007	3	0.011	25MR	26MR	02AP	151	1
	GRADING AND PRODUCTION																
072040	OAKRIDGE H	WILLAM @ DEXTER	10MR80-11MR80		16	30.9	C075.0S	B	3	0.010	7	0.023	20MR	27MR	14AP	170	24
	GRADING AND PRODUCTION						C075.0M	P	15	0.049	34	0.111	07AP	16AP	24AP	163	11
							C016.0N	P	2	0.007			23AP	23AP	24AP	166	11
072042	OAKRIDGE H	WILLAM @ DEXTER	10MR80-11MR80		9	30.7	C075.0S	B	5	0.017	9	0.029	19MR	27MR	15AP	190	24
	GRADING AND PRODUCTION						C075.0M	P	15	0.049	36	0.119	02AP	14AP	22AP	172	12
							C016.0N	P	4	0.014			18AP	18AP	18AP	158	12
							4005.3S	P	1	0.004			07JN	07JN	07JN	215	5
072044	OAKRIDGE H	WILLAM @ DEXTER	10MR80		8	30.7	C075.0S	B	7	0.023	14	0.047	21MR	06AP	29AP	195	15
	GRADING AND PRODUCTION						C075.0M	P	18	0.059	47	0.155	31MR	15AP	28AP	184	12
072046	OAKRIDGE H	WILLAM @ DEXTER	10MR80		4	29.0	C075.0S	B	7	0.025	17	0.060	19MR	30MR	07AP	195	21
	GRADING AND PRODUCTION						C075.0M	P	8	0.028	25	0.085	26MR	10AP	17AP	217	13
							C016.0N	P	1	0.004			18AP	18AP	18AP	171	12
							4006.4S	P	1	0.004			29MY	29MY	29MY	276	6
632017	PRIEST RAPIDS	PRIEST RAPIDS	28JN79		77	82.2	C075.0M	P	1	0.002	1	0.002	23AP	23AP	23AP	157	1
	COL RIVER FALL CHIN EVAL																

SPECIES: CHINOOK-1S

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 1ST FISH	MED. FISH	LAST FISH	AVG LEN MM	MVMT RATE KM/DAY
102113	RAPID RIVER HAT	RAPID RIVER	05N079-28AP80		14	39.2	C016.ON	P	1	0.003			16MY	16MY	16MY	133	1
*			LA IU 1														
102114	RAPID RIVER HAT	RAPID RIVER	05N079-28AP80		14	43.2	C075.OM	P	1	0.003	2	0.005	06MY	06MY	06MY	142	1
*			LA IU 1				C016.ON	P	5	0.012			28AP	06MY	16MY	146	1
LA IU 1	RAPID RIVER HAT	RAPID RIVER	05N079-10AP80			61.0	C075.OM	P	10	0.017	19	0.031	25AP	29AP	09MY	146	1
*			CWT'S 102113, & 102114				C016.ON	P	3	0.005			28AP	02MY	06MY	125	1
RA IU 1	RAPID RIVER HAT	RAPID RIVER	15AP80		14	10.3	C075.OM	P	9	0.088	16	0.154	25AP	08MY	05JN	144	38
	MIGRATION HOMING CONTROL						C016.ON	P	1	0.010			05MY	05MY	05MY	130	47
LA IU 3	RAPID RIVER HAT	TRUCK BELOW BONN	09AP80-15AP80		14	39.2	C075.OS	B	9	0.023	15	0.039	17AP	21AP	01MY	132	13
*	MIGRATION HOMING TRANSPORT		Cwt 102115				C075.OM	P	7	0.018	14	0.035	21AP	30AP	06MY	140	7
							C016.ON	P	10	0.026			30AP	06MY	09MY	145	8
							4005.1S	P	1	0.003			28MY	28MY	28MY	157	5
102112	RED RIVER	S. FORK CLEAR	25SE79-27SE79			43.8	C075.OS	B	1	0.003	1	0.003	06JN	06JN	06JN	126	1
							C075.OM	P	5	0.012	9	0.022	03MY	17MY	09JN	125	1
							C016.ON	P	7	0.016			05MY	06MY	16MY	115	1
							4005.3S	P	1	0.003			07JN	07JN	07JN	137	1
072153	ROUND BUTTE	DESCHUTES R.	01MY80-30JN80		20	3.5	C075.OM	P	2	0.057	4	0.108	12JN	13JN	13JN	135	10
							4008.2N	P	1	0.029			05JN	05JN	05JN	131	14
071949	ROUND BUTTE	DESCHUTES R.	14AP80		8	28.2	C075.OM	P	15	0.054	27	0.096	22AP	29AP	16MY	181	29
	HATCHERY EVAL.						C016.ON	P	13	0.047			02MY	06MY	09MY	163	22
071950	ROUND BUTTE	DESCHUTES R.	14AP80		8	30.0	C075.OM	P	8	0.030	19	0.070	23AP	29AP	07MY	162	29
	HATCHERY EVAL.						C016.ON	P	11	0.037			02MY	06MY	06MY	165	22
071951	ROUND BUTTE	DESCHUTES R.	14AP80-15AP80		8	29.1	C075.OM	P	7	0.025	13	0.043	25AP	06MY	10MY	177	20
	HATCHERY EVAL.						C016.ON	P	11	0.038			02MY	06MY	08MY	167	22
072020	S. SANTIAM	S. SANTIAM,FOSTER	05N079-06N079		9	33.0	C075.OM	P	2	0.007	4	0.013	15AP	15AP	15AP	163	0
	LOCATION TIME & SIZE OF RELEASE																
072021	S. SANTIAM	S. SANTIAM,FOSTER	05N079-06N079		9	34.8	C075.OM	P	1	0.003	2	0.007	21AP	20AP	21AP	187	0
	LOCATION TIME & SIZE OF RELEASE																
072022	S. SANTIAM	S. SANTIAM,FOSTER	05N079-06N079		10	34.2	C075.OM	P	1	0.003	2	0.005	22AP	22AP	22AP	223	0
	LOCATION TIME & SIZE OF RELEASE																
071945	S. SANTIAM	S. SANTIAM,FOSTER	14MR80		6	29.4	C075.OS	B	8	0.028	20	0.068	20MR	23MR	03AP	208	38
	LOCATION TIME & SIZE OF RELEASE						C075.OM	P	15	0.051	42	0.144	26MR	11AP	23AP	208	12
							C016.ON	P	2	0.007			18AP	18AP	23AP	172	11
071946	S. SANTIAM	S. SANTIAM,FOSTER	14MR80		5	29.9	C075.OS	B	7	0.024	16	0.055	21MR	25MR	10AP	216	31
	LOCATION TIME & SIZE OF RELEASE						C075.OM	P	12	0.041	30	0.102	28MR	14AP	17AP	177	11
							C016.ON	P	1	0.004			18AP	18AP	18AP	227	11
072018	S. SANTIAM	BELOW WILLAM FALLS	05N079-06N079		9	34.8	C075.OS	B	2	0.006	4	0.011	19MR	20MR	08AP	137	0
	LOCATION TIME & SIZE OF RELEASE						C075.OM	P	1	0.003	3	0.009	18AP	18AP	18AP	131	0
072019	S. SANTIAM	BELOW WILLAM FALLS	05N079-06N079		8	35.0	C075.OS	B	3	0.009	5	0.014	26MR	27MR	10AP	152	0
	LOCATION TIME & SIZE OF RELEASE						C075.OM	P	1	0.003	3	0.010	07AP	06AP	07AP	132	0
071947	S. SANTIAM	BELOW WILLAM FALLS	13MR80-14MR80		6	32.1	C075.OS	B	20	0.063	43	0.135	18MR	31MR	21AP	211	7
	LOCATION TIME & SIZE OF RELEASE						C075.OM	P	16	0.050	39	0.121	01AP	11AP	21AP	197	4
							C016.ON	P	1	0.004			30AP	30AP	30AP	184	4

SPECIES: CHINOOK-1S

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 1ST FISH	RECAPTURE DATE MED. FISH	RECAPTURE DATE LAST FISH	AVG LEN MM	MVMT RATE KM/DAY
071948	S. SANTIAM	BELOW WILLAM FALLS	13MR80-14MR80		6	28.5	C075.0S	B	22	0.078	55	0.193	17MR	20MR	22AP	201	19
	LOCATION TIME & SIZE OF RELEASE						C075.0M	P	8	0.029	27	0.094	19MR	03AP	17MY	220	6
							C016.0N	P	1	0.004			19MY	19MY	19MY	280	3
							4010.1N	P	1	0.004			03JN	03JN	03JN	200	2
							4008.1S	P	1	0.004			05JN	05JN	05JN	240	2
631854	TOUTLE RIVER	GREEN RIVER @ HAT	17JN79		160	144.1	C075.0S	B	1	0.001	5	0.004	14MR	14MR	14MR	110	0
	COL. RIVER FALL CHIN EVAL,CONBINED with 631941																
631941	TOUTLE RIVER	GREEN RIVER @ HAT	17JN79		160	144.1	C075.0S	B	1	0.001	3	0.003	21MR	21MR	21MR	100	0
	COL. R. F. CH. EVAL COMBINED W 631854																
050627	WARM SPRING NFH	WARM SPRINGS HAT.	07AP80-14AP80			168.0	C075.0S	B	2	0.002	3	0.002	09MY	09MY	09MY	149	13
	WARM SPRINGS NFH CONTRIBUTION						C075.0M	P	49	0.030	94	0.057	24MR	08MY	10JN	147	13
							C016.0N	P	46	0.028			30AP	08MY	21MY	145	16
							4005.1N	P	1	0.001			28MY	28MY	28MY	146	9
050628	WARM SPRING NFH	WARM SPRINGS HAT.	07AP80-14AP80			10.9	C075.0M	P	5	0.046	9	0.086	28AP	08MY	13MY	135	13
	WARM SPRINGS NFH CONTRIBUTION						C016.0N	P	3	0.028			12MY	13MY	13MY	133	13
071830	WARM SPRINGS R	WARM SPRINGS R. TR	23SE79-01DE79			4.2	C016.0N	P	1	0.024			02MY	02MY	02MY	145	1
*	WILD FISH CONTRIB.		(LPHE1-4;RP HE 1)														
072005		NO RELEASE INFO					4002.2S	P	1	0.000			01SE	01SE	01SE	319	
072952		NO RELEASE INFO					C075.0M	P	1	0.000			26MR	26MR	26MR	138	
BLNK TAG		NO RELEASE INFO					C075.0S	B	2	0.000			18MR	18MR	19MR	72	
BR		NO RELEASE INFO					C016.0N	P	2	0.000			28AP	28AP	30AP	156	
LA U 3		NO RELEASE INFO					C016.0N	P	1	0.000			21AP	21AP	21AP	145	
LA W 1		NO RELEASE INFO					C016.0N	P	1	0.000			07MY	07MY	07MY	135	
LD IK 2		NO RELEASE INFO					C075.0M	P	1	0.000			05JN	05JN	05JN	155	
LD T 1		NO RELEASE INFO					C075.0M	P	1	0.000			03JN	03JN	03JN	142	
NO TAG		NO RELEASE INFO					C075.0S	B	26	0.000			17MR	31MR	10JN	138	
							C075.0M	P	43	0.000			31MR	03MY	05JN	141	
							C016.0N	P	10	0.000			02MY	09MY	30JN	146	
							4009.1N	P	1	0.000			04SE	04SE	04SE	297	

SPECIES: CHINOOK-1S

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 1ST FISH	MED. FISH	LAST FISH	AVG LEN MM	MVMT RATE KM/DAY
						4007.1N	P	1	0.000			06JN	06JN	06JN	191	
						4005.0	P	1	0.000			17JN	17JN	24JL	89	
						4004.3S	P	1	0.000			28AU	28AU	28AU	275	
						4001.1S	P	1	0.000			31AU	31AU	31AU	292	
RA L 4		NO RELEASE INFO				C075.0S	B	1	0.000			17MY	17MY	17MY	120	
RA SP 2		NO RELEASE INFO				C016.0N	P	1	0.000			02MY	02MY	02MY	150	
RA T 1		NO RELEASE INFO				C075.0M	P	5	0.000			08MY	04JN	05JN	137	
RD H 1		NO RELEASE INFO				4005.0	P	1	0.000			21JL	21JL	21JL	153	
WH		NO RELEASE INFO				C075.0M	P	2	0.000			17AP	17AP	17AP	169	
LP		NO RELEASE INFO				C075.0S	B	1	-----			30AP	30AP	30AP	145	
						4009.3S	P	1	-----			09JL	09JL	09JL	204	
						4004.3S	P	1	-----			27MY	27MY	27MY	470	
						4001.4N	P	1	-----			31AU	31AU	31AU	232	
						4001.3S	P	1	-----			31AU	31AU	31AU	277	
LPRP		NO RELEASE INFO				4010.3N	P	1	-----			05SE	05SE	05SE	281	
LV		NO RELEASE INFO				C075.0S	B	21	-----			07AP	14AP	10MY	171	
						C075.0M	P	13	-----			08AP	15AP	10MY	162	
						C016.0N	P	9	-----			30AP	12MY	22MY	150	
						4010.1N	P	1	-----			03JN	03JN	03JN	212	
						4005.1N	P	1	-----			28MY	28MY	28MY	170	
						4005.0	P	1	-----			07JL	07JL	07JL	200	
						4004.2S	P	1	-----			27MY	27MY	27MY	311	
						4004.1N	P	2	-----			27MY	27MY	27MY	178	
RP		NO RELEASE INFO				C075.0M	P	1	-----			09AP	09AP	09AP	135	
						4003.1S	P	1	-----			30MY	30MY	30MY	230	
						4001.3N	P	1	-----			31AU	31AU	31AU	260	

RELEASE AND RECAPTURE INFORMATION - COLUMBIA RIVER ESTUARY 1980

REPORT DATE 12/29/80

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

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 1ST FISH	MED. FISH	LAST FISH	AVG LEN MM	MVMT RATE KM/DAY
624702	ANADROMOUS INC.	COOS BAY OR.	19JL80			19.9	4001.3S	P	1	0.006			31AU	31AU	31AU	201	0
	DIET EXPERIMENT																
624802	ANADROMOUS INC.	COOS BAY OR.	21JL80			19.9	4002.1N	P	1	0.006			01SE	01SE	01SE	187	0
	DIET EXPERIMENT																
071956	BIG CREEK	BIG CREEK	06JN80		19	28.5	C075.0M	P	1	0.004	3	0.012	21JN	21JN	21JN	114	-1
	RELEASE TIME STUDY																
071954	BIG CREEK	BIG CREEK	07JL80		18	27.9	C016.0N	P	4	0.015			09JL	09JL	10JL	141	17
	RELEASE TIME STUDY						4002.2S	P	1	0.004			01SE	01SE	01SE	256	1
071957	BIG CREEK	BIG CREEK	07JL80		19	27.6	C016.0N	P	5	0.019			09JL	10JL	11JL	128	11
	RELEASE TIME STUDY						4001.3S	P	2	0.008			31AU	31AU	31AU	266	1
071912	BONNEVILLE HAT	BONNEVILLE	06JL79		23	25.2	C075.0M	P	1	0.004	2	0.007	12MY	12MY	12MY	153	0
	COHO TIME REL.																
071963	CASCADE NFH	BELOW BONN. DAM	28AP80		24	29.2	C075.0S	B	3	0.011	4	0.014	07MY	16MY	17MY	125	9
	RELEASE TIME STUDY						C075.0M	P	10	0.035	20	0.068	09MY	17MY	29MY	134	8
							C016.0N	P	2	0.007			09MY	09MY	13MY	136	19
631952	GRAYS RIVER	GRAYS RIVER HAT	09AP80		18	104.7	C016.0N	P	19	0.019			25AP	01MY	21MY	138	2
631953	GRAYS RIVER	GRAYS RIVER HAT	09AP80		18	103.6	C016.0N	P	20	0.020			24AP	06MY	21MY	135	2
RD T 2	JONES BEACH	JONES BEACH MIDRIV	12MY80	140		0.3	C075.0M	P	1	0.292	1	0.391	14MY	14MY	14MY	135	0
	MIGRATIONAL TIMING THROUGH ESTUARY																
072155	Vanderveldt Pd	Tucker Cr.	11AP80		12	45.0	C016.0N	P	1	0.003			06MY	06MY	06MY	133	1
	HATCHERY CONTRIBUTION		Klatskanine-U Nehalem				4001.3S	P	1	0.003			31MY	31MY	31MY	227	1
LA H 1	MCNARY DAM	MCNARY TAILRACE	08AP80-12MY80			0.2	C016.0N	P	1	0.565			16MY	16MY	16MY	109	12
*	TAILRACE CONTROL		CWT ERLA														
RA 2 1	MCNARY DAM	BELOW BONNEVILLE	22AP80-18MY80			0.0	C016.0N	P	1	2.326			02MY	02MY	02MY	125	21
*	BARGE TRANSPORT		CWT ERPR														
RA V 1	MCNARY DAM	DALTON POINT	09AP80-12MY80			0.1	C016.0N	P	1	0.764			06MY	06MY	06MY	135	7
*	TRUCK TRANSPORT		CWT NDSM														
RA V 2	MCNARY DAM	DALTON POINT	14MY80-13JN80			1.4	4005.4N	P	1	0.070			07JN	07JN	07JN	170	8
*	TRUCK TRANSPORT		CWT DY														
RD T 1	NEHALEM HAT	THE DALLES/FOREBAY	07MY80-15MY80			27.6	C075.0M	P	8	0.030	20	0.073	16MY	19MY	23MY	141	19

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 1ST FISH	MED. FISH	LAST FISH	AVG LEN MM	MVMT RATE KM/DAY
RD T 1	NEHALEM HAT	THE DALLES/FOREBAY	07MY80-15MY80			27.6	C016.0N	P	6	0.022			06MY	13MY	19MY	143	48
RD T 2	NEHALEM HAT	THE DALLES/FOREBAY	07MY80-15MY80			29.4	C075.0M	P	12	0.041	23	0.078	05MY	16MY	23MY	139	26
							C016.0N	P	3	0.011			16MY	19MY	20MY	137	24
603125	OR. AGUA@SPGFLD HATCHERY EVAL.	YAQUINA BAY	15MR80			12.0	4005.3N	P	1	0.009			07JN	07JN	07JN	227	0
603149	OR. AGUA@SPGFLD GENETIC STUDY	YAQUINA BAY	28JN80		24	14.5	4001.2N	P	1	0.007			31AU	31AU	31AU	236	0
603339	OR. AGUA@SPGFLD HATCHERY EVAL.	YAQUINA BAY	30JN80		22	20.0	4001.3S	P	1	0.005			31AU	31AU	31AU	224	0
603336	OR. AGUA@SPGFLD DENSITY REAR. STUDY	YAQUINA BAY	05AU80		18	16.3	4001.3S	P	1	0.007			31AU	31AU	31AU	206	0
RD IX 3	ROCKY REACH DAM SPILLWAY TEST	ROCKY REACH FOREBA	16MY80			23.6	C075.0M	P	1	0.005	2	0.008	05JN	05JN	05JN	130	34
072031	SANDY NUTRITION EVAL. 1	CEDAR CREEK @ HAT	01MY80		18	25.1	C075.0S	B	2	0.008	4	0.016	07MY	24MY	24MY	140	7
							C075.0M	P	14	0.054	31	0.120	10MY	19MY	28MY	144	9
							C016.0N	P	4	0.016			08MY	13MY	16MY	135	18
072032	SANDY NUTRITION EVAL. 1	CEDAR CREEK @ HAT	01MY80		17	25.5	C075.0S	B	4	0.015	7	0.026	08MY	17MY	24MY	131	10
							C075.0M	P	12	0.045	26	0.097	08MY	19MY	29MY	147	9
							C016.0N	P	2	0.008			13MY	13MY	19MY	133	18
072033	SANDY NUTRITION EVAL. 1	CEDAR CREEK @ HAT	01MY80		18	25.1	C075.0S	B	7	0.028	9	0.036	06MY	08MY	17MY	141	22
							C075.0M	P	8	0.032	25	0.096	10MY	19MY	24MY	145	9
							C016.0N	P	2	0.008			13MY	13MY	20MY	157	18
072034	SANDY NUTRITION EVAL. 1	CEDAR CREEK @ HAT	01MY80		18	25.2	C075.0M	P	17	0.066	36	0.138	09MY	18MY	24MY	142	9
							C016.0N	P	4	0.016			09MY	13MY	21MY	147	18
072035	SANDY NUTRITION EVAL. 2	CEDAR CREEK @ HAT	01MY80		18	25.1	C075.0S	B	3	0.012	4	0.015	07MY	08MY	09MY	141	22
							C075.0M	P	9	0.036	17	0.070	08MY	18MY	28MY	142	9
							C016.0N	P	5	0.020			13MY	13MY	20MY	148	18
072036	SANDY NUTRITION EVAL. 2	CEDAR CREEK @ HAT	01MY80		18	24.0	C075.0S	B	2	0.009	2	0.011	07MY	15MY	16MY	137	11
							C075.0M	P	18	0.075	36	0.152	08MY	18MY	28MY	144	9
							C016.0N	P	3	0.013			13MY	13MY	20MY	143	18
							4009.1N	P	1	0.005			04SE	04SE	04SE	299	2
072037	SANDY NUTRITION EVAL. 2	CEDAR CREEK @ HAT	01MY80		19	25.4	C075.0M	P	13	0.052	28	0.111	10MY	18MY	28MY	142	9
							C016.0N	P	2	0.008			12MY	12MY	13MY	145	20
							4003.2S	P	1	0.004			30MY	30MY	30MY	135	8
072038	SANDY NUTRITION EVAL. 2	CEDAR CREEK @ HAT	01MY80		19	25.9	C075.0S	B	5	0.020	8	0.030	08MY	11MY	19MY	136	16
							C075.0M	P	15	0.058	30	0.115	10MY	19MY	28MY	145	9
							C016.0N	P	2	0.008			16MY	16MY	20MY	140	14
072015	SILETZ H COASTAL STOCK ACCESSMENT	SILETZ R	15MR80		15	26.0	4005.3N	P	1	0.004			07JN	07JN	07JN	230	0

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 1ST FISH	MED. FISH	LAST FISH	AVG LEN MM	MVMT RATE KM/DAY
631931	TOUTLE HAT	GREEN RIVER @ HAT	07MY80		18	38.6	C075.0S	B	10	0.026	17	0.044	15MY	18MY	19MY	135	8
	SIZE AND TIME AT RELEASE						C075.0M	P	33	0.086	68	0.175	13MY	17MY	19MY	141	9
							C016.0N	P	4	0.011			16MY	20MY	20MY	135	11
632058	TOUTLE HAT	GREEN RIVER @ HAT	07MY80		20	39.5	C075.0S	B	4	0.011	7	0.018	15MY	18MY	19MY	137	8
	SIZE AND TIME AT RELEASE						C075.0M	P	27	0.069	58	0.147	14MY	17MY	19MY	139	9
							C016.0N	P	4	0.011			20MY	20MY	21MY	142	11
632028	TOUTLE HAT	TOUTLE HAT	19MY80			0.1	C075.0S	B	1	1.001	1	1.442	06MY	06MY	06MY	134	-6
							C075.0M	P	2	2.001	3	3.225	07MY	08MY	09MY	127	-7
LD 52 1	TURTLE ROCK CONTROL	ROCKY REACH FOREBA	13MY80			24.2	C075.0M	P	7	0.029	15	0.062	23MY	04JN	19JN	161	31
LD 52 2	TURTLE ROCK SPILLWAY TEST	ROCKY REACH TAILRA	13MY80			25.5	C075.0M	P	10	0.040	19	0.077	23MY	29MY	11JN	159	43
RD 52 1	TURTLE ROCK CONTROL	ROCKY REACH FOREBA	13MY80			24.1	C075.0M	P	5	0.021	11	0.046	31MY	04JN	11JN	148	31
RD 52 2	TURTLE ROCK SPILLWAY TEST	ROCKY REACH TAILRA	13MY80			22.4	C075.0M	P	5	0.023	11	0.050	28MY	01JN	11JN	170	36
LD IX 2	TURTLE ROCK CONTROL	ROCKY REACH TAILRA	16MY80			27.2	C075.0M	P	5	0.019	10	0.036	29MY	04JN	19JN	158	36
LD IX 3	TURTLE ROCK SPILLWAY TEST	ROCKY REACH FOREBA	16MY80			27.2	C075.0M	P	3	0.012	5	0.017	09JN	10JN	11JN	151	27
RD IX 2	TURTLE ROCK CONTROL	ROCKY REACH TAILRA	16MY80			24.8	C075.0M	P	2	0.009	5	0.020	29MY	01JN	02JN	155	43
LD IH 2	TURTLE ROCK SPILLWAY TEST	ROCKY REACH FOREBA	19MY80			25.0	C075.0M	P	8	0.033	14	0.058	02JN	05JN	09JN	159	40
							4005.2N	P	1	0.005			07JN	07JN	07JN	160	39
LD IH 3	TURTLE ROCK CONTROL	ROCKY REACH TAILRA	19MY80			28.0	C075.0M	P	4	0.015	7	0.027	02JN	04JN	06JN	157	43
RD IH 2	TURTLE ROCK SPILLWAY TEST	ROCKY REACH FOREBA	19MY80			27.2	C075.0M	P	3	0.012	5	0.018	05JN	05JN	10JN	165	40
							4002.2N	P	1	0.004			01SE	01SE	01SE	256	7
RD IH 3	TURTLE ROCK CONTROL	ROCKY REACH TAILRA	19MY80			25.4	C075.0M	P	6	0.024	10	0.041	03JN	05JN	10JN	158	40
632039	WASHOUGAL TIMING,COWLITZ	WASHOUGAL STOCK	08MY80		18	99.6	C075.0S	B	29	0.030	42	0.043	14MY	17MY	19MY	135	16
							C075.0M	P	53	0.054	102	0.102	13MY	17MY	14JN	138	16
							C016.0N	P	1	0.002			21MY	21MY	21MY	133	16
							4009.1N	P	1	0.002			04SE	04SE	04SE	308	2
							4006.2N	P	1	0.002			08SE	08SE	08SE	311	2
							4004.2N	P	1	0.002			27MY	27MY	27MY	125	11
632040	WASHOUGAL TIMING,COWLITZ	WASHOUGAL STOCK	08MY80		18	98.7	C075.0S	B	11	0.012	18	0.019	13MY	17MY	19MY	136	16
							C075.0M	P	57	0.058	106	0.108	12MY	17MY	28MY	141	16
							C016.0N	P	7	0.008			16MY	19MY	21MY	140	19
							4010.3S	P	1	0.002			05SE	05SE	05SE	305	2
							4008.1N	P	1	0.002			06SE	06SE	06SE	309	2
							4005.1S	P	1	0.002			28MY	28MY	28MY	141	11
							4004.2S	P	1	0.002			07JL	07JL	07JL	150	4

SPECIES: COHO

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 1ST FISH	RECAPTURE DATE MED. FISH	RECAPTURE DATE LAST FISH	AVG LEN MM	MVMT RATE KM/DAY
							4003.1S	P	1	0.002			02SE	02SE	02SE	258	2
	TIMING,COWLITZ STOCK																
632037	WASHOUGAL	WASHOUGAL	09JN80		18	97.3	C075.0S	B	14	0.015	17	0.018	16JN	16JN	19JN	136	21
	TIMING,COWLITZ STOCK						C075.0M	P	39	0.041	73	0.076	13JN	15JN	18JN	137	24
							C016.0N	P	19	0.020			16JN	18JN	19JN	138	23
							4010.3S	P	1	0.002			10JL	10JL	10JL	182	7
							4004.3S	P	1	0.002			28AU	28AU	28AU	274	3
							4004.1S	P	1	0.002			07JL	07JL	07JL	182	8
632038	WASHOUGAL	WASHOUGAL	09JN80		18	97.8	C075.0S	B	16	0.017	20	0.021	14JN	15JN	18JN	140	24
	TIMING,COWLITZ STOCK						C075.0M	P	49	0.051	93	0.096	13JN	14JN	19JN	139	29
							C016.0N	P	14	0.015			16JN	16JN	19JN	137	29
							4004.3S	P	1	0.002			28AU	28AU	28AU	286	3
							4004.1S	P	1	0.002			07JL	07JL	07JL	168	8
631954	WASHOUGAL	WASHOUGAL	07JL80		19	106.7	C075.0S	B	13	0.013	18	0.018	11JL	13JL	17JL	132	24
	TIMING,COWLITZ STOCK						C075.0M	P	113	0.106	267	0.251	10JL	12JL	15JL	140	29
							C016.0N	P	35	0.033			14JL	15JL	18JL	136	26
							4001.3S	P	1	0.001			31AU	31AU	31AU	227	4
631955	WASHOUGAL	WASHOUGAL	07JL80		18	107.0	C075.0S	B	11	0.011	16	0.016	10JL	13JL	15AU	139	24
	TIMING,COWLITZ STOCK						C075.0M	P	107	0.101	258	0.242	18JN	12JL	25JL	138	29
							C016.0N	P	42	0.040			11JL	15JL	18JL	130	26
							4008.2N	P	1	0.001			06SE	06SE	06SE	224	3
							4006.2S	P	1	0.001			08SE	08SE	08SE	243	3
							4005.2S	P	1	0.001			29AU	29AU	29AU	215	4
							4004.3N	P	1	0.001			28AU	28AU	28AU	216	4
							4003.1N	P	2	0.002			02SE	02SE	02SE	210	4
							4001.3S	P	3	0.003			31AU	31AU	31AU	216	4
++++++++++																	
050638	WILLARD	YAKIMA RIVER	24OC79-30OC79		36	76.6	C075.0M	P	2	0.003	5	0.006	29MY	02JN	03JN	120	1
	CONTRIBUTION						C016.0N	P	1	0.002			16MY	16MY	16MY	140	1
							4001.2S	P	1	0.002			31AU	31AU	31AU	264	1
050359	WILLARD	L.W.SAL.R.@WILLARD	23MY80			42.4	C075.0S	B	3	0.008	5	0.013	30MY	30MY	30MY	150	27
	NMFS HOMING,CONTROL, Marked in fall						C075.0M	P	9	0.022	19	0.045	28MY	02JN	05JN	127	19
050654	WILLARD	L.W.SAL.R.@WILLARD	23MY80			51.5	C075.0S	B	3	0.006	5	0.011	30MY	31MY	05JN	129	24
	NMFS HOMING,CONTROL, Marked in spring						C075.0M	P	3	0.006	6	0.013	29MY	02JN	05JN	131	19
050358	WILLARD	L.W.S.R.BLW.BARRIE	14MY80			43.0	C075.0S	B	1	0.003	3	0.007	19MY	19MY	19MY	138	37
	NMFS HOMING,CONTROL #1						C075.0M	P	2	0.005	5	0.013	19MY	20MY	28MY	133	31
050660	WILLARD	BELOW BONN.	24MY80			33.7	C075.0S	B	2	0.006	4	0.013	30MY	01JN	02JN	129	19
	NMFS HOMING BARGE #2						C075.0M	P	1	0.003	5	0.014	31MY	31MY	31MY	140	22
050650	WILLARD	BARGE BELOW BONN.	25MY80			47.9	C075.0S	B	6	0.013	8	0.018	28MY	29MY	05JN	131	39
	NMFS HOMING,TEST #3						C075.0M	P	2	0.005	3	0.007	05JN	06JN	09JN	131	13
							4010.3S	P	1	0.003			05SE	05SE	05SE	283	2
050655	WILLARD	BARGE BELOW BONN.	25MY80			51.4	C075.0S	B	8	0.016	11	0.021	28MY	28MY	29MY	129	52
	NMFS HOMING,ALTERNATE TEST #1						C075.0M	P	10	0.020	21	0.041	27MY	02JN	09JN	126	19
050651	WILLARD	DALTON PT.	21MY80			50.8	C075.0S	B	2	0.004	4	0.009	24MY	25MY	28MY	129	33
	NMFS HOMING,TEST #4						C075.0M	P	3	0.006	6	0.012	27MY	04JN	05JN	133	9
							4003.2S	P	1	0.002			30MY	30MY	30MY	140	22

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 1ST FISH	MED. FISH	LAST FISH	AVG LEN MM	MVMT RATE KM/DAY
050652	WILLARD	BEAVER TERMINAL	22MY80			51.7	C075.0S	B	21	0.041	66	0.128	23MY	23MY	24MY	123	9
	NMFS HOMING,TEST #6						4006.3S	P	1	0.002			29MY	29MY	29MY	115	11
							4005.3N	P	1	0.002			28MY	28MY	28MY	127	13
050653	WILLARD	HAMMOND	23MY80			50.6	4006.3N	P	1	0.002			29MY	29MY	29MY	120	0
	NMFS HOMING,TEST #5						4003.2S	P	1	0.002			30MY	30MY	30MY	157	1
LA J 3		NO RELEASE INFO					C075.0M	P	1	0.000			03MY	03MY	03MY	140	
LET GU		NO RELEASE INFO					C016.0N	P	1	0.000			20MY	20MY	20MY	140	
NO TAG		NO RELEASE INFO					C075.0S	B	34	0.000			24AP	14MY	07JN	142	
							C075.0M	P	85	0.000			28AP	18MY	15JL	142	
							C016.0N	P	18	0.000			22AP	19MY	16JL	137	
													05JN	05JN	05JN	164	
													05JN	05JN	05JN	154	
													29MY	29MY	29MY	136	
							4005.3S	P	1	0.000			07JN	07JN	07JN	158	
							4005.3N	P	1	0.000			07JN	07JN	07JN	204	
							4005.1S	P	1	0.000			28MY	28MY	28MY	155	
							4003.2S	P	1	0.000			30MY	30MY	30MY	155	
							4003.2N	P	1	0.000			30MY	30MY	30MY	140	
							4002.1S	P	1	0.000			05JL	05JL	05JL	173	
RD U 4		NO RELEASE INFO					C075.0M	P	1	0.000			27MY	26MY	27MY	185	
LP		NO RELEASE INFO					C075.0S	B	22	-----			24AP	05MY	20JN	140	
							C075.0M	P	41	-----			29AP	16MY	02JL	141	
							C016.0N	P	4	-----			07MY	20MY	21MY	141	
							4004.2S	P	1	-----			27MY	27MY	27MY	500	
LPRP		NO RELEASE INFO					C075.0S	B	2	-----			05MY	06MY	06MY	135	
							C075.0M	P	3	-----			13MY	17MY	28MY	132	
							C016.0N	P	1	-----			20MY	20MY	20MY	130	
LV		NO RELEASE INFO					C016.0N	P	3	-----			28AP	22MY	19JN	142	
							4006.3S	P	1	-----			29MY	29MY	29MY	159	
RP		NO RELEASE INFO					C075.0S	B	16	-----			25AP	08MY	06JN	136	
							C075.0M	P	47	-----			25AP	14MY	10JN	139	
							C016.0N	P	7	-----			13MY	19MY	20MY	136	
							4010.4N	p	1	-----			10JL	10JL	10JL	204	
							4007.1S	P	1	-----			06JN	06JN	06JN	215	
							4006.3S	P	1	-----			29MY	29MY	29MY	141	
							4005.3S	P	1	-----			07JN	07JN	07JN	190	
							4005.3N	P	1	-----			07JN	07JN	07JN	165	
RV		NO RELEASE INFO					C075.0M	P	1	-----			02JN	02JN	02JN	140	
							4007.2S	P	1	-----			06JN	06JN	06JN	160	

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

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 1ST FISH	RECAPTURE DATE MED. FISH	RECAPTURE DATE LAST FISH	AVG LEN MM	MVMT RATE KM/DAY
100533	DWORSHAK NFH	CLEARWATER @DNFH	23MY79-01MY80		150	32.5	C075.0M	P	3	0.010	5	0.017	10MY	11MY	16MY	242	1
*	MIGRATION HOMING TEST		LD SU 3; RA SU 2 (79)														
050455	DWORSHAK NFH	CLEARWATER @DNFH	17AP80		8	59.1	C075.0S	B	2	0.004	4	0.006	05MY	05MY	05MY	188	41
							C075.0M	P	57	0.097	102	0.172	25AP	06MY	02JN	188	38
							C016.0N	P	9	0.016			30AP	06MY	16MY	189	42
102162	DWORSHAK NFH	CLEARWATER @ DNFH	17AP80		6	46.9	C075.0M	P	29	0.062	48	0.102	29AP	06MY	14MY	196	38
							C016.0N	P	10	0.022			30AP	06MY	16MY	193	42
RA 4 4	DWORSHAK NFH	CLEARWATER @DNFH	18AP80		8	10.0	C016.0N	P	1	0.010			05MY	05MY	05MY	195	46
	TIMING AND MIGRATION																
LD IU 1	DWORSHAK NFH	CLEARWATER @DNFH	22AP80	141	17	5.1	C016.0N	P	1	0.020			08MY	08MY	08MY	150	49
	TIMING AND MIGRATION																
LD IU 2	DWORSHAK NFH	CLEARWATER @DNFH	22AP80	71	10	5.0	C075.0M	P	3	0.061	6	0.112	29AP	03MY	10MY	175	66
	TIMING AND MIGRATION						C016.0N	P	1	0.021			16MY	16MY	16MY	180	33
LD IU 4	DWORSHAK NFH	CLEARWATER @DNFH	22AP80	198	6	5.0	C075.0M	P	9	0.181	15	0.307	29AP	02MY	10MY	202	73
	TIMING AND MIGRATION																
102161	DWORSHAK NFH	CLEARWATER @ DNFH	25AP80		9	49.2	C075.0M	P	36	0.074	71	0.144	03MY	09MY	19MY	201	52
							C016.0N	P	10	0.021			06MY	06MY	09MY	184	72
LA X3 3	DWORSHAK NFH	CLEARWATER @DNFH	29AP80		7	10.1	C075.0M	P	2	0.020	3	0.031	10MY	11MY	14MY	192	61
	TIMING AND MIGRATION						C016.0N	P	1	0.010			16MY	16MY	16MY	195	46
RA DT 3	DWORSHAK NFH	CLEARWATER @DNFH	29AP80		7	10.0	C075.0M	P	2	0.021	3	0.032	07MY	07MY	07MY	210	91
	TIMING AND MIGRATION																
LD SU 3	DWORSHAK NFH	CLEARWATER @DNFH	01MY80		5	0.5	4007.1S	P	1	0.210			06JN	06JN	06JN	160	22
*	MIGRATION HOMING TEST		Cwt 100533														
RD X3 1	DWORSHAK NFH	PAHSIMEROI	04FE80-27AP80		5	5.4	C075.0M	P	1	0.019	2	0.028	15MY	15MY	15MY	200	12
	TIMING AND MIGRATION RATES																
RA SU 1	DWORSHAK NFH	PAHSIMEROI	28MR80-27AP80		5	5.0	C016.0N	P	1	0.020			24AP	24AP	24AP	145	48
	TIMING AND MIGRATION RATES																
LA SU 1	DWORSHAK NFH	PAHSIMEROI	23AP80-27AP80		5	5.1	C075.0M	P	1	0.020	2	0.038	23MY	23MY	23MY	200	41
	TIMING AND MIGRATION RATES																
RD IU 2	DWORSHAK NFH	UPPER LEMHI	22AP80		5	10.6	C075.0M	P	2	0.019	5	0.044	21MY	22MY	18JN	165	41
	TIMING AND MIGRATION																
LA SU 4	DWORSHAK NFH	LOWER LEMHI	24AP80		5	10.1	C075.0M	P	2	0.020	4	0.038	28AP	29AP	10JN	200	233
	TIMING AND MIGRATION																
102119	DWORSHAK NFH	BARGE BELOW BONN.	29AP80-02MY80		6	40.0	C075.0S	B	3	0.008	5	0.014	05MY	05MY	05MY	178	26
*			LD 4 1				C075.0M	P	72	0.180	155	0.388	03MY	05MY	17MY	191	26
							C016.0N	P	19	0.048			06MY	06MY	09MY	194	31
LD 4 1	DWORSHAK NFH	BARGE BELOW BONN.	29AP80		6	8.5	C075.0M	P	20	0.236	44	0.515	03MY	05MY	08MY	196	26
*			CWT 102119				C016.0N	P	5	0.059			05MY	06MY	07MY	195	31
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050636	HAGERMAN	PAHSIMEROI	04FE80-27AP80		4	40.5	C075.0M	P	15	0.038	28	0.069	05MY	10MY	23MY	212	13
*	EVAL. OF COLD WATER CONDITIONING		10077 WITH LD DT 1				C016.0N	P	3	0.008			13MY	16MY	16MY	222	13
050637	HAGERMAN	PAHSIMEROI	04FE80-27AP80		4	33.9	C075.0S	B	1	0.003	1	0.004	09MY	09MY	09MY	213	13
*	EVAL. OF COLD WATER CONDITIONING		8490 WITH R D DT 1				C075.0M	P	25	0.074	41	0.121	09MY	12MY	23MY	222	13
							C016.0N	P	10	0.030			06MY	13MY	16MY	218	13
050635	HAGERMAN	PAHSIMEROI	21AP80-27AP80		5	36.6	C075.0M	P	7	0.020	14	0.037	10MY	11MY	19MY	220	62
*	EVAL. OF COLD WATER CONDITIONING		9145 WITH L A DT 3														

SPECIES: STEELHEAD

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 1ST FISH	MED. FISH	LAST FISH	AVG LEN MM	MVMT RATE KM/DAY
	PURPOSE OF RELEASE		OTHER MARKS														
050635	HAGERMAN	PAHSIMEROI	21AP80-27AP80		5	36.6	C016.0N	P	3	0.009			13MY	16MY	16MY	225	52
*	EVAL. OF COLD WATER CONDITIONING		9145 WITH LA DT 3				4008.3S	P	1	0.003			05JN	05JN	05JN	230	29
LA DT 3	HAGERMAN	PAHSIMEROI	27AP80			9.1	C075.0M	P	1	0.011	2	0.022	17MY	17MY	17MY	250	62
*	COLD WATER COND.		CWT 050635				4009.4S	P	1	0.011			04JN	04JN	04JN	240	34
LD DT 1	HAGERMAN	PAHSIMEROI	27AP80			10.1	C075.0M	P	4	0.040	7	0.070	10MY	16MY	23MY	192	65
*	COLD WATER COND.		CWT 050636				C016.0N	P	1	0.010			13MY	13MY	13MY	220	81
							4009.4S	P	1	0.010			04JN	04JN	04JN	246	34
RD DT 1	HAGERMAN	PAHSIMEROI	27AP80			8.5	C075.0M	P	2	0.024	4	0.043	10MY	10MY	10MY	227	95
*	COLD WATER COND.		CWT 050637				C016.0N	P	1	0.012			09MY	09MY	09MY	215	107
RA HE 1	JOHN DAY DAM	BLALOCK SHORE	24AP80			0.9	C075.0M	P	2	0.233	3	0.385	01MY	09MY	10MY	175	20
	EFFICIENCY REL																
RD HE 1	JOHN DAY DAM	BLALOCK SHORE	25AP80			0.7	C016.0N	P	1	0.136			02MY	02MY	02MY	180	51
	EFFICIENCY REL																
RP HE 1	JOHN DAY DAM	BLALOCK SHORE	28AP80			1.2	C075.0M	P	3	0.260	6	0.529	03MY	04MY	09MY	212	50
	EFFICIENCY REL																
LA HE 1	JOHN DAY DAM	BLALOCK SHORE	29AP80			0.8	C075.0M	P	1	0.131	1	0.190	08MY	08MY	08MY	187	33
	EFFICIENCY REL																
RA HE 2	JOHN DAY DAM	BLALOCK MIDRIV.	02MY80			0.6	C075.0M	P	2	0.344	3	0.537	08MY	09MY	09MY	157	43
	EFFICIENCY REL						C016.0N	P	1	0.172			09MY	09MY	09MY	172	51
RD HE 2	JOHN DAY DAM	BLALOCK SHORE	03MY80			1.1	C016.0N	P	1	0.094			09MY	09MY	09MY	200	60
	EFFICIENCY REL																
RP HE 2	JOHN DAY DAM	BLALOCK MIDRIV.	04MY80			1.0	C075.0M	P	2	0.203	4	0.364	10MY	10MY	10MY	187	50
	EFFICIENCY REL																
LA HE 2	JOHN DAY DAM	BLALOCK MIDRIV.	05MY80			1.1	C075.0M	P	2	0.186	4	0.334	10MY	10MY	10MY	190	60
	EFFICIENCY REL																
LP HE 2	JOHN DAY DAM	BLALOCK MIDRIV.	07MY80			1.5	C075.0M	P	1	0.066	2	0.108	12MY	12MY	12MY	230	60
	EFFICIENCY REL						C016.0N	P	1	0.066			13MY	13MY	13MY	182	60
RA HE 3	JOHN DAY DAM	BLALOCK SHORE	08MY80			1.4	C075.0M	P	1	0.071	2	0.140	17MY	17MY	17MY	185	33
	EFFICIENCY REL																
LA HE 3	JOHN DAY DAM	BLALOCK SHORE	11MY80			0.7	C075.0M	P	1	0.154	2	0.276	10MY	10MY	10MY	207	-299
	EFFICIENCY REL																
RA IT 4	JONES BEACH	JONES BEACH MIDRIV	06JN80	196		0.1	C075.0S	B	1	1.370	1	1.614	10JN	10JN	10JN	215	0
	MIGRATIONAL TIMING THROUGH ESTUARY																
LA P 1	L.GOOSE DAM	TEXAS RAPIDS LANDI	24AP80-02MY80			5.0	C075.0M	P	5	0.100	8	0.161	09MY	10MY	13MY	186	34
*	TAILRACE CONTROL		CWT ER														
LA P 2	L.GOOSE DAM	TEXAS RAPIDS LANDI	06MY80-15MY80			10.8	C075.0M	P	5	0.047	9	0.088	10MY	30MY	10JN	200	23
*	TAILRACE CONTROL		CWT ER														
LA P 3	L.GOOSE DAM	TEXAS RAPIDS LANDI	17MY80-30MY80			3.4	C075.0M	P	1	0.030	2	0.068	27MY	26MY	27MY	210	61
*	TAILRACE CONTROL		CWT ER														
LA IS 2	LO.GRANITE DAM	CLARKSTON	21AP80-06MY80			5.1	C075.0M	P	9	0.176	16	0.305	05MY	10MY	15MY	201	35
	FOREBAY RELEASE																

SPECIES: STEELHEAD

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	PURPOSE OF RELEASE		OTHER MARKS													
LA IS 2	LO.GRANITE DAM	CLARKSTON	21AP80-06MY80		5.1	C016.0N	P	1	0.020			16MY	16MY	16MY	177	29
	FOREBAY RELEASE															
LA IS 4	LO.GRANITE DAM	CLARKSTON	23MY80-02JN80		8.3	C075.0M	P	2	0.025	3	0.037	06JN	07JN	09JN	187	44
	FOREBAY RELEASE					4008.3S	P	1	0.013			05JN	05JN	05JN	257	56
RA W 1	LO.GRANITE DAM	BEACON ROCK	20AP80-29AP80		2.1	C075.0M	P	7	0.341	14	0.665	29AP	05MY	10MY	198	10
*	BARGE TRANSPORT		CWT HOPR			C016.0N	P	4	0.195			06MY	06MY	06MY	198	13
RA W 2	LO.GRANITE DAM	BEACON ROCK	01MY80-10MY80		28.4	C075.0M	P	15	0.053	26	0.092	07MY	10MY	15MY	215	17
*	BARGE TRANSPORT		CWT'S HOPR,DYPR			C016.0N	P	6	0.022			09MY	16MY	20MY	174	14
						4009.4S	P	1	0.004			04JN	04JN	04JN	220	6
						4008.3N	P	1	0.004			05JN	05JN	05JN	231	6
						4006.3S	P	1	0.005			29MY	29MY	29MY	123	8
LD AN 1	MCNARY DAM	PORT KELLY (OR.)	28AP80		0.6	C016.0N	P	1	0.161			06MY	06MY	06MY	210	61
	EFFICIENCY REL.															
LD IM 1	MCNARY DAM	PORT KELLY (OR.)	01MY80		1.7	C075.0M	P	1	0.059	1	0.085	08MY	08MY	08MY	165	61
	EFFICIENCY REL					C016.0N	P	1	0.059			16MY	16MY	16MY	197	32
LD IM 2	MCNARY DAM	PORT KELLY (OR.)	05MY80		0.7	C075.0M	P	1	0.153	2	0.250	12MY	12MY	12MY	195	61
	EFFICIENCY REL															
LD 3 1	MCNARY DAM	PORT KELLY (WA.)	06MY80		1.2	C075.0M	P	1	0.085	1	0.126	06JN	06JN	06JN	195	14
	EFFICIENCY REL.															
LD 3 3	MCNARY DAM	PORT KELLY (OR.)	08MY80		1.0	C016.0N	P	1	0.104			16MY	16MY	16MY	215	61
	EFFICIENCY REL.															
LA 2X 2	MCNARY DAM	PORT KELLY (OR.)	13MY80		1.2	4008.4S	P	1	0.083			05JN	05JN	05JN	205	21
	EFFICIENCY REL.															
LA 5 4	MCNARY DAM	PORT KELLY (OR.)	29MY80		0.9	C075.0M	P	1	0.114	1	0.170	09JN	09JN	09JN	170	39
	EFFICIENCY REL.															
LA B2 3	MCNARY DAM	PORT KELLY (OR.)	03JN80		0.2	C075.0M	P	1	0.496	1	0.741	10JN	10JN	10JN	185	61
	EFFICIENCY REL.															
LA H 1	MCNARY DAM	MCNARY TAILRACE	08AP80-12MY80		15.3	C075.0M	P	12	0.079	22	0.142	25AP	08MY	14MY	192	13
*	TAILRACE CONTROL		CWT ERLA			C016.0N	P	7	0.046			06MY	13MY	16MY	213	13
LA H 2	MCNARY DAM	MCNARY TAILRACE	14MY80-09JN80		6.0	C075.0M	P	1	0.017	3	0.049	24MY	24MY	24MY	170	39
*	TAILRACE CONTROL		CWT CEND													
RA 2 1	MCNARY DAM	BELOW BONNEVILLE	22AP80-18MY80		21.4	C075.0S	B	1	0.005	2	0.009	05MY	05MY	05MY	210	12
*	BARGE TRANSPORT		CWT ERPR			C075.0M	P	31	0.145	61	0.284	25AP	04MY	17MY	194	13
						C016.0N	P	19	0.089			30AP	06MY	06MY	199	15
RA 2 2	MCNARY DAM	BELOW BONNEVILLE	21MY80-30MY80		9.0	C075.0M	P	2	0.023	7	0.081	31MY	01JN	02JN	187	14
*	BARGE TRANSPORT		CWT LATB			4009.2S	P	1	0.012			04JN	04JN	04JN	205	15
RA V 1	MCNARY DAM	DALTON POINT	09AP80-12MY80		14.3	C075.0M	P	57	0.398	104	0.727	17AP	07MY	28MY	205	5
*	TRUCK TRANSPORT		CWT NDSM			C016.0N	P	8	0.056			06MY	06MY	09MY	205	7
RA V 2	MCNARY DAM	DALTON POINT	14MY80-13JN80		8.0	C075.0M	P	14	0.175	25	0.313	16MY	23MY	06JN	185	15
*	TRUCK TRANSPORT		CWT DY			C016.0N	P	1	0.013			16JN	16JN	16JN	182	6
						4009.3N	P	1	0.013			04JN	04JN	04JN	208	9
632003	NACHES	YAKIMA RIVER	09AP80-27MY80	6	43.8	C075.0M	P	17	0.039	26	0.060	29AP	10MY	10JN	187	15
	SKAMANIA STOCK					C016.0N	P	5	0.012			30AP	09MY	16MY	187	17

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 1ST FISH	MED. FISH	LAST FISH	AVG LEN MM	MVMT RATE KM/DAY
100343	NIAGARA SPRINGS IDENTIFI. HATCH. RESEAR.	PAHSIMEROI RIVER	19MR79		6	56.0	C016.0N	P	1	0.002			13MY	13MY	13MY	258	1
102156	NIAGRA SPRINGS	PAHSIMEROI	06AP80-16AP80		6	49.9	C075.0S	B	1	0.003	2	0.004	05MY	05MY	05MY	228	42
							C075.0M	P	25	0.051	42	0.085	29AP	10MY	12JN	233	36
							C016.0N	P	10	0.021			02MY	06MY	16MY	216	43
102157	NIAGRA SPRINGS	PAHSIMEROI	07AP80-17AP80		6	50.3	C075.0M	P	31	0.062	53	0.107	29AP	10MY	19JN	239	37
							C016.0N	P	2	0.004			13MY	13MY	16MY	245	36
631855	SKAMANIA	KLICKITAT RIVER	17AP80-22AP80		7	24.6	C075.0M	P	28	0.114	50	0.206	01MY	10MY	03JN	200	11
							C016.0N	P	6	0.025			02MY	09MY	16MY	201	14
632018	SKAMANIA SKAMANIA STOCK	WIND RIVER	24AP80-30AP80			75.0	C075.0S	B	1	0.002	1	0.002	08MY	08MY	08MY	199	14
							C075.0M	P	55	0.074	97	0.130	30AP	10MY	24MY	195	12
							C016.0N	P	17	0.023			06MY	13MY	19MY	198	13
							4009.4S	P	2	0.003			04JN	04JN	04JN	222	6
							4008.4S	P	1	0.002			05JN	05JN	05JN	211	6
LA PP 2 *	TUCANNON HATCHERY EVAL.	WALLA WALLA R.	15MY80-18MY80 CWT GDLA	171		16.9	C075.0M	P	1	0.006	2	0.015	03JN	03JN	03JN	160	23
RA L 1 *	TUCANNON HOMING STUDY	DALTON POINT	09AP80 CWT PRYB	164		21.7	C075.0S	B	5	0.024	9	0.040	15AP	21AP	22AP	162	11
							C075.0M	P	19	0.088	36	0.167	21AP	29AP	17MY	169	7
							C016.0N	P	3	0.014			06MY	06MY	09MY	181	7
LASMLAPR *	TUCANNON HOMING STUDY	DALTON PT.	08MY80 RA L 3	172		19.7	4009.3S	P	1	0.006			04JN	04JN	04JN	211	7
RA L 3 *	TUCANNON HOMING STUDY	DALTON PT.	08MY80 LASMLAPR	172		19.7	C075.0M	P	2	0.011	3	0.017	14MY	22MY	23MY	190	9
							C016.0N	P	7	0.036			13MY	13MY	13MY	178	38
DYLA *	TUCANNON TEST #3 ATPASE	DALTON POINT	12JN80 RA L 2	171		19.0	C016.0N	P	6	0.032			16JN	16JN	16JN	189	47
RA L 2 *	TUCANNON TEST #3 ATPASE	DALTON POINT	12JN80 CWT DYLA	171		19.0	C075.0M	P	1	0.006	2	0.011	14JN	14JN	14JN	180	66
091636	WALLOWA WALLOWA STOCK EVAL.	WALLOWA R. HATCHER	30AP78-12MY78		8	84.4	C075.0M	P	1	0.002	1	0.002	29AP	29AP	29AP	202	0
071614	WALLOWA	WALLOWA HAT.	16MY79-05AP80		15	51.7	C075.0M	P	10	0.020	18	0.036	08MY	10MY	25JN	220	1
							4008.4S	P	1	0.002			05JN	05JN	05JN	237	1
072201	WALLOWA	WALLOWA HAT.	21AP80		11	28.4	C075.0M	P	10	0.036	19	0.067	10MY	24MY	27JN	176	26
							C016.0N	P	1	0.004			16MY	16MY	16MY	178	37
050439	WARM SP. R. H EVAL AND CONTRIB.	WARM SP. R. HATCHE	10MY79		15	87.4	C075.0M	P	5	0.006	8	0.010	21AP	13MY	10JN	288	0
LD Y 1	WELLS DAM SPILLWAY TEST	WELLS DAM FOREBAY	01MY80			13.5	C075.0M	P	1	0.008	1	0.010	14MY	14MY	14MY	193	58

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 1ST FISH	RECAPTURE DATE MED. FISH	RECAPTURE DATE LAST FISH	AVG LEN MM	MVMT RATE KM/DAY
RD Y 1	WELLS DAM	WELLS DAM FOREBAY	01MY80			13.1	C075.0M	P	1	0.008	1	0.011	14MY	14MY	14MY	170	58
	SPILLWAY TEST																
RD Y 2	WELLS DAM	WELLS DAM FOREBAY	01MY80			13.6	C075.0M	P	1	0.008	2	0.014	23MY	23MY	23MY	230	34
	TURBINE TEST						C016.0N	P	1	0.008			16MY	16MY	16MY	158	54
LD K 3	WELLS DAM	WELLS DAM FOREBAY	03MY80			14.3	C075.0M	P	1	0.007	2	0.013	16MY	16MY	16MY	192	58
	TURBINE TEST																
RD K 1	WELLS DAM	WELLS DAM FOREBAY	03MY80			12.0	C075.0M	P	4	0.034	10	0.086	16MY	19MY	19MY	185	47
	SPILLWAY TEST																
RD K 3	WELLS DAM	WELLS DAM FOREBAY	03MY80			13.6	C075.0M	P	1	0.008	2	0.013	16MY	16MY	16MY	195	58
	TURBINE TEST																
LD IJ 3	WELLS DAM	WELLS DAM FOREBAY	05MY80			13.2	C075.0M	P	1	0.008	2	0.013	05JN	05JN	05JN	180	24
	TURBINE TEST																
RD IJ 2	WELLS DAM	WELLS DAM FOREBAY	05MY80			11.7	C075.0M	P	2	0.018	4	0.033	23MY	23MY	23MY	182	42
	SPILLWAY TEST																
RD IJ 3	WELLS DAM	WELLS DAM FOREBAY	05MY80			11.2	C075.0M	P	1	0.009	2	0.016	16MY	16MY	16MY	210	68
	TURBINE TEST																
LD Y 3	WELLS DAM	WELLS DAM TAILRACE	01MY80			13.0	C075.0M	P	2	0.016	4	0.028	16MY	16MY	16MY	190	50
	CONTROL						C016.0N	P	1	0.008			16MY	16MY	16MY	195	54
RD Y 3	WELLS DAM	WELLS DAM TAILRACE	01MY80			12.3	C075.0M	P	1	0.009	1	0.011	14MY	14MY	14MY	150	58
	CONTROL																
LD K 2	WELLS DAM	WELLS DAM TAILRACE	03MY80			13.1	C075.0M	P	2	0.016	6	0.048	19MY	20MY	21MY	167	44
	CONTROL																
RD K 2	WELLS DAM	WELLS DAM TAILRACE	03MY80			13.8	C075.0M	P	1	0.008	2	0.013	16MY	16MY	16MY	200	58
	CONTROL																

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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 1ST FISH	RECAPTURE DATE MED. FISH	RECAPTURE DATE LAST FISH	AVG LEN MM	MVMT RATE KM/DAY
BR		NO RELEASE INFO					C075.0M	P	3	0.000			29AP	05MY	12MY	175	
							C016.0N	P	3	0.000			01MY	02MY	10MY	174	
BR WH		NO RELEASE INFO					C016.0N	P	1	0.000			12MY	12MY	12MY	173	
							C016.0N	P	1	0.000			13MY	13MY	13MY	165	
LA 13 2		NO RELEASE INFO					C075.0M	P	1	0.000			06JN	06JN	06JN	290	
LA 2 1		NO RELEASE INFO					C075.0M	P	1	0.000			25AP	25AP	25AP	220	
LD IU 3		NO RELEASE INFO					C075.0M	P	1	0.000			29AP	29AP	29AP	200	
							C016.0N	P	1	0.000			06MY	06MY	06MY	205	
LET GO		NO RELEASE INFO					C016.0N	P	31	0.000			05MY	06MY	16MY	220	
NO TAG		NO RELEASE INFO					C075.0S	B	2	0.000			03MY	03MY	30MY	150	
							C075.0M	P	70	0.000			29AP	04MY	23JN	194	
							C016.0N	P	6	0.000			02MY	08MY	16MY	189	
													05JN	05JN	05JN	204	
							4007.4S	P	1	0.000			06JN	06JN	06JN	182	
							4007.3S	P	1	0.000			06JN	06JN	06JN	108	
RA IV 1		NO RELEASE INFO					C016.0N	P	1	0.000			09MY	09MY	09MY	232	

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 1ST FISH	RECAPTURE DATE MED. FISH	RECAPTURE DATE LAST FISH	AVG LEN MM	MVMT RATE KM/DAY
WH		NO RELEASE INFO					C075.0M	P	7	0.000			02MY	17MY	16JN	137	
							C016.0N	P	2	0.000			13MY	13MY	13MY	170	
LM		NO RELEASE INFO					C075.0M	P	10	-----			29AP	19MY	16JN	218	
							C016.0N	P	4	-----			25AP	12MY	21MY	199	
LMLP		NO RELEASE INFO					C075.0M	P	3	-----			28MY	09JN	09JN	233	
							C016.0N	P	1	-----			18JN	18JN	18JN	240	
LMLV		NO RELEASE INFO					C016.0N	P	3	-----			02MY	09MY	19MY	230	
LMLVRP		NO RELEASE INFO					C016.0N	P	1	-----			13MY	13MY	13MY	224	
LMRM		NO RELEASE INFO					C075.0M	P	1	-----			10JN	10JN	10JN	160	
LMRP		NO RELEASE INFO					C075.0M	P	8	-----			28AP	10MY	10JN	212	
							C016.0N	P	1	-----			05MY	05MY	05MY	240	
LMRV		NO RELEASE INFO					C075.0M	P	1	-----			10JN	10JN	10JN	200	
LP		NO RELEASE INFO					C075.0M	P	96	-----			24AP	10MY	11JN	205	
							C016.0N	P	27	-----			02MY	13MY	16JN	216	
							4004.3N	P	1	-----			27MY	27MY	27MY	180	
LPRM		NO RELEASE INFO					C075.0M	P	1	-----			09JN	09JN	09JN	240	
							C016.0N	P	1	-----			08MY	08MY	08MY	243	
LPRP		NO RELEASE INFO					C075.0S	B	1	-----			05MY	05MY	05MY	190	
							C075.0M	P	34	-----			29AP	01MY	19MY	197	
LPRPLV		NO RELEASE INFO					C075.0M	P	1	-----			10MY	10MY	10MY	200	
LV		NO RELEASE INFO					C075.0M	P	11	-----			28AP	10MY	06JN	209	
							C016.0N	P	26	-----			06MY	13MY	21MY	207	
							4006.3N	P	1	-----			29MY	29MY	29MY	227	
							4005.1S	P	1	-----			28MY	28MY	28MY	205	
							4004.2S	P	1	-----			07JL	07JL	07JL	296	
							4004.1S	P	1	-----			07JL	07JL	07JL	242	
LVRV		NO RELEASE INFO					C075.0M	P	1	-----			09MY	09MY	09MY	170	
							C016.0N	P	3	-----			06MY	16MY	21MY	190	
							4003.3S	P	1	-----			30MY	30MY	30MY	230	
RM		NO RELEASE INFO					C075.0M	P	6	-----			14AP	03MY	02JN	234	
							C016.0N	P	6	-----			22AP	06MY	16MY	218	
							4007.3S	P	1	-----			06JN	06JN	06JN	190	

SPECIES: STEELHEAD

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 1st FISH	MED. FISH	LAST FISH	AVG LEN MM	MVMT RATE KM/DAY
	PURPOSE OF RELEASE		OTHER MARKS													
RMLP		NO RELEASE INFO				C075.0M	P	2	-----			05MY	14MY	14MY	230	
RMRP		NO RELEASE INFO				C075.0M	P	4	-----			30AP	10MY	10MY	233	
						C016.0N	P	1	-----			20MY	20MY	20MY	240	
RP		NO RELEASE INFO				C075.0S	B	1	-----			13MY	13MY	13MY	220	
						C075.0M	P	140	-----			23AP	03MY	09JN	203	
						C016.0N	P	32	-----			23AP	09MY	21MY	204	
						4007.4S	P	1	-----			06JN	06JN	06JN	200	
RV		NO RELEASE INFO				C075.0M	P	7	-----			29AP	02MY	14MY	209	
						C016.0N	P	9	-----			06MY	13MY	16JN	206	
						4005.3S	P	1	-----			28MY	28MY	28MY	192	
						4004.2S	P	1	-----			07JL	07JL	07JL	285	

RELEASE AND RECAPTURE INFORMATION - COLUMBIA RIVER ESTUARY 1980

REPORT DATE 12/29/80

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

SPECIES: SOCKEYE

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 1ST FISH	MED. FISH	LAST FISH	AVG LEN MM	MVMT RATE KM/DAY
LA H 2	MCNARY DAM	MCNARY TAILRACE	14MY80-09JN80		2.3	C075.0M	P	2	0.087	6	0.255	24MY	24MY	24MY	122	39
*	TAILRACE CONTROL		CWT CEND													
RA V 2	MCNARY DAM	DALTON POINT	14MY80-13JN80		3.4	C016.0N	P	1	0.030			16JN	16JN	16JN	104	6
*	TRUCK TRANSPORT		CWT DY													

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Appendix Table A6.--Travel time and rate of movement for selected groups[a] of marked hatchery fish from release sites to Jones Beach, Oregon, 1980.

Release information					Recapture information				Movement rates
Mark: Brand[b] and/or Tag No. (Ag/D1/D2)	Site	Date	Size (No/lb)	No. (Thous)	Catch Act. (No.)	Catch Adj.[c] (%)	Date of median fish	Days	Release site to RKm 75 (km/day)
			Subyearling Chinook Salmon						
05/06/39	Spring Creek	10MR	123	130.2	117	0.189	27MR	17	11
05/06/40	" "	10AP	83	77.7	108	0.228	23AP	13	15
05/06/41	" "	09MY	51	61.8	55	0.126	13MY	4	48
63/19/47	Klickitat	27MY	85	156.1	64	0.065	09JN	13	22
07/21/33-36	Tanner Creek (Bonn)	27MY	69	197.9	76	0.067	03JN	7	22
63/20/06	Lower Kalama	06JN	150	144.5	209	0.194	14JN	8	7
05/06/43	Lit Wh Salmon R	10JN	120	162.6	94	0.072	19JN	9	21
63/21/05	Kalama Falls	13-24JN	115	100.4	163	0.238	11JL	28	2
63/21/53	Washougal River	30JN	80	319.2	609	0.322	19JL	19	8
05/06/42	Spring Creek	07AU	19	23.1	9	0.143	13AU	6	32
			Yearling Chinook Salmon						
07/20/40 & 42,44,46	Dexter (Oakrige)	10-11MR	9	121.3	78	0.156	11AP	32	13
07/17/33	Tanner Creek (Bonn)	13MR	7	49.3	70	0.320	04AP	22	7
07/19/47-48	Blw Willam Fal (S Sant)	13-14MR	6	60.6	66	0.271	30MR	17	8
07/20/48 & 51,53	McKenzie	15MR	6	95.4	44	0.113	13AP	29	14
07/19/49-51	Deschutes R (R'nd Butte)	14-15AP	8	87.3	31	0.069	30AP	16	27
RA IU 1	Rapid River	15AP	14	10.3	9	0.088	08MY	23	38
05/05/32	Kooskia	16AP	22	61.3	14	0.044	04MY	18	44
LA PP 2	Icicle Cr (Leavenworth)	24AP-01MY	-	195.5	30	0.032	27MY	33	24
05/04/37-38	Carson	28AP	19	170.9	88	0.077	07MY	9	22
LD IL 3 & RD F 2, LD IY 2, RD IL 3, LD F 2, RD IY 2	Priest Rp (Leavenworth)	20-27MY	-	90.2	48	0.090	05JN	16	35

Appendix Table A6.--cont

Release information					Recapture information				Movement rates
Mark: Brand[b/] and/or Tag No. (Ag/D1/D2)	Site	Date	Size (No/lb)	No. (Thous)	Catch Act. (No.)	Catch Adj.[c/] (%)	Date of median fish	Days	Release site to RKm 75 (km/day)
			Coho Salmon						
07/19/63	Tanner Creek (Cascade)	28AP	24	29.2	13	0.082	17MY	19	8
07/20/31-38	Cedar Creek (Sandy)	01MY	18	205.4	129	0.128	18MY	17	9
63/19/31 & 63/20/58	Green River (Toutle)	07MY	19	78.1	74	0.192	17MY	10	9
63/20/39-40	Washougal	08MY	18	198.3	150	0.135	17MY	9	16
05/03/59 & 05/06/54	Lit Wh Salmon (Willard)	23MY	-	93.9	18	0.037	01JN	9	21
63/20/37-38	Washougal	09JN	18	195.1	118	0.104	15JN	6	24
LA & RD 52 1, & LD IX 3, LD & RD IH 2	Rocky Reach Forebay (Turtle Rock)	13-19MY	-	127.7	50	0.039	06JN	24	34
			Steelhead						
05/04/55 & 10/21/61-62	N Fk Clearwater (Dworshak) (78 & 79 brood yr)	17-25AP	7	155.2	124	0.145	06-09MY	17	43
07/22/01	Wallowa	21AP	11	28.4	10	0.067	24MY	33	26
63/20/18	Wind River (Skamania)	24-30AP	-	75.0	56	0.131	10MY	16	12
10/21/56-57	Pahsimeroi (Niagra Sp)	06-17AP	6	100.2	57	0.097	10MY	34	36

a/ Marked groups which represent major groups present in the migrant population each year.

b/ Recapture data for Brands includes data from associated Tags (not listed).

c/ Purse and Beach seine recaptures of each mark group combined and replicate groups averaged.

Appendix Table A7.--Travel time and movement rate to and through the estuary for marked juvenile salmon caught in marine waters near shore (1 to 37 km), from Tillamook, Oregon, to Copalis, Washington, 1980.

Release information				Recapture information					Movement rates				
				RKm 75		Ocean			Release site to RKm 75		RKm 75 to Ocean[b]		
Mark: Brand[a] and/or Tag No. (Ag/D1/D2)	Site	Date	Size (No/lb)	Act. catch (No)	Date of median fish	Act. catch (No)	Date of 1st fish	Date of last fish	(days)	(km/day)	(days)	(km/day)	
				Subyearling chinook salmon									
07/20/55	Willam.R Sites (Sta Pd)	28AP-21JN	100	57	19MY	1	17JN	17JN	21	11	29	3	
05/06/48-9	Blw Bonn (Spring Cr)	19MY	-	71	24MY	4	27MY	29MY	5	31	3	31	
07/21/34	Tanner Cr (Bonn Hat)	27MY	69	14	03JN	1	17JN	17JN	7	22	14	7	
07/21/60	Big Cr	13-23MY	77	0	-	4	17JN	12JL	-	-	35	3	c/
07/21/61	Klaskanine	04JN	-	0	-	1	17JN	17JN	-	-	13	8	c/
07/21/63	Skamania Lt (Oxbow)	27-28MY	100	20	12JN	1	26JN	26JN	16	9	14	7	
01/02/03	Grays R (Weyco Pd)	10JN	64	0	-	1	26JN	26JN	-	-	16	6	c/
63/20/06	Lo Kalama (Kalama Falls)	06JN	150	209	14JN	1	13AU	13AU	8	7	60	2	
07/21/45	Deschutes R	14AP-06JN	-	4	06JL	1	14AU	14AU	83	5	39	3	
RA IC 1	Blw Bonn (McNary)	13JN-17JL	-	40	10JL	2	12JL	21JL	27	6	2	66	
63/19/48	Pr Rapid	20MY-24JN	88	11	11JL	2	21JL	22AU	52	11	10	10	
63/21/05	Kalama Falls	13-24JN	115	163	11JL	1	13AU	13AU	28	2	33	3	
LD AR 1	Blalock (John Day D)	27JN	-	0	-	1	21JL	21JL	-	-	24	4	c/
07/22/07	Tanner Cr (Bonn Hat)	30JN	83	38	15JL	1	21JL	21JL	15	10	6	22	
LD U 1	Prescott (Washougal) held	13JL	-	64	17JL	1	24JL	24JL	4	10	7	14	
63/21/53	Washougal R	30JN	80	609	18JL	6	13AU	14AU	18	8	26	4	
01/02/02	Lewis R wild (Lewis R)	16-29AP	-	16	29JL	1	14AU	14AU	104	1	16	6	
63/21/59	Lo Rivers (Cowlitz)	18-19JN	119	15	05AU	2	13AU	13AU	-	-	56	2	c/
63/21/60	Lewis R wild (Lewis R)	15JL	148	197	05AU	3	24JL	14AU	20	4	-	18	c/
63/21/24	" "	29MY-04JN	-	51	06AU	1	13AU	13AU	69	1	7	14	
63/21/25	" "	05-10JN	-	60	13AU	1	13AU	13AU	69	1	0	99	
05/06/42	Spring Cr	07AU	19	9	13AU	3	13AU	14AU	6	32	0	99	
63/22/14	Lewis R wild (Lewis R)	24JN-07JL	-	37	14AU	1	14AU	14AU	51	2	0	99	
63/21/54	Lo Rivers (Cowlitz)	03-18JN	129	66	15AU	2	21JL	21JL	-	-	48	2	c/
63/22/08	Lewis R wild (Lewis R)	17-25JN	-	50	15AU	1	22AU	22AU	59	1	7	14	
63/20/05	Elokomin	01JN	80	3	-	1	31AU	31AU	-	-	91	1	c/

Appendix Table A7.--cont

Release information				Recapture information					Movement rates			
				RKm 75		Ocean			Release site to RKm 75		RKm 75 to Ocean[b]	
Mark: Brand[a] and/or Tag No. (Ag/D1/D2)	Site	Date	Size (No/lb)	Act. catch (No)	Date of median fish	Act. catch (No)	Date of 1st fish	Date of last fish	(days)	(km/day)	(days)	(km/day)
				Coho salmon								
05/06/51	Dalton Pt (Willard)	21MY	-	5	31MY	1	30MY	30MY	10	13	-	27 c/
05/06/50	Barge Bonn (Willard)	25MY	-	8	31MY	1	05SE	05SE	6	26	97	2
LD IH 2 & RD IH 2	Rocky Reach Forebay (Turtle Is)	19MY	-	11	05JN	2	07JN	01SE	17	40	2	44
RA V 2	Dalton Pt (McNary)	14MY-13JN	-	0	-	1	07JN	07JN	-	-	24	10 c/
63/20/37-8	Washougal	09JN	18	118	15JN	5	07JN	28AU	6	24	22	4
63/19/54-5	"	07JL	18	244	12JL	10	28AU	08SE	5	29	47	2
07/19/54 & 57	Big Cr	07JL	19	0	-	3	31AU	01SE	-	-	55	2 c/
				Steelhead								
63/20/18	Wind R (Skamania)	24-30AP	-	56	10MY	3	04JN	05JN	16	12	25	6
RA W 2	Beacon Rock (Lo Gran)	01-10MY	-	15	10MY	3	29MY	05JN	9	17	9	10
05/06/36 & LD DT 1	Pahsimeroi R (Hager)	04FE-27AP	4	19	11MY	1	04JN	04JN	97	13	121	1
LA DT 3 & 05/06/35	" "	21-27AP	5	8	12MY	2	04JN	05JN	98	13	23	7
RA L 3 & LASM/LAPR	Dalton Pt (Tucannon)	08MY	-	2	22MY	1	04JN	04JN	14	9	13	12
RA V 2	Dalton Pt (McNary)	14MY-13JN	-	14	23MY	1	04JN	04JN	9	15	12	13
LA 2X 2	Port Kelly (McNary)	13MY	-	0	-	1	05JN	05JN	-	-	23	25 c/
RA 2 2	Blw Bonn (McNary)	21-30MY	-	2	01JN	1	04JN	04JN	11	14	3	52
LA IS 4	Clarkston (Lo Gran D)	23MY-02JN	-	2	07JN	1	05JN	05JN	15	44	-	62 c/
LD SU 3	Clearwater (Dworshak)	01MY	5	0	-	1	06JN	06JN	-	-	36	23 c/

a/ Recapture data for brands includes data from associated tags (not listed).

b/ Based upon first date of ocean recapture and actual km to ocean recovery site (movement rate for recaptures at 4005.0 calculated using 24km from river mouth.

c/ Release site downstream of RKm 75, or no recaptures at RKm 75, or median date after ocean recaptures; therefore ocean movement rate was calculated from release site.

Appendix Table A7.--cont

Release information				Recapture information					Movement rates			
				RKm 75		Ocean			Release site to RKm 75		RKm 75 to Ocean[b]	
Mark: Brand[a] and/or Tag No. (Ag/Dl/D2)	Site	Date	Size (No/lb)	Act. catch (No)	Date of median fish	Act. catch (No)	Date of 1st fish	Date of last fish	(days)	(km/day)	(days)	(km/day)
				Yearling chinook salmon								
07/19/48	Blw Willam Falls (S San)	13-14MR	6	30	25MR	2	03JN	05JN	12	11	70	2
07/17/33	Tanner Cr (Bonn Hat)	13MR	7	70	04AP	1	30MY	30MY	22	7	56	2
07/20/40 & 42, 44, 46	Dexter (Oakridge)	10-11MR	9	78	11AP	2	29MY	07JN	32	13	48	2
RA V 1 & NDSM	Dalton Pt (McNary)	09AP-12MY	-	38	22AP	2	06JL	07JL	13	10	75	1
LA IU 3	Blw Bonn (Rapid R)	09-15AP	14	16	25AP	1	28MY	28MY	16	10	33	2
RA 2 1	Blw Bonn (McNary)	22AP-18MY	-	20	28AP	1	07JN	07JN	6	26	40	2
10/21/26	Lemhi R (Hayden Cr)	03-04AP	26	4	04MY	1	28MY	28MY	31	36	24	3
LA H 1	McNary Tail (McNary)	08AP-12MY	-	25	06MY	1	04JN	04JN	28	14	29	5
RA IK 3	Dalton Pt (Leavenworth)	01MY	-	34	06MY	1	29MY	29MY	5	26	23	4
05/04/37-8	Carson	28AP	19	88	07MY	3	29MY	04JN	9	22	22	4
05/06/27	Warm Spring	07-14AP	-	51	08MY	1	28MY	28MY	31	13	20	4
LA PP 1 & LA S 1	Wh Bluffs (Leavenworth)	24AP	-	29	16MY	3	28MY	28MY	22	24	12	7
RA V 2	Dalton Pt (McNary)	14MY-13JN	-	22	23MY	1	30MY	30MY	9	15	7	16
RA 2 2	Blw Bonn (McNary)	21-30MY	-	1	24MY	1	28MY	28MY	3	52	4	23
LA H 2	McNary Tail (McNary)	14MY-09JN	-	7	27MY	4	29MY	06JN	13	30	2	46
03/61/02 & LA PP 2	Icicle R (Leavenworth)	24AP-01MY	-	16	30MY	4	29MY	06JN	36	20	-	23 c/
RD IL 1 & LD IL 1	Richland (Leavenworth)	22MY	-	10	03JN	1	05JN	05JN	12	39	2	68
07/21/53	Deschutes R (Rnd Butte)	01MY-30JN	20	2	13JN	1	05JN	05JN	43	10	-	16 c/
				Coho salmon								
63/20/39-40	Washougal	08MY	18	150	17MY	8	27MY	08SE	9	16	10	10
07/20/31-8	Cedar Cr (Sandy)	01MY	18	129	18MY	2	30MY	04SE	17	9	12	10
07/21/55	Vander Pd (Tucker Cr)	11AP	12	0	-	1	31MY	31MY	-	-	50	2 c/
05/06/53	Hammond (Willard)	23MY	-	0	-	2	29MY	30MY	-	-	6	5 c/
05/06/52	Beaver Term (Willard)	22MY	-	21	23MY	2	28MY	29MY	1	9	5	18

Appendix Table A8.--Monthly catch composition by month of beach seine samples at Jones Beach, March through September, 1980.

Month	Mar.	April	May	June	July	Aug.	Sept.	Yearly total	CPUE
No. Sets	76	172	191	234	218	196	125	1212	
Species									
Chin.-subyearling *Oncorhynchus tshawytscha*	4,186	8,439	20,868	21,565	23,643	10,422	3,148	92,271	76.0
Chin.-yearling *Oncorhynchus tshawytscha*	1,253	2,698	1,359	74	10	1	0	5,395	4.4
Coho-juvenile *Oncorhynchus kisutch*	1	1,364	4,513	370	37	1	1	6,287	5.2
Sockeye-juvenile *Oncorhynchus nerka*	8	16	3	5	3	0	0	35	0.0
Chum-juvenile *Oncorhynchus keta*	2	1	6	1	0	0	0	10	0.0
Steelhead-juvenile *Salmo gairdneri*	0	38	202	393	84	3	2	722	0.6
Coastal Cutthroat Tr. *Salmo clarki*	3	95	21	58	69	99	34	379	0.3
Threespine stickleback *Gasterosteus aculeatus*	595	1,536	2,555	1,809	5,009	2,140	927	14,571	12.0
American Shad-juv-year 1. *Alosa sapidissima*	1.	34	162	761	647	356	50	2,111	1.7
American Shad-juv-subyear. *Alosa sapidissima*	0	0	0	1	12	64	12,414	18,906	15.6
Eulachon *Thaleichthys pacificus*	64	4	0	0	0	0	0	68	0.1
Starry Flounder *Platichthys stellatus*	93	143	192	49	180	688	503	1,848	1.5
Carp *Cyprinus carpio*	31	23	33	147	25	5	4	268	0.2
Sucker *Catostomus sp.*	49	30	196	109	59	42	33	518	0.4
Black Crappie *Pomoxis nigromaculatus*	0	5	9	5	1	4	0	24	0.0
Bluegill *Lepomis macrochirus*	0	0	0	0	1	0	0	1	0.0
Largemouth Bass *Micropterus salmoides*	0	1	1	0	0	1	0	3	0.0
Peamouth *Mylocheilus caurinus*	95	106	3,706	2,345	1,980	2,016	1,125	11,373	9.4
Northern Squawfish *Ptychocheilus oregonensis*	0	2	107	110	184	198	98	762	0.6
Mountain Whitefish *Prosopium williamsoni*	2	3	1	5	50	23	14	98	0.1
Prickly Sculpin *Cottus asper*	10	1	763	385	270	93	129	1,651	1.4
Pacific Lamprey-adult *Lampetra tridentata*	0	0	2	6	1	0	0	9	0.0
Steelhead -adult *Salmo gairdneri*	10	19	9	58	20	13	1	130	0.1
Chinook Salmon-adult *Oncorhycnhus tshawytscha*	0	5	6	18	3	23	17	72	0.1
Chinook Salmon-jack *Oncorhynchus tshawytscha*	0	1	4	206	22	13	18	264	0.2

Appendix Table A8.--cont

Month	Mar.	April	May	June	July	Aug.	Sept.	Yearly total	CPUE
No. Sets									
Species									
Coho Salmon-adult *Oncorhynchus kisutch*	0	0	0	0	0	9	15	23	0.0
Coho Salmon-jack *Oncorhynchus kisutch*	0	0	0	0	0	2	14	16	0.0
Sockeye Salmon-adult *Oncorhynchus nerka*	0	0	0	162	20	0	0	182	0.2
American Shad-adult *Alosa sapidissima*	0	0	0	1	4	1	0	6	0.0
Goldfish *Carassium auratus*	1	1	0	2	2	0	0	6	0.0
Yellow Perch *Perca flavescens*	2	16	11	14	56	11	2	112	0.1
White Sturgeon *Acipenser transmontanus*	1	0	38	9	12	1	0	43	0.0
Redside Shinner *Richardsonius balteatus*	0	0	18	12	6	0	0	36	0.0
Bullhead *Ictalurus sp.*	0	0	2	0	0	0	0	2	0.0
Sand Roller *Percopsis transmontana*	0	0	3	4	0	0	0	7	0.0
Longfin Smelt *Spirinchus thaleichthys*	0	1	0	0	0	0	0	1	0.0
Leopard Dace *Rhinichthys falcatus*	0	0	0	0	1	1	1	3	0.0

Appendix Table A9.--Monthly catch composition by month of purse seine samples at Jones Beach, March through September, 1980.

Month	Mar.	April	May	June	July	Aug.	Sept.	Yearly total	CPUE
No Sets	15	65	78	76	52	30	13	329	
Species									
Chin. subyearling *Onocorhynchus tshawytscha*	14	389	4,903	3,147	3,004	1,002	341	12,800	38.9
Chin. yearling *Oncorhynchus tshawytscha*	48	2,572	4,978	766	5	1	0	8,370	25.4
Coho-juvenile *Oncorhynchus kisutch*	0	735	10,455	1,553	326	2	0	13,071	39.7
Sockeye-juvenile *Oncorhynchus nerka*	0	13	235	99	0	0	0	347	1.1
Steelhead-juvenile *Salmo gairdneri*	1	1,612	7,913	473	5	0	0	10,004	30.4
Chum-juvenile *Oncorhynchus keta*	0	0	0	0	0	0	0	0	0.0
Coastal Cuthroat Trout *Salmo clarki*	0	45	57	14	1	3	2	122	0.4
Threespine Stickleback *Gasterosteus aculeatus*	0	17	5	20	44	43	12	141	0.4
American Shad-juv-year l. *Alosa sapidissima*	0	0	3	51	58	96	87	295	0.9
American Shad-juv-subyear. *Alosa sapidissima*	0	0	0	0	0	72	714	796	2.4
Eulachon *Thaleichthys pacificus*	249	7	0	0	0	0	0	256	0.8
Starry Flounder *Platichthys stellatus*	4	4	30	0	0	5	5	48	0.1
Carp *Cyprinus carpio*	0	2	6	6	0	0	1	15	0.0
Sucker *Catostomus sp.*	0	2	26	32	7	1	1	69	0.2
Black Crappie *Pomoxis nigromaculatus*	0	0	1	0	0	1	0	2	0.0
Bluegill *Lepomis macrochirus*	0	0	0	0	0	0	0	0	0.0
Largemouth Bass *Micropterus salmoides*	0	0	0	0	0	0	0	0	0.0
Peamouth *Mylocheilus caurinus*	2	4	505	1,035	658	239	49	2,492	7.6
Northern Squawfish *Ptychocheilus oregonensis*	0	0	10	4	12	2	1	29	0.1
Mountain Whitefish *Prosopium williamsoni*	0	0	0	0	2	0	0	2	0.0
Prickly Sculpin *Cottus asper*	0	0	13	0	0	0	0	13	0.0
Pacific Lamprey-adult *Lampetra tridentata*	0	1	3	0	0	0	0	4	0.0
Steelhead-adult *Salmo gairdneri*	2	39	16	8	0	0	0	64	0.2
Chinook salmon-adult *Oncorhycnhus tshawytscha*	0	2	0	0	0	2	0	4	0.0
Chinook salmon-jack *Oncorhynchus tshawytscha*	0	0	0	3	0	0	1	4	0.0
Coho salmon-adult *Oncorhynchus kisutch*	0	0	0	0	0	0	4	4	0.0

Appendix Table A9.--cont

Month	Mar.	April	May	June	July	Aug.	Sept.	Yearly total	CPUE
No. Sets									
Species									
Coho salmon-jack *Oncorhynchus kisutch*	0	0	0	0	0	0	2	2	0.0
Sockeye salmon-adult *Oncorhynchus nerka*	0	0	0	0	1	0	0	1	0.0
American Shad-adult *Alosa sapidissima*	0	0	13	29	15	5	18	80	0.2

Appendix Table A10.--Monthly catch composition by month of purse seine samples in the lower Columbia River estuary at RKm 16, April through August, 1980.

Month	April	May	June	July	Aug.	Yearly Total	CPUE
No. Sets	29	37	33	62	19	180	
Species							
Chin.-subyearling *Oncorhynchus tshawytscha*	7	3,186	4,422	5,793	316	13,724	76
Chin.-yearling *Oncorhynchus tshawytscha*	450	3,949	165	11	2	4,581	25
Coho-juvenile *Oncorhynchus kisutch*	203	4,410	165	206	0	4,984	28
Sockeye-juvenile *Oncorhynchus nerka*	1	60	5	0	0	67	0
Chum-juvenile *Oncorhynchus keta*	0	5	0	0	0	5	0
Steelhead-juvenile *Salmo gairdneri*	176	2,907	70	0	0	3,151	17
Coastal Cuthroat Tr. *Salmo clarki*	4	0	28	76	15	123	0
American Shad-juvenile *Alosa sapidissima*	15	182	640	369	364	1,570	9
American Shad-adult *Alosa sapidissima*	1	2	10	9	1	23	0
Pacific Herring-juvenile *Clupea pallasii*	10	12,500	4,520	21,000	5,250	43,280	239
Pacific Herring-adult *Clupea pallasii*	100	664	72	647	64	1,547	9
Northern Anchovy-juvenile *Engraulis mordax*	0	139	50	96	2	287	2
Northern Anchovy-adult *Engraulis mordax*	0	435	20	127	31	613	3
Whitebait Smelt *Allosmerus elongatus*	0	105	485	80	0	670	4
Surf Smelt-juvenile *Hypomesus pretiosus*	32	44	1,130	3,500	230	4,936	27
Surf Smelt-adult *Hypomesus pretiosus*	2	14	83	255	155	509	3
Longfin Smelt-juvenile *Spirinchus thaleichthys*	0	215	4,100	1,460	43	5,818	32
Longfin Smelt-adult *Spirinchus thaleichthys*	0	850	546	150	140	1,186	7
Eulachon *Thaleichthys pacificus*	43	3	0	0	0	46	0
Pacific Tomcad-juvenile *Microgadus proximus*	0	0	0	2	2	4	0
Tube-Snout *Aulorhynchus flavidus*	0	19	0	0	0	19	0
Stickleback *Gasterosteus aculeatus*	288	72	58	89	4	511	3
Bay Pipefish *Syngnathus griseolineatus*	0	2	0	0	1	3	0
Redtail Surfperch-adult *Amphistichus rhodoterus*	0	0	0	29	2	31	0
Shiner Perch *Cymatogaster aggregata*	0	114	73	1,475	75	1,737	10
Walleye Surfperch-juvenile *Hyperprosopon argenteum*	0	0	1	2	0	3	0
Snake Prickleback *Lumpenius sagitta*	0	2	0	0	0	2	0

Appendix Table A10.--cont

Month	April	May	June	July	Aug.	Yearly total	CPUE
No. Sets	29	37	34	62	19	181	
Species							
Pacific Sand Lance *Ammodgtes hexapterus*	12	0	0	0	0	12	0
Pacific Pompano *Peprilus simillim*	0	1	0	0	0	1	0
Rockfish-juvenile *Sebastes sp.*	0	0	0	7	0	7	0
Kelp Greenling-juvenile *Hexagranmmos decagrammus*	0	2	0	0	0	2	0
Prickly Sculpin *Cottus asper*	0	9	16	15	1	41	0
Pacific Staghorn Sculpin *Leptrcottis armetus*	0	33	39	42	0	114	1
Cabezon-juvenile *Scorpaenichthys marmontus*	0	0	0	2	0	2	0
Starry Flounder-juvenile *Platichthys stellatus*	0	107	19	44	15	185	1
Starry Flounder-adult *Platichthys stellatus*	0	3	1	1	1	6	0
White Sturgeon *Acipenser transmontanus*	1	1	0	0	0	2	0
Pacific Lamprey-juvenile *Lampetra tridentatus*	1	44	106	21	14	246	1
Pacific Lamprey-adult *Lampetra tridentatus*	2	1	0	0	0	3	0
River Lamprey *Lampetra yresi*	0	12	43	133	72	260	1
Dungeness Crab-juvenile *Cancer magister*	1	3	0	0	0	4	0
Dungeness Crab-adult *Cancer magister*	0	1	0	0	0	1	0
Sand Shrimp *Crangon sp.*	0	200	880	375	27	1,482	8
Largescale Sucker *Catostomus macrochelus*	0	0	1	1	0	2	0
Peamouth *Mylocheilus caurinus*	0	0	1	3	0	4	0
Chin.-adult *Oncorhynchus tshawytscha*	0	0	0	1	0	1	0
Coho-adult *Oncorhynchus kisutch*	0	0	0	0	1	1	0
Steelhead-adult *Salmo gairdneri*	5	5	1	0	0	11	0

Appendix Table A11.--Monthly catch composition of purse seine sampling in marine waters within 24 km of the Columbia River mouth, 1980.

Species / Month	June	July	Aug.	Yearly total	CPUE
Set	12	18	37	67	
Chin. subyearling *Oncorhynchus tshawytscha*	147	255	1106	1508	23
Chin. yearling *Oncorhynchus tshawytscha*	5	21	16	42	1
Chin. adult *Oncorhynchus tshawytscha*	0	2	0	2	0
Coho juvenile *Oncorhynchus kisutch*	4	0	2	6	0
Coho adult *Oncorhynchus kisutch*	0	1	3	4	0
Starry flounder juvenile *Platichthys stellatus*	1	20	34	55	1
Starry flounder adult *Platichthys stellatus*	0	2	5	7	0
Sand sole juvenile *Psettichthys melanostictus*	3	17	15	35	1
Sand sole adult *Psettichthys melanostictus*	0	1	2	3	0
Rex sole *Glyptocephalus zachirus*	2	6	5	13	0
Englis sole *Parophrys vetulus*	5	3	21	29	0
Sanddab *Citharichthys sp*	21	46	76	143	2
American shad *Alosa sapidissima*	0	38	58	96	1
Pacific herring *Clupea harengus*	383	719	951	2,053	31
Northern anchovy *Engraulis mordax*	105	35,229	580	35,914	536
Surf smelt *Hypomesus pretiosus*	522	3,283	1,192	4,996	75
Longfin smelt *Spirinchus thaleichthys*	17	181	177	395	6
Redtail surfperch *Amphistichus rhodoterus*	0	16	69	85	1
Shiner perch *Cymatogaster aggregata*	0	350	780	1,130	17
Pacific pompano *Peprilus simillimus*	1	0	5	6	0
Snake prickleback *Lumprnus sagitta*	0	0	1	1	0
Pacific Sandlance *Ammodytes hexapterus*	19	0	88	107	1
Pacific Tomcod *Microgadus proximus*	0	0	9	9	0
Rockfish *Sebastes sp*	8	7	0	15	0
Staghorn sculpin *Leptocotus armatus*	0	8	37	45	1
Red irish lord *Hemilepidotus hemilepidotus*	0	1	3	4	0

Appendix Table A11.--cont

Species Month	June	July	Aug.	Yearly total	CPUE
Set	12	18	37	67	
Cabezon *Scorpaenichthys marmoratus*	0	4	3	7	0
White Sturgeon *Acipenser transmontanus*	0	1	1	2	0
Green sturgeon *Acipenser medirostris*	0	2	1	3	0
Spiny dogfish *Squalus acanthias*	0	9	2	11	0
Big skate *Raja binoculata*	0	0	2	2	0
Dungeness crab *Cancer magister*	0	88	89	177	3

Appendix Table A12.--Marked juvenile chinook salmon captured off Washington-Oregon coast, 1980.

Brand or CWT	Source (brood year)	Date released	Release site	Distance from Col. River mouth (RKm)	Date captured	Transect (station)	Fork length at capture (mm)
034902 (S)	Leavenworth (78)	4/24/80	White Bluffs	(596)	5/28/80	South (1) Jetty	131
036102 (S)	Leavenworth (78)	4/24/80	Icicle River	(787)	6/06/80	Klipsan (1) Beach	158
050437 (S)	Carson (78)	4/28/80	Carson	(274)	5/29/80	North (3) Head	169
050438 (S)	Carson (78)	4/28/80	Carson	(274)	6/04/80	Grays (1) Harbor	160
050627 (S)	Warm Sp. (78)	4/07/80-4/14/80	Warm Springs	(485)	5/28/80	South (1) Jetty	146
071733 (S)	Bonneville (78)	3/13/80	Tanner Creek	(230)	5/30/80	Tillamook (1) Rock	223
071948	Oakridge (78)	3/13/80	South Santiam	(205)	(a) 6/03/80 (N)	Copalis (1) Head	200
					(b) 6/05/80 (S)	Willapa (1) Bay	240
072042 (S)	Oakridge (78)	3/11/80	Willamette R. (Dexter)	(491)	6/07/80	South (3) Jetty	215
072153 (S)	Round Butte (78)	5/01/80-6/30/80	Deschutes R. (Rnd. Butte)	(506)	6/05/80	Willapa (2) Bay	131
102112 (S)	Red River (78)	9/27/79	S. Fork Clearwater	(1000)	6/07/80	South (3) Jetty	137
102126 (S)	Hayden Cr. (78)	4/04/80	Hayden Creek	(1187)	5/28/80	South (1) Jetty	160
603149	Ore. Aqua (78)	6/28/80	Yaquina Bay	(NA)	8/31/80	Tillamook (2) Bay	236
603339	Ore. Aqua (78)	6/30/80	Yaquina Bay	(NA)	8/31/80	Tillamook (3) Bay	247
624702	Anadromous Inc. (78)	7/19/80	Coos Bay	(NA)	8/31/80	Tillamook (3) Bay	201
631859 (S)	Lewis R. (78)	7/13/79-7/26/79	Lewis River	(163)	5/30/80	Tillamook (1) Bay	160

Appendix Table A12.—cont

Brand or CWT	Source (brood year)	Date released	Release site	Distance from Col. River mouth (RKm)	Date captured	Transect (station)	Fork length at capture (mm)
RA V 1 (S)	McNary Dam (78)	4/09/80-5/12/80	Dalton Pt.	(206)	(a) 6/06/80	Tillamook (1) Rock	206
					(b) 7/06/80 (S)	Tillamook (1) Rock	245
RA H 1 (S)	McNary Dam (78)	4/08/80-5/12/80	McNary Tailrace	(467)	6/04/80	Grays (2) Harbor	132
LA IU 3 (S)	Rapid R. (78)	4/20/80	Trucked Below Bonn.	(230)	5/28/80	South (1) Jetty	157
LA S 1 (S)	Leavenworth (78)	4/24/80	White Bluffs	(596)	5/28/80	South (3) Jetty	120
LA PP 1 (S)	Leavenworth (78)	4/24/80	White Bluffs	(596)	5/28/80	South (3) Jetty	162
LA PP 2 (S)	Leavenworth (78)	4/24/80-5/01/80	Icicle River	(787)	(a) 5/29/80	North (1) Head	142
					(b) 5/29/80	North (3) Head	127
					(c) 5/29/80	North (3) Head	135
LA H 2 (S)	McNary Dam (78)	5/14/80-6/09/80	McNary Dam Tailrace	(467)	(a) 5/29/80	North (3) Head	163
					(b) 5/29/80	North (3) Head	111
					(c) 6/06/80	Klipsan (1) Beach	160
RA 2 2 (S)	McNary Dam (78)	5/21/80-5/30/80	Barged Below Bonn.	(230)	5/28/80	South (3) Jetty	151
RA IK 3 (S)	Leavenworth (78)	5/01/80	Trucked to Dalton Pt.	(206)	5/29/80	North (3) Head	123
RD IL 1 (S)	Leavenworth (78)	5/22/80	Richland	(540)	6/05/80	Willapa (2) Bay	153
RA W 2 (S)	L. Granite Dam (78)	5/01/80-5/10/80	Trucked to Beacon Rock	(228)	5/29/80	North (3) Head	123
RA 2 1 (S)	McNary Dam (78)	4/22/80-5/18/80	Barged Below Bonn.	(230)	6/07/80	South (4) Jetty	200

Appendix Table A12.--cont

Brand or CWT	Source (brood year)	Date released	Release site	Distance from Col. River mouth (RKm)	Date captured	Transect (station)	Fork length at capture (mm)
RA V 1 (S)	McNary Dam (78)	4/09/80-5/12/80	Trucked to Dalton Pt.	(206)	6/06/80	Tillamook (1) Rock	206
050648	Spring Creek (79)	5/19/80	Barged Below Bonn.	(230)	(a) 5/29/80	North (2) Head	99
					(b) 5/29/80	North (3) Head	85
050649	Spring Creek (79)	5/19/80	Barged Below Bonn.	(230)	(a) 5/27/80	Delmoor (1)	99
					(b) 5/29/80	North (1) Head	92
072160	Big Creek (79)	5/13/80-5/27/80	Big Creek	(50)	6/12/80	Willapa (1) Bay	119
632005	Elokomin (79)	6/01/80	Elokomin River	(94)	8/31/80	Tillamook (2) Rock	271
RA IC 1	McNary Dam (79)	6/13/80-7/17/80	Trucked Below Bonn.	(230)	7/12/80	Willapa (1) Bay	94

Appendix Table A13.--Marked juvenile coho salmon captured off Washington-Oregon coast, 1980

Brand or CWT	Source (brood year)	Date released	Release site	Distance from Col. River mouth (RKm)	Date captured	Transect (station)	Fork length at capture (mm)
050638	Willard	10/24/79-10/30/79	Yakima River	(535)	8/31/80	Tillamook Bay (2)	264
050650	Willard	5/25/80	Barged Below Bonn.	(230)	9/05/80	Copalis Head (3)	283
050651	Willard	5/21/80	Trucked to Dalton Pt.	(206)	5/30/80	Tillamook Rock (2)	140
050652	Willard	5/22/80	Trucked to Beaver Ter.	(84)	(a) 5/28/80	South Jetty (1)	127
					(b) 5/28/80	South Jetty (3)	127
					(c) 5/29/80	North Head (3)	115
050653	Willard	5/23/80	Trucked to Hammond	(13)	5/30/80	Tillamook Rock (2)	157
071954	Big Creek	7/01/80	Big Creek	(50)	9/01/80	Cape Falcon (2)	256
071957	Big Creek	7/01/80	Big Creek	(50)	(a) 8/31/80	Tillamook Bay (3)	231
					(b) 8/31/80	Tillamook Bay (3)	301
072005	Smith Creek	5/09/80	Umpqua River	(NA)	9/01/80	Cape Falcon (2)	319
072015	Siletz River	3/15/80	Siletz River	(NA)	6/07/80	South Jetty (1)	230
072036	Sandy	5/01/80	Cedar Creek	(231)	9/04/80	Grays Harbor (1)	299
072037	Sandy	5/01/80	Cedar Creek	(231)	5/30/80	Tillamook Rock (2)	135
072155	Lewis & Clark	4/11/80	Vanderveldt Pond	(30)	5/31/80	Tillamook Bay (3)	227
603125	Oregon Aqua	3/15/80	Yaquina Bay	(NA)	6/07/80	South Jetty (3)	227

Appendix Table A13.--cont

Brand or CWT	Source (brood year)	Date released	Release site	Distance from Col. River mouth (RKm)	Date captured	Transect (station)	Fork length at capture (mm)
603336	Oregon Aqua	8/05/80	Yaquina Bay	(NA)	8/31/80	Tillamook (3) Bay	172
624802	Anadromous Inc.	7/21/80	Coos Bay	(NA)	9/01/80	Cape (1) Falcon	187
631954	Washougal River	7/07/80	Washougal River	(221)	8/31/80	Tillamook (3) Bay	227
631955	Washougal River	7/07/80	Washougal River	(221)	(a) 8/28/80	Delmoor (3)	216
					(b) 8/29/80	South (2) Jetty	215
					(c) 8/31/80	Tillamook (3) Bay	210
					(d) 8/31/80	Tillamook (3) Bay	212
					(e) 9/02/80	Tillamook (1) Rock	191
					(f) 9/02/80	Tillamook (1) Rock	229
					(g) 9/06/80	Willapa (1) Bay	224
					(h) 9/08/80	North (2) Head	243
632037	Washougal River	6/07/80	Washougal River	(221)	(a) 7/07/80	Delmoor (1)	182
					(b) 7/10/80	Copalis (2) Head	182
					(c) 8/28/80	Delmoor (3)	274
632038	Washougal River	5/07/80	Washougal River	(221)	(a) 7/07/80	Delmoor (1)	168
					(b) 8/28/80	Delmoor (3)	286
632039	Washougal River	5/07/80	Washougal River	(221)	(a) 5/27/80	Delmoor (2)	125

Appendix Table A13.--cont

Brand or CWT	Source (brood year)	Date released	Release site	Distance from Col. River mouth (RKm)	Date captured	Transect (station)	Fork length at capture (mm)
632039	Washougal River	5/07/80	Washougal River	(221)	(b) 9/04/80	Grays (1) Harbor	308
					(c) 9/08/80	North (2) Head	311
632040	Washougal River	5/08/80	Washougal River	(221)	(a) 5/28/80	South (1) Jetty	141
					(b) 7/07/80	Delmoor (2)	150
					(c) 9/02/80	Tillamook (1) Rock	258
					(d) 9/05/80	Copalis (3) Head	305
					(e) 9/06/80	Willapa (1) Bay	309
RA V 2	McNary Dam	5/14/80-6/13/80	Trucked Dalton Pt.	(206)	(a) 5/30/80	Tillamook (2) Rock	160
					(b) 6/07/80	South (3) Jetty	170
RD IH 1	Rocky Reach	5/19/80	Rocky Reach Dam	(758)	9/01/80	Cape (2) Falcon	256

Appendix Table A14.--Marked juvenile steelhead captured off Washington-Oregon coast, 1980.

Brand or CWT	Source (brood year)	Date released	Release site	Distance from Col. River mouth (RKm)	Date captured	Transect (station)	Fork length at capture (mm)
050635	Hagerman (79)	4/21/80-4/27/80	Pahsimeroi River	(1305)	6/05/80	Willapa (3) Bay	230
632018	Skamania (79)	4/24/80-4/30/80	Wind River	(266)	(a) 6/04/80	Grays (4) Harbor	220
					(b) 6/04/80	Grays (4) Harbor	225
RA L 3	Tucannon (78)	5/08/80	Trucked Dalton Pt.	(206)	6/04/80	Grays (3) Harbor	211
RA 2 2	McNary Dam	5/21/80-5/30/80	Barged Below Bonn.	(230)	6/04/80	Grays (2) Harbor	205
RA V 2	McNary Dam	5/14/80-6/13/80	Trucked Dalton Pt.	(206)	6/04/80	Grays (3) Harbor	206
LA DT 1	Hagerman (79)	4/27/80	Pahsimeroi River	(1305)	6/04/80	Grays (4) Harbor	246
LA DT 3	Hagerman (79)	4/27/80	Pahsimeroi River	(1305)	6/04/80	Grays (4) Harbor	240
RA W 2	Lower Granite	5/01/80-5/10/80	Barged Beacon Rock	(228)	(a) 6/04/80	Grays (4) Harbor	220
					(b) 6/05/80	Willapa (3) Bay	231
LA IS 4	Lower Granite	5/23/80-6/02/80	Clarkston	(739)	6/05/80	Willapa (3) Bay	257
LA 2X 2	McNary Dam	5/13/80	Port Kelly	(501)	6/05/80	Willapa (4) Bay	205

APPENDIX B

Cruise Logs

Cruise 1: 27 May to 7 June 1980

Cruise 2: 4 to 15 July 1980

Cruise 3: 28 August to 8 September 1980

CRUISE 1

DAILY CRUISE LOG, MAY-JUNE
SHOWING OCEANOGRAPHIC DATA AND SALMONID
AND INCIDENTAL CATCHES*

May 27, 1980 Delmoor Transect

Station 1

	Cond.	Salinity	Temp.
Surface	29.8	25.3	11.2
30 m	34.9	32.7	8.9

Set 1 (0925 h) open to north 5 minutes

Chinook juv.: 24

Herring adult: 200
Surface smelt adult: 125

Set 2 (1050 h) open to south 5 minutes

Sthd. juv.: 1

Herring adult: 75
Surface smelt adult: 20
Lamprey adult: 2

Station 2

Surface	24.6	22.1	12.0
30 m	34.9	32.8	8.8

Set 3 (1245 h) open to south 5 minutes

Chinook juv.: 7 Coho adult: 1
Coho juv.: 1

Set 4 (1400 h) open to north 5 minutes

Chinook juv.: 7
Coho juv.: 3

Station 3

Surface	27.0	22.3	12.3
30 m	34.9	32.7	9.0

Set 5 (1540 h) open to north 5 minutes

Chinook juv.: 1 Chinook adult: 1
Coho juv.: 1
Sthd. juv.: 2

Set 6 (1730 h) open to south 5 minutes

Chinook juv.: 1 Chinook adult: 4
Coho adult: 2

*Species other than salmonids are estimates for numbers over 100.

May 28, 1980 South Jetty Transect

Station 1

	Cond.	Salinity	Temp.
Surface	30.7	26.2	11.7
30 m	35.2	33.0	8.6

Set 1 (1000 h) open to north 5 minutes

Chinook juv.: 7

Herring adult: 125
Surface smelt juv.: 100
Long fin smelt juv.: 100

Set 2 (1115 h) open to south 5 minutes

Chinook juv.: 71
Coho juv.: 34
Sthd. juv.: 11
Sockeye juv.: 1

Chinook adult: 7
Coho adult: 4
Sthd. adult: 1

Herring adult: 175
Surface smelt juv.: 75
Long fin smelt juv.: 125

Station 2

Surface	29.5	24.5	12.7
30 m	34.8	32.6	8.8

Set 3 (1355 h) open to south 5 minutes

Coho juv.: 1
Sthd. juv.: 3

Chinook adult: 6
Coho adult: 4

Set 4 (1500 h) open to north 5 minutes

Chinook juv.: 1

Station 3

Surface	32.2	27.2	12.2
30 m	34.9	32.7	8.7

Set 5 (1630 h) open to north 5 minutes

Chinook juv.: 2
Coho juv.: 14
Sthd. juv.: 2

Chinook adult: 8
Coho adult: 7

Set 6 (1735 h) open to south 5 minutes

Chinook juv.: 15
Coho juv.: 16
Sthd. juv.: 3

Chinook adult: 19
Coho adult: 27

May 29, 1980 North Head Transect

Station 1

	Cond.	Salinity	Temp.
Surface	23.2	17.1	12.7
30 m	35.1	33.1	8.5

Set 1 (1015 h) open to south 5 minutes

Chinook juv.: 16
Coho juv.: 1
Chinook adult: 5

Herring adult: 200
Surface smelt adult: 50
Long fin smelt adult: 100
Anchovy adult: 75
Shad adult: 12
Starry flounder juv.: 1

Set 2 (1120 h) open to north 5 minutes

Chinook juv.: 1
Coho juv.: 1
Chinook adult: 14

Herring adult: 100
Surface smelt adult: 300
Long fin smelt adult: 150
Anchovy adult: 150
Shad adult: 9
Dogfish: 1

Station 2

Surface	22.9	18.6	12.1
30 m	34.8	32.8	8.4

Set 3 (1255 h) open to south 5 minutes

Chinook juv.: 10
Coho juv.: 2
Chinook adult: 3

Herring adult: 100
Surface smelt adult: 100
Long fin smelt adult: 150
Anchovy adult: 75
Shad adult: 3
Dogfish: 1
Squid: 15

Set 4 (1400 h) open to north 5 minutes

Chinook juv.: 2
Coho juv.: 2
Chinook adult: 4
Coho adult: 1

Herring adult: 150
Long fin smelt adult: 75
Anchovy adult: 25
Shad adult: 5
Dogfish: 1

Station 3

	Cond.	Salinity	Temp.
Surface	25.7	21.1	12.5
30 m	35.0	32.2	9.5

Set 5 (1440 h) open to south 5 minutes

Chinook juv.: 87 Chinook adult: 1
Coho juv.: 26 Coho adult: 1
Sockeye juv.: 1

Set 6 (1620 h) open to north 5 minutes

Chinook juv.: 32
Coho juv.: 25
Sthd. juv.: 1

Station 4

Surface	28.7	24.2	12.6
30 m	35.0	32.6	9.3

Set 7 (1800 h) open to south 5 minutes

Chinook juv.: 10
Coho juv.: 13
Sthd. juv.: 2

May 30, 1980 Tillamook Rock Transect

Station 1

Surface	31.7	26.7	12.2
30 m	34.8	32.8	8.4

Set 1 (0915 h) open to south 5 minutes

Chinook juv.: 16 Cutthroat adult: 1 Dogfish: 1
Coho juv.: 9 Wolf eel: 1

Set 2 (1030 h) open to north 5 minutes

Coho juv.: 7 Black rockfish adult: 1
Sthd. juv.: 1 English sole juv.: 1

Station 2

Surface	31.7	26.7	13.1
30 m	35.1	32.9	8.4

Set 3 (1200 h) open to south 5 minutes

Chinook juv.: 3 Coho adult: 2 Dogfish: juv.: 1
Coho juv.: 119

Set 4 (1340 h) open to north 5 minutes

Coho juv.: 17 Coho adult: 3 Dogfish: 1

Station 3

	Cond.	Salinity	Temp.
Surface	31.5	25.8	13.3
30 m	35.1	33.1	8.2

Set 5 (1520 h) open to north 5 minutes

Coho juv.: 1 Dogfish: 2

Set 6 (1640 h) open to south 5 minutes

Coho juv.: 12 Cutthroat adult: 2
Chum juv.: 1

May 31, 1980 Tillamook Bay Transect

Station 1

Surface	34.8	29.6	12.2
30 m	34.8	32.8	8.3

Set 1 (0930 h) open to south 5 minutes

Water haul

Set 2 (1030 h) open to north 5 minutes

Water haul

Station 2

Surface	31.8	26.2	13.1
30 m	34.6	29.9	8.9

Set 3 (1150 h) open to south 5 minutes

Chinook juv.: 3 Chinook adult: 1 Dogfish: 3
Coho juv.: 6 Coho adult: 2
Cutthroat adult: 2

Set 4 (1310 h) open to north 5 minutes

Water haul

Station 3

	Cond.	Salinity	Temp.
Surface	31.8	26.0	13.2
30 m	35.3	28.6	9.7

Set 5 (1440 h) open to south 5 minutes

Coho juv.: 52

Set 6 (1615 h) open to north 5 minutes

Sablefish juv.: 9

June 3, 1980 Copalis Head Transect

Station 1

Surface	36.5	31.7	11.4
30 m	35.9	34.6	8.2

Set 1 (1430 h) open to south 5 minutes

Chinook juv.: 4 Coho adult: 1
Coho juv.: 2

Herring juv.: 2500
Black rockfish adult: 12
Dogfish: 4

Set 2 (1550 h) open to north 5 minutes

Chinook juv.: 14
Coho juv.: 5

Herring juv.: 7000
Black rockfish adult: 1
Pompano adult: 4
Squid: 2

Station 2

Surface	36.7	31.5	12.0
30 m	35.8	34.5	8.7

Set 3 (1720 h) open to south 5 minutes

Chinook juv.: 2
Coho juv.: 6

Black rockfish adult: 1
Dogfish: 2

Set 4 (1850 h) open to north 5 minutes

Chinook juv.: 3
Coho juv.: 5

Rockfish juv.: 3

June 4, 1980 Grays Harbor Transect

Station 1

	Cond.	Salinity	Temp.
Surface	36.2	31.5	11.7
30 m	35.8	34.4	8.4

Set 1 (0600 h) open to south 5 minutes

Chinook juv.: 10 Coho adult: 1 Herring adult: 2
Coho juv.: 21 Rockfish juv.: 3
Sockeye juv.: 16 Squid: 1
Chum juv.: 2

Set 2 (0730 h) open to north 5 minutes

Chinook juv.: 2 Coho adult: 1 Squid: 7
Coho juv.: 23
Sockeye juv.: 10
Chum juv.: 2

Station 2

Surface	36.6	31.2	12.1
30 m	35.8	34.5	8.8

Set 3 (0910 h) open to south 5 minutes

Chinook juv.: 10 Saury: 1
Sthd. juv.: 38

Set 4 (1040 h) open to north 5 minutes

Sthd. juv.: 3

Station 3

Surface	37.8	32.3	12.7
30 m	34.8	32.5	9.0

Set 5 (1200 h) open to south 5 minutes

Chinook juv.: 1 Chinook adult: 2
Sthd. juv.: 53 Coho adult:4

Set 6 (1345 h) open to north 5 minutes

Chinook juv.: 1 Coho adult: 3
Sthd. juv.: 2

Station 4

Surface	37.1	32.1	12.3
30 m	35.6	32.4	9.7

Set 7 (1520 h) open to south 5 minutes

Chinook juv.: 1
Sthd juv.: 74
Saury: 13

Set 8 (1700 h) open to north 5 minutes

Sthd. juv.: 8 Coho adult: 1

Station 5

	Cond.	Salinity	Temp.
Surface	37.0	32.0	11.8
30 m	35.4	32.3	9.7

Set 9 (1830 h) open to south 5 minutes

Sthd. juv.: 3
Saury: 27

Set 10 (1940 h) open to north 5 minutes

Sthd. juv.: 2
Saury: 21

June 5, 1980 Willapa Bay Transect

Station 1

Surface	34.1	29.3	12.0
30 m	35.1	30.9	10.6

Set 1 (0700 h) open to south 5 minutes

Chinook juv.: 12
Coho juv.: 50
Herring juv.: 500
Anchovy adult: 50
Shad juv.: 30
Dogfish: 2
Squid: 60
Skate: 1

Set 2 (0840 h) open to north 5 minutes

Chinook juv.: 1
Coho juv.: 42
Herring juv.: 75
Surface smelt adult: 300
Shad juv.: 13
Rockfish juv.: 2
Dogfish: 2
Squid: 2

Station 2

Surface	36.1	31.4	12.0
30 m	34.7	32.5	8.8

Set 3 (1020 h) open to north 5 minutes

Chinook juv.: 4 Coho adult: 1 Dogfish: 1
Coho juv.: 4 Squid: 5

Set 4 (1130 h) open to south 5 minutes

Chinook juv.: 32 Coho adult: 1 Dogfish: 3
Coho juv.: 74 Thresher shark: 1
Sthd. juv.: 2
Sockeye juv.: 9
Chum juv.: 1

Station 3

	Cond.	Salinity	Temp.
Surface	36.7	32.0	11.6
30 m	34.5	32.3	8.9

Set 5 (1330 h) open to north 5 minutes

Coho juv.: 7 Wolf eel: 1
Sthd. juv.: 18

Set 6 (1450 h) open to south 5 minutes

Chinook juv.: 2
Coho juv.: 3
Sthd. juv.: 23

Station 4

Surface	36.9	32.1	11.3
30 m	34.8	32.4	8.8

Set 7 (1640 h) open to north 5 minutes

Water haul

Set 8 (1745 h) open to south 5 minutes

Chinook juv.: 1
Sthd. juv.: 31

Station 5

Surface	36.8	32.0	11.5
30 m	34.8	32.3	8.5

Set 9 (1920 h) open to south 5 minutes

Sthd. juv.: 2 Saury: 11

June 6, 1980 Klipsan Beach Transect

Station 1

Cond. Salinity Temp.

Salinometer probe
out of order

Set 1 (0730 h) open to north 5 minutes

Chinook juv.: 2
Coho juv.: 3
Sthd. juv.: 1

Chinook adult: 3
Cutthroat adult: 2

Herring juv.: 50
Surface smelt: 10
Black rockfish adult: 1

Set 2 (0910 h) open to south 5 minutes

Chinook juv.: 19
Coho juv.: 101
Sthd. juv.: 5
Sockeye juv.: 4

Chinook adult: 4
Coho adult: 8

Herring juv.: 25
Black rockfish adult: 1
Dogfish: 2

Station 2

Set 3 (1050 h) open to north 5 minutes

Chinook adult: 1

Set 4 (1200 h) open to south 5 minutes

Coho juv.: 2
Sthd. juv.: 4

Coho adult: 1

Station 3

Set 5 (1340 h) open to north 5 minutes

Water haul

Set 6 (1445 h) open to south 5 minutes

Sthd. juv.: 31

Anchovy adult: 3
Squid: 75

Station 4

Set 7 (1620 h) open to south 5 minutes

Chinook juv.: 2
Sthd. juv.: 29

Anchovy adult: 25

Set 8 (1730 h) open to north 5 minutes

Water haul

Station 5

Set 9 (1905 h) open to south 5 minutes

Sthd. juv.: 3

June 7, 1980 South Jetty Transect

Station 2

Cond. Salinity Temp.

Salinometer probe
out of order

Set 1 (0700 h) open to north 5 minutes

Chinook juv.: 2	Chinook adult: 4	Wolf eel: 1
Coho juv.: 27	Coho adult: 46	
	Cutthroat adult: 1	

Set 2 (0830 h) open to south 5 minutes

Chinook juv.: 3	Chinook adult: 1	Anchovy adult: 150
Coho juv.: 22	Coho adult: 5	Black rockfish adult: 1
Sockeye juv.: 1	Cutthroat adult: 3	

Station 3

Set 3 (1010 h) open to north 5 minutes

Coho juv.: 44	Cutthroat: 1	Anchovy adult: 10
Sthd. juv.: 2		

Set 4 (1145 h) open to south 5 minutes

Chinook juv.: 13	Coho adult: 6	Dogfish: 2
Coho juv.: 45	Cutthroat adult: 4	
Sthd. juv.: 2		
Sockeye juv.: 2		

Station 4

Set 5 (1340 h) open to north 5 minutes

Coho juv.: 2	Sablefish juv.: 1
	Dogfish: 1
	Wolf eel: 1

Set 6 (1500 h) open to south 5 minutes

Chinook juv.: 3	Cutthroat adult: 1
Coho juv.: 7	
Sthd. juv.: 2	

Station 5

Set 7 (1635 h) open to south 5 minutes

Anchovy adult: 10,000

May Cruise

70 Sets

467 Chinook
858 Coho
364 Sthd.
44 Sockeye
6 Chum

87 Chinook adult
133 Coho adult
1 Sthd. adult
17 Cutthroat adult

Shad adult: 20
Shad juv.: 43
Herring adult: 1127
Herring juv.: 10,150
Anchovy: 10,563
Surface smelt: 1,060
Longfin smelt: 700

Saury: 73
Wolf eel: 1
Pampono: 4
Black rock adult: 26
Sablefish juv.: 10
Eng. sole juv.: 1

Starry juv.: 1
Lamprey eel: 2
Thresher shark: 1
Dogfish: 29
Big skate: 1
Squid: 167

CRUISE 2

DAILY CRUISE LOG, JULY
SHOWING OCEANOGRAPHIC DATA AND SALMONID
AND INCIDENTAL CATCHES*

July 4, 1980 Tillamook Bay Transect

Station 1

	Cond.	Salinity	Temp.
Surface	33.5	26.9	14.3
30 m	34.7	33.1	9.1

Set 1 (0600 h) open to south 5 minutes

Chinook juv.: 1
Coho juv.: 1
Rockfish juv.: 12

Set 2 (0715 h) open to north 5 minutes

Chinook juv.: 1
Rockfish juv.: 2

Station 2

Surface	36.5	29.4	14.7
30 m	35.2	32.5	9.2

Set 3 (0840 h) open to south 5 minutes

Saury: 5

Set 4 (0945 h) open to north 5 minutes

Saury: 17

Station 3

Surface	37.1	29.8	14.6
30 m	37.1	32.0	12.0

Set 5 (1120 h) open to south 5 minutes

Water haul

Set 6 (1215 h) open to north 5 minutes

Saury: 1

Station 4

Surface	36.5	29.5	14.8
30 m	35.6	32.2	10.1

Set 7 (1340 h) open to south 5 minutes

Saury: 9

Set 8 (1430 h) open to north 5 minutes

Saury: 4

*Jellyfish poundages are estimates, species other than salmonids are estimates in numbers over 100.

July 5, 1980 Cape Falcon Transect

Station 1

	Cond.	Salinity	Temp.
Surface	34.3	27.5	14.7
30 m	34.9	33.4	8.0

Set 1 (0630 h) open to south 5 minutes

Chinook juv.: 4 Chinook adult: 1 Rockfish juv.: 9
Coho juv.: 3 Coho adult: 6

Set 2 (0810 h) open to north 5 minutes

Coho adult: 2

Station 2

Surface	36.4	29.2	14.7
30 m	35.3	32.3	9.9

Set 3 (0930 h) open to south 5 minutes

Ocean sunfish juv.: 1

Set 4 (1030 h) open to north 5 minutes

Sablefish juv.: 1

Station 3

Surface	38.6	31.4	14.2
30 m	35.5	32.1	9.9

Set 5 (1140 h) open to south 5 minutes

Blue shark: 1

Set 6 (1250 h) open to north 5 minutes

Water haul

Station 4

Surface	38.6	31.7	14.7
30 m	35.0	32.4	9.0

Set 7 (1420 h) open to north 5 minutes

Blue shark: 1
Saury: 3

Set 8 (1520 h) open to south 5 minutes

Saury: 2

Station 5

	Cond.	Salinity	Temp.
Surface	38.7	31.9	14.9
30 m	35.1	32.4	8.9

Set 9 (1650 h) open to south 5 minutes

Saury: 11

Set 10 (1800 h) open to north 5 minutes

Saury: 6

July 6, 1980 Tillamook Rock Transect

Station 1

Surface	34.2	27.2	14.7
30 m	34.6	33.2	7.8

Set 1 (0600 h) open to south 5 minutes

Chinook juv.: 10 Coho adult: 6
Coho juv.: 2
Sthd. juv.: 1

Set 2 (0740 h) open to north 5 minutes

Chinook juv.: 2 Chinook adult: 2 Dogfish: 1
Coho adult: 9
Sthd. adult: 1

Station 2

Surface	34.5	27.4	14.9
30 m	34.7	32.3	8.6

Set 3 (0900 h) open to south 5 minutes

Chinook juv.: 1 Rockfish juv.: 16
Coho juv.: 3
Sockeye juv.: 1

Set 4 (0955 h) open to north 5 minutes

Herring juv.: 3
Saury: 8

Station 3

	Cond.	Salinity	Temp.
Surface	36.4	29.0	15.2
30 m	34.8	32.3	9.0

Set 5 (1030 h) open to south 5 minutes

Lamprey adult: 1

Set 6 (1130 h) open to north 5 minutes

Rockfish juv.: 46
Saury: 5

Station 4

Surface	39.2	31.5	15.0
30 m	35.4	32.3	9.8

Set 7 (1245 h) open to south 5 minutes

Sablefish juv.: 1
Saury: 26

Set 8 (1345 h) open to north 5 minutes

Saury: 3

Station 5

Surface	39.3	31.2	15.1
30 m	35.1	32.3	9.2

Set 9 (1510 h) open to south 5 minutes

Sablefish juv.: 1
Saury: 42
Blue shark: 1

Set 10 (1605 h) open to north 5 minutes

Rockfish juv.: 9
Saury: 6

July 7, 1980 Delmoor Transect

Station 1

	Cond.	Salinity	Temp.
Surface	34.3	27.6	14.6
30 m	34.2	33.0	7.7

Set 1 (0700 h) open to south 5 minutes

Chinook juv.: 10 Coho adult: 8
Coho juv.: 2
Sthd juv.: 2

Black rockfish adult: 1
Dogfish: 1
Lamprey adult: 1

Set 2 (0835 h) open to north 5 minutes

Chinook juv.: 4 Coho adult: 3
Coho juv.: 1
Sthd. juv.: 1

Station 2

	Cond.	Salinity	Temp.
Surface	32.4	25.9	14.5
30 m	36.9	31.0	13.3

Set 3 (0950 h) open to north 5 minutes

Chinook juv.: 1 Chinook jack: 1
Sthd. juv.: 1 Coho adult: 1

Set 4 (1105 h) open to south 5 minutes

Chinook juv.: 3 Chinook jack: 1
Coho juv.: 2 Coho adult: 16
Sthd. juv.: 3

July 9, 1980 Grays Harbor Transect

Station 1

Surface	36.6	30.1	13.8
30 m	34.7	33.7	7.5

Set 1 (1040 h) open to north 5 minutes

Chinook juv.: 3 Jellyfish: 10 tons

Set 2 (1140 h) open to south 5 minutes

Estimated 100 tons of jellyfish, couldn't purse--net sank. Turned net loose and drummed in.

Station 2

Surface	36.3	28.1	15.5
30 m	35.5	33.1	8.7

Set 3 (1305 h) open to north 5 minutes

Chinook juv.: 2 Squid: 20
Jellyfish: 2 tons

Set 4 (1410 h) open to south 5 minutes

Chinook juv.: 3 Squid: 13
Jellyfish: 3 tons

Station 3

	Cond.	Salinity	Temp.
Surface	35.9	28.4	15.3
30 m	34.8	32.7	8.6

Set 5 (1535 h) open to north 5 minutes

Chinook juv.: 9
Coho juv.: 6

Saury: 11
Squid: 5
Jellyfish: 1000 lb

Set 6 (1640 h) open to south 5 minutes

Chinook juv.: 17
Coho juv.: 11
Chum. juv.: 2

Saury: 6
Squid: 2
Jellyfish: 1500 lb

Station 4

Surface	37.7	30.2	15.2
30 m	34.6	32.4	8.5

Set 7 (1810 h) open to south 5 minutes

Rockfish juv.: 9
Saury: 17
Blue shark: 1

Station 5

Surface	38.8	31.2	15.1
30 m	34.7	32.3	9.1

Set 8 (1945 h) open to south 5 minutes

Rockfish juv.: 27
Ocean sunfish juv.: 1

July 10, 1980 Copalis Head Transect

Station 1

Surface	37.2	30.2	14.0
30 m	35.0	32.9	9.0

Set 1 (0730 h) open to north 5 minutes

Estimated 100 tons of jellyfish, couldn't purse. Turned net loose and drummed in.

Station 2

Surface	38.1	30.5	15.0
30 m	35.2	33.0	8.7

Set 2 (0920 h) open to south 5 minutes

Hake juv.: 7
Soupfin shark: 1
Squid: 6
Medusafish adult: 1

Set 3 (1015 h) open to north 5 minutes

Hake juv.: 9
Soupfin shark: 1
Squid: 3

Station 3

	Cond.	Salinity	Temp.
Surface	38.4	30.4	15.5
30 m	34.9	32.3	9.0

Set 4 (1150 h) open to north 5 minutes

Chinook juv.: 12
Coho juv.: 7

Hake juv.: 7
Squid: 3000

Set 5 (1310 h) open to south 5 minutes

Chinook juv.: 7
Coho juv.: 6

Ocean sunfish juv.: 1
Squid: 2

Station 4

Surface	39.3	31.4	15.3
30 m	35.2	32.4	9.2

Set 6 (1445 h) open to north 5 minutes

Coho juv.: 1 Coho adult: 2

Saury: 7

Set 7 (1550 h) open to south 5 minutes

Chinook juv.: 1
Coho juv.: 2

Rockfish juv.: 12
Saury: 2
Blue shark: 1
Soupfin shark: 1

Station 5

Surface	39.1	31.6	14.9
30 m	34.8	32.4	8.9

Set 8 (1750 h) open to north 5 minutes

Saury: 1

Set 9 (1840 h) open to south 5 minutes

Water haul

July 12, 1980 Willapa Bay Transect

Station 1

Surface	35.2	27.7	15.5
30 m	34.9	33.7	7.9

Set 1 (0700 h) open to north 5 minutes

Chinook juv.: 33
Coho juv.: 2

Chinook adult: 8
Chinook jack: 8
Cutthroat adult: 1

Herring adult: 200
Surf smelt: 2
Anchovy adult: 3
Pompano: 1
Jack mackerel adult: 9
Dogfish: 4
Jellyfish: 3 tons

Set 2 (0840 h) open to south 5 minutes

Chinook juv.: 11
Coho juv.: 2

Herring adult: 50
Dogfish: 1
Jellyfish: 3 tons

Station 2

	Cond.	Salinity	Temp.
Surface	34.8	27.3	15.2
30 m	34.8	32.7	8.1

Set 3 (1055 h) open to north 5 minutes

Chinook juv.: 1

Dogfish: 1
Squid: 3
Jellyfish: 2 tons

Set 4 (1220 h) open to south 5 minutes

Dogfish: 1
Jellyfish: 2 tons

Station 3

Surface	37.9	29.6	16.2
30 m	34.8	32.9	8.4

Set 5 (1410 h) open to south 5 minutes

Rockfish juv.: 5
Saury: 13
Jellyfish: 500 lb

Set 6 (1500 h) open to north 5 minutes

Rockfish juv.: 5
Saury: 1
Wolf eel (tagged): 1
Squid: 3
Jellyfish: 300 lb

Station 4

Surface	37.6	29.3	16.2
30 m	35.1	33.1	8.7

Set 7 (1620 h) open to south 5 minutes

Rockfish juv.: 7
Sablefish juv.: 1
Saury: 7
Blue shark: 1
Jellyfish: 50 lb

Set 8 (1715 h) open to north 5 minutes

Rockfish juv.: 5
Sablefish juv.: 3
Jellyfish: 50 lb

July 13, 1980 Klipsan Beach Transect

Station 1

	Cond.	Salinity	Temp.
Surface	35.8	27.9	16.0
30 m	35.0	33.5	7.7

Set 1 (1140 h) open to north 5 minutes

Chinook juv.: 1 Coho adult: 1

Herring adult: 4
Saury: 1
Jellyfish: 50 lb

Set 2 (1230 h) open to south 5 minutes

Water haul

Jellyfish: 50 lb

Station 2

Surface	37.0	28.6	16.4
30 m	37.0	31.7	12.2

Set 3 (1410 h) open to south 5 minutes

Wolf eel: 1
Jellyfish: trace

Set 4 (1455 h) open to north 5 minutes

Sablefish juv.: 9
Saury: 1
Jellyfish: trace

Station 3

Surface	38.3	29.8	16.2
30 m	35.0	32.8	8.8

Set 5 (1645 h) open to north 5 minutes

Blue shark: 1
Jellyfish: trace

Set 6 (1750 h) open to south 5 minutes

Soupfin shark: 1
Jellyfish: trace
Pod of 5-6 Dall Porpoise in & out of net & around boat while pursing & drumming.

July 14, 1980 South Jetty Transect

Station 1

	Cond.	Salinity	Temp.
Surface	31.5	25.1	14.7
30 m	34.9	33.9	7.7

Set 1 (1130 h) open to north 5 minutes

Chinook juv.: 3 Coho adult: 28

Jack mackerel: 1
Jellyfish: 100 lb

Set 2 (1230 h) open to south 5 minutes

Chinook juv.: 17 Chinook adult: 6
Chinook jack: 6
Coho adult: 23
Cutthroat adult: 1

Herring adult: 17
Jack mackerel: 27
Jellyfish: 100 lb

Station 2

Surface	34.7	27.4	14.9
30 m	34.9	33.6	7.8

Set 3 (1400 h) open to north 5 minutes

Chinook juv.: 3 Cutthroat adult: 3

Herring adult: 9
Surf smelt: 7
Anchovy: 75
Dogfish: 2
Jellyfish: trace

Set 4 (1510 h) open to south 5 minutes

Chinook juv.: 4 Chinook adult: 3
Chinook jack: 3
Coho adult: 2
Cutthroat adult: 6

Herring adult: 4
Anchovy: 16
Dogfish: 1
Jellyfish: trace

Station 3

Surface	30.3	22.9	16.4
30 m	36.6	31.6	12.5

Set 5 (1640 h) open to north 5 minutes

Coho juv.: 3

Jellyfish: trace

Set 6 (1745 h) open to south 5 minutes

Cutthroat: 3

Anchovy: 1
Sablefish juv.: 3
Jellyfish: trace

July 15, 1980 North Head Transect

Station 1

	Cond.	Salinity	Temp.
Surface	35.2	27.4	15.9
30m	34.9	33.3	9.0

Set 1 (0540 h) open to north 5 minutes

Coho juv.: 1

Herring adult: 1250
Anchovy: 60
Soupfin shark: 1

Set 2 (0630 h) open to south 5 minutes

Coho juv.: 1
Chinook adult: 2
Coho adult: 1

Herring adult: 750
Anchovy: 250
Soupfin shark: 1

Station 2

Surface	37.2	28.1	16.0
30 m	35.2	33.3	8.4

Set 3 (0815 h) open to north 5 minutes

Cutthroat adult: 1

Wolf eel: 1
Soupfin shark: 1

Set 4 (0900 h) open to south 5 minutes

Rockfish juv.: 17
Blue shark: 1

Station 3

Surface	38.7	28.2	16.2
30 m	34.7	32.8	8.5

Set 5 (1020 h) open to north 5 minutes

Saury: 1
Jellyfish: trace

Set 6 (1100 h) open to south 5 minutes

Cutthroat adult: 2

Sablefish juv.: 17
Saury: 3
Jellyfish: trace

Station 4	Cond.	Salinity	Temp.
Surface	38.7	30.5	15.7
30 m	34.7	32.4	8.9

Set 7 (1220 h) open to north 5 minutes

Rockfish juv.: 12
Sablefish juv.: 7
Squid: 11
Jellyfish: trace

Set 8 (1320 h) open to south 5 minutes

Sablefish juv.: 7
Jellyfish: trace

July Cruise

75 Sets

Juvenile	Adult
	22 Chinook
164 Chinook	108 Coho
19 Jack	1 Steelhead
56 Coho	17 Cutthroat
8 Steelhead	
1 Sockeye	
2 Chum	

Herring adult: 2284
Herring juv.: 3
Anchovy: 405
Surface smelt: 9
Hake juv.: 23
Saury: 219
Wolfeel: 3
Jack mackerel: 37
Medusafish adult: 1
Pompano: 1

Rockfish adult: 1
Rockfish juv: 193
Sablefish: 50
Ocean sunfish juv.: 3
Lamprey eel: 2
Soupfin shark: 7
Blue shark: 8
Dogfish: 12
Squid: 3068

CRUISE 3

DAILY CRUISE LOG, AUGUST-SEPTEMBER
SHOWING OCEANOGRAPHIC DATA AND SALMONID
AND INCIDENTAL CATCHES*

August 28, 1980 Delmoor Transect

Station 1

	Cond.	Salinity	Temp.
Surface	34.7	28.9	13.2
30 m	34.7	33.7	7.4

Set 1 (1000 h) open to north 5 minutes

Chinook juv.: 4
Coho juv.: 1
Jellyfish: 2 tons

Set 2 (1120 h) open to south 5 minutes

Chinook juv.: 2
Coho juv.: 1
Chinook adult: 1
Coho adult: 6
Hake juv.: 1
Jellyfish: 2 tons

Station 2

Surface	35.2	28.5	14.0
30 m	34.4	32.7	8.4

Set 3 (1300 h) open to north 5 minutes

Chinook juv.: 8
Coho juv.: 3
Coho adult: 1
Chub mackerel: 5
Blue shark: 1
Jellyfish: 1 ton

Set 4 (1420 h) open to south 5 minutes

Chinook juv.: 10
Coho juv.: 4
Chinook adult: 5
Chinook jack: 4
Coho adult: 1
Hake juv.: 4
Jack mackerel: 3
Jellyfish: 1 ton

Station 3

Surface	34.0	27.8	13.5
30 m	34.6	33.6	8.2

Set 5 (1600 h) open to south 5 minutes

Chinook juv.: 9
Coho juv.: 4
Chinook adult: 5
Chinook jack: 5
Hake juv.: 2
Jellyfish: 500 lb

*Jellyfish poundages are estimates. Species other than salmonids are estimates in numbers over 100.

Set 6 (1715 h) open to north 5 minutes

Chinook juv.: 11
Coho juv.: 4

Jellyfish: 500 lb

Station 4

	Cond.	Salinity	Temp.
Surface	34.6	27.7	13.4
30 m	34.5	33.8	8.0

Set 7 (1850 h) open to north 5 minutes

Chinook juv.: 2

Jellyfish: 500 lb

Set 8 (1950 h) open to south 5 minutes

Chinook juv.: 1

Saury: 1
Jellyfish: 500 lb

August 29, 1980 South Jetty Transect

Station 1

Surface	34.8	29.5	12.7
30 m	34.8	33.5	7.0

Set 1 (0700 h) open to north 5 minutes

Chinook juv.: 3
Chinook adult: 2
Jack chinook: 1
Coho adult: 8

Jellyfish: 1 ton

Set 2 (0820 h) open to south 5 minutes

Chinook juv.: 7
Coho juv.: 2
Chinook adult: 4
Jack chinook: 5
Coho adult: 11

Shad adult: 6
Hake juv.: 2
Jellyfish: 1 ton

Station 2

Surface	34.2	27.2	14.7
30 m	35.2	33.3	8.2

Set 3 (1015 h) open to north 5 minutes

Chinook juv.: 1
Coho juv.: 2
Chinook adult: 1
Jack chinook: 1

Hake juv.: 5
Ocean sunfish adult: 1
Blue shark: 1
Jellyfish: 1000 lb

Set 4 (1135 h) open to south 5 minutes

Chinook juv.: 1
Coho juv.: 1

Black rockfish adult: 1
Hake juv.: 4
Jellyfish: 1000 lb

Station 3

	Cond.	Salinity	Temp.
Surface	35.6	28.9	14.1
30 m	34.9	33.0	8.1

Set 5 (1300 h) open to north 5 minutes

Water haul — Jellyfish: 1000 lb

Set 6 (1400 h) open to south 5 minutes

Sockeye juv.: 2 — Chinook adult: 1 — Coho adult: 2 — Jellyfish: 1000 lb

Station 4

Surface	35.7	29.1	13.8
30 m	35.0	33.2	8.0

Set 7 (1535 h) open to north 5 minutes

Chinook juv.: 1 — Jellyfish: 500 lb

Set 8 (1630 h) open to south 5 minutes

Chinook juv.: 1 — Jellyfish: 750 lb

Station 5

Surface	35.5	29.8	13.5
30 m	35.4	33.6	7.9

Set 9 (1800 h) open to south 5 minutes

Water haul — Jellyfish: 500 lb

Set 10 (1850 h) open to north 5 minutes

Water haul — Jellyfish: 500 lb

August 31, 1980 Tillamook Bay Transect

Station 1

Surface	36.5	32.7	10.6
30 m	35.5	33.8	8.4

Set 1 (0640 h) open to north 5 minutes

Chinook juv.: 2 — Coho juv.: 2 — Jellyfish: 2 tons

Set 2 (0730 h) open to south 5 minutes

Water haul — Jellyfish: 2 tons

Station 2

	Cond.	Salinity	Temp.
Surface	36.3	31.6	11.2
30 m	35.8	32.6	9.8

Set 3 (0910 h) open to north 5 minutes

Chinook juv.: 10
Coho juv.: 8
Coho adult: 3
Sthd. adult: 1
Hake juv.: 4
Blue shark: 1
Jellyfish: 2 tons

Set 4 (1030 h) open to south 5 minutes

Chinook juv.: 10
Coho juv.: 14
Chinook adult: 1
Hake juv.: 3
Saury: 1
Jellyfish: 3 tons

Station 3

Surface	37.4	30.7	13.8
30 m	34.7	33.6	7.4

Set 5 (1210 h) open to south 5 minutes

Chinook juv.: 53
Coho juv.: 38
Chum juv.: 5
Coho adult: 2
Hake juv.: 12
Jack mackerel: 6
Jellyfish: 3 tons

Set 6 (1320 h) open to north 5 minutes

Chinook juv.: 42
Coho juv.: 27
Chum juv.: 4
Herring adult: 300
Hake juv.: 3
Sablefish juv.: 1
Jellyfish: 3 tons

Station 4

Surface	38.4	31.2	14.7
30 m	34.7	33.5	7.7

Set 7 (1500 h) open to south 5 minutes

Chinook juv.: 9
Coho juv.: 5
Chum juv.: 4
Jellyfish: 5 tons

Set 8 (1620 h) open to north 5 minutes

Chinook juv.: 11
Coho juv.: 5
Chum juv.: 1
Jellyfish: 5 tons

Station 5

Surface	39.1	31.6	14.4
30 m	34.5	32.6	7.9

Set 9 (1800 h) open to south 5 minutes

Chinook juv.: 1
Coho juv.: 2

Jellyfish: 7 tons

Set 10 (1910 h) open to north 5 minutes

Chinook juv.: 1

September 1, 1980 Cape Falcon Transect

Station 1

	Cond.	Salinity	Temp.
Surface	36.6	31.5	12.2
30 m	35.3	33.4	8.3

Set 1 (0710 h) open to south 5 minutes

Chinook adult: 5
Coho adult: 2

Electric ray: 1
Jellyfish: 5 tons

Set 2 (0800 h) open to north 5 minutes

Chinook juv.: 3
Chinook adult: 2
Coho adult: 4

Jellyfish: 5 tons

Station 2

Surface	37.4	31.3	13.1
30 m	35.1	33.4	8.3

Set 3 (0940 h) open to south 5 minutes

Chinook juv.: 6
Coho juv.: 4
Chinook adult: 1

Hake juv.: 2
Jack mackerel: 49
Jellyfish: 1 ton

Set 4 (1100 h) open to north 5 minutes

Chinook juv.: 8
Coho juv.: 3
Chum juv.: 3

Hake juv.: 3
Jack mackerel: 7
Jellyfish: 1 ton

Station 3

Surface	37.8	33.3	12.4
30 m	34.4	33.2	7.7

Set 5 (1240 h) open to south 5 minutes

Chinook juv.: 6
Coho juv.: 3
Chum juv.: 4

Hake juv.: 1
Saury: 1
Soupfin shark: 1
Jellyfish: 1 ton

Set 6 (1355 h) open to north 5 minutes

Chinook juv.: 6
Coho juv.: 2
Chum juv.: 2

Jellyfish: 1 ton

Station 4

	Cond.	Salinity	Temp.
Surface	37.9	32.2	12.5
30 m	34.5	32.8	8.0

Set 7 (1540 h) open to south 5 minutes

Chinook juv.: 3
Coho juv.: 1
Chum juv.: 1

Saury: 1
Jellyfish: 1 ton

Set 8 (1650 h) open to north 5 minutes

Chinook juv.: 2

Jellyfish: 1 ton

Station 5

Surface	38.7	32.2	13.4
30 m	34.5	32.8	8.2

Set 9 (1730 h) open to south 5 minutes

King-of-the-salmon: 1
Squid: 6
Jellyfish: 250 lb

Set 10 (1830 h) open to north 5 minutes

Chinook juv.: 1

Squid: 4
Jellyfish: 250 lb

September 2, 1980 Tillamook Rock Transect

Station 1

Surface	37.1	31.6	12.4
30 m	35.7	33.1	9.2

Set 1 (0815 h) open to south 5 minutes

Chinook juv.: 1
Coho juv.: 1

Herring juv.: 750
Shad adult: 9
Jellyfish: 15 tons

Set 2 (0945 h) open to north 5 minutes

Chinook juv.: 2 Chinook adult: 1
Chum juv.: 1

Herring juv.: 500
Jellyfish: 20 tons

Station 2

Surface	37.0	31.3	12.8
30 m	36.4	32.2	10.7

Set 3 (1130 h) open to south 5 minutes

Chinook juv.: 3	Coho adult: 1	Sablefish juv.: 1
Coho juv.: 1	Pink adult: 1	Saury: 1
Chum juv.: 1		Squid: 3
		Jellyfish: 2 tons

Set 4 (1240 h) open to north 5 minutes

Chinook juv.: 2	Coho adult: 1	Squid: 11
		Jellyfish: 2 tons

Station 3

	Cond.	Salinity	Temp.
Surface	38.7	32.1	13.3
30 m	34.6	33.1	7.6

Set 5 (1400 h) open to south 5 minutes

Chinook juv.: 2	Hake juv.: 3
	Jellyfish: 1 ton

Set 6 (1510 h) open to north 5 minutes

Chinook juv.: 5	Chinook adult: 1	Jellyfish: 1 ton

Station 4

Surface	38.2	32.1	14.0
30 m	35.4	32.7	9.4

Set 7 (1645 h) open to south 5 minutes

Chinook juv.: 2	Chinook adult: 4	Jellyfish: 750 lb
Coho juv.: 2	Coho adult: 2	

Set 8 (1755 h) open to north 5 minutes

Chinook juv.: 2	Chinook adult: 2	Jellyfish: 500 lb
Coho juv.: 1	Coho adult: 1	

Station 5

Surface	38.9	32.1	14.0
30 m	35.4	32.7	9.4

Set 9 (1920 h) open to south 5 minutes

Hake juv.: 2
Sablefish: 126
Saury: 3
Jellyfish: 100 lb

September 4, 1980 Grays Harbor Transect

Station 1

	Cond.	Salinity	Temp.
Surface	35.4	29.7	12.6
30 m	35.8	32.8	9.7

Set 1 (1125 h) open to south 5 minutes

Chinook juv.: 7
Coho juv.: 4
Chinook adult: 2
Jack chinook: 3
Coho adult: 1
Jack mackerel: 7
Blue shark: 1
Jellyfish: 500 lb

Set 2 (1230 h) open to north 5 minutes

Chinook juv.: 4
Coho juv.: 5
Chinook adult: 5
Jack chinook: 4
Medusafish adult: 1
Jellyfish: 500 lb

Station 2

Surface	37.5	31.9	12.2
30 m	34.4	33.2	7.5

Set 3 (1400 h) open to south 5 minutes

Chinook juv.: 19
Coho juv.: 9
Chinook adult: 5
Jack chinook: 11
Coho adult: 1
Medusafish adult: 1
Jellyfish: 100 lb

Set 4 (1500 h) open to north 5 minutes

Chinook juv.: 21
Coho juv.: 15
Chinook adult: 6
Jack chinook: 10
Jellyfish: 100 lb

Station 3

Surface	38.3	32.4	13.0
30 m	35.3	33.3	8.4

Set 5 (1640 h) open to south 5 minutes

Chinook juv.: 2
Jellyfish: 50 lb

Set 6

Coho juv.: 1
Jellyfish: 50 lb

Station 4

Surface	38.6	32.0	13.3
30 m	34.4	33.4	7.2

Set 7 (1900 h) open to south 5 minutes

Blue shark: 1
Jellyfish: 50 lb

September 5, 1980 Copalis Head Transect

Station 1

	Cond.	Salinity	Temp.
Surface	35.2	29.5	12.9
30	36.1	33.1	10.4

Set 1 (0740 h) open to south 5 minutes

Chinook juv.: 5 Coho adult: 2

Herring adult: 23
Hake juv.: 3
Black rockfish adult: 353
Medusafish adult: 2
Starry flounder adult: 1
Dogfish: 2
Jellyfish: 75 lb

Set 2 (0855 h) open to north 5 minutes

Chinook juv.: 9 Chinook adult:3
Coho juv.: 2 Jack chinook: 2
Coho adult: 2

Herring adult: 7
Hake juv.: 5
Black rockfish adult: 307
Dogfish: 1
Jellyfish: 100 lb

Station 2

Surface	38.2	32.6	12.5
30 m	34.9	33.5	7.9

Set 3 (1030 h) open to south 5 minutes

Chinook juv.: 5 Jack chinook: 2
Coho juv.: 1

Herring adult: 3
Jellyfish: 50 lb

Set 4 (1120 h) open to north 5 minutes

Chinook juv.: 28 Coho adult: 1
Coho juv.: 6

Herring adult: 5
Black rockfish adult: 1
Jellyfish: 50 lb

Station 3

Surface	38.6	32.2	13.6
30 m	34.7	33.4	7.5

Set 5 (1250 h) open to south 5 minutes

Chinook juv.: 5
Coho juv.: 2

Herring adult: 6
Black rockfish adult: 1
Jellyfish: 50 lb

Set 6 (1345 h) open to north 5 minutes

Chinook juv.: 48 Jack chinook: 4
Coho juv.: 36

Jellyfish: 100 lb

Station 4

	Cond.	Salinity	Temp.
Surface	40.3	33.2	13.7
30 m	34.6	33.6	7.4

Set 7 (1540 h) open to north 5 minutes

Chinook juv.: 1

Jellyfish: 500 lb

Station 5

Surface	40.2	33.3	13.9
30 m	34.6	33.5	7.4

Set 8 (1730 h) open to north 5 minutes

Water haul

Jellyfish: 1000 lb

September 6, 1980 Willapa Bay Transect

Station 1

Surface	34.2	28.0	13.6
30 m	34.8	33.8	7.3

Set 1 (0710 h) open to south 5 minutes

Chinook juv.: 7 Coho adult: 1

Herring juv.: 5
Longfin smelt adult: 5
Hake juv.: 3
Dogfish: 2
Jellyfish: 10 tons

Set 2 (0830 h) open to north 5 minutes

Chinook juv.: 7
Coho juv.: 1

Herring juv.: 3
Hake juv.: 1
Medusafish juv.: 1
Dogfish: 1
Jellyfish: 15 tons

Station 2

Surface	37.9	32.2	12.4
30 m	34.5	33.3	7.6

Set 3 (1010 h) open to south 5 minutes

Chinook juv.: 2 Chinook adult: 1
Coho juv.: 1 Jack chinook: 2
Coho adult: 1

Hake juv.: 3
Kelpgreenling adult: 1
Dogfish juv.: 1
Jellyfish: 5 tons

Set 4 (1130 h) open to north 5 minutes

Chinook juv.: 2	Chinook adult: 2 Jack chinook: 4 Coho adult: 1	Jellyfish: 5 tons

Station 3

	Cond.	Salinity	Temp.
Surface	38.2	32.0	13.1
30 m	34.7	33.1	7.9

Set 5 (1305 h) open to south 5 minutes

Chinook juv.: 5 Coho juv.: 2	Chinook adult: 3 Jack chinook: 1 Coho adult: 1	Hake juv.: 2 Ocean sunfish juv.: 2 Jellyfish: 5 tons

Set 6 (1425 h) open to north 5 minutes

Chinook juv.: 2 Coho juv.: 3	Chinook adult: 3 Jack chinook: 4 Coho adult: 1	Ocean sunfish juv.: 1 Squid: 14 Jellyfish: 5 tons

Station 4

Surface	38.6	32.1	13.6
30 m	34.4	33.1	7.7

Set 7 (1610 h) open to south 5 minutes

Water haul — Jellyfish: 10 tons

Station 5

Surface	39.1	32.9	13.9
30 m	34.5	33.1	7.5

Set 8 (1720 h) open to north 5 minutes

Water haul — Jellyfish: 5 tons

September 7, 1980 Klipsan Beach Transect

Station 1

Surface	33.1	27.2	13.2
30 m	34.7	33.7	7.5

Set 1 (0750 h) open to south 5 minutes

Chinook juv.: 5 Coho juv.: 2	Dogfish: 1 Jellyfish: 20 tons

Set 2 (0915 h) open to north 5 minutes

Chinook juv.: 4 Coho juv.: 1	Jellyfish: 20 tons

Station 2

	Cond.	Salinity	Temp.
Surface	32.8	26.9	13.3
30 m	34.8	33.3	8.0

Set 3 (1050 h) open to south 5 minutes

Chinook juv.: 6 Chinook adult: 6 Dogfish: 1
Coho juv.: 1 Jack chinook: 2 Jellyfish: 1 ton

Set 4 (1200 h) open to north 5 minutes

Chinook juv.: 1 Chinook adult: 1 Jellyfish: 1 ton
Jack chinook: 5

Station 3

Surface	31.6	25.5	13.9
30 m	34.7	33.3	7.9

Set 5 (1340 h) open to south 5 minutes

Chinook juv.: 3 Herring adult: 2
Coho juv.: 3 Jellyfish: 500 lb

Set 6 (1445 h) open to north 5 minutes

Chinook juv.: 4 Chub mackerel: 2
Coho juv.: 3 Jellyfish: 500 lb

Station 4

Surface	32.7	26.5	14.0
30 m	35.2	32.8	9.3

Set 7 (1620 h) open to south 5 minutes

Coho juv.: 1 Jellyfish: 500 lb

Station 5

Surface	33.7	27.9	13.8
30 m	35.8	32.8	9.0

Set 8 (1800 h) open to north 5 minutes

Water haul Jellyfish: 1 ton

September 8, 1980 North Head Transect

Station 1

Surface	23.3	18.1	14.3
30 m	34.8	32.4	9.8

Set 1 (0810 h) open to south 5 minutes

Chinook juv.: 2

Herring adult: 3
Jellyfish: trace

Set 2 (0900 h) open to north 5 minutes

Chinook juv.: 4

Herring adult: 2
Hake juv.: 3
Jellyfish: 50 lb

Station 2

	Cond.	Salinity	Temp.
Surface	29.0	23.4	13.5
30 m	35.5	33.0	8.6

Set 3 (1035 h) open to south 5 minutes

Chinook juv.: 5 Chinook adult: 1
Coho adult: 1

Hake juv.: 3
Jellyfish: 100 lb

Set 4 (1130 h) open to north 5 minutes

Chinook juv.: 8 Chinook adult: 1

Hake juv.: 3
Jack mackerel: 11
Jellyfish: 100 lb

Station 3

Surface	32.6	26.3	14.3
30 m	35.1	33.1	8.2

Set 5 (1310 h) open to south 5 minutes

Chinook juv.: 1 Coho adult: 2
Coho juv.: 1

Jellyfish: 250 lb

Set 6 (1400 h) open to north 5 minutes

Chinook juv.: 3

Jellyfish: 500 lb

Station 4

Surface	33.2	28.1	14.5
30 m	35.2	33.3	8.1

Set 7 (1540 h) open to north 5 minutes

Water haul

Jellyfish: 1000 lb

Station 5

Surface	34.0	29.6	14.6
30 m	35.2	33.4	8.1

Set 8 (1730 h) open to south 5 minutes

Water haul

Jellyfish: 1000 lb

August Cruise

86 Sets

Juvenile	Adult
479 Chinook	84 Chinook
80 Jack	61 Coho
241 Coho	1 Steelhead
2 Sockeye	1 Pink
26 Chum	

Shad adult: 15
Herring adult: 351
Herring juvenile: 1258
Longfin smelt: 5
Hake Juv.: 77

Saury: 8
King-of-the-salmon: 1
Jack macherel: 90
Medusafish adult: 4
Medusafish juv.: 1

Rockfish: 663
Sablefish juv.: 128
Kelpgreenling adult: 1
Starry flounder adult: 1
Ocean sunfish juv.: 1

Soupfin shark: 1
Blue shark: 5
Dogfish adult: 8
Dogifsh juv.: 1
Electric ray: 1
Squid: 33