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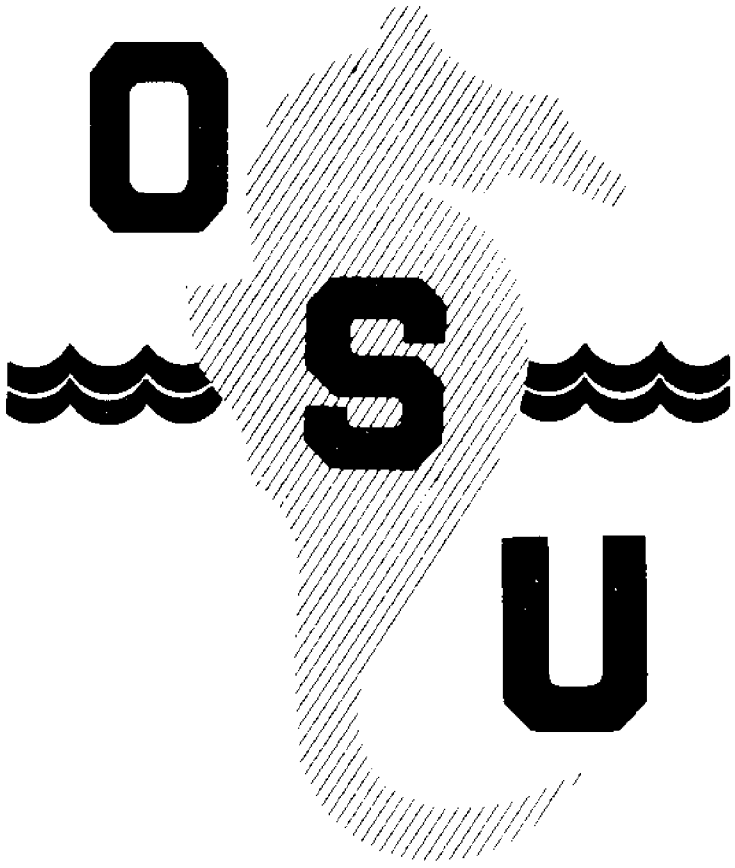

STUDIES OF JUVENILE SALMONIDS OFF THE OREGON AND WASHINGTON COAST, 1982

by
J. P. Fisher, W. G. Pearcy and
A. W. Chung

Oregon State University
Sea Grant College Program
ORESU-T-83-003

Reference 83-2
January 1983
Cruise Report

OREGON STATE UNIVERSITY

Addendum to "Studies of juvenile salmonids off the Oregon and Washington coast, 1981":
CWT's decoded after publication

COHO

Set	I.D. No.	Transect	Brood	Tag Code	Agency	Hatchery	Ocean Entry Site	Release Date	Recovery Date	Days since release	N-S Distance from Ocean entry	Length at Recovery (mm,FL)
90	006	Warrenton	79	05-08-26	FWS	Eagle Cr.	Columbia River	22/IV/81	11/VI/81	50	5 S	173
247	001	Newport	79	07-21-32	ODFW	Cascade	Columbia River	6/VII/81	15/VIII/81	40	97 S	202
243	015	Tillamook Rock	79	07-22-38	ODFW	Big Cr.	Columbia River	6/VII/81	13/VIII/81	38	20 S	185
227	003	Warrenton	79	63-21-51	WDF	Washougal	Columbia River	27/V/81	12/VIII/81	87	5 S	224
224	018	Warrenton	79	63-22-03	WDF	Washougal	Columbia River	27/V/81	12/VIII/81	87	5 S	262
234	014	Tillamook Rock	80	60-33-61	OAF	OAF	Yaquina Bay	21/VI/81	13/VIII/81	53	79 N	191
191	010	Newport	80	60-34-25	OAF	OAF	Yaquina Bay	21/VI/81	17/VII/81	26	2 N	170
231	013	Tillamook Rock	80	60-32-18	OAF	OAF	Yaquina Bay	21/VI/81	13/VIII/81	53	79 N	203
180	006	Tillamook Rock	80	60-33-54	OAF	OAF	Coos Bay	5/VI/81	13/VII/81	38	154 N	161
250	001	Newport	79	62-35-04	ANAD.	ANAD.	Coos Bay	2-16/VII/81	15/VIII/81	30-45	13 N	230
180	007	Tillamook Rock	79	62-24-05	ANAD.	ANAD.	Coos Bay	10-24/VI/81	13/VII/81	19-33	154 N	195
091	004	Warrenton	79	7-23-13	ODFW	Butte Falls	Winchester Bay	4/V/81	11/VI/81	38	150 N	200

CHINOOK

151	001	Warrenton	79	7-22-22	ODFW	McKenzie	Columbia River	16/III/81	11/VII/81	117	5 S	206
164	008	Cape Disapp.	80	63-22-51	WDF	Washougal	Columbia River	VI-VII/81	12/VII/81	<30	5 N	91

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We would also like to thank W. McNeil, B. Suzumoto, V. Jackson and other personnel of Oregon Aqua-Foods, Inc. for pigment marking smolts and supplying samples from various release groups; S. Lewis and R. Buckmann of the ODFW Marine Regional Office for supplying Floy tags, a marking gun and information on recoveries of tagged fish; the personnel of the ODFW Clackanas laboratory for decoding CWT's; various agency tag coordinators for supplying release data on tag groups; W. Wakefield for preparing for the cruises; W. Wakefield, R. Brodeur, J. Shenker, D. Gushee and C. Banner for their long hours at sea; R. Brodeur and J. Shenker for processing collections in the laboratory; M. Hall of the Environmental Remote Sensing Applications Laboratory, O.S.U. for organizing the radiometer flyover on short notice; and the captain and crew of the F/V Pacific Warwind for their cooperation in this study.

CRUISE PERSONNEL

MAY: A. Chung, D. Gushee, J. Fisher, W. Pearcy and W. Wakefield.

JUNE: R. Brodeur, A. Chung, J. Fisher and J. Shenker.

SEPTEMBER: C. Banner, R. Brodeur, A. Chung and J. Fisher.

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INTRODUCTION

The School of Oceanography, Oregon State University, conducted three cruises (May 19-June 2, June 7-22, and September 4-14) in 1982 to study the distribution, abundance, migration, growth and feeding habits of juvenile salmonids during their first summer in the ocean. This is the second year we have had a series of cruises during the summer months and the fourth year that we have sampled the Oregon and Washington coasts during June. The purpose of this report is to describe the sampling area and methods used for the 1982 cruises and to present some preliminary results.

METHODS

Vessel and Gear

The Pacific Warwind, a 28-m (92-ft) commercial drum purse seiner was chartered for these cruises. A herring purse seine of 32 mm (1¼-in) stretch measure mesh and approximately 495 m long was used to collect salmonids and associated nekton. All sets were round hauls, where the net was laid out in a circle by seiner and skiff. A depth gauge attached to the bottom of the net indicated that the seine fished to depths of 50-67 m. Each set sampled approximately 19,100 m^2 and 955,000 to 1,280,000 m^3.

Sampling Area

Sets were made at stations generally 5 nautical miles apart along transect lines extending from Waatch Point, Washington to the Siuslaw River, Oregon in May and from the Quinault River, Washington to Yachats, Oregon in June and September (Figs. 1 and 2). We sampled from as close to the coast as we could safely set the seine (to approximately the 55-m contour) out to 20 miles. If salmon were present at the 20 mile station an attempt was made to sample out to 25 or 30

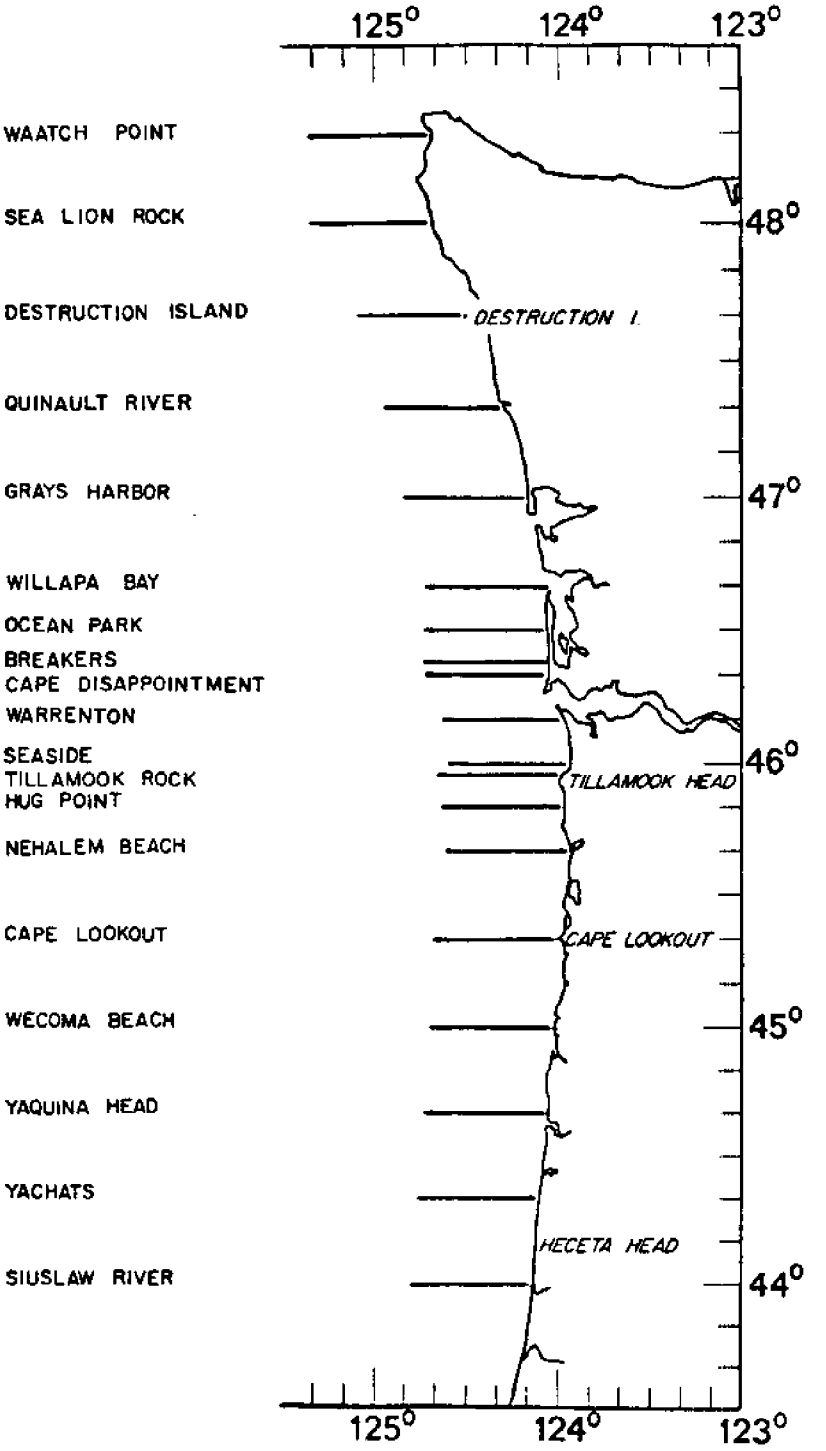

Figure 1. Names and locations of transect lines sampled during 1982.

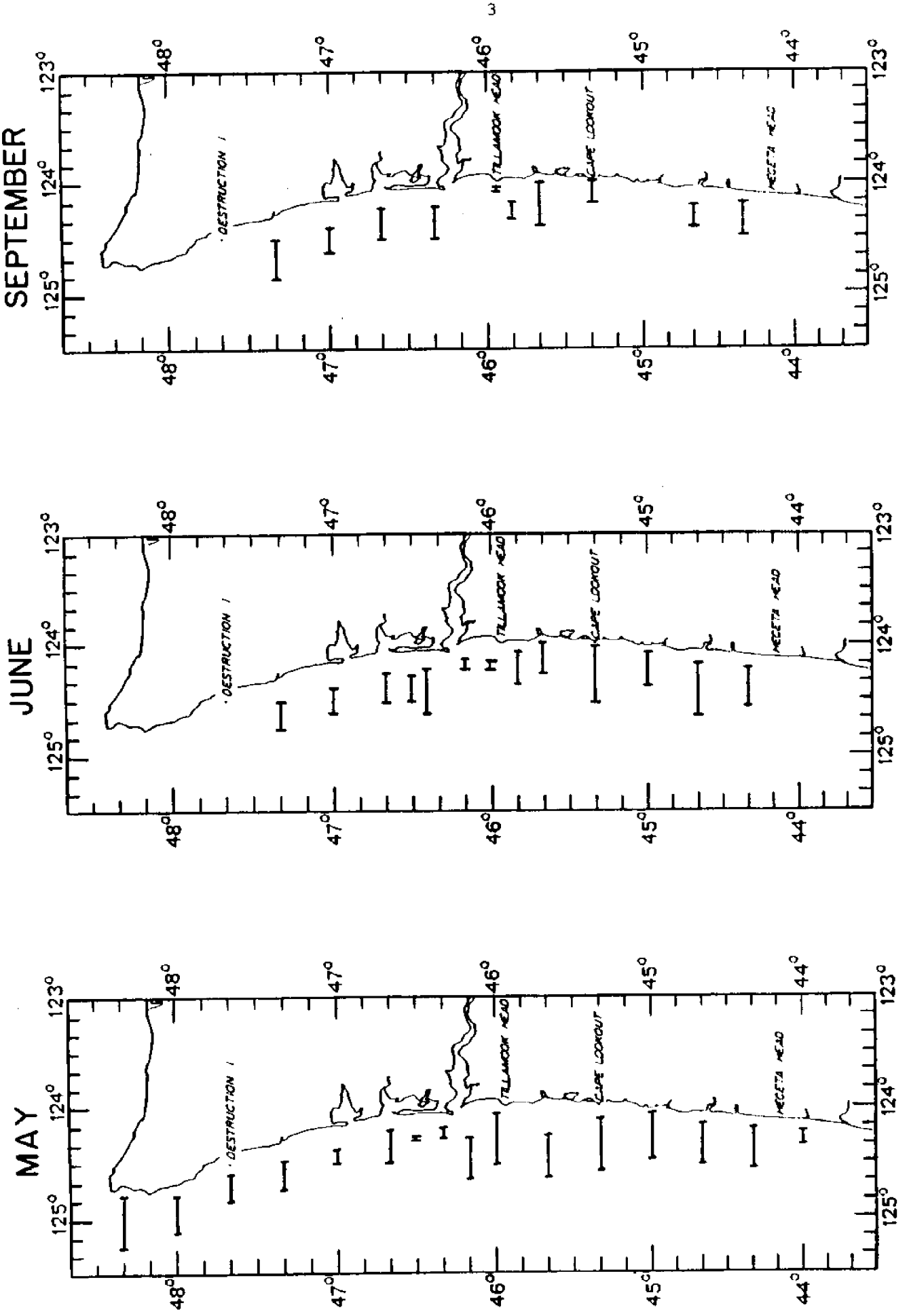

Figure 2. Locations of transect lines sampled during the May, June, and September cruises.

miles. At the Destruction Island, Quinault River, Grays Harbor and Willapa Bay transects, where the shelf is quite shallow, the closest sets to shore were at 10 miles. Sets were made to within 6 to 8 miles of shore at the other Washington transects. Off Oregon, where the shelf is steeper, sets were generally to within 3 to 5 miles of shore.

Sixteen transects were sampled during the May cruise, 13 during the June cruise and 10 during the September cruise (Fig. 2). Set locations were determined by Loran C coordinates and water depth as determined with the ship's depth recorder. A total of 173 purse seine sets were made during the three cruises. Of these, 17 were aborted or were non-quantitative because of gear problems or bad sea conditions. Locations of purse seine sets along with some environmental data are listed in Appendix A.

Environmental Data

Surface water samples were taken at each purse seine station. Temperatures were measured and water samples were obtained for later salinity determinations with a Guildline Autosalinometer (Model 8400). Salinity and temperature profiles of the water column were obtained at most stations with a self-contained Applied Microsystems CTD-12.

Ocean surface temperatures over the area from Leadbetter Point, Washington to Cape Lookout, Oregon and from the shore out to 30 miles were measured with an infrared radiometer (Barnes PRT-5) from on an aircraft at an altitude of 1000 ft on June 8, 1982. This flight was operated by personnel from the Environmental Remote Sensing Applications Laboratory at O.S.U.

Water clarity was measured with a 30-cm Secchi disk. Ambient light intensity was measured at deck level using a Spectra Lumicon light meter.

To estimate surface chlorophyll concentrations a 500 ml water sample was taken at each station about one meter below the surface and filtered through a 0.3 µm glass fiber filter. The filtrate was frozen and chlorophyll-a and phaeophytin-a were extracted from the filtrate at a later time with 90% acetone, and their concentrations were measured using a model-10 Turner Designs floro-meter.

Zooplankton tows were made at several stations using a 70-cm mouth diameter, 0.333 mm Nitex mesh, cylindrical-conical plankton net. Zooplankton sampling was not extensive due to time constraints.

Pigment Marking of Coho Smolts

To increase the number of marked coho smolts produced by Oregon Aqua-Foods, Inc. (OAF) in the ocean during September, 835,229 smolts were spray marked with fluorescent pigment prior to their transport from OAF's Springfield hatchery to the release facility on Yaquina Bay. These fish were marked in two groups. The first group, marked with red pigment, was released August 1 to 3, 1983; the second group, marked with yellow pigment, was released August 29 to September 1, 1982. Based on studies of pigment retention and mortality of fish prior to release, we estimate that about 350,000 fish with red marks and 295,000 with yellow marks were actually released into the ocean. All coho collected during September <300 mm fork length (FL) were checked under ultraviolet light for pigment marks.

Processing the Catch at Sea

The purse seine catch was either dipnetted from the seine bunt, lifted aboard in the bunt or brailed aboard. Large catches of jellyfish were quite common and a rough estimate was made of their total volume in each set. Species

were counted and individual bell diameters were measured from a subsample of jellyfish. Fishes and squids were also identified and counted and lengths were measured. Stomachs were removed from possible predators on juvenile salmonids (black rockfish, hake, blue shark, etc.) and preserved in 10% formalin. Selected whole fishes and squids were also preserved.

Juvenile salmonids. Small salmonids were anesthesized with MS 222, identified, measured to the nearest millimeter (FL), checked for adipose clips and other external marks, individually wrapped in plastic bags (along with a label identifying set number, species and length) and frozen.

Adult salmonids. Adult salmonids were anesthesized with MS 222, identified, measured, sampled for scales, and examined for adipose clips and other marks. Heads from adipose clipped adults were removed, labeled and frozen for later recovery of coded wire tags.

Kidney smears were taken from 65 adult coho, 36 adult chinook and 1 adult chum salmon for a study of bacterial kidney disease (BKD) by Craig Banner, Department of Microbiology, O.S.U. Stomachs were removed and preserved from all adult salmon killed.

Most adults were released after they were measured and scale samples removed. In order to trace movements of adult salmon in the ocean 194 coho, 73 chinook, 4 chum and 1 sockeye were tagged with orange Floy tags below the dorsal fin using a Dennison Mark II tagging gun. The Floy tags were supplied by the ODFW Marine Regional Office, Newport, Oregon. Fish were released after they had recovered from the anaesthetic in a tank of circulating sea water. All fish were active when released to the ocean, although sometimes badly descaled.

Laboratory Processing of Juvenile Salmonids

Each frozen juvenile salmon was given a serial number (collection year, seine set number and fish sequence number), weighed in its tared plastic bag, re-identified, and examined for fluorescent pigment marks (September) under ultraviolet light, and re-examined for adipose fin clip and other marks. Scales from a subsample of 25 fish of each salmonid species from each set were removed from the preferred area (see Scarnecchia, 1979) mounted on gum cards and acetate impressions made in preparation for future growth studies. Heads from individuals with adipose fin clips were removed and sent to the Oregon Department of Fish and Wildlife for coded wire tag removal and decoding. Stomach contents from 10 fish of each species for each set were removed, weighed and preserved in 5% buffered formalin. Kidney smears from these fish were examined for BKD by the Department of Microbiology, O.S.U.

RESULTS

Ocean Conditions

Upwelling was exceptionally strong during May 1982. The Bakun upwelling index for 45°N-125°W reached its highest value for May since 1967. As a result of the strong northerly winds and upwelling, the sea surface temperatures were cool off Oregon and Washington, averaging 10.8°C at the stations sampled. Temperatures 20-30 miles offshore were all less than 12.3°C, indicating a broad zone of cool water during this month. The chlorophyll-a content of surface water was much higher during May than the other periods, indicating a high standing stocks of phytoplankton.

Upwelling during June was not strong and the upwelling index was about the same as in June of other years in the late 70's and early 80's. Sea surface

temperatures averaged 11.6°C during this month, but temperatures were cooler (8.8-9.2°C) south of Nehalem Beach where upwelled water with high salinity (>33‰) was present. Sea surface temperatures measured with the infrared radiometer on June 8, 1982 during the aircraft overflight showed a weak inshore-offshore gradient (Fig. 3). Highest temperatures (>13°C) converged in the area north of Cape Disappointment, and lowest temperatures (<10°C) were found nearshore south of Nehalem. The sea surface temperatures measured from the seiner from 9 to 15 miles offshore, Willapa Bay to Warrenton, on June 10 were very similar to those measured from the aircraft in the same area.

During the September cruise surface temperatures were warm, averaging 15.3°C. Cooler water of 14.5°C or less was only encountered south of the Columbia River and temperatures less than 13°C were only found within 3 miles of shore south of Nehalem Beach.

Catch of Salmonids

Seven species of salmonids occurred in the purse seine collections (Table 1; Appendix B). Juvenile coho that had entered the ocean in spring or summer 1982 were the most common salmonid during all three cruises. (These are designated as .0 age, where the digit to the left of the period indicates the years spent in fresh water and the digit to the right indicates years in the ocean.) These .0 age coho comprised 58% of the total salmonid catch. Juvenile chinook salmon were the next most numerous salmonid (16% of the catch). They were common in catches during the May and June cruises but few were caught in September. Numbers of 0.0 age chum salmon, on the other hand, increased during the cruises and they were the second most numerous salmonid during the September cruise. Juvenile steelhead and cutthroat trout and pink and sockeye salmon were collected, but they were not

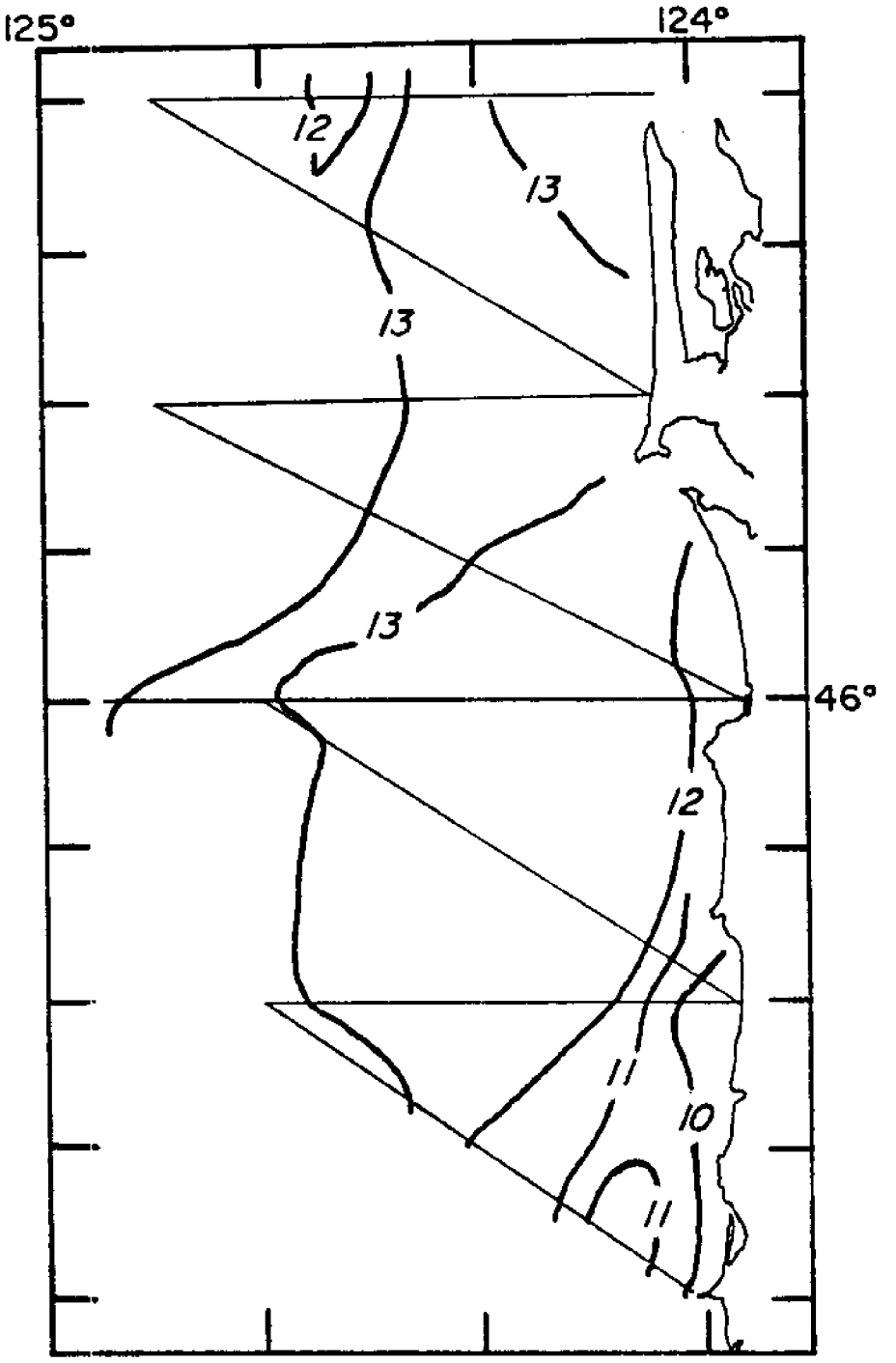

Figure 3. Sea-surface isotherms on June 8, 1982. Temperatures were measured with an infrared radiometer along the aircraft tract lines indicated.

Table 1. Summary of catch of salmonids and CWT recoveries in 1982.

	May				June				Sept.				Total		
	Length (mm,FL)	Total	#CWT	%CWT	Length (mm,FL)	Total	#CWT	%CWT	Length (mm,FL)	Total	#CWT	%CWT	Total	#CWT	%CWT
Coho	101-300	529	26	4.9	101-300	825	40	4.8	101-420	384	22	5.7	1738	88	5.1
	301+	210	6	2.9	301+	121	2	1.7	421+	25	1	4.0	356	9	2.5
Chinook	101-400	225	17	7.6	101-400	228	16	7.0	101-400	8	1	12.5	461	34	7.4
	401+	50	1	2.0	401+	39	0	0.0	401+	10	0	0.0	99	1	1.0
Steelhead	161-260	33	1	3.0	201-220	2	0	0.0	--	0	--	--	35	1	2.9
Cutthroat	181-360	8	--	--	181-350	9	--	--	--	0	--	--	17	--	--
Chum	121-130	1	--	--	91-170	55	--	--	151-230	155	--	--	211	--	--
	321+	5	--	--	351+	1	--	--	351+	0	--	--	6	--	--
Pink	--	0	--	--	--	0	--	--	151-190	47	--	--	47	--	--
Sockeye	550	1	--	--	111-170	21	--	--	161-170	1	--	--	23	--	--
												Total	2993		
No. Sets		62				56				38				156	

numerous. All the 0.0 age pink were captured during the September cruise. Maturing (.1+) coho, chinook, chum and sockeye salmon were also captured.

A total of 88 juvenile coho (5.1%) and 34 juvenile chinook (7.4%) had coded wire tags. Details on the release and recapture of fish with CWT's are given in Appendix C.

Coho Length-Frequency Distributions

Length-frequency distributions of coho for each cruise and three different areas are given in Figure 4. The size separation of juveniles (age .0) from adult fish (age .1) was distinct for all three months. During May most juveniles were between 121 and 210 mm FL and during June between 121 and 250 mm FL.

During September the coast-wide catch of juveniles was trimodal, with three modes north of the Columbia, two modes between Seaside and Nehalem and only one mode from Cape Lookout south. Average size decreased from north to south. The wide size range of juvenile coho (131 mm to 410 mm) in September was due to the presence of both recently released Oregon Aqua-Food's coho and juveniles that had entered the ocean earlier in the season.

Very few adult coho were collected in September compared to May and June (Fig. 4). The adults may have been close inshore, or their depth distribution may have changed making them less available to the purse seine during this period when surface seawater temperatures were warm.

Catch Per Set of Juvenile Coho

During May the mean catch per set was low north of the Columbia River, increased between Warrenton and Nehalem, and was high south of Cape Lookout (Table 2). Two exceptionally large catches of juvenile coho were made on the

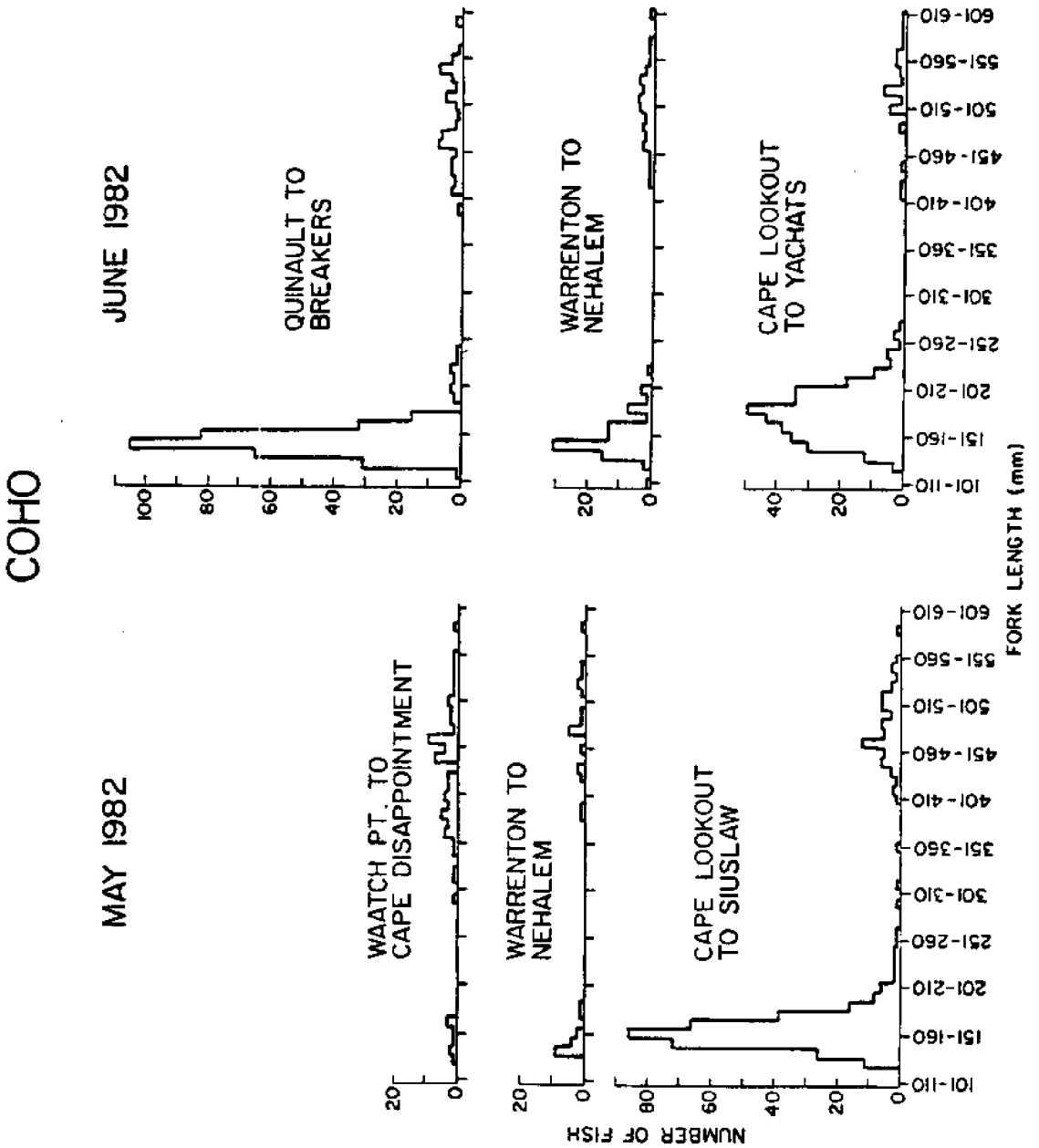

Figure 4. Length-frequency distributions of coho for the May, June and September cruises.

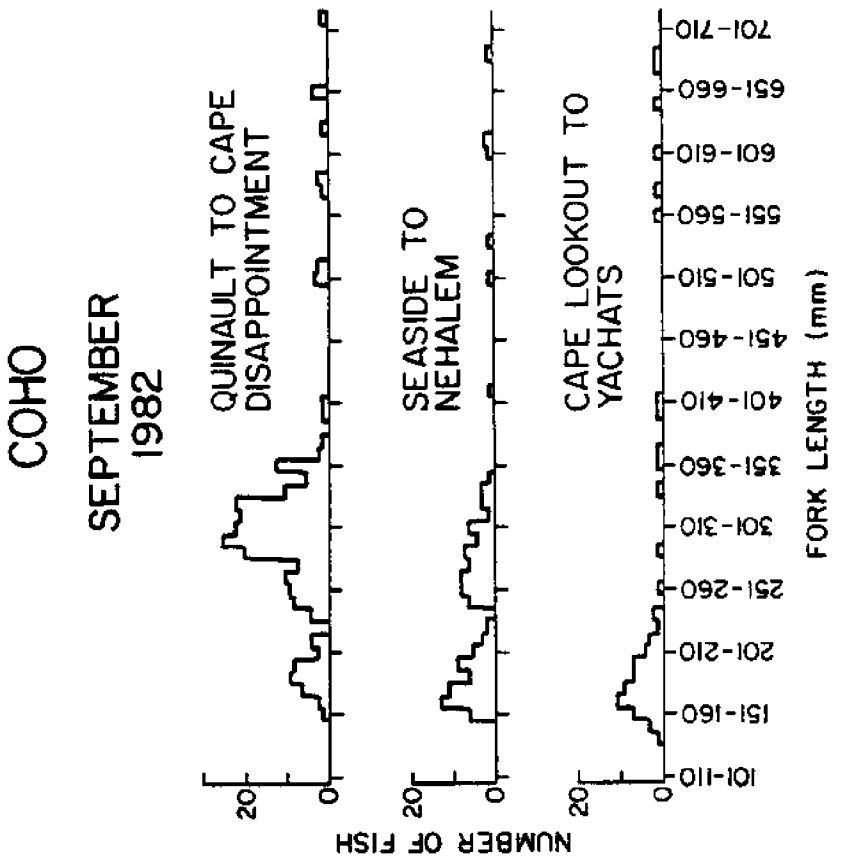

Figure 4. (cont.)

Table 2. Number of sets and mean catch per set of juvenile coho and chinook by area and cruise.

Species	Area	No. of sets/(catch per set)		
		May	June	September
Juvenile Coho	Waatch Pt. to Cape Disapp.	27(0.4)	21(16.6)	19(11.1)
	Warrenton to Nehalem	13(1.3)	10(8.8)	7(16.1)
	Cape Lookout to Siuslaw	22(22.8)	25(15.6)	12(7.4)*
Juvenile Chinook	Waatch Pt. to Cape Disapp.	27(1.9)	21(10.0)	19(0.2)
	Warrenton to Nehalem	13(7.1)	10(0.8)	7(0.0)
	Cape Lookout to Siuslaw	22(3.6)	25(0.4)	12(0.9)*

*Adjusted to correct for the smaller area fished by the shorter seine in the last 8 sets (Appendix B).

Wecoma Beach transect in May (Appendix B), but even excluding these the mean catch per set (6.6) was still much higher in this southern area than in the two areas to the north.

The mean catch per set of juvenile coho during the June cruise was ~~almost~~ as high north of the Columbia as south of Cape Lookout. During September mean catch per set was higher north of Cape Lookout than south of Cape Lookout.

Recoveries of Marked Juvenile Coho

Over the summer 88 CWT and 6 fluorescent pigment marked juvenile coho were collected (Table 1; Appendix C). Eight of 96 juvenile coho with missing adipose fins (8.3%) had no CWT's.

Recovery data for major hatchery groups of CWT juvenile coho are summarized by cruise and area in Table 3. During May most CWT juvenile coho were collected south of Cape Lookout. Most of these originated from Columbia River hatcheries, released about one month prior to recapture. All but one fish were collected south of where they entered the ocean; the one exception was a fish that had been released 76 days earlier.

Both catch per set (Table 2) and distribution of CWT juvenile coho (Table 3) indicate a southward movement of small juvenile coho in the ocean off Oregon and Washington during May 1982. This movement may have been active or passive. As mentioned earlier, upwelling was strong during May resulting in relatively strong surface currents that may have transported the smolts to the south.

The composition of the CWT catch indicates that some fish in a release group tend to stay together during their downstream and early ocean migrations. In two sets within two miles of each other on the Wecoma Beach transect 17 CWT Columbia River fish were collected; 4 were released from Cowlitz hatchery on

Table 3. Summary by month and area of days since release, north-south distance between point of ocean entrance and ocean capture, and size of CWT and pigment marked juvenile coho.

Cruise	Area	Hatchery Group	n	Days since Release: Mean (Range)	North-South Distance from Ocean Entrance (naut. miles): Mean (Range)	Fork Length (mm): Mean (Range)
May	Warrenton to Nehalem	1980 Brood-Columbia River	1	25	6 S	138
May	Cape Lookout to Siuslaw	1980 Brood-Columbia River	21	30 (26-33)	76 S (74 S - 95 S)	155 (136-188)
		1980 Brood-Coastal Washington	2	12,0-35	114 S, 141 S	133,143
		1980 Brood-Coastal Oregon	2	31,76	2 S, 61 N	147,193
June	Quinault to Breakers	1980 Brood-Coastal Washington	13	27 (12-49)	13 S (25 S - 20 N)	154 (127-224)
		1980 Brood-Columbia River	2	17,35	15 N, 8 N	137,147
June	Warrenton to Nehalem	1980 Brood-Columbia River	3	19,20,38	35 S, 34 S, 25 S	136,146,204
June	Cape Lookout to Yachats	1980 Brood-Coastal Washington	1	51	80 S	145
		1980 Brood-Columbia River	12	37 (18-50)	58 S (54 S - 80 S)	167 (141-205)
		1980 Brood-Coastal Oregon	9	72 (30-97)	46 N (18 N - 80 N)	203 (162-274)

Table 3. (cont.)

Cruise	Area	Hatchery Group	n	Days since Release: Mean (Range)	North-South Distance from Ocean Entrance (naut. miles): Mean (Range)	Fork Length (mm): Mean (Range)
Sept.	Quinault to Cape Disappointment	1980 Brood-Columbia River	10	116 (87-157)	43 N (5N - 65 N)	316 (268-373)
		1980 Brood-Coastal Oregon	1	129	85 N	352
		1981 Brood-OAF	4	32 (10-62)	113 N (103 N - 143 N)	199 (181-242)
Sept.	Seaside to Nehalem	1980 Brood-Coastal Oregon	1	131	45 N	336
		1981 Brood-OAF	5	50 (15-86)	79 N (79 N)	207 (166-246)
Sept.	Cape Lookout to Yachats	1981 Brood-OAF	5	16 (12-21)	31 N (18 S - 44 N)	177 (155-204)
		1980 Brood-OAF	1	130	17 S	408

May 3, 3 from Sandy on April 30, 4 from Lower Kalama on May 3, 3 from Eagle Creek on May 3-6, 2 from Big Creek on April 28 and 29 and one from Speelyai on May 4 (Appendix C).

During June CWT juvenile coho were collected both north and south of the Columbia. Most (87%) of those collected north of the Columbia were from coastal Washington hatcheries, released less than one month prior to recapture. These fish show little net north-south movement (Table 3). Columbia River fish made up only 13% of recovered CWT's north of the Columbia and were not found farther than 15 miles north of the mouth of the Columbia River. South of the Columbia, Columbia River fish accounted for 60% of CWT recoveries. During June, coho from coastal Oregon hatcheries that had been released early in the spring were generally the largest size ($\bar{x}$ = 203 mm FL). These juvenile CWT coho were the only ones that were consistently collected to the north of where they had entered the ocean (Table 3). They also made up a higher percentage (41%) of the catch south of Cape Lookout in June than in May (8%). No OAF coho smolts with CWT's were collected in May or June.

During the September cruise, all juvenile coho with CWT's collected north of the Columbia River were from Columbia River, coastal Oregon or OAF hatcheries. No coastal Washington CWT fish were collected in any of the regions sampled. Six Columbia River and 1 OAF juvenile coho were collected on the most northerly transect (Quinault River). Most of the large (268 mm - 373 mm FL) coho with CWT's collected north of the Columbia River were Columbia River fish released three to five months previously (Table 3).

South of the Columbia, 11 of 12 CWT or pigment marked juvenile coho were from the OAF release site. These ranged in size from 155 to 246 mm FL and probably made up many of the fish in this size mode during September in all regions (Fig. 4).

Net movement of most juvenile coho during September 1982 was to the north. All but two of the CWT .0 age coho were collected north of where they entered the ocean. One of these was a very large (408 mm FL) male with well developed testes, probably a jack (Table 3).

Summarizing ocean movements of juvenile coho during the summer of 1982: 1) Net movement off Oregon and Washington during May 1982 was generally to the south. 2) Little evidence was found for northward migration of Columbia River or coastal Oregon juvenile coho into the waters off Washington by early to mid June. 3) Fish originating from Columbia River and Oregon hatcheries clearly had migrated to the north by September, while coho from coastal Washington hatcheries apparently had migrated out of the sampling area.

Chinook Length-Frequency Distributions

The varied life histories of chinook salmon caused a broad size range of .0 age chinook collected during May and June (Fig. 5). The length range of .0 age chinook was estimated from our catches of CWT fish. Fork lengths of CWT chinook released from fall 1981 through spring 1982 ranged from 139 mm to 316 mm in the May 1982 collections and from 150 mm to 340 mm in June 1982 collections (Table 4). In this report "juvenile" chinook are defined to be those 400 mm FL or less for the May and June cruises.

Catch Per Set of Juvenile Chinook

During the May cruise, catch per set of juvenile chinook was lowest north of the Columbia River, as it was for juvenile coho (Table 2). Catch per set was highest from Warrenton to Nehalem. During June, catch per set was high north of the Columbia River and very low elsewhere. During September very few chinook salmon were caught and the catch per set was very low.

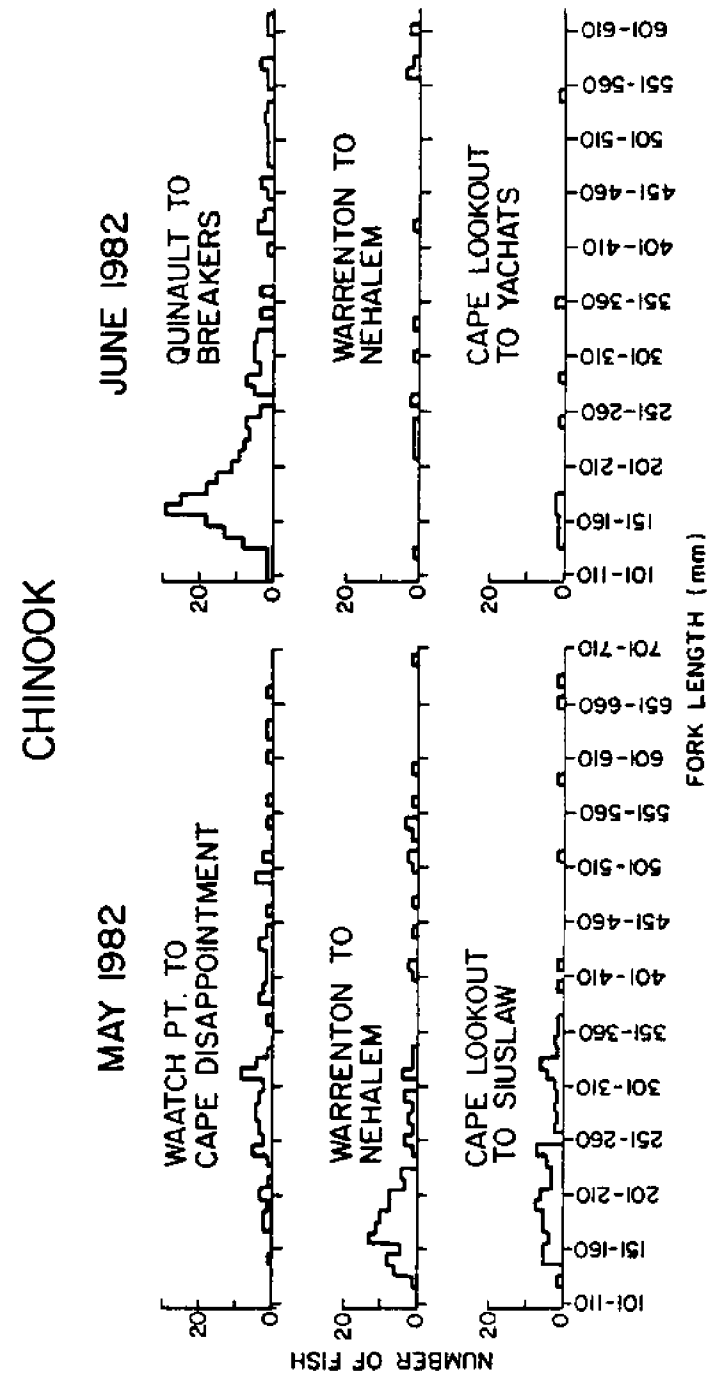

Figure 5. Length-frequency distributions of chinook salmon for the May and June cruises.

Table 4. Summary by month and area of days since release, north-south distance between point of ocean entrance and ocean capture, and size of CWT and pigment marked juvenile chinook.

Cruise	Area	Hatchery Group	n	Days since Release: Mean (Range)	North-South Distance from Ocean Entrance (naut. miles): Mean (Range)	Fork Length (mm): Mean (Range)
May	Waatch Point to Cape Disappointment	1980 Brood-Coastal Washington	1	47	54 S	203
		1980 Brood-Domsea (Coastal Oregon-Fall release)	1	∿143-174	150 N	270
May	Warrenton to Nehalem	1980 Brood-Columbia River	6	63(47-73)	15 S (15 S)	183 (139-213)
May	Cape Lookout to Siuslaw	1980 Brood-Columbia River	6	61(41-76)	61 S (55 S - 94 S)	220 (173-302)
		1980 Brood-Columbia River (Fall release)	1	204	74 S	306
		1980 Brood-Coastal Oregon	1	91	40 N	248
		1980 Brood-Coastal Oregon (Fall release)	1	247	73 N	316
June	Quinault to Breakers	1980 Brood-Columbia River	12	81(59-88)	18 N (8N - 26 N)	224 (140-287)
		1980 Brood-Columbia River (Fall release)	1	219	25 N	150
		1980 Brood-Domsea (Coastal Oregon-Fall release)	1	∿161-191	150 N	309

Table 4. (cont.)

Cruise	Area	Hatchery Group	n	Days since Release: Mean (Range)	North-South Distance from Ocean Entrance (naut. miles): Mean (Range)	Fork Length (mm): Mean (Range)
June	Cape Lookout to Yachats	1980 Brood-Columbia River	1	97	55 S	284
		1978 Brood-Columbia River	1	~~031~~ ~330	55 S	355
Sept.	Cape Lookout to Yachats	1980 Brood-Columbia River	1	166	116 S	340

Recoveries of CWT Juvenile Chinook

Most juvenile chinook with CWT's were recoverd in May south of where they entered the ocean (Table 4). All CWT Columbia River chinook were found south of the Columbia River mouth. The only juvenile chinook found north of where they entered the ocean were coastal Oregon fish released at least 91 days prior to recapture.

During June there was a dramatic increase in catch per set of juvenile chinook north of the Columbia River (Table 2; Fig. 5). Nearly all the CWT fish caught here were from Columbia River hatcheries, indicating migration of these juvenile chinook as far north as the Willapa Bay transect (Table 4). Both CWT juveniles collected south of the Columbia River in June were Columbia River fish, as was the one CWT juvenile collected in September.

The CWT data indicate a general southward movement of juvenile chinook during May but northward movement in June. The very low abundance of juvenile chinook in September suggests that they had either moved out of the sampling area, or had become less available to capture with the purse seine, perhaps due to a change in depth distribution.

Length-Frequency Distributions of Chum and Sockeye Salmon and Steelhead and Cutthroat Trout.

Very few 0.0 age chum were collected in May. During June most 0.0 age chum were between 121 mm and 170 mm FL and were most common south of Cape Lookout (Table 5). During September 0.0 age chum were 151 mm to 230 mm FL and were most common north of the Columbia.

No juvenile sockeye were collected in May. During June they were between 111 mm and 170 mm FL and were most common north of the Columbia (Table 5). Only one juvenile sockeye was collected during the September cruise.

Table 5. Size-frequency distributions of chum, sockeye and pink salmon by month and area.

Fork Length (mm)	CHUM (June)[1]			CHUM (Sept)[2]			SOCKEYE (June)[3]			PINK (Sept)[4]		
	Quinault to Breakers	Warrenton to Nehalem	Cape Lookout to Yachats	Quinault to Cape Disapp.	Seaside to Nehalem	Cape Lookout to Yachats	Quinault to Breakers	Warrenton to Nehalem	Cape Lookout to Yachats	Quinault to Cape Disapp.	Seaside to Nehalem	Cape Lookout to Yachats
<100		1										
101-110												
111-120							1					
121-130			3				8					
131-140		2	10				6					
141-150		1	24				2	1				
151-160			11	3			1			7		
161-170			3	19			1		1	10		
171-180				35						8		
181-190				35		1				3		
191-200				8								
201-210				2								
211-220												
221-230				1								
231-240												
241-250												
251-260												
261-270												
271-280												
281-290												
291-300												
301-310												
311-320												
321-330												
331-340												
341-350												
351+	1											

1 May: 2 chum 123mm, 754 mm (Cape Lookout to Siuslaw R.); 2 chum 738 mm, 703 mm (Warrenton to Nehalem); 2 chum 324 mm, 353 mm (Waatch Pt.)

2 51 chum not measured

3 One 550 mm sockeye caught in May (Quinault R.): one 161 mm sockeye caught in September (Quinault R.)

4 No pinks caught in either May or June

Table 6. Size-frequency distributions of cutthroat and steelhead by month and area.

Fork Length (mm)	CUTTROAT (May)			CUTTROAT (June)[1]			STEELHEAD (May)			STEELHEAD (June)		
	Waatch Pt. to Cape Disapp.	Warrenton to Nehalem	Cape Lookout to Siuslaw	Quinault to Breakers	Warrenton to Nehalem	Cape Lookout to Yachats	Waatch Pt. to Cape Disapp.	Warrenton to Nehalem	Cape Lookout to Siuslaw	Quinault to Breakers	Warrenton to Nehalem	Cape Lookout to Yachats
<100												
101-110												
111-120												
121-130												
131-140												
141-150												
151-160												
161-170								2				
171-180							4	2	1			
181-190				1				2	3			
191-200							1	2				
201-210							2		1	1		
211-220									1	1		
221-230				1			5		1			
231-240			3					1				
241-250			2		1		1	1	1			
251-260							1		1			
261-270				2								
271-280												
281-290						1						
291-300					1							
301-310												
311-320				1								
321-330			1									
331-340												
341-350					1							
351-360			2									

[1] No Cuttroat or Steelhead were caught in September

Juvenile pink salmon were collected only during September north of the Columbia. They were between 151 mm and 190 mm FL.

Juvenile steelhead trout were most common during May and were fairly evenly distributed along the coast (Table 6). They were rare during June and did not occur in September collections.

Cutthroat trout were most common south of Cape Lookout during May and north of Cape Lookout in June. They ranged from 181 mm to 360 mm in the collections (Table 6). They were not collected during September.

Bacterial Kidney Disease (BKD)

To date 228 juvenile chinook salmon collected in the ocean during 1982 have been examined for BKD. Thirty-six (16%) were infected. Of 325 juvenile coho examined, 17 (5%) had BKD. Of 186 juvenile chinook from 1981 ocean collections, 18 (10%) had BKD; of 974 juvenile coho, 26 (3%) had BKD. The incidence of BKD was higher in juvenile chinook than in juvenile coho for fish collected during 1981 and 1982 (Craig Banner, Department of Microbiology, O.S.U.).

Recoveries of Floy-tagged Adult Salmon

Tags from 17 coho and three chinook salmon were returned to us. Most of these fish were caught over 30 days after being tagged and released (range 6-146 days). Over half were recoverd less than 30 miles north or south of the latitude of release, indicating little net north-south migration. Four coho tagged off Washington were recovered in British Columbia (Table 7).

REFERENCE

Scarnecchia, D.L. 1979. Factors affecting coho salmon production in Oregon. M.S. Thesis, Oregon State University, Corvallis, OR, 100 pp.

Table 7. Summary of recoveries of floy tagged salmon through December, 1982.

Floy Tag Number	Set No.	Location Tagged	Location Recovered	Date Tagged	Date Recovered	Species	Days Between Release and Recovery
218	002	9.9 mi Waatch Pt.	Canadian Fishery	5/19/82	--	CO	--
225 + 226	003	14.7 mi Waatch Pt.	12 mi off Tatoosh Is.	5/19/82	7/20/82	CO	62
228	003	14.7 mi Waatch Pt.	Southern Puget Sound	5/19/82	9/18/82	CO	122
242 + 243	007	6.2 mi Sea Lion Rk.	Landed Sekiu, WA	5/20/82	9/18/82	CO	121
262 + 263	019	10.1 mi Grays Hbr.	Estevan to Tofino, BC	5/22/82	(7/15/82)?	CO	54
288	023	9.7 mi Willapa Bay	Banks of the Fraser R. (not attached to a fish)	5/23/82	--	Chin	--
289 + 290	025	15.1 mi Willapa Bay	Cape Disappointment	5/23/82	7/1/82	CO	39
393	056	10.3 mi Wecoma Bch.	Straits of Juan De Fuca	5/31/82	9/8/82	CO	100
398	056	10.3 mi Wecoma Bch.	South of Columbia R. Buoy #2	5/31/82	7/1/82	CO	31
438	056	10.3 mi Wecoma Bch.	Cape Meares	5/31/82	7/10/82	CO	40
444	056	10.3 mi Wecoma Bch.	Off Yachats	5/31/82	7/6/82	Chin	36
517 + 518	072	14.9 mi Quinault R.	Robertson Cr. Hatch. BC	6/7/82	10/28/82	CO	143
611	089	8.4 mi Breakers	Columbia Gillnet River Miles 18 to 52	6/11/82	11/4/82	CO	146
612 + 613	089	8.4 mi Breakers	Off South Jetty of Columbia R.	6/11/82	7/31/82	Chin	50
616 + 618	089	8.4 mi Breakers	Cowlitz Hatchery	6/11/82	10/26/82	CO	137
619	089	8.4 mi Breakers	Near Columbia R.	6/11/82	6/22/82	CO	11
640 + 641	091	16.2 mi Breakers	Near Ilwaco	6/11/82	7/6/82	CO	25
693 + 694	098	4.0 mi Hug Pt.	No information	6/13/82	--	CO	--
724 + 725	129	8.2 mi Cape Lookout	Inside Depoe Bay	6/22/82	6/28/82	CO	6
727	107	8.7 mi Cape Lookout	Cascade Hd. to Heceta Hd.	6/16/82	7/19-25/82	CO	33

Appendix A. Purse seine set locations and environmental data, 1982.

Set No.	Date	Transect	Distance Offshore (n.mi)	Lat.	Long.	Time Start	Depth (m)	Bearing (°true)	Temp. °C	Sal. (‰)	Light (fc)	Secchi (m)	Chl.a	Phae. a	CTD	Plankton Tow No.	Comments
001	May 19	Waatch Pt.	5.3	48 20.8	124 49.6	1123	62	30	10.8	32.2	1300	9.0	5.518	0.407			
002	May 19	Waatch Pt.	9.9	48 19.8	124 54.5	1256	318	50	10.4	31.7	1200	7.0	3.920	0.203			
003	May 19	Waatch Pt.	14.7	48 20.3	125 01.9	1426	218	60	11.5	31.4	1200	4.0	14.617	1.529			
004	May 19	Waatch Pt.	20.1	48 20.0	125 09.6	1600	143	--	12.2	30.9	1000	10.0	0.823	0.223			
005	May 19	Waatch Pt.	24.7	48 20.2	125 16.7	1734	137	50	11.8	30.8	500	7.5	0.871	0.290			
006	May 19	Waatch Pt.	5.7	48 20.2	124 49.9	2025	59	250	9.5	32.7	100	8.0	2.823	0.323			
007	May 20	Sea Lion Rock	6.2	47 58.8	124 49.4	0837	55	0	11.0	31.0	250	10.0	0.968	0.310		82-Z1	
008	May 20	Sea Lion Rock	10.4	47 59.7	124 56.2	1320	93	220	11.7	30.7	400	10.0	0.484	0.271	x	82-Z2	
009	May 20	Sea Lion Rock	14.9	47 59.8	125 03.1	1505	121	125	12.0	30.8	700	10.0	0.358	0.130	x	82-Z3	
010	May 20	Sea Lion Rock	20.2	48 00.3	125 10.8	1839	154	50	11.9	30.9	200	13.0	0.329	0.136			
011	May 21	Destruct. Is.	10.3	47 39.9	124 39.0	0701	55	260	10.0	31.6	200	5.0	9.738	0.000			Aborted
012	May 21	Destruct. Is.	10.7	47 40.2	124 39.6	0802	55	20	--	--	150	--	--	--			Aborted
013	May 21	Destruct. Is.	11.2	47 40.3	124 40.7	0921	59	--	--	--	200	--	--	--			
014	May 21	Destruct. Is.	15.1	47 40.3	124 46.1	1113	80	57	11.2	31.2	700	5.0	4.259	0.155	x		
015	May 21	Destruct. Is.	20.3	47 39.8	124 53.4	1335	115	30	12.1	30.9	700	11.0	0.348	0.267	x		
016	May 21	Quinault R.	19.9	47 20.4	124 46.6	1700	329+*	52	11.7	30.9	500	10.0	0.600	0.074	x		
017	May 21	Quinault R.	14.6	47 20.3	124 38.9	1849	93	20	11.4	31.3	400	8.0	0.532	0.165	x		
018	May 21	Quinault R.	9.9	47 20.3	124 32.1	2024	57	5	10.1	31.9	60	--	21.296	0.774			
019	May 22	Grays Harbor	10.1	47 00.0	124 24.9	1305	57	60	11.6	32.1	300	3.5	5.847	0.960		82-Z4	
020	May 22	Grays Harbor	14.8	46 59.9	124 31.9	1646	79	325	11.7	32.2	700	5.0	2.964	0.738	x	82-Z5	
021	May 22	Grays Harbor	9.9	46 59.8	124 24.7	2016	55	300	11.4	32.1	90	--	--	--			
022	May 23	Willapa Bay	9.7	46 40.4	124 18.2	1023	62	80	10.5	31.6	700	4.0	5.953	1.539			
023	May 23	Willapa Bay	9.7	46 40.4	124 18.2	1137	62	52	--	--	---	--	--	--			Repeat Set
024	May 23	Willapa Bay	13.8	46 41.1	124 24.3	1315	82	--	--	--	--	--	--	--			Aborted
025	May 23	Willapa Bay	15.1	46 40.3	124 25.9	1406	90	70	11.4	32.3	725	2.5	12.197	0.348	x		
026	May 23	Willapa Bay	20.0	46 40.1	124 32.0	1715	124	--	11.5	31.5	600	4.5	10.164	0.987	x		
027	May 23	Willapa Bay	8.3	46 39.8	124 15.9	2000	51	110	11.2	31.8	150	--	2.081	0.532			
028	May 24	Ocean Park	9.6	46 30.4	124 17.6	702	62	--	10.8	31.5	--	--	7.357	1.007			
029	May 24	Cape Disapp.	7.0	46 20.7	124 13.7	903	49	60	11.4	31.1	625	6.0	2.904	0.581			
030	May 24	Cape Disapp.	--	--	--	--	--	--	13.0	14.6	--	--	--	--			Aborted
031	May 24	Cape Disapp.	9.8	46 19.6	124 18.0	1408	150	--	11.8	31.0	800	4.5	4.646	0.697			
032	May 27	Seaside	5.6	46 00.2	124 03.5	1009	53	50	10.7	25.0	440	2.0	3.146	0.803			Aborted
033	May 27	Seaside	5.7	46 00.4	124 03.6	1235	57	60	10.4	31.2	800	2.0	--	--			
034	May 27	Seaside	10.1	46 00.3	124 10.0	1413	86	--	10.4	30.0	1200	3.0	5.421	1.084			
035	May 27	Seaside	10.0	46 00.0	124 10.0	1555	88	--	11.0	31.2	1000	3.5	5.421	0.620			
036	May 27	Seaside	14.7	45 59.8	124 16.9	1816	119	--	11.4	32.2	600	4.0	8.228	1.646			
037	May 27	Seaside	20.5	46 00.0	124 25.0	2002	143	--	10.6	32.2	100	3.5	--	--			
038	May 27	Seaside	25.0	46 00.2	124 31.3	2131	152	East	10.3	31.9	.06	--	8.954	1.500			
039	May 28	Warrenton	14.8	46 09.3	124 19.1	1212	106	50	12.3	17.6	1000	1.0	3.388	0.910	x	82-Z6	
040	May 28	Warrenton	21.5	46 09.4	124 28.9	1601	135	--	10.3	32.0	700	3.5	18.876	0.871	x	82-Z7	Aborted
041	May 28	Warrenton	22.3	46 07.6	124 29.0	1736	134	150	10.8	32.0	450	4.0	--	--			Repeat Set
042	May 28	Warrenton	24.6	46 10.2	124 33.9	1920	155	140	11.2	31.8	160	6.0	4.937	0.407			
043	May 28	Warrenton	30.2	46 10.2	124 41.7	2054	366	150	11.4	31.7	25	5.0	1.500	0.532			Aborted
044	May 30	Nehalem	5.4	45 40.7	124 03.8	1005	71	160	9.3	33.1	500	5.0	8.518	1.239	x		
045	May 30	Nehalem	10.0	45 40.6	124 10.4	1121	108	200	11.4	31.5	750	4.5	6.582	0.387	x		
046	May 30	Nehalem	15.2	45 40.3	124 17.8	1305	141	110	12.0	29.2	1000	3.5	6.776	0.891	x		
047	May 30	Nehalem	19.9	45 40.3	124 24.6	1506	166	100	12.2	27.4	800	3.5	5.034	0.542	x		

* Depth from navigation chart

Appendix A. (cont.)

Set No.	Date	Transect	Distance Offshore (n.mi)	Lat.	Long.	Time Start	Depth (m)	Bearing (°true)	Temp. °C	Sal. (‰)	Light (fc)	Secchi (m)	Chl. a	Phae. a	CTD	Plankton Tow No.	Comments
048	May 30	Cape Lookout	5.2	45 19.9	124 05.5	1921	88	200	10.6	32.0	400	3.5	16.940	1.065			
049	May 30	Cape Lookout	4.6	45 20.2	124 04.9	2021	88	200	10.4	32.0	40	--	--	--			Repeat Set
050	May 31	Cape Lookout	9.3	45 20.7	124 12.4	0742	148	150	9.8	32.3	200	7.0	7.163	1.665	x		
051	May 31	Cape Lookout	14.8	45 20.1	124 19.4	0952	192	150	10.8	31.3	300	6.0	3.098	1.723	x		
052	May 31	Cape Lookout	19.2	45 20.9	124 25.8	1140	366	170	11.3	31.0	250	6.0	2.323	0.581	x		
053	May 31	Cape Lookout	25.1	45 20.0	124 33.7	1400	454	170	11.7	30.8	400	5.0	2.323	0.581	x		
054	May 31	Wecoma Beach	19.7	44 59.5	124 28.4	1659	346	170	11.8	31.8	400	7.5	0.836	0.348	x		
055	May 31	Wecoma Beach	15.0	45 00.9	124 21.7	1841	201	130	11.2	31.6	400	8.0	1.162	0.465	x		
056	May 31	Wecoma Beach	10.3	45 00.4	124 15.0	2109	146	200	10.2	31.6	0.5	--	1.404	0.629	x		
057	June 1	Wecoma Beach	2.2	45 00.9	124 04.9	0748	59	150	9.7	32.7	400	3.0	21.296	1.936			
058	June 1	Wecoma Beach	3.3	45 00.3	124 05.2	0852	60	140	--	--	150	--	--	--		82-Z8	Repeat Set
059	June 1	Wecoma Beach	5.1	45 00.6	124 07.7	1124	88	--	10.6	32.4	750	3.5	15.004	3.001			
060	June 1	Yaquina Head	5.2	44 40.4	124 10.8	1425	60	170	10.8	32.3	750	3.0	10.164	1.162			
061	June 1	Yaquina Head	9.7	44 40.9	124 17.7	1545	82	140	10.8	33.1	300	3.5	7.550	0.348	x		
062	June 1	Yaquina Head	14.5	44 40.7	124 24.4	1711	90	160	11.3	31.8	300	7.5	1.936	0.620	x		
063	June 1	Yaquina Head	19.5	44 41.3	124 31.4	1850	137	--	11.5	32.5	400	12.0	0.465	0.197	x		
064	June 2	Yachats	19.8	44 20.0	124 33.5	0534	93	320	10.4	32.2	7.0	5.0	4.259	0.852	x		
065	June 2	Yachats	14.5	44 20.0	124 26.2	0715	90	340	9.9	33.2	100	2.5	17.424	3.485	x		
066	June 2	Yachats	10.4	44 19.7	124 20.6	0846	79	40	9.3	32.9	150	3.5	12.342	1.597	x		
067	June 2	Yachats	4.5	44 19.7	124 12.4	1041	59	20	9.4	33.2	300	3.5	16.456	4.453	x		
068	June 2	Siuslaw R.	4.6	43 59.6	124 14.6	1400	73	60	9.9	32.9	175	3.0	8.954	1.210	x		
069	June 2	Siuslaw R.	9.9	44 00.3	124 24.8	1550	110	--	10.2	33.0	600	3.5	13.310	3.533	x		
070	June 2	Siuslaw R.	14.8	44 00.0	124 28.7	1740	128	20	10.7	32.2	300	7.0	5.808	1.162	x		Aborted
071	June 7	Quinault R.	10.0	47 20.0	124 32.1	0626	57	~100	11.3	32.8	82	8.0	0.465	0.197	x		
072	June 7	Quinault R.	14.9	47 20.3	124 39.3	0815	95	30	10.8	32.4	150	4.5	7.986	1.249	x		
073	June 7	Quinault R.	19.2	47 20.6	124 45.9	1028	159	--	11.7	31.8	200	10.0	0.736	0.275	x		
074	June 7	Quinault R.	15.4	47 20.0	124 39.9	1210	101	75	--	--	300	4.5	--	--			Aborted
075	June 7	Grays Harbor	20.1	47 00.0	124 39.5	1608	104	30	11.5	31.8	300	8.5	0.891	0.271			
076	June 7	Grays Harbor	15.1	47 00.2	124 32.1	1736	79	55	10.8	32.3	150	6.0	4.646	0.000			
077	June 7	Grays Harbor	10.0	47 00.3	124 24.8	1907	57	130	12.3	31.3	150	5.5	--	---			
078	June 7	Grays Harbor	10.0	47 00.3	124 24.8	2002	57	70	--	--	--	--	--	--	x		Repeat Set
079	June 8	Willapa Bay	9.4	46 40.7	124 17.8	0646	62	110	12.1	28.2	80	3.5	--	--	x	82-Z9	
080	June 8	Willapa Bay	11.4	46 40.5	124 20.6	0851	71	130	12.4	27.0	150	--	4.840	0.736			
081	June 8	Willapa Bay	17.2	46 40.9	124 29.2	1045	97	70	11.6	30.9	360	6.5	2.517	0.097	x		
082	June 10	Willapa Bay	10.7	46 40.2	124 19.4	0723	70	75	11.9	31.4	110	6.3	2.323	0.581			
083	June 10	Willapa Bay	14.9	46 40.4	124 25.6	0902	88	125	11.6	32.2	200	6.0	3.001	0.484	x		
084	June 10	Willapa Bay	19.1	46 40.8	124 32.0	1041	119	100	11.7	32.1	330	8.0	1.520	0.722	x		
085	June 10	Ocean Park	20.1	46 30.0	124 32.4	1243	~560*	--	11.7	32.1	400	8.0	0.213	0.221	x		
086	June 10	Ocean Park	14.9	46 30.0	124 25.0	1430	99	170	12.3	31.6	420	6.0	1.549	0.426	x		
087	June 10	Ocean Park	10.0	46 30.3	124 18.0	1616	68	110	11.8	31.7	350	3.5	8.131	0.278			
088	June 10	Ocean Park	9.8	46 29.8	124 17.5	1705	66	140	11.7	--	280	--	--	--		82-Z10	Repeat Set
089	June 11	Breakers	8.4	46 22.7	124 15.6	0730	60	70	11.6	31.4	250	4.5	5.808	0.697			
090	June 11	Breakers	10.3	46 23.1	124 18.2	0940	71	80	12.5	31.6	170	5.0	3.678	0.503	x		
091	June 11	Breakers	16.2	46 22.9	124 26.8	1128	110	20	12.4	32.0	300	7.0	1.162	0.348	x		
092	June 11	Breakers	20.2	46 23.3	124 32.5	1259	139	50	12.0	31.8	200	9.0	0.436	0.145			
093	June 11	Warrenton	7.8	46 10.0	124 09.5	1609	57	0	10.8	29.0	380	4.0	2.420	1.065			
094	June 11	Warrenton	11.2	46 09.9	124 14.3	1737	88	345	--	--	230	2.0	--	--			Aborted
095	June 12	Seaside	9.7	46 00.6	124 09.4	0840	84	90	12.4	26.5	230	5.0	4.259	0.794			

* Depth from navigation chart

Appendix A. (cont.)

Set No.	Date	Transect	Distance Offshore (n.mi)	Lat.	Long.	Time Start	Depth (m)	Bearing (°true)	Temp. °C	Sal. (‰)	Light (fc)	Secchi (m)	Chl, a	Phae, a	CTD	Plankton Tow No.	Comments
096	June 12	Seaside	10.4	46 00.2	124 10.5	1000	88	55	12.4	26.3	200	--	--	--	x		Repeat Set
097	June 12	Seaside	12.8	46 00.8	124 13.8	1113	95	85	12.6	26.5	150	5.0	3.291	0.891			
098	June 13	Hug Point	4.0	45 51.2	124 03.5	0959	68	85	12.6	26.1	230	5.0	2.517	0.736			
099	June 13	Hug Point	7.5	45 49.9	124 08.3	1149	90	50	13.1	26.1	280	8.0	2.517	0.503			Aborted
100	June 13	Hug Point	16.4	45 50.3	124 21.0	1521	137	--	13.3	30.0	240	7.0	0.920	1.113			
101	June 13	Hug Point	12.1	45 50.3	124 14.7	1647	124	60	13.0	26.6	170	6.0	1.868	0.536			
102	June 14	Nehalem	3.7	45 39.6	124 01.6	1945	59	--	11.5	30.1	85	3.0	11.053	1.859			
103	June 14	Nehalem	4.9	45 40.0	124 03.3	0736	68	90	10.9	30.9	300	3.0	8.712	3.833			
104	June 14	Nehalem	9.9	45 40.6	124 10.3	1040	108	100	12.1	28.9	160	7.0	2.033	0.871			
105	June 14	Nehalem	15.1	45 40.6	124 17.6	1240	--	125	12.6	29.4	320	8.0	1.258	0.484			Not quantative
106	June 16	Cape Lookout	5.0	45 20.0	124 05.3	0621	146	100	8.8	33.0	100	11.0	0.678	0.484	x		
107	June 16	Cape Lookout	8.7†	45 20.4	124 12.3	0818	148	130	11.1	31.8	300	6.5	1.162	0.465	x		
108	June 16	Cape Lookout	9.1†	45 20.4	124 12.9	1037	15	--	11.2	--	250	6.0	--	--			Repeat Set
109	June 17	Wecoma Beach	3.5	45 00.0	124 05.4	1455	62	110	9.2	33.0	360	10.0	0.687	0.347			
110	June 17	Wecoma Beach	10.3	45 00.3	124 15.0	1723	152	115	10.6	32.1	180	7.5	1.113	0.397	x		
111	June 18	Yaquina Head	14.3†	44 40.5	124 24.7	0949	93	80	9.7	32.5	800	15.5	0.513	0.207	x		
112	June 18	Yaquina Head	20.0	44 40.2	124 31.5	1130	134	85	11.8	32.1	900	10.5	1.089	0.218	x		
113	June 18	Yaquina Head	25.2	44 40.0	124 38.7	1316	285	110	13.4	31.9	900	7.5	1.791	0.474	x		
114	June 18	Yaquina Head	29.3†	44 40.6	124 45.5	1512	~95*	--	13.8	31.5	850	8.0	1.210	0.300	x		
115	June 19	Yaquina Head	10.1	44 39.4	124 17.5	1856	77	300	9.2	33.0	350	12.0	0.426	0.108	x		
116	June 19	Yaquina Head	5.1	44 40.2	124 10.7	2033	60	240	8.9	33.8	48	10.0	0.407	0.128			
117	June 19	Yachats	4.7	44 19.8	124 12.7	1427	60	310	11.3	33.5	500	2.5	17.182	2.856			
118	June 19	Yachats	9.8	44 20.0	124 19.6	1600	77	60	11.4	33.5	350	4.5	10.745	0.058	x		
119	June 19	Yachats	15.5	44 20.0	124 27.5	1750	93	95	9.8	33.2	200	7.0	3.485	0.232	x		
120	June 19	Yachats	19.9	44 20.0	124 33.6	1920	95	58	9.6	32.8	120	10.0	1.452	0.523			
121	June 20	Wecoma Beach	3.6	44 59.6	124 05.8	0945	64	--	10.3	32.8	200	5.5	1.113	0.304			
122	June 20	Wecoma Beach	10.4	45 00.3	124 15.1	1310	148	110	12.9	30.2	400	5.0	1.723	0.449	x		
123	June 20	Wecoma Beach	15.2	45 00.0	124 22.1	1454	205	120	13.1	30.6	200	7.0	1.162	0.348	x		
124	June 20	Wecoma Beach	15.2	45 00.0	124 22.1	1652	203	--	13.1	--	280	--	--	--			Repeat Set
125	June 21	Cape Lookout	19.0†	45 20.6	124 26.2	0848	~22*	140	12.7	30.4	230	6.5	1.307	0.436	x		
126	June 21	Cape Lookout	24.0†	45 20.5	124 33.7	1133	~59*	100	13.3	30.4	490	6.5	0.997	0.397	x		
127	June 21	Cape Lookout	19.8	45 20.1	124 26.3	1405	~26*	140	13.2	30.0	500	6.0	--	--			Repeat Set
128	June 21	Cape Lookout	1.3	45 19.8	123 59.9	1850	11	--	9.0	33.6	150	4.5	--	--			
129	June 22	Cape Lookout	8.2†	45 20.4	124 12.0	0633	141	120	11.4	31.6	180	4.5	3.388	0.678	x		
130	June 22	Cape Lookout	14.5†	45 20.6	124 19.7	0849	190	--	12.1	31.1	400	4.5	3.098	0.852	x		
131	Sept. 4	Quinault R.	9.9	47 19.8	124 31.7	0810	57	230	15.2	30.9	150	3.5	4.356	1.104	x		
132	Sept. 4	Quinault R.	14.7	47 20.3	124 39.0	1204	93	90	15.4	31.5	450	6.5	1.549	0.310	x		
133	Sept. 4	Quinault R.	20.2	47 20.0	124 46.9	1452	~571*	80	15.1	--	600	10.0	0.561	0.275			
134	Sept. 4	Quinault R.	20.0	47 19.8	124 46.6	1540	~571*	210	16.1	31.7	280	--	--	--	x		Not quantitative
135	Sept. 4	Quinault R.	25.3	47 20.0	124 54.2	1749	~686*	85	16.8	32.0	300	14.0	0.165	0.079	x		Not quantitative
136	Sept. 5	Grays Harbor	9.8	47 00.0	124 24.6	0703	55	--	14.8	31.5	50	12.0	0.639	0.281	x		
137	Sept. 5	Grays Harbor	12.7	46 59.8	124 28.6	0925	70	160	15.0	31.8	400	13.0	0.503	0.170			
138	Sept. 5	Grays Harbor	15.2	47 00.4	124 32.4	1041	77	90	15.5	32.1	500	7.5	1.139	0.305			
139	Sept. 5	Grays Harbor	15.1	46 59.5	124 32.2	1157	79	90	15.6	31.9	700	6.0	--	--	x		Repeat Set
140	Sept. 5	Grays Harbor	20.3	47 00.0	124 39.8	1452	106	70	17.0	31.4	--	8.5	0.358	0.165	x		
141	Sept. 5	Willapa Bay	8.7	46 40.0	124 16.6	1843	55	65	16.2	30.0	400	7.0	1.065	0.213			
142	Sept. 6	Willapa Bay	8.3	46 40.2	124 16.3	0638	55	140	15.8	29.0	5	6.5	5.421	0.620			

† Off a cape or point
* Depth from navigation chart

Appendix A. (cont.)

Set No.	Date	Transect	Distance Offshore (n.mi)	Lat.	Long.	Time Start	Depth (m)	Bearing (°true)	Temp. °C	Sal. (‰)	Light (fc)	Secchi (m)	Chl, a	Phae. a	CTD	Plankton Tow No.	Comments
143	Sept. 6	Willapa Bay	12.4	46 40.4	124 22.1	0835	77	140	16.1	--	450	7.5	2.710	0.310			
144	Sept. 6	Willapa Bay	12.0	46 40.3	124 21.5	0945	77	--	16.1	--	550	6.0	--	--	x		Repeat Set
145	Sept. 6	Willapa Bay	14.9	46 40.0	124 25.6	1105	88	140	16.1	31.1	700	12.5	1.036	0.161	x		
146	Sept. 6	Willapa Bay	20.2	46 39.9	124 33.0	1309	126	245	16.5	31.4	350	11.5	0.490	0.149	x		
147	Sept. 6	Cape Disapp.	19.4	46 20.4	124 31.5	1730	137	145	15.4	25.8	190	4.0	7.938	0.658			
148	Sept. 6	Cape Disapp.	14.9	46 20.0	124 25.1	2007	126	330	15.5	25.4	0.1	--	5.905	0.949	x		
149	Sept. 6	Cape Disapp.	7.0	46 20.0	124 14.0	0643	53	110	15.6	24.9	110	4.0	7.725	0.569	x	82-212	
150	Sept. 7	Cape Disapp.	10.0	46 20.1	124 18.2	0948	79	150	15.8	25.2	558	4.0	9.293	0.000	x		
151	Sept. 7	Cape Disapp.	9.2	46 20.1	124 17.7	1050	77	155	--	--	--	--	--	--			Repeat Set
152	Sept. 7	Cape Disapp.	15.5	46 20.0	124 26.2	1237	128	140	16.5	-	400	4.0	4.308	0.571			Aborted
153	Sept. 7	Seaside	19.3	45 59.0	124 23.6	1634	137	270	17.4	--	250	4.5	3.098	0.387			Not quantitative
154	Sept. 8	Tillamook Rk.	2.4	45 56.3	124 02.9	0744	57	260	14.1	31.8	350	4.5	4.066	2.207	x		
155	Sept. 8	Tillamook Rk.	5.1	45 56.3	124 06.7	1002	79	255	15.0	31.5	250	7.5	1.113	0.165	x		
156	Sept. 9	Hug Point	9.3	45 50.5	124 11.2	1046	104	195	16.5	--	200	4.5	1.682	0.515	x		
157	Sept. 9	Hug Point	15.1	45 50.4	124 19.1	1345	144	40	16.6	29.1	300	7.0	1.210	0.184	x		
158	Sept. 9	Nehalem	20.1	45 40.2	124 35.0	1640	172	35	16.7	31.2	400	9.0	0.552	0.122	x		
159	Sept. 9	Nehalem	14.8	45 39.2	124 17.4	1810	143	100	15.9	31.4	200	7.5	0.968	0.310			
160	Sept. 9	Nehalem	3.1	45 40.0	124 00.8	2050	55	23	15.2	31.5	--	--	1.055	0.211	x		
161	Sept. 11	Cape Lookout	2.0†	45 20.7	124 02.3	1707	55	70	13.9	32.0	--	5.5	--	--	x		
162	Sept. 11	Cape Lookout	4.9	45 21.1	124 05.4	1903	88	70	14.4	31.8	4	5.0	--	--			Repeat Set
163	Sept. 12	Cape Lookout	4.2†	45 20.7	124 05.3	0717	84	75	14.8	31.7	50	6.5	4.162	0.949	x		
164	Sept. 12	Cape Lookout	9.8	45 20.0	124 12.2	0912	143	--	15.8	31.5	180	8.0	0.891	0.248	x		
165	Sept. 12	Cape Lookout	5.6	45 20.5	124 08.0	1104	104	130	14.5	31.9	300	5.0	3.001	0.832			Not quantitative
166	Sept. 13	Yaquina Head	6.7	44 40.2	124 13.2	1705	68	85	14.0	32.3	200	6.0	2.023	0.532	x		
167	Sept. 14	Yaquina Head	10.3	44 40.2	124 17.9	0706	80	120	13.4	32.9	70	5.0	2.396	0.926	x		
168	Sept. 14	Yaquina Head	14.9	44 40.1	124 24.5	0900	93	100	13.7	32.1	175	7.5	1.694	0.687	x		
169	Sept. 14	Yachats	15.1	44 20.0	124 27.0	1217	93	160	13.9	32.8	400	11.0	1.094	0.091	x		
170	Sept. 14	Yachats	10.5	44 19.8	124 20.5	1402	79	190	13.5	--	300	7.5	2.497	0.499			
171	Sept. 14	Yachats	4.7	44 19.9	124 12.6	1534	55	175	13+	32.9	--	9.0	1.113	0.745			
172	Sept. 14	Yachats	3.1	44 19.1	124 10.7	1629	51	150	13.0	33.1	300	6.5	2.710	1.007	x		
173	Sept. 14	Yachats	2.8	44 18.6	124 10.4	1735	51	175	12.4	--	150	5.5	2.807	1.723			

† Off a cape or point

Appendix B. Catch of salmonids by set.

MAY 1982 CRUISE

Set #	Date	Transect/distance From Shore (n.mi)		Depth (meters)	Temp (°C)	Coho 101-300 mm	Coho 301+ mm	Chinook 101-400 mm	Chinook 401+ mm	Chum 101-280 mm	Chum 281+ mm	Sockeye 101-280 mm	Sockeye 281+ mm	Steelhead 164-260mm	Cutthroat 181-360mm
001	May 19	Waatch Pt.	5.3	62	10.8	0	13	2	0						
002	May 19	Waatch Pt.	9.9	318	10.4	1	8			0	2				
003	May 19	Waatch Pt.	14.7	218	11.5	0	3								
004	May 19	Waatch Pt.	20.1	143	12.2										
005	May 19	Waatch Pt.	24.7	137	11.8	0	1								
006	May 19	Waatch Pt.	5.7	59	9.5										
007	May 20	Sea Lion Rock	6.2	55	11.0	0	6								
008	May 20	Sea Lion Rock	10.4	93	11.7	0	1							6	
009	May 20	Sea Lion Rock	19.9	121	12.0									3	
010	May 20	Sea Lion Rock	20.2	154	11.9										
011*	May 21	Destruction Is.	10.3	55	10.0										
012*	May 21	Destruction Is.	10.7	55	--	0	1								
013	May 21	Destruction Is.	11.2	59	--	0	1	2	0						
014	May 21	Destruction Is.	15.1	80	11.2										
015	May 21	Destruction Is.	20.3	115	12.1										
016	May 21	Quinault R.	19.9	329	11.7	1	0	3	0					1	
017	May 21	Quinault R.	14.6	93	11.4										
018	May 21	Quinault R.	9.9	57	10.1	2	1	3	0			1		1	
019	May 22	Grays Harbor	10.1	57	11.6	0	20	0	7						
020	May 22	Grays Harbor	14.8	79	11.7	0	1	1	0						
021	May 22	Grays Harbor	9.9	55	11.4	1	0	1	1						
022	May 23	Willapa Bay	9.7	62	10.5	2	1	12	5						
023	May 23	Willapa Bay	9.7	62	--	0	1	3	1					1	
024*	May 23	Willapa Bay	13.8	82	--			2	1						
025	May 23	Willapa Bay	15.1	90	11.4	1	9	6	0					1	
026	May 23	Willapa Bay	20.0	124	11.5										
027	May 23	Willapa Bay	8.3	51	11.2			2	1						
028	May 24	Ocean Park	9.6	62	10.8			1	4						
029	May 24	Cape Disapp.	7.0	49	11.4	1	0	5	1						
030*	May 24	Cape Disapp.	--	--	13.0										
031	May 24	Cape Disapp.	9.8	150	11.8	1	0	10	2					1	
032*	May 27	Seaside	5.6	53	10.7										
033	May 27	Seaside	5.7	57	10.4	0	1	4	0						
034	May 27	Seaside	10.1	86	10.4	0	1	24	0						
035	May 27	Seaside	10.0	88	11.0			10	1					1	
036	May 27	Seaside	14.7	119	11.4	2	0	19	9					1	
037	May 27	Seaside	20.5	143	10.6	0	3	11	0						
038	May 27	Seaside	25.0	152	10.3	1	0	12	0						

Appendix B. (cont.) MAY 1982 CRUISE (cont.)

Set #	Date	Transect/distance From Shore (n.mi)	Depth (meters)	Temp (°C)	Coho 101-300 mm	Coho 301+ mm	Chinook 101-400 mm	Chinook 401+ mm	Chum 101-280 mm	Chum 281+ mm	Sockeye 101-280 mm	Sockeye 281+ mm	Steelhead 164-260mm	Cutthroat 181-360mm
039	May 28	Warrenton 14.8	166	12.3	12	1	4	4						
040*	May 28	Warrenton 21.5	135	10.3	0	1								
041	May 28	Warrenton 22.3	134	10.8	0	5			0	1			4	
042	May 28	Warrenton 24.6	155	11.2			3	0					4	
043*	May 28	Warrenton 30.2	366	11.4										
044	May 30	Nehalem 5.4	71	9.3										
045	May 30	Nehalem 10.0	108	11.4	0	4	1	0						
046	May 30	Nehalem 15.2	141	12.0	1	1	3	2	0	1				
047	May 30	Nehalem 19.9	166	12.2	1	2	1	0						
048	May 30	Cape Lookout 5.2	88	10.6	16	3	4	0						
049	May 30	Cape Lookout 4.6	88	10.4	15	2	5	1						1
050	May 31	Cape Lookout 9.3	148	9.8										
051	May 31	Cape Lookout 14.8	192	10.8	3	1	5	0						
052	May 31	Cape Lookout 19.2	366	11.3	4	0	1	0					5	
053	May 31	Cape Lookout 25.1	454	11.7									1	
054	May 31	Wecoma Beach 19.7	346	11.8	2	0	1	0						
055	May 31	Wecoma Beach 15.0	201	11.2	8	0							1	4
056	May 31	Wecoma Beach 10.3	146	10.2	5	101	18	4					1	
057	June 1	Wecoma Beach 3.2	59	9.7	16	0	7	0						
058	June 1	Wecoma Beach 3.3	60	--	41	0	7	1	0	1				
059	June 1	Wecoma Beach 5.1	88	10.6	329	9	13	2						3
060	June 1	Yaquina Head 5.2	60	10.8	8	2								
061	June 1	Yaquina Head 9.7	82	10.8	25	0	1	0						
062	June 1	Yaquina Head 14.5	90	11.3	10	0	9	0					1	
063	June 1	Yaquina Head 19.5	137	11.5										
064	June 2	Yachats 19.8	93	10.4	2	2	1	0	1	0				
065	June 2	Yachats 14.5	90	9.9	6	1	0	1						
066	June 2	Yachats 10.4	79	9.3	0	2								
067	June 2	Yachats 4.5	59	9.4	2	1	2	0						
068	June 2	Siuslaw R. 4.6	73	9.9	6	0	5	1						
069	June 2	Siuslaw R. 9.9	110	10.2	4	0	0	1						
070*	June 2	Siuslaw R. 14.8	128	10.7			1	0						

*Aborted Set

Appendix B. (cont.)

JUNE 1982 CRUISE

Set #	Date	Transect/distance From Shore (n.mi)		Depth (meters)	Temp (°C)	Coho 101-300 mm	Coho 301+ mm	Chinook 101-400 mm	Chinook 401+ mm	Chum 101-280 mm	Chum 281+ mm	Sockeye 101-280 mm	Sockeye 281+ mm	Steelhead 164-260mm	Cutthroat 181-260mm
071	June 7	Quinault R.	10.0	57	11.3	0	8	0	4						
072	June 7	Quinault R.	14.9	95	10.8	13	8	1	0			1	0		
073	June 7	Quinault R.	19.2	159	11.7	0	2	3	0						
074*	June 7	Quinault R.	15.4	101	--	0	1								
075	June 7	Grays Harbor	20.1	104	11.5	0	2								
076	June 7	Grays Harbor	15.1	79	10.8			2	0			1	0		
077	June 7	Grays Harbor	10.0	57	12.3	22	3	9	1			2	0		
078	June 7	Grays Harbor	10.0	57	--	57	3	4	1			4	0	1	1
079	June 8	Willapa Bay	9.4	62	12.1	44	1	13	3			1	0		1
080	June 8	Willapa Bay	11.4	71	12.4	17	0	5	3			1	0		
081	June 8	Willapa Bay	17.2	97	11.6	80	0	25	0			4	0		
082	June 10	Willapa Bay	10.7	70	11.9	27	2	50	1						
083	June 10	Willapa Bay	14.9	88	11.6	0	11	12	0			2	0	1	
084	June 10	Willapa Bay	19.1	119	11.7										
085	June 10	Ocean Park	20.1	560	11.7	1	0					1	0		
086	June 10	Ocean Park	14.9	99	12.3	31	2	41	0			2	0		
087	June 10	Ocean Park	10.0	68	11.8	20	0	9	1						1
088	June 10	Ocean Park	9.8	66	11.7	28	1	15	1	0	1				
089	June 11	Breakers	8.4	60	11.6	2	7	13	12						2
090	June 11	Breakers	10.3	71	12.5	5	0	4	2						
091	June 11	Breakers	16.2	110	12.4	1	4	1	1						
092	June 11	Breakers	20.2	139	12.0			2	0						
093	June 11	Warrenton	7.8	57	10.8	0	4	1	5						1
094*	June 11	Warrenton	11.2	88	--										
095	June 12	Seaside	9.7	84	12.4	7	2	1	1	1	0				1
096	June 12	Seaside	10.4	88	12.4	7	2	3	0						
097	June 12	Seaside	12.8	95	12.6	6	0	0	1						
098	June 13	Hug Point	4.0	68	12.6	1	4	2	0						
099*	June 13	Hug Point	7.5	90	13.1										
100	June 13	Hug Point	16.4	137	13.3	1	0								
101	June 13	Hug Point	12.1	124	13.0	7	0								
102	June 14	Nehalem	3.7	59	11.5	42	0	1	0						
103	June 14	Nehalem	4.9	68	10.9										
104	June 14	Nehalem	9.9	108	12.1	17	23								1
105*	June 14	Nehalem	15.1	--	12.6					3	0	1	0		
106	June 16	Cape Lookout	5.0	146	8.8										
107	June 16	Cape Lookout	8.7	148	11.1	67	6								
108	June 16	Cape Lookout	9.1	15	11.2	105	0	2	0						

Appendix B. (cont.)

JUNE 1982 CRUISE (cont.)

Set #	Date	Transect/distance From Shore	(n.mi)	Depth (meters)	Temp (°C)	Coho 101-300 mm	Coho 301+ mm	Chinook 101-400 mm	Chinook 401+ mm	Chum 101-280 mm	Chum 281+ mm	Sockeye 101-280 mm	Sockeye 281+ mm	Steelhead 164-260mm	Cuttrhoat 181-260mm
109	June 17	Wecoma Beach	3.5	62	9.2										
110	June 17	Wecoma Beach	10.3	152	10.6										
111	June 18	Yaquina Head	14.3	93	9.7										
112	June 18	Yaquina Head	20.0	134	11.8	2	1								
113	June 18	Yaquina Head	25.2	285	13.4	1	4								
114	June 18	Yaquina Head	29.3	95	13.8										
115	June 19	Yaquina Head	10.1	77	9.2	13	0	1	0						
116	June 19	Yaquina Head	5.1	60	8.9			0	1						
117	June 19	Yachats	4.7	60	11.3	2	0	2	0						
118	June 19	Yachats	9.8	77	11.4			0	1						
119	June 19	Yachats	15.5	93	9.8										
120	June 19	Yachats	19.9	95	9.6										
121	June 20	Wecoma Beach	3.6	64	10.3										
122	June 20	Wecoma Beach	10.4	148	12.9										
123	June 20	Wecoma Beach	15.2	205	13.1	10	0			5	0				
124	June 20	Wecoma Beach	15.2	203	13.1	10	9								1
125	June 21	Cape Lookout	19.0	22	12.7	39	0			23	0				
126	June 21	Cape Lookout	24.0	59	13.3	7	0								
127	June 21	Cape Lookout	19.8	26	13.2	1	1								
128	June 21	Cape Lookout	1.3	11	9.0										
129	June 22	Cape Lookout	8.2	141	11.4	7	8	5	0						
130	June 22	Cape Lookout	14.5	190	12.1	125	2	1	0	23	0	1	0		

*Aborted Set

Appendix B. (cont.)

SEPTEMBER 1982 CRUISE

Set #	Date	Transect/distance From Shore	(n.mi)	Depth (meters)	Temp (°C)	Coho 101-420 mm	Coho 421+ mm	Chinook 101-400 mm	Chinook 401+ mm	Chum 101-280 mm	Chum 281+ mm	Pink 101-280 mm	Pink 281+ mm	Sockeye 101-280 mm	Sockeye 281+ mm
131	Sept. 4	Quinault R.	9.9	57	15.2	50	5	1	3						
132	Sept. 4	Quinault R.	14.7	93	15.4	4	1	1	0	13	0	1	0	1	0
133	Sept. 4	Quinault R.	20.2	571	15.1	0	1			13	0				
134*	Sept. 4	Quinault R.	20.0	571	16.1	1	0			3	0				
135*	Sept. 4	Quinault R.	25.3	686	16.8										
136	Sept. 5	Grays Harbor	9.8	55	14.8	1	0			119	0	44	0		
137	Sept. 5	Grays Harbor	12.7	70	15.0	1	0								
138	Sept. 5	Grays Harbor	15.2	77	15.5	5	1								
139	Sept. 5	Grays Harbor	15.1	79	15.6	12	0			6	0	2	0		
140	Sept. 5	Grays Harbor	20.3	106	17.0	1	0								
141	Sept. 5	Willapa Bay	8.7	55	16.2	1	0								
142	Sept. 6	Willapa Bay	8.3	55	15.8	1	0								
143	Sept. 6	Willapa Bay	12.4	77	16.1	13	0								
144	Sept. 6	Willapa Bay	12.0	77	16.1	2	0	1	0						
145	Sept. 6	Willapa Bay	14.9	88	16.1	5	0								
146	Sept. 6	Willapa Bay	20.2	126	16.5										
147	Sept. 6	Cape Disapp.	19.4	137	15.4										
148	Sept. 6	Cape Disapp.	14.9	126	15.5	7	0								
149	Sept. 7	Cape Disapp.	7.0	53	15.6	31	5	1	2						
150	Sept. 7	Cape Disapp.	10.0	79	15.8	56	0	0	1						
151	Sept. 7	Cape Disapp.	9.2	77	--	21	0								
152*	Sept. 7	Cape Disapp.	15.5	128	16.5										
153*	Sept. 7	Seaside	19.3	137	17.4										
154	Sept. 8	Tillamook	2.4	57	14.1	98	4	0	4						
155	Sept. 8	Tillamook	5.1	79	15.0	11	0								
156	Sept. 9	Hug Point	9.3	104	16.5										
157	Sept. 9	Hug Point	15.1	144	16.6										
158	Sept. 9	Nehalem B.	20.1	172	16.7										
159	Sept. 9	Nehalem B.	14.8	143	15.9										
160	Sept. 9	Nehalem B.	3.1	55	15.2	1	2								
161	Sept. 11	Cape Lookout	2.0	55	13.9	3	3								

Appendix B. (cont.)

SEPTEMBER 1982 CRUISE (cont.)

Set #	Date	Transect/distance From Shore	(n.mi)	Depth (meters)	Temp (°C)	Coho 101-420 mm	Coho 421+ mm	Chinook 101-400 mm	Chinook 401+ mm	Chum 101-280 mm	Chum 281+ mm	Pink 101-280 mm	Pink 281+ mm	Sockeye 101-280 mm	Sockeye 281+ mm
162	Sept. 11	Cape Lookout	4.9	88	14.4	26	0								
163	Sept. 12	Cape Lookout	4.2	84	14.8	14	0								
164	Sept. 12	Cape Lookout	9.8	143	15.8										
165*	Sept. 12	Cape Lookout	5.6	104	14.5					1	0				
166**	Sept. 13	Yaquina Head	6.7	68	14.0	7	0								
167**	Sept. 14	Yaquina Head	10.3	80	13.4	1	1								
168**	Sept. 14	Yaquina Head	14.9	93	13.7	1	0								
169**	Sept. 14	Yachats	15.1	93	13.9	1	0								
170**	Sept. 14	Yachats	10.5	79	13.5										
171**	Sept. 14	Yachats	4.7	55	13+	2	1								
172**	Sept. 14	Yachats	3.1	51	13.0	7	0	3	0						
173**	Sept. 14	Yachats	2.8	51	12.4	0	1	1	0						

* Aborted or non-quantitative sets
**Only 310 m of sein set

Appendix C. Release and recovery data for individual CWT and pigment marked salmonids collected in 1982.

1980 and 1981 Brood Juvenile Coho[1]

Purse Seine Set	I.D. No.	Transect	Brood Yr	Tag Code	Agency	Hatchery	Ocean Entry Site	Release Date	Recovery Date	Days Since Release	N-S Distance from Ocean Entry		Length at Recovery
62	003	Yaquina	80	5-8-45	ODNR	Wild	Queets R.	27/IV-20/VI/82	1/VI/82	0-35	141	S	143
72	001	Quinault	80	5-10-19	ODNR	Wild	Queets R.	15/V-11/VI/82	7/VI/82	0-23	12	S	127
77	001	Grays Hbr.	80	63-23-57	WDF	Wild	Grays Hbr.	V/82	7/VI/82	~7-37	5	N	150
87	002	Ocean Park	80	63-23-58	WDF	Wild	Grays Hbr.	V/82	10/VI/82	~10-40	25	S	128
82	001	Willapa Bay	80	63-24-04	WDF	Humptulips	Grays Hbr.	24/V/82	10/VI/82	17	15	S	150
88	002	Ocean Park	80	63-24-4	WDF	Humptulips	Grays Hbr.	24/V/82	10/VI/82	17	25	S	149
59	016	Wecoma	80	63-24-8	WDF	Simpson	Grays Hbr.	20/V/82	1/VI/82	12	144	S	133
88	001	Ocean Park	80	63-24-8	WDF	Simpson	Grays Hbr.	20/V/82	10/VI/82	21	25	S	133
86	004	Ocean Park	80	63-24-15	WDF	Wild	Grays Hbr.	20/V/82	10/VI/82	21	25	S	167
81	002	Willapa Bay	80	63-25-48	WDF	Wild	Grays Hbr.	V/82	8/VI/82	~8-38	14	S	144
81	006	Willapa Bay	80	63-22-49	WDF	Wild	Quillayute R.	V/82	8/VI/82	~8-38	73	S	168
82	004	Willapa Bay	80	63-24-1	WDF	Naselle R.	Willapa Bay	6/V/82	10/VI/82	35	1	S	224
78	032	Grays Hbr.	80	63-24-02	WDF	Nemah	Willapa Bay	26/IV/82	7/VI/82	42	20	N	165
79	001	Willapa Bay	80	63-24-02	WDF	Nemah	Willapa Bay	26/IV/82	8/VI/82	43	0	-	133
107	007	Cape Lookout	80	63-24-2	WDF	Nemah	Willapa Bay	26/IV/82	16/VI/82	51	80	S	145
78	031	Grays Hbr.	80	63-24-09	WDF	Willapa	Willapa Bay	19/IV/82	7/VI/82	49	20	N	160
59	002	Wecoma	80	63-23-3	WDF	Lower Kalama	Columbia R.	3/V/82	1/VI/82	29	74	S	164
59	012	Wecoma	80	63-23-03	WDF	Lower Kalama	Columbia R.	3/V/82	1/VI/82	29	74	S	160
59	013	Wecoma	80	63-23-03	WDF	Lower Kalama	Columbia R.	3/V/82	1/VI/82	29	74	S	169
59	015	Wecoma	80	63-23-03	WDF	Lower Kalama	Columbia R.	3/V/82	1/VI/82	29	74	S	161
108	005	Cape Lookout	80	63-23-3	WDF	Lower Kalama	Columbia R.	3/V/82	16/VI/82	44	55	S	166
59	009	Wecoma	80	63-23-4	WDF	Speelyai	Columbia R.	4/V/82	1/VI/82	28	74	S	148
131	003	Quinault	80	63-23-05	WDF	Speelyai	Columbia R.	2/VI/82	4/IX/82	94	65	N	330
57	002	Wecoma	80	63-23-63	WDF	Grays R.	Columbia R.	30/IV/82	1/VI/82	32	74	S	161
56	002	Wecoma	80	63-24-23	WDF	Cowlitz	Columbia R.	3/V/82	31/V/82	28	75	S	141
59	001	Wecoma	80	63-24-27	WDF	Cowlitz	Columbia R.	3/V/82	1/VI/82	29	74	S	164
58	002	Wecoma	80	63-24-36	WDF	Cowlitz	Columbia R.	3/V/82	1/VI/82	29	75	S	136
59	003	Wecoma	80	63-24-36	WDF	Cowlitz	Columbia R.	3/V/82	1/VI/82	29	74	S	158
107	003	Cape Lookout	80	63-24-37	WDF	Cowlitz	Columbia R.	3/V/82	16/VI/82	44	55	S	164
130	005	Cape Lookout	80	63-24-38	WDF	Cowlitz	Columbia R.	3/V/82	22/VI/82	50	54	S	141
59	006	Wecoma	80	63-24-39	WDF	Cowlitz	Columbia R.	3/V/82	1/VI/82	29	74	S	149
39	014	Warrenton	80	63-24-46	WDF	Cowlitz	Columbia R.	3/V/82	28/V/82	25	6	S	138
131	005	Quinault	80	63-24-48	WDF	Cowlitz	Columbia R.	3/V/82	4/IX/82	124	65	N	316
131	001	Quinalut	80	63-23-49	WDF	Cowlitz	Columbia R.	3/V/82	4/IX/82	122	65	N	332
102	002	Nehalem	80	63-25-16	WDF	Washougal	Columbia R.	25/V/82	13/VI/82	19	35	S	136
90	001	Breakers	80	63-25-18	WDF	Washougal	Columbia R.	25/V/82	11/VI/82	17	8	N	137
123	003	Wecoma	80	63-25-19	WDF	Washougal	Columbia R.	25/V/82	20/VI/82	26	75	S	155
125	002	Cape Lookout	80	63-25-26	WDF	Washougal	Columbia R.	25/V/82	21/VI/82	27	54	S	165
104	001	Nehalem	80	63-25-29	WDF	Washougal	Columbia R.	25/V/82	14/VI/82	20	34	S	146
150	004	Cape Disapp.	80	63-25-30	WDF	Washougal	Columbia R.	25/V/82	7/IX/82	105	5	N	270
130	003	Cape Lookout	80	7-13-10	ODFW	Big Creek	Columbia R.	29/IV/82	22/VI/82	23	54	S	193
59	004	Wecoma	80	7-15-11	ODFW	Big Creek	Columbia R.	29/IV/82	1/VI/82	33	74	S	153
130	002	Cape Lookout	80	7-26-48	ODFW	Big Creek	Columbia R.	3/VI/82	22/VI/82	19	54	S	173
58	004	Wecoma	80	7-26-49	ODFW	Big Creek	Columbia R.	28/IV/82	1/VI/82	34	75	S	142
62	001	Yaquina	80	9-2-11	ODFW	Big Creek	Columbia R.	29/IV/82	1/VI/82	33	95	S	188
131	006	Quinault	80	7-24-27	ODFW	Cascade	Columbia R.	9/VI/82	4/IX/82	87	65	N	279

Appendix C. (cont.)

1980 and 1981 Brood Juvenile Coho (cont.)

Purse Seine Set	I.D. No.	Transect	Brood Yr	Tag Code	Agency	Hatchery	Ocean Entry Site	Release Date	Recovery Date	Days Since Release	N-S Distance from Ocean Entry		Length at Recovery
125	001	Cape Lookout	80	7-24-32	ODFW	Cascade	Columbia R.	3/VI/82	21/VI/82	18	54	S	160
131	002	Quinault	80	7-24-34	ODFW	Cascade	Columbia R.	3/VI/82	4/IX/82	93	65	N	120
150	003	Cape Disapp.	80	7-25-49	ODFW	Sandy	Columbia R.	30/IV/82	7/IX/82	157	5	N	208
150	001	Cape Disapp.	80	7-25-50	ODFW	Sandy	Columbia R.	30/IV/82	7/IX/82	130	5	N	353
59	008	Wecoma	80	7-25-56	ODFW	Sandy	Columbia R.	30/IV/82	1/VI/82	32	74	S	153
61	002	Yaquina	80	7-25-56	ODFW	Sandy	Columbia R.	30/IV/82	1/VI/82	32	94	S	163
59	007	Wecoma	80	7-25-57	ODFW	Sandy	Columbia R.	30/IV/82	1/VI/82	32	74	S	152
59	011	Wecoma	80	7-25-57	ODFW	Sandy	Columbia R.	30/IV/82	1/VI/82	32	74	S	150
108	001	Cape Lookout	80	7-25-57	ODFW	Sandy	Columbia R.	30/IV/82	16/VI/82	47	55	S	163
123	001	Wecoma	80	7-25-58	ODFW	Sandy	Columbia R.	30/IV/82	20/VI/82	51	75	S	174
131	004	Quinault	80	5-10-35	FWS	Eagle Cr.	Columbia R.	6/V/82	4/IX/82	121	65	N	373
59	017	Wecoma	80	5-10-35	FWS	Eagle Cr.	Columbia R.	6/V/82	1/VI/82	26	74	S	156
86	003	Ocean Pk	80	5-10-36	FWS	Eagle Cr.	Columbia R.	6/V/82	10/VI/82	35	15	N	147
58	001	Wecoma	80	5-10-37	FWS	Eagle Cr.	Columbia R.	3/V/82	1/VI/82	29	75	S	146
101	010	Hug Pt.	80	5-10-38	FWS	Eagle Cr.	Columbia R.	6/V/82	13/VI/82	38	25	S	204
130	004	Cape Lookout	80	5-10-38	FWS	Eagle Cr.	Columbia R.	6/V/82	22/VI/82	47	54	S	156
127	001	Cape Lookout	80	5-10-39	FWS	Eagle Cr.	Columbia R.	6/V/82	21/VI/82	46	55	S	156
143	001	Willapa Bay	80	5-10-39	FWS	Eagle Cr.	Columbia R.	6/V/82	6/IX/82	123	25	N	317
58	003	Wecoma	80	5-10-40	FWS	Eagle Cr.	Columbia R.	6/V/82	1/VI/82	26	75	S	147
107	004	Cape Lookout	80	7-24-55	ODFW	Salmon R.	Salmon R.	15/III/82	16/VI/82	93	18	N	162
59	014	Wecoma	80	7-24-56	ODFW	Salmon R.	Salmon R.	1/V/82	1/VI/82	31	2	S	147
130	001	Cape Lookout	80	7-24-56	ODFW	Salmon R.	Salmon R.	1/V/82	22/VI/82	52	18	N	212
107	002	Cape Lookout	80	7-24-58	ODFW	Siletz	Siletz Bay	1/V/82	16/VI/82	46	25	N	204
150	005	Cape Disapp.	80	7-24-58	ODFW	Siletz	Siletz Bay	1/V/82	7/IX/82	129	85	N	352
160	001	Nehalam	80	7-24-58	ODFW	Siletz	Siletz Bay	1/V/82	9/IX/82	131	45	N	336
108	003	Cape Lookout	80	7-24-6	ODFW	Fall Cr.	Alsea R.	1/V/82	16/VI/82	46	55	N	210
107	006	Cape Lookout	80	7-25-34	ODFW	Fall Cr.	Alsea R.	15/III/82	16/VI/82	93	55	N	274
108	004	Cape Lookout	80	7-25-34	ODFW	Fall Cr.	Alsea R.	15/III/82	16/VI/82	93	55	N	200
112	001	Yaquina	80	7-25-8	ODFW	Butte Falls	Siuslaw R.	11-27/V/81	18/VI/82	22-38	30	N	165
61	001	Yaquina	80	7-24-3	ODFW	Rock Creek	Winchester Bay	17/III/82	1/VI/82	76	61	N	193
124	001	Wecoma	80	7-24-3	ODFW	Rock Creek	Winchester Bay	17/III/82	20/VI/82	95	80	N	198
123	002	Wecoma	80	7-24-4	ODFW	Rock Creek	Winchester Bay	15/III/82	20/VI/82	97	80	N	205
155	001	Tillamook Rk.	80	60-05-16	OAF	OAF	Yaquina Bay	14/VI/82	8/IX/82	86	79	N	246
150	002	Cape Disapp.	81	60-05-33	OAF	OAF	Yaquina Bay	7/VII/82	7/IX/82	62	103	N	242
154	001	Tillamook Rk.	81	60-05-40	OAF	OAF	Yaquina Bay	24/VIII/82	8/IX/82	15	79	N	184
172	001	Yachats	81	60-05-40	OAF	OAF	Yaquina Bay	24/VIII/82	14/IX/82	21	18	S	204
163	001	Cape Lookout	81	60-05-41	OAF	OAF	Yaquina Bay	24/VIII/82	12/IX/82	19	43	N	186
162	001	Cape Lookout	81	60-05-42	OAF	OAF	Yaquina Bay	24/VIII/82	11/IX/82	18	44	N	157
154	002	Tillamook Rk.	81	60-05-55	OAF	OAF	Yaquina Bay	26/VI/82	8/IX/82	74	79	N	245
151	001	Cape Disapp.	81	60-05-60	OAF	OAF	Yaquina Bay	17/VIII/82	8/XI/82	21	103	N	182
171	001	Yachats	81	60-41-48	OAF	OAF	Yaquina Bay	7/V/82	14/IX/82	130	17	S	408

Appendix C. (cont.)

1979 and 1980 Brood Adult Coho[1]

Purse Seine Set	I.D. No.	Transect	Brood Yr	Tag Code	Agency	Hatchery	Ocean Entry Site	Release Date	Recovery Date	Days Since Release	N-S Distance from Ocean Entry	Length at Recovery
45	--	Nehalem	79	5-7-57	TULA	Skykomish	Mid Puget Sd.	VI/81	30/V/82	~329-359	(163 S)*	399
22	--	Willapa	80	63-21-30	WDF	Deschutes/SQUA	So. Puget Sd.	7-8/VI/81	23/V/82	319-320	(103 S)*	444
41	--	Warrenton	79	63-21-30	WDF	Deschutes/SQUA	So. Puget Sd.	7-8/VI/81	28/V/82	324-325	(136 S)*	433
19	--	Grays Hbr.	79	63-21-39	WDF	Green R.	So. Puget Sd.	1/V/81	22/V/82	386	(84 S)*	460
104	--	Nehalem	79	63-23-13	WDF	Wild	No. Puget Sd.	V/81	14/VI/82	~379-410	(163 S)*	455
47	--	Nehalem	79	63-22-3	WDF	Washougal	Columbia R.	27/V/81	30/V/82	368	35 S	518
41	--	Warrenton	79	7-22-63	ODFW	Sandy	Columbia R.	1/V/81	28/V/82	392	7 S	480
171	--	Yachats	80	60-34-23	OAF	OAF	Yaquina Bay	11/VIII/81	14/IX/82	13 mo.	17 S	552

Pigment marked 1981 Brood Coho Juveniles

136	019	Quinalt	81	Red	OAF	OAF	Yaquina Bay	1-2/VIII/82	4/IX/82	33-34	143 N	189
154	005	Tillamook Rk.	81	Red	OAF	OAF	Yaquina Bay	1-2/VIII/82	8/IX/82	37-38	79 N	193
154	049	Tillamook Rk.	81	Red	OAF	OAF	Yaquina Bay	1-2/VIII/82	8/IX/82	37-38	79 N	166
150	042	Cape Disapp.	81	Yellow	OAF	OAF	Yaquina Bay	29-31/VIII/82	7/IX/82	9-11	103 N	181
161	001	Cape Lookout	81	Yellow	OAF	OAF	Yaquina Bay	29-31/VIII/82	11/IX/82	11-13	43 N	155
162	002	Cape Lookout	81	Yellow	OAF	OAF	Yaquina Bay	29-31/VIII/82	11/IX/82	11-13	44 N	185

Chinook

20	001	Grays Hbr	80	63-23-7	WDF	Sol Duc	Quillayute R.	6/V/82	22/V/82	47	54 S	203
173	001	Yachats	80	63-23-10	WDF	Cowlitz	Columbia R.	1/IV/82	14/IX/82	166	116 S	340
33	001	Seaside	80	63-23-11	WDF	Cowlitz	Columbia R.	1/IV/82	27/V/82	56	15 S	159
57	001	Wecoma	80	5-6-59	IDFG	Dworshak	Columbia R.	16/IV/82	1/VI/82	46	74 S	183
86	006	Ocean Park	80	10-24-12	IDFG	McCall	Columbia R.	10/IV/82	10/VI/82	61	15 N	168
34	001	Seaside	80	19-24-13	IDFG	McCall	Columbia R.	10/IV/82	27/V/82	47	15 S	139
81	004	Willapa Bay	80	10-24-13	IDFG	McCall	Columbia R.	10/IV/82	8/VI/82	59	26 N	140
62	002	Yaquina	80	5-10-41	YAKI	Leavenworth	Columbia R.	21/IV/82	1/VI/82	41	94 S	173
129	001	Cape Lookout		3-17-33	NMFS	Wild	Columbia R.	VII/81	22/VI/82	~330	55 S	355
59	021	Wecoma	80	7-21-41	ODFW	Bonneville	Columbia R.	9/XI/81	1/VI/82	204	74 S	306
89	010	Breakers	80	7-21-43	ODFW	Bonneville	Columbia R.	17/III/82	11/VI/82	86	8 N	227
129	002	Cape Lookout	80	7-21-43	ODFW	Bonneville	Columbia R.	17/III/82	22/VI/82	97	55 S	284
56	003	Wecoma	80	7-25-7	ODFW	Bonneville	Columbia R.	30/III/82	31/V/82	62	75 S	289

Appendix C. (cont.)

Chinook (cont.)

Purse Seine Set	I.D. No.	Transect	Brood Yr	Tag Code	Agency	Hatchery	Ocean Entry Site	Release Date	Recovery Date	Days Since Release	N-S Distance from Ocean Entry	Length at Recovery
91	001	Breakers	80	7-20-54	ODFW	McKenzie	Columbia R.	15/III/82	11/VI/82	88	8 N	280
34	016	Seaside	80	7-25-16	ODFW	McKenzie	Columbia R.	15/III/82	27/V/82	73	15 S	207
79	002	Willapa Bay	80	7-24-19	ODFW	Oakridge	Columbia R.	15/III/82	8/VI/82	85	26 N	247
86	001	Ocean Park	80	7-24-19	ODFW	Oakridge	Columbia R.	15/III/82	10/VI/82	87	15 N	287
87	003	Ocean Park	80	7-24-22	ODFW	Oakridge	Columbia R.	16-18/III/82	10/VI/82	86-87	15 N	260
82	002	Willapa Bay	80	7-25-24	ODFW	Oakridge	Columbia R.	2-3/XI/81	10/VI/82	219	25 N	150
86	002	Ocean Park	80	7-25-25	ODFW	Marion Forks	Columbia R.	15/III/82	10/VI/82	87	15 N	210
82	003	Willapa Bay	80	7-25-26	ODFW,	Marion Forks	Columbia R.	16/III/82	10/VI/82	86	25 N	193
62	010	Yaquina	80	7-25-27	ODFW	Marion Forks	Columbia R.	17/III/82	1/VI/82	76	94 S	179
81	001	Willapa Bay	80	7-25-27	ODFW	Marion Forks	Columbia R.	17/III/82	8/VI/82	83	26 N	165
35	010	Seaside	80	7-25-28	ODFW	Marion Forks	Columbia R.	18/III/82	27/V/82	70	15 S	213
36	011	Seaside	80	7-25-29	ODFW	Marion Forks	Columbia R.	19/III/82	27/V/82	69	15 S	186
87	004	Ocean Park	80	7-25-29	ODFW	Marion Forks	Columbia R.	19/III/82	10/VI/82	83	15 N	228
34	002	Seaside	80	7-23-[illegible]	ODFW	Round Butte	Columbia R.	23/III/82	27/V/82	65	15 S	192
51	001	Cape Lookout	80	7-23-[illegible]	ODFW	Round Butte	Columbia R.	23/III/82	31/V/82	69	55 S	191
51	006	Wecoma	80	7-23-[illegible]	ODFW	Round Butte	Columbia R.	23/III/82	1/VI/82	70	74 S	302
81	007	Willapa Bay	80	7-23-[illegible]	ODFW	Round Butte	Columbia R.	23/III/82	8/VI/82	77	26 N	287
92	010	Willapa Bay	80	62-48-32	Domsea	Domsea	Siuslaw Bay	XII/81	23/V/82	~143-174	150 N	270
82	005	Willapa Bay	80	62-48-32	Domsea	Domsea	Siuslaw Bay	XII/81	10/VI/82	~161-191	150 N	309
67	001	Yachats	80	7-25-[illegible]	ODFW	Rock Creek	Winchester Bay	3/III/82	2/VI/82	91	40 N	248
56	001	Wecoma	80	7-25-30	ODFW	Elk R.	Elk R.	27/IX/81	31/V/82	247	73 N	316
36	---	Seaside	79	6-61-[illegible]	ODFG	Trinity R.	Klamath R.	VI/80	27/V/82	~696-726	260 N	519

Steelhead

52	001	Cape Lookout	80	5-10-43	HOH	Hoh	Hoh R.	14/V/82	31/V/82	17	145 S	185

[1] One CWT from a juvenile coho was lost and one CWT from an adult coho was unreadable.

*Distance from Cape Flattery.