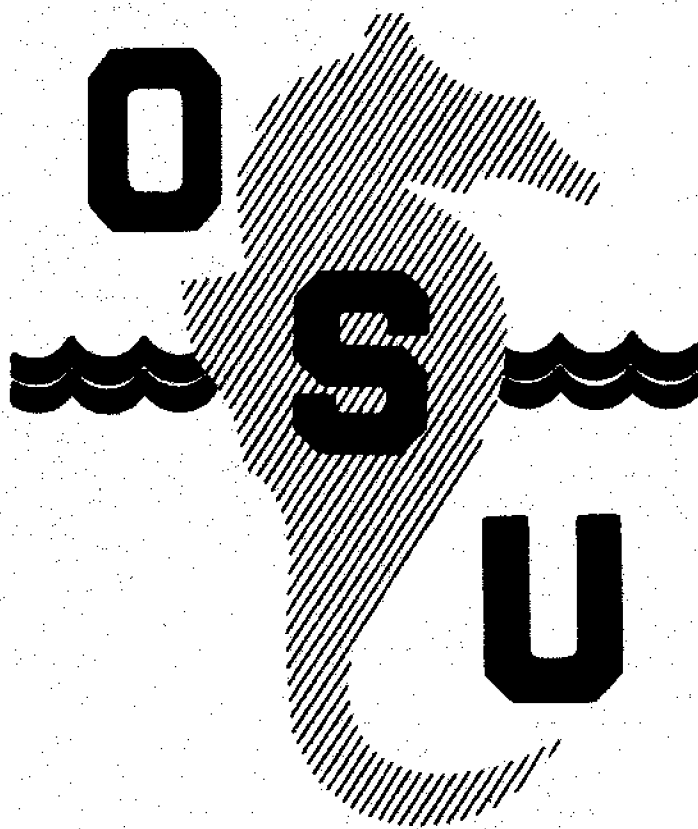


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**STUDIES OF JUVENILE SALMONIDS  
OFF THE OREGON AND  
WASHINGTON COAST, 1983**

by

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

Oregon State University  
Sea Grant College Program  
ORESU-T-84-001

Reference 84-2  
January 1984  
Cruise Report

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**OREGON STATE UNIVERSITY**

Errata Sheet for the 1983 Cruise Report

Appendix A:

Set 62 Distance offshore should read 22.2 km.

Set 68 Distance offshore should read 28.1 km.

Set 114 Depth should read 135 m.

Appendix B:

Set 62 Distance offshore should read 22.2 km.

Set 68 Distance offshore should read 28.1 km.

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CRUISE REPORT

Cruise Report  
Reference 84-2  
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G. Ross Heath  
Dean

## ACKNOWLEDGMENTS

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## PERSONNEL

MAY CRUISE: C. Banner, R. Brodeur, J. Fisher

JUNE CRUISE: C. Banner, R. Brodeur, A. Chung, J. Fisher, S. Johnson, W. Percy, M. Solazzi

SEPTEMBER CRUISE: R. Brodeur, A. Chung, J. Fisher, T. Gentle, M. Hall, W. Percy, F. Ratti, J. Shenker, J. Trautman

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## INTRODUCTION

The College of Oceanography, Oregon State University, conducted three cruises (May 16-27, June 9-27, and September 15-24) in 1983 to study the distribution, abundance, migration, growth and feeding habits of juvenile salmonids during their first summer in the ocean. This is the third year we have had a series of cruises during the summer months and the fifth 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 1983 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 (1.25 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. The direction of the opening of the seine when half set was noted. A depth guage attached to the bottom of the net indicated that the seine fished to a depth of about 49 m. Each set sampled an area of approximately 19,000 square meters.

## Sampling Area

Sets were made at stations generally 9.3 kilometers apart along transect lines extending from  $48^{\circ}20'N$  to  $44^{\circ}20'N$  in May, from  $48^{\circ}20'N$  to  $43^{\circ}00'N$  in June, and from  $48^{\circ}20'N$  to  $43^{\circ}28'N$  in September (Figs. 1 and 2). We generally sampled from the 37 m contour out to 37 kilometers offshore, or until juvenile salmonids were no longer caught.

Fifty-five good sets were made during May, 58 during June and 52 during September. Eight additional sets were attempted but were aborted because of gear problems, high winds or strong currents. Set positions were determined by Loran C except during most of the September cruise when radar was used because of a Loran C receiver malfunction. Locations and times of purse seine sets along with environmental data are given in Appendix A.

## Environmental Data

Temperature of a surface-water bucket sample was taken at each station. Additional water samples were taken with an NIO bottle at 1 m and at 10 m from which chlorophyll-a and phaeophytin concentrations and salinity were determined. Salinities of the water samples were measured at the Mark O. Hatfield Marine Science Center with a Guildline Autosalinometer (Model 8400). Chlorophyll-a and phaeophytin content of 140 ml water samples were determined by filtering the water through a  $0.3 \mu m$  (pore size) glass fiber filter (Gelman type A/E). The

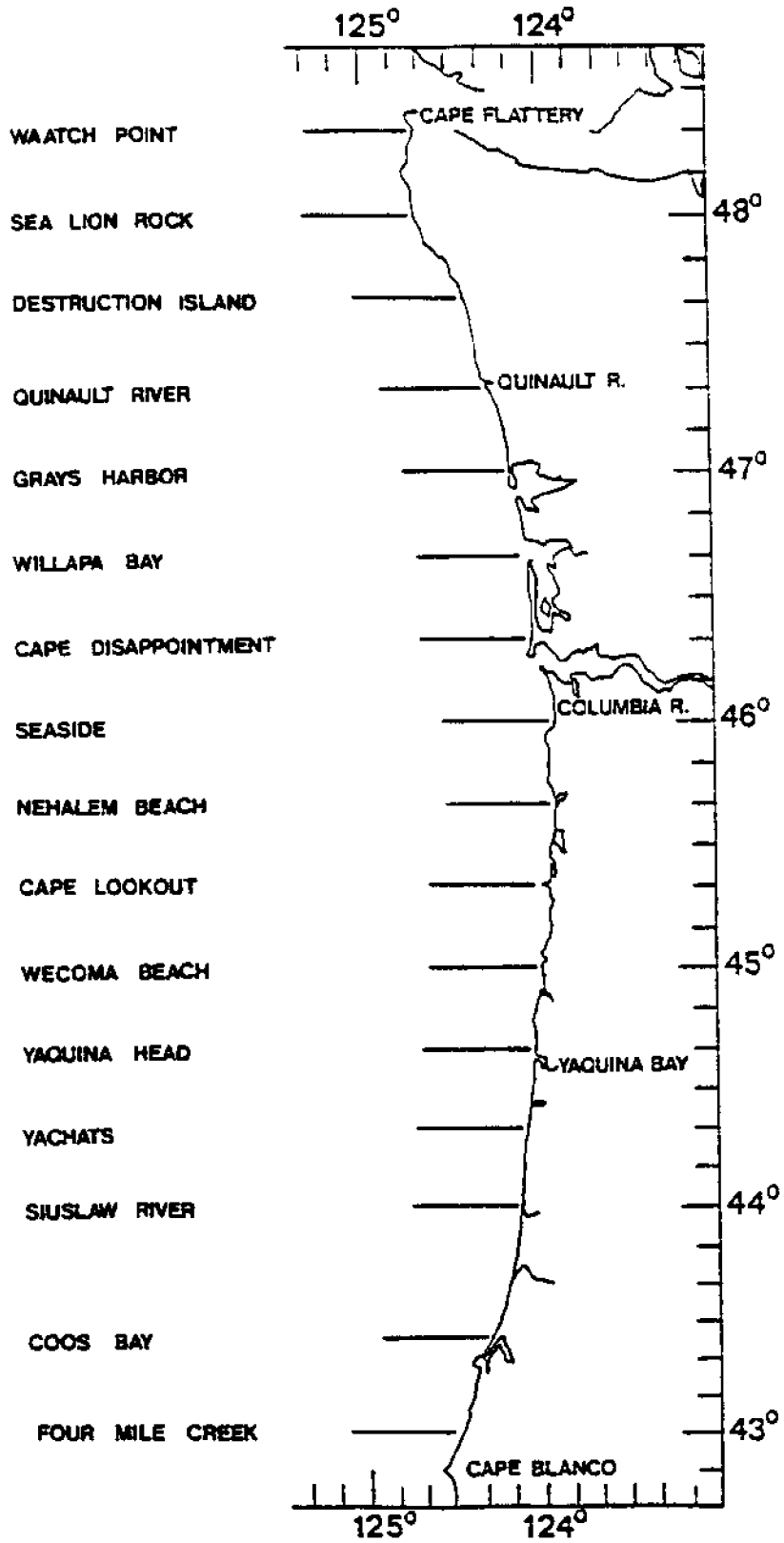


Figure 1. Transect lines sampled during the 1983 purse seine cruises.



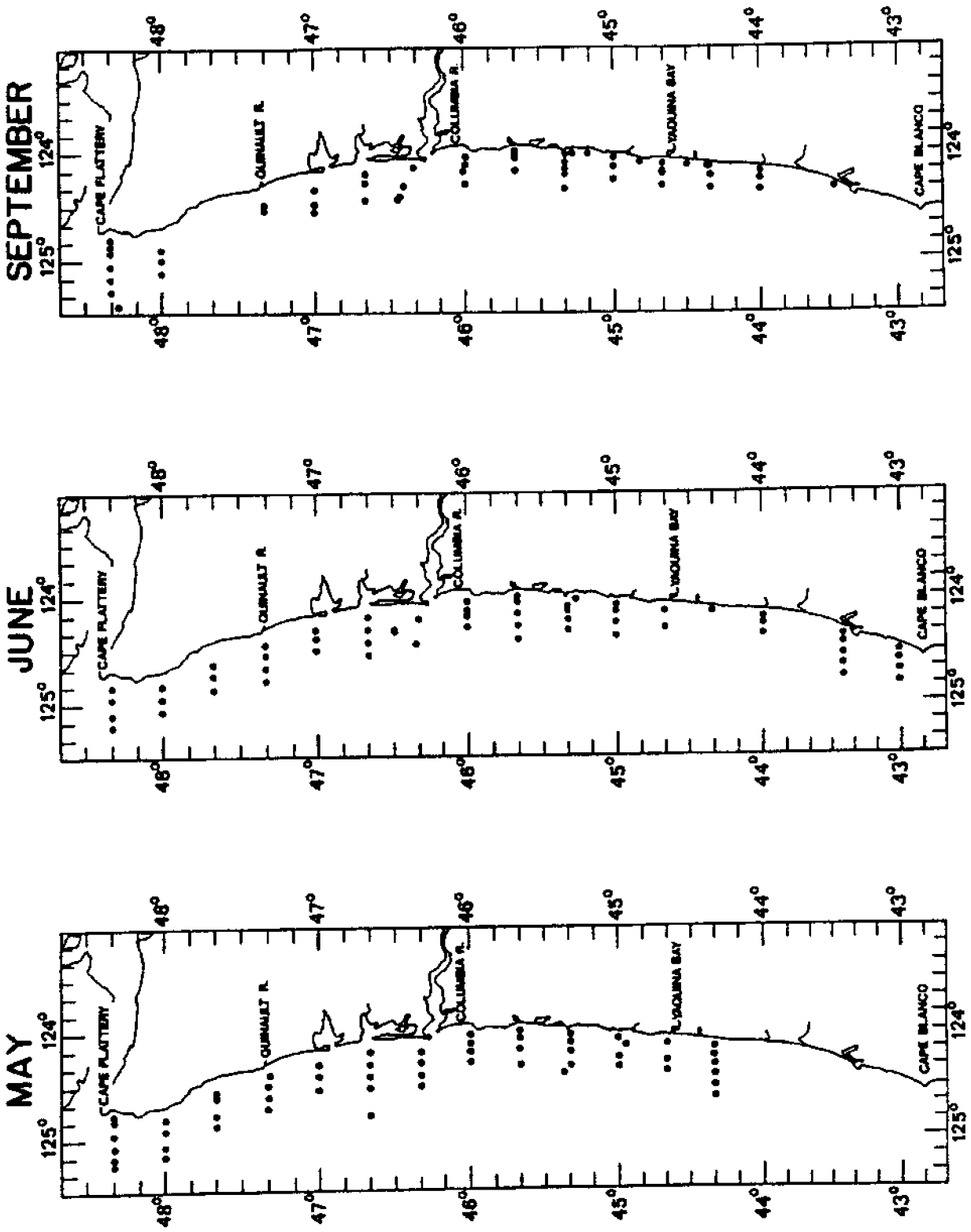


Figure 2. Set locations for May, June and September 1983.

pigment was extracted from the filtrate with a known volume of 90% acetone; and the fluorescence measured with a Model-10 Turner Designs Fluorometer.

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

#### Processing the Catch at Sea

The purse seine catch was dip-netted from the seine bunt, lifted aboard in the bunt or brailed aboard. Large catches of medusae sometimes occurred and a rough estimate was made of their total volume in each set. Medusae were identified and counted and individual bell diameters were measured from a subsample of the total catch. Fishes and squids were also identified, counted and measured. Stomachs were removed from possible predators of juvenile salmonids and preserved in 10% formalin. Selected whole fishes and squids were also preserved.

Juvenile salmonids were anesthetized in a seawater solution of MS 222, identified, and measured to the nearest millimeter (F.L.). They were then checked for adipose clips, individually wrapped in plastic bags (along with a label identifying set number, species and length) and frozen.

Adult salmonids were anesthetized in a seawater solution of 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.

Most adults were released after they were measured and scale samples removed. To trace movements of adult salmon in the ocean 142 coho, 5 chinook, and 1 steelhead 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. Three adult wolf-eels and 3 ocean sunfish were also tagged and released.

Kidney smears were taken from adult coho and adult chinook 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.

#### Laboratory Processing of Juvenile Salmonids

Each frozen juvenile salmon was given an identification number (collection year, seine set number and fish sequence number), weighed in a tared plastic bag, re-identified and re-examined for adipose fin clips 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) and mounted on gum cards from which acetate impressions were made. Heads from individuals with adipose fin clips were removed and sent to the Oregon Department of Fish and Wildlife, Clackamas laboratory, for removal and decoding of coded wire tags. Stomach contents from 10 fish of each species from each set were

removed, weighed and preserved in 5% buffered formalin. Kidney smears from these fish were examined for BKD by personnel of the Department of Microbiology, O.S.U.

## RESULTS

### Ocean Conditions

Associated with the 1983 El Nino were higher than average sea-surface temperatures off Oregon and Washington in May and June. Sea surface temperatures during these two months averaged 1°C to 4°C higher than in 1982 (Table 1).

### Catch of Salmonids

Seven species of salmonids occurred in the 1983 purse seine collections (Table 2, Appendix B). As in 1981 and 1982, chinook and coho were much more abundant than the other species. In 1983, however, the total catch of juvenile chinook was higher than that of juvenile coho. Almost 8 and 4 times as many juvenile coho as juvenile chinook were collected in 1981 and 1982, respectively. Chum and sockeye were the next most numerous salmonids, although almost all of these fish were collected in one set off Cape Disappointment in May.

### Catch Per Set of Salmonids

Mean catch per set of juvenile coho and chinook salmon was

Table 1. Comparison of sea-surface temperatures for 1982 and 1983. Average of all stations. Repeat measurements at the same stations averaged and counted only once.

Month	Area	n (Stations)	$\bar{x}$ ( $^{\circ}\text{C}$ )	$\Delta t$ 1983-1982
May 1982	Washington Coast	24	11.3	+1.1 $^{\circ}\text{C}$
May 1983	Washington Coast	28	12.4	
May 1982	Oregon Coast	33	10.8	+2.4 $^{\circ}\text{C}$
May 1983	Oregon Coast	26	13.2	
June 1982	Washington Coast	18	11.8	+2.7 $^{\circ}\text{C}$
June 1983	Washington Coast	23	14.5	
June 1982	Oregon Coast	32	11.5	+4.1 $^{\circ}\text{C}$
June 1983	Oregon Coast	33	15.6	
September 1982	Washington Coast	17	15.8	-0.6 $^{\circ}\text{C}$
September 1983	Washington Coast	21	15.2	
September 1982	Oregon Coast	18	14.8	-1.3 $^{\circ}\text{C}$
September 1983	Oregon Coast	30	13.5	

Table 2. Total catch of salmonids by species and cruise during 1983.

Species	MAY			JUNE			SEPTEMBER			ALL CRUISES					
	Fork Length (mm)	Total	# CWT	% CWT	Fork Length (mm)	Total	# CWT	% CWT	Fork Length (mm)	Total	# CWT	% CWT			
Coho	101-300	178	7	4.0	101-350	202	28	13.5	101-420	194	5	2.6	580	40	6.9
	301+	81	6	7.4	351+	167	2	1.2	421+	25	0	0.0	267	8	3.0
Chinook	101-400	129	7	5.4	101-400	52	2	3.8	101-400	213	0	0.0	607	9	1.5
	401+	5	0	0.0	401+	14	0	0.0	401+	5	0	0.0	24	0	0.0
Steelhead	171-210	4	0	0.0	231-460	3	0	0.0	-	0	0	0.0	7	0	0.0
Cutthroat	221-300	7	0	0.0	231-380	8	0	0.0	-	0	0	0.0	15	0	0.0
Pink	399	1	0	0.0	455	1	0	0.0	-	0	0	0.0	2	0	0.0
Chum	101-130	53	0	0.0	111-140	3	0	0.0	-	0	0	0.0	56	0	0.0
Sockeye	101-130	54	0	0.0	---	0	0	0.0	-	0	0	0.0	54	0	0.0

calculated for three areas for each of the three cruises in 1983 (Table 3). Mean catch per set of juvenile coho was lower in 1983 than in 1982 in all areas during June and September, and also lower from Cape Lookout south in May, (See Fisher et al., 1983, p.14 for comparison). During September 1983, all but 2 of the 143 juvenile coho collected north of the Columbia River were from the Waatch Point transect; elsewhere off Washington the mean catch per set of juvenile coho was extremely low.

Catch per set of juvenile chinook, unlike coho, was higher in 1983 than in 1982 south of the Columbia River during September. The difference between the two years in catch of juvenile chinook salmon during September may be due partly to a change in coverage of our sampling. In 1983 we used a shallower net and were able to sample in closer to shore. Of 207 juvenile chinook collected south of the Columbia in September 1983, 204 were collected within 4.3 km of the coast. Twelve sets were made within 4.3 km of the coast south of the Columbia River during September 1983 but only two sets were made in September 1982.

#### Coho Length-Frequency Distributions

Coho length-frequency distributions showed two distinct modes during the summer: the smaller mode comprised of juvenile (.0 age) fish and the larger mode of maturing (.1 age) fish (Figure 3). The size of juvenile coho was similar in all areas

Table 3. Number of sets and catch per set of juvenile coho and chinook salmon.

Species	Area	May			June			September		
		# Sets	# Fish	Catch/ Set	# Sets	# Fish	Catch/ Set	# Sets	# Fish	Catch/ Set
Juvenile Coho	Waatch Point to Cape Disappoint.	29	39	1.3	24	139	5.8	20	143	7.2
	Seaside to Nehalem	8	73	9.1	9	19	2.1	8	18	2.3
	Cape Lookout and South	17*	61	3.6	25	49	2.0	24	33	1.4
Juvenile Chinook	Waatch Point to Cape Disappoint.	29	97	3.3	24	25	1.0	20	6	0.3
	Seaside to Nehalem	8	21	2.6	9	7	0.8	8	35	4.4
	Cape Lookout and South	17*	9	0.5	25	20	0.8	24	172	7.2

\*1 non-quantitative set not included

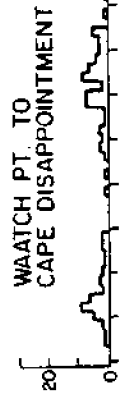


COHO

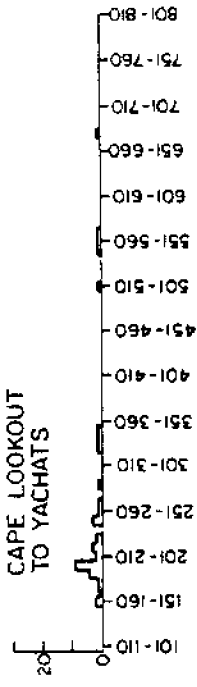
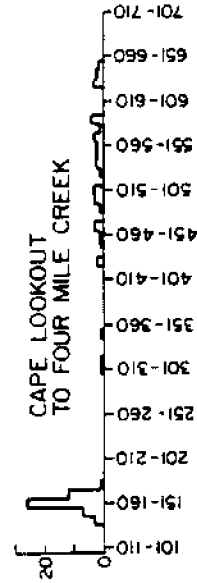
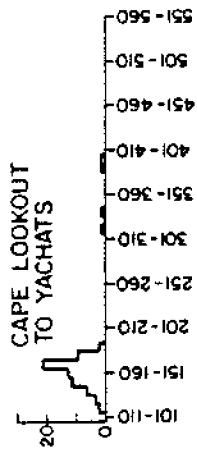
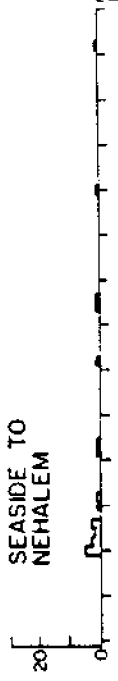
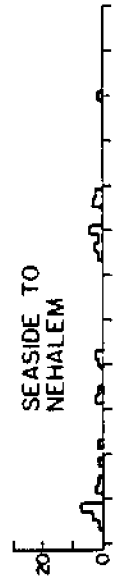
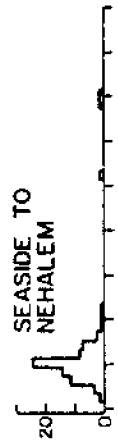
MAY 1983

JUNE 1983

SEPT 1983



NUMBER OF FISH



FORK LENGTH (mm)

101-110  
151-160  
201-210  
251-260  
301-310  
351-360  
401-410  
451-460  
501-510  
551-560

101-110  
151-160  
201-210  
251-260  
301-310  
351-360  
401-410  
451-460  
501-510  
551-560  
601-610  
651-660  
701-710

101-110  
151-160  
201-210  
251-260  
301-310  
351-360  
401-410  
451-460  
501-510  
551-560  
601-610  
651-660  
701-710  
751-760  
801-810

Figure 3. Length-frequency distributions of coho salmon, 1983.

# CHINOOK

SEPT 1983

JUNE 1983

MAY 1983

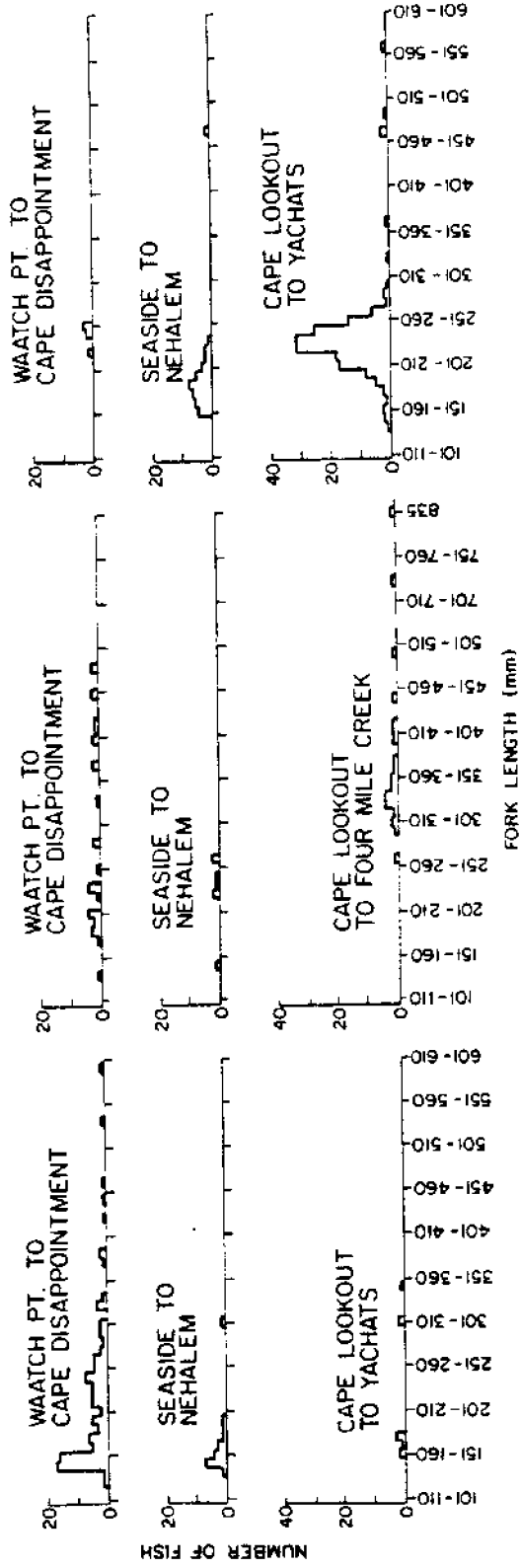


Figure 4. Length-frequency distributions of chinook salmon, 1983.

during May 1983 and also was similar to the size of juvenile coho collected in May 1981 and 1982. In all cases the modes were centered at about 151-170 mm F.L.

During June 1983 the juvenile coho were largest north of the Columbia River (the mode at approximately 195 mm F.L.) and smaller south of the Columbia River (the mode at 151 to 160 mm F.L.). This differs from June 1982 when juvenile coho were larger south of Cape Lookout, but is similar to June 1981 when the juveniles were larger between Tillamook Rock and Leadbetter point than they were to the south (Wakefield et al., 1981; Fisher et al., 1983).

During September 1983 (Figure 3) and 1982 and August 1981 juvenile coho were distinctly larger to the north than they were to the south.

#### Length-Frequency Distributions of other Salmonid Species

Length-frequency distributions of chinook appear in Figure 4. A broad range of sizes was represented in all three months with a distinct mode at 220-250 mm F.L. south of Cape Lookout in September. The lengths of other salmonid species are shown in Table 4.

#### Recoveries of CWT'd Juvenile Coho

During the summer 48 juvenile coho with CWT's were collected (Table 5, Appendix C). The CWT'd fish were divided

Table 4. Length-frequency distributions of chum, pink and sockeye salmon and steelhead and cutthroat trout.

Fork Length (mm)	MAY					JUNE			
	Chum*	Pink	Steelhead	Cutthroat	Sockeye*	Chum	Pink	Steelhead	Cutthroat
91-100									
101-110	3				4				
111-120	5				5	1			
121-130	3				2	1			
131-140									
141-150									
151-160									
161-170			2						
171-180			1						
181-190									
191-200			1						
201-210									
211-220									
221-230				1					
231-240				1				1	
241-250									
251-260									
261-270									
271-280				4					1
281-290									
291-300				1				1	
301-310									
311-320									
321-330									
331-340									
341-350									
351-360									
361-370									
371-380									
381-390									
391-400									
401-410		1							
411-420									
421-430									
431-440									
441-450							1		
451-460									

\*Additional Chum and Sockeye were collected but not measured.

Table 5. Catch of juvenile CWT'd coho by month and area.

Cruise	Area	Hatchery Group	n	Days Since Release: Mean (Range)	North-South Distance From Ocean Entrance in km:		Fork Length in mm: Mean (Range)
					Mean (Range)	Mean (Range)	
<b>May</b>							
	Waatch Point to Cape Disappoint.	1981 Brood Coastal Oregon	2	43 (20-65)	116 (76N - 156N)	185 (170-200)	
	Seaside to Nehalem	1981 Brood Columbia River	4	28 (19-49)	55S (28S - 65S)	151 (134-173)	
	Cape Lookout to Yachats	1981 Brood Coastal Oregon	1	25 -----	11N	173 -----	
<b>June</b>							
	Waatch Point to Cape Disappoint.	1981 Brood Coastal Oregon	3	48 (42-57)	235N (224N - 250N)	215 (190-233)	
		1981 Brood Columbia River	4	39 (36-40)	37N (28N - 46N)	201 (190-210)	
	Seaside to Nehalem	1981 Brood Coastal Oregon	1	100 -----	39N (39N)	325 -----	
	Cape Lookout to Four Mile Creek	1981 Brood Columbia River	2	16 -----	47S (28S-65S)	140 (134-145)	
		1981 Brood Coastal Oregon	1	103 -----	24S -----	325 -----	
		1981 Brood Anadromous	17	2 (2-2)	11N -----	159 (144-174)	
<b>September</b>							
	Waatch Point to Cape Disappoint.	1982 Brood OAF	1	78 -----	413N -----	272 -----	
	Seaside to Nehalem	1982 Brood OAF	2	48 (31-64)	117N -----	219 (206-232)	
	Cape Lookout to Coos Bay	1982 Brood OAF	2	38 (33-42)	42N (6N-77N)	175 (152-198)	

into four groups based on origin: 1) Columbia River 2) Coastal Oregon Public Hatchery, 3) Oregon Aqua-Foods Inc. (OAF) and 4) Anadromous Inc. All OAF and Anadromous coho and all but one coastal Oregon fish were found north of where they entered the ocean (Table 5, Figure 5). Columbia River fish were found both north and south of the Columbia River. No coastal Washington CWT'd coho were collected in 1983. That most CWT'd juvenile coho in June and September were collected north of where they entered the ocean together with the larger size of juveniles and greater catch per set to the north during these months suggest a general northward migration of juvenile coho during the summer of 1983.

#### Recoveries of CWT'd juvenile chinook

Most CWT'd juvenile chinook were collected north of the Columbia River in May (Table 6, Appendix C). None of the chinook collected in September 1983 had CWT's although total catch was greater than in May or June.

#### Recoveries of Floy Tagged Salmon

Through December 1983 18 of the 148 (12.2%) adult salmonids tagged with floy tags were recovered. Large movements both to the north and south occurred between release and recovery among many of the tagged salmon (Table 7).

Table 6. Catch of juvenile CWT'd chinook by month and area.

Cruise	Area	Hatchery Group	n	Days Since Release: Mean (Range)	North-South Distance from Ocean Entrance in km:		Fork Length in mm: Mean (Range)
					Mean (Range)	Mean (Range)	
May	Waatch Pt. to Cape Dis.	1981 Brood Columbia River	6	49 (31-63)	58 N (11 N to 195 N)	225 (158-254)	
	Seaside to Nehalem	1981 Brood Columbia River	1	48 -----	63 S	146 -----	
	Cape Lookout to Yachats	-----	0	-----	-----	-----	
June	Waatch Pt. to Cape Dis.	1982 Brood Columbia River	1	9 -----	48 N	124 -----	
		1981 Brood Coastal Washington	1	43 -----	72 S	238 -----	

No other CWT'd juvenile Chinook were collected.

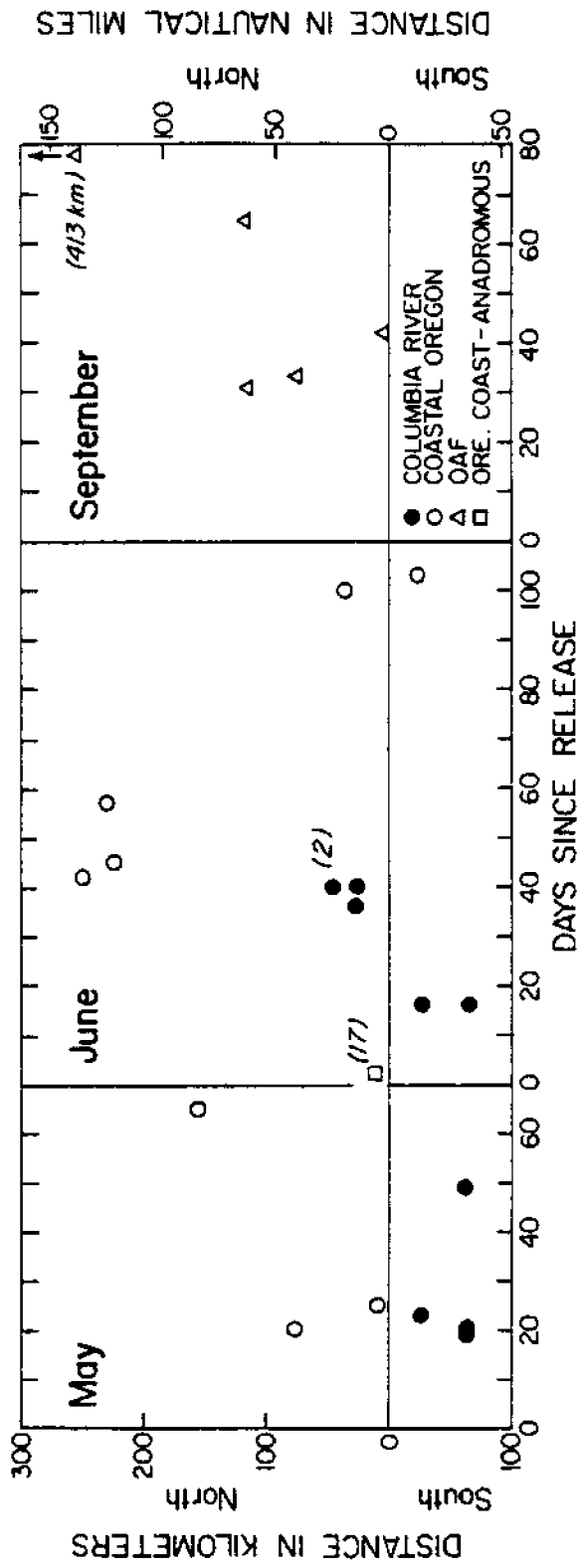


Figure 5. North-south distance from ocean entrance to recovery position vs. days since release for CWT'd juvenile coho salmon.



Table 7. Release and recovery information for adult salmon Floy tagged during 1983.

Floy Tag #	Species	Set #	Location Tagged	Location Recovered	Date Tagged	Date Recovered	Days Release to Recovery	Approximate N-S Distance of Recovery Site Relative to Release Site (km)
00852	Coho	062	22km 00FW offshore release	Off Coos Bay	12/6/83	9/7/83	27	368 S
00855	Coho	062	22km 00FW offshore release	Off Long Beach	12/6/83	4/7/83	22	15 S
00881	Coho	082	28km Quinalt River	Near Bay to Tatocosh	16/6/83	17/7/83	31	118 N
00885	Coho	082	28km Quinalt River	La Perouse Bank west Coast Vancouver Is.	16/6/83	28/7/83	42	200+ N
00893	Coho	085	11km Cape Disappointment	Landed at Ilwaco	22/6/83	24/7/83	32	11 S*
00897	Coho	085	11km Cape Disappointment	Columbia River Channel	22/6/83	3/8/83	42	11 S*
00916	Coho	079	18km Destruction Island	River mile 2.4 of Dugeness River	15/6/83	23/11/83	161	81 S
00917	Coho	079	25km Destruction Island	Off Gray's Harbor	15/6/83	27/8/83	73	83 S
00919	Coho	080	16km Destruction Island	2 mi. north of Columbia River Buoy No. 1	15/6/83	4/7/83	19	154 S
00933	Coho	109	3km Coos Bay	Off mouth of Columbia River	26/6/83	9/9/83	74	311 N
00934	Coho	107	3km Coos Bay	3 mi. west of Umpqua River	26/6/83	6/7/83	10	24 N
00939	Coho	108	9km Coos Bay	Off Coos Bay	26/6/83	3/7/83	7	11 S
00980	Coho	108	9km Coos Bay	Maselle Harbory	26/6/83	3/11/83	130	358 N*
00990	Steelhead	085	11km Cape Disappointment	Jones Beach Columbia River	22/6/83	9/9/83	79	11 S*
00992	Coho	085	11km Cape Disappointment	-----	22/6/83	9/8/83	43	-----
00994	Coho	085	11km Cape Disappointment	Off north end of Lincoln City	22/6/83	9/7/83	17	150 S
00995	Coho	085	11km Cape Disappointment	Off's Depoe Bay	22/6/83	11/7/83	19	171 S
00997	Coho	085	11km Cape Disappointment	Landed at Coos Bay	22/6/83	25/7/83	33	332 S*

\*Distance between tag location and river mouth or bay.

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Appendix A. Positions and times of purse seine sets and environmental data.

Set No.	Date	Transect	Distance Offshore		Latitude	Longitude	Time	Depth (m)	Beating (strokes)	Temp (°C)	Salinity (‰)		Light Secchi (fc)	Chl. a (µg/L)	Phase (µg/L)	Chl. a (µg/L)	Phase (µg/L)	Chl. a (µg/L)	Phase (µg/L)	Comments
			1 mi	2 mi							1 m	10 m								
001	May 16	Watch Point	1.1	5.8	48 20.1	124 49.4	1245	42	326	10.1	32.2	32.6	400	7.0	2.06	0.77	--	--	--	--
002	May 16	Watch Point	4.9	9.1	48 20.2	124 46.2	1445	41	111	10.6	31.9	32.5	225	8.5	2.65	0.53	0.87	0.24	0.24	0.24
003	May 16	Watch Point	10.1	18.7	48 20.0	124 54.8	1643	302	131	10.9	31.3	31.5	250	6.0	1.94	0.94	4.53	6.31	6.31	6.31
004	May 16	Watch Point	19.9	27.6	48 20.0	125 02.4	1839	181	121	11.1	30.7	30.7	300	5.5	6.24	1.65	8.41	1.82	1.82	1.82
005	May 16	Watch Point	19.4	36.0	48 20.4	125 09.5	2005	181	181	11.7	30.2	30.2	75	5.0	3.32	1.12	7.65	2.24	2.24	2.24
006	May 16	Watch Point	24.7	45.8	48 20.4	125 17.5	2218	112	--	12.2	30.9	31.0	--	--	2.12	0.64	0.65	0.23	0.23	after dark
007	May 17	Sea Lion Rock	4.8	8.9	48 00.4	124 47.8	0930	35	--	11.2	31.2	31.7	490	4.0	11.18	2.24	11.18	2.24	2.24	2.24
008	May 17	Sea Lion Rock	10.0	18.5	48 00.0	124 55.8	1100	88	46	11.9	30.4	31.9	550	5.5	7.06	2.12	0.77	0.31	0.31	0.31
009	May 17	Sea Lion Rock	15.5	26.7	48 00.3	125 04.4	1236	123	56	13.0	31.1	31.3	550	11.0	0.97	0.31	0.38	0.36	0.36	0.36
010	May 17	Sea Lion Rock	19.3	35.8	48 00.0	125 10.1	1414	146	101	12.5	31.4	31.5	500	10.0	0.29	0.27	0.32	0.24	0.24	0.24
011	May 17	Destruction Island	19.8	36.7	47 40.3	124 53.0	1744	115	71	12.7	31.0	31.4	300	11.0	0.29	0.17	0.29	0.24	0.24	0.24
012	May 17	Destruction Island	14.6	27.1	47 40.5	124 45.3	1910	77	181	12.4	31.0	31.7	250	7.0	0.82	0.31	0.29	0.31	0.31	0.31
013	May 17	Destruction Island	8.5	15.8	47 40.5	124 37.6	2033	46	206	11.8	31.0	31.4	25	3.5	8.82	1.77	9.41	1.18	1.18	1.18
014	May 18	Destruction Island	7.3	13.5	47 40.4	124 34.5	0837	35	112	11.9	30.7	31.0	175	4.0	2.79	0.74	3.62	1.87	1.87	1.87
015	May 18	Quinault River	6.4	11.9	47 19.6	124 26.5	1026	38	111	12.9	30.2	31.6	450	6.0	1.35	0.34	0.58	0.41	0.41	0.41
016	May 18	Quinault River	9.7	18.0	47 20.1	124 31.5	1317	54	--	12.9	30.5	30.6	500	5.5	1.82	0.50	1.71	0.22	0.22	0.22
017	May 18	Quinault River	14.8	27.4	47 19.9	124 38.9	1510	91	111	13.0	31.0	31.2	500	7.0	0.62	0.24	0.50	0.46	0.46	0.46
018	May 18	Quinault River	19.9	30.9	47 20.2	124 46.9	1659	549*	136	13.1	30.7	31.5	250	10.0	0.31	0.150	0.23	0.10	0.10	Aborted
019	May 18	Greys Harbor	6.1	11.3	46 59.8	124 19.1	2043	37	136	12.6	30.9	32.9	25	--	0.34	0.30	0.37	0.21	0.21	0.21
020	May 18	Greys Harbor	10.1	18.7	47 00.3	124 25.0	1423	53	151	13.3	30.6	30.6	450	4.0	0.29	0.17	0.29	0.20	0.20	0.20
021	May 19	Greys Harbor	10.6	19.6	47 00.0	124 25.7	1728	55	161	13.3	--	--	550	9.0	--	--	--	--	--	--
022	May 19	Greys Harbor	15.3	28.4	47 00.0	124 32.6	1900	79	181	13.1	30.6	30.6	290	4.0	0.27	0.09	0.19	0.11	0.11	0.11
023	May 20	Willapa Bay	6.1	11.3	46 39.8	124 12.6	0829	40	160	12.8	30.7	32.2	250	7.5	0.65	0.42	0.37	0.25	0.25	0.25
024	May 20	Willapa Bay	10.2	18.9	46 40.3	124 18.9	1021	66	155	13.0	30.9	31.0	175	7.0	0.32	0.35	0.55	0.21	0.21	0.21
025	May 20	Willapa Bay	14.8	27.4	46 40.2	124 25.6	1153	84	150	12.9	29.7	31.4	300	10.0	0.16	0.10	0.31	0.21	0.21	0.21
026	May 20	Willapa Bay	19.8	36.7	46 40.2	124 32.7	1342	119	20	13.4	30.0	30.5	250	10.5	0.38	0.15	0.28	0.13	0.13	0.13
027	May 20	Willapa Bay	25.5	47.3	46 40.0	124 40.8	1528	146-165	330	13.4	30.0	--	150	--	0.73	0.12	--	--	--	Aborted
028	May 21	Cape Disappointment	5.4	10.0	46 20.7	124 11.4	0922	35	150	12.3	30.1	31.1	200	4.5	1.65	0.61	1.35	0.45	0.45	0.45
029	May 21	Cape Disappointment	10.0	18.5	46 20.7	124 18.0	1344	75-88	150	13.2	31.2	31.3	350	7.5	0.37	0.32	0.59	0.44	0.44	0.44
030	May 21	Cape Disappointment	15.4	28.5	46 19.8	124 25.9	1545	128	120	13.7	30.4	30.9	250	10.0	0.19	0.10	0.19	0.13	0.13	0.13
031	May 21	Cape Disappointment	20.0	37.1	46 20.5	124 32.5	1718	-137	150	13.9	29.9	30.3	200	13.0	0.12	0.08	0.16	0.10	0.10	0.10
032	May 21	Cape Disappointment	14.9	27.6	46 19.8	124 25.0	1950	128	105	13.4	30.6	30.9	150	11.0	0.15	0.10	0.21	0.11	0.11	0.11
033	May 22	Seaside	3.5	6.5	46 00.0	124 00.8	0900	37	145	12.4	31.1	31.2	350	8.0	0.55	0.29	0.35	0.18	0.18	0.18
034	May 22	Seaside	7.3	13.5	46 00.3	124 06.0	1046	73	130	13.6	29.1	30.9	300	4.0	0.59	0.40	0.54	0.17	0.17	0.17
035	May 22	Seaside	10.1	18.7	46 00.0	124 10.2	1154	86	180	13.9	25.6	30.7	400	5.0	1.15	0.37	1.09	0.36	0.36	0.36
036	May 22	Seaside	14.9	27.6	46 00.2	124 17.0	1317	117	117	13.8	24.6	31.0	500	4.0	2.08	0.41	0.67	0.60	0.60	0.60
037	May 23	Nehalem	2.1	3.9	45 00.5	123 58.1	0907	38	--	11.9	31.8	32.2	300	8.0	0.54	0.29	1.09	0.25	0.25	0.25
038	May 23	Nehalem	4.8	8.9	45 41.0	124 03.0	1024	68	115	12.9	31.3	31.8	290	7.5	0.65	0.41	0.44	0.37	0.37	0.37
039	May 23	Nehalem	10.0	18.5	45 40.9	124 10.6	1154	106	70	14.1	29.4	29.9	350	10.0	0.14	0.09	0.38	0.18	0.18	0.18
040	May 23	Nehalem	15.4	28.5	45 40.6	124 18.0	1325	143	95	15.3	27.6	30.9	400	8.5	0.24	0.09	--	--	--	--
041	May 23	Cape Lookout	17.3	32.1	45 23.8	124 22.5	1606	421	--	15.0	26.6	31.9	225	8.0	6.77	0.29	6.13	0.14	0.14	0.14
042	May 23	Cape Lookout	14.5	26.9	45 20.5	124 18.9	1834	183	129	14.5	26.9	--	250	7.5	0.21	0.08	--	--	--	--
043	May 23	Cape Lookout	10.1	18.7	45 19.8	124 12.5	1947	140	149	14.6	26.9	--	120	8.5	0.22	0.11	--	--	--	--
044	May 24	Cape Lookout	2.6	4.8	45 19.5	124 01.6	0411	44	259	12.4	30.8	--	60	8.0	0.41	0.08	--	--	--	Aborted

Set No.	Date	Transact	Distance offshore (n.m.)	Latitude	Longitude	Time Start	Depth (m)	Searing (turns)	Temp (°C)	Salinity (‰)	Light (fc)	Seachl (u)	Chl.a (µg/l)	Phase (µg/l)	Chl.a (µg/l)	Phase (µg/l)	Comments
045	May 24	Cape Lookout	4.2	45 19.3	124 06.0	1012	73-82	54	14.0	28.5	--	350	0.5	0.16	0.09	--	--
046	May 24	Wecoma Beach	2.2	44 59.7	124 03.8	1312	37	19	13.5	31.6	--	350	6.0	1.29	0.29	--	--
047	May 24	Wecoma Beach	11.6	44 59.5	124 17.3	1449	141	49	13.8	29.3	--	150	12.0	0.26	0.12	--	--
048	May 24	Wecoma Beach	15.0	45 00.2	124 21.8	1619	201	89	13.9	29.6	--	150	11.0	0.15	0.10	--	--
049	May 24	3 mi. south Wecoma Beach	4.9	44 56.2	124 08.6	1815	82	119	13.9	28.3	--	200	7.0	0.21	0.15	--	--
050	May 25	Yaquina Head	3.0	44 40.0	124 07.6	1028	42	104	11.8	32.6	31.0	150	3.0	8.53	1.00	14.71	1.53
051	May 25	Yaquina Head	10.1	44 40.0	124 17.6	1315	81	189	14.0	28.9	32.4	500	10.0	0.21	0.06	0.44	0.37
052	May 25	Yaquina Head	14.8	44 40.1	124 24.2	1546	95	229	14.1	30.1	32.0	500	8.0	0.10	0.06	0.21	0.15
053	May 26	Yachats	2.0	44 20.4	124 08.7	0745	37	133	11.1	32.8	33.2	180	3.5	8.62	2.12	7.77	1.55
054	May 26	Yachats	5.0	44 20.0	124 13.0	0920	60	--	11.9	32.7	32.7	400	3.5	5.88	1.88	5.59	1.82
055	May 26	Yachats	10.9	44 22.3	124 20.8	1054	73	--	11.9	32.6	32.8	--	3.5	11.47	3.00	10.41	1.09
056	May 27	Yachats	10.0	44 19.8	124 20.0	0648	73-81	59	11.4	32.8	32.8	180	3.5	10.29	2.06	10.59	2.12
057	May 27	Yachats	15.4	44 20.5	124 27.2	0824	88-92	144	11.6	32.8	32.8	350	4.0	7.06	1.41	7.35	1.47
058	May 27	Yachats	14.6	44 19.4	124 20.8	0958	92	211	11.7	--	--	300	5.0	--	--	--	Hydro Station
059	May 27	Yachats	19.7	44 19.8	124 33.4	1105	92	249	11.9	32.8	32.7	300	5.0	8.09	1.97	8.09	1.79
060	May 27	Yachats	24.8	44 19.8	124 40.6	1240	82	239	12.2	32.1	32.2	400	7.5	0.32	0.28	0.38	0.29
061	June 9	Offshore Release Site	12.5	46 29.7	124 21.5	1046	81	110	12.6	31.8	31.8	300	2.0	5.00	1.00	7.06	0.71
062	June 12	Offshore Release Site	12.0	46 29.4	124 20.8	1102	73	60	15.9	29.4	31.4	800	4.0	5.59	1.12	3.09	0.62
063	June 12	Willapa Bay	4.9	46 40.8	124 11.5	1324	37	90	15.2	26.8	32.2	850	3.5	5.00	0.65	8.24	2.35
064	June 12	Willapa Bay	10.0	46 40.0	124 18.5	1739	62	120	15.3	31.6	31.7	900	4.0	1.09	0.25	3.53	1.06
065	June 13	Willapa Bay	10.0	46 39.9	124 18.5	0750	62	140	14.7	31.5	31.8	200	5.5	1.27	0.22	5.29	1.06
066	June 13	Willapa Bay	15.3	46 40.0	124 26.3	0935	62	130	15.4	31.4	31.6	450	4.5	0.44	0.16	0.82	0.45
067	June 13	Willapa Bay	19.9	46 40.3	124 33.1	1055	124	130	15.9	31.6	31.6	600	5.0	0.39	0.16	0.41	0.22
068	June 13	Grays Harbor	15.2	47 00.0	124 32.3	1348	77	140	15.5	31.3	31.4	1000	4.5	0.29	0.09	0.59	0.33
069	June 13	Grays Harbor	9.4	47 00.0	124 24.0	1509	53	170	15.3	25.5	31.2	750	3.5	2.07	0.36	7.94	1.94
070	June 13	Grays Harbor	6.7	47 00.0	124 20.0	1945	48	140	14.9	26.7	28.6	220	3.0	3.18	0.35	8.82	2.47
071	June 14	Watch Point	4.7	48 20.2	124 46.8	0605	40	29	12.9	31.6	32.1	125	4.0	4.41	0.53	4.71	0.94
072	June 14	Watch Point	16.3	48 20.0	125 04.3	1055	187	131	12.9	31.7	31.9	275	7.5	2.10	0.23	3.24	0.65
073	June 14	Watch Point	19.6	48 19.8	125 09.2	1242	119	146	13.2	31.4	31.9	500	7.0	1.33	0.46	1.41	0.53
074	June 14	Watch Point	9.7	48 20.0	124 54.4	1500	302	96	12.7	31.4	32.0	200	6.0	3.24	0.65	2.50	0.50
075	June 15	Sea Lion Rock	5.0	48 00.2	124 46.1	0951	38	151	12.9	31.1	31.1	250	4.0	6.18	1.24	6.62	0.62
076	June 15	Sea Lion Rock	10.2	48 00.0	124 56.1	1132	90	81	13.5	31.3	31.3	200	6.5	1.32	0.62	2.65	0.88
077	June 15	Sea Lion Rock	15.1	48 00.0	125 03.4	1300	123	91	14.0	31.1	31.9	750	4.0	1.77	0.71	0.38	0.32
078	June 15	Destruction Island	18.6	47 40.0	124 51.2	1708	106	61	15.4	31.1	31.1	400	5.5	5.29	0.71	4.71	0.94
079	June 15	Destruction Island	13.5	47 39.7	124 43.8	1815	71	61	16.0	31.5	31.5	200	5.0	1.47	0.65	3.24	0.29
080	June 15	Destruction Island	8.6	47 40.0	124 37.5	1940	42	31	15.5	31.5	31.7	200	5.0	--	--	1.09	0.25
081	June 16	Quinalt River	20.4	47 20.1	124 47.2	1102	549	61	14.2	31.5	31.4	250	11.0	0.27	0.05	0.32	0.10
082	June 16	Quinalt River	15.0	47 20.0	124 39.3	1245	92	81	14.5	31.6	31.3	150	6.0	0.91	0.25	1.32	0.72
083	June 16	Quinalt River	10.0	47 20.0	124 32.0	1310	59	111	14.2	31.6	31.6	150	4.0	0.32	0.10	0.44	0.30
084	June 16	Quinalt River	6.3	47 20.3	124 26.8	1410	33	161	14.7	28.2	30.6	120	4.5	1.77	0.35	1.82	0.75
085	June 22	Cape Disappointment	5.8	46 20.7	124 12.2	0610	38	135	15.9	18.1	30.9	100	3.0	1.62	0.57	0.84	0.48
086	June 22	Cape Disappointment	15.2	46 21.6	124 25.5	0912	112	110	--	17.8	29.7	--	--	1.68	0.72	0.59	0.40
087	June 23	Seaside	4.1	46 00.4	124 01.4	0717	37-38	120	15.4	26.5	29.5	250	11.0	0.40	0.13	0.88	0.39
088	June 23	Seaside	10.1	46 00.7	124 10.0	0917	84	55	15.7	25.2	30.3	200	8.5	0.32	0.10	1.68	0.72

Aborted

Aborted

Aborted

Aborted

Aborted

Aborted

Aborted

Aborted

Aborted

Aborted

Aborted

Aborted

Aborted

Aborted

Aborted

Aborted

Aborted

Aborted

## Appendix A. (continued)

Set No.	Date	Transect	Distance Offshore (n.mi)		Latitude	Longitude	Time Start	Depth (m)	Bearings (true)	Temp (°C)	Salinity (‰)		Light (fc)	Secchi (m)	Chl. a (µg/l)		Phae. (µg/l)		Comments
			1 mi	2 mi							1 m	10 m			1 m	10 m			
089	June 23	Seaside	14.8	27.4	45 00.4	124 16.7	1045	112	350	15.2	25.3	30.4	290	6.0	0.85	0.21	0.74	0.32	
090	June 23	Seaside	7.0	13.0	45 00.1	124 05.6	1240	68	55	16.3	25.2	27.9	800	9.0	0.31	0.11	0.69	0.32	
091	June 23	Mehalem	20.2	37.4	45 39.1	124 25.1	1616	165	220	16.3	29.7	30.8	600	9.5	--	--	--	--	
092	June 23	Mehalem	18.8	27.4	45 40.3	124 17.3	1727	141	190	16.4	29.8	31.4	500	9.0	0.12	0.07	0.21	0.13	
093	June 23	Mehalem	9.7	18.0	45 40.1	124 10.0	1831	104	170	16.2	27.2	31.4	250	6.0	0.26	0.15	0.35	0.18	
094	June 23	Mehalem	4.8	8.9	45 40.5	124 03.1	1942	66	130	16.1	25.3	31.0	200	7.0	0.32	0.14	0.59	0.33	
095	June 23	Mehalem	2.3	4.3	45 40.0	123 59.6	2039	38	110	16.0	25.1	31.0	50	7.0	0.31	0.12	0.35	0.25	
096	June 24	Cape Lookout	14.8	27.4	45 20.4	124 19.3	1036	192	116	15.9	29.9	31.6	200	11.0	0.15	0.07	0.11	0.06	
097	June 24	Cape Lookout	10.2	18.9	45 19.8	124 12.5	1200	145	110	15.5	30.3	30.4	360	9.0	0.18	0.11	0.15	0.07	
098	June 24	Cape Lookout	7.1	13.2	45 20.7	124 08.3	1327	110	245	15.5	29.0	29.8	300	9.0	0.32	0.17	0.27	0.12	
099	June 24	Cape Lookout	5.1	9.5	45 20.2	124 05.6	1437	84	120	15.7	28.8	30.3	175	9.0	0.20	0.15	0.47	0.17	
100	June 24	3 mi., South Cape Lookout	2.4	4.4	45 16.8	124 21.3	1557	44	50	15.7	28.1	29.1	250	10.0	0.44	0.27	0.32	0.14	
101	June 24	Wecoma Beach	14.7	27.2	45 01.1	124 01.2	1910	198	149	16.0	30.5	31.4	150	12.0	0.09	0.19	0.02	0.02	
102	June 24	Wecoma Beach	9.8	18.2	45 00.0	124 14.6	2029	143	124	16.0	29.7	31.5	75	10.0	0.18	0.04	0.24	0.15	
103	June 24	Wecoma Beach	4.9	9.1	45 00.6	124 07.4	2145	84	79	15.8	29.7	29.8	--	--	0.19	0.07	0.13	0.05	After dark
104	June 24	Wecoma Beach	2.4	4.4	45 00.7	124 04.0	2245	42	139	15.3	29.4	30.0	--	--	0.24	0.08	0.56	0.18	After dark
105	June 25	Yaquina Head	2.7	5.0	44 40.0	124 07.2	1046	44-46	--	14.9	31.1	31.1	300	6.5	1.29	0.54	1.62	0.32	
106	June 25	Yaquina Head	10.1	18.7	44 40.0	124 17.6	1241	79	109	15.4	30.8	31.9	500	8.5	0.32	0.10	1.29	0.68	
107	June 26	Coos Bay	1.8	3.3	43 27.5	124 19.0	0615	40-42	129	12.6	32.2	32.5	75	8.0	0.77	0.15	0.85	0.31	
108	June 26	Coos Bay	4.8	8.9	43 27.5	124 22.1	0719	90	169	14.5	31.2	32.6	100	7.5	0.53	0.18	1.29	0.57	
109	June 26	Coos Bay	10.0	18.5	43 27.5	124 30.1	0841	117	119	15.6	31.2	31.3	150	9.0	0.21	0.08	0.31	0.13	
110	June 26	Coos Bay	10.0	18.5	43 27.5	124 30.1	1016	119	189	15.9	--	--	--	10.0	--	--	--	--	
111	June 26	Coos Bay	14.6	27.1	43 27.6	124 36.4	1411	187	169	16.3	31.0	31.0	175	10.0	0.16	0.07	0.27	0.09	
112	June 26	Coos Bay	20.2	37.4	43 27.5	124 44.1	1254	516	129	16.4	30.1	36.3	500	13.0	0.12	0.06	0.25	0.09	
113	June 26	Four Mile Creek	14.6	27.1	42 59.8	124 47.3	1637	150	139	16.2	30.5	31.5	300	8.0	0.22	0.12	0.35	0.25	
114	June 26	Four Mile Creek	9.8	18.2	43 00.0	124 40.7	1748	15	--	16.4	30.7	30.8	300	8.5	0.31	0.17	0.53	0.39	
115	June 26	Four Mile Creek	4.6	8.5	43 00.1	124 33.7	1902	90	124	14.5	32.0	32.1	75	4.5	1.21	0.88	1.53	1.05	
116	June 26	Four Mile Creek	1.4	2.6	43 00.0	124 29.4	2016	42	89	14.1	32.9	33.2	50	4.5	1.77	0.35	10.59	3.53	
117	June 27	Stuslaw River	2.2	4.1	43 59.8	124 11.2	0859	42	99	14.8	31.7	32.4	125	5.0	0.56	0.15	1.29	0.47	
118	June 27	Stuslaw River	4.8	8.9	44 00.0	124 14.9	1009	71	104	15.6	31.6	32.2	150	8.5	0.35	0.28	0.59	0.47	
119	June 27	Stuslaw River	9.9	18.3	44 00.1	124 21.8	1153	110	299	15.8	31.3	31.6	175	9.0	0.15	0.06	0.39	0.39	
120	June 27	Yachats*	1.5	2.8	44 20.0	124 08.2	1531	42	99	15.4	31.9	32.8	300	6.5	0.41	0.33	0.62	0.23	
121	Sept 15	Watch Point*	4.8	8.9	48 20.0	124 46.9	0808	38	11	14.1	31.8	32.1	180	7.0	1.38	0.67	1.06	0.46	
122	Sept 15	Watch Point*	7.1	13.2	48 20.0	124 50.8	0914	71	121	14.6	31.5	32.4	400	8.0	0.82	0.31	0.65	0.34	
123	Sept 15	Watch Point*	9.9	18.3	48 19.7	124 54.4	1107	307	131	14.5	31.9	32.1	400	7.0	1.71	0.48	1.32	0.62	
124	Sept 15	Watch Point*	15.0	27.8	48 20.0	125 02.2	1234	225	91	14.9	31.6	31.6	350	7.0	1.36	0.54	1.91	0.45	
125	Sept 15	Watch Point*	20.0	37.1	48 20.0	125 09.6	1451	121	151	15.1	31.6	31.6	300	6.0	--	--	1.38	0.84	
126	Sept 15	Watch Point*	25.0	46.3	48 20.0	125 17.2	1602	178	91	15.2	31.5	31.9	250	6.0	1.47	0.82	1.68	1.08	
127	Sept 15	Watch Point*	30.0	55.6	48 17.5	125 24.8	1735	113	151	14.5	31.6	31.6	500	4.0	3.29	1.22	7.44	2.27	
128	Sept 16	Destruction Island*	8.0	14.8	47 40.0	124 35.5	0732	42	171	15.9	30.8	31.1	200	7.0	0.62	0.28	0.97	0.16	
129	Sept 16	Destruction Island*	12.5	23.2	47 40.0	124 41.3	1004	70	221	15.8	31.0	31.3	300	8.0	0.71	0.21	0.86	0.21	
130	Sept 16	Destruction Island*	17.5	32.4	47 40.0	124 49.5	1155	104	211	15.8	31.0	31.0	500	6.0	1.00	0.06	1.24	0.18	
131	Sept 16	Quinalt River*	10.0	18.5	47 20.0	124 32.0	1635	60	101	16.2	30.6	31.4	300	6.0	2.82	0.49	0.97	0.19	
132	Sept 16	Quinalt River*	7.2	13.3	47 20.0	124 28.1	1748	44	221	15.6	30.7	31.7	350	5.0	1.94	0.12	1.29	0.33	

## Appendix A (continued)

Set No.	Date	Transact	Distance Offshore (n.mi)	Latitude	Longitude	Time Start	Depth (m)	Bearing (true)	Temp (°C)	Salinity (‰)	Light Secchi (fc)	Chl. a (µg/l) 1 m	Phase 1 m	Chl. a (µg/l) 10 m	Phase 10 m	Comments	
133	Sept 17	Grays Harbor*	7.0	47 00.0	124 27.5	0821	42	188	14.7	30.9	31.2	300	6.0	2.12	0.64	3.24	0.65
134	Sept 17	Grays Harbor*	12.5	47 00.0	124 28.5	1037	71	150	15.8	30.8	30.9	600	6.0	1.77	0.35	2.50	0.32
135	Sept 17	Grays Harbor*	16.0	47 00.0	124 33.5	1146	88	190	15.9	30.6	30.6	325	6.5	2.41	0.52	1.07	0.21
136	Sept 17	Willapa Bay*	15-16	46 40.0	124 26.5	1451	90	184	16.4	30.9	31.2	300	9.0	1.03	0.07	2.35	0.47
137	Sept 17	Willapa Bay*	9.0	46 40.0	124 17.2	1624	59	--	15.6	30.8	31.1	300	5.0	3.68	0.38	5.15	0.68
138	Sept 17	Willapa Bay*	6.0	46 40.0	124 13.5	1834	40	190	15.6	31.1	31.2	175	5.0	5.29	0.35	4.05	0.97
139	Sept 19	Cape Disappointment*	6.25	46 20.5	124 13.0	0755	42	130	13.3	--	31.2	250	3.0	4.41	0.88	5.15	0.68
140	Sept 19	Cape Disappointment*	10.2	46 24.0	124 18.6	0943	71	160	14.4	31.2	31.1	450	7.0	3.68	0.38	4.41	0.53
141	Sept 19	Cape Disappointment*	15.0	46 27.0	124 25.5	1103	106	120	15.1	--	--	--	--	--	--	--	Aborted
142	Sept 19	Cape Disappointment*	16.0	46 28.0	124 26.9	1220	101	270	15.1	31.1	31.3	--	8.0	2.53	0.44	2.56	0.55
143	Sept 20	Seaside*	4.3	45 58.5	124 01.9	0846	44	--	13.8	30.6	31.7	300	4.5	2.50	3.68	3.56	0.32
144	Sept 20	Seaside*	7.0	46 00.0	124 05.6	1000	71	290	13.8	30.6	31.3	400	4.0	7.44	0.71	3.97	0.44
145	Sept 20	Seaside*	10.0	46 01.0	124 10.5	1111	88	295	14.1	30.8	31.1	480	6.0	7.44	0.71	6.77	0.65
146	Sept 20	Seaside*	15.0	46 00.0	124 18.0	1251	119	320	14.0	31.3	31.4	500	6.5	6.62	0.97	6.32	0.21
147	Sept 20	Neahalem*	10.0	45 40.0	124 10.4	1519	106-108	240	14.4	30.4	30.4	350	5.0	5.00	0.29	4.71	0.24
148	Sept 20	Neahalem*	5.0	45 40.0	124 03.3	1710	70	240	14.6	30.4	31.5	275	4.5	5.29	0.35	4.12	0.29
149	Sept 20	Neahalem*	4.8	45 40.0	124 03.1	1800	70	240	14.7	--	200	--	--	--	--	--	--
150	Sept 20	Neahalem*	2.0	45 39.4	123 59.0	1903	40	--	14.0	30.8	32.3	140	4.0	6.18	0.53	6.03	0.85
151	Sept 21	Cape Lookout*	15.5	45 20.0	124 20.2	1920	192	80	14.9	31.2	31.2	35	3.5	6.96	1.00	5.88	0.47
152	Sept 21	Cape Lookout*	10.0	45 20.3	124 12.4	2034	145	--	14.2	31.5	31.8	--	--	8.82	0.35	8.53	1.00
153	Sept 21	Cape Lookout*	7.5	45 20.0	124 10.9	2132	110	210	13.4	31.4	31.9	--	--	8.82	1.77	4.71	0.94
154	Sept 22	Cape Lookout*	5.0	45 20.0	124 05.3	0648	82	35	12.9	31.6	31.8	5	4.5	9.41	1.18	10.88	1.47
155	Sept 22	Cape Lookout*	2.0	45 20.2	124 01.3	0747	44-46	250	12.9	31.5	32.0	200	3.5	7.77	0.78	7.65	0.82
156	Sept 22	3 mi. S. Cape Lookout*	2.0	45 17.3	124 01.0	0850	40-42	107	12.1	31.9	31.9	250	5.0	8.82	1.77	10.59	1.41
157	Sept 22	Mastucca Bay*	1.75	45 10.3	124 01.0	1031	42-44	119	11.3	32.3	32.6	400	4.5	5.00	1.00	5.88	1.18
158	Sept 22	Wecoma Beach*	1.8	45 00.0	124 03.2	1227	40-42	139	12.2	32.6	32.8	550	9.0	3.38	0.50	1.41	0.78
159	Sept 22	Wecoma Beach*	5.0	45 00.0	124 07.5	1357	88	99	13.7	32.0	32.3	600	7.0	4.71	0.59	6.77	1.00
160	Sept 22	Wecoma Beach*	10.0	45 00.0	124 14.9	1505	148	104	14.3	31.8	32.1	700	7.0	2.65	0.76	4.37	0.49
161	Sept 22	Government Point*	1.25	44 49.4	124 05.9	1713	40-42	39	12.5	32.6	32.9	150	7.5	4.71	0.94	3.53	0.71
162	Sept 22	Yaquina Head*	5.0	44 40.0	124 10.2	1917	59	--	12.3	32.6	32.6	35	--	2.29	0.60	2.65	0.88
163	Sept 23	Yaquina Head*	2.3	44 40.0	124 06.7	0923	40	245	13.0	32.5	32.5	200	6.5	5.74	0.44	13.53	1.29
164	Sept 23	Yaquina Head*	5.2	44 40.0	124 10.9	1025	60	110	12.6	32.5	32.6	200	8.0	4.41	0.53	4.69	0.16
165	Sept 23	Yaquina Head*	10.1	44 40.0	124 17.5	1133	82	155	14.0	32.2	32.4	200	7.0	2.03	0.83	5.02	1.01
166	Sept 23	Yaquina*	10.0	44 20.0	124 19.9	1426	77	110	15.4	32.0	32.0	200	12.0	0.41	0.22	0.41	0.29
167	Sept 23	Yaquina*	5.0	44 20.0	124 13.1	1544	62	200	14.6	32.2	32.6	200	10.0	2.71	0.40	9.12	1.82
168	Sept 23	Yaquina*	1.7	44 20.0	124 33.9	1647	38	--	13.2	32.6	32.6	200	5.0	7.35	0.77	10.00	1.29
169	Sept 23	Yaquina*	2.0	44 20.0	124 08.7	1737	38	155	13.9	--	--	--	8.0	--	--	--	--
170	Sept 23	Seal Rock*	2.0	44 30.0	124 07.8	1922	44	155	14.1	32.2	32.3	3	--	1.91	0.56	3.82	0.41
171	Sept 24	Stiuslaw*	2.1	44 00.0	124 11.0	0821	44	109	12.4	32.8	33.0	150	6.0	6.47	3.41	5.88	2.54
172	Sept 24	Stiuslaw*	5.0	44 00.0	124 15.0	0912	71	129	12.3	33.0	33.1	320	6.0	5.88	4.00	5.44	2.50
173	Sept 24	Stiuslaw*	10.0	44 00.0	124 22.0	1042	112	89	13.6	32.7	32.7	700	10.5	0.97	0.65	3.38	1.91
174	Sept 24	Cove Bay*	1.6	43 27.5	124 18.5	1719	46-48	59	13.3	32.8	33.2	425	9.0	0.74	0.36	1.42	1.34

\*Position fixed by radar.

APPENDIX B. CATCH OF SALMONIDS BY SET DURING 1983.

Set No.	Date	Transect	Distance From Shore (km)	Depth (m)	Temp. (°C)	Coho		Chinook		Pink 391-460 (mm)	Steelhead		Cutthroat		Sockeye 101-130 (mm)	Comments
						101-300 (mm)	301+ (mm)	101-400 (mm)	401+ (mm)		171-310 (mm)	455 (mm)	221-300 (mm)	301+ (mm)		
001	May 16	Waatch Pt.	5.9	42	10.1	0	0	0	0							
002	May 16	Waatch Pt.	9.1	41	10.6	0	2	0	0							
003	May 16	Waatch Pt.	16.7	302	10.9	0	3	0	0							
004	May 16	Waatch Pt.	27.6	181	11.1	1	6	6	1		1					
005	May 16	Waatch Pt.	36.0	191	11.7	0	32	5	1							
006	May 16	Waatch Pt.	45.8	112	12.2	0	10	0	0	1						
007	May 17	Sea Lion Rock	8.9	35	11.2	0	0	1	0							
008	May 17	Sea Lion Rock	18.5	68	11.9	0	11	5	0							
009	May 17	Sea Lion Rock	28.7	123	13.0	0	0	0	0							
010	May 17	Sea Lion Rock	35.6	146	12.5	0	0	0	0							
011	May 17	Destruction Is.	36.7	115	12.7	0	0	0	0							
012	May 17	Destruction Is.	27.1	77	12.4	0	0	3	0							
013	May 17	Destruction Is.	15.0	46	11.8	1	5	2	0							
014	May 18	Destruction Is.	13.5	35	11.9	0	1	3	0							
015	May 18	Quinault R.	11.9	38	12.9	17	0	6	0							
016	May 18	Quinault R.	18.0	54	12.9	2	0	0	0							5 Juv. lost
017	May 18	Quinault R.	27.4	91	13.0	0	0	6	0							
018	May 18	Quinault R.	36.9	549+	13.1	0	0	0	0							
019	May 18	Grays Harbor	11.3	37	12.6											
020	May 19	Grays Harbor	18.7	53	13.3											
021	May 19	Grays Harbor	19.6	55	13.3											
022	May 19	Grays Harbor	20.4	79	13.1	0	2	7	0					1		
023	May 20	Willapa Bay	11.3	40	12.6	5	0	3	0							
024	May 20	Willapa Bay	18.9	66	13.0	1	0	0	0							
025	May 20	Willapa Bay	27.4	84	12.9	1	0	6	0							
026	May 20	Willapa Bay	36.7	119	13.4	1	0	6	0							
027	May 20	Willapa Bay	47.3	146-165	13.4											
028	May 21	Cape Dis.	10.0	35	12.3	4	0	15	3							
029	May 21	Cape Dis.	18.5	75-88	13.2	0	0	2	0							
030	May 21	Cape Dis.	28.5	128	13.7	3	0	12	0							
031	May 21	Cape Dis.	37.1	137	13.9	0	0	0	0							
032	May 21	Cape Dis.	27.6	128	13.4	3	0	9	0							
033	May 22	Seaside	6.5	37	12.4	0	0	0	0							
034	May 22	Seaside	13.5	73	13.6	2	1	1	0							
035	May 22	Seaside	18.7	66	13.9	7	2	1	0							
036	May 22	Seaside	27.6	117	13.8	0	0	0	0							
037	May 23	Mehalem	3.9	38	11.9	24	0	1	0							
038	May 23	Mehalem	8.9	68	12.9	2	0	3	0							
039	May 23	Mehalem	18.5	106	14.1	38	0	15	0							
040	May 23	Mehalem	28.5	143	15.3	0	0	0	0							
041	May 23	Cape Lookout	32.1	421	15.0	0	0	0	0							
042	May 23	Cape Lookout	26.9	183	14.5	2	0	0	0							
043	May 23	Cape Lookout	18.7	146	14.6	1	0	0	0							
044	May 24	Cape Lookout	4.8	44	12.8											
045	May 24	Cape Lookout	7.8	73-82	14.0	8	3	0	0							
046	May 24	Wecoma Beach	4.1	37	13.5	0	0	0	0							
047	May 24	Wecoma Beach	21.5	141	13.8	1	0	0	0							
048	May 24	Wecoma Beach	27.8	201	13.9	0	0	0	0							
049	May 24	Wecoma Beach	9.1	82	13.9	29	1	4	0							
050	May 25	Yaquina Head	5.6	82	11.8	0	0	0	0							
051	May 25	Yaquina Head	16.7	81	14.0	0	0	0	0							
052	May 25	Yaquina Head	27.4	95	14.1	0	0	0	0							
053	May 26	Yaquina Head	3.7	37	11.1	1	0	0	0							
054	May 26	Yaquina Head	9.3	60	11.9	0	0	0	0							
055	May 26	Yaquina Head	16.5	73	11.9											
056	May 27	Yaquina Head	18.5	73-81	11.4	2	2	1	0							No set
057	May 27	Yaquina Head	28.5	88-92	11.6	5	0	1	0							
058	May 27	Yaquina Head	27.1	92	11.7	3	0	0	0							
059	May 27	Yaquina Head	36.5	92	11.9	5	0	3	0							
060	May 27	Yaquina Head	46.0	82	12.2	9	0	0	0							

54

53

Aborted

5 Juv. lost

Aborted set  
Aborted set

Aborted set

No set

1/2 net set





Set No.	Date	Transect	Distance From Shore (km)	Depth (m)	Temp. (°C)	Coho		Chinook		Chum 101-140 (mm)	Pink 391-456 (mm)	Steelhead		Cutthroat		Sockeye 301-330 (mm)	Comments
						101-420 (mm)	421-480 (mm)	101-400 (mm)	401-480 (mm)			171-310 (mm)	310-455 (mm)	221-300 (mm)	300-301+ (mm)		
121	Sept 15	Watch Pt.	8.9	36	14.1	28	0	6	0								
122	Sept 15	Watch Pt.	13.2	71	14.6	68	10	0	0								
123	Sept 15	Watch Pt.	18.3	307	14.5	3	0	0	0								
124	Sept 15	Watch Pt.	27.8	225	14.9	2	2	0	0								
125	Sept 15	Watch Pt.	37.1	121	15.1	9	1	0	0								
126	Sept 15	Watch Pt.	46.3	178	15.2	9	1	0	0								
127	Sept 15	Watch Pt.	55.8	113	14.5	0	1	0	0								
128	Sept 16	Destruction Is.	14.8	42	15.9	0	1	0	0								
129	Sept 16	Destruction Is.	23.2	70	15.8	0	0	0	0								
130	Sept 16	Destruction Is.	32.4	104	15.6	0	0	0	0								
131	Sept 16	Quinault R.	18.5	60	16.2	0	0	0	0								
132	Sept 16	Quinault R.	13.3	44	15.6												
133	Sept 17	Grays Harbor	11.0	42	14.7	0	0	0	0								Aborted
134	Sept 17	Grays Harbor	23.2	71	15.8	0	0	0	0								Spilled 1/2 net
135	Sept 17	Grays Harbor	29.7	88	15.9	0	0	0	0								
136	Sept 17	Willapa Bay	29.0	90	16.4	0	0	0	0								
137	Sept 17	Willapa Bay	16.7	59	15.8	0	0	0	0								
138	Sept 17	Willapa Bay	11.1	40	15.6	1	0	0	0								
139	Sept 19	Cape Dis.	11.6	42	13.3	0	0	0	0								
140	Sept 19	Cape Dis.	18.9	71	14.4	0	0	0	0								
141	Sept 19	Cape Dis.	27.6	106	15.1												
142	Sept 19	Cape Dis.	29.7	101	15.1	0	0	0	0								Aborted
143	Sept 20	Seaside	8.0	44	13.8	0	1	0	1								
144	Sept 20	Seaside	13.0	71	13.8	0	2	0	0								
145	Sept 20	Seaside	18.5	88	14.1	0	1	0	0								
146	Sept 20	Seaside	27.8	119	14.0	0	0	0	0								
147	Sept 20	Mehalem Beach	18.5	106-108	14.4	0	0	0	0								
148	Sept 20	Mehalem Beach	9.3	70	14.6	6	0	0	0								
149	Sept 20	Mehalem Beach	8.9	70	14.7	12	0	0	0								
150	Sept 20	Mehalem Beach	3.7	40	14.0	0	0	35	0								
151	Sept 21	Cape Lookout	28.7	192	14.9	0	0	0	0								
152	Sept 21	Cape Lookout	18.5	145	14.2	0	0	0	0								
153	Sept 21	Cape Lookout	13.9	110	13.4	0	0	0	0								
154	Sept 22	Cape Lookout	9.3	82	12.9	1	0	0	0								
155	Sept 22	Cape Lookout	3.7	44-46	12.9	11	0	22	0								
156	Sept 22	3 mi. S C. Lookout	3.7	40-42	12.1	5	1	10	0								
157	Sept 22	Mecoma Bay	3.2	42-44	11.3	0	1	8	0								
158	Sept 22	Mecoma Beach	3.3	40-42	12.2	6	0	1	0								
159	Sept 22	Mecoma Beach	9.3	88	13.7	0	0	0	0								
160	Sept 22	Mecoma Beach	16.5	148	14.3	0	0	0	0								
161	Sept 22	Government Pt.	2.3	40-42	12.5	0	0	6	0								
162	Sept 22	Taquina Head	9.3	59	12.3	0	0	0	0								
163	Sept 23	Taquina Head	4.3	40	13.0	1	0	3	0								
164	Sept 23	Taquina Head	9.6	60	12.6	0	0	0	0								
165	Sept 23	Taquina Head	18.7	82	14.0	0	0	0	0								
166	Sept 23	Fachats	18.5	77	15.4	0	0	0	0								
167	Sept 23	Fachats	9.3	62	14.6	0	0	1	0								
168	Sept 23	Fachats	3.2	38	13.2	1	0	19	1								
169	Sept 23	Fachats	3.7	38	13.9	4	3	64	2								
170	Sept 23	Seal Rock	3.9	44	14.1	0	0	34	0								
171	Sept 24	Sluslaw	9.3	44	12.4	0	0	2	0								
172	Sept 24	Sluslaw	9.3	73	12.3	2	0	2	1								
173	Sept 24	Sluslaw	18.5	112	13.6	2	0	0	0								
174	Sept 24	Coo's Bay	3.0	46-48	13.3	0	0	0	0								

## Appendix C. Release and recovery information for CWT'd salmonids collected in 1983.

## JUVENILE COHO

Tag Code	Brood Year	Agency	Hatchery	Ocean Entry Site	Release Date Da/Mo/Yr	Recovery Date Da/Mo/Yr	Recovery Seine Days	ID No.	Transact	N-S Distance From Ocean Entry (km)	Fish F.L. (mm)	
05-09-29	81	FWS	Willard	Columbia River	7/6/83	23/6/83	16	90	001	Seaside	28S	134
05-09-38	81	FWS	Willard	Columbia River	7/6/83	23/6/83	16	95	001	Nehalem	65S	145
05-11-36	81	FWS	Eagle Creek	Columbia River	4/5/83	13/6/83	40	66	002	Willapa Bay	46N	195
05-11-37	81	FWS	Eagle Creek	Columbia River	4/5/83	23/5/83	19	39	003	Nehalem	63S	153
07-24-45	81	ODFW	Fall Creek	Siletz River	17/3/83	21/5/83	65	32	001	Cape Disappointment	156N	170
07-24-49	81	ODFW	Klaskanina	Columbia River	4/4/83	23/5/83	49	39	001	Nehalem	63S	173
07-24-50	81	ODFW	Siletz	Siletz River	18/4/83	13/6/83	57	68	002	Grays Harbor	230W	222
07-25-59	81	ODFW	Nehalem	Nehalem Bay	15/3/83	23/6/83	100	87	001	Seaside	39N	325
07-25-61	81	ODFW	Nehalem	Nehalem Bay	1/5/83	21/5/83	20	28	004	Cape Disappointment	76N	200
07-25-61	81	ODFW	Nehalem	Nehalem Bay	1/5/83	15/6/83	45	80	009	Destruction Island	224N	233
07-26-39	81	ODFW	Rock Creek	Winchester Bay	15/3/83	26/6/83	103	107	001	Coos Bay	24S	315
07-26-42	81	ODFW	Fall Creek	Alsea Bay	2/5/83	27/5/83	25	59	001	Yachats	11N	173
07-26-42	81	ODFW	Fall Creek	Alsea Bay	2/5/83	13/6/83	42	66	003	Willapa Bay	250N	190
07-27-35	81	ODFW	Sandy	Columbia River	29/4/83	22/5/83	23	34	002	Seaside	28S	146
60-05-48	82	OAF	OAF	offshore Yaquina Bay	29/6/83	15/9/83	78	122	001	Watch Point	413N	272
60-06-17	82	OAF	OAF	Yaquina Bay	18/7/83	20/9/83	64	149	002	Nehalem	117N	232
60-35-56	82	OAF	OAF	Yaquina Bay	20/8/83	22/9/83	33	155	001	Cape Lookout	77N	198
60-35-57	82	OAF	OAF	Yaquina Bay	20/8/83	20/9/83	31	149	001	Nehalem	117N	206
60-35-59	82	OAF	OAF	Yaquina Bay	12/8/83	23/9/83	42	163	003	Yaquina Head	5N	152
62-15-21	81	ANAD	ANAD	Coos Bay	24/6/83	26/6/83	2	109	002	Coos Bay	11N	157
62-15-21	81	ANAD	ANAD	Coos Bay	24/6/83	26/6/83	2	109	005	Coos Bay	11N	148
62-15-21	81	ANAD	ANAD	Coos Bay	24/6/83	26/6/83	2	110	003	Coos Bay	11N	153
62-15-22	81	ANAD	ANAD	Coos Bay	24/6/83	26/6/83	2	109	006	Coos Bay	11N	158
62-15-22	81	ANAD	ANAD	Coos Bay	24/6/83	26/6/83	2	110	009	Coos Bay	11N	151
62-15-26	81	ANAD	ANAD	Coos Bay	24/6/83	26/6/83	2	111	001	Coos Bay	11N	167
62-15-32	81	ANAD	ANAD	Coos Bay	24/6/83	26/6/83	2	110	001	Coos Bay	11N	147
62-15-32	81	ANAD	ANAD	Coos Bay	24/6/83	26/6/83	2	110	005	Coos Bay	11N	152
62-15-33	81	ANAD	ANAD	Coos Bay	24/6/83	26/6/83	2	110	004	Coos Bay	11N	151
62-15-33	81	ANAD	ANAD	Coos Bay	24/6/83	26/6/83	2	110	008	Coos Bay	11N	174
62-15-34	81	ANAD	ANAD	Coos Bay	24/6/83	26/6/83	2	109	004	Coos Bay	11N	148
62-15-34	81	ANAD	ANAD	Coos Bay	24/6/83	26/6/83	2	109	007	Coos Bay	11N	167
62-15-34	81	ANAD	ANAD	Coos Bay	24/6/83	26/6/83	2	109	008	Coos Bay	11N	161
62-15-34	81	ANAD	ANAD	Coos Bay	24/6/83	26/6/83	2	110	002	Coos Bay	11N	155
62-15-35	81	ANAD	ANAD	Coos Bay	24/6/83	26/6/83	2	110	003	Coos Bay	11N	153
62-15-35	81	ANAD	ANAD	Coos Bay	24/6/83	26/6/83	2	111	003	Coos Bay	11N	159
62-15-35	81	ANAD	ANAD	Coos Bay	24/5/83	26/6/83	2	110	007	Coos Bay	11N	160
63-26-05	81	WDF	Lower Kalama	Columbia River	4/5/83	9/6/83	36	61	003	Ocean Release	28N	203
63-26-05	81	WDF	Lower Kalama	Columbia River	4/5/83	13/5/83	40	66	001	Willapa Bay	46N	210
63-26-32	81	WDF	Cowlitz	Columbia River	3/5/83	23/5/83	20	37	001	Nehalem	65S	134
63-26-45	81	WDF	Washougal	Columbia River	30/4/83	9/6/83	40	61	002	Ocean Release	28N	198

## ADULT COHO

05-10-62	80	TULA	Skykomish	Puget Sound	6/82	16/5/83	---	5	002	Watch Point	6S	370
07-24-56	80	ODFW	Salmon River	Salmon River	1/5/82	18/5/83	382	14	---	Destruction Island	293N	544
07-25-44	80	ODFW	Cole Rivers	Rogue River	29/4/82	22/5/83	388	34	001	Seaside	385N	440
60-05-33	81	OAF	OAF	Yaquina Bay	17/7/82	13/6/83	331	69	---	Grays Harbor	265N	400
63-23-34	80	WDF	(Wild)	Puget Sound	4/82-6/82	17/5/83	---	13	---	Destruction Island	80S	435
63-23-34	80	WDF	(Wild)	Puget Sound	4/82-6/82	16/5/83	---	5	001	Watch Point	6S	392
63-24-45	80	WDF	Cowlitz	Columbia River	5/82	17/5/83	---	8	002	Sea Lion Rock	195N	394
63-25-29	80	WDF	Washougal	Columbia River	5/82	9/6/83	---	61	---	Ocean Release	28N	466

## CHINOOK JUVENILES

05-11-22	81	FWS	Quinalt	Quinalt River	3/5/83	15/6/83	43	75	001	Sea Lion Rock	72 N	238
05-13-39	81	YAKI	Leavenworth	Columbia River	18-22/4/83	21/5/83	31	30	001	Cape Disappointment	9 N	152
07-25-47	81	ODFW	Bonneville	Columbia River	23-31/3/83	17/5/83	51	8	001	Sea Lion Rock	195 N	254
07-28-36	82	ODFW	Round Butte	Columbia River	24/5-13/6/83	12/6/83	0-19	63	001	Willapa Bay	48 N	124
10-23-18	81	IDFG	Rapid River	Columbia River	18/3/83	20/5/83	63	26	001	Willapa Bay	46 N	158
10-24-58	81	IDFG	McCall	Columbia River	4-7/4/83	23/5/83	48	39	002	Nehalem	63 S	146
63-25-05	81	WDF	Cowlitz	Columbia River	1/4/83	21/5/83	50	28	003	Cape Disappointment	11 N	255
63-25-09	81	WDF	Cowlitz	Columbia River	1/4/83	21/5/83	50	28	001	Cape Disappointment	11 N	254
63-26-09	81	WDF	Cowlitz	Columbia River	1/4/83	23/5/83	50	28	002	Cape Disappointment	11 N	254

