

FISH COMMISSION OF OREGON
TRAWL INVESTIGATION

Report of Cruise 67-2, Shrimp Survey, Phase B-Fish

Vessel: MV Sunrise, chartered trawler.

Date: February 20-May 4, 1967

Objectives: Phase A. To determine distribution and abundance of pink shrimp (Pandalus jordani) off Oregon and determine size, sex ratio, and age composition of shrimp caught.

Phase B. 1. To collect data on sex and size composition of Dover sole.

2. To identify, count, and weigh incidentally caught fish.

3. To collect incidentally caught fishes and invertebrates as requested.

4. To collect oceanographic data (salinities, temperatures, and bottom-type samples).

Methods:

The 60-foot vessel towed a 41-foot headrope Gulf semi-balloon trawl. The trawl was made of 1-1/8-inch stretch mesh netting in the body and intermediate, with 1-1/2-inch mesh in the cod end. The anterior one-third of the cod end contained a 1-1/8 half-inch innerliner, while the posterior two-thirds of the cod end had a 1/2-inch knotless innerliner. Plastic rollers and 1/4-inch galvanized chains, hung loop style, were attached to the 52-foot footrope. A 49-foot, 5/16-inch steel tickler chain completed the net which was attached to the otter boards by a 30-foot bridle.

The catch from each tow was sorted to species and fish were weighed and, if time permitted, counted. Dover sole were sexed and measured to the nearest lower cm except that those less than 16 cm in length were preserved. Unique and requested fish and invertebrate species were preserved as time permitted. A number of bottom-type samples, salinities, and temperatures were collected.

Results:

The survey of the Oregon coastal waters was divided into five areas: (1) Oregon-California border to Cape Blanco; (2) Cape Blanco to Umpqua River; (3) Umpqua River to lower Heceta Bank (44° 02' N Latitude); (4) Stonewall Bank (44° 20' N. Latitude) to Cape Kiwanda; and (5) Cape Kiwanda to Columbia River. A total of 173 tows were made. In area 1, 26 tows were made in 46 to 138 fathoms. Area 2 had 35 tows made in 50 to 132 fathoms. In area 3, 19 tows were made in 54 to 126 fathoms. Area 4 had 38 tows made in 50 to 125 fathoms. In area 5, 55 tows were made in 49 to 123 fathoms. No tows were made on Heceta Bank because of rough bottom.

Each tow is summarized in Table 1 as to tow data and pounds of catch. Weights are listed for petrale, English, and Dover sole and Pacific ocean perch. Other species were grouped into rockfish, flatfish, round fish, and miscellaneous fish. Table 2 lists the species caught in each group. Figure 1 shows tow locations by area.

Area 1. Rex and slender sole were the most commonly caught species and occurred at depths of 40-100 fathoms. Next in prominence were Dover sole and stripetail rockfish. Dover sole was commonly caught at 80-100 fathoms while stripetail rockfish occurred at depths of 60-80 fathoms and greater than 100 fathoms.

Area 2. The most commonly caught species was rex sole which occurred in depths of 50 to greater than 100 fathoms. Other prominent species were tomcod caught in 50 to 60 fathoms, slender sole caught in 60 to 100 fathoms, smelt caught in 60 to 80 fathoms, and sablefish caught in 80 to 100 fathoms. At depths greater than 100 fathoms, blackmouth rockfish was commonly caught.

Area 3. The most commonly caught species was slender sole, which was taken in depths of 60 to greater than 100 fathoms. Next in prominence was rex sole caught between 50 and 80 fathoms, and Dover sole at depths of 80 to 100 fathoms. Rockfish species were commonly caught at depths greater than 100 fathoms.

Area 4. Slender sole was the most commonly caught species, being found in depths of 60 to greater than 100 fathoms. Other commonly caught species were tomcod and sand dabs found in 50 to 60 fathoms, smelt and rex sole in 60 to 80 fathoms, and Dover sole caught at depths greater than 100 fathoms.

Area 5. Of the species caught, smelt and rex sole were the most common and were found in 60 to 100 fathoms. Sand dabs and tomcod were caught in 50 to 60 fathoms. Sablefish, Dover sole, and Pacific ocean perch were prominent in depths of 80 to greater than 100 fathoms.

Personnel: Jack Robinson, Party Chief, 2/20-3/19, 3/29-5/2/67
 Robert Demory, Party Chief, 3/20-3/28, 5/3-4/67
 Rudy Lovvold, Vessel Captain
 Gary Milburn, Biologist, 2/20-5/4/67
 Roland Montagne, Biologist, 2/25-26/67
 Terry Link, Biologist, 2/20-23/67
 Robert Thompson, Trainee, 4/2-11/67
 Tom Lovvold, Crewman

Distribution:

Schoning & Weberg
 Commissioners - 3
 Portland Main File
 Clackamas File - 2
 Dayton L. Alverson
 FRBC - Nanaimo
 Dr. Wm. McNeil
 WDF - Olympia

Astoria Charleston
 Brookings Meehan
 Loeffel Van Hyning
 Newport
 Harvey L. Moore
 Dr. Wm. Percy
 PMFC

Terry Link
 Oregon Fish Commission
 Research Division
 August 30, 1967

Table 1. Tow data and pounds of catch listed by station, cruise 67-2, phase B.

No.	Tow data				Catch in pounds								
	Depth (fms)	Time (min)	Loran		Pet. ^{1/}	Eng. ^{1/}	Dov. ^{1/}	P.O.P. ^{1/}	Rock- fish ^{2/}	Flat- fish ^{2/}	Round fish ^{2/}	Misc. fish ^{2/}	
			Start-End (2H4)	Start-End (2H5)									
1	56-58	15	1398-1405			4	T ^{3/}		T	55	31	32	
2	66-65	15	1395-1380				T			17	14	7	
3	103-102	18	1390-1400				T		1	56	6+	6	
4	51-50	15	1440-1430	2	5			2		14	35	116	
5	60-61	15	1430-1442				T		5	43	1	7	
6	75-80	15	1440-1450				T		31	28	22	16	
7	87-90	17	1475-1490						5	143	131	7	
8	65-71	15	1490-1495				T		7	50	5	18	
9	74	20	1527-1538			1	T			4	107	58+	17
10	110-114	16	1526-1532				T	2		35	41	8	2
11	60	17	1472-1482				T			12	103	15	9
12	62	18	1535-1542			1	T			8	320	19	5
13	54-57	10	1530-1522	2	2		T				52	2	28
14	56-58	10	1575-1568						T		5	41	13
15	53-55	12	1635-1641			1	T			T	53	6	10
16	66	12	1575-1565				T			T	15	13	T
17	72-77	15	1562-1565				T			2	68	45	10
18	65-66	10	1345-1350				1			30	4	T	16
19	102-105	11	1335-1330				1			2	12	T	1
20	97-98	10	1305-1300				T			1	6	T	5
21	84-92	15	1255-1249					4		4	T		5
22	86-89	6	1225-1229			1	T			1	9	T	2
23	132	15	1230-1240			6	1	31	47	44	79	5	1
24	82	15	1182-1178				2	T	3	8	5	2	29
25	56-54	10	1172-1178				1	T		1	18	8	4
26	102-103	10	1185-1190			10	38	10	41	109	130	15	11
27	50-51	10	1130-1138			1	2	T			24	20	16
28	68-69	15	1135-1132				1	T		7	18	17	5
29	83-82	15	1145-1149					T			22	25	61
30	80	10	1115-1118			15	1	11		184	120	9	6
31	73-74	10	1103-1106					T		12	7	11	6
32	59	15	1088-1083			3	2	1		T	16	22	42
33	79	10	1070-1067			2		1		9	6+	5	2

^{1/} Pet. = petrale sole; Eng. = English sole; Dov. = Dover sole; P.O.P. = Pacific ocean perch.

^{2/} See Table 2 for species composition.

^{3/} T = Trace, barely an observable amount, not enough to weigh, usually less than a pound.

Table 1. Tow data and pounds of catch listed by station, cruise 67-2, phase B (continued).

No.	Tow data				Catch in pounds							
	Depth (fms)	Time (min.)	Loran		Pet. ^{1/}	Eng. ^{1/}	Dov. ^{1/}	P.O.P. ^{1/}	Rock- fish ^{2/}	Flat- fish ^{2/}	Round fish ^{2/}	Misc. fish ^{2/}
			Start-End (2H4)	Start-End (2H5)								
34	110-106	10	1090-1090 (2H3)				11	6	99	12	54	19
35	51-55	15	1090-1088		2	6	5			33	29	70
36	67-69	16	1095-1091		1		15		54	35	2	43
37	79	13	1100-1105			2	1		26	22	4	10
38	89-86	10	1132-1136		1		1		18	20	3	2
39	60-62	15	1140-1130		1		1		6	56	7	10
40	51	15	1130-1135			3	1		1	98	5	29
41	52	15	1185-1178		3		1		1	74	8	25
42	60-62	13	1180-1175		2	2	1		1	30	3	11
43	73	15	1182-1187		9	3	10		118	66	16	37
44	52-53	15	1205-1200			1	T		1	20	27	3
45	120-135	6	1125-1125			2	8	7	19	14	4	1
46	93-97	15	1345-1351		4		67		50	26	7	11
47	62-63	10	1349-1355		T		1			7	2	2
48	79-85	11	1400-1405				1		15	22	4	44
49	50-46	15	1390-1395		6	8	4		T	68	40	25
50	59-60	10	1440-1445			3	1		T	37	19	27
51	90-98	15	1438-1433			4	70		40	165	19	4
52	130-138	10	1480-1485				20	10	20	14	20	2
53	70	16	1478-1470		2		9		7	77	8	22
54	48-47	12	1520-1524		7	12	T		14	71	43	21
55	50-52	12	1608-1601		5	3	8		53	102	15	37
56	62-60	10	1602-1592		4				1	2	5	19
57	75	1	1600-1600									
58	84-81	10	1580-1576				1		29	56	5	20
59	64	10	1562-1557							15	51	1
60	51-49	10	1570-1562		1	2	2		T	61	4	1
61	62-64	10	1538-1545 (2H4)						1	49	10	1
62	110-108	14	1575-1582		1		17	14	7	42	19	T
63	120-126	10	1658-1660				23	19	17	24	23	T

^{1/} Pet. = petrale sole; Eng. = English sole; Dov. = Dover sole; P.O.P. = Pacific ocean perch.

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Table 1. Tow data and pounds of catch listed by station, cruise 67-2, phase B (continued).

No.	Tow data				Catch in pounds							
	Depth (fms)	Time (min.)	Loran		Pet.1/ ^{1/}	Eng.1/ ^{1/}	Dov.1/ ^{1/}	P.O.P.1/ ^{1/}	Rook- fish2/ ^{2/}	Flat- fish2/ ^{2/}	Round fish2/ ^{2/}	Misc. fish2/ ^{2/}
			Start-End (2H4)	Start-End (2H5)								
64	68-71	15	1665-1672			4	8		189	26		2
65	58-60	15	1658-1655	3382-			4		T	78	2	4
66	55-57	15	1657-1660	-3385			2	1	1	43	3	2
67	55-54	15	1712-1705			4	5			9	1	9
68	62-59	17	1700-1707				3		26	37		3
69	67	15	1710-1714				3		26	T	T	T
70	108-112	15	1705-1710				26	5	16	32	32	T
71	105-106	15	1738-1745				26	18	35	73	18	35
72	71-72	15	1745-1750						7	1		
73	57	10	1759-1765	3390-3390		1	4		T	55	1	8
74	57	10	1786-1790	3384-		2	15		11	59	T	25
75	65-68	10	1780-1778	3375-	5	4	16		39	121		4
76	101-106	11	1779-1781				3	5	48	27	4	8
77	98	13	1815-1810	3365-3365			40	35	7	32	5	26
78	88-87	10	1825-1830	3368-3368	2		140	21	42	77	T	13
79	73-74	10	1820-1825	3377-		4	12	T	T	136	12	T
80	70-71	10	1868-1875	3370-3370	2		15	2	9	55	T	15
81	84-85	12	2342-2332				10		14	54	13	2
82	80-75	10	2301-2297				20		9	31	3	8
83	75	16	2260-2251			4	6		1	63		1
84	95-100	10	2205-2208	3362-3360			3		T	2		
85	82-84	12	2160-2158	3360-3361		3	12		4	42	3	2
86	110-102	10	2222-2116	3352-3352		1	10	5	6	23	1	3
87	67-69	10	2129-2130	3359-3358		4	4	3	3	80	3	3
88	55-56	8	2130-	3365-								
89	74-76	14	2222-2230	3378-3378		10	5		4	62		11
90	61-65	15	2390-2395	3400-3400		5	4		2	50	25	12
91	51-52	15	2388-2390	-3409		1				14	6	
92	65	15	2440-2448	3405			1		T	66	18	11
93	70	15	2450-2455	3402-			7		35	93	30	12
94	86-88	18	2438-2450	3392-3392			13		5	84	10	3
95	123-125	16	2440-2448	3385-3385			44	22	23	35	20	4

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Table 1. Tow data and pounds of catch listed by station, cruise 67-2, phase B (continued).

No.	Tow data				Catch in pounds							
	Depth (fms)	Time (min.)	Loran		Pet.1/	Eng.1/	Dov.1/	P.O.P.1/	Rock- fish2/	Flat- fish2/	Round fish2/	Misc. fish2/
			Start-End (2H4)	Start-End (2H5)								
96	115-110	15	2479-2479	3390-3391			43	8	38	55	5	5
97	96-94	20	2474-2468	3396-3396			24	3	77	46	4	2
98	79	15	2480-2472	3405-3405	3		2		T	75	25	7
99	69	16	2478-2470	3412			3		14	51	7	35
100	55	19	2480-2470	3420-3420		4	T			18	24	3
101	62-66	15	2527-2534	-3420	3		3		6	38	27	7
102	76	15	2530-2538	3412-3412	3		7		2	84	16	2
103	86-85	16	2527-2519	3405-3405			5		5	28	T	2
104	110-117	17	2515-2521	3395-3395			29	19	15	58	5	9
105	96-91	15	2562-2555	3407-	2		11	17	9	16	13	16
106	86	15	2570-2562	3413-3413			4	4	2	35	T	9
107	69-70	15	2586-2592	3422-3422	4		1		1	64	56	4
108	51-50	16	2618-2610	-3432		3				29	22	T
109	74-75	16	2610-2620	3422-	1		1		13	70	40	4
110	102-107	17	2637-2642	3415-			25	23	11	46	10	1
111	81	18	2655-2650	3426-3426			10		13	48	12	T
112	58	16	2662-2668	3434-3434	T	8	T			21	9	1
113	61	20	2700-2709	3435-3435	1	5	14		5	32	103	20
114	86-90	20	2690-2701	3425-3425			20	47	7	50	2	12
115	107-104	18	2700-2712	3420-3420			17	12	24	21	5	T
116	103-104	17	2742-2750	3420-			44	37	66	28		5
117	88	15	2750-2755	3429-3430	5		155	26	22	106	5	8
118	60	16	2740-2750	3435-3435	10	5	9		T	72	10	4
119	58-60	17	2842-2847	3442-	3	6	6		T	29	14	4
120	58	15	2806-2798	3440-	4	5	1			18	39	T
121	89	17	2802-2806	3430-3430			45	64	4	45	6	4
122	90-91	15	2838-2842	3433-3433			4	8	2	29	1	1
123	120-115	18	2850-2854	3424-3423			16	82	67	26	176	
124	98-97	16	2890-2895	3426-			8	31	28	26	53	T
125	94	15	2933-2938	3426-				3	408	7	90	2
126	85	16	2940-2933	3435-3435	3	1	2	T	T	40	8	1

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Table 1. Tow data and pounds of catch listed by station, cruise 67-2, phase B (continued).

No.	Tow data				Catch in pounds							
	Depth (fms)	Time (min.)	Loran		Pet. 1/	Eng. 1/	Dov. 1/	P.O.P. 1/	Rock- fish 2/	Flat- fish 2/	Round fish 2/	Misc. fish 2/
			Start-End (2H4)	Start-End (2H5)								
127	85	16	2890-2882	3435-	4		3	1	7	21	25	T
128	62	12	2890-2886	3445-		3	1			17	30	6
129	60	10	2945-2950	3446-			3		T	11	7	7
130	60	12	2970-2965				2		T	25	11	4
131	85	17	2978-2972	3435-	2		6		2	25	15	12
132	95-96	16	2973-2968	3425-			9	T	1	13	90	T
133	49-50	16	3440-3435	3462-3462	3	1	3		5	10	120	14
134	52	16	3390-3385	3460-	2	3				9	1	T
135	57-59	17	3338-3332	3456-	1		7		16	8	161	4
136	62	16	3288-3282	3455-3455	9		13		4	72	33	30
137	65-66	15	3235-3230	3452-3452	1		18		1	79	9	23
138	51-52	15	3188-3182	3458-3458			1		T	6	2	T
139	69	17	3187-3192	3449-3449			2		1	13	20	11
140	69	16	3141-3136	3447-3447	2		6		9	49	14	16
141	51-50	10	3082-3079	3455-		2	T			6	8	2
142	74-73	11	3086-3090				2		192	8	2	43
143	86-88	15	3082-3076	3433-			T	T	1	3	10	2
144	100-106	11	3075-3070	3422-			27	2	2	9	2	T
145	114-115	17	3075-3068	3415-			25	78	13	36	29	
146	120-123	17	3138-3130	3402-			3	4	188	9	10	T
147	106-110	15	3142-3135	3417-	1		4	15	1	21	23	2
148	92-95	16	3140-3136	3425-			4	T		15	10	
149	65-75	0	3143-3143	3434-3434								
150	81-82	16	3188-3180	3440-			4		4	12	14	
151	86-87	12	3175-3170	3427-3427			8	T	16	3	32	T
152	97-99	12	3190-3186	3415-	2		18		2	27	30	6
153	101-103	15	3230-3225	3404-			3	15	341	16	5	T
154	91	16	3233-3238	3420-			4		1	19	10	13
155	86	17	3238-3229	3420-			1	T	1	25	10	4
156	83	14	3238-3233	3440-			1		1	18	16	4
157	78-80	15	3282-3277	3445-			7		10	19	66	T
158	74	13	3336-3340	3445-			5		8	34	36	3
159	64-66	16	3390-3398	3448-			17		14	52	78	8

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Table 1. Tow data and pounds of catch listed by station, cruise 67-2, phase B (continued).

No.	Tow data				Catch in pounds							
	Depth (fms)	Time (min.)	Loran		Pet. ^{1/}	Eng. ^{1/}	Dov. ^{1/}	P.O.P. ^{1/}	Rock- fish ^{2/}	Flat fish ^{2/}	Round fish ^{2/}	Misc. fish ^{2/}
			Start-End (2H4)	Start-End (2H5)								
160	64-63	10	3435-3438	3452-3452		1	4		3	10	31	1
161	55	16	3525-3522	3460-3460	7	2	2		110	7	35	9
162	60	15	3480-3475	3455-3455	5		6		15	16	119	6
163	71-72	15	3478-3472	3441-	2	1	6		14	28	36	7
164	68	15	3430-3425	3438-			10			25	41	11
165	72-73	16	3373-3368	3438-			5		7	49	24	12
166	78-79	15	3330-3336	3438-			5		5	41	19	4
167	80-81	16	3280-3277	3432-			1		25	20	159	1
168	86-88	14	3282-3286	3422-3422			3	T	1	38	25	13
169	89-90	20	3338-3344	3422-			6	3	52	29	26	6
170	83-85	15	3386-3381	3424-			1	1	12	4	129	
171	95-96	16	3375-3370	3410-			29	4	13	26	9	
172	80	15	3432-3438	3428-			4		3	5	11	T
173	78	15	3485-3480	3428-	3	3	11		3	9	12	1

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Table 2. Common and scientific names of fishes caught during the spring 1967 shrimp cruise.

Petrale sole	<u>Eopsetta jordani</u>
English sole	<u>Parophrys vetulus</u>
Dover sole	<u>Microstomus pacificus</u>
Pacific ocean perch	<u>Sebastes alutus</u>
Rockfishes:	
Rougheye rockfish	<u>Sebastes aleutianus</u>
Blackmouth rockfish	<u>S. crameri</u>
Splitnose rockfish	<u>S. diploproa</u>
Greenstriped rockfish	<u>S. elongatus</u>
Widowrockfish	<u>S. entomelas</u>
Yellowtail rockfish	<u>S. flavidus</u>
Rosethorn rockfish	<u>S. helvomaculatus</u>
Shortbelly rockfish	<u>S. jordani</u>
Boccaccio	<u>S. paucispinis</u>
Canary rockfish	<u>S. pinniger</u>
Redstripe rockfish	<u>S. proriger</u>
Yellowmouth rockfish	<u>S. reedi</u>
Raspehead rockfish	<u>S. ruberrimus</u>
Flag rockfish	<u>S. rubrivinct</u>
Stripetail rockfish	<u>S. saxicola</u>
Pygmy rockfish	<u>S. willsonii</u>
Sharpchin	<u>S. zacentrus</u>
Flatfishes:	
Pacific sanddab	<u>Citharichthys sordidus</u>
Arrowtooth flounder	<u>Atheresthes stomias</u>

Table 2. Common and scientific names of fishes caught during the spring 1967 shrimp cruise. (continued)

Rex sole	<u>Glyptocephalus zachirus</u>
Flathead sole	<u>Hippoglossoides elassodon</u>
Slender sole	<u>Lyopsetta exilis</u>
Roundfishes:	
Pacific herring	<u>Clupea harengus pallasii</u>
Northern anchovy	<u>Engraulis mordax</u>
Smelts	Osmeridae
Pacific cod	<u>Gadus macrocephalus</u>
Pacific hake	<u>Merluccius productus</u>
Pacific tomcod	<u>Microgadus proximus</u>
Walleye pollack	<u>Theragra chalcogrammus</u>
Sablefish	<u>Anoplopoma fimbria</u>
Lingcod	<u>Ophiodon elongatus</u>
Red Irish lord	<u>Hemilepidotus spinosus</u>
Miscellaneous fishes:	
Pacific hagfish	<u>Polistotrema stouti</u>
Lampreys	Petromyzontidae
Spiny dogfish	<u>Squalus acanthias</u>
Big skate	<u>Raja binoculata</u>
Longnose skate	<u>R. rhina</u>
Starry skate	<u>R. stellulata</u>
Ratfish	<u>Hydrolagus colliei</u>
Hatchetfishes	Sternoptychidae
Lanternfish	Myctophidae
Shiner perch	<u>Cymatogaster aggregata</u>
Threadfin sculpin	<u>Icelinus filamentosus</u>

Table 2. Common and scientific names of fishes caught during the spring 1967 shrimp cruise. (continued)

Sea poacher	Agonidae
Snailfish	Cyclopteridae
Ronquils	Bathymasteridae
Eel pouts	Zoarchidae

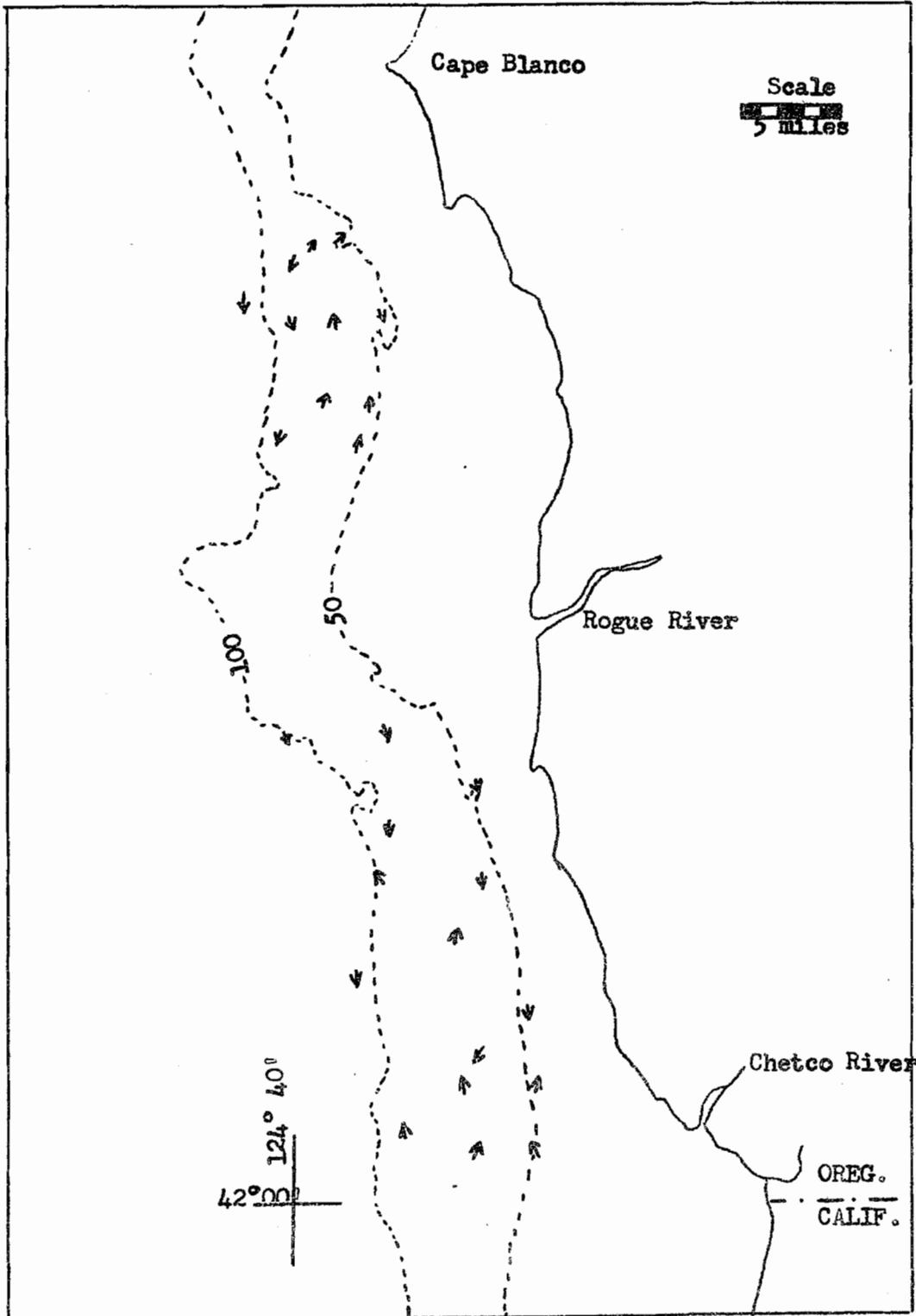


Figure 1. Area 1 tow locations.

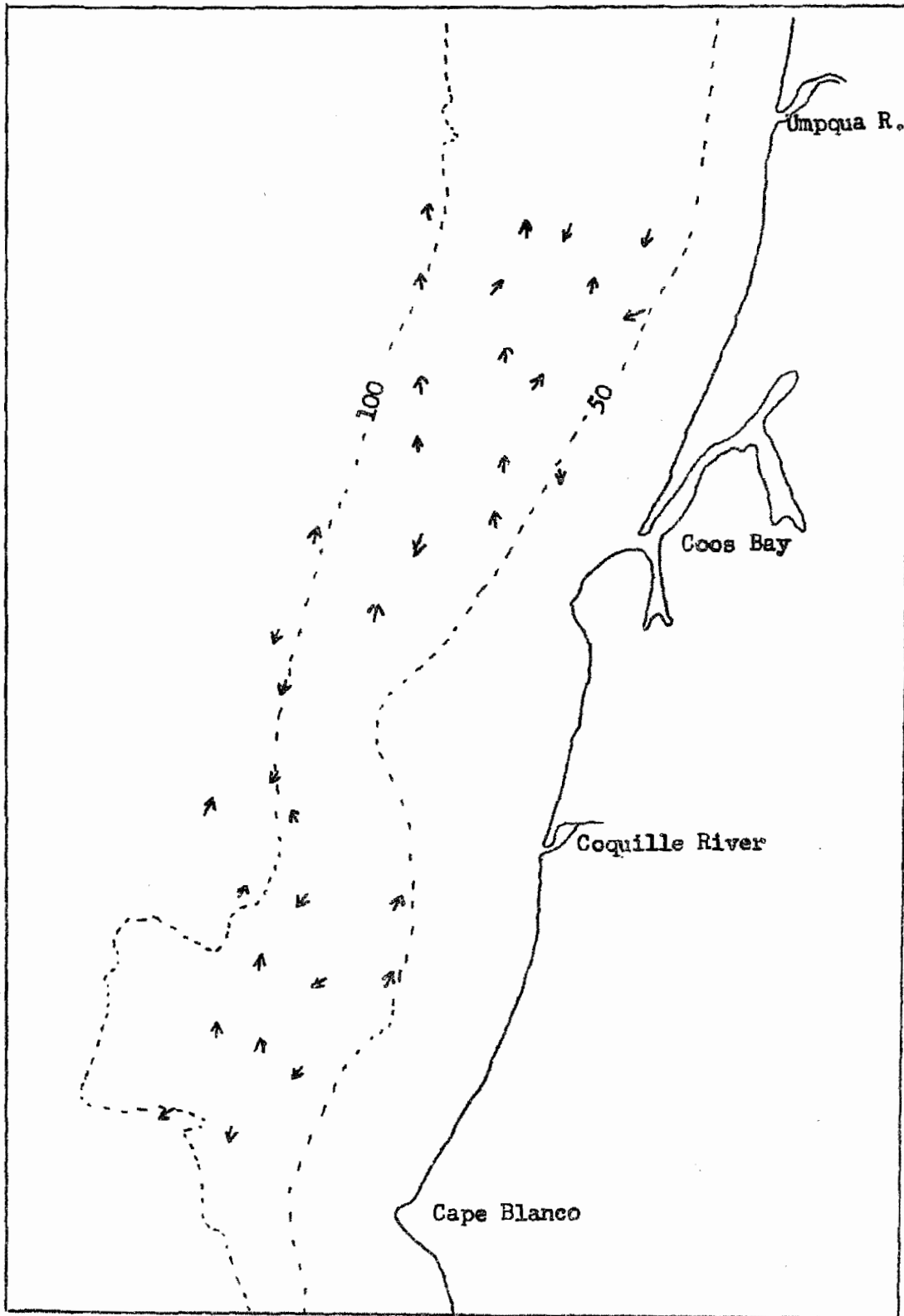


Figure 1 (continued). Area 2 tow locations.

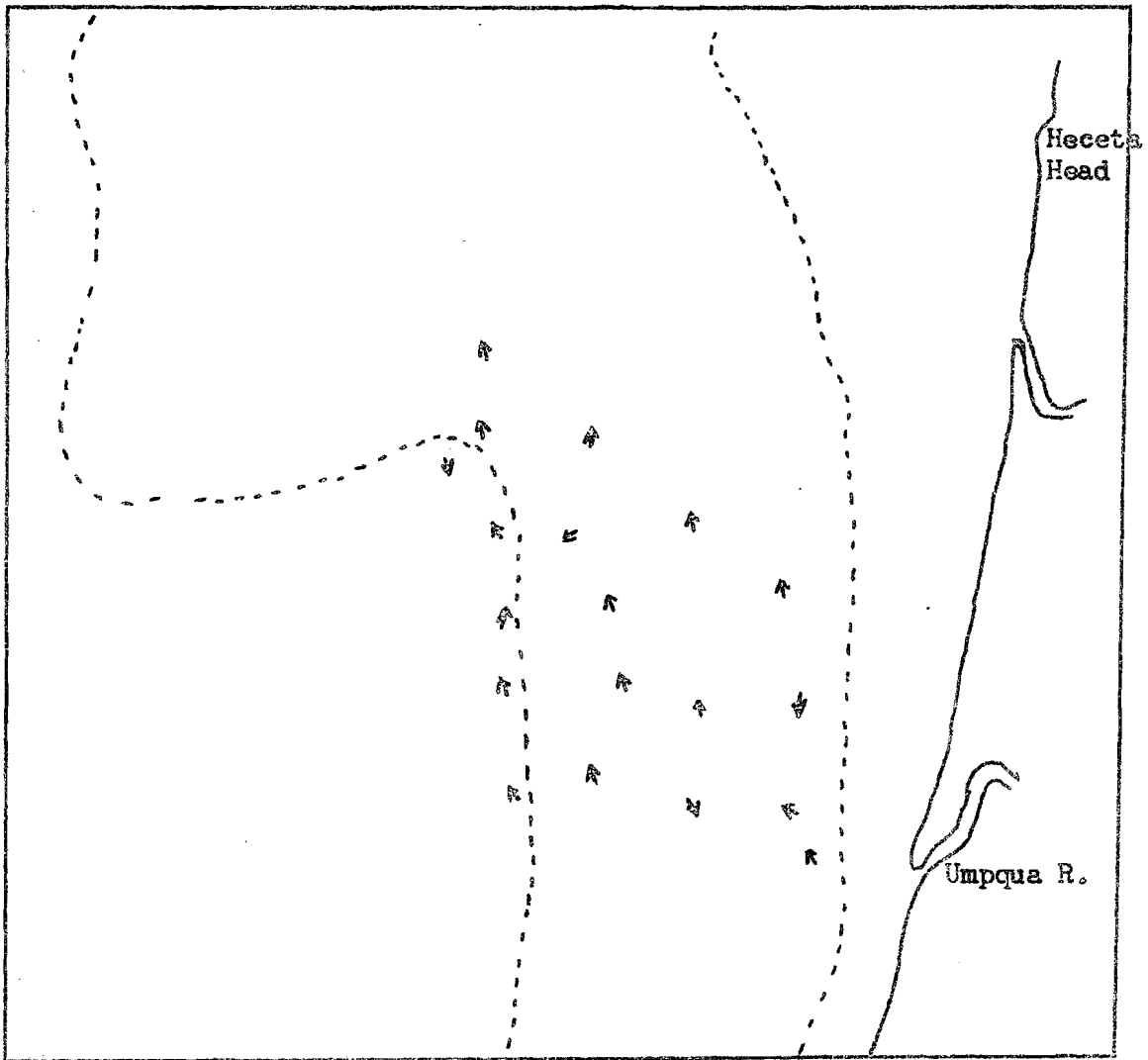


Figure 1 (continued). Area 3 tow locations.

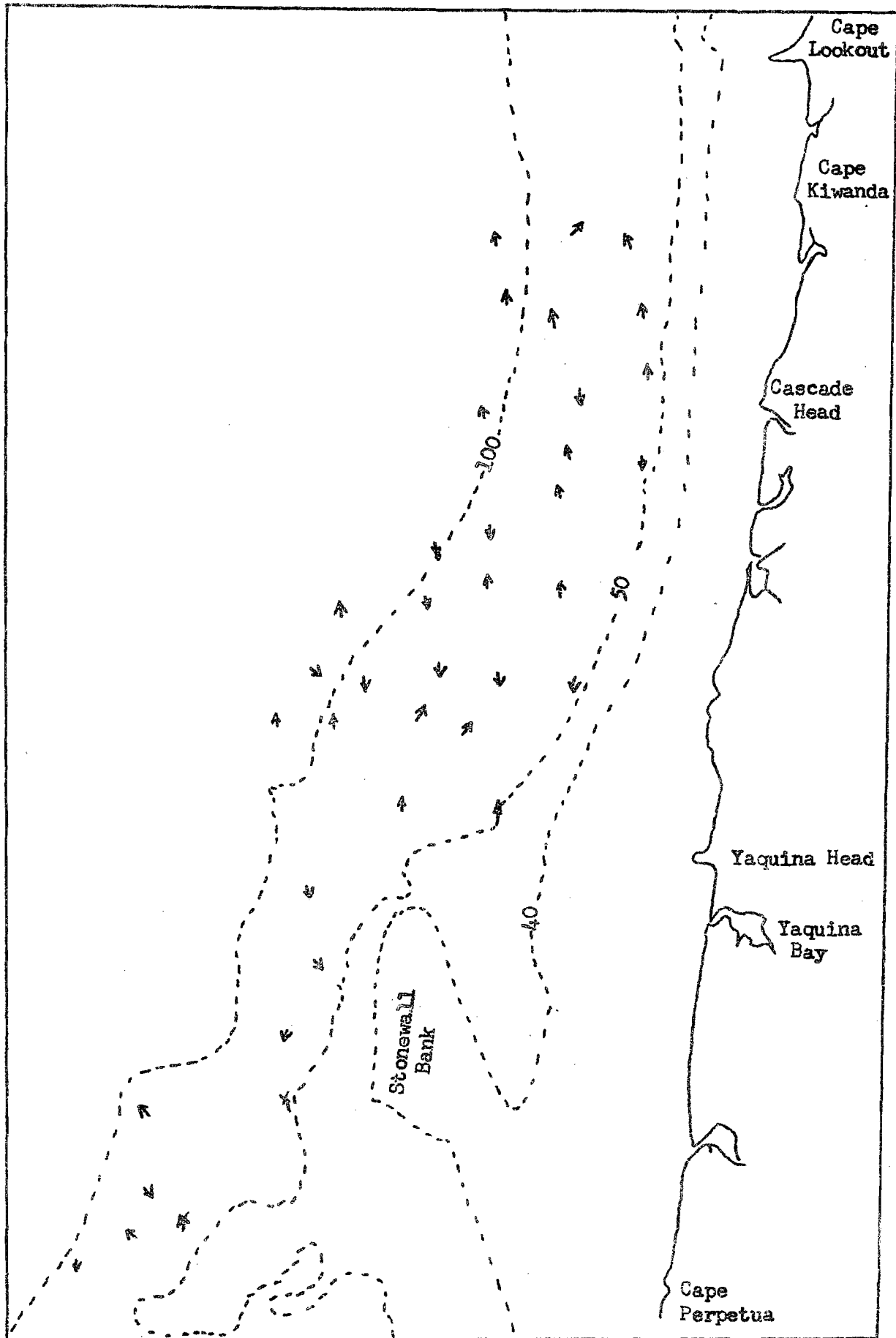


Figure 1 (continued). Area & tow locations.

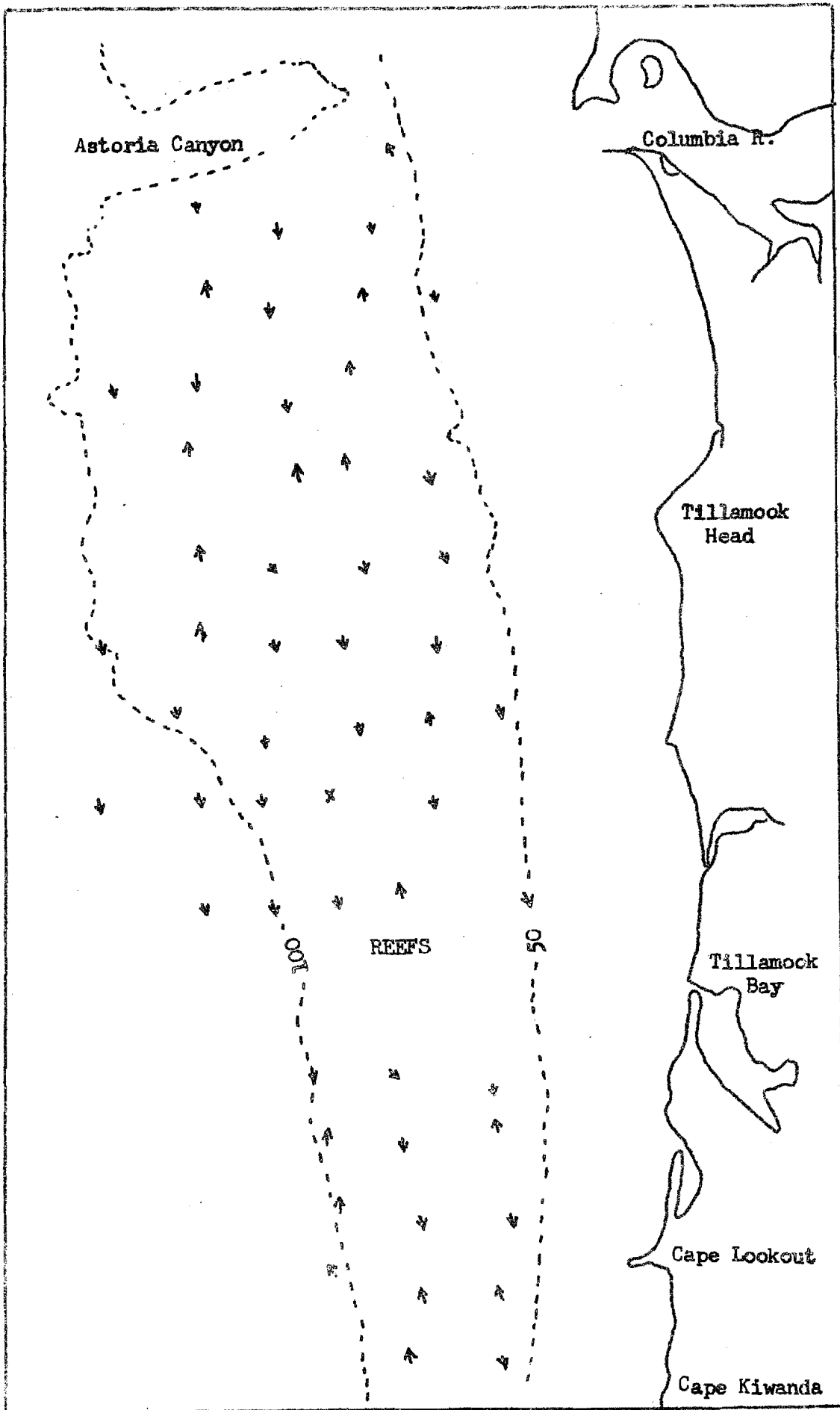


Figure 1 (continued). Area 5 tow locations.