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Midwater Trawl Tows and Catches Made on *G. B. Reed* Cruise GBR80-6, Dixon Entrance and North End Hecate Straits, June 4-24, 1980

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August 1981

MIDWATER TRAWL TOWS AND CATCHES MADE ON G.B. REED CRUISE

GBR80-6, DIXON ENTRANCE AND NORTH END HECATE STRAITS,

JUNE 4-24, 1980

by

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ABSTRACT

Barner, L. W., and F. H. C. Taylor. 1981. Midwater trawl tows and catches made on G.B. REED cruise GBR80-6, Dixon Entrance and north end Hecate Straits, June 4-24, 1980. Can. Data Rep. Fish. Aquat. Sci. 294: iv + 54 p.

This report gives the midwater catches, fishing positions, and biological sampling data obtained during G.B. REED cruise GBR80-6, June 4-24, 1980, Dixon Entrance and north end Hecate Straits. Tows were made to determine the distribution and abundance of walleye pollock (Theragra chalcogramma) and other fish stocks present.

Sex and length data were obtained for herring, yellowtail rockfish (Sebastes flavidus), and sablefish.

Key words: Marine fish, catch composition, walleye pollock, distribution and abundance, Dixon Entrance, north end Hecate Straits.

RÉSUMÉ

Barner, L. W., and F. H. C. Taylor. 1981. Midwater trawl tows and catches made on G.B. REED cruise GBR80-6, Dixon Entrance and north end Hecate Straits, June 4-24, 1980. Can. Data Rep. Fish. Aquat. Sci. 294: iv + 54 p.

Le présent rapport fournit les données sur les prises des chaluts pélagiques, les lieux de pêche et l'échantillonnage biologique, qui ont été recueillies lors de l'expédition GBR80-6 du G.B. REED, du 4 au 24 juin 1980 dans l'entrée Dixon et l'extrémité nord du détroit d'Hécate. On a effectué des chalutages pour déterminer la répartition et l'abondance de la morue du Pacifique occidental (Theragra chalcogramma) et des autres stocks de poisson peuplant ces eaux.

On a également collecté des données sur le sexe et la longueur des harengs, des sébastes à queue jaune (Sebastodes flavidus) et des morues charbonnières.

Mots-clés: poissons de mer, composition des prises, morue du Pacifique occidental, répartition et abondance, entrée Dixon, extrémité nord du détroit d'Hécate.

INTRODUCTION

In June 1980 an acoustic survey was carried out in Dixon Entrance by the C.G.S. G.B. REED to determine the distribution and abundance of walleye pollock and other fish stocks present. These stocks were primarily; walleye pollock (Theragra chalcogramma), Pacific herring (Clupea harengus pallasi), yellowtail rockfish (Sebastes flavidus), and sablefish (Anoplopoma fimbria).

SURVEY METHODS

Echo sounding was carried out at 9 kn following the grid of transect lines (Fig. 1-2) covering the whole of Dixon Entrance including the banks and gullies. Some survey lines were run off the west coast of Graham Island and in the northern end of Hecate Straits. Loran "C" was used to determine vessel position. During this survey, midwater trawl tows were made to identify the major species of fish in the main sound scattering layers (Fig. 3).

NETS AND FISHING GEAR

Only one type of net was used on this cruise, an Engel midwater trawl fished with 40-fm, 5/8-in bridles and 3 m^2 Süberkrüb otter boards. The forepart of the net was 434, 16-in meshes in circumference, the net tapered to a codend of double 1 1/2-in web. The codend had a 1-in liner.

The depth of the net was determined by a headline transducer connected by a cable to an Elac netsounder operating at 30 kHz.

SAMPLING METHODS

The catch from each tow was brought aboard and sorted by species into galvanized tubs with perforated bottoms to release water. Six tubs of each species were weighed on a beam balance and the remainder of the tubs counted. Also, any incomplete or partially filled tubs were weighed for each species. The average weight of the six tubs weighed was raised by the total number of tubs of that species to obtain a total estimated weight for the species.

The main sampling effort was devoted to pollock and herring. Pectoral fins were taken from 1,187 pollock, 1,767 were measured for stage of maturity and round undressed weight was taken on 471 individuals.

Six hundred and two herring were measured, scales taken for age determination, and stage of maturity determined.

Table 1 presents a complete summary of species sampled, type of sample taken, and numbers of specimens examined.

This report contains length and sex data for the following species:

Walleye pollock	Appendix Table 1
Pacific herring	Appendix Table 2
Yellowtail rockfish	Appendix Table 3
Sablefish	Appendix Table 4

Fork length was measured in rockfish and pollock to the nearest centimeter. In herring, the length to the end of the silvery area of the caudal peduncle was measured to the nearest millimeter.

CATCH COMPOSITION

Twenty-four tows were made, all by midwater trawl. Table 2 contains a list of scientific and common names of species captured.

Walleye pollock dominated the catches accounting for 3,434.1 kg or 51.9% by weight of the total midwater catch (Table 3). They appeared in 17 of the 24 tows. Pacific herring ranked second accounting for 2,340.9 kg or 35.4% of the catch and were present in 7 tows. Yellowtail rockfish (Sebastes flavidus) was third with 425.8 kg or 6.4% of the catch and were in 7 tows.

Of the total walleye pollock catch by weight, 55.8% were located in Hecate Straits, while in Dixon Entrance, Dundas Island, and Two Peaks area had 40.7% of the walleye pollock catch with 3.5% scattered over the rest of the survey area.

Hecate Straits contained 73% of all the herring caught, mainly off Warrior Rocks while the Two Peaks area of Dixon Entrance contain 27%. Herring were "seen" along the 50 fm edges in McIntyre Bay, Rose Spit, and in Hecate Straits off Warrior Rocks and Browning Entrance.

Ninety-seven point seven percent of the yellowtail rockfish (Sebastes flavidus) caught were found in the Dundas Island-Two Peaks area of Dixon Entrance.

Individual round weights were taken from 471 pollock. The total average weights for male and female pollock by centimeter length group are shown in Table 5.

Fifty-six individual weights were taken on yellowtail rockfish (Sebastes flavidus) and these are shown in Table 6.

Sexual maturity was determined on 602 herring (Table 7) using the stages defined in Table 8. Combining males and females in all areas 3.0% were immature, 3.3% had not spawned and were maturing, 93.6% were spents or recovering spents, only in 0.1% reabsorption was evident.

Detailed tables (Tables 9, 10) show the time, location, and catches (kg) of midwater trawl tows made in Dixon Entrance and northern Hecate Straits on cruise GBR80-6, June 4-24, 1980.

The results and the acoustic surveys will be discussed elsewhere.

ACKNOWLEDGMENTS

The co-operation and assistance of Captain Jim Liston and the crew of the C. G. S. G. B. REED are most gratefully acknowledged. Ingrid Miller prepared the figures for this report.

Table 1. Summary of species sampled, type of sample, and number of specimens examined on G.B. REED cruise, GBR80-6, June 4-24, 1980.

Species	Tow no.	Type of net	Length	No. of fish measured	
				Sex	
				M	F
Pollock	1	Midwater	362	221	141
Pollock	2	Midwater	323	175	148
Pollock	3	Midwater	62	24	38
Pollock	5	Midwater	37	18	19
Pollock	6	Midwater	13	4	9
Pollock	8	Midwater	72	37	35
Pollock	9	Midwater	225	114	111
Pollock	10	Midwater	245	134	111
Pollock	11	Midwater	25	4	21
Pollock	12	Midwater	8	1	7
Pollock	13	Midwater	12	1	11
Pollock	16	Midwater	16	8	8
Pollock	19	Midwater	201	103	98
Pollock	20	Midwater	50	17	33
Pollock	23	Midwater	116	54	62
Total	15		1767	915	852
Herring	5	Midwater	101	58	43
Herring	18	Midwater	100	48	52
Herring	20	Midwater	100	43	57
Herring	21	Midwater	101	58	43
Herring	22	Midwater	100	44	56
Herring	24	Midwater	100	56	44
Total	5		602	307	295
<u>S. flavidus</u>	5	Midwater	9	9	-
<u>S. flavidus</u>	9	Midwater	56	47	9
<u>S. flavidus</u>	10	Midwater	124	93	31
Total	3		189	149	40
Sablefish	21	Midwater	48	15	18
Sablefish	22	Midwater	163	96	67
	2		211	111	85
Dogfish	23	Midwater	23	10	23

Table 1 (cont'd)

Species	Tow no.	Body weight	Maturity	Age	Stomach	Sampling remarks
Pollock	1	200	200	200	-	4 of 21 tubs
Pollock	2	126	323	200	-	5 of 15 tubs
Pollock	3	-	62	-	-	total sample
Pollock	5	-	37	-	-	total sample
Pollock	6	-	13	-	-	total sample
Pollock	8	-	72	-	-	total sample
Pollock	9	60	225	225	-	4 of 7 tubs
Pollock	10	41	245	245	-	4 of 11 tubs
Pollock	11	-	25	-	-	total sample
Pollock	12	-	8	-	-	total sample
Pollock	13	-	12	-	-	total sample
Pollock	16	-	16	-	-	total sample
Pollock	19	44	201	201	-	3 of 8 tubs
Pollock	20	-	50	-	-	total sample
Pollock	23	-	116	116	-	total sample
Total	15	471	1605	1187		
Herring	5	-	101	101		random sub-sample
Herring	18	-	100	100	-	random sub-sample
Herring	20	-	100	100	-	random sub-sample
Herring	21	-	101	101	-	random sub-sample
Herring	22	-	100	100	-	random sub-sample
Herring	24		100	100	-	random sub-sample
Total	5	-	602	602	-	
<u>S. flavidus</u>	5	-	-	-	-	total sample
<u>S. flavidus</u>	9	56	-	-	-	total sample
<u>S. flavidus</u>	10	-	-	-	-	total sample
Total	3	56	-	-	-	
Sablefish	21	-	-	-	-	total sample
Sablefish	22	-	-	-	-	total sample
Total	2	-	-	-	-	
Dogfish	23	-	-	-	23	total sample

Table 2. Scientific and common names of species captured.

Common name	Scientific name
Spiny dogfish	<u>Squalus acanthias</u>
Longnose skate	<u>Raja rhina</u>
Pacific herring	<u>Clupea harengus pallasi</u>
Chinook salmon	<u>Oncorhynchus tshawytscha</u>
Eulachon	<u>Thaleichthys pacificus</u>
Pacific viperfish	<u>Chauliodus macouni</u>
Lanternfish	Family Myctophidae
Pacific cod	<u>Gadus macrocephalus</u>
Walleye pollock	<u>Theragra chalcogramma</u>
Eelpout	Family Zoarcidae
Pacific Ocean perch	<u>Sebastes alutus</u>
Silvergray rockfish	<u>Sebastes brevispinis</u>
Sablefish (blackcod)	<u>Anoplopoma fimbria</u>
Yellowtail rockfish (greenies)	<u>Sebastes flavidus</u>
Arrowtooth flounder (turbot)	<u>Atheresthes stomias</u>
Pacific halibut	<u>Hippoglossus stenolepis</u>
Rock sole	<u>Lepidopsetta bilineata</u>
English sole	<u>Parophrys vetulus</u>

Table 3. Total catch by principal species, G.B. Reed Cruise GBR80-6, June 4-24, 1980.

Species	Kilograms	% of Total
Pollock	3434.1	51.88%
Herring	2340.9	35.36%
Yellowtail rockfish	425.8	6.43%
Sablefish	205.8	3.11%
Dogfish	53.5	0.81%
Turbot	39.7	0.60%
Glass shrimp	20.6	0.31%
Silvergray rockfish	16.0	0.24%
Eulachon	15.0	0.23%
Pacific Ocean perch	13.0	0.20%
Pacific cod	11.0	0.17%
Skate	10.0	0.15%
English sole	9.0	0.14%
Rock sole	8.0	0.12%
Halibut	8.0	0.12%
Lanternfish	6.7	0.10%
Chinook salmon	1.7	0.03%
Squid	TR	TR%
Eelpout	TR	TR%
Viperfish	TR	TR%
Total	6618.8	100.00%

Table 4. Total catch by species and area showing the percent by weight each area contributed to the total weight of each species.

Area	Tow no.	Pollock	Herring	Yellowtail Rockfish
Hecate Strait	1	1041.0	+	-
	2	707.0	-	-
	20	68.0	109.0	2.0
	21	-	533.0	-
	22	-	956.4	-
	23	100.3	-	-
	24	-	110.0	-
Total		1916.3	1708.4	2.0
Percent		55.8	73.0	0.5
Dundas Island, Two Peaks area	3	72.3	-	-
	4	-	-	-
	5	30.5	141.5	24.3
	8	69.5	-	7.5
	9	341.5	-	121.0
	10	509.5	-	249.5
	18	-	491.0	-
	19	375.0	-	13.5
Total		1398.3	632.5	415.8
Percent		40.7	27.0	97.7
Cape Chacon to Frederick Is.	6	17.0	-	8.0
	7	8.0	-	-
	11	36.0	-	-
	12	16.5	-	-
	13	18.0	-	-
	14	-	-	-
	15	4.0	-	-
	16	20.0	-	-
Total		119.5	-	8.0
Percent		3.5	-	1.9
Total weight		3434.1	2340.9	425.8

Table 5. Average body weight in grams of pollock by cm length group and sex, G.B. REED cruise GBR80-6, June 4-24, 1980.

Fork length cm	Round weight (grams)						
	Male						
28	215						
29	196	212	222	189	200	211	
30	225	261	245	235	250	259	307
31	278	262	256	280	272	307	247
32	319	313	297	289	268	279	299
33	344	357	343	329	308	357	345
34	334	341	417	337	395	312	395
35	424	340	399	401	424	468	391
36	488	441	341	408	349	461	457
37	482	385	357	498	459	391	490
38	391	440	473	565	458	463	504
39	495	534	555	628	475	531	544
40	642	557	579	718	496	624	448
41	659	520	536	616	644	712	592
42	628	601	726	648	730	623	748
43	652	813	716	781	702	630	745
44	740	696	743	630	750	748	749
45	936	808	825	824	856	796	880
46	870	901	849	850	786	774	862
47	975	914	1003	794	991	932	1035
48	1054	930	798	762	977	816	967
49	995	1116	972	995	1072	1009	873
50	1065	1066					
51	1064	1088	1017				
52	961	1157					
53	1224	1118	1214				
54	1282	1080	1029	1267			
55	1124	1408*	1278				
56	1505						
57	1425	1220					
58	1429	1277	1112	1489	1146	1518	
59	1297						

Table 5 (cont'd)

Fork length cm	Round weight (grams)		Average wt. per length group	No. of fish per length group
	Male	Female		
28			215	1
29			205	6
30			247	8
31	257		271	11
32	327		296	11
33			352	9
34	349		364	11
35	436		406	11
36	415	321	419	12
37			442	9
38	517		479	11
39			545	9
40			586	10
41			600	10
42			679	10
43	725		720	11
44			727	10
45			828	9
46	913		870	11
47			935	9
48			941	10
49			987	8
50			1066	2
51			1056	3
52			1059	2
53			1185	3
54			1165	4
55			1201	2
56			1505	1
57			1323	2
58			1329	6
59			1297	1

In pollock, the maturity stages encountered immature, resting, or recovering, with the exception of one ripe 55 cm 1408 gram fish. This weight was not used in the average weight/cm.

Table 5 (cont'd)'

Fork length cm	Round weight (grams)				Average wt. per length group	No. of fish per length group
	Female					
28					193	1
29					182	2
30					240	1
31					247	7
32					310	10
33	316	350	335	328	333	14
34	363	341	321		363	13
35					390	9
36	427				424	11
37	473				444	11
38					508	10
39	558	497			537	12
40	616				576	11
41					600	10
42					665	10
43					719	10
44					782	8
45					897	10
46					886	9
47					950	10
48					941	9
49	997	983			1001	12
50					1039	6
51					1219	1
52					1295	3
53					1290	1
54					1310	3
55					1299	3
56					1432	1
57					1288	5
58					1361	2
59					1375	3
60					1470	3
61					1769	2
62					1544	1
63					1562	1
64					0	0
65					0	0
66					1710	1

Table 6. Average body weight in grams of Sebastes flavidus by cm length group and sex, G.B. REED Cruise GBR80-6, June 4-24, 1980.

Table 6 (cont'd)

Fork length cm	Round weight (grams)		Average wt. per length group	No. of fish per length group
	Male			
44				
45			1394	3
46			1581	3
47			1732	8
48	1547	1734	1754	12
49			1842	10
50			1918	8
51			2153	3
52				
53				
54				
55				
56				
57				

Table 6 (cont'd)

Fork length cm	Round weight (grams)		Average wt. per length group	No. of fish per length group
	Female			
44	1314		1314	1
45				
46				
47				
48	1646	1840	1743	2
49				
50				
51	2013		2013	1
52	2165	2117	2141	2
53				
54	2426		2426	1
55	2638		2638	1
56				
57	2657		2657	1

Table 7. Herring maturity. Number of fish sampled in each maturity stage by sex on cruise GBR80-6, Dixon Entrance, Northern Hecate Strait, June 4-24, 1980.

Haul no.	I	Male maturity stages								Re-absorb
		II	III	IV	V	VI	VII	VIII		
5	0	11	0	0	6	0	17	25	0	
18	0	2	0	0	1	0	22	23	0	
20	0	0	0	0	0	0	4	39	0	
21	0	0	0	0	0	0	15	43	0	
22	0	0	0	0	0	0	6	38	0	
24	0	1	0	0	0	0	4	51	0	
Total	0	14	0	0	7	0	68	219	0	
Percent*	0	4.5	0	0	2.3	0	22.1	71.1	0	

*The percentage each maturity stage formed of the total
Note: for maturity condition code, see Table 8.

Table 7 (cont'd)

Haul no.	Female maturity stages								Re-absorb
	I	II	III	IV	V	VI	VII	VIII	
5	0	3	1	6	0	0	23	9	0
18	0	0	0	3	0	0	38	11	0
20	1	0	0	0	0	0	20	36	0
21	0	0	1	1	0	0	17	24	0
22	0	0	1	0	0	0	35	19	1
24	0	0	0	0	0	0	22	22	0
Total	1	3	3	10	0	0	155	121	1
Percent*	0.3	1.0	1.0	3.4	0	0	52.7	41.2	0.3

*The percentage each maturity stage formed of the total
 Note: for maturity condition code, see Table 8.

Table 8. Definition of maturity stages.

Stages	Hjort International	Herring	Description
I		Imm.	Virgin individuals. Very small sexual organs close under vertebral column. Female wine-coloured torpedo-shaped ovaries about 2-3 cm long and 2-3 mm thick. Eggs invisible to naked eye. Male whitish or greyish brown knife-shaped testes 2-3 cm long and 2-3 mm broad.
II		<1/4	Maturing virgins or recovering spents. Ovaries somewhat longer than half the length of ventral cavity, about 1 cm diam. Eggs small but visible to naked eye. Milt whitish, somewhat bloodshot, same size as ovaries, but still thin and knife-shaped.
III			Sexual organs more swollen, occupying about half of ventral cavity.
IV			Ovaries and testes nearly filling 2/3 of ventral cavity. Eggs not transparent, milt whitish swollen.
V		3/4	Sexual organs filling ventral cavity. Ovaries with some large transparent eggs. Milt white, not yet running.
VI		R & R R	Roe and milt running (spawning).
VII		Spt	Spents. Ovaries slack with residual eggs. Testes baggy, blood shot.
VIII		Spt +	Recovering spents. Ovaries and testes taking up the slack. No eggs visible. Testes empty.

Table 9. Species composition of G.B. REED, trawl catches, June 4-24, 1980.

Type of net	Midwater		Midwater		Midwater	
	Tow number	1	Tow number	2	Tow number	3
Total catch (kg)	1063.2		720.7		86.3	
Duration (min)	30		21		30	
	Wt	No	Wt	No	Wt	No
Arrowtooth flounder	12.2	4	12.0	6	8.0	1
English sole	-	-	-	-	-	-
Pacific halibut	-	-	-	-	-	-
Rock sole	-	-	-	-	-	-
<u>Sebastes alutus</u>	-	-	-	-	6.0	2
<u>S. brevispinis</u>	-	-	-	-	-	-
<u>S. flavidus</u>	-	-	-	-	-	-
Chinook salmon	-	-	0.2	1	-	-
Eelpout	-	-	-	-	-	-
Eulachon	-	-	Tr	1	-	-
Lanternfish	-	-	-	-	-	-
Pacific cod	-	-	-	-	-	-
Pacific herring	Tr	2	-	-	-	-
Pacific viperfish	-	-	-	-	-	-
Sablefish	-	-	1.5	1	-	-
Walleye pollock	1041.0	1907	707.0	900	72.3	62
Longnose skate	10.0	1	-	-	-	-
Spiny dogfish	-	-	-	-	-	-
Squid	-	-	-	-	-	-
Glass shrimp	-	-	-	-	-	-

*Tr = trace <0.5kg

Table 9 (cont'd)

Type of net	Midwater		Midwater		Midwater	
Tow number	4		5		6	
Total catch (kg)	0		199.3		25.0	
Duration (min)	30		30		45	
	Wt	No	Wt	No	Wt	No
Arrowtooth flounder	-	-	Tr	I	-	-
English sole	-	-	-	-	-	-
Pacific halibut	-	-	-	-	-	-
Rock sole	-	-	-	-	-	-
<u>Sebastes alutus</u>	-	-	-	-	-	-
<u>S. brevispinis</u>	-	-	-	-	-	-
<u>S. flavidus</u>	-	-	24.3	9	8.0	2
Chinook salmon	-	-	-	-	-	-
Eelpout	-	-	-	-	-	-
Eulachon	-	-	-	-	-	-
Lanternfish	-	-	-	-	-	-
Pacific cod	-	-	-	-	-	-
Pacific herring	-	-	141.5	765	-	-
Pacific viperfish	-	-	-	-	-	-
Sablefish	-	-	3.0	1	-	-
Walleye pollock	-	-	30.5	37	17.0	13
Longnose skate	-	-	-	-	-	-
Spiny dogfish	-	-	-	-	-	-
Squid	-	-	-	-	-	-
Glass shrimp	-	-	-	-	-	-

Table 9 (cont'd)

Type of net	Midwater		Midwater		Midwater	
Tow number	7		8		9	
Total catch (kg)	30.0		77.5		463.0	
Duration (min)	53		33		31	
	Wt	No	Wt	No	Wt	No
Arrowtooth flounder	-	-	-	-	-	-
English sole	-	-	-	-	-	-
Pacific halibut	-	-	-	-	-	-
Rock sole	-	-	-	-	-	-
<u>Sebastes alutus</u>	7.0	2	-	-	-	-
<u>S. brevispinis</u>	-	-	-	-	-	-
<u>S. flavidus</u>	-	-	7.5	2	121.0	56
Chinook salmon	-	-	-	-	-	-
Eelpout	Tr	1	-	-	-	-
Eulachon	-	-	-	-	0.5	12
Lanternfish	2.0	-	-	-	-	-
Pacific cod	-	-	-	-	-	-
Pacific herring	-	-	-	-	-	-
Pacific viperfish	Tr	1	-	-	-	-
Sablefish	-	-	-	-	-	-
Walleye pollock	8.0	3	69.5	72	341.5	388
Longnose skate	-	-	-	-	-	-
Spiny dogfish	-	-	-	-	-	-
Squid	-	-	0.5	1	-	-
Glass shrimp	13.0	-	-	-	-	-

Table 9 (cont'd)

Type of net	Midwater		Midwater		Midwater	
Tow number	10		11		12	
Total catch (kg)	770.5		36.0		19.7	
Duration (min)	30		30		40	
	Wt	No	Wt	No	Wt	No
Arrowtooth flounder	0.5	1	-	-	-	-
English sole	-	-	-	-	-	-
Pacific halibut	-	-	-	-	-	-
Rock sole	-	-	-	-	-	-
<u>Sebastes alutus</u>	-	-	-	-	-	-
<u>S. brevisipinus</u>	11.0	2	-	-	-	-
<u>S. flavidus</u>	249.5	124	-	-	-	-
Chinook salmon	-	-	-	-	-	-
Eelpout	-	-	-	-	-	-
Eulachon	-	-	-	-	-	-
Lanternfish	-	-	-	-	3.2	-
Pacific cod	-	-	-	-	-	-
Pacific herring	-	-	-	-	-	-
Pacific viperfish	-	-	-	-	-	-
Sablefish	-	-	-	-	-	-
Walleye pollock	509.5	698	36.0	25	16.5	8
Longnose skate	-	-	-	-	-	-
Spiny dogfish	-	-	-	-	-	-
Squid	-	-	-	-	-	-
Glass shrimp	-	-	-	-	-	-

Table 9 (cont'd)

Type of net	Midwater		Midwater		Midwater	
Tow number	13		14		15	
Total catch (kg)	27.1		0		4.0	
Duration (min)	30		34		32	
	Wt	No	Wt	No	Wt	No
Arrowtooth flounder	-	-	-	-	-	-
English sole	-	-	-	-	-	-
Pacific halibut	-	-	-	-	-	-
Rock sole	-	-	-	-	-	-
<u>Sebastes alutus</u>	-	-	-	-	-	-
<u>S. brevispinis</u>	-	-	-	-	-	-
<u>S. flavidus</u>	-	-	-	-	-	-
Chinook salmon	-	-	-	-	-	-
Eelpout	-	-	-	-	-	-
Eulachon	-	-	-	-	-	-
Lanternfish	1.5	-	-	-	Tr	-
Pacific cod	-	-	-	-	-	-
Pacific herring	-	-	-	-	-	-
Pacific viperfish	-	-	-	-	-	-
Sablefish	-	-	-	-	-	-
Walleye pollock	18.0	12	-	-	4.0	4
Longnose skate	-	-	-	-	-	-
Spiny dogfish	-	-	-	-	-	-
Squid	-	-	-	-	-	-
Glass shrimp	7.6	-	-	-	-	-

Table 9 (cont'd)

Type of net	Midwater		Midwater		Midwater	
Tow number	16		17		18	
Total catch (kg)	20.0		0		494.0	
Duration (min)	39		31		51	
	Wt	No	Wt	No	Wt	No
Arrowtooth flounder	-	-	-	-	-	-
English sole	-	-	-	-	-	-
Pacific halibut	-	-	-	-	-	-
Rock sole	-	-	-	-	-	-
<u>Sebastes alutus</u>	-	-	-	-	-	-
<u>S. brevispinis</u>	-	-	-	-	3.0	1
<u>S. flavidus</u>	-	-	-	-	-	-
Chinook salmon	-	-	-	-	-	-
Eelpout	-	-	-	-	-	-
Eulachon	-	-	-	-	-	-
Lanternfish	-	-	-	-	-	-
Pacific cod	-	-	-	-	-	-
Pacific herring	-	-	-	-	491.0	2158
Pacific viperfish	-	-	-	-	-	-
Sablefish	-	-	-	-	-	-
Walleye pollock	20.0	16	-	-	-	-
Longnose skate	-	-	-	-	-	-
Spiny dogfish	-	-	-	-	-	-
Squid	-	-	-	-	-	-
Glass shrimp	-	-	-	-	-	-

Table 9 (cont'd)

Type of net	Midwater		Midwater		Midwater	
Tow number	19		20		21	
Total catch (kg)	404.0		217.0		568.3	
Duration (min)	40		27		10	
	Wt	No	Wt	No	Wt	No
Arrowtooth flounder	-	-			-	-
English sole	-	-	9.0	-	-	-
Pacific halibut	-	-	8.0	1	-	-
Rock sole	-	-	8.0	-	-	-
<u>Sebastes alutus</u>	-	-			-	-
<u>S. brevispinis</u>	-	-	2.0	1	-	-
<u>S. flavidus</u>	13.5	5	2.0	1	-	-
Chinook salmon	-	-			-	-
Eelpout	-	-			-	-
Eulachon	14.5	-			-	-
Lanternfish	-	-			-	-
Pacific cod	-	-	11.0	2	-	-
Pacific herring	-	-	109.0	703	533.0	-
Pacific viperfish	-	-			-	-
Sablefish	1.0	1			35.3	48
Walleye pollock	375.0	521	68.0	50	-	-
Longnose skate	-	-			-	-
Spiny dogfish	-	-			-	-
Squid	-	-			-	-
Glass shrimp	-	-	-	-	-	-

Table 9 (cont'd)

Type of net	Midwater		Midwater		Midwater	
Tow number	22		23		24	
Total catch (kg)	1123.9		158.3		111.5	
Duration (min)	16		21		30	
	Wt	No	Wt	No	Wt	No
Arrowtooth flounder	-	-	7.0	-	-	-
English sole	-	-	-	-	-	-
Pacific halibut	-	-	-	-	-	-
Rock sole	-	-	-	-	-	-
<u>Sebastes alutus</u>	-	-	-	-	-	-
<u>S. brevispinis</u>	-	-	-	-	-	-
<u>S. flavidus</u>	-	-	-	-	-	-
Chinook salmon	1.5	1	-	-	-	-
Eelpout	-	-	-	-	-	-
Eulachon	-	-	-	-	-	-
Lanternfish	-	-	-	-	-	-
Pacific cod	-	-	-	-	-	-
Pacific herring	956.4	5170	-	-	110.0	-
Pacific viperfish	-	-	-	-	-	-
Sablefish	165.0	163	-	-	-	-
Walleye pollock	-	-	100.3	116	-	-
Longnose skate	-	-	-	-	-	-
Spiny dogfish	1.0	1	51.0	23	1.5	1
Squid	-	-	-	-	-	-
Glass shrimp	-	-	-	-	-	-

Table 10. Tow information.

	Yr	Mo	Day		
Vessel: G.B. REED	Date:	80	6	6	
Location: Butterworth Edge	Area:	Hecate Straits			
Start: Lat. 54°05.5'	Long.	131°03.5'			
End: Lat. 54°06.4'	Long.	131°02.8'			
					min.
Gear: M.W.T. 434 E	Start time (P.D.T.):	1755			Duration: 30
Bottom depth m: Start: 84	End:	106			Est. av. depth: 95
Net depth range footrope m: 75-97					Est. av. depth: 86
					mi.
Direction of set °true: 10	Speed kn:	4.2	Distance travelled: 2.1		
Set on: near bottom layer	Water condition:	ripple			Tide: flood
Wind direction: 340°T	Wind speed:	14kts			Recorder: WB
t _{tm} : t _{dm} : bt:	Other oceanographic data:				
Remarks: lot of euphausiids in net					
Sounder summary: light layer 64-82M					

	Yr	Mo	Day		
Vessel: G.B. REED	Date:	80	6	6	
Location: Butterworth Edge	Area:	Hecate Straits			
Start: Lat. 53°59.8'	Long.	131°03.7'			
End: Lat. 54°01.4'	Long.	131°03.9'			
					min.
Gear: M.W.T. 434 E	Start time (P.D.T.):	1942			Duration: 21
Bottom depth m: Start: 88	End:	92			Est. av. depth: 90
Net depth range footrope m: 70-74					Est. av. depth: 72
					mi.
Direction of set °true: 0	Speed kn:	4.8	Distance travelled: 1.7		
Set on: layer off bottom	Water condition:	ripple			Tide:
Wind direction:	Wind speed:	10-15			Recorder: F.T.
t _{tm} : t _{dm} : bt:	Other oceanographic data:				
Remarks: Euphausiids in net					
Sounder summary:					

Table 10 (cont'd)

	Yr	Mo	Day	
Vessel: <u>G.B. REED</u>	Date: <u>80</u>	<u>6</u>	<u>8</u>	Set/haul no: <u>3</u>
Location: <u>Rose Spit</u>	Area: <u>Dixon Entrance</u>			
Start: Lat. <u>54°19.8'</u>	Long. <u>131°28.5'</u>			
End: Lat. <u>54°19.7'</u>	Long. <u>131°30.7'</u>			
				min.
Gear: <u>M.W.T. 434 E</u>	Start time (P.D.T.): <u>1032</u>	Duration: <u>30</u>		
Bottom depth m: Start: <u>172</u>	End: <u>172</u>	Est. av. depth: <u>172</u>		
Net depth range footrope m: <u>163-128</u>		Est. av. depth: <u>128</u>		
				mi.
Direction of set °true: <u>265</u>	Speed kn: <u>2.8</u>	Distance travelled: <u>1.4</u>		
Set on: <u>layer 92-146M.</u>	Water condition: <u>lt. chop</u>	Tide: <u>ebb</u>		
Wind direction: <u>300</u>	Wind speed: <u>15</u>	Recorder: <u>WB</u>		
ttm: _____ tdm: _____ bt: <u>2</u>	Other oceanographic data: _____			
Remarks: <u>targets sounding below net as gear towed</u>				
Sounder summary: <u>lot of euphausiids in web of net.</u>				
<u>light single fish type layer 92-146m.</u>				

	Yr	Mo	Day	
Vessel: <u>G.B. REED</u>	Date: <u>80</u>	<u>6</u>	<u>8</u>	Set/haul no: <u>4</u>
Location: <u>Rose Spit</u>	Area: <u>Dixon Entrance</u>			
Start: Lat. <u>54°19.5'</u>	Long. <u>131°29.5'</u>			
End: Lat. <u>54°19.9'</u>	Long. <u>131°26.3'</u>			
				min.
Gear: <u>M.W.T. 434 E</u>	Start time (P.D.T.): <u>1250</u>	Duration: <u>30</u>		
Bottom depth m: Start: <u>168</u>	End: <u>168</u>	Est. av. depth: <u>168</u>		
Net depth range footrope m: <u>106-106</u>		Est. av. depth: <u>106</u>		
				mi.
Direction of set °true: <u>80</u>	Speed kn: <u>3.8</u>	Distance travelled: <u>1.9</u>		
Set on: <u>midwater</u>	Water condition: <u>ripple</u>	Tide: <u>ebb</u>		
Wind direction: <u>300</u>	Wind speed: <u>8</u>	Recorder: <u>WB</u>		
ttm: _____ tdm: _____ bt: <u>3</u>	Other oceanographic data: _____			
Remarks: <u>fish dive below net, gear festooned with euphausiids</u>				
Sounder summary: <u>individual schools 55m from surface</u>				

Table 10 (cont'd)

	Yr	Mo	Day		
Vessel: G.B. REED	Date:	80	6	8	
Location: Two Peaks	Area:	Dixon Entrance			
Start: Lat. 54°18.3'	Long.	131°21.3'			
End: Lat. 54°18.0'	Long.	131°24.2'			
					min.
Gear: M.W.T. 434-E	Start time (P.D.T.):	1435			Duration: 30
Bottom depth m: Start: 82	End:	70	Est. av. depth:	69	
Net depth range footrope m: 67-60			Est. av. depth:	60	
					mi.
Direction of set °true: 235	Speed kn:	3.6	Distance travelled:	1.8	
Set on: near bottom schools	Water condition:	lt. chop			Tide: ebb
Wind direction: 300	Wind speed:	15kts			Recorder: WB
ttm: tdm: bt:	Other oceanographic data:				
Remarks: net festooned with euphausiids					
Sounder summary: heavy herring schools 46-64m, fish sounded as net approached.					

	Yr	Mo	Day		
Vessel: G.B. REED	Date:	80	6	10	
Location: off Langara	Area:	Dixon Entrance			
Start: Lat. 54°15.3'	Long.	132°46.7'			
End: Lat. 54°17.5'	Long.	132°46.2'			
					min.
Gear: M.W.T. 434 E	Start time (P.D.T.):	1010			Duration: 45
Bottom depth m: Start: 300	End:	336	Est. av. depth:	318	
Net depth range footrope m: 38-93			Est. av. depth:	93	
					mi.
Direction of set °true: 350	Speed kn:				Distance travelled:
Set on: midwater layer	Water condition:	ripple			Tide: flood
Wind direction: 350	Wind speed:	5	Recorder:	WB	
ttm: tdm: bt:	Other oceanographic data:				
Remarks:					
Sounder summary: zig zig plankton like layer with single fish echoes.					

Table 10 (cont'd)

Yr Mo Day
 Vessel: G.B. REED Date: 80 6 10 Set/haul no: 7
 Location: Learmonth Bk. Area: Dixon Entrance
 Start: Lat. 54°25.3' Long. 132°54.4'
 End: Lat. 54°22.2' Long. 132°56.3'
min.
 Gear: M.W.T. 434 E Start time (P.D.T.): 1615 Duration: 53
 Bottom depth m: Start: 373 End: 326 Est. av. depth: 345
 Net depth range footrope m: 300-198 Est. av. depth: _____
mi.
 Direction of set °true: 180 Speed kn: 3.5 Distance travelled: 3.1
 Set on: midwater layer Water condition: lt. chop Tide: _____
 Wind direction: 270°T Wind speed: 15kts Recorder: WB
 ttm: _____ tdm: _____ bt: _____ Other oceanographic data: _____
 Remarks: _____
 Sounder summary: plankton like layer 300-340m.

Yr Mo Day
 Vessel: G.B. REED Date: 80 6 12 Set/haul no: 8
 Location: Dundas Island Area: Dixon Entrance
 Start: Lat. 54°30.6' Long. 131°03.5'
 End: Lat. 54°30.3' Long. 131°06.4'
min.
 Gear: M.W.T. 434 E Start time (P.D.T.): 1332 Duration: 33
 Bottom depth m: Start: 154 End: 146 Est. av. depth: 150
 Net depth range footrope m: 90-82 Est. av. depth: 86
mi.
 Direction of set °true: 255 Speed kn: 3.3 Distance travelled: 1.8
 Set on: single fish midlayer Water condition: lt. chop Tide: flood
 Wind direction: 270 Wind speed: 5kts Recorder: WB
 ttm: _____ tdm: _____ bt: _____ Other oceanographic data: _____
 Remarks: _____
 Sounder summary: light layer.

Table 10 (cont'd)

Yr Mo Day

Vessel: G.B. REED Date: 80 6 12 Set/haul no: 9

Location: Dundas Island Area: Dixon Entrance

Start: Lat. 54°30.5' Long. 131°14.0'

End: Lat. 54°29.4' Long. 131°11.3'

min.

Gear: M.W.T. 434 E Start time (P.D.T.): 1342 Duration: 31

Bottom depth m: Start: 135 End: 143 Est. av. depth: 139

Net depth range footrope m: 102-110 Est. av. depth: 106

mi.

Direction of set °true: 100 Speed kn: 3.5 Distance travelled: 1.8

Set on: midwater layer Water condition: ripple-chop Tide: ebb

Wind direction: 270°T Wind speed: 5kts Recorder: WB

ttm: _____ tdm: _____ bt: _____ Other oceanographic data: _____

Remarks: lot of euphausiids and juvenile eulachon in web of net.

Sounder summary:

Yr Mo Day

Vessel: G.B. REED Date: 80 6 12 Set/haul no: 10

Location: Two Peaks-bend Area: Dixon Entrance

Start: Lat. 54°21.3' Long. 131°17.0'

End: Lat. 54°19.5' Long. 131°17.9'

min.

Gear: M.W.T. 434 E Start time (P.D.T.): 1801 Duration: 30

Bottom depth m: Start: 134 End: 130 Est. av. depth: 132

Net depth range footrope m: 94-81 Est. av. depth: 87

mi.

Direction of set °true: 170 Speed kn: 4.2 Distance travelled: 2.1

Set on: off bottom layer Water condition: ripple-chop Tide: _____

Wind direction: 250°T Wind speed: 5kts Recorder: FT

ttm: _____ tdm: _____ bt: _____ Other oceanographic data: _____

Remarks: blotchy off bottom layer

Sounder summary:

Table 10 (cont'd)

	Yr	Mo	Day
Vessel: <u>G.B. REED</u>	<u>80</u>	<u>6</u>	<u>13</u>
Location: <u>off Cape Chacon</u>			Set/haul no: <u>11</u>
Start: Lat. <u>54°34.0'</u>			Area: <u>Dixon Entrance</u>
End: Lat. <u>54°34.0'</u>			Long. <u>132°11.5'</u>
			Long. <u>132°07.7'</u>
			min.
Gear: <u>M.W.T. 434 E</u>			Start time (P.D.T.): <u>1011</u> Duration: <u>30</u>
Bottom depth m: Start: <u>198</u>		End: <u>212</u>	Est. av. depth: <u>205</u>
Net depth range footrope m: <u>75</u>			Est. av. depth: <u>75</u>
			mi.
Direction of set °true: <u>85</u>		Speed kn: <u>4.6</u>	Distance travelled: <u>2.3</u>
Set on: <u>midwater layer</u>		Water condition: <u>rippled</u>	Tide:
Wind direction: <u>165</u>		Wind speed: <u>15kts</u>	Recorder: <u>FT</u>
ttm: _____ tdm: _____ bt: _____		Other oceanographic data: _____	
Remarks: <u>set on 55-73m layer, from surface.</u>			
Sounder summary:			

	Yr	Mo	Day
Vessel: <u>G.B. REED</u>	<u>80</u>	<u>6</u>	<u>13</u>
Location: <u>off Cape Chacon</u>			Set/haul no: <u>12</u>
Start: Lat. <u>54°29.0'</u>			Area: <u>Dixon Entrance</u>
End: Lat. <u>54°29.2'</u>			Long. <u>132°05.0'</u>
			Long. <u>132°02.5'</u>
			min.
Gear: <u>M.W.T. 434 E</u>			Start time (P.D.T.): <u>1237</u> Duration: <u>40</u>
Bottom depth m: Start: <u>318</u>		End: <u>264</u>	Est. av. depth: <u>291</u>
Net depth range footrope m: <u>194</u>			Est. av. depth: <u>194</u>
			mi.
Direction of set °true: <u>100</u>		Speed kn: <u>4.8</u>	Distance travelled: <u>3.2</u>
Set on: <u>midwater layer</u>		Water condition: <u>ripple</u>	Tide:
Wind direction: <u>160°T</u>		Wind speed: <u>10kts</u>	Recorder: <u>FT</u>
ttm: _____ tdm: _____ bt: _____		Other oceanographic data: _____	
Remarks: <u>small lanternfish in web of net.</u>			
Sounder summary: <u>mushy layer.</u>			

Table 10 (cont'd)

Yr Mo Day
Vessel: G.B. REED Date: 80 6 13 Set/haul no: 13
Location: middle Dixon Entrance Area: Dixon Entrance
Start: Lat. 54°30.0' Long. 132°17.0'
End: Lat. 54°30.0' Long. 132°20.5'
min.
Gear: M.W.T. 434 E Start time (P.D.T.): 1736 Duration: 30
Bottom depth m: Start: 370 End: 370 Est. av. depth: 370
Net depth range footrope m: 242-205 Est. av. depth: 224
mi.
Direction of set °true: 275 Speed kn: 4.2 Distance travelled: 2.1
Set on: midwater layer Water condition: glass Tide:
Wind direction: nil Wind speed: nil Recorder: WB
ttm: tdm: bt: Other oceanographic data:
Remarks: main reason for set to fix netsounder wire.
Sounder summary: plankton layer at 146 m

Yr Mo Day
Vessel: G.B. REED Date: 80 6 15 Set/haul no: 14
Location: Langara Spit Area: West Coast Q.C.I.
Start: Lat. 54°21.2' Long. 133°29.5'
End: Lat. 54°22.5' Long. 133°31.0'
min.
Gear: M.W.T. 434 E Start time (P.D.T.): 0923 Duration: 34
Bottom depth m: Start: 247 End: 238 Est. av. depth: 242
Net depth range footrope m: 178 Est. av. depth: 178
mi.
Direction of set °true: 320 Speed kn: 3.0 Distance travelled: 1.7
Set on: midwater schools Water condition: ripple Tide: ebb
Wind direction: 210°T Wind speed: 10kts Recorder: WB
ttm: tdm: bt: Other oceanographic data:
Remarks:
Sounder summary: layer of small schools 165-201m

Table 10 (cont'd)

Yr Mo Day
Vessel: G.B. REED Date: 80 6 15 Set/haul no: 15
Location: Learmonth Bk Area: Dixon Entrance
Start: Lat. 54°25.3' Long. 133°10.1'
End: Lat. 54°23.9' Long. 133°10.6'
min.
Gear: M.W.T. 434 E Start time (P.D.T.): 1255 Duration: _____
Bottom depth m: Start: 435 End: 447 Est. av. depth: 441
Net depth range footrope m: 172m Est. av. depth: 172m
mi.
Direction of set °true: 190 Speed kn: 3.0 Distance travelled: 1.5
Set on: midwater scratch Water condition: glass Tide: _____
Wind direction: _____ Wind speed: _____ Recorder: WB
ttm: _____ tdm: _____ bt: _____ Other oceanographic data: _____
Remarks: _____
Sounder summary: very light small marks 128-220m from surface.

Yr Mo Day
Vessel: G.B. REED Date: 80 6 15 Set/haul no: 16
Location: off Langara Is. Area: Dixon Entrance
Start: Lat. 54°19.4' Long. 133°02.6'
End: Lat. 54°17.8' Long. 133°03.6'
min.
Gear: M.W.T. 434 E Start time (P.D.T.): 1509 Duration: 39
Bottom depth m: Start: 490 End: 461 Est. av. depth: 476
Net depth range footrope m: 121 Est. av. depth: 121
mi.
Direction of set °true: 180 Speed kn: 2.4 Distance travelled: 1.6
Set on: midwater layer Water condition: glass Tide: flood
Wind direction: nil Wind speed: nil Recorder: WB
ttm: _____ tdm: _____ bt: _____ Other oceanographic data: _____
Remarks: _____
Sounder summary: light layer 110-128m

Table 10 (cont'd)

	Yr	Mo	Day			
Vessel: G.B. REED	Date:	80	6	16	Set/haul no: 17	
Location: Langara Spit	Area:	W.C.Q.C.I.				
Start: Lat. 54°04.3'	Long.	133°26.1'				
End: Lat. 54°05.8'	Long.	133°23.2'				
						min.
Gear: M.W.T. 434 E	Start time (P.D.T.):	1347 Duration: 31				
Bottom depth m: Start: 187	End: 194	Est. av. depth: 190				
Net depth range footrope m: 184-185	Est. av. depth: 181					
						mi.
Direction of set °true: 050	Speed kn:	4.8				Distance travelled: 2.4
Set on: school near bottom	Water condition:	lt. chop				Tide: flood
Wind direction: 190	Wind speed:	10kts				Recorder: WB
ttm: tdm: bt: Other oceanographic data:						
Remarks: school sounded as gear approached.						
Sounder summary:						

	Yr	Mo	Day			
Vessel: G.B. REED	Date:	80	6	19	Set/haul no: 18	
Location: Two Peaks - bend	Area:	Dixon Entrance				
Start: Lat. 54°18.3'	Long.	131°20.6'				
End: Lat. 54°17.8'	Long.	131°25.8'				
						min.
Gear: M.W.T. 434 E	Start time (P.D.T.):	0925 Duration: 51				
Bottom depth m: Start: 77	End: 73	Est. av. depth: 75				
Net depth range footrope m: 68-64	Est. av. depth: 66					
						mi.
Direction of set °true: 260	Speed kn:	3.6				Distance travelled: 3.1
Set on: near bottom	Water condition:	chop				Tide: ebb
Wind direction: 310	Wind speed:	15kts				Recorder: WB
ttm: tdm: bt: Other oceanographic data:						
Remarks:						
Sounder summary: herring schools 9-18m off bottom fish sound when gear approached.						

Table 10 (cont'd)

	Yr	Mo	Day		
Vessel: G.B. REED	Date:	80	6	19	
Location: bend	Area:	Dixon Entrance			
Start: Lat. 54°19.2'	Long.	131°21.5'			
End: Lat. 54°19.1'	Long.	131°25.4'			
					min.
Gear: M.W.T. 434 E	Start time (P.D.T.):	1240			Duration: 40
Bottom depth m: Start: 134	End:	134			Est. av. depth: 134
Net depth range footrope m: 122-110					Est. av. depth: 116
					mi.
Direction of set °true: 260	Speed kn:	3.6			Distance travelled: 2.4
Set on: midwater layer	Water condition:	lt. chop			Tide:
Wind direction: 290	Wind speed:	15kts			Recorder: WB
ttm: tdm: bt:	Other oceanographic data:				
Remarks:					
Sounder summary:					

	Yr	Mo	Day		
Vessel: G.B. REED	Date:	80	6	19	
Location: Butterworth	Area:	Hecate Straits			
Start: Lat. 54°14.8'	Long.	131°03.6'			
End: Lat. 54°12.5'	Long.	131°03.8'			
					min.
Gear: M.W.T. 434 E	Start time (P.D.T.):	1600			Duration: 27
Bottom depth m: Start: 90	End:	70			Est. av. depth: 80
Net depth range footrope m: 84-64					Est. av. depth: 74
					mi.
Direction of set °true: 180	Speed kn:	4.8			Distance travelled: 2.2
Set on:	Water condition:	lt. chop			Tide:
Wind direction: 280	Wind speed:	20kts			Recorder: FT
ttm: tdm: bt:	Other oceanographic data:				
Remarks:					
Sounder summary:					

Table 10 (cont'd)

Yr Mo Day
Vessel: G.B. REED Date: 80 6 20 Set/haul no: 21
Location: off Porcher Is. Area: Hecate Straits
Start: Lat. 53°57.4' Long. 131°02.8'
End: Lat. 53°56.5' Long. 131°02.2'
min.
Gear: M.W.T. 434 E Start time (P.D.T.): 1338 Duration: 10
Bottom depth m: Start: 79 End: 79 Est. av. depth: 79
Net depth range footrope m: _____ Est. av. depth: _____
mi.
Direction of set °true: 160 Speed kn: 4.2 Distance travelled: 0.7
Set on: _____ Water condition: chop Tide: _____
Wind direction: 290 Wind speed: 20kts Recorder: WB
ttm: _____ tdm: _____ bt: _____ Other oceanographic data: _____
Remarks: _____
Sounder summary: schools 46m to bottom.

Yr Mo Day
Vessel: G.B. REED Date: 80 6 22 Set/haul no: 22
Location: off Warrior Rk. Area: Hecate Straits
Start: Lat. 53°59.2' Long. 131°03.7'
End: Lat. 53°58.2' Long. 131°03.2'
min.
Gear: M.W.T. 434 E Start time (P.D.T.): 1511 Duration: 16
Bottom depth m: Start: 79 End: 77 Est. av. depth: 78
Net depth range footrope m: 73-71 Est. av. depth: 72
mi.
Direction of set °true: 153 Speed kn: 3.6 Distance travelled: 1.0
Set on: _____ Water condition: _____ Tide: _____
Wind direction: _____ Wind speed: 20kts Recorder: FT
ttm: _____ tdm: _____ bt: _____ Other oceanographic data: _____
Remarks: moderate layer of blotches
Sounder summary:

Table 10 (cont'd)

Yr Mo Day
Vessel: G.B. REED Date: 80 6 21 Set/haul no: 23
Location: Browning Entrance Area: Hecate Straits
Start: Lat. 53°36.6' Long. 130°44.5'
End: Lat. 53°38.2' Long. 130°44.0'
min.
Gear: M.W.T. 434 E Start time (P.D.T.): 1337 Duration: 29
Bottom depth m: Start: 154 End: 145 Est. av. depth: 144.0
Net depth range footrope m: 128-119 Est. av. depth: 124
mi.
Direction of set °true: 10 Speed kn Distance travelled:
Set on: Water condition: ripple Tide: ebb
Wind direction: 160°T Wind speed: 5kts Recorder: WB
ttm: tdm: bt: Other oceanographic data:
Remarks: 59m single fish type layer to bottom
Sounder summary:

Yr Mo Day
Vessel: G.B. REED Date: 80 6 21 Set/haul no: 24
Location: off White Rocks Area: Hecate Straits
Start: Lat. 53°41.3' Long. 130°46.0'
End: Lat. 53°43.8' Long. 130°48.1'
min.
Gear: M.W.T 434 E Start time (P.D.T.): 1545 Duration: 45
Bottom depth m: Start: 82 End: 157 Est. av. depth: 120
Net depth range footrope m: 75-155 Est. av. depth: 116
mi.
Direction of set °true: 160 Speed kn: Distance travelled:
Set on: Water condition: ripple Tide:
Wind direction: Wind speed: Recorder: FT
ttm: tdm: bt: Other oceanographic data:
Remarks:
Sounder summary: small herring schools tight to bottom.

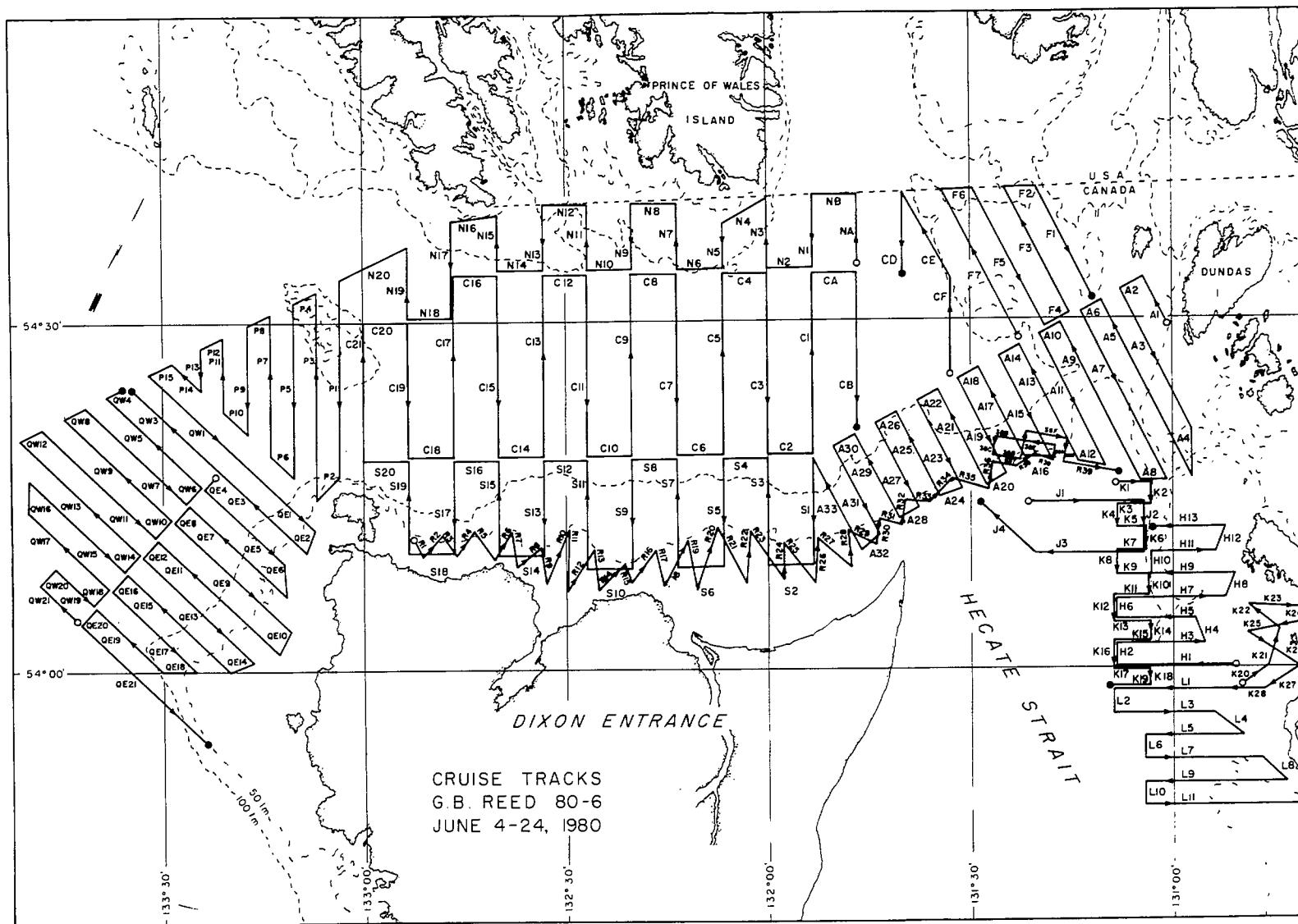
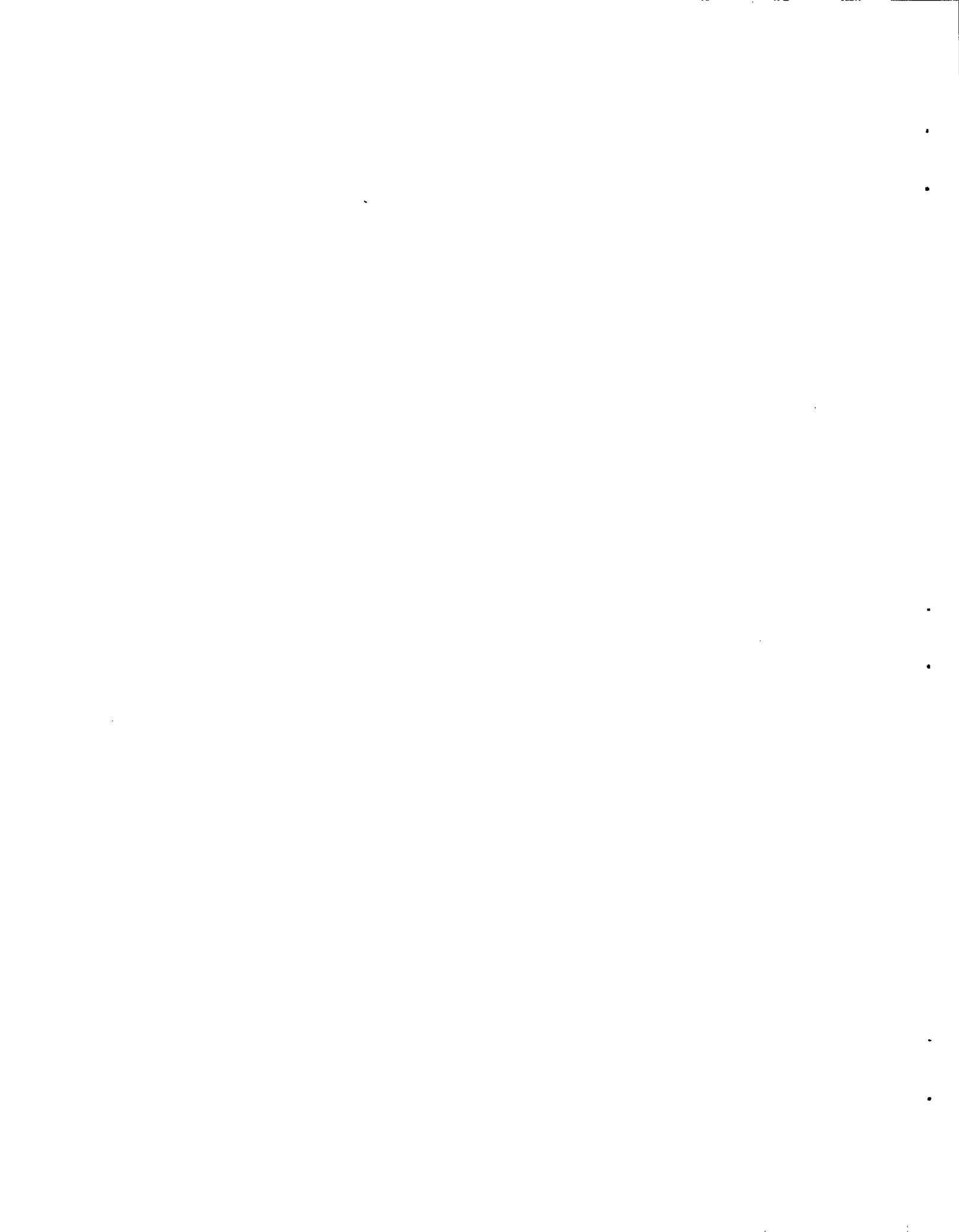


Fig. 1. Cruise tracks of the G. B. REED cruise GBR80-6 to Dixon Entrance, showing the area surveyed.



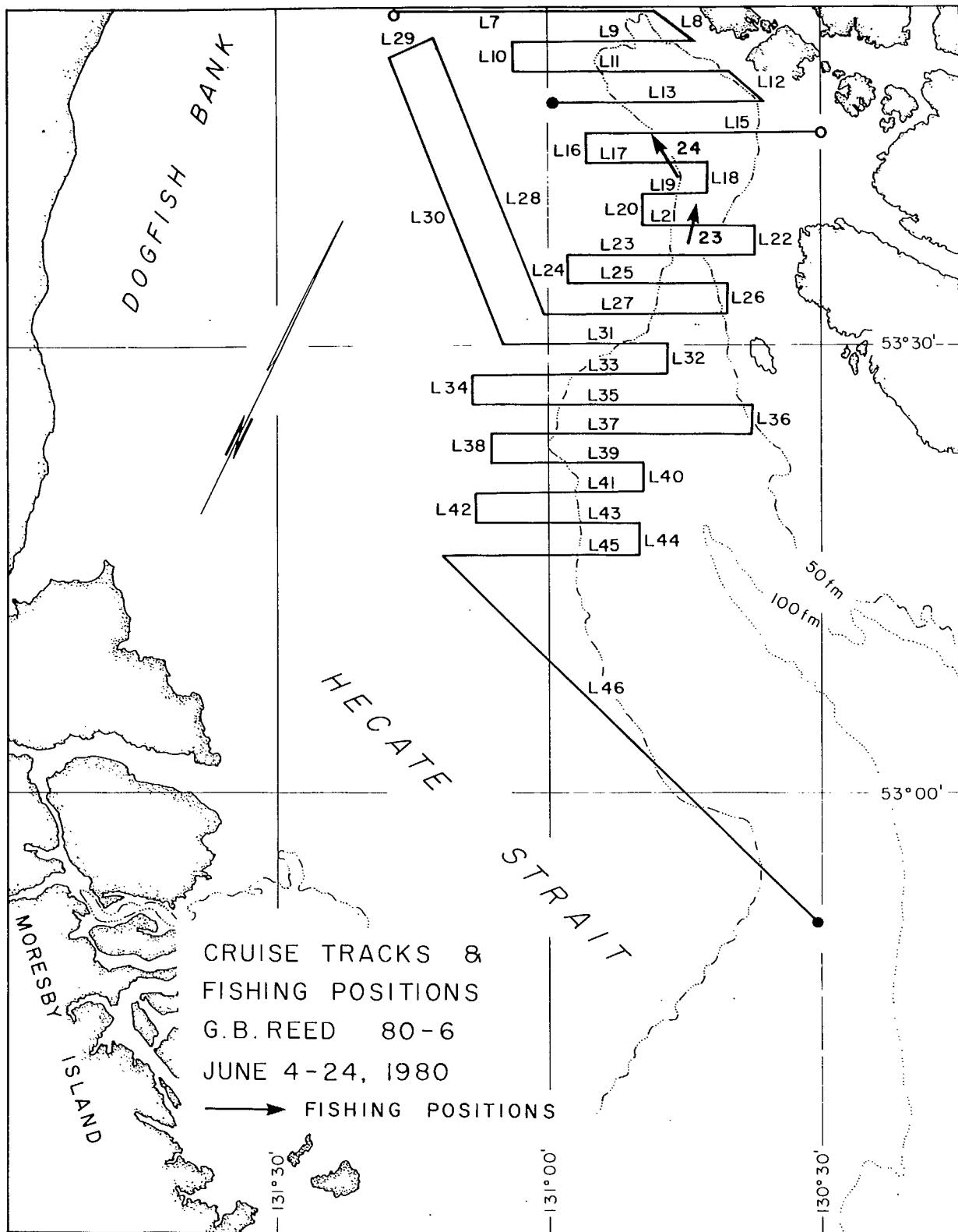
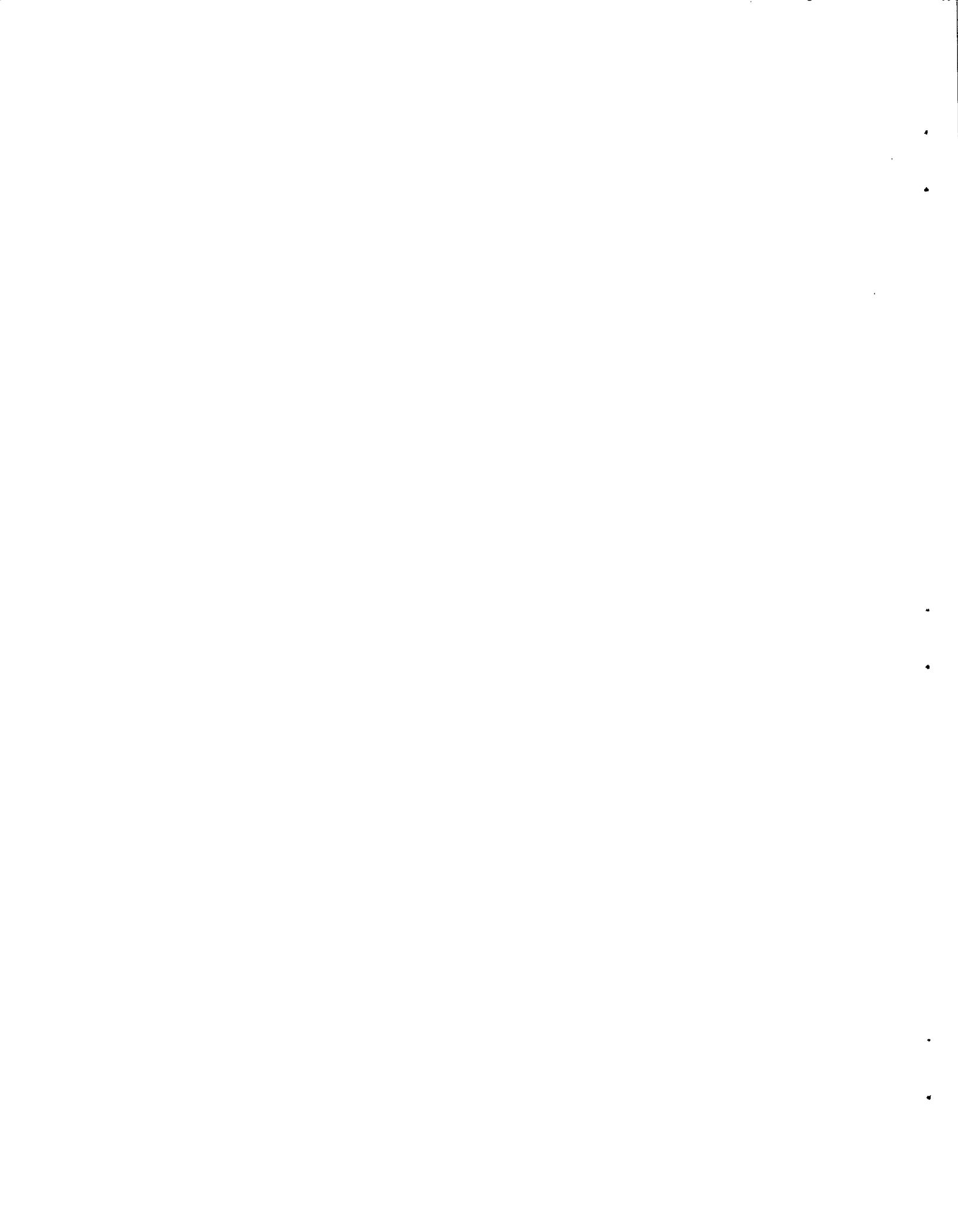


Fig. 2. Cruise tracks of the G. B. REED cruise GBR80-6 to Hecate Strait, showing the area surveyed.



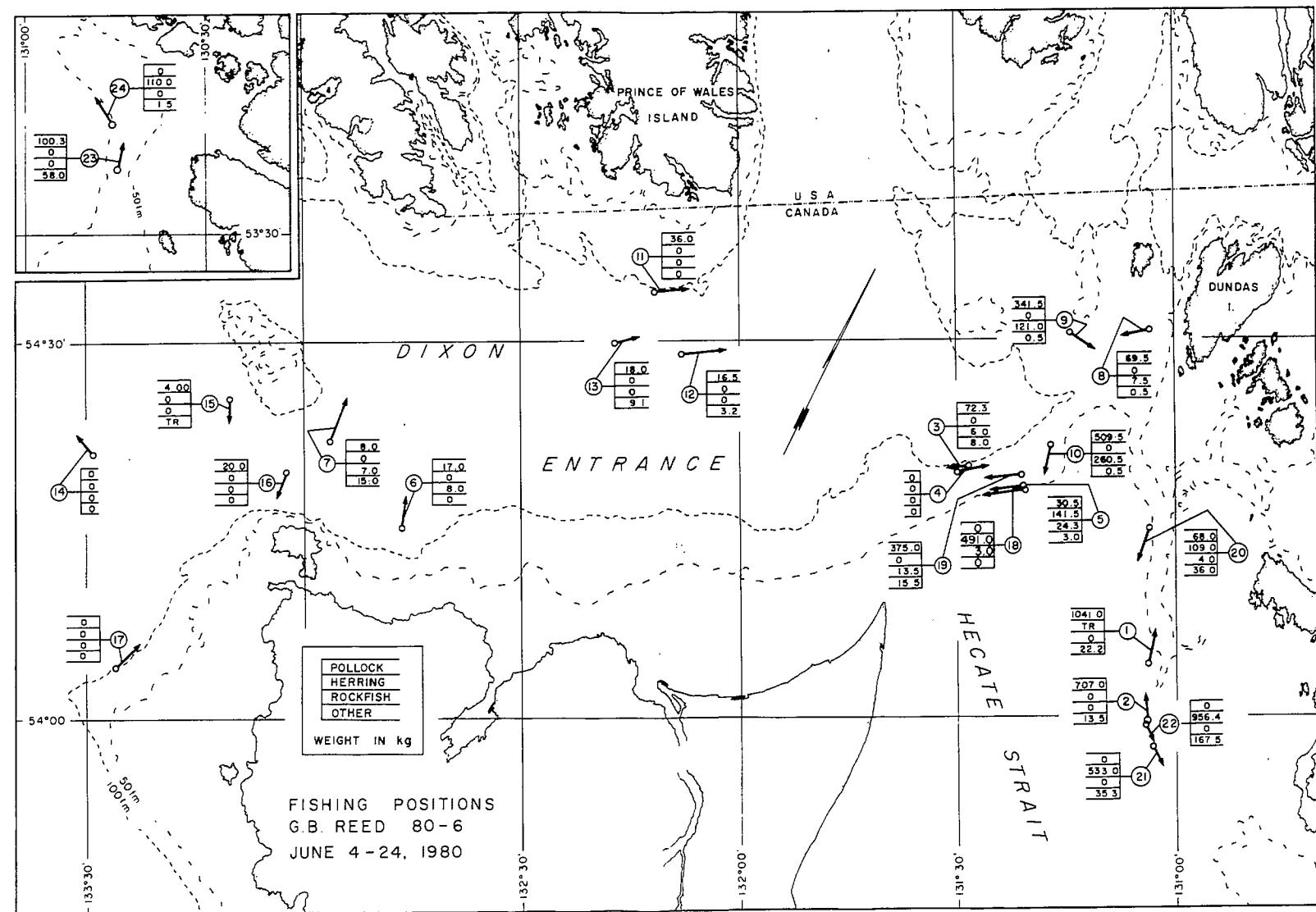
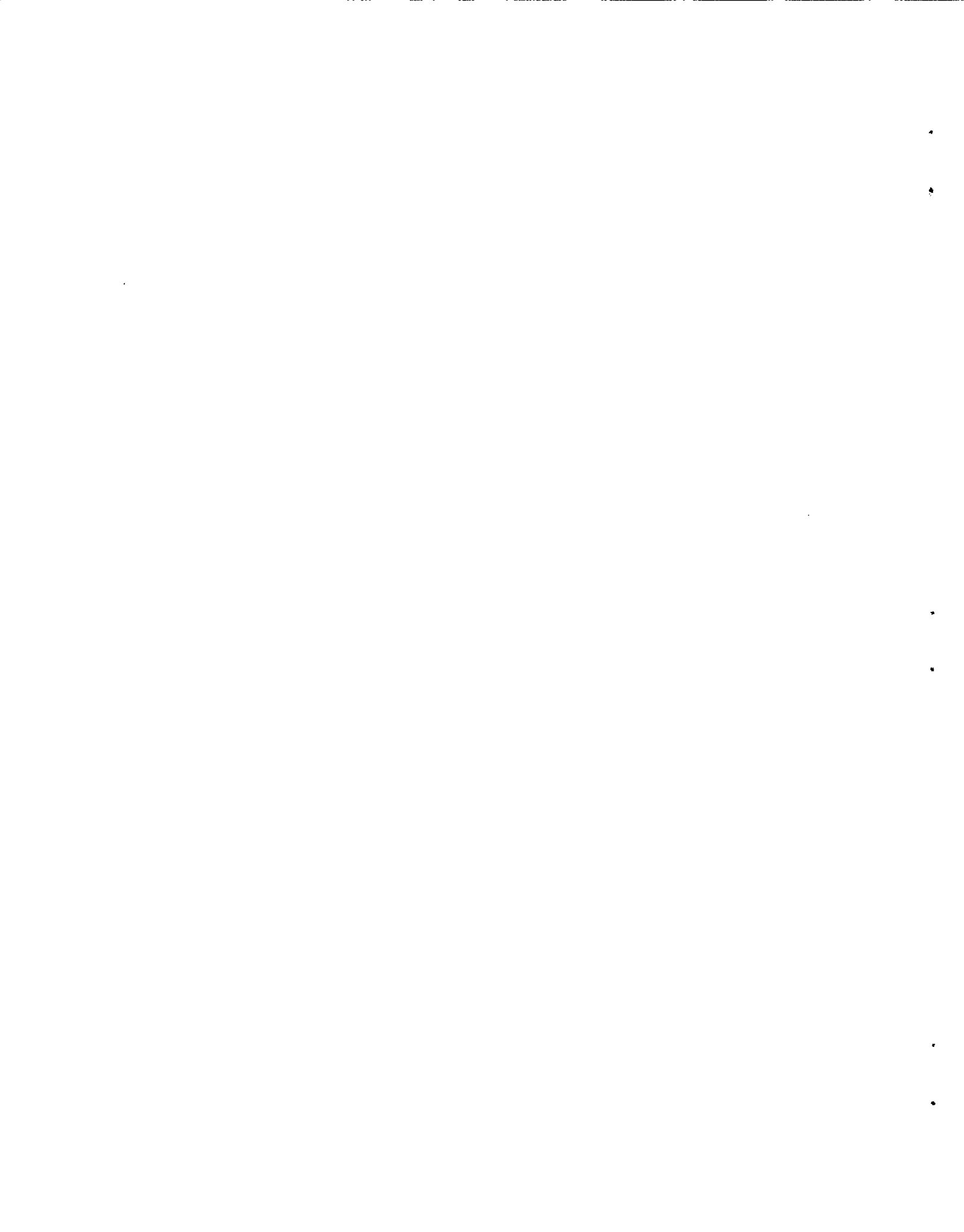


Fig. 3. Location of midwater trawl tows on G. B. REED cruise GBR80-6 to Dixon Entrance, showing the main species caught in kilograms.



Appendix Table 1. Size composition of walleye pollock (Theragra chalcogramma), numbers sampled, by haul, by sex for CGS G.B. REED cruise GBR80-6, June 4-24, 1980.

Fork length (cm)	Tow no.											
	1			2			3			5		
	M	F	T	M	F	T	M	F	T	M	F	T
27	1	-	1	-	-	-	-	-	-	-	-	-
28	1	1	2	-	-	-	-	-	-	-	-	-
29	8	4	12	-	-	-	-	-	-	-	-	-
30	9	2	11	-	-	-	-	-	-	-	-	-
31	8	6	14	6	-	6	-	-	-	-	-	-
32	16	13	29	3	5	8	-	-	-	1	-	1
33	14	19	33	4	3	7	-	-	-	1	1	2
34	13	9	22	8	2	10	-	-	-	0	1	1
35	10	5	15	6	6	12	-	-	-	0	0	0
36	7	10	17	3	4	7	-	-	-	0	0	0
37	15	2	17	8	2	10	-	-	-	0	0	0
38	18	4	22	6	5	11	1	-	1	0	1	1
39	10	4	14	11	5	16	0	-	0	0	0	0
40	15	6	21	12	11	23	0	-	0	1	1	2
41	21	9	30	13	12	25	0	-	0	0	1	1
42	11	9	20	19	10	29	1	1	2	3	2	5
43	11	12	23	19	15	34	3	0	3	2	0	2
44	13	8	21	20	17	37	4	1	5	3	3	6
45	9	6	15	13	16	29	4	1	5	1	5	6
46	5	8	13	5	11	16	3	7	10	4	2	6
47	2	2	4	10	12	22	3	5	8	2	1	3
48	1	0	1	3	6	9	1	1	2	-	0	0
49	0	0	0	2	2	4	0	4	4	-	0	0
50	0	0	0	0	0	0	0	3	3	-	0	0
51	0	0	0	0	2	2	1	0	1	-	0	0
52	0	0	0	1	0	1	0	0	0	-	0	0
53	1	1	2	0	0	0	1	0	1	-	1	1
54	1	0	1	0	0	0	1	1	2	-	-	-
55	0	0	0	2	0	2	0	1	1	-	-	-
56	1	0	1	1	0	1	1	1	2	-	-	-
57	-	0	0	-	1	1	-	3	3	-	-	-
58	-	1	1	-	0	0	-	3	3	-	-	-
59	-	-	-	-	0	0	-	1	1	-	-	-
60	-	-	-	-	0	0	-	1	1	-	-	-
61	-	-	-	-	1	1	-	2	2	-	-	-
62	-	-	-	-	-	-	-	1	1	-	-	-
63	-	-	-	-	-	-	-	0	0	-	-	-
64	-	-	-	-	-	-	-	-	0	-	-	-
65	-	-	-	-	-	-	-	-	0	-	-	-
66	-	-	-	-	-	-	-	1	1	-	-	-
Total	221	141	362	175	148	323	24	38	62	18	19	37

Appendix Table 1 (cont'd)

Fork length (cm)	Tow no.											
	6			8			9			10		
	M	F	T	M	F	T	M	F	T	M	F	T
27	-	-	-	-	-	-	-	-	-	-	-	-
28	-	-	-	-	-	-	-	-	-	-	-	-
29	-	-	-	-	-	-	-	-	-	-	-	-
30	-	-	-	-	-	-	-	-	-	-	-	-
31	-	-	-	-	-	-	-	-	-	1	2	3
32	-	-	-	-	-	-	-	-	-	3	1	4
33	-	-	-	-	-	-	-	1	1	4	2	6
34	-	-	-	-	-	-	1	0	1	5	1	6
35	-	-	-	-	-	-	0	0	0	10	1	11
36	-	-	-	-	-	-	1	0	1	6	3	9
37	-	-	-	-	1	1	4	0	4	6	4	10
38	-	-	-	-	0	0	4	0	4	6	2	8
39	-	-	-	1	0	1	4	2	6	4	4	8
40	-	-	-	3	1	4	9	4	13	8	3	11
41	-	-	-	1	0	1	11	4	15	11	9	20
42	-	1	1	4	3	7	15	9	24	13	5	18
43	-	1	1	4	6	10	8	4	12	13	12	25
44	1	0	1	4	3	7	12	23	35	16	12	28
45	0	1	1	4	4	8	13	15	28	9	10	19
46	0	1	1	5	4	9	6	13	19	10	10	20
47	0	0	0	3	4	7	3	16	19	2	9	11
48	1	1	2	0	2	2	6	6	12	4	5	9
49	0	1	1	0	0	0	1	3	4	3	5	8
50	0	1	1	0	0	0	1	3	4	-	4	4
51	0	0	0	0	0	0	2	0	2	-	0	0
52	0	0	0	0	1	1	1	1	2	-	1	1
53	0	0	0	1	0	1	2	0	2	-	0	0
54	0	0	0	1	1	2	3	1	4	-	1	1
55	1	0	1	1	0	1	1	2	3	-	0	0
56	1	0	1	1	0	1	0	0	0	-	1	1
57	-	1	1	3	2	5	2	2	4	-	0	0
58	-	0	0	1	0	1	4	2	6	-	0	0
59	-	0	0	-	1	1	-	-	-	-	0	0
60	-	1	1	-	1	1	-	-	-	-	2	2
61	-	-	-	-	1	1	-	-	-	-	1	1
62	-	-	-	-	-	-	-	-	-	-	0	0
63	-	-	-	-	-	-	-	-	-	-	1	1
64	-	-	-	-	-	-	-	-	-	-	-	-
65	-	-	-	-	-	-	-	-	-	-	-	-
66	-	-	-	-	-	-	-	-	-	-	-	-
Total	4	9	13	37	35	72	114	111	225	134	111	245

Appendix Table 1 (cont'd)

Fork length (cm)	Tow no.											
	11			12			13			16		
	M	F	T	M	F	T	M	F	T	M	F	T
27	-		-	-		-	-		-	-		-
28	-		-	-		-	-		-	-		-
29	-		-	-		-	-		-	-		-
30	-		-	-		-	-		-	-		-
31	-		-	-		-	-		-	-		-
32	-		-	-		-	-		-	-		-
33	-		-	-		-	-		-	-		-
34	-		-	-		-	-		-	-		-
35	-		-	-		-	-		-	-		-
36	-		-	-		-	-		-	-		-
37	-		-	-		-	-		-	-		-
38	-		-	-		-	-		-	-		-
39	-		-	-		-	-		-	-		-
40	-		-	-		-	-		-	-		-
41	-		-	-		-	-		-	-		-
42	-		-	-		-	1		1	1		1
43	-		-	-		-	0		0	0		0
44	-		-	-		-	0		0	1		3
45	-		-	-		-	1		1	3		4
46	1		1	-		-	0		0	1		2
47	0		0	-		-	1		0	0		1
48	1		0	1		-	0		0	0		0
49	0		1	1		-	3		3	0		0
50	0	1	1	-	-	-	-	0	0	2	1	3
51	0	2	2	-	-	-	-	0	0	-	0	0
52	1	1	2	-	-	-	-	0	0	-	0	0
53	1	0	1	-	-	-	-	0	0	-	0	0
54	0	1	1	-	-	-	-	0	0	-	0	0
55	0	0	0	1	-	1	-	0	0	-	0	0
56	1	1	2	-	1	1	-	0	0	-	0	0
57	-	5	5	-	0	0	-	0	0	-	1	1
58	-	3	3	-	1	1	-	1	1	-	1	1
59	-	1	1	-	2	2	-	2	2	-	-	-
60	-	0	0	-	0	0	-	2	2	-	-	-
61	-	2	2	-	0	0	-	1	1	-	-	-
62	-	2	2	-	2	2	-	-	-	-	-	-
63	-	-	-	-	0	0	-	-	-	-	-	-
64	-	-	-	-	0	0	-	-	-	-	-	-
65	-	-	-	-	0	0	-	-	-	-	-	-
66	-	-	-	-	1	1	-	-	-	-	-	-
Total	4	21	25	1	7	8	1	11	12	8	8	16

Appendix Table 1 (cont'd)

Fork length (cm)	Tow no.											
	19			20			23			Total		
	M	F	T	M	F	T	M	F	T	M	F	GT
27	-	-	-	-	-	-	-	-	-	1	-	1
28	-	-	-	1	-	1	-	-	-	2	1	3
29	-	-	-	0	-	0	-	-	-	8	4	12
30	1	-	1	0	-	0	1	-	1	11	2	13
31	2	-	2	0	-	0	1	-	1	18	8	26
32	1	2	3	0	-	0	2	-	2	26	21	47
33	3	2	5	0	-	0	4	3	7	30	31	61
34	6	6	12	0	-	0	6	3	9	39	22	61
35	3	5	8	0	1	1	3	5	8	32	23	55
36	13	6	19	0	1	1	3	3	6	33	27	60
37	3	6	9	0	0	0	1	3	4	37	18	55
38	6	10	16	0	0	0	1	5	6	42	27	69
39	5	3	8	1	1	2	0	1	1	36	20	56
40	7	2	9	0	1	1	2	1	3	57	30	87
41	11	4	15	1	0	1	2	1	3	71	40	111
42	11	6	17	1	1	2	4	2	6	83	50	133
43	3	8	11	0	0	0	7	2	9	70	60	130
44	5	4	9	1	0	1	5	2	7	85	75	160
45	7	8	15	0	0	0	0	4	4	63	72	135
46	3	7	10	0	1	1	4	3	7	46	69	115
47	1	5	6	1	0	1	2	4	6	30	59	89
48	1	1	2	0	2	2	1	4	5	19	28	47
49	3	3	6	0	0	0	0	1	1	9	23	32
50	1	0	1	0	2	2	1	0	1	5	15	20
51	1	0	1	1	1	2	0	1	1	5	6	11
52	1	0	1	1	0	1	0	1	1	5	5	10
53	0	0	0	0	0	0	0	1	1	6	3	9
54	1	1	2	2	0	2	1	1	2	10	7	17
55	1	1	2	1	1	2	0	2	2	8	7	15
56	0	0	0	0	2	2	0	0	0	6	6	12
57	0	1	1	2	1	3	0	0	0	7	17	24
58	2	0	2	2	3	5	0	0	0	9	15	24
59	1	3	4	1	4	5	1	1	2	3	15	18
60	-	1	1	1	5	6	0	1	1	1	14	15
61	-	1	1	-	3	3	1	1	2	1	13	14
62	-	1	1	-	1	1	1	1	2	1	8	9
63	-	0	0	-	2	2	-	2	2	0	5	5
64	-	0	0	-	-	-	-	3	3	-	3	0
65	-	0	0	-	-	-	-	-	-	-	0	0
66	-	1	1	-	-	-	-	-	-	-	3	3
Total	103	98	201	17	33	50	54	62	116	915	852	1767

Appendix Table 2. Size composition of herring (Clupea harengus pallasi), numbers sampled, by haul and sex, for G.B. REED cruise GBR80-6, June 4-24, 1980.

Length (mm)	Haul no.								
	5			18			20		
	M	F	T	M	F	T	M	F	T
126-8	-	-	-	-	-	-	-	1	1
9-131	-	-	-	-	-	-	-	0	0
132-4	-	-	-	-	-	-	-	0	0
5-7	-	-	-	-	-	-	-	0	0
8-140	-	-	-	-	-	-	-	0	0
141-3	-	-	-	-	-	-	-	0	0
4-6	-	-	-	-	-	-	-	0	0
7-9	-	-	-	-	-	-	-	0	0
150-2	-	-	-	-	-	-	-	0	0
3-5	-	-	-	-	-	-	-	0	0
6-8	-	-	-	-	-	-	-	0	0
9-161	-	-	-	-	-	-	-	0	0
162-4	-	-	-	-	-	-	-	0	0
5-7	-	-	-	-	-	-	-	0	0
8-170	-	-	-	-	-	-	-	0	0
171-3	-	-	-	1	-	1	-	0	0
4-6	-	-	-	1	-	1	-	0	0
7-9	-	-	-	0	-	0	-	2	2
180-2	2	-	2	0	-	0	2	2	4
3-5	1	2	3	0	-	0	2	1	3
6-8	0	1	1	0	-	0	5	9	14
9-191	3	0	3	0	1	1	5	11	16
192-4	4	1	5	3	0	3	6	5	11
5-7	2	0	2	0	0	0	1	3	4
8-200	2	5	7	0	1	1	1	3	4

Appendix Table 2 (cont'd)

Length (mm)	Haul no.								
	5			18			20		
	M	F	T	M	F	T	M	F	T
201-3	0	1	1	0	3	3	4	2	6
4-6	1	0	1	1	0	1	0	1	1
7-9	1	0	1	0	0	0	0	1	1
210-2	2	2	4	0	2	2	2	0	2
3-5	1	1	2	0	0	0	2	3	5
6-8	0	2	2	1	1	2	2	1	3
9-221	0	2	2	4	1	5	1	0	1
222-4	3	1	4	1	1	2	0	1	1
5-7	2	1	3	1	2	3	1	0	1
8-230	1	4	5	3	0	3	1	1	2
231-3	8	5	13	4	3	7	3	5	8
4-6	5	0	5	2	2	4	0	3	3
7-9	1	2	3	3	0	3	2	0	2
240-2	2	3	5	3	3	6	2	0	2
3-5	0	2	2	2	4	6	0	0	0
6-8	2	0	2	1	2	3	0	1	1
9-251	5	0	5	5	5	10	0	0	0
2-4	5	1	6	1	5	6	1	0	1
5-7	0	0	0	2	1	3	0	1	1
8-260	1	0	1	4	6	10	-	-	-
1-3	1	3	4	2	4	6	-	-	-
4-6	1	0	1	1	2	3	-	-	-
7-9	3	2	5	1	2	3	-	-	-
270-2	-	0	0	1	0	1	-	-	-
3-5	-	0	0	0	1	1	-	-	-
6-8	-	0	0	-	-	-	-	-	-
9-281	-	1	1	-	-	-	-	-	-
Total	59	42	101	48	52	100	43	57	100

Appendix Table 2 (cont'd)

Length (mm)	Haul no.											
	21			22			24			Total		
	M	F	T	M	F	T	M	F	T	M	F	GT
126-8	-	-	-	-	-	-	-	-	-	-	1	1
9-131	-	-	-	-	-	-	-	-	-	-	0	0
132-4	-	-	-	-	-	-	-	-	-	-	0	0
5-7	-	-	-	-	-	-	-	-	-	-	0	0
8-140	-	-	-	-	-	-	-	-	-	-	0	0
141-3	-	-	-	-	-	-	-	-	-	-	0	0
4-6	-	-	-	-	-	-	-	-	-	-	0	0
7-9	-	-	-	-	-	-	-	-	-	-	0	0
150-2	-	-	-	-	-	-	-	-	-	-	0	0
3-5	-	-	-	-	-	-	-	-	-	-	0	0
6-8	-	-	-	-	-	-	-	-	-	-	0	0
9-161	-	-	-	-	-	-	-	-	-	-	0	0
162-4	-	-	-	-	-	-	-	-	-	-	0	0
5-7	-	-	-	-	-	-	-	-	-	-	0	0
8-170	-	-	-	-	-	-	-	-	-	-	0	0
171-3	-	-	-	-	-	-	1	-	1	2	0	2
4-6	-	-	-	-	-	-	0	-	0	1	0	1
7-9	-	-	-	-	-	-	0	1	1	0	3	3
180-2	3	-	3	1	-	1	6	0	6	14	2	16
3-5	1	2	.3	0	-	0	4	2	6	8	7	15
6-8	3	3	6	0	-	0	7	3	10	15	16	31
9-191	2	9	11	0	1	1	10	8	18	20	30	50
192-4	6	5	11	0	0	0	6	3	9	25	14	39
5-7	2	2	4	0	0	0	6	6	12	11	11	22
8-200	4	2	6	2	0	2	3	4	7	12	15	27

Appendix Table 2 (cont'd)

Length (mm)	Haul no.											
	21			22			24			Total		
	M	F	T	M	F	T	M	F	T	M	F	GT
201-3	1	0	1	0	2	2	1	3	4	6	11	17
4-6	0	2	2	0	1	1	2	1	3	4	5	9
7-9	0	0	0	0	0	0	0	0	0	1	1	2
210-2	3	0	3	2	2	4	0	1	1	9	7	16
3-5	3	0	3	3	2	5	1	1	2	10	7	17
6-8	2	0	2	2	2	4	2	1	3	9	7	16
9-221	5	1	6	5	2	7	0	3	3	15	9	24
222-4	3	0	3	9	3	12	0	0	0	16	6	22
5-7	2	2	4	2	3	5	3	2	5	11	10	21
8-230	4	3	7	1	6	7	0	0	0	10	14	24
231-3	2	2	4	3	9	12	1	1	2	21	25	46
4-6	1	1	2	3	2	5	1	1	2	12	9	21
7-9	0	1	1	2	5	7	0	0	0	8	8	16
240-2	3	3	6	4	7	11	1	1	2	15	17	32
3-5	0	0	0	2	3	5	1	1	2	5	10	15
6-8	1	1	2	0	1	1	-	1	1	4	6	10
9-251	3	0	3	0	1	1	-	-	-	13	6	19
2-4	1	1	2	3	0	3	-	-	-	11	7	18
5-7	1	0	1	0	1	1	-	-	-	3	3	6
8-260	2	0	2	-	0	0	-	-	-	7	6	13
1-3	0	0	0	-	2	2	-	-	-	3	9	12
4-6	-	1	1	-	0	0	-	-	-	2	3	5
7-9	-	0	0	-	0	0	-	-	-	4	4	8
270-2	-	1	1	-	1	1	-	-	-	1	2	3
3-5	-	0	0	-	-	-	-	-	-	-	1	1
6-8	-	0	0	-	-	-	-	-	-	-	0	0
9-281	-	1	1	-	-	-	-	-	-	-	2	2
Total	58	43	101	44	56	100	56	44	100	308	294	602

Appendix Table 3. Size composition of yellowtail rockfish (*Sebastes flavidus*), numbers sampled, by haul, by sex for CGS G.B. REED cruise GBR80-6, June 4-24, 1980.

Fork length (cm)	Tow no.									Total		
	5			9			10					
	M	F	T	M	F	T	M	F	T	M	F	GT
36	1	-	1	-	-	-	-	-	-	1	-	1
37	0	-	0	-	-	-	-	-	-	0	-	0
38	0	-	0	-	-	-	1	-	1	1	-	1
39	0	-	0	-	-	-	1	-	1	1	-	1
40	0	-	0	-	-	-	4	-	4	4	-	4
41	0	-	0	-	-	-	3	1	4	3	1	4
42	0	-	0	-	-	-	3	2	5	3	2	5
43	1	-	1	-	-	-	7	3	10	8	3	11
44	1	-	1	-	1	1	6	5	11	7	6	13
45	0	-	0	3	0	3	3	3	6	6	3	9
46	0	-	0	3	0	3	11	0	11	14	0	14
47	3	-	3	8	0	8	13	2	15	24	2	26
48	0	-	0	12	2	14	16	0	16	28	2	30
49	1	-	1	10	0	10	12	0	12	23	0	23
50	1	-	1	8	0	8	9	2	11	18	2	20
51	0	-	0	3	1	4	2	6	8	5	7	12
52	0	-	0	-	2	2	1	1	2	1	3	4
53	1	-	1	-	0	0	1	3	4	2	3	5
54	-	-	-	-	1	1	-	1	1	-	2	2
55	-	-	-	-	1	1	-	2	2	-	3	3
56	-	-	-	-	0	0	-	-	-	-	0	0
57	-	-	-	-	1	1	-	-	-	-	1	1
Total	9	0	9	47	9	56	93	31	124	149	40	189

Appendix Table 4. Size composition of sablefish (Anoplopoma fimbria), sampled, by haul, by sex for CGS G.B. REED cruise GBR80-6, June 4-24, 1980.

Fork length (cm)	Tow no.								
	21			22			Total		
	M	F	T	M	F	T	M	F	GT
34	-	-	-	2	-	2	2	-	2
35	1	-	1	1	2	3	2	2	4
36	0	-	0	3	1	4	3	1	4
37	0	-	0	0	1	1	0	1	1
38	0	-	0	0	2	2	0	2	2
39	0	-	0	1	1	2	1	1	2
40	0	-	0	1	1	2	1	1	2
41	0	-	0	2	1	3	2	1	3
42	0	-	0	8	0	8	8	0	8
43	3	-	3	14	5	19	17	5	22
44	1	1	2	17	7	24	18	8	26
45	3	3	6	13	9	22	16	12	28
46	1	1	2	9	9	18	10	10	20
47	2	3	5	6	12	18	8	15	23
48	2	2	4	10	8	18	12	10	22
49	1	4	5	3	5	8	4	9	13
50	1	0	1	4	2	6	5	2	7
51	-	2	2	1	0	1	1	2	3
52	-	2	2	1	0	1	1	2	3
53	-	-	-	-	0	0	-	0	0
54	-	-	-	-	0	0	-	0	0
55	-	-	-	-	1	1	-	1	1
Total	15	8	33	96	67	163	111	85	196

