G.B. Reed Groundfish Cruise No. 79-4, June 26-July 13, 1979

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ABSTRACT

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Pacific cod were caught by on-bottom trawl over a depth range of 10-79 fm in Hecate Strait and Dixon Entrance during early summer, 1979. Mean catch rates per 10-fm depth interval were usually less than 500 kg/hr. Juveniles (mostly age 1+) predominated in the catches. Abnormally warm on-bottom temperatures were thought to have caused the low abundance of adult cod on the grounds trawled.

Key words: Pacific cod; distribution and abundance; Hecate Strait.

RÉSUMÉ

Westrheim, S. J., R. P. Foucher, W. R. Harling, and W. Shaw. 1980. G.B. REED Groundfish Cruise No. 79-4, June 26-July 13, 1979. Can. Data Rep. Fish. Aquat. Sci. 179: 73 p.

Au début de l'été 1979, on a capturé des morues du Pacifique par chalutage sur le fond, à des profondeurs de 10 à 79 brasses, dans le détroit d'Hécate et l'entrée Dixon. Le taux moyen des prises, par tranche de 10 brasses, était habituellement inférieur à 500 kg/h. Les jeunes (surtout âgés de 1+ an) prédominaient. Les températures anormalement élevées du fond semblent être la cause de la faible quantité de morue dans les zones étudiées.

Mots clés: morue du Pacifique, distribution et abondance, détroit d'Hécate

INTRODUCTION

G. B. REED Groundfish Cruise 79-4 took place during June 26-July 13, 1979. Primary purpose of the cruise was to investigate the abundance and distribution of Pacific cod (Gadus macrocephalus) in Hecate Strait and Dixon Entrance (Fig. 1). Secondary purposes were to collect temperature and salinity data in Queen Charlotte Sound and Hecate Strait, and sample surficial sediments in Hecate Strait.

One port call was made, at Sandspit on June 28, to pick up S. J. Westrheim.

This project was supported in part by funds from the Department of the Environment, Province of British Columbia.

MATERIALS AND METHODS

Abundance and distribution of Pacific cod were investigated with echo sounder (SIMRAD EK-38), and the standard, Granton on-bottom trawl, equipped with a rubber-disc groundline (see Appendix Table 1 for detailed description).

Water temperatures were collected with bathythermographs, XBT, and Nansen bottles.

Surficial sediment samples were collected with a Shipek bottom grab. Echo-sounder transects were usually conducted between bottom-grab stations for interpolation purposes.

RESULTS

GENERAL

Trawl hauls completed totalled 29, of which 26 were deemed usable. (Fig. 2). Following is a summary of the total catch by species:

Species	Catch (kg)	%
Arrowtooth flounder	9,906	27.4
Pacific cod	6,085	16.8
English sole	4,671	12.9
Walleye pollock	2,672	7.4
Rock sole	2,103	5.8
Sable fish	1,854	5.1
Starfish (mixed)	1,636	4.5
Pacific halibut	1,270 (316)	3.5
Kex sole	1,106	3.1
Spiny dogfish	1,002	2.8
Other	3,839	10.6
Total	36,144	99.9

Appendix Table 1 contains detailed records of location and species composition for each haul.

A total of 25,127 specimens (comprising 12 species) were sampled for fork length (Table 1). Pacific cod specimens totalled 11,483. For age determination, scales were collected from 377 Pacific cod, and otoliths were collected from 13 petrale sole. Stomach contents were recorded for 559 Pacific cod. Appendix Tables 2-7 contain size compositions, by haul, of all species sampled.

Hydrographic stations occupied totalled 14 in Queen Charlotte Sound and 44 in Hecate Strait (Table 2, Fig. 3). Water temperatures were collected at all of these stations, and salinity samples at 14. Appendix Table 8 contains detailed records by station. Analysis of these collections will be undertaken by oceanographic staff at the Pacific Biological Station.

Mean water temperatures in the shallower portions (10-99 fm) of Hecate Strait ranged from 11.5-13.8°C at the surface, and 6.2-11.3 on the bottom (Table 2). At depths shallower than 50 fm, where cod are normally found at this time of year, mean bottom temperature was 8.2-11.3°C and varied inversely with depth. At 30-49 fm, mean bottom temperatures were 8.2-9.1°C compared with 6.4-6.7°C in July 1975.

In Moresby Gully (deep portion of Hecate Strait), mean bottom temperature likewise varied inversely with depth, and ranged from 5.0°C at 200-219 fm to 6.2°C at 80-99 fm (Table 2). Comparable values in July-August 1978 were 4.8-5.4°C.

In Queen Charlotte Sound, mean bottom temperatures also varied inversely with depth -- 4.6°C at 220-239 fm to 6.5°C at 40-59 fm (Table 2). At 100-179 fm, mean bottom temperatures per 20-fm interval were 5.2-5.9°C in 1979, and 5.0-5.4°C in 1978.

Shipek-grab stations totalled 276, most of which were in sampling grids on established trawling grounds (Fig. 4). Appendix Table 9 contains detailed records for each station. Analysis of these collections will be undertaken by geologists at the Pacific Geo-Science Center.

PACIFIC COD DISTRIBUTION AND ABUNDANCE

Distribution and abundance of Pacific cod was investigated on five well-known trawling grounds--Two Peaks, Butterworth, White Rocks, Shell, and Horseshoe (Fig. 1). Depth range of trawling was 10-79 fms, and some cod were caught throughout this range (Table 3). Mean catch rates, by 10-fm interval, were generally poor within and among grounds -- 15-1,063 kg/hr, except for Shell ground -- 6,115 kg/hr (primarily age 1+ cod). Low abundance of cod on the grounds trawled is attributed to abnormally warm on-bottom water temperatures.

Echo-sounder scouting throughout the study area, including Reef Island and Ramsay Island Grounds, failed to locate any "typical" cod schools.

DIET OF PACIFIC COD

Principal diet components in the 559 cod stomachs were sandlance (Ammodytes hexapterus) and shrimp-euphausiids. Sandlance were found in 185 stomachs of cod 25-72 cm FL, while shrimp-euphausiids were found in 254 stomachs of cod 19-60 cm (Table 4). Sandlance were present in 50% or more of the stomachs from cod larger than 30 cm, while shrimp-euphausiids were present in 42% or more of the stomachs of cod less than 34 cm FL.

PERSONNEL

S. J. Westrheim (i/c)	Pacific Biological Station	June 28-July 13
R. P. Foucher	Pacific Biological Station	June 26-July 13
W. R. Harling	Pacific Biological Station	June 26-July 13
A. I. Matheson	Pacific Biological Station	June 26-July 13
W. Shaw	Pacific Biological Station	June 26-July 13

Table 1. Numbers of fish sampled, by species and type of sample during G.B. REED Groundfish Cruise 79-4, June 26-July 13, 1979.

Species	Fork length	Sex		Ageing		Stomach contents
		Male	Female	No.	Structure	
Pacific cod	11,483	990	946	377	Scales	559
Pacific herring	84	-	-	-	-	-
Pacific sandlance	98	-	-	-	-	-
Sablefish	760	-	-	-	-	-
Walleye pollock	3,152	650	742	-	-	-
Butter sole	243	-	-	-	-	-
Dover sole	456	70	120	-	-	-
English sole	6,317	119	217	-	-	-
Pacific halibut	316	-	-	-	-	-
Petrale sole	329	2	11	13	Otoliths	-
Rock sole	1,811	70	81	-	-	-
Pacific ocean perch	78	-	-	-	-	-
Total	25,127			390		559

Table 2. Surface and bottom water temperatures (°C), by area and depth interval, collected during G. B. REED Groundfish Cruise 79-4, June 26-July 13, 1979.

Depth interval (fm)	Surface temp. (°C)		Bottom temp. (°C)		
	Mean	Range	Mean	Range	N
		Hecate Strait (Shallow)[a]			
10- 19	11.5 (-)	10.1-12.4	11.3 (-)	10.0-12.1	7(-)
20- 29	12.4 (-)	11.8-13.1	10.2 (-)	9.3-11.2	3(-)
30- 39	13.8 (11.3)	-	9.1 (6.7)	-	1(4)
40- 49	12.1 (12.1)	12.0-12.2	8.2 (6.4)	7.9- 8.5	2(4)
50- 59	11.7 (-)	10.9-13.5	6.8 (-)	6.2- 7.8	9(-)
60- 69	12.0 (-)	11.3-12.5	6.2 (-)	6.0- 6.4	5(-)
70- 79	11.9 (-)	11.8-12.0	6.3 (-)	6.0- 6.5	2(-)
80- 89	12.2 (-)	11.8-13.1	6.5 (-)	6.5- 6.6	3(-)
90- 99	11.5 (-)	-	7.8 (-)	-	1(-)
		Moresby Gully[b]			
80- 99	13.8 (14.1)	-	6.2 (5.4)	-	1(1)
100-119	12.4 (13.9)	12.1-12.7	5.8 (5.4)	5.3- 6.4	4(2)
120-139	11.7 (14.0)	10.9-13.2	5.3 (4.9)	-	2(2)
140-159	13.5 (13.6)	-	5.1 (5.0)	-	1(1)
160-179	- (-)	-	- (-)	-	-(-)
180-199	13.1 (14.0)	12.8-13.3	5.0 (4.9)	4.9- 5.0	2(1)
200-219	12.9 (13.4)	-	5.0 (4.8)	-	1(2)
		Queen Charlotte Sound[b]			
40- 59	13.2 (-)	-	6.5 (-)	-	1(-)
60- 79	- (13.5)	-	- (6.6)	-	-(2)
80- 99	- (14.6)	-	- (6.5)	-	-(2)
100-119	13.1 (14.9)	12.6-13.6	5.9 (5.4)	5.7- 6.1	4(3)
120-139	13.3 (15.0)	12.6-13.6	5.8 (5.4)	5.5- 6.2	5(4)
140-159	13.1 (15.6)	12.9-13.3	5.5 (5.3)	5.3- 5.7	2(3)
160-179	12.5 (15.4)	-	5.2 (5.0)	-	1(1)
180-199	- (14.8)	-	- (4.9)	-	-(3)
200-219	- (14.4)	-	- (4.8)	-	-(2)
220-239	12.9 (-)	-	4.6 (-)	-	1(-)

[a] July 1975 values in parentheses.
[b] July-August 1978 values in parentheses.

Table 3. Pacific cod catch rates (kg/hr; no/hr) and modal size (cm), by ground and depth interval, during G.B. REED Groundfish Cruise 79-4, June 26-July 13, 1979.

Ground	Depth interval (fms)	No. of hauls[b]	Catch rate (kg/hr)	Catch rate (no./hr)	Modal size interval (cm)[a]
Two Peaks	30-39	2	346	121	71,65,47,56
	40-49	4	287	125	50,74,68,59
	50-59	1	156	74	47-50,65
Butterworth	10-19	1	32	80	32
	30-39	1	124	80	no mode
	40-49	1	200	124	41,47
White Rocks	30-39	2	15	16	no samples
	50-59	1	128	96	47
	60-69	1	192	176	44-47
Shell	30-39	3	6,115	16,635	32
Horseshoe	30-39	2	350	2,811	23
	40-49	2	1,063	1,083	44,29
	50-59	2	549	510	47,26
	60-69	2	122	155	44,35
	70-79	1	18	18	41
Total		26			

[a]Based on 3 cm size intervals
[b]Usable only.

Table 4. Incidence (numbers and percent) of sandlance and shrimp-euphausiids in Pacific cod stomachs, by length of cod, G.B. REED Groundfish Cruise 79-4, June 26-July 13, 1979.

Length[a] (cm)	Total no. of stomachs examined	Sandlance		Shrimp-Euphausiid	
		N	%	N	%
20	17	0	0	16	94
23	84	0	0	67	80
26	94	4	4	56	60
29	87	26	30	37	43
32	84	43	51	35	42
35	44	29	66	7	16
38	20	8	40	6	30
41	24	7	29	5	21
44	29	12	41	8	28
47	33	22	67	8	24
50	14	11	79	4	29
53	9	7	78	3	33
56	3	2	67	1	33
59	5	5	100	1	20
62	5	4	80	0	0
65	2	1	50	0	0
68	4	4	100	0	0
71	1	1	100	0	0
Total	559	185		254	

[a] Mid-point of 3-cm interval.

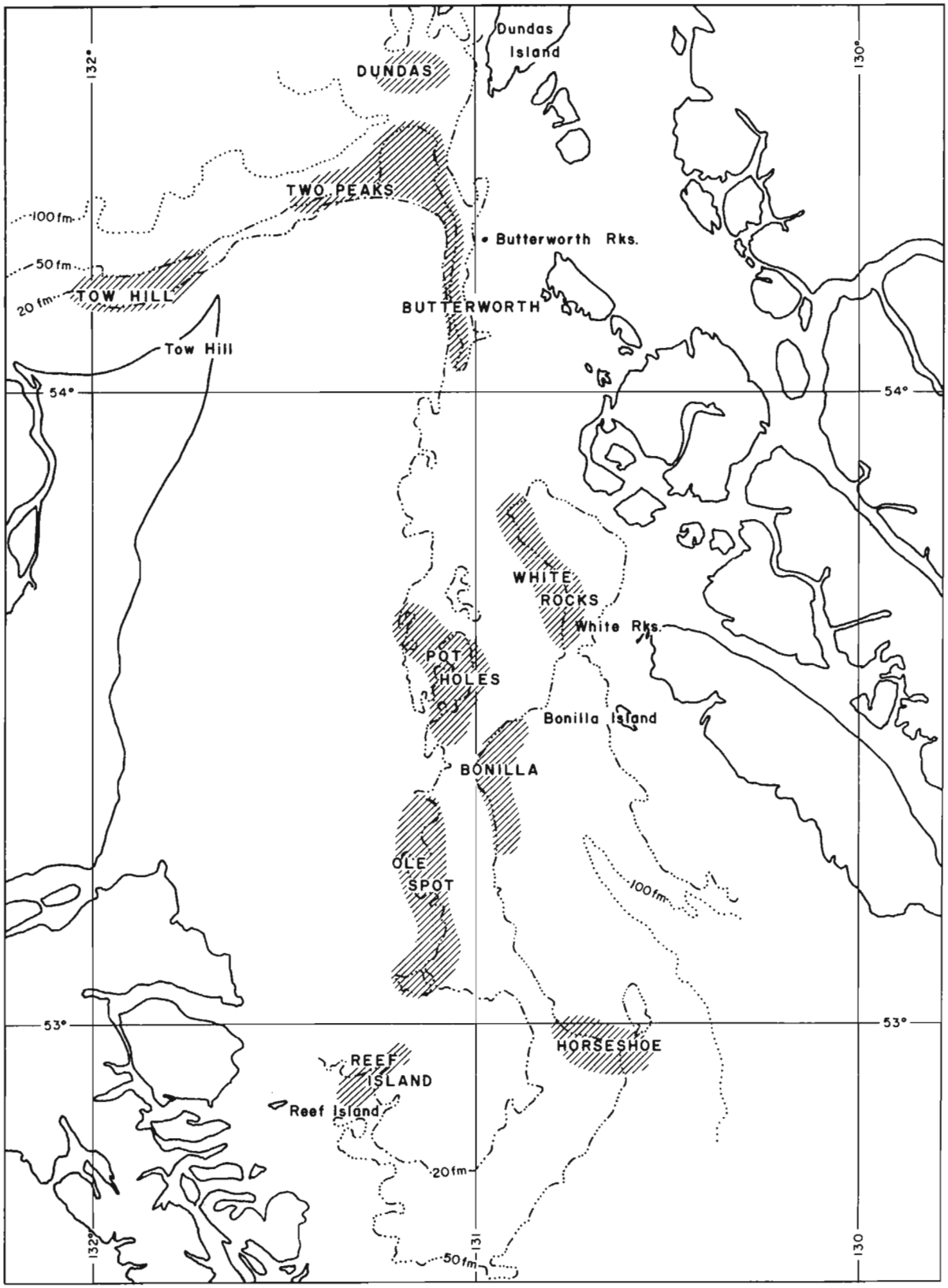

Fig. 1. Trawling grounds in Hecate Strait.

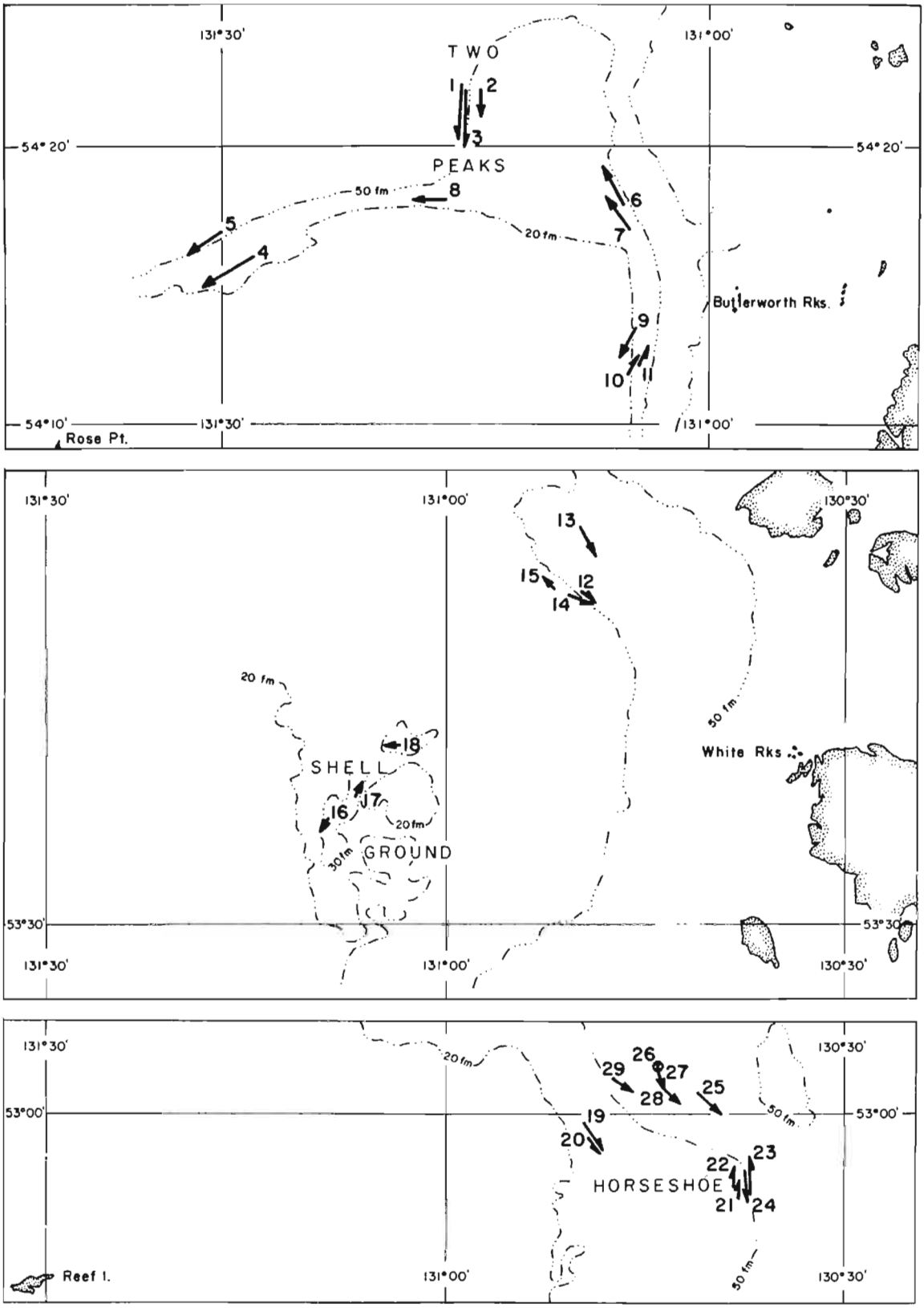

Fig. 2. Location of trawl hauls completed in Hecate Strait during G.B. REED Groundfish Cruise 79-4, June-July, 1979.

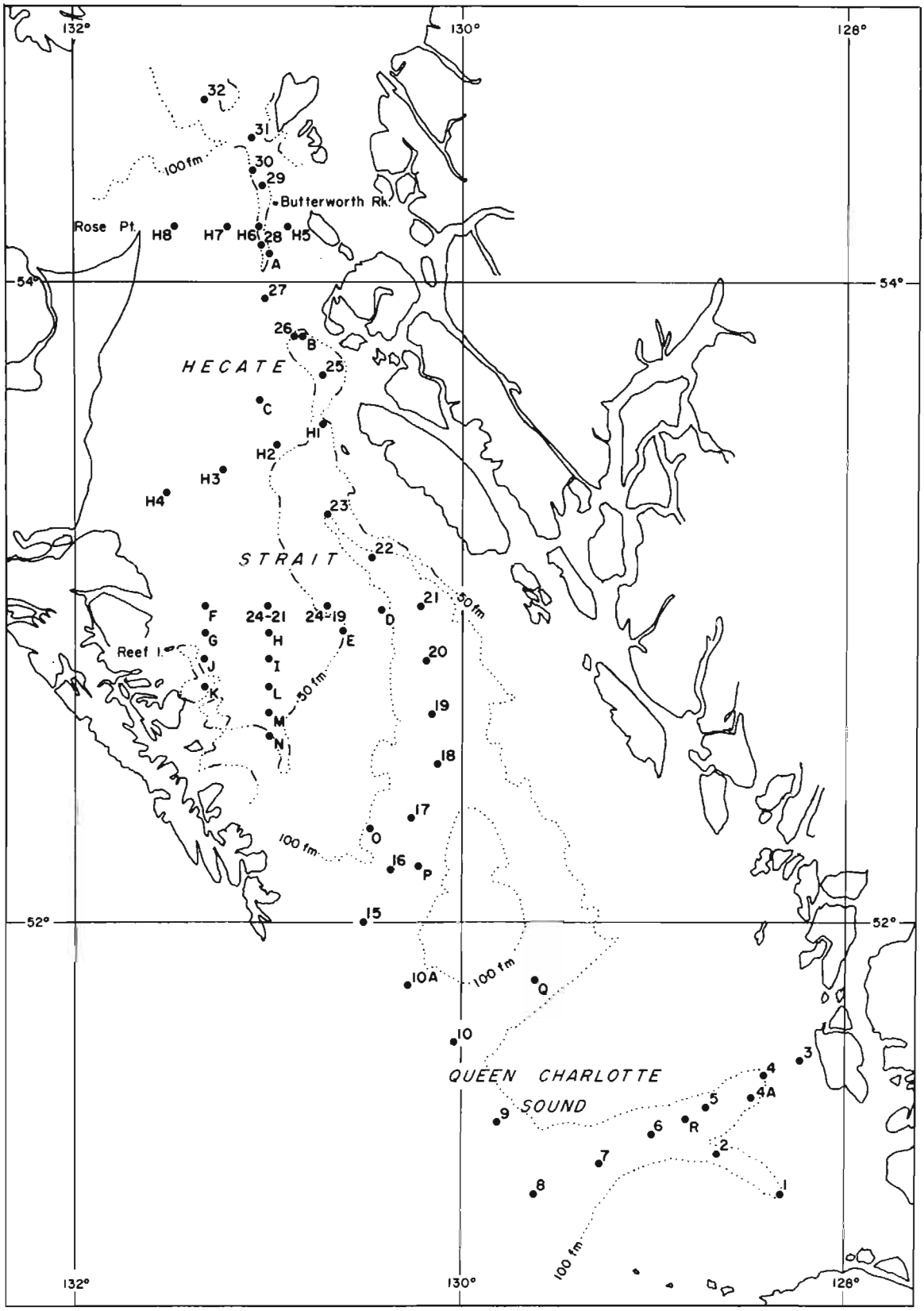

Fig. 3. Location of hydrographic stations occupied in Queen Charlotte Sound and Hecate Strait during G.B. REED Groundfish Cruise 79-4, June-July, 1979.

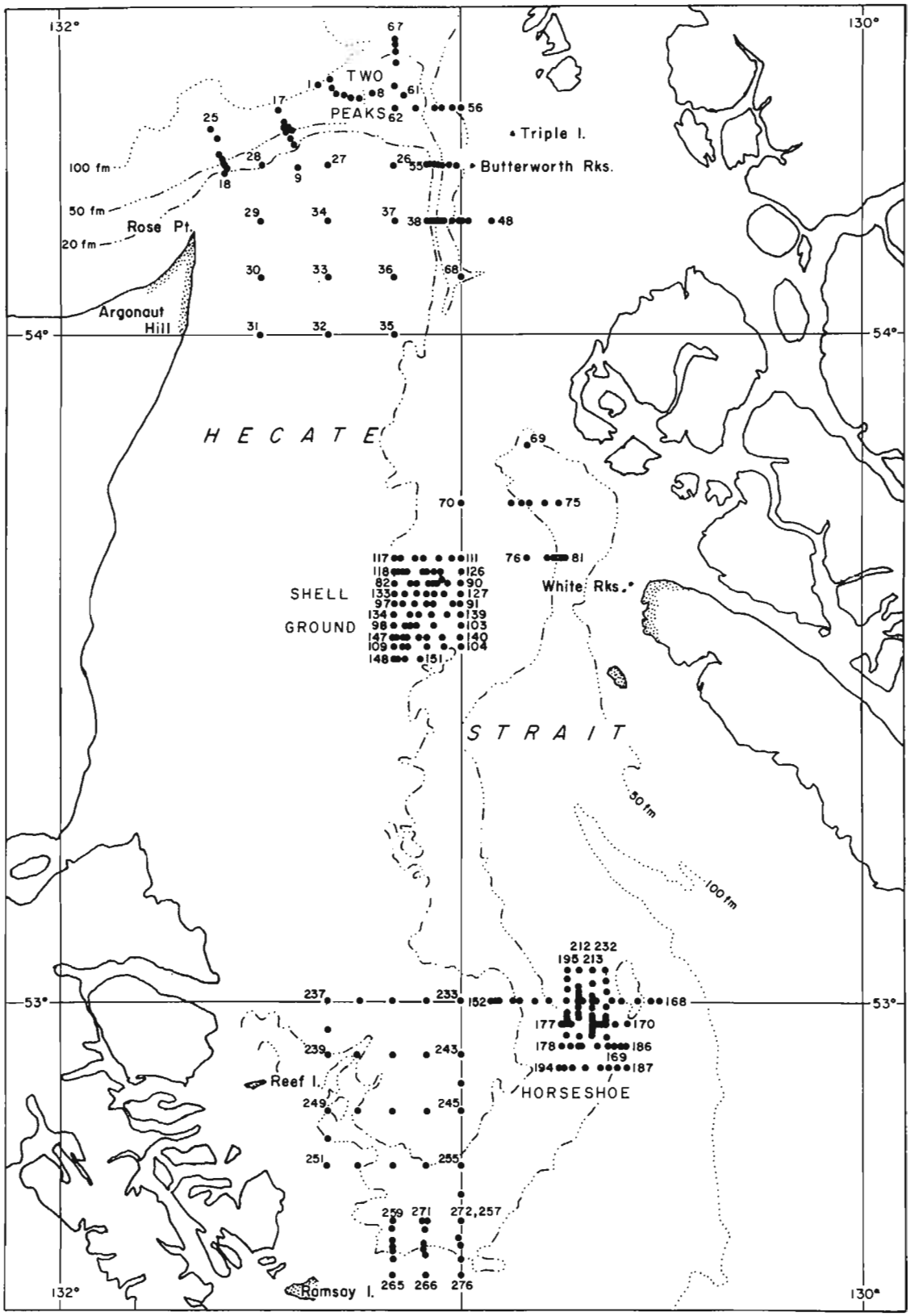

Fig. 4. Shipek-grab stations occupied during G.B. REED Groundfish Cruise 79-4, June-July, 1979.

APPENDIX TABLES

APPENDIX TABLE 1. FISHING LOG FOR G.B. REED GROUNDFISH CRUISE NO. 79-4, JUNE 26 - JULY 13, 1979

HAUL NO.		1	2	3	4	5
DATE		JUN 29	JUN 29	JUN 29	JUN 30	JUN 30
AREA		TP	TP	TP	TP	TP
START TIME	(PDT)	1038	1355	1552	1247	1440
DURATION	(MIN)	30	30	30	30	30
START N. LAT.	(DEG)	054	054	054	054	054
	(MIN)	23.4	22.0	22.0	16.1	17.0
W. LONG.	(DEG)	131	131	131	131	131
	(MIN)	13.3	14.1	15.0	28.1	30.0
DIRECTION (DEG.TRUE)		180	180	180	265	260
FINISH N. LAT.	(DEG)	054	054	054	054	054
	(MIN)	22.0	21.0	20.0	15.1	16.0
W.LONG.	(DEG)	131	131	131	131	131
	(MIN)	14.2	14.0	15.0	31.1	32.0
HAUL DISTANCE (N.M.)		1.5	1.2	2.0	2.2	1.3
DEPTH	(FATHOMS)	45- 45	47- 46	54- 57	42- 43	54- 56
	(METERS)	82- 82	85- 84	98-104	76- 78	98-102
DEPTH INTERVAL	(FM)	40	40	50	40	50
TYPE OF GEAR		1	1	1	1	1
TOTAL CATCH	(KG)	3262	2159	..	2427	1766
REMARKS		USABLE	USABLE	UNUSABLE	USABLE	USABLE

APPENDIX TABLE 1 CONTINUED

HAUL NO.	1	2	3	4	5
DATE	JUN 29	JUN 29	JUN 29	JUN 30	JUN 30
AREA	TP	TP	TP	TP	TP
TOTAL CATCH (KG)	3262	2159	0	2427	1766
ARROWTOOTH FLOUNDER	2221	1594	..	577	1170
BUTTER SOLE	2	19	..	45	35
CURLFIN SOLE	..	..	..	..	..
DOVER SOLE	1	T	..	..	13
ENGLISH SOLE	127	13	..	24	50
FLATHEAD SOLE	3	3	..	..	..
PACIFIC HALIBUT	115	107	..	218	18
PACIFIC SANDDAB	..	..	..	..	..
PETRALE SOLE	2	1	..	T	..
REX SOLE	8	1	..	T	63
ROCK SOLE	4	5	..	51	T
SAND SOLE	..	..	..	..	..
STARRY FLOUNDER	..	..	..	..	..
OTHER FLATFISH	..	..	..	..	..
S. ALUTUS	..	..	..	..	..
S. BREVISPINIS	7	2	..	1	23
S. CRAMERI	..	..	..	..	..
S. FLAVIDUS	..	22	..	..	5
S. PAUCISPINIS	..	15	..	..	..
S. PINNIGER	2	..	..	..	..
S. RUBERRIMUS	..	..	..	..	..
OTHER ROCKFISH	..	..	..	..	..
EULACHON	..	..	..	..	..
LINGCOD	..	..	..	..	10
PACIFIC COD	121	105	..	169	78
PACIFIC HERRING	..	..	..	..	..
STURGEON POACHER	..	..	..	..	..
SABLEFISH	435	121	..	60	92
WALLEYE POLLOCK	76	54	..	1057	89
OTHER ROUNDFISH	..	..	..	..	..
RATFISH	T	..	..	..	T
SKATES	95	34	..	39	25
SPINY DOGFISH	43	61	..	186	88
OTHER SELACHII	..	..	..	..	..
INVERTEBRATES	..	2	..	T	7

APPENDIX TABLE 1 CONTINUED

HAUL NO.	6	7	8	9	10
DATE	JUL 1	JUL 1	JUL 1	JUL 2	JUL 2
AREA	TP	TP	TP	BE	BE
START TIME (PDT)	0831	1218	1520	0855	1343
DURATION (MIN)	30	30	30	15	15
START N. LAT. (DEG)	054	054	054	054	054
(MIN)	17.8	17.0	18.1	13.5	11.8
W. LONG. (DEG)	131	131	131	131	131
(MIN)	05.2	04.1	16.0	04.6	05.0
DIRECTION (DEG.TRUE)	340	320	270	200	000
FINISH N. LAT. (DEG)	054	054	054	054	054
(MIN)	19.2	17.0	18.0	12.6	12.5
W.LONG. (DEG)	136	131	131	131	131
(MIN)	06.6	04.1	18.1	05.6	04.5
HAUL DISTANCE (N.M.)	1.7	1.7	1.3	1.0	0.8
DEPTH (FATHOMS)	36- 38	37- 37	45- 45	15- 15	14- 37
(METERS)	65- 69	67- 67	82- 82	27- 27	25- 67
DEPTH INTERVAL (FM)	30	30	40	10	30
TYPE OF GEAR	1	1	1	1	1
TOTAL CATCH (KG)	2446	2177	2244	904	1193
REMARKS	USABLE	USABLE	USABLE	USABLE	USABLE

APPENDIX TABLE 1 CONTINUED

HAUL NO.	6	7	8	9	10
DATE	JUL 1	JUL 1	JUL 1	JUL 2	JUL 2
AREA	TP	TP	TP	BE	BE
TOTAL CATCH (KG)	2446	2177	2244	904	1193
ARROWTOOTH FLOUNDER	309	216	808	5	64
BUTTER SOLE	41	31	52	1	5
CURLFIN SOLE	..	..	..	..	..
DOVER SOLE	9	3	..	3	5
ENGLISH SOLE	976	833	217	157	395
FLATHEAD SOLE	..	..	..	..	..
PACIFIC HALIBUT	34	60	134	47	15
PACIFIC SANDDAB	..	..	..	T	..
PETRALE SOLE	..	..	..	1	..
REX SOLE	287	196	3	2	89
ROCK SOLE	15	36	T	448	60
SAND SOLE	..	..	..	4	..
STARRY FLOUNDER	..	..	8	10	4
OTHER FLATFISH	..	..	..	..	..
S. ALUTUS	..	..	..	..	..
S. BREVISPINIS	..	..	T	..	2
S. CRAMERI	..	..	..	..	..
S. FLAVIDUS	..	..	..	..	..
S. PAUCISPINIS	..	7	4	..	..
S. PINNIGER	..	..	..	..	..
S. RUBERRIMUS	..	..	..	..	..
OTHER ROCKFISH	..	T	..	..	..
EULACHON	..	..	..	..	5
LINGCOD	2	T	..	3	4
PACIFIC COD	298	48	178	8	31
PACIFIC HERRING	T	..	..	T	..
STURGEON POACHER	T	T	..	T	1
SABLEFISH	38	29	35	15	78
WALLEYE POLLOCK	103	48	683	2	19
OTHER ROUNDFISH	..	T	..	..	..
RATFISH	1	..	..	..	..
SKATES	15	105	5	49	44
SPINY DOGFISH	28	23	81	5	86
OTHER SELACHII	..	..	..	..	..
INVERTEBRATES	290	542	36	144	286

APPENDIX TABLE 1 CONTINUED

HAUL NO.	11	12	13	14	15
DATE	JUL 2	JUL 4	JUL 4	JUL 4	JUL 4
AREA	BE	WR	WR	WR	WR
START TIME (PDT)	1539	0835	1005	1336	1507
DURATION (MIN)	15	15	15	15	10
START N. LAT. (DEG)	054	053	053	053	053
(MIN)	12.1	44.9	47.8	44.8	45.1
W. LONG. (DEG)	131	130	130	130	130
(MIN)	04.4	49.9	49.9	51.0	52.0
DIRECTION (DEG.TRUE)	000	130	120	140	330
FINISH N. LAT. (DEG)	054	053	053	053	053
(MIN)	12.8	44.5	46.6	44.4	45.5
W.LONG. (DEG)	131	130	130	130	130
(MIN)	03.8	49.0	48.9	49.0	52.7
HAUL DISTANCE (N.M.)	0.9	0.8	0.8	1.4	1.7
DEPTH (FATHOMS)	42- 44	52- 53	62- 65	36- 30	38- 40
(METERS)	76- 80	95- 96	113-118	65- 54	69- 73
DEPTH INTERVAL (FM)	40	50	60	30	30
TYPE OF GEAR	1	1	1	1	1
TOTAL CATCH (KG)	1164	1009	1054	91	487
REMARKS	USABLE	USABLE	USABLE	USABLE	USABLE

APPENDIX TABLE 1 CONTINUED

HAUL NO.	11	12	13	14	15
DATE	JUL 2	JUL 4	JUL 4	JUL 4	JUL 4
AREA	BE	WR	WR	WR	WR
TOTAL CATCH (KG)	1164	1009	1054	91	487
ARROWTOOTH FLOUNDER	78	186	322	..	103
BUTTER SOLE	5	..	..	..	8
CURLFIN SOLE	..	..	..	..	..
DOVER SOLE	25	83	372	..	..
ENGLISH SOLE	214	142	29	6	102
FLATHEAD SOLE	3	T	51	..	..
PACIFIC HALIBUT	8	14	..	25	82
PACIFIC SANDDAB	..	..	..	..	..
PETRALE SOLE	..	..	..	2	..
REX SOLE	129	56	25	..	24
ROCK SOLE	10	T	..	16	7
SAND SOLE	..	..	..	..	..
STARRY FLOUNDER	..	..	..	..	..
OTHER FLATFISH	..	..	T	..	T
S. ALUTUS	..	..	4	..	..
S. BREVISPINIS	..	4	..	..	..
S. CRAMERI	..	..	..	..	..
S. FLAVIDUS	..	..	..	..	..
S. PAUCISPINIS	..	9	..	..	..
S. PINNIGER	..	..	..	..	..
S. RUBERRIMUS	..	..	..	..	..
OTHER ROCKFISH	..	..	..	..	..
EULACHON	T	..	1	..	..
LINGCOD	..	..	..	..	18
PACIFIC COD	50	32	48	T	5
PACIFIC HERRING	..	T	..	T	T
STURGEON POACHER	..	..	..	..	..
SABLEFISH	37	317	96	2	77
WALLEYE POLLOCK	80	96	18	..	T
OTHER ROUNDFISH	..	..	..	..	..
RATFISH	..	62	72	38	19
SKATES	68	..	4	..	20
SPINY DOGFISH	36	8	7	..	19
OTHER SELACHII	..	..	..	..	..
INVERTEBRATES	421	T	5	2	3

APPENDIX TABLE 1 CONTINUED

HAUL NO.	16	17	18	19	20
DATE	JUL 5	JUL 5	JUL 6	JUL 7	JUL 7
AREA	SH	SH	SH	HS	HS
START TIME (PDT)	1024	1430	0820	0818	1527
DURATION (MIN)	15	15	10	30	10
START N. LAT. (DEG)	053	053	053	052	052
(MIN)	34.8	35.8	38.1	59.6	58.8
W. LONG. (DEG)	131	131	131	130	130
(MIN)	08.9	06.9	03.5	49.6	49.2
DIRECTION (DEG.TRUE)	190	035	270	140	140
FINISH N. LAT. (DEG)	053	053	053	052	052
(MIN)	34.3	36.4	38.1	58.3	58.2
W.LONG. (DEG)	131	131	131	130	130
(MIN)	09.4	06.3	04.5	48.1	48.3
HAUL DISTANCE (N.M.)	0.7	0.6	0.7	1.8	1.1
DEPTH (FATHOMS)	39- 34	35- 28	36- 39	35- 36	36- 35
(METERS)	71- 62	64- 51	65- 71	64- 65	65- 64
DEPTH INTERVAL (FM)	30	30	30	30	30
TYPE OF GEAR	1	1	1	1	1
TOTAL CATCH (KG)	2586	244	2895	776	243
REMARKS	USABLE	USABLE	USABLE	USABLE	USABLE

APPENDIX TABLE 1 CONTINUED

HAUL NO.	16	17	18	19	20
DATE	JUL 5	JUL 5	JUL 6	JUL 7	JUL 7
AREA	SH	SH	SH	HS	HS
TOTAL CATCH (KG)	2586	244	2895	776	243
ARROWTOOTH FLOUNDER	2	..	..	T	..
BUTTER SOLE	17	..	..	T	1
CURLFIN SOLE	..	..	1	3	..
DOVER SOLE	40	..	T	1	3
ENGLISH SOLE	537	..	1	376	56
FLATHEAD SOLE	..	..	..	..	..
PACIFIC HALIBUT	38	41	30	37	24
PACIFIC SANDDAB	4	..	3	52	21
PETRALE SOLE	2	..	..	10	4
REX SOLE	7	..	..	1	..
ROCK SOLE	759	100	143	29	17
SAND SOLE	T	..	..	..	..
STARRY FLOUNDER	..	..	..	..	..
OTHER FLATFISH	T	..	..	..	..
S. ALUTUS	..	..	..	..	..
S. BREVISPINIS	..	..	..	..	..
S. CRAMERI	..	..	..	..	..
S. FLAVIDUS	..	..	..	..	..
S. PAUCISPINIS	..	..	..	..	..
S. PINNIGER	..	..	..	..	..
S. RUBERRIMUS	..	..	..	..	..
OTHER ROCKFISH	..	..	T	..	..
EULACHON	..	..	..	..	..
LINGCOD	T	..	11	..	17
PACIFIC COD	880	1	2470	252	98
PACIFIC HERRING	..	..	T	T	..
STURGEON POACHER	..	..	..	1	T
SABLEFISH	44	..	..	..	..
WALLEYE POLLOCK	T	..	..	..	..
OTHER ROUNDFISH	..	..	..	..	..
RATFISH	2	..	92	2	..
SKATES	38	73	120	2	..
SPINY DOGFISH	129	20	10	2	..
OTHER SELACHII	..	..	..	..	..
INVERTEBRATES	87	9	14	8	2

APPENDIX TABLE 1 CONTINUED

HAUL NO.		21	22	23	24	25
DATE		JUL 8	JUL 8	JUL 8	JUL 8	JUL 9
AREA		HS	HS	HS	HS	HS
START TIME	(PDT)	0830	1029	1220	1515	0840
DURATION	(MIN)	15	17	30	30	30
START N. LAT.	(DEG)	052	052	052	052	053
	(MIN)	56.1	56.6	56.3	57.4	00.8
W. LONG.	(DEG)	130	130	130	130	130
	(MIN)	37.9	38.3	37.0	37.4	41.1
DIRECTION (DEG.TRUE)		000	360	350	165	130
FINISH N. LAT.	(DEG)	052	052	052	052	053
	(MIN)	56.9	57.6	57.9	56.1	00.0
W.LONG.	(DEG)	130	130	130	130	130
	(MIN)	37.9	38.3	37.2	37.1	39.3
HAUL DISTANCE (N.M.)		0.8	1.2	1.7	1.5	1.3
DEPTH	(FATHOMS)	44- 47	44- 43	52- 67	54- 48	81- 73
	(METERS)	80- 85	80- 78	95-122	98- 87	148-133
DEPTH INTERVAL	(FM)	40	40	50	50	70
TYPE OF GEAR		1	1	1	1	1
TOTAL CATCH	(KG)	926	427	787	892	2405
REMARKS		USABLE	USABLE	USABLE	USABLE	USABLE

APPENDIX TABLE 1 CONTINUED

HAUL NO.	21	22	23	24	25
DATE	JUL 8	JUL 8	JUL 8	JUL 8	JUL 9
AREA	HS	HS	HS	HS	HS
TOTAL CATCH (KG)	926	427	787	892	2405
ARROWTOOTH FLOUNDER	34	13	73	47	1568
BUTTER SOLE	..	2	..	1	..
CURLFIN SOLE	T	T	..	1	..
DOVER SOLE	..	..	4	1	273
ENGLISH SOLE	40	24	95	24	123
FLATHEAD SOLE	..	..	..	..	12
PACIFIC HALIBUT	31	34	122	22	..
PACIFIC SANDDAB	T	..	..	..	..
PETRALE SOLE	87	111	234	77	..
REX SOLE	3	T	1	1	109
ROCK SOLE	167	205	12	19	..
SAND SOLE	..	..	..	..	..
STARRY FLOUNDER	..	..	..	..	..
OTHER FLATFISH	..	..	..	..	..
S. ALUTUS	..	..	T	1	27
S. BREVISPINIS	..	..	24	..	..
S. CRAMERI	..	..	..	..	5
S. FLAVIDUS	..	..	..	..	..
S. PAUCISPINIS	..	..	..	..	..
S. PINNIGER	..	..	..	..	..
S. RUBERRIMUS	..	..	..	..	..
OTHER ROCKFISH	..	..	..	..	T
EULACHON	..	..	..	..	..
LINGCOD	..	7	58	113	..
PACIFIC COD	520	13	107	538	9
PACIFIC HERRING	1	9	T	T	..
STURGEON POACHER	T	T	T	T	..
SABLEFISH	..	..	..	T	157
WALLEYE POLLOCK	..	..	T	..	23
OTHER ROUNDFISH	..	T	..	..	T
RATFISH	6	3	4	..	24
SKATES	32	4	41	32	33
SPINY DOGFISH	..	..	..	..	40
OTHER SELACHII	..	..	..	..	..
INVERTEBRATES	5	2	12	15	2

APPENDIX TABLE 1 CONTINUED

HAUL NO.		26	27	28	29
DATE		JUL 9	JUL 9	JUL 10	JUL 10
AREA		HS	HS	HS	HS
START TIME	(PDT)	1245	1325	0830	1020
DURATION	(MIN)	6	30	30	30
START N. LAT.	(DEG)	053	053	053	053
	(MIN)	02.2	01.9	01.2	01.6
W. LONG.	(DEG)	130	130	130	130
	(MIN)	44.3	44.0	43.7	47.4
DIRECTION (DEG.TRUE)		150	220	140	130
FINISH N. LAT.	(DEG)	053	053	053	053
	(MIN)	01.9	01.1	00.4	01.0
W.LONG.	(DEG)	130	130	130	130
	(MIN)	43.8	43.6	42.2	46.0
HAUL DISTANCE (N.M.)		0.6	0.8	1.5	1.3
DEPTH	(FATHOMS)	68- 69	68- 61	63- 63	53- 53
	(METERS)	124-126	124-111	115-115	96- 96
DEPTH INTERVAL	(FM)	60	60	60	50
TYPE OF GEAR		1	1	1	1
TOTAL CATCH	(KG)	..	..	726	854
REMARKS		X-DOORS UNUSABLE	NET TORN UNUSABLE	USABLE	USABLE

APPENDIX TABLE 1 CONTINUED

HAUL NO.	26	27	28	29
DATE	JUL 9	JUL 9	JUL 10	JUL 10
AREA	HS	HS	HS	HS
TOTAL CATCH (KG)	0	0	726	854
ARROWTOOTH FLOUNDER	..	..	228	288
BUTTER SOLE	..	..	..	..
CURLFIN SOLE	..	..	..	..
DOVER SOLE	..	..	10	28
ENGLISH SOLE	..	..	38	72
FLATHEAD SOLE	..	..	2	39
PACIFIC HALIBUT	..	..	13	1
PACIFIC SANDDAB	..	..	..	..
PETRALE SOLE	..	..	1	11
REX SOLE	..	..	15	86
ROCK SOLE	..	..	..	..
SAND SOLE	..	..	..	..
STARRY FLOUNDER	..	..	..	..
OTHER FLATFISH	..	..	..	..
S. ALUTUS	..	..	..	..
S. BREVISPINIS	..	..	10	..
S. CRAMERI	..	..	..	..
S. FLAVIDUS	..	..	..	..
S. PAUCISPINIS	..	..	..	10
S. PINNIGER	..	..	..	3
S. RUBERRIMUS	..	..	3	..
OTHER ROCKFISH	..	..	..	..
EULACHON	..	..	..	..
LINGCOD	..	..	1	6
PACIFIC COD	..	..	15	11
PACIFIC HERRING	..	..	..	T
STURGEON POACHER	..	..	..	..
SABLEFISH	..	..	205	16
WALLEYE POLLOCK	..	..	80	244
OTHER ROUNDFISH	..	..	..	T
RATFISH	..	..	2	4
SKATES	..	..	..	8
SPINY DOGFISH	..	..	103	27
OTHER SELACHII	..	..	..	..
INVERTEBRATES	..	..	..	..

FOOTNOTES TO APPENDIX TABLE 1

Area: BE = Butterworth Edge; HS = Horseshoe; SH = Shell; TP = Two Peaks; WR = White Rocks.

Depth: At start and end of haul.

Depth Interval: 10-fm depth interval in which most of haul was made. 10 = 10-19; 20= 20-29; etc.

Type of Gear: 1 = standard, on-bottom trawl equipped with rubber-disk groundline; 78-ft headrope; 109-ft footrope; 3-in mesh; 1.5-in liner in cod-end; 35-fm sweeplines; 1,400-lb Brompton doors.

Other (any category): Any species not constituting at least 0.5 kg in any haul.

Other flatfish: Slender sole (Haul 7).

Other rockfish: S. ciliatus (Haul 7); S. maliger (Haul 18); S. zacentrus (Haul 25).

Other roundfish: Clingfish (Haul 25); eelpout (Hauls 25, 29); Pacific tomcod (Haul 7); sandlance (Haul 22).

Other selachii: Nil.

T = Trace = less than 1 kg.

Invertebrates: Details by category in Appendix Table 11.

Appendix Table 2. Size composition (no. sampled), by sex, by haul, of Pacific cod, G.B. REED Groundfish Cruise 79-4, June 26-July 13, 1979.

Fork length (cm)	Haul no. 1		2		4		5		6		7	
	M	F	M	F	M	F	M	F	M	F	M	F
18	-	-	-	-	-	-	-	-	-	-	-	-
19	-	-	-	-	-	-	-	-	-	-	-	-
20	-	-	-	-	-	-	-	-	-	-	-	-
21	-	-	-	-	-	-	-	-	-	-	-	-
22	-	-	-	-	-	-	-	-	-	-	-	-
23	-	-	-	-	-	-	-	-	-	-	-	-
24	-	-	-	-	-	-	-	-	-	-	-	-
25	-	-	-	-	-	-	-	-	-	-	-	-
26	-	-	-	-	-	-	-	-	-	-	-	-
27	-	-	-	-	-	-	-	-	1	-	-	-
28	-	-	-	-	-	-	-	-	0	-	-	-
29	-	-	-	-	-	-	-	-	0	-	-	-
30	-	-	-	-	-	-	-	-	0	-	-	-
31	-	-	-	-	-	-	-	-	0	-	-	-
32	-	-	-	-	-	-	-	-	0	-	-	-
33	-	-	-	-	-	-	-	-	2	-	-	-
34	-	-	-	-	-	-	-	-	0	2	-	-
35	-	-	-	-	-	-	1	-	0	0	-	-
36	-	-	1	-	-	-	0	-	0	0	-	-
37	1	-	0	-	-	-	0	-	0	0	-	-
38	0	-	0	-		-	0	-	0	0	-	-
39	0	-	1	-	-	-	2	-	0	0	1	-
40	0	-	0	-	-	-	0	1	0	1	0	1
41	1	-	2	1	-	-	1	1	0	0	0	0
42	0	1	0	0	1	-	0	1	2	1	0	0
43	0	0	1	1	0	2	1	1	0	1	0	0
44	2	0	2	0	1	0	0	1	0	0	0	0
45	2	0	2	1	1	1	1	0	2	0	0	1
46	4	1	4	3	2	0	0	2	3	1	1	0
47	2	0	2	2	2	0	0	0	1	0	2	0
48	3	2	2	1	1	0	0	3	1	2	0	0
49	1	0	3	0	2	3	0	1	1	1	0	0
50	4	0	3	2	3	0	1	2	0	3	0	0
51	5	0	1	2	0	3	1	0	0	0	0	0
52	6	0	1	1	1	0	1	0	2	2	0	0
53	1	0	1	1	0	1	0	0	2	0	0	0
54	1	0	0	0	0	0	2	0	1	0	0	0
55	2	0	0	0	0	0	1	0	1	1	1	0
56	0	1	0	0	0	1	0	0	0	0	1	2
57	0	0	0	0	0	0	0	0	1	1	0	0
58	0	0	1	0	0	0	0	0	0	0	0	0
59	1	0	0	2	1	1	0	0	2	0	0	0

Appendix Table 2 (cont'd)

Fork length (cm)	Haul no. 1		2		4		5		6		7	
	M	F	M	F	M	F	M	F	M	F	M	F
60	0	0	0	0	1	0	0	0	3	0	0	0
61	1	0	0	0	1	0	0	0	1	1	0	0
62	0	0	0	0	1	0	0	0	1	1	0	0
63	0	0	0	0	0	0	0	1	3	1	0	0
64	0	1	1	0	1	0	0	0	2	1	1	1
65	0	1	0	0	0	1	1	0	2	1	0	1
66	0	0	1	0	0	0	0	2	4	0	0	0
67	0	0	0	1	3	0	0	0	2	0	0	0
68	0	0	0	0	1	0	0	0	2	1	0	1
69	1	1	0	0	1	1	0	1	1	2	0	0
70	0	0	0	1	1	0	0	0	2	5	0	0
71	0	1	0	0	3	0	0	1	2	4	0	3
72	1	1	0	0	2	0	0	1	2	1	1	0
73	0	1	1	2	1	3	0	1	2	2	-	0
74	1	0	0	0	0	0	1	0	2	2	-	0
75	0	2	1	1	0	1	0	0	0	3	-	0
76	0	0	-	0	0	1	0	0	2	0	-	0
77	0	2	-	0	2	3	0	0	0	1	-	0
78	0	0	-	0	-	1	0	1	1	0	-	0
79	0	0	-	0	-	2	0	0	-	3	-	0
80	0	0	-	0	-	1	1	1	-	0	-	0
81	0	0	-	1	-	-	-	-	-	0	-	1
82	0	1	-	1	-	-	-	-	-	0	-	-
83	0	-	-	-	-	-	-	-	-	0	-	-
84	0	-	-	-	-	-	-	-	-	0	-	-
85	1	-	-	-	-	-	-	-	-	0	-	-
86	-	-	-	-	-	-	-	-	-	0	-	-
87	-	-	-	-	-	-	-	-	-	0	-	-
88	-	-	-	-	-	-	-	-	-	0	-	-
89	-	-	-	-	-	-	-	-	-	0	-	-
90	-	-	-	-	-	-	-	-	-	1	-	-
Total	41	16	31	24	33	26	15	22	56	46	8	11
% male	72		56		56		41		55		42	

Appendix Table 2 (cont'd)

Fork length (cm)	Haul no. 8		9		10		11		12		13	
	M	F	M	F	M	F	M	F	M	F	M	F
18	-	-	-	-	-	-	-	-	-	-	-	-
19	-	-	-	-	-	-	-	-	-	-	-	-
20	-	-	-	-	-	-	-	-	-	-	-	-
21	-	-	-	-	-	-	-	-	-	-	-	-
22	-	-	-	-	-	-	-	-	-	-	-	-
23	-	-	-	-	-	-	-	-	-	-	-	-
24	-	-	-	-	-	-	-	-	-	-	-	-
25	-	-	-	-	-	1	-	-	-	-	-	-
26	-	-	-	1	-	0	-	-	-	-	-	-
27	-	-	-	0	-	0	-	-	-	-	-	-
28	1	-	-	3	-	0	-	-	-	-	-	-
29	0	-	2	0	-	0	-	-	-	-	-	-
30	0	-	1	1	-	0	-	-	-	-	-	-
31	0	-	2	1	-	0	-	-	-	-	-	-
32	0	-	3	2	-	1	-	-	-	-	-	-
33	0	-	1	0	1	0	-	-	-	-	-	-
34	0	-	2	0	0	0	-	-	-	-	-	-
35	2	-	-	0	0	0	-	1	-	-	-	-
36	0	-	-	0	0	1	-	0	-	-	-	-
37	0	-	-	0	0	1	-	1	-	-	1	-
38	0	-	-	0	0	0	-	1	-	-	0	2
39	0	-	-	0	0	0	-	1	-	-	1	1
40	0	-	-	0	1	0	-	1	1	-	1	1
41	1	1	-	0	0	0	-	1	0	-	1	2
42	0	0	-	0	0	0	1	2	0	1	2	1
43	1	2	-	0	0	0	0	0	0	0	0	1
44	1	1	-	0	0	0	3	0	1	0	5	5
45	0	0	-	0	0	2	1	0	0	1	2	0
46	1	1	-	0	2	0	0	2	1	1	2	2
47	1	2	-	0	1	1	1	1	2	4	4	1
48	2	2	-	0	0	0	1	0	1	1	2	2
49	2	1	-	0	0	0	0	0	2	1	1	2
50	3	1	-	1	0	0	1	1	1	1	-	0
51	2	1	-	-	0	2	0	1	0	1	-	1
52	3	2	-	-	1	0	1	0	0	0	-	1
53	5	1	-	-	0	0	1	0	1	0	-	-
54	4	0	-	-	0	0	0	0	0	0	-	-
55	0	3	-	-	0	0	0	0	0	0	-	-
56	0	0	-	-	0	0	0	0	0	0	-	-
57	0	0	-	-	0	0	1	0	0	0	-	-
58	0	1	-	-	0	0	0	0	0	0	-	-
59	1	0	-	-	0	0	0	0	0	0	-	-

Appendix Table 2 (cont'd).

Fork length (cm)	Haul no. 8		9		10		11		12		13	
	M	F	M	F	M	F	M	F	M	F	M	F
60	1	0	-	-	0	1	1	1	0	0	-	-
61	0	0	-	-	0	0	0	0	0	0	-	-
62	0	0	-	-	0	0	0	1	0	0	-	-
63	1	0	-	-	0	0	0	0	0	0	-	-
64	1	0	-	-	0	0	0	0	0	0	-	-
65	3	0	-	-	0	0	0	0	0	0	-	-
66	1	2	-	-	0	1	0	1	1	0	-	-
67	1	0	-	-	0	0	0	1	-	0	-	-
68	3	2	-	-	0	0	0	0	-	0	-	-
69	0	3	-	-	0	1	0	0	-	0	-	-
70	0	0	-	-	0	0	0	0	-	0	-	-
71	0	0	-	-	0	0	0	1	-	0	-	-
72	0	1	-	-	1	0	0	-	-	1	-	-
73	0	2	-	-	-	1	0	-	-	-	-	-
74	1	2	-	-	-	-	0	-	-	-	-	-
75	0	0	-	-	-	-	0	-	-	-	-	-
76	1	0	-	-	-	-	1	-	-	-	-	-
77	-	1	-	-	-	-	-	-	-	-	-	-
78	-	3	-	-	-	-	-	-	-	-	-	-
79	-	-	-	-	-	-	-	-	-	-	-	-
80	-	-	-	-	-	-	-	-	-	-	-	-
81	-	-	-	-	-	-	-	-	-	-	-	-
82	-	-	-	-	-	-	-	-	-	-	-	-
83	-	-	-	-	-	-	-	-	-	-	-	-
84	-	-	-	-	-	-	-	-	-	-	-	-
85	-	-	-	-	-	-	-	-	-	-	-	-
86	-	-	-	-	-	-	-	-	-	-	-	-
87	-	-	-	-	-	-	-	-	-	-	-	-
88	-	-	-	-	-	-	-	-	-	-	-	-
89	-	-	-	-	-	-	-	-	-	-	-	-
90	-	-	-	-	-	-	-	-	-	-	-	-
Total	43	35	11	9	7	13	13	18	11	13	22	22
% male	55		55		35		42		46		50	

Appendix Table 2 (cont'd)

Fork length (cm)	Haul no. 16[a] M	16[a] F	16[a] U	18 M	18 F	18 U	19[a] U	20 U	21 M	21 F
18	-	-	-	-	-	-	-	2	-	-
19	-	-	-	-	-	1	2	1	-	-
20	-	-	-	-	-	2	8	28	-	-
21	-	-	-	-	-	4	21	37	-	-
22	-	-	3	-	-	14	43	64	-	-
23	-	-	5	-	-	47	42	58	3	6
24	1	-	15	2	-	135	45	65	3	8
25	0	1	21	1	2	248	41	63	7	4
26	0	2	48	7	5	403	46	54	7	5
27	3	3	53	3	6	492	40	34	5	6
28	3	3	68	11	4	570	16	28	8	11
29	2	3	75	4	8	606	21	32	15	13
30	4	6	77	8	8	765	19	26	15	16
31	0	2	65	9	11	731	22	19	10	16
32	1	1	59	6	7	677	13	10	8	13
33	3	1	57	7	6	663	13	7	7	8
34	1	2	62	6	9	527	9	6	3	11
35	1	1	52	2	6	461	9	2	6	8
36	1	1	49	2	3	294	4	2	4	5
37	0	1	55	4	1	172	2	2	6	8
38	4	5	59	2	1	107	4	0	8	0
39	0	1	68	0	0	63	1	1	8	8
40	1	3	48	0	2	45	1	1	9	3
41	2	2	44	1	0	16	1	1	15	9
42	3	1	41	0	0	28	0	3	13	11
43	1	0	34	0	0	16	1	0	14	13
44	0	0	32	0	1	9	0	0	13	14
45	0	3	33	0	-	13	1	1	17	23
46	0	1	22	0	-	6	0	0	14	10
47	2	3	30	0	-	8	2	0	11	12
48	0	1	25	1	-	3	-	0	13	16
49	2	0	17	-	-	2	-	0	11	12
50	1	1	18	-	-	2	-	0	5	11
51	-	0	18	-	-	1	-	0	7	5
52	-	0	9	-	-	1	-	0	6	1
53	-	0	5	-	-	0	-	0	7	3
54	-	0	4	-	-	0	-	0	7	3
55	-	0	0	-	-	0	-	0	3	2
56	-	0	1	-	-	0	-	0	2	1
57	-	1	0	-	-	0	-	1	0	1
58	-	-	3	-	-	1	-	-	1	3
59	-	-	4	-	-	0	-	-	1	1

Appendix Table 2 (cont'd)

Fork length (cm)	Haul no. 16[a] M	16[a] F	16[a] U	18 M	18 F	18 U	19[a] U	20 U	21 M	21 F
60	-	-	0	-	-	1	-	-	4	0
61	-	-	0	-	-	-	-	-	1	0
62	-	-	1	-	-	-	-	-	1	2
63	-	-	0	-	-	-	-	-	0	0
64	-	-	0	-	-	-	-	-	0	2
65	-	-	0	-	-	-	-	-	1	0
66	-	-	3	-	-	-	-	-	2	1
67	-	-	0	-	-	-	-	-	0	1
68	-	-	1	-	-	-	-	-	1	-
69	-	-	0	-	-	-	-	-	1	-
70	-	-	0	-	-	-	-	-	-	-
71	-	-	0	-	-	-	-	-	-	-
72	-	-	0	-	-	-	-	-	-	-
73	-	-	0	-	-	-	-	-	-	-
74	-	-	0	-	-	-	-	-	-	-
75	-	-	0	-	-	-	-	-	-	-
76	-	-	0	-	-	-	-	-	-	-
77	-	-	1	-	-	-	-	-	-	-
78	-	-	-	-	-	-	-	-	-	-
79	-	-	-	-	-	-	-	-	-	-
80	-	-	-	-	-	-	-	-	-	-
81	-	-	-	-	-	-	-	-	-	-
82	-	-	-	-	-	-	-	-	-	-
83	-	-	-	-	-	-	-	-	-	-
84	-	-	-	-	-	-	-	-	-	-
85	-	-	-	-	-	-	-	-	-	-
86	-	-	-	-	-	-	-	-	-	-
87	-	-	-	-	-	-	-	-	-	-
88	-	-	-	-	-	-	-	-	-	-
89	-	-	-	-	-	-	-	-	-	-
90	-	-	-	-	-	-	-	-	-	-
Total	36	49	1285	76	80	7134	427	548	303	306
% male	42		-	49		-	-	-	50	

Appendix Table 2 (cont'd)

Fork length (cm)	Haul no. 22 M	22 F	23 U	24 M	24 F	25 U	28 M	28 F	29 M	29 F
18	-	-	-	-	-	-	-	-	-	-
19	-	-	-	-	-	-	-	-	-	-
20	-	-	-	-	-	-	-	-	-	-
21	-	-	-	1	-	-	-	-	-	-
22	-	-	-	3	-	-	-	-	-	-
23	-	2	1	3	4	-	-	-	-	-
24	-	0	1	3	5	-	-	-	-	-
25	-	0	0	5	4	-	-	-	-	-
26	-	1	3	8	5	-	-	-	-	-
27	-	1	0	5	6	-	-	-	1	1
28	1	0	3	15	7	-	-	-	0	0
29	0	2	1	7	7	-	-	-	0	0
30	0	0	2	11	3	-	-	-	0	1
31	0	2	7	6	5	-	-	-	1	1
32	3	2	7	4	2	-	-	1	1	0
33	1	0	8	2	3	-	-	0	0	0
34	0	0	8	3	0	-	-	0	0	0
35	1	0	11	6	1	-	-	0	1	0
36	0	0	5	3	2	-	-	0	0	0
37	0	1	6	1	1	-	-	0	0	0
38	0	0	5	4	1	1	-	0	0	0
39	0	0	9	4	6	0	-	0	1	0
40	0	0	7	5	7	2	-	1	0	3
41	0	0	6	12	5	1	-	0	0	1
42	0	0	8	9	12	1	-	0	0	0
43	1	0	6	10	13	1	1	0	0	0
44	0	1	12	12	8	1	1	0	0	1
45	0	0	6	11	9	0	0	1	0	1
46	0	2	4	12	14	0	1	0	0	0
47	0	0	4	17	21	1	1	1	0	0
48	0	1	4	8	9	0	0	-	0	0
49	0	1	2	6	5	0	0	-	0	0
50	0	-	1	5	11	0	0	-	0	0
51	1	-	2	6	11	0	0	-	0	0
52	-	-	0	6	5	0	0	-	1	0
53	-	-	1	6	3	0	0	-	-	0
54	-	-	1	4	1	0	0	-	-	0
55	-	-	0	4	1	0	0	-	-	0
56	-	-	0	5	2	0	0	-	-	0
57	-	-	1	4	3	0	1	-	-	0
58	-	-	0	5	0	0	0	-	-	0
59	-	-	0	2	1	0	0	-	-	1

Appendix Table 2 (cont'd)

Fork length (cm)	Haul no. 22 M	22 F	23 U	24 M	24 F	25 U	28 M	28 F	29 M	29 F
60	-	-	0	3	3	0	0	-	-	-
61	-	-	0	3	1	0	0	-	-	-
62	-	-	0	2	2	0	0	-	-	-
63	-	-	0	6	2	0	1	-	-	-
64	-	-	0	3	1	1	0	-	-	-
65	-	-	0	0	3	-	0	-	-	-
66	-	-	1	1	2	-	1	-	-	-
67	-	-	0	1	2	-	-	-	-	-
68	-	-	0	1	0	-	-	-	-	-
69	-	-	0	-	4	-	-	-	-	-
70	-	-	0	-	3	-	-	-	-	-
71	-	-	1	-	-	-	-	-	-	-
72	-	-	-	-	-	-	-	-	-	-
73	-	-	-	-	-	-	-	-	-	-
74	-	-	-	-	-	-	-	-	-	-
75	-	-	-	-	-	-	-	-	-	-
76	-	-	-	-	-	-	-	-	-	-
77	-	-	-	-	-	-	-	-	-	-
78	-	-	-	-	-	-	-	-	-	-
79	-	-	-	-	-	-	-	-	-	-
80	-	-	-	-	-	-	-	-	-	-
81	-	-	-	-	-	-	-	-	-	-
82	-	-	-	-	-	-	-	-	-	-
83	-	-	-	-	-	-	-	-	-	-
84	-	-	-	-	-	-	-	-	-	-
85	-	-	-	-	-	-	-	-	-	-
86	-	-	-	-	-	-	-	-	-	-
87	-	-	-	-	-	-	-	-	-	-
88	-	-	-	-	-	-	-	-	-	-
89	-	-	-	-	-	-	-	-	-	-
90	-	-	-	-	-	-	-	-	-	-
Total	8	16	144	263	226	9	7	4	6	10
% male	33		-	54		-	64		38	

[a]Selected sample

Appendix Table 3. Size composition (no. sampled) by haul, of all halibut caught, G.B. REED Groundfish Cruise 79-4, June 26-July 13, 1979.

Fork length (cm)	Haul no.							
	1	2	4	5	6	7	8	9
36	-	-	-	-	-	-	-	1
37	-	-	-	-	-	-	-	1
38	-	-	-	-	-	-	-	1
39	-	-	-	-	-	-	-	0
40	-	-	-	-	-	-	-	0
41	-	-	-	-	-	1	-	0
42	-	-	-	-	-	1	-	2
43	-	-	-	-	-	0	-	0
44	-	-	-	-	-	0	-	1
45	-	-	-	-	-	0	-	1
46	-	1	-	-	1	0	-	0
47	-	0	-	-	0	0	-	3
48	-	0	-	-	0	0	-	0
49	-	1	-	-	0	0	-	0
50	-	1	-	-	0	0	-	0
51	-	1	-	-	1	0	-	0
52	-	1	-	-	1	0	-	0
53	-	0	-	-	0	0	-	1
54	-	0	-	-	0	1	1	0
55	-	0	2	-	0	0	2	0
56	1	1	0	-	0	1	0	0
57	0	1	2	-	2	0	1	1
58	1	1	0	-	0	0	2	0
59	0	0	0	-	0	0	0	1
60	0	0	1	-	0	0	1	1
61	1	1	1	-	1	0	1	0
62	1	0	0	-	0	1	0	1
63	1	0	1	-	1	0	0	0
64	0	2	0	-	0	3	0	0
65	0	0	1	-	1	1	2	0
66	1	0	0	-	1	2	2	0
67	1	1	0	-	0	0	0	0
68	0	0	0	-	0	0	2	1
69	1	2	1	-	0	1	0	0
70	0	1	0	-	0	0	1	0
71	0	0	1	-	0	0	0	1
72	0	0	0	-	0	0	0	0
73	0	0	0	-	0	0	2	0
74	1	1	0	1	0	1	0	0
75	2	1	1	0	0	0	1	0
76	0	0	0	0	1	0	0	0
77	0	1	1	0	0	0	1	0
78	0	2	0	1	0	0	3	0
79	1	1	1	0	0	0	0	0

Appendix Table 3 (cont'd)

Fork length (cm)	Haul no.							
	1	2	4	5	6	7	8	9
80	0	1	0	1	0	0	2	0
81	0	0	0	-	0	1	1	0
82	0	2	0	-	0	0	0	0
83	1	0	0	-	0	0	0	0
84	0	0	0	-	0	0	0	0
85	0	1	0	-	1	0	0	1
86	0	0	0	-	-	1	0	0
87	1	0	0	-	-	0	0	0
88	0	0	0	-	-	0	0	0
89	2	0	0	-	-	0	1	0
90	0	0	0	-	-	0	1	0
91	1	0	1	-	-	0	1	0
92	1	0	-	-	-	0	0	0
93	0	0	-	-	-	1	0	0
94	0	0	-	-	-	-	0	0
95	0	0	-	-	-	-	0	0
96	1	0	-	-	-	-	0	0
97	1	1	-	-	-	-	0	0
98	-	-	-	-	-	-	1	0
99	-	-	-	-	-	-	-	0
100 ~ 122	-	-	-	-	-	-	-	1 -
~ 130	-	-	-	-	-	-	-	-
Total	20	26	14	3	11	16	29	19

Appendix Table 3 (cont'd)

Fork length (cm)	Haul no.							
	10	11	12	14	15	16	17	18
36	-	-	-	-	-	-	-	1
37	-	-	-	-	-	-	1	0
38	-	-	-	1	-	-	0	1
39	-	-	-	1	-	-	0	1
40	-	-	-	0	-	-	3	0
41	1	-	-	1	-	-	1	0
42	1	-	-	0	-	-	0	1
43	1	-	-	3	-	1	0	1
44	0	-	-	0	1	0	1	1
45	0	-	-	0	0	0	0	2
46	0	-	-	0	1	0	1	2
47	1	-	-	0	0	1	0	3
48	0	-	-	0	0	0	0	0
49	0	-	-	0	0	1	0	1
50	0	-	-	1	1	0	0	2
51	0	-	-	0	0	0	0	1
52	1	-	-	0	0	0	0	0
53	1	-	-	0	0	0	0	2
54	1	-	-	0	0	0	1	0
55	0	-	-	0	0	0	0	1
56	0	-	-	0	0	0	0	0
57	0	1	-	0	0	0	0	0
58	0	0	-	1	0	0	0	0
59	0	0	-	0	1	0	1	0
60	0	0	-	0	0	0	0	0
61	0	0	-	0	1	0	0	0
62	1	0	-	0	0	0	0	0
63	1	0	-	0	0	0	0	0
64	0	0	-	1	0	0	0	0
65	0	0	-	0	0	0	0	0
66	0	0	-	0	1	0	0	0
67	0	0	-	0	1	0	0	0
68	1	0	-	0	0	0	0	0
69	-	0	-	1	2	0	0	0
70	-	0	-	0	0	0	0	0
71	-	0	-	0	0	0	0	0
72	-	0	-	1	0	0	0	0
73	-	0	-	0	1	0	0	2
74	-	0	-	0	0	0	0	-
75	-	0	-	0	1	1	0	-
76	-	0	-	0	0	0	0	-
77	-	0	-	0	0	0	0	-
78	-	1	-	0	0	0	0	-
79	-	-	-	0	2	0	0	-

Appendix Table 3 (cont'd)

Fork length (cm)	Haul no.							
	10	11	12	14	15	16	17	18
80	-	-	-	0	1	0	0	-
81	-	-	1	0	0	0	0	-
82	-	-	0	1	0	0	0	-
83	-	-	0	-	1	0	0	-
84	-	-	0	-	0	0	0	-
85	-	-	0	-	0	0	0	-
86	-	-	1	-	1	0	0	-
87	-	-	-	-	0	0	1	-
88	-	-	-	-	0	0	0	-
89	-	-	-	-	1	0	0	-
90	-	-	-	-	1	0	0	-
91	-	-	-	-	-	0	0	-
92	-	-	-	-	-	0	0	-
93	-	-	-	-	-	0	0	-
94	-	-	-	-	-	0	0	-
95	-	-	-	-	-	0	0	-
96	-	-	-	-	-	0	0	-
97	-	-	-	-	-	0	0	-
98	-	-	-	-	-	0	0	-
99	-	-	-	-	-	0	0	-
100 ~ 122	-	-	-	-	-	0	1	-
~ 130	-	-	-	-	-	1	-	-
Total	10	2	2	12	18	5	11	22

Appendix Table 3 (cont'd)

Fork length (cm)	Haul no.							
	19	20	21	22	23	24	28	29
36	-	-	-	-	-	-	-	-
37	-	-	-	-	-	-	-	-
38	-	-	-	-	-	-	-	-
39	-	-	-	-	-	-	-	-
40	-	-	-	-	-	-	-	-
41	-	-	-	-	-	-	-	-
42	-	-	-	-	-	-	-	-
43	1	-	-	-	-	1	-	-
44	1	1	1	-	-	0	-	-
45	0	1	0	1	1	0	-	-
46	2	0	1	1	0	0	-	1
47	0	0	0	1	0	1	-	-
48	0	0	0	2	3	2	-	-
49	0	1	0	2	1	1	-	-
50	0	0	0	0	0	3	1	-
51	0	0	1	0	0	0	0	-
52	0	0	0	2	3	1	0	-
53	0	0	0	1	1	1	1	-
54	0	0	1	0	1	0	0	-
55	0	1	0	0	1	1	0	-
56	2	0	1	0	0	0	0	-
57	1	0	0	0	1	1	0	-
58	0	0	0	1	0	0	0	-
59	0	0	0	0	0	0	0	-
60	0	0	0	0	0	0	0	-
61	0	0	0	0	0	0	0	-
62	0	0	0	0	0	1	0	-
63	0	0	0	0	0	0	0	-
64	0	0	0	0	1	0	0	-
65	0	0	2	1	1	1	0	-
66	0	0	0	0	3	-	0	-
67	0	0	0	0	0	-	0	-
68	0	0	1	0	3	-	0	-
69	0	0	2	0	1	-	1	-
70	0	0	0	1	1	-	0	-
71	0	0	1	0	0	-	0	-
72	0	0	0	0	1	-	0	-
73	0	1	0	1	3	-	0	-
74	0	0	0	0	0	-	0	-
75	0	0	0	0	0	-	0	-
76	0	1	0	0	0	-	0	-
77	0	0	1	0	0	-	0	-
78	0	0	-	0	1	-	0	-
79	0	0	-	0	1	-	1	-

Appendix Table 3 (cont'd)

Fork length (cm)	Haul no.							
	19	20	21	22	23	24	28	29
80	0	0	-	0	0	-	-	-
81	1	0	-	0	1	-	-	-
82	0	0	-	0	1	-	-	-
83	0	0	-	0	0	-	-	-
84	0	0	-	0	1	-	-	-
85	0	0	-	0	0	-	-	-
86	0	0	-	0	1	-	-	-
87	0	0	-	0	0	-	-	-
88	0	0	-	1	0	-	-	-
89	0	0	-	-	0	-	-	-
90	0	0	-	-	0	-	-	-
91	0	0	-	-	0	-	-	-
92	0	1	-	-	0	-	-	-
93	1	-	-	-	0	-	-	-
94	0	-	-	-	0	-	-	-
95	1	-	-	-	0	-	-	-
96	-	-	-	-	0	-	-	-
97	-	-	-	-	0	-	-	-
98	-	-	-	-	0	-	-	-
99	-	-	-	-	1	-	-	-
100 ~ 122 ~ 130	-	-	-	-	-	-	-	-
Total	10	7	12	15	33	14	4	1

Appendix Table 4. Size composition (no. sampled), by sex, by haul of butter sole, Dover sole, English sole, petrale sole and rock sole, G.B. REED Groundfish Cruise 79-4, June 26-July 13, 1979.

Fork length (cm)	Butter sole	Dover sole				English sole			
	Haul no.	Haul no.				Haul no.			
	4[a]	12[b]	13[a]		25[a]	1[b]		6[a]	7[a]
	U	U	M	F	U	M	F	U	U
13	-	-	-	-	-	-	-	-	-
14	-	-	-	-	-	-	-	-	-
15	-	-	-	-	-	-	-	-	-
16	-	-	-	-	-	-	-	-	-
17	-	-	-	-	-	-	-	-	-
18	1	-	-	-	-	-	-	-	-
19	1	-	-	-	-	-	-	-	-
20	2	-	-	-	-	-	-	-	1
21	7	-	-	-	-	-	-	1	4
22	14	-	-	-	-	-	-	9	7
23	25	1	-	1	-	-	-	15	15
24	29	0	-	0	-	-	-	36	52
25	34	8	-	0	3	-	-	45	99
26	33	1	-	0	2	-	-	60	109
27	25	3	-	1	1	-	-	60	94
28	27	9	-	0	3	-	-	39	82
29	11	8	1	1	8	-	-	51	65
30	6	7	3	2	7	-	-	36	45
31	7	11	4	1	2	-	-	21	41
32	0	7	8	5	3	-	-	12	18
33	4	8	5	6	2	-	-	18	14
34	1	8	11	7	7	-	-	12	14
35	7	12	13	8	5	3	3	5	9
36	7	13	7	5	8	3	1	6	2
37	1	5	8	7	5	3	1	4	3
38	0	11	6	5	11	3	3	2	1
39	0	5	2	12	5	3	5	2	2
40	0	8	1	9	2	1	6	2	0
41	0	6	0	10	5	2	6	0	0
42	1	7	1	7	1	1	15	0	0
43	-	6	-	10	8	1	13	0	2
44	-	4	-	2	5	-	11	0	0
45	-	2	-	5	2	-	8	1	0
46	-	2	-	4	2	-	12	-	0
47	-	4	-	3	3	-	9	-	1
48	-	1	-	1	0	-	6	-	1
49	-	4	-	5	2	-	6	-	-
50	-	0	-	2	0	-	4	-	-
51	-	2	-	0	0	-	9	-	-

Appendix Table 4 (cont'd)

Fork length (cm)	Butter sole	Dover sole				English sole			
	Haul no.	Haul no.				Haul no.			
	4[a]	12[b]	13[a]		25[a]	1[b]		6[a]	7[a]
	U	U	M	F	U	M	F	U	U
52	-	1	-	0	0	-	1	-	-
53	-	-	-	1	1	-	1	-	-
54	-	-	-	-	-	-	1	-	-
55	-	-	-	-	-	-	-	-	-
56	-	-	-	-	-	-	-	-	-
Total	243	164	70	120	102	20	121	437	681
% males	-	-	37		-	14		-	-

Appendix Table 4 (cont'd)

Fork length (cm)	English sole								
	Haul no.								
	8[a]	9[a]	10[a]	11[a]	12[a]		16[a]	19[a]	20[b]
	U	U	U	U	M	F	U	U	U
13	-	-	-	-	-	-	-	2	16
14	-	-	-	-	-	-	-	15	65
15	-	-	-	-	-	-	1	68	84
16	-	1	-	-	-	-	0	100	78
17	-	1	-	-	-	-	1	95	31
18	-	1	-	-	-	-	0	115	19
19	-	2	1	-	-	-	1	163	22
20	-	11	4	1	-	-	14	236	16
21	-	43	4	0	-	-	34	216	27
22	-	89	16	0	-	-	53	138	18
23	-	111	44	3	-	-	74	92	9
24	-	105	67	1	-	-	64	46	3
25	3	51	50	4	1	1	23	43	2
26	2	24	55	11	0	0	13	64	5
27	3	9	21	10	0	0	11	74	4
28	3	3	16	13	2	0	17	58	9
29	7	1	14	12	2	0	25	74	4
30	8	2	11	15	4	0	29	49	8
31	7	0	3	15	3	2	30	44	1
32	7	1	1	12	7	0	54	38	4
33	13	-	1	14	10	3	56	42	7
34	10	-	2	13	14	3	49	30	6
35	14	-	2	6	17	4	49	24	2
36	9	-	1	10	20	8	62	46	3
37	6	-	1	4	7	9	73	36	4
38	14	-	1	2	7	5	65	37	4
39	6	-	1	2	4	10	81	32	6
40	11	-	1	1	1	11	58	22	5
41	4	-	-	0	-	11	50	29	5
42	2	-	-	1	-	10	49	20	3
43	0	-	-	1	-	6	34	18	3
44	0	-	-	0	-	8	25	26	2
45	0	-	-	1	-	4	22	11	3
46	0	-	-	-	-	0	23	8	3
47	1	-	-	-	-	0	16	5	0
48	-	-	-	-	-	1	14	4	1
49	-	-	-	-	-	-	17	-	-
50	-	-	-	-	-	-	7	-	-
51	-	-	-	-	-	-	8	-	-
52	-	-	-	-	-	-	2	-	-
53	-	-	-	-	-	-	3	-	-

Appendix Table 4 (cont'd)

Fork length (cm)	English sole								
	Haul no.								
	8[a]	9[a]	10[a]	11[a]	12[a]		16[a]	19[a]	20[b]
	U	U	U	U	M	F	U	U	U
54	-	-	-	-	-	-	-	-	-
55	-	-	-	-	-	-	-	-	-
56	-	-	-	-	-	-	-	-	-
Total	130	455	317	159	99	96	1,207	2,120	482
% males	-	-	-	-	51		-	-	-

Appendix Table 4 (cont'd)

Fork length (cm)	Petrale sole						Rock sole			
	Haul no.						Haul no.			
	21[b]	22[b]	23[b]	24[b]			9[a]		16[b]	17[b]
	U	U	U	M	F	U	M	F	U	U
13	-	-	-	-	-	-	-	-	-	-
14	-	-	-	-	-	-	-	-	-	-
15	-	-	-	-	-	-	-	-	-	-
16	-	-	-	-	-	-	-	-	-	1
17	-	-	-	-	-	-	-	-	-	1
18	-	-	-	-	-	-	-	-	2	8
19	-	-	-	-	-	-	-	-	7	9
20	-	-	-	-	-	-	-	-	11	14
21	-	-	-	-	-	-	1	-	6	10
22	-	-	-	-	-	-	0	-	3	3
23	-	-	-	-	-	-	0	-	2	2
24	-	-	-	-	-	-	0	-	0	2
25	-	-	-	-	-	-	0	-	0	2
26	-	-	-	-	-	-	0	-	1	2
27	-	-	-	-	-	-	0	-	1	4
28	-	-	-	-	-	-	0	-	0	2
29	-	-	-	-	-	-	1	-	2	5
30	-	-	-	-	-	-	0	-	1	4
31	-	-	-	-	-	-	4	1	10	5
32	-	-	1	-	-	-	11	5	23	4
33	-	-	0	-	-	-	9	2	28	6
34	-	-	1	-	-	-	13	11	55	5
35	-	-	0	-	-	-	8	4	56	6
36	1	1	0	-	-	1	11	4	55	4
37	1	0	0	-	-	0	7	9	59	4
38	0	0	0	-	-	0	3	13	78	4
39	1	0	2	-	-	0	2	14	57	3
40	2	2	2	-	-	0	-	7	39	9
41	0	1	1	-	-	0	-	4	49	6
42	1	1	2	-	-	0	-	0	33	7
43	3	3	5	-	-	2	-	3	62	7
44	4	1	5	-	-	4	-	3	64	12
45	7	2	13	-	-	4	-	1	57	4
46	7	2	18	2	-	3	-	-	47	5
47	9	5	9	-	-	4	-	-	33	4
48	7	10	7	-	4	4	-	-	21	3
49	7	10	21	-	4	4	-	-	13	1
50	3	10	13	-	-	4	-	-	7	0
51	6	8	14	-	2	3	-	-	2	1
52	0	3	17	-	-	3	-	-	1	-
53	0	6	10	-	-	1	-	-	1	-

Appendix Table 4 (cont'd)

Fork length (cm)	Petrale sole						Rock sole			
	Haul no.						Haul no.			
	21[b]	22[b]	23[b]	24[b]			9[a]		16[b]	17[b]
	U	U	U	M	F	U	M	F	U	U
54	1	1	6	-	-	1	-	-	-	-
55	-	-	3	-	0	-	-	-	-	-
56	-	-	2	-	1	-	-	-	-	-
Total	60	66	152	2	11	38	70	81	886	169
% males	-	-	-	15		-	46		-	-

Appendix Table 4 (cont'd)

Fork length (cm)	Rock sole	
	Haul no.	
	21[b]	22[b]
	U	U
13	-	-
14	-	-
15	-	1
16	2	3
17	2	2
18	2	7
19	5	26
20	34	36
21	26	40
22	30	32
23	22	17
24	7	10
25	4	8
26	3	9
27	4	1
28	1	2
29	2	6
30	2	2
31	1	1
32	2	1
33	3	2
34	4	8
35	1	3
36	2	6
37	4	6
38	3	4
39	5	9
40	8	7
41	8	10
42	6	6
43	9	6
44	8	14
45	15	11
46	4	14
47	9	8
48	6	11
49	2	9
50	5	3
51	4	1
52	4	1
53	1	1
54	-	1

Appendix Table 4 (cont'd)

Fork length (cm)	Rock sole	
	Haul no.	
	21[b]	22[b]
	U	U
55	-	-
56	-	-
Total	260	345
% males	-	-

[a]Selected sample.
[b]Total catch.

Appendix Table 5. Size composition (no. sampled) by sex, by haul, of walleye pollock, G.B. REED Groundfish Cruise 79-4, June 26-July 13, 1979.

Fork length (cm)	Haul no. 1[b]		2[b]		4[a]		5[b]		6[b]	
	M	F	M	F	M	F	M	F	M	F
17	-	-	-	-	-	-	-	-	-	-
18	-	-	-	-	-	-	-	-	-	-
19	-	-	-	-	-	-	-	-	-	-
20	-	-	-	-	-	-	-	-	2	4
21	-	-	-	-	-	-	-	-	2	3
22	-	-	-	-	-	-	-	-	0	5
23	-	-	-	-	-	-	-	-	1	3
24	-	-	-	-	-	-	-	-	3	7
25	-	-	-	-	-	-	-	-	2	0
26	-	-	-	-	-	-	-	-	3	3
27	-	-	-	-	-	-	-	-	1	0
28	-	-	-	-	-	-	-	-	1	1
29	-	-	-	-	-	-	-	-	2	5
30	-	-	-	-	-	-	-	-	9	1
31	-	-	-	-	-	-	-	-	15	11
32	-	-	-	-	1	-	1	-	25	19
33	-	-	2	1	0	1	0	-	29	12
34	-	-	1	0	0	0	0	-	22	10
35	1	-	1	0	0	0	1	1	13	18
36	2	2	0	1	5	2	0	0	17	17
37	2	1	1	0	8	7	2	1	14	14
38	8	2	0	4	12	10	1	2	6	6
39	10	4	1	3	7	19	0	2	2	2
40	8	11	1	1	11	18	3	1	2	4
41	6	11	1	3	15	16	3	2	1	1
42	13	7	0	2	14	21	3	7	0	0
43	7	5	0	0	9	18	2	7	0	0
44	6	3	0	0	4	12	3	2	0	0
45	3	4	0	0	3	3	1	3	0	0
46	2	1	0	1	1	1	0	5	0	0
47	-	0	1	2	1	0	1	0	0	0
48	-	1	2	0	1	1	1	3	0	0
49	-	-	1	0	-	-	3	2	0	0
50	-	-	0	0	-	-	1	1	0	0
51	-	-	0	0	-	-	3	1	0	0
52	-	-	1	1	-	-	1	1	0	0
53	-	-	0	1	-	-	0	1	1	0
54	-	-	2	4	-	-	2	5	-	0
55	-	-	2	0	-	-	1	1	-	0
56	-	-	2	0	-	-	1	4	-	0
57	-	-	0	3	-	-	0	1	-	1
58	-	-	2	1	-	-	0	3	-	-

Appendix Table 5 (cont'd)

Fork length (cm)	Haul no. 1[b] M	1[b] F	2[b] M	2[b] F	4[a] M	4[a] F	5[b] M	5[b] F	6[b] M	6[b] F
59	-	-	-	2	-	-	1	2	-	-
60	-	-	-	2	-	-	-	1	-	-
61	-	-	-	2	-	-	-	-	-	-
62	-	-	-	-	-	-	-	-	-	-
63	-	-	-	-	-	-	-	-	-	-
64	-	-	-	-	-	-	-	-	-	-
Total	68	52	21	34	92	129	35	59	173	147
% males	57		38		42		37		54	

Appendix Table 5 (cont'd)

Fork length (cm)	Haul no. 7[b] M	7[b] F	8[a] M	8[a] F	11[b] M	11[b] F	12[b] M	12[b] F	25[b] U	28[b] U	29[b] U
17	-	-	-	-	-	-	-	-	-	-	3
18	-	-	-	-	-	-	-	-	-	-	24
19	-	-	-	-	-	-	-	-	-	-	100
20	-	2	-	-	-	-	-	-	-	8	210
21	-	1	-	-	-	-	-	-	3	10	254
22	1	0	-	-	-	-	1	-	0	7	181
23	0	0	-	-	-	-	0	-	1	8	83
24	1	0	-	-	-	-	0	-	1	3	31
25	2	0	-	-	-	-	0	-	1	0	10
26	0	1	-	-	-	-	0	-	0	1	4
27	0	0	-	-	-	-	0	-	0	1	5
28	0	0	-	-	-	-	1	-	0	0	10
29	2	2	-	-	-	-	0	-	1	1	19
30	1	5	1	-	-	-	1	-	0	6	19
31	7	5	0	1	-	-	0	1	0	12	54
32	11	7	1	0	-	1	4	0	4	21	67
33	16	11	6	3	-	0	2	3	6	26	112
34	8	10	5	4	-	0	5	3	15	52	106
35	5	8	6	4	-	0	10	8	17	43	75
36	9	9	9	6	-	0	20	19	10	23	35
37	5	4	3	12	-	0	10	23	5	25	30
38	0	3	5	6	-	0	7	14	4	5	9
39	4	1	12	12	-	0	9	17	0	3	3
40	0	0	13	20	-	1	10	6	1	1	1
41	0	0	12	12	-	2	5	7	-	-	-
42	1	1	7	9	-	1	2	5	-	-	-
43	0	-	4	4	1	1	0	2	-	-	-
44	1	-	2	4	0	0	2	1	-	-	-
45	-	-	1	2	0	1	-	1	-	-	-
46	-	-	0	1	1	0	-	-	-	-	-
47	-	-	1	-	0	0	-	-	-	-	-
48	-	-	-	-	0	1	-	-	-	-	-
49	-	-	-	-	1	0	-	-	-	-	-
50	-	-	-	-	0	0	-	-	-	-	-
51	-	-	-	-	0	1	-	-	-	-	-
52	-	-	-	-	0	0	-	-	-	-	-
53	-	-	-	-	1	0	-	-	-	-	-
54	-	-	-	-	0	1	-	-	-	-	-
55	-	-	-	-	2	0	-	-	-	-	-
56	-	-	-	-	0	1	-	-	-	-	-
57	-	-	-	-	1	2	-	-	-	-	-
58	-	-	-	-	1	4	-	-	-	-	-

Appendix Table 5 (cont'd)

Fork length (cm)	Haul no. 7[b] M	7[b] F	8[a] M	8[a] F	11[b] M	11[b] F	12[b] M	12[b] F	25[b] U	28[b] U	29[b] U
59	-	-	-	-	2	5	-	-	-	-	-
60	-	-	-	-	-	7	-	-	-	-	-
61	-	-	-	-	-	4	-	-	-	-	-
62	-	-	-	-	-	4	-	-	-	-	-
63	-	-	-	-	-	3	-	-	-	-	-
64	-	-	-	-	-	1	-	-	-	-	-
Total	74	70	88	100	10	41	89	110	59	256	1445
% males	51		47		20		45		-	-	-

[a]Selected sample.
[b]Total catch.

Appendix Table 6. Size composition (no. sampled), by haul, of sablefish, G.B. REED Groundfish Cruise 79-4, June 26-July 13, 1979.

Fork length (cm)	Haul no.					
	1[a]	2[b]	10[b]	12[b]	13[b]	25[a]
32	-	-	2	-	-	-
33	-	-	3	-	-	-
34	-	-	1	-	-	-
35	-	-	4	-	-	1
36	-	-	5	-	-	0
37	-	-	4	-	-	0
38	-	2	3	-	1	1
39	1	6	10	2	5	0
40	5	18	12	2	4	2
41	14	18	23	3	15	3
42	17	24	22	15	16	6
43	35	34	11	17	23	6
44	37	20	8	23	22	8
45	39	25	3	20	15	8
46	13	10	5	10	10	6
47	11	4	1	11	5	4
48	9	2	1	4	6	3
49	1	-	0	5	0	1
50	1	-	1	2	2	1
51	1	-	-	2	1	1
52	-	-	-	0	-	1
53	-	-	-	1	-	-
Total	184	163	119	117	125	52

[a]Selected sample
[b]Total catch

Appendix Table 7. Size composition (no. sampled) by haul of Pacific sandlance, Pacific herring and Pacific ocean perch, G.B. REED Groundfish Cruise 79-4, June 26-July 13, 1979.

	P. sandlance			P. herring	P. ocean perch[c]
	Haul no.			Haul no.	Haul no.
Fork length (cm)	18[a]	21[a]	24[a]	22[b]	25[b]
	U	U	U	U	
7	1	-	-	-	-
8	0	-	-	-	-
9	0	-	-	-	-
10	0	-	-	-	-
11	0	-	-	-	-
12	2	-	-	-	-
13	2	3	2	-	-
14	11	17	3	-	-
15	15	20	1	-	-
16	3	6	0	-	2
17	0	4	1	1	4
18	2	3	-	6	0
19	1	-	-	32	0
20	-	-	-	15	0
21	-	-	-	2	0
22	-	-	-	8	0
23	-	-	-	5	0
24	-	-	-	4	1
25	-	-	-	7	1
26	-	-	-	1	5
27	-	-	-	3	13
28	-	-	-	2	15
29	-	-	-	-	14
30	-	-	-	-	14
31	-	-	-	-	3
32	-	-	-	-	1
33	-	-	-	-	4
34	-	-	-	-	0
35	-	-	-	-	1
Total	37	53	8	84	78

[a]P. sandlance recovered from Pacific cod stomachs.
[b]Total catch.
[c]Measured to nearest lower cm.

Appendix Table 8. Water temperatures (°C), by station, G.B. REED Groundfish Cruise 79-4, June 26-July 13, 1979.

Stn. no.	Date	Depth (fm)	Position		Temperature		Sample[a] type
			Latitude	Longitude	Surface	Bottom	
1	Jun 27	103	51°07'	128°20'	12.6	6.0	XBT
2	Jun 27	107	51°15'	128°40'	12.6	6.1	XBT
3	Jun 27	55	51°33'	128°13'	13.2	6.5	XBT
4	Jun 27	105	51°29.5'	128°25'	13.6	5.7	XBT
4A	Jun 27	110	51°26'	128°29'	13.4	5.7	XBT; NAN
5	Jun 27	120	51°24'	128°42.5'	13.4	5.7	XBT
6	Jun 27	133	51°18.5'	129°00'	13.1	5.5	XBT
7	Jun 27	154	51°13'	129°17'	12.9	5.3	XBT
8	Jun 27	235	51°07'	129°37'	12.9	4.6	XBT; NAN
9	Jun 27	131	51°21'	129°49'	12.9	5.6	XBT
10	Jun 28	174	51°36.5'	130°02'	12.5	5.2	XBT
10A	Jun 28	114	51°48'	130°16'	12.6	5.7	XBT
15	Jun 28	199	52°00'	130°30'	12.8	4.9	XBT
16	Jun 28	202	52°10'	130°22'	12.9	5.0	XBT
17	Jun 28	198	52°20'	130°15'	13.3	5.0	XBT
18	Jun 28	156	52°30'	130°07'	13.5	5.1	XBT
19	Jun 28	132	52°40'	130°09'	13.2	5.3	XBT
20	Jun 28	124	52°50'	130°10.5'	10.9	5.3	XBT
21	Jun 28	119	53°00'	130°12'	12.8	5.8	XBT; NAN
22	Jun 28	112	53°09'	130°27.5'	12.6	5.7	XBT
23	Jun 28	106	53°17'	130°41.5'	12.5	6.4	XBT
H-4	Jun 28	18	53°21'	131°32'	12.2	12.1	BT; NAN
H-3	Jun 28	15	53°25.5'	131°14.5'	11.9	11.6	BT; NAN
H-2	Jun 28	47	53°30'	130°57.5'	12.2	7.9	BT; NAN
H-1	Jun 29	86	53°34'	130°43.5'	11.8	6.5	XBT; NAN; BT
H-8	Jun 29	12	54°10'	131°29'	10.1	10.0	BT; NAN
H-7	Jun 29	16	54°10'	131°13'	11.2	11.3	BT; NAN
H-6	Jun 29	58	54°10'	131°03'	10.9	6.2	XBT; NAN; BT
H-5	Jun 29	57	54°10'	130°54'	12.0	7.3	BT; NAN
25	Jun 30	80	53°43'	130°43'	11.8	6.6	XBT
26	Jun 30	55	53°50'	130°52'	11.4	6.7	XBT
27	Jun 29	50	53°57'	131°01'	11.2	6.7	XBT
28	Jun 29	60	54°07'	131°02'	11.3	6.2	XBT
29	Jun 30	67	54°17'	131°02'	12.5	6.0	XBT
30	Jun 30	62	54°20'	131°05'	12.5	6.0	XBT
31	Jun 30	77	54°26'	131°05'	12.0	6.0	XBT
32	Jun 30	62	54°33'	131°20'	11.8	6.2	XBT
A	Jul 3	59	54°05'	131°00'	11.0	6.4	BT; NAN
B	Jul 3	55	53°50'	130°50'	11.6	6.8	BT; NAN
C	Jul 6	35	53°38.3'	131°02.9'	13.8	9.1	BT
24-21	Jul 7	29	53°00'	131°00'	13.1	11.2	BT
24-19	Jul 7	80	53°00'	130°41.4'	13.1	6.5	BT
D	Jul 7	95	52°59.3'	130°24.5'	13.8	6.2	BT
E	Jul 8	53	52°55.5'	130°36.6'	13.5	6.7	BT

Appendix Table 8 (cont'd).

Stn. no.	Date	Depth (fm)	Position		Temperature		Sample type
			Latitude	Longitude	Surface	Bottom	
Haul 29	Jul 10	56	53°01'	130°46'	12.6	7.0	BT
F	Jul 10	14	53°00'	131°20'	10.7	10.4	BT
G	Jul 10	25	52°55'	131°20'	11.8	9.3	BT
H	Jul 10	18	52°55'	131°00'	12.0	11.9	BT
I	Jul 10	19	52°50'	131°00'	12.4	12.1	BT
J	Jul 10	54	52°50'	131°20'	11.5	7.8	BT
K	Jul 10	97	52°45'	131°20'	11.5	7.8	BT
L	Jul 11	23	52°45'	131°00'	12.3	10.2	BT
M	Jul 11	40	52°40'	131°00'	12.0	8.5	BT
N	Jul 11	65	52°35.3'	131°00.2'	11.8	6.4	BT; NAN
O	Jul 11	111	52°18'	130°28'	12.7	5.3	XBT
P	Jul 11	110[b]	52°11'	130°13'	13.3	5.7	XBT
Q	Jul 11	150	51°49'	129°37'	13.3	5.7	XBT
R	Jul 12	122	51°22'	128°50'	13.6	6.2	XBT

[a]XBT = expendable bathythermograph
NAN = Nansen water bottle cast for temperature (reversing thermometers) and salinity at standard depths (usually 0, 10, 20, 30, 50 meters plus increments of 25 meters to bottom).
BT = retrievable bathythermograph (Wallace and Tiernan).
[b]XBT malfunctioned below 110 fm. Actual sounding was 230 fm.

Appendix Table 9. Contents and locations[a] of Shipek bottom grabs completed in Hecate Strait during G.B. REED Groundfish Cruise 79-4, June 26-July 13, 1979.

Grab no.	Station no.	Latitude	Longitude	Depth (fm)	Depth (m)	Contents[b] of grab	Remarks
Two Peaks							
1	7.58-23.15	54°22.1'	131°21.5'	104	190	C	bivalve
2	17.5 -22.98	54°22.5'	131°19.8'	100	183	C	2 attempts
3	7.66-22.96	54°21.7'	131°19.6'	90	164	C	3 attempts
4	7.66-22.88	54°21.4'	131°18.8'	81	148	C;S	-
5	7.78-22.75	54°21.1'	131°17.5'	70	128	sC	-
6	7.8 -22.66	54°21.0'	131°16.6'	60	110	sC	-
7	7.8 -22.5	54°21.0'	131°15.0'	50	91	S	-
8	7.76-22.5	54°21.2'	131°13.5'	40	74	S	-
9	9.1 -23.44	54°14.5'	131°24.4'	16	29	S;shell	-
10	8.66-23.52	54°16.7'	131°25.2'	28	51	S	-
11	8.54-23.55	54°17.3'	131°25.5'	38	70	S	-
12	8.42-23.52	54°17.9'	131°25.2'	45	82	-	-
13	8.38-23.55	54°18.1'	131°25.5'	57	104	S	-
14	8.34-23.56	54°18.3'	131°25.6'	67	123	S	brittle star
15	8.3 -23.6	54°18.5'	131°26.0'	76	139	S	tubeworm
16	8.22-23.65	54°18.9'	131°26.5'	86	157	S	-
17	8.06-23.7	54°19.7'	131°27.0'	96	176	S	-
18	9.1 -24.52	54°14.5'	131°35.2'	20	37	S	amphipod
19	9.08-24.52	54°14.6'	131°35.2'	32	59	S	bivalve
20	9 -24.55	54°15.0'	131°35.5'	41	75	S	wood; polychaete
21	8.98-24.56	54°15.1'	131°35.6'	51	93	S	polychaete
22	8.96-24.56	54°15.2'	131°35.6'	59	108	S	-
23	8.8 -24.65	54°16.0'	131°36.5'	68	124	-	2 attempts
24	8.52-24.65	54°17.4'	131°36.5'	80	146	S	-
25	8.32-24.74	54°18.4'	131°37.4'	89	163	S	-
56	8 -21	54°20.0'	131°00.0'	23	42	Coral	crab; brittle star
57	8 -21.12	54°20.0'	131°01.2'	36	66	gS	-

Appendix Table 9 (cont'd)

Grab no.	Station no.	Latitude	Longitude	Depth (fm)	Depth (m)	Contents[b] of grab	Remarks
58	8 -21.3	54°20.0'	131°03.1'	45	85	S	trace; 2 attempts
59	8 -21.4	54°20.0'	131°04.0'	54	100	gS	trace
60	8 -21.68	54°20.0'	131°06.8'	46	84	S	trace; fine grains
61	8 -21.85	54°21.2'	131°08.5'	36	68	zS	razor clam
62	8 -22	54°20.0'	131°10.0'	34	62	S	trace; fine grains
63	7.8-22	54°22.0'	131°10.0'	37	69	S	trace; fine grains; 2 attempts
64	7.2-22	54°24.0'	131°10.0'	44	80	S	trace; fine grains
65	7 -22	54°25.0'	131°10.0'	53	97	zS	-
66	6.9-22	54°25.5'	131°10.0'	63	120	sC	-
67	6.8-22	54°26.0'	131°10.0'	75	137	sZ	2 attempts
Butterworth	54°00' - 54°15' N		131°10' - 130°55' W				
38	10 -21.52	54°10.0'	131°05.2'	12	22	gS	-
39	10 -21.46	54°10.0'	131°04.6'	22	40	(g)S	gastropod; tubeworm
40	10 -21.45	54°10.0'	131°04.5'	33	60	S	2 attempts
41	10 -21.42	54°10.0'	131°04.2'	45	82	S	-
42	10 -21.38	54°10.0'	131°03.8'	55	101	zS	-
43	10 -21.27	54°10.0'	131°02.7'	57	104	S	-
44	10 -21.14	54°10.0'	131°01.4'	45	82	sG; shell	-
45	10 -21.08	54°10.0'	131°00.8'	38	70	C; gS	3 attempts
46	10 -21.02	54°10.0'	131°00.2'	28	51	C; gS	2 attempts; sponge
47	10 -20.85	54°10.0'	130°58.5'	31	57	S; shell	2 attempts
48	10 -20.55	54°10.0'	130°55.5'	23	42	gS	gastropod; coral
49	9 -21.08	54°15.0'	131°00.8'	56	102	gS	g = 2 - 4 mm
50	8.9-21.2	54°15.1'	131°02.0'	65	119	S	trace only
51	9 -21.3	54°15.0'	131°03.0'	56	102	sC	strong H_2S smell
52	8.9-21.35	54°15.1'	131°03.5'	45	82	S	trace only
53	8.8-21.38	54°15.2'	131°03.8'	35	64	S	trace only
54	8.8-21.44	54°15.2'	131°04.4'	25	46	S	fine grains

Appendix Table 9 (cont'd)

Grab no.	Station no.	Latitude	Longitude	Depth (fm)	Depth (m)	Contents[b] of grab	Remarks
55	9 -21.05	54°15.0'	131°00.5'	12	22	gS	trace only
68	11 -21	54°05.0'	131°00.0'	55	101	S	fine grains
Argonaut Flats	54°00' - 54°15' N	west of 131°10' W					
26	9 -22	54°15.0'	131°10.0'	12	22	gS; shell	gastropod
27	9 -23	54°15.0'	131°20.0'	15	28	S; shell	-
28	9 -24	54°15.0'	131°30.0'	33	60	S	trace only
29	10 -24	54°10.0'	131°30.0'	10	18	gS; shell	polychaete
30	11 -24	54°05.0'	131°30.0'	10	18	S; shell	-
31	12 -24	54°00.0'	131°30.0'	10	18	S	fine grains
32	12 -23	54°00.0'	131°20.0'	14	26	S	bucket 1/2 full
33	11 -23	54°05.0'	131°20.0'	14	26	S	bucket 1/2 full
34	10 -23	54°10.0'	131°20.0'	13	24	S	2 attempts; 1/4 full
35	12 -22	54°00.0'	131°10.0'	18	33	sG; shell	-
36	11 -22	54°05.0'	131°10.0'	19	35	S	trace only
37	10 -22	54°10.0'	131°10.0'	18	33	S; shell	crab; shrimp; tubeworm
White Rocks	53°40' - 53°50' N	east of 130°55' W					
69	14 -20	53°50.0'	130°50.0'	53	97	zS	-
70	15 -21	53°45.0'	131°00.0'	25	47	shell	Dentalium; Olivella
71	15 -20.26	53°45.0'	130°52.6'	35	64	S	-
72	15 -20.08	53°45.0'	130°50.8'	45	82	S	-
73	15 -19.97	53°45.0'	130°49.7'	55	101	zS	-
74	15 -19.75	53°45.0'	130°47.5'	65	119	zS	-
75	15 -19.53	53°45.0'	130°45.3'	75	137	sZ	brittle star
76	16 -20	53°40.0'	130°50.0'	27	49	S	-
77	16 -19.72	53°40.0'	130°47.2'	37	68	-	-
78	16 -19.6	53°40.0'	130°46.0'	48	88	S	-

Appendix Table 9 (cont'd)

Grab no.	Station no.	Latitude	Longitude	Depth (fm)	Depth (m)	Contents[b] of grab	Remarks
79	16 -19.58	53°40.0'	130°45.8'	57	104	zS	-
80	16 -19.55	53°40.0'	130°45.5'	67	122	zS	H_2S smell
81	16 -19.45	53°40.0'	130°44.5'	75	137	sZ	-
Shell Ground	53°30' - 53°40' N		131°00' - 131°10' W				
82	16.4-22	53°38.0'	131°10.0'	24	44	S; shell	gastropod; broken shell
83	16.4-21.72	53°38.0'	131°07.2'	33	60	S; shell	-
84	16.4-21.67	53°38.0'	131°06.7'	26	48	gS; shell	2 attempts.
85	16.4-21.53	53°38.0'	131°05.3'	29	53	shell	-
86	16.4-21.47	53°38.0'	131°04.7'	39	71	S; shell	-
87	16.4-21.4	53°38.0'	131°04.0'	31	57	shell	-
88	16.4-21.3	53°38.0'	131°03.0'	42	77	trS	-
89	16.4-21.21	53°38.0'	131°02.1'	27	50	S; shell	Trace sand
90	16.4-21	53°38.0'	131°00.0'	32	59	S; shell	-
91	16.8-21	53°36.0'	131°00.0'	25	46	G; shell	barnacles;polychaetes;tubeworms
92	16.8-21.18	53°36.0'	131°01.8'	22	40	sG	-
93	16.8-21.38	53°36.0'	131°03.8'	20	37	G	2 attempts
94	16.8-21.51	53°36.0'	131°05.1'	23	42	sG	barnacles
95	16.8-21.68	53°36.0'	131°06.8'	36	66	S; shell	Dentalium; polychaete
96	16.8-21.88	53°36.0'	131°08.8'	30	55	zS	scallop
97	16.8-22	53°36.0'	131°10.0'	22	40	gS; shell	sponge;urchin;barnacles;hydroids
98	17.2-22	53°34.0'	131°10.0'	30	55	S; shell	tubeworms
99	17.2-21.83	53°34.0'	131°08.3'	36	66	S; shell	-
100	17.2-21.75	53°34.0'	131°07.5'	34	62	shell	Dentalium; gastropod
101	17.2-21.65	53°34.0'	131°06.5'	25	46	sG; shell	amphipod; barnacles; bivalve; scallop; serpulid
102	17.8-21.4	53°34.0'	131°04.0'	25	46	G; shell	barnacles; bivalve
103	17.2-21	53°34.0'	131°00.0'	26	49	gS	barnacles; coral; tunicate
104	17.8-21	53°32.0'	131°00.0'	29	53	gS	bucket 1/3 full

Appendix Table 9 (cont'd)

Grab no.	Station no.	Latitude	Longitude	Depth (fm)	Depth (m)	Contents[b] of grab	Remarks
105	17.8-21.25	53°32.0'	131°02.5'	27	50	G; shell	bucket 1/2 full
106	17.8-21.52	53°32.0'	131°05.2'	21	39	G; shell	bucket 1/3 full
107	17.8-21.78	53°32.0'	131°07.8'	22	40	gS; shell	bucket 1/2 full
108	17.8-21.85	53°32.0'	131°08.5'	30	55	S; shell	full bucket
109	17.8-22	53°32.0'	131°10.0'	39	71	S; shell	fine grain
110	16.34-21.29	53°38.3	131°02.9'	37	68	gS; C	-
111	16 -21	53°40.0'	131°00.0'	21	38	sG	coral
112	16 -21.16	53°40.0'	131°01.6'	23	42	G	-
113	16 -21.34	53°40.0'	131°03.4'	31	57	gS	-
114	16 -21.57	53°40.0'	131°05.7'	25	46	sG; shell	-
115	16 -21.68	53°40.0'	131°06.8'	31	57	gS; shell	-
116	16 -21.91	53°40.0'	131°09.1'	25	46	S; shell	-
117	16 -22	53°40.0'	131°10.0'	24	44	C; sand	-
118	16.2-22	53°39.0'	131°10.0'	25	46	sG; shell	-
119	16.2-21.93	53°39.0'	131°09.3'	26	47	gS; shell	-
120	16.2-21.86	53°39.0'	131°08.6'	23	42	gS; shell	bucket 1/4 full
121	16.2-21.82	53°39.0'	131°08.2'	26	47	gS; shell	bucket 1/2 full
122	16.2-21.56	53°39.0	131°05.6'	24	44	S	-
123	16.2-21.5	53°39.0'	131°05.0'	26	47	sG; shell	-
124	16.2-21.38	53°39.0'	131°03.8'	36	66	sG; clay	-
125	16.2-21.27	53°39.0'	131°02.7'	26	47	sG	-
126	16.2-21	53°39.0'	131°00.0'	24	44	sG	-
127	16.6-21	53°37.0'	131°00.0'	25	46	S; shell	-
128	16.6-21.25	53°37.0'	131°02.5'	21	38	G; shell	bucket 1/3 full; 3 attempts
129	16.6-21.38	53°37.0'	131°03.8'	25	46	gS; shell	full bucket
130	16.6-21.53	53°37.0'	131°05.3'	26	47	shell	-
131	16.6-21.66	53°37.0'	131°06.6'	32	58	S; shell	-
132	16.6-21.83	53°37.0'	131°08.3'	24	44	sG	-
133	16.6-22	53°37.0'	131°10.0'	25	46	gS; shell	-
134	17 -22	53°35.0'	131°10.0'	32	58	gzS	-

Appendix Table 9 (cont'd)

Grab no.	Station no.	Latitude	Longitude	Depth (fm)	Depth (m)	Contents[b] of grab	Remarks
135	17 -21.73	53°35.0'	131°07.3'	33	60	S; shell	4 attempts
136	17 -21.63	53°35.0'	131°06.3'	23	42	sG	bucket 1/3 full
137	17 -21.44	53°35.0'	131°04.4'	21	38	G; shell	-
138	17 -21.21	53°35.0'	131°02.1'	32	40	sG; shell	-
139	17 -21	53°35.0'	131°00.0'	26	47	G; shell	-
140	17.4-21	53°33.0'	131°00.0'	27	49	sG	-
141	17.4-21.28	53°33.0'	131°02.8'	24	44	sG; shell	-
142	17.4-21.52	53°33.0'	131°05.2'	18	33	G; shell	-
143	17.4-21.63	53°33.0'	131°06.3'	29	53	shell	-
144	17.8-21.8	53°33.0'	131°08.0'	29	53	G; shell	-
145	17.4-21.85	53°33.0'	131°08.5'	34	62	shell	-
146	17.4-21.95	53°33.0'	131°09.5'	23	42	-	4 attempts; no recovery
147	17.4-22	53°33.0'	131°10.0'	23	42	S	trace only; barnacles
148	17.8-22	53°31.0'	131°10.0'	17	31	gS; shell	full bucket
149	17.8-21.95	53°31.0'	131°09.5'	27	49	S; shell	full bucket; 2 attempts
150	17.8-21.78	53°31.0'	131°07.8'	23	42	sG; shell	2 attempts
151	17.8-21.6	53°31.0'	131°06.0'	23	42	G; shell	-
Horseshoe	52°53' - 53°03' N		130°30' - 130°55' W				
153	24 -20.5	53°00.0'	130°55.0'	16	29	S; shell	-
154	24 -20.47	53°00.0'	130°54.7'	17	31	gS	-
155	24 -20.42	53°00.0'	130°54.2'	18	33	S; shell	-
156	24 -20.22	53°00.0'	130°52.2'	16	29	S; shell	-
157	24 - 20.13	53°00.0'	130°51.3'	31	57	S; shell	-
158	24 -19.9	53°00.0'	130°49.0'	41	75	S	fine grains
159	24 -19.69	53°00.0'	130°46.9'	47	86	zS	-
160	24 -19.42	53°00.0'	130°44.2'	54	98	zS	-
161	24 -19.23	53°00.0'	130°42.3'	62	113	S	trace only; 3 attempts
162	24 -19.14	53°00.0'	130°41.4'	76	139	S	fine grains

Appendix Table 9 (cont'd)

Grab no.	Station no.	Latitude	Longitude	Depth (fm)	Depth (m)	Contents[b] of grab	Remarks
163	24 -18.95	53°00.0'	130°39.5'	73	133	sZ	-
164	24 -18.71	53°00.0'	130°37.1'	67	122	sZ	-
165	24 -18.57	53°00.0'	130°35.7'	52	92	sZ	-
166	24 -18.31	53°00.0'	130°33.1'	51	93	zS	-
167	24 -18.11	53°00.0'	130°31.1'	64	117	zS	-
168	24 -18	53°00.0'	130°30.0'	67	122	S	fine grains
169	24.2-18.72	52°55.9'	130°37.2'	48	88	S	fine grains; bucket 3/4 full
170	24.4-18.5	52°58.0'	130°35.0'	65	119	zsG	brachiopods; brittle star
171	24.4-18.68	52°58.0'	130°36.8'	66	121	S	-
172	24.4-18.88	52°58.0'	130°38.8'	41	75	gS	2 attempts; brittle star
173	24.4-18.97	52°58.0'	130°39.7'	33	60	gS	-
174	24.4-19.3	52°58.0'	130°41.3'	30	55	sG	2 sandlance
175	24.4-19.34	52°58.0'	130°43.4'	32	59	gS	-
176	24.4-19.42	52°58.0'	130°44.2'	36	66	S; shell	-
177	24.4-19.5	52°58.0'	130°45.0'	35	64	S; shell	-
178	24.8-19.5	52°56.0'	130°45.0'	26	48	sG; shell	2 attempts
179	24.8-19.36	52°56.0'	130°43.6'	29	53	sG; shell	-
180	24.8-19.23	52°56.0'	130°42.3'	31	57	gS; shell	-
181	24.8-19.18	52°56.0'	130°41.8'	30	55	G	-
182	24.8-18.93	52°56.1'	130°39.3'	38	70	gS	-
183	24.8-18.79	52°56.0'	130°37.9'	44	81	S	coarse grain
184	24.8-18.7	52°56.0'	130°37.0'	51	93	S	H_2S smell
185	24.8-18.6	52°56.0'	130°36.0'	54	99	gS	H_2S smell
186	24.8-18.5	52°56.0'	130°35.0'	56	102	gzS	-
187	25.2-18.5	52°54.0'	130°35.0'	57	104	zS	-
188	25.2-18.63	52°54.0'	130°36.3'	51	93	sZ	-
189	25.2-18.78	52°54.0'	130°37.8'	48	88	S; shell	-
190	25.2-18.89	52°54.0'	130°38.9'	42	77	gS	-
191	25.2-19.12	52°54.0'	130°41.2'	36	66	S; shell	trace only; 4 attempts
192	25.2-19.32	52°54.0'	130°43.2'	31	57	gS; shell	2 attempts

Appendix Table 9 (cont'd)

Grab no.	Station no.	Latitude	Longitude	Depth (fm)	Depth (m)	Contents[b] of grab	Remarks
193	25.2 -19.45	52°54.0'	130°44.5'	31	57	G; shell	-
194	25.2 -19.5	52°54.0'	130°45.0'	30	55	shell	-
195	23.4 -19.4	53°02.9'	130°44.0'	73	133	zS	-
196	23.6 -19.4	53°02.1'	130°44.0'	69	126	S	fine grains; bucket 3/4 full
197	23.8 -19.4	53°01.1'	130°44.0'	59	108	S	-
198	24 -19.4	53°00.1'	130°44.0'	57	104	S	fine grains; 3 attempts
199	24.2 -19.4	52°59.1'	130°44.0'	50	91	S	bucket 1/2 full
200	24.24-19.4	52°58.8'	130°44.0'	45	82	S	-
201	24.3 -19.4	52°58.5'	130°44.0'	40	73	S	bucket 7/8 full
202	24.4 -19.4	52°58.0'	130°44.0'	35	64	S	coarse grains
203	24.6 -19.4	52°57.0'	130°44.0'	30	55	sG; shell	bucket 1/3 full
204	24.6 -19.2	52°57.0'	130°42.0'	30	55	S; shell	-
205	24.42-19.2	52°57.9'	130°42.0'	30	55	sG	bucket 2/3 full
206	24.24-19.2	52°58.8'	130°42.0'	38	70	sG	full bucket
207	24.2 -19.2	52°59.0'	130°42.0'	48	89	S; shell	bucket 4/5 full
208	24.08-19.2	52°59.6'	130°42.0'	58	106	S	trace only
209	23.84-19.2	53°00.8'	130°42.0'	70	128	S	trace only
210	23.9 -19.2	53°01.0'	130°42.0'	80	146	zS; shell	-
211	23.68-19.2	53°01.6'	130°42.0'	66	121	sZ	bucket 3/4 full
212	23.4 -19.2	53°03.0'	130°42.0'	62	113	zS	-
213	23.4 -19	53°03.0'	130°40.0'	58	106	S	bucket 1/2 full; fine grains
214	23.68-19	53°01.6'	130°40.0'	68	124	sZ	bucket 3/4 full
215	23.88-19	53°00.6'	130°40.0'	70	128	sZ	bucket 2/3 full
216	23.96-19	53°00.2'	130°40.0'	79	145	S	fine grains
217	24.12-19	52°59.4'	130°40.0'	75	137	zS	-
218	24.24-19	52°58.8'	130°40.0'	59	108	S	bucket 2/3 full
219	24.28-19	52°58.6'	130°40.0'	42	77	S	coarse grains
220	24.32-19	52°58.4'	130°40.0'	34	62	S	coarse grains; bucket 3/4 full
221	24.42-19	52°58.1'	130°40.0'	32	59	sG	2 sandlance; bucket 3/4 full
222	24.46-19	52°57.7'	130°40.0'	34	62	gS	1 sandlance

Appendix Table (cont'd)

Grab no.	Station no.	Latitude	Longitude	Depth (fm)	Depth (m)	Contents[b] of grab	Remarks
223	24.6 -19	52°57.0'	130°40.0'	34	62	gS	coarse grains
224	24.6 -18.8	52°57.0'	130°38.0	44	81	S	-
225	24.4 -18.8	52°58.0'	130°38.0'	50	91	gS; shell	starfish; brittlestar; crab
226	24.34-18.8	52°58.3'	130°38.0'	62	113	G;S	-
227	24.28-18.8	52°58.6'	130°38.0'	76	139	S	-
228	24.1 -18.8	52°59.5'	130°38.0'	74	135	zS	-
229	23.8 -18.8	53°01.0'	130°38.0'	66	120	S	fine grains
230	23.66-18.8	53°01.7'	130°38.0'	57	104	sG	3 brittlestars
231	23.52-18.8	53°02.4'	130°38.0'	58	106	S	fine grains; H_2S smell
232	23.4 -18.8	53°03.0'	130°38.0'	56	102	S	fine grains
Reef Island	52°42.5' - 53°00' N		131°00' - 131°20' W				
152	24 -21	53°00.0'	131°00.0'	14	25	sG; shell	-
233	24 -21	53°00.0'	131°00.0'	18	33	sG; shell	fine gravel
234	24 -21.5	53°00.0'	131°05.0'	17	31	S; shell	-
235	24 -22	53°00.0'	131°10.0'	16	29	sG; shell	bucket 2/3 full
236	24 -22.5	53°00.0'	131°15.0'	15	27	G; shell	barnacles; coarse gravel
237	24 -23	53°00.0'	131°20.0'	12	22	G; shell	barnacles; bucket 3/4 full
238	24.5 -23	52°57.5'	131°20.0'	12	22	G	very coarse; 3 attempts
239	25 -23	52°55.0'	131°20.0'	24	44	sG; shell	-
240	25 -22.5	52°55.0'	131°15.0'	14	26	G	cobble
241	25 -22	52°55.0'	131°10.0'	14	26	G; shell	-
242	25 -21.5	52°55.0'	131°05.0'	16	29	G; shell	fine gravel
243	25 -21	52°55.0'	131°00.0'	17	31	sG; shell	-
244	25.5 -21	52°52.5'	131°00.0'	17	31	gS; shell	-
245	26 -21	52°50.0'	131°00.0'	16	29	sG; shell	-
246	26 -21.5	52°50.0'	131°05.0'	15	27	G; shell	3 attempts
247	26 -22	52°50.0'	131°10.0'	14	26	G	filled 2 containers (A&B)
248	26 -22.5	52°50.0'	131°15.0'	12	22	G; shell	-
249	26 -23	52°50.0'	131°20.0'	48	88	zsG	-

Appendix Table 9 (cont'd)

Grab no.	Station no.	Latitude	Longitude	Depth (fm)	Depth (m)	Contents[b] of grab	Remarks
250	26.5 -23	52°47.5'	131°20.0'	52	95	S	trace; 2 attempts
251	27 -23	52°45.0'	131°20.0'	94	174	S	2 attempts;brittlestar;crinoid
252	27 -22.5	52°45.0'	131°15.0'	60	110	S	2 attempts
253	27 -22	52°45.0'	131°10.0'	69	126	gS; shell	-
254	25 -21.5	52°45.0'	131°05.0'	22	40	gS	coarse grains
255	25 -21	52°45.0'	131°00.0'	21	38	G; shell	crab; coral; chiton
256	25.5 -21	52°42.5'	131°00.0'	30	55	sG; shell	-
Ramsey Island	52°35' - 52°40' N		131°00' - 131°10' W				
257	26 -21	52°40.0'	131°00.0'	37	68	sG	bucket 1/2 full
258	26 -21.5	52°40.0'	131°05.0'	39	71	sG; shell	-
259	26 -22	52°40.0'	131°10.0'	44	80	gS	-
260	28.16-22	52°39.2'	131°10.0'	37	67	sG	bucket 3/4 full; tunicate
261	28.4 -22	52°38.0'	131°10.0'	43	78	S; shell	fine grains; 3 attempts
262	28.5 -22	52°37.5'	131°10.0'	52	95	S	bucket 3/4 full
263	28.56-22	52°37.2'	131°10.0'	56	102	S	bucket 2/3 full; gastropod
264	28.7 -22	52°36.5'	131°10.0'	69	126	gS	-
265	29 -22	52°35.0'	131°10.0'	79	144	S	bucket 1/2 full; fine grains
266	29 -21.5	52°35.0'	131°05.0'	56	100	gzS	bucket 1/2 full
267	28.6 -21.53	52°37.0'	131°05.3'	59	108	gS	-
268	28.52-21.55	52°37.4'	131°05.5'	55	100	G;S	bucket 1/4 full
269	28.4 -21.56	52°38.0'	131°05.6'	47	86	sG; shell	2 attempts
270	28.16-21.52	52°39.2'	131°05.2'	36	66	sG; shell	brittlestars
271	28 -21.52	52°40.0'	131°05.2'	38	69	G; shell	bucket 1/2 full
272	28 -21	52°40.0'	131°00.0'	38	69	G; shell	tubeworms
273	28.28-21.04	52°38.6'	131°00.4'	42	77	S; shell	trace only
274	28.44-21.02	52°37.8'	131°00.2'	46	84	sG; shell	-
275	28.72-21.01	52°36.4'	131°00.1'	60	110	sG	-
276	29 -21.01	52°35.0'	131°00.1'	60	110	S	-

[a]See Figure 4 for locations of grab stations.
[b]See Appendix Table 11 for explanation of contents codes.

Appendix Table 10. Invertebrate catch summary - occurrence by haul and total catch.

Species	Total catch (kg)	Haul no.																						
		2	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
Sponges	64							x	x				x					x	x			x		
Anemone	155			x		x		x	x	x	x		x	x	x		x	x		x	x	x	x	
Sea pens	1				x			x				x												
Univalves	2			x				x	x	x	x													
Bivalves	T				x	x		x	x	x			x											
Octopus	21				x			x														x		
Squid	T							x					x											
Nudibranchs	T				x																			
Polychaetes	T								x															
Prawns	T																							x
Crabs	5					x		x	x															
Cucumbers	2													x										
Starfish	1,636[a]	x		x	x	x	x	x	x	x	x	x			x	x	x	x				x		
Brittle stars	1	x										x											x	
Urchins	5	x	x	x								x												x
Basket stars	2											x	x									x	x	
Tunicates	T							x																

[a]Principal catches were from hauls 6 (272 kg), 7 (542 kg), 9 (109 kg), 10 (226 kg), 11 (396 kg), and 16 (87 kg).

Appendix Table 11. Definition of abbreviated terms applied to the sediment types taken from Hecate Strait during G.B. REED Groundfish Cruise No. 79-4.

Abbreviations	Description
G	Gravel
sG	Sandy gravel
zsG	Muddy sandy gravel
(g)S	Slightly gravelly sand
gS	Gravelly sand
gzS	Gravelly muddy sand
S	Sand
zS	Muddy sand
sZ	Sandy mud
C	Clay
sC	Sandy clay