G.B. Reed groundfish cruise No. 67-1, February 1 to April 24, 1967

by

W.R. Harling, D. Davenport and S.J. Westrheim

FISHERIES RESEARCH BOARD OF CANADA

TECHNICAL REPORT NO. 22

1967

FISHERIES RESEARCH BOARD OF CANADA

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ERRATA NOTE

For: G.B. Reed groundfish cruise no. 67-1, February 1 to April 24, 1967.

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Fisheries Research Board Technical Report No. 22, 1967

Substitute the following list of Flatfish species for Table II on pages 24, 25, and 26, respectively:

Flatfish[7]	Flatfish[7]	Flatfish[7]
Dover sole	Dover sole	Dover sole
English sole	English sole	English sole
Halibut[8]	Halibut[8]	Halibut[8]
Petrale sole	Petrale sole	Petrale sole
Rex sole	Rex sole	Rex sole
Turbot	Turbot	Turbot
Other[9]	Other[9]	Other[9]

In addition, footnote 9 to Appendix tables I, II, and III on page 37 should include the following species:

English sole (*Parophrys vetulus*)	+	-	-
Slender sole (*Lyopsetta exilis*)	-	+	-

FISHERIES RESEARCH BOARD OF CANADA

TECHNICAL REPORT NO. 22

G.B. REED GROUNDFISH CRUISE NO. 67-1, FEBRUARY 1 TO APRIL 24, 1967

by

W. R. Harling, D. Davenport, and S. J. Westrheim

FISHERIES RESEARCH BOARD OF CANADA
Biological Station, Nanaimo, B. C.

June, 1967

PURPOSE

1. Investigate the bathymetric distribution and abundance of Pacific ocean perch (Sebastodes alutus) off La Pérouse Bank (Fig. 1).

2. Determine the maturity stages of gonads from all species of rockfish caught.

3. Collect eyed larvae from ovaries of rockfish species for identification studies.

4. Collect material for systematics studies of marine fishes by protein electrophoresis.

5. Collect live petrale sole (Eopsetta jordani) in Estevan Deep for air shipment to Nanaimo (egg incubation studies).

6. Sample the Smith Sound stock of juvenile Pacific ocean perch.

The cruise was divided into 3 parts (Fig. 2, 3 and 4) to follow changes in behaviour of ocean perch and development of rockfish ovaries. The dates were: Part I, February 1-17; Part II, March 7-22; and Part III, April 11-23.

PORTS OF CALL

Victoria (Feb. 5-8)	-	Repairs to forward gallows.
Port Renfrew (Feb. 8)	-	Medical treatment for injured crewman.
Ucluelet (Mar. 13-14)	-	Repairs to trawl net and injured crewman.

GENERAL RESULTS

A total of 87 groundfish trawl hauls were completed during the cruise. Following is a summary of the total catch by important species.

Species or group	Pounds	Percentage of catch
S. alutus	75,900	24.8
Turbot	59,800	19.5
Blackcod	38,100	12.4
Dover sole	27,200	8.9
Selachii	22,000	7.2
S. brevispinis	14,700	4.8
S. rubrivinctus	12,200	4.0
Rex sole	8,600	2.8
S. zacentrus	6,500	2.1
S. diploproa	6,000	2.0
Petrale sole	5,600	1.8
S. proriqer	5,300	1.7
Seb. alascanus	4,200	1.4
S. crameri	3,700	1.2
Other*	16,500	5.4
Total	306,300	100.00

*Species amounting to less than 3000 lb total weight, and includes halibut (1477 lb - 58 fish).

The following table summarizes the samples collected for otoliths and/or size composition.

Species	No. measured	No. of otoliths
S. alutus	18,703	5,641
Petrale sole	1,624	..
S. zacentrus	1,284	96
S. proriger	884	192
Shrimp (4 species)	716	..
S. brevispinis	463	68
S. diploproa	371	..
S. helvomaculatus	362	185
S. elongatus	240	240
Pacific cod	167	..
S. rubrivinctus	88	88
S. flavidus	62	62
S. paucispinis	58	58
Halibut	56	..
S. pinniger	30	30
S. crameri	28	28
Total	25,136	6,688

Appendix Tables I, II and III contain the detailed results by haul. Ocean perch size composition data are recorded in Appendix Tables IV (nos./hr, sexes combined) and V (nos. sampled by sex).

An item of interest was the capture of 8 specimens of S. aurora and 5 specimens of Seb. altivelis--two species not previously recorded in waters off British Columbia.

Water temperatures were taken in all trawling areas by reversing bottle and/or bathythermograph casts. Following is a summary of bottom temperatures (°C) by depth:

Depth range (fm)	La Pérouse Bank	Barkley Sound	Smith Sound	Triangle Island	Juan de Fuca
<60	..	8.3-8.6	..	..	7.8-8.0
60-100	6.4-7.9	..	7.4-7.5	7.0	7.5
101-200	5.5-7.0	..	..	6.5	..
>200	4.7-5.6	..	..	..	..

An attempt to capture inshore rockfish species with gill nets and hand lines was unsuccessful in Barkley Sound during stormy weather in March.

Several Japanese and USSR vessels were sighted, but none contacted. Off La Pérouse Bank, a small Japanese tanker was sighted in February and a Japanese setliner (No. W-28) was observed fishing in March. Soviet trawlers (one BMRT, one SRTM, and two SRT) and a gunboat were also observed off La Pérouse Bank in March and/or April. Off Estevan Point, a Japanese (?) trawler was observed at long range in February. Off Triangle Island, several Soviet trawlers (one BMRT, one SRTM, and two SRT) were observed in March and April.

PROJECT RESULTS

1. Distribution and abundance of Pacific ocean perch off La Pérouse Bank

A total of 70 hauls were completed off La Pérouse Bank during the 3 parts of cruise 67-1. Substantial catch rates occurred occasionally, with the largest catches occurring during part I (February). Maximum catch rate was 23,146 lb/hr (haul no. 22 in 154-156 fm). Catch rates were generally lower during succeeding parts of the cruise. Maximum catch rate in part II was 4654 lb/hr (haul no. 38 in 180-196 fm), and in part III, 5340 lb/hr (haul no. 94 in 166-182 fm).

Table I summarizes the ocean perch mean catch rates per 20-fm interval for the 61 usable hauls on La Pérouse Bank in February, March, and April. Catch rates generally decreased during the study period, and there was no indication of a shift to the shallower depths occupied during the summer months.

Table II summarizes the size composition (modal size) and sex ratio (% males) information for the same 61 usable hauls. Little change in modal size is evident among months. The juveniles (modal sizes 10-28 cm) are scarce or absent deeper than 140-159 fm, and few adult fish are found shallower than the same depth interval. Males predominated in catches from virtually all depth intervals and months.

2. Rockfish maturity studies

Approximately 17,000 specimens, comprising all 21 species of *Sebastodes* caught, were examined for stage of maturity. Following is a summary of the collections.

	Part I (February)	Part II (March)	Part III (April)	Total
Number of species	18	19	19	21
Number examined				
Males	3,221	2,925	3,044	9,190
Females	2,873	2,131	3,093	8,097
Unknown	2	8	6	16
Total	6,096	5,064	6,143	17,303

While some species (among them *S. alutus* and *S. crameri*) had reached the eyed-larvae stage, the bulk of the species were still in the yellow-egg or translucent stage.

3. Identification studies of eyed larvae

Samples of eyed larvae were collected from *S. alutus*, *S. crameri*, *S. rubrivinctus*, *S. saxicola*, and *S.* sp. (nova). Few female *S. alutus* possessing eyed larvae were encountered although a significant number of spent fish were noted in April.

Table I. Pacific ocean perch mean catch rates (lb/hr) by 20-fm depth interval on La Pérouse Bank during GBR 67-1, February-April 1967.

Depth interval (fms)	February		March		April	
	lb/hr	No. of hauls	lb/hr	No. of hauls	lb/hr	No. of hauls
60-79	2	1	..	0	..	0
80-99	2	1	9	2	114	2
100-119	103	4	1110	1	2	1
120-139	1740	1	370	1	27	2
140-159	8193	3	2467	3	920	2
160-179	5064	3	1873	2	4635	3
180-199	7935	4	3709	4	2028	2
200-219	2686	1	1742	2	707	2
220-239	2010	1	2843	2	1006	2
240-259	..	0	2914	1	1123	2
260-279	..	0	62	1	1022	1
280-299	..	0	0	1	0	1
300-319	..	0	0	1	0	1
Total		19		21		21

Table II. Pacific ocean perch catch rate (no./hr), modal size (cm), and sex ratio (% males) by 20-fm depth interval during GBR 67-1, February-April 1967.

Depth interval (fms)	February			March			April		
	no./hr	mode[a]	% males	no./hr	mode	% males	no./hr	mode	% males
60-79	30	14;10	NS[c]	..	..	..	..	..	..
80-99	NM[b]	..	..	112	18;14	NS	180	20;24	NS
100-119	375	18;24	NS	1312	18;24	NS	16	14	NS
120-139	5092	24;18	53	1058	18;26	NS	46	24;30;36	65
140-159	5055	38;26;18	76	1633	36;26;18	67	1060	40;28	45
160-179	3154	36	59	1261	34	58	2765	36	44
180-199	4738	38	60	2709	34	63	1502	34	56
200-219	1726	36	59	1548	36	64	500	34	53
220-239	1233	36	52	1856	36	73	682	36	67
240-259	..	..	..	1894	36	87	756	36	65
260-279	..	..	..	42	36	57	680	36	66
280-299	..	..	..	0	..	..	0	..	..
300-319	..	..	..	0	..	..	0	..	..

[a]Cm. Ranked by magnitude [b]NM = Not counted or measured [c]Not sexed

4. Systematics studies by protein electrophoresis

Personnel from the Vancouver Station continued the biochemical systematics projects initiated on GBR 65-3. Additional samples for blood and muscle protein analysis were collected from marine fishes for comparative electrophoresis studies. Blood hemoglobins were processed and partially analysed aboard ship to investigate stability characteristics, species specificity, and intraspecies polymorphisms useful in gene-frequency studies. Muscle samples were frozen for processing ashore. Following is a summary of the samples collected.

Sample type	Rockfish		Other roundfish		Flatfish	
	Number of species	Number of samples	Number of species	Number of samples	Number of species	Number of samples
Blood	23	655	3	49	6	101
Muscle	23	398	3	49	6	101

5. Egg incubation studies of live petrale sole

Collection of live petrale sole for egg incubation studies at the Nanaimo Station was undertaken at the beginning of part I. Six tows were attempted off Estevan Point. Five were completed yielding no running-ripe fish. During the sixth tow, the net snagged and in the subsequent attempt to free the net the forward gallows collapsed. This resulted in the loss of all gear except one trawl door and necessitated shipyard repairs in Victoria. The last tow of part I, off La Pérouse Bank, produced a few ripe males and females which were successfully returned alive to the Nanaimo Biological Station aboard the G.B. Reed.

6. Juvenile Pacific ocean perch studies in Smith Sound

Seven hauls were completed in Smith Sound during part II (Fig. 3 insert) to collect otoliths for age and growth studies of juvenile Pacific ocean perch. The 1962 year-class once again dominated the catches. Location of hauls and catch statistics are given in Appendix Table VI.

In addition to the scheduled purposes of the cruise, other investigators at the Nanaimo Station and elsewhere made use of the G.B. Reed facilities for projects of their own. These were completed either by the

investigators concerned or by the groundfish personnel. Following is a brief summary of collections made for the Nanaimo Station.

(a) Live blackcod were collected for rearing studies at the Nanaimo Station.

(b) A collection of gastropods was made for the Marine Invertebrate Investigation.

(c) At the request of the Pacific Oceanographic Group, Secchi disc readings (14) were taken and surface water samples (21) were collected for nitrate and chlorophyl a analysis.

(d) Shrimp abundance was monitored in Barkley Sound and Smith Sound at the request of the Crustacean Investigation (details in Appendix Table VI).

Following is a list of projects completed for other Stations and agencies.

(1) Samples of commercial rockfish and other species were collected by personnel of the Vancouver Station to study postmortem proteolysis (Project A), cold storage qualities (Project B), and packaging studies (Project C). The following table summarizes the results.

Project	Rockfish		Other roundfish		Flatfish		Selachii	
	No. of species	Samples	No. of species	Samples	No. of species	Samples	No. of species	Samples
A	7	42 fish	4	22 fish	7	37 fish	2	12 fish
B	7	1045 lb	1	125 lb	2	210 lb	..	-
C	10	830 fish	..	-	2	111 fish	..	-

(2) U.B.C. personnel collected pituitary glands from approximately 500 dogfish (Squalus suckleyi) and 50 skate (Rajidae) for hormone studies at the Department of Zoology.

(3) A collection of Sebastodes helvomaculatus was made for taxonomic and growth studies at Scripps Institution of Oceanography.

(4) Live halibut and other groundfish species were collected for the Vancouver Aquarium.

PERSONNEL

Part I

H. Tsuyuki	Fisheries Research Board - Vancouver	Feb. 1-5
S. J. Westrheim	Fisheries Research Board - Nanaimo	Feb. 1-17
D. Davenport	Fisheries Research Board - Nanaimo	Feb. 1-17
W. Hadaway	Fisheries Research Board - Vancouver	Feb. 1-17
W. R. Harling	Fisheries Research Board - Nanaimo	Feb. 1-17
E. J. R. Lippa	Fisheries Research Board - Nanaimo	Feb. 8-17
M. S. Smith	Fisheries Research Board - Nanaimo	Feb. 1-17
W. Smith	Fisheries Research Board - Vancouver	Feb. 8-17
J. A. Stickland	Fisheries Research Board - Nanaimo	Feb. 1-5
R. M. Wowchuk	Fisheries Research Board - Nanaimo	Feb. 1-5

Part II

J. C. Quast	Bureau of Commercial Fisheries - Juneau	Mar. 7-23
S. J. Westrheim	Fisheries Research Board - Nanaimo	Mar. 7-23
D. Davenport	Fisheries Research Board - Nanaimo	Mar. 7-23
W. Hadaway	Fisheries Research Board - Vancouver	Mar. 7-23
W. R. Harling	Fisheries Research Board - Nanaimo	Mar. 7-23
M. S. Smith	Fisheries Research Board - Nanaimo	Mar. 7-23
W. M. Smith	Fisheries Research Board - Vancouver	Mar. 7-23
V. J. Swiatkievicz	University of British Columbia - Vancouver	Mar. 7-23

Part III

R. L. Demory	Oregon Fish Commission	Apr. 11-23
Y. Kitano	Fisheries Agency of Japan	Apr. 11-23
D. E. Kramer	Fisheries Research Board - Vancouver	Apr. 11-23
S. J. Westrheim	Fisheries Research Board - Nanaimo	Apr. 11-23
D. Davenport	Fisheries Research Board - Nanaimo	Apr. 11-23
W. Hadaway	Fisheries Research Board - Vancouver	Apr. 11-23
W. R. Harling	Fisheries Research Board - Nanaimo	Apr. 11-23
R. M. Wilson	Fisheries Research Board - Nanaimo	Apr. 11-23

ACKNOWLEDGMENTS

As the personnel roster indicates, a relatively large number of individuals took part in the cruise. To all of these the authors wish to express their appreciation for the friendly assistance rendered.

APPENDIX

Table I. Groundfish trawl fishing log for part I of G.B. Reed groundfish cruise no. 67-1, February 1-17, 1967.

Haul No.		1	2	3	4	5	6	7
Date		Feb. 2	Feb. 2	Feb. 3	Feb. 3	Feb. 3	Feb. 4	Feb. 9
Area[1]		ED	ED	ED	ED	ED	ED	LP
Start (PST)[2]		1012	1509	0738	1238	1441	0822	1050
Duration (min)		30	30	41	30	31	33	30
Start: N. Lat.	°	48	48	48	49	49	48	48
	'	48.5	58.7	58.5	00	00.2	59	25
W. Long.	°	126	126	126	126	126	126	126
	'	45	46	45	44.3	43	41	06.5
Direction (°True)		150	130	130	140	140	100	135
End: N. Lat.	°	48	48	48	48	48	48	48
	'	48	58	58	59	59	58.5	23
W. Long.	°	126	126	126	126	126	126	126
	'	44	44.3	44	43.5	43.7	42	06
Depth (fm)[3]		194-198	223-226	142-194	132-152	109-121	138-135	140-148
Water temp. (°C)								
Surface		9.0	9.0	8.8	8.9	8.9	..	9.3
Bottom		5.6	..	6.7	6.9	7.2	..	6.0
Depth (fm)[4]		208	..	180	150	118	..	148
Net used[5]		D-2	D-2	D-2	D-2	D-2	D-2	D-3
Total catch (lb)[6]		4700	2600	2700	2300	2000	0	1000
Remarks		..	..	..	..	..	Snag, net and stbd. door lost	New sweeps 35 fms

continued...

APPENDIX

Table I (continued)

Haul No.	8	9	10	11	12	13	14
Date	Feb. 9	Feb. 9	Feb. 10	Feb. 10	Feb. 10	Feb. 11	Feb. 11
Area[1]	LP	LP	LP	LP	LP	LP	LP
Start (PST)[2]	1302	1603	0848	1317	1359	0739	1307
Duration (min)	30	30	27	15	23	10	30
Start: N. Lat. °	48	48	48	48	48	48	48
'	25	24	24	26.7	27	28	47
W. Long. °	126	126	126	125	125	126	126
'	07.3	08	01	58.5	59.2	00	22
Direction (°True)	135	140	280	320	320	160	250
End: N. Lat. °	48	48	48	48	48	48	48
'	23.7	22.3	25	26.7	27.5	28	47.3
W. Long. °	126	126	126	125	126	126	126
'	05.5	05	03	58	00	00	25
Depth (fm)[3]	162-172	178-187	110-112	92-96	94-96	80	188-170
Water temp. (°C)							
Surface	9.2	9.0	8.8	..	8.9	..	8.4
Bottom	6.2	6.2	6.9	..	6.8	..	5.7
Depth (fm)[4]	164	163	110	..	96	..	150
Net used[5]	D-3	D-3	D-3	D-3	D-3	D-3	D-3
Total catch (lb)[6]	2000	13800	6400	0	1400	110	12800
Remarks	..	..	..	x-doors	Snag. Headrope broken	Snag. Wings torn	..

continued...

APPENDIX

Table I (continued)

Haul No.	15	16	17	18	19	20	21
Date	Feb. 12	Feb. 12	Feb. 13	Feb. 13	Feb. 13	Feb. 13	Feb. 14
Area[1]	LP	LP	LP	LP	LP	LP	LP
Start (PST)[2]	1007	1414	0847	1105	1311	1412	0738
Duration (min)	37	30	25	30	30	28	30
Start: N. Lat. °	48	48	48	48	48	48	48
'	49	43	44.5	47.5	46.5	47	47
W. Long. °	126	126	126	126	126	126	126
'	20	10	15.5	20	22	24	21
Direction (°True)	270	184	360	290	270	270	245
End: N. Lat. °	48	48	48	48	48	48	48
'	50	41.5	45.5	48.5	48	47.2	46
W. Long. °	126	126	126	126	126	126	126
'	22.5	09.5	18	22	24	24.5	26
Depth (fm)[3]	104-103	72-73	100-115	101-104	120-124	150-154	150-278
Water temp. (°C)							
Surface	8.4	8.5	8.9	8.3	8.3	9.0	8.9
Bottom	7.1	7.9	7.3	7.1	6.3	6.9	4.9
Depth (fm)[4]	103	70	92	104	124	130	292
Net used[5]	D-3	D-3	D-3	D-3	D-3	D-3	D-3
Total catch (lb)[6]	1600	390	2800	1500	4900	1900	2400
Remarks	..	..	Snag. Headrope broken	..	..	..	..

continued...

APPENDIX

Table I (continued)

Haul No.	22	23	24	25	26	27	28
Date	Feb. 14	Feb. 14	Feb. 15	Feb. 15	Feb. 15	Feb. 16	Feb. 16
Area[1]	LP	LP	LP	LP	LP	LP	LP
Start (PST)[2]	1025	1450	0827	1112	1427	0750	1018
Duration (min)	30	30	30	30	30	30	30
Start: N. Lat. °	48	48	48	48	48	48	48
'	47.5	47.2	46.7	46.5	46.5	46.5	47.3
W. Long. °	126	126	126	126	126	126	126
'	27	29	29.5	30	31	34	29.5
Direction (°True)	270	210	300	310	310	310	300
End: N. Lat. °	48	48	48	48	48	48	48
'	48	47.4	48.5	47.7	47.8	47.5	48.5
W. Long. °	126	126	126	126	126	126	126
'	30	31	32.5	32.5	33	35.5	33
Depth (fm)[3]	154-156	184-181	160-172	182-202	205-216	222-240	180-185
Water temp. (°C)							
Surface	8.9	8.7	8.8	9.0	9.0	8.9	8.9
Bottom	5.9	..	6.3	6.0	5.5	5.4	6.1
Depth (fm)[4]	150	..	150	164	195	226	171
Net used[5]	D-3	D-3	D-3	D-3	D-3	D-3	D-3
Total catch (lb)[6]	14200	8300	3300	5400	5600	3100	4400
Remarks	..	..	..	..	..	..	..

continued..

APPENDIX

Table I (continued)

Haul No.	1	2	3	4	5	6	7
Date	Feb. 2	Feb. 2	Feb. 3	Feb. 3	Feb. 3	Feb. 4	Feb. 9
Area	ED	ED	ED	ED	ED	ED	LP
Total catch (lb)	4700	2600	2700	2300	2000	0	1000
Flatfish[7]							
Dover sole	20	81	1	T	T	..	..
Halibut[8]	(4)53	(1)10	..	..	(1)59	..	(3)53
Petrale	346	77	413	359	98	..	41
Rex sole	87	199	78	103	76	..	39
Slender sole	12	T	T	5	17	..	42
Turbot	1658	1557	421	209	390	..	307
Other[9]	T[14]	..	..	..	..	..	..
Rockfish							
S. aleutianus	53	..	6	..	..	..	..
S. alutus	1693	200	538	27	213	..	72
S. brevispinis	..	..	5	27	23	..	31
S. crameri	19	25	7	1	..	..	..
S. diploproa	122	2	175	13	..	..	161
S. elongatus	..	..	..	..	88	..	2
S. entomelas	..	..	14	20	..	..	..
S. flavidus	..	..	..	4	..	..	..
S. helvomaculatus	..	..	10	25	36	..	25
S. paucispinis	..	..	..	9	9	..	12
S. pinniger	..	..	..	..	..	..	..
S. proriger	..	..	..	..	5	..	..
S. ruberrimus	..	..	..	..	..	..	..
S. rubrivinctus	80	..	115	158	..	..	6
S. saxicola	..	..	..	..	..	..	..
S. zacentrus	3	..	143	331	72	..	8
Seb. alascanus	35	99	7	8	..	..	17
Other[10]	4	..	3	16	..	..	4
Roundfish[11]							
Blackcod	49	184	4	..	6	..	67
Chinook salmon	..	..	5	..	26	..	..
Eelpout	1	18	5	1	..	..	5
Eulachon	..	..	T	T	1	..	..
Hake	2	6	2	..	..	..	..
Lingcod	20	..	179	58	85	..	..
Pacific cod	..	..	3	8	12	..	8
Other[12]	T	..	4	T	T	..	2
Selachii[13]							
Dogfish	228	121	56	388	283	..	39
Ratfish	147	22	443	377	199	..	14
Skate	57	10	72	156	276	..	58
Invertebrate	6	7	35	16	T	..	1

APPENDIX

Table I (continued)

Haul No.	8	9	10	11	12	13	14
Date	Feb. 9	Feb. 9	Feb. 10	Feb. 10	Feb. 10	Feb. 11	Feb. 11
Area	LP	LP	LP	LP	LP	LP	LP
Total catch (lb)	2000	13800	6400	0	1400	110	12800
Flatfish[7]							
Dover sole	4	16	18	..	9	..	..
Halibut[8]	..	..	..	..	..	..	(1)4
Petrale	87	534	178	..	1	3	..
Rex sole	13	96	190	..	43	4	83
Slender sole	35	16	9	..	3	T	..
Turbot	341	1434	27	..	22	4	2095
Other[9]	..	18	..	..	1	..	..
Rockfish							
S. aleutianus	..	14	..	..	..	..	11
S. alutus	1096	10274	43	..	T	..	4846
S. brevispinis	10	4	146	..	651	48	3
S. crameri	1	231	..	..	..	..	2139
S. diploproa	92	50	..	..	..	..	1289
S. elongatus	..	..	151	..	16	8	..
S. entomelas	52	63	..	..	..	..	13
S. flavidus	..	..	..	..	4	5	..
S. helvomaculatus	25	13	158	..	11	T	18
S. paucispinis	50	20	11	..	..	..	..
S. pinniger	..	..	..	..	67	17	..
S. proriger	..	..	4	..	451	3	..
S. ruberrimus	..	..	..	..	5	..	..
S. rubrivinctus	5	75	1	..	4	..	70
S. saxicola	..	..	..	..	..	..	..
S. zacentrus	1	2	82	..	45	2	..
Seb. alascanus	46	102	T	..	..	..	72
Other[10]	20	17	4	..	1	..	..
Roundfish[11]							
Blackcod	45	787	48	..	1	..	2074
Chinook salmon	..	..	..	..	..	7	..
Eelpout	10	5	..	..	..	T	6
Eulachon	..	..	..	..	..	T	..
Hake	..	7	..	..	..	..	12
Lingcod	..	..	44	..	9	4	..
Pacific cod	..	..	46	..	15	2	..
Other[12]	7	..	2	..	..	..	8
Selachii[13]							
Dogfish	25	13	364	..	27	..	..
Ratfish	4	16	4745	..	39	3	30
Skate	1	..	108	..	..	T	16
Invertebrate	5	T	4	..	5	3	7

APPENDIX

Table I (continued)

Haul No.	15	16	17	18	19	20	21
Date	Feb. 12	Feb. 12	Feb. 13	Feb. 13	Feb. 13	Feb. 13	Feb. 14
Area	LP	LP	LP	LP	LP	LP	LP
Total catch (lb)	1600	390	2800	1500	4900	1900	2400
Flatfish[7]							
Dover sole	1	T	T	..	2	7	3
Halibut[8]	(4)116	..	..	(1)6	..	(1)23	..
Petrale sole	20	..	..	11	10	..	..
Rex sole	20	11	48	5	92	28	62
Slender sole	..	9	..	T	..	11	5
Turbot	19	94	62	30	245	783	185
Other[9]	..	T	..	..	1	2	..
Rockfish							
S. aleutianus	..	..	..	..	..	T	22
S. alutus	107	T	1	53	870	368	393
S. brevispinis	92	..	168	116	32	24	23
S. crameri	..	..	..	..	2	8	24
S. diploproa	..	..	..	..	..	68	381
S. elongatus	111	7	42	166	26	1	9
S. entomelas	..	..	6	..	..	15	70
S. flavidus	..	3	38	..	..	..	488
S. helvomaculatus	84	..	15	82	59	43	10
S. paucispinis	..	5	68	..	6	24	8
S. pinniger	22	..	111	..	6	10	..
S. proriger	56	..	181	56	2	2	1
S. ruberrimus	..	..	35	..	..	..	..
S. rubrivinctus	4	..	164	..	84	38	148
S. saxicola	..	..	3	..	..	..	32
S. zacentrus	37	..	1586	24	83	52	224
Seb. alascanus	1	..	1	T	8	25	65
Other[10]	T	T	..	3	1	..	6
Roundfish[11]							
Blackcod	..	2	14	1	11	91	54
Chinook salmon	..	..	..	..	..	..	..
Eelpout	..	..	..	..	T	..	9
Eulachon	..	41	..	..	..	..	..
Hake	..	..	..	..	..	..	4
Lingcod	123	12	40	28	56	11	..
Pacific cod	204	..	18	568	35	10	5
Other[12]	..	8	T	T	1	T	3
Selachii[13]							
Dogfish	489	93	83	266	155	50	30
Ratfish	13	5	70	44	2967	126	67
Skate	55	93	..	21	101	116	34
Invertebrate	5	10	T	T	2	..	1

continued....

APPENDIX

Table I (continued)

Haul No.	22	23	24	25	26	27	28
Date	Feb. 14	Feb. 14	Feb. 15	Feb. 15	Feb. 15	Feb. 16	Feb. 16
Area	LP	LP	LP	LP	LP	LP	LP
Total catch (lb)	14200	8300	3300	5400	5600	3100	4400
Flatfish[7]							
Dover sole	6	10	4	6	28	2	2
Halibut[8]	..	..	(1)5	(2)18	(2)28	(4)42	(1)9
Petrale	..	..	113	417	273	99	480
Rex sole	8	48	45	172	215	257	81
Slender sole	..	..	10	37	..	5	10
Turbot	1655	2297	695	1655	1920	585	1949
Other[9]	3	..	3	3	1	..	3
Rockfish							
S. aleutianus	T	..	1	66	68	152	8
S. alutus	11573	4202	1650	1096	1343	1005	298
S. brevispinis	35	5	..	..	..	..	..
S. crameri	61	168	2	115	124	52	18
S. diploproa	456	823	70	185	35	4	51
S. elongatus	..	..	..	..	..	..	..
S. entomelas	66	9	8	..	..	..	3
S. flavidus	..	..	..	4	..	..	..
S. helvomaculatus	..	..	14	6	3	..	2
S. paucispinis	30	..	..	34	..	..	7
S. pinniger	..	..	..	..	..	..	..
S. proriger	..	..	..	..	..	..	..
S. ruberrimus	..	..	..	..	..	..	..
S. rubrivinctus	35	15	5	67	60	6	18
S. saxicola	..	..	..	..	..	..	..
S. zacentrus	..	..	2	..	..	..	T
Seb. alascanus	6	42	36	81	112	114	16
Other[10]	7	..	..	..	..	..	..
Roundfish[11]							
Blackcod	91	397	400	1371	1184	643	1238
Chinook salmon	9	..	..	..	..	..	..
Eelpout	3	5	2	5	22	33	5
Eulachon	..	..	..	..	..	..	..
Hake	..	11	..	..	26	28	..
Lingcod	53	18	28	..	..	..	..
Pacific cod	..	..	..	..	..	..	..
Other[12]	4	5	2	..	..	T	..
Selachii[13]							
Dogfish	31	65	89	19	38	46	119
Ratfish	14	72	8	..	10	4	10
Skate	11	92	80	71	78	29	39
Invertebrate	1	1	2	5	4	17	1

APPENDIX

Table II. Groundfish trawl fishing log for part II of G.B. Reed groundfish cruise no. 67-1, March 7-22, 1967.

Haul No.	29	30	31	32	33	34	35
Date	Mar. 8	Mar. 8	Mar. 9	Mar. 9	Mar. 9	Mar. 10	Mar. 10
Area[1]	LP	LP	LP	LP	LP	LP	LP
Start (PST)[2]	0913	1423	0732	1037	1336	0916	1232
Duration (min)	30	16	30	30	30	30	30
Start: N. Lat. °	48	48	48	48	48	48	48
'	25.9	21.8	47.5	47.5	47.0	48.0	47.5
W. Long. °	125	125	126	126	126	126	126
'	55.5	51.5	20.4	20.8	22.0	29.8	31.3
Direction (°True)	270	165	270	270	260	115	130
End: N. Lat. °	48	48	48	48	48	48	48
'	25.3	21.5	47.4	47.3	47.2	47.6	51.5
W. Long. °	125	125	126	126	126	126	126
'	57.4	51.5	23.2	23.5	23.5	26.6	30.0
Depth (fm)[3]	96-101	92-98	114-124	128	148-158	159-164	168-176
Water temp. (°C)							
Surface	8.2	8.1	7.7	7.9	7.7	8.0	..
Bottom	6.4	6.8	5.9	5.9	5.7	5.5	..
Depth (fm)[4]	94	101	119	122	139	148	..
Net used[5]	D-3	D-3	D-3	D-3	D-3	D-3	D-3
Total catch (lb)[6]	1400	1000	3400	1500	1100	2600	2300
Remarks	..	..	..	..	Snag. Headrope broken	..	..

continued...

APPENDIX

Table II (continued)

Haul No.	36	37	38	39	40	41	42
Date	Mar. 10	Mar. 11	Mar. 11	Mar. 11	Mar. 12	Mar. 12	Mar. 12
Area[1]	LP	LP	LP	LP	LP	LP	LP
Start (PST)[2]	1520	0728	1035	1408	0737	0955	1344
Duration (min)	30	30	30	30	30	30	29
Start: N. Lat. °	48	48	48	48	48	48	48
'	47.0	46.4	47.0	46.5	47.5	45.1	47.8
W. Long. °	126	126	126	126	126	126	126
'	29.0	32.2	34.0	33.4	35.6	32.0	33.0
Direction (°True)	095	110	110	110	138	310	090
End: N. Lat. °	48	48	48	48	48	48	48
'	46.8	46.4	46.5	46.1	46.4	46.0	47.5
W. Long. °	126	126	126	126	126	126	126
'	28.0	30.0	31.0	31.2	34.0	33.9	30.0
Depth (fm)[3]	194-189	208-198	220-226	220-266	300-286	300-318	180-196
Water temp. (°C)							
Surface	7.7	7.6	8.1	..	7.8	..	7.9
Bottom	5.94	5.46	5.32	..	4.73	..	5.77
Depth (fm)[4]	190	200	228	..	288	..	182
Net used[5]	D-3	D-3	D-3	D-3	D-3	D-3	D-3
Total catch (lb)[6]	6800	9800	8700	6100	1000	1200	6300
Remarks	..	..	..	..	..	..	..

continued....

APPENDIX

Table II (continued)

Haul No.	43	44	45	46	51	52	53
Date	Mar. 12	Mar. 13	Mar. 15	Mar. 15	Mar. 18	Mar. 18	Mar. 18
Area[1]	LP	LP	LP	LP	LP	LP	LP
Start (PST)[2]	1529	1015	1003	1149	0729	1011	1325
Duration (min)	9	6	30	6	30	30	30
Start: N. Lat. °	48	48	48	48	48	48	48
'	48.2	50.2	48.0	48.0	48.5	48.0	47.5
W. Long. °	126	126	126	126	126	126	126
'	22.2	22.7	31.3	31.4	32.2	31.5	32.0
Direction (°True)	120	055	..	080	120	122	130
End: N. Lat. °	48	48	48	48	48	48	48
'	48.0	50.3	47.5	..	48.2	47.5	46.5
W. Long. °	126	126	126	126	126	126	126
'	21.0	22.6	28.0	..	29.0	27.0	30.2
Depth (fm)[3]	98-94	98-96	152-150	150	150	166	198-192
Water temp. (°C)							
Surface	7.8	..	8.1	..	8.0	8.0	..
Bottom	6.6	..	6.3	..	6.7	6.71	5.90
Depth (fm)[4]	100	..	150	..	150	161	186
Net used[5]	D-3	D-3	D-3	D-3	D-3	D-3	D-3
Total catch (lb)[6]	2000	50	90	580	3900	5600	6900
Remarks	Slowed by mud & rock. Net torn.	Slowed by clay & rocks	Gear not fishing properly	x-doors	..	..	..

continued...

APPENDIX

Table II (continued)

Haul No.	54	55	56	57
Date	Mar. 18	Mar. 19	Mar. 19	Mar. 19
Area[1]	LP	LP	LP	LP
Start (PST)[2]	1623	0852	1042	1415
Duration (min)	30	30	30	30
Start: N. Lat. °	48	48	48	48
'	47.1	47.4	46.8	47.3
W. Long. °	126	126	126	126
'	33.6	34.9	35.0	34.2
Direction (°True)	125	135	120	130
End: N. Lat. °	48	48	48	48
'	47.0	46.8	46.3	45.0
W. Long. °	126	126	126	126
'	29.5	31.0	32.5	32.0
Depth (fm)[3]	198-189	214-205	230	262-264
Water temp. (°C)				
Surface	..	8.1	..	8.2
Bottom	..	5.96	..	5.58
Depth (fm)[4]	..	200	..	252
Net used[5]	D-3	D-3	D-3	D-3
Total catch (lb)[6]	6300	5000	8700	7000
Remarks	..	..	..	..

continued...

APPENDIX

Table II (continued)

Haul No.	29	30	31	32	33	34	35
Date	Mar. 8	Mar. 8	Mar. 9	Mar. 9	Mar. 9	Mar. 10	Mar. 10
Area	LP	LP	LP	LP	LP	LP	LP
Total catch (lb)	1400	1000	3400	1500	1100	2600	2300
Flatfish[7]							
Dover sole	10	..	5	..	7	14	13
English sole	72	..	1	2	2	5	22
Halibut[8]	..	..	..	(1)35	..	..	..
Petrale sole	8	11	19	2	..	6	..
Rex sole	88	1	20	26	15	21	61
Turbot	153	1	188	444	314	314	603
Other[9]	5	..	1	10	7	21	7
Rockfish							
S. aleutianus	..	..	..	T	..	T	1
S. alutus	7	..	555	185	261	1893	973
S. brevispinis	79	71	54	28	9	15	12
S. crameri	1	..	..	5	6	1	10
S. diploproa	..	..	..	2	73	58	123
S. elongatus	11	10	73	11	..	..	..
S. helvomaculatus	2	22	110	51	28	25	6
S. paucispinis	8	..	19	8	..	14	..
S. pinniger	..	28	..	4	..	..	..
S. proriger	11	260	13	1	..	..	..
S. ruberrimus	..	..	..	..	..	..	..
S. rubrivinctus	2	2	19	41	35	10	18
S. zacentrus	199	195	329	108	36	14	4
Seb. alascanus	..	..	2	11	7	38	33
Other[10]	..	16	6	5	T	9	T
Roundfish[11]							
Blackcod	39	T[14]	36	197	159	64	343
Eelpout	..	..	T	T	..	3	5
Lingcod	9	30	71	55	32	5	..
Pacific cod	2	..	129	36	..	..	..
Other[12]	1	..	1	13	1	6	2
Selachii[13]							
Dogfish	689	324	808	62	15	16	13
Ratfish	5	59	914	61	25	8	2
Skate	10	..	51	63	41	T	21
Cat shark	..	..	..	..	..	..	..
Invertebrate	31	3	1	65	12	3	14

continued.....

APPENDIX

Table II (continued)

Haul No.	36	37	38	39	40	41	42
Date	Mar. 10	Mar. 11	Mar. 11	Mar. 11	Mar. 12	Mar. 12	Mar. 12
Area	LP	LP	LP	LP	LP	LP	LP
Total catch (lb)	6800	9800	8700	6100	1000	1200	6300
Flatfish[7]							
Dover sole	30	64	235	393	235	328	28
Halibut[8]	12	..	..	..	..	..	1
Petrale sole	..	(2)25	(1)4	(1)87	..	..	..
Rex sole	..	..	2	..	..	..	50
Slender sole	83	193	160	141	14	T	108
Turbot	1833	3124	3367	1879	11	18	3011
Other[9]	..	..	..	..	..	..	16
Rockfish							
S. aleutianus	..	19	117	40	137	64	5
S. alutus	1871	1226	2327	1457	..	..	2247
S. brevispinis	..	..	..	..	..	..	..
S. crameri	40	126	2	..	..	..	18
S. diploproa	225	60	495	21	..	..	24
S. elongatus	..	..	..	..	..	..	..
S. helvomaculatus	2	..	..	..	..	..	6
S. paucispinis	..	..	..	..	..	..	..
S. pinniger	..	..	..	..	..	..	..
S. proriger	..	..	..	..	..	..	..
S. ruberrimus	..	..	..	..	..	..	..
S. rubrivinctus	22	32	40	24	..	..	35
S. zacentrus	..	..	..	..	..	..	..
Seb. alascanus	35	123	278	383	76	162	93
Other[10]	..	..	..	..	T	..	..
Roundfish[11]							
Blackcod	2548	4618	1489	1460	442	561	581
Eelpout	10	27	25	33	2	..	10
Lingcod	..	..	..	..	..	..	27
Pacific cod	..	..	..	..	..	..	..
Other[12]	..	17	20	18	3	1	T
Selachii[13]							
Dogfish	6	6	5	..	..	..	30
Ratfish	15	13	32	15	..	..	..
Skate	40	53	52	103	17	..	33
Cat shark	..	4	..	..	2	..	..
Invertebrate	9	20	2	14	11	40	6

continued....

APPENDIX

Table II (continued)

Haul No.	43	44	45	46	51	52	53
Date	Mar. 12	Mar. 13	Mar. 15	Mar. 15	Mar. 18	Mar. 18	Mar. 18
Area	LP	LP	LP	LP	LP	LP	LP
Total catch (lb)	2000	50	90	580	3900	5600	6900
Flatfish[7]							
Dover sole	..	..	..	T	26	29	53
Halibut[8]	..	..	..	..	..	17	..
Petrale sole	..	..	..	..	..	..	(1)32
Rex sole	21	..	..	6	..	16	230
Slender sole	5	..	3	14	49	70	214
Turbot	5	..	39	81	1448	3536	2539
Other[9]	..	..	1	T	5	..	10
Rockfish							
S. aleutianus	..	..	..	..	..	1	43
S. alutus	..	..	17	227	1544	900	2059
S. brevispinis	96	11	..	3	..	..	..
S. crameri	..	..	..	..	..	6	54
S. diploproa	..	..	2	10	77	116	75
S. elongatus	8	T	1	1	1	..	..
S. helvomaculatus	10	1	4	42	118	5	..
S. paucispinis	25	..	..	..	..	..	..
S. pinniger	33	..	..	..	..	..	..
S. proriger	316	..	..	..	..	..	..
S. ruberrimus	48	14	..	..	..	..	..
S. rubrivinctus	361	..	5	17	98	11	109
S. zacentrus	415	4	5	66	172	..	..
Seb. alascanus	T	..	T	13	72	23	23
Other[10]	3	..	..	..	..	2	..
Roundfish[11]							
Blackcod	..	..	..	..	61	674	1346
Eelpout	..	..	..	..	..	10	3
Lingcod	37	..	..	..	..	46	..
Pacific cod	..	..	..	..	..	..	..
Other[12]	..	..	..	..	..	..	17
Selachii[13]							
Dogfish	385	8	10	..	76	59	2
Ratfish	221	14	..	51	112	32	3
Skate	..	..	..	48	43	..	83
Cat shark	..	..	..	..	..	..	..
Invertebrate	4	T	..	T	1	7	5

continued..

APPENDIX

Table II (continued)

Haul No.	54	55	56	57
Date	Mar. 18	Mar. 19	Mar. 19	Mar. 19
Area	LP	LP	LP	LP
Total catch (lb)	6300	5000	8700	7000
Flatfish[7]				
Dover sole	114	184	4722	5476
Halibut[8]	..	..	..	..
Petrale sole	..	(1)27	..	..
Rex sole	236	314	269	6
Slender sole	354	291	207	67
Turbot	2321	2025	840	122
Other[9]	20	10	15	..
Rockfish				
S. aleutianus	91	132	64	40
S. alutus	1182	1065	516	31
S. brevispinis	..	..	..	..
S. crameri	70	11	37	6
S. diploproa	25	2	..	3
S. elongatus	..	..	..	..
S. helvomaculatus	1	..	..	..
S. paucispinis	..	..	..	..
S. pinniger	..	..	..	..
S. proriger	..	..	..	..
S. ruberrimus	..	..	..	..
S. rubrivinctus	83	38	10	..
S. zacentrus	..	..	..	..
Seb. alascanus	25	53	125	138
Other[10]	3	..	2	5
Roundfish[11]				
Blackcod	1693	735	1688	987
Eelpout	7	14	15	17
Lingcod	..	..	..	..
Pacific cod	..	..	..	..
Other[12]	9	11	3	11
Selachii[13]				
Dogfish	..	23	4	16
Ratfish	4	6	8	5
Skate	28	32	65	44
Cat shark	..	..	..	..
Invertebrate	7	4	..	4

continued....

APPENDIX

Table III. Groundfish trawl fishing log for part III of G.B. Reed groundfish cruise no. 67-1, April 11-23, 1967.

Haul No.	65	66	67	68	69	70	71
Date	Apr. 12	Apr. 12	Apr. 12	Apr. 13	Apr. 13	Apr. 13	Apr. 13
Area[1]	LP	LP	LP	LP	LP	LP	LP
Start (PST)[2]	1030	1330	1607	0730	0955	1252	1503
Duration (min)	30	30	30	30	30	30	30
Start: N. Lat. °	48	48	48	48	48	48	48
'	42.5	47.0	46.0	47.5	48.0	47.5	47.5
W. Long. °	126	126	126	126	126	126	126
'	27.0	27.7	30.0	31.0	31.0	35.0	34.0
Direction (°True)	300	290	300	..	..	140	120
End: N. Lat. °	48	48	48	48	48	48	48
'	48.4	47.6	47.8	48.2	48.5	46.0	46.5
W. Long. °	126	126	126	126	126	126	126
'	31.0	31.0	31.0	34.0	34.0	33.0	31.0
Depth (fm)[3]	152-154	166-168	194-190	205-210	254-266	237-246	230-235
Water temp. (°C)							
Surface	8.6	8.8	..	8.4	..	..	..
Bottom	6.5	6.06	..	5.95	4.84	5.00	5.18
Depth (fm)[4]	149	158	..	182	263	246	271
Net used[5]	D-3	D-3	D-3	D-3	D-3	D-3	D-3
Total catch (lb)[6]	1400	3500	6100	5100	7300	4400	3600
Remarks	..	..	..	..	Gear fouled for 5 min.	..	..

continued.....

APPENDIX

Table III (continued)

Haul No.	72	73	74	75	76	77	78
Date	Apr. 13	Apr. 14	Apr. 14	Apr. 14	Apr. 14	Apr. 15	Apr. 15
Area[1]	LP	LP	LP	LP	LP	LP	LP
Start (PST)[2]	1734	0950	1252	1500	1721	0830	1319
Duration (min)	26	30	30	30	30	6	30
Start: N. Lat. °	48	48	48	48	48	48	48
'	46.9	48.0	49.4	50.5	52.2	20.0	24.2
W. Long. °	126	126	126	126	126	125	125
'	35.0	36.0	29.8	29.0	25.6	50.5	52.2
Direction (°True)	120	150	110	090	090	135	140
End: N. Lat. °	48	48	48	48	48	..	48
'	46.0	46.0	48.5	49.2	52.0	..	23.2
W. Long. °	126	126	126	126	126	..	125
'	34.0	35.0	28.0	28.0	23.0	..	50.5
Depth (fm)[3]	294-302	298-319	133	112-110	92-90	90	95-94
Water temp. (°C)							
Surface	..	..	8.4	8.6	8.6	8.4	8.8
Bottom	4.76	..	6.5	7.0	7.2	7.3	7.3
Depth (fm)[4]	298	..	134	107	92	93	91
Net used[5]	D-3	D-3	D-3	D-3	D-3	D-3	D-3
Total catch (lb)[6]	3000	2600	1600	830	540	1700	2300
Remarks	90% of tow at 294-296 fm.	..	..	..	..	Snag, wing torn	Net torn

continued...

APPENDIX

Table III (continued)

Haul No.	79	80	81	82	83	84	85
Date	Apr. 16	Apr. 16	Apr. 16	Apr. 16	Apr. 16	Apr. 17	Apr. 17
Area[1]	LP	LP	LP	LP	LP	LP	LP
Start (PST)[2]	0738	0932	1115	1456	1740	0740	0935
Duration (min)	30	30	30	30	30	8	30
Start: N. Lat. °	48	48	48	48	48	48	48
'	48.0	49.0	49.5	48.5	47.8	46.5	46.0
W. Long. °	126	126	126	126	126	126	126
'	33.0	32.0	30.0	32.7	33.3	31.2	31.0
Direction (°True)	..	130	130	140	130	320	310
End: N. Lat. °	48	48	48	48	48	48	48
'	47.0	47.0	48.2	46.4	46.5	47.0	47.5
W. Long. °	126	126	126	126	126	126	126
'	30.0	28.5	28.0	30.7	30.0	31.5	32.2
Depth (fm)[3]	165-170	145-152	125-130	187-191	198-208	230-232	240-230
Water temp. (°C)							
Surface	..	8.4	8.3	..	..	..	..
Bottom	5.99	6.4	6.6	5.96	5.37	..	5.44
Depth (fm)[4]	171	149	133	178	204	..	222
Net used[5]	D-3	D-3	D-3	D-3	D-3	D-3	D-3
Total catch (lb)[6]	2800	2000	11600	3000	3900	470	1900
Remarks	..	..	..	..	..	x-doors	..

continued....

APPENDIX

Table III (continued)

Haul No.	86	87	88	89	90	91	92
Date	Apr. 17	Apr. 18	Apr. 18	Apr. 18	Apr. 19	Apr. 19	Apr. 20
Area[1]	LP	TI	TI	TI	TI	CI	EP
Start (PST)[2]	1235	0955	1448	1801	0907	1452	0917
Duration (min)	30	2	2	11	2	11	30
Start: N. Lat. °	48	50	50	50	49	50	49
'	45.7	50.2	53.4	53.0	52.5	42.0	37.0
W. Long. °	126	129	129	129	129	128	127
'	31.0	27.2	30.0	32.3	30.0	37.0	02.0
Direction (°True)	310	..	330	000	320	090	310
End: N. Lat. °	48	..	50	50	49	50	49
'	46.6	..	53.4	53.3	52.5	41.6	39.2
W. Long. °	126	..	129	129	129	128	127
'	33.8	..	30.0	32.4	30.0	36.2	03.0
Depth (fm)[3]	257-248	101	102	108-114	102	76-74	56-60
Water temp. (°C)							
Surface	..	..	..	8.0	..	9.3	9.1
Bottom	4.96	..	..	6.5	..	7.0	7.7
Depth (fm)[4]	239	..	..	106	..	74	62
Net used[5]	D-3	D-3	D-3	D-3	D-3	D-3	D-3
Total catch (lb)[6]	2100	100	10	830	160	670	530
Remarks	..	Snag	Snag, headrope broke	..	Snag, net torn	Snag, net torn	..

continued....

APPENDIX

Table III (continued)

Haul No.	93	94	95	96	97	98
Date	Apr. 20	Apr. 21	Apr. 22	Apr. 22	Apr. 22	Apr. 22
Area[1]	EP	LP	JF	JF	JF	JF
Start (PST)[2]	1247	1756	0836	1053	1335	1428
Duration (min)	30	30	30	30	15	10
Start: N. Lat. °	49	48	48	48	48	48
'	27.0	24.0	37.7	33.7	32.2	32.1
W. Long. °	127	126	124	124	124	124
'	12.6	07.7	52.0	43.0	33.5	33.0
Direction (°True)	340	135	290	100	100	100
End: N. Lat. °	49	48	48	48	48	48
'	28.7	22.0	39.4	33.0	32.1	31.7
W. Long. °	127	126	124	124	124	124
'	13.4	05.5	57.0	39.0	32.2	31.2
Depth (fm)[3]	98-97	166-182	25-30	55-60	36-34	35-44
Water temp. (°C)						
Surface	9.2	..	9.0	9.0	9.3	..
Bottom	6.6	5.94	8.0	7.5	7.8	..
Depth (fm)[4]	100	174	33	61	37	..
Net used[5]	D-3	D-3	D-3	D-3	D-3	D-3
Total catch (lb)[6]	15600	4100	240	1700	480	190
Remarks	..	..	..	..	..	..

continued...

Table III (continued)

Haul No.	65	66	67	68	69	70	71
Date	Apr. 12	Apr. 12	Apr. 12	Apr. 13	Apr. 13	Apr. 13	Apr. 13
Area	LP	LP	LP	LP	LP	LP	LP
Total catch (lb)	1400	3500	6100	5100	7300	4400	3600
Flatfish[7]							
Dover sole	39	64	1338	1676	3861	2097	1149
English sole	..	12	..	..	..	..	..
Halibut[8]	(2)170	..	..	(2)51	(3)42	..	(1)17
Petrale sole	3	..	75	230	86	4	75
Rex sole	36	272	1064	178	154	108	100
Rock sole	..	..	..	..	..	..	..
Slender sole	17	58	..	..	10	5	..
Turbot	164	207	2397	1726	664	323	499
Other[9]	..	..	..	..	..	..	..
Rockfish							
S. aleutianus	T[14]	T	..	16	47	42	23
S. alutus	539	2307	409	405	511	1089	757
S. brevispinis	29	4	..	..	..	..	..
S. crameri	..	30	7	39	40	72	69
S. diploproa	33	102	30	2	1	3	1
S. elongatus	..	..	..	..	..	..	..
S. entomelas	4	..	..	..	..	..	..
S. flavidus	3	..	..	..	..	..	..
S. helvomaculatus	93	5	..	..	..	..	..
S. paucispinis	10	..	..	..	..	..	..
S. pinniger	..	..	..	..	..	..	..
S. proriger	..	..	..	..	..	..	..
S. rubrivinctus	28	11	14	32	13	1	5
S. sp. (nova?)	2	29	..	..	..	..	..
S. zacentrus	32	T	..	..	..	..	..
Seb. alascanus	74	70	118	58	211	114	92
Other[10]	..	..	..	..	3	2	..
Roundfish[11]							
Blackcod	78	309	587	619	1550	482	683
Hake	..	..	..	..	26	30	5
Lingcod	23	13	..	..	..	..	..
Pacific cod	12	..	..	..	..	..	..
Other[12]	1	2	13	13	12	18	15
Selachii[13]							
Dogfish	12	2	..	9	1	2	..
Ratfish	9	2	2	6	3	3	..
Skate	8	T	54	3	59	46	58
Cat shark	..	..	..	..	..	..	..
Invertebrate	..	16	2	4	14	8	8

Table III (continued)

Haul No.	72	73	74	75	76	77	78
Date	Apr. 13	Apr. 14	Apr. 14	Apr. 14	Apr. 14	Apr. 15	Apr. 15
Area	LP	LP	LP	LP	LP	LP	LP
Total catch (lb)	3000	2600	1600	830	540	1700	2300
Flatfish[7]							
Dover sole	1749	743	5	..	10	..	..
English sole	..	..	..	..	..	..	..
Halibut[8]	..	..	(2)160	(1)17	..	..	(2)69
Petrale sole	..	..	6	35	3	..	5
Rex sole	2	9	141	20	3	8	82
Rock sole	..	..	..	..	..	..	..
Slender sole	..	..	..	..	..	..	..
Turbot	39	57	113	..	166	..	33
Other[9]	..	..	..	..	..	..	..
Rockfish							
S. aleutianus	3	..	..	..	..	..	..
S. alutus	..	..	21	1	26	1	88
S. brevispinis	..	..	20	148	53	1014	334
S. crameri	..	..	..	..	..	..	..
S. diploproa	..	..	..	..	..	..	..
S. elongatus	..	..	36	94	46	15	97
S. entomelas	..	..	..	..	..	..	1
S. flavidus	..	..	..	..	..	..	..
S. helvomaculatus	..	..	113	106	10	20	88
S. paucispinis	..	..	18	6	..	33	20
S. pinniger	..	..	..	..	6	143	67
S. proriger	..	..	6	8	27	437	326
S. rubrivinctus	..	..	337	1	1	..	T
S. sp. (nova?)	..	..	58	T	..	4	19
S. zacentrus	..	..	287	11	20	52	953
Seb. alascanus	143	163	4	..	..	..	T
Other[10]	T	1	..	..	18	T	6
Roundfish[11]							
Blackcod	1039	1557	37	19	2	..	55
Hake	3	21	..	..	..	..	..
Lingcod	..	..	18	21	32	..	14
Pacific cod	..	..	30	80	..	..	37
Other[12]	2	2	..	1	18	..	2
Selachii[13]							
Dogfish	..	..	77	125	26	..	1
Ratfish	..	..	72	86	9	12	14
Skate	4	33	79	48	52	..	..
Cat shark	5	1	..	..	..	..	..
Invertebrate	16	56	2	T	15	..	..

Table III (continued)

Haul No.	79	80	81	82	83	84	85
Date	Apr. 16	Apr. 16	Apr. 16	Apr. 16	Apr. 16	Apr. 17	Apr. 17
Area	LP	LP	LP	LP	LP	LP	LP
Total catch (lb)	2800	2000	11600	3000	3900	470	1900
Flatfish[7]							
Dover sole	39	18	2	20	231	165	273
English sole	2	..	..	2	..	..	..
Halibut[8]	..	(1)23	(2)108	..	..	..	(1)54
Petrale sole	5	11	13	12	84	5	35
Rex sole	108	20	198	352	600	53	204
Rock sole	..	..	..	..	..	..	..
Slender sole	15	..	2	5	4	..	..
Turbot	284	636	155	405	1545	97	484
Other[9]	..	..	..	..	..	..	..
Rockfish							
S. aleutianus	1	..	..	3	31	..	20
S. alutus	1972	381	6	1619	302	4	249
S. brevispinis	..	10	58	9	..	..	..
S. crameri	4	1	..	20	28	..	10
S. diploproa	149	116	1	37	13	..	1
S. elongatus	..	T	16	..	..	..	..
S. entomelas	..	..	..	4	..	..	T
S. flavidus	..	..	..	..	..	..	..
S. helvomaculatus	4	138	66	1	4	..	..
S. paucispinis	..	..	134	..	..	..	..
S. pinniger	..	..	..	..	..	..	..
S. proriger	..	..	4	..	..	..	..
S. rubrivinctus	4	46	9404	24	42	..	6
S. sp. (nova?)	23	13	656	2	..	..	..
S. zacentrus	T	202	462	T	..	..	..
Seb. alascanus	43	94	7	23	68	25	161
Other[10]	..	..	..	..	..	..	..
Roundfish[11]							
Blackcod	167	69	48	443	906	83	325
Hake	..	..	..	..	..	..	2
Lingcod	10	18	..	10	..	..	..
Pacific cod	..	4	72	..	..	..	..
Other[12]	1	3	..	..	7	9	5
Selachii[13]							
Dogfish	..	54	71	1	6	..	2
Ratfish	4	28	48	6	5	..	2
Skate	2	117	43	..	61	22	49
Cat shark	..	..	..	..	..	..	..
Invertebrate	12	..	T	8	..	4	3

Table III (continued)

Haul No.	86	87	88	89	90	91	92
Date	Apr. 17	Apr. 18	Apr. 18	Apr. 18	Apr. 19	Apr. 19	Apr. 20
Area	LP	TI	TI	TI	TI	CI	ED
Total catch (lb)	2100	100	10	830	160	670	530
Flatfish[7]							
Dover sole	1094	..	..	T	..	2	2
English sole	..	..	..	..	..	31	23
Halibut[8]	..	..	..	..	..	..	(3)28
Petrale sole	..	..	..	T	..	7	1
Rex sole	141	T	..	T	..	18	24
Rock sole	..	..	..	..	..	..	..
Slender sole	..	..	..	..	..	..	..
Turbot	146	..	..	..	..	50	21
Other[9]	..	..	..	..	..	..	..
Rockfish							
S. aleutianus	86	..	..	..	..	..	..
S. alutus	34	..	..	..	..	..	..
S. brevispinis	..	..	..	10	4	76	111
S. crameri	..	..	..	..	..	..	..
S. diploproa	..	..	..	..	..	..	..
S. elongatus	..	..	..	..	..	..	..
S. entomelas	..	..	..	90	..	8	..
S. flavidus	..	..	..	..	..	151	85
S. helvomaculatus	..	..	..	4	..	..	..
S. paucispinis	..	..	..	..	..	1	37
S. pinniger	..	..	..	..	..	103	..
S. proriger	..	40	..	292	48	37	..
S. rubrivinctus	..	..	..	T	..	..	..
S. sp. (nova?)	..	47	6	348	61	..	..
S. zacentrus	..	12	6	63	21	12	..
Seb. alascanus	..	2	..	..	..	..	..
Other[10]	2	..	T	20	24	8	..
Roundfish[11]							
Blackcod	386	..	..	..	..	2	..
Hake	45	..	..	..	..	..	..
Lingcod	..	..	..	..	..	19	30
Pacific cod	..	..	..	..	..	132	59
Other[12]	5	..	..	..	..	..	39
Selachii[13]							
Dogfish	2	..	..	..	..	..	58
Ratfish	..	..	..	..	..	9	9
Skate	58	..	..	..	..	..	..
Cat shark	..	..	..	..	..	..	..
Invertebrate	5	..	..	T	4	..	..

Table III (continued)

Haul No.	93	94	95	96	97	98
Date	Apr. 20	Apr. 21	Apr. 22	Apr. 22	Apr. 22	Apr. 22
Area	ED	LP	JF	JF	JF	JF
Total catch (lb)	15600	4100	240	1700	480	190
Flatfish[7]						
Dover sole	7	399	T	40	1	2
English sole	4	..	10	156	64	30
Halibut[8]	(3)90	..	(2)E12	..	..	..
Petrale sole	123	2	..	14	4	3
Rex sole	143	228	..	41	4	4
Rock sole	..	..	37	..	..	..
Slender sole	..	10	..	..	..	..
Turbot	93	289	..	311	48	24
Other[9]	..	..	19	..	15	11
Rockfish						
S. aleutianus	..	..	..	..	..	..
S. alutus	2	2670	..	..	..	..
S. brevispinis	10971	4	..	..	..	..
S. crameri	..	25	..	..	..	..
S. diploproa	..	116	..	..	..	..
S. elongatus	32	..	..	..	..	..
S. entomelas	..	..	..	..	..	..
S. flavidus	62	..	..	20	5	..
S. helvomaculatus	17	27	..	..	..	..
S. paucispinis	216	19	..	2	..	..
S. pinniger	260	..	..	2	..	..
S. proriger	3282	..	..	..	..	..
S. rubrivinctus	..	84	..	..	..	..
S. sp. (nova?)	..	..	..	..	..	..
S. zacentrus	74	..	..	..	..	..
Seb. alascanus	..	85	..	..	..	..
Other[10]	11	..	..	..	..	..
Roundfish[11]						
Blackcod	5	133	..	15	..	..
Hake	..	..	..	..	..	..
Lingcod	29	38	8	15	7	8
Pacific cod	36	..	36	342	63	31
Other[12]	5	5	2	14	8	4
Selachii[13]						
Dogfish	..	2	32	448	120	17
Ratfish	14	..	..	224	55	28
Skate	85	9	74	77	84	28
Cat shark	..	..	..	..	..	..
Invertebrate	T	2	6	..	..	..

Footnotes to Appendix Tables I, II, and III

[1]Area: ED = Estevan Deep; LP = La Pérouse Bank; TI = Triangle Island; CI = Cox Island; JF = Juan de Fuca Strait.

[2]PST: Pacific Standard Time

[3]Depth (fm): depth at beginning and end of haul.

[4]Depth (fm): depth at which bottom temperature was recorded.

[5]Net used: D-2, D-3 = 500-mesh eatern-type groundfish trawl, 3" mesh size (stretched measure between knots). 1" mesh liner in intermediate and codend. 19" rubber bobbin groundrope. D-2 sweeplines = 26 fm; D-3 sweeplines = 35 fm.

[6]Total catch (lb): catches greater than 1000 lb taken to nearest 100 lb; catches less than 1000 lb but greater than 10 lb taken to nearest 10 lb; catches less than 10 lb taken to nearest pound.

[7]Flatfish: Dover sole (Microstomus pacificus); English sole (Parophrys vetulus); halibut (Hippoglossus stenolepis); petrale sole (Eopsetta jordani); rex sole (Glyptocephalus zachirus); rock sole (Lepidopsetta bilineata); slender sole (Lyopsetta exilis); turbot (Atheresthes stomias)

[8]Halibut: numbers of fish in parentheses.

[9]Other flatfish (less than 25 lb per haul):

Species	Appendix Table I	II	III
curlfin sole (Pleuronichthys decurrens)	-	-	+
flathead sole (Hippoglossoides elassodon)	+	+	-
mottled dab (Citharichthys sordidus)	-	-	+
sand sole (Psettichthys melanostictus)	-	-	+

[10]Other rockfish (less than 25 lb per haul):

Species	Appendix Table I	II	III
S. aurora	-	+	+
S. entomelas	-	+	-
S. flavidus	-	+	-
S. jordani	-	-	+
S. ruberrimus	-	-	+
S. saxicola	-	+	-
S. sp. (nova?)	+	+	-
S. wilsoni	+	-	+
Seb. altivelis	-	+	+

Footnotes to Appendix Tables I, II, and III (continued)

[11]Roundfish: blackcod (Anoplopoma fimbria); chinook salmon (Oncorhynchus tshawytscha); eelpout (Zoarcidae); eulachon (Thaleichthys pacificus); hake (Merluccius productus); lingcod (Ophiodon elongatus); Pacific cod (Gadus macrocephalus).

[12]Other roundfish (never more than 24 lb per haul):

Species	Appendix table I	II	III
arrow dragonfish (Tactostoma macropus)	-	+	-
blenny (Stichaeidae)	-	-	+
chinook salmon (Oncorhynchus tshawytscha)	-	+	+
eelpout (family Zoarcidae)	-	-	+
eulachon (Thaleichthys pacificus)	-	+	+
lanternfish (Myctophidae)	+	+	-
longfin cod (Antimora rostrata)	-	-	+
Pacific hagfish (Polistotrema stoutii)	+	+	-
Pacific pollock (Theragra chalcogrammus)	+	+	+
Pacific tomcod (Microgadus proximus)	-	-	+
poacher (Agonidae)	+	+	+
rattail (Coryphaenoididae)	-	+	+
sculpin (Cottidae)	+	+	+
shad (Alosa sapidissima)	-	-	+
shiner seaperch (Cymatogaster aggregata)	+	-	+
snailfish (Liparidae)	-	+	+

[13]Selachii: dogfish (Squalus suckleyi); ratfish (Hydrolagus colliei); skate (Rajidae); brown cat shark (Apristurus brunneus)

[14]T = trace = less than one pound.

Appendix Table IV. Size composition of Pacific ocean perch (numbers caught per hour trawling), by haul, for G.B. Reed groundfish cruise no. 67-1. (Modal frequencies are underlined.)

Fork length (cm)	Haul Number																
	1	2	3	4	5	7	8	9	10	14	15	16	17	18	19	20	21
8	..	..	..	..	..	..	..	..	..	..	..	4	..	..	..	..	..
10	..	..	..	..	..	..	..	..	..	..	..	6	..	..	..	..	..
2	..	..	..	..	14	..	..	..	..	..	..	2	..	..	..	..	..
4	..	..	..	..	132	..	..	..	20	..	13	10	..	6	38	6	..
6	..	..	1	6	282	..	..	..	25	..	21	2	2	10	108	9	2
8	6	..	26	82	1,539	4	..	..	219	..	315	6	0	90	1,314	107	8
20	0	..	12	24	337	2	..	..	69	..	145	..	2	42	900	94	10
2	0	..	13	12	23	2	..	..	16	..	88	..	2	70	377	43	2
4	25	..	40	26	17	28	..	..	42	..	93	..	0	92	1,331	195	24
6	31	..	38	20	6	54	..	..	29	17	29	..	2	36	787	225	28
8	19	..	26	0	..	40	8	..	0	34	7	..	..	4	162	103	24
30	74	2	10	2	..	14	0	187	4	34	..	..	..	..	43	36	28
2	426	28	15	..	..	10	30	375	..	454	..	..	..	..	27	51	20
4	808	156	38	..	..	16	135	1,462	..	1,445	..	..	..	..	5	43	36
6	672	88	70	..	..	2	224	2,175	..	1,814	..	..	..	..	..	28	54
8	327	16	89	..	..	2	186	2,887	..	1,545	..	..	..	..	..	17	112
40	123	4	95	..	..	6	380	2,362	..	621	..	..	..	..	..	79	126
2	25	2	48	..	..	0	127	1,312	..	118	..	..	..	..	..	36	32
4	6	..	15	..	..	0	68	487	..	17	..	..	..	..	..	4	8
6	..	..	6	..	..	2	17	150	..	..	..	..	..	..	..	..	..
8	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
50	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Total	2,542	296	542	172	2,350	182	1,175	11,397	424	6,099	711	30	8	350	5,092	1,076	514

Appendix Table IV (continued)

Fork length (cm)	Haul Number														
	22	23	24	25	26	27	28	29	31	32	33	34	35	36	37
8	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
10	..	..	..	..	..	..	..	6	..	..	..	..	..	..	..
2	..	..	..	..	..	..	..	2	..	..	..	..	..	..	..
4	..	..	..	..	..	..	..	38	14	16	..	..	..	..	..
6	..	..	..	..	..	..	..	18	44	36	..	..	..	..	..
8	..	..	..	..	..	..	..	42	588	418	10	..	..	..	..
20	..	..	..	..	..	..	..	6	286	158	6	..	..	..	..
2	43	..	..	..	..	..	..	..	84	60	4	14	..	..	..
4	0	..	13	..	..	..	..	..	178	126	32	70	7	7	..
6	87	16	13	..	4	..	..	..	92	144	44	113	7	7	..
8	87	0	33	4	0	..	4	..	18	56	28	84	41	14	..
30	0	95	52	31	24	4	8	..	6	22	18	99	67	58	..
2	609	473	163	154	135	27	76	..	2	8	26	190	226	492	105
4	1,871	1,419	346	440	347	179	170	..	..	0	26	528	441	1,223	469
6	2,610	1,466	646	467	516	393	124	..	..	10	68	563	323	854	578
8	4,177	1,119	594	330	424	366	66	..	..	4	74	408	159	159	350
40	2,741	710	248	114	203	214	10	..	..	..	64	289	56	80	105
2	1,523	189	91	18	63	50	4	..	..	..	10	91	48	14	14
4	174	16	..	9	10	..	..	..	..	..	4	91	22	..	..
6	..	16	..	..	..	..	..	..	..	..	..	14	0	..	..
8	..	..	..	..	..	..	..	..	..	..	..	..	4	..	..
50	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Total	13,922	5,519	2,199	1,567	1,726	1,233	462	112	1,312	1,058	414	2,554	1,401	2,908	1,621

Appendix Table IV (continued)

Fork length (cm)	Haul Number															
	38	39	42	45	46	51	52	53	54	55	56	57	65	66	67	68
8	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
10	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
2	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
4	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
6	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
8	..	..	..	..	..	12	..	..	..	..	..	..	..	..	..	..
20	..	..	..	..	..	0	..	..	..	..	..	..	..	..	..	..
2	..	..	..	..	..	0	..	..	..	..	..	..	..	..	..	..
4	..	..	..	..	10	6	3	..	..	..	..	..	..	..	..	..
6	..	..	..	..	70	31	10	..	..	..	..	..	6	9	..	..
8	..	..	9	..	60	43	20	8	..	..	..	..	26	26	..	..
30	..	..	18	..	110	49	61	0	9	4	..	..	20	123	6	2
2	52	39	425	..	110	178	128	196	125	89	14	..	68	255	56	50
4	485	401	1,257	6	520	276	195	884	593	424	130	10	102	545	132	188
6	1,473	886	1,045	6	480	337	198	917	566	513	354	16	96	650	134	204
8	841	518	487	2	180	423	192	589	299	315	160	14	120	404	114	88
40	139	50	89	2	150	380	188	213	76	93	42	0	126	343	76	28
2	17	..	18	4	20	153	74	57	36	36	4	2	64	308	20	10
4	..	..	9	..	..	43	44	..	4	..	..	..	28	176	4	..
6	..	..	..	..	..	6	7	..	..	..	..	..	..	26	..	..
8	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
50	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Total	3,007	1,894	3,357	20	1,710	1,937	1,120	2,864	1,708	1,474	704	42	656	2,865	542	570

Appendix Table IV (continued)

Fork length (cm)	Haul Number														
	69	70	71	74	75	76	77	78	79	80	82	83	85	86	94
8	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
10	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
2	..	..	..	..	..	..	..	2	..	..	..	..	..	..	..
4	..	..	..	..	6	..	..	18	..	..	..	..	..	..	..
6	..	..	..	..	0	14	..	18	..	..	..	..	..	..	..
8	..	..	..	2	4	44	..	40	..	..	..	..	..	..	..
20	..	..	..	8	4	56	10	28	..	2	..	..	..	..	..
2	..	..	..	6	2	16	0	6	..	0	..	..	..	..	..
4	..	..	..	12	..	34	10	8	..	0	..	..	..	..	..
6	..	..	..	10	..	16	10	8	8	14	..	..	..	..	..
8	..	..	..	10	..	..	..	2	31	28	7	..	..	..	21
30	2	..	..	12	..	..	..	0	38	24	59	2	..	..	73
2	20	13	31	0	..	..	..	0	100	10	361	36	6	..	197
4	124	279	259	2	..	..	..	2	338	12	885	158	40	10	622
6	294	624	359	8	..	..	..	6	338	16	701	116	156	24	850
8	170	434	284	2	..	..	..	8	353	58	295	70	104	6	757
40	60	102	75	2	..	..	..	28	230	110	105	34	20	4	467
2	8	13	22	..	..	..	..	22	430	84	33	12	4	..	207
4	2	..	..	..	..	..	..	6	246	44	7	2	..	..	83
6	..	..	..	..	..	..	..	2	38	2	..	..	..	..	10
Total	680	1,465	1,030	74	16	180	30	204	2,150	404	2,453	430	330	44	3,287

Appendix Table V. Size composition of Pacific ocean perch (numbers sampled), by haul, by sex, for G.B. Reed groundfish cruise no. 67-1. (Modal frequencies are underlined.)

Fork	Haul Number																					
length	1		2		3		7		8		9		14		19		20		21		22	
(cm)	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F
10	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
2	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
4	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	3	..	..	..	..	..
6	..	..	..	..	1	..	..	..	..	..	..	..	..	..	..	..	2	2	..	1	..	..
8	1	..	..	..	9	9	2	..	..	..	..	..	..	..	34	21	30	20	2	2	..	..
20	2	2	..	..	6	2	0	1	..	..	..	..	..	..	14	8	32	12	4	1	..	..
2	2	3	..	..	6	3	1	0	..	..	..	..	..	..	17	9	14	6	0	1	1	..
4	2	1	..	..	14	13	4	10	..	..	..	..	..	..	39	42	43	48	6	6	0	..
6	7	5	..	..	19	7	13	14	..	..	..	..	..	1	21	25	56	49	6	8	1	1
8	42	27	..	..	9	9	9	11	2	..	..	..	..	2	2	5	25	23	7	5	1	1
30	82	49	1	..	4	3	4	3	0	..	4	1	2	0	1	1	8	9	11	3	0	0
2	44	65	9	5	7	3	3	2	4	3	9	1	17	10	1	2	19	5	8	2	9	5
4	20	33	49	29	18	8	6	2	19	13	23	16	59	27	..	..	15	5	16	2	24	19
6	4	16	20	24	26	22	1	0	42	11	44	14	67	41	..	..	12	1	19	8	43	17
8	1	3	1	7	43	18	1	0	38	6	49	28	46	46	..	..	7	1	49	7	73	23
40	..	1	..	2	48	17	3	0	84	6	35	28	8	29	..	..	34	3	55	8	58	5
2	..	..	..	1	23	10	..	0	21	9	10	25	..	7	..	..	17	..	13	3	34	1
4	..	..	..	..	2	8	..	0	1	15	..	13	..	1	..	..	2	..	2	2	3	1
6	..	..	..	..	..	4	..	1	..	4	..	4	..	..	..	..	..	..	..	..	..	..
8	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
50	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Total	207	205	80	68	235	136	47	44	211	67	174	130	199	164	129	113	319	184	198	59	247	73

Appendix Table V (continued)

Fork length (cm)	Haul Number 23 M	23 F	24 M	24 F	25 M	25 F	26 M	26 F	27 M	27 F	28 M	28 F	33 M	33 F	34 M	34 F	35 M	35 F	36 M	36 F
10	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
2	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
4	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
6	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
8	..	..	..	..	..	..	..	..	..	..	..	..	3	2	..	..	..	..	..	..
20	..	..	..	..	..	..	..	..	..	..	..	..	2	1	..	..	..	..	..	..
2	..	..	..	..	..	..	..	..	..	..	..	..	0	2	..	2	..	..	..	..
4	..	..	2	..	..	..	..	..	..	..	..	..	9	7	6	4	2	..	1	..
6	1	..	1	1	..	..	1	..	..	..	..	..	14	8	10	6	1	1	0	1
8	0	..	2	3	..	1	0	..	..	..	1	1	9	5	9	3	8	3	1	1
30	4	2	2	6	5	2	3	2	1	..	3	1	5	4	6	8	11	7	4	4
2	20	10	15	10	20	15	20	8	3	4	21	17	8	5	18	9	36	25	40	28
4	58	32	31	22	59	41	54	18	32	15	48	37	9	4	44	31	70	49	107	62
6	57	36	57	42	69	37	72	35	73	30	40	22	26	8	50	30	57	30	64	54
8	50	21	61	30	53	22	53	35	50	46	21	12	35	2	44	14	27	16	11	11
40	30	15	30	8	14	12	9	33	10	46	2	3	32	..	37	4	8	7	5	6
2	5	7	5	9	3	1	..	13	..	13	1	1	5	..	8	5	2	11	2	..
4	..	1	..	..	..	2	..	2	..	..	..	..	2	..	1	12	..	6	..	..
6	..	1	..	..	..	..	..	..	..	..	..	..	..	..	..	2	..	0	..	..
8	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	1	..	..
50	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Total	225	125	206	131	223	133	212	146	169	154	137	94	159	48	233	130	222	156	235	167

Appendix Table V (continued)

Fork	Haul Number																					
length	37		38		39		42		45		46		51		52		53		54		55	
(cm)	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F
10	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
2	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
4	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
6	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
8	..	..	..	..	..	..	..	..	..	..	..	..	2	..	..	..	..	..	..	..	..	..
20	..	..	..	..	..	..	..	..	..	..	..	..	0	..	..	..	..	..	..	..	..	..
2	..	..	..	..	..	..	..	..	..	..	..	..	0	..	..	..	..	..	..	..	..	..
4	..	..	..	..	..	..	..	..	..	..	..	1	1	..	..	1	..	..	..	..	..	..
6	..	..	..	..	..	..	..	..	..	..	4	3	5	..	1	2	..	..	..	..	..	..
8	..	..	..	..	..	..	1	..	..	..	0	6	6	1	4	2	1	..	..	..	..	..
30	..	..	..	..	..	..	1	1	..	..	6	5	4	4	13	5	0	..	..	2	1	..
2	13	10	3	3	6	1	31	17	..	..	9	2	18	11	26	12	15	9	21	7	18	4
4	75	28	45	11	63	9	98	44	1	2	37	15	25	20	34	24	75	33	94	39	74	31
6	92	35	130	40	144	15	61	57	3	..	25	23	35	20	38	21	88	24	84	43	89	38
8	50	27	73	22	80	13	28	27	1	..	15	3	51	18	39	18	54	18	41	26	38	40
40	3	20	8	8	3	6	6	4	1	..	14	1	52	10	29	27	7	19	7	10	3	20
2	1	2	..	2	..	..	1	1	2	..	2	..	18	7	7	15	..	7	1	7	..	9
4	..	..	..	..	..	..	..	1	..	..	..	..	3	4	1	12	..	..	..	1	..	..
6	..	..	..	..	..	..	..	..	..	..	..	..	..	1	..	2	..	..	..	..	..	..
8	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
50	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Total	234	122	259	86	296	44	227	152	8	2	112	59	220	96	192	141	240	110	248	135	223	142

Appendix Table V (continued)

Fork length (cm)	Haul Number 56 M	56 F	57 M	57 F	65 M	65 F	66 M	66 F	67 M	67 F	68 M	68 F	69 M	69 F	70 M	70 F	71 M	71 F	74 M	74 F	78 M	78 F
10	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
2	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	1	..
4	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	4	5
6	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	5	4
8	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	1	..	5	15
20	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	2	2	8	6
2	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	2	1	2	1
4	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	4	2	3	1
6	..	..	..	..	2	1	1	..	..	..	..	..	..	..	..	..	..	..	4	1	3	1
8	..	..	..	..	9	4	2	1	..	..	..	..	..	..	..	..	..	..	1	4	1	0
30	..	..	..	..	5	5	10	4	2	1	..	1	..	1	..	..	..	..	4	2	0	0
2	4	3	..	..	21	13	20	9	18	10	17	8	10	0	3	..	7	3	0	0	0	0
4	51	14	3	2	30	21	39	23	41	25	51	43	42	20	42	21	52	31	1	0	1	0
6	134	43	7	1	25	23	42	32	41	26	63	39	106	41	94	47	80	35	2	2	2	1
8	52	28	2	5	28	32	23	23	28	29	32	12	56	29	66	32	60	31	1	0	4	0
40	8	13	..	0	33	30	7	32	10	28	2	12	8	22	10	13	13	11	..	1	11	3
2	..	2	..	1	12	20	..	35	..	10	..	5	1	3	1	2	..	7	..	..	8	3
4	..	..	..	..	..	14	..	20	..	2	..	..	..	1	..	..	..	..	..	..	1	2
6	..	..	..	..	..	..	..	3	..	..	..	..	..	..	..	..	..	..	..	..	..	1
8	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
50	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Total	249	103	12	9	165	163	144	182	140	131	165	120	223	117	216	115	212	118	22	15	59	43

Appendix Table V (continued)

Fork	Haul Number													
length	79		80		82		83		85		86		94	
(cm)	M	F	M	F	M	F	M	F	M	F	M	F	M	F
10	..	..	..	..	..	..	..	..	..	..	..	..	..	..
2	..	..	..	..	..	..	..	..	..	..	..	..	..	..
4	..	..	..	..	..	..	..	..	..	..	..	..	..	..
6	..	..	..	..	..	..	..	..	..	..	..	..	..	..
8	..	..	..	..	..	..	..	..	..	..	..	..	..	..
20	..	..	..	1	..	..	..	..	..	..	..	..	..	..
2	..	..	..	0	..	..	..	..	..	..	..	..	..	..
4	..	..	..	0	..	..	..	..	..	..	..	..	..	..
6	1	..	6	1	..	..	..	..	..	..	..	..	..	..
8	3	1	8	6	1	..	..	..	..	..	..	..	..	2
30	2	3	7	5	5	4	1	..	..	..	..	..	4	3
2	8	5	4	1	37	18	12	6	1	2	..	..	10	9
4	30	14	2	4	92	43	44	35	16	4	4	1	34	26
6	27	17	5	3	57	50	28	30	62	16	6	6	53	29
8	20	26	9	20	19	26	12	23	41	11	3	0	40	33
40	6	24	25	30	3	13	3	14	4	6	..	2	17	28
2	..	56	5	37	..	5	1	5	..	2	..	..	2	18
4	..	32	2	20	..	1	1	..	..	..	..	..	..	8
6	..	5	..	1	..	..	..	..	..	..	..	..	..	1
8	..	..	..	..	..	..	..	..	..	..	..	..	..	..
50	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Total	97	183	73	129	214	160	102	113	124	41	13	9	160	157

Appendix Table VI. Shrimp trawl fishing log for part II of G.B. Reed groundfish cruise no. 67-1, March 7-22, 1967.

Haul No.	47	48	49	50	58	59
Date	Mar. 17	Mar. 17	Mar. 17	Mar. 17	Mar. 21	Mar. 21
Area[1]	BS	BS	BS	BS	SS	SS
Start (PST)[2]	0926	1004	1230	1407	0909	1012
Duration (min)	15	15	15	15	15	15
Start: N. Lat. °	48	48	48	48	51	51
'	54.8	54.9	57.1	52.8	17.6	17.1
W. Long. °	125	125	125	125	127	127
'	12.4	12.6	10.5	12.5	40.0	40.5
Direction (°True)	032	038	200	200	050	050
End: N. Lat. °	48	48	48	48	51	51
'	55.4	55.1	56.6	51.7	18.0	17.6
W. Long. °	125	125	125	125	127	127
'	12.0	12.0	10.9	12.8	38.9	39.5
Depth (fm)[3]	50-52	50	53	48-46	76-81	92-76
Water temp. (°C)						
Surface	..	7.5	7.9	7.7	7.0	7.1
Bottom	..	8.6	8.5	8.3	7.4	7.4
Depth (fm)[4]	..	55	54	49	84	86
Net used[5]	S-1	S-1	S-1	S-1	S-1	S-1
Total catch (lb)[6]	0	1200	180	110	110	390
Remarks	Net off bottom.	..	..	..	..	..

Appendix Table VI (continued)

Haul No.	60	61	62	63	64
Date	Mar. 21	Mar. 21	Mar. 21	Mar. 21	Mar. 21
Area[1]	SS	SS	SS	SS	SS
Start (PST)[2]	1104	1232	1354	1446	1600
Duration (min)	15	20	16	15	15
Start: N. Lat. °	51	51	51	51	51
'	18.3	18.4	19.7	19.7	17.2
W. Long. °	127	127	127	127	127
'	38.8	38.8	32.9	33.0	40.9
Direction (°True)	040-070	060	230	240	068
End: N. Lat. °	51	51	51	51	51
'	18.6	18.6	19.3	19.3	17.6
W. Long. °	127	127	127	127	127
'	37.9	37.6	34.0	33.9	40.3
Depth (fm)[3]	72-68	66-70	72-75	72-78	70-74
Water temp. (°C)					
Surface	7.2	7.2	7.2	7.2	..
Bottom	7.4	7.4	7.5	7.4	..
Depth (fm)[4]	76	80	72	77	..
Net used[5]	S-1	S-1	S-1	S-1	S-1
Total catch (lb)[6]	110	160	100	80	140
Remarks	..	..	..	..	..

Appendix Table VI (continued)

Haul No.	47	48	49	50	58	59
Date	Mar. 17	Mar. 17	Mar. 17	Mar. 17	Mar. 21	Mar. 21
Area	BS	BS	BS	BS	SS	SS
Total catch (lb)	0	1200	180	110	110	390
Flatfish[7]						
Dover sole	..	8	..	1	..	..
Flathead sole	..	36	..	..	5	8
Slender sole	..	12	55	18	6	5
Turbot	..	..	..	..	4	..
Other[8]	..	9	6	T	T	..
Rockfish						
S. aleutianus	..	..	..	..	..	12
S. alutus	..	..	..	..	40	21
S. elongatus	..	21	..	..	..	..
S. flavidus	..	155	..	..	..	9
S. maliger	..	10	..	..	..	..
S. paucispinis	..	103	..	..	..	13
S. pinniger	..	56	..	..	..	..
S. proriger	..	100	..	..	..	..
S. ruberrimus	..	15	..	..	..	..
Other[9]	..	9	..	4	..	..
Roundfish[10]						
Blackcod	..	..	..	..	15	..
Eelpout	..	..	1	..	2	T
Hake	..	118	46	4	T	11
Lingcod	..	3	25	..	..	..
Midshipman	..	65	6	15	T	..
Pacific cod	..	15	..	..	..	7
Pacific pollock	..	..	1	8	..	17
Other[11]	..	3	1	T	T	T
Selachii[12]						
Dogfish	..	..	..	..	16	8
Ratfish	..	471	20	10	27	275
Skate	..	..	..	23	..	..
Shrimp[13]						
Brown	..	..	..	..	..	1
Pink	..	3	11	..	5	1
Prawn	..	2	T	1	1	T
Sidestripe	..	T[15]	2	T	4	4
Other[14]	..	T	T	T	..	..
Other invertebrates	..	T	T	23	T	..

Appendix Table VI (continued)

Haul No.	60	61	62	63	64
Date	Mar. 21	Mar. 21	Mar. 21	Mar. 21	Mar. 21
Area	SS	SS	SS	SS	SS
Total catch (lb)	110	160	100	80	140
Flatfish[7]					
Dover sole	..	..	20	T	..
Flathead sole	2	2	..	10	3
Slender sole	4	..	5	14	19
Turbot	..	..	15	..	..
Other[8]	T	4	..	..	..
Rockfish					
S. aleutianus	T	..	..	..	3
S. alutus	8	4	18	3	10
S. elongatus	..	..	..	..	..
S. flavidus	..	..	..	..	..
S. maliger	..	..	..	..	..
S. paucispinis	7	6	..	..	..
S. pinniger	..	..	..	..	..
S. proriger	..	..	..	..	..
S. ruberrimus	..	..	..	..	..
Other[9]	..	..	..	..	..
Roundfish[10]					
Blackcod	..	2	..	..	2
Eelpout	T	10	T	2	..
Hake	T	15	11	7	3
Lingcod	..	..	..	..	..
Midshipman	..	..	..	..	..
Pacific cod	..	..	..	..	..
Pacific pollock	1	10	3	..	2
Other[11]	1	1	T	T	..
Selachii[12]					
Dogfish	8	..	..	11	18
Ratfish	4	8	20	25	53
Skate	..	2	..	..	..
Shrimp[13]					
Brown	..	T	..	T	T
Pink	65	97	T	T	1
Prawn	3	2	T	T	T
Sidestripe	2	8	8	3	3
Other[14]	T	T	..	T	..
Other invertebrates	2	..	..	..	20

Footnotes to Appendix Table VI

[1]Area: BS = Barkley Sound; SS = Smith Sound.

[2]PST: Pacific Standard Time

[3]Depth (fm): depth at beginning and end of haul.

[4]Depth (fm): depth at which bottom temperature was recorded.

[5]Net used: S-1 = 70-ft gulf balloon shrimp trawl.

[6]Total catch (lb): catches greater than 1000 lb taken to nearest 100 lb; catches less than 1000 lb but greater than 10 lb taken to nearest 10 lb; catches less than 10 lb taken to nearest pound.

[7]Flatfish: Dover sole (Microstomus pacificus); flathead sole (Hippoglossoides elassodon); slender sole (Lyopsetta exilis); turbot (Atheresthes stomias).

[8]Other flatfish (never more than 9 lb per haul): English sole (Parophrys vetulus); rex sole (Glyptocephalus zachirus).

[9]Other rockfish (never more than 9 lb per haul): S. brevispinis, S. entomelas, S. jordani, S. zacentrus.

[10]Roundfish: blackcod (Anoplopoma fimbria); eelpout (Zoarcidae); hake (Merluccius productus); lingcod (Ophiodon elongatus); midshipman (Porichthys notatus); Pacific cod (Gadus macrocephalus); Pacific pollock (Theragra chalcogrammus).

[11]Other roundfish (never more than 9 lb per haul): anchovy (Engraulis mordax); blenny (Stichaeidae); eulachon (Thaleichthys pacificus); herring (Clupea pallasii); poacher (Agonidae); sculpin (Cottidae); shiner seaperch (Cymatogaster aggregata).

[12]Selachii: dogfish (Squalus suckleyi); ratfish (Hydrolagus colliei); skate (Rajidae).

[13]Shrimp: brown (Crangon sp.); pink (Pandalus borealis and P. jordani); prawn (Pandalus platyceros); sidestripe (Pandalopsis dispar).

[14]Other shrimp (less than 1 lb per haul): coonstripe (Pandalus danae); humpback (P. hypsinotus).

[15]T = trace = less than 1 lb per haul.

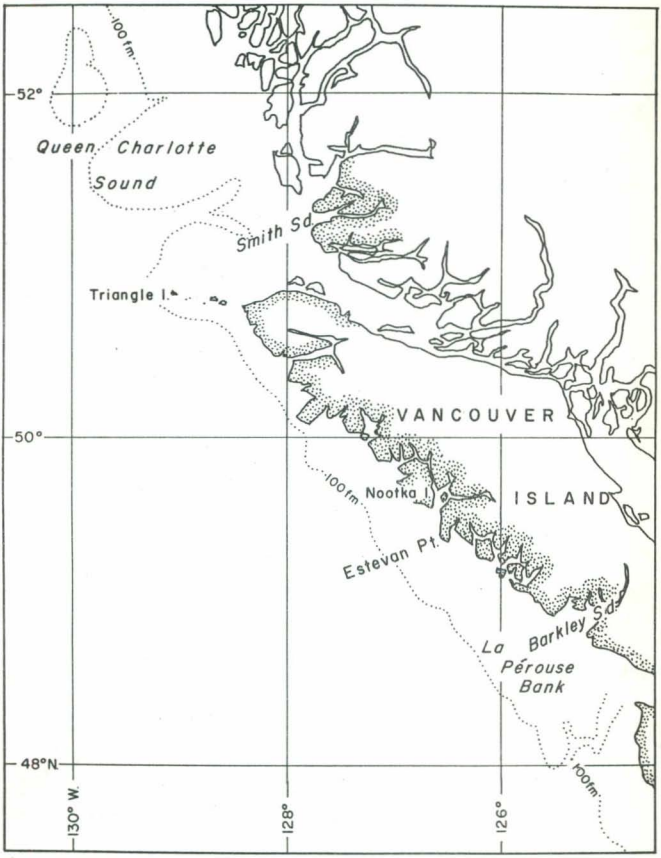

Fig. 1. Fishing areas for G.B. Reed groundfish cruise no. 67-1, February-April, 1967.

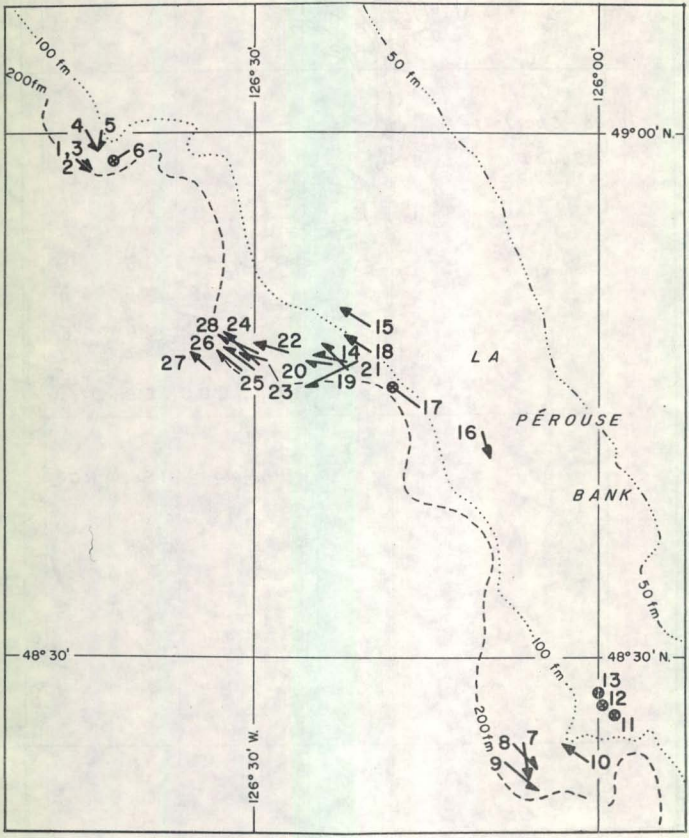

Fig. 2. Location of trawl hauls completed during part I of G.B. Reed groundfish cruise no. 67-1.

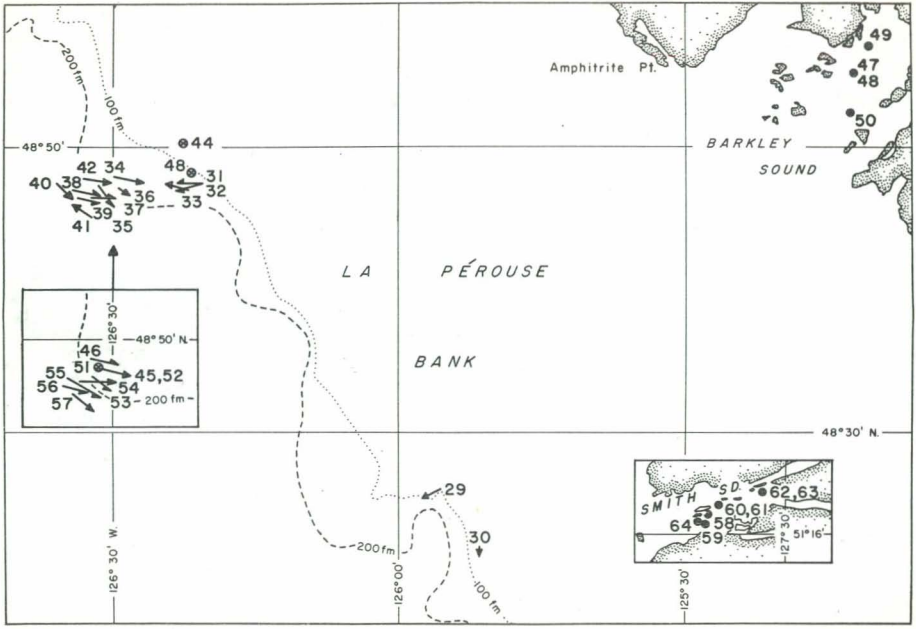

Fig. 3. Location of trawl hauls completed during part II of G.B. Reed groundfish cruise no. 67-1 (hauls 45-57 were made in the same location as hauls 34-42).

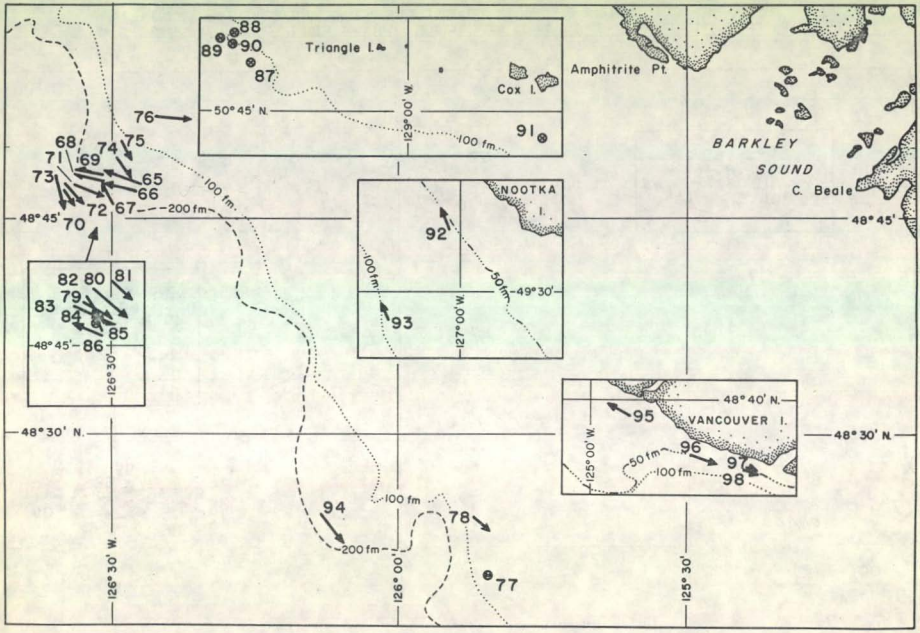

Fig. 4. Location of trawl hauls completed during part III of G.B. Reed groundfish cruise no. 67-1 (hauls 79-86 were made in the same location as hauls 65-75).