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Hydroacoustic Herring Survey Results and Trawl Catches from Hecate Strait, July 14 - 27, 1987. *W. E. RICKER* Cruise WER87F

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HYDROACOUSTIC HERRING SURVEY RESULTS AND TRAWL CATCHES FROM HECATE STRAIT, JULY 14 - 27, 1987.

W. E. RICKER CRUISE WER87F

by

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ABSTRACT

McCarter, P. B., R. Kieser and D. E. Hay. 1988. Hydroacoustic herring survey results and trawl catches from Hecate Strait, July 14-27, 1987. W. E. RICKER cruise WER87F. Can. MS Rep. Fish. Aquat. Sci. 1996: 63 p.

Coastal waters within the 50-200 m bottom contour of Hecate Strait were surveyed to determine Pacific herring abundance estimates and distribution patterns. Total midwater biomass estimates were 3,300 tonnes at Two Peaks and Butterworth edge, 1,140 tonnes at Browning Entrance, 1,090 tonnes SW of Bonilla Island, 570 tonnes at the Horseshoe grounds and 1,320 tonnes off Ramsay Island. Midwater species assemblages of pollock, dogfish and herring precluded separate estimates of herring biomass. Species composition of five midwater trawl and 66 bongo net catches, stomach contents and size and age distribution of herring were also examined. Oceanographic data were collected at nine hydrographic and plankton stations.

Key words: Pacific herring, Hecate Strait, hydroacoustic, abundance estimate, trawl, survey

RÉSUMÉ

McCarter, P. B., R. Kieser and D. E. Hay. 1988. Hydroacoustic herring survey results and trawl catches from Hecate Strait, July 14-27, 1987. W. E. RICKER cruise WER87F. Can. MS Rep. Fish. Aquat. Sci. 1996: 63 p.

On a procédé à un recensement dans les eaux côtières dans les limites du contour de fond (50-200 m de profondeur) du détroit d'Hecate pour déterminer l'abondance des stocks de harengs du Pacifique et les modèles de distribution. La biomasse pélagique totale a été estimée à 3 300 tonnes à Two Peaks et en bordure de Butterworth, à 1 140 tonnes à l'entrée Browning, à 1 090 tonnes au SO de l'Île Bonilla, à 570 tonnes aux lieux de pêche de Horseshoe et à 1 320 tonnes au large de l'Île Ramsay. Comme il y avait un mélange d'espèces pélagiques (goberge, chien de mer, hareng), il était impossible de calculer séparément la biomass de harengs. On a également examiné la composition des espèces prises dans cinq chaluts pélagiques et 66 filets bongo, le contenu de l'estomac des poissons capturés ainsi que la répartition des harengs en fonction de la taille et de l'âge. On a recueilli des données océanographiques à neuf stations hydrographiques et à plancton.

Mots-clés: Hareng du Pacifique, détroit d'Hecate, Hydroacoustique, estimation de l'abondance, chalut recensement

INTRODUCTION

The primary objective of this survey was to examine the feasibility of obtaining hydroacoustic estimates of Pacific herring (Clupea harengus pallasi) during summer. The second objective was to compare summer versus winter distributions of herring in Hecate Strait. Midwater trawl and bongo net tows were conducted to verify the identity of major hydroacoustic targets and assign species composition fractions where possible. Herring biomass estimates obtained from this survey should not necessarily be regarded as accurate but rather, they represent the best available hydroacoustic estimates in view of the dynamic behaviour of herring and the time and resources available.

Information from this survey also contributes to the Hecate Strait Project in which the overall objective is to map fish assemblages and develop an ecological basis for mixed-species assessment and management techniques. A schedule of the W. E. RICKER's activities is located in Appendix Table 1. This report describes vessel activities including hydroacoustic transects, tows and hydrographic stations. It also summarizes hydroacoustic fish density estimates, catch composition, biological samples and oceanographic data.

METHODS

HYDROACOUSTIC AND FISHING EQUIPMENT

The hydroacoustic equipment on the W. E. RICKER was configured for echo integration. Its major components are a Biosonic model 101 echo sounder, model 121 echo integrator and model 111 thermal chart recorder. Data was recorded on a Vax 11/730 shipboard computer. The ship's hull-mounted 38 kHz transducer was used during the cruise as the towed, torpedo-mounted transducer system was inoperative. Most parallel transects were 2.0 nm apart and based on Loran C lines tracked during a previous summer cruise (McCarter et al. 1986). A fish target strength of -32.0 dB/kg was used to convert the measured backscattering strength to fish density estimates. Biomass estimates were obtained by expanding the surface density over the area of interest.

Target calibration was conducted in Skincuttle Inlet July 16, 1987 using a 38.1 mm tungsten steel sphere suspended under the ship's transducer by three nylon lines. Difficulties in stabilizing the sphere precluded accurate results. A calibration of the echo sounder and towed body transducer was done March 11, 1988 at the hydroacoustic barge of the University of Washington, Seattle. This subsequent calibration, although not in situ, was used for data analysis.

Fishing equipment on the W. E. RICKER included a Canadian Diamond 7 midwater trawl with 60 fathom sweeplines and 5 m^2 Suberkrub otter boards. Catches were brought aboard, sorted by species into tubs and weighed to the nearest kilogram. Herring samples were placed in buckets and frozen. Catches were interpreted and applied to hydroacoustic biomass estimates after echograms were closely examined.

HERRING SAMPLES

Scales for age determinations were removed from 100 herring in each sample. Herring standard length measurements were recorded to the nearest millimeter, fish weights to the nearest gram and sex and maturity determined whenever possible. Herring stomachs were injected through the body cavity with 10 percent formalin and the herring frozen. Stomachs were later examined for contents using the same methods as in a previous summer Hecate Strait survey (McCarter et al. 1986).

PLANKTON TOWS

Sixty-six oblique plankton tows were conducted using a 0.25 m^2 Bongo equipped with 350 µm and 500 µm black Nitex nets of modified SCOR design. General Oceanic flowmeters with low speed rotors were used to measure the volume of seawater filtered. Depth of tows varied from 15-100 m and bottom depths at stations were 27-183 m. Tows lasted 3-16 minutes at vessel speeds of 2 knots. Cable descent rates were 50 m/min and the ascent rates were 20 m/min. Two neuston net tows and one Tucker trawl tow were conducted on a trial basis. Recovered nets were washed with a high pressure hose and samples preserved in 10 percent buffered seawater formalin.

HYDROGRAPHIC STATIONS

Nine expendable bathythermograph (X.B.T.) casts and nine vertical plankton hauls were completed at hydrographic stations using a 0.25 m^2 SCOR net with a 350 µm black Nitex mesh.

RESULTS AND DISCUSSION

HYDROACOUSTIC SURVEYS

Calculated biomass estimates in tonnes are shown in detail for all transects and transect groupings or localities (Appendix Table 2). Each locality covered major commercial trawling grounds. Two Peaks and Butterworth edge transects 15-32 comprised an area of 1,007 km^2 with a biomass estimate of 3,300 tonnes (Fig. 1), Freeman's Pass-Whiterocks transects 2-12 comprised an area of 824 km^2 with a biomass estimate of 1,140 tonnes (Fig. 2), SW Bonilla Island transects 63-72 comprised an area of 892 km^2 with a biomass estimate of 1,090 tonnes (Fig. 3), Horseshoe transects 73-86 comprised an area of 792 km^2 with a biomass estimate of 570 tonnes (Fig. 4) and Reef-Ramsay Island transects 87-92 comprised an area of 359 km^2 with a biomass estimate of 1,320 tonnes. Biomass estimates are summarized in Table 1. Biomass estimates were not obtained from transects 93-98 in the Reef Island locality because of an integrator to computer, data transfer error.

Surface density maps were plotted from these same transect groupings (Figures 6-10). The transects are shown as dotted lines, verticals to the transects indicate density on a logarithmic scale. A range from 0.001 kg/m^2 to 0.1 kg/m^2 is used and the maximum height is indicated by a dot. These estimates include all species in the echo integration zone and are based on an acoustic fish target strength of -32.0 dB/kg. The echo integration zone includes the entire water column except for a distance of 5 m from the bottom and 15 m to the transducer. These depth strata were not integrated to avoid bottom echo integration and surface interference.

BIOLOGICAL DATA

Two midwater trawl tows were completed on the Two Peaks fishing ground (Figure 1) and three tows were completed near Ramsay Island (Figure 5). Trawl catches by tow are contained in Table 2. Herring samples were collected from the three Ramsay Island tows. Midwater trawling equipment and techniques were not fully refined on the new vessel such that species composition data was deficient.

Age composition, mean length-at-age and mean weight-at-age data are presented in Table 3. The contents of 100 herring stomachs from Ramsay Island were examined microscopically. Most stomachs were quarter full to full. The euphausiids, Thysanoessa spinifer and Euphausia pacifica were the dominant food items while copepods, Calanus pacificus and amphipods, Parathemisto sp. were codominant.

Sixty-six bongo tows collected a total of 459 fish larvae which were separated by family, counted and total length measured to the nearest 0.2 mm using an ocular micrometer. Larval identifications were based on descriptions and drawings in Garrison and Miller (1982). Relative abundance

estimates of fish larvae from single tows ranged from 0 to 242 larvae per 1,000 m^3 of seawater filtered. Cottids (sculpins) were present in most Hecate Strait tows and comprised 18 percent of the total larvae captured. Pleuronectids which were mainly rock sole (Lepidopsetta bilineata) comprised 20 percent and were caught primarily on the Horseshoe and Reef Island trawling grounds. The identity of forty-one percent of the larvae was not confirmed due to their small size (< 4.0 mm) but they were suspected to be comprised mostly of cottids and pleuronectids. Gadids, Pacific cod (Gadus macrocephalus) and pollock (Theragra chalcogramma) comprised 7 percent of larvae and were caught on the Horseshoe, Ramsay Island and Reef Island grounds. Clupeids (Pacific herring) comprised 6 percent of larvae and were captured primarily in Browning Entrance and Butterworth edge. Mean lengths and numbers of fish larvae collected are summarized in Table 4 and locations of bongo tows are shown in Figures 1-5 and Table 5.

SEAWATER TEMPERATURES

Seawater temperatures determined by expendable bathythermograph averaged 13.7°C at the surface and 5.8°C at the bottom. Table 6 shows seawater temperatures at hydrographic stations (Figure 11).

CONCLUSIONS

The relative abundance estimation of midwater acoustic biomass by locality and by season was accomplished, however accurate species compositions of midwater targets remain uncertain. There appears to be a shift of midwater biomass from the Two Peaks-Butterworth edge region in summer to the Browning Entrance region in winter (Table 7). Hydroacoustic separation of the species involved, however, is not possible at the present time. Winter midwater tows in Browning Entrance often yield catches composed entirely of herring whereas summer midwater tows at Two Peaks yield mixed catches of pollock, dogfish and herring. The situation is similar off SE Moresby Island where summer offshore herring are usually mixed with dogfish and pollock, but in winter, midwater herring are often clearly separated from pollock and dogfish and concentrate in Juan Perez Sound.

Species identification of acoustic targets is more certain in winter as herring seem to be more clearly segregated from other species than in summer. Winter herring schools are also more extensive and nocturnal vertical migrations more conspicuous. Total midwater biomass densities were considerably lower in summer than in winter. This may be a result of several factors: (1) herring are greatly dispersed during summer feeding, (2) many herring are found in the shallows during summer and inaccessible to large

hydroacoustic survey vessels, (3) target strengths are lower in summer due to vertical aspects of herring during feeding. Hydroacoustic abundance estimations of herring using the echo integration technique are therefore most profitably conducted during the fall and winter season.

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Table 1. Summary of biomass estimates by fishing locality obtained during W. E. RICKER cruise, July 14-27, 1987.

Location	Event Number	Transect Name	Survey Area (km^2)	Estimated Biomass (t)	Time (PDST)	Date (D/M/Y)
Two Peaks-Butterworth	102-162	15-32	1,007	3,300	16:02-17:48 12:30-24:00 16:58-24:00 00:00-04:19	20.07.87 21.07.87 22.07.87 23.07.87
Freeman's-Whiterocks	64-100	2-12	824	1,140	17:30-24:00 00:00-12:59	18.07.87 19.07.87
SW Bonilla	163-197	63-72	892	1,090	10:09-24:00 00:00-04:57	23.07.87 24.07.87
Horseshoe	198-225 41-62	73-80 81-86	432 360	317 251	05:10-19:06 02:20-11:32	24.07.87 18.07.87
Reef Is.-Ramsay IS.	1-40	87-92	359	1,320	01:27-20:59	17.07.87
Total areas	all	all	3,874	7,418		

Table 2. Midwater trawl locations and species[1] compositions of catches made by the W. E. RICKER, July 14-27, 1987.

Tow number	1	2	3
Date (Day/Mo.)	17/07	22/07	22/07
Time (P.D.S.T.)	23:20	10:13	12:50
Duration (min)	60	36	63
Location	Ramsay Is.	Two Peaks	Two Peaks
Start			
Latitude (o')	52 35.46	54 18.63	54 22.13
Longitude (o')	131 17.20	131 15.68	131 15.21
Finish			
Latitude (o')	52 37.30	54 20.00	54 18.68
Latitude (o')	131 18.30	131 16.99	131 16.84
Bottom depth (m)			
Start	96	87	97
Finish	-	100	100
Net depth (m)			
Start	60	60	50
Finish	70	70	60
Speed (kts)	3.8	3.8	3.2
Warp length (m)	150	100	100
Spiny Dogfish	8	-	-
Pacific herring	2	-	-
Silvergray rockfish	-	1	-
Arrowtooth flounder	1	2	-
English sole	1	-	-
Jellyfish	-	-	(in webb)
Total catch (kg)	12	3	-

[1]After Hart (1973)

Table 2 (cont'd).

Tow number	4	5
Date (Day/Mo.)	25/07	25/07
Time (P.D.S.T.)	12:15	14:13
Duration (min)	40	47
Location	Ramsay Is.	Ramsay Is.
Start		
Latitude (o')	52 33.99	54 18.63
Longitude (o')	131 10.23	131 15.68
Finish		
Latitude (o')	52 33.97	54 20.00
Latitude (o')	131 14.58	131 16.99
Bottom depth (m)		
Start	151	151
Finish	140	130
Net depth (m)		
Start	70	100
Finish	70	100
Speed (kts)	3.6	3.5
Warp length (m)	200	250
Spiny Dogfish	-	10
Pacific herring	3	100
Silvergray rockfish	-	-
Arrowtooth flounder	-	-
English sole	-	-
Jellyfish	(in webb)	-
Total catch (kg)	3	110

[1]After Hart (1973)

Table 3. Percent age composition, mean length-at-age (mm) and mean weight-at-age (g) of herring sampled from W. E. RICKER midwater trawl tows, July 14-27, 1987.

Tow no.		Age							Number aged
		3	4	5	6	7	8	9	
1	% Comp.	60.0	00.0	5.0	15.0	10.0	10.0	-	20
	Mean length	178.2	-	210.0	212.7	223.0	226.5	-	
	Mean weight	78.0	-	131.0	128.3	155.5	169.5	-	
4	% Comp.	73.0	13.5	8.1	5.4	-	-	-	37
	Mean length	174.1	187.6	198.3	213.4	-	-	-	
	Mean weight	70.6	93.2	117.3	136.0	-	-	-	
5	% Comp.	49.0	19.0	10.0	7.0	11.0	2.0	2.0	100
	Mean length	175.3	189.4	204.6	211.3	219.5	224.5	240.0	
	Mean weight	71.7	90.8	117.5	126.6	151.8	166.5	185.5	

Table 4. Larval fish catches and mean larval lengths (mm) from bongo net samples collected during W. E. RICKER cruise, July 14-27, 1987.

Area	Bongo station number	Larval count and mean length by family classification[1]										Total count
		UN	CL	GA	ST	AM	HE	CO	AG	PL	SC	
Browning Entrance	3	-	2 21.2	-	-	-	-	1 12.0	-	-	-	3
	4	1 5.6	-	-	-	-	-	-	-	1 15.2	-	2
	5	-	-	-	-	-	1 26.1	-	-	1 10.1	1 14.7	3
	6	18 4.4	2 26.6	-	-	-	-	-	-	1 11.2	3 11.5	24
	7	-	3 18.4	-	-	-	-	1 8.0	1 16.3	1 20.8	-	6
	8	3 4.3	2 24.4	-	-	-	-	-	-	-	-	5
	9	9 4.3	-	-	1 13.2	-	-	2 8.9	-	-	-	12
	10	15 3.9	2 20.0	-	-	-	1 27.2	1 9.9	-	-	-	19
	11	5 3.5	2 14.0	-	-	-	2 8.0	1 13.1	-	-	-	10
	12	3 3.4	-	-	-	-	-	-	-	-	-	3
	13	13 4.3	1 16.8	-	-	-	-	-	-	-	-	14

Table 4 (cont'd)

Area	Bongo station number	Larval count and mean length by family classification[1]										Total count
		UN	CL	GA	ST	AM	HE	CO	AG	PL	SC	
Butterworth Edge	15	7 4.0	-	-	-	-	-	-	-	-	-	7
	16	9 3.3	1 21.6	-	-	-	-	2 9.2	-	-	-	12
	17	3 3.8	1 16.8	-	-	-	-	-	-	-	-	4
	18	2 3.3	1 25.6	-	-	-	1 24.8	-	-	-	-	4
	20	3 3.1	-	-	-	-	-	-	-	-	-	3
	21	-	2 25.2	-	-	-	-	-	-	-	-	2
	22	2 3.0	-	-	-	-	-	1 13.4	-	-	-	3
Two Peaks to Rose Spit	23	-	-	-	-	-	-	1 13.0	-	-	-	1
	24	3 3.1	-	-	-	-	-	1 10.9	-	-	-	4
	25	1 24.8	-	-	-	-	-	-	-	-	-	1
	26	-	-	-	-	-	-	2 9.9	-	-	-	2
	27	1 3.0	-	1 17.6	-	-	3 30.7	3 10.4	-	-	-	8
	28	5 3.4	-	-	-	-	-	1 5.6	-	-	-	6
	29	3 3.3	1 13.8	-	-	-	-	1 6.4	-	-	-	5
	30	-	-	1 13.9	-	1 19.2	2 29.6	-	-	-	-	4

Table 4 (cont'd)

Area	Bongo station number	Larval count and mean length by family classification[1]										Total count
		UN	CL	GA	ST	AM	HE	CO	AG	PL	SC	
Two Peaks to Rose Spit	31	1 3.8	1 19.5	-	-	-	-	-	-	-	-	2
	32	-	3 33.8	-	-	-	-	-	-	-	-	3
SW Bonilla Island	63	1 2.9	-	-	-	-	-	1 7.2	-	-	-	2
	65	-	-	-	-	-	-	-	-	2 16.2	-	2
	66	-	-	-	-	-	-	-	-	1 15.2	-	1
	67	1 2.4	-	-	-	-	-	-	-	1 10.6	1 11.4	3
	68	3 2.9	-	-	-	-	-	-	-	-	1 12.0	4
	69	3 3.2	-	-	-	-	-	2 8.5	-	-	-	5
	70	-	-	1 4.5	-	-	-	-	-	-	-	1
	71	-	-	-	-	-	-	-	-	1 13.7	-	1
	72	1 8.3	-	-	-	-	-	-	-	-	-	1

Table 4 (cont'd)

Area	Bongo station number	Larval count and mean length by family classification[1]										Total count
		UN	CL	GA	ST	AM	HE	CO	AG	PL	SC	
Horseshoe	73	-	-	1 4.2	-	-	-	-	-	2 16.0	-	3
	74	1 5.8	-	1 5.8	-	-	-	-	-	-	-	2
	75	-	1 31.2	-	-	-	-	1 11.4	-	2 16.2	-	4
	76	1 2.9	-	-	-	-	-	2 10.8	-	1 16.8	-	4
	77	1 3.2	-	-	-	-	-	1 8.9	-	3 9.6	-	5
	78	-	-	1 5.8	-	-	-	-	-	4 10.0	-	5
	79	-	-	-	-	-	-	4 10.9	-	4 10.2	-	8
	80	1 4.1	-	1 7.5	-	-	-	1 5.6	-	2 10.4	1 5.1	6
	81	-	-	-	-	-	-	3 10.3	-	3 5.9	-	6
	82	-	-	4 7.2	-	-	-	4 6.5	-	1 17.6	1 6.4	10
	83	-	-	2 9.7	-	-	-	3 9.3	-	-	-	5
	84	-	-	1 6.9	-	-	-	-	-	-	-	1
	85	1 4.0	-	-	-	-	-	2 6.2	-	3 7.7	1 23.5	7
	86	-	-	1 23.2	-	-	-	1 6.7	-	4 12.9	-	6

Table 4 (cont'd)

Area	Bongo station number	Larval count and mean length by family classification[1]										Total count
		UN	CL	GA	ST	AM	HE	CO	AG	PL	SC	
Ramsay Is. to Reef Is.	87	6 4.2	-	-	-	-	-	1 7.0	-	-	7 6.2	14
	88	15 4.6	-	2 8.2	-	-	1 32.3	6 6.7	-	15 5.0	2 6.6	41
	89	6 4.2	-	2 5.4	-	-	-	-	-	-	-	8
	90	9 4.2	-	1 6.4	-	-	-	2 4.6	-	-	-	12
	91	7 5.2	-	2 5.7	-	-	-	3 5.8	-	2 10.6	-	14
	92	3 4.2	-	2 23.7	-	-	-	-	-	7 6.5	-	12
	93	2 3.0	-	3 7.0	-	-	-	1 5.8	-	-	1 8.0	7
	94	4 4.0	-	2 6.7	-	-	-	4 5.5	-	5 8.3	1 7.7	16
	95	-	-	1 5.9	-	-	-	6 7.6	-	5 8.3	-	12
	96	5 4.2	-	1 9.9	-	-	-	4 7.6	-	4 6.6	-	14
	97	4 5.4	-	-	-	-	-	6 5.6	-	10 6.6	-	20
	98	5 4.0	-	2 11.8	-	-	2 15.2	5 6.7	-	5 6.8	-	19
	99	-	-	-	-	-	-	3 7.0	2 14.3	1 9.9	-	6
Totals		187	25	33	1	1	13	84	3	92	20	459
Percent		41	6	7	0	0	3	18	1	20	4	100

[1]UN - unclassified
CL - Clupeidae (herring)
GA - Gadidae (codfishes)
ST - Stichaeidae (pricklebacks)
AM - Ammodytidae (sandlance)
HE - Hexagrammidae (greenlings)
CO - Cottidae (sculpins)
AG - Agonidae (poachers)
PL - Pleuronectidae (flatfishes)
SC - Scorpaenidae (rockfishes)

Table 5. Hecate Strait plankton log of W. E. RICKER cruise, July 14-27, 1987.

Transect station name	Line out depth (m)	Sampling date (D/M/Y)	Sampling time (PDST)	Maximum net depth (m)	Flowmeter revolutions		Bongo tow position	
					500µm	350µm	N. Lat (°')	W. Long (°')
88	117	17.07.87	0240	83	12723	13436	52 33.2	131 04.5
89	140	17.07.87	0336	99	11251	11097	52 31.7	131 11.7
90	110	17.07.87	0548	78	16239	15123	52 36.7	131 08.1
91	39	17.07.87	0815	28	3892	4154	52 42.2	131 04.1
92	70	17.07.87	0903	50	21218	21997	52 39.9	131 13.2
93	100	17.07.87	1003	71	12195	12192	52 38.4	131 21.5
94	93	17.07.87	1315	66	9976	9984	52 44.6	131 16.3
95	30	17.07.87	1455	21	7002	7261	52 47.8	131 15.3
96	20	17.07.87	1605	14	8490	8450	52 53.5	131 10.4
97	30	17.07.87	1745	21	6927	6883	52 47.9	131 26.3
98	30	17.07.87	1957	21	7111	7818	52 54.0	131 20.6
99	140	17.07.87	2046	99	14169	14547	52 52.8	131 27.5
87	90	18.07.87	0220	64	6094	6314	52 35.0	131 55.8
86	80	18.07.87	0330	57	10970	11491	52 39.1	130 56.7
85	30	18.07.87	0439	21	8206	8388	52 42.0	131 00.5
84	78	18.07.87	0635	55	16577	18730	52 43.4	130 52.6
83	100	18.07.87	0900	71	11467	11726	52 43.3	130 42.4
82	80	18.07.87	1000	57	16079	16436	52 47.4	130 45.9
81	35	18.07.87	1120	25	5936	6193	52 51.7	130 52.6
2	110	18.07.87	1743	78	8340	8470	53 40.2	130 40.2
3	65	18.07.87	1835	46	12432	12664	53 44.8	130 36.0
4	65	18.07.87	2020	46	15136	15956	53 41.5	130 47.2
5	75	18.07.87	2143	53	15022	15480	53 47.5	130 40.4
6	110	18.07.87	2335	78	13188	13609	53 47.1	130 46.1
7	44	19.07.87	0200	31	7278	8051	53 43.6	130 58.0
8	95	19.07.87	0314	67	8572	8821	53 48.2	130 53.8
9	30	19.07.87	0430	21	9609	10035	53 53.3	130 49.0
10	85	19.07.87	0640	60	18309	17998	53 51.5	130 57.4
11	30	19.07.87	1000	21	8440	8687	53 44.5	131 18.5
12	45	19.07.87	1132	32	11146	11460	53 52.5	131 06.1
21	138	20.07.87	1555	98	13075	13485	54 18.7	130 56.8
22	55	20.07.87	1710	39	6160	6336	54 18.9	131 01.2
23	63	21.07.87	1325	45	6155	6237	54 18.2	131 12.1
24	74	21.07.87	1402	52	7429	7303	54 20.9	131 08.1
25	112	21.07.87	1505	79	10194	10460	54 25.1	131 04.1
26	125	21.07.87	1607	88	10188	10282	54 24.1	131 14.5
27	170	21.07.87	1645	120	9811	9812	54 23.1	131 19.6
28	60	21.07.87	1745	42	9264	9698	54 17.9	131 15.6
29	115	21.07.87	1923	81	12014	12280	54 18.6	131 25.3
30	170	21.07.87	2103	120	15218	15925	54 21.7	131 39.9
31	140	21.07.87	2200	99	14806	18770	54 17.5	131 38.2
32	90	21.07.87	2312	64	11540	11947	54 14.4	131 38.8

Table 5 (cont'd)

Transect station name	Line out depth (m)	Sampling date (D/M/Y)	Sampling time (PDST)	Maximum net depth (m)	Flowmeter revolutions		Bongo tow position	
					500µm	350µm	N. Lat (°')	W. Long (°')
20	25	22.07.87	1910	18	3953	2208	54 10.8	131 09.0
19	25	22.07.87	2038	18	6711	6898	54 03.4	131 21.1
18	95	22.07.87	2342	67	10296	10562	54 08.9	131 02.4
17	84	23.07.87	0142	59	6158	6198	54 09.7	130 55.2
16	95	23.07.87	0220	67	9492	10823	54 04.4	131 02.1
15	41	23.07.87	0343	29	10942	11398	53 58.6	131 08.5
63	90	23.07.87	1012	64	14008	10787	53 33.2	130 47.9
64	84	23.07.87	1320	59	13273	11875	53 24.2	131 00.1
65	38	23.07.87	1540	27	5669	5570	53 17.2	131 08.1
66	85	23.07.87	1645	60	10068	6927	53 20.0	130 57.9
67	145	23.07.87	1755	103	11390	10496	53 22.3	130 47.9
68	90	23.07.87	2040	64	12860	10830	53 15.6	130 55.6
69	39	23.07.87	2315	28	6315	6881	53 07.5	130 06.0
70	89	24.07.87	0033	63	7461	7367	53 10.1	130 55.5
71	142	24.07.87	0140	100	13315	13224	53 11.8	130 47.0
72	96	24.07.87	0412	68	10330	10247	53 06.3	130 52.2
73	25	24.07.87	0615	18	5101	5033	53 02.1	130 54.8
74	105	24.07.87	0700	74	7625	7612	53 03.3	130 47.6
75	105	24.07.87	0743	74	8260	7745	53 04.5	130 41.6
76	95	24.07.87	0953	67	14595	14820	52 59.9	130 43.3
77	43	24.07.87	1223	30	7285	7153	52 53.8	130 49.2
78	61	24.07.87	1320	43	11834	11561	52 56.3	130 40.3
79	100	24.07.87	1646	71	8738	8827	52 59.3	130 31.2
80	97	24.07.87	1821	69	7228	7264	52 50.4	130 38.7

Table 6. Locations of hydrographic and plankton stations and water temperatures (°C) at significant depths collected by expendable bathythermograph (X.B.T.) during W. E. RICKER cruise, July 14-27, 1987.

Station	#1		#5		#8	
N. Lat (°')	51 07		51 23		51 07	
W. Long (°')	128 19		128 42		129 37	
Date	July 15, 1987		July 15, 1987		July 26, 1987	
Time (PDST)	17:20		20:20		02:00	
Significant Point	Depth (m)	Temperature (°C)	Depth (m)	Temperature (°C)	Depth (m)	Temperature (°C)
1	2	14.5	2	13.9	2	14.2
2	10	10.0	11	13.9	14	14.1
3	20	9.0	14	13.5	25	12.6
4	30	8.0	16	13.0	27	11.7
5	40	7.0	18	11.8	37	10.3
6	50	6.8	25	10.9	65	8.8
7	75	6.7	43	10.5	71	8.0
8	100	6.6	56	9.6	92	7.1
9	150	6.7	138	7.0	300	5.4
10	175	6.7	139	7.0	380	BTM
11	183	BTM	140	7.6	-	-
12	-	-	148	6.9	-	-
13	-	-	173	6.2	-	-
14	-	-	215	6.0	-	-
15	-	-	223	BTM	-	-
16	-	-	-	-	-	-
17	-	-	-	-	-	-
18	-	-	-	-	-	-

Table 6 (cont'd).

Station	#10		#13		#15	
N. Lat (°')	51 36		52 00		52 00	
W. Long (°')	130 03		129 30		130 31	
Date	July 25, 1987		July 16, 1987		July 16, 1987	
Time (PDST)	22:40		01:30		05:35	
Significant Point	Depth (m)	Temperature (°C)	Depth (m)	Temperature (°C)	Depth (m)	Temperature (°C)
1	2	14.0	2	13.9	2	13.2
2	8	13.9	8	13.8	20	13.1
3	17	12.7	18	13.0	22	12.8
4	19	13.0	19	12.7	25	11.6
5	20	11.4	20	11.9	43	10.0
6	25	10.5	23	11.2	74	8.9
7	30	11.9	27	11.0	90	7.8
8	32	12.1	29	10.4	126	6.6
9	41	11.0	42	10.1	180	5.9
10	52	10.5	47	9.5	351	4.9
11	57	9.7	54	9.6	437	BTM
12	79	8.5	56	9.0	-	-
13	97	7.7	100	7.3	-	-
14	126	7.3	145	6.2	-	-
15	145	6.5	195	5.8	-	-
16	325	5.0	202	5.8	-	-
17	344	BTM	203	6.3	-	-
18	-	-	206	BTM	-	-

Table 6 (cont'd)

Station	#21		#24		#33	
N. Lat (°')	53 00		53 30		54 25	
W. Long (°')	130 12		130 46		131 20	
Date	July 24, 1987		July 23, 1987		July 22, 1987	
Time (PDST)	15:30		09:40		16:00	
Significant Point	Depth (m)	Temperature (°C)	Depth (m)	Temperature (°C)	Depth (m)	Temperature (°C)
1	2	13.8	2	13.4	2	12.5
2	19	13.0	7	12.7	12	12.0
3	25	12.3	9	11.4	14	12.4
4	30	11.2	14	10.1	22	11.3
5	43	11.5	18	9.5	35	10.9
6	45	10.5	34	9.0	38	11.4
7	73	9.2	48	7.8	43	11.1
8	94	7.2	72	6.7	47	10.4
9	141	5.5	127	5.8	50	10.7
10	229	BTM	165	BTM	56	10.5
11	-	-	-	-	66	9.4
12	-	-	-	-	70	8.4
13	-	-	-	-	88	7.5
14	-	-	-	-	148	7.0
15	-	-	-	-	160	6.8
16	-	-	-	-	161	6.4
17	-	-	-	-	220	BTM
18	-	-	-	-	-	-

Table 7. Comparison of midwater acoustic biomass estimates (t) by region, season and year (from Kieser et al. 1987, McCarter et al. 1986, 1987, 1988).

	Winter		Summer	
Year	Two Peaks-Butterworth	Browning Entrance	Two Peaks-Butterworth	Browning Entrance
1984	2,700	28,900	-	-
1985	177[a]	17,300	no est.	no est.
1986	-	-	-	-
1987	510[a]	11,300[b]	3,300	1,140

[a]only Butterworth edge was surveyed
[b]estimate is low due to incomplete coverage

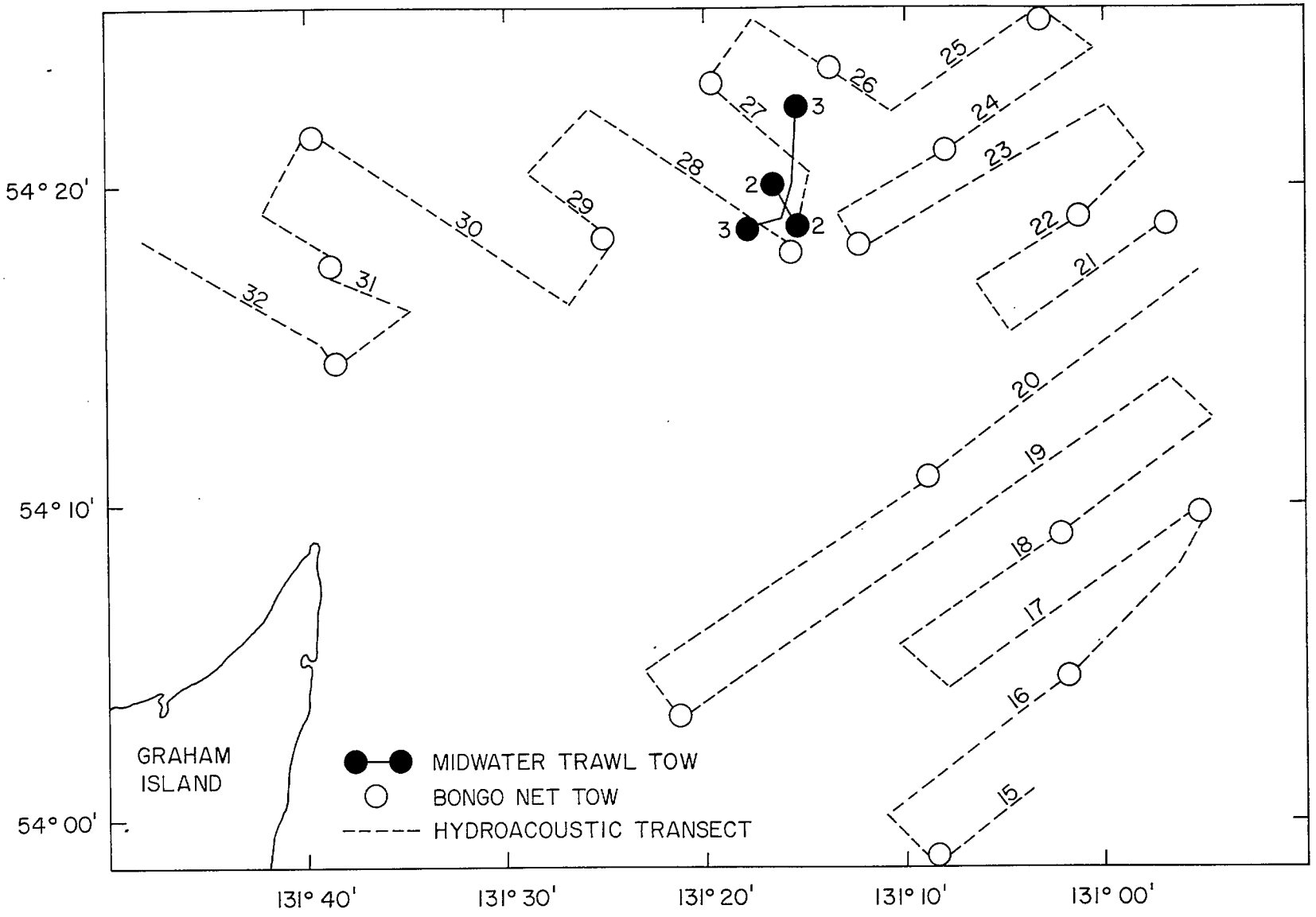

Fig. 1. Hydroacoustic transects, midwater trawl and bongo tow locations in the Two Peaks-Butterworth vicinity during W. E. RICKER cruise, July 14-27, 1987.

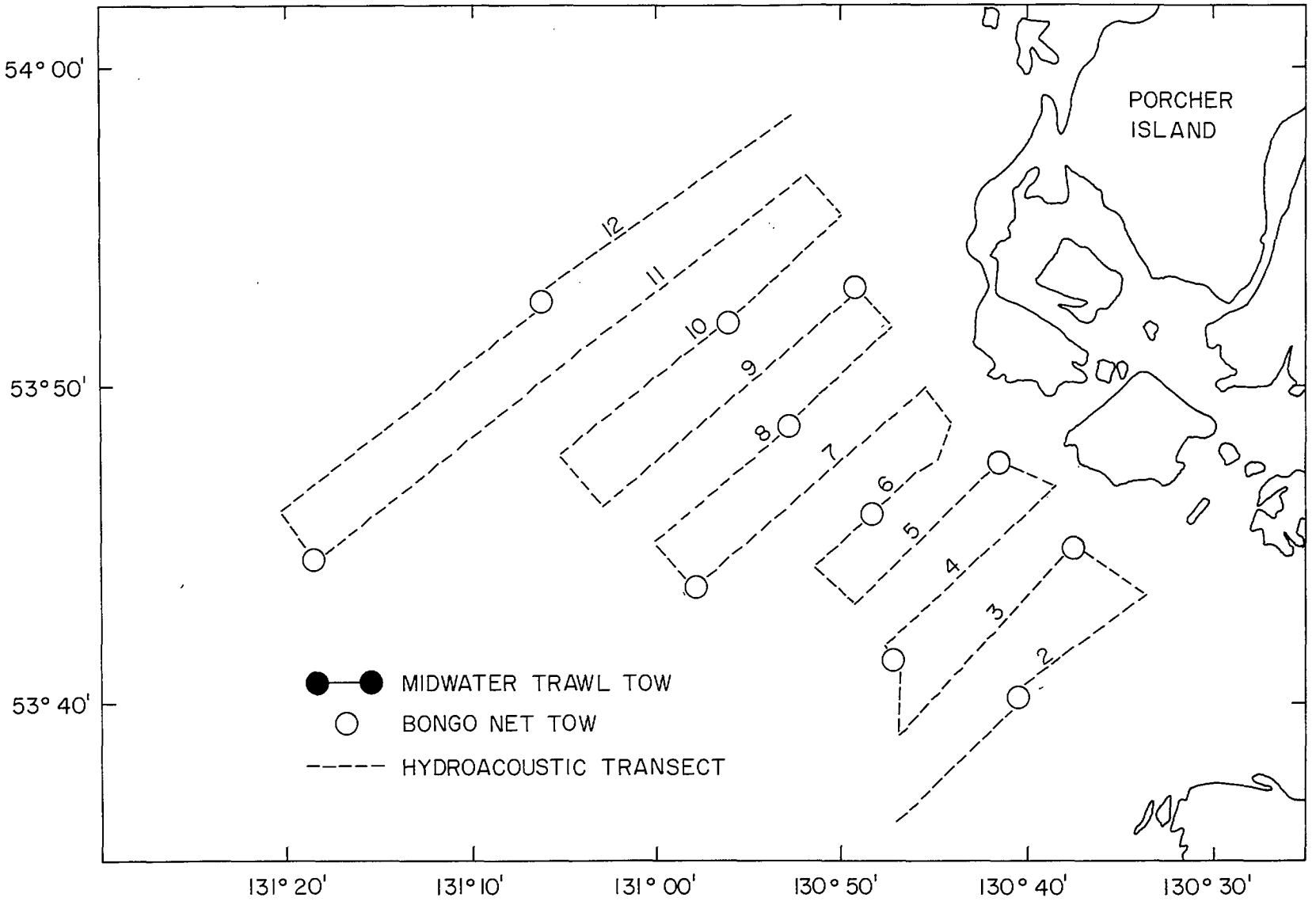

Fig. 2. Hydroacoustic transects, midwater trawl and bongo tow locations in the Freeman's Pass-Whiterocks vicinity during W. E. RICKER cruise, July 14-27, 1987.

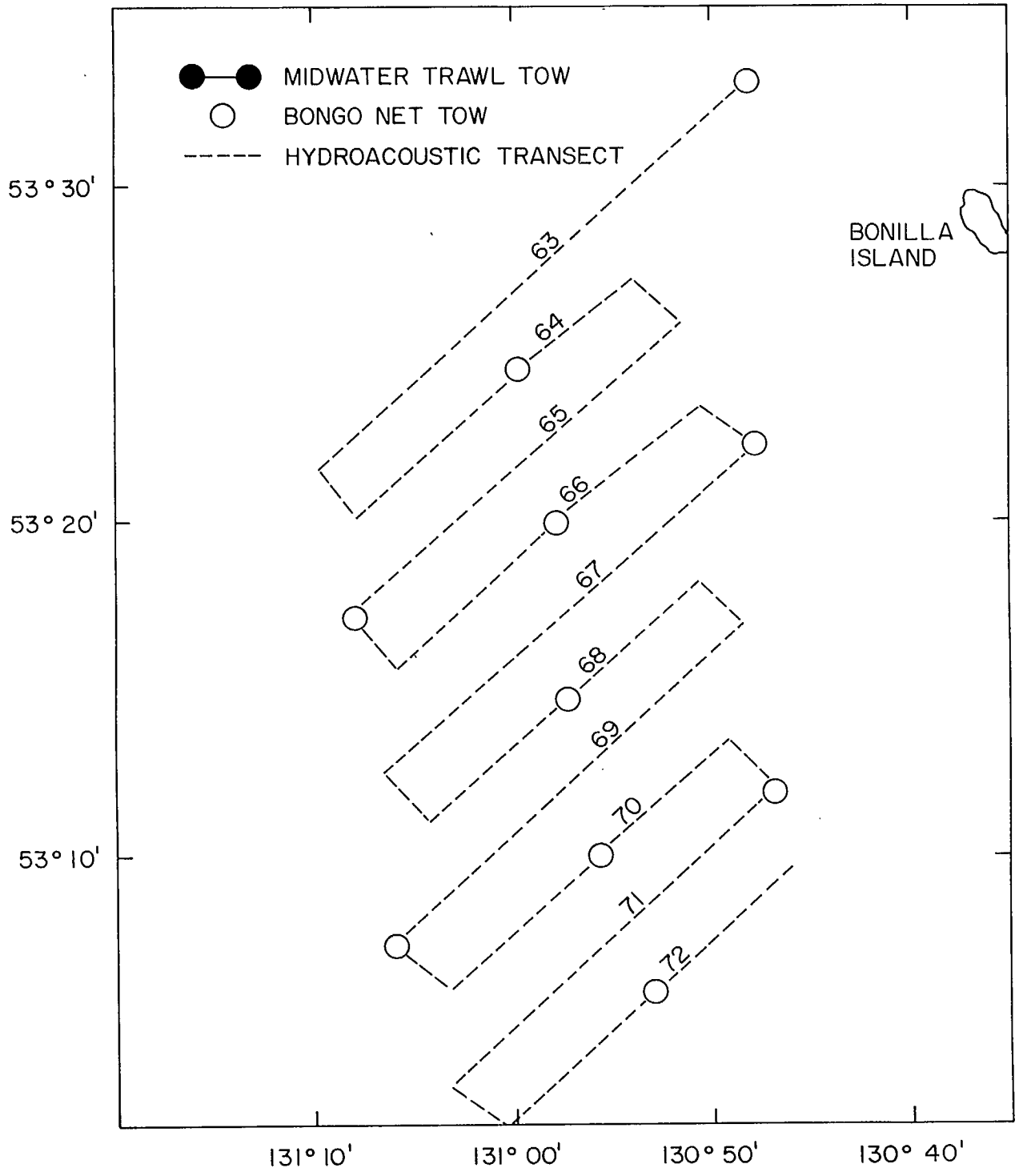

Fig. 3. Hydroacoustic transects, midwater trawl and bongo tow locations in thw SW Bonilla Island vicinity during W. E. RICKER cruise, July 14-27, 1987.

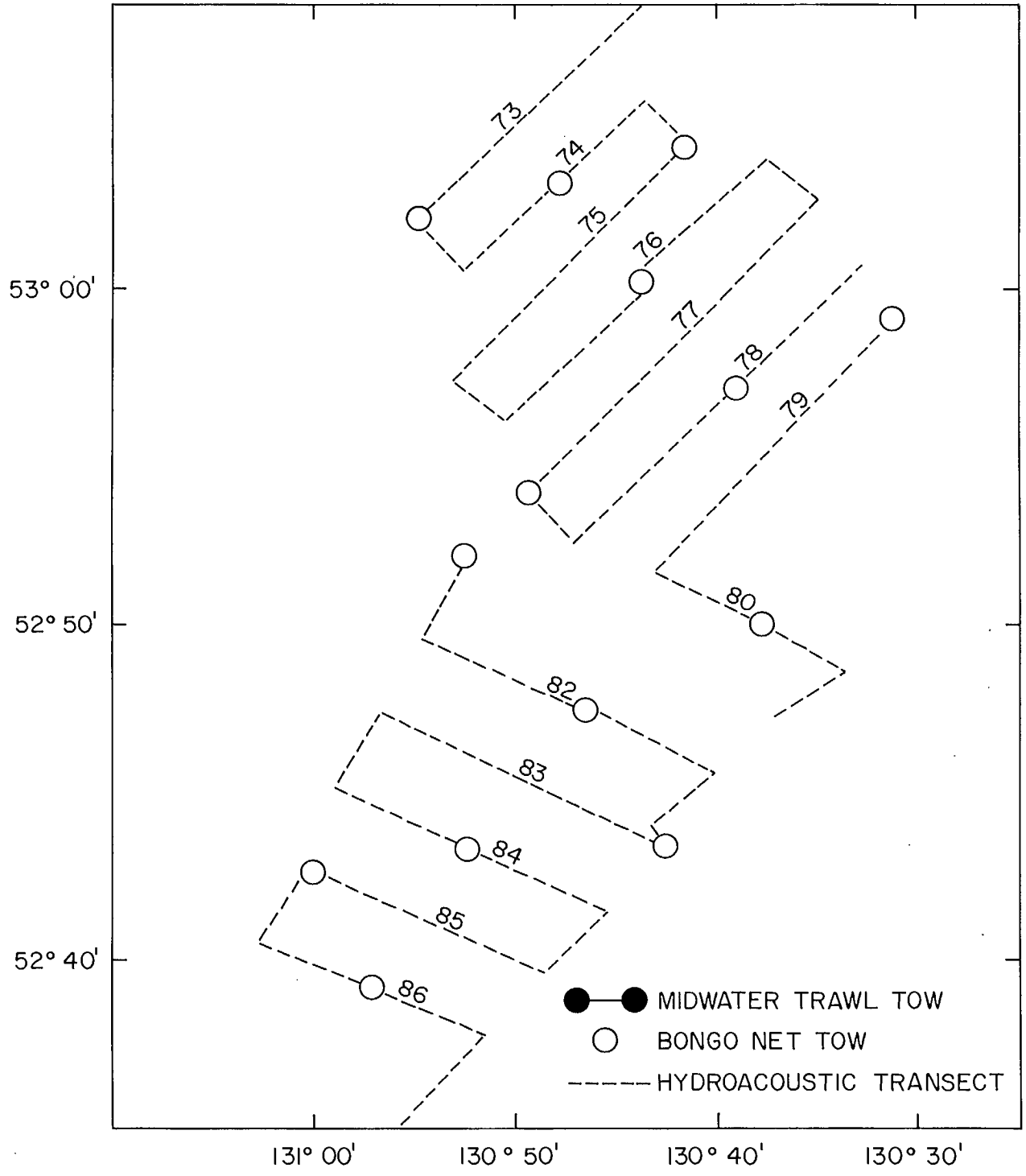

Fig. 4. Hydroacoustic transects, midwater trawl and bongo tow locations in the Horseshoe fishing ground vicinity during W. E. RICKER cruise, July 14-27, 1987.

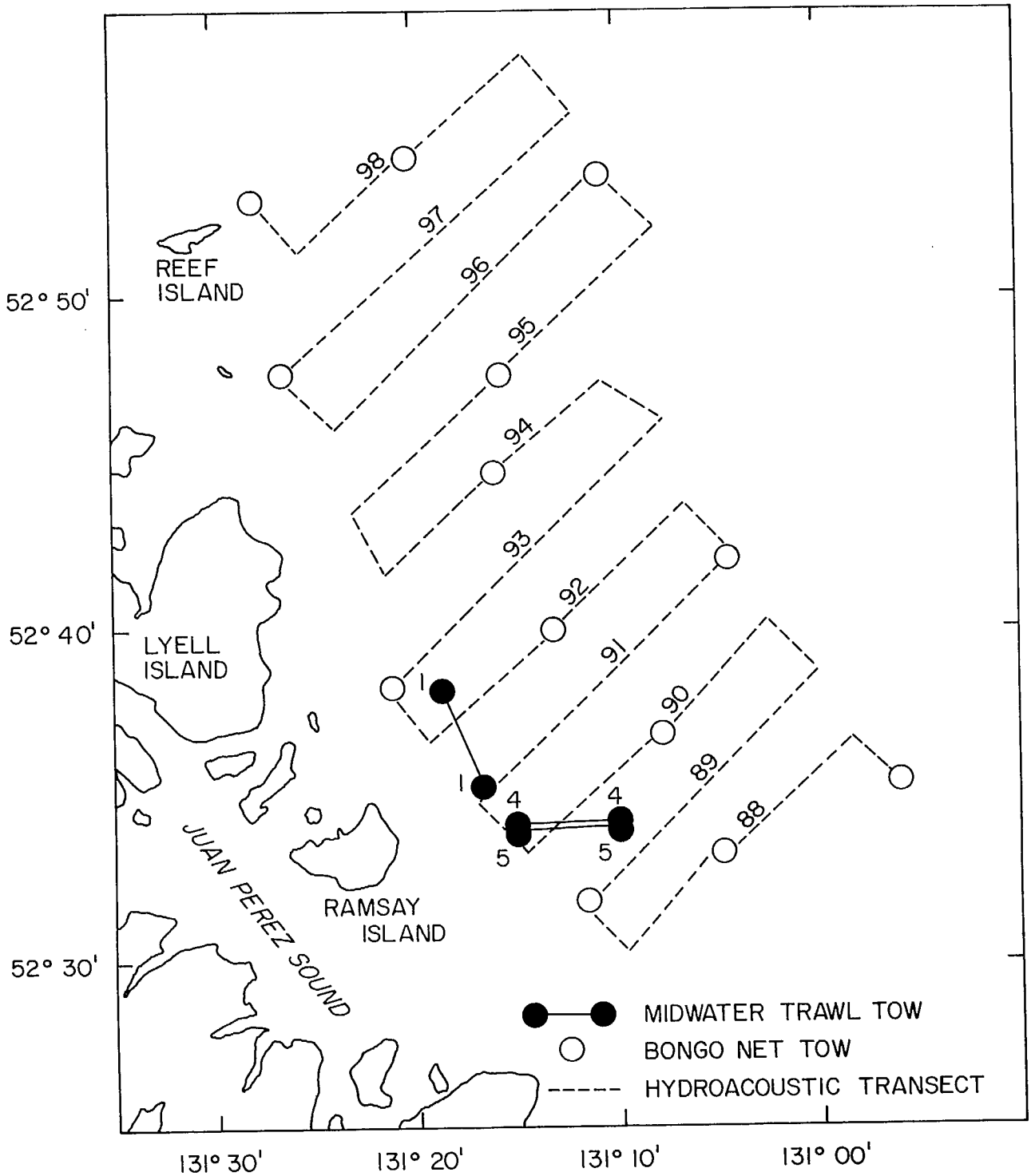

Fig. 5. Hydroacoustic transects, midwater trawl and bongo tow locations in the Reef and Ramsay Island vicinity during W. E. RICKER cruise, July 14-27, 1987.

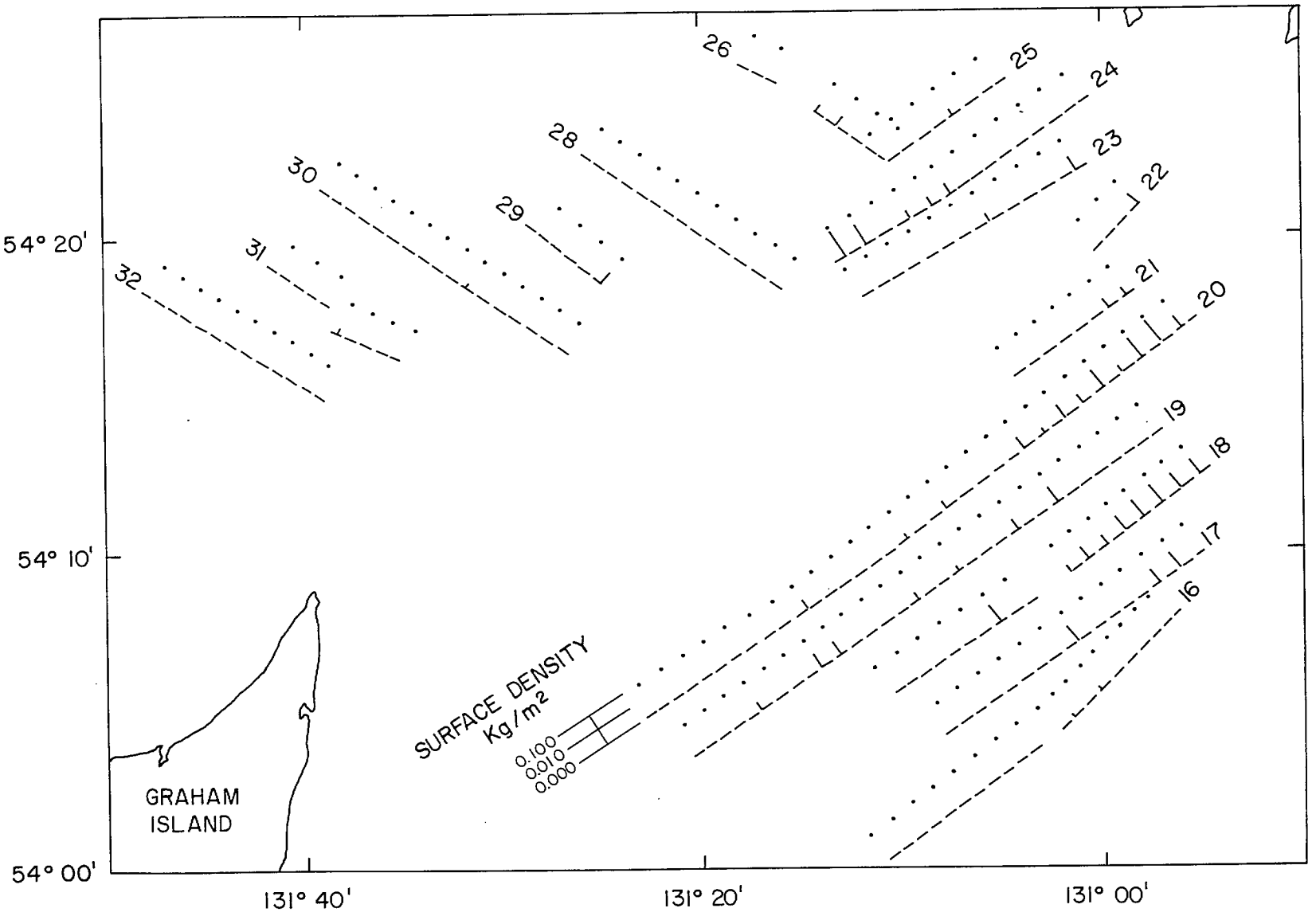

Fig. 6. Biomass density map of Two Peaks-Butterworth edge fishing ground. Total biomass estimated at 3,300 tonnes. Density bars use a logarithmic scale of .001 kg/m^2 to .100 kg/m^2 in figures 6-10.

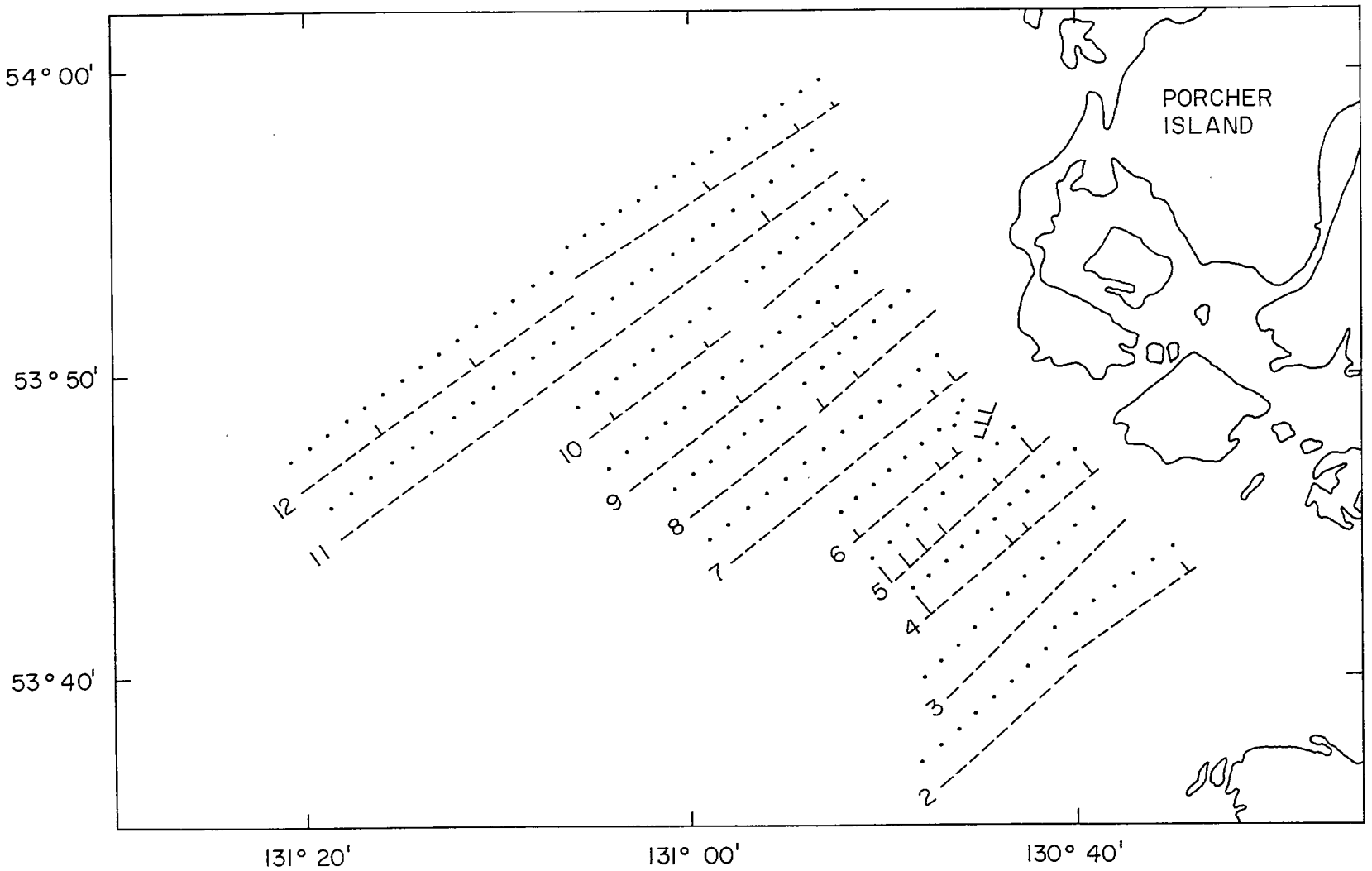

Fig. 7. Biomass density map of Freeman's Pass-Whiterocks fishing ground. Total biomass estimated at 1,140 tonnes. Density bars use a logarithmic scale of .001 kg/m^2 to .100 kg/m^2 in figures 6-10.

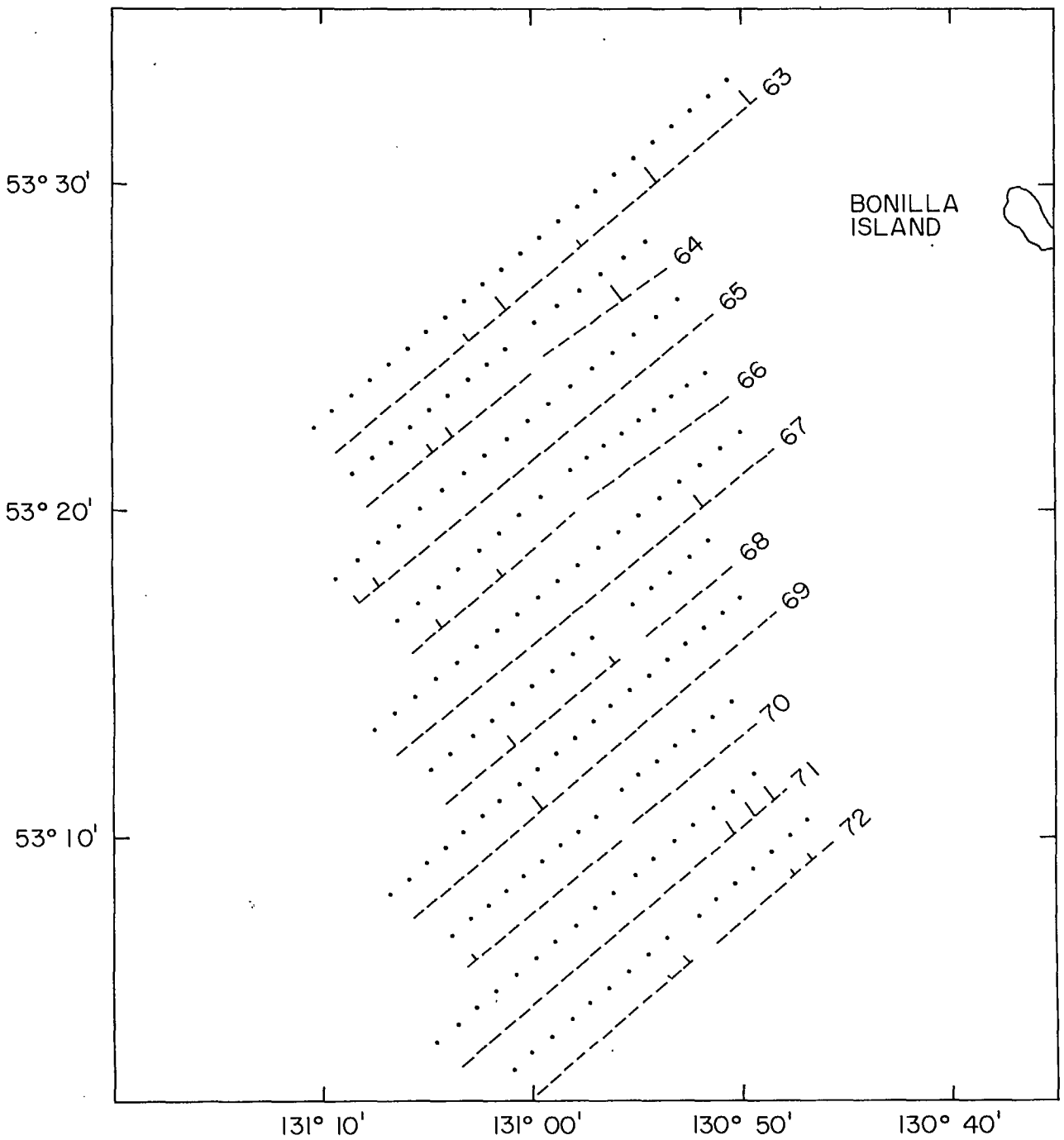

Fig. 8. Biomass density map of SW Bonilla Island fishing ground. Total biomass estimated at 1,090 tonnes. Density bars use a logarithmic scale of .001 kg/m^2 to .100 kg/m^2 in figures 6-10.

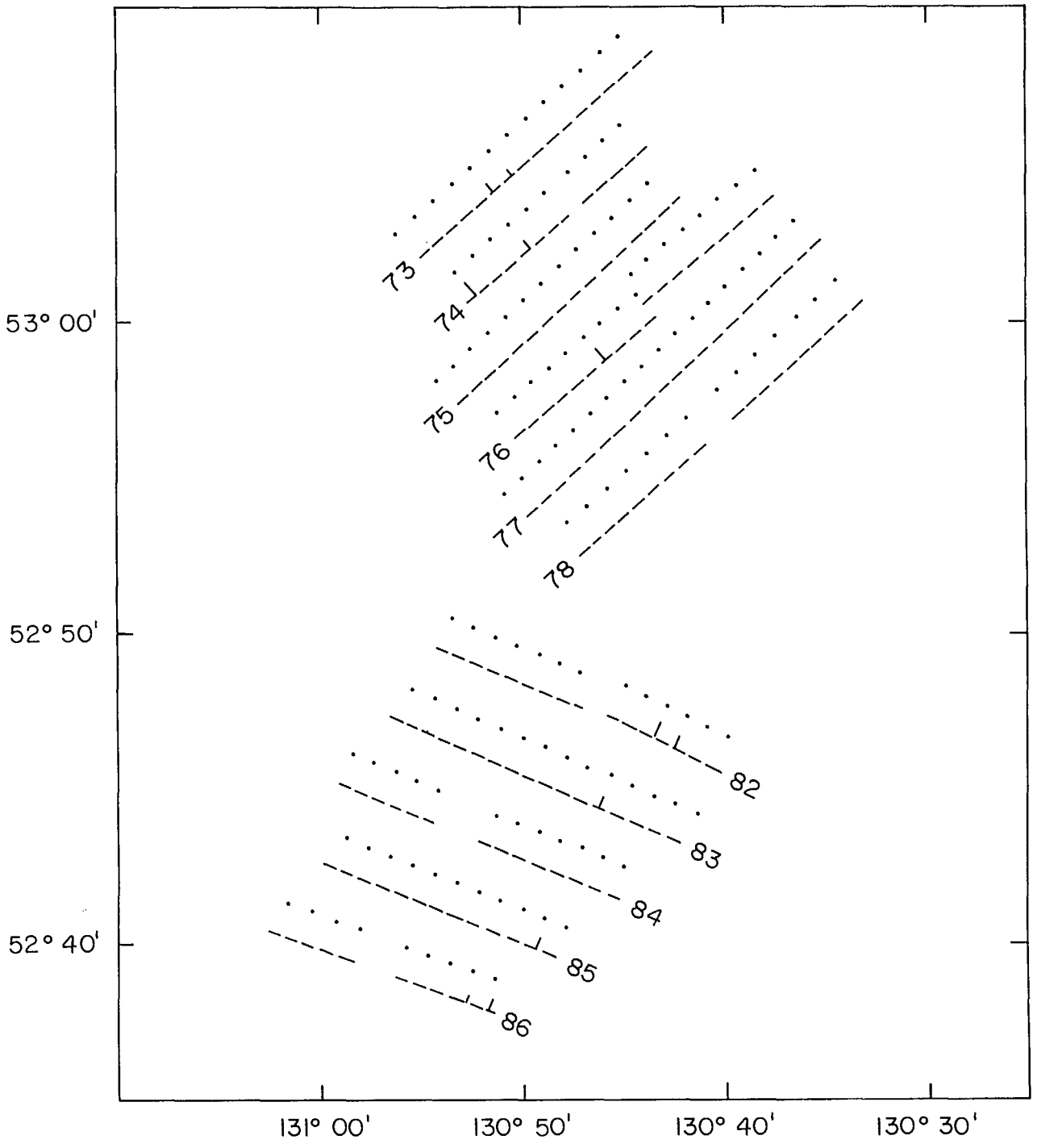

Fig. 9. Biomass density map of Horseshoe fishing ground. Total biomass estimated at 570 tonnes. Density bars use a logarithmic scale of .001 kg/m^2 to .100 kg/m^2 in figures 6-10.

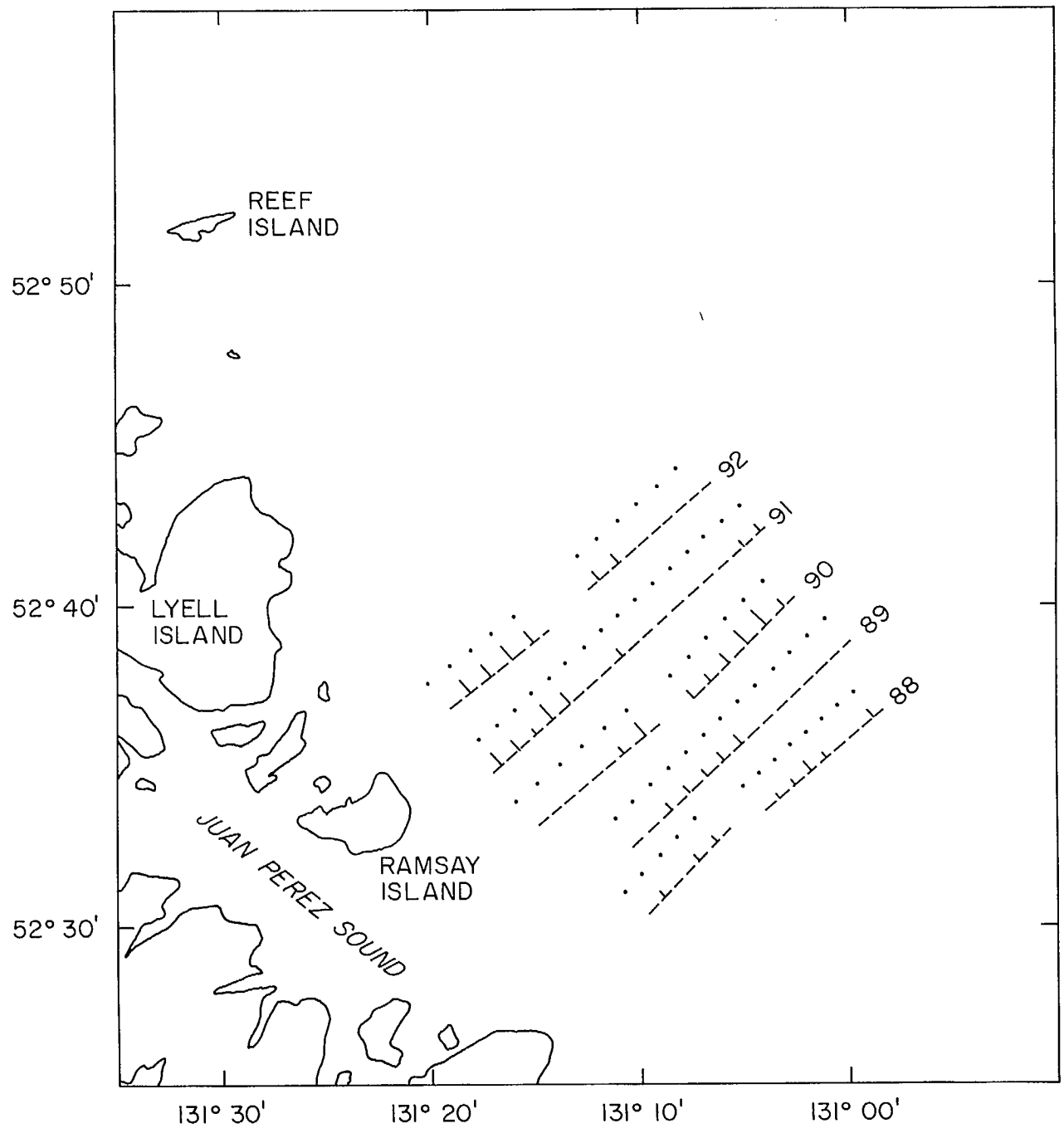

Fig. 10. Biomass density map of Reef Island-Ramsay Island fishing ground. Total biomass estimated at 1,320 tonnes. Density bars use a logarithmic scale of .001 kg/m^2 to .100 kg/m^2 in figures 6-10.

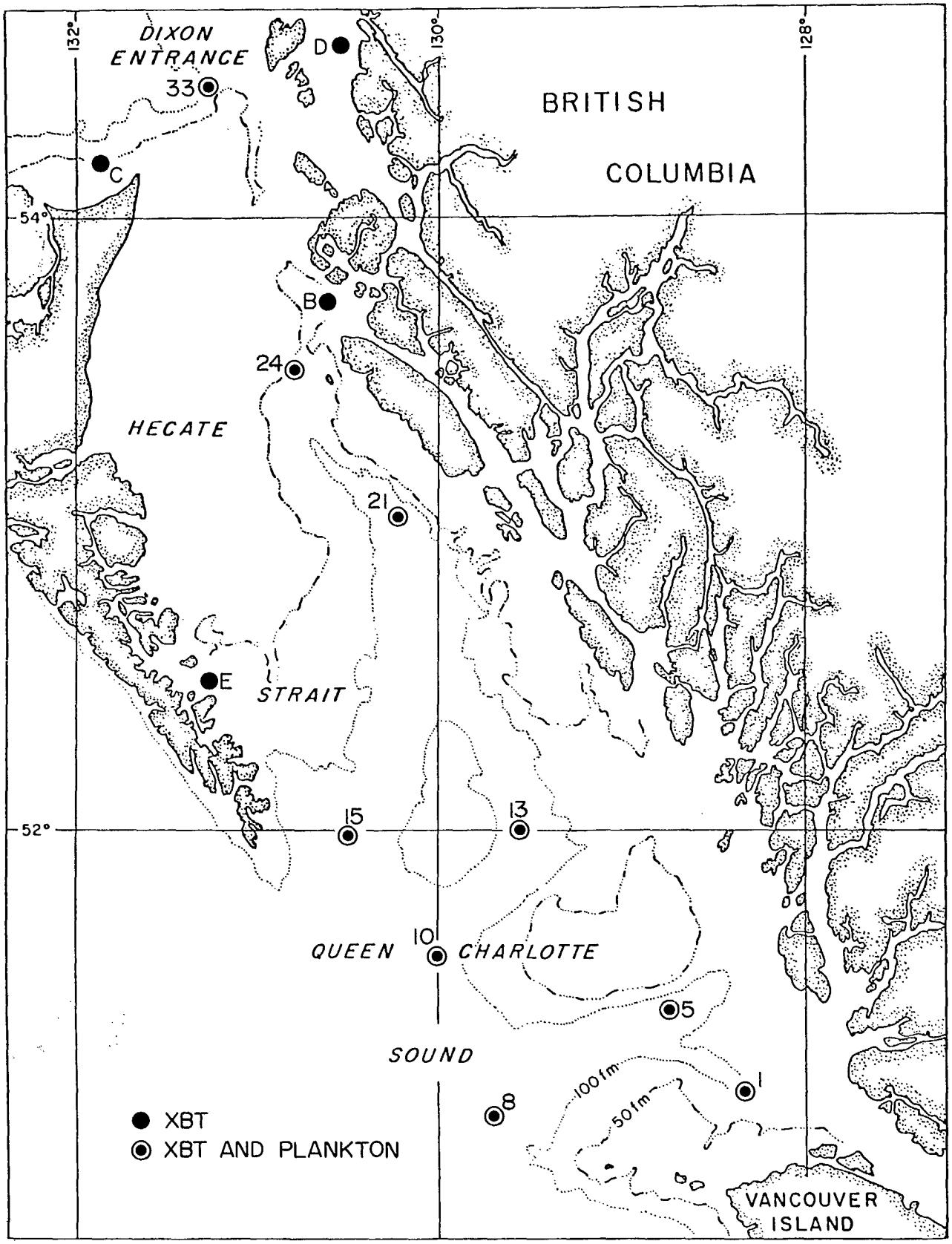

Fig. 11. Locations of expendable bathythermograph and vertical plankton tow stations during W. E. RICKER cruise, July 14-27, 1987.

Appendix Table 1. Cruise schedule of the W. E. RICKER, July 14-27, 1987.

Date	Time	Activity
14 July	18:30	Scientific party, D. Hay, R. Kieser, B. McCarter, L. Rosenfeld, D. Bouillon and C. Taylor board W. E. RICKER at PBS
	18:55	W. E. RICKER leaves PBS, Nanaimo for Hecate Strait
15	17:20	XBT station #1 and vertical plankton haul
	20:20	XBT station #5 and vertical plankton haul
16	01:30	XBT station #13 and vertical plankton haul
	05:35	XBT station #15 and vertical plankton haul
	12:20	Start target calibration (anchored Swan Bay, Skincuttle Inlet)
	22:23	Finish target calibration (anchored Swan Bay, Skincuttle Inlet)
17	01:27	Transects and bongos 88-99 (Ramsay Island to Reef Island)
	23:20	Midwater trawl tow #1 (East of Ramsay Island)
18	02:20	Transects and bongos 87-81 (Ramsay Island to Horseshoe)
	17:30	Transects and bongos 2-12 (Browning Entrance)
19	00:00	Neuston tow #1 (Browning Entrance)
	02:11	Neuston tow #2 (Browning Entrance)
	13:54	Tucker trawl #1 (Entrance to Edye Passage)
	24:00	Secured at Ocean Dock, Prince Rupert (R. Kieser & D. Hay depart)
20	13:00	Depart Ocean Dock, Prince Rupert
	15:44	Transects and bongos 21-22 (Butterworth Edge)
	17:48	Return to Prince Rupert (Injured crewman require medical aid)
	21:15	Secured at Ocean Dock, Prince Rupert
21	08:55	Depart Ocean Dock, Prince Rupert
	12:30	Transects and bongos 23-32 (Two Peaks)
22	10:13	Midwater trawl tow #2 (Two Peaks)
	12:50	Midwater trawl tow #3 (Two Peaks)
	16:00	XBT station #33 and vertical plankton haul
	16:58	Transects and bongos 20-15 (Butterworth Edge)
23	09:40	XBT station #24 and vertical plankton haul
	10:09	Transects and bongos 63-78 (SW Bonilla to Horseshoe)
24	15:30	XBT station #21 and vertical plankton haul
	16:46	Transects and bongos 79-80 (Horseshoe)
25	12:15	Midwater trawl tow #4 (East of Ramsay Island)
	14:13	Midwater trawl tow #5 (East of Ramsay Island)
	22:40	XBT station #10 and vertical plankton haul
26	02:00	XBT station #8 and vertical plankton haul
27	07:15	Secured at PBS, Nanaimo

Appendix Table 2. Condensed hydroacoustic biomass output of W. E. RICKER cruise, July 14-27, 1987. A biomass estimate in tonnes is given for each transect under the far right column headed 'BIOMASS' and a cumulative biomass for each cumulative area follows on the line below. Parameters are described as follows:

Current parameters	Description
ICO 87FEIBI03.CON	Input control file (file name, TT: or N)
IDA 87F001.DAT	Input echo integration file (file name or N)
OCB N	Output condensed biomass (file name, TT: or N)
OFB 87FEIBI03.OFX	Output full biomass (file name, TT: or N)
FBO BOTH	For full biomass output: SEQ, CUM, BOTH
CEV 0,99999	Choose first and last event
CSP ALL	Choose species code to be analysed or NONE
DEB 0	Debugging output: 0, 1, 2
ECH Y	Echo control lines: Y or N
TLL 220.4	Transmit level (dB) re 1 uPascal at 1m
RSS -103.46	Receiver sensitivity (dB) re 1 Volt/uPascal
BFF -17.55	Beam factor (dB)
REF 30.0	Reference range for receiver TVG (m)
ALP .0099	Absorption coefficient for receiver TVG (dB/m)
SOU 1490.0	Speed of sound in water (m/sec)
TAU 0.6	Pulse length (m/sec)
GA1 0.0	Add. fixed system gain - Beam width factor (dB)
GA2 -12.0	Adj. system gain - Receiver gain (dB)
TVC 0,0	Near range and TVG correction factor (dB)
TVG 20,0.0099 20,0.0099	Time varied gain = 20 log R + 2*ALP*R
TSS/ALL -32.0	/SPE Target strength (dB/Kg)
MME 0,100	Min. & max. accepted integration value (V^2)
DEP/ALL 15,200	/SPE min. & max. depth strata (m)
UNI NM	Units for DPP and WID: km or nm
DPP 0.001	DIStance per ping (UNI/ping)
WID 1.0,0.0	Width (UNI) and slope (m/m) of transects
FRA/ALL 1	SPE/ Species fraction
AVE 5	Number of Sequences to be averaged
EVE 1 14:07:04 52 30.0 131 30.0	Event number, Time, Lat., Long.
DAT 17-JUL-87	Date DD-MMM-YY
TRA T53 1 10 1000 10.0 92.0 8.8	Transect name EIS1 EIS2-1 PIT DIS BEA TIM SPE
FIR/ALL	/SPE First sequence number to be processed
LAS/ALL	/SPE Last sequence number to be processed
LOU/ALL	/SPE zero 1. cumulative biomass output
ZER	Zero 1. and 2. cumulative biomass output
EXI	Close files, exit

Appendix Table 2 (cont'd)

```
*DAT 17-JUL-87
*IDA 87F001.DAT
*IDA 87F002.DAT
> Overall systems gain GAIOD dB:  53.7764
*IDA 87F003.DAT
*UNI NM
*WID 2.14
*DEP/ALL 15,200
```

RAMSAY ISLAND TRANSECTS (Offshore)

*EVE 2 01:55:00 52 36.73 130 58.27

*TRA	T-name	EIS1	EIS2-1	PIT	DIS	BEA	TIM	SPE
*TRA	88	44	82	2331	4.888	227.379	0.650	7.520

*ZER

*LOU/ALL

N #	P #	LEN KM	AREA KM^2	DEP M	COL M	DCS M	DCB M	LCB KM	VOL/D KG/M^3	SURF/D KG/M^2	BIOMASS T
40	2451	9.3	36.8	102.2	94.7	49.1	51.6	4.3	2.50E-05	2.37E-03	8.72E+01
40	2451	9.3	36.8	102.2	94.7	49.1	51.6	0.0	2.50E-05	2.37E-03	8.72E+01

*EVE 4 02:53:00 52 32.93 131 05.73

*TRA	T-name	EIS1	EIS2-1	PIT	DIS	BEA	TIM	SPE
*TRA	88	103	125	1361	3.556	221.333	0.400	8.890

*LOU/ALL

N	P	LEN	AREA	DEP	COL	DCS	DCB	LCB	VOL/D	SURF/D	BIOMASS
25	1479	7.2	28.4	128.5	121.0	98.5	39.2	2.8	1.66E-05	2.01E-03	5.70E+01
65	3930	16.4	65.2	113.7	106.2	68.6	46.7	0.0	2.08E-05	2.21E-03	1.44E+02

*EVE 6.1 03:54:00 52 32.35 131 10.40 ! Log omission (est.)

*TRA	T-name	EIS1	EIS2-1	PIT	DIS	BEA	TIM	SPE
*TRA	89	163	224	3664	8.993	44.630	1.033	8.703

*LOU/ALL

N	P	LEN	AREA	DEP	COL	DCS	DCB	LCB	VOL/D	SURF/D	BIOMASS
65	3841	17.5	69.2	82.7	75.2	37.6	55.4	6.8	2.69E-05	2.02E-03	1.40E+02
130	7771	33.9	134.4	97.7	90.2	53.3	51.0	0.0	2.34E-05	2.11E-03	2.84E+02

*EVE 7 05:09:00 52 40.28 131 02.43

*TRA	T-name	EIS1	EIS2-1	PIT	DIS	BEA	TIM	SPE
*TRA	90	238	266	1711	4.607	222.810	0.467	9.873

*LOU/ALL

N	P	LEN	AREA	DEP	COL	DCS	DCB	LCB	VOL/D	SURF/D	BIOMASS
30	1770	8.8	35.0	69.3	61.8	67.5	0.3	3.7	1.38E-04	8.55E-03	2.99E+02
160	9541	42.7	169.3	91.9	84.4	60.6	25.0	0.0	4.08E-05	3.44E-03	5.83E+02

Appendix Table 2 (cont'd)

```
*EVE        9  06:02:00   52 36.24  131 08.99 ! fish schools on echogram
*-------------------------------------------------------------------------
*TRA T-name   EIS1 EIS2-1    PIT     DIS     BEA     TIM     SPE
*TRA 90        291    316   1535   4.489 228.235   0.433  10.359
*LOU/ALL
   N     P   LEN  AREA   DEP   COL   DCS   DCB   LCB    VOL/D   SURF/D  BIOMASS
  30  1771   9.6  38.0 127.5 120.0 106.3  15.9   2.0 2.52E-05 3.02E-03 1.15E+02
 190 11312  52.3 207.4  98.4  90.9  68.1  23.5   0.0 3.70E-05 3.37E-03 6.98E+02

*EVE       10  06:48:00   52 34.80  131 16.90 ! fish schools on echogram
*-------------------------------------------------------------------------
*TRA T-name   EIS1 EIS2-1    PIT     DIS     BEA     TIM     SPE
*TRA 91        337    412   4484  10.624  46.075   1.267   8.387
*LOU/ALL
   N     P   LEN  AREA   DEP   COL   DCS   DCB   LCB    VOL/D   SURF/D  BIOMASS
  80  4720  20.7  82.1  58.4  50.9  71.5   6.2   5.5 7.06E-05 3.59E-03 2.95E+02
 270 16032  73.0 289.4  87.1  79.6  69.1  18.3   0.0 4.31E-05 3.43E-03 9.93E+02

*EVE       13  08:28:00   52 43.75  131 06.54
*-------------------------------------------------------------------------
*TRA T-name   EIS1 EIS2-1    PIT     DIS     BEA     TIM     SPE
*TRA 92        437    468   1888   5.057 226.669   0.533   9.481
*LOU/ALL
   N     P   LEN  AREA   DEP   COL   DCS   DCB   LCB    VOL/D   SURF/D  BIOMASS
  33  1829  10.2  40.6  56.4  48.9  52.7   9.6   7.3 4.55E-05 2.23E-03 9.05E+01
 303 17861  83.3 330.0  83.3  75.8  67.8  17.6   0.0 4.33E-05 3.28E-03 1.08E+03

*! Only EIS numbers 1-55 integrated in file 87F004.DAT (lost data)
*IDA 87F004.DAT

*EVE       15  09:24:00   52 39.11  131 14.43
*-------------------------------------------------------------------------
*TRA T-name   EIS1 EIS2-1    PIT     DIS     BEA     TIM     SPE
*TRA 92          6     29   1422   3.844 229.828   0.400   9.611
*LOU/ALL
   N     P   LEN  AREA   DEP   COL   DCS   DCB   LCB    VOL/D   SURF/D  BIOMASS
  25  1481   7.4  29.4 118.1 110.6 100.4  16.5   3.2 7.14E-05 7.90E-03 2.32E+02
 328 19342  90.7 359.4  86.1  78.6  73.5  17.4   0.0 4.65E-05 3.66E-03 1.32E+03
*
*EVE       20  12:41:00   52 47.48  131 10.65
*-------------------------------------------------------------------------
*TRA T-name   EIS1 EIS2-1    PIT     DIS     BEA     TIM     SPE
*TRA 94        205    231     -1   4.305 229.250   0.467   9.225
*
*EVE       22  13:24:00   52 44.02  131 17.20 ! heavy bottom schools on echogram
*-------------------------------------------------------------------------
*TRA T-name   EIS1 EIS2-1    PIT     DIS     BEA     TIM     SPE
*TRA 94        246    267     -1   3.526 225.761   0.367   9.617
*
```

Appendix Table 2 (cont'd)

```
*EVE       24  14:05:00   52 43.50  131 22.99
*-------------------------------------------------------------------------------
*TRA T-name   EIS1 EIS2-1    PIT     DIS     BEA     TIM     SPE
*TRA 95        287    328     -1   5.664  47.316   0.683   8.289
*
*EVE       26  15:07:00   52 48.38  131 14.44
*-------------------------------------------------------------------------------
*TRA T-name   EIS1 EIS2-1    PIT     DIS     BEA     TIM     SPE
*TRA 95        350    386     -1   5.406  47.240   0.650   8.316
*
*EVE       29  16:15:00   52 53.15  131 11.85
*-------------------------------------------------------------------------------
*TRA T-name   EIS1 EIS2-1    PIT     DIS     BEA     TIM     SPE
*TRA 96        416    484     -1  10.227 225.249   1.133   9.024
*
*EVE       32  17:53:00   52 47.93  131 25.85
*-------------------------------------------------------------------------------
*TRA T-name   EIS1 EIS2-1    PIT     DIS     BEA     TIM     SPE
*TRA 97        515    589     -1  11.191  48.398   1.250   8.952
*
*EVE       34  19:24:00   52 57.16  131 14.37
*-------------------------------------------------------------------------------
*TRA T-name   EIS1 EIS2-1    PIT     DIS     BEA     TIM     SPE
*TRA 98        607    637     -1   4.700 228.403   0.550   8.545
*
*EVE       37  20:07:00   52 53.77  131 21.06
*-------------------------------------------------------------------------------
*TRA T-name   EIS1 EIS2-1    PIT     DIS     BEA     TIM     SPE
*TRA 98        648    670     -1   3.649 227.397   0.383   9.519

*DAT 18-JUL-87
*IDA 87F005.DAT
*UNI NM
*WID 2.5
*DEP/ALL 15,200


-------------------------------------------------------------------------------
                          HORSESHOE TRANSECTS (Lower portion)
-------------------------------------------------------------------------------
*EVE       43  03:04:00   52 37.83  130 51.45
*-------------------------------------------------------------------------------
*TRA T-name   EIS1 EIS2-1    PIT     DIS     BEA     TIM     SPE
*TRA 86         91    113   1356   3.285 291.424   0.350   9.387
*ZER
*LOU/ALL
   N     P   LEN  AREA   DEP   COL   DCS   DCB   LCB    VOL/D   SURF/D  BIOMASS
  25  1474   6.6  30.6  77.3  69.8  33.5  49.3   1.6 1.91E-05 1.33E-03 4.07E+01
  25  1474   6.6  30.6  77.3  69.8  33.5  49.3   0.0 1.91E-05 1.33E-03 4.07E+01
```

Appendix Table 2 (cont'd)

*EVE 45 03:44:00 52 39.45 130 58.05
*----------
*TRA T-name EIS1 EIS2-1 PIT DIS BEA TIM SPE
*TRA 86 134 153 1180 3.064 291.236 0.350 8.756
*LOU/ALL

N	P	LEN	AREA	DEP	COL	DCS	DCB	LCB	VOL/D	SURF/D	BIOMASS
20	1180	5.7	26.3	53.5	46.0	42.1	12.9	2.4	3.86E-06	1.78E-04	4.66E+00
45	2654	12.3	56.9	66.3	58.8	34.4	45.5	0.0	1.36E-05	7.98E-04	4.54E+01

*EVE 48 04:42:00 52 42.66 130 59.90
*----------
*TRA T-name EIS1 EIS2-1 PIT DIS BEA TIM SPE
*TRA 85 189 240 3068 7.468 113.600 0.850 8.786
*LOU/ALL

N	P	LEN	AREA	DEP	COL	DCS	DCB	LCB	VOL/D	SURF/D	BIOMASS
55	3245	14.6	67.7	67.3	59.8	64.7	17.7	11.2	1.35E-05	8.08E-04	5.48E+01
100	5899	26.9	124.6	66.9	59.4	51.0	30.3	0.0	1.35E-05	8.04E-04	1.00E+02

*EVE 50 05:55:00 52 41.47 130 45.13
*----------
*TRA T-name EIS1 EIS2-1 PIT DIS BEA TIM SPE
*TRA 84 263 296 2006 4.696 293.465 0.567 8.288
*LOU/ALL

N	P	LEN	AREA	DEP	COL	DCS	DCB	LCB	VOL/D	SURF/D	BIOMASS
35	2065	9.0	41.5	84.2	76.7	74.7	8.4	4.9	7.53E-06	5.78E-04	2.39E+01
135	7964	35.9	166.1	71.2	63.7	55.6	26.1	0.0	1.17E-05	7.47E-04	1.24E+02

*EVE 52 06:58:00 52 43.96 130 54.29
*----------
*TRA T-name EIS1 EIS2-1 PIT DIS BEA TIM SPE
*TRA 84 325 346 1298 3.068 294.252 0.367 8.366
*LOU/ALL

N	P	LEN	AREA	DEP	COL	DCS	DCB	LCB	VOL/D	SURF/D	BIOMASS
25	1475	6.5	29.9	40.5	33.0	33.4	5.1	3.7	2.50E-06	8.26E-05	2.47E+00
160	9439	42.3	196.0	66.5	59.0	55.1	25.7	0.0	1.09E-05	6.46E-04	1.27E+02

*EVE 54 07:39:00 52 47.42 130 56.61

*----------
*TRA T-name EIS1 EIS2-1 PIT DIS BEA TIM SPE
*TRA 83 366 431 3894 9.514 115.062 1.050 9.061
*LOU/ALL

N	P	LEN	AREA	DEP	COL	DCS	DCB	LCB	VOL/D	SURF/D	BIOMASS
70	4130	18.7	86.5	68.9	61.4	77.8	2.8	12.3	8.00E-06	4.92E-04	4.25E+01
230	13569	61.0	282.5	67.2	59.7	60.8	19.9	0.0	1.00E-05	5.99E-04	1.69E+02

Appendix Table 2 (cont'd)

```
*EVE       57  09:34:00   52 45.58  130 40.11
*-------------------------------------------------------------------------------
*TRA T-name   EIS1 EIS2-1    PIT     DIS     BEA     TIM     SPE
*TRA 82        481    507   1593   3.757 298.276   0.450   8.350
*LOU/ALL
   N     P   LEN  AREA   DEP   COL   DCS   DCB   LCB    VOL/D   SURF/D  BIOMASS
  30  1770   7.7  35.8  83.3  75.8  82.4   1.7   3.8 2.74E-05 2.08E-03 7.45E+01
 260 15339  68.7 318.3  69.1  61.6  67.4  14.4   0.0 1.24E-05 7.65E-04 2.44E+02

*EVE       59  10:28:00   52 47.65  130 47.25
*-------------------------------------------------------------------------------
*TRA T-name   EIS1 EIS2-1    PIT     DIS     BEA     TIM     SPE
*TRA 82        535    569   2068   4.871 294.373   0.550   8.856
*LOU/ALL
   N     P   LEN  AREA   DEP   COL   DCS   DCB   LCB    VOL/D   SURF/D  BIOMASS
  35  2068   9.0  41.8  46.7  39.2  30.7  16.6   4.3 4.24E-06 1.66E-04 6.94E+00
 295 17407  77.8 360.1  66.5  59.0  66.4  14.4   0.0 1.18E-05 6.96E-04 2.51E+02

*IDA 87F006.DAT
*UNI NM
*WID 1.94
*DEP/ALL 15,200

--------------------------------------------------------------------------------
                          BROWNING ENTRANCE TRANSECTS
--------------------------------------------------------------------------------
*EVE       63  16:52:00   53 36.07  130 47.23
*-------------------------------------------------------------------------------
*TRA T-name   EIS1 EIS2-1    PIT     DIS     BEA     TIM     SPE
*TRA 2         156    193   2242   5.741  45.699   0.633   9.065
*ZER
*LOU/ALL
   N     P   LEN  AREA   DEP   COL   DCS   DCB   LCB    VOL/D   SURF/D  BIOMASS
  40  2360  11.2  40.2 123.6 116.1 105.3  22.4   4.7 9.99E-07 1.16E-04 4.67E+00
  40  2360  11.2  40.2 123.6 116.1 105.3  22.4   0.0 9.99E-07 1.16E-04 4.67E+00

*EVE       65  17:45:00   53 40.40  130 40.53 ! heavy fish schools on echogram
*-------------------------------------------------------------------------------
*TRA T-name   EIS1 EIS2-1    PIT     DIS     BEA     TIM     SPE
*TRA 2         210    243   2006   5.109  53.204   0.583   8.758
*LOU/ALL
   N     P   LEN  AREA   DEP   COL   DCS   DCB   LCB    VOL/D   SURF/D  BIOMASS
  35  2065   9.7  35.0  67.4  59.9  53.5   2.7   8.3 1.54E-05 9.25E-04 3.24E+01
  75  4425  20.9  75.2  97.5  90.0  60.0   5.1   0.0 5.47E-06 4.92E-04 3.70E+01
```

Appendix Table 2 (cont'd)

```
*EVE       68  19:00:00   53 44.98  130 37.41
*-------------------------------------------------------------------------------
*TRA T-name   EIS1 EIS2-1    PIT     DIS     BEA     TIM     SPE
*TRA 3         286    339   3186   8.235 223.131   0.900   9.150
*LOU/ALL
   N     P   LEN  AREA   DEP   COL   DCS   DCB   LCB    VOL/D   SURF/D  BIOMASS
  55  3245  15.5  55.8 109.1 101.6  87.5  17.4   6.2 4.12E-06 4.18E-04 2.34E+01
 130  7670  36.5 131.0 102.4  94.9  70.6   9.9   0.0 4.86E-06 4.61E-04 6.04E+01

*EVE       71  20:35:00   53 41.80  130 47.70
*-------------------------------------------------------------------------------
*TRA T-name   EIS1 EIS2-1    PIT     DIS     BEA     TIM     SPE
*TRA 4         379    433   3245   7.445  47.498   0.900   8.272
*LOU/ALL
   N     P   LEN  AREA   DEP   COL   DCS   DCB   LCB    VOL/D   SURF/D  BIOMASS
  55  3245  13.8  49.5 106.6  99.1  48.2  35.7   5.1 4.33E-05 4.29E-03 2.12E+02
 185 10915  50.3 180.6 103.6  96.1  53.2  30.0   0.0 1.57E-05 1.51E-03 2.73E+02

*EVE       74  22:02:00   53 47.61  130 41.50 ! fish schools on echogram
*-------------------------------------------------------------------------------
*TRA T-name   EIS1 EIS2-1    PIT     DIS     BEA     TIM     SPE
*TRA 5         467    508   2492   6.414 225.443   0.717   8.949
*LOU/ALL
   N     P   LEN  AREA   DEP   COL   DCS   DCB   LCB    VOL/D   SURF/D  BIOMASS
  45  2669  12.7  45.7 105.1  97.6  30.1  58.7   8.4 6.28E-05 6.13E-03 2.80E+02
 230 13584  63.0 226.3 103.9  96.4  41.5  44.5   0.0 2.54E-05 2.44E-03 5.53E+02

*EVE       76  23:00:00   53 44.34  130 51.43
*-------------------------------------------------------------------------------
*TRA T-name   EIS1 EIS2-1    PIT     DIS     BEA     TIM     SPE
*TRA 6         525    556   1912   4.324  48.054   0.550   7.861
*LOU/ALL
   N     P   LEN  AREA   DEP   COL   DCS   DCB   LCB    VOL/D   SURF/D  BIOMASS
  35  2092   8.8  31.5  98.2  90.7  57.9  36.8   4.3 2.38E-05 2.16E-03 6.81E+01
 265 15676  71.7 257.7 103.2  95.7  43.3  43.7   0.0 2.52E-05 2.41E-03 6.21E+02

*DAT 19-JUL-87
*IDA 87F007.DAT

*EVE     78.1  00:26:00   53 47.63  130 44.78
*-------------------------------------------------------------------------------
*TRA T-name   EIS1 EIS2-1    PIT     DIS     BEA     TIM     SPE
*TRA 6           3     17    884   1.271  19.260   0.267   4.767
*LOU/ALL
   N     P   LEN  AREA   DEP   COL   DCS   DCB   LCB    VOL/D   SURF/D  BIOMASS
  15   884   2.4   8.5  84.0  76.5  61.5  20.6   1.3 6.38E-05 4.88E-03 4.13E+01
 280 16560  74.1 266.2 102.6  95.1  44.4  42.2   0.0 2.62E-05 2.49E-03 6.62E+02
```

Appendix Table 2 (cont'd)

*EVE 80 00:52:00 53 49.94 130 45.46
*----------
*TRA T-name EIS1 EIS2-1 PIT DIS BEA TIM SPE
*TRA 7 28 90 3718 9.728 229.403 1.033 9.414
*LOU/ALL

N	P	LEN	AREA	DEP	COL	DCS	DCB	LCB	VOL/D	SURF/D	BIOMASS
65	3836	18.6	66.8	72.3	64.8	51.5	34.3	5.1	1.63E-05	1.06E-03	7.07E+01
345	20396	92.7	333.0	96.5	89.0	45.1	41.5	0.0	2.47E-05	2.20E-03	7.33E+02

*EVE 83 02:37:00 53 45.13 131 00.06
*----------
*TRA T-name EIS1 EIS2-1 PIT DIS BEA TIM SPE
*TRA 8 133 166 2006 4.703 50.043 0.550 8.550
*LOU/ALL

N	P	LEN	AREA	DEP	COL	DCS	DCB	LCB	VOL/D	SURF/D	BIOMASS
35	2065	9.0	32.2	49.5	42.0	52.0	9.3	6.2	4.99E-06	2.10E-04	6.76E+00
380	22461	101.6	365.2	92.4	84.9	45.2	41.2	0.0	2.39E-05	2.03E-03	7.40E+02

*EVE 85 03:33:00 53 48.57 130 53.28
*----------
*TRA T-name EIS1 EIS2-1 PIT DIS BEA TIM SPE
*TRA 8 190 222 1947 4.858 46.888 0.533 9.109
*LOU/ALL

N	P	LEN	AREA	DEP	COL	DCS	DCB	LCB	VOL/D	SURF/D	BIOMASS
35	2065	9.5	34.3	67.2	59.7	56.8	17.4	3.0	3.17E-05	1.89E-03	6.49E+01
415	24526	111.2	399.5	90.2	82.7	46.1	39.3	0.0	2.44E-05	2.01E-03	8.05E+02

*EVE 88 04:36:00 53 52.70 130 49.66
*----------
*TRA T-name EIS1 EIS2-1 PIT DIS BEA TIM SPE
*TRA 9 252 317 3894 10.129 230.078 1.117 9.070
*LOU/ALL

N	P	LEN	AREA	DEP	COL	DCS	DCB	LCB	VOL/D	SURF/D	BIOMASS
70	4130	19.9	71.5	55.3	47.8	37.1	27.8	7.5	2.07E-05	9.89E-04	7.07E+01
485	28656	131.1	471.0	84.9	77.4	45.4	38.3	0.0	2.40E-05	1.86E-03	8.75E+02

*EVE 90 05:58:00 53 47.82 131 05.20
*----------
*TRA T-name EIS1 EIS2-1 PIT DIS BEA TIM SPE
*TRA 10 334 372 2301 5.772 51.284 0.633 9.113
*LOU/ALL

N	P	LEN	AREA	DEP	COL	DCS	DCB	LCB	VOL/D	SURF/D	BIOMASS
40	2360	11.0	39.4	44.0	36.5	40.3	-0.9	5.0	2.01E-05	7.33E-04	2.89E+01
525	31016	142.0	510.4	81.8	74.3	45.2	37.1	0.0	2.39E-05	1.77E-03	9.04E+02

Appendix Table 2 (cont'd)

```
*EVE       92  06:57:00   53 51.95  130 56.24
*-------------------------------------------------------------------------------
*TRA T-name   EIS1 EIS2-1    PIT     DIS     BEA     TIM     SPE
*TRA 10        394    429   2124   5.059  47.007   0.583   8.673
*LOU/ALL
   N     P   LEN  AREA   DEP   COL   DCS   DCB   LCB    VOL/D   SURF/D  BIOMASS
  40  2360  10.4  37.4  45.5  38.0  20.7  -2.2   8.1 3.79E-05 1.44E-03 5.40E+01
 565 33376 152.5 547.8  79.3  71.8  43.8  34.9   0.0 2.44E-05 1.75E-03 9.58E+02

*EVE       94  07:46:00   53 56.69  130 51.92
*-------------------------------------------------------------------------------
*TRA T-name   EIS1 EIS2-1    PIT     DIS     BEA     TIM     SPE
*TRA 11        442    567   7461  19.836 231.935   2.150   9.226
*LOU/ALL
   N     P   LEN  AREA   DEP   COL   DCS   DCB   LCB    VOL/D   SURF/D  BIOMASS
 126  7461  37.9 136.2  37.7  30.2  43.9   6.2   9.2 1.64E-05 4.95E-04 6.75E+01
 691 40837 190.4 684.0  71.0  63.5  43.8  33.0   0.0 2.36E-05 1.50E-03 1.03E+03

*IDA 87F008.DAT

*EVE       97  10:19:00   53 46.10  131 20.26
*-------------------------------------------------------------------------------
*TRA T-name   EIS1 EIS2-1    PIT     DIS     BEA     TIM     SPE
*TRA 12         12     82   4254  10.266  52.569   1.217   8.438
*LOU/ALL
   N     P   LEN  AREA   DEP   COL   DCS   DCB   LCB    VOL/D   SURF/D  BIOMASS
  75  4492  20.1  72.1  26.5  19.0  31.7  -1.5  10.5 3.67E-05 6.97E-04 5.03E+01
 766 45329 210.5 756.1  66.8  59.3  43.3  31.4   0.0 2.40E-05 1.42E-03 1.08E+03

*EVE       99  11:49:00   53 53.13  131 05.80
*-------------------------------------------------------------------------------
*TRA T-name   EIS1 EIS2-1    PIT     DIS     BEA     TIM     SPE
*TRA 12        101    171   4189   9.613  55.029   1.167   8.240
*LOU/ALL
   N     P   LEN  AREA   DEP   COL   DCS   DCB   LCB    VOL/D   SURF/D  BIOMASS
  75  4425  18.8  67.6  52.7  45.2  55.8   3.2  12.0 2.06E-05 9.34E-04 6.31E+01
 841 49754 229.3 823.7  65.6  58.1  44.0  29.8   0.0 2.38E-05 1.38E-03 1.14E+03
```

Appendix Table 2 (cont'd)

```
*! Only EIS numbers 1-134 integrated in file 87F009.DAT (lost data)
*DAT 20-JUL-87
*IDA 87F009.DAT
*UNI NM
*WID 2.01
DEP/ALL 15,200
-------------------------------------------------------------------------------
                          TWO PEAKS-BUTTERWORTH EDGE TRANSECTS
-------------------------------------------------------------------------------
*EVE      102  16:02:00   54 18.27  130 58.23
*-----------------------------------------------------------------------------
*TRA T-name   EIS1 EIS2-1    PIT     DIS     BEA     TIM     SPE
*TRA 21         93    127   2068   4.742 231.993   0.550   8.622
*ZER
*LOU/ALL
   N     P   LEN  AREA   DEP   COL   DCS   DCB   LCB    VOL/D   SURF/D  BIOMASS
  35  2068   8.8  32.7  96.6  89.1  79.4  14.9   2.7 1.45E-05 1.29E-03 4.22E+01
  35  2068   8.8  32.7  96.6  89.1  79.4  14.9   0.0 1.45E-05 1.29E-03 4.22E+01

*IDA 87F010.DAT

*EVE    106.1  17:24:00   54 19.43  131 00.34
*-----------------------------------------------------------------------------
*TRA T-name   EIS1 EIS2-1    PIT     DIS     BEA     TIM     SPE
*TRA 22          2     14    774   2.062  42.086   0.217   9.515
*LOU/ALL
   N     P   LEN  AREA   DEP   COL   DCS   DCB   LCB    VOL/D   SURF/D  BIOMASS
  15   893   4.4  16.4  74.9  67.4  53.0  11.4   3.6 3.35E-05 2.26E-03 3.70E+01
  50  2961  13.2  49.1  89.4  81.9  67.1  13.3   0.0 1.97E-05 1.61E-03 7.92E+01

*IDA 87F011.DAT
*DAT 21-JUL-87

*EVE      109  12:30:00   54 22.16  131 00.62
*-----------------------------------------------------------------------------
*TRA T-name   EIS1 EIS2-1    PIT     DIS     BEA     TIM     SPE
*TRA 23         78    130   3127   7.841 237.959   0.883   8.877
*LOU/ALL
   N     P   LEN  AREA   DEP   COL   DCS   DCB   LCB    VOL/D   SURF/D  BIOMASS
  55  3245  15.1  56.1  57.5  50.0  45.7   6.2   3.6 2.93E-05 1.46E-03 8.20E+01
 105  6206  28.3 105.2  72.4  64.9  56.2   9.7   0.0 2.36E-05 1.53E-03 1.61E+02

*EVE      112  13:40:00   54 19.12  131 13.29 ! fish schools on echogram
*-----------------------------------------------------------------------------
*TRA T-name   EIS1 EIS2-1    PIT     DIS     BEA     TIM     SPE
*TRA 24        148    169   1299   3.320  58.596   0.367   9.055
*LOU/ALL
   N     P   LEN  AREA   DEP   COL   DCS   DCB   LCB    VOL/D   SURF/D  BIOMASS
  25  1476   7.0  26.0  54.0  46.5  37.2  18.4   1.2 6.38E-04 2.97E-02 7.72E+02
 130  7682  35.2 131.2  68.7  61.2  40.5  16.9   0.0 1.16E-04 7.11E-03 9.33E+02
```

Appendix Table 2 (cont'd)

```
*EVE      114  14:13:00   54 21.04  131 07.93
*-------------------------------------------------------------------------------
*TRA T-name   EIS1 EIS2-1    PIT     DIS     BEA     TIM     SPE
*TRA 24        181    214   2019   5.372  53.040   0.583   9.209
*LOU/ALL
   N     P   LEN  AREA   DEP   COL   DCS   DCB   LCB    VOL/D   SURF/D  BIOMASS
  35  2079  10.2  38.1  72.8  65.3  63.9   9.5   1.4 1.44E-05 9.41E-04 3.59E+01
 165  9761  45.5 169.3  69.6  62.1  41.4  16.6   0.0 9.21E-05 5.72E-03 9.69E+02

*EVE      117  15:19:00   54 24.87  131 04.62
*-------------------------------------------------------------------------------
*TRA T-name   EIS1 EIS2-1    PIT     DIS     BEA     TIM     SPE
*TRA 25        247    274   1665   4.323 232.866   0.483   8.945
*LOU/ALL
   N     P   LEN  AREA   DEP   COL   DCS   DCB   LCB    VOL/D   SURF/D  BIOMASS
  30  1785   8.6  32.0  79.5  72.0  64.0   4.6   5.3 1.03E-05 7.41E-04 2.37E+01
 195 11546  54.1 201.3  71.2  63.7  41.9  16.3   0.0 7.74E-05 4.93E-03 9.92E+02

*UNI NM
*WID 2.78
*DEP/ALL 15,200

*EVE      118  15:48:00   54 22.26  131 10.54
*-------------------------------------------------------------------------------
*TRA T-name   EIS1 EIS2-1    PIT     DIS     BEA     TIM     SPE
*TRA 26        275    292   1078   2.760 306.709   0.283   9.742
*LOU/ALL
   N     P   LEN  AREA   DEP   COL   DCS   DCB   LCB    VOL/D   SURF/D  BIOMASS
  20  1197   5.7  29.2  77.6  70.1  75.2  14.4   4.0 2.54E-05 1.78E-03 5.21E+01
 215 12743  59.7 230.5  71.8  64.3  43.1  16.2   0.0 7.20E-05 4.63E-03 1.04E+03

*EVE      120  16:24:00   54 24.73  131 16.10
*-------------------------------------------------------------------------------
*TRA T-name   EIS1 EIS2-1    PIT     DIS     BEA     TIM     SPE
*TRA 26        311    316    355   0.987 297.790   0.100   9.866
*LOU/ALL
   N     P   LEN  AREA   DEP   COL   DCS   DCB   LCB    VOL/D   SURF/D  BIOMASS
  10   591   3.0  15.7 192.2 175.8 122.1  71.0   1.4 2.75E-06 4.83E-04 7.57E+00
 225 13334  62.8 246.2  77.6  69.7  43.6  16.5   0.0 6.36E-05 4.43E-03 1.05E+03

*EVE      123  17:00:00   54 22.62  131 18.79 ! interference from other sounder
*-------------------------------------------------------------------------------
*TRA T-name   EIS1 EIS2-1    PIT     DIS     BEA     TIM     SPE
*TRA 27        348    370   1363   3.355 133.743   0.400   8.389
```

Appendix Table 2 (cont'd)

```
*EVE      126  17:54:00   54 18.23  131 15.83 ! fish schools on echogram
*-------------------------------------------------------------------------------
*TRA T-name   EIS1 EIS2-1    PIT     DIS     BEA     TIM     SPE
*TRA 28        403    453   3009   7.090 305.827   0.850   8.341
*LOU/ALL
   N     P   LEN  AREA   DEP   COL   DCS   DCB   LCB    VOL/D   SURF/D  BIOMASS
  55  3245  14.2  72.9 140.7 132.5  82.0  77.1   8.7 3.54E-06 4.69E-04 3.42E+01
 280 16579  77.0 319.1  89.2  81.3  44.4  17.9   0.0 4.56E-05 3.70E-03 1.09E+03

*EVE      128  19:03:00   54 20.35  131 28.73 ! fish schools on echogram
*-------------------------------------------------------------------------------
*TRA T-name   EIS1 EIS2-1    PIT     DIS     BEA     TIM     SPE
*TRA 29        472    487    944   2.577 130.693   0.317   8.137
*LOU/ALL
   N     P   LEN  AREA   DEP   COL   DCS   DCB   LCB    VOL/D   SURF/D  BIOMASS
  20  1180   6.0  30.7 148.0 140.5  86.3  42.5   4.6 1.61E-05 2.26E-03 6.93E+01
 300 17759  82.9 349.8  93.5  85.5  46.3  19.0   0.0 4.21E-05 3.60E-03 1.16E+03

*EVE      131  19:51:00   54 16.24  131 26.73
*-------------------------------------------------------------------------------
*TRA T-name   EIS1 EIS2-1    PIT     DIS     BEA     TIM     SPE
*TRA 30        518    586   4071   9.161 306.039   1.150   7.967
*LOU/ALL
   N     P   LEN  AREA   DEP   COL   DCS   DCB   LCB    VOL/D   SURF/D  BIOMASS
  70  4130  17.2  88.6 130.8 123.3  86.8  61.9  10.0 6.46E-06 7.96E-04 7.06E+01
 370 21889 100.1 438.4  99.9  92.0  48.1  20.9   0.0 3.39E-05 3.12E-03 1.23E+03

*EVE      134  21:40:00   54 19.15  131 42.05
*-------------------------------------------------------------------------------
*TRA T-name   EIS1 EIS2-1    PIT     DIS     BEA     TIM     SPE
*TRA 31        627    640    826   2.391 124.672   0.233  10.246
*LOU/ALL
   N     P   LEN  AREA   DEP   COL   DCS   DCB   LCB    VOL/D   SURF/D  BIOMASS
  15   885   4.7  24.4 153.9 146.4 115.9  37.3   2.4 4.83E-06 7.07E-04 1.73E+01
 385 22774 104.9 462.8 102.3  94.5  48.8  21.1   0.0 3.18E-05 3.01E-03 1.24E+03

*EVE      136  22:20:00   54 17.11  131 38.77
*-------------------------------------------------------------------------------
*TRA T-name   EIS1 EIS2-1    PIT     DIS     BEA     TIM     SPE
*TRA 31        667    685   1121   2.563 114.927   0.317   8.092
*LOU/ALL
   N     P   LEN  AREA   DEP   COL   DCS   DCB   LCB    VOL/D   SURF/D  BIOMASS
  20  1180   5.0  25.7 123.1 115.6 107.1  18.9   2.0 1.03E-05 1.19E-03 3.07E+01
 405 23954 109.9 488.6 103.3  95.4  49.9  21.1   0.0 3.06E-05 2.92E-03 1.27E+03
```

Appendix Table 2 (cont'd)

```
*EVE      139  23:27:00   54 14.97  131 39.13
*-------------------------------------------------------------------------
*TRA T-name   EIS1 EIS2-1    PIT     DIS     BEA     TIM     SPE
*TRA 32        734    783   2950   6.390 302.995   0.867   7.374
*LOU/ALL
   N     P   LEN  AREA   DEP   COL   DCS   DCB   LCB    VOL/D   SURF/D  BIOMASS
  50  2950  11.8  60.9 144.7 137.2  68.1  65.9   4.5 1.73E-06 2.37E-04 1.44E+01
 455 26904 121.7 549.5 107.3  99.5  50.1  21.4   0.0 2.68E-05 2.66E-03 1.29E+03

*DAT 22-JUL-87
*IDA 87F012.DAT
*UNI NM
*WID 2.01
*DEP/ALL 15,200

*EVE      141  17:58:00   54 17.23  130 55.42 ! fish schools on echogram
*-------------------------------------------------------------------------
*TRA T-name   EIS1 EIS2-1    PIT     DIS     BEA     TIM     SPE
*TRA 20         37    104   4029  10.077 230.794   1.150   8.763
*LOU/ALL
   N     P   LEN  AREA   DEP   COL   DCS   DCB   LCB    VOL/D   SURF/D  BIOMASS
 105  6212  28.8 107.1  78.0  70.4 126.1  11.7   5.4 1.27E-04 8.93E-03 9.57E+02
 560 33116 150.5 656.6 101.7  93.9  83.7  17.1   0.0 4.11E-05 3.86E-03 2.25E+03

*EVE      143  19:17:00   54 10.57  131 09.12
*-------------------------------------------------------------------------
*TRA T-name   EIS1 EIS2-1    PIT     DIS     BEA     TIM     SPE
*TRA 20        116    180   3836  10.091 234.500   1.067   9.461
*LOU/ALL
   N     P   LEN  AREA   DEP   COL   DCS   DCB   LCB    VOL/D   SURF/D  BIOMASS
   5   295   1.4   5.4  55.8  48.3  45.6  10.2   0.7 5.12E-05 2.47E-03 1.32E+01
 565 33411 151.9 662.0 101.3  93.5  83.5  17.1   0.0 4.12E-05 3.85E-03 2.26E+03

*EVE      146  20:48:00   54 03.56  131 20.54 ! fish schools on echogram
*-------------------------------------------------------------------------
*TRA T-name   EIS1 EIS2-1    PIT     DIS     BEA     TIM     SPE
*TRA 19        206    325   7142  17.354  53.347   2.000   8.677
*LOU/ALL
   N     P   LEN  AREA   DEP   COL   DCS   DCB   LCB    VOL/D   SURF/D  BIOMASS
 120  7142  32.1 119.6  98.8  90.5  83.1  20.5  16.7 2.13E-05 1.93E-03 2.31E+02
 685 40553 184.1 781.6 100.8  93.0  83.5  17.4   0.0 3.78E-05 3.51E-03 2.49E+03

*EVE      149  23:00:00   54 12.62  130 54.59
*-------------------------------------------------------------------------
*TRA T-name   EIS1 EIS2-1    PIT     DIS     BEA     TIM     SPE
*TRA 18        338    376   2309   5.468 231.283   0.650   8.412
*LOU/ALL
   N     P   LEN  AREA   DEP   COL   DCS   DCB   LCB    VOL/D   SURF/D  BIOMASS
  40  2368  10.4  38.7 112.9 105.4  97.1  31.9   3.9 1.05E-04 1.10E-02 4.27E+02
 725 42921 194.4 820.3 101.5  93.7  85.5  19.6   0.0 4.18E-05 3.92E-03 2.92E+03
```

Appendix Table 2 (cont'd)

```
*EVE      151  23:55:00   54 08.46  131 03.40
*-------------------------------------------------------------------------------
*TRA T-name   EIS1 EIS2-1    PIT     DIS     BEA     TIM     SPE
*TRA 18        393    424   1888   5.021 234.577   0.533   9.414
*LOU/ALL
   N     P   LEN  AREA   DEP   COL   DCS   DCB   LCB    VOL/D   SURF/D  BIOMASS
  35  2065  10.2  37.9  89.2  81.7  36.7  28.6   2.5 3.19E-05 2.60E-03 9.86E+01
 760 44986 204.6 858.1 100.9  93.1  83.9  19.9   0.0 4.14E-05 3.85E-03 3.01E+03

*DAT 23-JUL-87

*EVE      153  00:40:00   54 04.19  131 07.89
*-------------------------------------------------------------------------------
*TRA T-name   EIS1 EIS2-1    PIT     DIS     BEA     TIM     SPE
*TRA 17        438    498   3600   9.231  52.653   1.000   9.231
*LOU/ALL
   N     P   LEN  AREA   DEP   COL   DCS   DCB   LCB    VOL/D   SURF/D  BIOMASS
  65  3836  18.2  67.8 158.6 150.5 111.6  27.2  12.5 2.19E-05 3.30E-03 2.24E+02
 825 48822 222.8 925.9 105.6  97.8  85.8  20.4   0.0 3.89E-05 3.81E-03 3.24E+03

*EVE      156  02:00:00   54 08.07  130 56.24 ! fish schools on echogram
*-------------------------------------------------------------------------------
*TRA T-name   EIS1 EIS2-1    PIT     DIS     BEA     TIM     SPE
*TRA 16        517    557   2419   4.931 222.763   0.667   7.396
*LOU/ALL
   N     P   LEN  AREA   DEP   COL   DCS   DCB   LCB    VOL/D   SURF/D  BIOMASS
  45  2655  10.0  37.3 108.2 100.7  90.2  49.1   7.0 7.92E-06 7.98E-04 2.98E+01
 870 51477 232.9 963.2 105.7  97.9  85.9  20.7   0.0 3.76E-05 3.68E-03 3.27E+03

*EVE      158  02:50:00   54 04.02  131 02.89
*-------------------------------------------------------------------------------
*TRA T-name   EIS1 EIS2-1    PIT     DIS     BEA     TIM     SPE
*TRA 16        569    607   2301   6.136 230.657   0.667   9.204
*LOU/ALL
   N     P   LEN  AREA   DEP   COL   DCS   DCB   LCB    VOL/D   SURF/D  BIOMASS
  40  2360  11.7  43.4 163.7 156.2 100.1  62.9   6.0 4.82E-06 7.52E-04 3.26E+01
 910 53837 244.5 1006.6 108.5 100.7 86.0  21.1   0.0 3.51E-05 3.54E-03 3.30E+03

*EVE      161  03:57:00   53 58.86  131 07.85
*-------------------------------------------------------------------------------
*TRA T-name   EIS1 EIS2-1    PIT     DIS     BEA     TIM     SPE
*TRA 15        635    649    885   3.462  49.677   0.367   9.441
```

Appendix Table 2 (cont'd)

```
*IDA 87F013.DAT
*UNI NM
*WID 2.02
*DEP/ALL 15,200
-------------------------------------------------------------------------------
                          SW BONILLA ISLAND TRANSECTS
-------------------------------------------------------------------------------
*EVE      164  10:16:00   53 32.68  130 49.15
*-----------------------------------------------------------------------------
*TRA T-name   EIS1 EIS2-1    PIT     DIS     BEA     TIM     SPE
*TRA 63        101    215   6785  16.586 227.852   2.133   7.775
*ZER
*LOU/ALL
   N     P   LEN  AREA   DEP   COL   DCS   DCB   LCB    VOL/D   SURF/D  BIOMASS
 115  6785  30.7 114.9  53.7  46.2  57.7   5.6  10.7 5.10E-05 2.36E-03 2.71E+02
 115  6785  30.7 114.9  53.7  46.2  57.7   5.6   0.0 5.10E-05 2.36E-03 2.71E+02

*EVE      166  12:37:00   53 20.09  131 07.96
*-----------------------------------------------------------------------------
*TRA T-name   EIS1 EIS2-1    PIT     DIS     BEA     TIM     SPE
*TRA 64        230    271   2478   6.122  48.459   0.700   8.746
*LOU/ALL
   N     P   LEN  AREA   DEP   COL   DCS   DCB   LCB    VOL/D   SURF/D  BIOMASS
  45  2655  12.1  45.4  44.0  36.5  37.4   8.2   6.4 3.26E-05 1.19E-03 5.41E+01
 160  9440  42.9 160.4  51.0  43.5  54.3   6.0   0.0 4.66E-05 2.02E-03 3.25E+02

*EVE      168  13:37:00   53 24.73  130 59.49
*-----------------------------------------------------------------------------
*TRA T-name   EIS1 EIS2-1    PIT     DIS     BEA     TIM     SPE
*TRA 64        290    315   1534   4.185  52.459   0.433   9.658
*LOU/ALL
   N     P   LEN  AREA   DEP   COL   DCS   DCB   LCB    VOL/D   SURF/D  BIOMASS
  30  1770   8.9  33.5  89.2  81.7  68.3  22.1   4.9 3.43E-05 2.80E-03 9.36E+01
 190 11210  51.8 193.8  57.6  50.1  57.4   9.6   0.0 4.31E-05 2.16E-03 4.18E+02

*EVE      170  14:16:00   53 25.98  130 51.51
*-----------------------------------------------------------------------------
*TRA T-name   EIS1 EIS2-1    PIT     DIS     BEA     TIM     SPE
*TRA 65        329    409   4779  13.111 228.719   1.367   9.593
*LOU/ALL
   N     P   LEN  AREA   DEP   COL   DCS   DCB   LCB    VOL/D   SURF/D  BIOMASS
  85  5015  25.5  95.3  72.2  64.7  60.7   1.7  16.1 9.46E-06 6.12E-04 5.83E+01
 275 16225  77.3 289.1  62.4  54.9  57.8   8.6   0.0 3.00E-05 1.65E-03 4.77E+02
```

Appendix Table 2 (cont'd)

```
*EVE      173  16:00:00   53 15.62  131 05.80
*-------------------------------------------------------------------------------
*TRA T-name   EIS1 EIS2-1    PIT     DIS     BEA     TIM     SPE
*TRA 66        434    473   2360   6.320  47.372   0.700   9.028
*LOU/ALL
   N     P   LEN  AREA   DEP   COL   DCS   DCB   LCB    VOL/D   SURF/D  BIOMASS
  40  2360  11.7  43.8  56.8  49.3  55.3  -2.6   4.7 2.06E-05 1.02E-03 4.45E+01
 315 18585  89.0 332.9  61.6  54.1  57.6   7.7   0.0 2.89E-05 1.57E-03 5.21E+02

*EVE      175  16:53:00   53 20.25  130 57.55
*-------------------------------------------------------------------------------
*TRA T-name   EIS1 EIS2-1    PIT     DIS     BEA     TIM     SPE
*TRA 66        485    528   2596   5.328  51.730   0.750   7.104
*LOU/ALL
   N     P   LEN  AREA   DEP   COL   DCS   DCB   LCB    VOL/D   SURF/D  BIOMASS
  45  2655  10.1  37.8 100.0  92.5  92.6  12.3   5.5 2.88E-06 2.66E-04 1.01E+01
 360 21240  99.1 370.7  65.5  58.0  58.3   7.8   0.0 2.47E-05 1.43E-03 5.31E+02

*EVE      178  18:07:00   53 21.87  130 48.55
*-------------------------------------------------------------------------------
*TRA T-name   EIS1 EIS2-1    PIT     DIS     BEA     TIM     SPE
*TRA 67        560    652   5511  14.297 228.893   1.550   9.224
*LOU/ALL
   N     P   LEN  AREA   DEP   COL   DCS   DCB   LCB    VOL/D   SURF/D  BIOMASS
  95  5631  27.1 101.2  75.9  68.4  87.3  21.3   7.6 8.37E-06 5.72E-04 5.79E+01
 455 26871 126.1 471.9  67.8  60.3  61.1   9.1   0.0 2.07E-05 1.25E-03 5.89E+02

*EVE      180  19:53:00   53 11.05  131 04.25
*-------------------------------------------------------------------------------
*TRA T-name   EIS1 EIS2-1    PIT     DIS     BEA     TIM     SPE
*TRA 68        667    711   2686   6.896  48.827   0.783   8.804
*LOU/ALL
   N     P   LEN  AREA   DEP   COL   DCS   DCB   LCB    VOL/D   SURF/D  BIOMASS
  45  2686  12.8  47.8  55.8  48.3  51.0   5.9   7.0 2.53E-05 1.22E-03 5.85E+01
 500 29557 138.9 519.7  66.7  59.2  60.2   8.8   0.0 2.11E-05 1.25E-03 6.48E+02

*EVE      182  20:59:00   53 16.17  130 54.61
*-------------------------------------------------------------------------------
*TRA T-name   EIS1 EIS2-1    PIT     DIS     BEA     TIM     SPE
*TRA 68        732    753   1305   3.189  48.575   0.367   8.697
*LOU/ALL
   N     P   LEN  AREA   DEP   COL   DCS   DCB   LCB    VOL/D   SURF/D  BIOMASS
  25  1482   6.7  25.1 109.5 102.0 102.8   7.6   3.5 5.56E-06 5.67E-04 1.42E+01
 525 31039 145.6 544.8  68.6  61.1  61.1   8.8   0.0 1.99E-05 1.21E-03 6.62E+02

*IDA 87F014.DAT
```

Appendix Table 2 (cont'd)

```
*EVE      184  21:36:00   53 16.85  130 48.58
*-------------------------------------------------------------------------------
*TRA T-name   EIS1 EIS2-1    PIT     DIS     BEA     TIM     SPE
*TRA 69          1     96   5655  13.665 227.683   1.600   8.541
*LOU/ALL
   N     P   LEN  AREA   DEP   COL   DCS   DCB   LCB    VOL/D   SURF/D  BIOMASS
 100  5891  26.4  98.6  72.4  64.9  56.9  10.7  13.3 1.47E-05 9.54E-04 9.41E+01
 625 36930 172.0 643.4  69.2  61.7  60.6   9.0   0.0 1.90E-05 1.17E-03 7.56E+02

*EVE      187  23:49:00   53 05.98  131 03.16
*-------------------------------------------------------------------------------
*TRA T-name   EIS1 EIS2-1    PIT     DIS     BEA     TIM     SPE
*TRA 70         134    176   2537   5.929  48.225   0.717   8.273
*LOU/ALL
   N     P   LEN  AREA   DEP   COL   DCS   DCB   LCB    VOL/D   SURF/D  BIOMASS
  45  2655  11.5  43.0  47.1  39.6  49.1   1.8   6.2 2.11E-05 8.36E-04 3.59E+01
 670 39585 183.5 686.4  67.8  60.3  60.1   8.7   0.0 1.91E-05 1.15E-03 7.92E+02

*DAT 24-JUL-87

*EVE      189  00:47:00   53 10.45  130 55.20
*-------------------------------------------------------------------------------
*TRA T-name   EIS1 EIS2-1    PIT     DIS     BEA     TIM     SPE
*TRA 70         192    225   2006   4.705  49.588   0.567   8.302
*LOU/ALL
   N     P   LEN  AREA   DEP   COL   DCS   DCB   LCB    VOL/D   SURF/D  BIOMASS
  35  2065   9.0  33.6  96.3  88.8  89.3  13.9   5.9 6.75E-06 6.00E-04 2.01E+01
 705 41650 192.4 719.9  69.2  61.7  60.8   8.8   0.0 1.83E-05 1.13E-03 8.12E+02

*EVE      192  01:55:00   53 11.42  130 47.94
*-------------------------------------------------------------------------------
*TRA T-name   EIS1 EIS2-1    PIT     DIS     BEA     TIM     SPE
*TRA 71         260    340   4782  12.373 227.745   1.300   9.518
*LOU/ALL
   N     P   LEN  AREA   DEP   COL   DCS   DCB   LCB    VOL/D   SURF/D  BIOMASS
  85  5018  24.0  90.0  68.6  61.1  80.6  18.8   4.4 3.55E-05 2.17E-03 1.95E+02
 790 46668 216.5 809.9  69.1  61.6  64.7  10.8   0.0 2.02E-05 1.24E-03 1.01E+03

*EVE      194  03:27:00   53 01.88  131 00.32
*-------------------------------------------------------------------------------
*TRA T-name   EIS1 EIS2-1    PIT     DIS     BEA     TIM     SPE
*TRA 72         352    395   2596   6.539  47.708   0.733   8.917
*LOU/ALL
   N     P   LEN  AREA   DEP   COL   DCS   DCB   LCB    VOL/D   SURF/D  BIOMASS
  45  2655  12.4  46.3  46.2  38.7  59.6   4.7   9.3 2.07E-05 8.01E-04 3.71E+01
 835 49323 228.9 856.2  67.9  60.4  64.5  10.5   0.0 2.02E-05 1.22E-03 1.04E+03
*
```

Appendix Table 2 (cont'd)

```
*EVE      196  04:27:00   53 06.61  130 51.46 ! fish schools on echogram
*-------------------------------------------------------------------------
*TRA T-name   EIS1 EIS2-1    PIT     DIS     BEA     TIM     SPE
*TRA 72        411    442   1888   4.650  46.686   0.500   9.300
*LOU/ALL
   N     P   LEN  AREA   DEP   COL   DCS   DCB   LCB    VOL/D   SURF/D  BIOMASS
  35  2065   9.4  35.2 110.9 103.4  90.2  22.1   5.1 1.37E-05 1.42E-03 5.00E+01
 870 51388 238.3 891.5  69.6  62.1  65.6  11.1   0.0 1.98E-05 1.23E-03 1.09E+03

*UNI NM
*WID 2.0
*DEP/ALL 15,200
-------------------------------------------------------------------------
                          HORSESHOE TRANSECTS (Upper portion)
-------------------------------------------------------------------------
*EVE      198  05:10:00   53 08.50  130 43.47
*-------------------------------------------------------------------------
*TRA T-name   EIS1 EIS2-1    PIT     DIS     BEA     TIM     SPE
*TRA 73        455    516   3658   9.380 226.558   1.033   9.078
*ZER
*LOU/ALL
   N     P   LEN  AREA   DEP   COL   DCS   DCB   LCB    VOL/D   SURF/D  BIOMASS
  65  3836  18.2  67.5  82.7  75.2  65.0  10.8  10.4 1.35E-05 1.01E-03 6.83E+01
  65  3836  18.2  67.5  82.7  75.2  65.0  10.8   0.0 1.35E-05 1.01E-03 6.83E+01

*EVE      201  06:32:00   53 00.58  130 52.51 ! fish schools on echogram
*-------------------------------------------------------------------------
*TRA T-name   EIS1 EIS2-1    PIT     DIS     BEA     TIM     SPE
*TRA 74        537    564   1659   4.046  47.753   0.483   8.370
*LOU/ALL
   N     P   LEN  AREA   DEP   COL   DCS   DCB   LCB    VOL/D   SURF/D  BIOMASS
  30  1777   8.0  29.7  65.6  58.1  53.0  -0.2   2.2 6.70E-05 3.89E-03 1.16E+02
  95  5613  26.2  97.2  77.5  70.0  57.4   3.9   0.0 2.71E-05 1.89E-03 1.84E+02

*EVE      203  07:13:00   53 03.69  130 46.83
*-------------------------------------------------------------------------
*TRA T-name   EIS1 EIS2-1    PIT     DIS     BEA     TIM     SPE
*TRA 74        576    594   1123   2.716  45.602   0.283   9.585
*LOU/ALL
   N     P   LEN  AREA   DEP   COL   DCS   DCB   LCB    VOL/D   SURF/D  BIOMASS
  20  1182   5.3  19.6 106.0  98.5  95.9  10.1   3.5 9.42E-07 9.28E-05 1.82E+00
 115  6795  31.5 116.8  82.3  74.8  57.8   4.0   0.0 2.13E-05 1.59E-03 1.86E+02

*EVE      206  07:55:00   53 03.85  130 42.09
*-------------------------------------------------------------------------
*TRA T-name   EIS1 EIS2-1    PIT     DIS     BEA     TIM     SPE
*TRA 75        620    682   3754   9.319 225.254   1.050   8.875
*LOU/ALL
   N     P   LEN  AREA   DEP   COL   DCS   DCB   LCB    VOL/D   SURF/D  BIOMASS
  65  3872  17.8  65.9  67.4  59.9  52.8   0.5  11.5 9.37E-06 5.61E-04 3.70E+01
 180 10667  49.3 182.8  76.9  69.4  57.0   3.4   0.0 1.76E-05 1.22E-03 2.23E+02
```

Appendix Table 2 (cont'd)

```
*EVE      208  09:11:00   52 56.10  130 50.45 ! fish schools on echogram
*-------------------------------------------------------------------------
*TRA T-name   EIS1 EIS2-1    PIT     DIS     BEA     TIM     SPE
*TRA 76        697    737   2419   5.725  47.335   0.700   8.179
*LOU/ALL
   N     P   LEN  AREA   DEP   COL   DCS   DCB   LCB    VOL/D   SURF/D  BIOMASS
  45  2655  11.6  43.1  61.0  53.5  70.1   1.8   7.1 2.44E-05 1.30E-03 5.62E+01
 225 13322  61.0 225.9  73.9  66.4  59.6   3.1   0.0 1.86E-05 1.24E-03 2.79E+02

*EVE      210  10:07:00   53 00.49  130 43.96
*-------------------------------------------------------------------------
*TRA T-name   EIS1 EIS2-1    PIT     DIS     BEA     TIM     SPE
*TRA 76        751    787   2183   5.203  49.197   0.600   8.672
*LOU/ALL
   N     P   LEN  AREA   DEP   COL   DCS   DCB   LCB    VOL/D   SURF/D  BIOMASS
  40  2360  10.4  38.6  96.7  89.2  86.5  18.8   3.8 1.02E-06 9.09E-05 3.51E+00
 265 15682  71.4 264.4  77.2  69.7  60.0   3.3   0.0 1.53E-05 1.07E-03 2.83E+02

*EVE      212  10:56:00   53 02.67  130 34.88
*-------------------------------------------------------------------------
*TRA T-name   EIS1 EIS2-1    PIT     DIS     BEA     TIM     SPE
*TRA 77        801    886   5074  12.362 224.744   1.433   8.624
*LOU/ALL
   N     P   LEN  AREA   DEP   COL   DCS   DCB   LCB    VOL/D   SURF/D  BIOMASS
  90  5310  24.0  88.7  62.6  55.1  64.1  10.0  10.1 2.79E-06 1.54E-04 1.36E+01
 355 20992  95.4 353.2  73.5  66.0  60.1   3.6   0.0 1.27E-05 8.39E-04 2.96E+02

*EVE      215  12:45:00   52 52.47  130 47.06
*-------------------------------------------------------------------------
*TRA T-name   EIS1 EIS2-1    PIT     DIS     BEA     TIM     SPE
*TRA 78        909    940   1888   5.239  46.592   0.517  10.140
*LOU/ALL
   N     P   LEN  AREA   DEP   COL   DCS   DCB   LCB    VOL/D   SURF/D  BIOMASS
  35  2065  10.6  39.3  40.9  33.4  44.8   0.9   8.9 5.19E-06 1.73E-04 6.82E+00
 390 23057 106.0 392.5  70.3  62.8  59.8   3.5   0.0 1.23E-05 7.72E-04 3.03E+02

*EVE      217  13:33:00   52 56.75  130 39.61
*-------------------------------------------------------------------------
*TRA T-name   EIS1 EIS2-1    PIT     DIS     BEA     TIM     SPE
*TRA 78        959    993   2065   5.775  45.325   0.600   9.624
*LOU/ALL
   N     P   LEN  AREA   DEP   COL   DCS   DCB   LCB    VOL/D   SURF/D  BIOMASS
  35  2065  10.7  39.6  87.1  79.6  70.2   5.1   4.4 4.42E-06 3.52E-04 1.39E+01
 425 25122 116.7 432.1  71.8  64.3  60.3   3.6   0.0 1.14E-05 7.34E-04 3.17E+02

*! Only EIS numbers 1-43 integrated in file 87F015.DAT (lost data)
*IDA 87F015.DAT
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Appendix Table 2 (cont'd)

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*EVE      220  16:57:00   52 58.90  130 31.46
*-------------------------------------------------------------------------
*TRA T-name   EIS1 EIS2-1    PIT     DIS     BEA     TIM     SPE
*TRA 79         19     81     -1  10.134 223.832   1.117   9.075
*
*EVE      221  18:04:00   52 51.59  130 43.10
*-------------------------------------------------------------------------
*TRA T-name   EIS1 EIS2-1    PIT     DIS     BEA     TIM     SPE
*TRA 80         82    101     -1   2.803 114.897   0.267  10.511
*
*EVE      223  18:28:00   52 50.14  130 38.08
*-------------------------------------------------------------------------
*TRA T-name   EIS1 EIS2-1    PIT     DIS     BEA     TIM     SPE
*TRA 80        110    128     -1   3.099 119.584   0.317   9.787

*EXI
```