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Hydroacoustic Herring Survey Results and Trawl Catches from Hecate Strait, November 14 - 24, 1987. *W. E. RICKER* Cruise WER87J

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HYDROACOUSTIC HERRING SURVEY RESULTS AND TRAWL CATCHES
FROM HECATE STRAIT, NOVEMBER 14 - 24, 1987.

W. E. RICKER CRUISE WER87J

by

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ABSTRACT

McCarter, P. B., R. Kieser, D. E. Hay, and D. C. Miller. 1988. Hydroacoustic herring survey results and trawl catches from Hecate Strait, November 14-24, 1987. W. E. RICKER cruise WER87J. Can. MS Rep. Fish. Aquat. Sci. 1997: 72 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 for herring were 11,300 tonnes at Browning Entrance, 2,820 tonnes SW of Bonilla Island, 510 tonnes along Butterworth edge, 620 tonnes in mid-Hecate Strait, 920 tonnes off Lyell Island and 14,620 tonnes in Juan Perez Sound. Herring schools were difficult to integrate acoustically in inlets and narrow sounds because of bottom echo interference and high herring densities near the surface at night. Species composition of thirteen midwater trawl and nine bongo net catches, stomach contents and size and age distribution of herring were also examined. Seawater temperatures were collected at six X.B.T./trawl locations.

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

RÉSUMÉ

McCarter, P. B., R. Kieser, D. E. Hay, and D. C. Miller. 1988. Hydroacoustic herring survey results and trawl catches from Hecate Strait, November 14-24, 1987. W. E. RICKER cruise WER87J. Can. MS Rep. Fish. Aquat. Sci. 1997: 72 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 de harengs a été estimée à 11 300 tonnes à l'entrée Browning, à 2 820 tonnes au SO de l'île Bonilla, à 510 tonnes en bordure de Butterworth, à 620 tonnes au milieu du détroit d'Hecate, à 920 tonnes au large de l'île Lyelle et à 14 620 tonnes dans le détroit Juan Perez. Les bancs de harengs étaient difficiles à repérer au moyen d'un équipement acoustique dans les criques et les détroits étroits à cause de l'interférence de l'écho du fond et de la forte densité de la population de harengs près de la surface durant la nuit. On a également examiné la composition des espèces prises dans treize chaluts pélagiques et neuf filets bongo, le contenu de l'estomac des poissons capturés, ainsi que la répartition des spécimens par taille et âge. Les températures de l'eau de mer ont été relevées à 6 emplacements de chalut/X.B.T.

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 pallasii). The second objective was to identify and confirm sites where herring concentrate to overwinter prior to moving into shallower water for spawning. 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. These herring estimates are compared with other stock estimates which are based on spawn surveys and analyses of catch and age structure (Haist et al. 1988).

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, midwater trawl tows, bongo net tows and X.B.T. stations. It also summarizes hydroacoustic fish density estimates, catch composition, biological samples and seawater temperatures.

METHODS

HYDROACOUSTIC AND FISHING EQUIPMENT

The hydroacoustic equipment on the W.E. RICKER was configured for echo integration. Its major components are a Biosonics model 101 echo sounder, model 121 echo integrator and model 111 thermal chart recorder. Data was recorded on a VAX 11/730 shipboard computer. An 8 by 13 degree, 38 kHz ceramic transducer was mounted in a torpedo shaped body which was towed behind the vessel to minimize interference. The body also contained a roll and pitch sensor that records the body's attitude on a chart recorder. The ship's hull-mounted 38 kHz transducer was used when surveying shallow, protected waters. Most parallel transects were 1.0 nm apart and based on Loran C lines tracked during a previous winter cruise (McCarter et al. 1987). Single transects were assumed to have a width of 1.0 nm for area computations. A fish target strength of -32 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 using a 38.1 mm tungsten steel sphere suspended under the towed body's transducer by three nylon lines while the vessel was secured at the dock. Difficulties in stabilizing the sphere

precluded accurate results. The echo sounder and transducer were subsequently calibrated March 11, 1988 at the hydroacoustic barge of the University of Washington, Seattle and the calibration parameters derived were used for this analysis.

Fishing equipment on the W.E. RICKER included a Canadian Diamond 5 midwater trawl with 40 fathom sweepnet and 3 m² Suberkrub otter boards. Catches were brought aboard, sorted by species into tubs and total species weights estimated. Herring samples were placed in buckets and frozen. Species catch compositions 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 and gonad 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

Nine oblique plankton tows were conducted using a 0.25 m² 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 56-155 m and bottom depths at stations were 90-220 m. Tows lasted 6-16 minutes at vessel speeds of 2 knots. Cable descent rates were 50 m/min and the ascent rates were 20 m/min. Recovered nets were washed with a high pressure hose and samples preserved in 10 percent buffered seawater formalin.

HYDROGRAPHIC STATIONS

Six expendable bathythermograph (X.B.T.) casts were completed at six different trawl locations.

RESULTS AND DISCUSSION

HYDROACOUSTIC SURVEYS

Calculated biomass estimates in tonnes are shown in condensed form for all transects and transect groupings or localities (Appendix Table 2). Three major overwintering herring concentrations were assessed. Browning Entrance transects 14-26 comprised an area of 406 km² with a biomass estimate of 11,300 tonnes (Fig. 1), SW Bonilla Island transects B1-B9 comprised an area of 176 km² with a biomass estimate of 2,820 tonnes (Fig. 2) and Juan Perez Sound transects J12, J13 and J16 comprised an area of 82 km² with a biomass estimate of 14,620 tonnes (Fig. 3). Areas adjacent to these three localities were also surveyed and some transects repeated. Table 1 contains a summary of all biomass estimates obtained.

Surface density maps were plotted from selected transects (Figures 4-14). The transects are shown as dotted lines, verticals to the transects indicate density on a logarithmic scale. A range from 0.001 Kg/m² to 0.1 kg/m² 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 5 m to the transducer. These depth strata were not integrated to avoid bottom echo integration and surface interference.

Herring biomass estimates were difficult to obtain during the first coverage of the Browning Entrance transects because many of the dense herring schools were close to the bottom during daylight hours and not within the echo integration zone. The herring biomass estimate of 7,520 t is conservative. The second coverage of the Browning Entrance transects was conducted primarily during dark hours when most herring were in the midwater and surface layers. An integrator to computer data transfer malfunction, however, prevented complete coverage. The second herring biomass estimate also had to be adjusted for interference caused by porpoise schools. These mammals were frequently seen around the vessel and produced characteristic patterns on the echogram. It is estimated that 500 t of the 11,800 t second estimate was attributable to porpoise noise.

Biomass estimates were also difficult to obtain in the inlets and narrow sounds that were surveyed because the irregular sea bottom caused bottom tracking difficulties and prevented distinct integration of fish schools. This problem has been documented before (McCarter et al. 1987) and should be considered when choosing survey tracklines. High herring densities near the surface were also not assessed because of similar bottom tracking problems and vessel avoidance. An estimate can sometimes be obtained at night, however, by setting the depth strata window where the major schools are stratified. This was done for the first and second coverage of Juan Perez Sound when herring were descending and ascending respectively. The first coverage estimate was considerably lower than the second because high herring densities near the surface were not integrated. The second coverage integrated herring schools while they were ascending in the water column,

prior to skimming near the surface and consequently produced a relatively high estimate. The third coverage, during daylight hours, integrated very few of the schools as they were too close to the sea bottom. The echo integration technique seems to work best when herring form subsurface skimmers or broken schools at 30-100 m depth, clear from any bottom or surface interference.

BIOLOGICAL DATA

Four midwater trawl tows were completed in Browning Entrance on the Freeman's fishing ground (Fig. 1), two tows were completed on the Bonilla fishing ground (Fig. 2) and seven tows were completed in Juan Perez Sound (Fig. 3). Trawl catches were composed entirely of herring at the Bonilla and Freeman's ground. Juan Perez tows averaged 87 percent herring, 11 percent dogfish and 2 percent pollock. Trawl catches by tow are contained in Table 2. Herring samples were collected from most tows.

Age composition, mean length-at-age and mean weight-at-age of herring samples are presented in Table 3. The contents of 50 herring stomachs from each of tow numbers 2, 4-6 and 11-13 were examined microscopically. Most stomachs were less than half full. The amphipod, Parathemisto sp. was the dominant food item while the euphausiids, Thysanoessa spinifera and Euphausia pacifica were codominant.

Nine bongo tows collected a total of 30 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). Mean lengths and numbers of fish larvae collected are summarized in Table 4 and locations of bongo tows are shown in Figures 1-3.

SEAWATER TEMPERATURES

Seawater temperatures determined by expendable bathythermograph averaged 9.5°C at the surface and 8.7°C at the bottom. Table 5 shows seawater temperatures at trawl locations.

COMPARISON OF HYDROACOUSTIC ESTIMATES WITH OTHER BIOMASS ESTIMATES

The predicted stock biomass from age-structured and escapement models respectively, were 15,000 t and 11,000 t in the Queen Charlotte Islands area (assuming average recruitment) by Haist et al, 1988. The hydroacoustic

biomass estimate in comparison was 14,620 t in Juan Perez Sound with an additional 920 t offshore Lyell Island.

The hydroacoustic biomass estimates in the Prince Rupert District were: (1) 11,300 t in Browning Entrance, (2) 2,820 t SW of Bonilla Island, (3) 510 t at Butterworth edge, and (4) 620 t in mid-Hecate Strait. The total biomass from these surveys was 15,250 t. This compares with a predicted stock biomass from age-structured and escapement models respectively, of 44,500 t and 31,800 t.

CONCLUSIONS

Overwintering Hecate Strait herring were concentrated in the same areas as previous winter surveys in 1984 (Kieser et al. 1987) and 1985 (McCarter et al. 1987). Biomass estimates were also close to those of previous surveys and other stock assessment methods. Significant differences in the total biomass estimate in the Prince Rupert District in 1987-88 were likely attributable to incomplete hydroacoustic coverage in the Browning Entrance area. In the Queen Charlotte Island area it appears that stock size may have increased since the 1985-86 season. Other stock assessment methods based on spawn surveys and analyses of catch and age structure (Haist et al. 1988) support this view. Hydroacoustic surveys using the integration technique have significant potential as a stock assessment tool, however, considerable effort must be expended to ensure complete coverage of overwintering herring schools. Also, target calibration difficulties have prevented in situ measurement of calibration parameters. This temporary short-coming may produce significant error in year-to-year comparisons of total biomass.

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We thank Captain A. Ranger and crew of the W.E. RICKER for their generous cooperation. Helen Stallard of LGL Ltd examined and identified herring stomach contents and Mary-Jane Hudson of J. C. Lee & Associates subsampled and identified plankton species from bongo net tows.

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Table 1. Summary of total biomass estimates (t) by locality obtained during W.E. RICKER cruise, November 14-24, 1987.

Location	Event Number	Transect Name	Survey Area (km ²)	Estimated Biomass (t)	Time (PDST)	Date (D/M/Y)
Butterworth edge	67-94	100-122	229	510	18:58-24:00 00:00-04:26	16.11.87 17.11.87
Browning Entr. (first coverage)	12-51	14-29	456	7,520	11:11-24:00 00:00-02:29	15.11.87 16.11.87
Browning Entr. (second coverage)	97-136	14-29	406	11,800	18:25-24:00 00:00-08:55	17.11.87 18.11.87
SW Bonilla (first coverage)	52-64	10-13	157	2,830	02:38-08:00	16.11.87
SW Bonilla (second coverage)	292-310	B1-B9	176	2,820	06:44-12:32	22.11.87
Mid-Hecate Strait	274-292	H1-H16	285	620	21:55-24:00 00:00-06:44	21.11.87 22.11.87
Lyell Island (inshore)	139-166	Q1-Q13	138	no est.	08:57-14:48	19.11.87
Lyell Island (offshore)	171-189	Q16-Q19	597	916	16:47-24:00 00:00-02:45	19.11.87 20.11.87
Juan Perez (first coverage)	191-214	J1-J9	101	5,190 ^a	03:47-08:06	20.11.87
Juan Perez (second coverage)	219-227	J12-J16	82	16,800 ^a	16:42-20:12	20.11.87
Juan Perez (third coverage)	263-269	J12-J16	85	4,620	13:29-16:15	21.11.87
Skincuttle	230-251	R1-R18	246	no est.	01:05-07:51	21.11.87
Total areas	all	all	2,968			

^aBiomass estimate is based on a selected depth strata interval of 5-120 meters to avoid bottom interference. All other estimates are based on a 5-200 m maximum integration depth interval.

Table 2. Midwater trawl locations and species¹ compositions of catches made by the W.E. RICKER, November 14-24, 1987.

	1	2	3
Tow number			
Date (Day/Mo.)	16/11	16/11	16/11
Time (P.S.T.)	09:10	13:05	15:35
Duration (min)	30	40	10
Location	Bonilla Is.	Browning Entr.	Browning Entr.
Start			
Latitude (o')	53 32.43	53 48.6	53 48.5
Longitude (o')	130 48.11	130 49.9	130 48.5
Finish			
Latitude (o')	53 33.78	-	53 48.9
Longitude (o')	130 46.32	-	130 47.9
Bottom depth (m)			
Start	97	97	109
Finish	106	100	106
Net depth (m)			
Start	44	79	70
Finish	78	66	90
Speed (kts)	3.4	3.3	3.6
Warp length (m)	175	175	200
Spiny dogfish (adult)	-	-	-
Spiny dogfish (juven)	-	-	-
Pacific herring	240	280	200
Walleye pollock	-	-	-
Yellowtail rockfish	-	-	-
Total catch (kg)	240	280	200

¹after Hart (1973)

Table 2 (cont'd)

Tow number	4	5	6
Date (Day/Mo.)	18/11	18/11	20/11
Time (P.S.T.)	09:31	11:30	08:51
Duration (min)	47	35	30
Location	Browning Entr.	Browning Entr.	Juan Perez
Start			
Latitude (o')	53 47.40	53 47.76	52 30.26
Longitude (o')	130 51.93	130 52.47	131 24.58
Finish			
Latitude (o')	53 45.93	53 49.40	52 31.25
Longitude (o')	130 50.03	130 51.10	131 24.58
Bottom depth (m)			
Start	102	102	179
Finish	111	83	249
Net depth (m)			
Start	54	73	50
Finish	92	80	70
Speed (kts)	2.4	3.1	3.0
Warp length (m)	200	175	150
Spiny dogfish (adult)	-	-	20
Spiny dogfish (juven)	-	-	-
Pacific herring	-	480	100
Walleye pollock	-	-	-
Yellowtail rockfish	-	-	-
Total catch (kg)	-	480	120

¹after Hart (1973)

Table 2 (cont'd)

Tow number	7	8	9
Date (Day/Mo.)	20/11	20/11	20/11
Time (P.S.T.)	10:00	12:43	13:30
Duration (min)	48	8	50
Location	Juan Perez	Juan Perez	Juan Perez
Start			
Latitude (o')	52 31.48	52 31.50	52 31.60
Longitude (o')	131 25.24	131 25.50	131 25.50
Finish			
Latitude (o')	52 30.07	52 31.30	52 29.90
Longitude (o')	131 22.30	131 24.90	131 22.20
Bottom depth (m)			
Start	254	258	218
Finish	171	181	77
Net depth (m)			
Start	50	-	80
Finish	70	-	63
Speed (kts)	2.9	3.5	3.2
Warp length (m)	150	150	250
Spiny dogfish (adult)	-	-	60
Spiny dogfish (juven)	640	-	-
Pacific herring	20	-	15
Walleye pollock	1	-	-
Yellowtail rockfish	1	-	10
Total catch (kg)	662	(tow aborted)	85

¹after Hart (1973)

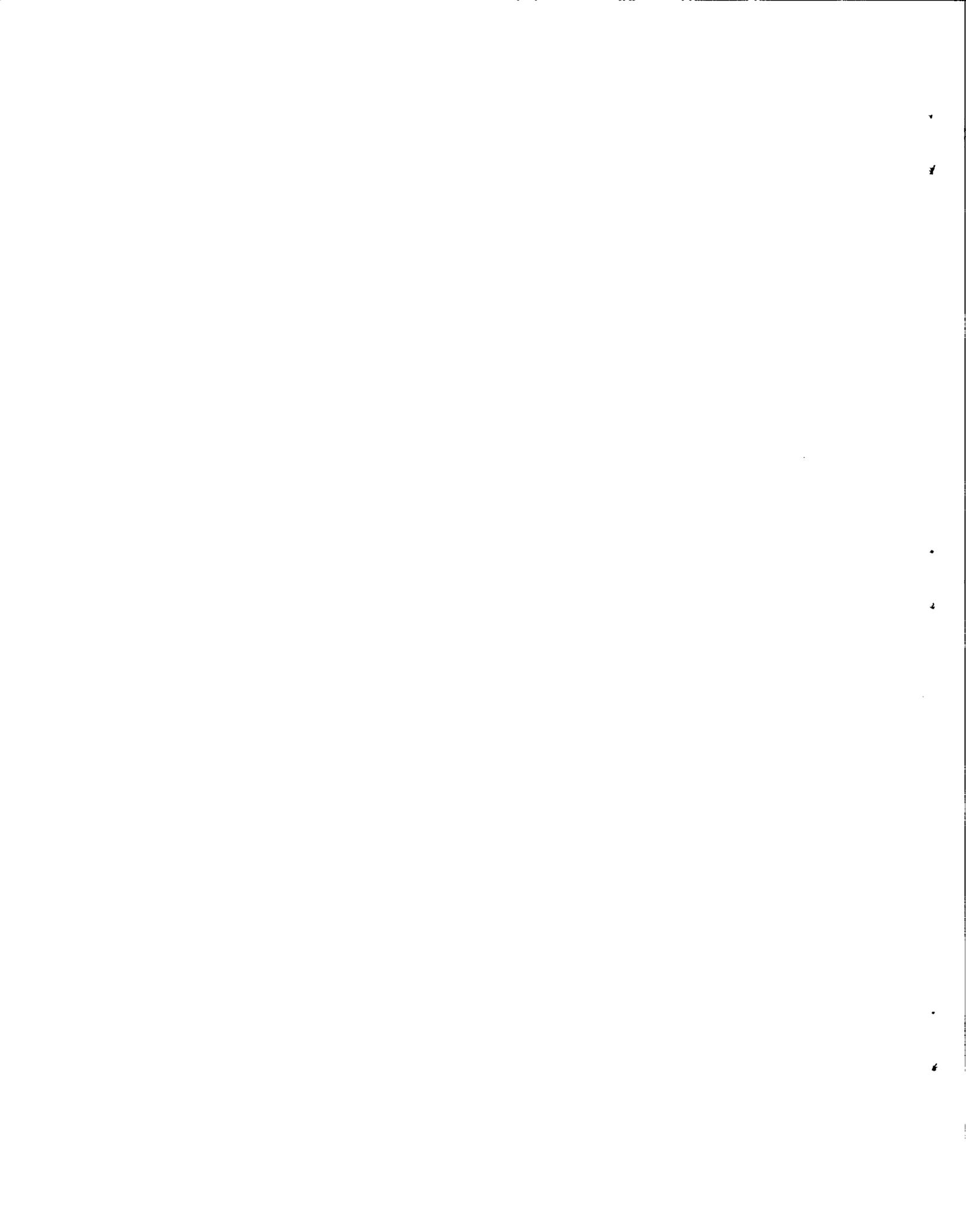


Table 2 (cont'd)

Tow number	13
Date (Day/Mo.)	22/11
Time (P.S.T.)	13:19
Duration (min)	20
Location	Bonilla Is.
Start	
Latitude (o')	53 31.80
Longitude (o')	130 47.70
Finish	
Latitude (o')	53 31.00
Longitude (o')	130 48.10
Bottom depth (m)	
Start	103
Finish	102
Net depth (m)	
Start	85
Finish	85
Speed (kts)	2.4
Warp length (m)	150

Spiny dogfish (adult)	-
Spiny dogfish (juven)	-
Pacific herring	60
Walleye pollock	-
Yellowtail rockfish	-

Total catch (kg)	60
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¹after Hart (1973)

Table 3. Percent age composition (PC), mean length (mm)-at-age (ML) and mean weight (g)-at-age (MW) of herring sampled from W.E. RICKER midwater trawl tows, November 14 - 24, 1987.

Tow no.		Age									Number aged
		2	3	4	5	6	7	8	9	10+	
1	PC	0.0	22.5	35.0	11.3	11.3	7.5	6.3	5.0	1.3	80
	ML	0.0	178.7	191.5	208.2	207.0	215.8	217.4	236.5	220.0	
	MW	0.0	77.1	96.7	123.9	122.9	150.7	126.2	185.0	124.0	
2	PC	0.0	11.3	32.5	12.5	13.8	16.3	3.8	8.8	1.3	80
	ML	0.0	173.3	189.7	205.0	216.1	213.5	209.3	222.3	237.0	
	MW	0.0	71.8	94.0	114.5	132.1	131.5	129.3	138.6	166.0	
4	PC	1.3	10.5	53.9	7.9	6.6	9.2	3.9	3.9	2.6	76
	ML	178.0	172.8	190.5	198.5	207.4	215.4	217.0	244.3	245.5	
	MW	70.0	72.1	93.2	111.2	125.6	130.7	125.7	185.3	194.0	
5	PC	0.0	11.1	48.6	16.7	5.6	11.1	4.2	2.8	0.0	72
	ML	0.0	171.5	189.7	199.5	213.0	214.1	229.0	209.0	0.0	
	MW	0.0	69.8	96.0	109.7	132.8	146.3	176.7	128.5	0.0	
6	PC	0.0	67.5	19.3	0.0	3.6	6.0	0.0	3.6	0.0	83
	ML	0.0	185.8	205.2	0.0	223.3	229.8	0.0	230.7	0.0	
	MW	0.0	92.1	124.9	0.0	146.7	168.6	0.0	179.3	0.0	
7	PC	0.0	78.8	3.0	6.1	6.1	6.1	0.0	0.0	0.0	33
	ML	0.0	180.7	192.0	210.5	229.0	223.5	0.0	0.0	0.0	
	MW	0.0	83.5	99.0	135.5	178.5	149.5	0.0	0.0	0.0	
9	PC	3.8	67.3	5.8	3.8	7.7	9.6	1.9	0.0	0.0	52
	ML	163.0	177.2	208.0	222.5	216.8	223.2	237.0	0.0	0.0	
	MW	58.5	79.3	123.7	143.0	142.8	150.0	217.0	0.0	0.0	
11	PC	2.6	44.9	14.1	3.8	17.9	9.0	2.6	2.6	2.6	78
	ML	164.0	179.6	198.6	213.3	219.8	227.6	229.5	240.0	232.0	
	MW	64.5	83.0	117.5	145.0	156.4	176.9	172.0	222.0	207.0	
12	PC	0.0	88.8	5.6	0.0	0.0	3.4	1.1	0.0	0.0	88
	ML	0.0	183.1	205.4	0.0	0.0	228.0	227.0	0.0	0.0	
	MW	0.0	87.8	123.2	0.0	0.0	183.7	180.0	0.0	0.0	
13	PC	0.0	12.7	38.0	11.4	17.7	15.2	3.8	0.0	1.3	79
	ML	0.0	179.2	192.1	201.3	215.7	215.6	220.3	0.0	228.0	
	MW	0.0	80.5	97.7	115.7	136.1	136.0	162.0	0.0	163.0	

Table 4. Larval fish catches and mean larval lengths (mm) from bongo net samples collected during W.E. RICKER cruise, November 14-24, 1987.

Bongo station	Location (o' N. lat x W. long)	Maximum Net Depth (m)	Date (D/M/Y)	Time (PST)	Flowmeter revolutions		Larval Count and mean length (mm) by family ¹					
					500µm	350µm	UN	GA	HE	CO	PL	TOT
1	Browning Entr. 53 47.4 x 130 51.1	71	18.11.87	1255	7301	7557	-	-	4 8.8	-	-	4
2	Browning Entr. 53 41.7 x 130 45.1	85	18.11.87	1350	9423	9790	-	-	-	-	-	0
3	N. Bonilla Is. 53 34.7 x 130 46.1	64	18.11.87	1445	9265	9355	-	-	-	-	-	0
4	Selwyn Inlet	106	19.11.87	1140	18312	18585	1 2.9	4 8.6	-	-	-	5
5	Logan Inlet	100	19.11.87	1300	16157	16490	-	-	-	1 9.1	4 11.8	5
6	Juan Perez 52 30.9 x 131 26.4	57	19.11.87	1510	8580	8636	3 3.5	3 8.4	-	-	4 5.7	10
7	Juan Perez 52 30.9 x 131 26.4	156	19.11.87	1535	24154	24399	-	-	-	1 5.6	-	1
8	Juan Perez 52 32.4 x 131 14.2	92	21.11.87	2130	15013	13863	-	1 8.3	-	-	4 11.0	5
9	W. Bonilla Is. 53 30.9 x 130 47.8	71	22.11.87	1400	9370	9750	-	-	-	-	-	0
Total							4	8	4	2	12	30
Percent							13	27	13	7	40	100

- ¹UN - unclassified
GA - Gadidae (codfishes)
HE - Hexagrammidae (greenlings)
CO - Cottidae (sculpins)
PL - Pleuronectidae (flatfishes)
TOT - total larval count

Table 5. Seawater temperatures (°C) at trawl locations and significant depths collected by expendable bathythermograph (X.B.T.) during W.E RICKER cruise, November 14-24, 1987.

Trawl tow	#2		#3		#4		#6		#7		#13	
N. Lat (o')	53 49		53 49		53 47		52 30		52 31		53 32	
W. Long (o')	130 50		130 49		130 52		131 25		131 25		130 48	
Date	Nov. 16, 1987		Nov. 16, 1987		Nov. 18, 1987		Nov. 20, 1987		Nov. 20, 1987		Nov. 22, 1987	
Time (PST)	13:05		15:35		09:31		08:51		10:00		13:19	

Significant Point	Depth Temperature											
	(m)	(°C)										
1	2	9.9	2	8.9	2	9.7	2	9.5	2	9.5	2	9.6
2	5	9.8	4	9.8	65	9.9	40	9.7	23	9.9	86	10.1
3	36	10.1	8	10.2	79	9.0	65	9.3	45	9.2	102	9.3
4	47	10.0	44	10.4	110	8.3	211	9.4	126	8.0	120	9.3
5	52	9.6	62	10.1	-	-	-	-	255	7.6	-	-
6	83	9.2	87	8.7	-	-	-	-	-	-	-	-
7	-	-	107	8.5	-	-	-	-	-	-	-	-



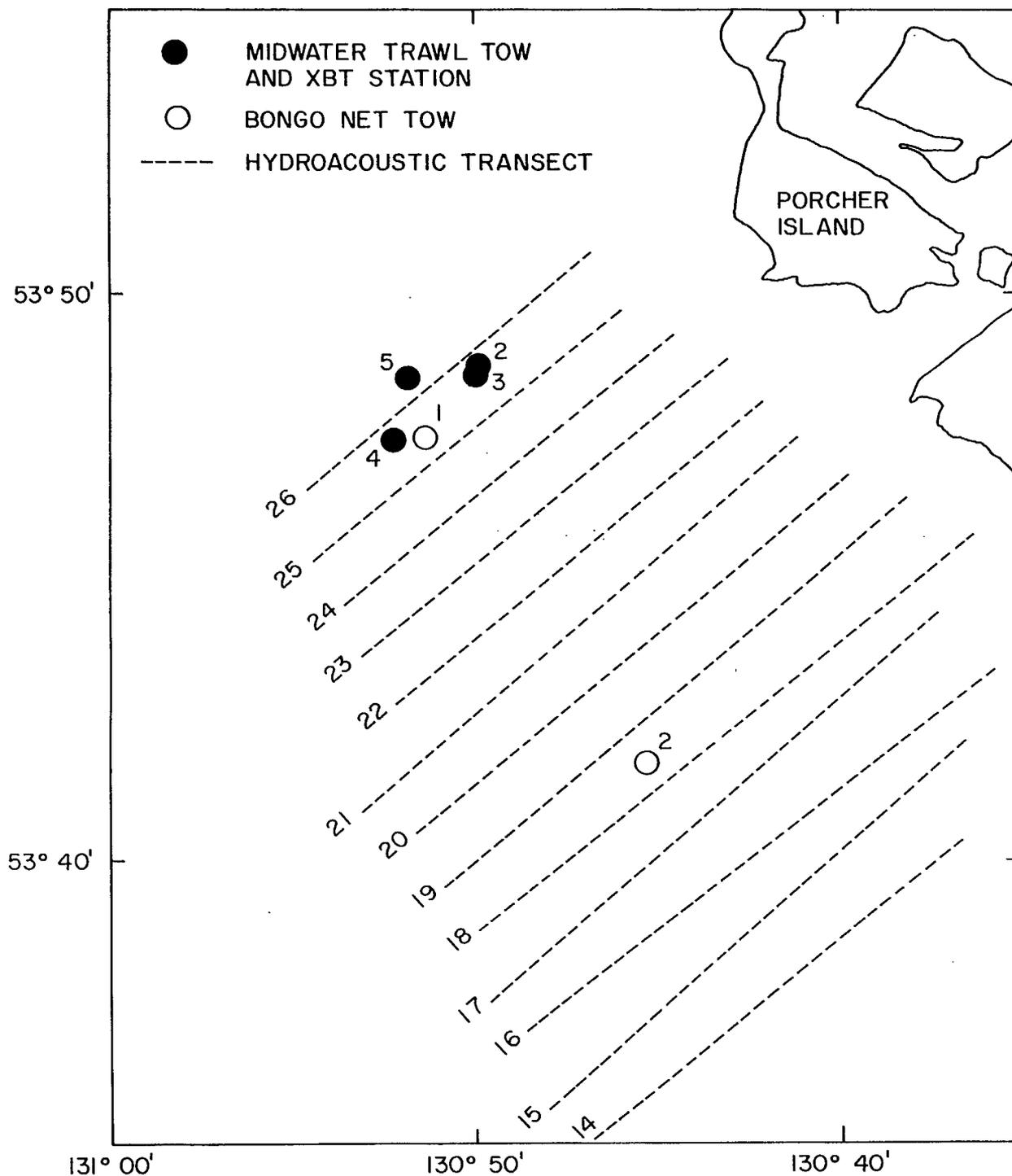
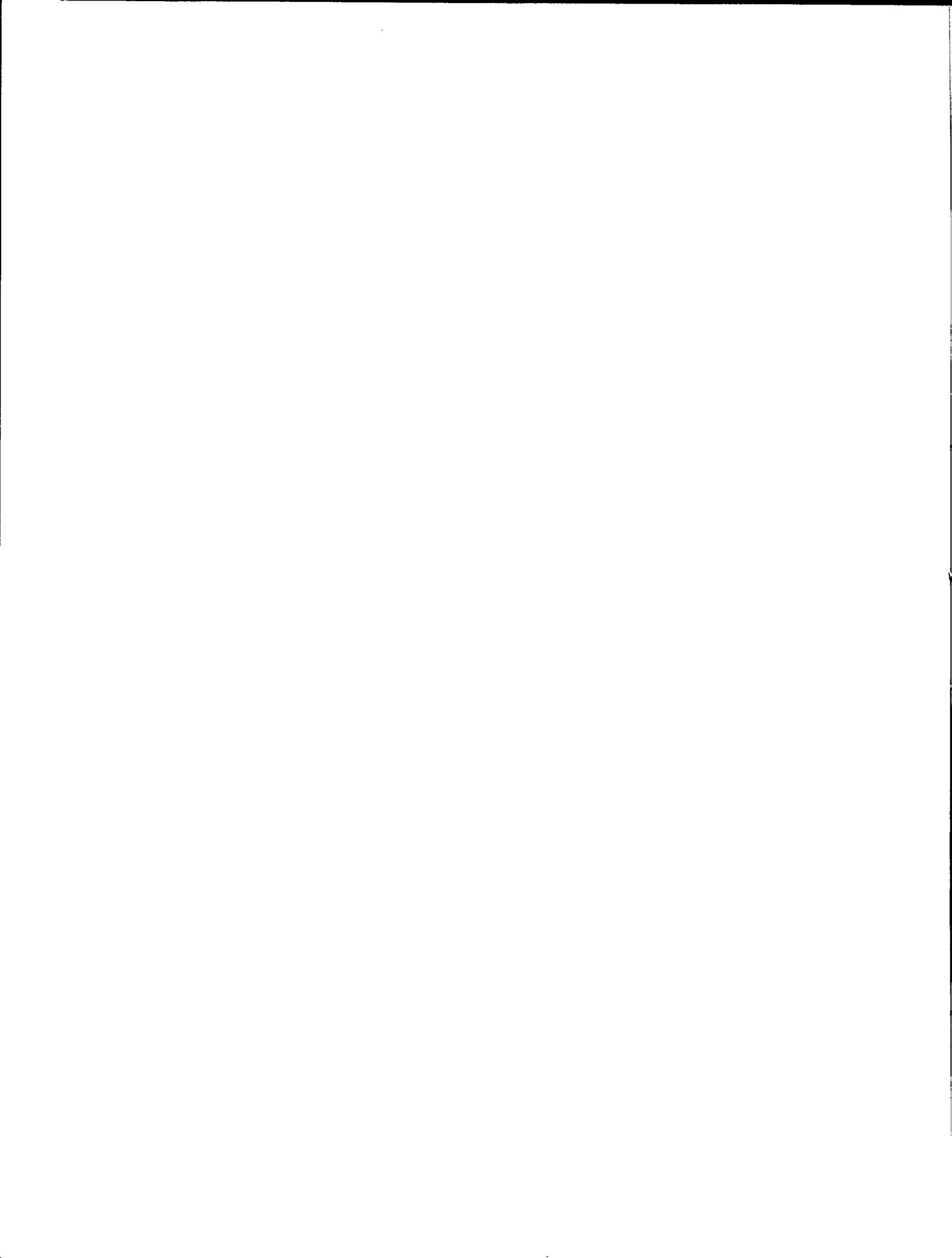


Fig. 1. Hydroacoustic transects, midwater trawl and bongo tow locations in Browning Entrance during W. E. RICKER cruise, November 14-24, 1987.



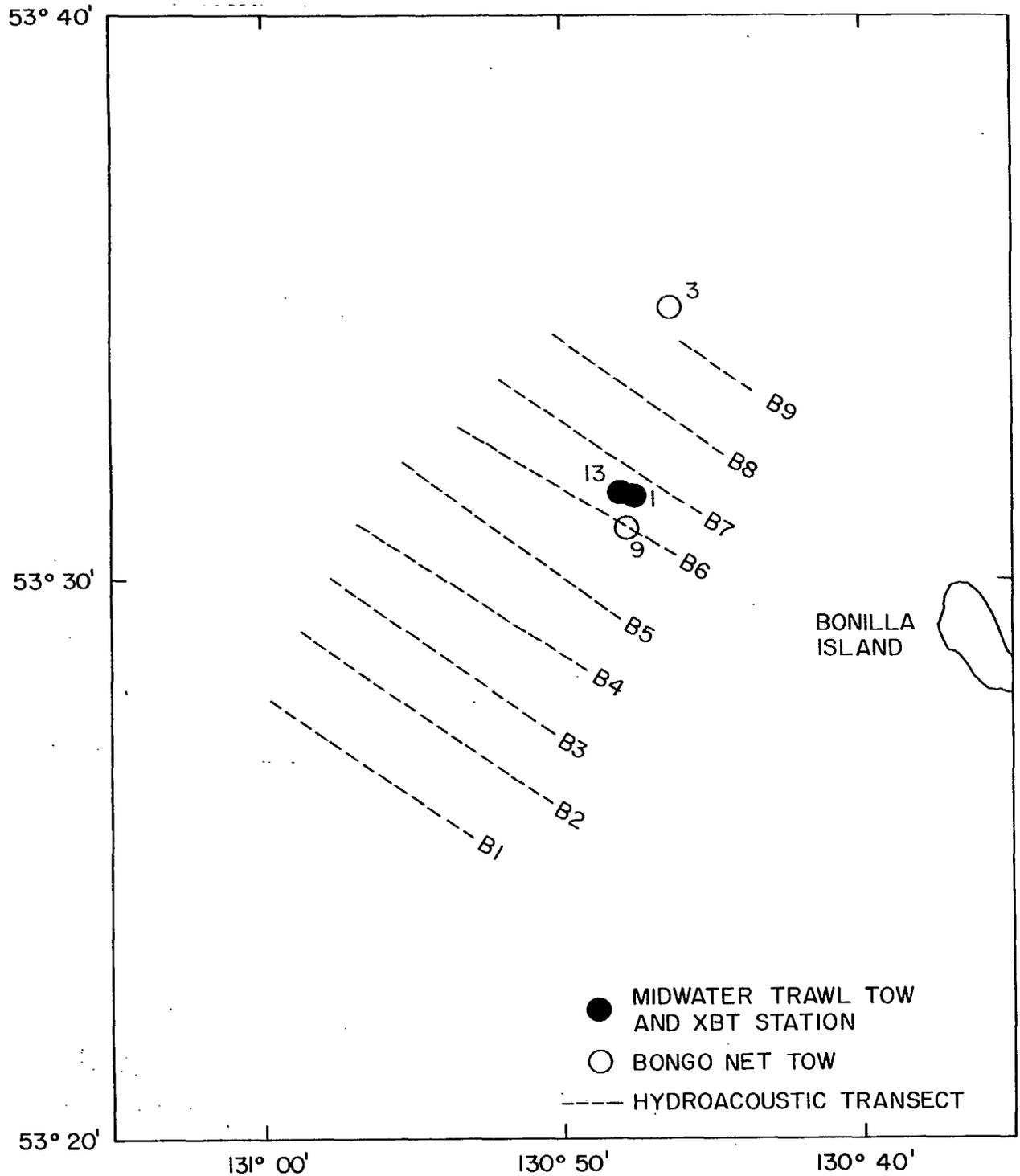
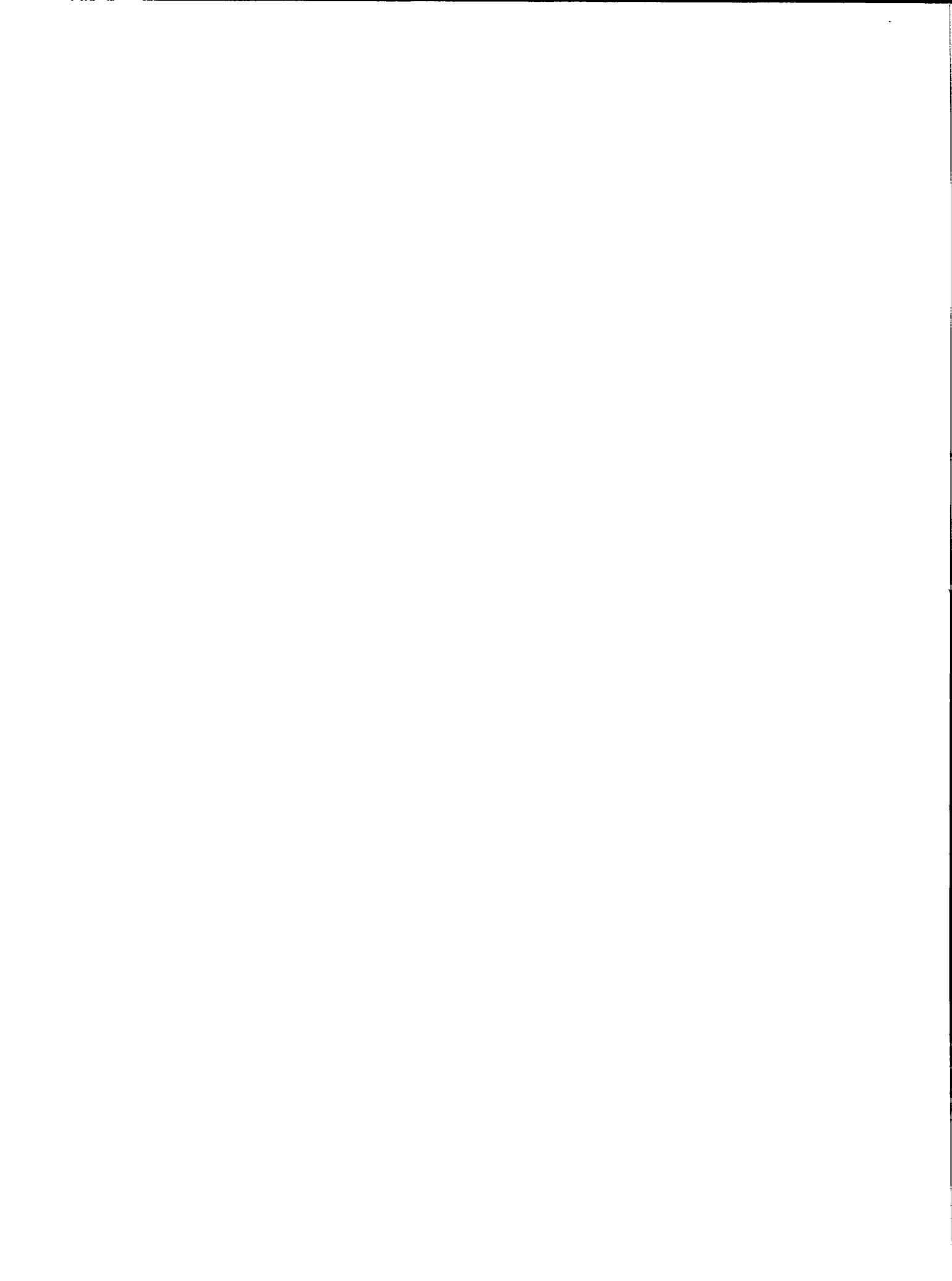


Fig. 2. Hydroacoustic transects, midwater trawl and bongo tow locations off SW Bonilla Island during W. E. RICKER cruise, November 14-24, 1987.



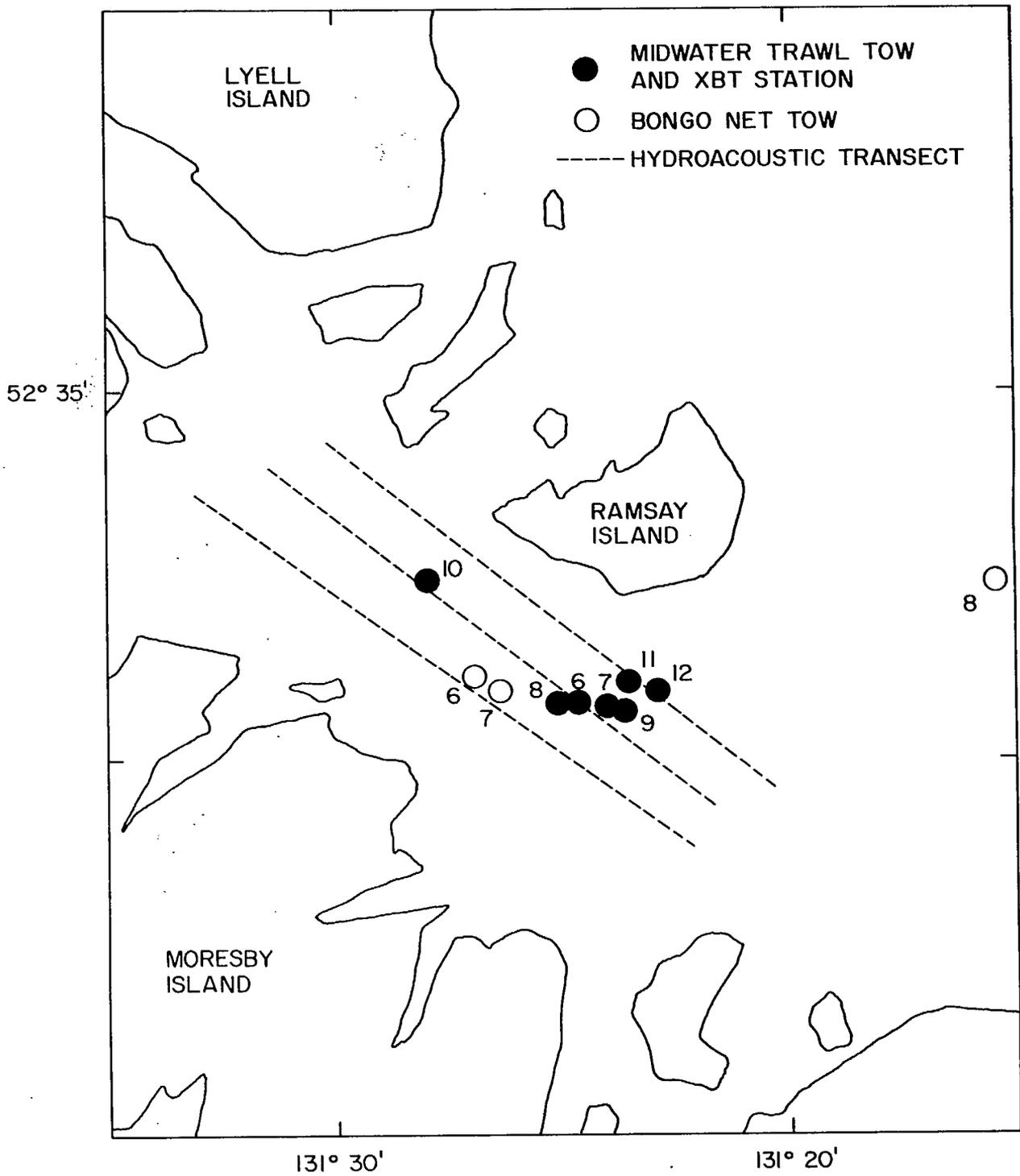


Fig. 3. Hydroacoustic transects, midwater trawl and bongo tow locations in Juan Perez Sound during W. E. RICKER cruise, November 14-24, 1987.



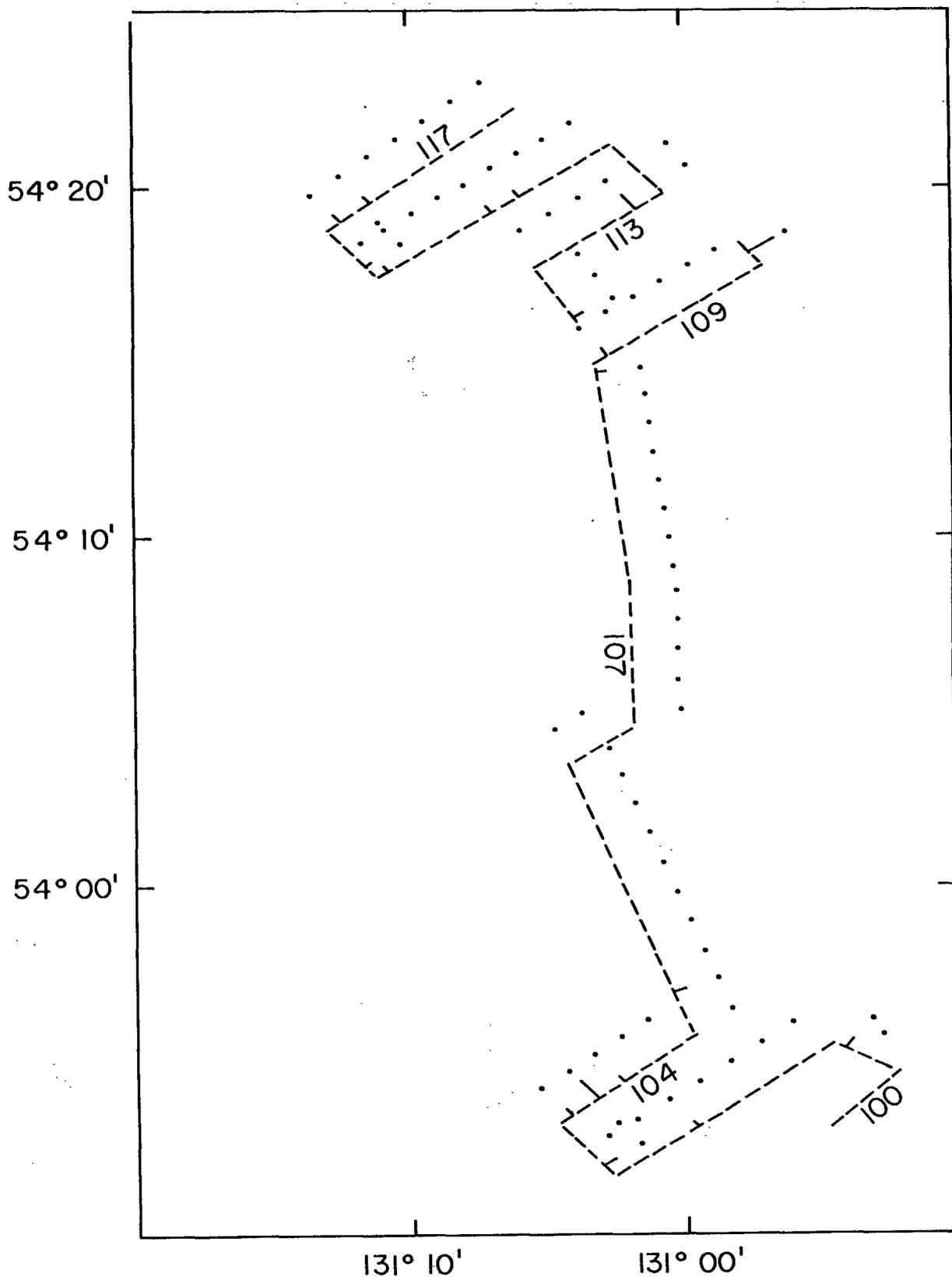


Fig. 4. Biomass density map of Butterworth edge. Total biomass estimated at 510 tonnes. Density bars use a logarithmic scale of $.001 \text{ kg/m}^2$ to $.100 \text{ kg/m}^2$.



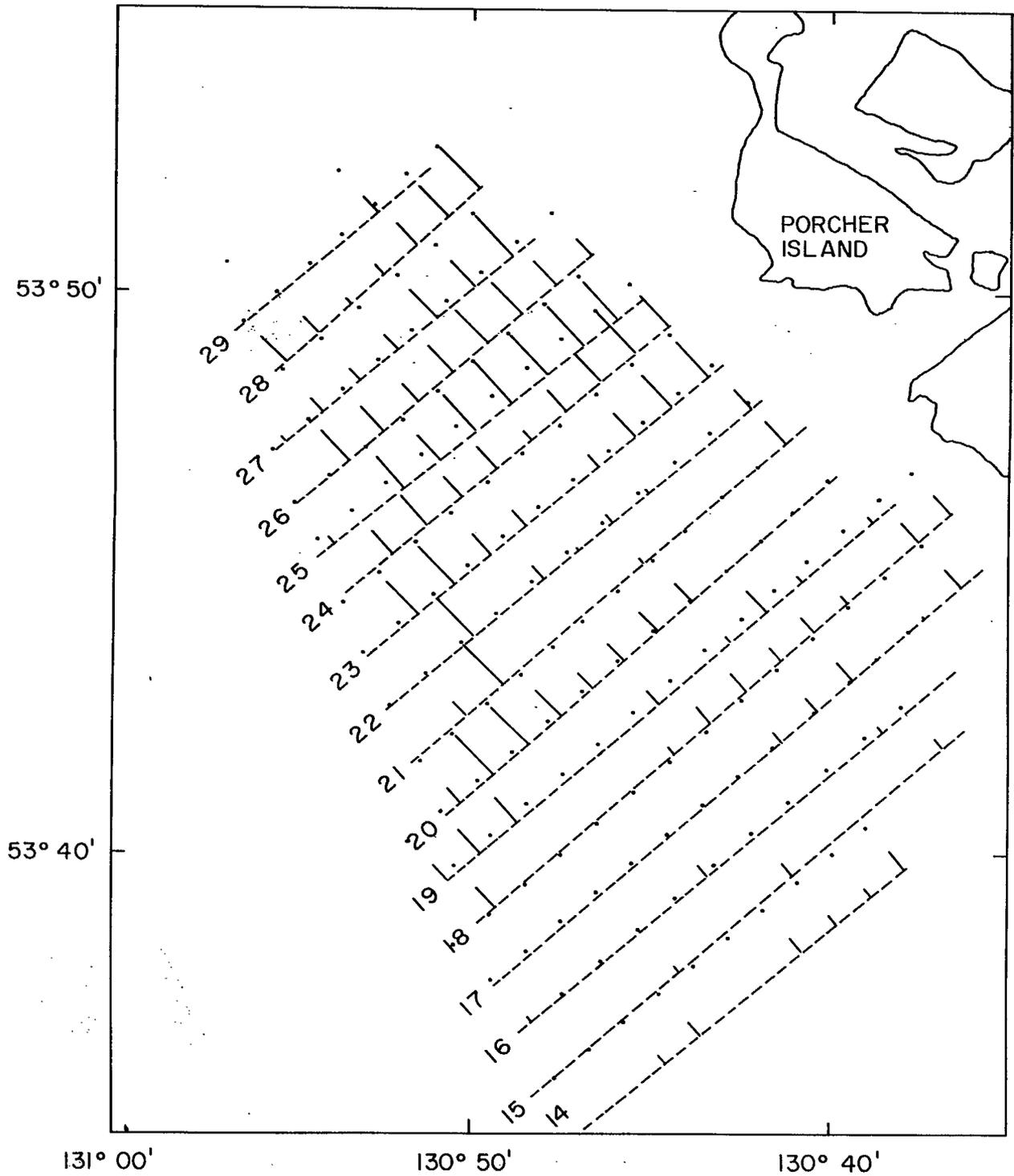
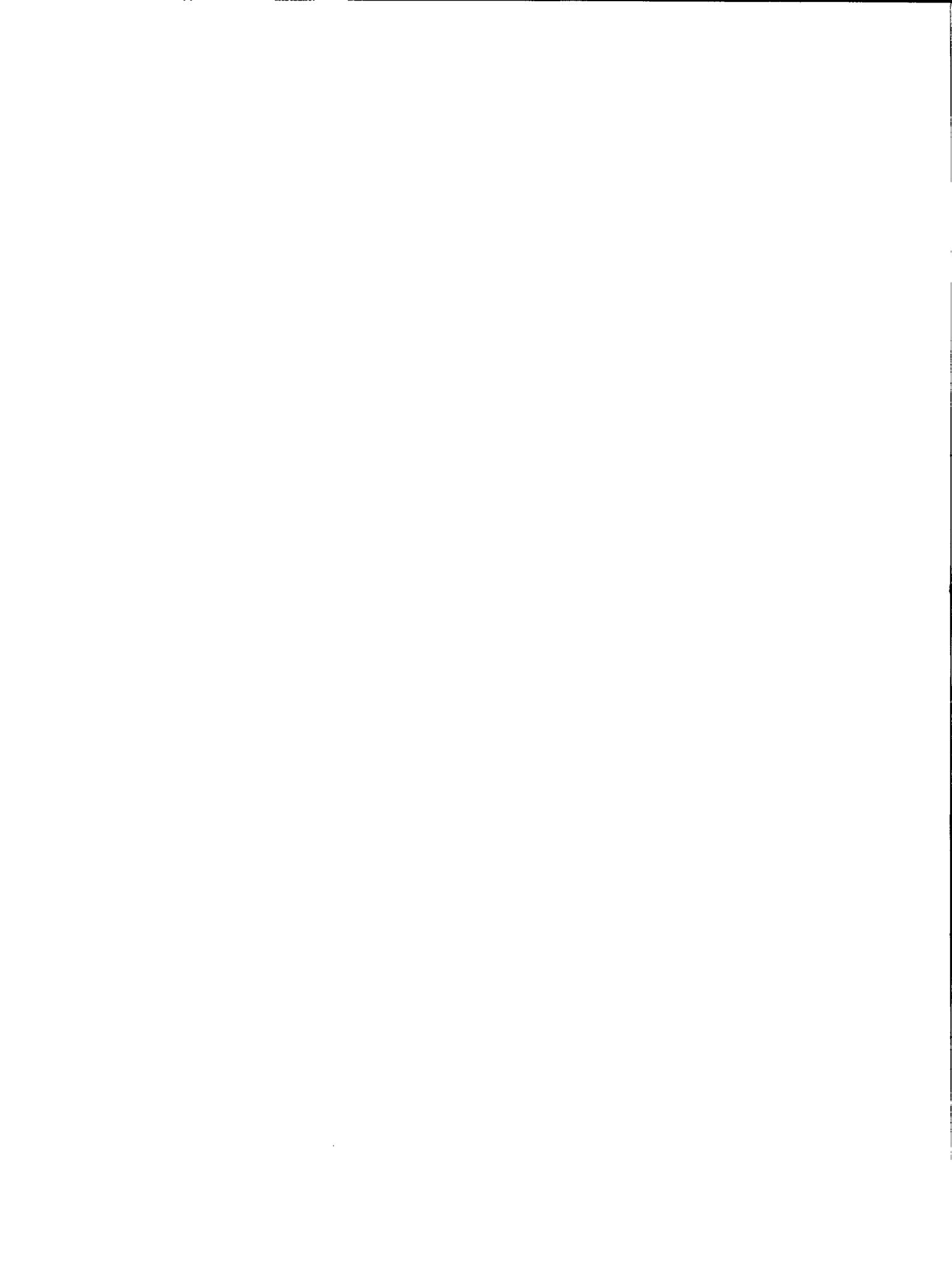


Fig. 5. Biomass density map of Browning Entrance (first coverage). Total biomass estimated at 7,520 tonnes. Density bars use a logarithmic scale of .001 kg/m² to .100 kg/m².



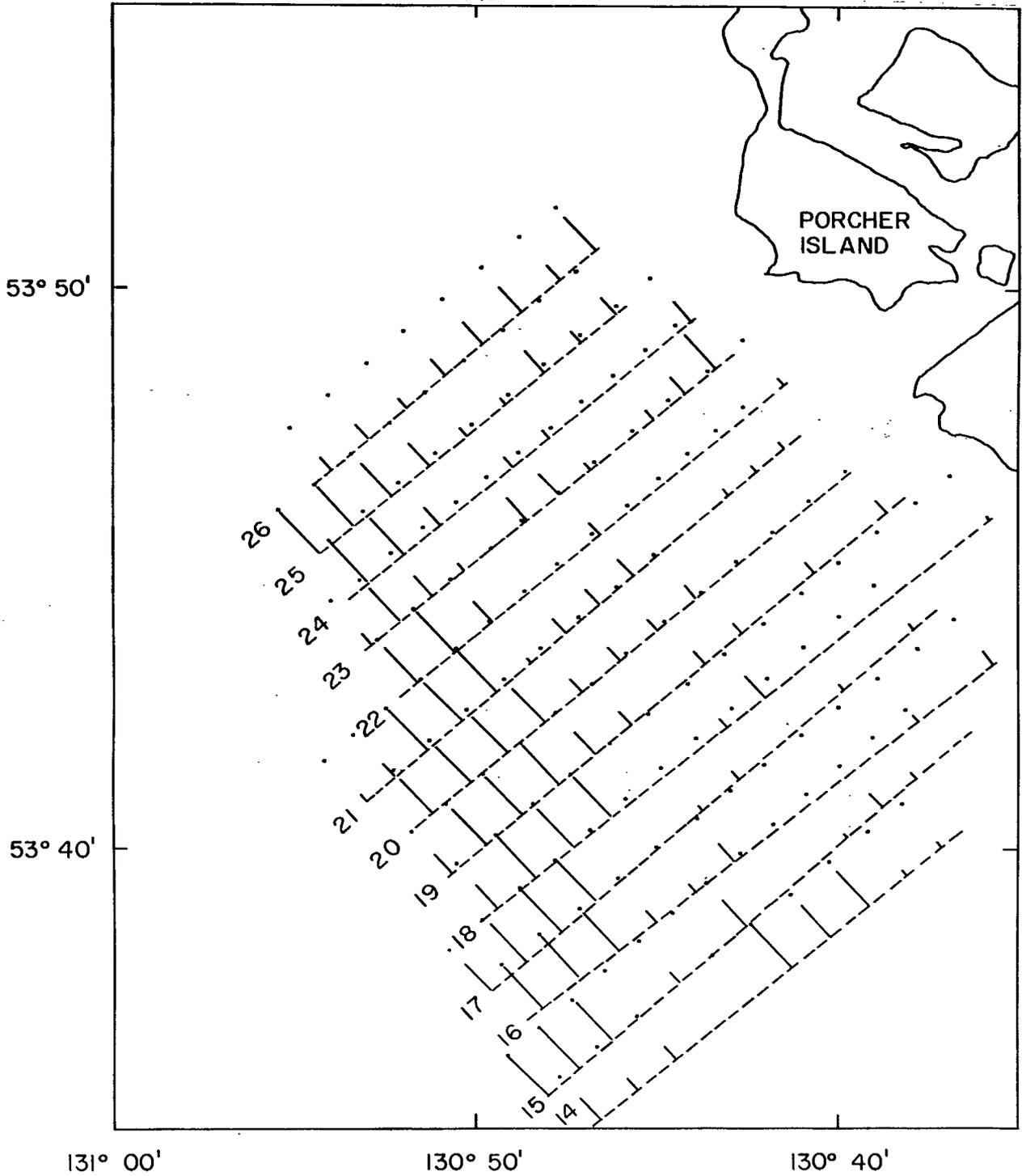


Fig. 6. Biomass density map of Browning Entrance (second coverage). Total biomass estimated at 11,800 tonnes. Density bars use a logarithmic scale of .001 kg/m² to .100 kg/m².



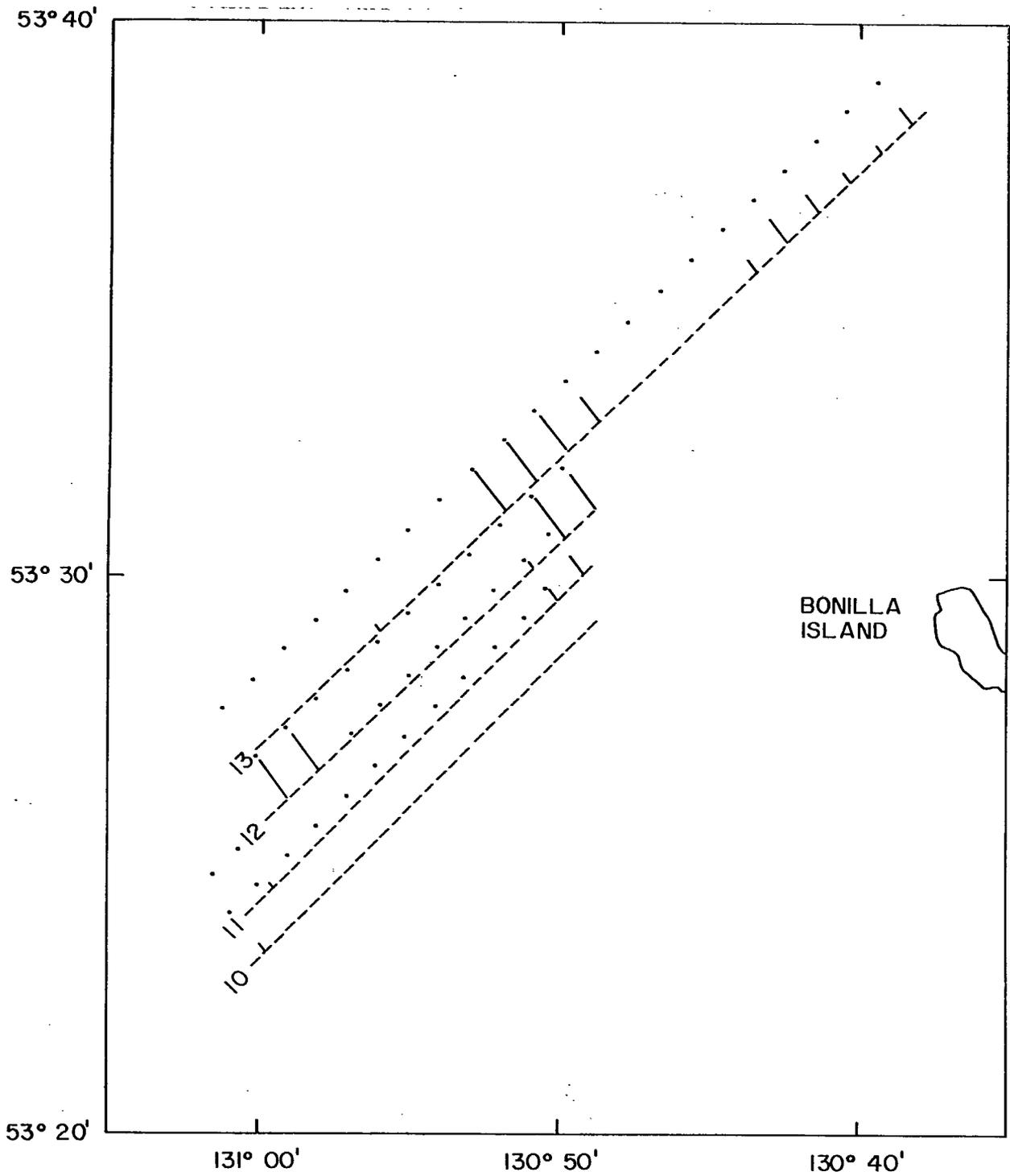
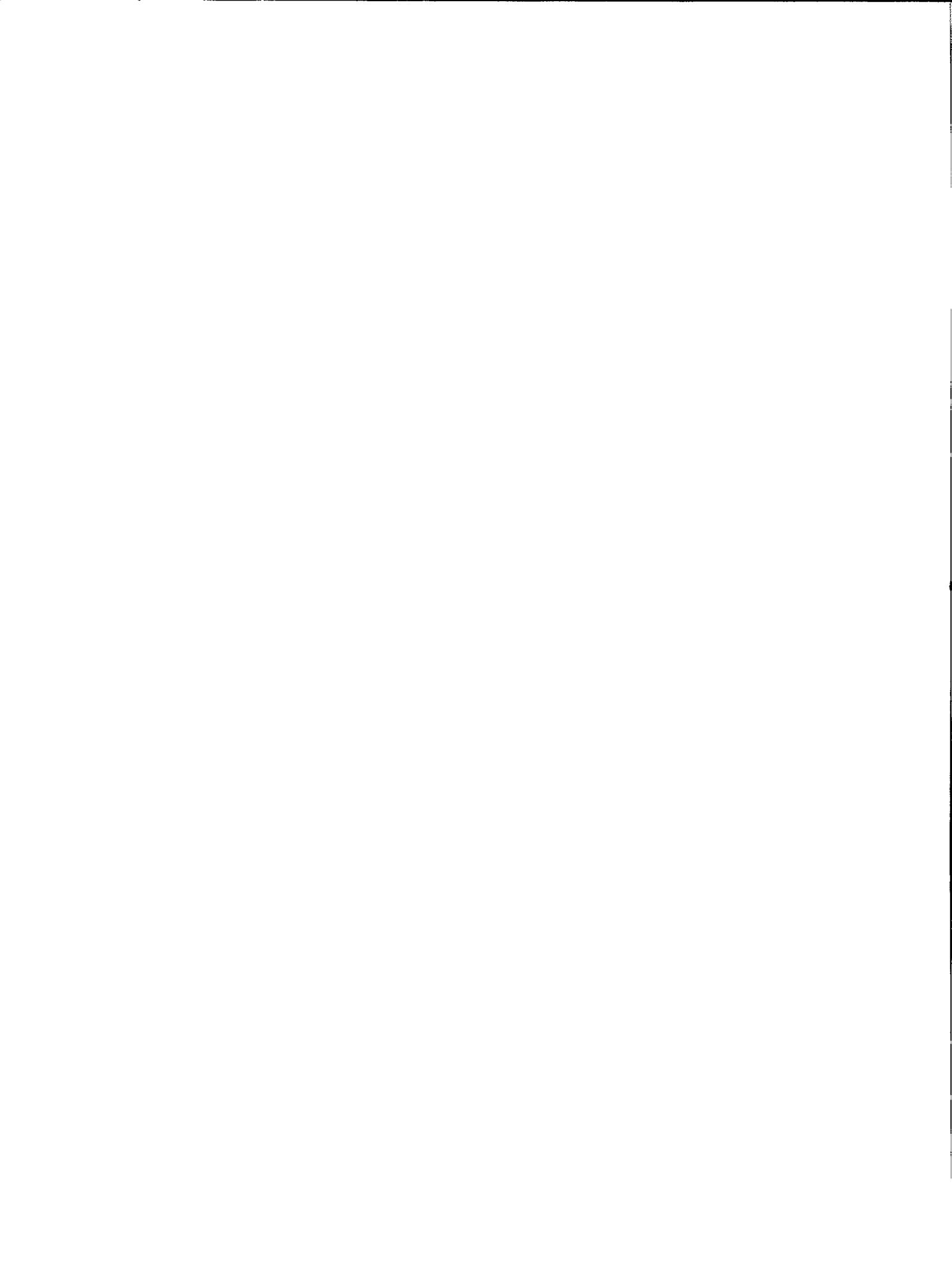


Fig. 7. Biomass density map of SW Bonilla Island (first coverage). Total biomass estimated at 2,830 tonnes. Density bars use a logarithmic scale of .001 kg/m² to .100 kg/m².



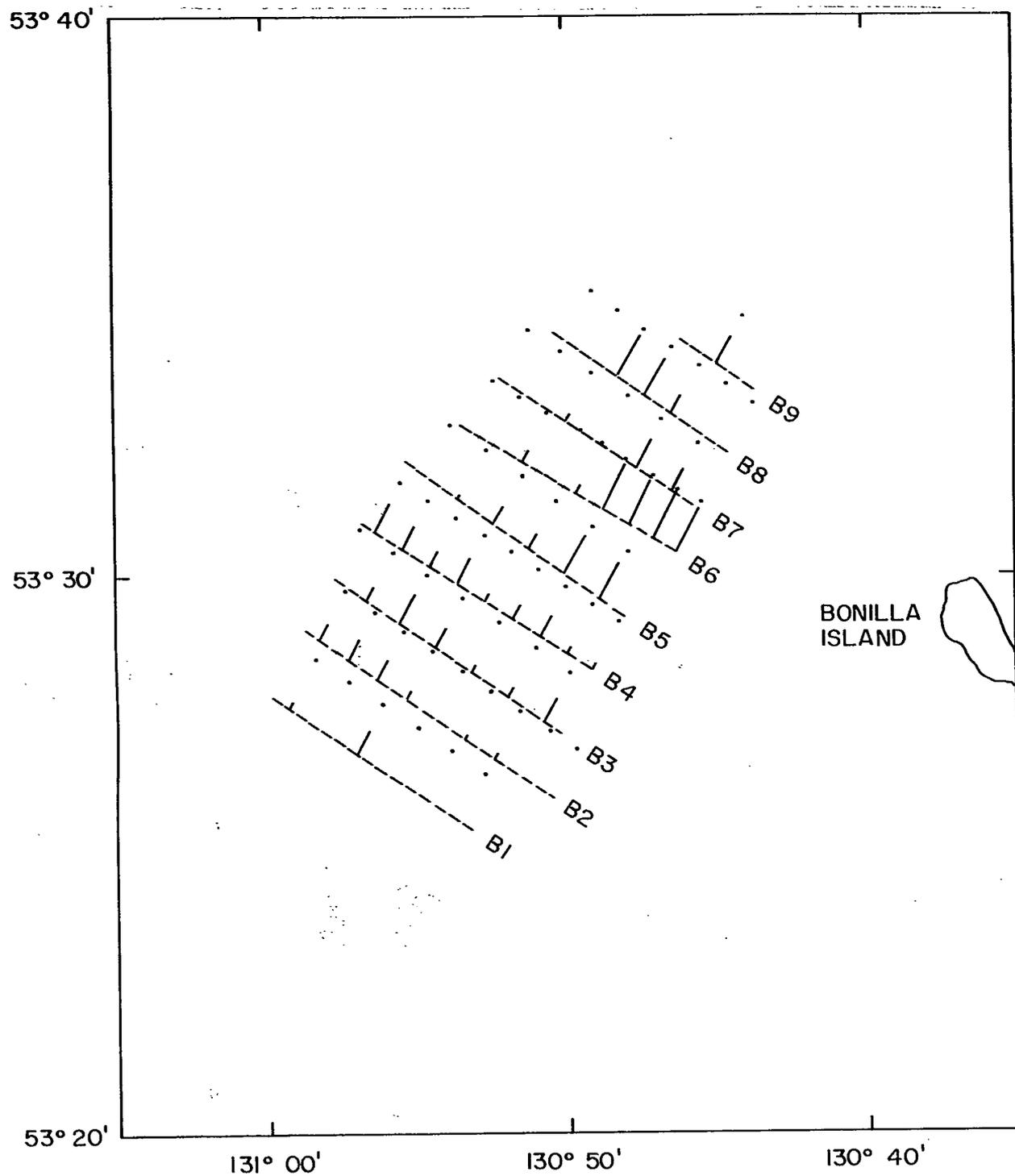


Fig. 8. Biomass density map of SW Bonilla Island (second coverage). Total biomass estimated at 2,820 tonnes. Density bars use a logarithmic scale of $.001 \text{ kg/m}^2$ to $.100 \text{ kg/m}^2$.



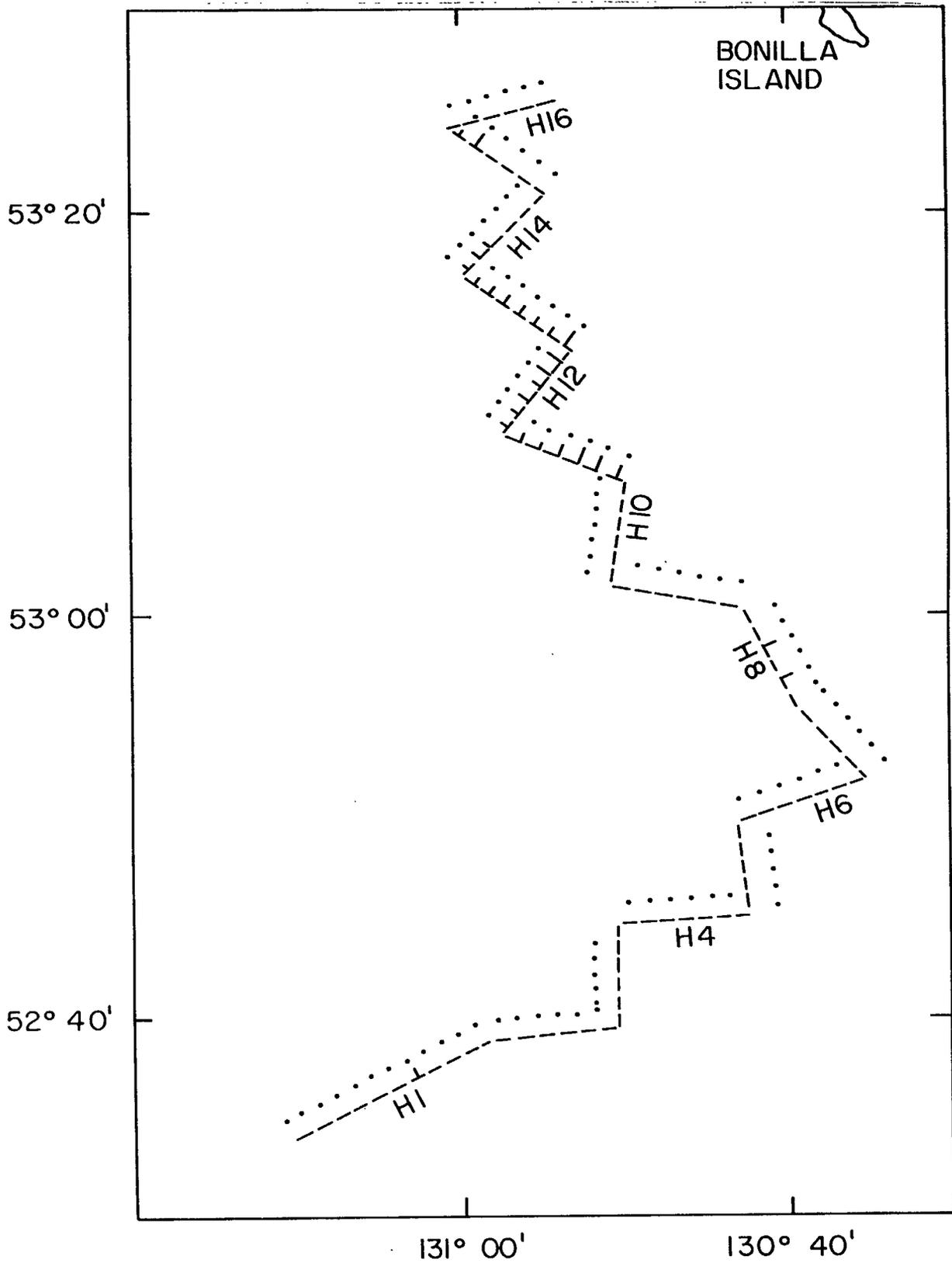
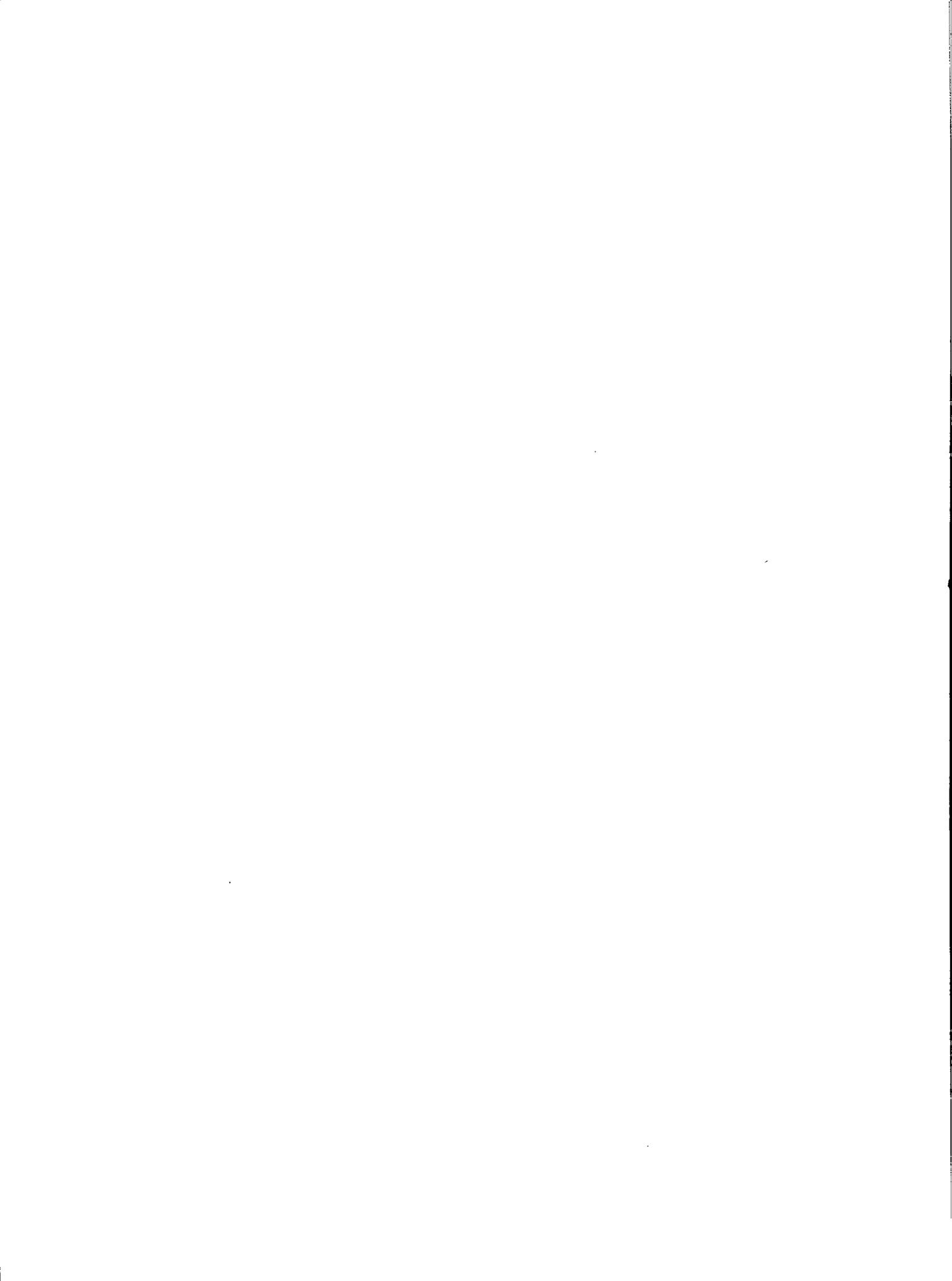


Fig. 9. Biomass density map of mid-Hecate Strait. Total biomass estimated at 620 tonnes. Density bars use a logarithmic scale of $.001 \text{ kg/m}^2$ to $.100 \text{ kg/m}^2$.



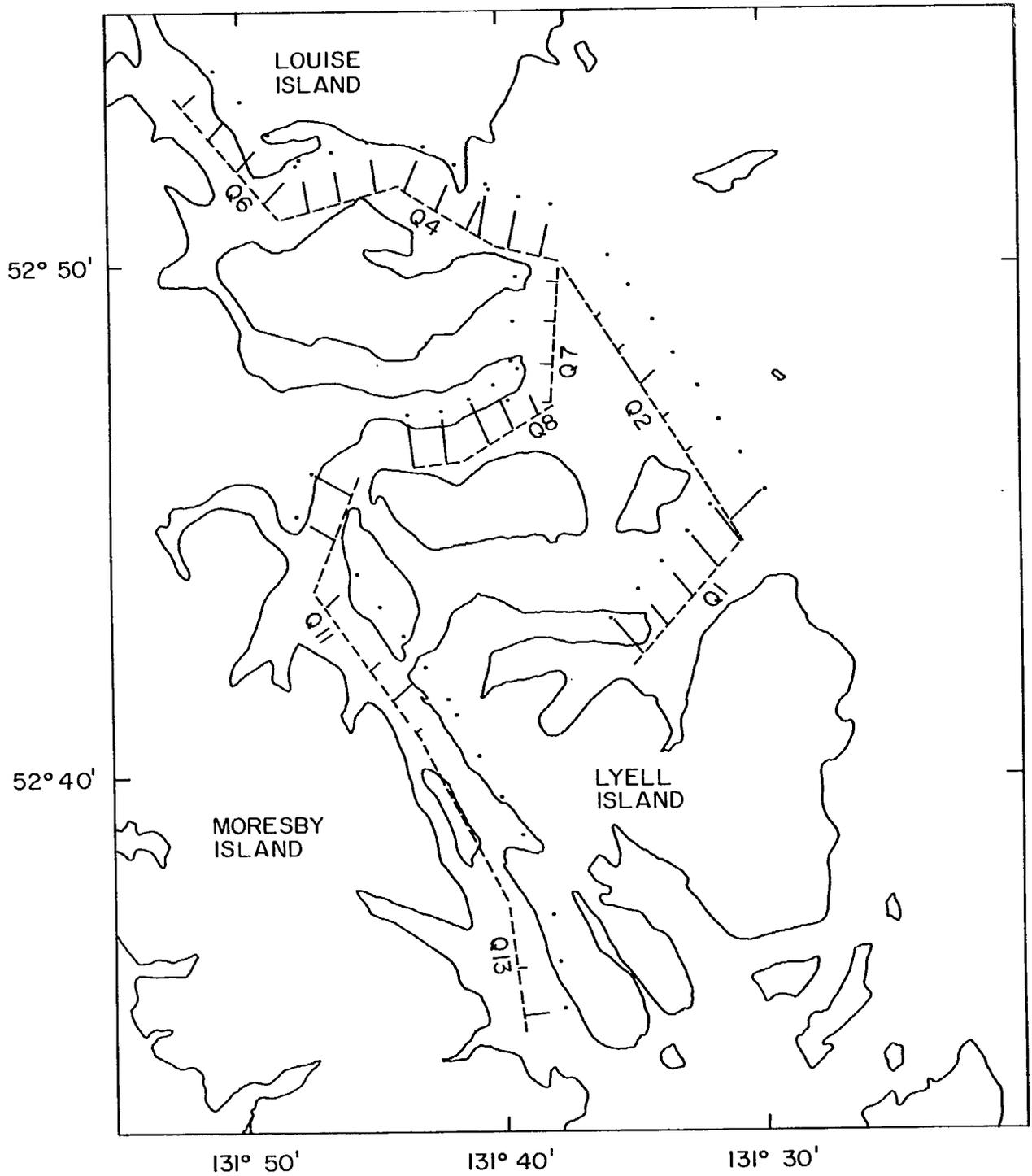
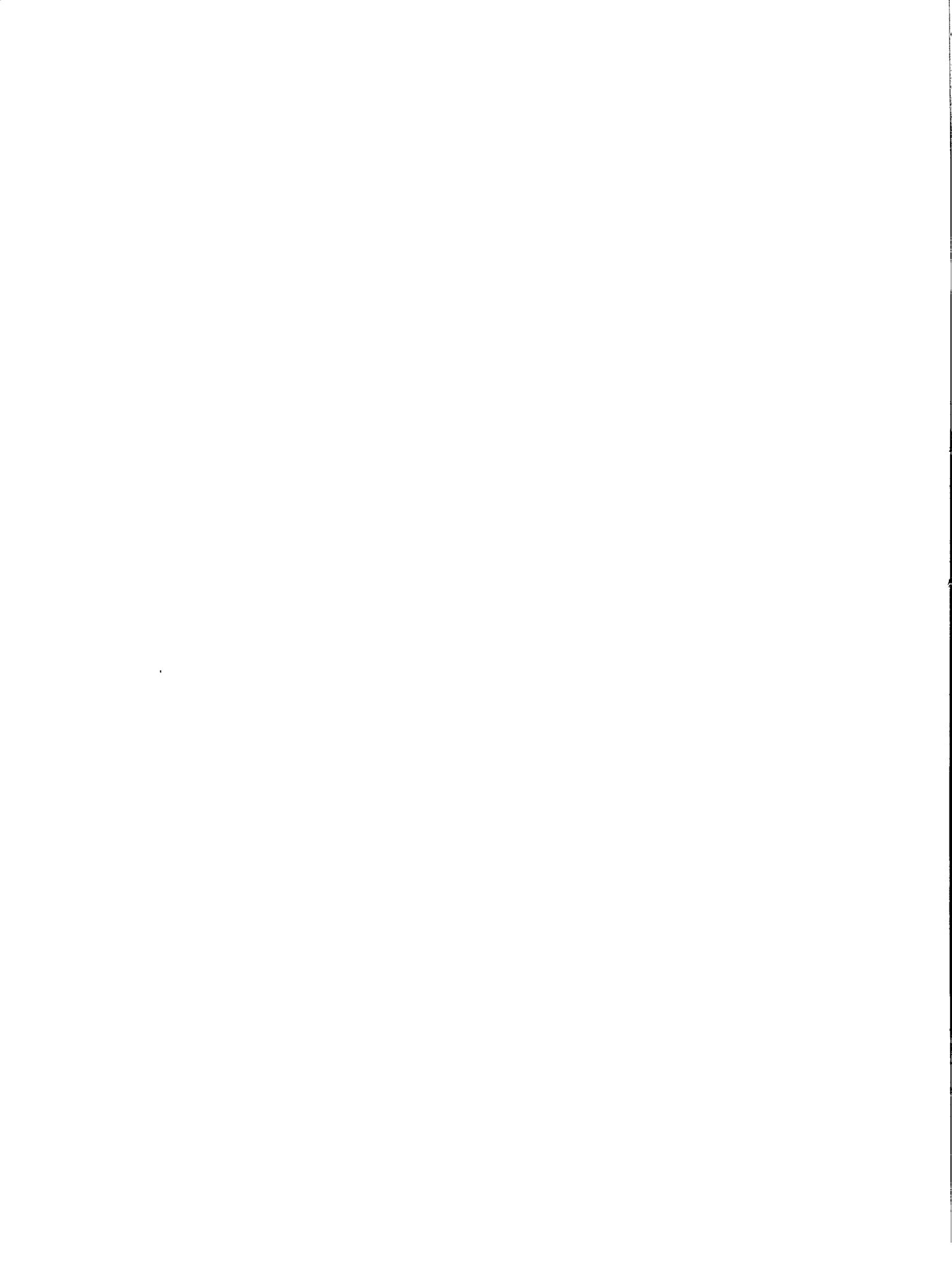


Fig. 10. Biomass density map of Lyell Island inshore. Total biomass estimated at 2,830 tonnes. Density bars use a logarithmic scale of .001 kg/m² to .100 kg/m².



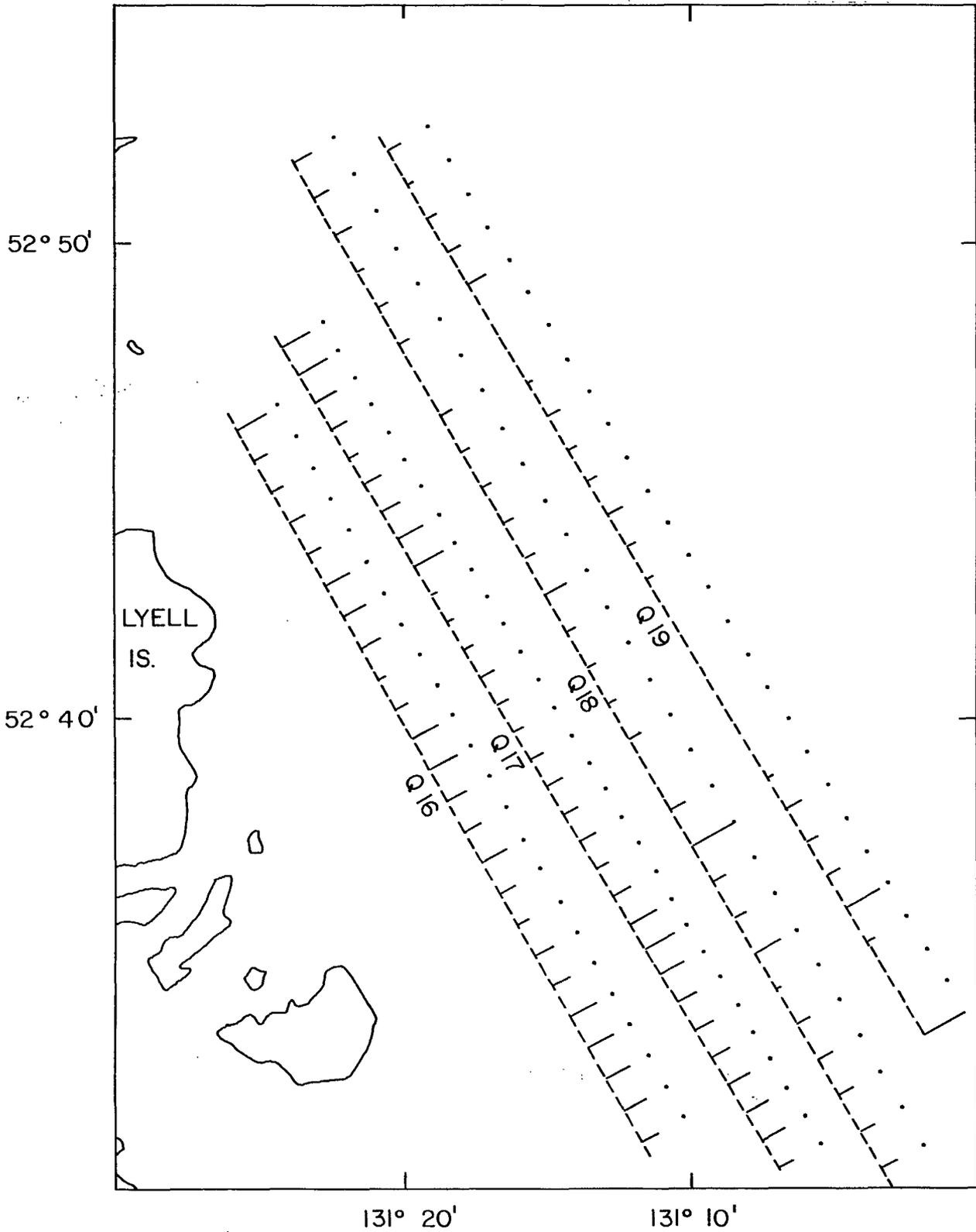


Fig. 11. Biomass density map of Lyell Island offshore. Total biomass estimated at 916 tonnes. Density bars use a logarithmic scale of .001 kg/m² to .100 kg/m².



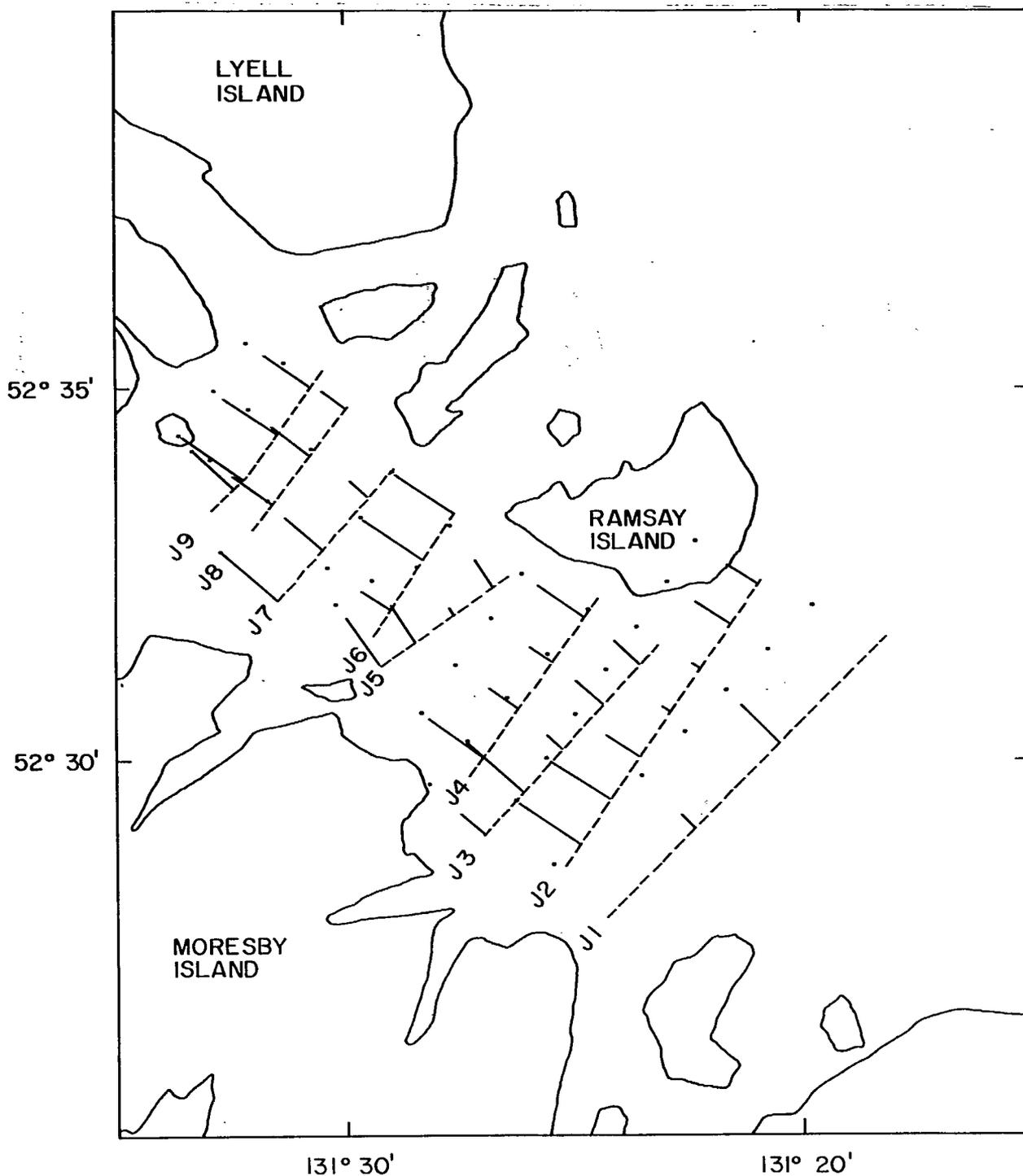
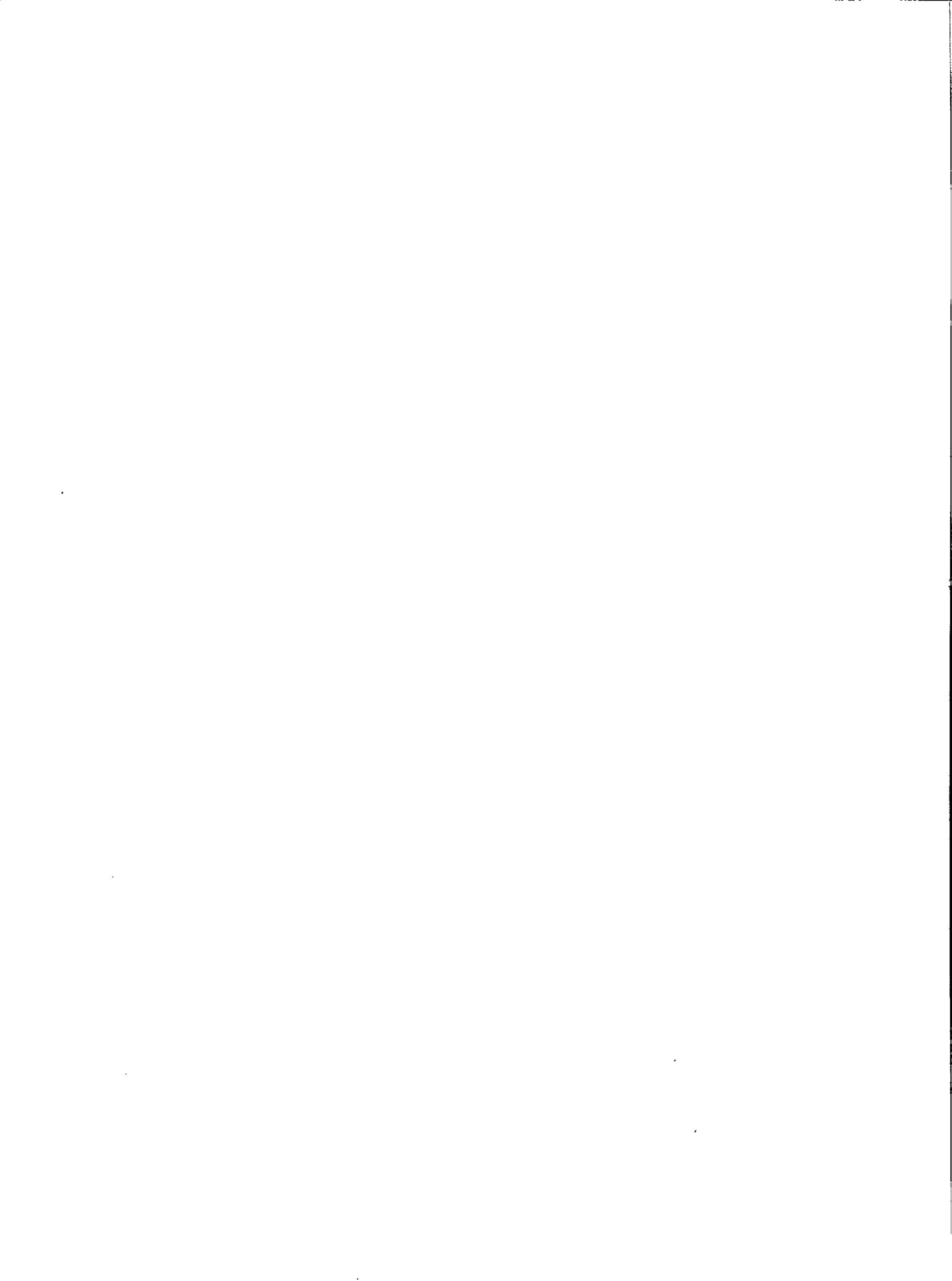


Fig. 12. Biomass density map of Juan Perez Sound (first coverage). Total biomass estimated at 5,190 tonnes. Density bars use a logarithmic scale of $.001 \text{ kg/m}^2$ to $.100 \text{ kg/m}^2$.



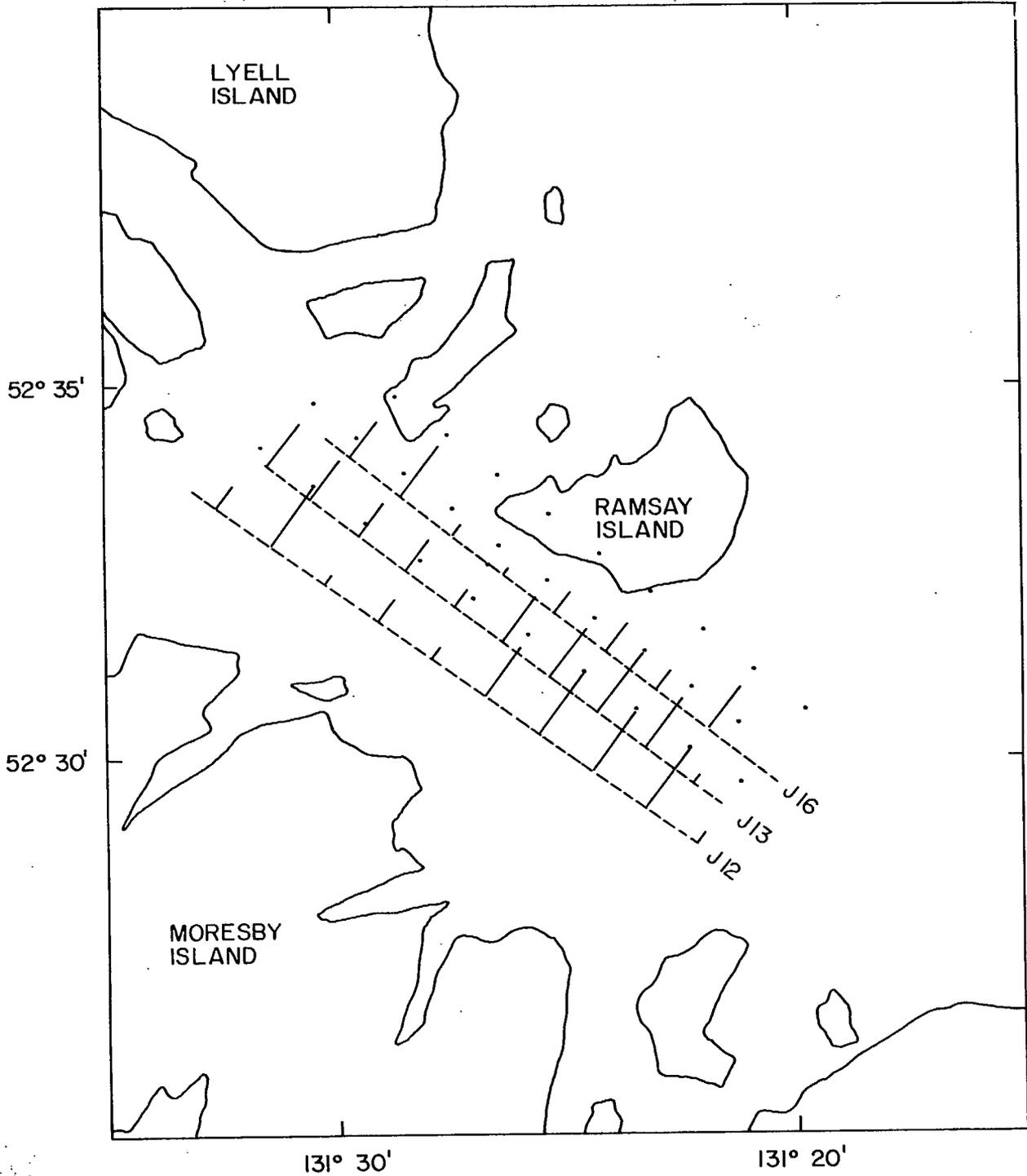
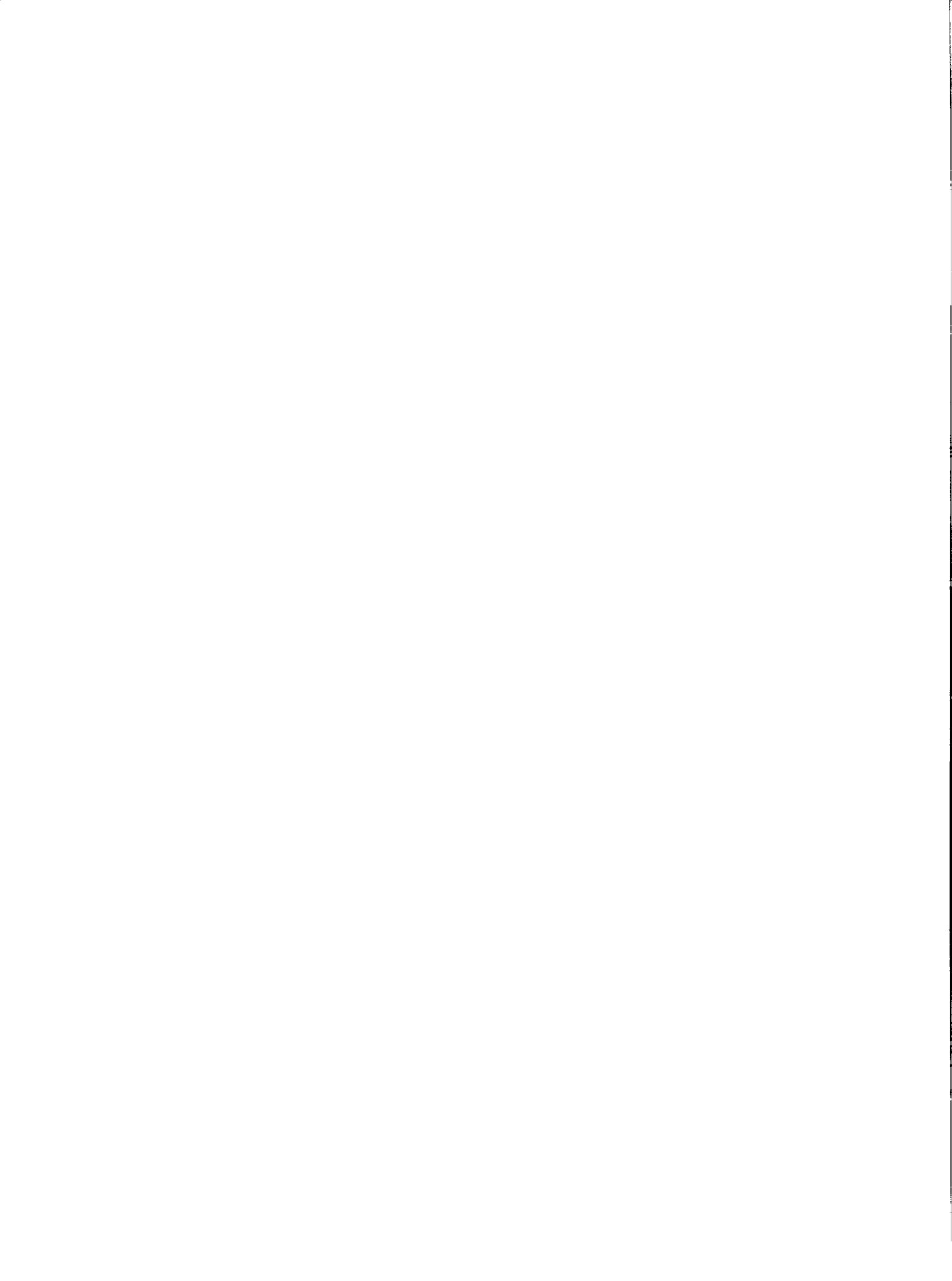


Fig. 13. Biomass density map of Juan Perez Sound (second coverage). Total biomass estimated at 16,800 tonnes. Density bars use a logarithmic scale of $.001 \text{ kg/m}^2$ to $.100 \text{ kg/m}^2$.



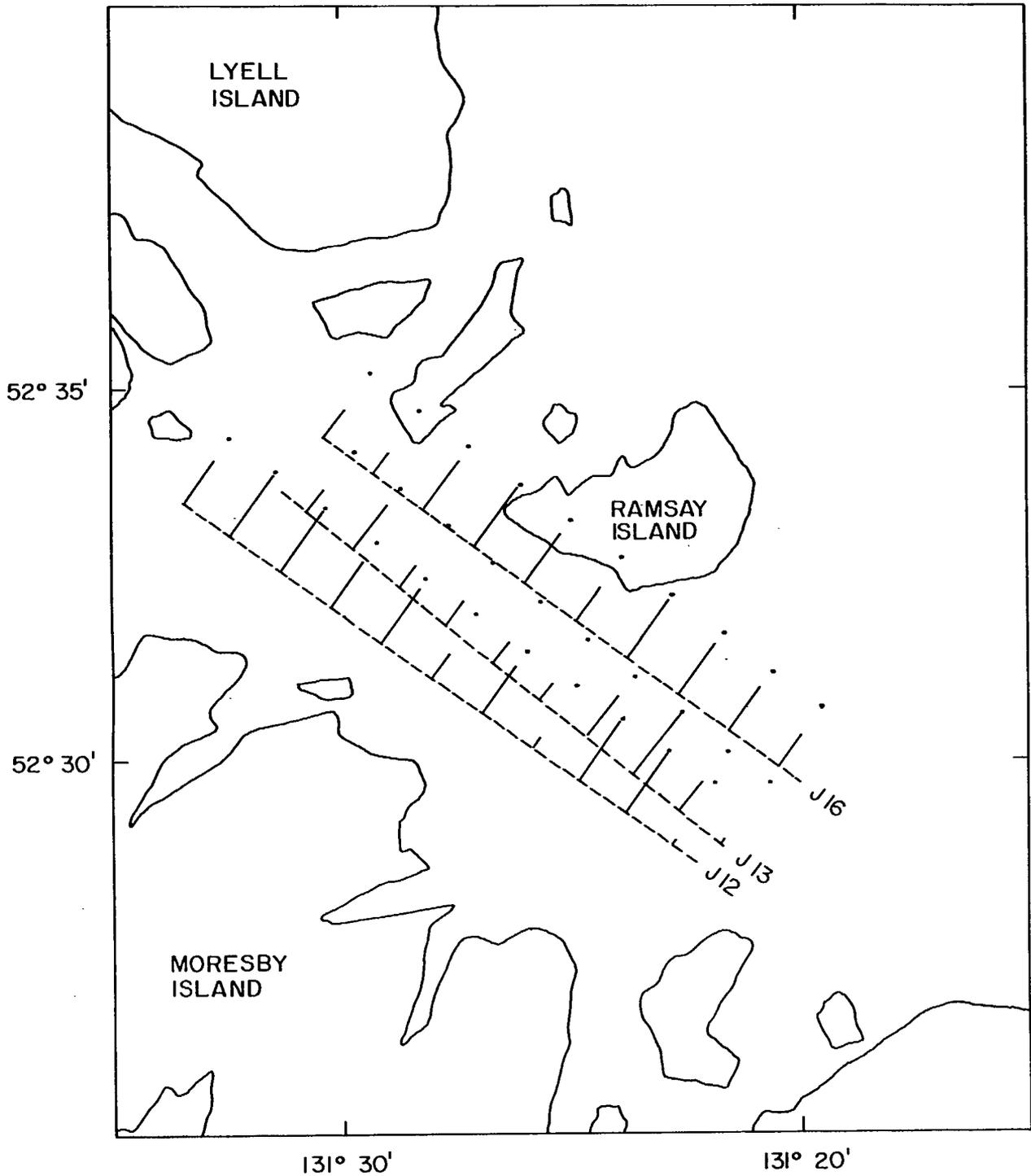
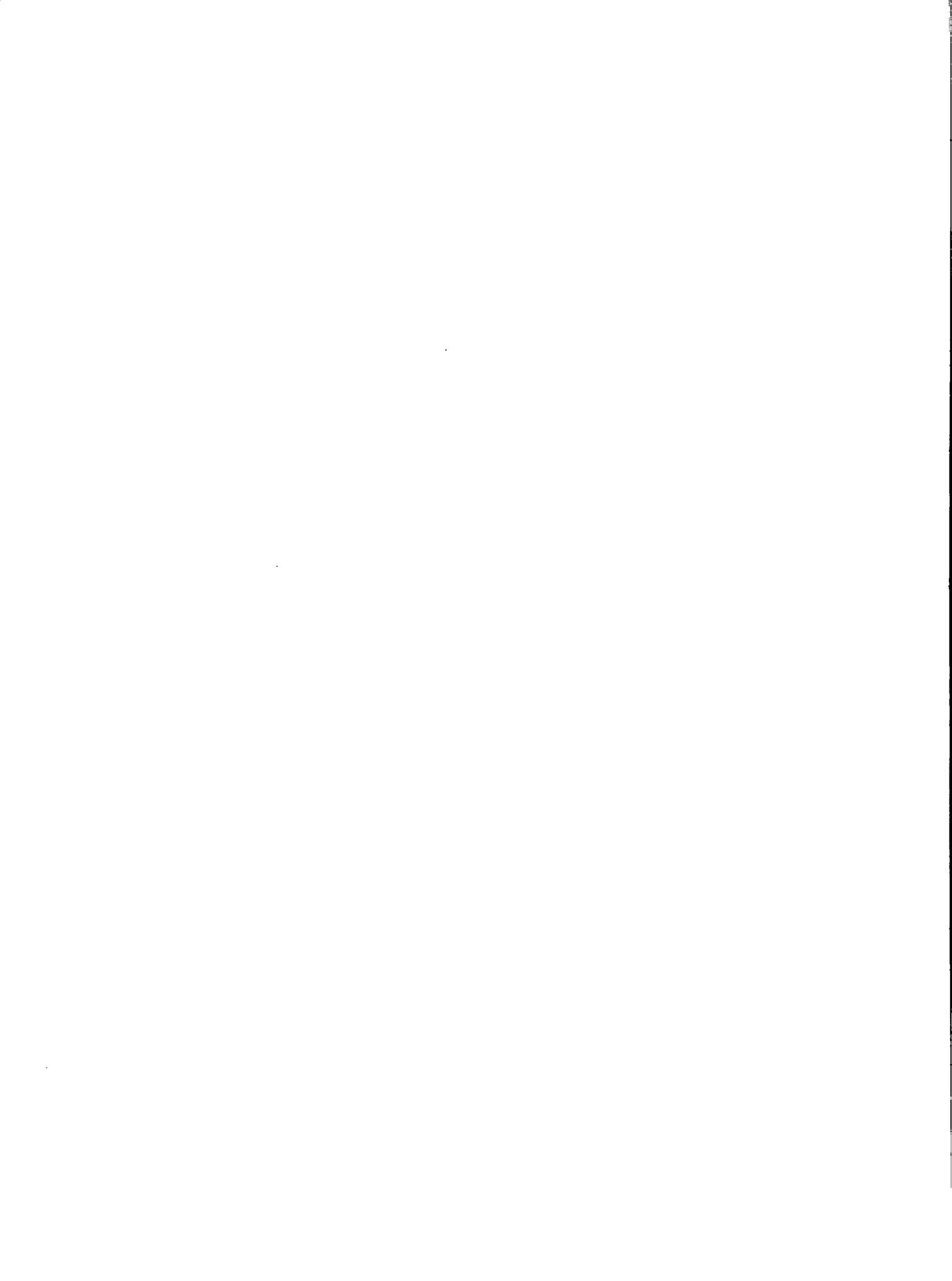


Fig. 14. Biomass density map of Juan Perez Sound (third coverage). Total biomass estimated at 4,620 tonnes. Density bars use a logarithmic scale of $.001 \text{ kg/m}^2$ to $.100 \text{ kg/m}^2$.



Appendix Table 1. Cruise schedule of the W.E. RICKER, November 14-24, 1987.

Date	Time	Activity
14 Nov	12:00	Scientific party, D. Hay, R. Kieser, B. McCarter and D. Miller board W.E. RICKER at Ocean Dock, Prince Rupert
14	12:30	Start calibration of towed body transducer while secured at dock
15	04:46	Depart Ocean Dock, Prince Rupert
	11:11	Transects 29-10 (Browning Entrance-first coverage)
16	09:10	Midwater trawl tow #1 (SW Bonilla Island)
	13:05	Midwater trawl tow #2 (Browning Entrance)
	15:35	Midwater trawl tow #3 (Browning Entrance)
	18:58	Transects 100-122 (Butterworth Edge)
17	04:26	Sounding terminated due to SE winds of 50 kts.
	16:42	Transects 29-14 (Browning Entrance-second coverage)
18	09:31	Midwater trawl tow #4 (Browning Entrance)
	11:30	Midwater trawl tow #5 (Browning Entrance)
	12:55	Bongo tow #1 (Browning Entrance)
	13:50	Bongo tow #2 (Browning Entrance)
	14:45	Bongo tow #3 (N. Bonilla Island)
	22:26	Anchor Beljay Bay, Queen Charlotte Islands
19	08:57	Transects Q1-Q14 (Lye11 Island inshore)
	11:40	Bongo tow #4 (Selwyn Inlet)
	13:00	Bongo tow #5 (Logan Inlet)
	15:10	Bongo tow #6 (Juan Perez Sound)
	15:35	Bongo tow #7 (Juan Perez Sound)
	16:02	Transects Q15-Q20 (Lye11 Island offshore)
20	03:47	Transects J1-J10 (Juan Perez Sound-first coverage)
	08:51	Midwater trawl tow #6 (Juan Perez Sound)
	10:00	Midwater trawl tow #7 (Juan Perez Sound)
	12:43	Midwater trawl tow #8 (Juan Perez Sound)
	13:30	Midwater trawl tow #9 (Juan Perez Sound)
	16:21	Transects J11-J16 (Juan Perez Sound-second coverage)
	22:32	Midwater trawl tow #10 (Juan Perez Sound)
	22:56	Midwater trawl tow #11 (Juan Perez Sound)
21	01:05	Transects R1-R24 (Skincuttle area)
	13:00	Transect J11-J17 (Juan Perez Sound-third coverage)
	19:04	Midwater trawl tow #12 (Juan Perez Sound)
	21:30	Bongo tow #8 (Juan Perez Sound)
	21:55	Transect H1-H16 (mid-Hecate Strait)
22	06:44	Transect B1-B9 (SW Bonilla Island-second coverage)
	13:19	Midwater trawl tow #13 (SW Bonilla Island)
	14:00	Bongo tow #9 (W. Bonilla Island)
24	14:45	Secured at PBS, Nanaimo

Appendix Table 2. Condensed hydroacoustic biomass output of W.E. RICKER cruise, November 14-24, 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 87JEIBI03.CON	Input control file (file name, TT: or N)
IDA 87J001.INT	Input echo integration file (file name or N)
OCB N	Output condensed biomass (file name, TT: or N)
OFB 87JEIBI03.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 5,200	/SPE min. & max. depth strata (m)
UNI KM	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 15-NOV-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

*DAT 15-NOV-87
*IDA 87J001.INT
> Overall systems gain GAI0D dB: 53.7764
*IDA 87J002.INT
*UNI NM
*WID 1.0
*DEP/ALL 5,200

BROWNING ENTRANCE TRANSECTS (First Coverage)

*EVE 12 11:11 53 52.23 130 51.13 ! TOWED BODY TRANSDUCER ON
*

*TRA T-name EIS1 EIS2-1 PIT DIS BEA TIM SPE
*TRA 29 4 12 531 4.412 227.687 0.467 9.454

*ZER

*LOU/ALL

N	P	LEN	AREA	DEP	COL	DCS	DCB	LCB	VOL/D	SURF/D	BIOMASS
#	#	KM	KM ²	M	M	M	M	KM	KG/M ³	KG/M ²	T
10	590	9.1	16.8	59.2	59.2	53.7	3.9	2.8	5.32E-05	3.15E-03	5.30E+01
10	590	9.1	16.8	59.2	59.2	53.7	3.9	0.0	5.32E-05	3.15E-03	5.30E+01

*EVE 14 11:46 53 48.47 130 55.65
*

*TRA T-name EIS1 EIS2-1 PIT DIS BEA TIM SPE
*TRA 28 39 71 1895 4.810 45.359 0.517 9.310

*LOU/ALL

N	P	LEN	AREA	DEP	COL	DCS	DCB	LCB	VOL/D	SURF/D	BIOMASS
#	#	KM	KM ²	M	M	M	M	KM	KG/M ³	KG/M ²	T
35	2013	9.5	17.5	58.9	58.9	46.7	11.1	7.2	3.61E-04	2.12E-02	3.72E+02
45	2603	18.5	34.3	59.1	59.1	47.6	10.2	0.0	2.10E-04	1.24E-02	4.25E+02

*EVE 16 12:25 53 50.93 130 48.36
*

*TRA T-name EIS1 EIS2-1 PIT DIS BEA TIM SPE
*TRA 27 80 114 2032 5.775 228.185 0.583 9.899

*LOU/ALL

N	P	LEN	AREA	DEP	COL	DCS	DCB	LCB	VOL/D	SURF/D	BIOMASS
#	#	KM	KM ²	M	M	M	M	KM	KG/M ³	KG/M ²	T
35	2032	10.7	19.8	61.8	61.8	47.3	13.7	2.1	3.47E-04	2.14E-02	4.24E+02
80	4635	29.2	54.1	60.1	60.1	47.5	12.0	0.0	2.61E-04	1.57E-02	8.49E+02

*EVE 18 13:06 53 46.21 130 54.89
*

*TRA T-name EIS1 EIS2-1 PIT DIS BEA TIM SPE
*TRA 26 121 162 2478 6.508 47.224 0.700 9.298

*LOU/ALL

N	P	LEN	AREA	DEP	COL	DCS	DCB	LCB	VOL/D	SURF/D	BIOMASS
#	#	KM	KM ²	M	M	M	M	KM	KG/M ³	KG/M ²	T
45	2655	12.9	23.9	59.4	59.4	56.9	6.3	7.2	4.08E-04	2.42E-02	5.80E+02
125	7290	42.2	78.1	59.9	59.9	51.3	9.6	0.0	3.06E-04	1.83E-02	1.43E+03

*EVE 20 13:56 53 49.76 130 45.51

*

*TRA T-name EIS1 EIS2-1 PIT DIS BEA TIM SPE
*TRA 25 171 215 2612 6.871 229.086 0.733 9.370

*LOU/ALL

N	P	LEN	AREA	DEP	COL	DCS	DCB	LCB	VOL/D	SURF/D	BIOMASS
45	2612	12.7	23.6	70.6	70.6	67.0	18.3	4.6	1.55E-03	1.10E-01	2.59E+03
170	9902	54.9	101.6	62.4	62.4	61.4	15.2	0.0	6.34E-04	3.95E-02	4.02E+03

*EVE 22 14:45 53 44.57 130 53.66

*

*TRA T-name EIS1 EIS2-1 PIT DIS BEA TIM SPE
*TRA 24 222 269 2807 7.287 47.959 0.817 8.923

*LOU/ALL

N	P	LEN	AREA	DEP	COL	DCS	DCB	LCB	VOL/D	SURF/D	BIOMASS
50	2926	14.1	26.1	67.7	67.7	59.2	8.1	10.4	4.59E-04	3.11E-02	8.10E+02
220	12828	68.9	127.7	63.5	63.5	61.0	14.0	0.0	5.96E-04	3.78E-02	4.83E+03

*EVE 26 15:39 53 48.78 130 42.96

*

*TRA T-name EIS1 EIS2-1 PIT DIS BEA TIM SPE
*TRA 23 278 328 2957 7.972 228.042 0.850 9.379

*LOU/ALL

N	P	LEN	AREA	DEP	COL	DCS	DCB	LCB	VOL/D	SURF/D	BIOMASS
55	3194	15.9	29.5	64.3	64.3	50.1	8.5	8.3	4.25E-04	2.73E-02	8.06E+02
275	16022	84.9	157.2	63.6	63.6	59.5	13.2	0.0	5.63E-04	3.58E-02	5.63E+03

*EVE 28 16:36 53 42.58 130 52.34

*

*TRA T-name EIS1 EIS2-1 PIT DIS BEA TIM SPE
*TRA 22 336 390 3217 8.383 47.899 0.900 9.314

*LOU/ALL

N	P	LEN	AREA	DEP	COL	DCS	DCB	LCB	VOL/D	SURF/D	BIOMASS
55	3217	15.5	28.8	69.9	69.9	32.9	4.3	4.4	2.27E-04	1.59E-02	4.57E+02
330	19239	100.4	186.0	64.6	64.6	57.5	12.6	0.0	5.07E-04	3.27E-02	6.09E+03

*EVE 30 17:36 53 47.61 130 40.75

*

*TRA T-name EIS1 EIS2-1 PIT DIS BEA TIM SPE
*TRA 21 397 452 3305 8.893 227.130 0.933 9.528

*LOU/ALL

N	P	LEN	AREA	DEP	COL	DCS	DCB	LCB	VOL/D	SURF/D	BIOMASS
60	3522	17.6	32.5	67.2	67.2	19.1	16.0	11.5	2.18E-04	1.47E-02	4.77E+02
390	22761	118.0	218.5	65.0	65.0	54.7	12.8	0.0	4.63E-04	3.01E-02	6.57E+03

*EVE 32 18:39 53 40.69 130 50.69

*

*TRA T-name EIS1 EIS2-1 PIT DIS BEA TIM SPE
*TRA 20 460 519 3471 9.010 46.516 1.017 8.862

*LOU/ALL

N	P	LEN	AREA	DEP	COL	DCS	DCB	LCB	VOL/D	SURF/D	BIOMASS
60	3471	16.7	30.9	71.4	71.4	25.7	7.0	3.8	1.99E-04	1.42E-02	4.38E+02
450	26232	134.7	249.4	65.8	65.8	52.9	12.4	0.0	4.27E-04	2.81E-02	7.01E+03

*IDA 87J003.INT

*EVE 37 19:47 53 46.22 130 38.30

*-----
*TRA T-name EIS1 EIS2-1 PIT DIS BEA TIM SPE
*TRA 19 2 63 3628 9.771 227.432 1.033 9.456
*LOU/ALL
N P LEN AREA DEP COL DCS DCB LCB VOL/D SURF/D BIOMASS
65 3807 19.0 35.2 72.0 72.0 44.5 10.5 12.1 6.24E-05 4.49E-03 1.58E+02
515 30039 153.6 284.5 66.5 66.5 52.7 12.4 0.0 3.78E-04 2.52E-02 7.16E+03

*EVE 39 20:55 53 38.79 130 49.78

*-----
*TRA T-name EIS1 EIS2-1 PIT DIS BEA TIM SPE
*TRA 18 70 136 3913 10.536 46.820 1.117 9.436
*LOU/ALL
N P LEN AREA DEP COL DCS DCB LCB VOL/D SURF/D BIOMASS
70 4090 20.4 37.8 72.1 72.1 59.9 15.5 11.9 4.96E-05 3.58E-03 1.35E+02
585 34129 174.0 322.3 67.2 67.2 52.8 12.5 0.0 3.37E-04 2.26E-02 7.30E+03

*EVE 41 22:09 53 45.06 130 35.82

*-----
*TRA T-name EIS1 EIS2-1 PIT DIS BEA TIM SPE
*TRA 17 145 211 3956 10.816 227.191 1.133 9.544
*LOU/ALL
N P LEN AREA DEP COL DCS DCB LCB VOL/D SURF/D BIOMASS
70 4134 20.9 38.8 78.9 78.9 62.4 20.8 6.0 2.48E-05 1.96E-03 7.59E+01
655 38263 195.0 361.1 68.4 68.4 52.9 12.6 0.0 2.98E-04 2.04E-02 7.37E+03

*EVE 44 23:22 53 36.75 130 48.75

*-----
*TRA T-name EIS1 EIS2-1 PIT DIS BEA TIM SPE
*TRA 16 219 282 3746 9.849 47.926 1.067 9.234
*LOU/ALL
N P LEN AREA DEP COL DCS DCB LCB VOL/D SURF/D BIOMASS
65 3805 18.5 34.3 81.0 81.0 59.5 27.0 9.2 1.23E-05 1.00E-03 3.43E+01
720 42068 213.5 395.4 69.5 69.5 53.0 12.6 0.0 2.69E-04 1.87E-02 7.41E+03

*DAT 16-NOV-87

*EVE 48 00:36 53 42.22 130 36.33

*-----
*TRA T-name EIS1 EIS2-1 PIT DIS BEA TIM SPE
*TRA 15 294 351 3369 9.634 227.168 0.967 9.967
*LOU/ALL
N P LEN AREA DEP COL DCS DCB LCB VOL/D SURF/D BIOMASS
60 3487 18.5 34.2 87.9 87.9 69.9 18.6 7.3 1.37E-05 1.21E-03 4.12E+01
780 45555 232.0 429.6 71.0 71.0 53.0 12.7 0.0 2.44E-04 1.73E-02 7.45E+03

*EVE 50 01:43 53 35.02 130 46.95

*

*TRA T-name EIS1 EIS2-1 PIT DIS BEA TIM SPE
*TRA 14 362 407 2704 6.924 48.698 0.767 9.031

*LOU/ALL

N	P	LEN	AREA	DEP	COL	DCS	DCB	LCB	VOL/D	SURF/D	BIOMASS
50	2940	13.9	25.8	75.0	75.0	48.8	12.8	8.8	3.38E-05	2.53E-03	6.54E+01
830	48495	245.9	455.4	71.2	71.2	53.0	12.7	0.0	2.32E-04	1.65E-02	7.52E+03

*UNI NM

*WID 1.0

*DEP/ALL 5,200

SW BONILLA ISLAND TRANSECTS (First Coverage)

*EVE 52 02:38 53 38.38 130 37.77

*

*TRA T-name EIS1 EIS2-1 PIT DIS BEA TIM SPE
*TRA 13 418 524 6292 17.438 228.915 1.767 9.871

*ZER

*LOU/ALL

N	P	LEN	AREA	DEP	COL	DCS	DCB	LCB	VOL/D	SURF/D	BIOMASS
110	6469	33.2	61.5	65.7	65.7	43.8	14.4	17.9	3.12E-04	2.05E-02	1.26E+03
110	6469	33.2	61.5	65.7	65.7	43.8	14.4	0.0	3.12E-04	2.05E-02	1.26E+03

*EVE 57 04:33 53 25.70 130 59.52

*

*TRA T-name EIS1 EIS2-1 PIT DIS BEA TIM SPE
*TRA 12 534 585 3066 8.323 49.546 0.867 9.603

*LOU/ALL

N	P	LEN	AREA	DEP	COL	DCS	DCB	LCB	VOL/D	SURF/D	BIOMASS
55	3243	16.3	30.2	64.0	64.0	38.0	24.8	11.4	7.70E-04	4.93E-02	1.49E+03
165	9712	49.5	91.7	65.2	65.2	40.7	20.1	0.0	4.60E-04	3.00E-02	2.75E+03

*EVE 59 05:31 53 30.21 130 48.77

*

*TRA T-name EIS1 EIS2-1 PIT DIS BEA TIM SPE
*TRA 11 593 654 3559 9.228 227.366 1.067 8.651

*LOU/ALL

N	P	LEN	AREA	DEP	COL	DCS	DCB	LCB	VOL/D	SURF/D	BIOMASS
65	3736	17.9	33.2	67.9	67.9	57.1	9.8	5.8	2.44E-05	1.66E-03	5.51E+01
230	13448	67.4	124.9	65.9	65.9	41.0	19.9	0.0	3.41E-04	2.24E-02	2.80E+03

*EVE 61 06:39 53 22.98 131 00.16

*

*TRA T-name EIS1 EIS2-1 PIT DIS BEA TIM SPE
*TRA 10 662 721 3432 9.240 47.689 0.967 9.559

*LOU/ALL

N	P	LEN	AREA	DEP	COL	DCS	DCB	LCB	VOL/D	SURF/D	BIOMASS
60	3432	17.1	31.7	76.8	76.8	42.9	30.2	7.2	9.15E-06	7.03E-04	2.23E+01
290	16880	84.6	156.6	68.1	68.1	41.0	19.9	0.0	2.65E-04	1.80E-02	2.83E+03

*DAT 16-NOV-87
*IDA 87J004.INT
*! EI data EIS 1-28 lost
*UNI NM
*WID 1.0
*DEP/ALL 5,200

BUTTERWORTH EDGE TRANSECTS

*EVE 67 18:58 53 52.95 130 54.87

*

*TRA T-name EIS1 EIS2-1 PIT DIS BEA TIM SPE
*TRA 100 30 31 120 2.285 44.131 0.250 9.140

*ZER

*LOU/ALL

N	P	LEN	AREA	DEP	COL	DCS	DCB	LCB	VOL/D	SURF/D	BIOMASS
5	300	10.6	19.6	32.6	32.6	29.2	3.4	5.3	1.89E-04	6.16E-03	1.21E+02
5	300	10.6	19.6	32.6	32.6	29.2	3.4	0.0	1.89E-04	6.16E-03	1.21E+02

*EVE 68 19:13 53 54.59 130 52.17

*

*TRA T-name EIS1 EIS2-1 PIT DIS BEA TIM SPE
*TRA 101 32 34 180 1.598 304.717 0.200 7.989

*LOU/ALL

N	P	LEN	AREA	DEP	COL	DCS	DCB	LCB	VOL/D	SURF/D	BIOMASS
5	300	4.9	9.1	43.3	43.3	24.6	18.7	2.5	4.35E-05	1.88E-03	1.72E+01
10	600	15.5	28.7	36.0	36.0	28.6	5.3	0.0	1.33E-04	4.80E-03	1.38E+02

*EVE 69 19:25 53 55.50 130 54.40 !est. (log omission)

*

*TRA T-name EIS1 EIS2-1 PIT DIS BEA TIM SPE
*TRA 102 35 70 2113 6.145 231.322 0.617 9.964

*LOU/ALL

N	P	LEN	AREA	DEP	COL	DCS	DCB	LCB	VOL/D	SURF/D	BIOMASS
35	2049	11.0	20.4	44.5	44.5	34.6	9.6	5.8	3.03E-05	1.35E-03	2.76E+01
45	2649	26.5	49.2	39.5	39.5	29.6	6.0	0.0	8.51E-05	3.36E-03	1.65E+02

*EVE 70 20:02 53 51.66 131 02.54

*

*TRA T-name EIS1 EIS2-1 PIT DIS BEA TIM SPE
*TRA 103 71 82 708 1.964 321.154 0.200 9.822

*LOU/ALL

N	P	LEN	AREA	DEP	COL	DCS	DCB	LCB	VOL/D	SURF/D	BIOMASS
10	559	2.9	5.3	22.1	22.1	20.8	1.3	1.1	1.10E-04	2.42E-03	1.29E+01
55	3208	29.4	54.5	37.8	37.8	29.0	5.7	0.0	8.65E-05	3.27E-03	1.78E+02

*EVE 71 20:14 53 53.19 131 04.63

*

*TRA T-name EIS1 EIS2-1 PIT DIS BEA TIM SPE
*TRA 104 83 109 1539 3.883 49.733 0.433 8.962

*LOU/ALL

N	P	LEN	AREA	DEP	COL	DCS	DCB	LCB	VOL/D	SURF/D	BIOMASS
25	1452	6.8	12.6	39.7	39.7	32.8	2.8	2.4	1.04E-04	4.13E-03	5.19E+01
80	4660	36.2	67.1	38.2	38.2	29.8	5.1	0.0	9.00E-05	3.43E-03	2.30E+02

*EVE 72 20:40 53 55.70 130 59.60

*

*TRA	T-name	EIS1	EIS2-1	PIT	DIS	BEA	TIM	SPE				
*TRA 105		110	156	2721	8.204	341.059	0.767	10.701				
*LOU/ALL												
N	P	LEN	AREA	DEP	COL	DCS	DCB	LCB	VOL/D	SURF/D	BIOMASS	
50	2898	16.2	30.0	59.4	59.4	46.3	11.0	7.2	1.84E-05	1.09E-03	3.28E+01	
130	7558	52.4	97.0	44.7	44.7	31.9	5.8	0.0	6.06E-05	2.71E-03	2.63E+02	

*EVE 73 21:26 54 03.46 131 04.13

*

*TRA	T-name	EIS1	EIS2-1	PIT	DIS	BEA	TIM	SPE				
*TRA 106		157	168	669	1.804	51.624	0.200	9.020				
*LOU/ALL												
N	P	LEN	AREA	DEP	COL	DCS	DCB	LCB	VOL/D	SURF/D	BIOMASS	
10	551	2.8	5.1	62.0	62.0	48.0	14.7	1.6	1.19E-05	7.35E-04	3.75E+00	
140	8109	55.1	102.1	45.6	45.6	32.1	5.9	0.0	5.73E-05	2.61E-03	2.67E+02	

*EVE 74 21:38 54 04.58 131 01.72

*

*TRA	T-name	EIS1	EIS2-1	PIT	DIS	BEA	TIM	SPE				
*TRA 107		169	191	1357	4.001	358.741	0.383	10.437				
*LOU/ALL												
N	P	LEN	AREA	DEP	COL	DCS	DCB	LCB	VOL/D	SURF/D	BIOMASS	
25	1433	7.8	14.5	76.3	76.3	48.1	28.3	3.7	5.42E-06	4.14E-04	6.00E+00	
165	9542	63.0	116.6	49.4	49.4	32.5	6.4	0.0	4.73E-05	2.34E-03	2.73E+02	

*EVE 75 22:01 54 08.58 131 01.87

*

*TRA	T-name	EIS1	EIS2-1	PIT	DIS	BEA	TIM	SPE				
*TRA 108		192	231	2268	6.361	353.504	0.633	10.043				
*LOU/ALL												
N	P	LEN	AREA	DEP	COL	DCS	DCB	LCB	VOL/D	SURF/D	BIOMASS	
40	2311	12.0	22.2	68.6	68.6	46.5	18.8	7.4	1.55E-05	1.06E-03	2.36E+01	
205	11853	75.0	138.8	52.5	52.5	33.6	7.4	0.0	4.07E-05	2.13E-03	2.96E+02	

*EVE 76 22:39 54 14.90 131 03.10

*

*TRA	T-name	EIS1	EIS2-1	PIT	DIS	BEA	TIM	SPE				
*TRA 109		232	262	1830	4.546	52.781	0.483	9.406				
*LOU/ALL												
N	P	LEN	AREA	DEP	COL	DCS	DCB	LCB	VOL/D	SURF/D	BIOMASS	
30	1770	8.1	15.1	72.1	72.1	54.6	27.5	3.6	1.02E-05	7.36E-04	1.11E+01	
235	13623	83.1	153.9	54.4	54.4	34.3	8.1	0.0	3.67E-05	2.00E-03	3.07E+02	

*EVE 78 23:08 54 17.65 130 56.90

*

*TRA	T-name	EIS1	EIS2-1	PIT	DIS	BEA	TIM	SPE				
*TRA 110		263	266	237	0.787	325.694	0.067	11.803				
*LOU/ALL												
N	P	LEN	AREA	DEP	COL	DCS	DCB	LCB	VOL/D	SURF/D	BIOMASS	
5	296	1.8	3.4	91.9	91.9	93.8	-1.9	0.9	2.35E-04	2.16E-02	7.28E+01	
240	13919	84.9	157.3	55.2	55.2	45.7	6.2	0.0	4.38E-05	2.42E-03	3.80E+02	

*EVE 80 23:42 54 15.93 131 03.50

*-----
 *TRA T-name EIS1 EIS2-1 PIT DIS BEA TIM SPE
 *TRA 112 293 306 771 2.006 330.155 0.183 10.942
 *LOU/ALL
 N P LEN AREA DEP COL DCS DCB LCB VOL/D SURF/D BIOMASS
 15 830 4.0 7.4 29.6 29.6 25.5 7.8 1.3 5.16E-05 1.53E-03 1.13E+01
 255 14749 88.9 164.7 54.1 54.1 45.1 6.2 0.0 4.40E-05 2.38E-03 3.92E+02

*EVE 81 23:53 54 17.67 131 05.21

*-----
 *TRA T-name EIS1 EIS2-1 PIT DIS BEA TIM SPE
 *TRA 113 307 328 1276 3.336 53.382 0.367 9.099
 *LOU/ALL
 N P LEN AREA DEP COL DCS DCB LCB VOL/D SURF/D BIOMASS
 25 1453 7.0 13.0 60.9 60.9 40.6 10.3 5.1 6.26E-05 3.81E-03 4.97E+01
 280 16202 96.0 177.7 54.6 54.6 44.6 6.7 0.0 4.55E-05 2.48E-03 4.41E+02

*DAT 17-NOV-87

*EVE 82 00:15 54 19.66 131 0.62

*-----
 *TRA T-name EIS1 EIS2-1 PIT DIS BEA TIM SPE
 *TRA 114 329 340 680 1.801 325.268 0.200 9.004
 *LOU/ALL
 N P LEN AREA DEP COL DCS DCB LCB VOL/D SURF/D BIOMASS
 10 563 2.8 5.1 44.3 44.3 31.3 11.5 1.2 2.80E-05 1.24E-03 6.36E+00
 290 16765 98.7 182.8 54.3 54.3 44.4 6.8 0.0 4.51E-05 2.45E-03 4.48E+02

*EVE 83 00:27 54 21.14 131 2.38

*-----
 *TRA T-name EIS1 EIS2-1 PIT DIS BEA TIM SPE
 *TRA 115 341 385 2606 6.230 232.992 0.733 8.496
 *LOU/ALL
 N P LEN AREA DEP COL DCS DCB LCB VOL/D SURF/D BIOMASS
 45 2605 11.5 21.4 41.5 41.5 29.0 10.1 6.3 3.37E-05 1.40E-03 2.98E+01
 335 19370 110.3 204.2 52.9 52.9 43.5 7.0 0.0 4.42E-05 2.34E-03 4.77E+02

*EVE 85 01:11 54 17.39 131 10.91

*-----
 *TRA T-name EIS1 EIS2-1 PIT DIS BEA TIM SPE
 *TRA 116 386 396 633 1.732 320.185 0.183 9.445
 *LOU/ALL
 N P LEN AREA DEP COL DCS DCB LCB VOL/D SURF/D BIOMASS
 10 574 2.9 5.4 33.3 33.3 28.6 4.0 1.3 4.81E-05 1.60E-03 8.64E+00
 345 19944 113.2 209.6 52.4 52.4 43.2 6.9 0.0 4.42E-05 2.32E-03 4.86E+02

*EVE 86 01:22 54 18.72 131 12.81

*

*TRA T-name EIS1 EIS2-1 PIT DIS BEA TIM SPE
*TRA 117 397 429 1908 5.321 49.585 0.583 9.123

*LOU/ALL

N	P	LEN	AREA	DEP	COL	DCS	DCB	LCB	VOL/D	SURF/D	BIOMASS
35	2001	10.3	19.1	41.3	41.3	31.4	8.3	3.2	3.08E-05	1.27E-03	2.44E+01
380	21945	123.5	228.7	51.5	51.5	42.6	7.0	0.0	4.33E-05	2.23E-03	5.10E+02

*DAT 17-NOV-87

*IDA 87J006.INT

*! EI data EIS 1-74 lost

*UNI NM

*WID 1.0

*DEP/ALL 5,200

BROWNING ENTRANCE TRANSECTS (Second Coverage)

*EVE 97 16:42 53 50.69 130 54.40

*

*TRA T-name EIS1 EIS2-1 PIT DIS BEA TIM SPE
*TRA 29 99 99 59 1.872 223.409 0.217 8.640

*

*EVE 98 16:55 53 49.33 130 56.58 ! Entered 5 min. late

*

*TRA T-name EIS1 EIS2-1 PIT DIS BEA TIM SPE
*TRA 29S 100 100 59 1.004 146.829 0.133 7.526

*

*EVE 99 17:03 53 48.49 130 55.65

*

*TRA T-name EIS1 EIS2-1 PIT DIS BEA TIM SPE
*TRA 28 101 101 59 4.891 49.905 0.533 9.170

*

*EVE 100 17:35 53 51.64 130 49.31

*

*TRA T-name EIS1 EIS2-1 PIT DIS BEA TIM SPE
*TRA 28S 102 102 59 0.731 151.059 0.100 7.313

*

*EVE 101 17:41 53 51.00 130 48.71

*

*TRA T-name EIS1 EIS2-1 PIT DIS BEA TIM SPE
*TRA 27 103 103 59 5.495 225.954 0.617 8.910

*

*EVE 102 18:18 53 47.18 130 55.40

*

*TRA T-name EIS1 EIS2-1 PIT DIS BEA TIM SPE
*TRA 27S 104 111 476 0.811 143.299 0.117 6.949

*

*EVE 103 18:25 53 46.53 130 54.58

*-----
*TRA T-name EIS1 EIS2-1 PIT DIS BEA TIM SPE
*TRA 26 112 148 2165 6.116 47.776 0.633 9.657
*ZER
*LOU/ALL
N P LEN AREA DEP COL DCS DCB LCB VOL/D SURF/D BIOMASS
40 2343 12.3 22.7 62.9 62.9 47.7 8.8 8.5 1.43E-04 8.99E-03 2.04E+02
40 2343 12.3 22.7 62.9 62.9 47.7 8.8 0.0 1.43E-04 8.99E-03 2.04E+02

*EVE 106 19:12 53 49.80 130 45.75 ! Fish on echogram

*-----
*TRA T-name EIS1 EIS2-1 PIT DIS BEA TIM SPE
*TRA 25 162 203 2384 6.649 228.570 0.733 9.067
*LOU/ALL
N P LEN AREA DEP COL DCS DCB LCB VOL/D SURF/D BIOMASS
45 2562 13.2 24.5 70.6 70.6 35.6 12.9 10.4 3.56E-04 2.51E-02 6.16E+02
85 4905 25.5 47.2 66.9 66.9 38.6 11.9 0.0 2.60E-04 1.74E-02 8.20E+02

*EVE 108 20:03 53 44.52 130 53.53 ! Fish on echogram

*-----
*TRA T-name EIS1 EIS2-1 PIT DIS BEA TIM SPE
*TRA 24 212 258 2729 7.296 48.232 0.783 9.314
*LOU/ALL
N P LEN AREA DEP COL DCS DCB LCB VOL/D SURF/D BIOMASS
50 2906 14.4 26.6 71.2 71.2 25.0 9.8 1.7 3.49E-04 2.49E-02 6.63E+02
135 7811 39.9 73.9 68.5 68.5 32.5 10.9 0.0 2.93E-04 2.01E-02 1.48E+03

*EVE 111 20.57 53 48.83 130 43.06

*-----
*TRA T-name EIS1 EIS2-1 PIT DIS BEA TIM SPE
*TRA 23 261 320 3453 8.036 228.545 1.263 6.361
*LOU/ALL
N P LEN AREA DEP COL DCS DCB LCB VOL/D SURF/D BIOMASS
60 3453 14.9 27.6 68.4 68.4 34.7 13.2 9.4 2.07E-04 1.42E-02 3.90E+02
195 11264 54.8 101.4 68.4 68.4 33.0 11.4 0.0 2.70E-04 1.85E-02 1.87E+03

*EVE 113 22:07 53 42.75 130 52.13

*-----
*TRA T-name EIS1 EIS2-1 PIT DIS BEA TIM SPE
*TRA 22 338 388 2960 8.115 47.998 0.833 9.738
*LOU/ALL
N P LEN AREA DEP COL DCS DCB LCB VOL/D SURF/D BIOMASS
55 3197 16.2 30.1 75.3 75.3 26.3 14.8 2.3 1.89E-04 1.43E-02 4.29E+02
250 14461 71.0 131.5 70.0 70.0 31.7 12.0 0.0 2.50E-04 1.75E-02 2.30E+03

*EVE 115 23:05 53 47.44 130 41.16 ! Chart recorder rewind inoperative

*-----
*TRA T-name EIS1 EIS2-1 PIT DIS BEA TIM SPE
*TRA 21 398 463 3579 9.321 226.973 1.017 9.168
*LOU/ALL
N P LEN AREA DEP COL DCS DCB LCB VOL/D SURF/D BIOMASS
70 3815 18.4 34.1 67.5 67.5 18.0 9.1 13.3 9.68E-04 6.53E-02 2.23E+03
320 18276 89.4 165.6 69.5 69.5 25.0 10.6 0.0 3.94E-04 2.74E-02 4.53E+03

*DAT 18-NOV-87

*EVE 117 00:12 53 40.41 130 51.72

*

*TRA	T-name	EIS1	EIS2-1	PIT	DIS	BEA	TIM	SPE
*TRA 20		470	529	3483	9.667	47.987	0.983	9.831

*LOU/ALL

N	P	LEN	AREA	DEP	COL	DCS	DCB	LCB	VOL/D	SURF/D	BIOMASS
60	3483	17.9	33.2	73.5	73.5	23.0	3.2	3.3	4.59E-04	3.37E-02	1.12E+03
380	21759	107.3	198.7	70.2	70.2	24.6	9.1	0.0	4.05E-04	2.84E-02	5.65E+03

*EVE 120 01:19 53 46.36 130 38.19

*

*TRA	T-name	EIS1	EIS2-1	PIT	DIS	BEA	TIM	SPE
*TRA 19		538	601	3732	10.176	227.461	1.050	9.692

*LOU/ALL

N	P	LEN	AREA	DEP	COL	DCS	DCB	LCB	VOL/D	SURF/D	BIOMASS
65	3793	19.2	35.5	73.4	73.4	22.5	6.0	14.8	4.48E-04	3.29E-02	1.17E+03
445	25552	126.5	234.2	70.6	70.6	24.3	8.6	0.0	4.12E-04	2.91E-02	6.81E+03

*EVE 122 02:26 53 38.73 130 49.96

*

*TRA	T-name	EIS1	EIS2-1	PIT	DIS	BEA	TIM	SPE
*TRA 18		606	671	3839	10.735	49.018	1.067	10.064

*LOU/ALL

N	P	LEN	AREA	DEP	COL	DCS	DCB	LCB	VOL/D	SURF/D	BIOMASS
70	4076	21.1	39.1	71.6	71.6	24.4	6.6	4.1	4.04E-04	2.89E-02	1.13E+03
515	29628	147.6	273.3	70.8	70.8	24.3	8.3	0.0	4.11E-04	2.91E-02	7.94E+03

*EVE 125 03:42 53 44.30 130 37.42

*

*TRA	T-name	EIS1	EIS2-1	PIT	DIS	BEA	TIM	SPE
*TRA 17		683	743	3585	9.663	226.677	1.000	9.663

*LOU/ALL

N	P	LEN	AREA	DEP	COL	DCS	DCB	LCB	VOL/D	SURF/D	BIOMASS
65	3821	19.1	35.3	78.8	78.8	24.8	14.9	15.1	4.93E-04	3.89E-02	1.37E+03
580	33449	166.6	308.6	71.7	71.7	24.3	9.3	0.0	4.21E-04	3.02E-02	9.32E+03

*EVE 128 04:48 53 36.93 130 48.73

*

*TRA	T-name	EIS1	EIS2-1	PIT	DIS	BEA	TIM	SPE
*TRA 16		750	810	3525	9.826	49.971	1.033	9.509

*LOU/ALL

N	P	LEN	AREA	DEP	COL	DCS	DCB	LCB	VOL/D	SURF/D	BIOMASS
65	3745	19.3	35.8	81.0	81.0	32.4	12.9	2.4	4.12E-04	3.34E-02	1.19E+03
645	37194	186.0	344.4	72.7	72.7	25.3	9.7	0.0	4.20E-04	3.05E-02	1.05E+04

*EVE 133 05:56 53 42.11 130 36.54

*

*TRA	T-name	EIS1	EIS2-1	PIT	DIS	BEA	TIM	SPE
*TRA 15		820	881	3674	9.302	226.271	1.050	8.859

*LOU/ALL

N	P	LEN	AREA	DEP	COL	DCS	DCB	LCB	VOL/D	SURF/D	BIOMASS
65	3851	18.1	33.4	88.2	88.2	40.9	18.2	15.5	2.51E-04	2.22E-02	7.41E+02
710	41045	204.0	377.9	74.0	74.0	26.3	10.3	0.0	4.02E-04	2.98E-02	1.13E+04

*EVE 135 07:05 53 34.93 130 47.08

*

*TRA T-name	EIS1	EIS2-1	PIT	DIS	BEA	TIM	SPE
*TRA 14	888	937	2880	8.180	48.687	1.833	4.462

*LOU/ALL

N	P	LEN	AREA	DEP	COL	DCS	DCB	LCB	VOL/D	SURF/D	BIOMASS
50	2880	15.1	28.1	82.9	82.9	60.8	12.2	8.8	2.27E-04	1.88E-02	5.27E+02
760	43925	219.2	405.9	74.7	74.7	27.8	10.3	0.0	3.89E-04	2.90E-02	1.18E+04

*DAT 19-NOV-87
 *IDA 87J007.INT
 *UNI NM
 *WID 1.0
 *DEP/ALL 5,200

LYELL ISLAND TRANSECTS (Inshore)

*EVE 137 08:50 ! SHIP'S TRANSDUCER ON
 *EVE 139 08:57 52 42.70 131 35.32 ! Exit Beljay Bay

*

*TRA T-name	EIS1	EIS2-1	PIT	DIS	BEA	TIM	SPE
*TRA Q1	7	29	1339	3.671	45.995	0.383	9.575

*ZER

*LOU/ALL

N	P	LEN	AREA	DEP	COL	DCS	DCB	LCB	VOL/D	SURF/D	BIOMASS
25	1459	7.4	13.7	164.5	152.7	131.9	29.9	3.0	2.58E-04	3.94E-02	5.40E+02
25	1459	7.4	13.7	164.5	152.7	131.9	29.9	0.0	2.58E-04	3.94E-02	5.40E+02

*EVE 142 09:20 52 45.25 131 30.96

*

*TRA T-name	EIS1	EIS2-1	PIT	DIS	BEA	TIM	SPE
*TRA Q2	30	71	2428	6.901	322.429	0.683	10.100

*LOU/ALL

N	P	LEN	AREA	DEP	COL	DCS	DCB	LCB	VOL/D	SURF/D	BIOMASS
40	2308	12.1	22.5	86.6	86.0	142.4	-24.8	1.2	4.06E-04	3.49E-02	7.86E+02
65	3767	19.6	36.2	116.1	111.3	138.1	-2.5	0.0	3.29E-04	3.66E-02	1.33E+03

*EVE 144 10:01 52 50.72 131 37.92 ! Fish schools & bottom tracking problems

*

*TRA T-name	EIS1	EIS2-1	PIT	DIS	BEA	TIM	SPE
*TRA Q3	72	83	676	1.726	283.401	0.200	8.629

*LOU/ALL

N	P	LEN	AREA	DEP	COL	DCS	DCB	LCB	VOL/D	SURF/D	BIOMASS
15	856	4.0	7.5	115.3	113.2	104.7	25.6	2.4	2.73E-04	3.09E-02	2.31E+02
80	4623	23.6	43.7	116.0	111.6	133.2	1.7	0.0	3.19E-04	3.56E-02	1.56E+03

*EVE 145 10:13 52 51.12 131 40.70 ! Bottom tracking difficulties

*

*TRA T-name	EIS1	EIS2-1	PIT	DIS	BEA	TIM	SPE
*TRA Q4	84	97	822	2.295	297.227	0.550	4.173

*LOU/ALL

N	P	LEN	AREA	DEP	COL	DCS	DCB	LCB	VOL/D	SURF/D	BIOMASS
15	882	4.6	8.4	148.6	147.9	129.0	25.3	2.4	1.30E-04	1.93E-02	1.63E+02
95	5505	28.2	52.2	121.2	117.5	132.8	3.9	0.0	2.81E-04	3.30E-02	1.72E+03

*EVE 146 10:46 52 52.17 131 44.08

*-----
*TRA T-name EIS1 EIS2-1 PIT DIS BEA TIM SPE
*TRA Q5 98 114 966 2.773 257.290 23.950 0.116
*LOU/ALL
N P LEN AREA DEP COL DCS DCB LCB VOL/D SURF/D BIOMASS
15 846 4.5 8.3 141.7 141.7 116.5 25.2 2.2 1.11E-04 1.58E-02 1.31E+02
110 6351 32.7 60.5 124.1 120.8 131.6 5.4 0.0 2.53E-04 3.06E-02 1.85E+03

*EVE 147 10:43 52 51.56 131 48.56 ! Ship's sonar turned on at 10:52

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*TRA T-name EIS1 EIS2-1 PIT DIS BEA TIM SPE
*TRA Q6 115 134 1183 3.546 315.063 0.333 10.637
*LOU/ALL
N P LEN AREA DEP COL DCS DCB LCB VOL/D SURF/D BIOMASS
20 1182 6.6 12.2 117.1 117.1 102.1 20.2 2.6 8.99E-05 1.05E-02 1.28E+02
130 7533 39.2 72.6 122.9 120.2 129.7 6.4 0.0 2.27E-04 2.73E-02 1.98E+03

*EVE 154 12:23 52 50.72 131 37.87

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*TRA T-name EIS1 EIS2-1 PIT DIS BEA TIM SPE
*TRA Q7 195 212 1049 2.877 183.975 0.283 10.154
*LOU/ALL
N P LEN AREA DEP COL DCS DCB LCB VOL/D SURF/D BIOMASS
20 1168 5.9 11.0 79.5 79.5 69.5 11.1 3.0 3.28E-05 2.61E-03 2.86E+01
150 8701 45.2 83.6 117.2 114.8 128.9 6.4 0.0 2.09E-04 2.40E-02 2.01E+03

*EVE 155 12:40 52 47.85 131 38.20

*-----
*TRA T-name EIS1 EIS2-1 PIT DIS BEA TIM SPE
*TRA Q8 213 229 935 2.278 243.120 0.267 8.543
*LOU/ALL
N P LEN AREA DEP COL DCS DCB LCB VOL/D SURF/D BIOMASS
15 816 3.7 6.8 137.8 137.7 139.3 28.7 2.7 2.19E-04 3.02E-02 2.06E+02
165 9517 48.8 90.5 118.7 116.6 129.8 8.5 0.0 2.10E-04 2.45E-02 2.21E+03

*EVE 157 12:56 52 46.82 131 41.56

*-----
*TRA T-name EIS1 EIS2-1 PIT DIS BEA TIM SPE
*TRA Q9 230 235 300 0.883 263.496 0.067 13.241
*LOU/ALL
N P LEN AREA DEP COL DCS DCB LCB VOL/D SURF/D BIOMASS
10 537 2.9 5.4 187.7 182.1 155.7 31.8 1.4 2.89E-04 5.26E-02 2.85E+02
175 10054 51.8 95.9 122.6 120.3 132.8 11.2 0.0 2.17E-04 2.61E-02 2.50E+03

*EVE 160 13:24 52 46.54 131 45.63

*-----
*TRA T-name EIS1 EIS2-1 PIT DIS BEA TIM SPE
*TRA Q10 236 249 829 2.540 206.154 0.083 30.481
*LOU/ALL
N P LEN AREA DEP COL DCS DCB LCB VOL/D SURF/D BIOMASS
10 592 3.4 6.2 154.8 154.7 134.7 30.9 1.3 2.02E-04 3.12E-02 1.94E+02
185 10646 55.1 102.1 124.6 122.4 132.9 12.6 0.0 2.16E-04 2.64E-02 2.69E+03

*EVE 163 13:51 52 44.26 131 47.48

*TRA T-name	EIS1	EIS2-1	PIT	DIS	BEA	TIM	SPE					
*TRA Q11	257	277	1239	3.371	139.417	0.350	9.631					
*LOU/ALL												
N	P	LEN	AREA	DEP	COL	DCS	DCB	LCB	VOL/D	SURF/D	BIOMASS	
25	1475	7.4	13.8	69.5	69.5	82.4	-4.6	4.0	8.21E-05	5.71E-03	7.86E+01	
210	12121	62.6	115.9	118.1	116.1	131.5	12.1	0.0	2.06E-04	2.39E-02	2.77E+03	

*EVE 164 14:12 52 41.70 131 43.86

*TRA T-name	EIS1	EIS2-1	PIT	DIS	BEA	TIM	SPE					
*TRA Q12	278	299	1281	4.111	147.319	0.367	11.211					
*LOU/ALL												
N	P	LEN	AREA	DEP	COL	DCS	DCB	LCB	VOL/D	SURF/D	BIOMASS	
20	1163	6.9	12.8	43.2	43.2	46.3	2.5	4.3	1.03E-05	4.46E-04	5.71E+00	
230	13284	69.5	128.7	110.6	108.8	131.3	12.1	0.0	1.98E-04	2.16E-02	2.78E+03	

*EVE 165 14:34 52 38.24 131 40.20

*TRA T-name	EIS1	EIS2-1	PIT	DIS	BEA	TIM	SPE					
*TRA Q13	300	313	826	2.602	172.492	0.233	11.153					
*LOU/ALL												
N	P	LEN	AREA	DEP	COL	DCS	DCB	LCB	VOL/D	SURF/D	BIOMASS	
15	885	5.2	9.6	71.4	70.8	91.1	2.5	4.0	7.94E-05	5.63E-03	5.38E+01	
245	14169	74.6	138.2	107.9	106.2	130.5	11.9	0.0	1.93E-04	2.05E-02	2.83E+03	

*EVE 168 15:41 52 30.89 131 26.36 ! SHIP'S TRANSDUCER OFF

*EVE 169 16:02 52 30.80 131 22.81 ! TOWED BODY TRANSDUCER ON

*UNI NM

*WID 2.0

*DEP/ALL 5,200

LYELL ISLAND TRANSECTS (Offshore)

*EVE 171 16:47 52 30.67 131 11.3 ! Begin trackline 331.7' T

*TRA T-name	EIS1	EIS2-1	PIT	DIS	BEA	TIM	SPE					
*TRA Q16	414	534	7121	18.191	330.418	2.000	9.096					
*ZER												
*LOU/ALL												
N	P	LEN	AREA	DEP	COL	DCS	DCB	LCB	VOL/D	SURF/D	BIOMASS	
120	7062	33.4	123.8	104.5	104.5	73.5	27.1	16.1	1.82E-05	1.90E-03	2.35E+02	
120	7062	33.4	123.8	104.5	104.5	73.5	27.1	0.0	1.82E-05	1.90E-03	2.35E+02	

*EVE 175 19:01 52 48.07 131 24.45 ! Course 149.9' T

*TRA T-name	EIS1	EIS2-1	PIT	DIS	BEA	TIM	SPE					
*TRA Q17	549	702	9093	20.802	148.729	2.567	8.105					
*LOU/ALL												
N	P	LEN	AREA	DEP	COL	DCS	DCB	LCB	VOL/D	SURF/D	BIOMASS	
155	9153	38.8	143.6	105.5	105.5	67.1	42.6	18.0	1.65E-05	1.74E-03	2.49E+02	
275	16215	72.2	267.4	105.0	105.0	70.2	35.1	0.0	1.73E-05	1.81E-03	4.85E+02	

*EVE 178 21:52 52 30.06 131 02.90

*

*TRA T-name	EIS1	EIS2-1	PIT	DIS	BEA	TIM	SPE
*TRA Q18	721	864	8498	25.231	329.681	2.417	10.440

*LOU/ALL

N	P	LEN	AREA	DEP	COL	DCS	DCB	LCB	VOL/D	SURF/D	BIOMASS
145	8558	47.1	174.3	89.3	89.3	45.8	42.9	19.5	1.41E-05	1.26E-03	2.20E+02
420	24773	119.2	441.7	98.8	98.8	62.6	37.5	0.0	1.61E-05	1.59E-03	7.04E+02

*DAT 20-NOV-87

*IDA 87J008.INT

*EVE 186 00:29 52 52.24 131 20.81

*

*TRA T-name	EIS1	EIS2-1	PIT	DIS	BEA	TIM	SPE
*TRA Q19	9	145	8046	22.090	148.725	2.267	9.746

*LOU/ALL

N	P	LEN	AREA	DEP	COL	DCS	DCB	LCB	VOL/D	SURF/D	BIOMASS
140	8224	41.8	154.9	61.1	61.1	53.0	28.9	32.3	2.24E-05	1.37E-03	2.12E+02
560	32997	161.1	596.6	89.0	89.0	60.4	35.5	0.0	1.72E-05	1.54E-03	9.16E+02

*UNI NM

*WID 1.0

*DEP/ALL 5,120

JUAN PEREZ SOUND TRANSECTS (First Coverage)

*EVE 191 03:47 52 31.67 131 18.11 ! Bottom tracking difficulties

*

*TRA T-name	EIS1	EIS2-1	PIT	DIS	BEA	TIM	SPE
*TRA J1	208	239	1851	5.229	224.965	0.533	9.805

*ZER

*LOU/ALL

N	P	LEN	AREA	DEP	COL	DCS	DCB	LCB	VOL/D	SURF/D	BIOMASS
35	2022	10.6	19.6	86.7	63.8	18.7	24.3	4.4	6.12E-05	3.90E-03	7.65E+01
35	2022	10.6	19.6	86.7	63.8	18.7	24.3	0.0	6.12E-05	3.90E-03	7.65E+01

*EVE 194 04:25 52 28.60 131 25.18 ! Herring skimmer begins again

*

*TRA T-name	EIS1	EIS2-1	PIT	DIS	BEA	TIM	SPE
*TRA J2	247	277	1798	4.279	34.183	0.500	8.559

*LOU/ALL

N	P	LEN	AREA	DEP	COL	DCS	DCB	LCB	VOL/D	SURF/D	BIOMASS
35	2037	9.0	16.6	172.7	100.8	21.8	62.0	1.9	1.19E-03	1.20E-01	1.99E+03
70	4059	19.6	36.2	126.2	80.8	21.7	60.6	0.0	7.06E-04	5.70E-02	2.07E+03

*EVE 196 05:04 52 31.55 131 23.15

*

*TRA T-name	EIS1	EIS2-1	PIT	DIS	BEA	TIM	SPE
*TRA J3	286	306	1189	3.129	222.149	0.333	9.388

*LOU/ALL

N	P	LEN	AREA	DEP	COL	DCS	DCB	LCB	VOL/D	SURF/D	BIOMASS
25	1425	6.9	12.9	129.7	82.9	24.8	59.1	4.6	5.31E-04	4.40E-02	5.66E+02
95	5484	26.5	49.1	127.1	81.3	22.3	60.3	0.0	6.59E-04	5.36E-02	2.63E+03

*EVE 198 05:29 52 29.73 131 27.36

*-----
*TRA T-name EIS1 EIS2-1 PIT DIS BEA TIM SPE
*TRA J4 312 331 1141 3.015 35.971 0.317 9.521
*LOU/ALL
N P LEN AREA DEP COL DCS DCB LCB VOL/D SURF/D BIOMASS
20 1141 5.6 10.3 153.9 108.7 53.7 75.4 2.7 3.18E-04 3.46E-02 3.58E+02
115 6625 32.1 59.4 131.7 86.1 26.1 62.1 0.0 5.84E-04 5.03E-02 2.99E+03

*EVE 200 05:55 52 32.50 131 26.31

*-----
*TRA T-name EIS1 EIS2-1 PIT DIS BEA TIM SPE
*TRA J5 340 356 1017 2.146 235.022 0.300 7.152
*LOU/ALL
N P LEN AREA DEP COL DCS DCB LCB VOL/D SURF/D BIOMASS
20 1138 4.4 8.2 153.0 101.8 41.2 66.4 3.2 1.85E-04 1.89E-02 1.55E+02
135 7763 36.5 67.7 134.3 88.0 26.8 62.3 0.0 5.28E-04 4.65E-02 3.14E+03

*EVE 202 06:16 52 31.70 131 29.35

*-----
*TRA T-name EIS1 EIS2-1 PIT DIS BEA TIM SPE
*TRA J6 362 373 718 1.905 33.965 0.217 8.793
*LOU/ALL
N P LEN AREA DEP COL DCS DCB LCB VOL/D SURF/D BIOMASS
15 857 4.2 7.8 159.5 104.7 68.6 80.5 2.5 9.23E-04 9.66E-02 7.53E+02
150 8620 40.7 75.5 136.9 89.7 34.9 65.8 0.0 5.76E-04 5.17E-02 3.90E+03

*EVE 204 06:36 52 33.86 131 28.96

*-----
*TRA T-name EIS1 EIS2-1 PIT DIS BEA TIM SPE
*TRA J7 382 393 720 2.210 221.320 0.217 10.201
*LOU/ALL
N P LEN AREA DEP COL DCS DCB LCB VOL/D SURF/D BIOMASS
15 896 5.1 9.4 158.3 97.1 45.5 47.8 3.9 4.72E-04 4.58E-02 4.32E+02
165 9516 45.8 84.9 139.3 90.5 36.0 64.0 0.0 5.63E-04 5.10E-02 4.33E+03

*EVE 207 06:55 52 33.10 131 32.00

*-----
*TRA T-name EIS1 EIS2-1 PIT DIS BEA TIM SPE
*TRA J8 402 415 802 2.226 37.321 0.233 9.539
*LOU/ALL
N P LEN AREA DEP COL DCS DCB LCB VOL/D SURF/D BIOMASS
15 861 4.4 8.2 132.2 110.2 85.0 55.2 1.3 3.87E-04 4.27E-02 3.50E+02
180 10377 50.3 93.1 138.7 92.3 39.6 63.4 0.0 5.45E-04 5.03E-02 4.68E+03

*EVE 209 07:14 52 35.27 131 30.42

*-----
*TRA T-name EIS1 EIS2-1 PIT DIS BEA TIM SPE
*TRA J9 421 432 603 1.685 214.999 0.167 10.108
*LOU/ALL
N P LEN AREA DEP COL DCS DCB LCB VOL/D SURF/D BIOMASS
15 780 4.0 7.5 96.8 88.6 41.7 47.9 2.6 7.67E-04 6.79E-02 5.08E+02
195 11157 54.3 100.6 135.6 92.0 39.8 61.9 0.0 5.61E-04 5.16E-02 5.19E+03

*DAT 20-NOV-87
*IDA 87J009.INT
*UNI NM
*WID 1.0
*DEP/ALL 5,120

JUAN PEREZ SOUND TRANSECTS (Second Coverage)

*EVE 219 16:42 52 33.58 131 33.12 ! Start main transects

*TRA T-name EIS1 EIS2-1 PIT DIS BEA TIM SPE
*TRA J12 29 76 2843 8.254 125.304 0.800 10.317
*ZER
*LOU/ALL
N P LEN AREA DEP COL DCS DCB LCB VOL/D SURF/D BIOMASS
50 2962 15.9 29.5 150.8 104.9 60.8 53.4 11.2 4.41E-03 4.62E-01 1.36E+04
50 2962 15.9 29.5 150.8 104.9 60.8 53.4 0.0 4.41E-03 4.62E-01 1.36E+04

*EVE 221 17:35 52 29.41 131 21.68

*TRA T-name EIS1 EIS2-1 PIT DIS BEA TIM SPE
*TRA J13 83 129 2767 7.285 307.257 0.783 9.299
*LOU/ALL
N P LEN AREA DEP COL DCS DCB LCB VOL/D SURF/D BIOMASS
50 2947 14.4 26.6 187.2 112.9 70.1 83.2 8.0 7.78E-04 8.79E-02 2.34E+03
100 5909 30.3 56.1 168.0 108.7 62.2 57.8 0.0 2.62E-03 2.85E-01 1.60E+04

*EVE 226 19:24 52 34.27 131 30.17

*TRA T-name EIS1 EIS2-1 PIT DIS BEA TIM SPE
*TRA J16 192 236 2694 7.673 127.774 0.800 9.591
*LOU/ALL
N P LEN AREA DEP COL DCS DCB LCB VOL/D SURF/D BIOMASS
45 2694 14.2 26.3 148.5 106.2 74.1 54.6 5.8 2.92E-04 3.11E-02 8.18E+02
145 8603 44.5 82.4 161.8 107.9 62.7 57.6 0.0 1.89E-03 2.04E-01 1.68E+04

*DAT 21-NOV-87
*IDA 87J010.INT
*UNI NM
*WID 1.0
*DEP/ALL 5,200

SKINCUTTLE AREA TRANSECTS

*EVE 230 01:05 52 30.43 131 13.23

*TRA T-name EIS1 EIS2-1 PIT DIS BEA TIM SPE
*TRA R1 6 12 414 1.049 86.720 0.133 7.865
*ZER
*LOU/ALL
N P LEN AREA DEP COL DCS DCB LCB VOL/D SURF/D BIOMASS
10 591 2.8 5.1 104.3 104.3 103.0 2.0 0.8 1.91E-04 2.00E-02 1.03E+02
10 591 2.8 5.1 104.3 104.3 103.0 2.0 0.0 1.91E-04 2.00E-02 1.03E+02

*EVE 231 01:13 52 30.49 131 11.51

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*TRA T-name EIS1 EIS2-1 PIT DIS BEA TIM SPE
*TRA RR1 13 30 1028 2.656 92.158 0.283 9.373

N P LEN AREA DEP COL DCS DCB LCB VOL/D SURF/D BIOMASS
15 851 4.1 7.5 85.2 85.2 69.6 16.0 1.9 1.33E-05 1.14E-03 8.58E+00
25 1442 6.8 12.7 92.9 92.9 100.4 3.1 0.0 9.43E-05 8.76E-03 1.11E+02

*EVE 232 01:30 52 30.39 131 07.15

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*TRA T-name EIS1 EIS2-1 PIT DIS BEA TIM SPE
*TRA R2 31 59 1654 4.756 153.610 0.483 9.839
*LOU/ALL
N P LEN AREA DEP COL DCS DCB LCB VOL/D SURF/D BIOMASS
30 1713 9.1 16.9 64.4 64.4 36.5 32.2 4.6 1.04E-05 6.70E-04 1.13E+01
55 3155 16.0 29.6 76.7 76.7 94.5 5.8 0.0 5.40E-05 4.14E-03 1.22E+02

*EVE 233 01:59 52 26.13 131 03.68

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*TRA T-name EIS1 EIS2-1 PIT DIS BEA TIM SPE
*TRA R3 60 88 1657 3.410 189.786 0.467 7.306
*LOU/ALL
N P LEN AREA DEP COL DCS DCB LCB VOL/D SURF/D BIOMASS
30 1716 6.5 12.1 64.3 64.3 36.9 19.1 1.9 3.15E-05 2.03E-03 2.46E+01
85 4871 22.5 41.7 73.1 73.1 84.9 8.0 0.0 4.82E-05 3.53E-03 1.47E+02

*EVE 234 02:27 52 22.77 131 04.63

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*TRA T-name EIS1 EIS2-1 PIT DIS BEA TIM SPE
*TRA R4 89 97 484 1.160 234.123 0.117 9.946
*LOU/ALL
N P LEN AREA DEP COL DCS DCB LCB VOL/D SURF/D BIOMASS
10 543 2.4 4.5 84.1 84.1 89.3 -3.5 0.8 2.02E-04 1.70E-02 7.59E+01
95 5414 24.9 46.1 74.1 74.1 86.4 4.1 0.0 6.51E-05 4.83E-03 2.23E+02

*EVE 235 02:34 52 22.09 131 06.17

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*TRA T-name EIS1 EIS2-1 PIT DIS BEA TIM SPE
*TRA R5 98 117 1124 2.971 169.336 0.333 8.914
*LOU/ALL
N P LEN AREA DEP COL DCS DCB LCB VOL/D SURF/D BIOMASS
20 1124 5.5 10.2 82.8 82.8 69.1 13.4 2.7 4.78E-06 3.96E-04 4.03E+00
115 6538 30.4 56.3 75.7 75.7 86.1 4.3 0.0 5.32E-05 4.03E-03 2.27E+02

*EVE 236 02:54 52 19.17 131 05.27

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*TRA T-name EIS1 EIS2-1 PIT DIS BEA TIM SPE
*TRA R6 118 128 631 1.826 120.621 0.167 10.955
*LOU/ALL
N P LEN AREA DEP COL DCS DCB LCB VOL/D SURF/D BIOMASS
10 572 3.1 5.7 64.6 64.6 50.4 14.9 1.4 5.43E-06 3.51E-04 1.99E+00
125 7110 33.5 62.0 74.7 74.7 85.8 4.3 0.0 4.94E-05 3.69E-03 2.29E+02

*EVE 237 03:04 52 18.24 131 02.70 ! No fish on echogram

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*TRA T-name EIS1 EIS2-1 PIT DIS BEA TIM SPE
*TRA R7 129 169 2404 6.747 145.202 0.683 9.873
*LOU/ALL
N P LEN AREA DEP COL DCS DCB LCB VOL/D SURF/D BIOMASS
40 2346 12.2 22.6 106.9 106.9 77.7 13.6 4.0 4.28E-04 4.58E-02 1.03E+03
165 9456 45.7 84.6 83.3 83.3 79.1 12.0 0.0 1.79E-04 1.49E-02 1.26E+03

*EVE 238 03:45 52 12.70 130 56.41

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*TRA T-name EIS1 EIS2-1 PIT DIS BEA TIM SPE
*TRA R8 170 190 1240 3.046 183.693 0.350 8.704
*LOU/ALL
N P LEN AREA DEP COL DCS DCB LCB VOL/D SURF/D BIOMASS
20 1180 5.4 9.9 86.9 86.9 90.3 -0.6 3.5 5.17E-05 4.49E-03 4.47E+01
185 10636 51.0 94.5 83.7 83.7 79.5 11.5 0.0 1.65E-04 1.38E-02 1.31E+03

*EVE 239 04:06 52 09.66 130 56.73

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*TRA T-name EIS1 EIS2-1 PIT DIS BEA TIM SPE
*TRA R9 191 204 790 2.149 272.134 0.217 9.916
*LOU/ALL
N P LEN AREA DEP COL DCS DCB LCB VOL/D SURF/D BIOMASS
15 850 4.3 7.9 73.1 73.1 79.1 -2.1 1.3 1.02E-03 7.46E-02 5.92E+02
200 11486 55.3 102.5 82.8 82.8 79.4 7.3 0.0 2.24E-04 1.85E-02 1.90E+03

*EVE 240 04:19 52 09.74 131 00.23

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*TRA T-name EIS1 EIS2-1 PIT DIS BEA TIM SPE
*TRA R10 205 210 355 0.889 187.938 0.117 7.616
*LOU/ALL
N P LEN AREA DEP COL DCS DCB LCB VOL/D SURF/D BIOMASS
5 295 1.4 2.5 96.1 96.1 95.4 0.8 0.7 6.64E-04 6.39E-02 1.62E+02
205 11781 56.7 105.0 83.2 83.2 80.6 6.8 0.0 2.36E-04 1.96E-02 2.06E+03

*EVE 241 04:26 52 08.86 131 00.43

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*TRA T-name EIS1 EIS2-1 PIT DIS BEA TIM SPE
*TRA R11 211 233 1267 3.117 90.368 0.333 9.352
*LOU/ALL
N P LEN AREA DEP COL DCS DCB LCB VOL/D SURF/D BIOMASS
25 1387 6.3 11.7 98.7 98.7 130.5 -15.3 4.0 2.25E-04 2.22E-02 2.60E+02
230 13168 63.0 116.7 84.7 84.7 86.2 4.3 0.0 2.35E-04 1.99E-02 2.32E+03

*EVE 242 04:46 52 08.84 130 55.35 ! Bottom tracking difficulties

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*TRA T-name EIS1 EIS2-1 PIT DIS BEA TIM SPE
*TRA R12 234 254 1245 3.475 3.035 0.367 9.477
*LOU/ALL
N P LEN AREA DEP COL DCS DCB LCB VOL/D SURF/D BIOMASS
20 1184 6.1 11.3 162.7 162.2 180.5 -11.9 3.0 2.70E-05 4.38E-03 4.97E+01
250 14352 69.1 128.0 91.6 91.6 88.2 3.9 0.0 2.02E-04 1.85E-02 2.37E+03

*EVE 243 05:08 52 12.31 130 55.05 ! Bottom tracking difficulties

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*TRA T-name EIS1 EIS2-1 PIT DIS BEA TIM SPE
*TRA R13 255 335 4765 12.051 329.938 1.350 8.927
*LOU/ALL
N P LEN AREA DEP COL DCS DCB LCB VOL/D SURF/D BIOMASS
80 4706 22.0 40.8 127.1 126.8 141.1 0.6 9.2 1.00E-03 1.27E-01 5.19E+03
330 19058 91.2 168.9 100.2 100.1 124.5 1.6 0.0 4.47E-04 4.48E-02 7.56E+03

*EVE 246 06:29 52 22.74 131 04.92 ! Bottom tracking difficulties

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*TRA T-name EIS1 EIS2-1 PIT DIS BEA TIM SPE
*TRA R14 336 359 1392 3.547 269.354 0.400 8.867
*LOU/ALL
N P LEN AREA DEP COL DCS DCB LCB VOL/D SURF/D BIOMASS
25 1452 6.9 12.7 61.6 61.6 21.4 56.5 1.1 5.80E-04 3.58E-02 4.54E+02
355 20510 98.0 181.6 97.5 97.4 118.7 4.7 0.0 4.53E-04 4.42E-02 8.02E+03

*EVE 247 06:53 52 22.70 131 10.73

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*TRA T-name EIS1 EIS2-1 PIT DIS BEA TIM SPE
*TRA R15 360 369 538 1.440 229.761 0.150 9.598
*LOU/ALL
N P LEN AREA DEP COL DCS DCB LCB VOL/D SURF/D BIOMASS
10 537 2.7 4.9 52.5 52.5 46.6 12.3 2.0 7.04E-04 3.70E-02 1.82E+02
365 21047 100.7 186.5 96.3 96.2 117.1 4.9 0.0 4.57E-04 4.40E-02 8.20E+03

*EVE 248 07:02 52 21.77 131 12.53

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*TRA T-name EIS1 EIS2-1 PIT DIS BEA TIM SPE
*TRA R16 370 376 416 0.988 317.645 0.117 8.467
*LOU/ALL
N P LEN AREA DEP COL DCS DCB LCB VOL/D SURF/D BIOMASS
10 593 2.6 4.8 80.9 80.9 80.7 25.4 0.7 9.56E-04 7.73E-02 3.74E+02
375 21640 103.3 191.3 95.9 95.8 115.5 5.8 0.0 4.68E-04 4.48E-02 8.57E+03

*EVE 249 07:09 52 22.50 131 13.62

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*TRA T-name EIS1 EIS2-1 PIT DIS BEA TIM SPE
*TRA R17 377 386 590 1.559 40.821 0.167 9.356
*LOU/ALL
N P LEN AREA DEP COL DCS DCB LCB VOL/D SURF/D BIOMASS
10 590 2.9 5.3 59.9 59.9 39.7 15.0 0.8 2.62E-03 1.57E-01 8.40E+02
385 22230 106.2 196.7 94.9 94.9 108.7 6.6 0.0 5.05E-04 4.79E-02 9.41E+03

*EVE 250 07:19 52 23.68 131 11.95

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*TRA T-name EIS1 EIS2-1 PIT DIS BEA TIM SPE
*TRA R18 387 419 1935 4.889 88.476 0.533 9.168
*LOU/ALL
N P LEN AREA DEP COL DCS DCB LCB VOL/D SURF/D BIOMASS
29 1522 8.3 15.3 60.2 60.2 68.3 -1.5 3.7 2.74E-04 1.65E-02 2.53E+02
414 23752 114.5 212.0 92.4 92.4 107.7 6.4 0.0 4.94E-04 4.56E-02 9.67E+03

*DAT 21-NOV-87
*IDA 87J011.INT
*UNI NM

*EVE 252 08:33 52 20.85 131 10.50 ! SHIP'S TRANSDUCER ON

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*TRA T-name	EIS1	EIS2-1	PIT	DIS	BEA	TIM	SPE
*TRA R19	2	28	1574	2.777	236.066	0.433	6.407

*LOU/ALL

N	P	LEN	AREA	DEP	COL	DCS	DCB	LCB	VOL/D	SURF/D	BIOMASS
30	1751	5.7	10.6	82.7	82.7	74.1	24.6	3.2	6.03E-04	4.99E-02	5.29E+02
444	25503	120.2	222.6	92.0	91.9	105.9	7.4	0.0	4.98E-04	4.58E-02	1.02E+04

*EVE 253 08:59 52 19.30 131 14.27

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*TRA T-name	EIS1	EIS2-1	PIT	DIS	BEA	TIM	SPE
*TRA R20	29	43	832	1.596	253.998	0.233	6.841

*LOU/ALL

N	P	LEN	AREA	DEP	COL	DCS	DCB	LCB	VOL/D	SURF/D	BIOMASS
15	832	3.0	5.5	42.6	42.6	37.4	10.1	1.1	3.26E-04	1.39E-02	7.61E+01
459	26335	123.1	228.1	90.8	90.7	105.4	7.4	0.0	4.97E-04	4.50E-02	1.03E+04

*EVE 254 09:13 52 18.86 131 16.78

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*TRA T-name	EIS1	EIS2-1	PIT	DIS	BEA	TIM	SPE
*TRA R21	44	73	1726	0.889	259.629	0.500	1.777

*LOU/ALL

N	P	LEN	AREA	DEP	COL	DCS	DCB	LCB	VOL/D	SURF/D	BIOMASS
30	1726	1.6	3.0	38.5	38.5	39.6	7.8	0.4	1.85E-04	7.12E-03	2.17E+01
489	28061	124.8	231.1	90.1	90.0	105.3	7.4	0.0	4.95E-04	4.45E-02	1.03E+04

*EVE 255 09:43 52 18.70 131 18.21 ! Turn 180 in Skincuttle Inlet

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*TRA T-name	EIS1	EIS2-1	PIT	DIS	BEA	TIM	SPE
*TRA R22	74	101	1624	0.822	81.605	0.433	1.897

*LOU/ALL

N	P	LEN	AREA	DEP	COL	DCS	DCB	LCB	VOL/D	SURF/D	BIOMASS
25	1447	1.4	2.5	40.3	40.3	39.6	1.2	0.6	2.15E-05	8.65E-04	2.17E+00
514	29508	126.2	233.6	89.6	89.5	105.3	7.4	0.0	4.92E-04	4.41E-02	1.03E+04

*EVE 257 10:09 52 18.82 131 16.88

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*TRA T-name	EIS1	EIS2-1	PIT	DIS	BEA	TIM	SPE
*TRA R23	102	116	879	2.333	71.509	0.267	8.749

*LOU/ALL

N	P	LEN	AREA	DEP	COL	DCS	DCB	LCB	VOL/D	SURF/D	BIOMASS
15	879	4.3	8.0	56.8	56.8	46.3	13.0	2.2	2.00E-05	1.13E-03	9.07E+00
529	30387	130.5	241.6	88.5	88.4	105.2	7.4	0.0	4.82E-04	4.26E-02	1.03E+04

*EVE 259 10:25 52 19.56 131 13.26

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*TRA T-name EIS1 EIS2-1 PIT DIS BEA TIM SPE
*TRA R24 117 134 1012 1.831 52.282 0.300 6.102
*LOU/ALL
N P LEN AREA DEP COL DCS DCB LCB VOL/D SURF/D BIOMASS
20 1130 3.8 7.0 76.9 76.9 75.0 2.2 2.1 5.07E-05 3.90E-03 2.74E+01
549 31517 134.3 248.6 88.2 88.1 105.1 7.4 0.0 4.72E-04 4.16E-02 1.03E+04

*EVE 260 10:43 52 20.68 131 10.89 ! SHIP'S TRANSDUCER OFF

*EVE 261 12:43 52 27.48 131 10.42 ! TOWED BODY TRANSDUCER ON

*IDA 87J012.INT
*UNI NM
*WID 1.0
*DEP/ALL 5,200

JUAN PEREZ TRANSECTS (Third Coverage)

*EVE 263 13:29 52 29.63 131 19.90

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*TRA T-name EIS1 EIS2-1 PIT DIS BEA TIM SPE
*TRA J16 31 78 2859 7.938 306.574 0.817 9.720
*ZER
*LOU/ALL
N P LEN AREA DEP COL DCS DCB LCB VOL/D SURF/D BIOMASS
50 2978 15.3 28.4 149.8 142.9 127.5 35.4 7.6 2.82E-04 4.03E-02 1.14E+03
50 2978 15.3 28.4 149.8 142.9 127.5 35.4 0.0 2.82E-04 4.03E-02 1.14E+03

*EVE 265 14:24 52 33.56 131 31.20

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*TRA T-name EIS1 EIS2-1 PIT DIS BEA TIM SPE
*TRA J13 86 133 2811 7.453 128.995 0.783 9.515
*LOU/ALL
N P LEN AREA DEP COL DCS DCB LCB VOL/D SURF/D BIOMASS
50 2930 14.4 26.6 164.3 153.8 119.6 38.0 8.5 1.15E-04 1.76E-02 4.70E+02
100 5908 29.7 55.0 156.8 148.2 125.2 36.1 0.0 1.98E-04 2.93E-02 1.61E+03

*EVE 267 15:15 52 28.63 131 22.30

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*TRA T-name EIS1 EIS2-1 PIT DIS BEA TIM SPE
*TRA J12 137 189 3036 8.273 305.634 0.850 9.733
*LOU/ALL
N P LEN AREA DEP COL DCS DCB LCB VOL/D SURF/D BIOMASS
55 3156 15.9 29.5 155.5 148.6 71.3 45.0 5.6 6.86E-04 1.02E-01 3.01E+03
155 9064 45.6 84.5 156.4 148.3 90.1 41.9 0.0 3.69E-04 5.47E-02 4.62E+03

*IDA 87J013.INT
*UNI NM
*WID 1.0
*DEP/ALL 5,200

MID-HECATE STRAIT TRANSECTS

*EVE 274 21:55 52 33.83 131 10.60

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*TRA T-name EIS1 EIS2-1 PIT DIS BEA TIM SPE
*TRA H1 6 63 3366 8.960 56.693 0.967 9.269

*ZER

*LOU/ALL

N	P	LEN	AREA	DEP	COL	DCS	DCB	LCB	VOL/D	SURF/D	BIOMASS
60	3484	17.2	31.8	76.1	76.1	41.9	28.3	9.9	2.06E-05	1.57E-03	5.00E+01
60	3484	17.2	31.8	76.1	76.1	41.9	28.3	0.0	2.06E-05	1.57E-03	5.00E+01

*EVE 275 22:53 52 38.75 130 58.27

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*TRA T-name EIS1 EIS2-1 PIT DIS BEA TIM SPE
*TRA H2 64 96 1925 4.851 82.062 0.550 8.820

*LOU/ALL

N	P	LEN	AREA	DEP	COL	DCS	DCB	LCB	VOL/D	SURF/D	BIOMASS
35	2043	9.5	17.7	60.2	60.2	39.1	22.9	5.5	6.32E-06	3.81E-04	6.72E+00
95	5527	26.7	49.5	70.5	70.5	41.6	27.7	0.0	1.63E-05	1.15E-03	5.67E+01

*EVE 276 23:26 52 39.42 130 50.35

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*TRA T-name EIS1 EIS2-1 PIT DIS BEA TIM SPE
*TRA H3 97 130 1932 5.200 0.200 0.483 10.759

*LOU/ALL

N	P	LEN	AREA	DEP	COL	DCS	DCB	LCB	VOL/D	SURF/D	BIOMASS
30	1696	8.5	15.7	61.0	61.0	37.6	20.1	5.6	7.08E-06	4.32E-04	6.76E+00
125	7223	35.2	65.1	68.2	68.2	41.1	26.9	0.0	1.43E-05	9.75E-04	6.35E+01

*EVE 277 23:55 52 44.62 130 50.32

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*TRA T-name EIS1 EIS2-1 PIT DIS BEA TIM SPE
*TRA H4 131 162 1874 4.826 84.888 0.533 9.048

*LOU/ALL

N	P	LEN	AREA	DEP	COL	DCS	DCB	LCB	VOL/D	SURF/D	BIOMASS
35	2051	9.8	18.1	66.0	66.0	38.4	29.7	5.7	2.32E-06	1.53E-04	2.77E+00
160	9274	44.9	83.2	67.7	67.7	41.0	27.0	0.0	1.18E-05	7.96E-04	6.62E+01

*DAT 22-NOV-87

*EVE 278 00:27 52 45.05 130 42.38

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*TRA T-name EIS1 EIS2-1 PIT DIS BEA TIM SPE
*TRA H5 163 189 1569 4.593 355.771 0.433 10.598

*LOU/ALL

N	P	LEN	AREA	DEP	COL	DCS	DCB	LCB	VOL/D	SURF/D	BIOMASS
25	1451	7.9	14.6	62.0	62.0	31.1	26.3	5.3	4.86E-06	3.01E-04	4.39E+00
185	10725	52.8	97.8	66.8	66.8	40.4	27.0	0.0	1.08E-05	7.22E-04	7.06E+01

*EVE 279 00:53 52 49.63 130 42.94

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*TRA T-name EIS1 EIS2-1 PIT DIS BEA TIM SPE
*TRA H6 190 222 1891 5.176 65.698 0.550 9.410
*LOU/ALL
N P LEN AREA DEP COL DCS DCB LCB VOL/D SURF/D BIOMASS
35 2009 10.2 18.9 67.6 67.6 26.6 44.7 6.5 1.80E-06 1.22E-04 2.30E+00
220 12734 63.0 116.7 67.0 67.0 40.0 27.5 0.0 9.33E-06 6.25E-04 7.29E+01

*EVE 280 01:26 52 51.76 130 35.13

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*TRA T-name EIS1 EIS2-1 PIT DIS BEA TIM SPE
*TRA H7 223 251 1702 4.676 326.302 0.467 10.019
*LOU/ALL
N P LEN AREA DEP COL DCS DCB LCB VOL/D SURF/D BIOMASS
30 1761 9.0 16.6 52.7 52.7 31.6 16.2 5.6 3.45E-06 1.82E-04 3.02E+00
250 14495 72.0 133.3 65.2 65.2 39.6 27.1 0.0 8.74E-06 5.70E-04 7.60E+01

*EVE 281 01:54 52 55.65 130 39.43

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*TRA T-name EIS1 EIS2-1 PIT DIS BEA TIM SPE
*TRA H8 252 281 1739 5.078 338.355 0.500 10.156
*LOU/ALL
N P LEN AREA DEP COL DCS DCB LCB VOL/D SURF/D BIOMASS
30 1739 9.4 17.4 73.2 73.2 37.4 38.1 4.3 3.00E-05 2.19E-03 3.82E+01
280 16234 81.4 150.7 66.1 66.1 38.9 30.8 0.0 1.15E-05 7.58E-04 1.14E+02

*EVE 283 02:24 53 00.37 130 42.54

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*TRA T-name EIS1 EIS2-1 PIT DIS BEA TIM SPE
*TRA H9 282 313 1885 4.968 282.909 0.533 9.316
*LOU/ALL
N P LEN AREA DEP COL DCS DCB LCB VOL/D SURF/D BIOMASS
30 1767 8.6 16.0 60.9 60.9 61.6 3.2 3.8 2.19E-05 1.34E-03 2.13E+01
310 18001 90.0 166.7 65.6 65.6 42.5 26.4 0.0 1.24E-05 8.13E-04 1.36E+02

*EVE 284 02:56 53 01.48 130 50.59

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*TRA T-name EIS1 EIS2-1 PIT DIS BEA TIM SPE
*TRA H10 314 346 1906 5.210 6.157 0.533 9.769
*LOU/ALL
N P LEN AREA DEP COL DCS DCB LCB VOL/D SURF/D BIOMASS
35 2024 10.2 19.0 75.3 75.3 66.7 8.6 5.5 2.08E-05 1.57E-03 2.97E+01
345 20025 100.2 185.6 66.6 66.6 46.8 23.2 0.0 1.34E-05 8.90E-04 1.65E+02

*EVE 285 03:28 53 06.66 130 49.66 ! Scattering layer near bottom

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*TRA T-name EIS1 EIS2-1 PIT DIS BEA TIM SPE
*TRA H11 347 378 1855 5.031 297.462 0.517 9.737
*LOU/ALL
N P LEN AREA DEP COL DCS DCB LCB VOL/D SURF/D BIOMASS
30 1737 8.7 16.2 60.9 60.9 59.2 5.4 3.4 1.21E-04 7.38E-03 1.19E+02
375 21762 109.0 201.8 66.1 66.1 52.0 15.8 0.0 2.13E-05 1.41E-03 2.84E+02

*EVE 286 03:59 53 08.98 130 57.10

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*TRA T-name	EIS1	EIS2-1	PIT	DIS	BEA	TIM	SPE
*TRA H12	379	411	1920	4.846	30.628	0.550	8.811

*LOU/ALL

N	P	LEN	AREA	DEP	COL	DCS	DCB	LCB	VOL/D	SURF/D	BIOMASS
35	2038	9.5	17.6	69.5	69.5	67.6	5.6	6.0	1.23E-04	8.52E-03	1.50E+02
410	23800	118.5	219.4	66.4	66.4	57.4	12.3	0.0	2.98E-05	1.98E-03	4.35E+02

*EVE 287 04:32 53 13.15 130 52.98

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*TRA T-name	EIS1	EIS2-1	PIT	DIS	BEA	TIM	SPE
*TRA H13	412	447	2112	5.268	312.221	0.567	9.296

*LOU/ALL

N	P	LEN	AREA	DEP	COL	DCS	DCB	LCB	VOL/D	SURF/D	BIOMASS
35	2054	9.5	17.6	60.4	60.4	62.8	2.7	2.9	9.52E-05	5.75E-03	1.01E+02
445	25854	128.0	237.0	66.0	66.0	58.4	10.5	0.0	3.43E-05	2.26E-03	5.36E+02

*EVE 288 05:06 53 16.69 130 59.50 ! Bottom Scattering layer thinned out

*

*TRA T-name	EIS1	EIS2-1	PIT	DIS	BEA	TIM	SPE
*TRA H14	448	481	2001	4.985	36.643	0.583	8.546

*LOU/ALL

N	P	LEN	AREA	DEP	COL	DCS	DCB	LCB	VOL/D	SURF/D	BIOMASS
35	2063	9.5	17.6	71.1	71.1	57.0	4.5	2.8	3.33E-05	2.37E-03	4.17E+01
480	27917	137.5	254.6	66.3	66.3	58.3	10.0	0.0	3.42E-05	2.27E-03	5.77E+02

*EVE 289 05:41 53 20.69 130 54.52

*

*TRA T-name	EIS1	EIS2-1	PIT	DIS	BEA	TIM	SPE
*TRA H15	482	511	1746	4.770	313.604	0.517	9.233

*LOU/ALL

N	P	LEN	AREA	DEP	COL	DCS	DCB	LCB	VOL/D	SURF/D	BIOMASS
30	1742	8.8	16.3	66.8	66.8	52.2	9.3	5.6	2.84E-05	1.89E-03	3.09E+01
510	29659	146.3	271.0	66.4	66.4	58.0	10.0	0.0	3.38E-05	2.25E-03	6.08E+02

*EVE 291 06:12 53 23.98 131 00.31

*

*TRA T-name	EIS1	EIS2-1	PIT	DIS	BEA	TIM	SPE
*TRA H16	512	544	1904	4.589	71.712	0.533	8.604

*LOU/ALL

N	P	LEN	AREA	DEP	COL	DCS	DCB	LCB	VOL/D	SURF/D	BIOMASS
30	1727	7.7	14.3	78.6	78.6	56.8	20.7	3.8	1.01E-05	7.90E-04	1.13E+01
540	31386	154.0	285.2	67.0	67.0	58.0	10.2	0.0	3.24E-05	2.17E-03	6.20E+02

*UNI NM

*WID 1.2

*DEP/ALL 5,200

SW BONILLA ISLAND TRANSECTS

*EVE 292 06:44 53 25.42 130 53.00

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*TRA T-name EIS1 EIS2-1 PIT DIS BEA TIM SPE
*TRA B1 545 575 1822 4.836 301.268 0.500 9.672
*ZER
*LOU/ALL
N P LEN AREA DEP COL DCS DCB LCB VOL/D SURF/D BIOMASS
30 1763 8.7 19.3 63.0 63.0 52.0 9.3 5.1 3.90E-05 2.46E-03 4.73E+01
30 1763 8.7 19.3 63.0 63.0 52.0 9.3 0.0 3.90E-05 2.46E-03 4.73E+01

*EVE 294 07:21 53 29.04 130 58.63

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*TRA T-name EIS1 EIS2-1 PIT DIS BEA TIM SPE
*TRA B2 584 624 2407 5.500 121.577 0.700 7.857
*LOU/ALL
N P LEN AREA DEP COL DCS DCB LCB VOL/D SURF/D BIOMASS
45 2643 11.2 24.9 71.2 71.2 50.7 11.6 3.6 3.78E-05 2.69E-03 6.69E+01
75 4406 19.9 44.1 67.6 67.6 51.3 10.6 0.0 3.83E-05 2.59E-03 1.14E+02

*EVE 296 08:11 53 27.20 130 50.12 ! Fish schools

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*TRA T-name EIS1 EIS2-1 PIT DIS BEA TIM SPE
*TRA B3 634 666 1909 5.371 301.922 0.550 9.766
*LOU/ALL
N P LEN AREA DEP COL DCS DCB LCB VOL/D SURF/D BIOMASS
35 2027 10.6 23.5 60.7 60.7 56.1 7.4 5.1 8.26E-05 5.01E-03 1.18E+02
110 6433 30.4 67.6 65.2 65.2 53.7 9.0 0.0 5.26E-05 3.43E-03 2.32E+02

*EVE 298 08:52 53 30.97 130 56.71 ! Fish schools, 60-70 m bottom

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*TRA T-name EIS1 EIS2-1 PIT DIS BEA TIM SPE
*TRA B4 676 719 2552 5.415 120.278 0.733 7.384
*LOU/ALL
N P LEN AREA DEP COL DCS DCB LCB VOL/D SURF/D BIOMASS
45 2611 10.3 22.8 59.8 59.8 46.1 5.9 3.4 9.59E-05 5.74E-03 1.31E+02
155 9044 40.7 90.4 63.9 63.9 51.0 7.9 0.0 6.28E-05 4.01E-03 3.63E+02

*EVE 300 09:44 53 29.35 130 48.25 ! Fish schools, 70-80 m bottom

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*TRA T-name EIS1 EIS2-1 PIT DIS BEA TIM SPE
*TRA B5 729 758 1769 4.978 303.392 0.500 9.957
*LOU/ALL
N P LEN AREA DEP COL DCS DCB LCB VOL/D SURF/D BIOMASS
30 1769 9.2 20.5 55.6 55.6 61.7 3.7 2.1 2.49E-04 1.39E-02 2.84E+02
185 10813 49.9 110.9 62.3 62.3 55.7 6.0 0.0 9.36E-05 5.83E-03 6.47E+02

*EVE 302 10:22 53 32.73 130 53.52

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*TRA T-name EIS1 EIS2-1 PIT DIS BEA TIM SPE
*TRA B6 767 807 2363 4.737 118.086 0.667 7.105
*LOU/ALL
N P LEN AREA DEP COL DCS DCB LCB VOL/D SURF/D BIOMASS
45 2586 9.6 21.3 66.5 66.5 58.4 13.0 6.5 1.21E-03 8.04E-02 1.72E+03
230 13399 59.5 132.2 63.0 63.0 57.6 11.1 0.0 2.84E-04 1.79E-02 2.36E+03

*EVE 305 11:08 53 31.30 130 45.79

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*TRA T-name EIS1 EIS2-1 PIT DIS BEA TIM SPE
*TRA B7 814 841 1594 4.393 301.109 0.433 10.139

*LOU/ALL

N	P	LEN	AREA	DEP	COL	DCS	DCB	LCB	VOL/D	SURF/D	BIOMASS
30	1712	8.7	19.4	57.9	57.9	64.7	6.3	2.2	7.17E-05	4.15E-03	8.06E+01
260	15111	68.2	151.6	62.4	62.4	57.9	10.9	0.0	2.58E-04	1.61E-02	2.44E+03

*EVE 307 11:44 53 34.40 130 50.39

*

*TRA T-name EIS1 EIS2-1 PIT DIS BEA TIM SPE
*TRA B8 852 883 1885 4.001 122.505 0.517 7.744

*LOU/ALL

N	P	LEN	AREA	DEP	COL	DCS	DCB	LCB	VOL/D	SURF/D	BIOMASS
35	2062	8.1	18.0	85.5	85.5	65.0	7.1	3.5	1.82E-04	1.55E-02	2.80E+02
295	17173	76.3	169.7	64.8	64.8	58.6	10.5	0.0	2.48E-04	1.61E-02	2.72E+03

*EVE 309 12:24 53 33.34 130 43.72

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*TRA T-name EIS1 EIS2-1 PIT DIS BEA TIM SPE
*TRA B9 892 896 300 1.645 302.341 0.133 12.337

*LOU/ALL

N	P	LEN	AREA	DEP	COL	DCS	DCB	LCB	VOL/D	SURF/D	BIOMASS
5	300	3.0	6.8	129.4	129.4	101.1	28.4	1.5	1.14E-04	1.48E-02	1.00E+02
300	17473	79.4	176.4	67.3	67.3	60.1	11.2	0.0	2.38E-04	1.60E-02	2.82E+03

*EXI

