Status of the Southern Gulf of St. Lawrence Scallops Stocks - 1984

by

Jean Worms and Marc Lanteigne
Invertebrates Research Section
Fisheries Research Branch
Marine Biology Research Centre
Université de Moncton
Moncton, N.B. E1A 3E9

ABSTRACT

In 1985, four scallop beds were surveyed in the Southern Gulf of St. Lawrence. Densities on the bottom were found to have gone down in most areas, except on Pictou Island's bed where it remains pretty stable. Low percentage of prerecruits and high percentage of cluckers in Nepisiguit Bay may account for a poor fishing season. Occurence of prerecuits on the Cape Tormentine bed gives better scopes for future years in this area. The scallop fishing on the Pictou Island's bed was rewarding in the spring but went bad during the fall season with low yields and low meat quality. The overall image of the Southern Gulf scallop fishery is not encouraging. Sharp decrease of landings in district 7bl and 7C does not give much scope for the coming years. Preservation of the resource on the medium and long term will certainly require drastic conservation measures.

RESUME

En 1985, 4 bancs de pétoncles ont été explorés dans le Sud du Golfe du St. Laurent. Excepté sur le banc de Pictou Island, les densités calculées pour 1984 sont nettement en retrait par rapport à 1983. La faible abondance de prérecrues et le grand nombre de "claquettes" sur le banc de la Baie Nepisiguit expliquent peut-être en partie la mauvaise saison de pêche. Au Cap Tormentin, l'apparition de prérecrues laisse mieux augurer de l'avenir de ce banc. Après un bon début de saison au printemps sur le banc de Pictou, les rendements ainsi que la qualité des muscles ont fortement baissé au cours de l'automne. L'image générale de la pêcherie de pétoncles du Sud du Golfe n'est pas encourageante. La diminution importante des débarquements dans les districts 7C et 7bl ne donne pas beaucoup d'espoir pour les prochaines années. La préservation de la ressource à moyen et long terme demandera certainement la mise en place de mesures de conservation drastiques.

INTRODUCTION

On the basis of surveys conducted in the southern Gulf of St Lawrence in 1982 and 1983, assessment effort was concentrated on three fishing areas, one in each of the southern Gulf lobster districts (Appendix II). Those areas are:

Nepisiguit Bay (district 7C)
Cape Tormentine (district 8)
Pictou - Wood Islands (district 7B1)

Beside standard dragging as done in previous years, we also used a video camera mounted on a two bucket Digby drag to appraise gear performance and behaviour of scallops toward gear. Results from those experiments have not yet been analysed.

MATERIAL AND METHODS

As in 1982 and 1983, the sampling program included several approaches:

1. Sea sampling: Due to logistic and man power constraints, no sea sampling was done in Nepisiguit Bay and Cape Tormentine/ Borden areas. The scallops in each bucket were measured (shell height from hinge to outer margin) to the nearest millimeter for each tow.

2. Experimental surveys (Fig. 1 and 2): A total of 273 tows were performed in the three above mentioned areas (110 in Nepisiguit Bay, 69 in Cape Tormentine and 94 in Pictou/Wood Islands). As last year, we used a five bucket toothed Digby drag. Each bucket was 50.8 cm (20 in.) wide with 7.5 cm (3 in.) diameter steel rings and steel washers. In order to catch small scallops, two buckets were lined with shrimp net, 2 cm (3/4 in.) stretched mesh. Appendix 1 gives information on boats used and dates. CPUE calculated from those data are expressed as kg of meat per meter of drag per hour on the bottom.

3. Landing statistics: 70 mm is considered to be the minimum shucking size on commercial fishing boats as was done in 1982. Scallops less than 70 mm shell height are referred to as prerecruits i.e. not available for commercial fishing and/or not suitable for marketing. All estimates of CPUE from survey data were computed for individuals with shell height of 70 mm or more.

A 3 mm size class interval was used to build size frequency histograms. In order to compare 1984 results with those of the previous year, 1983 size frequency histograms are presented with 3 mm size class interval.

Commercial CPUE's were estimated for Cape Tormentine and Pictou area using different sources of data:

- Sale slips compiled in mid-November for catches and number of days fished (up to mid-July).

- Interview surveys in districts 7bl and 8 made in 1982 for average drag width.

- Phone enquiries with several fishermen for average number of hours fished per day.

4. Density estimates: Estimates of average density were calculated using a similar approach as last year (Worms, 1984). Density was calculated for each tow in gram(s) of live weight per square meter. The mean density and its variance were then calculated for each survey using the densities d$\geq$lg/m^2. Approximate confidence limits for the mean estimates were determined for $\alpha = 0.05$ using critical values of Student's t distribution. Variability of density estimates as a function of the number of observations (# of tows), was tested by calculating confidence intervals of estimates for an increasing number of tows randomly selected.

RESULTS

Results will be presented separately for each surveyed area. Area numbers refer to maps in the 1983 document (Worms et Chouinard, 1984).

Area 2. Nepisiguit Bay (Fig. 2A).

A total of 110 tows were performed in this area. As the Loran C navigation system does not work well in this area, stations were located with a range finder and a hand held compass. However, rough seas all along the survey did result in inaccurate readings and positioning. Only those stations whose position was accurately determined are on the map (76 stations).

Size distribution ranged from 20 to 148 mm with modes at 90 mm and 123 mm (Fig. 3A). Mean size of scallops over 70 mm was 101.1 mm (Table 1). Percentage of prerecruits was 4.5% overall. The average CPUE as computed from survey data was 0.89 kg/m/h (Table 2). Average density estimated on this area is 2.46 $\pm$ 0.23 g (live weight)/m^2(Table 5).

Area 3. Cape Tormentine (Fig. 2B).

Sixty nine (69) tows were done in this area. Size distribution for survey catches ranged from 20 to 122 mm (Fig. 4A) with a strong mode at 90 mm and a mean size of commercial sized individuals of 91.4 mm. Prerecruits accounted for 16% of the total survey catches.

Average CPUE from survey catches is 0.79 kg/m/h (Table 2) for the whole survey and 1.06 kg/m/h for those tows made on stations with an estimated density d$\geq$lg/m^2. CPUE as computed from commercial

catches was 0.81 kg/m/h (Table 3). The average density estimated for this bed is 3.10 ± 0.45 g (live weight)/m^2 (Table 5).

Area 12. Pictou (Fig. 2C).

As last year the two major components of this area are presented separately:

1. Indian Rocks.

As part of the Pictou survey, 25 tows were performed on the Indian Rocks bed. Sizes ranged from 18 to 134 mm (Fig 5A) with a strong mode around 87 mm and secondary modes around 42, 96 and 108 mm. Mean size of commercial sized scallops was 97.2 mm. Prerecruits accounted for 9.5% of survey catches.

Average CPUE as determined from survey data was 0.85 kg/m/h for the whole survey and 1.16 kg/m/h for those tows made on spots with a density $d \geq 1 g/m^2$ (live weight).

2. Pictou Island.

A total of 94 tows were done north of Pictou Island, yielding 3562 individuals. Sizes ranged from 20 mm to 140 mm (Fig. 6A) with modes at 36, 81 and 93 mm. Mean size of total catches was 84.1 mm with a mean size of 92 mm for commercial size scallops. Prerecruits accounted for 19.7% of survey catches. Average CPUE from survey data was 1.08 kg/m/h for the whole survey and 1.25 kg/m/h for the best tows.

Sea sampling in this area yielded 5167 measured scallops whose size ranged from 56 mm to 138 mm (Fig. 7). Three modes were visible at 84, 96 and 114 mm. Mean size of commercial catches was 100.8 mm. From commercial fishing information, an average CPUE of 1.02 kg/m/h was calculated for the Pictou Island area (Table 3).

3. Landing statistics.

Overall, landings for 1984 were below those of 1983 (Fig. 8, Table 4). The decrease from 333 MT to 252 MT of meat was mainly due to very poor results in district 7b1 and to a lesser extent in district 8 (Fig. 9). Although our data for average price are not updated, it seems that the increase in price between 1983 and 1984 was around 3% (Fig. 8).

In district 7C, reported catches increased from 28.9 MT of meat in 1983 to 40.1 MT in 1984 (Fig 9, Table 4). All major fishing sub-districts (Appendix II) showed record catches for the 10 last years (Fig. 10A).

Catches in district 8 decreased by 7% from the 1983 level. Sub-district 82 was mainly responsible for the decrease (Fig. 10B). The situation in sub-district 80 seems to have improved after two years of sharp decrease.

In district 7bl, landings dropped by more than 53% from 153 to 72 MT of meat between 1983 and 1984 (Fig. 9). The collapse is especially evident in sub-district 87 and 11 (Fig. 10C). Consultation with statistical coordinators in P.E.I. and Nova Scotia and with fishery officers and local fishermen confirmed the very poor fishing performances for most fishing areas of district 7bl in 1984.

4. Density estimates.

Table 5 summarizes results of density calculations made on survey data. If similar bed surfaces as calculated last year (Worms, 1984), are assumed standing biomass was as indicated in Table 6.

Incomplete information on landings prevents accurate estimation of exploitation rates. Calculation for Cape Tormentine area gives an exploitation rate of 9.2%.

The spatial distribution of density (g/m^2) on the surveyed beds (Fig. 11, 12, 13) does not show any clear pattern, at least at the scale studied. Scallops seem to be unevenly distributed on the bottom with some dense aggregation as was the case in 1983 (Worms 1984). Figure 14 shows average density estimates and confidence intervals for the four beds surveyed in 1984 with values in 1983 for comparison.

When plotting confidence limits of density estimates against number of observations, the final plot shows that a precision of 15% is reached after 25 to 35 tows in Pictou, 30 tows in Cape Tormentine and 38 tows in Nepisiguit Bay (Fig. 15A, 15B, 15C). An additional 30 to 40 tows is required to lower the confidence interval to 10%.

DISCUSSION

Previous assessment documents on the Southern Gulf sea scallop resource (Worms & Chouinard, 1983, 1984) stressed the difficulty of making short term predictions about the evolution of a given bed. Even if geographical location of major concentrations did not change between 1983 and 1984 other population parameters did.

Nepisiguit Bay, Fig. 3B, shows a shifting of modes to larger sizes. Concerning prerecruits, there were more individuals less than 50 mm shell height in 1984 than in 1983 but fewer individuals between 60 and 69 mm shell height (2.46% in 1984, 5.16% in 1983). Percentage of cluckers increased from 14.8% in 1983 to 33.4% in 1984, suggesting a localized mass mortality. Value of natural mortality calculated using the formula given by Dickie (1953) would be 1.6 times higher in 1984 than in 1983, for a 70 days disarticulation time (Naidu, 1969). Low percentage of prerecruits and high percentage of cluckers (i.e. high level of natural mortality) are somewhat worrying. Most fishermen interviewed by phone claimed a poor season in 1984 but did acknowledge an increase in the number of

cluckers. However, the range of size fished is still large and no major problem is expected for this fishery if the effort stays stable. However, assuming poor individual performances, the increase in landings is likely resulting from an increase in total effort. Although no precise data are available to date, advisory committee members for district 7C acknowledged a general increase in effort in 1984 partly due to an increase in the drag width. This general increase results from a rise in engine power, as many fishermen changed from gas to diesel engines.

In Cape Tormentine, where no evidence of prerecruitment had appeared in the previous 4 to 5 years (e.g. only 7% and 4% of the survey catches with shell height less than 70 mm in 1982 and 1983 respectively), prerecruits accounted for more than 16% of 1984 catches. As the same grounds as last year were surveyed with the same gear towed by the same boat, it is likely that those small scallops found in 1984 weren't present in 1983. Those small scallops ranged in size from 20 to 50 mm. According to Chouinard (1984) they will be aged between 1.1 and 2.4 years, and thus obviously not hatched from 1983 spawning. Again, the hypothesis that small scallops have a limited range of movement from unfishable inshore bottoms to commercial fishing grounds appears to have some merit. Late ice coverage in the spring might have been one of the factors triggering this movement.

The remainder of the size distribution looks like that of 1983 (Fig. 4B) with just a slight increase of the mean size of recruited ($\geq$70 mm) scallops from 89,8 mm in 1983 to 91.4 mm in 1984. The percentage of cluckers increased from 13.3% in 1983 to 25.3% in 1984, suggesting an increase of natural mortality rate.

First trials with an underwater videocamera mounted on a Digby drag confirmed that the drag was much less efficient in catching smaller sized scallops than those of commercial size. Small scallops actively escape the drags (lined or unlined). Percentage represented by small scallops in the whole catch would not then be regarded as accurate. This only gives a qualitative indication of the presence of small scallops on the bottom. However it is evident from several years of sampling that if small scallops are present on the bottom, they will be in the dredge as well even though under-represented.

The presence of prerecruits on the bottom is promising for the next few years. However, fishing pressure on the Cape Tormentine bed in termsof number of active licenses could compromise the future of those prerecruits due to direct and indirect fishing mortality. A shortening of the season in this area would certainly be a good conservation measure as well as a way to deactivate part of the back pocket licenses.

The situation in Pictou in 1984 as compared to 1983 looks stable. However, available data for this fishery pertain to the spring season. The general feeling among professional fishermen is that the fall season was less rewarding than the spring one.

Unfortunately the break down of catches per boat and per week is not yet available. Although no precise evidence supports this hypothesis, it is likely that CPUE's dropped drastically during the second half of the season.

We have no precise indication on the trends in meat counts but it seems that meat counts were much lower (i.e. less meats per half kg) in spring time with good quality meats than in fall where meats were smaller and low in quality. Again, several fishermen complained about some fishermen shucking almost everything they fished regardless of size.

If compared to 1983 survey data in the Pictou area, the mean size of commercial sized scallops is down from 95.8 mm to 92 mm. A positive fact is that the percentage of prerecruits is up in 1984 from 14.6% to 19.7% resulting in a much lower mean size for total survey catches (89.7 mm in 1983 and 84.1 mm in 1984). Figure 6B shows a mode at 36 mm in 1984 likely resulting from the small mode at 30 mm in 1983. In 1984, the strongest mode was set at 78 mm while it was set at 90 mm in 1983. There are obviously other components in the 1984 distribution but they are not as evident as in 1983. Mean size of commercial catches is much higher in 1984 (101.3 mm) than in 1983. Commercial catches (samples taken in May, June and July) show a better range of size and a more even distribution of catches among size classes than in 1983 (Fig. 7). A more in depth analysis of this fishery is hampered by the lack of sampling and precise commercial fishing data for the fall season. However the sharp decrease of daily yields toward the middle of the fall season as reported in 1983 and 1984 is somewhat alarming. In that respect, further limitation of the scallop fishing season in this area might be one of the measures to take next year. As almost all licensed fishermen fish for scallop between mid-April and first of May (opening of lobster season), opening the scallop season on the first of May will have two effects:

-most of scallop grounds around Pictou Island will be covered with lobster gears and thus protected;

-most effort will be diverted from scallop to lobster fishing.

Mapping of the density estimates for each tow showed no clear pattern at the scale studied. It was not possible from the spatial distribution of density estimates to draw isodensity lines. However in such areas as Pictou where tows were made along regular transects, the application of spatial distribution analysis techniques might allow a better understanding of the problem. This technique however requires software and computer facilities not yet available to us.

The approach taken for estimating the minimum number of tows needed for reaching a given level of precision (i.e. 15%) in the estimate is based on the same calculation we used in another paper (Worms,1984). However, using sampling without replacement, a given observation cannot be drawn two times and successive drawings will

not be independant, resulting in auto-correlation. This might result in over estimating the resampling variance which is conservative for this type of sampling problem.

CONCLUSION

As in 1983, exploitation rates appear to be low (9.2% in Cape Tormentine area) but results of the commercial fishery are bad. Such a situation cannot be explained with the standard population dynamics approaches. Although our problem is not quite similar to the one faced by Sluczanowski (1984), the example of the South Australia abalone fishery shows that new approaches can give good results where usual models failed to give an adequate description. As shown by Conan (1984), most population dynamic approaches had been developed for modelling finfish populations. Invertebrates, exclusive of some pelagic squids, have very little in common with fishes in terms of their physiology, behavior or general ecology.

A combination of low density on the bottom and low efficiency of gears could be part of the explanation for the apparent contradiction between low exploitation rates and low fishing performances. However one must be careful when speaking of exploitation rates. What is important is not the fraction of the standing biomass captured over a year but the fraction of the production.

Still, the main problem with the southern Gulf fisheries is not finding management options but having a legal environment to enforce them. Even if the standing resource partly recovered during winter time, full recovery may not occur resulting in lower yields over time. The increase in the price paid to fishermen, if much greater than the inflation index, will allow the level of acceptable yields to be lower (in term of kg of meat caught each day). This year, most fishermen were not satisfied with the price. This could have resulted in a decrease in effort (in number of days fished). First calculations made on available data actually suggest such a trend. Technological evolution over the last few years introduced drastic changes in the overall effort. The introduction of diesel powered engines allowed fishermen to tow wider drags and to reduce sailing time (thus to spend more time on fishing grounds). Also, fishermen are getting more familiar with the functioning of their navigation systems, thus making relocation of beds almost 100% efficient.

Lack of information on commercial catches, either through sea sampling or landing statistics makes it difficult to provide a detailed assessment of the scallop resource in the southern Gulf. A more complete set of commercial data (sea sampling, landing statistics per boat...) and better feedback from fishermen through scallop log books should allow more in depth analysis of the scallop fisheries in the Southern Gulf of St. Lawrence in 1985.

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Table 1. Mean size of scallops fished in each area surveyed in 1984.

	Survey		Commercial	
	Total	≥70 mm	Total	≥70 mm
NEPISIGUIT	95.7	101.1		
CAPE TORMENTINE	84.9	91.4		
INDIAN ROCKS	91.6	97.2		
PICTOU	84.1	92.0	100.8	101.3

Table 2. Summary of results obtained from surveys in 1984.

		Number of tows	Total duration (min.)	Total number of individuals			% of individuals < 70 mm			% of cluckers	CPUE (meat)	
				Lined	Unlined	Total	Lined	Unlined	Total		kg/m/h	lb/ft/h
Nepisiguit	a	110	970	981	1368	2349	8.1	2.0	4.5	33.4	0.89	0.60
	b	79	667	922	1276	2198	7.9	2.1	4.5	33.4	1.19	0.80
Cape Tormentine	a	69	600	793	1040	1833	30.1	5.3	16.3	25.3	0.79	0.53
	b	54	469	773	1026	1799	30.5	5.4	16.3	24.5	1.06	0.71
Indian Rocks	a	25	252	276	365	641	21.0	6.0	12.5	9.5	0.85	0.57
	b	17	172	249	337	586	20.1	5.6	11.8	9.4	1.16	0.78
Pictou	a	94	881	1628	1934	3562	34.0	7.8	19.7	16.4	1.08	0.73
	b	79	741	1591	1900	3491	34.1	7.9	19.9	16.3	1.25	0.84

a - results compiled from all stations (tows)

b - results compiled from stations (tows) with a density d $\geq$ $1g/m^2$

Table 3. Catch per unit of effort calculated from commercial fishery data.

	CAPE TORMENTINE	PICTOU
Number of days fished.	370	474
Number of hours fished per day.	11	8
Average drag width.	3.44 m 11.27 ft	3.62 m 11.88 ft
Total catch (meat).	11,282 kg 25,052 lb	13,964 kg 30,785 lb
Catch Per Unit of Effort (cpue).	0.81 kg/m/h 0.55 lb/ft/h	1.02 kg/m/h 0.68 lb/ft/h

Data available from beginning of the season to mid July

Table 4. Landings of scallop (kg of meat weight) in lobster district 7c, 8 and 7b1 for 1970 to 1984.

YEAR	Lobster District		
	7c	8	7b1
1970	69,673	298,373	327,917
1971	55,444	258,752	265,310
1973	81,098	151,032	275,966
1974	36,567	45,932	119,429
1975	31,082	58,083	185,955
1976	25,465	217,738	119,429
1977	14,927	175,219	60,979
1978	14,553	171,505	81,307
1979	13,094	122,049	95,143
1980	21,693	99,569	89,284
1981	23,035	157,179	174,379
1982	26,819	113,002	126,539
1983	28,952	150,861	153,555
1984	40,141	140,206	72,060

Table 5. Estimates of average density and confidence intervals for $\alpha = 0.05$ in 1983 and 1984.

	Year	Number of tows	Surface of bed (km^2)	Average density estimates (g/m^2)	Confidence intervals in %
NEPISIGUIT BAY	1983	40	49.35	4.04±0.83	20.6
	1984	77		2.46±0.23	9.2
CAPE TORMENTINE	1983	35	59.53	4.21±0.61	14.4
	1984	54		3.10±0.45	14.5
INDIAN ROCKS	1983	16	29.44	3.48±0.65	18.7
	1984	17		2.32±0.67	29.1
PICTOU	1983	32	86.42	3.59±0.52	14.5
	1984	79		3.29±0.33	10.0

Table 6. Minimum biomass and standing biomass as calculated from density estimates in 1983 and 1984.

		Minimum biomass		Standing biomass 8% drag eff.		5% drag eff.	
	Year	Live w. (MT)	Meat (MT)	Live w. (MT)	Meat (MT)	Live w. (MT)	Meat (MT)
NEPISIGUIT BAY	1983	199.61	22.94	2495.13	286.75	3992.19	458.80
	1984	123.37	14.18	1542.13	177.25	2467.41	283.60
CAPE TORMENTINE	1983	250.74	24.58	3134.25	307.28	5014.80	491.65
	1984	184.54	18.10	2306.75	226.25	3690.80	362.00
INDIAN ROCKS	1983	102.33	9.84	1279.13	123.00	2046.61	196.80
	1984	67.71	6.51	845.13	81.38	1352.21	130.21
PICTOU	1983	310.08	29.82	3876.00	372.69	6201.60	586.30
	1984	285.19	27.42	3564.88	342.75	5703.81	548.40

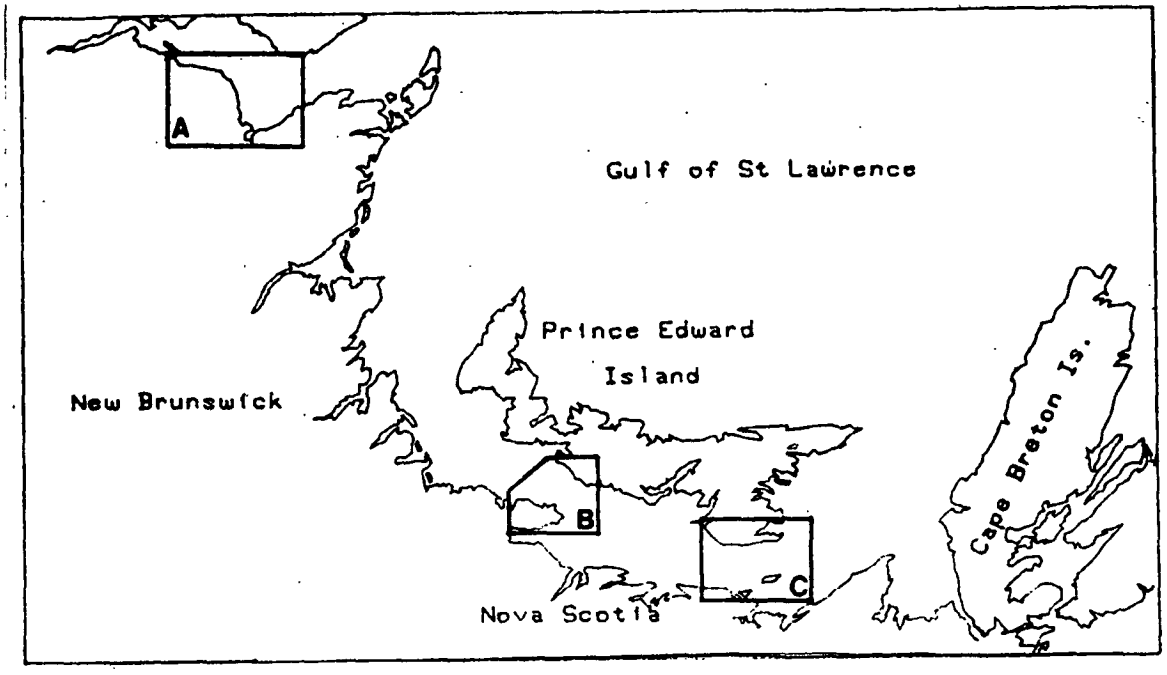


Fig. 1 - Location of 1984 survey areas in the Southern Gulf of St Lawrence.

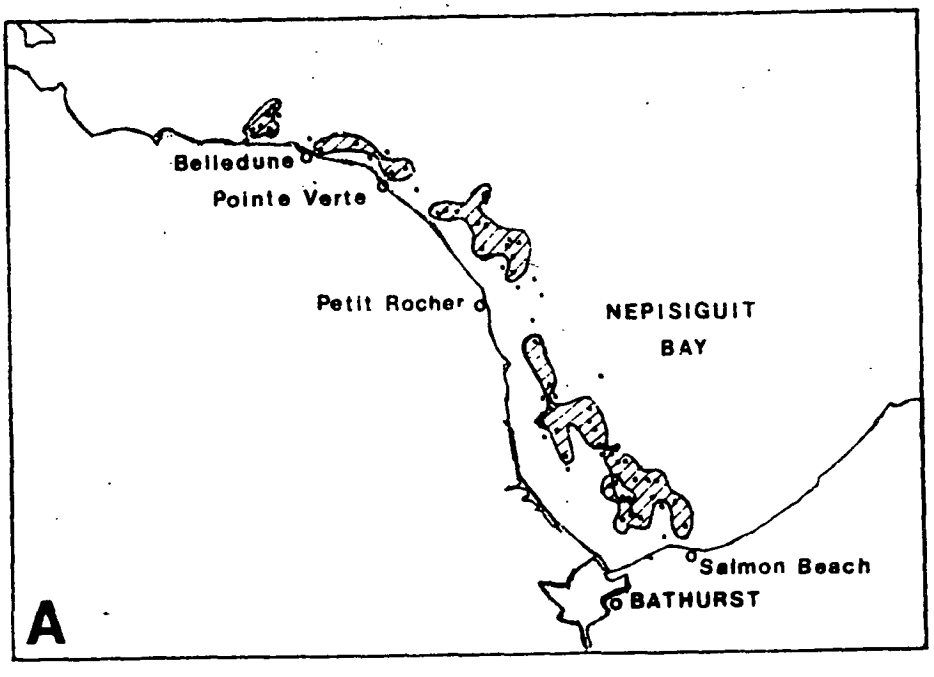
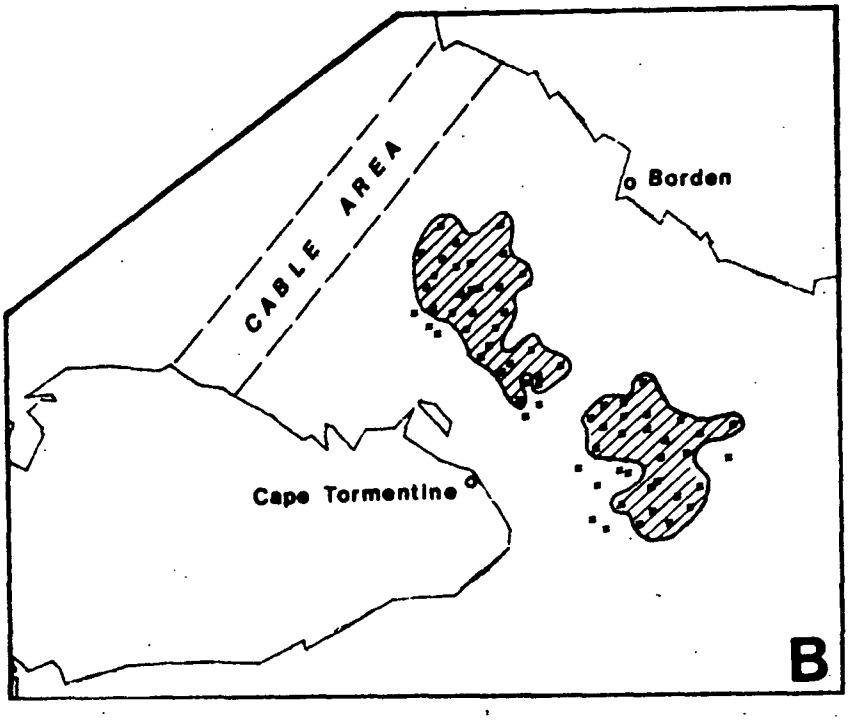
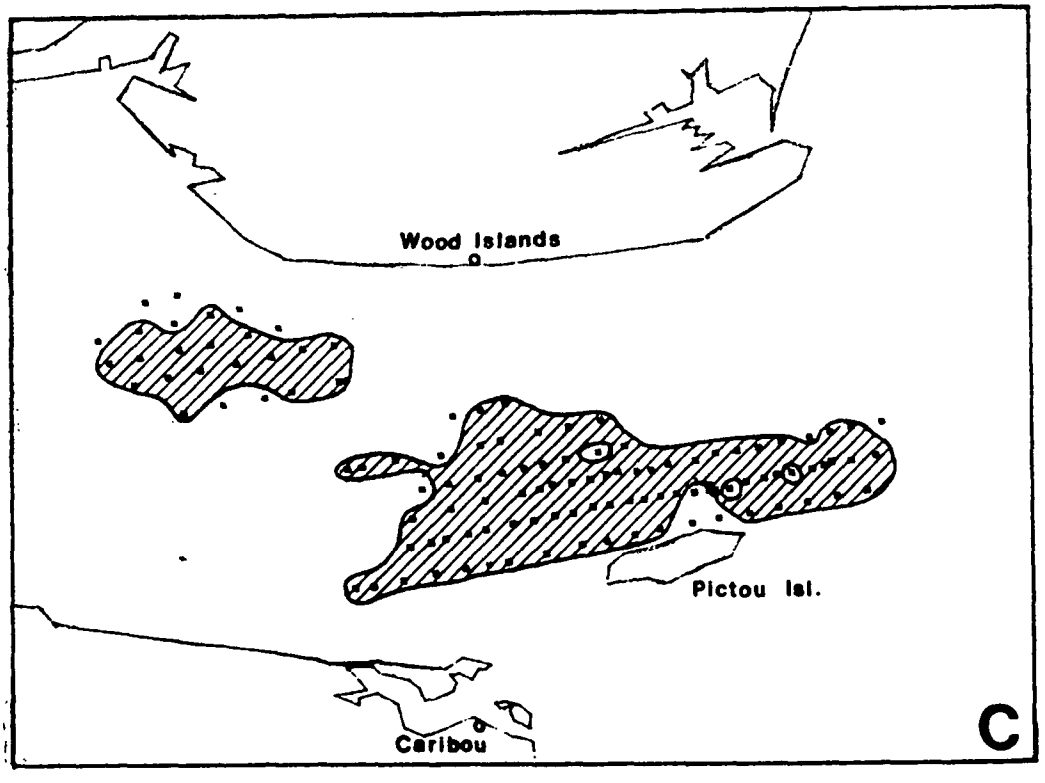


Fig. 2 - Position of tows for each survey area.
(cross-lined sections represents zones where density $d \geq 1 g/m^2$)

A. NEPISIGUIT BAY

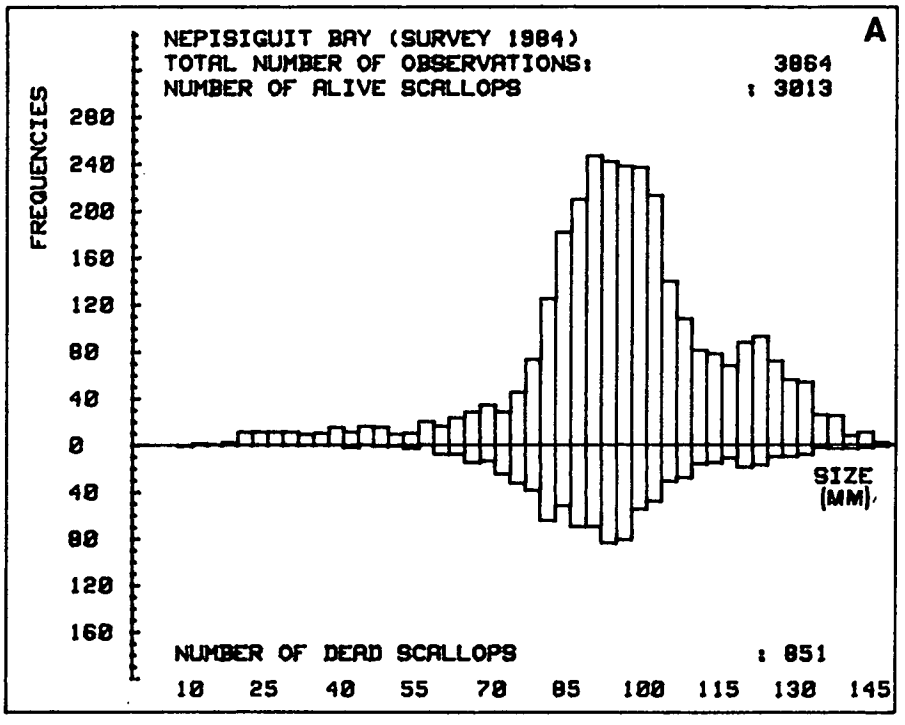


B. CAPE TORMENTINE



C. PICTOU ISLAND & INDIAN ROCKS

Fig. 2 - (continued)



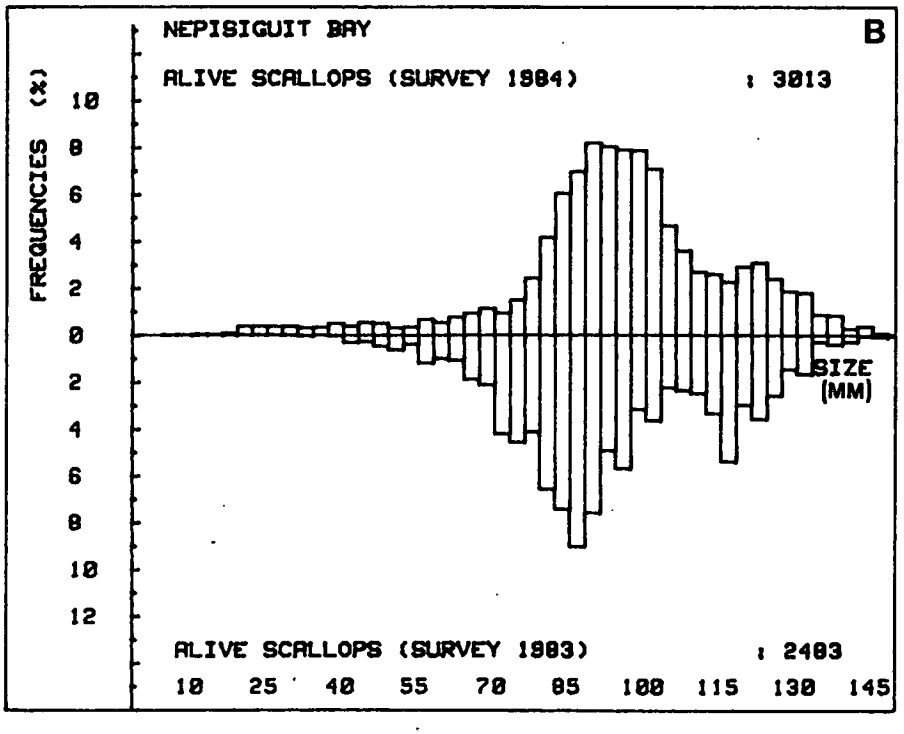
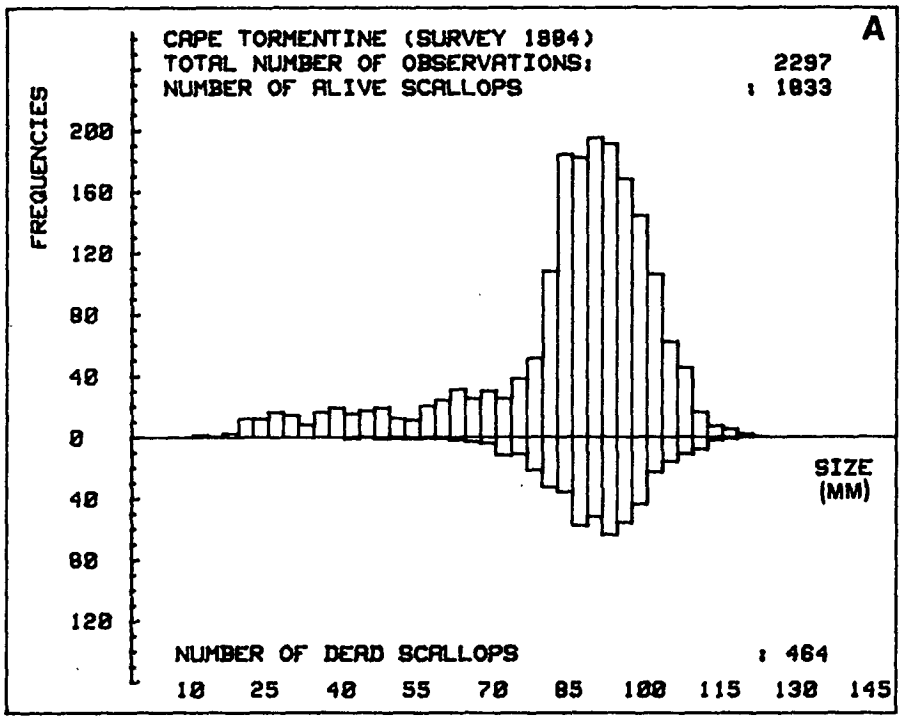


Fig. 3 - Size distribution of survey catches in Nepisiguit Bay in 1983 and 1984.



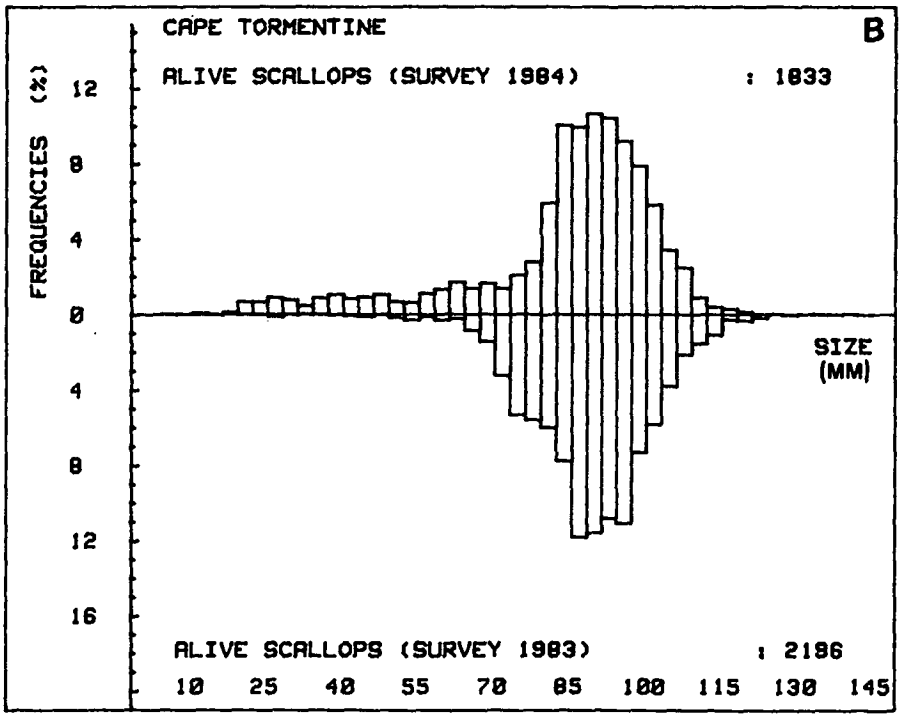
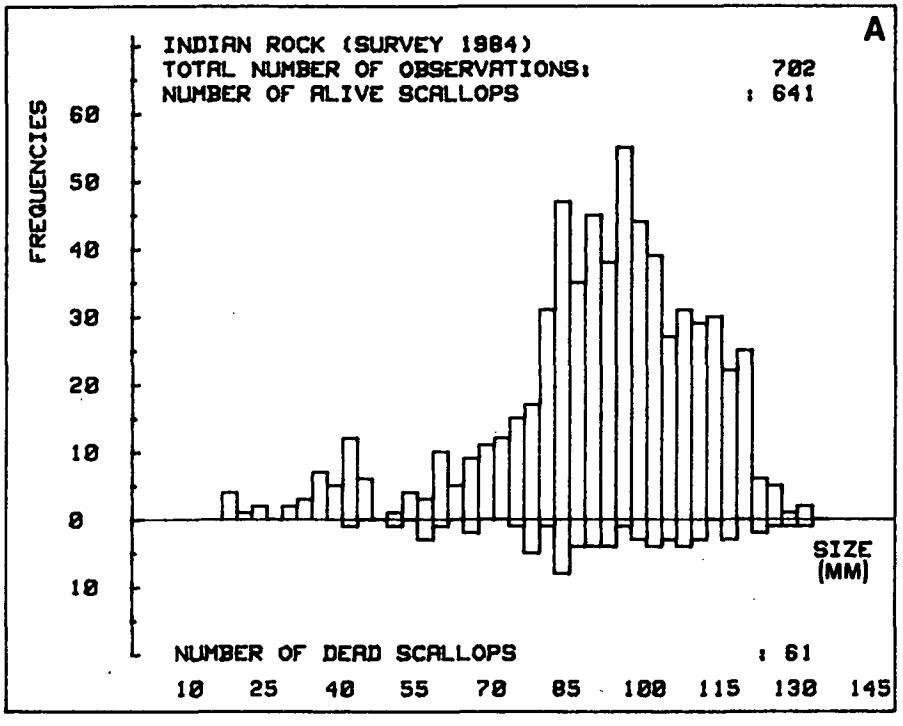


Fig. 4 - Size distribution of survey catches in the Cape Tormentine area in 1983 and 1984.



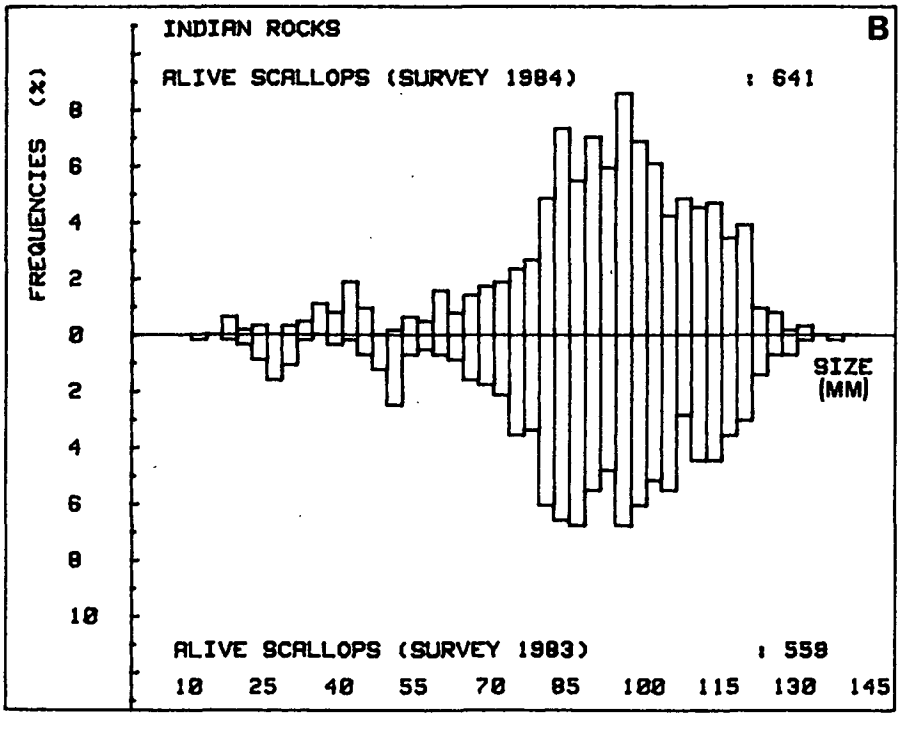
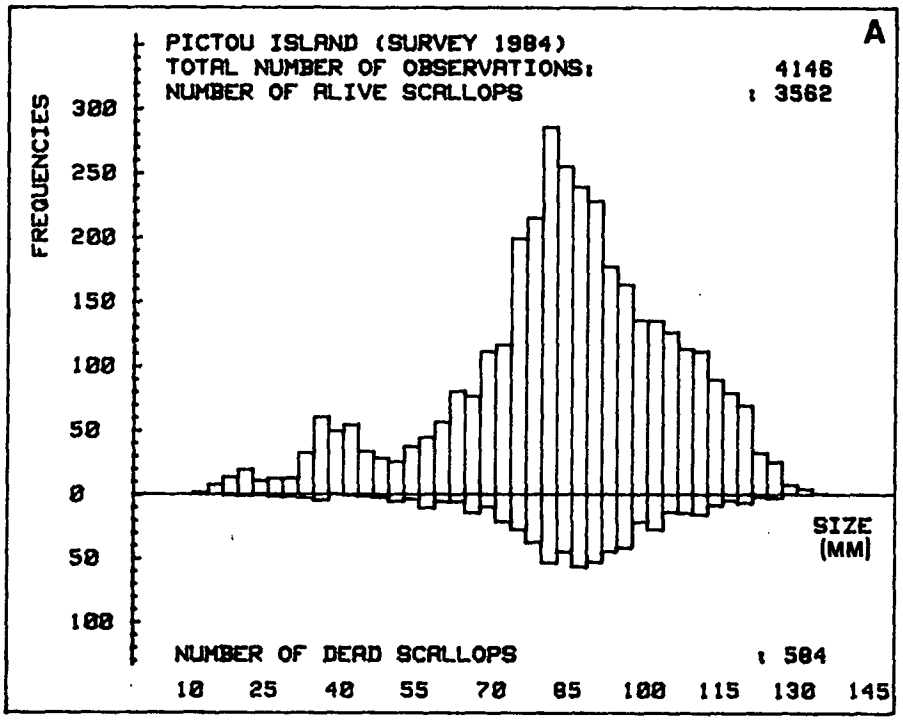


Fig. 5 - Size distribution of survey catches on Indian Rocks bed in 1983 and 1984.



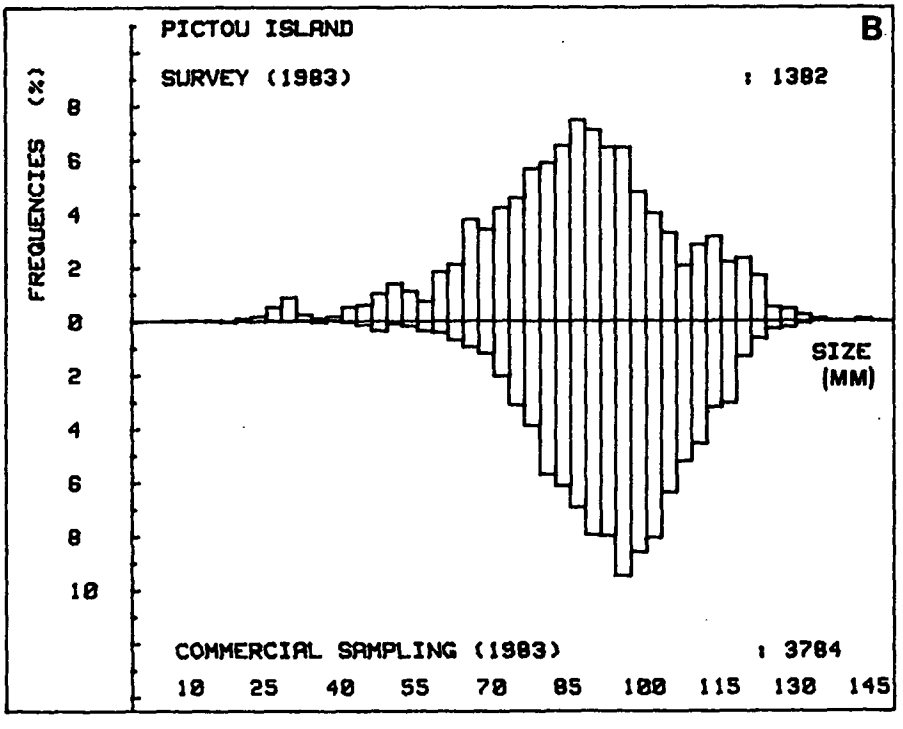
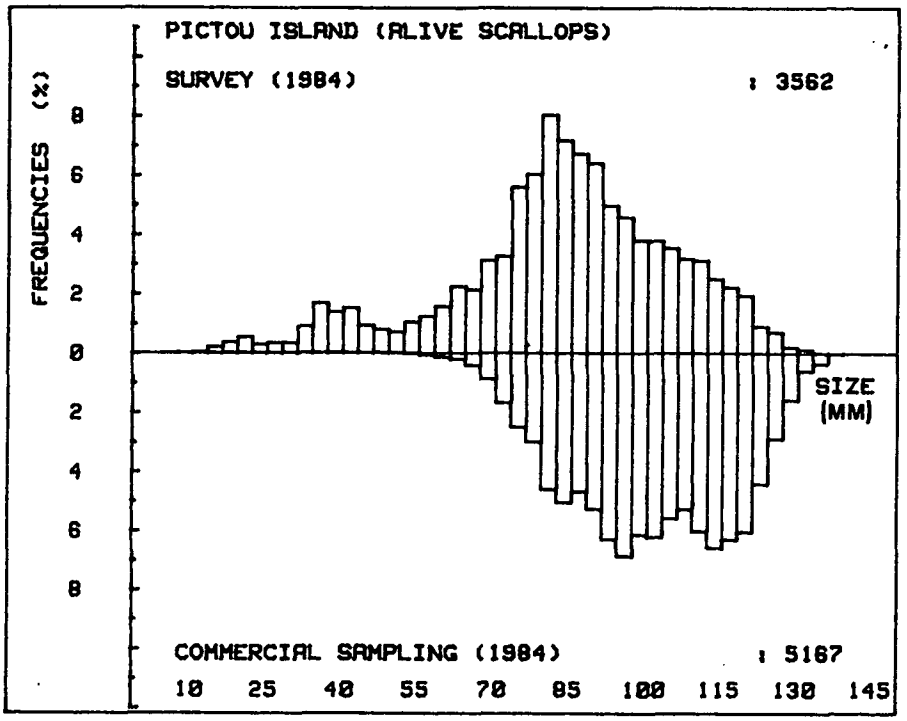


Fig. 6 - Size distribution of survey catches in Pictou Island area in 1983 and 1984.



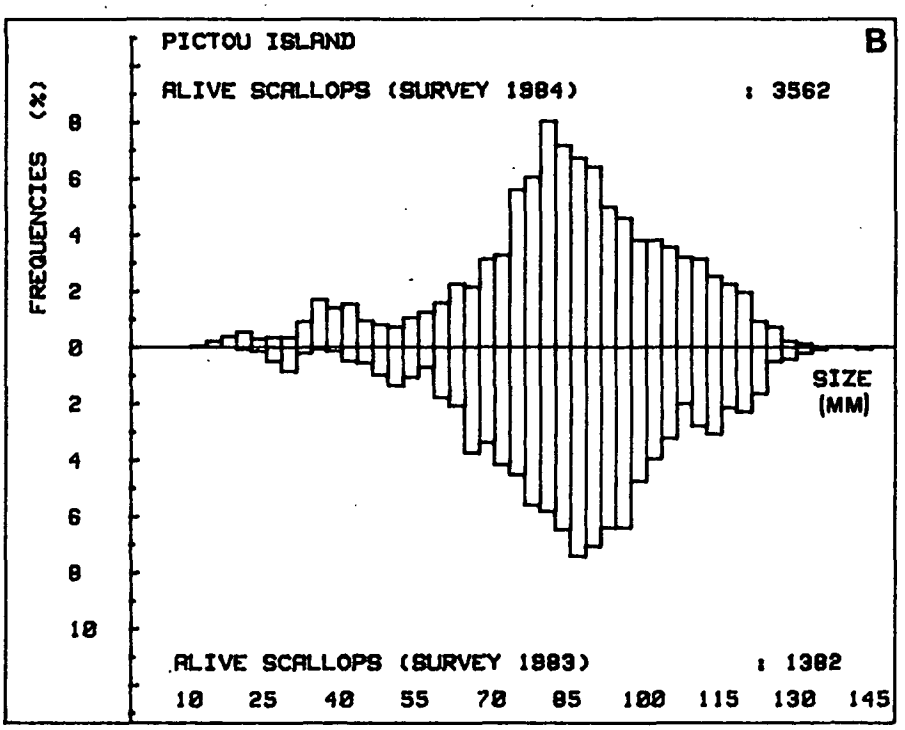


Fig. 7 - Comparison of size distribution from survey and commercial catches in Pictou Island area in 1983 and 1984.

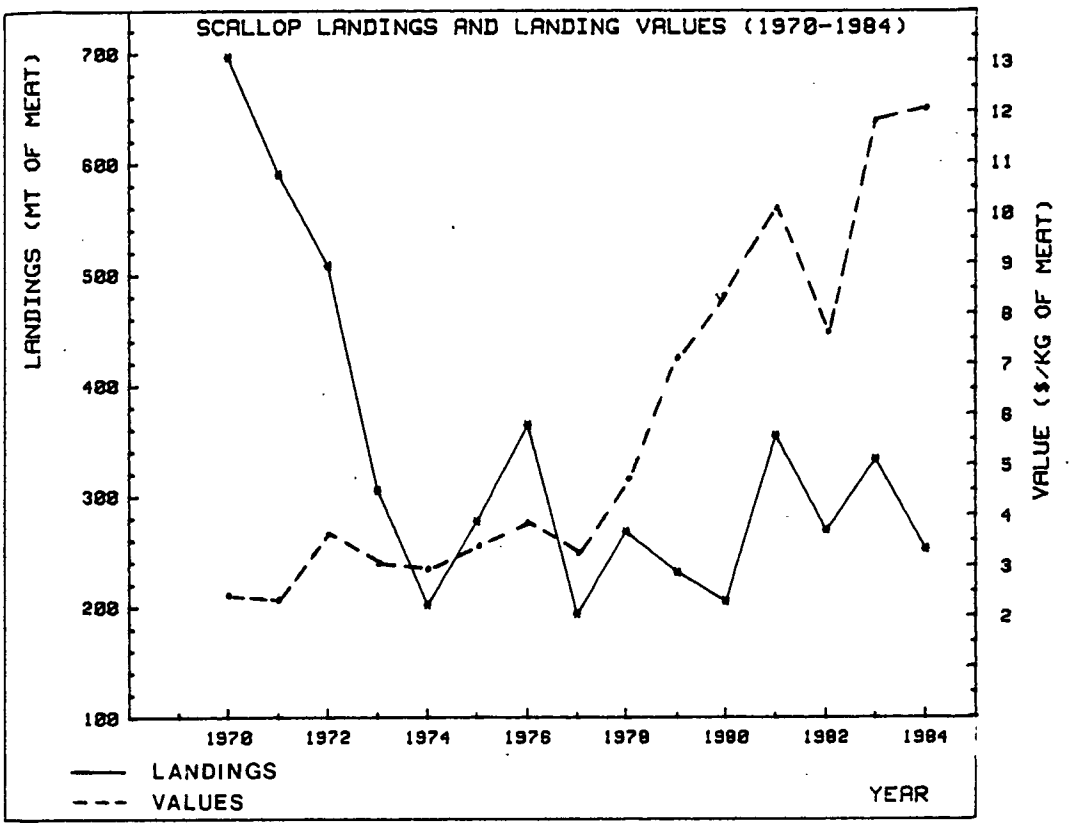


Fig. 8 - Yearly total scallop landings and landing values in the Southern Gulf (1970-1984).

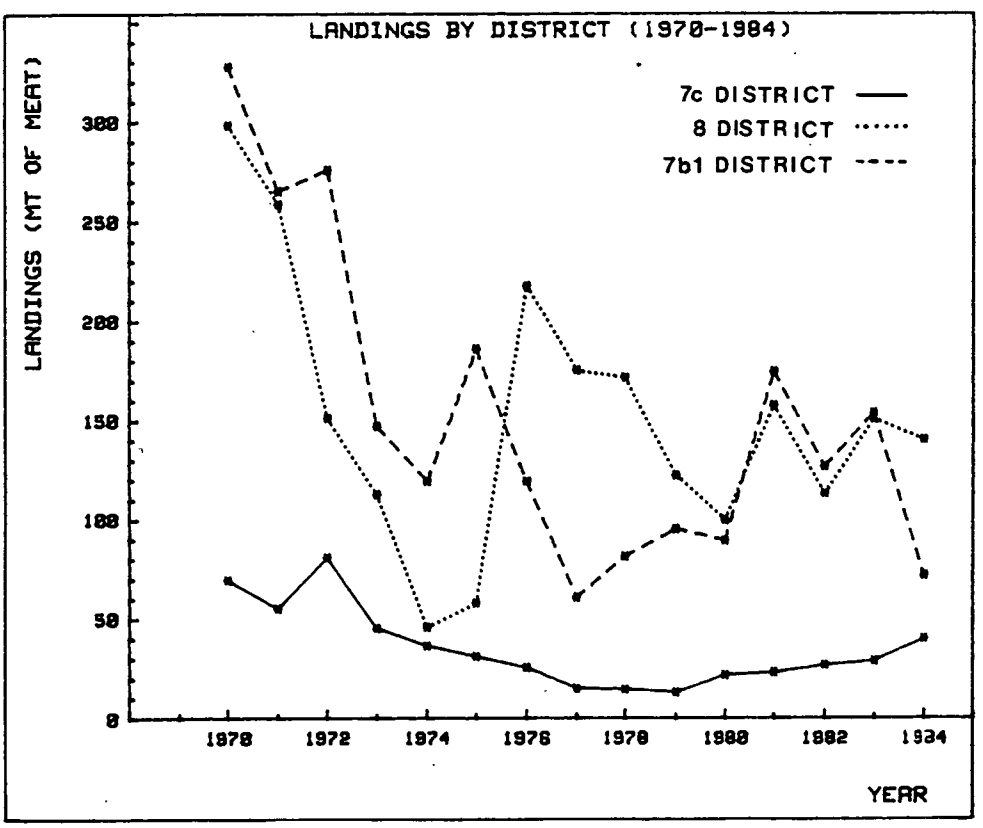
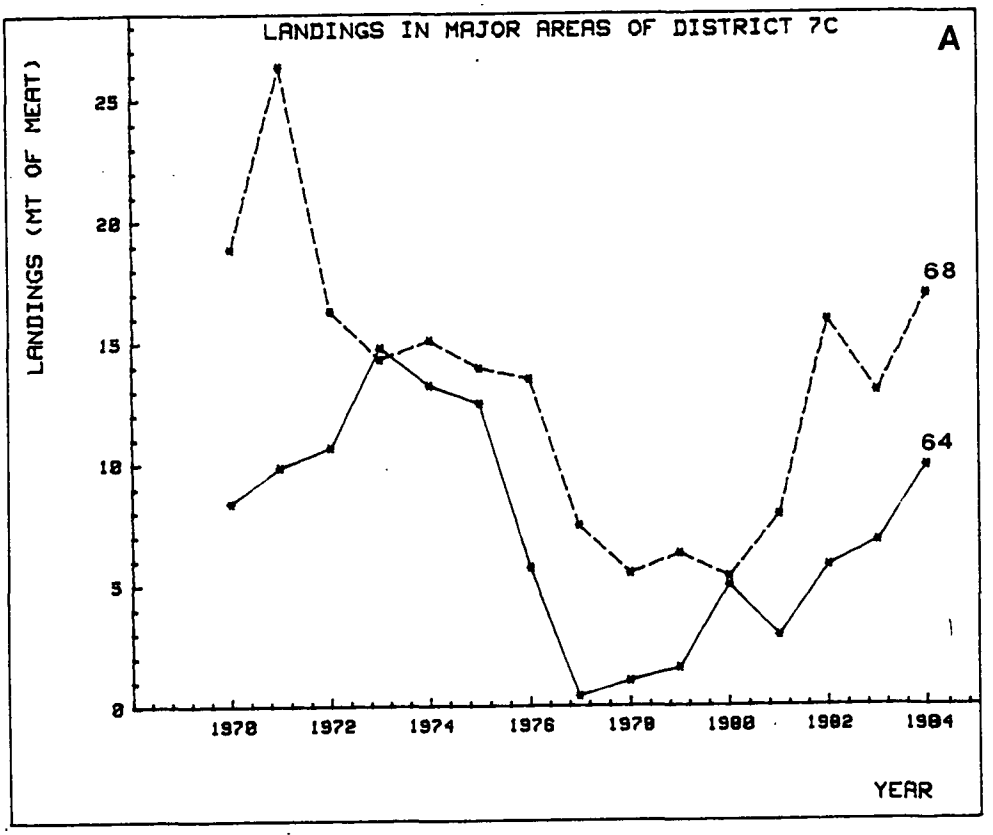


Fig. 9 - Yearly scallop landings in the three lobsters districts of the Southern Gulf (1970-1984).



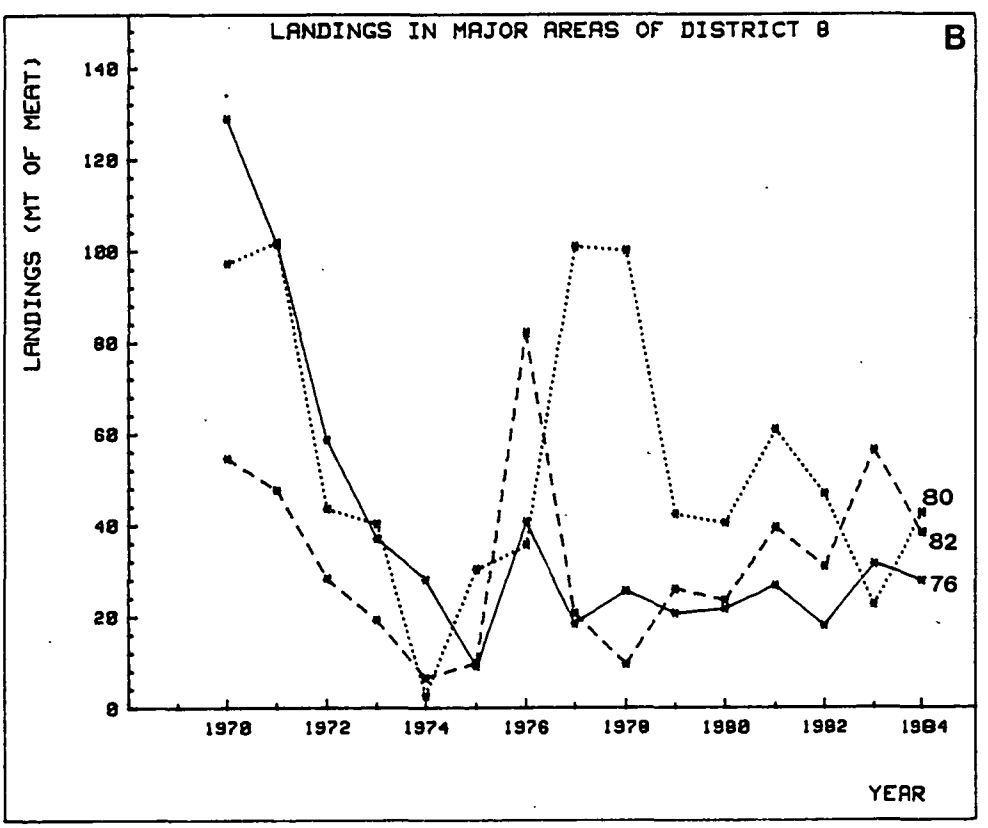


Fig. 10 - Yearly scallop landings in major statistical subdistricts of lobster districts 7C (A), 8 (B) and 7b1 (C).

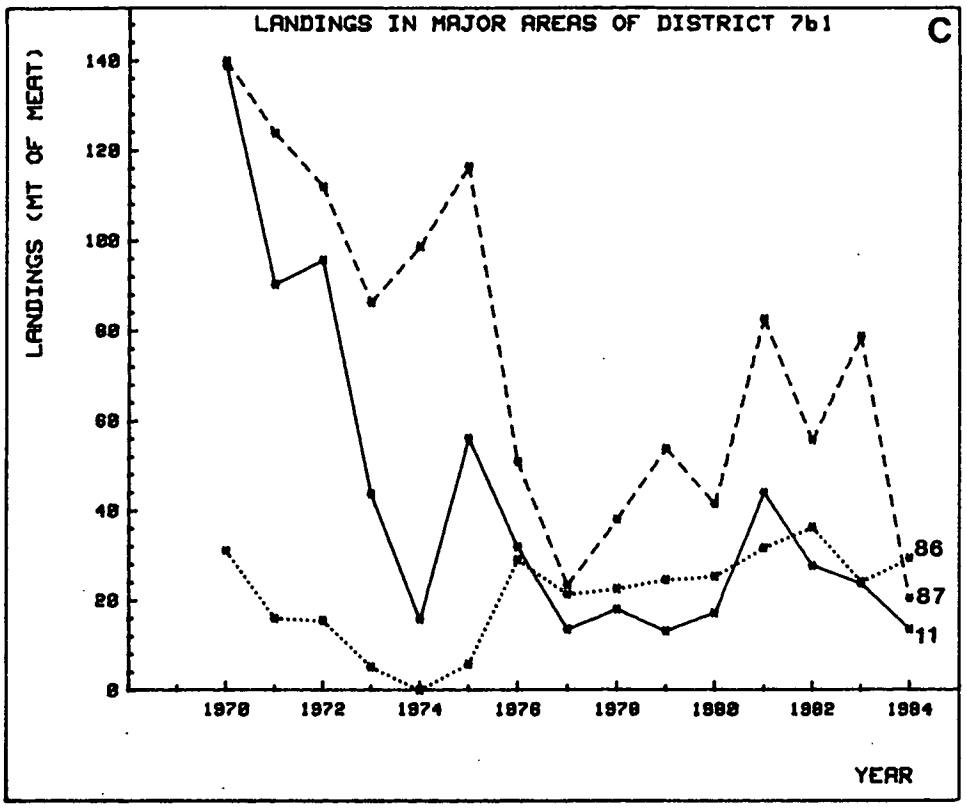


Fig. 10 - (continued)

STATIONS SURVEYED ON NEPISIGUIT BAY BEDS IN 1984

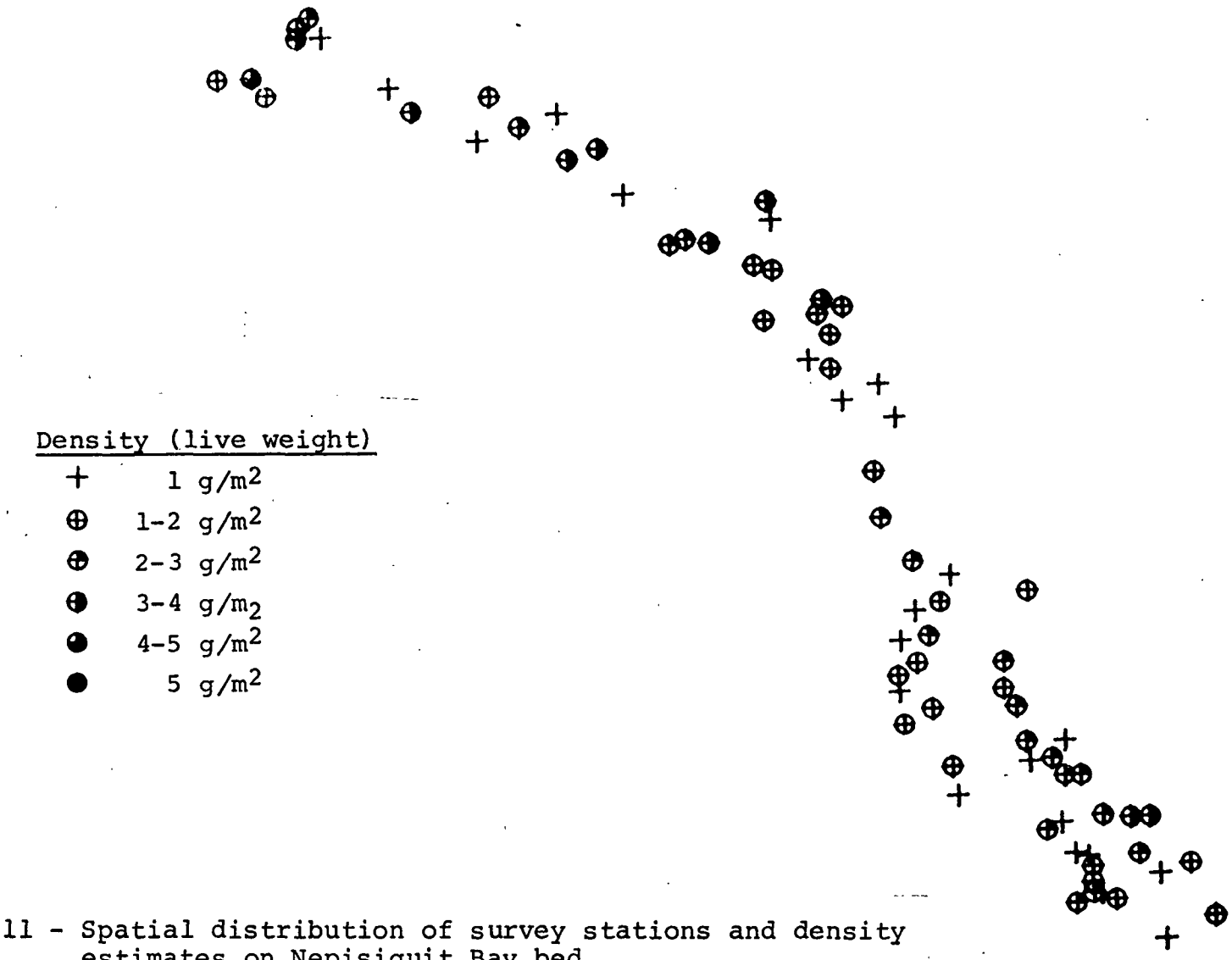


Fig. 11 - Spatial distribution of survey stations and density estimates on Nepisiguit Bay bed.

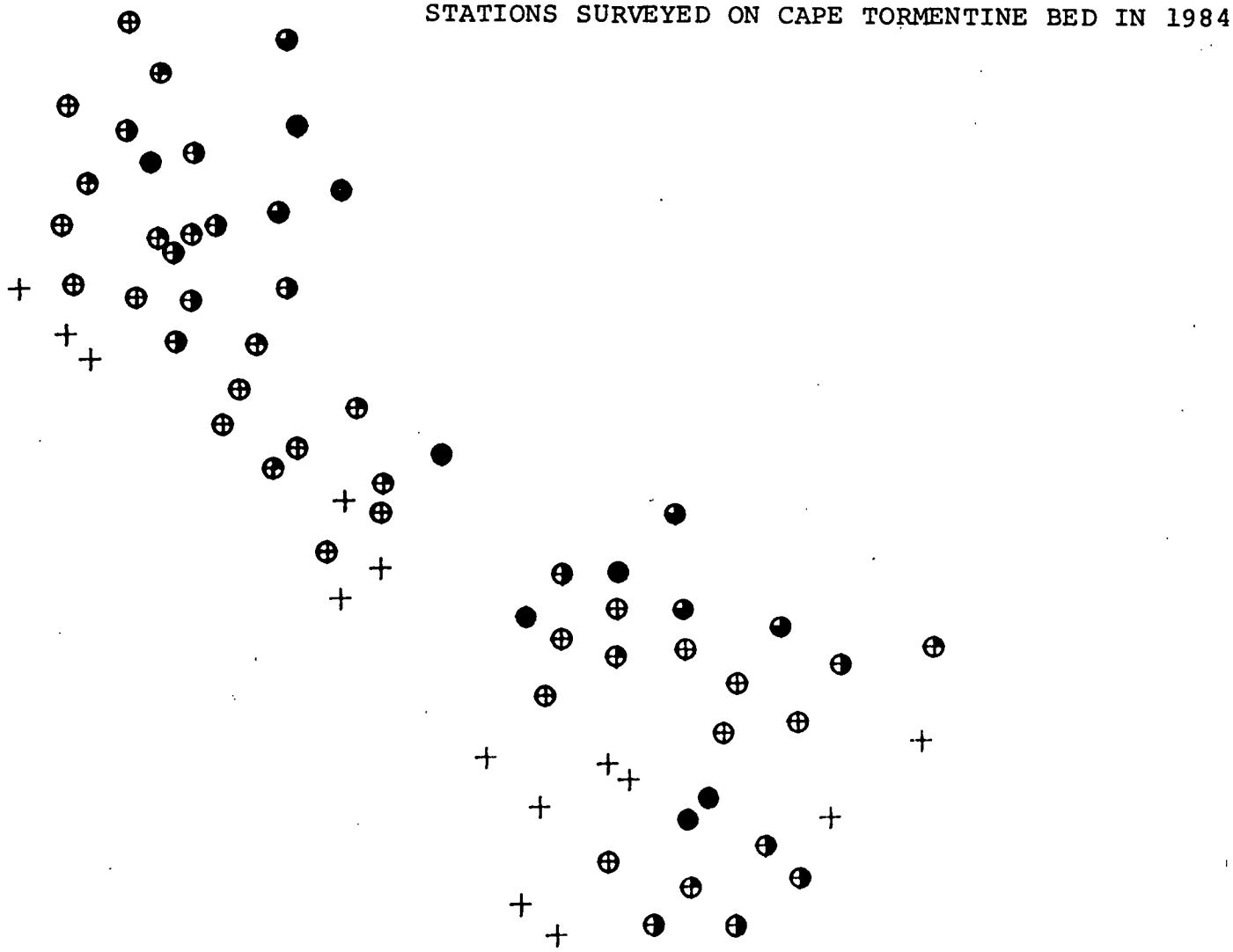


Fig. 12 - Spatial distribution and density estimates on Cape Tormentine beds (see caption on Fig. 11).

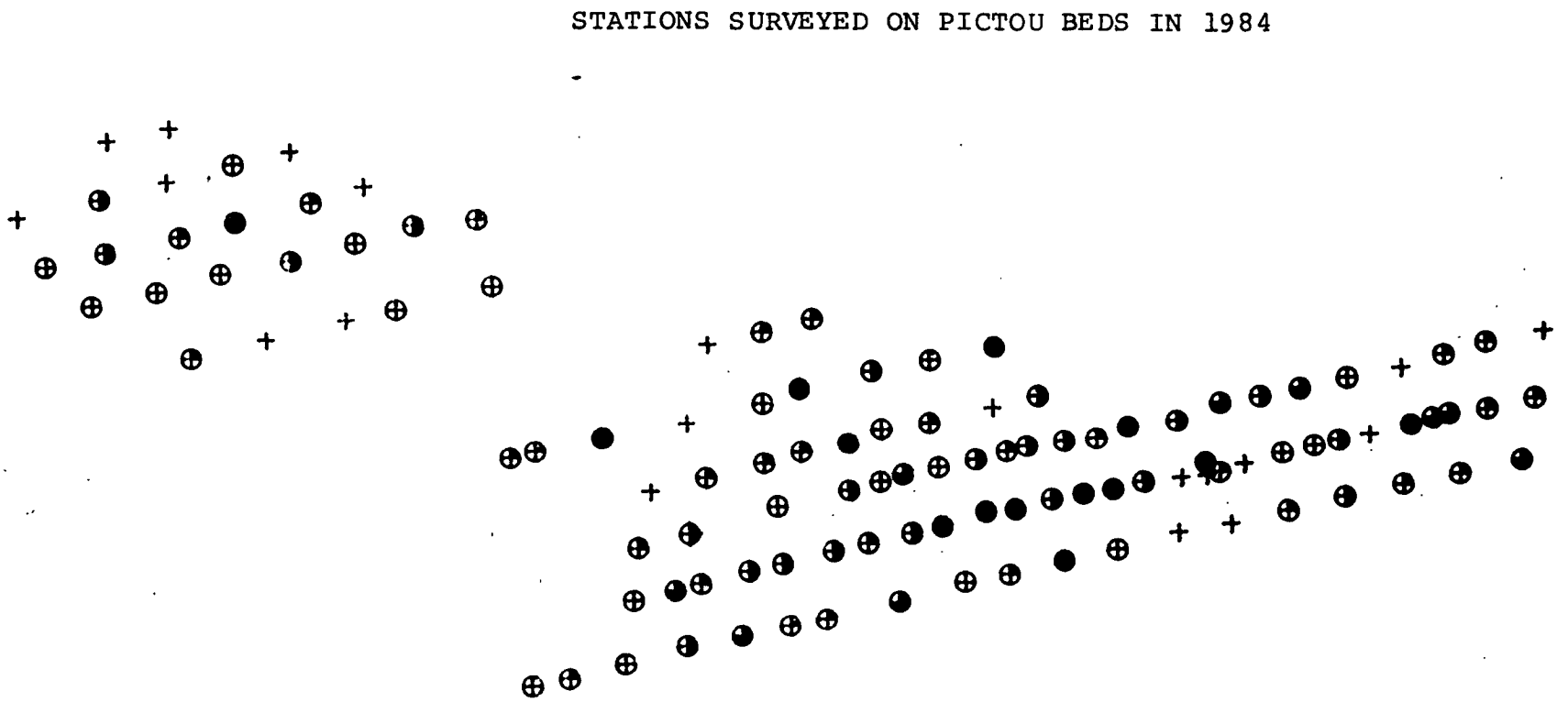


Fig. 13 - Spatial distribution and density estimates on Indian Rocks and Pictou Island beds (see caption on Fig. 11).

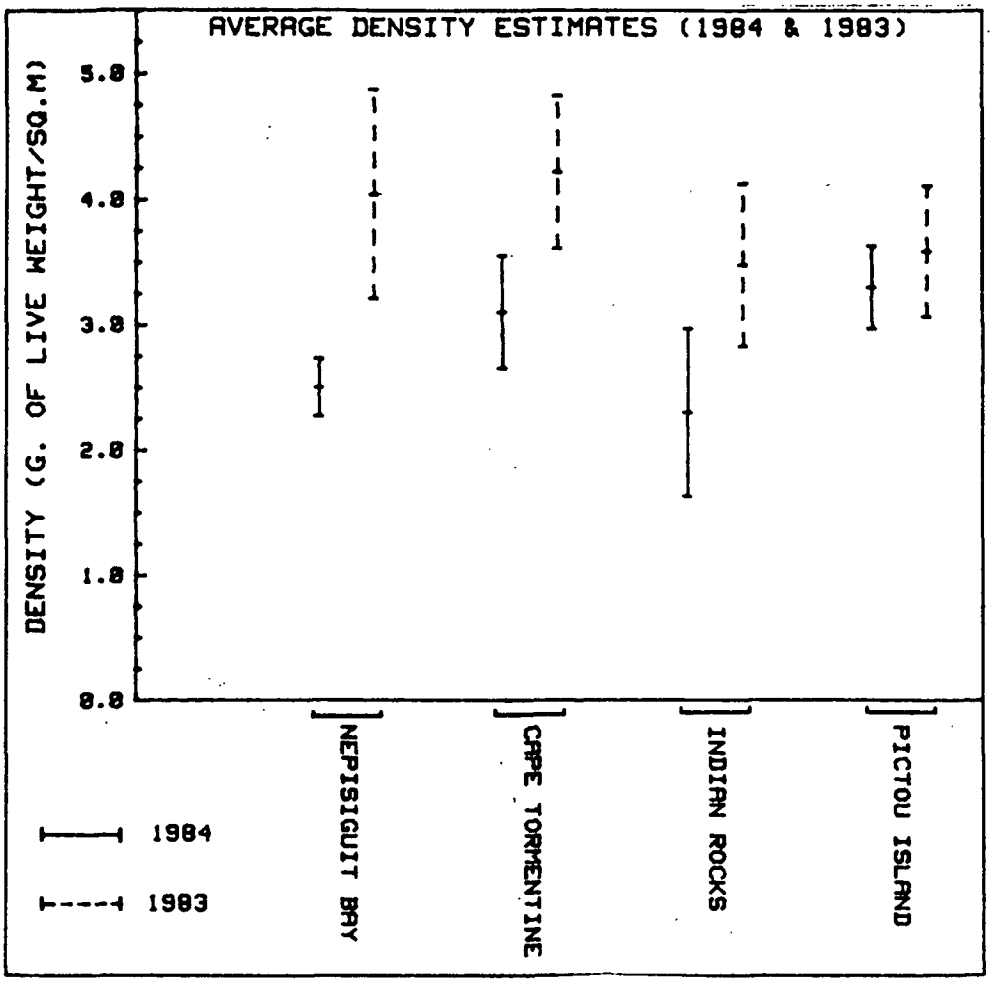


Fig. 14 - Average density estimates and confidence intervals for the four beds or groups of beds surveyed in 1984.

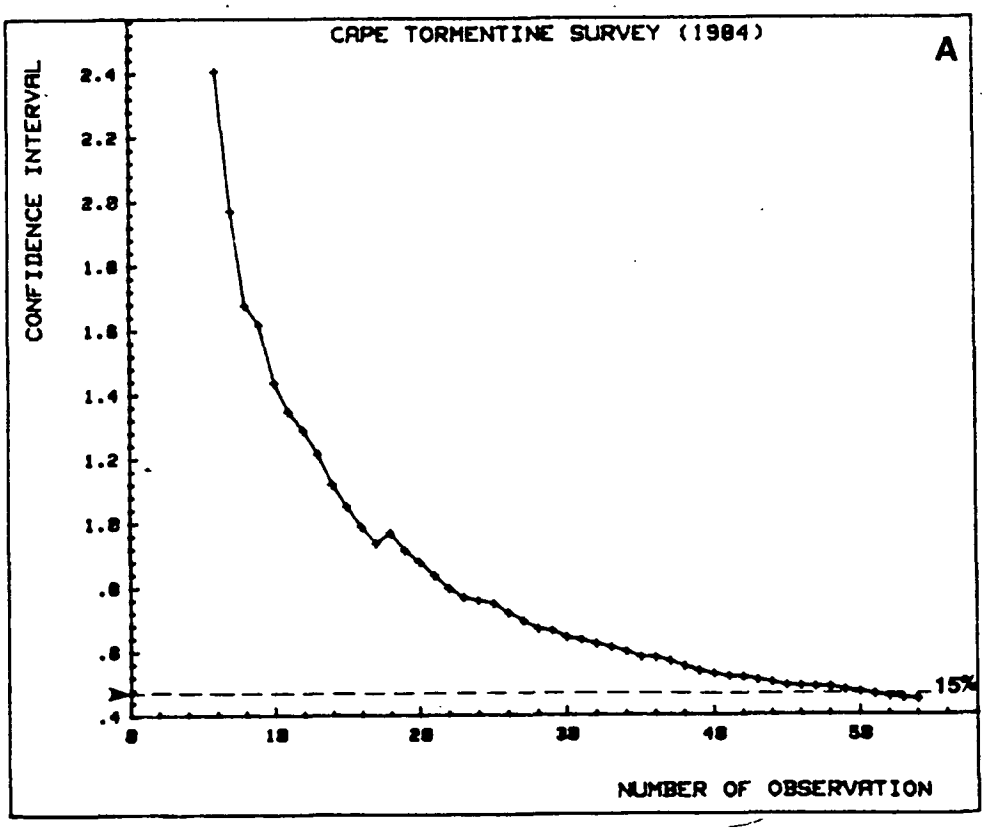
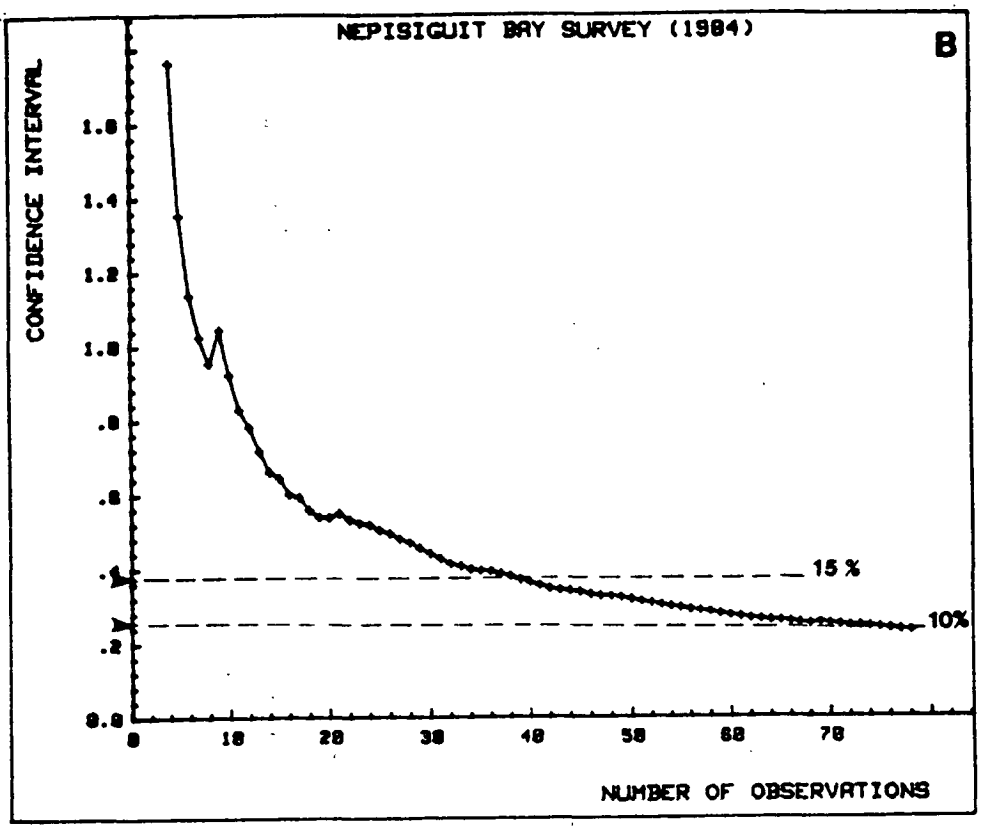


Fig. 15 - A (see caption next page) CAPE TORMENTINE.



B. NEPISIGUIT BAY

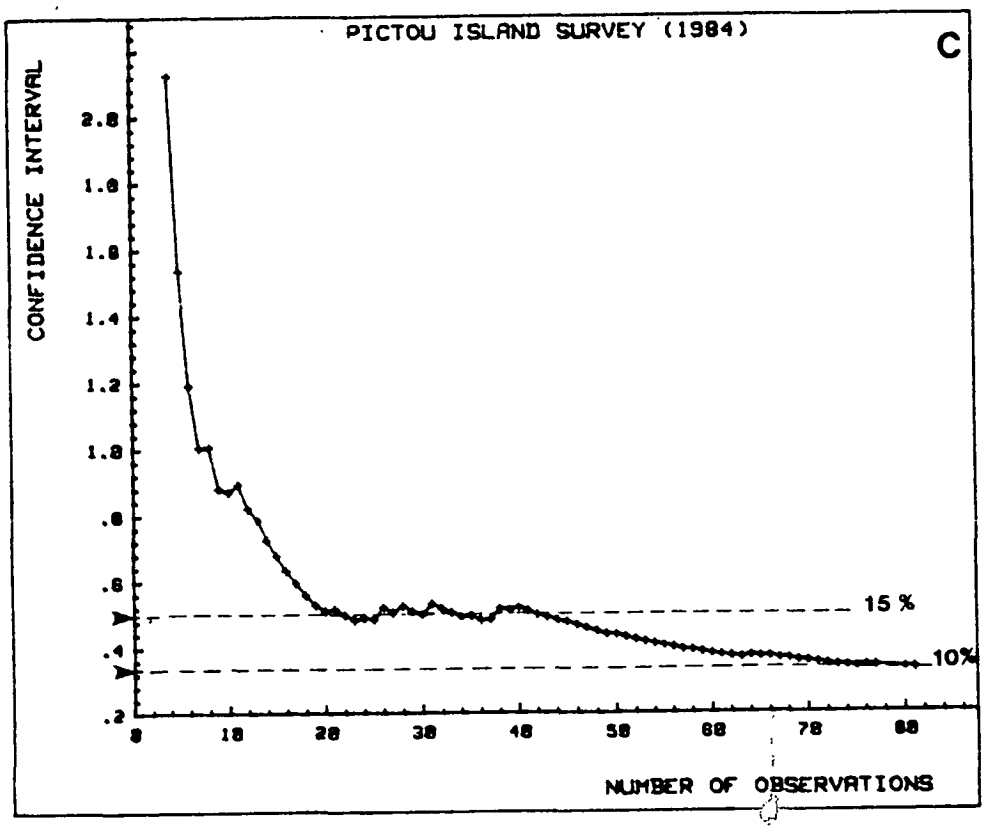


Fig. 15 - Variability of the confidence interval on density estimates calculated for an increasing number of tows.

C. PICTOU ISLAND

Appendix 1. List of boats chartered for 1984 survey program.

AREA	FISHERMEN	VESSEL	OVERALL LENGTH (ft)	TYPE	DATE	NO. OF TOWS
Nepisiguit	A. Doucet	Gilles	42	A-frame	13-27 August	110
Cape Tormentine	D.F.O vessel	1B-1284	43	A-frame	27-28 July 15-19 October	69
Pictou	D. Llewellyn	Knight	42	A-frame	5-9 September	94

Appendix II. - Map of the Southern Gulf of St. Lawrence showing lobster districts (large number) and statistical sub-districts (small numbers).