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An Assessment of the Abundance of the Iceland Scallop, Chlamys islandica, on Green Bank (NAFO Div. 3Ps)

by

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Abstract

A stratified-random survey of Green Bank has confirmed that aggregations of Iceland scallops, Chlamys islandica, are not sufficiently extensive to warrant large-scale commercialization. As on St. Pierre Bank, while the estimated total standing stock appears impressive at 1000-2300 t meats ($\bar{x}$ = 1200 t), much of it is too widely dispersed over the bank (1100 mi²) to be commercially attractive with current technology.

Résumé

Un échantillonnage aléatoire stratifié du Banc à Vert a confirmé que les concentrations de pétoncles d'Islande (*Chlamys islandica*) ne sont pas suffisantes pour justifier une pêche commerciale à grande échelle. Comme sur le banc de St. Pierre, le stock actuel estimé paraît important - de 1 000 à 2 300 t de chairs - (x = 1 200 t) - mais ils est en bonne part trop dispersé sur le banc (1 100 milles carrés) pour présenter un intérêt commercial, compte tenu de la technologie dont on dispose actuellement.

Introduction

The Department of Fisheries and Oceans has expressed only modest expectations regarding the potential catch of Iceland scallops outside the northern edge of St. Pierre Bank. Industry, meanwhile, has continued to allege that our research focus has primarily been along the northern edge and that our overall picture continues to be sketchy and that this in turn has resulted in a very conservative management strategy and a needlessly low TAC (Total Allowable Catch). One of the areas in question is Green Bank, an area east of St. Pierre Bank encompassing some 1100 mi^2 (Fig. 1). Since the continued viability to commercializing deposits of Iceland scallops in this area hinges on the availability and sustainability of additional, hitherto unknown aggregations, it was decided to conduct a directed survey for the mollusc on Green Bank with a view to evaluating its overall commercial potential.

Materials and Methods

A stratified-random survey was conducted (Smith and Somerton 1981), using a design similar to the one employed to survey groundfish (Pitt 1976). Two strata each covering 944 mi^2 and 166 mi^2 shallower than 100 m were fished (Table 1). All stations were randomly assigned.

A total of 78 one-mile tows was completed (Fig. 2) during a 3-day period between April 26 and April 28, 1991. The survey was conducted with the 82 m stern trawler, GADUS ATLANTICA. All tows were completed with an unlined 12 ft (3.6 m) New Bedford offshore dredge equipped with 3" rings. Rings were interconnected with three and four links on the top and belly, respectively. Towing speed was approximately 3 knots with a warp to depth ratio of 3:1.

For other details see, for example, Naidu (1991).

Results and Discussion

Of 78 tows, 17 produced no scallops, 58 produced catches under 49 kg (shell stock), typically below 10 kg, and only 3 sets resulted in catches in excess of 50 kg. Areal distribution of catch numbers/tow are shown in Figure 2. The better catches consisted of old, barnacle-infested Iceland scallops. Frequently, the encrustation was so severe that it contributed to some 30% of the total weight of scallops. As expected, extensive beds of Iceland scallops were not found. Overall, the results compare favourably with what we found in this area in 1979. Also, none of the tows on Green Bank produced sea scallops.

Tables 2-5 summarize selected biological characteristics of Iceland scallops from Green Bank.

Estimates of minimum trawlable standing stock and corresponding yields at 12.7% assuming a bracketed array of gear efficiencies ranging from 33 to 75% are summarized in Tables 6 and 7. The approximately 1,000-2,000 t of meats are dispersed over 1100 mi^2 nearly always in densities unlikely to attract commercial effort.

Over the years, a total of 129 stations have been fished over Green Bank, including other areas on Green Bank (Fig. 3). Nowhere have we found significant or extensive aggregations. Overall, prospects for their commercialization would appear to be minimal.

References

Naidu, K. S. 1991. An estimate of exploitable Iceland scallop (Chlamys islandica) biomass on St. Pierre Bank, 1990. CAFSAC Res. Doc. 91/46. 32 p.

Pitt, T. K. 1976. Contributions to a manual on ICNAF groundfish survey. ICNAF Res. Doc. 76/VI/119. 14 p.

Smith, S. J., and G. D. Somerton. 1981. STRAP: A user-oriented computer analysis system for groundfish research trawl survey data. Can. Tech. Rep. Fish. Aquat. Sci. 1030: iv + 66 p.

Table 1. Distribution of fishing sets by strata, areas and intensity of coverage during a resource survey for Iceland scallops on Green Bank, April 1991.

Stratum	Mean depth (m)	Area (mi^2)	No. of sets	No. sets/mi^2
325	78.0	944	73	0.08
326	84.2	166	5	0.03
TOTALS	78.4	1,110	78	0.07

Table 2. Stratum-specific mean numbers and weights (kg) of Iceland scallops per tow mile on Green Bank, April 1991.

Stratum	Mean depth fished (m)	No. of sets	Mean nos. (± S.D.)	Mean weight (kg) (± S.D.)
325	78.0	73	121.5 (±432.9)	6.8 (±27.4)
326	84.2	5	909.6 (±1870.8)	33.0 (±68.1)
TOTALS	78.4	78	172.1 (±628.3)	8.4 (±31.4)

Table 3. Number of Iceland scallops per kg (round) caught by stratum on Green Bank, April 1991.

Stratum	Total number	Total weight (kg)	No./kg (all scallops)	% ≥60 mm
325	8872	493.0	18.0	93
326	4548	164.8	27.6	65
Σ	13,420	657.8	20.4	89

Table 4. Stratum-specific mean and modal shell heights (mm) of Iceland scallops on Green Bank, April 1991.

Stratum	N	Mean shell height (mm) (± S.D.)	Modal shell heigth (mm)	Range	
				Max.	Min.
325	3731	70.6 (±8.1)	70	99	21
326	597	61.5 (±6.9)	60	83	31
Overall	4328	69.4 (±8.5)	70	99	21

Table 5. Biological meat yields, average meat weights and meat counts/500 g of Iceland scallops from Green Bank, April 1991.

Set	Stratum	N	Whole wt. (kg)	Meat wt. (g)	$\bar{x}$ meat wt. (g)	No./500 g	% yield
71	325	171	14.00	2131.3	12.5	40.1	15.2
83	325	179	8.00	996.5	5.6	89.8	12.5
87	325	162	8.90	1024.6	6.3	79.1	11.5
97	325	139	9.90	977.0	7.0	71.1	9.9
118	325	120	6.75	795.5	6.6	75.4	11.8
122	325	146	7.25	1042.3	7.1	70.0	14.4
Σ		917	54.80	6967.2	7.6	65.8	12.7

Table 6. Estimates of minimum travlable stratum-specific and overall biomass (kg, whole weight) of Iceland scallops on Green Bank, 1991.

Stratum	No. sets	Total	Average/set	Units	Total wt.	Variance
325	73	493	7	478,309	3,229,963	751
326	5	165	33	84,109	2,772,583	4643

Total	Upper	Lover	Mean	Upper	Lover
6,002,546	13,065,846	-1,060,755	10.67	23.23	-1.89

Table 7. Estimates (mean and 95% confidence bands) of Iceland scallop biomass (t, meats) on Green Bank, 1991. Based on overall gear efficiencies of 33%, 50%, and 75%.

Efficiency	Biomass
33%	-408 - 4978 ($\bar{x}$ = 2287)
50%	-269 - 3319 ($\bar{x}$ = 1524)
75%	-179 - 2157 ($\bar{x}$ = 991)

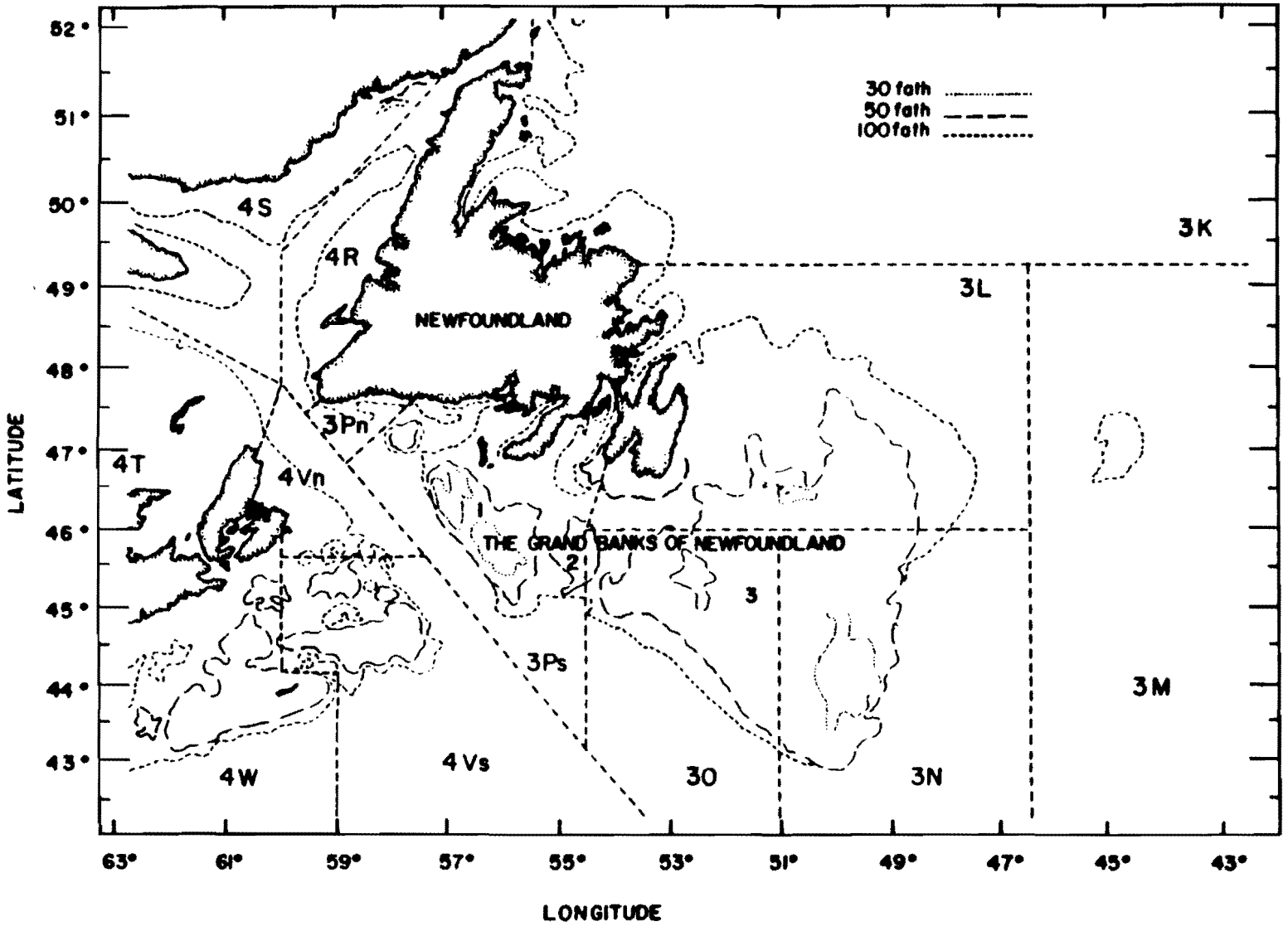

Fig. 1. The Grand Banks of Newfoundland showing the three major plateaus: 1. St. Pierre Bank, 2. Green Bank, and 3. Grand Bank.

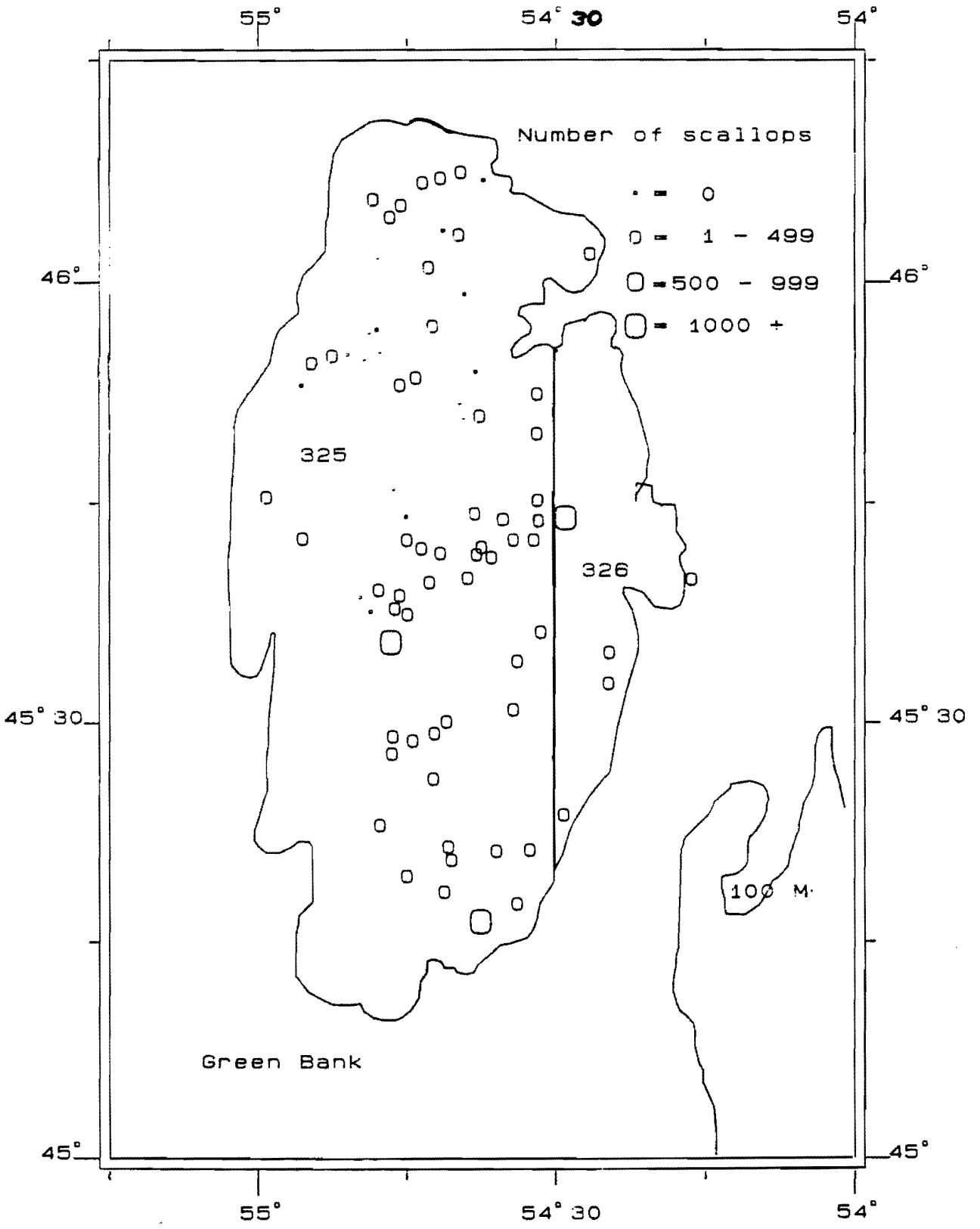

Fig. 2. Distribution of Iceland scallops (nos./tow) on Green Bank in April 1991.

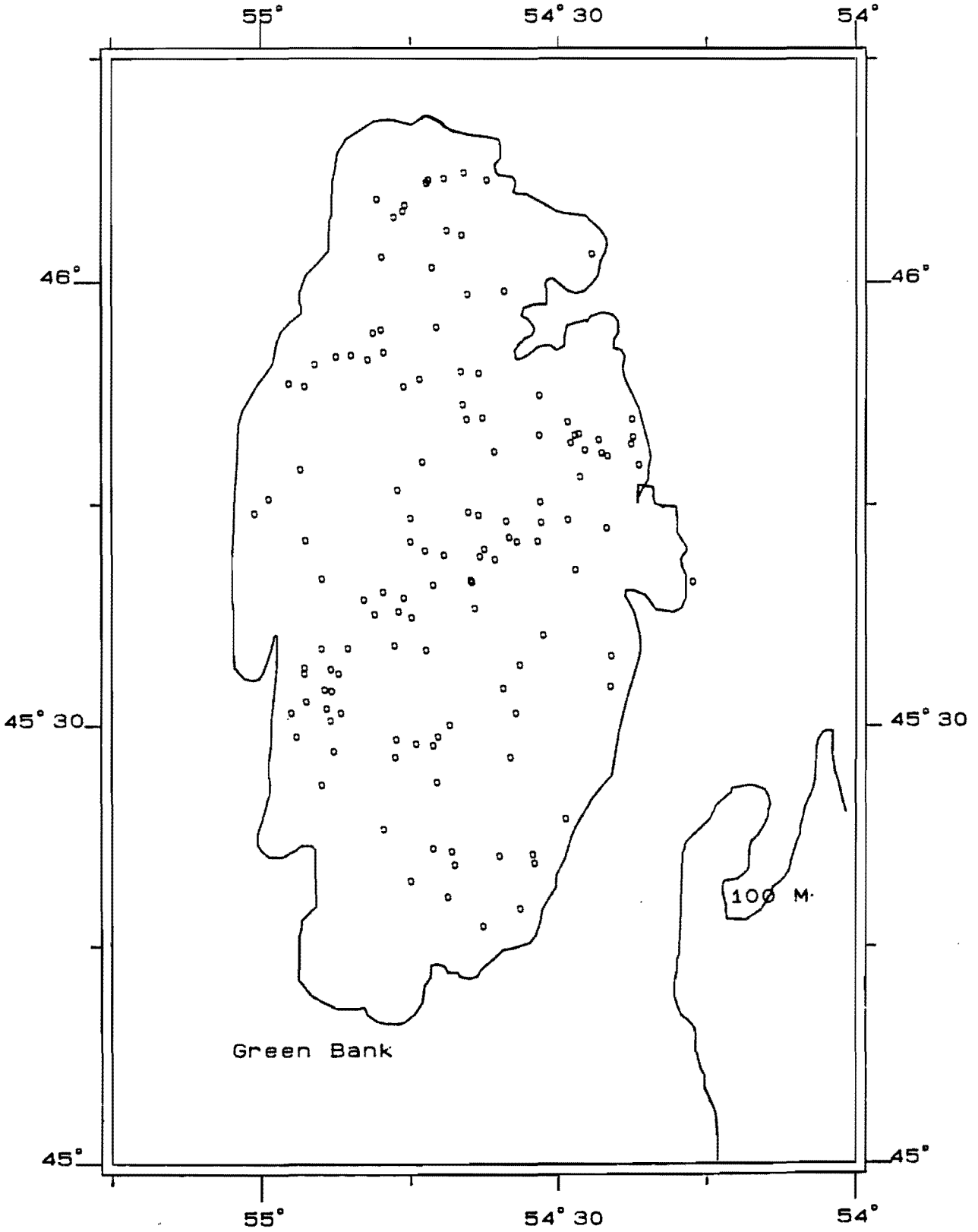

Fig. 3. Distribution (composite) of research survey stations on Green Bank, 1979-91.