Assessment, Current Status, and Future Outlook of Sea Scallop Populations (*Placopecten magellanicus*) in the Georges Bank and Mid-Atlantic Regions

by

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Introduction

The following report presents an assessment of the status of the sea scallop (*Placopecten magellanicus*) populations in the Georges Bank and Mid-Atlantic areas off the northeast coast of the United States. The data and results include recent landings statistics, USA and Canadian sea scallop research survey relative abundance indices, and commercial effort statistics. Background information (pre-1978 commercial and research data) for scallops in these areas was summarized previously by Serchuk et al. (1978). The present report updates past assessment material and uses the results of former analyses, in conjunction with the 1978 sea scallop research survey information, to evaluate present and future population conditions.

Recent Landings Statistics

Tables 1-3 list sea scallop landings by the USA and Canada from the entire Northwest Atlantic (Table 1), from major scalloping grounds within the Northwest Atlantic (Table 2), and from statistical subareas within the principal fishing regions (Table 3). The catch history of both the Georges Bank and Mid-Atlantic sea scallop fisheries was earlier reviewed in Serchuk et al. (1978), and will be only summarily discussed further here. Recent increases in yearly landings from 1975-1977, in both fisheries, have resulted from recruitment of the very strong 1972 year-class (MacKenzie et al. 1978), coupled with notable increases in effort (vessels, days fished, trips - Table 4). Total catches (USA and Canada), in each fishery, doubled between 1975 and 1977; overall total landings in 1977 exceeded 24,000 tons (meats)(Table 1), the highest on record.

The USA catch of sea scallops rose 27% from 8,712 tons in 1976 to 11,068 tons in 1977, the highest domestic annual landings since 1962 (Table 1). Georges Bank (Subdivision 5Ze) catches nearly tripled from 1,761 tons in 1976 to 4,805

tons in 1977, while Mid-Atlantic catches (Statistical Area 6) declined 11% from 6,576 to 5,869 tons (Table 3). The 1977 USA Mid-Atlantic catch, however, was still among the highest values ever in the fishery.

Canadian sea scallop catches from Georges Bank increased sharply from 9,726 tons in 1976 to 13,034 tons in 1977 (Table 2), an all-time peak in the Canadian offshore fishery. Similar to USA catch patterns, Canadian Georges Bank landings nearly doubled between 1975 and 1977 (76% increase).

Recent Catch Composition

USA commercial landings size-frequency data (shell height) from the South Channel region of Georges Bank and the New York Bight region in the Mid-Atlantic, 1975-1977, indicate the dependence of the domestic fleet during 1976 and 1977 on the 1972 year-class (Figures 1 and 2). Older age groups (larger sized scallops), well-represented in the 1975 landings and in earlier years, were of diminished importance in the 1976 and 1977 landings from both the northern and southern USA scallop fisheries.

Canadian commercial landings size-frequency data (shell height), 1975-1977, from the Northern Edge and Peak region of Georges Bank, derived from meat-weight port samples of the Canadian fleet (data provided by R. Chandler, personal communication), indicate a reliance on newly recruiting year-classes in the catch (Figure 3). The 1975 frequency-distribution clearly illustrates the importance of the 1972 year-class recruiting into the Canadian fishery, although older age groups were also represented. In 1976 and 1977, the 1972 year-class was also a major component of the landings, but the 1973 (and possibly 1974) year-classes appeared to be important as well.

Recent Sea Scallop Research Survey Data

Sea scallop research-vessel surveys were conducted most recently in 1975, 1977, and 1978. USA surveys covered all major scallop grounds on both Georges Bank and the Mid-Atlantic during 1975 and 1977. In 1978, all major regions in each area were again surveyed, except for the Northern Edge and Peak area of Georges Bank. This area was surveyed in both 1977 and 1978, however, by Canadian research surveys. In both years, USA scientific personnel participated in these endeavors.

The USA surveys utilized a standard 10-foot frame scallop dredge, equipped with a 2-inch ring bag, towed for 15 minutes at 3.5 knots. A stratified random sampling design was employed in both the 1977 and 1978 USA surveys. The 1975 survey used a transect design of stations. To compare the 1975 results with the later USA surveys, the 1975 station data was post-stratified, before analysis, into the sampling strata used in 1977 and 1978.

The Canadian scallop research surveys on Georges Bank in 1977 and 1978 utilized a standard 8-foot dredge with 3-inch diameter rings and a 1½-inch mesh nylon net liner, towed for 0.5 nautical miles of ocean bottom as measured from Loran bearings. Sampling stations were chosen on the basis of the amount of commercial effort expended in 10-minute statistical areas of latitude and longitude by both the Canadian and USA scallop fleets. Sampling intensity was therefore greatest in the Northern Edge and Peak region. Comparison of the Canadian data with USA survey results was facilitated by post-stratification of the Canadian tow data, before analysis, into USA sampling strata. The stratified mean number of scallops per tow obtained in the 1977 and 1978 Canadian surveys of the Northern Edge and Peak were further adjusted for the difference in tow distance between USA and Canadian standard tows. The mean distance towed per station in the 1977

and 1978 USA surveys was 0.88 and 0.89 nautical miles, respectively. Hence, Canadian mean numbers per tow were expanded by 1.76 (0.88/0.50) in 1977 and 1.78 (0.89/0.50) in 1978.

A preliminary comparison of the 1977 USA and Canadian survey results from the Northern Edge and Peak relative to size selectivity differences between the sampling gears suggests that the Canadian lined dredge was about twice as efficient in retaining pre-recruit scallops (<70 mm shell height) as the USA dredge. Both dredges, however, were equally efficient in sampling recruited scallops 70 mm and larger. These data imply that the relative abundance index of pre-recruit scallops derived from the 1978 Canadian survey of the Northern Edge and Peak may be only half as large as it is, when standardized against USA dredge size-efficiency data. The recruited index obtained from the 1978 Canadian survey of the Northern Edge and Peak should be directly comparable to previous USA recruit indices derived in 1975 and 1977 since little size efficiency differences were noted between the 1977 USA-Canadian recruit numbers per tow in this region.

Dates, research vessels used, and the number of tows accomplished in the recent sea scallop survey cruises are provided in Table 5.

Research Survey Size-Frequency Data

Survey-derived size (shell height) frequencies from the 1975, 1977, and 1978 cruises on Georges Bank and in the Mid-Atlantic are summarized, by principal commercial fishery regions, in Figures 4 and 5. The 1975 results indicated that the 1972 year-class (40-60 mm shell height) was a very strong one in almost all major fishing areas on both Georges Bank and in the Mid-Atlantic. The 1977 and 1978 results further substantiated the relative strength of the 1972 year class, but indicated also that apart from the Northern Edge and Peak region of Georges Bank, and the Virginia-North Carolina area in the Mid-Atlantic (1978 survey data),

recruitment of the 1973, 1974, and 1975 year classes was poor relative to the 1972 year class. The virtual absence of these year classes in the South Channel, Southeast Part, New York Bight, and Delmarva regions is striking.

The Northern Edge and Peak, which has consistently been the most productive area on Georges Bank (Bourne 1964), has maintained high recruitment levels since 1972. The 1978 Canadian size-frequency data suggests that the 1975 year class is much stronger than the 1974 year class in this region (Figure 6) and apparently significantly exceeds that of the 1972 year-class (Figure 4).

A successful 1975 year-class is evident also in the Virginia-North Carolina region of the Mid-Atlantic (Figure 5). The 1972 year class did not appear to be significant in this area in any of the recent surveys (note the absence of larger-sized individuals in the 1977 and 1978 cruises), and hence the current 1975 year class comprises the bulk of the population distribution.

Research Survey Relative Abundance Indices

Research survey relative abundance indices (numbers per tow) derived from the 1975, 1977, and 1978 Georges Bank and Mid-Atlantic cruises are presented in Tables 6 and 7, together with commercial landings, effort, and catch per effort data. Survey indices for all years have been tabulated for the pre-recruit (pre-commercial size: <70 mm shell height) and recruit (commercially harvestable: $\geq$70 mm shell height) components of the populations, as well as for total numbers per tow.

On the Georges Bank grounds, the recent time series of survey abundance indices indicates that in the South Channel the relative abundance of the recruited segment of the population declined between 1975 and 1978. The recruit index drastically declined 48% from 59.8 in 1977 to 31.0 in 1978. Equally, the pre-recruit index dropped from 27.9 in 1975 to only 3.6 in 1978, reflecting the growth of the 1972 year class into the exploitable sector of the population and the relative absence of subsequent recruitment. The

four-fold increase in landings from the South Channel between 1975 and 1977 (965-4492 tons), supported primarily by the 1972 year class (Figure 1), has significantly decreased population size from the 1975 level.

Slight declines in both the total number per tow and the recruit number per tow transpired in the Southeast Region between 1975 and 1978 (16-18% decrease). Recruitment, however, has remained relatively stable during the time period; the pre-recruit indices have ranged between 0.9 and 2.4. Landings doubled between 1976 and 1977, although the harvest of scallops from this area is minor compared to the landings from the South Channel and Northern Edge and Peak areas of the Bank.

Survey abundance indices from the Northern Edge and Peak, which were relatively high in 1975, substantially increased in the 1977 and 1978 surveys. Total numbers per tow almost quadrupled between 1975 and 1978; the pre-recruit and recruit indices similarly exhibited large increases between these years. The 1977 and 1978 pre-recruit indices suggest that recruitment of the 1974 and 1975 year classes has been excellent. Total recruit abundance of scallops on the Northern Edge and Peak in 1978 was three-fold greater than in 1975, despite a doubling of total landings during this period (Table 6).

For the Mid-Atlantic scallop grounds, the survey indices exhibit almost comparable trends for the New York Bight and Delmarva regions (Table 7). Total numbers per tow,in both areas, substantially declined between 1975 and 1978 (-32% in the New York Bight; -54% in Delmarva), while the relative abundance of the recruits remained stable. The pre-recruit indices, however, declined precipitously in each area, between 1975 and 1978 (25.0 to 1.5, New York Bight; 70.2 to 8.7, Delmarva). Commercial landings in 1976 and 1977 from both regions were 2-3 times higher than in 1975.

The 1978 relative abundance values for the Virginia-North Carolina area in the Mid-Atlantic were all (pre-recruit, recruit, and total numbers per tow) up significantly from preceding survey indices. Total relative abundance in 1978 was 12-fold higher than in 1975, due to a sharp increase in the number of pre-recruit scallops per tow (1.7 to 16.4), indicative of a successful 1975 year class of scallops in this area. While the 1978 total and recruit-indices are high compared to previous survey values observed in Virginia-North Carolina, they are generally low when compared with relative abundance levels, in any of the survey years, from other Mid-Atlantic areas.

Recent Commercial Effort (Days Fished)

Trends in commercial effort between 1975 and 1978 for each of the principal fishing grounds on both Georges Bank and in the Mid-Atlantic were analyzed to relate changes in survey values to effort variations. Data on USA effort was derived from port interview records comprising greater than 95% of the USA Georges Bank landings between 1965-1977 (73% for 1975-78), and about 59% of the domestic Mid-Atlantic scallop catch (46% for 1975-78). These data represent USA vessels using scallop dredges and landing in New England ports (Tables 8, 9, 10). Comparable Canadian Georges Bank data were obtained from J. F. Caddy (1975 and personal communication) and R. Chandler (personal communication).

Relative fishing power between the USA and Canadian fleet on Georges Bank was derived by a regression through the origin of the yearly mean catch per day values for the two fleets for the period 1965-1975 (Figure 7). The fishing power standardization coefficient was determined to be 1.0957, a value almost identical to the 1.09 coefficient derived by Caddy (1975) for the years 1961-1971, and which he attributed to the ratio of the standard dredge widths between the two fleets.

The 1976 and 1977 Canadian-USA yearly catch/effort values, when plotted, were well above the 1965-1975 regression line (Figure 7). Regression of these two points through the origin results in a standardization coefficient of 1.3918, suggesting that the Canadian fleet has recently become 27% (1.3918/1.0957) more effective in capturing scallops relative to the USA Georges Bank fleet then previously. The cause for this apparent increase in relative efficiency is not known, although it may be due to procedural efficiency changes within the Canadian fleet precipitated by quota regulations imposed since 1976 by the Canadian government. Equally plausible is that the Canadian fleet may have fished on denser concentrations of scallops than USA vessels. The smaller size of acceptable scallops to the Canadian fishermen relative to the USA fleet may have been a causative factor as well.

USA effort on Georges Bank and in the Mid-Atlantic for 1975-1977 was expressed as standardized USA days fished by dividing total USA catches from each of the principal fishing grounds by the appropriate USA total yearly areal catch rate (Table 10). Canadian Georges Bank effort during 1975-1977 (provided by R. Chandler, personal communication) was adjusted to standardized USA days by multiplying the Canadian days fished by either 1.0957 (1975 value) or 1.3918 (1976 and 1977 values).

Standardized effort values for the three principal scallop grounds on Georges Bank, 1975-1978, are provided in Table 6. The South Channel and Northern Edge and Peak regions exhibited significant increases in total effort between 1975 and 1977; only minor increases in fishing effort were observed in the Southeast Part of the Bank during this period. Standard USA days fished by the USA fleet increased five-fold in the South Channel from 1975 to 1977 (735.1 to 3888.7), and 2.5 times on the Northern Edge and Peak. The absolute increase in USA effort on

the Peak and Edge, however, is minor compared to recent Canadian effort in this region - Canada fished 8,100 standard days in 1975 and 11,585 standard days in 1978 (43% increase) on the Northern Edge and Peak.

The annual geographic distribution of scallop landings from the three principal grounds on Georges Bank for both countries (Table 11) tends to reflect the relative distribution of fishing effort expended by each fleet in the various Bank areas during any given year.

Relative changes in total standardized effort, total landings, and survey abundance indices for the Georges Bank scalloping grounds, 1975-1978, are presented in Table 12. Between 1975 and 1977, total standardized effort (both USA and Canada) increased 260% in the South Channel, 9% in the Southeast Part, and 45% on the Northern Edge and Peak. The corresponding landings increases from each area were 365%, 48%, and 85%, respectively. The effects of increased exploitation on the South Channel, coupled with a lack of substantive recruitment following the appearance of the 1972 year class in 1975, were evidenced in the relative declines of the survey recruit (-44%) and pre-recruit (-87%) indices between 1975 and 1978. Relative changes in all effort, landings, and survey parameters in the Southeast Part during the last three years were small compared to either the Channel or Peak areas. This is not unexpected given the limited fishing activity this region has been subject to in recent years.

The relative increases in effort and landings on the Northern Edge and Peak since 1975 have been much lower than the increases in any of the survey abundance indices. Between 1975 and 1977, total standardized effort increased by 45% and landings (tons) by 85%, while survey indices (total and recruit) increased by over 100%. The 1978 survey values show even more substantial percentage increases (1975-1978 comparisons) indicative of excellent recent recruitment.

Standardized effort values for the Mid-Atlantic scallop grounds, 1975-1978, and the relative changes in these values in relation to landings and survey indices are given in Tables 7 and 13. Effort increased in each of the three major grounds between 1975 and 1976; the most significant rise was observed in the New York Bight area(1,908 to 4,049 days,112% increase). Annual USA effort on the New York Bight and Virginia-North Carolina grounds declined between 1976 and 1977, while effort in Delmarva increased slightly (1,554 to 1,802 days). In recent years, as previously, annual effort in the New York Bight area has exceeded the combined effort applied in the two more southerly Mid-Atlantic scallop areas.

Since 1975, each of the Mid-Atlantic areas has exhibited large relative changes in yearly effort and catch. Effort increased by greater than 50% between 1975 and 1977 in both the New York Bight and Delmarva regions. Concomitantly, landings from these grounds increased 116% and 144%, respectively. The 1976 and 1977 catches from each of these areas were the highest observed since 1968, when detailed records were first maintained on sub-areal landings within the Mid-Atlantic (Table 3). The relative increases in effort and catch in the New York Bight and Delmarva areas from 1975-1977 have been accompanied by only minor changes in the survey recruit indices. However, the pre-recruit indices declined by 94% in the Bight and by 88% in Delmarva between 1975 and 1978. Clearly, the successful 1972 year-class has sustained the recent landings increases in these areas but subsequent good recruitment has not transpired.

The relatively high magnitude of recent changes in the Virginia-North Carolina effort, landings, and survey values belies the relative importance of this fishery vis-à-vis the two northerly Mid-Atlantic fisheries. Absolute annual effort and landings values in Virginia-North Carolina during 1975-1977 were an order of magnitude less than those of the other grounds. The substantial relative

change between the 1977 and 1978 survey abundance indices, however, implies a significant population increase due to recent recruitment.

Present Status and Future Outlook

Georges Bank Scallops - The scallop populations on Georges Bank have received increased fishing pressure during the last three years. Total landings incremented twofold between 1975 and 1978 as a result of recruitment of the highly successful 1972 year class into the commercial fishery in the South Channel and Northern Edge and Peak, and substantial increases in fishing effort. Both the USA and Canadian scallop fleets have relied heavily on the strength of this year class in their landings as indicated by commercial size-frequency distributions. Research survey relative abundance indices indicated in 1975 (and subsequently) that the 1972 year class was very good; the recent yearly catches have corroborated this finding.

The 1978 Georges Bank survey abundance indices indicate that the current abundance of the commercially exploitable segment of the scallop population in the South Channel is less than in 1975, and in the Southeast Part is similar to that observed in 1975, and that the pre-recruit indices have either drastically declined (South Channel) or remained at a low level. These data imply that recent recruitment (after 1972 year class) has been relatively poor in these regions, and that the present landings level (particularly for the South Channel) cannot be sustained without increasing fishing mortality.

A comparison of landings and effort between 1959-1964 (the previous period of exceptional recruitment and high landings on Georges Bank) and 1975-1977 (Table 14) suggests that by the end of 1978 approximately as much catch will have been removed from the South Channel and effort expended as occurred in the total six-year period from 1959-1964. The accumulated annual current effort may, in

fact, have already exceeded former levels since present effort (both USA and Canada) may be more effective than in the early 1960's, resulting in an underestimate of current standard days fished compared to previous times. The intensive fishery prosecuted in the early period resulted in total Georges Bank landings declining by 50% between 1964 and 1965 (Serchuk et al. 1978- Table 5); total catches from the South Channel dropped 73% from 1964 to 1965 (Tables 3 and 11). Research vessel survey abundance indices (A. Posgay, personal communication) correspondingly declined by greater than 50% (on both all of Georges Bank and in the South Channel) between 1964 and 1965. If the 1972 year class is of the same magnitude as the one that supported the Georges Bank scallop fishery during the early 1960's, declines in landings and catch per effort, similar to those that occurred after 1964, are likely to occur in future years in the South Channel if current fishing patterns persist. Lack of recent successful recruitment in the Channel area implies that scallop abundance will decrease in subsequent years. Even if the 1976 year class proves to be strong (unlikely, given previous patterns of recruitment in which strong year classes have appeared about once in a decade), this will not be significant in the South Channel landings until 1980, assuming present cull sizes.

The prospectus for the Southeast Part of Georges Bank, in the immediate future, is that this region should remain relatively stable productively if the current low levels of catch and effort are continued. Landings and effort were much higher in this area during 1959-1964 (Table 14) than at present. The relative absence of the 1972 year class in the survey size-distributions during 1975-1978 (Figure 4), and continued low recruitment levels (Table 6) indicate that any intensified future exploitation will rapidly upset the current balance between low productivity and low annual sustained yields.

The Northern Edge and Peak yielded, during 1975-1978, approximately 55% of the total scallop harvest taken between 1959-1964, with about 59% of the previous total effort (Table 14). At current exploitation rates (1977), present annual accumulated effort and catch will exceed the former total levels by the end of 1979. Recent successful recruitment, however, should maintain production at presently high levels for several years longer than this. If current fishing patterns change, as may be expected by shifts from the South Channel and the Mid-Atlantic regions to the Northern Edge and Peak, then the duration of high yield will be abbreviated accordingly. Since the Northern Edge and Peak, however, has exhibited more consistent annual recruitment than any other Northwest Atlantic sea scallop region, the biological risks associated with increased future exploitation appear relatively moderate.

In all regions on Georges Bank, scallops have been harvested, in recent years, at a size less than that producing maximum yield per recruit (about age 8, shell height 133 mm - Serchuk et al. 1978). Since yield per recruit analyses (Serchuk et al. 1978) indicate that for most values of size or age at first capture, the highest yields occur at relatively low fishing mortality, and that at any level of fishing mortality, yield increases as size at capture increases, future decreases in fishing mortality and increases in cull size will increase yield per recruit.

Except for the Northern Edge, continuation of current levels of fishing effort may decrease scallop populations significantly below historical levels. While the lower range of formerly observed scallop stock sizes has not resulted in lowered recruitment, the general history of commercial fisheries indicates that careful observations are required as stock sizes decline to very low levels to evaluate threshold levels below which the probability of abundant recruitment becomes reduced.

Mid-Atlantic Scallops - Recent trends in landings and effort in the Mid-Atlantic scallop regions have generally paralleled those on Georges Bank; increases in catch and effort have resulted from recruitment of the 1972 year class into the fishery. Research survey indices in the New York Bight and Delmarva areas indicated (in 1975 and afterward) an extremely high abundance of this year class (Table 7), and subsequent size-frequency distributions of commercial landings (Figure 2) and commercial annual catch/effort values (Table 10) have borne this out.

The 1978 Mid-Atlantic survey abundance indices suggest that in the New York Bight and Delmarva regions the commercially exploitable segments of the population are as relatively abundant now as in 1975, but recruitment (pre-recruit indices) is substantially less. Hence, present landings and effort levels cannot be continued in the future without increasing fishing mortality. In the Virginia-North Carolina region, recent good recruitment will permit moderate increases in exploitation, in the next several years, without a significant reduction in abundance.

Comparison of landings and effort between 1965-1968 (the previous period of strong recruitment and intensive exploitation in the Mid-Atlantic) and 1975-1977 (Table 15) indicates that by the end of 1978 (given 1977 rate) about 77% of the catch and 62% of the effort that occurred from 1965-1968 will have been recorded. These data, by themselves, seem to suggest that the total Mid-Atlantic fishery could proceed for another year or two at current levels, assuming recruitment was equally strong in both time periods. However, much of the Canadian landings during 1965 and 1966 were taken from Virginia (Caddy and Lord, 1968), an area in which recruitment of the 1972 year class was minor (Table 7, Figure 4). Equally, as in Georges Bank, current effort may be more effective than in the 1960's. The significant decrease in landings and effort

between 1976 and 1977 suggests that commercial abundance levels may have already declined. This may be true, in spite of an apparent increase in commercial catch rate in 1977 (Table 10), since the fleet tends to concentrate on areas of high productivity, fish these down, and move on to other areas of high production. The implication here is that the number of highly productive areas has started to decline.

After 1968, total Mid-Atlantic landings declined 56% (1968-1969: 4,311 to 1,896 tons, Table 3). Given the poor recent recruitment pattern, noted in the historically important New York Bight and Delmarva regions, future declines in overall Mid-Atlantic scallop abundance are expected. Under current exploitation levels, this may first become widely apparent in 1979.

As in the Georges Bank scallop populations, Mid-Atlantic scallops have been taken before the size of maximum yield per recruit. Increasing age at first capture and decreasing fishing mortality will be beneficial in increasing the total potential long-term yield from the resource.

Except for the Virginia-North Carolina area, current levels of fishing effort may reduce scallop populations significantly below those observed historically.

For all of the sea scallop populations off the northeast coast of the United States, given the data base currently available, the risks of the actual fishing mortality (F) being greater or less than desired are greater with catch limitations than with effort controls (days fished). Management strategies based on effort regulation are more robust than catch limits when the status of the resource is not precisely known and variations in production cannot be narrowly predicted.

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Table 1. United States and Canadian sea scallop landings (metric tons, meats) from the Northeast Coast of the United States (ICNAF Subarea 5 and Statistical Area 6), 1887-1977.

Year	USA[1]	Year	USA	Canada[2]	Total
1887	112	1940	3,467	--	3,467
1888	91	*1941	144	--	144
1889	141	1942	3,258	--	3,258
1892	53	1943	2,508	--	2,508
1897	435	1944	2,209	--	2,209
1898	156	1945	2,590	--	2,590
*1899	24	1946	5,236	--	5,236
*1900	79	1947	6,647	--	6,647
1901	286	1948	7,546	--	7,546
1902	61	1949	8,299	--	8,299
*1903	62	1950	9,063	--	9,063
1904	216	1951	8,503	91	8,594
1905	200	1952	8,451	91	8,542
*1906	255	1953	10,713	136	10,849
*1907	236	1954	7,997	91	8,088
1908	834	1955	10,036	136	10,172
*1909	843	1956	9,102	317	9,419
*1910	919	1957	9,523	771	10,294
*1911	663	1958	8,608	1,470	10,078
*1912	842	1959	11,178	2,721	13,899
*1913	353	1960	12,065	3,390	15,455
*1914	386	1961	12,456	4,549	17,005
*1916	266	1962	11,174	5,694	16,868
1919	89	1963	9,044	5,877	14,921
1921	38	1964	7,721	5,901	13,622
1924	154	1965	9,104	7,027	16,131
1926	506	1966	7,237	7,641	14,878
1928	216	1967	4,646	5,007	9,653
1929	1,130	1968	5,474	5,227	10,701
1930	1,111	1969	3,362	4,304	7,666
1931	1,058	1970	2,613	4,082	6,695
1932	1,517	1971	2,593	3,894	6,487
1933	2,009	1972	2,654	4,162	6,816
1934	54	1973	2,401	4,208	6,609
1935	1,955	1974	2,721	6,115	8,836
1937	3,989	1975	4,422	7,387	11,809
1938	4,041	1976	8,712	9,745	18,457
1939	4,440	1977[3]	11,068	13,036	24,104

[1]USA landings from 1887-1960 taken from Lyles (1969); USA landings from 1961-1974 taken from Fishery Statistics of the United States, and from 1963-1976 taken from ICNAF Statistical Bulletins; 1977 landings were taken from ICNAF Sum. Doc. 78/VI/28 (Revised 15 June 1978). for 1964-1977, USA landings statistics were validated against New England Detailed Weighout Data, Northeast Fisheries Center.

[2]Canadian landings from 1951-1975 taken from ICNAF Statistical Bulletins and Hare (1977); 1977 landings were taken from ICNAF Sum. Doc. 78/VI/28 (Revised 15 June 1978).

[3]Provisional

*Maine landings only - from Baird (1956).

Table 2. Sea scallop (Placopecten magellanicus) landings (metric tons) in the Northwest Atlantic, 1973-1977.

Area	Country	1973 Live	1973 Meats	1974 Live	1974 Meats	1975 Live	1975 Meats	1976 Live	1976 Meats	1977[1] Live	1977[1] Meats
5Y	USA	3,834	460	1,854	223	6,216	746	3,052	366	2,145	258
	Canada	-	-	-	-	-	-	-	-		
5Ze	USA	8,999	1,080	7,707	925	7,137	857	14,667	1,761	40,027	4,805
	Canada	35,055	4,208	50,934	6,115	61,536	7,387	81,017	9,726	108,573	13,034
5Zw	USA	25	3	39	5	417	50	77	9	89	11
	Canada	-	-	-	-	-	-	-	-	-	-
6	USA	7,142	857	13,067	1,569	23,064	2,769	54,777	6,576	48,892	5,869
	Canada	-	-	-	-	-	-	160	19	18	2
Subtotal	USA	20,000	2,401	22,667	2,721	36,834	4,422	72,573	8,712	92,192[2]	11,068[2]
	Canada	35,055	4,208	50,934	6,115	61,536	7,387	81,177	9,745	108,591	13,036
Grand Total		55,055	6,609	73,601	8,836	98,370	11,809	153,750	18,457	200,783	24,104

Sources: 1973-1976 ICNAF Statistical Bulletins
1977: ICNAF Sum. Doc. 78/IV/28 (Revised 15 June 1978)

[1]Provisional

[2]Includes 1039 tons live (125 tons meat) from Area 5NK (Division not known)

Table 3. USA sea scallop (Placopecten magellanicus) landings (metric tons, meat weight) from the Northwest Atlantic, 1961-1977.

Year	4	5Y	5Ze	5Zw	5Z	5NK	Total 5	6A	6B	6C	6NK	Total 6	Grand Total
1961		120			10,660		10,780					1,676	12,456
1962		103			9,690	3	9,796					1,378	11,174
1963	7	127			7,910		8,036					1,001[1]	9,044
1964	16	192	6,241	55	6,296		6,489					1,216[2]	7,721
1965		115	1,483	27	1,509		1,624					7,480[3]	9,104
1966		93	884	8	892		985					6,252	7,237
1967		80	1,221	8	1,229		1,309					3,337	4,646
1968		113	994	24	1,049		1,162	1,951	486		1,874	4,311	5,474
1969		123	1,325	19	1,343		1,466	553	307		1,045	1,896	3,362
1970		132	1,415	6	1,421		1,553	431	42		587	1,060	2,613
1971		362	1,329	7	1,336		1,698	274			621	895	2,593
1972		525	821	2	823		1,348	265	388	6	648	1,307	2,654
1973		460	1,080	3	1,083		1,544	143	95	11	609	857	2,401
1974		223	925	5	930		1,152	869	628	71		1,569	2,721
1975		746	857	50	907		1,653	1,641	899	228		2,769	4,422
1976		366	1,761	9	1,770		2,136	4,494	1,725	357		6,576	8,712
1977[4]		258	4,805	11	4,816	125	5,199	3,537	2,198	135		5,869	11,068

Sources: 1961-1974 Fishery Statistics of the United States.
1963-1976 ICNAF Statistical Bulletin.
1964-1977 Northeast Fisheries Center, New England Detailed Weighout Data, by Statistical Area.

[1] 973 from Fish. Stat. of U.S. (Mid-Atlantic and Chesapeake) + 28 from New England.
[2] 1,079 from Fish. Stat. of U.S. (Mid-Atlantic and Chesapeake) + 137 from New England.
[3] 3,509 from Fish. Stat. of U.S. (Mid-Atlantic and Chesapeake) + 3,971 from New England.
[4] Provisional (from ICNAF Sum. Doc. 78/IV/28, Revised 15 June 1978).

ble 4. Sea scallop landings and effort data from Georges Bank (Subdivision 5Zo) and the Mid-Atlantic (Statistical Area 6), by vessel class tonnage category[1], 1975-1977. Data derived from vessels using scallop dredges and landings in New England ports.

shing ound	Total Vessels				Days Fished				Trips				Scallops landed (mt. meats)				Catch/day (mt. meats)				Catch/Trip (mt. meats)				Days/Trip			
	Class 2	Class 3	Class 4	Total	Class 2	Class 3	Class 4	Total	Class 2	Class 3	Class 4	Total	Class 2	Class 3	Class 3	Total	Class 2	Class 3	Class 4	Total	Class 2	Class 3	Class 4	Total	Class 2	Class 3	Class 4	Total
orges ank																												
975	3	10	11	24	10.5	599.4	494.9	1099.8	9.0	105.0	75.0	189.0	2.0	491.4	350.4	843.8	0.2	0.8	0.7	0.8	0.2	4.7	4.7	4.5	1.2	5.7	6.6	5.8
976	28+	20+	17	65+	308.1	814.2	516.8	1639.1	338.5	170.5	83.0	592.0	261.2	886.0	530.0	1677.2	0.8	1.1	1.0	1.0	0.8	5.2	6.4	2.8	0.9	4.8	6.2	2.8
977	65+	56+	19	140+	1028.4	2313.5	1120.7	4462.6	1665.0	645.1	189.0	2499.1	891.9	2545.3	1271.4	4708.6	0.9	1.1	1.1	1.1	0.5	3.9	6.7	1.9	0.6	3.6	5.9	1.8
Increase 75-1977	2067	460	73	483	9694	289	126	306	18400	514	152	1222	44495	418	263	458	350	38	57	38	150	-17	43	-58	-50	-37	-11	-69
d-lantic																												
975	2	11	10	23	3.3	819.3	923.8	1746.4	12.0	131.5	127.5	271.0	0.9	659.7	845.2	1505.8	0.3	0.8	0.9	0.9	0.1	5.0	6.6	5.6	0.3	6.2	7.2	6.4
976	2	17	17	36	59.8	991.3	1625.9	2677.0	17.0	144.0	227.0	388.0	18.5	1042.4	1910.8	2971.7	0.3	1.1	1.2	1.1	1.1	7.2	8.4	7.7	3.5	6.9	7.2	6.9
977	8	31	19	58	70.7	818.3	1216.1	2105.1	33.0	123.7	165.0	321.7	34.2	929.7	1600.3	2564.2	0.5	1.1	1.3	1.2	1.0	7.5	9.7	8.0	2.1	6.6	7.4	6.5
Increase 75-1977	300	182	90	152	2042	0	32	21	175	-6	29	19	3700	41	89	70	67	38	44	33	900	50	47	43	600	6	3	2

lass 2: Vessels from 5-50 gross tons.
lass 3: Vessels from 51-150 gross tons.
lass 4: Vessels greater than 150 gross tons.

Table 5. Sea scallop research vessel survey cruises on Georges Bank and in the Mid-Atlantic, 1975-1978.

			Number of Stations (Tows)					
			Georges Bank			Mid-Atlantic		
Date	Nation	Research Vessel	South Channel	Southeast Part	Northern Edge and Peak	New York Bight	Delmarva	Virginia - North Carolina
8/7 - 8/16, 1975	USA	ALBATROSS IV	51	35	57			
9/27 - 10/3, 1975	USA	ALBATROSS IV				48	34	18
5/24 - 6/3, 1977	USA	ALBATROSS IV	40	27	77			
7/6 - 7/21, 1977	Canada	E. E. PRINCE	19	10	108			
9/6 - 9/16, 1977	USA	ALBATROSS IV				151	30	8
7/17 - 8/22, 1978	Canada	E. E. PRINCE	13	4	77			
8/15 - 9/1, 1978	USA	ALBATROSS IV	42	26	0	144	71	14

Table 6. USA sea scallop research survey abundance indices (stratified mean number per tow), 1975, 1977, and 1978, and total (USA and Canada) reported commercial landings (metric tons, meats and estimated number of scallops), and total commercial standardized effort (standard USA days fished), 1975-1978, from principal scallop grounds on Georges Bank (Subdiv, 5Ze). Survey indices are presented for pre-recruit (<70 mm shell height), recruit (≥ 70 mm shell height), and total scallops per tow.

		Stratified mean number per tow			Scallop landings (metric tons, meats)			Scallop landings (No. of scallops $x10^{-3}$)			Standard USA days fished		
		<70 mm per tow	≥70 mm per tow	Number per tow	USA	Canada	Total	USA	Canada	Total	USA	Canada	Total
Georges Bank													
South Channel	1975	27.9	55.4	83.3	566	399	965	23,510	31,566[1]	55,076	735.1	438.7	1,173.8
	1976	-	-	-	1,574	803	2,377	81,932	45,539	127,417	1,589.9	839.3	2,429.2
	1977	1.9	59.8	61.7	4,122	370	4,492	260,998	23,567[2]	284,565	3,888.7	336.8	4,225.5
	*1978	3.6	31.0	34.6	1,258	-	1,258	62,556	-	-	1,557.2	-	-
Southeast Part	1975	0.9	44.1	45.0	175	55	230	8,427	2,467[3]	10,894	227.3	57.0	284.3
	1976	-	-	-	141	17	158	8,064	717	8,781	142.4	72.4	214.8
	1977	2.4	42.8	45.2	277	64	341	11,548	3,020[4]	14,568	261.3	48.7	310.0
	*1978	1.5	36.3	37.8	50	-	50	2,486	-	-	55.2	-	-
Northern Edge and Peak	1975	43.6	134.6	178.2	116	6,933	7,049	5,244	596,085	601,329	150.6	8,100.5	8,251.1
	1976	-	-	-	45	8,906	8,951	2,854	570,534	573,388	45.5	9,334.8	9,380.3
	1977	42.7	349.4	392.1	407	12,600	13,007	18,156	871,972	890,128	384.0	11,585.3	11,969.3
	*1978	242.1	427.6	669.7[5]	729	5,710	6,439	30,695	-	-	572.2	-	-

*Landings and effort data for January-June only.

[1] Proration of landings done using mean weight of scallop derived from 1975 USA sea scallop research survey data from South Channel.

[2] Proration of landings done using Canadian mean weight of scallop derived from commercial weight-frequency distribution from South Channel for last six months of 1977.

[3] Proration of landings done using Canadian mean weight of scallop derived from commercial weight-frequency distribution from Southeast Part.

[4] Proration of landings done using Canadian mean weight of scallop derived from commercial weight-frequency distribution from Southeast Part for first six months of 1977.

[5] 1978 relative abundance indices on Northeast Edge and Peak derived from 1978 Canadian research survey data, adjusted for the distance differences between USA and Canadian standard tows (see text).

Table 7. USA sea scallop research survey relative abundance indices (stratified mean number per tow), 1975, 1977, and 1978, and total reported commercial landings (metric tons, meats and estimated number of scallops) and total commercial standardized effort (standard USA days fished), 1975-1978, from principal scallop areas in the Mid-Atlantic. Survey indices are presented for pre-recruit (<70 mm shell height), recruit (≥70 mm shell height), and total scallops per tow.

		Stratified Mean Number per Tow			Scallop landings		Standard USA Days fished
		Number <70 mm per tow	Number ≥ 70 mm per tow	Total number per tow	Metric tons (meats)	Number of scallops ($x10^{-3}$)	
Mid-Atlantic							
New York Bight							
	1975	25.0	57.2	82.2	1,641	105,288	1,908.1
	1976	-	-	-	4,494	345,484	4,048.6
	1977	0.7	52.3	53.0	3,537	230,971	2,899.2
	*1978	1.5	54.1	55.6	1,492	94,192	-
Delmarva							
	1975	70.2	39.3	109.5	899	61,134	1,045.3
	1976	-	-	-	1,725	136,724	1,554.1
	1977	2.4	34.4	36.8	2,198	115,747	1,801.6
	*1978	8.7	41.3	50.0	372	18,517	-
Virginia-No. Carolina							
	1975	1.7	0.1	1.8	228	13,897	276.7
	1976	-	-	-	357	27,496	321.6
	1977	0.1	0.1	0.2	135	8,256	110.7
	*1978	16.4	5.4	21.8	12	571	-

*Landings and effort data for January-June only from New England fishing vessels.

Table 8. USA sea scallop landings (metric tons, meats) from Georges Bank (Subdivision 5Ze), the Mid-Atlantic (Statistical Area 6), and Gulf of Maine (Division 5Y) fishing grounds, by vessel class tonnage category, 1965-1977. Data derived from vessels using scallop dredges and landing in New England ports.

Area	Tonnage category	Year 1965	1966	1967	1968	1969	1970	1971	1972	1973	1974	1975	1976	1977
Georges Bank (Subdivision 5Ze)	0-50	16.7	2.2	5.6	1.5	-	-	-	9.4	-	0.1	2.0	261.2	891.9
	51-150	1,275.5	733.7	921.4	819.3	917.2	993.1	766.1	467.3	678.1	557.4	491.4	931.4	2,545.3
	151-500	190.8	147.7	293.5	172.6	399.1	416.7	544.9	338.9	386.5	353.2	350.4	530.4	1,271.4
	Total	1,483.0	883.6	1,220.5	993.4	1,316.3	1,409.8	1,311.0	815.6	1,064.6	910.7	843.8	1,722.6	4,708.6
Mid-Atlantic (Area 6)	0-50	20.5	0.6	0.8	7.8	1.5	-	-	-	-	-	0.9	18.5	34.2
	51-150	3,608.1	3,530.3	1,547.5	1,601.3	481.7	189.9	72.1	289.2	42.5	397.1	659.7	1,042.4	929.7
	151-500	345.5	530.5	324.2	827.9	362.5	268.9	201.7	363.5	202.7	540.3	845.2	1,910.8	1,600.3
	Total	3,974.1	4,061.4	1,872.5	2,437.0	845.7	458.8	273.8	652.7	245.2	937.4	1,505.8	2,971.7	2,564.2
Gulf of Maine (Division 5Y)	0-50	99.5	92.6	77.5	108.5	107.8	114.6	222.8	487.0	393.8	210.6	734.1	349.0	252.1
	51-150	15.1	-	2.1	4.3	14.1	17.0	108.3	32.3	47.2	12.1	6.5	14.4	4.6
	151-500	-	-	-	-	-	-	26.6	4.9	18.6	-	-	-	-
	Total	114.6	92.6	79.6	112.8	121.9	131.6	357.7	524.2	459.6	222.7	740.5	363.4	256.7

Table 9. USA sea scallop effort (days fished) on Georges Bank (Subdivision 5Ze), in the Mid-Atlantic (Statistical Area 6), and Gulf of Maine (Division 5Y) fishing grounds, by vessel class tonnage category, 1965-1977. Data derived from vessels using scallop dredges and landing in New England ports.

Area	Tonnage category	Year 1965	1966	1967	1968	1969	1970	1971	1972	1973	1974	1975	1976	1977
Georges Bank (Subdivision 5Ze)	0-50	11.1	11.4	17.3	3.5	-	-	-	20.4	-	0.2	10.5	308.1	1,028.4
	51-150	1,894.4	885.9	1,468.8	1,500.0	1,953.8	1,755.3	1,424.2	965.0	1,102.7	811.8	594.4	914.2	2,313.5
	151-500	213.4	167.4	400.3	304.2	759.5	822.9	988.7	805.9	739.6	576.3	494.9	516.8	1,120.7
	Total	2,118.9	1,064.7	1,886.4	1,809.7	2,713.3	2,578.2	2,412.9	1,791.3	1,842.3	1,388.3	1,099.8	1,739.1	4,462.6
Mid-Atlantic (Area 6)	0-50	48.1	3.0	5.0	38.9	3.5	-	-	-	-	-	3.3	59.8	70.7
	51-150	3,621.5	3,784.4	2,224.2	2,561.4	1,142.4	476.7	239.9	717.9	128.0	523.6	819.3	991.3	818.3
	151-500	312.8	524.7	452.0	1,196.2	700.4	516.0	479.5	688.5	428.0	700.9	923.8	1,625.9	1,216.1
	Total	3,982.4	4,312.1	2,681.2	3,796.5	1,846.3	992.7	719.4	1,406.4	556.0	1,224.5	1,746.4	2,677.0	2,105.1
Gulf of Maine (Division 5Y)	0-50	261.0	270.3	239.4	423.9	510.9	584.1	1,062.7	1,998.7	2,364.5	1,545.7	2,392.8	2,257.5	1,393.3
	51-150	20.4	-	2.7	12.8	53.7	49.7	116.1	90.5	128.8	33.9	14.0	32.0	4.1
	151-500	-	-	-	-	-	-	37.3	10.0	30.7	-	-	-	-
	Total	281.4	270.3	242.1	436.7	564.6	633.8	1,216.1	2,099.2	2,524.0	1,579.6	2,406.8	2,289.5	1,397.4

Table 10. Observed USA sea scallop catch rates (metric tons of meats/day fished) from Georges Bank (Subdivision 5Ze), the Mid-Atlantic (Statistical Area 6), and Gulf of Maine (Division 5Y) fishing grounds, by vessel class tonnage category, 1965-1977. Data derived from vessels using scallop dredges and landing in New England ports.

Area	Tonnage category	Year 1965	1966	1967	1968	1969	1970	1971	1972	1973	1974	1975	1976	1977
Georges Bank (Subdivision 5Ze)	0-50	1.50	0.19	0.32	0.27	-	-	-	0.46	-	0.50	0.19	0.85	0.87
	51-150	0.67	0.83	0.63	0.55	0.47	0.57	0.54	0.48	0.61	0.69	0.83	1.02	1.10
	151-500	0.89	0.88	0.73	0.57	0.53	0.51	0.55	0.42	0.52	0.61	0.71	1.03	1.13
	Total	0.70	0.83	0.65	0.55	0.49	0.55	0.54	0.46	0.58	0.66	0.77	0.99	1.06
Mid-Atlantic (Area 6)	0-50	0.43	0.20	0.16	0.20	0.43	-	-	-	-	-	0.27	0.31	0.48
	51-150	1.00	0.93	0.70	0.63	0.42	0.40	0.30	0.40	0.33	0.76	0.81	1.05	1.14
	151-500	1.10	1.01	0.72	0.69	0.52	0.52	0.42	0.53	0.47	0.77	0.91	1.18	1.32
	Total	1.00	0.94	0.70	0.64	0.46	0.46	0.38	0.46	0.44	0.77	0.86	1.11	1.22
Gulf of Maine (Division 5Y)	0-50	0.38	0.34	0.32	0.26	0.21	0.20	0.21	0.24	0.17	0.14	0.31	0.15	0.18
	51-150	0.74	-	0.78	0.34	0.26	0.34	0.93	0.36	0.37	0.36	0.46	0.45	1.12
	151-500	-	-	-	-	-	-	0.71	0.49	0.61	-	-	-	-
	Total	0.41	0.34	0.33	0.26	0.22	0.21	0.29	0.25	0.18	0.14	0.31	0.16	0.18

Table 11. Geographical distribution of Georges Bank sea scallop landings for USA and Canada expressed as percentage of national yearly catch taken from the major fishing grounds, 1957-1977.

	USA			Canada		
Year	South Channel	Southeast Part	Northern Edge and Peak	South Channel	Southeast Part	Northern Edge and Peak
1957	19	8	73	1	-	99
1958	19	7	74	-	-	100
1959	23	33	44	-	-	100
1960	18	45	37	-	-	100
1961	20	17	63	-	-	100
1962	18	19	63	-	-	100
1963	26	28	46	-	8	92
1964	41	31	28	-	2	98
1965	46	26	28	-	4	96
1966	81	3	16	-	-	100
1967	52	26	22	-	-	100
1968	70	14	16	-	-	100
1969	44	17	39	-	-	100
1970	76	11	13	1	-	99
1971	82	16	2	14	-	86
1972	76	8	16	10	-	90
1973	82	16	2	27	-	73
1974	85	13	2	9	5	86
1975	66	20	14	8	1	91
1976	89	8	3	8	-	92
1977	86	6	8	2	-	98

Table 12. Relative changes in total standardized effort (standard USA days fished), total landings (metric tons, and estimated numbers of scallops), and research survey relative abundance indices (total number per tow, recent number per tow, and pre-recruit number per tow) from the principal scallop grounds on Georges Bank.

	Time interval	Total standardized effort	Total landings (tons)	Total landings (number)	Total survey index	Survey recruit index	Survey pre-recruit index
Georges Bank							
South Channel							
	1975-1976	107%	146%	131%	-	-	-
	1976-1977	74%	89%	123%	-	-	-
	1975-1977	260%	365%	417%	-26%	8%	-93%
	1975-1978	-	-	-	-58%	-44%	-87%
Southeast Part							
	1975-1976	-24%	-31%	-19%	-	-	-
	1976-1977	45%	116%	66%	-	-	-
	1975-1977	9%	48%	34%	0%	- 3%	167%[1]
	1975-1978	-	-	-	16%	-18%	67%
Northern Edge and Peak	1975-1976	14%	27%	- 5%	-	-	-
	1976-1977	28%	45%	55%	-	-	-
	1975-1977	45%	85%	48%	120%	160%	- 2%
	1975-1978	-	-	-	276%	218%	455%

[1] Large percentage increase due to increase in numbers of pre-recruit scallops from 0.9 to 2.4 per tow, an overall generally low level.

Table 13. Relative changes in total standardized effort (standard USA days fished), total landings (metric tons, and estimated numbers of scallops), and research survey relative abundance indices (total number per tow, recruit number per tow, and pre-recruit number per tow) from the principal scallop grounds in the Mid-Atlantic.

	Time interval	Total standardized effort	Total landings (tons)	Total landings (numbers)	Total survey index	Survey recruit index	Survey pre-recruit index
Mid-Atlantic							
New York Bight							
	1975-1976	112%	174%	228%	-	-	-
	1976-1977	-28%	-21%	-33%	-	-	-
	1975-1977	52%	115%	119%	-36%	- 9%	-97%
	1975-1978	-	-	-	-32%	- 5%	-94%
Delmarva							
	1975-1976	49%	92%	124%	-	-	-
	1976-1977	16%	27%	-15%	-	-	-
	1975-1977	72%	144%	89%	-66%	-12%	-97%
	1975-1978	-	-	-	-54%	+ 5%	-88%
Virginia-North Carolina							
	1975-1976	16%	57%	98%	-	-	-
	1976-1977	-66%	62%	-70%	-	-	-
	1975-1977	-60%	-41%	-41%	-89%[1]	0%	-94%[1]
	1975-1978	-	-	-	1111%[2]	5300%[2]	865%[2]

[1] Large percentage decline due to decrease in small absolute numbers per tow (total index: 1.8-0.2; pre-recruit index: 1.7-0.1)

[2] Large percentage increases due to relatively modest increase in absolute number per tow (total index: 0.2-21.8; recruit index: 0.1-5.4; pre-recruit index: 0.1-16.4).

Table 14. Comparison of total sea scallop landings (metric tons, meats) and total commercial standardized effort (standard USA days fished) from the principal scallop grounds on Georges Bank (Subdiv. 5Ze), 1959-1964 and 1975-1977.

Area	Statistic	Country	1959	1960	1961	1962	1963	1964	Total	1975	1976	1977	Total
			YEARS										
Georges Bank													
South Channel	Landings												
		USA	1,951	1,788	2,132	1,744	2,057	2,559	12,231	566	1,574	4,122	6,262
		Canada	-	-	-	-	-	-	-	399	803	370	1,572
		Total	1,951	1,788	2,132	1,744	2,057	2,559	12,231	965	2,377	4,492	7,834
	Effort												
		USA	1,968	1,447	1,734	1,613	2,007	2,732	11,501	735	1,590	3,889	6,214
		Canada	-	-	-	-	-	-	-	439	839	337	1,615
		Total	1,968	1,447	1,734	1,613	2,007	2,732	11,501	1,174	2,429	4,226	7,829
Southeast Part													
	Landings												
		USA	2,799	4,469	1,812	1,841	2,215	1,935	15,071	175	141	277	593
		Canada	-	-	-	-	470	118	588	55	17	64	136
		Total	2,799	4,469	1,812	1,841	2,685	2,053	15,659	230	158	341	729
	Effort												
		USA	2,823	3,618	1,474	1,702	2,161	2,065	13,843	227	142	261	630
		Canada	-	-	-	-	515	147	662	57	72	49	178
		Total	2,823	3,618	1,474	1,702	2,676	2,212	14,505	284	214	310	808
Northern Edge and Peak													
	Landings												
		USA	3,731	3,675	6,716	6,105	3,638	1,747	25,612	116	45	407	568
		Canada	2,721	3,390	4,549	5,694	5,407	5,783	27,544	6,933	8,906	12,600	28,439
		Total	6,452	7,065	11,265	11,799	9,045	7,530	53,156	7,049	8,951	13,007	29,007
	Effort												
		USA	3,765	2,974	5,463	5,644	3,550	1,865	23,261	151	45	384	580
		Canada	2,287	2,835	3,430	5,060	5,921	7,181	26,714	8,100	9,335	11,585	29,020
		Total	6,052	5,809	8,893	10,704	9,471	9,046	49,975	8,251	9,380	11,969	29,600
Total													
	Landings												
		USA	8,481	9,932	10,660	9,690	7,910	6,241	52,914	857	1,760	4,806	7,423
		Canada	2,721	3,390	4,549	5,694	5,877	5,901	28,132	7,387	9,726	13,034	30,147
		Total	11,202	13,322	15,209	15,384	13,787	12,142	81,046	8,244	11,486	17,840	37,570
	Effort												
		USA	8,556	8,039	8,671	8,959	7,718	6,662	48,605	1,113	1,777	4,534	7,424
		Canada	2,287	2,835	3,430	5,060	6,436	7,328	27,376	8,596	10,246	11,971	30,813
		Total	10,843	10,874	12,101	14,019	14,154	13,990	75,981	9,709	12,023	16,505	38,237

Table 15. Comparison of total sea scallop landings (metric tons, meats) and total USA standardized effort (standard USA days fished) from all principal scallop grounds in the Mid-Atlantic (Statistical Area 6), 1965-1968, and 1975-1977.

	Statistic	Country	1965	1966	1967	1968	Total	1975	1976	1977	Total
Mid-Atlantic											
	Landings										
		USA	7480	6252	3337	4311	21380	2768	6576	5870	15214
		Canada	2609	2780	-	422	5817	-	19	-	19
		Total	10089	9032	3343	4733	27197	2768	6595	5870	15233
	Effort										
		USA	7480	6651	4767	6736	25634	3230	5924	4812	13967
		Canada	2609	2957	-	659	4733	-	17		17
		Total	9263	8942	4767	7395	30367	3230	5941	4812	13983

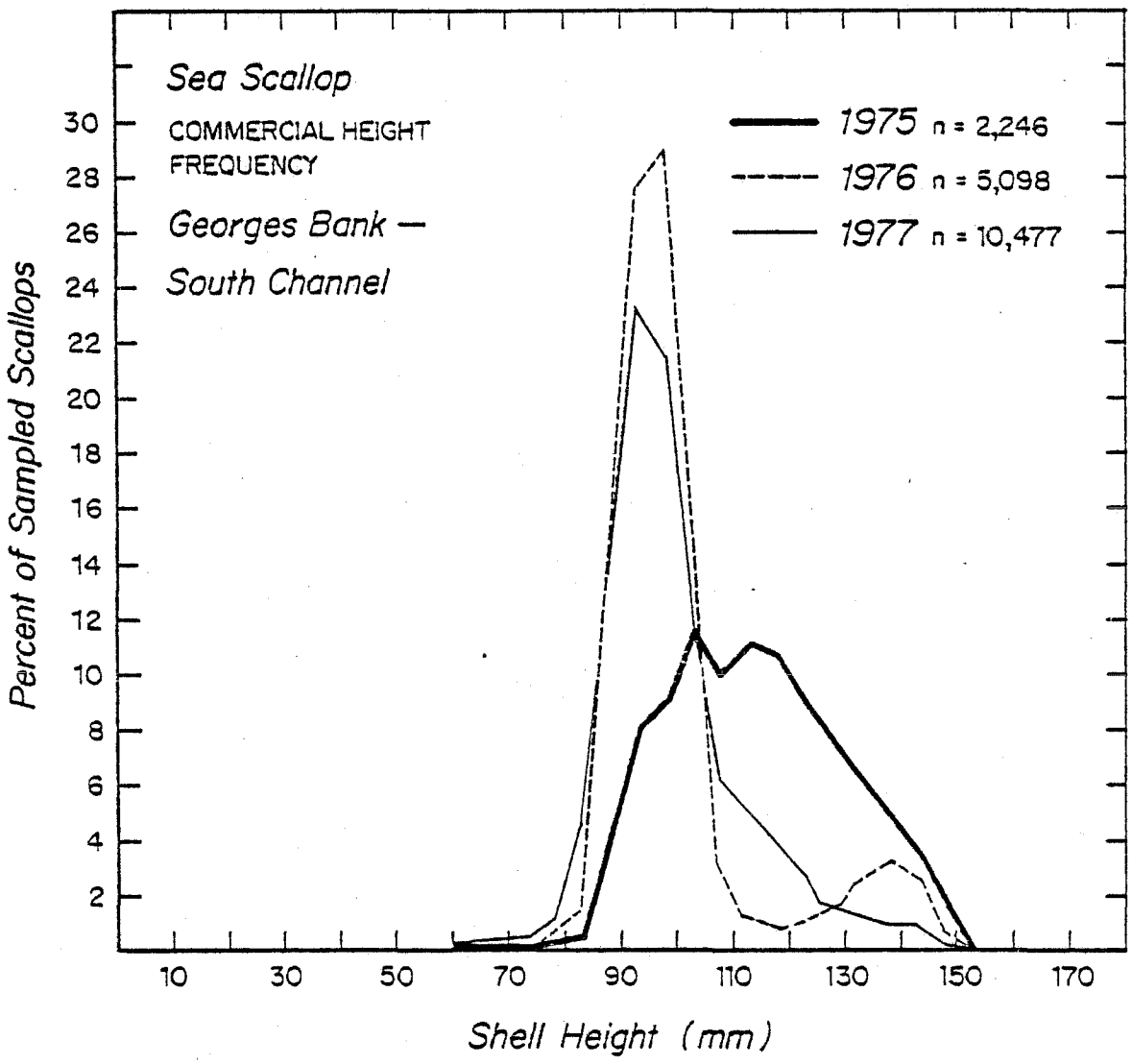

Figure 1. USA commercial landings height-frequency distributions of sea scallops from the South Channel region of Georges Bank, 1975-1977.

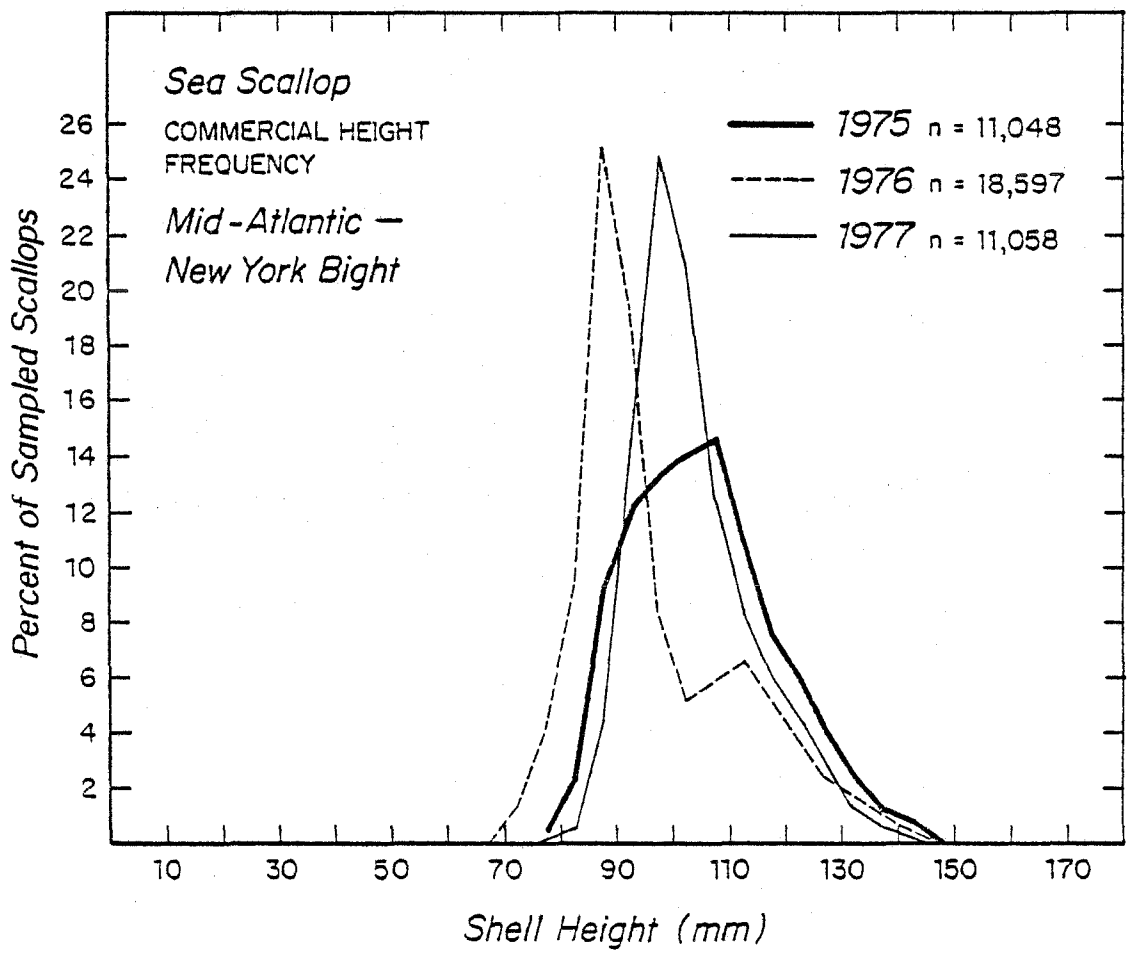

Figure 2. USA commercial landings height-frequency distributions of sea scallops from the New York Bight region of the Mid-Atlantic, 1975-1977.

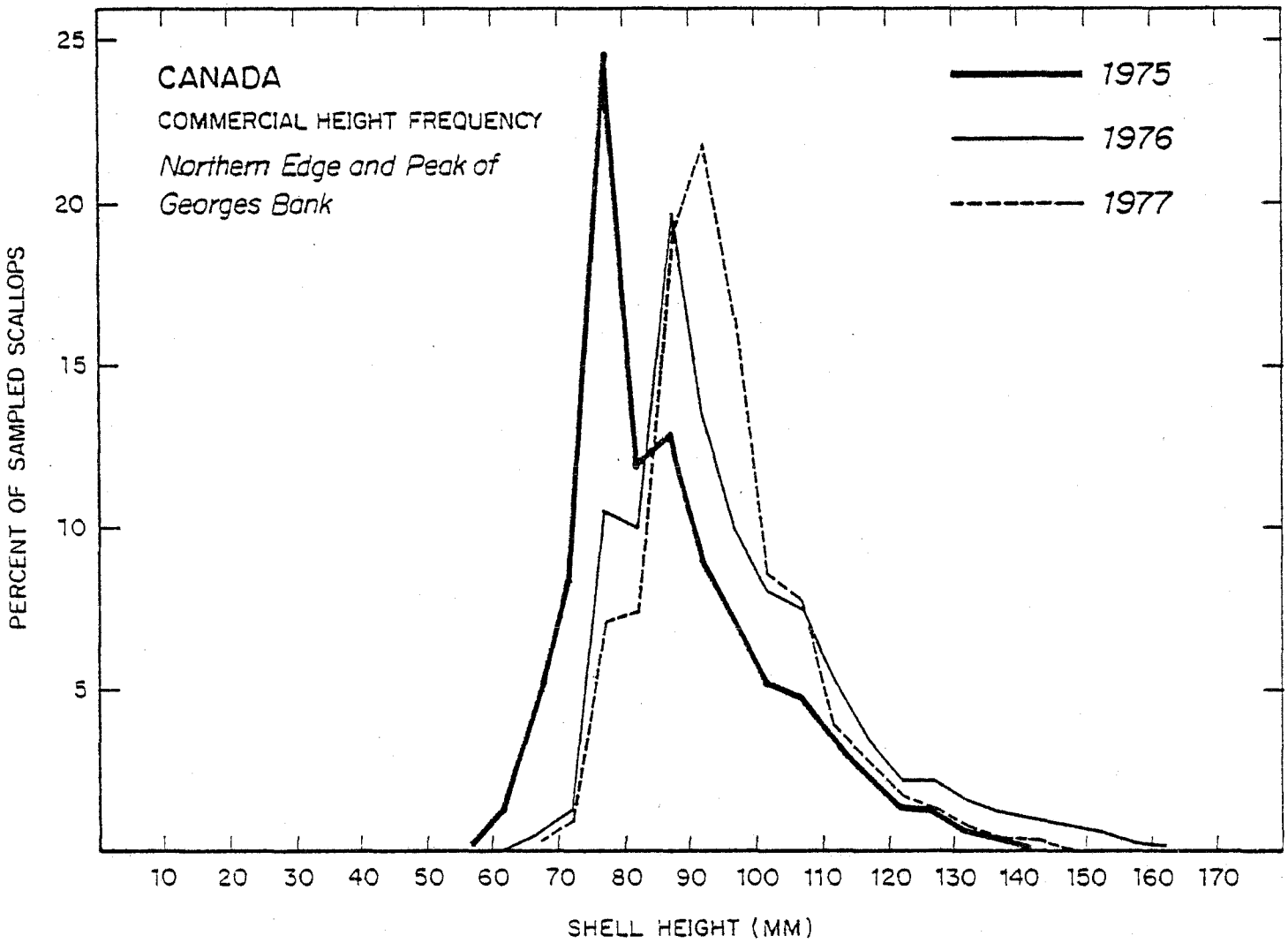

Figure 3. Canadian commercial landings height-frequency distributions, derived from Canadian meat-weight distributions, for the Northern Edge and Peak of Georges Bank, 1975-1977.

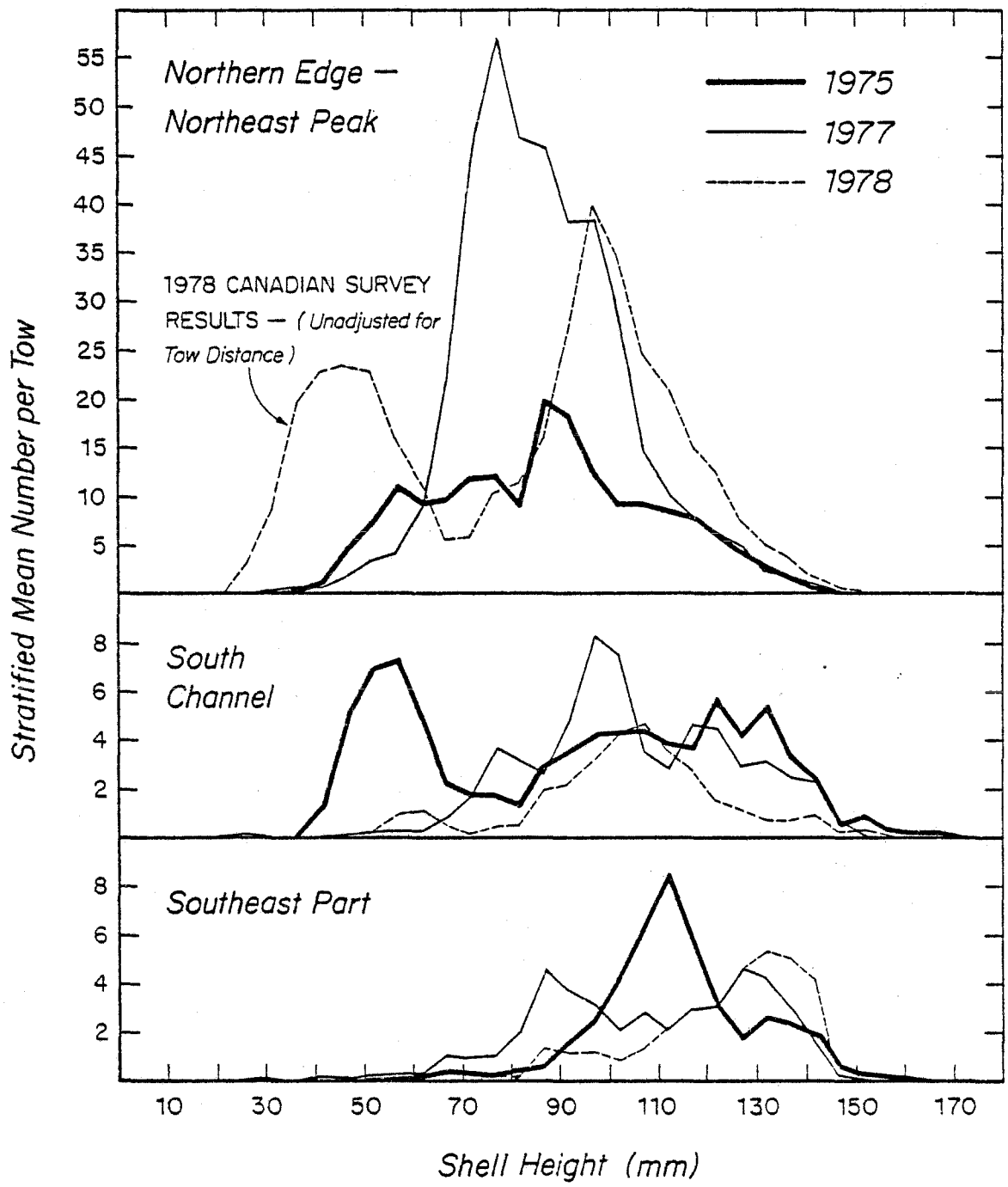

Figure 4. NMFS research vessel survey height-frequency distributions of sea scallops from the three major fishing grounds on Georges Bank (Northern Edge - Northeast Peak, South Channel, and Southeast Part), 1975, 1977, and 1978 (except No. Edge - Northeast Peak in 1978).

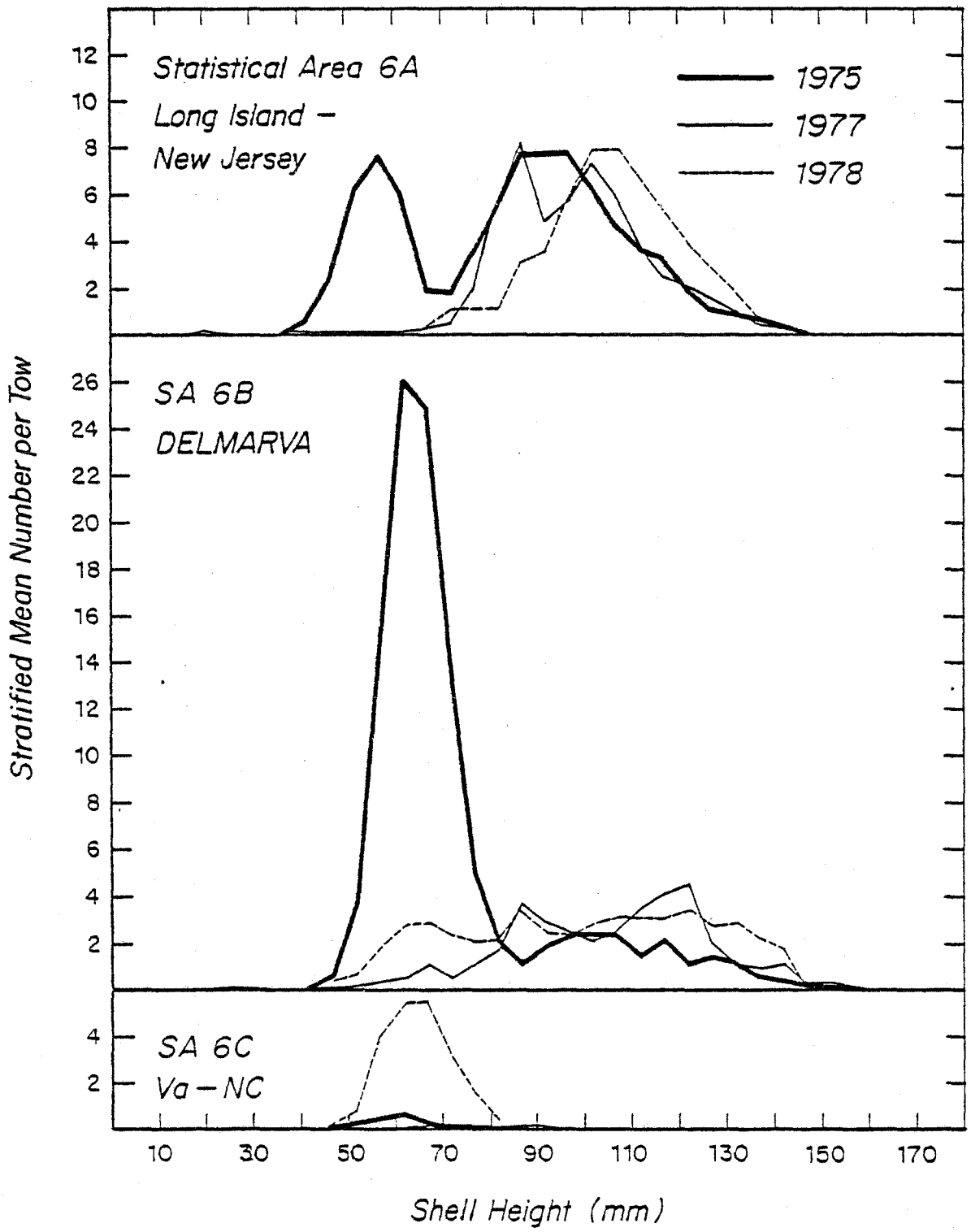

Figure 5. NMFS research survey height-frequency distributions of sea scallops from the three major fishing grounds in the Mid-Atlantic (Long Island-New Jersey, Delmarva, and Virginia - North Carolina), 1975, 1977, and 1978.

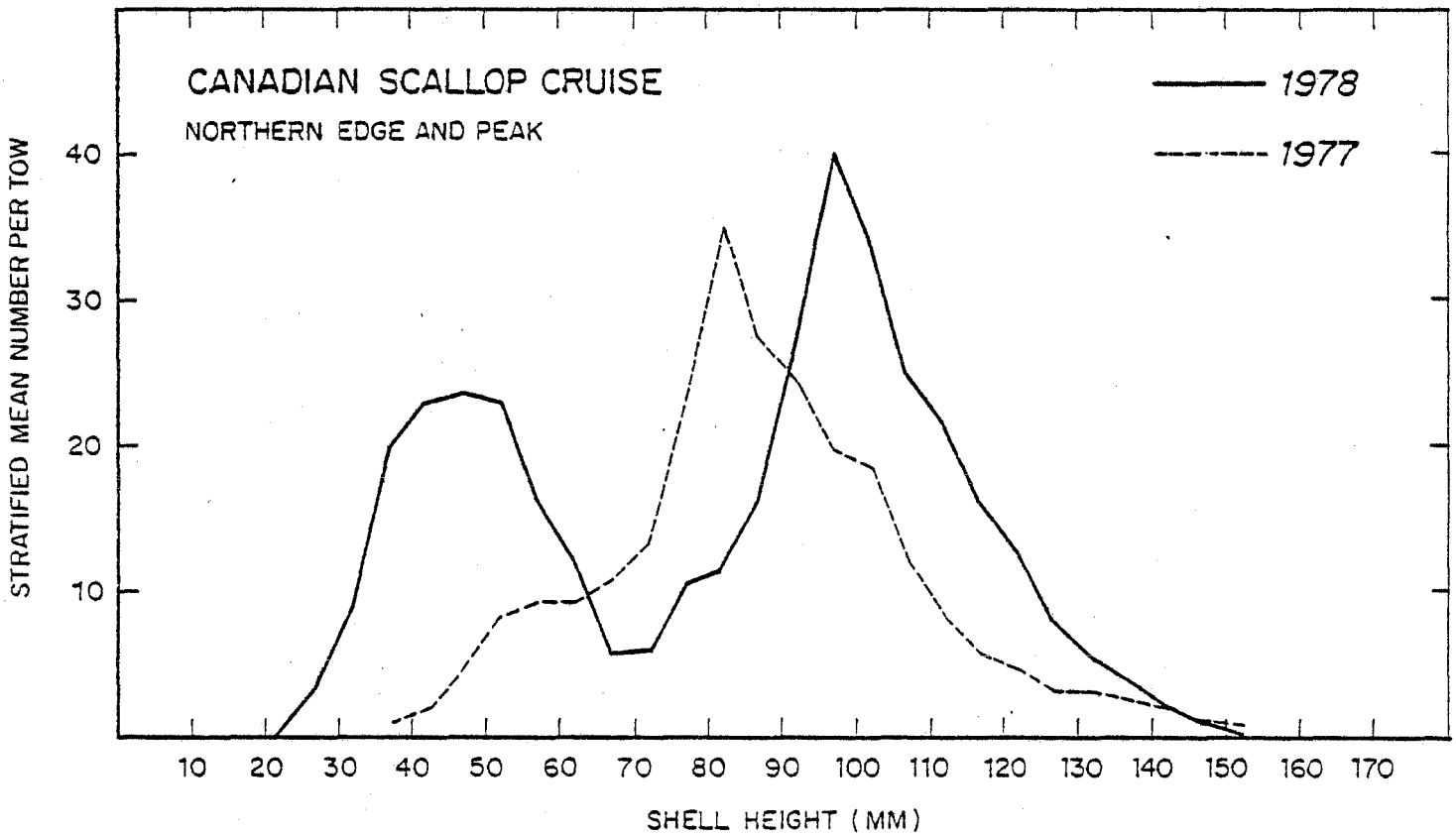

Figure 6. Canadian research survey height-frequency distributions of sea scallops from the Northern Edge and Peak of Georges Bank, 1977 and 1978.

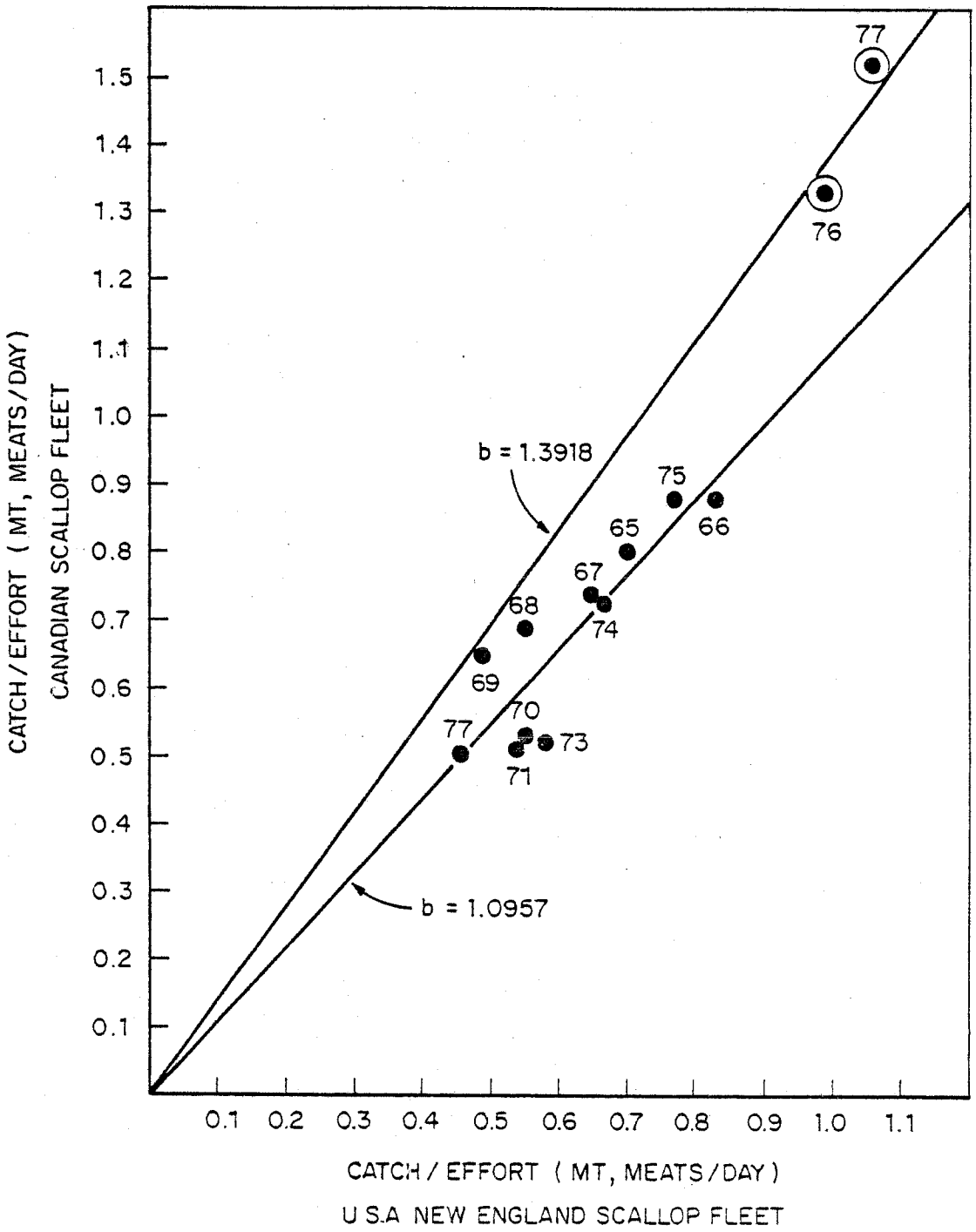

Figure 7. Relative fishing power relationships between the USA and Canadian Georges Bank sea scallop fleets, 1965-1975, and 1976-1977.