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Results of the 1984 USA Sea Scallop Research Vessel Survey: Status of Sea Scallop Resources in the Georges Bank, Mid-Atlantic, and Gulf of Maine Regions and Abundance and Distribution of Iceland Scallops off the Southeastern Coast of Cape Cod

by

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TABLE OF CONTENTS

	Page
SUMMARY	i
INTRODUCTION	1
METHODS	1
RESULTS	5
Sea Scallops	5
Sampling Intensity and Overall Catch	5
Research Survey Relative Abundance Indices	5
Georges Bank	7
South Channel	7
Southeast Part	8
Northern Edge and Peak	10
Mid-Atlantic	12
New York Bight	12
Delmarva	13
Virginia-North Carolina	13
Gulf of Maine	15
Iceland Scallops	17
DISCUSSION	19
LITERATURE CITED	22
TABLES	23-40
FIGURES	41-56
APPENDIX	57
Tables	58-69
Figures	70-74

SUMMARY

The 1984 USA sea scallop research vessel survey was conducted from 24 July to 30 August 1984 using the R/V *ALBATROSS IV* to evaluate relative abundance, size composition, and recruitment patterns in the Georges Bank, Mid-Atlantic, and Gulf of Maine sea scallop resources. Special sampling for Iceland scallops was also performed to assess resource status of the populations supporting the USA commercial fishery off the southeastern coast of Cape Cod.

The 1984 survey catch-per-tow indices reveal that in almost all regions on Georges Bank and in the Mid-Atlantic sea scallop abundance remains at historically low levels. Apart from the Northern Edge and Peak region of Georges Bank and the New York Bight region in the Mid-Atlantic, the 1984 survey abundance and biomass values were at or near the lowest recorded in the 1975-1984 survey time series. Due to a modest improvement in recruitment from the 1981 year class in the New York Bight region and exceptional recruitment of the 1981 cohort on the Northern Edge and Peak, resource abundance in these areas is higher than in 1983. In all other areas, however, recruitment remains low.

Significant quantities of sea scallops were taken in survey tows on Fippennies Ledge and Jeffreys Ledge in the Gulf of Maine for the second consecutive year. Above average recruitment of the 1979 and 1980 year classes was observed on Fippennies Ledge while the 1978 cohort dominates the Jeffreys Ledge population. Most scallops in both areas, however, remain above 35 count in meat size. No important sea scallop beds were detected in any of the four deep-water (>60 fm) Gulf of Maine areas surveyed in 1984.

Given the large disparity in sea scallop abundance levels among the various offshore regions and the present exclusion of USA fishing activity from those areas on the Northeast Peak of Georges Bank east of the boundary line established by the World Court in October 1984, fishing patterns of the USA scallop fleet are expected to change markedly in the near future. During 1985, the USA fleet is likely to concentrate much of its activity in the New York Bight region and in that section of the Northern Edge and Peak region westward of the boundary line. Transfer of effort to offshore Gulf of Maine areas is also anticipated. There is a high likelihood that the USA fleet will attempt to maintain yield levels by fishing upon incoming recruitment during 1985. Should this occur, losses in both yield per recruit and reproductive potential will ensue hampering prospects for any long-term resource recovery.

Iceland scallop populations off Cape Cod continue to appear stable and relatively abundant. Survey catches in 1984 were as large as in 1983 and were comprised of a wide size range of individuals. Any fishery-induced reductions in population density and/or changes in size composition were not detectable in either the survey catch-per-tow values or shell height frequency distributions. If Iceland scallops smaller than 60 mm in shell height were culled from the catches, average fishery meat counts between 85-90 would be achieved.

INTRODUCTION

Sea scallop research surveys have been conducted by the National Marine Fisheries Service in 1975 and annually from 1977 onward to evaluate trends in abundance, composition, and recruitment of USA offshore sea scallop populations. Survey results, in conjunction with commercial fisheries data, have been used to assess resource and fishery status and to forecast future stock conditions (Serchuk et al. 1979, 1982; Serchuk and Rak 1983; Serchuk 1983, 1984). Scientific advice developed from the survey analyses has been imparted to resource managers to provide an understanding of the biological basis of the sea scallop fisheries.

This report presents the results of the 1984 USA sea scallop research vessel survey and an evaluation of current resource conditions, recruitment prospects, and abundance trends in the Georges Bank, Mid-Atlantic, and Gulf of Maine sea scallop resources. Data are also provided on the status of the Iceland scallop populations located off the southeastern coast of Cape Cod derived from special Iceland scallop sampling performed during the survey.

METHODS

The 1984 survey was conducted from 24 July to 30 August using the R/V *ALBATROSS IV*, the vessel used in all previous USA surveys. Areas sampled included Georges Bank, Southern New England and the Mid-Atlantic in depths between 28-110 meters (15 to 60 fathoms) and selected locations in the Gulf of Maine at depths ranging from 21-179 meters (11 to 98 fathoms).

Sampling was performed using a 2.44 m (8 ft) wide commercial sea scallop dredge equipped with a 5.1 cm (2 in) ring bag and a 3.8 cm (1.5 in) polypropylene mesh liner to retain smaller scallops. Detailed specifications of this gear, used in all USA sea scallop surveys since 1979, are provided in Serchuk and Smolowitz (1980).

A stratified random sampling design was employed on Georges Bank, Southern New England, and in the Mid-Atlantic, with sampling strata based on depth and latitude (Figure 1). Four depth zones were covered: 15-25 fm, 26-30 fm, 31-40 fm, and 41-60 fm. Seventy (70) strata encompassing 33,838 sq n miles from Cape Hatteras to Georges Bank were sampled (Strata 1-66, 71-74, Figure 1). Sampling stations were allotted to strata in proportion to stratum area, with station locations randomly assigned within strata. Additional randomly selected stations were placed in strata in which either commercial fishing activity or sea scallop concentrations were known to occur to provide more precise estimates of relative abundance. Sampling station positions are depicted in Appendix Figures 1-3. Individual station catch and LORAN-C location data are summarized in Appendix Table 1.

Survey procedures in 1984 were identical to those in previous years. At each station, the survey dredge was towed for 15 minutes at 3.5 knots with a 3:1 wire scope. The catch from each tow was sorted into biological and trash components, and shell height[1] frequencies measured, in 5-mm intervals, for all live scallops and clappers (empty scallop shells with both valves still attached) caught. All by-catch of finfish and other invertebrates was also enumerated and measured. Trash portions were measured by volume and substrate type and composition recorded. The sampling gear was routinely inspected and repaired or replaced as appropriate. Hydrographic and navigational data were documented for each tow including distance over bottom using a Doppler speed log.

Stratified sampling was not used in the Gulf of Maine region. Rather, general sampling areas were preselected on the basis of (1) scallop catches in the 1983 USA Gulf of Maine sea scallop survey; (2) a request

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[1]Shell height is the greatest distance from the hinge region to the shell margin.

to sample deep-water sites (≥60 fm) to acquire biological samples for biochemical analyses; and (3) information provided by commercial fishermen on the location of specific scallop beds. Nine different areas were sampled with the selection of tow locations delegated to the Survey Chief Scientist contingent upon locating suitable bottom for dredging, and weather and time constraints. Gulf of Maine sampling station positions are presented in Appendix Figure 4; individual tow data are provided in Appendix Table 2. Except for the difference in sampling design, Gulf of Maine survey procedures were as previously described.

In all areas surveyed in 1984, shell samples representative of the height frequency distributions in the catch were collected and retained for aging purposes. Meat weight samples were also taken in the Gulf of Maine to provide additional data for shell height-meat weight analyses.

Special sampling for Iceland scallops and for evaluating the performance of a rock chain equipped dredge on sea scallop catch rates were also performed during the 1984 survey.

Tows for Iceland scallops were accomplished in an area east-southeast of Pollock Rip Channel in and adjacent to the Boston Harbor traffic lane (Appendix Figure 5). These grounds were also sampled for Iceland scallops in the 1983 USA survey and remain the mainstay of the USA Iceland scallop fishery. Tows in the 1984 survey were performed at or near sites yielding Iceland scallops in the 1983 survey. Several exploratory tows were also accomplished north of the northernmost station sampled in 1983 to gauge the spatial extent of the Iceland scallop beds. Station locations

were selected at sea and covered depths between 26-54 fm (Appendix Table 3). Sampling protocol was identical to that for sea scallops (i.e., 15 minute tows, enumeration of quantity and size distribution of catch). Biological sampling of individual shells and meats was also performed.

Experiments were conducted during the last seven days of the 1984 survey to compare sea scallop catches from two survey dredges, alternately equipped with and without rock chains. Ninety-three tows were accomplished among nine different areas selected on the basis of bottom type and scallop density observed during the earlier part of the 1984 Georges Bank and Gulf of Maine surveys. Within each area, replicate tows of 15-minute duration were performed using one dredge equipped with rock chains and the other without chains. The rock chains were variously switched from one dredge to the other to assess differences in the dredges themselves. In one area (Southeast Part of Georges Bank), 12 sets of alternate tows were conducted using the survey dredges without rock chains. The dredges used in the gear comparison work were the same as used during the regular scallop survey but the dredge liners were removed to avoid continual repair. Processing of the catch was performed in the standard survey manner.

Analyses of the experimental results are currently in progress and will be summarized at a later date. Individual station data and tow locations, however, are presented in Appendix Table 4 and Appendix Figure 4, respectively.

RESULTS

SEA SCALLOPS

Sampling Intensity and Overall Catch

A total of 527 tows were performed during the 1984 sea scallop survey: 188 on Georges Bank, 28 in Southern New England, 258 in the Mid-Atlantic, and 53 in the Gulf of Maine (Table 1). Sampling intensity (tows per sq n mile) averaged 1:61 on Georges Bank, 1:70 in the Mid-Atlantic, and 1:150 in Southern New England; these values represent the most intensive sampling performed to date in any of the synoptic annual USA scallop surveys. Individual stratum sampling intensities varied from one tow per 12 sq n miles (in Strata 6, 7, and 65) to one tow per 322 sq n miles (Stratum 39) (see Figure 1 for strata locations and areas).

Sea scallop catches ranged from 0 (99 tows) to 5,560 (Tow 64-3 on the Northeast Peak of Georges Bank) individuals per station. Over all areas sampled, a total 51,122 scallops were taken: 9,054 in the Mid-Atlantic, 152 in Southern New England, 32,790 on Georges Bank, and 9,126 in the Gulf of Maine (Tables 2 and 3). An additional 25,502 sea scallops were sampled during the rock chain gear comparison experiments (Table 4).

Research Survey Relative Abundance Indices

Survey indices of relative abundance and biomass were calculated in terms of mean number and mean meat weight per tow[2] for each sampling stratum in the Georges Bank - Mid-Atlantic survey area (Table 5), and in terms of stratified mean catch per tow (numbers and meat weight) for principal scallop regions within the Georges Bank and Mid-Atlantic areas (Tables 5-7). Survey indices were derived for prerecruit scallops (<70 mm shell height), recruited

[2]Meat weight per tow values were derived by applying area specific shell height-meat weight equations to shell height frequency distributions.

or commercial-sized scallops (≥70 mm shell height), and total scallops (all sizes) per tow (Figures 2 and 3). Size-related parameters (average shell height and average meat count) were derived from survey height frequency distributions and shell height-meat weight relationships, and calculated for each stratum and area (Tables 5-7) and individual tow (Appendix Tables 1 and 2).

Abundance indices (total number per tow) were also calculated for each region within Georges Bank and the Mid-Atlantic using a logarithmic transformation (ln x+1) of individual station catch data (Tables 8 and 9). This procedure tends to minimize the effect that extremely high but infrequent catches have in influencing the mean abundance level. Retransformed abundance estimates in original units were subsequently derived from the transformed values.

Since current management measures in the sea scallop fishery are based on meat count (number of meats per pound), survey catch per tow data were also analyzed in terms of catch distributions among various meat count intervals. For each stratum and area, percentage distributions of the number of scallops within four meat count categories (>40 count, 40-35 count, 35-30 count, and <30 count) were calculated (Table 5). Because the survey gear was equipped with a liner to retain small scallops normally not landed in the commercial fishery, survey meat count distributions of harvestable-sized scallops, (≥70 mm shell height, ≤80 count) were also determined (in terms of both biomass and numbers) for the major scallop regions within Georges Bank and the Mid-Atlantic (Tables 10-17, Figures 4-5). Similar analyses were performed for individual tow data but only the percent of each dredge haul catch ≤40 count is presented (Appendix Tables 1 and 2).

GEORGES BANK - Catch per tow indices from the 1984 survey indicated a differential pattern of resource abundance among the three principal sea scallop regions on Georges Bank (South Channel, Southeast Part, and Northern Edge and Peak) (Table 6, Figure 2).

South Channel - In the South Channel region, all number and weight per tow indices (prerecruit, commercial-size and total) declined from 1983. Abundance and biomass values for commercial-size and total scallops were the lowest recorded in the 1975-1984 time series (17.9 and 28.1, respectively, for number per tow; 0.35 and 0.37 kg, respectively, for biomass per tow, Table 6). Pronounced declines were evident in all but three of the twelve South Channel sampling strata; record low weight per tow values occurred in Strata 47, 50 and 54 (Table 5).

The 1984 survey size frequency data from the South Channel (Figure 6) indicate that the 1979 year class, observed to be exceptionally abundant in the 1982 survey, is no longer of prominence. The rapid, sequential reduction of this cohort in the 1983 and 1984 surveys suggests that fishing mortality in the Channel region has remained high. Historically, outstanding year classes have supported elevated fishery yields on Georges Bank for 4-5 years after initial exploitation (Serchuk 1983). Intense fishing pressure applied to the 1979 class at ages 3 and 4 (at meat counts between 40-150 count via "mixing" with small quantities of large scallop meats) effectively reduced its period of significance in the fishery by two years. The expectation of a large increase in the commercial-size number per tow index in 1983 from the large prerecruit index in 1982 was not realized; moreover, rather than remaining relatively stable, abundance of commercial-size scallops declined by 53% between 1983 and 1984 (37.0 vs 17.9, Table 6).

Survey catch distributions of harvestable biomass and numbers per tow show declines in the South Channel region during 1984 across all meat count intervals between 80-25 count (Tables 10 and 11). The largest decline occurred in the 80-40 meat count interval due to recruitment into the harvestable sector of the relatively weak 1980 year class (Figure 6). As a consequence, the percent of South Channel harvestable sea scallop biomass <30 count increased to 67% in 1984 (Table 12, Figure 4) while the proportion, by number, of <30 count scallops in the harvestable population nearly doubled to 41% (Table 13). These results imply that meat counts from the South Channel fishery are likely to decline in the future since larger scallops are relatively more dominant in the population than previously. This inference is further suggested by the declining trend in average South Channel survey meat counts between 1982 and 1984 (89 vs 34, Table 6).

The 1984 South Channel prerecruit index (10.2, Table 6) and the relatively minor 1984 shell height frequency mode between 47-62 mm (Figure 6) indicate that the 1981 year class is poor and even weaker than the 1980 year class. Accordingly, resource abundance in the South Channel will continue to be depressed until future recruitment improves.

Southeast Part - Survey data indicated little overall change in abundance and biomass levels of scallops on the Southeast Part of Georges Bank between 1983 and 1984 (Table 6, Figure 2). Resource levels remain low; the 1984 total number per tow index (16.3) was the second lowest in the survey time series while total and commercial weight per tow values (0.23 and 0.22 kg meats, respectively) were the lowest ever (Table 6). Some improvement was noted in the 1984 commercial number per tow index (12.1 vs 8.4 in 1983) but this was offset by a 59% reduction in the prerecruit value between 1983 and 1984

(10.2 vs 4.2). The modest increase in the number of commercial-sized scallops in 1984 was due to recruitment of the 1980 year class, assessed as better than average for the region from the 1983 prerecruit index and survey size frequency distribution (Table 6, Figure 7).

Growth of the 1980 year class during 1984 into the harvestable size range of the population resulted in about a fivefold increase in both the biomass and number of scallops within the 80-40 and 40-35 meat count intervals compared with 1983 (Tables 10 and 11). Counteracting these increases, however, were substantial declines in the abundance and biomass of 30-25 and <25 meat count scallops. The 1984 survey data indicate that the quantity and biomass of <25 count scallops in the Southeast Part of Georges Bank are currently at record low levels, at approximately one-sixth of their respective average 1975-1979 values (Tables 10 and 11).

Historically, both survey and fishery meat counts from the Southeast Part have been lower than those from other areas of Georges Bank (Table 6 for survey meat counts; see Serchuk et al. 1982 for fishery meat counts). With the recent reduction in abundance of large scallops and recruitment of the 1980 cohort into the harvestable sector of the population, fishery meat counts are likely to increase in the Southeast Part as smaller scallops become more fully exploited. The 1984 survey percent frequency distributions of harvestable-sized scallops (Tables 12 and 13) indicate that almost half (48%), by number, have meat counts between 80-40, and that over 25% of the commercial biomass is above 40 count in size (Figure 4). This sharply contrasts with conditions during 1982-1983 when less than 6% of the harvestable biomass and less than 17% of the harvestable number of scallops were in the 80-40 count range.

As in the South Channel, recruitment of the 1981 year class in the Southeast Part is relatively poor (Figure 7). Hence, resource levels in this region will remain extremely low for at least the next two years.

Northern Edge and Peak - In contrast with survey results for the South Channel and Southeast Part regions, all number and weight per tow indices for the Northern Edge and Peak region sharply increased in 1984 (Table 6, Figure 2). Total abundance and biomass values were the highest recorded since 1981. The 1984 prerecruit index (264.2, Table 6), the third highest value in the survey series, is indicative of exceptional recruitment of the 1981 year class in the region (Figure 8).

Significant resource improvement was evident throughout the entirety of the Northern Edge and Peak area. Increases in total number per tow values were recorded in eight of the ten sampling strata comprising the region; in the remaining two strata (Strata 63 and 74, Figure 1), the 1984 indices were essentially unchanged from 1983. In Stratum 64 (Northeast Peak), the 1984 prerecruit and total number per tow indices (Table 5) were the third highest ever obtained for any sampling stratum in the region during the nine-year survey series.

The 1981 year class, clearly outstanding in abundance in the area, should provide excellent recruitment to the Northern Edge and Peak fishery beginning in late 1985 and during 1986. Currently, the small size of these scallops (>100 count, <60 mm shell height) precludes their harvest even through "mixing". By summer 1985, however, these scallops will have grown to sizes (40-100 count) at which extensive "mixing becomes possible. To the degree that scallops from the 1981 cohort are "mixed" together with larger-sized scallops in the summer 1985 fishery, the potential yield from

the year class will be diminished. Given that the Northern Edge and Peak resource is dominated by scallops from the 1981 cohort (Figure 8) and that harvestable biomass, although improved in 1984, still remains at a relatively low level, the likelihood of extensive "mixing" in the 1985 fishery appears high. Should this ensue, the duration of elevated fishery yields possible from the 1981 year class will be much abbreviated. When the exceptional 1977 year class on the Northern Edge and the outstanding 1979 year class in the South Channel were intensively exploited before age 5 (in 1981 and 1982-83, respectively), above average yields lasted for only a single year.

The highest survey catches of scallops from the 1981 cohort were obtained in Strata 64, 65 and 66 at stations east of the United States-Canada maritime boundary announced by the International Court of Justice on October 12, 1984. Although detailed analyses of the survey data with respect to the boundary line were not performed, it is apparent that the largest improvement in Northern Edge and Peak scallop abundance has occurred in beds now under Canadian fisheries jurisdiction (see Appendix Figure 3 for boundary line location).

The survey distributions of harvestable-sized scallops in the Northern Edge and Peak region (Tables 10 and 11) indicate that increases in the 1984 commercial catch per tow indices stemmed from an increase of scallops possessing meats within the 80-40 count range. Progressions in survey height frequency modes between 1983 and 1984 (Figure 8) denote that these scallops are primarily from the 1980 year class. This cohort, which accounted for 27% of the commercial biomass in the survey (Table 12, Figure 4) and 52% of the harvestable number of scallops (Table 13), will serve as the principal source of larger-sized scallops should "mixing" occur in the Northern Edge and Peak fishery in 1985. By summer 1985, scallops from the 1980 cohort will range between 20 and 40 count and will be relatively easy to mix with smaller scallops to achieve average fishery meat counts of 35 or less.

The 1984 survey results indicate that a marked and statistically significant increase in scallop abundance has occurred on the Northern Edge and Peak region of Georges Bank (Table 8). Harvesting practices and management policies will now determine the extent to which growth overfishing (i.e., the intensive exploitation of small scallops) of the Northern Edge and Peak resource can be constrained.

MID-ATLANTIC - In the Mid-Atlantic, as on Georges Bank, results of the 1984 scallop survey differed markedly among the major scallop regions in the area (New York Bight, Delmarva, and Virginia-North Carolina) (Table 7, Figure 3).

New York Bight - The 1984 survey indices for the New York Bight region were higher than in 1983 implying a modest recovery in abundance. All of the number per tow values (prerecruit, commercial-sized, and total) increased to levels observed in 1980-1981 (Table 7, Figure 3). Biomass values although slightly higher in 1984 then in 1983, remain well below those observed in the late-1970's (Table 7).

Improvement in resource abundance was widespread throughout the region. Total number per tow indices were higher than 1983 values in all but three of the 16 New York Bight survey sampling strata. The three strata exhibiting declines (Strata 30, 33, and 34), all located off Long Island, New York, were ones where intensive fishing activity occurred during winter-spring 1984, and where the 1983 survey results indicated localized recruitment of the 1980 year class (Serchuk 1983).

Survey size frequency data (Figure 9) and prerecruit indices (Table 5) indicate the 1981 year class is somewhat stronger than 1980 year class in the New York Bight region and more widely distributed. Concentrations of the 1981 cohort were found in depths between 25-40 fathoms

from off mid-New Jersey (Strata 23 and 26) to off eastern Long Island (Strata 34). This recruitment was reflected in a decline in average shell size and an increase in meat count for New York Bight scallops between the 1983 and 1984 surveys (Table 7).

Survey-derived distributions of harvestable-sized scallops in the New York Bight region indicate an increase in number and biomass of 80-35 count scallops during 1984 but a reduction in larger-sized (<30 count) scallops (Tables 14 and 15). The 1980 year class (80-40 count scallops) currently dominates the harvestable population accounting for 27% of the biomass (Table 16, Figure 5) and 50% of the harvestable individuals (Table 17).

Improved resource conditions in the New York Bight have resulted from slightly enhanced recruitment. Fishery yields at the relatively high 1983 level (2900 metric tons, meats), however, are not sustainable from the present New York Bight resource. Hence, continued resource recovery should not be expected unless fishing pressure is moderated.

Delmarva - Survey results from the Delmarva region indicated little change in 1984 from the depressed resource conditions characteristic since 1981 (Table 7, Figure 3). All of the 1984 catch per tow indices were among the lowest values recorded. There was some improvement in the abundance of scallops in the northern portion of the region (Strata 14-15 and 18-19 off Delaware Bay: Figure 1) but this was offset by declines in more southerly strata.

Prerecruit size frequency data denote poor recruitment of the 1981 year class in the Delmarva region (Figure 10). This cohort is weaker than the 1980 year class and will not abet stock recovery.

Most of the harvestable biomass is still dominated by large scallops (<30 count; Table 14, Figure 5), although the percent of the 1984 harvestable population comprised by <30 count scallops fell to its lowest level in five years (Tables 16 and 17). Abundance and biomass values for <25 count scallops were the lowest recorded in any of the annual surveys (Tables 14 and 15). These declines presumably reflect fishery removals of the largest individuals from the resource.

Restoration of scallop abundance in the Delmarva region will be forestalled until recruitment markedly improves.

Virginia-North Carolina - In the Virginia-North Carolina region, all of the 1984 survey indices were among the lowest ever obtained (Table 7, Figure 3). The 1981 year class was virtually non-existent in the region (Figure 11). The 1980 year class, found to be localized in the northeastern portions of Strata 2, 6, and 7, during the 1983 survey was barely evident in the 1984 survey catches. The small quantities of harvestable-sized scallops that now comprise almost the entire resource (Tables 14 and 15) are primarily confined to a relatively small area in the northern corners of Strata 6 and 7 (Table 5, Figure 1).

The Virginia-North Carolina region is at the southern periphery of the distributional range for sea scallops. As such, abundance in the region is normally transitory and quite sporadic. Current resource conditions reflect the norm; in the absence of a significant recruitment pulse (as occurred in the early 1960's and again in the early 1970's), population levels tend to be extremely low and perhaps not self-sustaining. It is therefore doubtful that any resource recovery is possible in the region unless exceptional recruitment, a rare event in the area, occurs.

Gulf of Maine - Survey catches of Gulf of Maine sea scallops ranged from 0 to 3,650 individuals per tow (Table 3, Appendix Table 2). The largest catches occurred on Fippennies Ledge and Jeffreys Ledge at depths between 35-45 fm. Mean catch per tow was highest on Fippennies Ledge where an average of 690 scallops per tow was obtained. In the three other shallow-water (<60 fm) areas sampled (Jeffreys Ledge, Stellwagen Bank, and Cape Cod Bay), mean catch per tow values were 79, 14, and 66, respectively. Survey catches from the five deep-water (>60 fm) Gulf of Maine areas sampled (Jeffreys Basin, Tanta Ground, Northeast of Three Dory Ridge, Toothaker Ridge, and Southeast of Three Dory Ridge) were contrastingly much smaller; the single largest individual tow had only 25 scallops (Station 548, Appendix Table 2), with only 125 scallops taken from the five areas combined.

Size frequency patterns between shallow and deep-water areas were similar to those observed in the 1983 Gulf of Maine survey. Small scallops were most abundant in the shallower regions, while in the deep-water areas large scallops (>100 mm shell height) predominated (Figures 12 and 13). On Fippennies Ledge, greater than 89% of the scallops caught were less than 90 mm shell height with about 72% of the total catch less than 70 mm shell height (Figure 12). Two prominent size frequency modes have been evident in survey catches since 1980 (Figure 14), indicative of the 1979 and 1980 year classes. Calculated meat counts in the 1984 Fippennies Ledge sampling ranged from 30 to 322 count (Appendix Table 2) and averaged 135 count. In the 1983 survey, Fippennies Ledge scallops averaged 237 count.

On Jeffreys Ledge, most scallops caught (85%) were between 70 and 100 mm shell height and comprised a conspicuous height frequency mode at

87 mm, believed to be the 1978 year class (Figure 12). This cohort was also apparent in survey size frequency distributions from the 1982 and 1983 surveys. The modal height of the cohort, however, only increased by 5 mm (82 to 87 mm) between the 1983 and 1984 surveys. This change is less than expected from present growth rate information and may reflect fishery removals of larger-sized scallops or possibly spatial differences in the size composition of Jeffreys Ledge scallop beds sampled during 1983 and 1984 surveys. In the 1983 survey, all of the Jeffreys Ledge stations were located south of 43°N, east-northeast of New Scantum. In the 1984 survey, only six of the 13 Jeffreys Ledge sampling stations were in this general area; the remaining seven stations were located north of 43°N to assess scallop abundance on the northeastern extension of the Ledge (Appendix Figure 4). The northeasterly sampling proved unproductive, however, as only a total of 18 scallops were caught (Stations 527-539, Appendix Table 2). Had sampling intensity been higher in 1984 in the area surveyed during 1983, it is suspected that the modal size of scallops sampled on Jeffreys Ledge would have been larger than that obtained. This is implied by the large difference in mean shell height obtained from nearby sampling stations located south of 43°N in the 1984 survey (Stations 522 and 523:average shell heights of 91 and 106 mm, respectively - see Appendix Table 2).

Both the largest (152 mm) and the smallest scallops (12 mm) sampled in the Gulf of Maine were taken in Cape Cod Bay (Figure 12). Unlike the 1983 Cape Cod Bay survey results, small scallops dominated the 1984 size frequency distribution. Modes were evident at 17 mm and 52-62 mm suggestive of the 1982 and 1981 cohorts, respectively. The 1982 cohort was found only at Stations 506 and 509 (Appendix Table 2), both located in the eastern

part of the Bay, north of Billingsgate Shoal (Appendix Figure 4). The absence of significant quantities of large scallops in the Cape Cod Bay catches was somewhat surprising since the areas surveyed in 1984 were selected because commercial fishermen indicated that concentrations of larger-sized scallops existed at these sites.

Equally unexpected were the small 1984 survey catches of scallops in the deep-water area northeast of Three Dory Ridge (Appendix Table 2, Appendix Figure 4). This area, not sampled in 1983, was surveyed because of reports of commercial scalloping activity in the region. Survey tows were made from bearings provided by commercial vessel captains. Although scallops were taken in all six of the tows accomplished, no more than 25 individuals were caught in any one tow (Appendix Table 2). Large scallops ($\geq$100 mm) were dominant in all tows and accounted for 60% of the total number caught (Figure 13). However, the catch per tow values did not reflect high scallop densities. This discrepancy between fishery and survey results is perplexing and as yet unresolved. Perhaps, in deeper water, the survey dredge may be less efficient at capturing scallops then in shallower depths.

ICELAND SCALLOPS

A total of 22,199 Iceland scallops were collected during the 1984 scallop survey: 19,076 at 19 special Iceland scallop sampling stations, 3,115 at 14 regular sea scallop survey stations, and 8 at six gear comparison stations (Table 4). All but 129 scallops were caught in an area east-southeast of Pollock Rip Channel known to be the major fishing grounds for the USA Iceland scallop fishery (Appendix Figure 5). Outside of this region, Iceland scallops were only taken on the Northeast Peak of Georges Bank (Appendix Table 3, Stations 64-03 to 66-13) from the same areas in

which they were taken in the 1983 USA scallop survey. In both years, all of the Northeast Peak Iceland scallop catches occurred east of the USA/Canada boundary line announced in October 1984 by the World Court (i.e., in waters now under Canadian fisheries jurisdiction).

In the area east-southeast of Pollock Rip Channel, survey catches in 1984 ranged from 0 to 8,400 Iceland scallops per tow (Appendix Table 3). Five of the 25 tows in the region produced catches in excess of 1,000 scallops; all were located in the eastern half of the Boston Harbor traffic line between 41°30' to 41°34'N and 69°24' to 69°30'W at depths from 32-38 fm (Stations 495, 497, 500, 505, and 51-02, Appendix Figure 5). This is the same area in which the largest Iceland scallop tows were recorded in the 1983 survey.

To assess the northerly extent of Iceland scallop beds off the Pollock Rip area, five tows were performed in 1984 to the northwest of the area sampled in 1983 (Stations 486, 488, 489, 490, and 492). All were located above 40°38'N (at LORAN C 9960-Y bearings higher than 43888) in depths from 45-54 fm. No Iceland scallops were taken at any of the stations implying that the resource is localized to the southwest.

As in 1983, the 1984 survey size frequency distributions indicated a wide range of shell heights at all stations where large numbers of Iceland scallops were caught (Figure 15). Scallops ranged between 17-87 mm in shell height with 92% of the total catch between 35-75 mm. Distinct size frequency modes were evident at almost all stations with the most prominent peak between 50-70 mm.

Aggregate shell height frequency distributions from the 1983 and 1984 surveys of Iceland scallops in the area east-southeast of Pollock Rip Channel indicate that about a 5 mm increase in shell size occurred in the population in the past year (Figure 16). This growth increment appeared to be consistent over most size groups represented in the resource. The growth rate of Iceland scallops from the Cape Cod grounds thus appears similar to that for Gulf of St. Lawrence Iceland scallops which average 6 mm per year in shell height growth for 40-80 mm sized individuals (Naidu et al. 1982).

Based on the Gulf of St. Lawrence Iceland scallop growth data, approximately 13 age groups are represented in the Cape Cod frequency distributions with age groups 6-8 the most dominant.

Calculated meat counts[3] for the five largest Iceland scallop survey tows ranged between 91 and 152 count (Appendix Table 3). Due to rapid meat weight growth, Iceland scallops approximately double in meat weight yield for every 15 mm increase in shell height between 40 and 70 mm (i.e., 45 mm scallops yield 236 count meats, 60 mm scallops yield 118 count meats). Accordingly, if Iceland scallops less than 60 mm were culled out in the commercial fishery, the 1984 survey size distributions suggest that fishery meat counts would average between 85-90 count.

DISCUSSION

Results of the 1984 USA sea scallop research vessel survey indicate differential trends in sea scallop abundance among the principal fishery regions on Georges Bank and in the Mid-Atlantic.

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[3]Derived from the 1983 NMFS Iceland scallop survey shell height-meat weight equation ln Meat Weight (g) = -8.4879+2.4011 ln Shell Height (mm). Meat count values for Iceland scallops sampled in the 1983 survey were derived from the Gulf of St. Lawrence shell height-meat weight equation and hence are not directly comparable to the 1984 survey meat count results.

On Georges Bank, the 1984 survey abundance and biomass indices for the South Channel and Southeast Part regions were the lowest obtained in the annual survey time series. In both regions, the 1984 survey values were between one-half to one-third of the values observed during 1975-1979. Recruitment of the 1981 year class in each region was less than that from the 1980 year class; both year classes, however, are no better than average. Contrariwise, survey results from the Northern Edge and Peak region indicated a marked improvement in resource conditions from 1983 due to exceptional abundance of the 1981 cohort in the region. The highest densities of the 1981 year class are localized on the Northeast Peak in waters now under Canadian fisheries jurisdiction.

In the Mid-Atlantic, the 1984 survey data indicated a modest recovery in sea scallop abundance in the New York Bight region from 1983. In the other two Mid-Atlantic regions (Delmarva and Virginia-North Carolina), resource conditions remain depressed at historically low levels. Only in the New York Bight was significant recruitment of the 1981 year class evident in the 1984 survey.

Gulf of Maine survey results in 1984 were similar to those from 1983. The greatest concentrations of sea scallops were found on Fippennies and Jeffreys Ledges where small scallops (<100 mm shell height) were prominent. Above average recruitment of the 1979 and 1980 year classes was observed on Fippennies Ledge, while the 1978 year class was dominant on Jeffreys Ledge. In both areas, meat counts were lower than those obtained during the 1983 survey implying an increase in the percentage of commercial-sized scallops; most scallops, however, remain above 35 count in size. Survey catches in other Gulf of Maine areas sampled in 1984 were generally poor, particularly at deep-water sites. These other areas are unlikely to support significant scallop fisheries.

Given the present disparity in sea scallop abundance among the various offshore regions in the Northwest Atlantic and the exclusion of USA fishing operations north and east of the Georges Bank boundary line established by the World Court, fishing patterns of the USA scallop fleet are expected to markedly change in the near future. It is likely that the USA fleet will concentrate much of its fishing activity during 1985 in the New York Bight region and in that portion of the Northern Edge and Peak region west of the boundary line. Effort will be redirected from low abundance regions (South Channel, Southwest Part, Delmarva and Virginia-South Carolina) to areas of higher potential yield. Some transfer of effort to offshore Gulf of Maine areas (Fippennies Ledge and Jeffreys Ledge) is also anticipated. This is a high likelihood that fishermen will focus on incoming recruitment during 1985 (i.e., scallops from the 1981 year class in the New York Bight and on the Northern Edge) to maintain their catches. If this occurs, losses in both yield per recruit and resource reproductive potential will ensue jeopardizing any long-term population recovery.

Abundance of Iceland scallop populations off the southeastern coast of Cape Cod continues to appear relatively high. Survey catches in 1984 were as large as in 1983 and exhibited the same wide size range of individuals. Any fishery-induced reductions in population density and size composition were not detectable from either the 1984 survey catch per tow values or shell height frequency distributions. Fishery culling of scallops less than 60 mm shell height would result in average meat counts in the landings of between 85 and 90.

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Table 1. Sea scallop research vessel survey cruises on Georges Bank, in Southern New England, in the Mid-Atlantic, and in the Gulf of Maine, 1975-1984. Only surveys from which relative abundance data (catch per tow) were derived are listed.

Date					Number of Tows Accomplished										
					Georges Bank[1]					Mid-Atlantic[3]					
Month	Year	Country[4]	Dredge[5] Width (m)	Tow Duration	South Channel	Southeast Part	No. Edge and Peak	Total	Southern[2] New England	New York Bight	Del-marva	Virginia-North Carolina	Total	Gulf of Maine	Grand Total
8-10	1975	USA	3.05	15 min	64	21	53	138	6	38	28	13	79	-	223
5-6,9	1977	USA	3.05	15 min	37	24	71	132	24	130	27	11	168	-	324
8-9	1978	USA	3.05	15 min	51	22	-	73	34	127	66	23	216	-	323
7	1978	CAN	2.44	0.5 mi	-	(4)*	76	80	-	-	-	-	-	-	80
5	1979	USA	2.44	15 min	54	21	-	75	24	130	64	8	202	-	301
6	1979	CAN	2.44	0.5 mi	-	(5)*	155	160	-	-	-	-	-	-	160
5-6	1980	USA	2.44	15 min	45	21	-	66	6	131	65	13	209	-	281
5	1980	CAN	2.44	0.5 mi	-	(25)*	320	345	-	-	-	-	-	-	345
6-7	1981	USA	2.44	15 min	63	20	-	83	22	132	64	14	210	-	315
8	1981	CAN	2.44	0.5 mi	-	-	101	101	-	-	-	-	-	-	101
6-7	1982	USA	2.44	15 min	69	25	85	179	22	145	69	20	234	98	533
7-8	1983	USA	2.44	15 min	78	23	86	187	23	146	76	21	243	57	510[6]
7-8	1984	USA	2.44	15 min	79	23	86	188	28	151	80	27	258	53	527[7]

[1]Sampling strata on Georges Bank: South Channel (Strata 45-56); Southeast Part (Strata 56-60); Northern Edge and Peak (Strata 61-66; 71-74).

[2]Sampling strata in Southern New England: Strata 37-44.

[3]Sampling strata in the Mid-Atlantic: New York Bight (Strata 21-36); Delmarva (Strata 9-20), Virginia-North Carolina (Strata 1-8).

[4]USA surveys conducted with the Albatross IV; Canadian surveys conducted with the E. E. Prince.

[5]Survey dredges during USA 1975-1978 surveys were unlined. Survey dredges during USA 1979-1983 surveys and all Canadian surveys were equipped with a 3.8 cm (1.5 in) mesh liner.

[6]Excludes 13 special tows for Iceland scallops, 68 tows in tow duration experiments, and 11 tows in special gear comparison experiments.

*Catch data from these tows were not used in deriving relative abundance indices since USA data were available.

[7]Excludes 19 special tows for Iceland scallops and 93 tows in special gear comparison experiments.

Table 2. Frequency distribution of number of sea scallops caught per tow in 1984 USA sea scallop research vessel survey, by major sea scallop assessment region.

Number of Scallops Per Tow	STRATA 1-8 Virginia-No. Carolina	9-20 Delmarva	21-36 New York Bight	37-44 So. New England	45-56 South Channel	57-60 Southeast Part	61-66; 71-74 No. Edge & Peak	1-74 Total
0	13	13	21	17	18	5	12	99
1-5	7	19	18	4	14	9	9	80
6-10	2	9	15	2	12	3	7	50
11-20	3	12	22	3	5	1	8	54
21-50	2	16	35	2	13	2	9	79
51-100	-	8	16	-	6	3	13	46
101-500	-	3	24	-	10	-	18	55
501-1000	-	-	-	-	1	-	2	3
1001-10000	-	-	-	-	-	-	8	8
Total Number of Tows	27	80	151	28	79	23	86	474
Total Number of Scallops	146	1960	6948	152	3491	381	28918	41996

Table 3. Frequency distribution of number of sea scallops caught per tow in 1984 USA sea scallop research vessel survey in the Gulf of Maine, by sampling area.

Number of Scallops Per Tow	Sampling Areas									
	Cape Cod Bay	Stellwagen Bank	Jeffreys Ledge	Jeffreys Basin	Tanta Ground	NE of Three Dory Ridge	Toothaker Ridge	SE of Three Dory Ridge	Fippennies Ledge	Total
0	-	4	7	1	1	-	-	-	-	13
1-5	-	2	1	1	-	1	2	3	-	10
6-10	-	-	-	1	-	1	-	1	1	4
11-20	-	-	2	1	-	3	-	-	-	6
21-50	2	1	-	-	-	1	-	-	1	5
51-100	1	1	1	-	-	-	-	-	1	4
101-500	1	-	1	-	-	-	-	-	4	6
501-1000	-	-	1	-	-	-	-	-	2	3
1001-10000	-	-	-	-	-	-	-	-	2	2
Total Number of Tows	4	8	13	4	1	6	2	4	11	53
Total Number of Scallops	264	112	1031	26	0	83	5	11	7594	9126

Table 4. Frequency distribution of number of sea scallops and Iceland scallops caught per tow in special gear comparison experiments[1] and special Iceland scallop sampling tows performed during 1984 USA sea scallop research vessel survey.

Number of Scallops Per Tow	Gear Comparison Experiments - Sea Scallops								Iceland Scallops			
		Northern Edge and Peak										
	Fippennies Ledge	Stratum 65	Stratum 71	Stratum 64	Southeast Part	South Channel	So. New England	Total	Iceland Scallop Stations	Regular Survey Stations	Gear Comparison Stations	Total
0	-	-	-	-	-	-	3	3	7	-	-	7
1-5	-	-	-	-	-	-	-	-	4	6	6	16
6-10	-	1	-	-	-	-	-	1	1	2	-	3
11-20	-	-	-	-	-	-	-	-	-	2	-	2
21-50	-	1	2	4	14	-	-	21	1	2	-	3
51-100	-	1	2	5	14	2	-	24	1	-	-	1
101-500	4	1	-	5	4	9	-	23	1	1	-	2
501-1000	-	8	-	7	-	1	-	16	-	-	-	-
1001-10000	-	4	-	1	-	-	-	5	4	1	-	5
Total Number of Tows	4	16	4	22	32	12	3	93	19	14	6	39
Total Number of Scallops	1145	11167	204	7912	2150	2924	0	25502	19076	3115	8	22199

[1]Gear comparison experiments evaluated performance of two survey dredges, with and without rock chains.

Table 5. Summary of 1984 NMFS sea scallop research vessel survey data for sea scallops, by sampling stratum. Shell height data are in mm (25.4 mm=1 inch); meat weight data are in g (453.6g= 1 pound); meat count refers to number of meats per pound. Area mean number and mean weight per tow values represent stratified means weighted by stratum area.

Stratum or Area	Depth Range (fm)	No. of Tows	Mean Number Per Tow: Number <70 mm Per Tow	Mean Number Per Tow: Number ≥70 mm Per Tow	Mean Number Per Tow: Total Number Per Tow	All Scallops: Average Shell Height	All Scallops: Calculated[1] Meat Count	Average Meat Weight[2] (g) Per Tow	Percent Distribution of Catch in Numbers: >40 Count	40-35 Count	35-30 Count	<30 Count
1	15-25	4	0.0	0.0	0.0*	-	-	-	-	-	-	-
2	25-30	4	0.0	0.0	0.0*	-	-	-	-	-	-	-
3	30-40	3	1.0	0.0	1.0	54	203	2	100.0	0.0	0.0	0.0
4	40-60	2	0.5	0.0	0.5	57	168	1	100.0	0.0	0.0	0.0
5	15-25	3	0.0	0.0	0.0*	-	-	-	-	-	-	-
6	25-30	5	0.0	10.4	10.4	102	23	206	19.2	19.2	21.2	40.4
7	30-40	4	0.5	20.3	20.8	96	27	345	27.7	30.1	21.7	20.5
8	40-60	2	0.5	3.0	3.5	103	18	86	42.9	0.0	14.3	42.8
Virginia-No. Carolina (1-8)	*15-60*	*27*	*0.1*	*0.8*	*0.9*	*95*	*26*	*16*	*33.5*	*20.1*	*18.6*	*27.8*
9	15-25	6	0.5	4.3	4.8	102	20	110	24.1	13.8	6.9	55.2
10	25-30	8	2.6	12.3	14.9*	101	19	347	32.8	6.7	10.9	49.6
11	30-40	8	3.0	9.6	12.6*	87	27	211	47.5	14.9	7.9	29.7
12	40-60	4	0.3	4.7	5.0	93	30	76	45.0	10.0	15.0	30.0
13	15-25	4	0.5	0.3	0.8	62	122	3	100.0	0.0	0.0	0.0
14	25-30	10	2.7	15.5	18.2	95	25	325	30.8	14.8	15.9	38.5
15	30-40	12	28.6	24.7	53.3	72	51	478	70.3	7.8	8.6	13.3
16	40-60	7	3.7	4.3	8.0	75	48	76	66.1	16.1	7.1	10.7
17	15-25	4	0.0	1.8	1.8	137	9	87	0.0	14.3	0.0	85.7
18	25-30	6	17.2	25.0	42.2	81	35	547	60.5	10.3	7.5	21.7
19	30-40	8	47.0	21.0	68.0	49	71	434	84.6	3.1	2.8	9.5
20	40-60	3	0.7	1.3	2.0	77	50	18	50.0	16.7	33.3	0.0
Delmarva (9-20)	*15-60*	*80*	*5.4*	*6.9*	*12.3*	*76*	*36*	*157*	*60.5*	*8.7*	*7.1*	*23.7*
21	15-25	4	3.0	3.8	6.8	91	22	138	44.1	0.0	0.0	55.9
22	25-30	8	6.3	4.1	10.4	80	27	177	60.2	1.2	1.2	37.4
23	30-40	16	49.2	15.3	64.5	52	77	379	86.1	3.1	1.5	9.3
24	40-60	6	19.7	10.1	29.8	56	76	178	88.3	1.7	1.7	8.3
25	15-25	7	3.9	5.4	9.3	86	29	144	60.0	1.5	1.5	37.0
26	25-30	13	25.8	39.1	64.9	77	46	641	69.3	9.3	4.7	16.7
27	30-40	10	45.1	18.4	63.5	59	69	419	82.2	3.1	1.4	13.3
28	40-60	6	26.8	12.7	39.5	54	75	237	79.7	4.2	4.2	11.9
29	15-25	8	7.1	16.3	23.4	82	37	287	62.0	12.3	6.4	19.3
30	25-30	15	7.1	14.8	21.9	84	31	315	57.0	12.2	4.3	26.5
31	30-40	24	13.9	20.1	34.0	72	49	315*	76.0	3.2	3.1	17.7
32	40-60	3	5.0	8.0	13.0**	74	48	123**	53.8	25.6	7.7	12.9
33	15-25	10	5.3	18.5	23.8	81	44	245*	74.4	7.1	5.5	13.0
34	25-30	14	56.7	93.4	150.1	74	57	1192	79.4	9.0	4.6	7.0
35	30-40	5	2.8	24.4	27.2**	83	44	279**	75.0	14.0	4.4	6.6
36	40-60	2	0.0	0.0	0.0	-	-	-	-	-	-	-
New York Bight (21-36)	*15-60*	*151*	*13.0*	*13.9*	*26.9*	*70*	*48*	*253*	*74.2*	*6.8*	*3.3*	*15.7*
Mid-Atlantic (1-36)	*15-60*	*258*	*8.8*	*10.0*	*18.8*	*72*	*45*	*191*	*70.9*	*7.3*	*4.2*	*17.6*

Table 5 (continued).

Stratum or Area	Depth Range (fm)	No. of Tows	Mean Number Per Tow: Number <70 mm Per Tow	Mean Number Per Tow: Number ≥70 mm Per Tow	Mean Number Per Tow: Total Number Per Tow	All Scallops: Average Shell Height	All Scallops: Calculated[1] Meat Count	Average Meat Weight (g) Per Tow	Percent Distribution of Catch in Numbers: >40 Count	40-35 Count	35-30 Count	<30 Count
37	15-25	5	1.0	6.8	7.8	109	17	204	20.5	7.7	0.0	71.8
38	25-30	6	2.5	12.8	15.3	93	28	252	30.4	10.9	19.6	39.1
39	30-40	3	5.0	0.3	5.3	52	113	21	93.8	0.0	0.0	6.2
40	40-60	2	0.5	0.0	0.5**	57	159	1**	100.0	0.0	0.0	0.0
41	15-25	3	0.0	1.3	1.3	124	13	45	0.0	0.0	0.0	100.0
42	25-30	4	0.0	0.0	0.0*	-	-	-	-	-	-	-
43	30-40	2	0.0	0.0	0.0	-	-	-	-	-	-	-
44	40-60	3	0.0	0.0	0.0*	-	-	-	-	-	-	-
So. New England (37-44)	*15-60*	*28*	*1.5*	*2.3*	*3.8*	*86*	*28*	*61*	*47.4*	*5.5*	*5.3*	*41.8*
45	15-25	3	0.0	0.0	0.0*	-	-	-	-	-	-	-
46	25-30	6	5.0	14.7	19.7	93	25	363	40.7	7.6	4.2	47.5
47	30-40	9	16.9	18.1	35.0	76	38	416*	73.3	3.8	3.2	19.7
48	40-60	4	5.5	27.8	33.3	92	28	535	38.3	18.0	14.3	29.4
49	15-25	7	23.0	11.9	34.9	60	62	254	76.2	4.1	4.5	15.2
50	25-30	12	77.7	49.8	127.5	61	74	778*	85.2	3.3	3.5	8.0
51	30-40	12	14.3	48.8	63.1	80	40	709	58.7	10.6	10.8	19.9
52	40-60	6	0.5	4.3	4.8	102	20	109	17.2	6.9	17.2	58.7
53	40-60	6	0.2	18.2	20.0	116	15	608	14.2	4.2	5.0	76.6
54	30-40	6	8.3	11.9	20.2	87	29	315*	59.5	0.8	1.7	38.0
55	30-40	5	7.2	13.6	20.8	85	34	278	56.7	7.7	5.8	29.8
56	40-60	3	5.3	1.4	6.7	57	98	31	80.0	5.0	10.0	5.0
South Channel (45-56)	*15-60*	*79*	*10.2*	*17.9*	*28.1*	*81*	*34*	*374**	*58.1*	*8.5*	*7.3*	*26.1*
57	30-40	3	1.3	4.4	5.7	113	14	189	29.4	11.8	0.0	58.8
58	40-60	4	0.5	1.0	1.5	87	27	25	33.3	33.3	0.0	33.4
59	30-40	8	8.6	20.5	29.1	87	31	433	60.9	9.9	6.4	22.8
60	40-60	8	3.4	12.2	15.6	84	37	192	66.4	14.4	2.4	16.8
So. East Part (57-60)	*30-60*	*23*	*4.2*	*12.1*	*16.3*	*87*	*31*	*235**	*61.8*	*12.2*	*4.4*	*21.6*
61	30-40	7	5.3	13.0	18.3	105	16	528	32.8	3.9	8.6	54.7
62	40-60	9	75.2	29.9	105.1	57	71	670*	81.2	1.7	2.2	14.9
63	30-40	10	22.2	17.2	39.4	75	43	419	73.6	9.1	3.8	13.5
64	40-60	14	1165.9	131.4	1297.3**	43	204	2885	95.3	1.2	0.9	2.6
65	30-40	14	179.8	121.6	301.4	62	88	1546	94.8	1.1	0.3	3.8
66	40-60	14	211.0	121.9	332.9	60	82	1833	88.1	2.6	2.3	7.0
71	25-30	5	13.6	33.2	46.8	85	33	639	55.1	4.7	3.0	37.2
72	15-25	4	0.3	15.0	15.3	106	19	365	27.9	11.5	9.8	50.8
73	15-25	4	0.0	0.3	0.3	77	61	2	100.0	0.0	0.0	0.0
74	25-30	5	7.4	15.0	22.4	85	33	308	54.5	16.1	7.1	22.3
No. Edge and Peak (61-66;71-74)	*15-60*	*86*	*264.2*	*48.6*	*312.8*	*47*	*139*	*1019*	*92.6*	*1.6*	*1.2*	*4.6*
Georges Bank (45-66;71-74)	*15-60*	*188*	*118.6*	*30.1*	*148.7*	*50*	*107*	*629*	*89.4*	*2.4*	*1.7*	*6.5*

[1]Derived by applying shell height-meat weight equations to survey shell height frequency distributions.

*Lowest value obtained in 1975-1984 survey time series.

**Highest value obtained in 1975-1984 survey time series.

Table 6. USA sea scallop research survey relative abundance indices (standardized stratified mean number and mean weight per tow) (meats only, kg), mean shell height (mm), mean meat weight (g) per scallop, and average meat count (number of scallop meats per pound) of sea scallops from NMFS surveys on Georges Bank, 1975, 1977-1984. Data are presented by principal scallop regions on Georges Bank. Survey indices are presented for pre-recruit (<70 mm shell height), recruit (≥70 mm shell height), and total scallops per tow.[1]

		Standardized Stratified Mean Number Per Tow			Standardized Stratified Mean Weight (kg) Per Tow					
Area	Year	Number <70 mm Per Tow	Number ≥70 mm Per Tow	Total Number Per Tow	Weight <70 mm Per Tow	Weight ≥70 mm Per Tow	Total Weight Per Tow	Mean Shell Height	Mean[2] Meat Weight	Average[3] Meat Count
South Channel	1975	30.2	26.3	56.5	0.07	0.77	0.84	81.9	14.8	30.6
	1977	3.9	53.0	56.9	0.01	1.15	1.16	101.1	20.4	22.2
	1978	5.2	33.2	38.4	0.02	0.76	0.78	101.2	20.4	22.2
	1979	4.5	56.5	61.0	0.01	0.98	0.99	93.1	16.2	28.0
	1980	51.2	19.3	70.5	0.08	0.35	0.43	58.2	6.1	74.6
	1981	9.9	24.0	33.9	0.02	0.43	0.45	81.2	13.3	34.0
	1982	139.3	41.9	181.2	0.32	0.60	0.92	60.7	5.1	89.4
	1983	15.2	37.0	52.2	0.04	0.52	0.56	79.6	10.7	42.3
	1984	10.2	17.9	28.1	0.02	0.35	0.37	81.2	13.3	34.1
Southeast Part	1974	1.8	38.4	40.2	<0.01	1.02	1.02	110.3	25.5	17.8
	1977	2.9	24.7	27.6	0.01	0.62	0.63	103.9	22.8	19.9
	1978	2.1	24.8	26.9	0.01	0.86	0.87	117.5	32.2	14.1
	1979	6.9	19.2	26.1	0.01	0.64	0.65	99.4	24.9	18.2
	1980	19.4	37.4	56.8	0.03	0.63	0.66	78.2	11.7	38.8
	1981	1.3	17.4	18.7	<0.01	0.42	0.42	102.5	22.2	20.5
	1982	0.7	8.8	9.5	<0.01	0.28	0.28	113.5	29.9	15.2
	1983	10.2	8.4	18.6	0.02	0.23	0.25	78.7	13.7	33.2
	1984	4.2	12.1	16.3	0.01	0.22	0.23	86.6	14.4	31.4
Northern Edge and Peak	1975	86.8	120.6	207.4	0.23	1.81	2.04	77.0	9.8	46.2
	1977	66.1	384.8	450.9	0.24	5.06	5.30	85.3	11.8	38.6
	1978	178.6	372.0	550.6	0.31	7.56	7.87	84.9	14.3	31.7
	1979	64.3	234.9	299.2	0.18	4.03	4.21	87.2	14.1	32.2
	1980	598.6	129.3	727.9	0.82	1.85	2.67	52.4	3.7	123.9
	1981	277.4	405.7	683.1	0.63	3.79	4.42	68.9	6.5	70.1
	1982	37.0	58.8	95.8	0.11	0.85	0.96	78.1	10.0	45.2
	1983	43.4	33.4	76.8	0.07	0.60	0.67	68.2	8.7	51.9
	1984	264.2	48.6	312.8	0.27	0.75	1.02	46.7	3.3	139.2
Georges Bank (All Areas)	1975	46.3	62.8	109.1	0.12	1.19	1.31	80.2	12.0	37.8
	1977	27.9	176.4	204.3	0.10	2.57	2.67	87.6	13.1	34.7
	1978	66.5	152.5	219.0	0.12	3.21	3.33	87.0	15.2	29.8
	1979	28.8	121.7	150.5	0.08	2.14	2.22	88.6	14.8	30.7
	1980	305.3	74.7	380.0	0.42	1.11	1.53	53.5	4.0	112.6
	1981	76.4	120.1	196.5	0.17	1.29	1.46	70.7	7.4	61.2
	1982	73.2	43.9	117.1	0.18	0.66	0.84	67.5	7.1	63.5
	1983	26.5	30.9	57.4	0.05	0.51	0.56	73.0	9.7	46.6
	1984	118.6	30.1	148.7	0.13	0.50	0.63	50.1	4.2	107.2

[1]Relative abundance indices for the Northern Edge and Peak, 1978-1981, were derived from Canadian research vessel survey data standardized to USA tow distance.

[2]Mean meat weight derived by applying the 1978-1982 USA Georges Bank research survey sea scallop shell height-meat weight equation,

$$\ln \text{Meat Weight (g)} = -11.7656 + 3.1693 \ln \text{Shell Height (mm)} \quad (n = 5863,\ r = 0.98)$$

to each shell height in the survey frequency distribution, multiplying by the frequency at height, summing the products, and dividing by the total number of scallops in the frequency distribution.

[3]Average meat count derived by dividing the calculated mean meat weight into 453.6 grams (1 pound).

Table 7. USA sea scallop research survey relative abundance indices (standardized stratified mean number and mean weight per tow), (meats only, kg), mean shell height (mm), mean meat weight (g) per scallop, and average meat count (number of scallop meats per pound) of sea scallops from NMFS surveys in the Mid-Atlantic, 1975, 1977-1984. Data are presented by principal scallop regions 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.

		Standardized Stratified Mean Number Per Tow			Standardized Stratified Mean Weight (kg) Per Tow					
Area	Year	Number <70 mm Per Tow	Number ≥70 mm Per Tow	Total Number Per Tow	Weight <70 mm Per Tow	Weight ≥70 mm Per Tow	Total Weight Per Tow	Mean Shell Height	Mean[1] Meat Weight	Average[2] Meat Count
New York Bight	1975	27.3	23.8	51.1	0.07	0.43	0.50	75.3	9.6	47.1
	1977	1.1	39.7	40.8	<0.01	0.72	0.72	98.5	17.7	25.7
	1978	2.5	36.7	39.2	0.01	0.80	0.81	102.6	20.6	22.0
	1979	3.9	13.7	17.6	0.01	0.35	0.36	95.3	20.2	22.4
	1980	10.7	10.8	21.5	0.02	0.25	0.27	75.7	12.4	35.6
	1981	13.1	13.5	26.6	0.02	0.21	0.23	68.2	8.6	52.5
	1982	7.9	15.1	23.0	0.02	0.24	0.26	78.5	11.1	40.8
	1983	8.0	9.9	17.9	0.02	0.20	0.22	80.6	12.5	36.2
	1984	13.0	13.9	26.9	0.02	0.23	0.25	70.3	9.4	48.3
Delmarva	1975	25.2	16.1	41.3	0.09	0.24	0.33	72.1	7.9	57.7
	1977	2.9	24.2	27.1	0.01	0.60	0.62	103.9	22.7	20.0
	1978	8.3	26.2	34.5	0.03	0.62	0.65	95.7	18.9	24.1
	1979	30.8	39.3	70.1	0.05	0.60	0.65	73.7	9.3	48.9
	1980	23.4	13.3	36.7	0.04	0.27	0.31	66.8	8.4	54.3
	1981	2.8	5.9	8.7	0.01	0.15	0.16	90.1	18.0	25.2
	1982	5.5	8.0	13.5	0.02	0.18	0.20	85.2	14.5	31.3
	1983	7.8	5.4	13.2	0.03	0.13	0.16	78.7	11.8	38.4
	1984	5.4	6.9	12.3	0.01	0.15	0.16	75.8	12.8	35.5
Virginia-No. Carolina	1975	47.7	11.0	58.7	0.17	0.14	0.31	66.0	5.3	86.2
	1977	0.2	0.3	0.5	<0.01	0.01	0.01	88.7	14.2	31.9
	1978	15.7	7.3	23.0	0.06	0.09	0.15	68.7	6.4	71.2
	1979	4.6	6.5	11.1	0.01	0.10	0.11	75.3	9.9	45.9
	1980	0.8	4.6	5.4	<0.01	0.07	0.07	87.9	13.5	33.7
	1981	0.4	0.8	1.2	<0.01	0.02	0.02	95.2	18.5	24.5
	1982	1.0	0.3	1.3	<0.01	0.01	0.01	67.3	7.5	60.2
	1983	4.7	2.0	6.7	0.01	0.07	0.08	74.7	11.6	39.0
	1984	0.1	0.8	0.9	<0.01	0.02	0.02	95.3	17.4	26.1
Mid-Atlantic (All Areas)	1975	29.0	19.6	48.6	0.08	0.33	0.41	73.0	8.5	53.4
	1977	1.6	30.3	31.9	<0.01	0.61	0.61	100.0	19.0	23.8
	1978	6.0	29.7	35.7	0.02	0.66	0.68	97.8	18.9	23.9
	1979	13.9	22.9	36.8	0.02	0.43	0.45	79.9	12.4	36.6
	1980	14.8	11.3	26.1	0.02	0.25	0.27	71.3	10.4	43.8
	1981	8.6	10.0	18.6	0.01	0.18	0.19	72.0	10.3	44.2
	1982	6.2	10.9	17.1	0.01	0.19	0.20	80.2	12.0	37.9
	1983	7.6	7.4	15.0	0.02	0.16	0.18	79.7	12.3	37.0
	1984	8.8	10.0	18.8	0.01	0.18	0.19	71.6	10.2	44.5

[1]Mean meat weight derived by applying the 1977-1982 USA Mid-Atlantic research survey sea scallop shell height-meat weight equation,

$$\ln \text{Meat Weight (g)} = -12.1628 + 3.2539 \ln \text{Shell Height (mm)} \quad (n = 11943,\ r = 0.98)$$

to each shell height in the survey frequency distribution, multiplying by the frequency at height, summing the products, and dividing by the total number of scallops in the frequency distribution.

[2]Average meat count derived by dividing the calculated mean meat weight into 453.6 grams (1 pound).

Table 8. Standardized stratified mean catch (number) per tow of sea scallops from USA sea scallop research vessel surveys on Georges Bank, 1975, 1977-1984[1]. Standard deviation of the mean (S.D.), coefficient of variation (C.V.: 100 S.D./Mean), and 95% confidence limits are provided as indices of variability. Data are summarized by the three principal sea scallop regions on Georges Bank and for the entire Georges Bank area.

		Linear				Ln (x + 1)				Re-transformed	
Region	Year	Mean	S.D.	C.V.	Confidence limits	Mean	S.D.	C.V.	Confidence limits	Mean	Confidence limits
South Channel	1975	56.5	17.0	30.1	23.2 - 89.9	2.5674	0.2183	8.5	2.1398-2.9950	52.9	34.1 - 81.6
	1977	56.9	14.9	26.2	27.7 - 86.1	1.5169	0.2555	16.8	1.0160-2.1078	32.9	19.6 - 55.0
	1978	38.4	7.8	20.4	23.0 - 53.8	1.4171	0.1689	11.9	1.0862-1.7480	25.4	18.0 - 35.8
	1979	61.0	37.6	61.6	-12.7 -134.8	1.5418	0.1857	12.0	1.1777-1.9059	21.5	14.6 - 31.3
	1980	70.5	29.9	42.4	12.0 -129.0	1.5690	0.2096	13.4	1.1583-1.9797	25.7	16.7 - 39.3
	1981	33.9	10.0	29.4	14.3 - 53.5	1.6711	0.2366	14.2	1.2073-2.1349	26.5	16.3 - 42.8
	1982	181.2	80.3	44.3	23.7 -338.6	1.9410	0.4140	21.3	1.1296-2.7524	78.9	34.5 -178.8
	1983	52.2	14.5	27.8	23.7 - 80.7	1.9681	0.3038	15.4	1.3726-2.5636	40.2	21.7 - 73.7
	1984	28.1	8.7	30.9	11.1 - 45.1	1.8669	0.3126	16.7	1.2543-2.4795	31.9	16.8 - 59.7
Southeast Part	1975	40.2	9.4	23.4	21.7 - 58.6	2.9255	0.3011	10.3	2.3352-3.5158	53.2	29.0 - 96.8
	1977	27.6	8.7	31.5	10.5 - 44.6	1.9997	0.3155	15.8	1.3811-2.6183	35.4	18.6 - 66.6
	1978	26.9	4.5	16.9	18.0 - 35.8	2.7908	0.1762	6.3	2.4452-3.1364	29.1	20.3 - 41.5
	1979	26.1	6.7	25.6	13.0 - 39.2	2.4192	0.3009	12.4	1.8292-3.0092	34.3	18.6 - 62.7
	1980	56.8	21.8	38.3	14.2 - 99.5	2.2990	0.4307	18.7	1.4548-3.1432	84.4	35.7 -197.7
	1981	18.7	4.1	22.0	10.6 - 26.8	2.2330	0.2278	10.2	1.7865-2.6795	23.6	14.8 - 37.5
	1982	9.5	2.6	27.4	4.4 - 14.6	1.6546	0.2279	13.8	1.2077-2.1015	10.7	6.5 - 17.3
	1983	18.6	6.2	33.5	6.4 - 30.8	2.0634	0.2884	14.0	1.4980-2.6288	19.8	10.8 - 35.6
	1984	16.3	6.2	38.4	4.0 - 28.5	1.6776	0.3210	19.1	1.0486-2.3066	15.8	8.0 - 30.5
Northern Edge and Peak	1975	207.4	70.7	34.1	68.9 -345.9	3.5373	0.3785	10.7	2.7956-4.2790	446.2	212.0 -937.8
	1977	450.9	91.2	20.2	272.2 -629.7	3.8416	0.2272	5.9	3.3964-4.2868	1269.5	813.0-1982.1
	1978[1]	550.6	64.5	11.7	424.0 -677.2	5.7736	0.1112	1.9	5.5553-5.9919	559.5	449.6 -696.2
	1979[1]	299.2	27.6	9.2	245.0 -353.4	4.8503	0.1853	3.8	4.4873-5.2133	418.8	291.0 -602.5
	1980[1]	727.9	119.2	16.4	494.2 -961.6	4.0011	0.1184	3.0	3.7692-4.2330	2201.5	1745.6-2776.4
	1981[1]	683.1	116.5	17.1	454.7 -911.5	4.7078	0.2198	4.7	4.2770-5.1386	1906.7	1239.0-2933.8
	1982	95.8	17.7	18.5	61.1 -130.5	2.7888	0.1900	6.8	2.4164-3.1612	141.5	97.2 -205.8
	1983	76.8	17.6	22.9	42.2 -111.3	2.4856	0.2026	8.2	2.0882-2.8830	105.9	70.9 -158.1
	1984	312.8	99.3	31.8	118.1 -507.5	3.1559	0.2011	6.4	2.7619-3.5499	418.3	281.8 -620.7
Georges Bank (all areas)	1975	109.1	27.1	24.9	56.0 -162.3	2.9822	0.1796	6.0	2.6299-3.3345	124.3	87.1 -177.3
	1977	204.3	36.6	17.9	132.5 -276.1	2.5088	0.1518	6.1	2.2116-2.8060	243.5	180.6 -328.1
	1978	219.0	23.3	10.7	173.2 -264.7	3.2682	0.1113	3.4	3.0499-3.4865	626.9	503.8 -780.0
	1979	150.5	19.7	13.1	111.9 -189.1	3.0133	0.1211	4.0	2.7757-3.2509	248.3	195.6 -315.2
	1980	380.0	57.7	15.2	267.0 -493.0	2.8509	0.1194	4.2	2.6173-3.0845	487.0	385.4 -615.4
	1981	196.5	15.4	7.8	166.0 -266.7	2.5633	0.1467	5.7	2.2759-2.8507	175.0	131.0 -233.6
	1982	117.1	33.9	28.9	50.8 -183.5	2.2623	0.1925	8.5	1.8848-2.6398	80.8	55.1 -118.4
	1983	57.4	9.7	16.9	38.4 - 76.4	2.2059	0.1590	7.2	1.8941-2.5177	55.2	40.1 - 75.7
	1984	148.7	42.9	28.8	64.6 -232.8	2.3914	0.1630	6.8	2.0717-2.7111	106.8	77.3 -147.5

[1]Stratified mean catch (number) per tow indices for the Northern Edge and Peak, 1978-1981, were derived from Canadian sea scallop research survey data post-stratified into USA sampling strata and standardized for differences in tow distance between USA and Canadian standard survey tows.

Table 9. Standardized stratified mean catch (number) per tow of sea scallops from USA sea scallop research vessel surveys in the Mid-Atlantic, 1975, 1977-1984. Standard deviation of the mean (S.D.), coefficient of variation (C.V.: 100 S.D./Mean), and 95% confidence limits are provided as indices of variability. Data are summarized by the three principal sea scallop regions in the Mid-Atlantic and for the entire Mid-Atlantic area.

		Linear				Ln (x + 1)				Re-transformed	
Region	Year	Mean	S.D.	C.V.	Confidence limits	Mean	S.D.	C.V.	Confidence limits	Mean	Confidence limits
New York Bight	1975	51.1	10.0	19.5	31.6 - 70.7	2.1907	0.2197	10.0	1.7599-2.6215	62.4	40.2 - 96.6
	1977	40.8	3.5	8.7	33.8 - 47.7	2.1368	0.1485	6.9	1.8461-2.4275	71.3	53.0 - 95.6
	1978	39.2	3.6	8.8	32.4 - 46.0	2.2003	0.1251	5.7	1.9547-2.4459	61.6	48.0 - 79.1
	1979	17.6	2.1	11.8	13.5 - 21.7	2.0713	0.1153	5.6	1.8453-2.2973	19.5	15.4 - 24.7
	1980	21.5	2.6	11.9	16.4 - 26.5	1.9366	0.1175	6.1	1.7064-2.1668	24.4	19.2 - 31.0
	1981	26.6	4.9	18.5	17.0 - 36.3	1.8141	0.1197	6.6	1.5797-2.0485	22.5	17.6 - 28.7
	1982	23.0	2.8	12.3	17.4 - 28.5	1.8876	0.1092	5.8	1.6638-2.0914	20.3	16.2 - 25.4
	1983	17.9	1.8	10.2	14.3 - 21.5	1.6250	0.1029	6.3	1.4232-1.8268	17.1	13.8 - 21.2
	1984	26.9	3.3	12.3	20.4 - 33.4	2.1194	0.1771	8.4	1.7721-2.4667	34.1	23.8 - 48.7
Delmarva	1975	41.3	11.0	26.6	19.7 - 62.9	2.7166	0.3022	11.1	2.1244-3.3088	50.2	27.3 - 91.6
	1977	27.1	3.6	13.4	20.0 - 34.2	2.6288	0.2540	9.7	2.1310-3.1266	39.9	23.8 - 66.2
	1978	34.5	3.4	9.9	27.8 - 41.2	2.0714	0.2233	10.9	1.6336-2.5092	50.1	32.0 - 78.2
	1979	70.1	26.1	37.2	19.0 -121.2	2.2576	0.2585	15.9	1.5547-2.9605	110.5	54.2 -224.1
	1980	36.7	7.0	19.0	23.1 - 50.4	2.0951	0.2377	11.3	1.6292-2.5610	38.9	24.0 - 62.6
	1981	8.7	2.4	27.3	4.1 - 13.4	1.3413	0.2161	16.1	0.9177-1.7649	8.5	5.2 - 13.5
	1982	13.5	2.8	20.7	8.0 - 19.0	1.5072	0.1877	12.5	1.1395-1.8749	12.1	8.0 - 17.9
	1983	13.2	2.3	17.1	8.8 - 17.7	1.3159	0.2095	15.9	0.9052-1.7266	11.1	7.0 - 17.2
	1984	12.3	2.3	18.8	7.7 - 16.8	1.3747	0.2149	15.6	0.9534-1.7960	10.6	6.6 - 16.7
Virginia-No. Carolina	1975	58.7	0.7	1.2	57.3 - 60.1	0.5630	0.1004	17.8	0.3660-0.7600	6.8	5.4 - 8.4
	1977	0.5	0.2	36.1	0.1 - 0.8	0.1935	0.0981	50.7	0.0015-0.3855	0.4	0.1 - 0.7
	1978	23.0	14.0	60.8	-4.4 - 50.3	1.4280	0.5539	38.8	0.3424-2.5136	24.4	7.6 - 74.3
	1979	11.1	2.3	20.9	6.5 - 15.6	1.2907	0.3482	27.0	0.6081-1.9733	11.0	5.1 - 22.7
	1980	5.4	0.4	7.5	4.6 - 6.2	0.5469	0.0810	14.8	0.3877-0.7061	2.6	2.0 - 3.2
	1981	1.2	0.4	36.4	0.4 - 2.1	0.3542	0.1167	32.9	0.1256-0.5828	0.9	0.5 - 1.4
	1982	1.3	0.7	53.2	-0.1 - 2.6	0.5249	0.3060	58.3	-0.0751-1.1249	1.3	0.2 - 3.1
	1983	6.7	2.4	35.9	2.0 - 11.4	0.7370	0.2274	30.9	0.2913-1.1827	4.5	2.5 - 7.6
	1984	0.9	0.1	16.1	0.6 - 1.2	0.2256	0.0298	13.2	0.1668-0.2844	0.5	0.4 - 0.6
Mid-Atlantic (all areas)	1975	48.6	6.6	13.5	35.8 - 61.5	2.1812	0.1580	7.2	1.8713-2.4911	54.5	39.7 - 74.6
	1977	31.9	2.3	7.3	27.3 - 36.4	2.0851	0.1184	5.7	1.8532-2.3170	48.1	38.0 - 60.9
	1978	35.7	2.8	7.7	30.3 - 41.1	2.0661	0.1210	5.9	1.8293-2.3029	52.0	40.8 - 66.1
	1979	36.8	9.7	26.4	17.7 - 55.8	2.1101	0.1496	7.1	1.8168-2.4034	36.5	27.0 - 49.3
	1980	26.1	2.9	11.3	20.4 - 31.9	1.9168	0.1101	5.7	1.7012-2.1324	27.2	21.7 - 34.0
	1981	18.6	3.0	16.0	12.8 - 24.4	1.5529	0.1044	6.7	1.3483-1.7575	14.5	11.6 - 18.0
	1982	17.1	1.8	10.5	13.6 - 20.6	1.5869	0.0943	5.9	1.4020-1.7718	13.9	11.4 - 16.9
	1983	15.0	1.3	8.6	12.5 - 17.5	1.4119	0.0941	6.7	1.2270-1.5968	13.1	10.7 - 16.0
	1984	18.8	3.8	10.4	15.0 - 22.6	1.6363	0.0144	7.3	1.4011-1.8715	18.9	14.7 - 24.1

Table 10. Distribution of standardized stratified mean weight (g, meat) per tow among various meat count intervals for sea scallops from NMFS sea scallop research vessel surveys on Georges Bank, 1975, 1977-1984.[1]

		Meat Weight (g, meat) Per Tow						
		Total Biomass	Harvestable[2] Biomass	Meat Count Interval[3]				
Area	Year	Per Tow(g)	Per Tow (g)	80 - 40	40 - 35	35 - 30	30 - 25	<25
South Channel	1975	839	766	28	17	25	33	663
	1977	1161	1149	94	61	129	130	735
	1978	785	769	34	30	50	79	576
	1979	989	982	304	91	29	24	534
	1980	428	354	82	9	8	14	241
	1981	452	436	106	25	20	18	267
	1982	919	595	197	42	43	36	277
	1983	560	522	204	44	35	34	205
	1984	374	353	54	31	32	23	213
Southeast Part	1975	1023	1018	16	20	36	67	879
	1977	629	620	51	27	26	22	494
	1978	869	863	17	10	14	12	810
	1979	650	640	31	6	12	12	579
	1980	665	636	220	46	23	11	336
	1981	415	412	49	27	23	14	299
	1982	285	284	8	8	10	7	251
	1983	254	231	12	4	11	17	187
	1984	235	224	57	26	11	9	121
Northern Edge and Peak	1975	2037	1812	471	247	180	142	772
	1977	5299	5064	1826	522	621	531	1564
	1978	7875	7567	632	468	746	817	4904
	1979	4211	4028	934	233	206	229	2426
	1980	2665	1846	560	212	205	146	723
	1981	4417	3788	2565	244	221	157	601
	1982	961	855	265	85	88	93	324
	1983	671	601	115	51	59	58	318
	1984	1019	753	204	67	58	59	365
Georges Bank (All Areas)	1975	1307	1190	188	102	84	78	738
	1977	2667	2569	758	233	300	266	1012
	1978	3329	3211	245	182	291	330	2163
	1979	2222	2144	511	133	97	104	1299
	1980	1531	1111	333	112	104	76	486
	1981	1457	1287	722	81	72	53	359
	1982	836	657	196	55	57	56	293
	1983	559	510	135	40	42	42	251
	1984	629	505	119	46	40	36	264

[1]Meat weight values derived from shell height values using 1978-1982 USA research survey equation,

$$\ln \text{Meat Weight (g)} = -11.7656 + 3.1693 \ln \text{Shell Height (mm)} \quad (n = 5863,\ r = 0.98).$$

[2]Stratified mean weight (g, meat) per tow for sea scallops $\geq$70 mm, $\leq$80 count.

[3]Meat count is expressed as number of meats per pound.

Table 11. Distribution of standardized mean number per tow among various meat count intervals for sea scallops from NMFS sea scallop research vessel surveys on Georges Bank, 1975, 1977-1984.

		Stratified Mean Number of Scallops Per Tow						
				Meat Count Interval				
Area	Year	Total Number Per Tow	Harvestable Number Per Tow	80-40	40-35	35-30	30-25	<25
South Channel	1975	56.5	26.3	3.3	1.3	1.7	1.8	18.2
	1977	56.9	53.0	11.2	4.7	8.4	7.2	21.5
	1978	38.4	33.2	3.6	2.3	3.2	4.4	19.7
	1979	61.0	56.6	30.7	7.0	1.9	1.3	15.7
	1980	70.5	19.3	10.2	0.7	0.5	0.8	7.1
	1981	33.9	24.0	12.2	1.9	1.3	1.0	7.6
	1982	181.2	41.9	26.2	3.2	2.8	2.0	7.7
	1983	52.2	37.0	23.6	3.4	2.3	1.9	5.8
	1984	28.1	17.9	6.1	2.4	2.1	1.3	6.0
Southeast Part	1975	40.1	38.4	1.8	1.5	2.3	3.7	29.1
	1977	27.6	24.7	5.5	2.1	1.7	1.2	14.2
	1978	26.9	24.9	1.8	0.7	0.9	0.7	20.8
	1979	26.1	19.2	3.6	0.5	0.8	0.7	13.6
	1980	56.8	37.5	23.3	3.6	1.5	0.6	8.5
	1981	18.7	17.4	5.2	2.1	1.5	0.8	7.8
	1982	9.5	8.8	0.8	0.6	0.6	0.4	6.4
	1983	18.6	8.4	1.4	0.3	0.7	1.0	5.0
	1984	16.3	12.0	5.8	2.0	0.7	0.5	3.0
Northern Edge and Peak	1975	207.4	120.6	54.3	19.0	11.7	7.9	27.7
	1977	450.9	384.8	220.5	40.1	40.3	29.5	54.4
	1978	550.6	372.0	71.0	35.9	48.5	45.3	171.3
	1979	299.2	234.9	113.5	17.9	13.4	12.7	77.4
	1980	727.9	129.3	67.8	16.3	13.3	8.1	23.8
	1981	683.1	405.7	343.4	18.7	14.4	8.7	20.5
	1982	95.8	58.8	30.7	6.5	5.7	5.2	10.7
	1983	76.8	33.4	12.6	3.9	3.8	3.2	9.9
	1984	312.8	48.6	25.4	5.2	3.8	3.3	10.9
Georges Bank (All Areas)	1975	109.1	62.8	21.7	7.8	5.4	4.4	23.5
	1977	204.3	176.4	91.3	17.9	19.5	14.7	33.0
	1978	219.0	152.5	27.3	14.0	18.9	18.3	74.0
	1979	150.5	121.7	59.3	10.2	6.3	5.8	40.1
	1980	380.0	74.7	39.8	8.6	6.8	4.2	15.3
	1981	196.5	120.1	95.3	6.2	4.7	2.9	11.0
	1982	117.1	43.9	24.1	4.2	3.7	3.1	8.8
	1983	57.4	30.9	15.4	3.1	2.7	2.3	7.4
	1984	148.7	30.2	14.4	3.5	2.6	2.0	7.7

Table 12. Percentage distribution of harvestable biomass (meat weight) of Atlantic sea scallops on Georges Bank, within various meat count intervals. Harvestable biomass is defined as all sea scallops ≥70 mm shell height. Data derived from distribution of standardized stratified mean meat weight per tow in NMFS sea scallop research vessel surveys on Georges Bank, 1975, 1977-1984.

		Percent of Harvestable Biomass					
		Meat Count Interval[1]					
Area	Year	80 - 40	40 - 35	35 - 30	30 - 25	<30	<25
South Channel	1975	3.7	2.2	3.3	4.3	90.9	86.6
	1977	8.2	5.3	11.2	11.3	75.3	64.0
	1978	4.4	3.9	6.5	10.3	85.2	74.9
	1979	31.0	9.3	3.0	2.4	56.8	54.4
	1980	23.2	2.5	2.3	4.0	72.0	68.1
	1981	24.3	5.7	4.6	4.1	65.4	61.2
	1982	33.1	7.1	7.2	6.1	52.6	46.6
	1983	39.1	8.4	6.7	6.5	45.8	39.3
	1984	15.3	8.8	9.1	6.5	66.9	60.3
Southeast Part	1975	1.6	2.0	3.5	6.6	92.9	86.3
	1977	8.2	4.4	4.2	3.5	83.2	79.7
	1978	2.0	1.2	1.6	1.4	95.2	93.9
	1979	4.8	0.9	1.9	1.9	92.3	90.5
	1980	34.6	7.2	3.6	1.7	54.6	52.8
	1981	11.9	6.6	5.6	3.4	76.0	72.6
	1982	2.8	2.8	3.5	2.5	90.8	88.4
	1983	5.2	1.7	4.8	7.4	88.3	81.0
	1984	25.4	11.6	4.9	4.0	58.0	54.0
Northern Edge and Peak	1975	26.0	13.6	9.9	7.8	50.4	42.6
	1977	36.1	10.3	12.3	10.5	41.4	30.9
	1978	8.4	6.2	9.9	10.8	75.6	64.8
	1979	23.2	5.8	5.1	5.7	65.9	60.2
	1980	30.3	11.5	11.1	7.9	47.1	39.2
	1981	67.7	6.4	5.8	4.1	20.0	15.9
	1982	31.0	9.9	10.3	10.9	48.8	37.9
	1983	19.1	8.5	9.8	9.7	62.6	52.9
	1984	27.1	8.9	7.7	7.8	56.3	48.5
Georges Bank (All Areas)	1975	15.8	8.6	7.1	6.6	68.6	62.0
	1977	29.5	9.1	11.7	10.4	49.7	39.4
	1978	7.6	5.7	9.1	10.3	77.6	67.4
	1979	23.8	6.2	4.5	4.9	65.4	60.6
	1980	30.0	10.1	9.4	6.8	50.6	43.7
	1981	56.1	6.3	5.6	4.1	32.0	27.9
	1982	29.8	8.4	8.7	8.5	53.1	44.6
	1983	26.5	7.8	8.2	8.2	57.5	49.2
	1984	23.6	9.1	7.9	7.1	59.4	52.3

[1]Meat count is expressed as number of meats per pound.

Table 13. Percentage distribution of harvestable number of Atlantic sea scallops on Georges Bank, within various meat count intervals. Harvestable scallops are defined as all sea scallops ≥70 mm shell height. Data derived from distribution of standardized stratified mean number per tow of scallops in NMFS sea scallop research vessel surveys on Georges Bank, 1975, 1977-1984.

		Percent of Harvestable Scallops					
		Meat Count Interval					
Area	Year	80-40	40-35	35-30	30-25	<30	<25
South Channel	1975	12.6	4.9	6.5	6.8	76.0	69.2
	1977	21.1	8.9	15.8	13.6	54.2	40.6
	1978	10.9	6.9	9.6	13.3	72.6	59.3
	1979	54.2	12.4	3.4	2.3	30.0	27.7
	1980	52.9	3.6	2.6	4.1	40.9	36.8
	1981	50.8	7.9	5.4	4.2	35.9	31.7
	1982	62.5	7.6	6.7	4.8	23.2	18.4
	1983	63.8	9.2	6.2	5.1	20.8	15.7
	1984	34.1	13.4	11.7	7.3	40.8	33.5
Southeast Part	1975	4.7	3.9	6.0	9.6	85.4	75.8
	1977	22.3	8.5	6.9	4.8	62.3	57.5
	1978	7.2	2.8	3.6	2.8	86.4	83.6
	1979	18.8	2.6	4.2	3.6	74.4	70.8
	1980	62.1	9.6	4.0	1.6	24.3	22.7
	1981	29.9	12.1	8.6	4.6	49.4	44.8
	1982	9.1	6.8	6.8	4.5	77.3	72.7
	1983	16.7	3.6	8.3	11.9	71.4	59.5
	1984	48.3	16.7	5.8	4.2	29.2	25.0
Northern Edge and Peak	1975	45.0	15.8	9.7	6.5	29.5	23.0
	1977	57.3	10.4	10.5	7.7	21.8	14.1
	1978	19.1	9.7	13.0	12.2	58.2	46.0
	1979	48.3	7.6	5.7	5.4	38.4	33.0
	1980	52.4	12.6	10.3	6.3	24.7	18.4
	1981	84.6	4.6	3.6	2.1	7.2	5.1
	1982	52.2	11.1	9.7	8.8	27.0	18.2
	1983	37.7	11.7	11.4	9.6	39.2	29.6
	1984	52.3	10.7	7.8	6.8	29.2	22.4
Georges Bank (All Areas)	1975	34.6	12.4	8.6	7.0	44.4	37.4
	1977	51.8	10.1	11.1	8.3	27.0	18.7
	1978	17.9	9.2	12.4	12.0	60.5	48.5
	1979	48.7	8.4	5.2	4.8	37.7	32.9
	1980	53.3	11.5	9.1	5.6	26.1	20.5
	1981	79.3	5.2	3.9	2.4	11.6	9.2
	1982	54.9	9.6	8.4	7.1	27.1	20.0
	1983	49.8	10.0	8.7	7.5	31.5	24.0
	1984	47.7	11.6	8.6	6.6	32.1	25.5

Table 14. Distribution of standardized stratified mean weight (g, meat) per tow among various meat count intervals for sea scallops from NMFS sea scallop research vessel surveys in the Mid-Atlantic, 1975, 1977-1984.[1]

		Meat Weight (g, meat) Per Tow						
				Meat Count Interval[3]				
Area	Year	Total Biomass Per Tow(g)	Harvestable[2] Biomass Per Tow (g)	80 - 40	40 - 35	35 - 30	30 - 25	<25
New York Bight	1975	493	426	65	36	44	44	237
	1977	720	717	115	48	67	99	388
	1978	808	803	40	32	64	99	568
	1979	357	350	21	6	11	15	297
	1980	266	251	24	9	11	11	196
	1981	230	210	61	11	10	10	118
	1982	255	239	67	17	16	17	122
	1983	224	205	24	13	14	17	137
	1984	253	234	63	23	14	11	123
Delmarva	1975	325	240	66	13	16	19	126
	1977	614	606	43	23	21	24	495
	1978	650	624	55	21	24	33	491
	1979	650	597	192	80	54	34	237
	1980	307	270	38	6	14	23	189
	1981	158	152	15	3	4	4	126
	1982	195	178	19	7	12	10	130
	1983	157	130	13	7	4	3	103
	1984	157	145	18	13	13	12	89
Virginia-North Carolina	1975	309	141	47	-	1	3	90
	1977	7	7	1	1	<1	<1	4
	1978	146	92	36	2	2	6	46
	1979	109	102	35	9	12	4	42
	1980	73	72	22	3	3	7	37
	1981	23	21	<1	1	1	2	17
	1982	10	7	1	<1	1	<1	5
	1983	78	64	4	3	1	<1	56
	1984	16	16	2	2	3	1	8
Mid-Atlantic (All Areas)	1975	413	329	63	24	29	31	182
	1977	607	603	79	35	45	63	381
	1978	676	658	45	25	43	65	480
	1979	456	432	85	33	27	22	265
	1980	270	247	28	7	12	15	185
	1981	191	178	41	8	7	7	115
	1982	205	190	43	11	13	12	111
	1983	184	163	18	10	9	10	116
	1984	191	178	41	17	12	10	98

[1]Meat weight values derived from shell height values using 1977-1982 USA research survey equation,

$$\ln \text{Meat Weight (g)} = -12.1628 + 3.2539 \ln \text{Shell Height (mm)} \quad (n = 11943,\ r = 0.98)$$

[2]Stratified mean weight (g, meat) per tow for sea scallops $\geq$70 mm; $\leq$80 count.

[3]Meat count is expressed as number of meats per pound.

Table 15. Distribution of standardized mean number per tow among various meat count intervals for sea scallops from NMFS sea scallop research vessel surveys in the Mid-Atlantic, 1975, 1977-1984.

		Stratified Mean Number of Scallops Per Tow						
				Meat Count Interval				
Area	Year	Total Number Per Tow	Harvestable Number Per Tow	80-40	40-35	35-30	30-25	<25
New York Bight	1975	51.1	23.8	7.4	2.8	2.9	2.5	8.2
	1977	40.8	39.7	12.2	3.8	4.4	5.5	13.8
	1978	39.2	36.7	4.7	2.5	4.2	5.5	19.8
	1979	17.6	13.7	2.7	0.5	0.7	0.8	9.0
	1980	21.5	10.7	2.8	0.7	0.7	0.6	5.9
	1981	26.6	13.6	8.0	0.8	0.7	0.5	3.6
	1982	23.0	15.1	8.1	1.3	1.0	0.9	3.8
	1983	17.9	9.9	2.9	1.0	0.9	0.9	4.2
	1984	26.9	13.9	7.0	1.8	0.9	0.6	3.6
Delmarva	1975	41.3	16.1	9.5	1.0	1.0	1.1	3.5
	1977	27.1	24.2	4.7	1.8	1.4	1.3	15.0
	1978	34.5	26.2	6.4	1.7	1.6	1.8	14.7
	1979	70.1	39.3	21.1	6.2	3.5	1.9	6.6
	1980	36.7	13.4	4.7	0.5	0.9	1.3	6.0
	1981	8.7	5.9	1.6	0.2	0.3	0.2	3.6
	1982	13.5	8.0	2.5	0.6	0.8	0.5	3.6
	1983	13.2	5.4	1.8	0.5	0.3	0.2	2.6
	1984	12.3	6.9	2.1	1.1	0.9	0.7	2.1
Virginia-North Carolina	1975	58.7	11.0	7.8	-	0.1	0.1	3.0
	1977	0.5	0.3	0.1	0.1	0.0	0.0	0.1
	1978	23.0	7.3	5.5	0.2	0.2	0.3	1.1
	1979	11.1	6.5	3.7	0.7	0.8	0.2	1.1
	1980	5.4	4.7	2.5	0.3	0.2	0.4	1.3
	1981	1.2	0.8	0.0	0.1	0.1	0.1	0.5
	1982	1.3	0.3	0.1	0.0	0.0	0.0	0.2
	1983	6.7	2.0	0.4	0.3	0.1	0.0	1.2
	1984	1.0	0.8	0.2	0.2	0.2	0.1	0.1
Mid-Atlantic (All Areas)	1975	49.6	19.7	8.1	1.9	1.9	1.7	6.1
	1977	31.9	30.3	8.4	2.7	2.9	3.5	12.8
	1978	35.7	29.7	5.4	1.9	2.9	3.7	15.8
	1979	36.8	22.9	9.5	2.6	1.7	1.2	7.9
	1980	26.1	11.4	3.5	0.6	0.8	0.8	5.7
	1981	18.6	10.0	5.2	0.6	0.5	0.4	3.3
	1982	17.1	10.9	5.2	0.9	0.8	0.7	3.3
	1983	15.0	7.4	2.2	0.7	0.6	0.6	3.3
	1984	18.8	10.0	4.5	1.4	0.8	0.6	2.7

Table 16. Percentage distribution of harvestable biomass (meat weight) of Atlantic sea scallops in the Mid-Atlantic region, within various meat count intervals. Harvestable biomass is defined as all sea scallops ≥70 mm shell height. Date derived from distribution of standardized stratified mean meat weight per tow in NMFS sea scallop research vessel surveys in the Mid-Atlantic, 1975, 1977-1984.

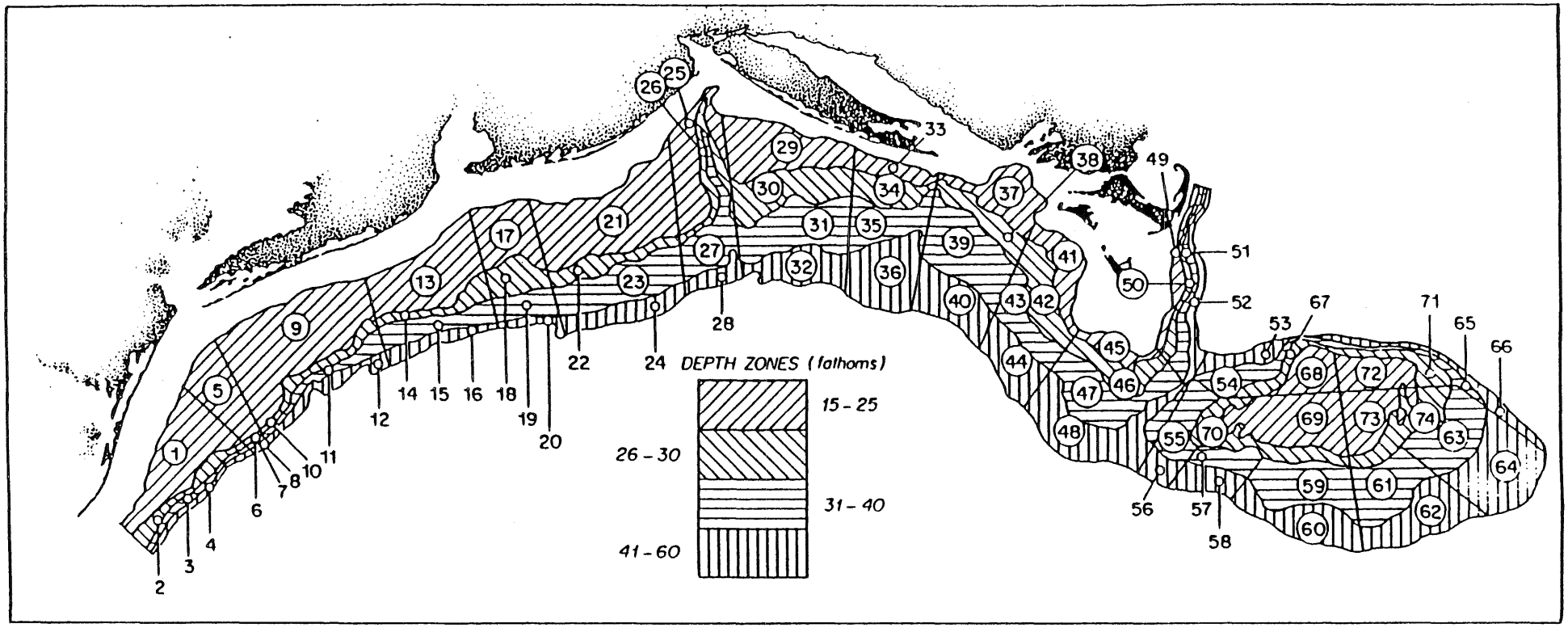
		Percent of Harvestable Biomass					
		Meat Count Interval[1]					
Area	Year	80 - 40	40 - 35	35 - 30	30 - 25	<30	<25
New York Bight	1975	15.3	8.5	10.3	10.3	66.0	55.6
	1977	16.0	6.7	9.3	13.8	67.9	54.1
	1978	5.0	4.0	8.0	12.3	83.1	70.7
	1979	6.0	1.7	3.1	4.3	89.1	84.9
	1980	9.6	3.6	4.4	4.4	82.5	78.1
	1981	29.0	5.2	4.8	4.8	61.0	56.2
	1982	28.0	7.1	6.7	7.1	58.2	51.0
	1983	11.7	6.3	6.8	8.3	75.1	66.8
	1984	26.9	9.8	6.0	4.7	57.3	52.6
Delmarva	1975	27.5	5.4	6.7	7.9	60.4	52.5
	1977	7.1	3.8	3.5	4.0	85.6	81.7
	1978	8.8	3.4	3.8	5.3	84.0	78.7
	1979	32.2	13.4	9.0	5.7	45.4	39.7
	1980	14.1	2.2	5.2	8.5	78.5	70.0
	1981	9.9	2.0	2.6	2.6	85.5	82.9
	1982	10.7	3.9	6.7	5.6	78.7	73.0
	1983	10.0	5.4	3.1	2.3	81.5	79.2
	1984	12.4	9.0	9.0	8.3	69.7	61.4
Virginia-North Carolina	1975	33.3	-	0.7	2.1	66.0	63.8
	1977	13.8	11.2	5.6	6.6	69.3	62.7
	1978	39.1	2.2	2.2	6.5	56.5	50.0
	1979	34.3	8.8	11.8	3.9	45.1	41.2
	1980	30.6	4.2	4.2	9.7	61.1	51.4
	1981	1.8	5.4	4.2	7.4	88.6	81.2
	1982	9.8	2.6	10.5	1.8	77.1	75.3
	1983	5.5	5.4	2.1	0.3	87.0	86.7
	1984	12.5	12.5	18.8	6.3	56.3	50.0
Mid-Atlantic (All Areas)	1975	19.1	7.3	8.8	9.4	64.7	55.3
	1977	13.1	5.8	7.5	10.4	73.6	63.2
	1978	6.8	3.8	6.5	9.9	82.8	72.9
	1979	19.7	7.6	6.3	5.1	66.4	61.3
	1980	11.3	2.8	4.9	6.1	81.0	74.9
	1981	23.0	4.5	3.9	3.9	68.5	64.6
	1982	22.6	5.8	6.8	6.3	64.7	58.4
	1983	11.0	6.1	5.5	6.1	77.3	71.2
	1984	23.0	9.6	6.7	5.6	60.7	55.1

[1]Meat count is expressed as number of meats per pound.

Table 17. Percentage distribution of harvestable numbers of Atlantic sea scallops in the Mid-Atlantic region, within various meat count intervals. Harvestable scallops are defined as all scallops ≥70 mm shell height. Data derived from distribution of standardized stratified mean number per tow of scallops in NMFS sea scallop research vessel surveys in the Mid-Atlantic, 1975, 1977-1984.

		Percent of Harvestable Scallops					
		Meat Count Interval					
Area	Year	80-40	40-35	35-30	30-25	<30	<25
New York Bight	1975	31.0	11.8	12.2	10.5	45.0	34.5
	1977	30.7	9.6	11.1	13.8	48.6	34.8
	1978	12.8	6.8	11.4	15.0	68.9	54.0
	1979	19.7	3.7	5.1	5.8	71.5	65.7
	1980	26.2	6.5	6.5	5.6	60.7	55.2
	1981	58.8	5.9	5.1	3.7	30.1	26.5
	1982	53.6	8.6	6.6	6.0	31.1	25.2
	1983	29.3	10.1	9.1	9.1	51.5	42.4
	1984	50.4	12.9	6.5	4.3	30.2	25.9
Delmarva	1975	59.0	6.2	6.2	6.8	28.6	21.8
	1977	19.4	7.4	5.8	5.4	67.4	62.0
	1978	24.4	6.5	6.1	6.9	63.0	56.1
	1979	53.7	15.8	8.9	4.8	21.6	16.8
	1980	35.1	3.7	6.7	9.7	54.5	44.8
	1981	27.1	3.4	5.1	3.4	64.4	61.0
	1982	31.2	7.5	10.0	6.3	51.3	45.0
	1983	33.3	9.3	5.6	3.7	51.9	48.1
	1984	30.5	15.9	13.0	10.2	40.6	30.4
Virginia-North Carolina	1975	70.9	-	0.9	0.9	28.2	27.3
	1977	33.4	33.3	0.0	0.0	33.3	33.3
	1978	75.4	2.7	2.7	4.1	19.2	15.1
	1979	56.9	10.8	12.3	3.1	20.0	16.9
	1980	53.2	6.4	4.2	8.5	36.2	27.2
	1981	0.0	12.5	12.5	12.5	75.0	62.5
	1982	33.3	0.0	0.0	0.0	66.7	66.7
	1983	20.0	15.0	5.0	0.0	60.0	60.0
	1984	25.0	25.0	25.0	12.5	25.0	12.5
Mid-Atlantic (All Areas)	1975	41.1	9.7	9.6	8.6	39.6	31.0
	1977	27.7	8.9	9.6	11.6	53.8	42.2
	1978	18.2	6.4	9.7	12.5	65.7	53.2
	1979	41.5	11.4	7.4	5.2	39.7	34.5
	1980	30.7	5.3	7.0	7.0	57.0	50.0
	1981	52.0	6.0	5.0	4.0	37.0	33.0
	1982	47.7	8.3	7.3	6.4	36.7	30.3
	1983	29.7	9.5	8.1	8.1	52.7	44.6
	1984	45.0	14.0	8.0	6.0	33.0	27.0

Figure 1. USA (Northeast Fisheries Center) sea scallop research vessel survey sampling strata in the Northwest Atlantic, Georges Bank to Cape Hatteras, used in annual surveys since 1979. For analytical purposes, survey strata are grouped by major fishing regions: Virginia-North Carolina (Strata 1-8); Delmarva (Strata 9-20); New York Bight (Strata 21-36); Southern New England (Strata 37-44); South Channel (Strata 45-56); Southeast Part (Strata 57-60); and Northern Edge and Peak (Strata 61-66, 71-74).



Strata No.	Square Miles	Strata No.	Square Miles	Strata No.	Square Miles	Strata No.	Square Miles
1	1163	20	120	39	967	57	184
2	175	21	1650	40	513	58	300
3	126	22	312	41	602	59	538
4	117	23	714	42	343	60	816
5	453	24	476	43	432	61	576
6	62	25	648	44	383	62	701
7	46	26	188	45	392	63	694
8	74	27	451	46	416	64	988
9	2171	28	149	47	871	65	164
10	152	29	1096	48	1109	66	266
11	229	30	669	49	244	67	210
12	204	31	932	50	150	68	370
13	1127	32	627	51	139	69	938
14	219	33	363	52	307	70	520
15	394	34	203	53	268	71	146
16	211	35	601	54	278	72	504
17	749	36	694	55	364	73	501
18	249	37	672	56	209	74	433
19	274	38	280				

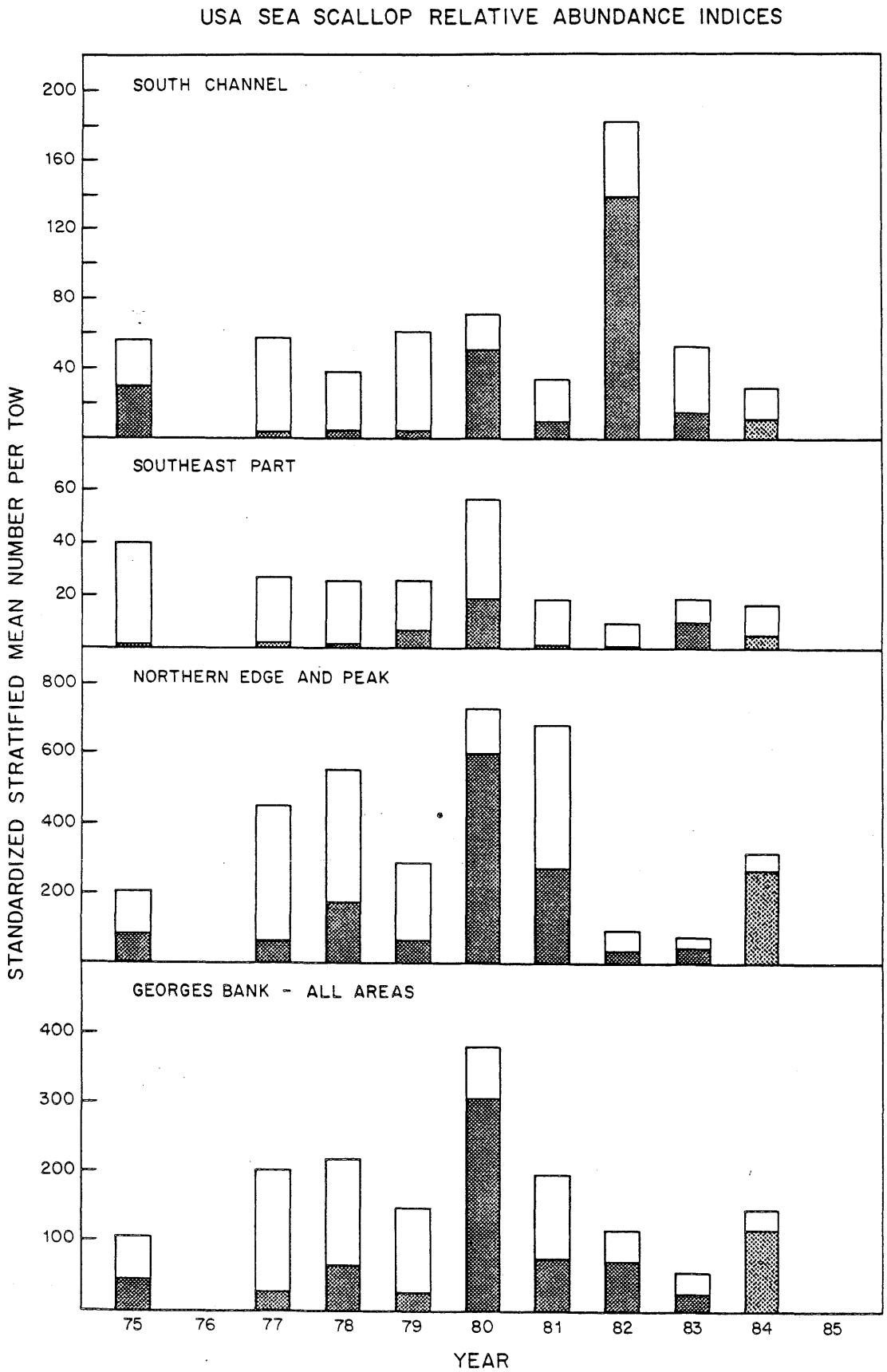


Figure 2. USA sea scallop relative abundance indices (standardized stratified mean number per tow), by principal scallop regions on Georges Bank, from USA sea scallop research vessel surveys of Georges Bank conducted during 1975 and 1977-1984. The shaded portion of each bar represents the relative abundance of pre-recruit scallops (<70 mm shell height); the upper, non-shaded portion of each bar represents the relative abundance of recruit or commercial-size scallops (≥70 mm shell height).

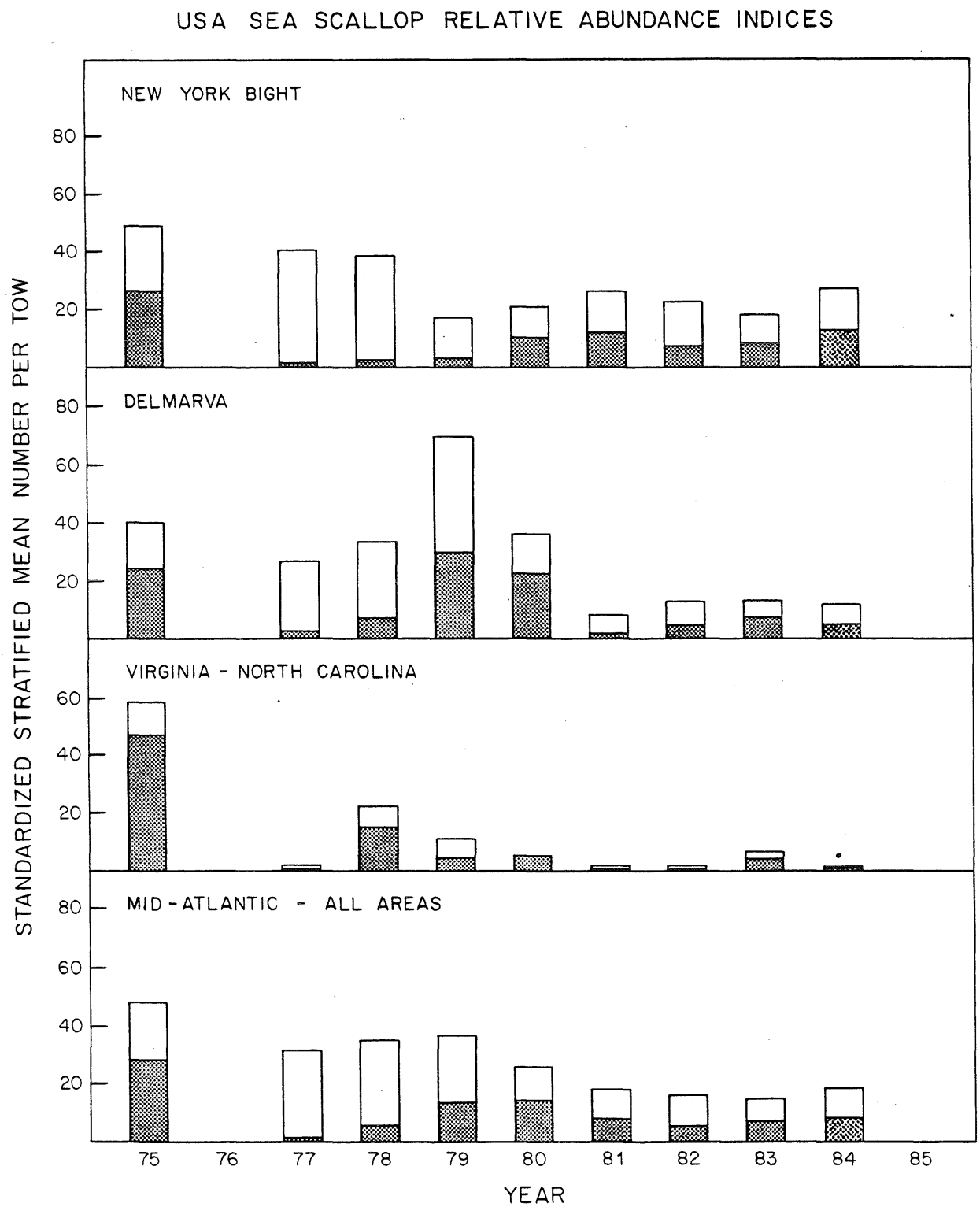


Figure 3. USA sea scallop relative abundance indices (standardized stratified mean number per tow), by principal scallop regions in the Middle Atlantic, from USA sea scallop research vessel surveys in the Middle Atlantic conducted during 1975 and 1977-1984. The shaded portion of each bar represents the relative abundance of pre-recruit scallops (<70 mm shell height); the upper, non-shaded portion of each bar represents the relative abundance of recruit or commercial-size scallops (≥70 mm shell height).

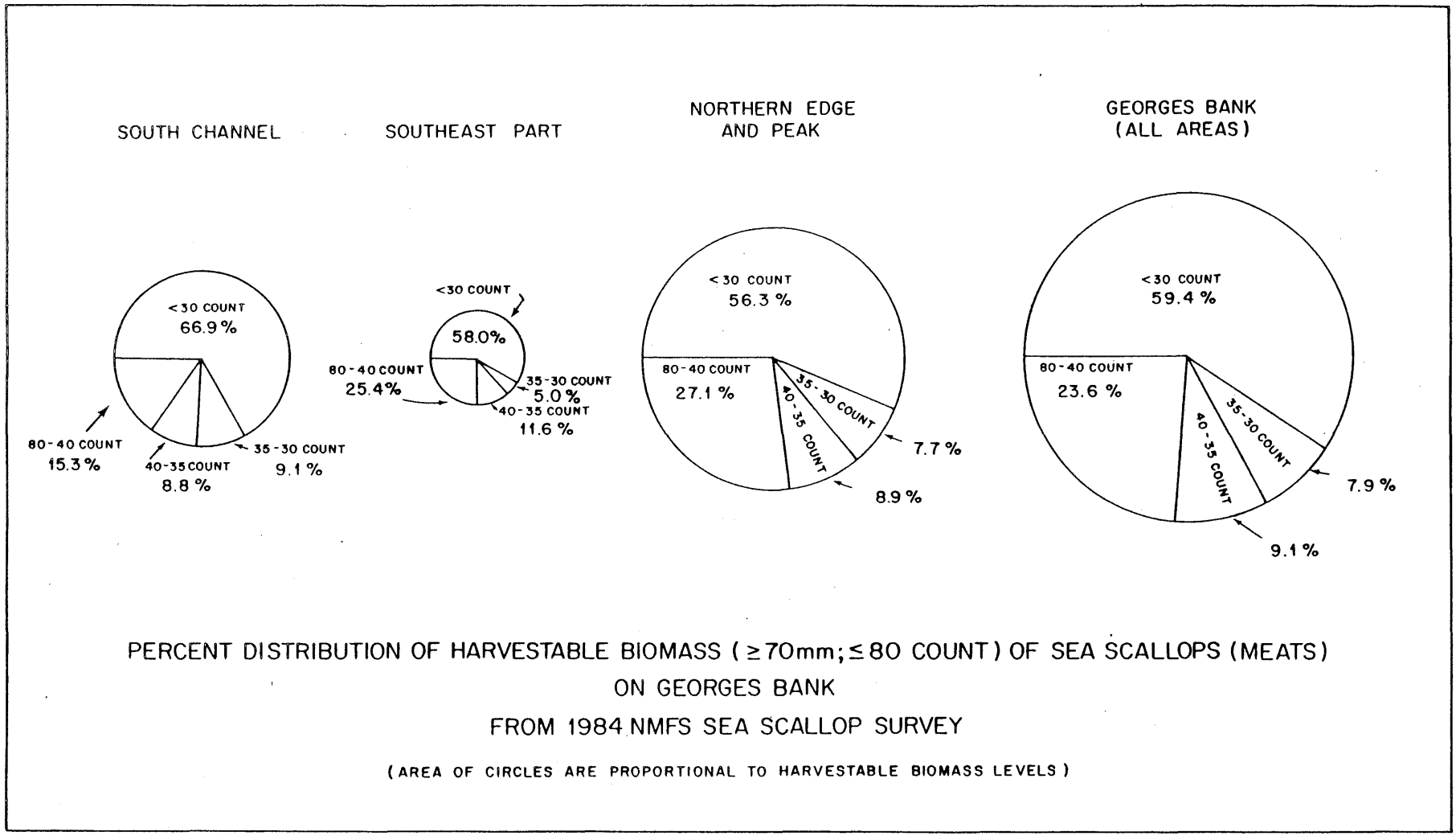


Figure 4. Percentage distribution of harvestable biomass (meat weight) of Atlantic sea scallops, within various meat count intervals (number of meats per pound), from the 1984 USA sea scallop research vessel survey of Georges Bank. Harvestable biomass is defined as all sea scallops ≥70 mm shell height. Data derived from 1984 survey distributions of standardized stratified mean meat weight per tow values.

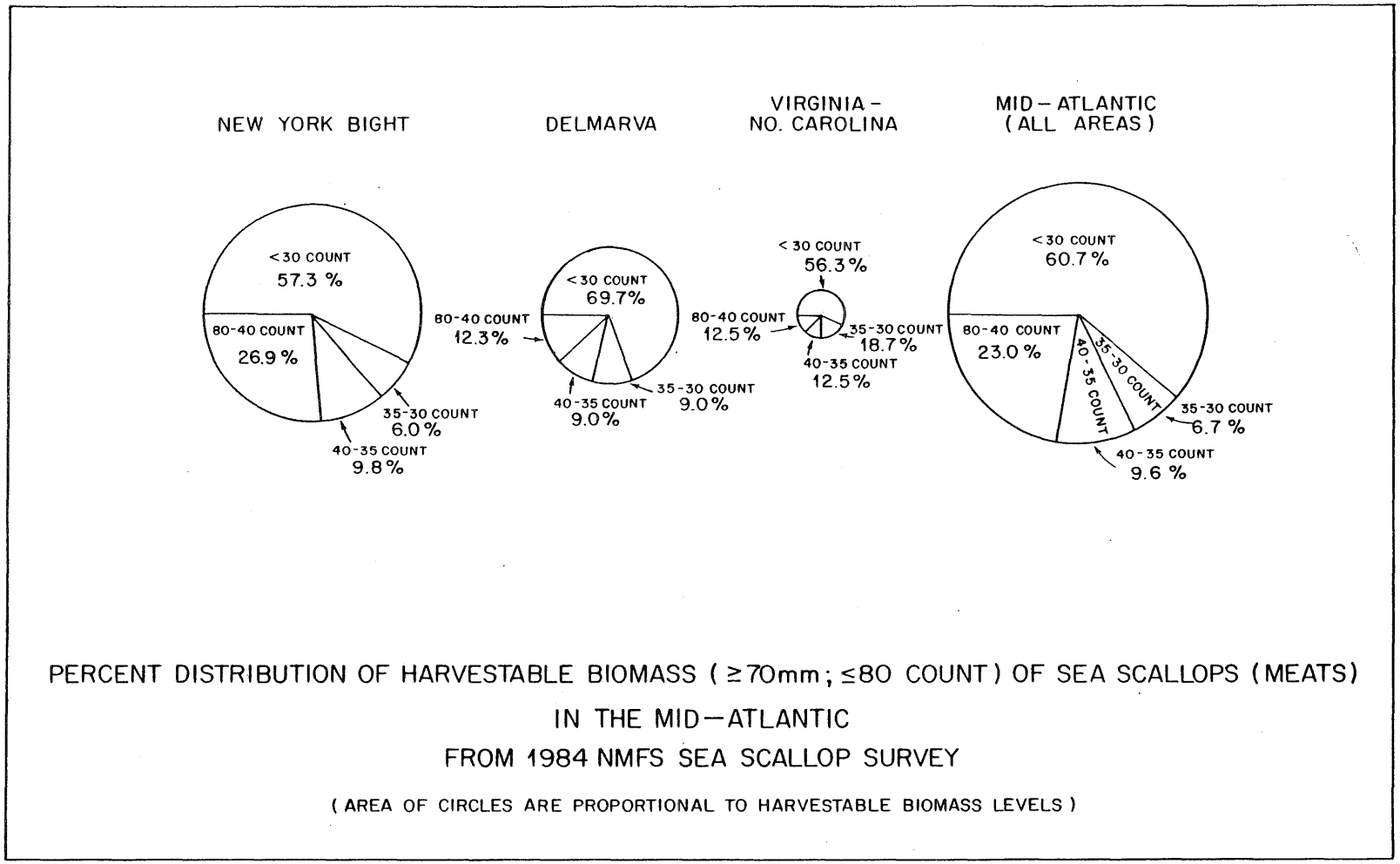


Figure 5. Percentage distribution of harvestable biomass (meat weight) of Atlantic sea scallops, within various meat count intervals (number of meats per pound), from the 1984 USA sea scallop research vessel survey in the Mid-Atlantic region. Harvestable biomass is defined as all sea scallops ≥70 mm shell height. Data derived from 1984 survey distributions of standardized stratified mean meat weight per tow values.

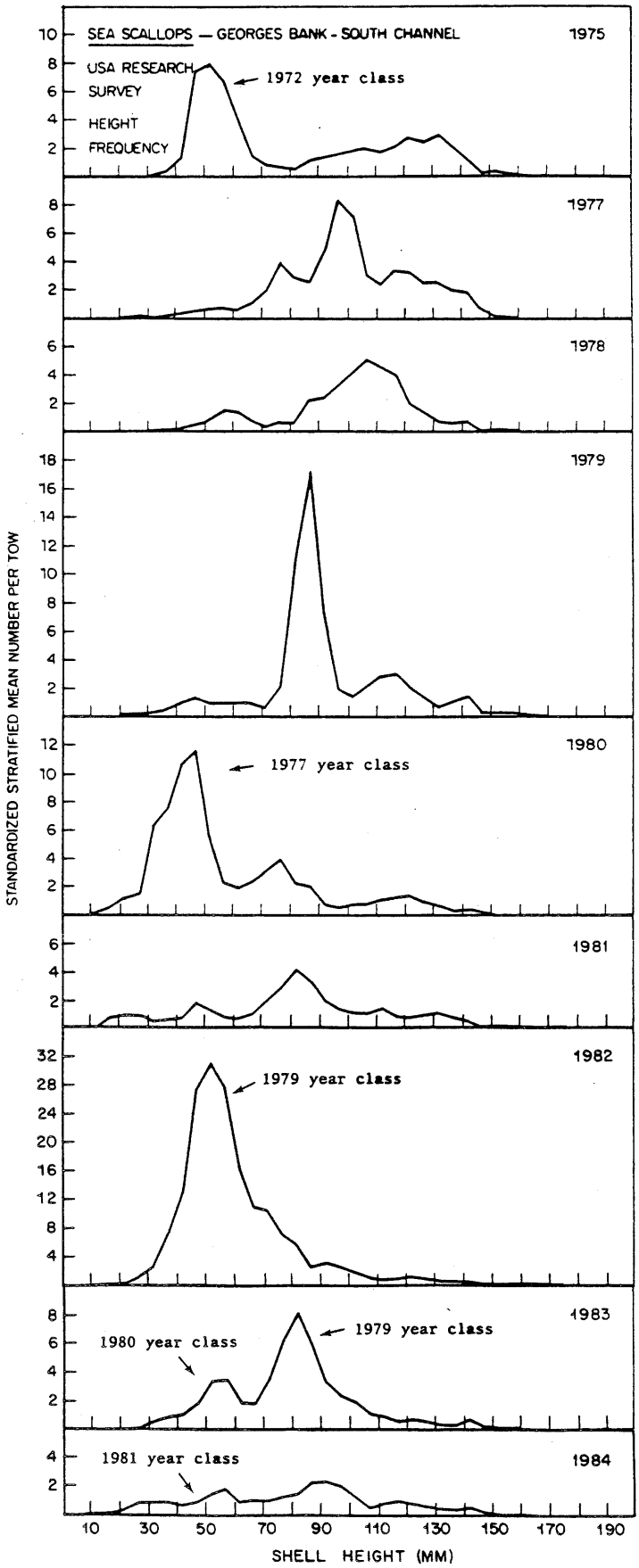


Figure 6. USA sea scallop research vessel survey shell height frequency distributions of sea scallops from the South Channel region (Strata 45-56) of Georges Bank, 1975, 1977-1984.

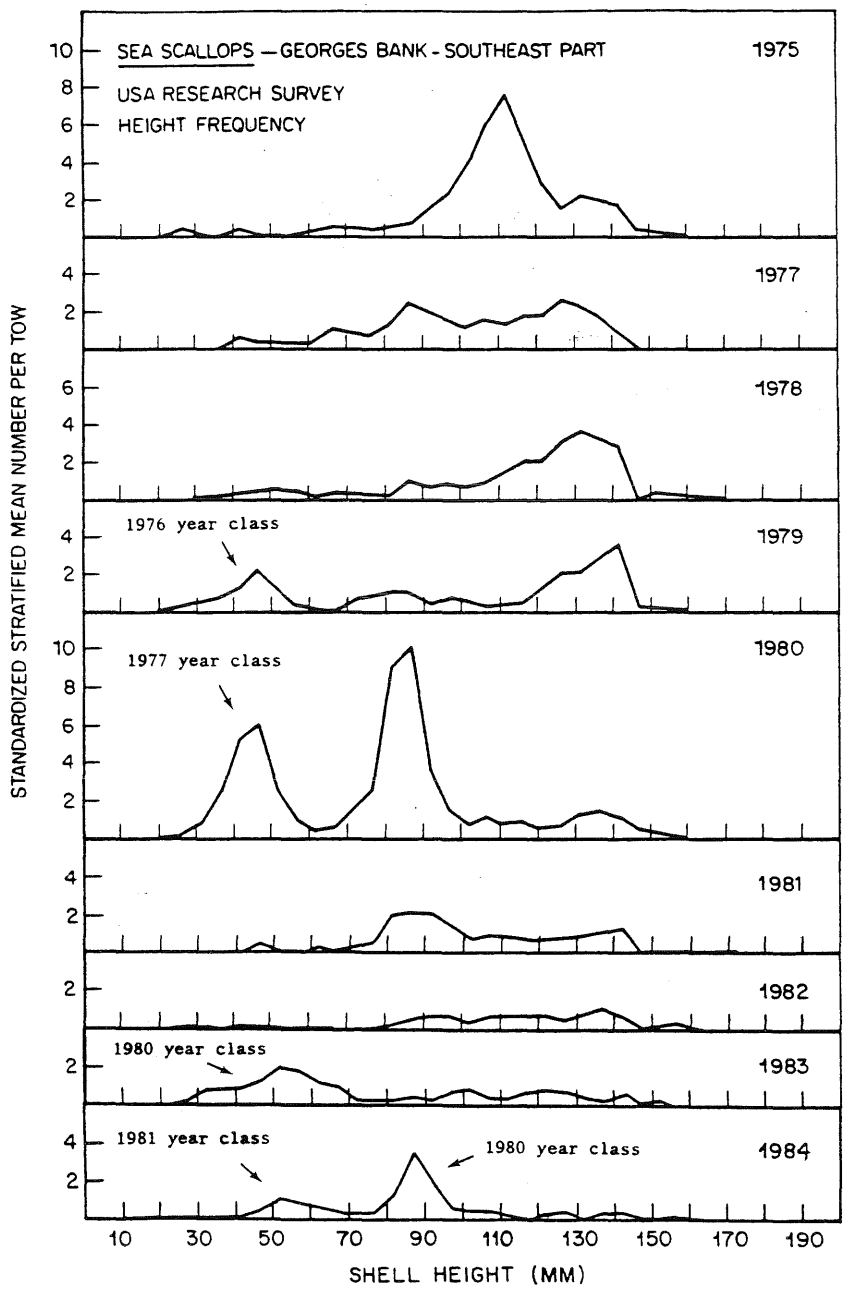


Figure 7. USA sea scallop research vessel survey shell height frequency distributions of sea scallops from the Southeast Part region (Strata 57-60) of Georges Bank, 1975, 1977-1984.

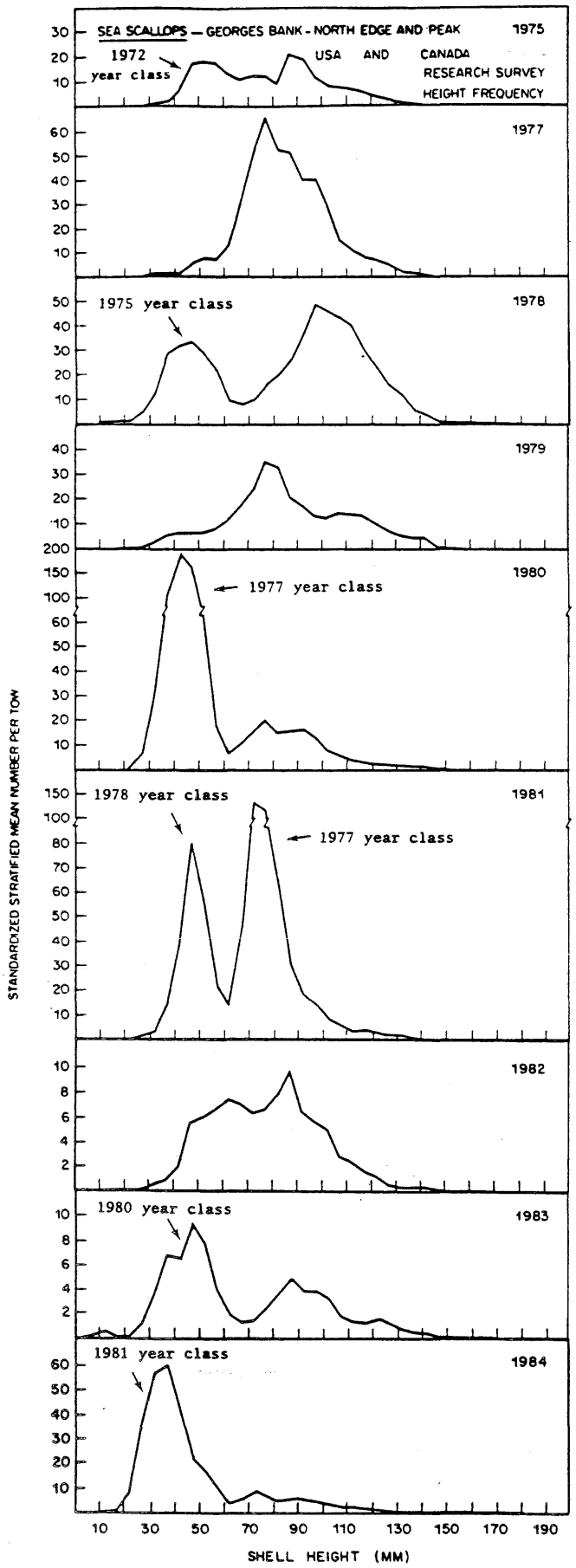


Figure 8. Sea scallop research vessel survey shell height frequency distributions of sea scallops from the Northern Edge and Peak region (Strata 61-66 and 71-74) of Georges Bank, 1975, 1977-1984. Frequency distributions for 1975, 1977, 1982-1984 were derived from USA research vessel surveys. Frequency distributions for 1978-1981 were derived from Canadian research vessel surveys.

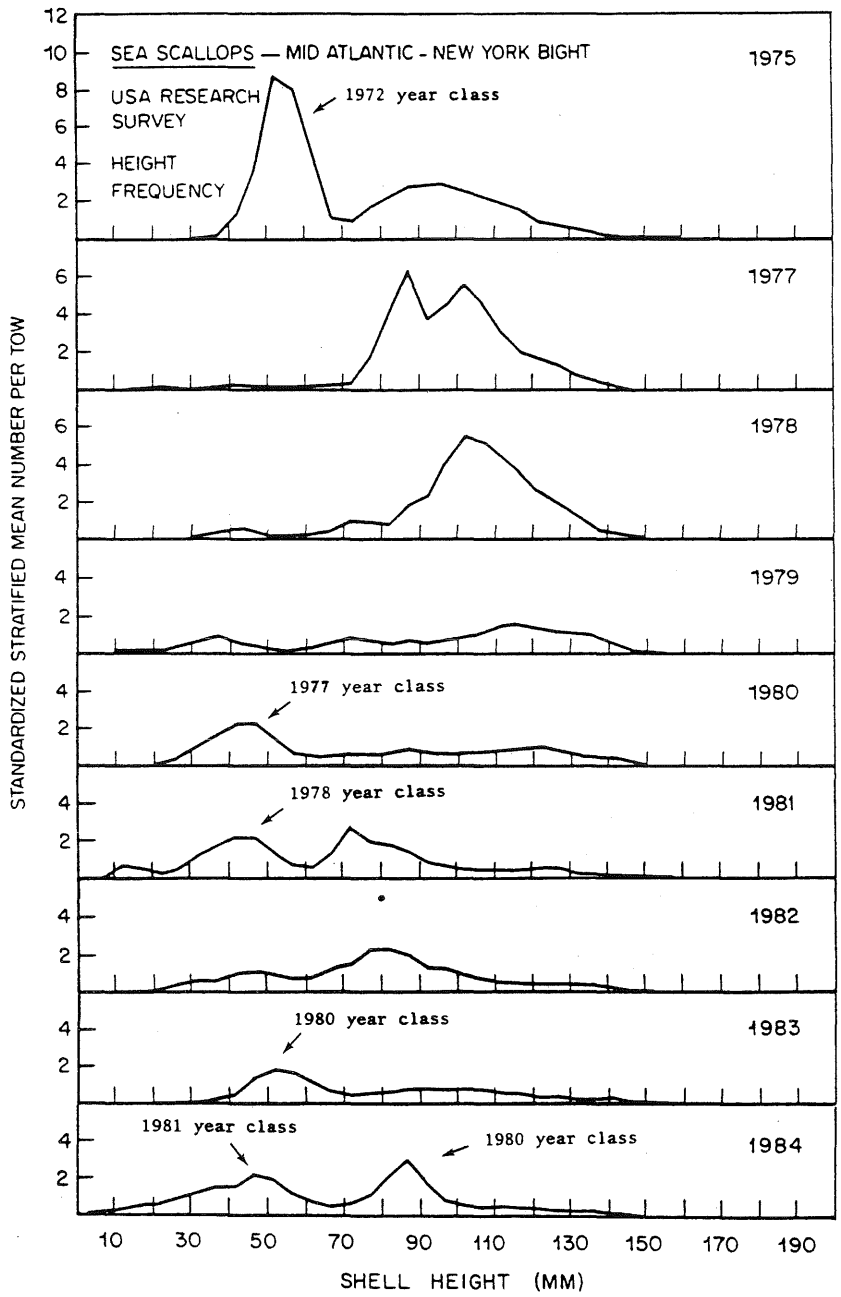


Figure 9. USA sea scallop research vessel survey shell height frequency distributions of sea scallops from the New York Bight region (Strata 21-36) of the Middle Atlantic, 1975, 1977-1984.

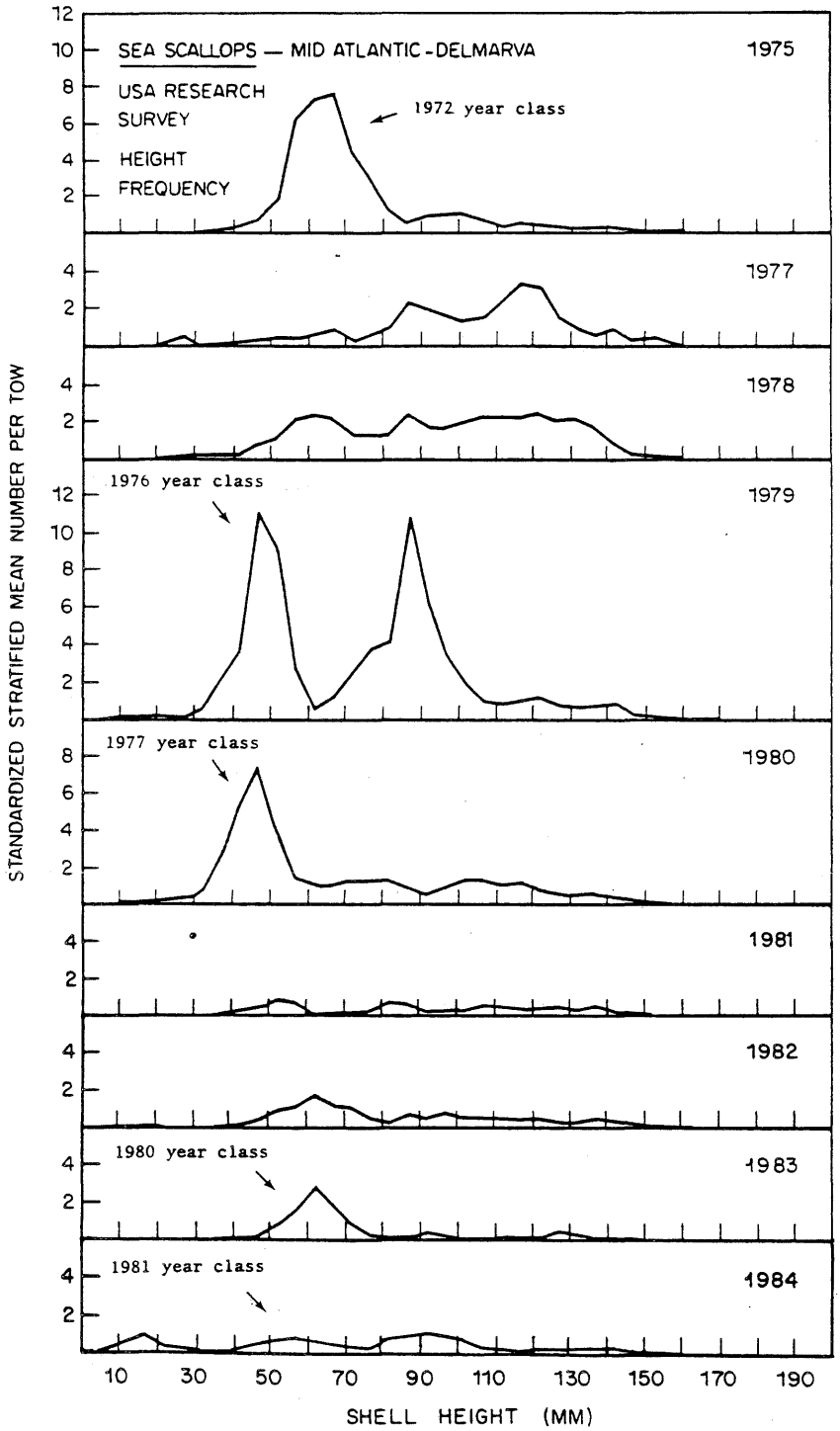


Figure 10. USA sea scallop research vessel survey shell height frequency distributions of sea scallops from the Delmarva region (Strata 9-20) of the Middle Atlantic, 1975, 1977-1984.

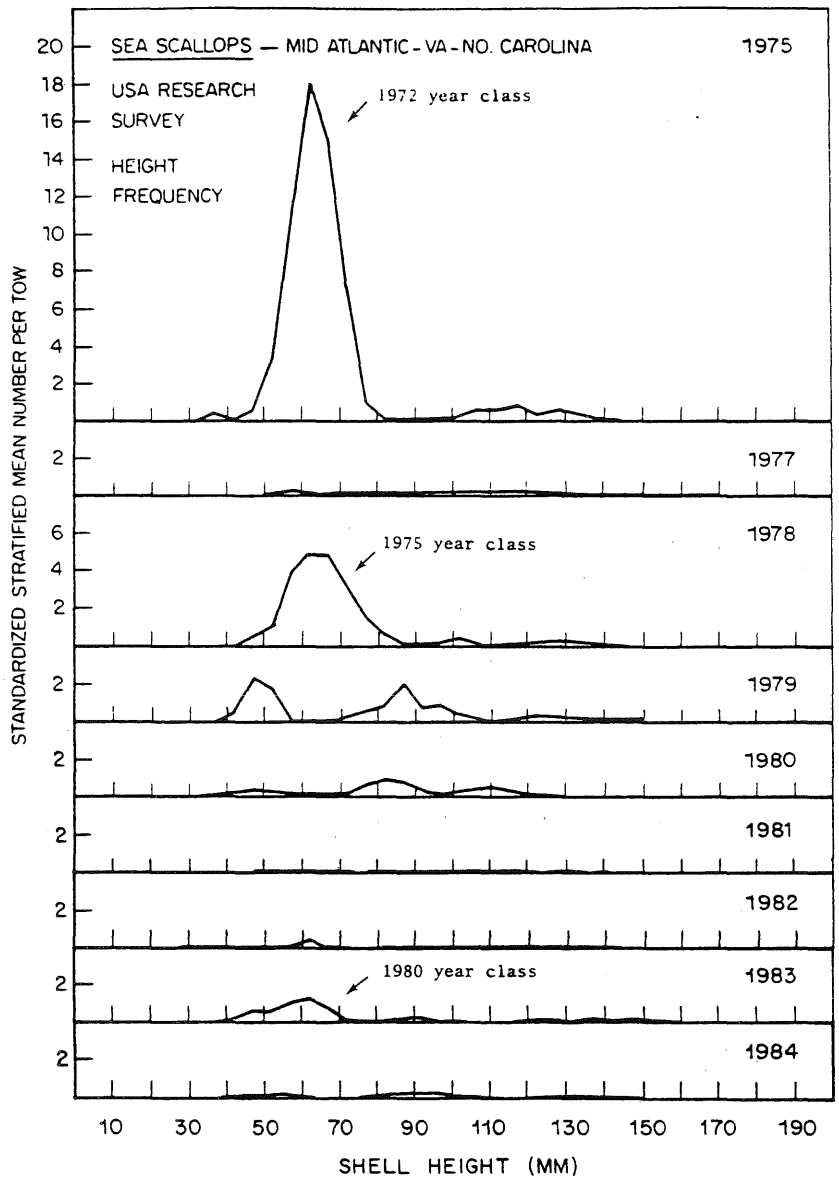


Figure 11. USA sea scallop research vessel survey shell height frequency distributions of sea scallops from the Virginia-North Carolina region (Strata 1-8) of the Middle Atlantic, 1975, 1977-1984.

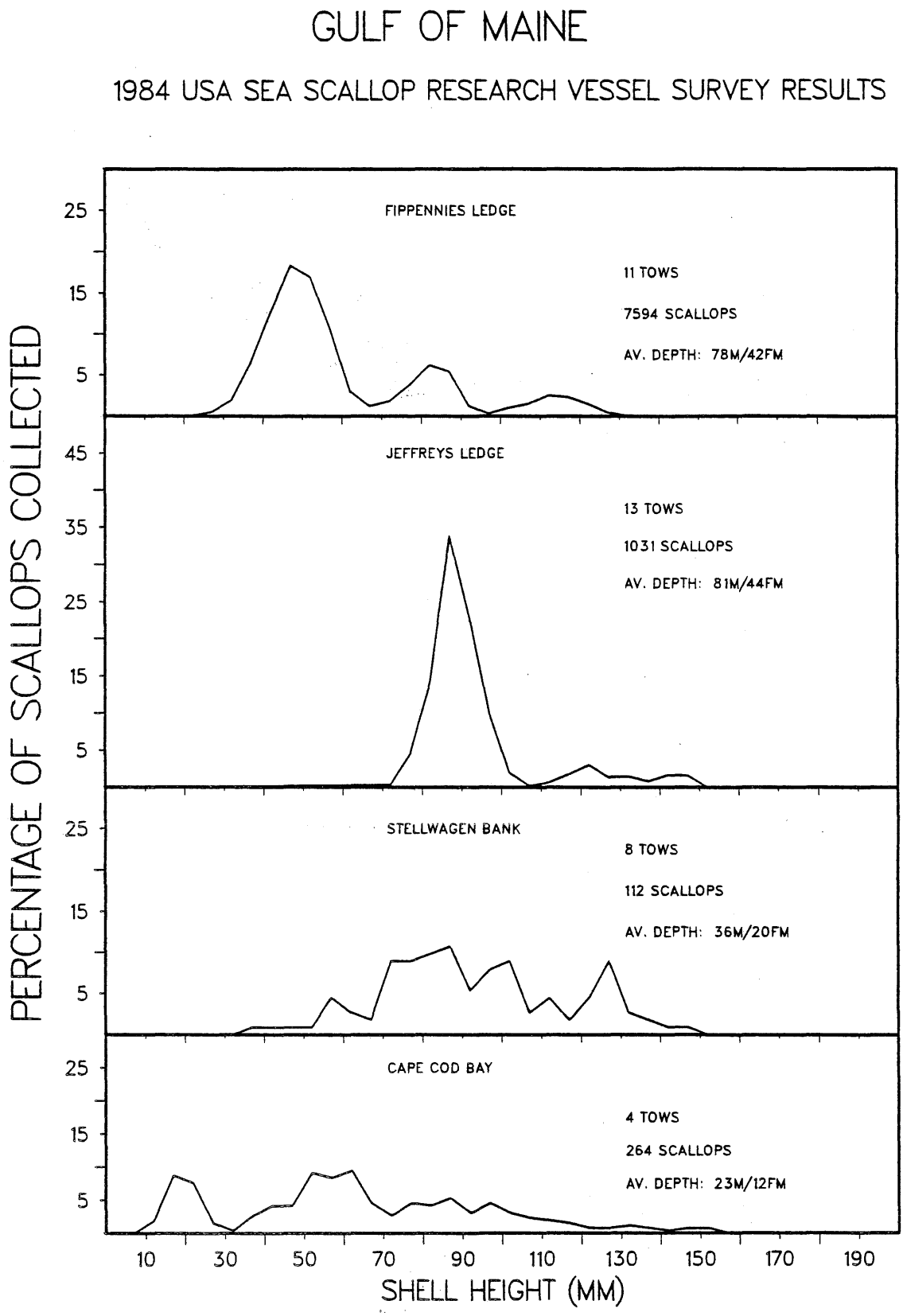


Figure 12. USA 1984 sea scallop research vessel survey shell height frequency distributions of sea scallops from four areas in the Gulf of Maine.

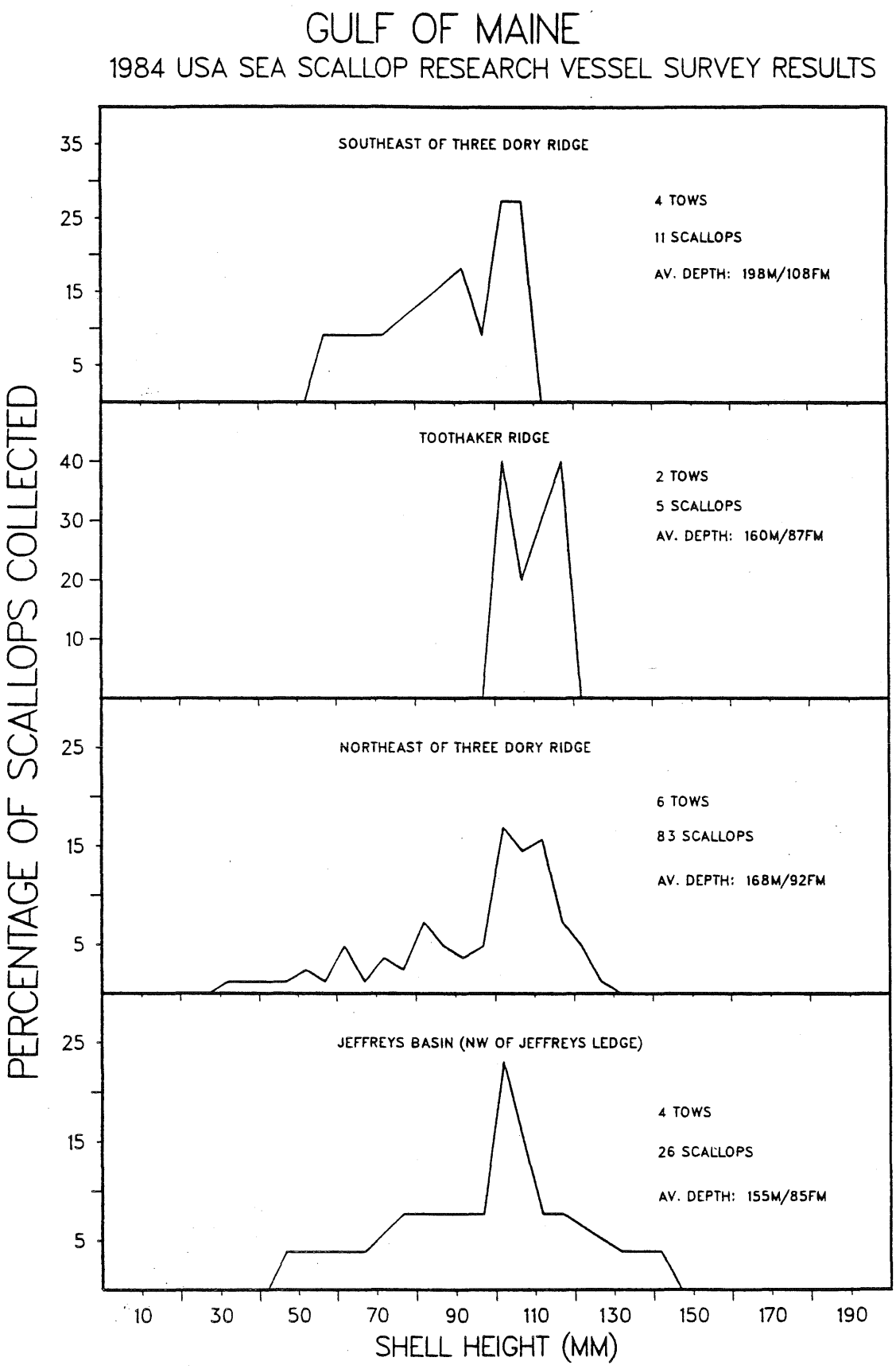


Figure 13. USA 1984 sea scallop research vessel survey shell height frequency distributions of sea scallops from four deep-water areas in the Gulf of Maine.

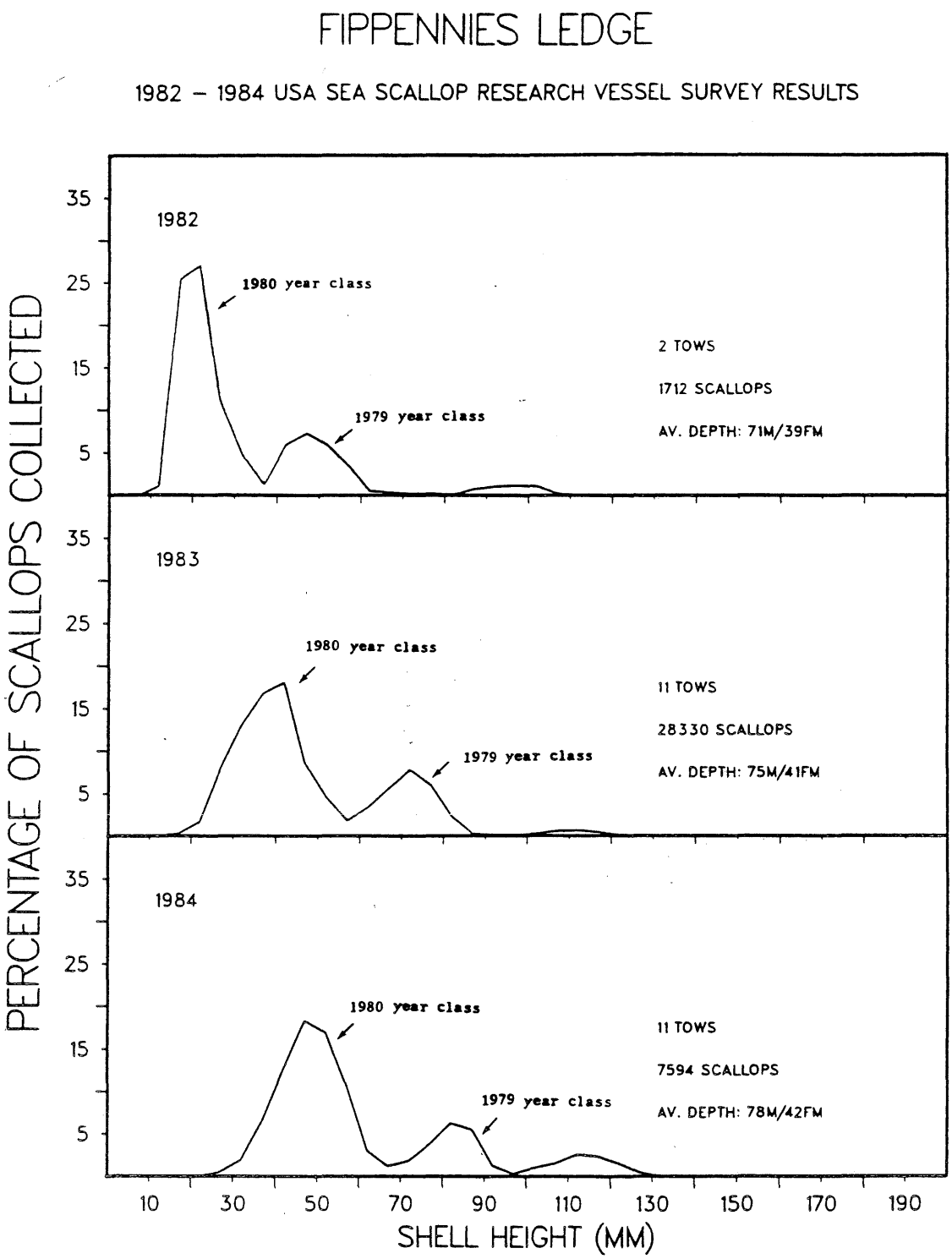


Figure 14. Shell height frequency distributions of sea scallops from Fippennies Ledge sampled during USA Gulf of Maine sea scallop research vessel surveys, 1982-1984.

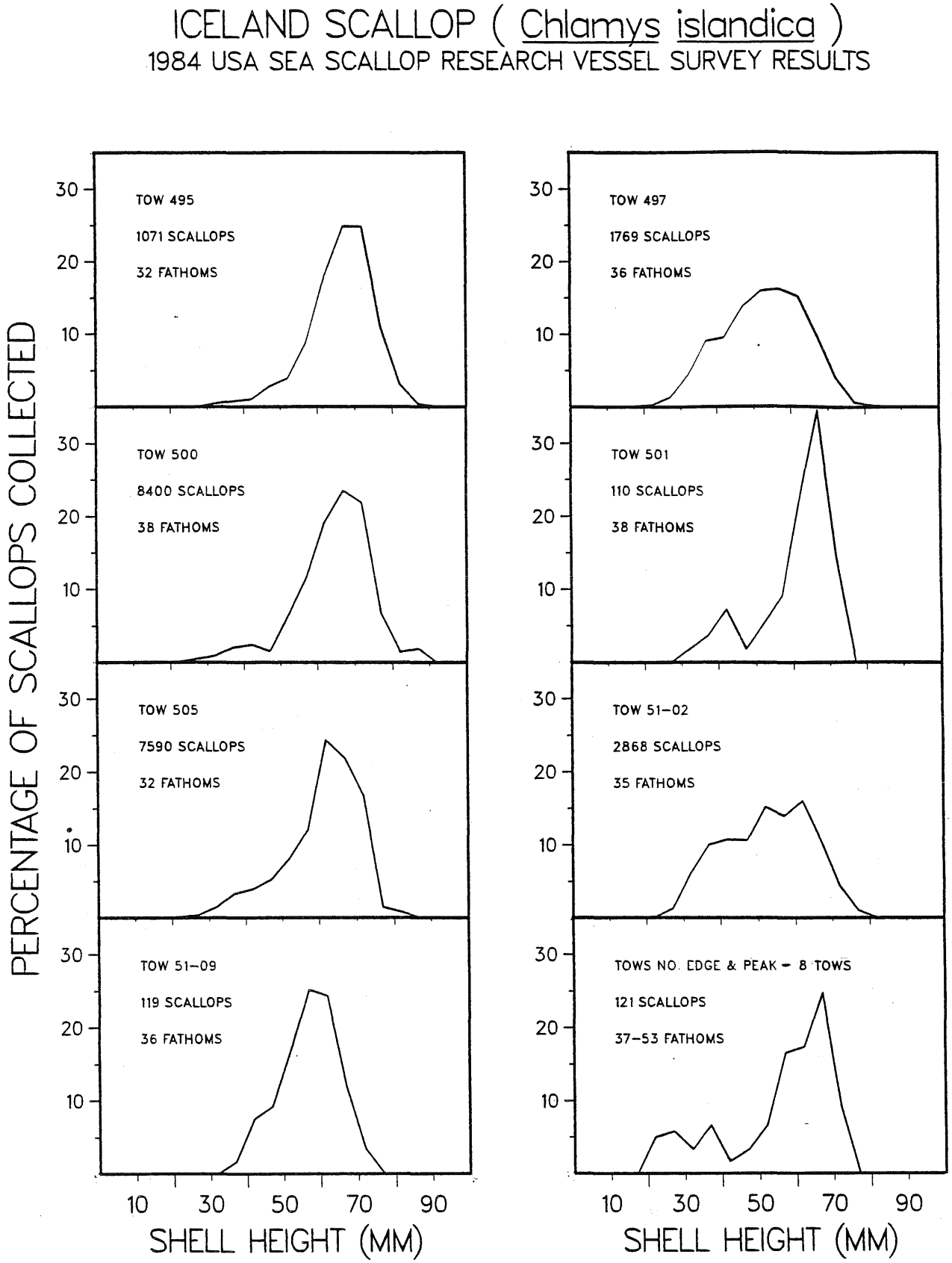


Figure 15. USA 1984 sea scallop research vessel survey shell height frequency distributions of Iceland scallops, by individual tow. Except for tows on the Northern Edge and Peak (Georges Bank), only tows in which more than 100 Iceland scallops were caught are depicted.

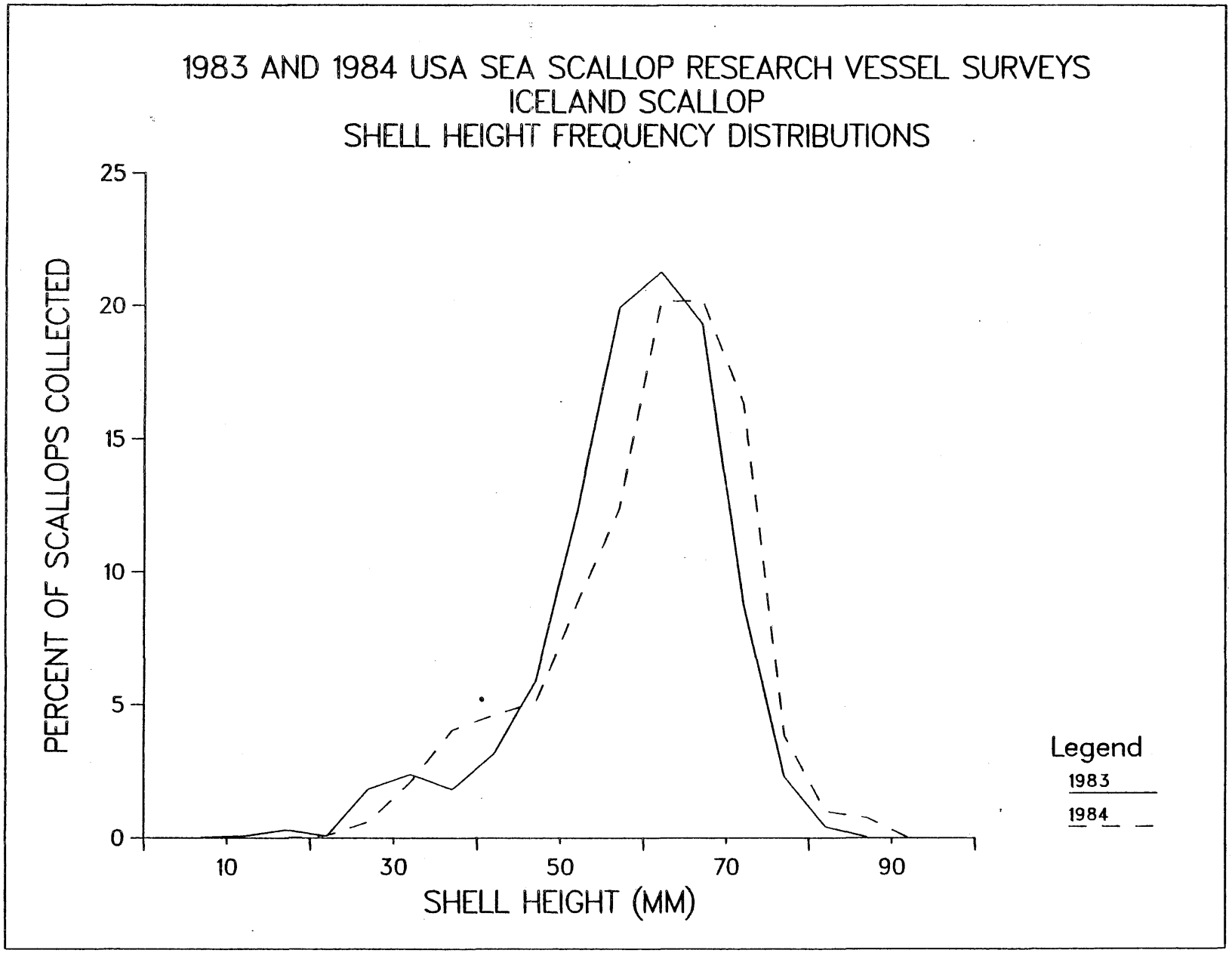


Figure 16. Aggregate shell height frequency distributions of Iceland scallops sampled from commercial fishing beds located east-southeast of Pollock Rip Channel in special Iceland scallop tows performed during the 1983 and 1984 USA sea scallop research vessel surveys. A total of 18,454 Iceland scallops were collected on the Cape Cod Grounds in 1983 (23 tows); a total of 22,079 Iceland scallops were collected on the Cape Cod Grounds in 1984 (25 tows).

APPENDIX

Appendix Table 1. Summary of 1984 NMFS sea scallop research survey sampling data from the Mid-Atlantic, Southern New England and Georges Bank, by individual tow.

Strata Tow Number[1]	No. of Sea Scallops Caught	Mean Shell Height (mm)	Calculated[2] Meat Count	Meat Weight Per Tow (g)	Percent of Catch ≤40 Count By Number	By Weight	Depth (fm)	LORAN C Bearings Start X	Start Y	End X	End Y	Date
Mid-Atlantic (Tows 1-1 to 36-2)												
1-1	0	-	-	-	-	-	14	27016	41031	27013	41026	7/29
1-2	0	-	-	-	-	-	22	26854	40588	26851	40585	7/29
1-3	0	-	-	-	-	-	21	26870	40832	26869	40823	7/29
1-4	0	-	-	-	-	-	17	26968	40986	26964	40980	7/29
2-1	0	-	-	-	-	-	20	26854	41123	26852	41132	7/29
2-2	0	-	-	-	-	-	22	26868	41064	26866	41072	7/29
2-3	0	-	-	-	-	-	28	26827	40618	26824	40615	7/29
2-4	0	-	-	-	-	-	24	26860	41043	26864	41047	7/29
3-1	0	-	-	-	-	-	30	26800	40591	26803	40598	7/29
3-2	1	52	227	2	0.0	0.0	33	26849	40975	26849	40985	7/29
3-3	2	55	193	5	0.0	0.0	34	26839	40894	26840	40902	7/29
4-1	1	57	168	3	0.0	0.0	45	26824	40739	26824	40748	7/29
4-2	0	-	-	-	-	-	50	26825	40816	26828	40822	7/29
5-1	0	-	-	-	-	-	12	27021	41119	27021	41109	7/29
5-2	0	-	-	-	-	-	12	27043	41257	27042	41247	7/29
5-3	0	-	-	-	-	-	16	26928	41202	26933	41202	7/29
6-1	8	103	23	155	87.5	93.1	27	26856	41237	26859	41244	7/30
6-2	3	107	18	75	66.7	90.4	27	26862	41245	26861	41254	7/30
6-3	27	101	24	514	74.1	85.8	32	26848	41232	26851	41238	7/30
6-4	5	105	20	115	100.0	100.0	29	26849	41215	26849	41224	7/30
6-5	9	103	24	171	88.9	93.8	28	26847	41187	26847	41196	7/29
7-1	17	95	27	288	70.6	84.9	33	26843	41200	26844	41191	7/29
7-2	18	94	32	255	72.2	80.5	34	26843	41166	26843	41175	7/29
7-3	29	101	23	571	79.3	90.2	34	26844	41228	26844	41218	7/30
7-4	19	93	32	267	63.2	72.0	36	26844	41238	26843	41229	7/30
8-1	5	117	14	160	80.0	94.5	47	26836	41198	26837	41207	7/30
8-2	2	67	75	12	0.0	0.0	46	26838	41234	26838	41243	7/30
9-1	0	-	-	-	-	-	15	27020	41612	27019	41601	7/28
9-2	3	120	14	95	100.0	100.0	20	26937	41628	26942	41631	7/28
9-3	18	108	18	447	94.4	97.6	21	26887	41307	26891	41299	7/28
9-4	8	81	31	117	25.0	72.5	22	26894	41383	26893	41374	7/28
9-5	0	-	-	-	-	-	14	27067	41716	27068	41706	7/28
9-6	0	-	-	-	-	-	15	27008	41530	27003	41529	7/28
10-1	22	66	59	170	27.3	73.3	31	26885	41442	26887	41433	7/28
10-2	4	108	19	93	75.0	88.5	31	26899	41526	26899	41535	7/28
10-3	15	101	22	316	40.0	73.4	31	26894	41870	26894	41860	7/28
10-4	17	116	13	571	76.5	96.4	31	26883	41703	26881	41693	7/28
10-5	7	138	9	346	100.0	100.0	31	26888	41601	26893	41598	7/28
10-6	24	108	19	563	91.7	96.5	31	26902	41901	26900	41891	7/28
10-7	7	109	17	189	71.4	91.9	29	26866	41327	26863	41335	7/30
10-8	23	103	20	525	78.3	94.6	28	26860	41276	26861	41284	7/30
11-1	24	49	63	173	25.0	88.0	32	26878	41627	26878	41617	7/28
11-2	1	127	12	37	100.0	100.0	36	26881	41531	26880	41522	7/28
11-3	17	101	23	328	58.8	78.4	31	26885	41916	26888	41907	7/28
11-4	6	138	9	289	100.0	100.0	36	26857	41368	26858	41377	7/30
11-5	7	101	18	178	57.1	94.3	32	26868	41431	26872	41434	7/28
11-6	6	119	14	194	83.3	96.3	34	26890	41558	26888	41549	7/28
11-7	36	89	37	442	58.3	71.6	36	26830	41851	26829	41860	7/30
11-8	4	87	42	43	0.0	0.0	34	26850	41769	26849	41778	7/30
12-1	4	103	20	90	50.0	78.3	48	26844	41489	26843	41499	7/30
12-2	0	-	-	-	-	-	50	26837	41626	26838	41636	7/30
12-3	5	96	30	76	60.0	71.9	44	26848	41737	26849	41746	7/30
12-4	11	88	36	138	54.5	72.9	45	26847	41389	26847	41399	7/30
13-1	0	-	-	-	-	-	25	26853	42181	26858	42177	7/27
13-2	3	62	122	11	0.0	0.0	27	26841	42404	26835	42404	7/27
13-3	0	-	-	-	-	-	17	26988	42438	26982	42434	7/27
13-4	0	-	-	-	-	-	13	26975	42149	26969	42146	7/27
14-1	27	110	19	658	96.3	98.4	28	26892	42022	26891	42013	7/28
14-2	2	142	8	110	100.0	100.0	32	26816	42179	26816	42169	7/27
14-3	11	92	24	209	45.5	83.8	31	26821	42401	26815	42401	7/27
14-4	3	127	10	131	100.0	100.0	24	26810	42238	26810	42228	7/27
14-5	29	84	34	386	51.7	82.5	30	26792	42382	26793	42373	7/27
14-6	37	85	37	459	54.1	78.4	29	26815	42326	26813	42317	7/27
14-7	5	124	12	194	80.0	94.5	30	26848	42124	26848	42134	7/27
14-8	38	97	27	629	76.3	87.7	30	26872	42059	26868	42052	7/28
14-9	10	109	18	251	100.0	100.0	27	26882	42094	26881	42085	7/28
14-10	20	86	40	225	60.0	79.5	25	26805	42271	26799	42266	7/27

Appendix Table 1 (cont'd)

Strata Tow Number[1]	No. of Sea Scallops Caught	Mean Shell Height (mm)	Calculated[2] Meat Count	Meat Weight Per Tow (g)	Percent of Catch ≤40 Count By Number	By Weight	Depth (fm)	LORAN C Bearings Start X	Start Y	End X	End Y	Date
15-1	3	129	11	123	100.0	100.0	39	26743	42338	26739	42330	7/30
15-2	60	74	58	471	36.7	65.6	40	26810	41978	26805	41977	7/30
15-3	70	89	36	871	61.4	77.5	35	26785	42245	26791	42244	7/27
15-4	150	56	112	610	8.7	50.5	39	26714	42320	26715	42329	7/31
15-5	93	55	94	451	10.8	58.0	41	26734	42313	26727	42312	7/31
15-6	28	86	40	317	25.0	42.2	31	26871	41949	26875	41940	7/28
15-7	38	64	62	278	18.4	76.0	42	26754	42229	26748	42233	7/30
15-8	14	123	13	505	92.9	99.1	36	26818	42090	26823	42095	7/27
15-9	76	62	77	448	21.1	61.0	40	26750	42288	26748	42297	7/30
15-10	15	100	23	292	80.0	92.0	35	26805	42155	26805	42146	7/27
15-11	56	90	37	684	50.0	63.5	33	26845	42015	26851	42016	7/28
15-12	37	94	25	680	43.2	76.8	36	26840	41940	26836	41946	7/30
16-1	2	142	9	105	100.0	100.0	44	26781	42113	26776	42118	7/30
16-2	16	65	70	104	25.0	53.8	43	26700	42314	26701	42323	7/31
16-3	1	87	42	11	0.0	0.0	56	26760	42096	26765	42100	7/30
16-4	2	95	32	29	50.0	62.7	50	26794	41980	26792	41988	7/30
16-5	33	73	56	268	36.4	71.4	42	26809	41930	26808	41939	7/30
16-6	2	82	51	18	0.0	0.0	44	26725	42259	26724	42269	7/30
16-7	0	-	-	-	-	-	58	26746	42154	26746	42164	7/30
17-1	0	-	-	-	-	-	26	26818	42644	26825	42645	7/27
17-2	0	-	-	-	-	-	19	26940	42557	26944	42549	7/27
17-3	0	-	-	-	-	-	24	26840	42491	26839	42500	7/31
17-4	7	137	9	350	100.0	100.0	27	26822	42592	26818	42584	7/31
18-1	25	80	38	298	32.0	78.6	30	26751	42470	26757	42472	7/31
18-2	7	110	15	215	71.4	97.4	31	26705	42579	26699	42573	7/31
18-3	24	126	12	872	95.8	98.8	30	26768	42547	26762	42549	7/31
18-4	1	92	35	13	100.0	100.0	34	26791	42540	26785	42544	7/31
18-5	47	93	25	850	61.7	85.9	30	26814	42485	26820	42484	7/31
18-6	149	69	65	1036	22.8	50.4	32	26778	42402	26784	42400	7/27
19-1	79	43	130	277	15.2	66.6	35	26677	42505	26676	42495	7/31
19-2	72	52	55	592	29.2	91.2	36	26693	42446	26697	42441	7/31
19-3	0	-	-	-	-	-	37	26733	42369	26739	42373	7/31
19-4	15	67	82	83	6.7	15.4	39	26610	42521	26610	42513	7/31
19-5	52	70	32	744	40.4	92.8	35	26714	42412	26718	42405	7/31
19-6	13	132	11	549	100.0	100.0	35	26748	42396	26750	42405	7/31
19-7	1	137	10	47	100.0	100.0	40	26697	42373	26697	42383	7/31
19-8	312	42	120	1177	4.8	36.0	38	26633	42534	26631	42525	7/31
20-1	3	77	47	29	66.7	96.6	44	26692	42345	26688	42353	7/31
20-2	3	77	54	25	33.3	60.6	49	26620	42476	26620	42467	7/31
20-3	0	-	-	-	-	-	61	26551	42485	26552	42494	7/31
21-1	0	-	-	-	-	-	22	26788	42727	26792	42721	7/27
21-2	27	91	22	550	55.6	96.6	25	26614	42990	26610	42996	7/26
21-3	0	-	-	-	-	-	20	26760	43041	26753	43038	7/26
21-4	0	-	-	-	-	-	18	26625	43142	26631	43137	7/26
22-1	10	90	18	246	50.0	98.0	30	26565	42936	26572	42937	7/26
22-2	24	62	61	177	20.8	83.3	28	26627	42749	26630	42742	7/26
22-3	5	69	53	43	20.0	75.3	31	26648	42655	26653	42662	7/27
22-4	8	87	22	166	37.5	91.8	27	26643	42785	26639	42776	7/26
22-5	2	80	48	19	50.0	81.1	28	26674	42697	26682	42699	7/27
22-6	9	100	19	214	66.7	97.1	30	26604	42841	26607	42834	7/26
22-7	10	94	16	285	50.0	97.6	27	26587	42941	26588	42932	7/26
22-8	15	83	25	268	46.7	95.7	31	26547	43036	26543	43028	7/26
23-1	4	152	7	268	100.0	100.0	30	26613	42692	26615	42683	7/27
23-2	9	120	12	340	88.9	99.6	34	26574	42724	26572	42732	7/31
23-3	207	43	103	909	12.1	66.4	39	26604	42570	26601	42578	7/31
23-4	6	75	31	87	33.3	84.5	36	26511	42967	26516	42961	7/26
23-5	27	77	34	363	40.7	-	39	26579	42616	26572	42616	7/31
23-6	23	57	108	96	4.3	-	36	26559	42772	26552	42773	8/1
23-7	217	58	92	1070	12.4	-	40	26436	42974	26429	42971	8/1
23-8	115	49	106	490	15.7	-	37	26423	42992	26430	42994	8/1
23-9	16	79	32	226	43.8	-	32	26547	42937	26550	42945	7/26
23-10	30	40	152	90	6.7	-	33	26505	43018	26501	43025	8/1
23-11	41	55	84	220	7.3	-	42	26563	42673	26566	42681	7/31
23-12	17	77	27	281	41.2	-	33	26535	42876	26530	42882	8/1
23-13	28	81	28	459	32.1	-	37	26483	43068	26476	43063	8/1
23-14	267	41	142	851	4.5	-	39	26470	42857	26477	42859	8/1
23-15	13	85	29	206	38.5	-	39	26474	42948	26468	42953	8/1
23-16	12	80	52	104	16.7	-	40	26500	42780	26493	42780	8/1
24-1	12	65	37	147	33.3	92.4	43	26537	42676	26543	42676	7/31
24-2	5	78	51	45	20.0	34.0	43	26458	42784	26452	42781	8/1
24-3	0	-	-	-	-	-	45	26563	42538	26565	42546	7/31
24-4	9	44	282	14	0.0	0.0	44	26471	42804	26471	47813	8/1
24-5	3	99	25	53	33.3	60.0	44	26533	42624	26532	42633	7/31
24-6	150	54	84	808	10.0	57.4	41	26394	42959	26389	42966	8/1

Appendix Table 1 (cont'd)

Strata Tow Number[1]	No. of Sea Scallops Caught	Mean Shell Height (mm)	Calculated[2] Meat Count	Meat Weight Per Tow (g)	Percent of Catch ≤40 Count By Number	By Weight	Depth (fm)	LORAN C Bearings Start X	Start Y	End X	End Y	Date
25-1	10	90	24	186	50.0	92.2	23	26559	43213	26567	43217	7/26
25-2	0	-	-	-	-	-	17	26896	43652	26892	43646	7/25
25-3	14	85	29	221	35.7	81.5	17	26805	43422	26802	43415	7/25
25-4	9	94	22	186	66.7	97.5	24	26524	43208	26526	43199	7/26
25-5	0	-	-	-	-	-	20	26657	43264	26656	43255	7/26
25-6	14	73	39	162	21.4	80.3	22	26538	43187	26544	43194	7/26
25-7	18	91	32	256	38.9	62.8	23	26680	43388	26681	43398	7/25
26-1	79	83	46	775	12.7	28.5	24	26807	43501	26793	43501	7/25
26-2	27	91	34	356	70.4	80.0	27	26505	43258	26496	43257	7/26
26-3	33	88	34	443	51.5	71.8	30	26480	43247	26485	43242	7/26
26-4	7	84	26	122	57.1	97.5	26	26481	43146	26483	43155	7/26
26-5	39	83	39	456	33.3	64.7	26	26587	43327	26580	43331	7/26
26-6	53	78	43	562	43.4	73.7	27	26521	43283	26515	43276	7/26
26-7	50	75	41	547	24.0	72.7	27	26683	43423	26675	43423	7/25
26-8	67	91	29	1048	59.7	89.4	28	26569	43339	26561	43334	7/26
26-9	159	77	49	1473	32.7	61.0	25	26762	43471	26769	43477	7/25
26-10	43	86	40	491	48.8	62.4	28	26496	43237	26489	43230	7/26
26-11	211	62	101	943	6.6	26.4	26	26541	43309	26535	43302	7/26
26-12	1	157	6	73	100.0	100.0	30	26464	43208	26462	43199	7/26
26-13	74	87	32	1041	44.6	80.0	28	26607	43351	26601	43343	7/25
27-1	115	57	120	436	3.5	27.1	32	26533	43337	26527	43330	7/26
27-2	9	79	24	168	33.3	94.2	37	26460	43166	26459	43158	7/26
27-3	146	70	48	1389	26.0	73.5	36	26382	43177	26379	43169	8/1
27-4	1	42	454	1	0.0	0.0	31	26669	43420	26662	43414	7/25
27-5	101	45	127	362	7.9	56.8	39	26321	43137	26312	43135	8/1
27-6	78	58	65	541	17.9	73.7	36	26431	43068	26432	43077	8/1
27-7	26	47	97	122	7.7	81.7	35	26437	43093	26432	43101	8/1
27-8	85	61	69	558	29.4	78.2	36	26358	43111	26352	43116	8/1
27-9	0	-	-	-	-	-	36	26761	43489	26759	43480	7/25
27-10	74	64	55	610	25.7	82.4	36	26440	43050	26438	43056	8/1
28-1	35	52	109	146	11.4	44.7	46	26356	42992	26348	42993	8/1
28-2	0	-	-	-	-	-	46	26309	43060	26315	43056	8/1
28-3	0	-	-	-	-	-	50	26330	43000	26327	43008	8/1
28-4	81	63	51	717	27.2	79.6	42	26350	43037	26356	43033	8/1
28-5	120	48	99	547	17.5	76.2	42	26301	43127	26295	43121	8/1
28-6	1	97	30	15	100.0	100.0	53	26274	43087	26270	43094	8/1
29-1	49	76	52	430	16.3	36.6	26	26364	43610	26368	43605	7/25
29-2	13	113	17	344	84.6	94.3	22	26696	43503	26704	43510	7/25
29-3	12	72	41	132	25.0	80.5	23	26586	43496	26595	43500	7/25
29-4	5	106	21	108	80.0	91.9	22	26638	43535	26648	43539	7/25
29-5	51	82	40	572	47.1	70.6	25	26331	43611	26339	43609	7/25
29-6	34	83	12	422	41.2	71.6	26	26270	43625	26278	43623	7/24
29-7	5	86	22	105	40.0	94.7	24	26553	43430	26559	43425	7/25
29-8	18	74	45	180	27.8	68.6	25	26471	43540	26463	43534	7/25
30-1	21	95	26	371	66.7	88.9	26	26427	43565	26434	43562	7/25
30-2	18	72	35	236	22.2	75.7	28	26485	43357	26476	43357	8/2
30-3	36	96	25	654	58.3	82.8	28	26223	43534	26231	43540	8/2
30-4	4	43	361	5	0.0	0.0	32	26427	43307	26435	43307	8/2
30-5	12	87	22	245	33.3	88.3	27	26583	43408	26591	43411	7/25
30-6	30	83	37	364	36.7	67.6	27	26208	43632	26215	43628	7/24
30-7	33	94	30	504	51.5	71.1	31	26357	43362	26349	43367	8/2
30-8	19	83	33	260	52.6	87.1	28	26445	43438	26454	43436	7/25
30-9	14	87	28	223	35.7	72.1	30	26335	43455	26326	43456	8/2
30-10	32	83	29	498	43.8	89.7	27	26486	43438	26494	43435	7/25
30-11	9	81	49	84	44.4	61.2	30	26242	43552	26236	43556	8/2
30-12	11	92	34	146	45.5	58.6	29	26406	43360	26403	43352	8/2
30-13	16	89	32	229	43.8	70.2	27	26390	43580	26397	43577	7/25
30-14	41	89	28	658	43.9	79.3	30	26407	43497	26404	43489	7/25
30-15	32	58	59	245	21.9	90.0	32	26353	43295	26347	43288	8/2
31-1	9	104	22	189	77.8	92.9	38	(W) 14980	43458	(W) 14980	43450	8/7
31-2	24	90	22	487	50.0	91.7	42	26338	43222	26346	43223	8/2
31-3	13	76	44	135	46.2	74.8	37	(W) 14854	43460	(W) 14857	43453	8/8
31-4	75	80	39	881	36.0	69.9	33	26334	43379	26329	43386	8/2
31-5	59	62	63	424	28.8	84.7	36	26280	43245	26273	43247	8/2
31-6	15	90	28	244	46.7	79.4	33	(W) 14960	43499	(W) 14962	43491	8/7
31-7	0	-	-	-	-	-	39	26468	43317	26476	43322	8/2
31-8	3	112	17	79	66.7	86.5	37	(W) 14964	43452	(W) 14959	43458	8/7
31-9	15	100	23	300	66.7	86.4	40	26364	43225	26370	43232	8/2
31-10	3	80	31	43	33.3	84.4	38	(W) 14976	43431	(W) 14973	43438	8/7
31-11	22	88	29	339	50.0	79.9	32	26315	43337	26322	43342	8/2
31-12	183	73	58	1427	14.2	36.1	32	(W) 14910	43576	(W) 14912	43568	8/7
31-13	28	75	52	243	17.9	43.1	34	26279	43469	26280	43476	8/2
31-14	2	77	62	15	0.0	0.0	34	(W) 14871	43509	(W) 14869	43502	8/7
31-15	0	-	-	-	-	-	38	(W) 14986	43388	(W) 14984	43396	8/7
31-16	7	67	61	52	28.6	59.0	39	(W) 14866	43419	(W) 14861	43415	8/8
31-17	24	79	39	282	25.0	63.1	32	26306	43426	26312	43433	8/2
31-18	69	80	48	656	13.0	29.6	32	(W) 14929	43538	(W) 14932	43531	8/7
31-19	160	57	96	757	15.6	60.2	40	26238	43259	26235	43266	8/2
31-20	35	61	63	251	20.0	68.6	34	26278	43354	26285	43349	8/2
31-21	9	95	30	137	55.6	75.3	34	(W) 14933	43490	(W) 14926	43491	8/7
31-22	28	78	47	269	14.3	35.3	31	26279	43494	26272	43497	8/2
31-23	3	140	9	152	100.0	100.0	38	26388	43248	26393	43255	8/2
31-24	31	61	74	190	12.9	53.4	42	26216	43307	26210	43311	8/2

Appendix Table 1 (cont'd)

Strata Tow Number[1]	No. of Sea Scallops Caught	Mean Shell Height (mm)	Calculated[2] Meat Count	Meat Weight Per Tow (g)	Percent of Catch ≤40 Count By Number	By Weight	Depth (fm)	LORAN C Bearings Start W	Start Y	End W	End Y	Date
32-1	9	37	262	16	11.1	82.2	43	14836	43400	14829	43403	8/8
32-2	2	70	64	14	50.0	89.9	51	(X) 26230	43152	(X) 26236	43158	8/1
32-3	28	86	37	339	57.1	78.7	41	(X) 26187	43318	(X) 26183	43324	8/2
33-1	0	-	-	-	-	-	19	14792	43790	14800	43789	8/7
33-2	15	91	31	218	33.3	78.3	22	14769	43773	14773	43779	8/7
33-3	110	80	49	1010	16.4	33.1	25	14868	43714	14874	43709	8/7
33-4	0	-	-	-	-	-	18	14946	43758	14940	43754	8/7
33-5	4	111	16	115	75.0	95.0	21	14910	43738	14903	43734	8/7
33-6	1	32	1100	<1	0.0	0.0	19	14694	43798	14690	43793	8/6
33-7	25	84	35	328	48.0	83.7	22	14723	43726	14730	43726	8/7
33-8	0	-	-	-	-	-	18	14681	43811	14688	43807	8/6
33-9	0	-	-	-	-	-	18	14827	43793	14835	43792	8/7
33-10	83	79	48	782	24.1	45.5	25	14794	43725	14790	43731	8/7
34-1	182	77	53	1558	19.2	36.1	28	14682	43742	14688	43737	8/7
34-2	48	85	38	568	45.8	70.0	27	14702	43728	14710	43726	8/7
34-3	97	81	42	1058	43.3	70.4	30	14753	43662	14760	43662	8/7
34-4	244	72	62	1775	11.5	24.4	28	14831	43696	14825	43691	8/7
34-5	90	74	56	727	21.1	42.8	27	14904	43664	14899	43659	8/7
34-6	41	89	32	575	61.0	83.7	28	14777	43671	14780	43678	8/7
34-7	171	72	64	1212	9.9	21.9	27	14891	43690	14894	43684	8/7
34-8	229	71	61	1696	24.5	50.1	30	14810	43675	14806	43669	8/7
34-9	89	77	54	749	27.0	51.0	27	14789	43707	14792	43714	8/7
34-10	208	72	60	1570	23.6	44.0	28	14841	43659	14839	43667	8/7
34-11	237	71	69	1566	12.2	36.1	26	14671	43772	14674	43765	8/6
34-12	191	67	74	1178	4.2	10.4	28	14885	43651	14878	43654	8/7
34-13	40	83	38	478	37.5	71.0	27	14724	43718	14727	43711	8/7
34-14	235	76	54	1974	26.8	49.9	30	14801	43656	14805	43650	8/7
35-1	0	-	-	-	-	-	38	14653	43685	14648	43681	8/8
35-2	136	83	44	1394	25.0	40.2	32	14834	43618	14840	43613	8/7
35-3	0	-	-	-	-	-	38	14677	43671	14672	43676	8/8
35-4	0	-	-	-	-	-	39	14791	43509	14785	43508	8/8
35-5	0	-	-	-	-	-	37	14700	43620	14697	43627	8/8
36-1	0	-	-	-	-	-	49	14659	43404	14655	43410	8/8
36-2	0	-	-	-	-	-	46	14712	43487	14709	43480	8/8
Southern New England (Tows 37-1 to 44-3)												
37-1	0	-	-	-	-	-	21	14452	43911	14459	43906	8/6
37-2	0	-	-	-	-	-	22	14395	43893	14401	43891	8/6
37-3	0	-	-	-	-	-	21	14335	43896	14341	43896	8/6
37-4	3	54	173	8	0.0	0.0	19	14477	43849	14485	43847	8/6
37-5	36	113	16	1013	86.1	97.2	25	14556	43822	14557	43816	8/6
38-1	1	17	7358	<1	0.0	0.0	29	14334	43692	14342	43689	8/9
38-2	44	100	25	799	86.4	94.2	26	14357	43760	14349	43761	8/8
38-3	6	105	20	133	83.3	96.4	28	14562	43796	14568	43792	8/6
38-4	8	76	48	76	37.5	64.3	31	14487	43758	14482	43764	8/8
38-5	15	100	22	313	73.3	94.0	28	14419	43770	14412	43769	8/8
38-6	18	76	43	188	38.9	75.4	29	14616	43767	14622	43772	8/6
39-1	16	52	113	64	6.3	63.7	32	14431	43649	14433	43642	8/9
39-2	0	-	-	-	-	-	37	14601	43662	14596	43667	8/8
39-3	0	-	-	-	-	-	39	14360	43561	14361	43555	8/9
40-1	0	-	-	-	-	-	45	14599	43490	14604	43493	8/8
40-2	1	57	159	3	0.0	0.0	51	14367	43463	14361	43462	8/9
41-1	4	125	13	136	100.0	100.0	26	14164	43605	14166	43599	8/9
41-2	0	-	-	-	-	-	18	14093	43789	14101	43787	8/8
41-3	0	-	-	-	-	-	25	14121	43575	14114	43577	8/9
42-1	0	-	-	-	-	-	30	14190	43562	14198	43563	8/9
42-2	0	-	-	-	-	-	26	14223	43737	14231	43735	8/8
42-3	0	-	-	-	-	-	28	14214	43628	14207	43632	8/9
42-4	0	-	-	-	-	-	27	14189	43640	14184	43636	8/9
43-1	0	-	-	-	-	-	38	14186	43484	14187	43490	8/9
43-2	0	-	-	-	-	-	32	14247	43571	14245	43578	8/9
44-1	0	-	-	-	-	-	54	14209	43368	14204	43373	8/9
44-2	0	-	-	-	-	-	53	14287	43413	14282	43410	8/9
44-3	0	-	-	-	-	-	51	14293	43434	14292	43427	8/9

Appendix Table 1 (cont'd)

Strata Tow Number[1]	No. of Sea Scallops Caught	Mean Shell Height (mm)	Calculated[2] Meat Count	Meat Weight Per Tow (g)	Percent of Catch ≤40 Count By Number	By Weight	Depth (fm)	LORAN C Bearings Start W	Start Y	End W	End Y	Date
Georges Bank (Tows 45-1 to 74-5)												
45-1	0	-	-	-	-	-	21	13919	43609	13925	43604	8/10
45-2	0	-	-	-	-	-	22	13943	43633	13941	43627	8/9
45-3	0	-	-	-	-	-	22	14086	43584	14083	43579	8/9
46-1	0	-	-	-	-	-	30	14069	43552	14062	43554	8/9
46-2	1	137	10	46	100.0	100.0	29	13945	43505	13945	43499	8/10
46-3	46	82	29	729	41.3	83.4	30	13830	43591	13823	43593	8/10
46-4	0	-	-	-	-	-	27	14013	43560	14008	43565	8/9
46-5	71	99	23	1403	70.4	91.2	30	13852	43534	13849	43540	8/10
46-6	0	-	-	-	-	-	28	13979	43537	13983	43531	8/10
47-1	6	124	12	235	83.3	98.8	36	13774	43501	13768	43504	8/10
47-2	84	71	50	761	31.0	77.4	40	13856	43488	13857	43494	8/10
47-3	1	157	6	71	100.0	100.0	33	13989	43517	13983	43515	8/10
47-4	26	111	17	711	80.8	95.5	33	13817	43575	13820	43571	8/10
47-5	1	92	35	13	100.0	100.0	36	13976	43445	13969	43447	8/10
47-6	10	135	10	451	100.0	100.0	36	14001	43460	13998	43456	8/10
47-7	138	67	76	829	4.3	9.4	34	13778	43619	-	-	8/10
47-8	43	61	43	449	20.9	88.6	39	13876	43478	13870	43482	8/10
47-9	6	121	12	226	83.3	98.4	32	13961	43484	13969	43481	8/10
48-1	1	97	29	15	100.0	100.0	43	13871	43445	13873	43450	8/10
48-2	132	92	28	2124	61.4	84.4	44	13734	43609	13729	43607	8/10
48-3	0	-	-	-	-	-	45	13888	43428	13884	43424	8/10
48-4	0	-	-	-	-	-	43	14139	43445	14144	43448	8/9
49-1	47	61	60	356	31.9	86.6	22	13745	43819	13743	43814	8/20
49-2	20	106	16	563	75.0	98.2	16	13794	43848	13792	43843	8/16
49-3	162	51	116	633	13.6	59.3	19	13751	43795	13752	43801	8/16
49-4	0	-	-	-	-	-	22	13750	44038	13748	44043	8/21
49-5	13	92	27	215	46.2	75.8	18	13791	43901	13787	43906	8/21
49-6	2	72	76	12	0.0	0.0	25	13806	43674	13807	43678	8/16
49-7	0	-	-	-	-	-	16	13792	43966	13789	43972	8/21
50-1	313	67	83	1711	3.5	9.7	33	13781	43663	13783	43667	8/16
50-2	4	108	12	149	75.0	99.9	29	13719	43835	13714	43840	8/20
50-3	30	122	13	1047	93.3	99.0	30	13760	43752	13758	43757	8/16
50-4	0	-	-	-	-	-	31	13740	44053	13738	44059	8/21
50-5	71	93	28	1153	63.4	89.4	30	13749	43697	13748	43692	8/16
50-6	163	72	64	1147	15.3	33.6	34	13777	43652	13778	43657	8/16
50-7	36	54	150	109	2.8	12.0	31	13774	43697	13771	43703	8/16
50-8	0	-	-	-	-	-	27	13736	43868	13740	43872	8/21
50-9	582	41	183	1441	6.5	40.8	28	13726	43800	13723	43805	8/20
50-10	2	100	26	35	50.0	69.0	24	13784	43945	13785	43950	8/21
50-11	204	83	43	2157	34.8	55.4	28	13763	43907	13769	43909	8/21
50-12	125	54	147	386	2.4	17.9	28	13784	43687	13782	43692	8/16
51-1	41	96	28	657	82.9	94.0	33	13746	43738	13749	43742	8/16
51-2	0	-	-	-	-	-	35	13709	43868	13716	43867	8/21
51-3	191	83	45	1915	27.7	40.3	36	13734	43886	13726	43887	8/21
51-4	0	-	-	-	-	-	38	13740	44017	13736	44022	8/21
51-5	6	132	10	277	100.0	100.0	36	13740	43682	13737	43678	8/16
51-6	143	51	104	623	10.5	37.7	33	13715	43807	13713	43813	8/20
51-7	242	92	32	3470	61.6	79.3	35	13764	43920	13757	43923	8/21
51-8	8	102	20	181	62.5	87.8	36	13776	43973	13774	43977	8/21
51-9	3	127	12	110	100.0	100.0	36	13705	43842	13703	43848	8/20
51-10	71	93	30	1092	62.0	84.3	38	13746	43646	13751	43647	8/16
51-11	52	51	131	180	7.7	31.6	36	13707	43823	13704	43829	8/20
51-12	0	-	-	-	-	-	37	13730	44058	13730	44053	8/21
52-1	3	80	22	61	66.7	99.9	50	13736	43926	13742	43927	8/21
52-2	0	-	-	-	-	-	43	13694	43865	13697	43868	8/20
52-3	1	112	19	24	100.0	100.0	46	13764	43972	13760	43977	8/21
52-4	7	109	19	170	100.0	100.0	45	13707	43888	13713	43890	8/21
52-5	7	94	26	122	71.4	94.5	52	13703	43721	13708	43723	8/16
52-6	11	108	18	276	81.8	95.6	56	13701	43702	13702	43707	8/16
53-1	9	134	10	402	100.0	100.0	45	13485	43742	13486	43746	8/15
53-2	28	121	13	1006	85.7	96.5	54	13608	43707	13601	43708	8/15
53-3	18	106	18	447	55.6	83.7	45	13429	43766	13428	43762	8/15
53-4	33	112	17	858	90.9	97.2	55	13506	43764	13513	43760	8/15
53-5	6	105	19	143	66.7	89.5	53	13577	43719	13585	43717	8/15
53-6	26	120	15	794	100.0	100.0	57	13458	43786	13452	43785	8/15

Appendix Table 1 (cont'd)

Strata Tow Number[1]	No. of Sea Scallops Caught	Mean Shell Height (mm)	Calculated[2] Meat Count	Meat Weight Per Tow (g)	Percent of Catch ≤40 Count By Number	By Weight	Depth (fm)	LORAN C Bearings Start W	Start Y	End W	End Y	Date
54-1	43	72	52	376	18.6	62.7	36	13381	43808	13386	43811	8/15
54-2	5	149	7	306	100.0	100.0	34	13477	43714	13477	43718	8/15
54-3	9	94	27	152	44.4	76.8	37	13641	43643	13647	43644	8/16
54-4	11	94	24	204	63.6	92.9	36	13545	43707	13549	43703	8/15
54-5	21	91	26	360	52.4	89.1	32	13419	43730	13425	43725	8/15
54-6	32	91	29	495	43.8	75.8	34	13593	43640	13597	43644	8/16
55-1	0	-	-	-	-	-	34	13715	43488	13709	43489	8/10
55-3	0	-	-	-	-	-	34	13682	43475	13689	43472	8/10
55-4	4	90	26	70	25.0	73.9	36	13712	43554	13718	43549	8/10
55-5	2	140	9	97	100.0	100.0	34	13716	43504	13717	43499	8/10
55-6	98	83	36	1224	42.9	77.0	42	13663	43617	13664	43611	8/10
56-1	10	47	252	18	0.0	0.0	49	13795	43382	13790	43380	8/10
56-2	9	66	67	61	33.3	79.5	49	13782	43379	13777	43383	8/10
56-3	1	92	35	13	100.0	100.0	46	13699	43433	13698	43428	8/11
57-1	3	125	12	118	100.0	100.0	42	13603	43473	13606	43467	8/11
57-2	5	141	8	276	100.0	100.0	37	13480	43516	13474	43516	8/11
57-3	9	93	24	173	44.4	87.3	33	13486	43550	13485	43546	8/11
58-1	2	65	66	14	50.0	94.7	54	13682	43400	13677	43404	8/11
58-2	0	-	-	-	-	-	56	13599	43426	13593	43428	8/11
58-3	3	85	35	39	66.7	94.6	45	13533	43475	13530	43480	8/11
58-4	1	137	10	46	100.0	100.0	50	13627	43442	13624	43447	8/11
59-1	2	102	16	55	50.0	93.3	34	13234	43584	13229	43583	8/12
59-2	95	88	35	1226	31.6	51.8	39	13432	43478	13426	43480	8/11
59-3	16	91	24	301	56.3	92.8	39	13204	43554	13210	43553	8/12
59-4	0	-	-	-	-	-	33	13206	43586	13200	43589	8/12
59-5	39	92	26	676	51.3	86.4	39	13260	43556	13266	43556	8/12
59-6	74	80	34	990	35.1	80.2	40	13372	43504	13366	43505	8/11
59-7	1	67	95	5	0.0	0.0	32	13386	43558	13390	43552	8/11
59-8	6	113	13	208	83.3	99.3	37	13467	43517	13461	43517	8/11
60-1	91	83	42	993	26.4	43.9	43	13351	43510	13347	43508	8/11
60-2	0	-	-	-	-	-	52	13293	43475	13287	43479	8/11
60-3	2	50	174	5	0.0	0.0	55	13517	43417	13511	43419	8/11
60-4	0	-	-	-	-	-	55	13266	43459	13261	43460	8/11
60-5	7	54	115	28	0.0	0.0	57	13194	43468	13189	43472	8/11
60-6	0	-	-	-	-	-	51	13472	43427	13475	43430	8/11
60-7	23	97	23	453	69.6	94.4	51	13303	43487	13303	43483	8/11
60-8	2	117	16	56	100.0	100.0	52	13269	43485	13270	43481	8/11
61-1	63	96	21	1353	69.8	97.0	39	13162	43539	13167	43539	8/12
61-2	8	102	17	213	50.0	91.9	41	13021	43653	13027	43649	8/12
61-3	36	108	14	1172	58.3	94.7	34	13169	43587	13166	43592	8/12
61-4	13	138	9	659	92.3	98.9	40	13061	43614	13055	43616	8/12
61-5	2	57	159	6	0.0	0.0	34	13183	43590	13179	43589	8/12
61-6	1	157	6	71	100.0	100.0	42	13004	43670	13006	43665	8/12
61-7	5	127	10	223	80.0	98.3	39	13055	43628	13058	43624	8/12
62-1	40	99	22	820	70.0	92.8	46	12993	43630	12998	43626	8/12
62-2	366	40	297	560	1.4	12.9	51	12969	43583	12965	43587	8/13
62-3	155	34	704	100	0.0	0.0	52	13043	43536	13038	43539	8/13
62-4	100	67	56	807	21.0	69.0	46	13174	43512	13173	43517	8/12
62-5	59	83	31	856	39.0	78.8	43	13035	43592	13037	43587	8/13
62-6	89	77	44	915	38.2	74.1	52	12926	43628	12923	43632	8/13
62-7	44	91	24	816	65.9	96.0	50	13152	43508	13158	43507	8/12
62-8	17	85	31	252	35.3	80.6	43	12996	43660	13002	43659	8/12
62-9	76	74	38	907	42.1	89.1	45	13063	43552	13066	43548	8/13
63-1	0	-	-	-	-	-	34	12985	43732	12987	43729	8/12
63-2	5	153	7	328	100.0	100.0	43	12922	43706	12917	43710	8/13
63-3	0	-	-	-	-	-	35	12991	43718	12994	43713	8/12
63-4	126	81	44	1310	36.5	61.2	34	12860	43814	12859	43817	8/14
63-5	175	60	92	863	8.6	48.1	39	12846	43809	12851	43810	8/14
63-6	0	-	-	-	-	-	34	12990	43748	12991	43744	8/12
63-7	78	83	35	999	35.9	69.7	37	12846	43792	12847	43795	8/14
63-8	0	-	-	-	-	-	37	12903	43720	12897	43724	8/13
63-9	0	-	-	-	-	-	31	12872	43837	12878	43833	8/14
63-10	10	155	7	690	100.0	100.0	39	12868	43739	12862	43742	8/13

Appendix Table 1 (cont'd)

Strata Tow Number[1]	No. of Sea Scallops Caught	Mean Shell Height (mm)	Calculated[2] Meat Count	Meat Weight Per Tow (g)	Percent of Catch ≤40 Count By Number	By Weight	Depth (fm)	LORAN C Bearings Start X	Start Y	End X	End Y	Date
64-1	8	103	17	214	62.5	93.5	43	12856	43719	12862	43719	8/13
64-2	1454	52	168	3917	1.3	10.9	43	12774	43819	12780	43815	8/14
64-3	5560	40	322	7830	3.2	39.4	52	12716	43770	12716	43774	8/13
64-4	473	50	167	1283	2.5	20.1	43	12820	43742	12818	43739	8/13
64-5	248	100	24	4601	83.9	93.5	45	12716	43806	12710	43810	8/14
64-6	434	55	100	1966	11.5	42.2	53	12723	43735	12717	43738	8/13
64-7	1301	43	178	3309	7.5	52.0	52	12708	43747	12710	43750	8/13
64-8	86	86	23	1670	46.5	94.8	43	12814	43771	12812	43768	8/13
64-9	3209	38	309	4445	1.9	23.8	54	12792	43700	12787	43700	8/13
64-10	0	-	-	-	-	-	44	12882	43711	12889	43708	8/13
64-11	4889	38	295	7526	2.1	21.4	56	12748	43711	12744	43715	8/13
64-12	274	49	124	998	7.7	55.1	46	12815	43711	12814	43708	8/13
64-13	321	59	76	1910	13.1	64.6	46	12854	43693	12853	43697	8/13
64-14	85	58	53	72	34.1	89.7	49	12711	43791	12706	43795	8/13
65-1	120	65	76	714	7.5	26.4	34	12851	43868	12853	43864	8/14
65-2	491	62	84	2643	6.7	26.4	28	12924	43892	12926	43887	8/14
65-3	1183	57	124	4324	2.5	13.7	40	12808	43851	12812	43854	8/14
65-4	499	63	89	2550	5.6	23.8	37	12825	43870	12830	43870	8/14
65-5	6	121	13	213	83.3	98.3	35	13221	43853	13226	43855	8/15
65-6	195	53	162	545	1.5	9.7	33	12869	43881	12862	43885	8/14
65-7	6	140	9	305	100.0	100.0	31	13189	43851	13191	43855	8/15
65-8	7	159	6	520	100.0	100.0	32	13134	43871	13133	43867	8/15
65-9	394	68	81	2207	1.8	5.2	30	12887	43882	12889	43885	8/14
65-10	14	125	13	498	92.9	98.2	34	13030	43889	13037	43889	8/18
65-11	14	140	9	732	100.0	100.0	34	13100	43877	13106	43879	8/15
65-12	1	162	6	78	100.0	100.0	34	13306	43839	13313	43839	8/15
65-13	1098	61	106	4714	2.1	8.7	37	12829	43861	12825	43866	8/14
65-14	191	75	54	1602	20.9	40.6	37	12981	43891	12980	43896	8/14
66-1	20	106	21	433	90.0	96.8	50	13233	43862	13240	43861	8/15
66-2	5	120	14	160	100.0	100.0	46	13284	43853	13290	43850	8/15
66-3	27	105	19	638	66.7	90.5	48	12983	43899	12990	43898	8/14
66-4	189	49	153	561	10.1	56.9	45	12758	43837	12763	43836	8/14
66-5	857	71	59	6619	23.6	48.5	53	12667	43817	12673	43817	8/13
66-6	32	118	15	964	93.8	98.2	48	13071	43893	13078	43891	8/15
66-7	2283	52	150	6908	1.2	10.6	44	12914	43900	12918	43895	8/14
66-8	49	105	19	1181	79.6	97.2	43	12773	43842	12773	43838	8/14
66-9	283	58	87	1471	10.6	31.4	48	12705	43825	12704	43829	8/14
66-10	11	125	12	422	100.0	100.0	44	13331	43842	13337	43838	8/15
66-11	23	119	14	770	82.6	97.5	43	13138	43878	13135	43874	8/15
66-12	53	111	17	1399	84.9	96.6	47	13199	43865	13206	43864	8/15
66-13	139	80	40	1564	43.9	68.4	48	12708	43836	12714	43835	8/14
66-14	690	55	122	2566	4.5	27.2	47	12855	43893	12858	43895	8/14
71-1	26	85	33	355	38.5	76.8	28	12974	43841	12980	43842	8/14
71-2	0	-	-	-	-	-	27	13052	43880	13058	43880	8/15
71-3	91	67	67	618	15.4	48.4	30	12925	43851	12917	43853	8/14
71-4	64	93	27	1061	60.9	86.2	27	12974	43875	12974	43880	8/14
71-5	53	104	21	1161	79.2	93.6	24	12946	43865	12951	43861	8/14
72-1	4	87	41	45	25.0	34.5	17	13201	43813	13202	43817	8/15
72-2	18	128	11	745	88.9	98.9	31	13020	43841	13017	43846	8/14
72-3	33	97	27	565	66.7	83.4	22	13162	43839	13167	43835	8/15
72-4	6	100	25	107	83.3	89.9	21	13081	43862	13084	43865	8/15
73-1	1	77	61	7	0.0	0.0	23	13195	43655	13192	43660	8/12
73-2	0	-	-	-	-	-	23	13115	43748	13109	43746	8/12
73-3	0	-	-	-	-	-	21	13171	43713	13163	43716	8/12
73-4	0	-	-	-	-	-	26	13176	43642	13178	43646	8/12
74-1	17	105	15	500	58.8	95.5	32	13011	43762	13005	43763	8/12
74-2	0	-	-	-	-	-	30	13072	43746	13066	43747	8/12
74-3	1	67	95	5	0.0	0.0	30	13107	43660	13113	43660	8/12
74-4	0	-	-	-	-	-	33	12977	43774	12981	43769	8/12
74-5	94	82	41	311	43.6	69.9	33	12926	43810	12925	43815	8/14

[1]See Appendix Figures 1-3 for tow locations.

[2]Number of meats per pound. Calculated by applying shell height-meat weight equation to survey shell height frequencies to obtain average meat weight per scallop and dividing this value into 453.6 grams (1 pound). Shell height-meat weight equations utilized were:

Mid-Atlantic: ln Meat Weight (g)= -12.1628 + 3.2539 ln Shell Height (mm) (n=11943, r=0.98)

So. New England & Georges Bank : ln Meat Weight (g)= -11.7656 + 3.1693 ln Shell Height (mm) (n=5863, r=0.98)

Appendix Table 2. Summary of 1984 NMFS sea scallop research vessel survey sampling data from the Gulf of Maine, by individual tow.

Station[1] Number	No. of Sea Scallops Caught	Mean Shell Height (mm)	Calculated[2] Meat Count	Meat Weight (g) Per Tow	% of Catch ≤40 Count By Number	% of Catch ≤40 Count By Weight	Depth (fm)	Depth (m)	Loran C Bearings Start W	Loran C Bearings Start Y	Loran C Bearings End W	Loran C Bearings End Y	Date
Cape Cod Bay													
506	104	62	111	424	11.5	41.5	11	21	13853	44044	13861	44042	8/22
507	22	89	47	213	22.7	60.4	13	23	13884	44037	13891	44039	8/22
508	38	88	49	354	39.5	62.5	13	24	13889	44033	13883	44038	8/22
509	100	49	197	231	3.0	18.5	12	22	13855	44043	13852	44048	8/22
Stellwagen Bank													
511	0	-	-	-	-	-	16	30	13790	44189	13782	44192	8/22
512	0	-	-	-	-	-	23	42	13757	44193	13752	44198	8/22
513	0	-	-	-	-	-	25	45	13746	44205	13754	44206	8/22
514	0	-	-	-	-	-	18	33	13768	44207	13776	44209	8/22
515	4	106	27	66	75.0	99.3	17	32	13782	44213	13784	44218	8/22
516	1	147	14	33	100.0	100.0	16	29	13785	44227	13787	44231	8/22
517	38	101	36	484	55.3	83.0	18	33	13794	44247	13799	44250	8/22
518	69	88	59	529	24.6	45.7	25	45	13790	44253	13781	44251	8/22
Jeffreys Ledge													
521	751	91	55	6157	7.5	22.6	34	62	13539	44365	13548	44364	8/22
522	154	91	58	1197	6.5	12.1	43	78	13532	44362	13522	44362	8/23
523	89	106	35	1166	53.9	73.3	48	87	13513	44363	13522	44363	8/23
524	2	87	68	13	0.0	0.0	45	82	13543	44361	13538	44357	8/23
525	0	-	-	-	-	-	45	83	13521	44377	13513	44377	8/23
526	17	116	25	307	94.1	99.9	41	75	13479	44378	13469	44377	8/23
527	0	-	-	-	-	-	58	106	13462	44403	13456	44407	8/23
528	0	-	-	-	-	-	29	53	13446	44409	13441	44413	8/23
529	0	-	-	-	-	-	57	104	13432	44408	13437	44404	8/23
530	0	-	-	-	-	-	34	63	13439	44411	13434	44416	8/23
531[3]	0	-	-	-	-	-	54	99	13442	44420	13449	44416	8/23
532[3]	18	130	20	413	100.0	100.0	40	74	13421	44423	13428	44420	8/23
539	0	-	-	-	-	-	46	84	13417	44435	13408	44438	8/23
Jeffreys Basin (Northwest of Jeffreys Ledge)													
533[3]	3	129	20	67	100.0	100.0	78	142	13465	44425	13473	44425	8/23
535[3]	15	100	39	173	66.7	83.8	97	177	13506	44425	13516	44425	8/23
537	8	89	57	64	50.0	70.4	92	169	13491	44425	13482	44425	8/23
538	0	-	-	-	-	-	73	133	13468	44427	13461	44432	8/23
Tanta Ground (Portland Shipping Lane, South)													
541	0	-	-	-	-	-	94	172	13332	44483	13323	44486	8/23

Appendix Table 2 (continued).

Station[1] Number	No. of Sea Scallops Caught	Mean Shell Height (mm)	Calculated[2] Meat Count	Meat Weight (g) Per Tow	% of Catch ≤40 Count By Number	% of Catch ≤40 Count By Weight	Depth (fm)	Depth (m)	Loran C Bearings Start W	Loran C Bearings Start Y	Loran C Bearings End W	Loran C Bearings End Y	Date
Northeast of Three Dory Ridge													
544	19	86	64	134	26.3	46.8	98	179	13086	44424	13077	44424	8/23
545	4	112	31	59	100.0	100.0	88	161	13036	44425	13027	44426	8/23
546	8	105	37	98	75.0	88.7	88	161	13002	44437	13005	44441	8/23
547	16	110	34	216	100.0	100.0	90	164	13030	(X)25700	13038	(X)25700	8/23
548	25	97	43	266	68.0	85.9	92	169	13066	(X)25699	13075	(X)25699	8/23
549	11	79	72	69	18.2	42.0	94	171	13106	44400	13115	44399	8/23
Toothaker Ridge													
551	2	102	42	22	100.0	100.0	92	168	12986	44384	12978	44384	8/23
552	3	114	30	45	100.0	100.0	83	152	12973	44389	12980	44385	8/24
Southeast of Three Dory Ridge													
553	1	97	49	9	0.0	0.0	108	198	13122	44355	13131	44355	8/24
554	8	95	48	75	75.0	92.7	108	198	13141	44349	13132	44350	8/24
555	1	92	58	8	0.0	0.0	108	197	13119	44350	13110	44350	8/24
556	1	92	58	8	0.0	0.0	109	200	13103	44354	13102	44358	8/24
Fippennies Ledge													
559	134	65	93	656	26.1	82.2	46	84	13258	44261	13258	44257	8/24
560[3]	139	92	53	1200	30.9	53.9	42	76	13263	44256	13269	44258	8/24
561[3]	1434	80	80	8173	6.8	19.0	38	69	13275	44260	13282	44262	8/24
562	122	113	30	1841	98.4	99.1	59	107	13293	44257	13299	44253	8/24
563	726	60	145	2266	8.8	46.6	42	77	13299	44249	13293	44247	8/24
565	925	49	322	1305	1.7	17.7	44	80	13269	44248	13263	44246	8/24
566[3]	3646	51	247	6703	5.7	44.3	41	75	13268	44240	13275	44238	8/24
567	57	95	47	534	35.1	62.1	39	71	13276	44241	13274	44246	8/24
568	33	87	50	297	39.4	71.5	38	70	13284	44246	13292	44246	8/24
569	7	106	37	85	71.4	78.2	40	73	13293	44244	13289	44240	8/24
570	371	77	72	2346	24.3	61.1	39	71	13284	44239	13279	44243	8/24

[1]See Appendix Figure 4 for tow locations.

[2]Number of meats per pound. Calculated by applying NMFS Gulf of Maine shell height-meat weight equation, $\ln \text{Meat Weight}_{(g)} = -11.6526+3.0584 \ln \text{Shell Height}_{(mm)}$ (n = 3487, r = 0.97), to survey shell height frequencies to obtain average meat weight per scallop and dividing this value into 453.6 grams (1 pound).

[3]Survey dredge with rock chains used in sampling.

Appendix Table 3. Summary station data for Iceland scallops, Chlamys islandica, obtained during 1984 NMFS sea scallop research vessel survey.

Station[1] Number	No. of Iceland Scallops Caught	Mean Shell Height (mm)	Calculated[2] Meat Count	Meat Weight(g) Per Tow	Depth (fm)	LORAN C Bearings Start W	Start Y	End W	End Y	Date
Special Iceland Scallop Stations										
486	0	-	-	-	50	13723	43914	13721	43909	8/21
488	0	-	-	-	54	13703	43904	13703	43898	8/21
489	0	-	-	-	45	13722	43904	13720	43900	8/21
490	0	-	-	-	49	13706	43897	13711	43893	8/21
491	2	50	170	5	37	13723	43884	13729	43880	8/21
492	0	-	-	-	50	13698	43889	13697	43884	8/21
493	39	53	141	125	46	13696	43878	13695	43873	8/21
494	2	35	443	2	40	13706	43876	13713	43877	8/21
495	1071	66	91	5366	32	13722	43867	13723	43863	8/21
496	4	50	153	12	39	13705	43864	13700	43868	8/21
497	1769	53	152	5295	36	13704	43859	13705	43853	8/21
498	77	63	98	355	38	13704	43843	13697	43845	8/21
499	7	51	156	20	43	13691	43846	13693	43850	8/21
500	8400	64	97	39483	38	13698	43849	13705	43845	8/21
501	110	61	109	458	38	13699	43831	13705	43833	8/22
502	5	63	101	23	34	13708	43838	13706	43843	8/22
503	0	-	-	-	26	13721	43839	13728	43835	8/22
504	0	-	-	-	28	13732	43857	13729	43863	8/22
505	7590	61	110	31230	32	13721	43864	13714	43865	8/22
Regular Sea Scallop Survey Stations										
50-11	1	72	76	6	28	13763	43907	13769	43909	8/21
51-02	2868	52	152	8562	35	13709	43868	13716	43867	8/21
51-03	3	55	141	10	36	13734	43886	13726	43887	8/21
51-06	1	42	279	2	33	13715	43807	13713	43813	8/20
51-09	119	57	132	410	36	13705	43842	13703	43848	8/20
52-04	2	62	105	9	44	13707	43888	13713	43890	8/21
64-03	6	32	521	5	52	12716	43770	12716	43774	8/13
64-05	9	50	176	23	45	12716	43806	12710	43810	8/14
64-14	29	63	104	127	49	12711	43791	12706	43795	8/13
65-04	1	32	536	1	37	12825	43870	12830	43870	8/14
65-13	2	37	378	2	37	12829	43861	12825	43866	8/14
66-05	43	63	103	190	53	12667	43817	12673	43817	8/13
66-09	20	42	221	41	48	12705	43825	12704	43829	8/14
66-13	11	50	150	33	48	12708	43836	12714	43835	8/14
Special Gear Comparison Experiment Stations										
581	1	47	213	2	34	12825	43862	12830	43862	8/25
587[3]	2	42	279	3	45	12773	43820	12778	43820	8/25
637[3]	1	42	279	2	37	12822	43862	12828	43862	8/28
638	1	42	279	2	38	12827	43862	12820	43862	8/28
640[3]	2	37	378	2	38	12827	43862	12820	43862	8/28
643[3]	1	42	278	2	37	12825	43861	12825	43857	8/28

[1]See Appendix Figures 3 and 5 for tow locations.

[2]Number of meats per pound. Calculated by applying 1983 NMFS survey shell height-meat weight equation, ln Meat Weight(g) = -8.4879+2.4011 ln Shell Height(mm), to survey shell height frequencies to obtain average meat weight per scallop and dividing that value into 453.6 grams (1 pound).

[3]Rock chains used on survey dredge.

Appendix Table 4. Summary of 1984 NMFS sea scallop research vessel survey sampling data from gear comparison experiments, by individual station. Experiments evaluated performance of two survey dredges (I and II), with and without rock chains. Dredges equipped with rock chains are indicated by an asterisk (*). Dredge liners were not used in these experiments.

Station Number[1] and Dredge Type		No. of Sea Scallops Caught	Mean Shell Height (mm)	Calculated[2] Meat Count	Meat Weight Per Tow(g)	Percent of Catch ≤40 Count By Number	By Weight	Depth (fm)	LORAN C Bearings Start W	Start Y	End W	End Y	Date
Fippennies Ledge													
571	I	219	84	63	1574	11.0	26.4	40	13274	44261	13282	44261	8/24
572	II*	101	89	45	1027	46.5	80.4	40	13282	44262	13275	44262	8/24
573	II*	496	67	98	2298	14.1	56.7	45	13276	44262	13284	44263	8/24
574	I	329	82	59	2523	21.0	48.7	40	13282	44262	13274	44261	8/24
Northern Edge (Scallop Survey Stratum 65)													
578	I	639	63	89	3244	3.6	13.5	37	12827	43862	12824	43862	8/25
579	II*	993	61	105	4295	1.7	8.5	34	12824	43862	12830	43863	8/25
580	II*	1065	61	109	4437	1.2	4.9	36	12830	43862	12824	43862	8/25
581	I	589	64	90	2959	2.5	12.1	34	12825	43862	12830	43862	8/25
582	II*	650	61	105	2816	3.1	13.7	38	12809	43850	12802	43849	8/25
583	I	8	64	78	47	12.5	52.0	40	12801	43849	12807	43849	8/25
584	I	190	72	61	1416	10.5	29.9	41	12808	43851	12804	43848	8/25
585	II*	68	68	72	428	8.8	28.9	42	12802	43849	12808	43850	8/25
637	I*	965	60	110	3994	1.6	7.1	37	12822	43862	12828	43862	8/28
638	II	812	64	90	4099	3.1	12.1	38	12827	43862	12820	43862	8/28
639	II	31	68	80	177	6.5	17.6	37	12821	43862	12827	43862	8/28
640	I*	1203	61	101	5381	2.1	10.8	38	12827	43862	12820	43862	8/28
641	II	1607	59	115	6313	1.6	7.0	37	12825	43862	12825	43858	8/28
642	I*	532	57	125	1928	2.1	11.4	37	12825	43857	12825	43861	8/28
643	I*	1283	58	123	4714	1.8	7.9	37	12825	43861	12825	43857	8/28
644	II	532	64	91	2660	1.5	5.8	37	12825	43858	12825	43862	8/28
Northern Edge (Scallop Survey Stratum 71)													
590	I	43	92	28	691	53.5	82.1	30	12944	43866	12949	43861	8/25
592	II*	50	105	21	1082	88.0	97.5	26	12943	43866	12939	43871	8/25
593	II*	56	87	38	677	25.0	46.0	26	12937	43872	12941	43868	8/25
594	I	55	92	31	799	45.5	67.1	26	12942	43868	12936	43872	8/25
Northeast Peak (Scallop Survey Stratum 64)													
586	I	23	77	45	233	26.1	63.5	44	12780	43820	12774	43820	8/25
587	II*	744	60	102	3298	5.0	20.4	45	12773	43820	12778	43820	8/25
588	II*	115	78	40	1314	27.0	68.9	45	12780	43820	12774	43820	8/25
589	I	192	67	73	1192	9.4	34.4	45	12775	43820	12781	43820	8/25
619	II*	189	68	62	1389	15.9	48.2	49	12875	43666	12875	43663	8/27
620	I	91	83	40	1024	33.0	62.0	50	12875	43664	12875	43668	8/27
621	I	49	91	30	738	44.9	71.5	49	12874	43671	12874	43668	8/27
622	II*	63	86	35	815	31.7	64.0	50	12874	43671	12874	43675	8/27
623	I	79	86	33	1071	39.2	73.0	48	12876	43668	12876	43664	8/27
624	II*	93	82	39	1091	33.3	68.9	50	12876	43665	12876	43669	8/27
625	II*	54	94	29	855	55.6	78.4	50	12876	43669	12876	43665	8/27
626	I	35	79	51	311	20.0	37.8	49	12876	43665	12875	43669	8/27
627	II*	47	71	52	406	23.4	62.7	48	12873	43666	12873	43663	8/27
628	I	295	58	94	1419	9.8	43.3	48	12873	43662	12873	43666	8/27
629	I*	495	59	105	2148	4.4	19.3	53	12791	43700	12784	43702	8/27
630	II	589	59	96	2778	8.1	30.1	53	12786	43702	12792	43699	8/27
631	II	791	55	118	3049	5.3	24.7	53	12792	43699	12786	43702	8/27
632	I*	607	67	69	4007	13.5	42.2	53	12786	43701	12792	43699	8/27
633	II	1309	50	134	4417	6.6	35.8	52	12790	43704	12785	43708	8/27
634	I*	645	61	85	3435	11.8	41.8	52	12786	43707	12792	43703	8/27
635	I*	743	59	88	3850	13.2	45.6	51	12791	43704	12785	43707	8/27
636	II	664	58	98	3078	8.4	33.1	52	12787	43707	12792	43703	8/27

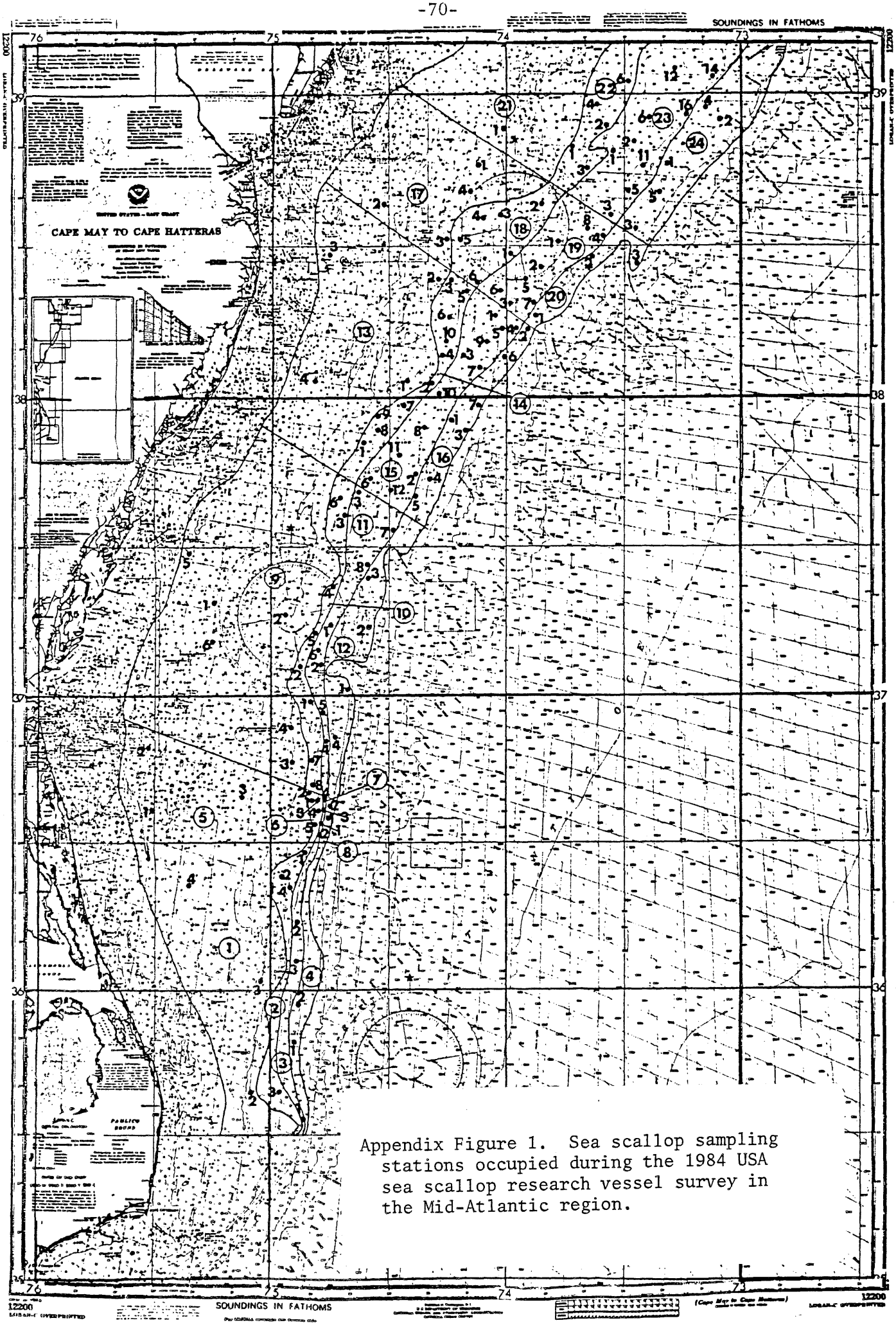
Appendix Table 4 (cont'd)

Station Number[1] and Dredge Type		No. of Sea Scallops Caught	Mean Shell Height (mm)	Calculated[2] Meat Count	Meat Weight Per Tow(g)	Percent of Catch ≤40 Count By Number	By Weight	Depth (fm)	LORAN C Bearings Start W	Start Y	End W	End Y	Date
Southeast Part (Border of Scallop Survey Strata 59 and 60)													
651	II	42	90	27	699	42.9	73.3	44	13358	43505	13364	43506	8/28
652	I	49	89	33	669	49.0	70.3	42	13363	43506	13358	43506	8/28
653	I	32	92	29	493	31.3	59.8	42	13358	43505	13364	43505	8/28
654	II	45	96	24	837	40.0	72.5	44	13363	43506	13358	43505	8/29
655	I	46	90	32	648	26.1	50.5	43	13355	43507	13355	43502	8/29
656	II	62	95	27	1032	27.4	56.5	42	13355	43502	13355	43507	8/29
657	II	55	86	40	617	12.7	23.8	42	13355	43507	13355	43502	8/29
658	I	56	89	35	716	21.4	40.2	42	13355	43503	13355	43507	8/29
659	II	45	86	39	525	20.0	35.5	42	13357	43508	13351	43508	8/29
660	I	45	92	30	679	37.8	62.9	42	13351	43508	13357	43508	8/29
661	I	38	89	36	484	28.9	45.4	42	13356	43508	13351	43508	8/29
662	II	48	84	44	499	25.0	34.3	42	13351	43508	13357	43508	8/29
663	I	201	83	45	2045	6.5	17.6	44	13361	43497	13363	43491	8/29
664	II	157	88	35	2034	15.3	39.7	44	13362	43493	13361	43498	8/29
665	II	135	85	42	1453	8.9	18.3	44	13361	43497	13362	43491	8/29
666	I	84	84	42	910	10.7	26.6	44	13362	43493	13362	43497	8/29
667	I	82	86	39	956	11.0	27.1	44	13359	43496	13358	43493	8/29
668	II	47	81	50	425	2.1	4.9	44	13359	43494	13360	43498	8/29
669	II	48	85	36	598	20.8	47.2	43	13365	43499	13362	43502	8/29
670	I	109	87	37	1338	20.2	40.8	44	13363	43500	13367	43495	8/29
671	I	100	85	38	1191	24.0	46.4	42	13359	43504	13365	43504	8/29
672	II	50	85	36	631	26.0	54.4	42	13364	43504	13359	43504	8/29
673	II	63	89	31	935	23.8	55.1	42	13360	43504	13366	43504	8/29
674	I	59	82	37	717	25.4	59.2	42	13363	43505	13358	43504	8/29
675	II	56	76	46	553	19.6	50.8	41	13364	43505	13369	43505	8/29
676	I*	43	84	39	505	44.2	68.5	41	13369	43505	13363	43505	8/29
677	I*	66	80	46	652	24.2	45.1	41	13364	43505	13370	43505	8/29
678	II	63	81	48	601	25.4	37.9	41	13369	43505	13363	43505	8/29
678	I*	48	92	26	841	50.0	81.3	42	13366	43503	13372	43503	8/29
680	II	58	90	28	929	48.3	77.3	41	13371	43502	13364	43502	8/29
681	II	57	87	31	829	31.6	64.4	42	13366	43503	13371	43502	8/29
682	I*	61	88	31	892	37.7	67.6	41	13370	43503	13364	43502	8/29
South Channel (Scallop Survey Stratum 50)													
685	I*	236	75	61	1761	7.6	14.6	31	13783	43669	13789	43669	8/30
686	II	113	78	54	946	14.2	23.3	32	13789	43669	13782	43669	8/30
687	II	391	76	58	3038	7.7	13.8	32	13784	43668	13791	43667	8/30
688	I*	161	79	53	1372	9.3	16.3	30	13790	43669	13783	43670	8/30
689	II	373	76	57	2989	22.8	41.3	32	13777	43666	13779	43659	8/30
690	I*	237	73	64	1686	9.7	19.8	31	13779	43660	13778	43665	8/30
691	I*	638	74	62	4653	10.5	20.4	32	13777	43666	13779	43660	8/30
692	II	112	68	81	626	2.7	6.2	32	13778	43661	13778	43666	8/30
693	I*	317	77	55	2629	9.1	20.1	28	13782	43687	13780	43693	8/30
694	II	94	77	57	743	3.2	5.9	30	13780	43691	13783	43686	8/30
695	II	95	78	53	812	9.5	19.9	28	13782	43687	13780	43693	8/30
696	I*	157	79	51	1397	17.8	29.6	30	13781	43691	13783	43685	8/30
South Channel (Scallop Survey Stratum 45)													
697	I*	0	-	-	-	-	-	19	14029	43604	14036	43604	8/30
So. New England (Scallop Survey Stratum 41)													
698	I*	0	-	-	-	-	-	25	14117	43575	14124	43575	8/30
So. New England (Scallop Survey Stratum 42)													
699	I*	0	-	-	-	-	-	27	14190	43640	14192	43645	8/30

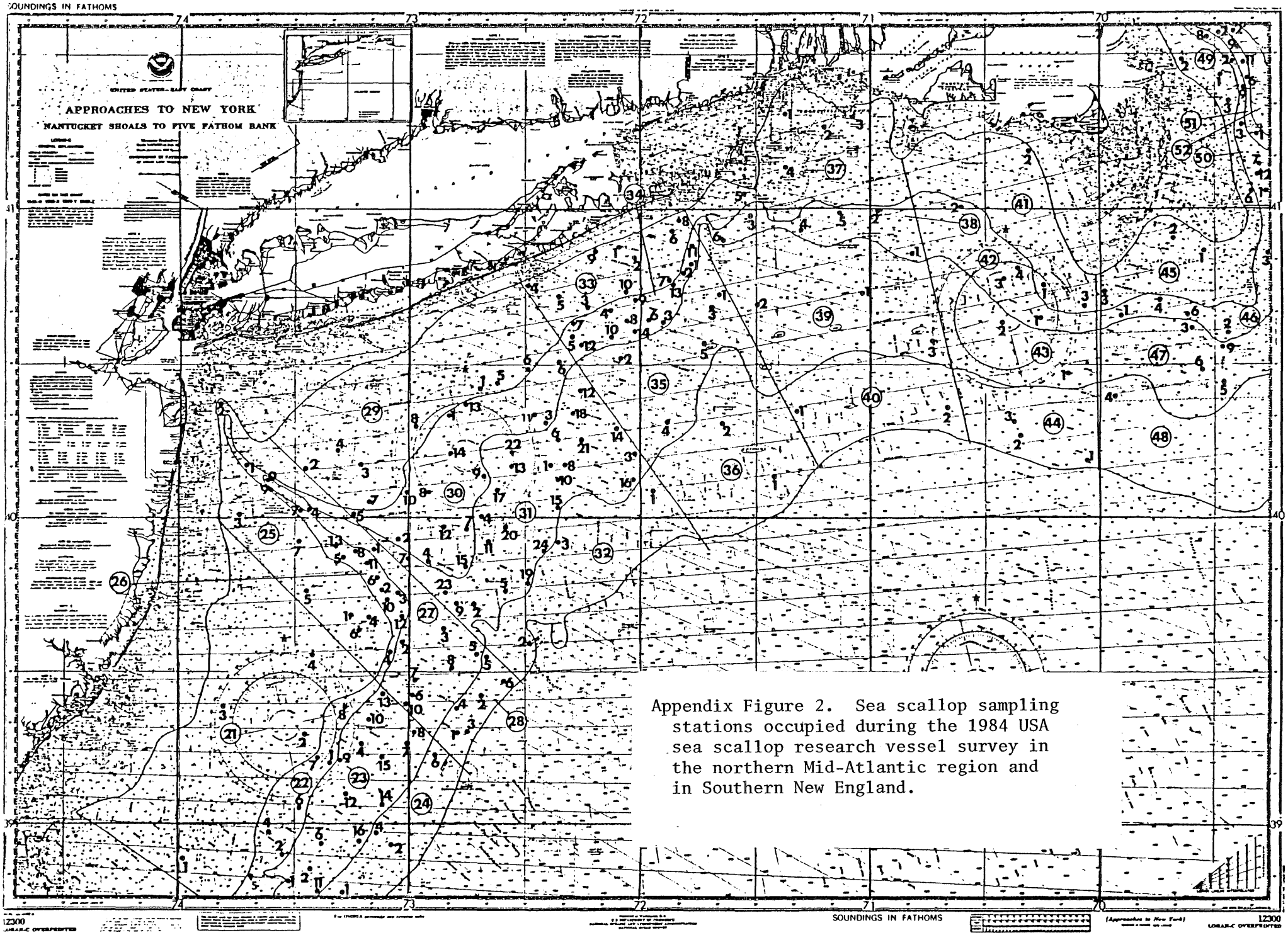
[1]See Appendix Figure 4 for tow locations.

[2]Number of meats per pound, calculated by applying shell height-meat weight equations to survey shell height frequencies to obtain average meat weight per scallop (in grams) and dividing this value into 453.6 grams (1 pound), shell height-meat weight equations utilized were:

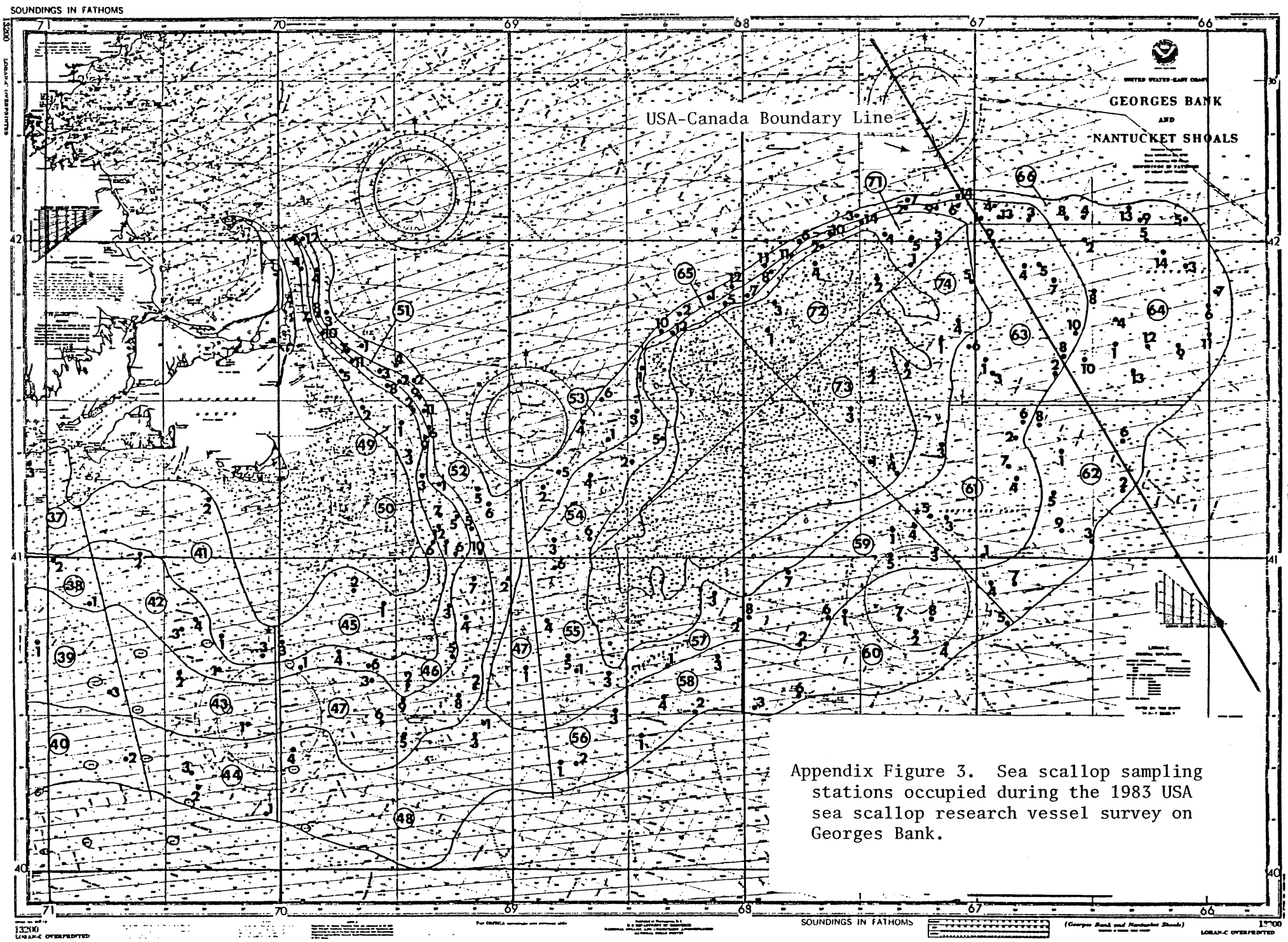
Fippennies Ledge (Gulf of Maine equation): ln Meat Weight (g) = -11.6526+3.0584 ln Shell Height (mm)
All Other Areas (Georges Bank equation): ln Meat Weight (g) = -11.7656+3.1693 ln Shell Height (mm)



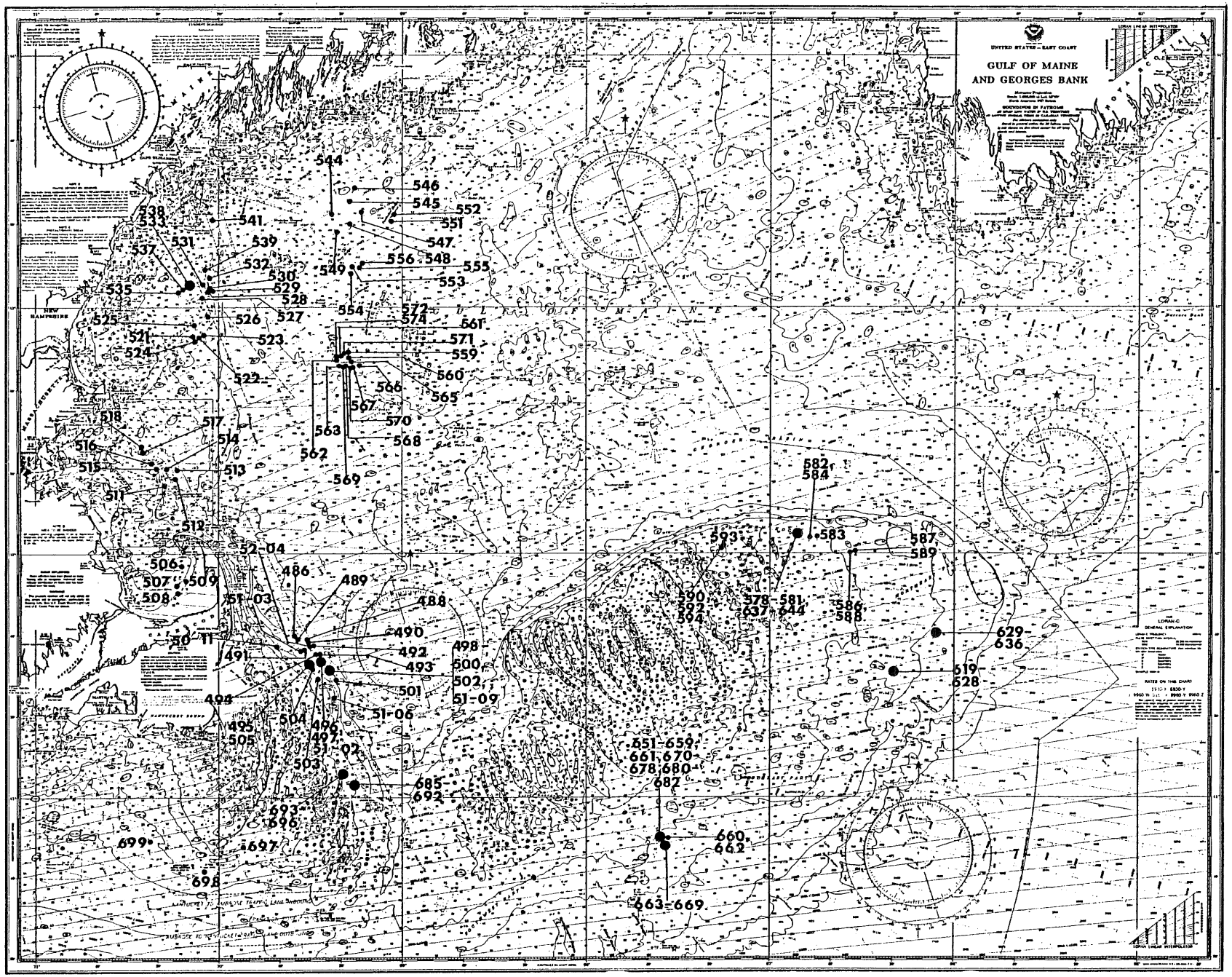
Appendix Figure 1. Sea scallop sampling stations occupied during the 1984 USA sea scallop research vessel survey in the Mid-Atlantic region.



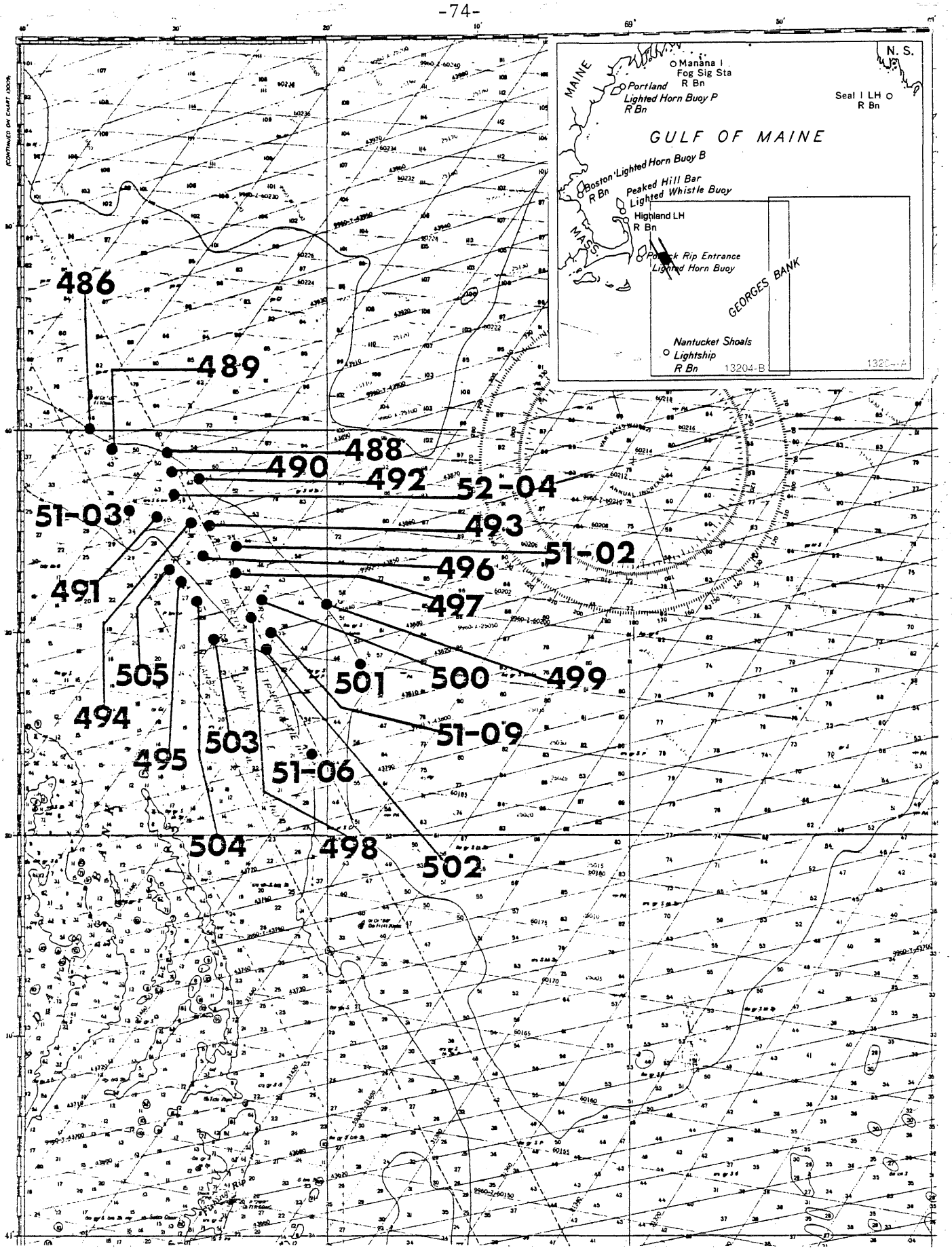
Appendix Figure 2. Sea scallop sampling stations occupied during the 1984 USA sea scallop research vessel survey in the northern Mid-Atlantic region and in Southern New England.



Appendix Figure 3. Sea scallop sampling stations occupied during the 1983 USA sea scallop research vessel survey on Georges Bank.



Appendix Figure 4. Gulf of Maine sea scallop sampling stations (Cape Cod Bay: 506-509; Stellwagen Bank: 511-518; Jeffreys Ledge: 521-532,539; Jeffreys Basin: 533, 535, 537-538; Tanta Ground: 541; Northeast of Three Dory Ridge: 544-549; Toothaker Ridge:551-552; Southeast of Three Dory Ridge: 553-556; and Fippennies Ledge: 559-570) and special gear comparison stations (571-699) occupied during the 1984 USA sea scallop research vessel survey. Also shown are special Iceland scallop sampling stations off of Cape Cod (see Appendix Figure 5 for greater detail of these stations).



Appendix Figure 5. Special Iceland scallop sampling stations (486-505) and regular sea scallop survey stations (51-02, 51-03, 51-06, 51-09, and 52-04) where Iceland scallops were caught during the 1984 USA sea scallop research vessel survey.