

**JOB 5: MARINE FINFISH SURVEY**

**Long Island Sound Trawl Survey**

# LONG ISLAND SOUND TRAWL SURVEY

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## **JOB 5: LONG ISLAND SOUND TRAWL SURVEY (LISTS)**

### **CRUISE RESULTS FROM THE 2017 SPRING AND FALL SURVEYS**

#### **STUDY PERIOD AND AREA**

The Connecticut DEEP Marine Fisheries Program completed the thirty-fourth year of the Long Island Sound Trawl Survey in 2017. The Long Island Sound Trawl Survey (LISTS) encompasses an area from New London to Greenwich, Connecticut and includes waters from 5 to 46 meters in depth in both Connecticut and New York state waters. Typically, Long Island Sound (LIS) is surveyed in the spring, from April through June, and during the fall, from September through October. This report includes results from the 2017 spring and fall sampling periods and provides time series information since the commencement of the survey in 1984.

#### **GOAL**

To provide long term monitoring of abundance, biomass and size composition of marine fishery resources along with environmental parameters, in order to evaluate the effects of fishing and environmental conditions on the distribution and abundance of living resources in Long Island Sound.

#### **OBJECTIVES**

- 1) Provide annual indices of counts and biomass per standard tow for 40 common species and age-specific indices of abundance for winter flounder, tautog, scup, summer flounder, bluefish (Age 0, 1+) and weakfish (Age 0, 1+).
- 2) Provide length-frequency distributions of bluefish, scup, summer flounder, winter flounder, tautog, striped bass, weakfish, black sea bass, and other ecologically important species.
- 3) Provide annual total counts and biomass for all finfish species taken and annual total biomass for all common macro-invertebrate species taken.
- 4) Provide species list for LIS based on LISTS sampling, noting the presence of additional species from other sampling conducted by the Marine Fisheries Programs.
- 5) Provide fishery independent survey data to cooperative state researchers or agencies, such as the National Marine Fisheries Service (NMFS), Atlantic States Marine Fisheries Commission (ASMFC), New England and Mid-Atlantic Fishery Management Councils (NEFMC and MAFMC, respectively), and researchers associated with state or local universities

## **INTRODUCTION**

The Long Island Sound Trawl Survey (LISTS) was initiated in 1984 to provide fishery independent monitoring of important recreational species in Long Island Sound (LIS). A stratified-random design based on bottom type and depth interval was chosen and 40 sites were sampled monthly from April through November to establish seasonal patterns of abundance and distribution. Seven finfish species were initially of primary interest: bluefish, scup, striped bass, summer flounder, tautog, weakfish, and winter flounder. Length data for these species were collected from every tow; scup, tautog, and winter flounder were sampled for aging. Lobster were also enumerated and measured from every tow. All fish species were identified and counted.

Since 1984, several changes have been incorporated into the Survey. In 1991, the sampling schedule was changed to a spring/fall format, although sampling is still conducted on a monthly basis (April - June, September, and October). Beginning in 1992, species were weighed in aggregate with an onboard scale to provide indices of biomass. Furthermore, more species have been sampled for lengths, such as windowpane and fourspot flounders, and important forage species such as butterfish, long-finned squid, and several herring species. By 2003, the list of species measured expanded to 20 finfish species and two invertebrate species (lobster and long-finned squid), plus rarely occurring species. Beginning in 2014, lengths were collected from all finfish species on each tow. In addition, at various times during the time-series, age structures were collected from bluefish, menhaden, tautog, scup, winter flounder, weakfish or summer flounder. All of these changes serve to improve the quality and quantity of information made available to fishery managers for local and regional assessment of stock condition, and to provide a more complete annual inventory of LIS fishery resources.

## **METHODS**

### **Sampling Design**

LISTS is conducted from longitude 72° 03' (New London, Connecticut) to longitude 73° 39' (Greenwich, Connecticut). The sampling area includes Connecticut and New York waters from 5 to 46 m in depth and is conducted over mud, sand and transitional (mud/sand) sediment types. Sampling is divided into spring (April-June) and fall (Sept-Oct) periods, with 40 sites sampled monthly for a total of 200 sites annually. The sampling gear employed is a 14 m otter trawl with a 51 mm mesh codend (Table 5.1). To reduce the bias associated with day-night changes in catchability of some species, sampling is conducted during daylight hours only (Sissenwine and Bowman 1978).

LISTS employs a stratified-random sampling design. The sampling area is divided into 1.85 x 3.7 km (1 x 2 nautical miles) sites (Figure 5.1), with each site assigned to one of 12 strata defined by depth interval (0 - 9.0 m, 9.1 - 18.2 m, 18.3 - 27.3 m or, 27.4+ m) and bottom type (mud, sand, or transitional as defined by Reid et al. 1979). For each monthly sampling cruise, sites are selected randomly from within each stratum. The number of sites sampled in each stratum was determined by dividing the total stratum area by 68 km<sup>2</sup> (20 square nautical miles), with a minimum of two sites sampled per stratum (Table 5.2, Gottschall et al. 2000). Discrete stratum areas smaller than a sample site are not sampled.



## Sampling Procedures

Prior to each tow, temperature (°C) and salinity (ppt), conductivity (mS/m) and dissolved oxygen (mg/l) were measured using an YSI model EXO2 data sonde. 2017 was the first year the EXO2 sonde was used by LISTS. The sonde records numerous water quality parameters while descending from surface to bottom and values are subsequently extracted at the depths most closely matching the 1m below surface and 0.5m above bottom depths used previously in the LISTS timeseries.

The survey's otter trawl was towed from the 15.2 m aluminum R/V John Dempsey for 30 minutes at approximately 3.5 knots, depending on the tide. At completion of the tow, the catch was placed onto a sorting table and sorted by species. Finfish, lobsters and squid were counted and weighed in aggregate (to the nearest 0.1 kg) by species with a precision marine-grade scale (30 kg, +/- 10 gm capacity). Catches weighing less than 0.1 kg were recorded as 0.1 kg. During the initial two years of the survey (1984 & 1985), lobsters were the only invertebrates recorded. Squid abundance has been recorded since 1986. Since 1992, additional invertebrate species have been weighed in aggregate, and some have been counted. The complete time series of species counted and weighed in the survey is documented in Appendix 5.4.

For finfish species, lengths were recorded to the centimeter as either total length or fork length (e.g. measurements from 100 mm to 109 mm were recorded as 10 cm) and entered in the database as 105 mm (Table 5.3). Lobsters were measured to 0.1 mm carapace length. Squid were measured using the mantle length (cm), horseshoe crab measurements were taken using prosomal width (cm) and whelk (knobbed and channeled) shell widths were measured in millimeters.

The number of individuals measured from each tow varied by species, the size of the catch and range of lengths (Table 5.3). If a species was subsampled, the length frequency of the catch was determined by multiplying the proportion of measured individuals in each centimeter interval by the total number of individuals caught. Some species were sorted and subsampled by length group so that, for example, all large individuals were measured and a subsample of small (often young-of-year) specimens was measured. All individuals not measured in a length group were counted. The length frequency of each group was estimated as described above, i.e. the proportion of individuals in each centimeter interval of the subsample was expanded to determine the total number of individuals caught in the length group. The estimated length frequencies of each size group were then appended to complete the length frequency for that species. This procedure was often used with catches of bluefish, scup, and weakfish, which were usually dominated by young-of-year or discrete age/length classes.

Bluefish, menhaden, scup, summer flounder, tautog and winter flounder were sampled for age determination (Table 5.3). The target number of age samples (otolith) for bluefish were 50 from the spring period (defined by ASMFC Bluefish Technical Committee as Jan-July) and 50 from the fall period (August-December). However, bluefish catches are hard to predict so the number of age samples varied greatly; sometimes more than the target number was collected solely from LISTS samples but other times LISTS samples needed to be augmented with samples from the recreational fishery to meet the target number. Sufficient numbers of bluefish age samples from LIS would also make it possible to develop an LIS-specific age key, so bluefish age samples were sometimes still collected even after the target number was reached.

Subsamples of scup, stratified by length group, were measured to the nearest mm (fork length) and scales from each individual were taken for ageing. Scup scales were removed posterior to the pectoral fin and ventral to the lateral line. The scales were pressed onto plastic laminate with an Ann Arbor roller press to obtain an impression of the scale, which was then viewed with a microfiche reader at 21x. Scales were also taken from all summer flounder greater than 59 cm. At least 15 scales were removed from the caudal peduncle area. These scales were pressed and aged to supplement the NMFS age key and were also included in the formulation of LISTS summer flounder catch-at-age matrix (see below). Subsamples of winter flounder, stratified by length group and area (as listed in bottom of Table 5.3), were iced and taken to the lab where they were measured to the millimeter (total length), weighed (gm) and sexed. Their maturity stage was determined (NMFS 1989), and otoliths were collected for age determination later. Amendment 2 of the ASMFC Atlantic menhaden Fishery Management Plan introduced a requirement of 10 fish for age samples per 300 metric tons landed in the commercial bait fishery to support improved stock assessments. Connecticut has such a small menhaden commercial fishery that one 10-fish sample would suffice. The same size/age component of the menhaden population taken in the commercial fishery was available to LISTS so menhaden scales were collected during LISTS sampling; 216 menhaden age samples were taken in 2016. LISTS age samples of menhaden provide one of the few fishery independent sources of age data for adult menhaden in northern waters and are therefore valuable for stock assessments. Menhaden fork length (mm), and sex were recorded and scales were taken about mid-body (lateral line) and below the insertion of the dorsal fin. The ASMFC Tautog Fishery Management Plan (FMP) requires CT DEEP to collect a minimum of 200 age structures per. Due to the low numbers of tautog caught in LISTS in recent years (less than 250 fish), age structures were collected from most tautog taken in LISTS. Tautog were iced and taken to the lab, where their total length (mm), sex, and total weight (gm) were recorded and age structures were collected. LISTS has used opercula to age tautog since 1984 (Cooper 1967). The ASMFC Tautog Technical Committee requested that states collect paired age structures for comparison studies; therefore, LISTS began collecting tautog otoliths in addition to opercula in 2012. Results from an ASMFC Tautog Ageing Workshop in May 2012 indicated there was no clear benefit to switching from opercula to otoliths for Connecticut, so otoliths were collected (minimum of 50 paired structures per ASMFC) and archived for potential use in the future. Subsequent to the 2012 workshop, a study conducted by Massachusetts Division of Marine Fisheries (Elzey and Trull 2016) showed tautog pelvic fin spine sections may be a better structure (easier to read and non-lethal to collect). In 2016, LISTS started to collect pelvic fin spines for tautog, archiving them for future ageing work.

In reports prior to 2001, three species were not included in annual and seasonal totals: American sand lance, bay anchovy, and striped anchovy. These species, with the possible exception of striped anchovy, can be very abundant in Long Island Sound, but are not retained well in the otter trawl. Additionally, many of these fish are young-of-year and often drop out of the net as it is retrieved and wound on the net reel. For this reason they were not included in the list of species to be counted when LISTS was started in 1984. However, to document the occurrence of these species in LISTS catches, American sand lance was added in 1994, striped anchovy was added in 1996, and bay anchovy was added in 1998. Since 2001, adults of these three species have been included in the annual and seasonal totals and young-of-year listed if present in the year's catch but are not quantified (Table 5.15, Appendix 5.4). Young-of-year for

these three species are included in the database but are cataloged with a separate species identifier and quantities are considered estimates (Appendix 5.2).

Interactions with endangered species during the course of sampling are regulated by the by NOAA Greater Atlantic Regional Fisheries Office (GARFO) Protected Species Division. Sampling procedures have been modified in recent years to minimize the likelihood of injury to Atlantic sturgeon (a Federally listed endangered species since 2012). When sampling in a season and area where the chance of catching a sturgeon is high (based on historic LISTS catch) and water depth is greater than 27 m, gear retrieval speed is reduced to decrease the stress induced by rapid changes in pressure. When an endangered species is detected in the net, it is removed as quickly and carefully as possible. Subsequent handling and processing of endangered species adhere to the Reasonable and Prudent Measures as well as the Terms and Conditions specified in the ESA Section 7 Biological Opinion's Incidental Take Statement issued by NOAA for CT in January 2013 ([http://www.greateratlantic.fisheries.noaa.gov/protected/section7/bo/actbiops/usfws\\_state\\_fisheries\\_surveys\\_2013.pdf](http://www.greateratlantic.fisheries.noaa.gov/protected/section7/bo/actbiops/usfws_state_fisheries_surveys_2013.pdf)). Additionally, handling and processing of sturgeon follow protocols described in A Protocol for Use of Shortnose, Atlantic, Gulf, and Green Sturgeons (Kahn and Mohead. 2010. U.S. Dep. Commerce, NOAA Tech Memo, NMFS-OPR-45, 62p., [http://www.nmfs.noaa.gov/pr/pdfs/species/kahn\\_mohead\\_2010.pdf](http://www.nmfs.noaa.gov/pr/pdfs/species/kahn_mohead_2010.pdf)). One (1) Atlantic sturgeon was captured on one (1) of the 144 tows completed in 2017. No other protected species were encountered. All interactions with endangered species are detailed in Appendix 5.5.

## **Data Analysis**

### ***Indices of Abundance: Annual Mean Count and Weight per Tow***

To evaluate the relative abundance of common species, an annual spring (April - June) and fall (September - October) geometric mean number per tow and weight per tow (biomass, kg) was calculated for the common finfish and invertebrate species. To calculate the geometric mean, the numbers and weight per tow were logged ( $\log_e$ ) to normalize the highly skewed catch frequencies typical of trawl surveys:

$$\text{Transformed variable} = \ln(\text{variable}+1).$$

Means were computed on the log scale and then retransformed to the geometric mean:

$$\text{geometric mean} = \exp(\text{mean})-1.$$

The geometric mean count per tow was calculated from 1984 - 2017 for 38 finfish species, lobster, and long-finned squid (1986 - 2017). The geometric mean weight per tow was calculated using weight data collected since 1992 for the same species, plus an additional 13 invertebrates.

For the seven finfish species that were measured on every tow in the time-series (bluefish, scup, striped bass, summer flounder, tautog, weakfish, and winter flounder), biomass indices were calculated for the years 1984 - 1991 by using length/weight equations to convert length frequencies to weight per tow. Bluefish, scup, weakfish and winter flounder lengths were converted using equations from Wilk et al. (1978); striped bass conversions were accomplished using an equation from Young et al. (1994); summer flounder and tautog conversions were

accomplished using equations developed from LISTS data from 1984 - 1987 and 1984 - 1996 respectively.

### ***Indices of Abundance: Indices-at-Age and Age Group***

Annual age specific indices (indices-at-age matrices) were calculated for scup, striped bass, summer flounder, winter flounder and tautog. The age data used to calculate the indices came from three sources: striped bass ages were derived using the von Bertalanffy (1938) equation; summer flounder age-length keys were obtained from the NMFS Northeast Fisheries Science Center spring and fall trawl surveys combined with LISTS ages (>59 cm); scup, winter flounder and tautog age-length keys (in 1 cm intervals) were obtained directly from LISTS. Since fish growth can fluctuate annually as a function of population size or other environmental factors, a year and season specific age-length key was used wherever possible. Once lengths had been converted to age, the proportion at age was multiplied by the abundance index of the appropriate season to produce an index of abundance at age.

Recruitment (young-of-year) and age 1+ (all fish age one and older) indices were calculated for bluefish and weakfish by using observed modes in the LISTS length frequencies to separate the two groups.

The specific methods used to calculate indices-at-age for each species were as follows:

- ◆ **Bluefish.** Age samples (otoliths) were taken from 125 bluefish, eleven (11) from the spring period and 114 from the fall period. In 2012 a coast wide biological sampling program was initiated through ASMFC Addendum 1 of the bluefish management plan. Since a robust age-length key was still not available for the Long Island Sound region, the method of using modes observed in the fall length frequencies to separate bluefish into age 0 and age 1+ groups, and calculating a geometric mean catch per tow for each group (Table 5.22) was continued through 2017. Comparison of the mean lengths-at-age reported for young-of-year and age 1 bluefish in the New York Bight (Chiarella and Conover 1990) and LIS (Richards 1976) with LISTS length frequencies suggests that bluefish can easily be identified as either age 0 (snapper bluefish) or adults (age 1+). Richards (1976) and Chiarella and Conover (1990) determined that most bluefish less than 30 cm are age 0. A discontinuity in the LISTS fall length frequencies occurs most years between 26 cm and 39 cm (Table 5.42). Therefore 30 cm was determined to be a suitable length for partitioning age 0 and age 1 fish. With the addition the biological sampling programs along the coast, a regional northeast key is being compiled through ASMFC.

Prior to 2012, there was limited bluefish ageing in the northeast. Although North Carolina state biologists have aged bluefish for some time, their age keys were not used to age Long Island Sound bluefish because North Carolina mean lengths-at-age are not consistent with modes observed in Long Island Sound bluefish length frequencies. This difference suggests that growth may vary by region, or that early and late spawned bluefish may be differentially distributed along the coast (Kendall and Walford 1979).

- ◆ **Scup.** Scales from 672 scup were collected in 2017; 385 from the spring cruise and 287 from the fall cruise. An index-at-age matrix was developed for 1984-2017 using spring

(May-June only) and fall (September-October) LISTS data (Table 5.23). April data was omitted since very few scup are taken during the month. A total of 15,143 scup aged between 1984 and 2017 were used to make year and season specific age-length keys (1 cm intervals). In the relatively few instances when the season/year specific key failed at a given 1 cm length interval, a three-year pooled key was used to determine the age. Three-year pooled keys were calculated using the years preceding and following the “run” year. For the terminal year, only two years were used for the pooled key. Indices-at-age were computed for both spring and fall each year. Since very few scup older than age 9 are taken (less than 4% in any given year), an age 10+ group was calculated by summing indices for ages 10 and up. To represent the full adult portion of the population an age 2+ index was calculated by summing the indices for ages 2 through 10+.

- ◆ **Striped bass.** To approximate the ages of striped bass taken in the spring survey (Table 5.24), the average of the Chesapeake Bay and Hudson River striped bass von Bertalanffy parameters ( $L_{\max} = 49.9$  in,  $K = 0.13$ ,  $t_0 = 0.16$ , Vic Crecco, pers. comm.) were used in the rearranged von Bertalanffy equation:

$$t = (1/K) * (-\log_e ((L_{\max} - L_t) / L_{\max})) + t_0$$

Since this equation estimates age  $t$  as a fraction of a year, the estimates were rounded to the nearest year (e.g. age 3 = ages 2.5 to 3.4). A spring catch-at-age matrix was developed for 1984 through 2017 by apportioning the spring index by the percentage of fish at each age (Table 5.25).

- ◆ **Summer flounder.** The year and season specific age-length keys (1 cm intervals) used to age LISTS catches were provided by NMFS from their spring and fall trawl surveys. These keys were supplemented with fish caught and aged by LISTS (typically 60 cm and over). LISTS also provides the age data from these fish (> 60cm) to NMFS. Only summer flounder greater than or equal to 60cm were sampled for age structures during the Spring 2017 LISTS cruise. During the fall cruise, however, LISTS staff decided to also collect representative scale samples from smaller fluke once it became known that there would be no samples from NMFS for this period. The age-key was constructed using both LISTS and NMFS age data. In 2017, 142 summer flounder were aged: 3 from the spring (60 - 70cm) and 139 from the fall (16 - 69cm). Since 2001, whenever the season/year specific key failed at a given 1 cm length interval a pooled year key using only adjacent years was used (Gottschall and Pacileo 2002).
- ◆ **Tautog.** An index-at-age matrix was developed for 1984-2015 using all survey months (Gottschall and Pacileo 2007) (Table 5.27). Ageing for 2006-2012 has been completed and preliminary ageing for 2013-2015 has been done. As 2016 (n=276) and 2017 (n=75) age samples have not yet been aged. The index-at-age matrix will be updated for 2016 and 2017 fish once the structures have been aged.
- ◆ **Weakfish.** Age 0 and age 1+ indices were calculated for both spring (1984 – 2017) and fall surveys (1984 – 2009, 2011 - 2017) (Table 5.28). Since few weakfish are taken in April, the spring geometric mean was calculated using only May and June. All weakfish taken in spring are assumed to be age 1+. Similar to bluefish, the fall age 0 and 1+

indices were calculated by using length frequencies to separate the catch. Since a break in the fall length frequencies generally occurs between 24 and 32 cm each year (Table 5.57), weakfish less than 30 cm are considered to be age 0 while those greater than or equal to 30 cm are ages 1+.

- ◆ **Winter flounder.** An index-at-age matrix was developed for 1984-2015 using April and May LISTS data (Table 5.29). June data were not used since length frequency data suggest that many adult winter flounder have left the Sound by this time (an exception was made for 1984, the first year of LISTS, because very few samples were taken in the spring months). A total of 23,697 winter flounder aged between 1984 and 2015 were used to make year and region (east of Stratford Shoal, west of Stratford Shoal) specific age-length keys in 1 cm intervals. Similar to scup and summer flounder, three year pooled keys using only the adjacent years (two years for the terminal year runs) were used to assign ages if year specific keys were not available. As 2016 (n=525) and 2017 (n=40) age samples have not yet been aged, a pooled key of from previous years was used.

Each flounder aged as described above was also assessed for maturity stage by sex following Burnett (1989). CT DEEP staging of winter flounder was verified in a cooperative study with NMFS in 2009-2010 (Gottschall and Pacileo 2011). The percentage of male and female fish in each centimeter length group that was sexually mature (ripe, resting, or spent) was calculated in order to determine the length group at which 50% was mature each year.

### ***Species Richness by Group***

The Long Island Sound Trawl Survey monitors species richness using groups of species classified as either cold temperate or warm temperate. For the purposes of tracking species richness, American sand lance, bay anchovy, and striped anchovy were omitted (see *Sampling Procedures* section). All other finfish species captured in LISTS were divided into groups based on their temperature preferences and seasonal spawning habits as documented in the literature (Collette and Klein-MacPhee 2002, Murdy et al. 1997). Species in the cold temperate group prefer water temperatures below 15°C (60°F), tend to spawn at the lower end of their temperature tolerance range, and are more abundant north of Long Island Sound than south of New York. Species in the warm temperate group prefer warmer temperatures (11-22°C or 50-77°F), tend to spawn in the upper range of their temperature tolerance, and are more abundant south of the Sound than north of Cape Cod (Appendix 5.6). Species that are not tolerant of cold temperatures, are abundant only south of Chesapeake Bay but stray into northern waters mostly as juveniles, and spawn only in the mid-Atlantic Bight and south were placed into a separate group (subtropical) and were not included in the analysis because they are typically only present in the fall LISTS.

### ***Open Water Forage Abundance***

A Long Island Sound open water forage index of abundance was compiled to measure the available food base which supports resident and migratory species within the Sound. This index is formulated as a biomass index that is assembled from 11 of the forage species that are most

common in LISTS catches along with three other species that are considered forage at an early life stage (young-of-year or YOY). The species used to generate the index are: Atlantic herring, long-finned squid, butterfish, alewife, blueback herring, American shad, hickory shad, menhaden, whiting, spotted hake, and red hake along with young-of-year scup, bluefish, and weakfish (Figure 5.16). The geometric mean biomass is calculated using the aggregate of these 14 species on a per tow basis and calculated using the same methodology as described above for individual species biomass indices.

## **RESULTS AND DISCUSSION**

### **Overview of LISTS 2017 Spring and Fall Surveys**

During routine inspection of the R/V John Dempsey, the research vessel used to conduct the Long Island Sound trawl Survey (LISTS), it was discovered the cutlass bearing needed to be replaced and the rudder box serviced. While the vessel was in dry dock it was also necessary to have a number of welding repairs made to metal handrails, starboard wheelhouse door hinge, engine discharge pipe and the stern tube. These repairs were integral to the vessel's safe operation and were required to meet safety standards for the vessel's USCG Certificate of Inspection. The hydraulics on the vessel also required a badly needed overhaul. Many of the mechanisms associated with the hydraulic system were replaced including the winch drum shafts, motors, rams, net reel motor and controls. These repairs took six weeks to complete and unfortunately impacted the spring trawl survey.

There was no April sampling in 2017, and only abbreviated May sampling due to the time it took to complete the repairs. May sampling started on May 22 and continued until June 2, completing 24 sites in eight (8) days underway. June sampling began on June 12 and ended on June 29, taking twelve (12) days underway to complete the 40 sites. The Fall Survey commenced on September 7 but didn't end until October 3. Although 40 sites for September were completed in nine (9) days underway, almost two full weeks were lost for sampling since weather conditions were too rough for sampling on five (5) days and the power-take-off on the hydraulics (PTO) was inoperable for four (4) days. The 40 sites for October were completed in ten (10) days underway but took from October 11 until November 1 due to time lost to rough weather (5) and staff shortage (1 day). In total, 144 LISTS sites were completed in 40 days underway during the spring and fall 2017 surveys (Table 5.4), not including transit or changeover days.

Maps showing the sites selected versus the sites sampled during each month of sampling are provided in Figure 5.2 (April), Figure 5.3 (May), Figure 5.4 (June), Figure 5.5 (September) and Figure 5.6 (October). Within each figure the red bordered sites are the sites selected for the month and the solid blue dots indicate the actual sites sampled. If a site had to be relocated during sampling, an explanation of why it was moved is provided under the figure. Additional site/station information is provided in Table 5.5 (April), Table 5.6 (May), Table 5.7 (June), Table 5.8 (September) and Table 5.9 (October). These tables provide date of sample, time, tow duration, latitude/longitude, surface and bottom temperature and salinity, average tow speed, distance towed and approximate area swept for each tow.

Sometimes, a full 30-minute tow cannot be completed. Typical reasons for short tows include lack of room because of observed pot gear set in the immediate area, a drop in speed due

to entanglement with some object on the bottom (frequently derelict pot gear), or a complete stop in forward motion (submerged wreck or rock pile). Survey crew will often attempt to finish an interrupted tow by clearing the net (if needed) and resetting beyond the obstruction or observed gear. If this is not possible, a site may have to be moved to another site nearby with the same stratum (bottom type and depth). If the site was moved, the data from the initial site will not be used. Typically, a minimum of 15-20 minutes of tow time is required for a LISTS tow to be recorded. However, there are occasions when a tow with less than 15 minutes will be accepted, usually because there is no alternate site in the designated strata in the vicinity. Short tow information for each month in the survey is summarized in Table 5.10.

### **Cooperative Sample and Data Collection**

LISTS staff participate in cooperative efforts for sample collections, data requests, and special projects using survey personnel, equipment, and other resources. Most of these cooperative efforts are with state researchers or agencies, the National Marine Fisheries Service, Atlantic States Marine Fisheries Commission, New England and Mid-Atlantic Councils, and researchers or graduate students associated with state or local universities. Table 5.11 illustrates many of the organizations that requested data during the project-year, while Table 5.12 shows sample requests received and fulfilled. In recent years, many requests for samples have come from high schools, aquariums, or other educational organizations needing finfish and invertebrates for teaching purposes. Additionally, Fisheries Division staff often have sample or data requests for media or other public outreach events (see Job 11 of this report).

### **Number of Species Identified**

LISTS observed 49 finfish species in 2017 (Table 5.13). No new vertebrate species were encountered in either of the spring or fall surveys. From 1984 to 2017, LISTS has identified 111 finfish species (Appendix 5.1), averaging 58 species per year with a range of 43 to 70 species (Figure 5.7). In addition, a total of 32 types of invertebrates were collected in 2017 (Table 5.14). Most invertebrates are identified to species. However, in some cases, invertebrates were identified to genus or a higher level taxon. One new invertebrate species, jingle shell clam (*Anomiidae* sp), was encountered in 2017 and identified to the genus level.

### **Total Catch**

Appendix 5.4 presents a time series (1984-2017) of the finfish species collected each year and their respective rank by numbers. Annual total biomass of invertebrates is also included in this appendix (1992-2017), ranked by weight (kg). A total of 134,295 finfish weighing 18,711 kg were sampled in 2017 (Table 5.15). In the spring of 2017, a total of 59,727 finfish weighing 11,356 kg were sampled and a total of 74,568 finfish weighing 7,355 kg were sampled in fall of 2017 (Table 5.16). A total of 1,073 kg of invertebrates were taken in 2017 (Table 5.15). The total biomass of invertebrate catch taken in the spring of 2017 was 266 kg while a total of 807 kg of invertebrates were taken in fall (Table 5.17).



## Length Frequencies

Length frequency tables are provided primarily to give the reader an understanding of the size range of various species taken in LISTS. Lengths are converted to age frequencies for analysis of principal species such as scup, bluefish, striped bass, summer flounder, tautog, winter flounder, and weakfish. Changes such as an expansion in the size (age) range for some important recreational species are apparent in recent years including more large scup (Table 5.52-5.53), striped bass (Table 5.54-5.55), and summer flounder (Table 5.56-5.57).

Length frequencies were prepared for 22 species:

alewife	spring and fall	1989 - 2017	Table 5.30;
American shad	spring and fall	1989 - 2017	Table 5.31;
American lobster	spring and fall (M&F)	1984 - 2017	Table 5.32-Table 5.35;
Atlantic herring	spring and fall	1989 - 2017	Table 5.36;
Atlantic menhaden	spring and fall	1996 - 2017	Table 5.37;
black sea bass	spring and fall	1987 - 2017	Table 5.38, Table 5.39
blueback herring	spring and fall	1989 - 2017	Table 5.40;
bluefish	spring and fall	1984 - 2017	Table 5.41, Table 5.42;
butterfish	spring and fall	1986 - 1990, 1992 - 2017	Table 5.43;
clearnose skate	spring and fall	1993 - 2017	Table 5.44, Table 5.45;
fourspot flounder	spring and fall	1989 - 1990, 1996 - 2017	Table 5.46;
hickory shad	spring and fall	1991 - 2017	Table 5.47;
horseshoe crab	spring and fall (M&F)	1998 - 2017	Table 5.48, Table 5.49;
long-finned squid	spring and fall	1986 - 1990, 1992 - 2017	Table 5.50, Table 5.51;
scup	spring and fall	1984 - 2017	Table 5.52, Table 5.53;
striped bass	spring and fall	1984 - 2017	Table 5.54, Table 5.55;
summer flounder	spring and fall	1984 - 2017	Table 5.56, Table 5.57;
tautog	spring and fall	1984 - 2017	Table 5.58, Table 5.59;
weakfish	spring and fall	1984 - 2017	Table 5.60, Table 5.61;
windowpane flounder	spring and fall	1989, 1990, 1994 - 2017	Table 5.62, Table 5.63;
winter flounder	April-May and fall	1984 - 2017	Table 5.64, Table 5.65;
winter skate	spring and fall	1995 - 2017	Table 5.66.

For the years where length data are available, length frequencies were prepared for the seasons or months for which the preferred indices of abundance and catch-at-age matrices are calculated; for some species length frequencies are provided for both seasons.

## Seasonal Indices of Abundance

The geometric mean count per tow was calculated from 1984-2017 for 38 finfish species plus lobster and long-finned squid (squid since 1986). All spring (April-June) and fall (September-October) data are used to compute the abundance indices presented in Tables 5.18 (spring) and 5.19 (fall), with the preferred seasonal index (for counts) denoted by an asterisk. Geometric mean biomass-per-tow indices have been calculated for 38 finfish and 15 invertebrate species (or species groups) since 1992, for both spring and fall (Table 5.20 and 5.21, respectively). Age specific indices of abundance were calculated for selected important recreational species, including scup, striped bass, summer flounder, and winter flounder (see

below). Bluefish and weakfish recruitment indices were calculated using modal analyses of the length frequencies. For each of the 38 finfish species, plots including catch per tow in numbers and biomass in kilograms are illustrated in Figures 5.8 through 5.13. These figures also include plots of each of the age specific indices and recruitment indices mentioned above. Figure 5.14 provides plots of abundance (biomass) indices for crabs (lady, rock, spider; 1992-2017), American lobster (1984-2017), horseshoe crab (1992-2017), and long-finned squid (1986-2017).

### **Indices of Abundance: Important Recreational Species**

Spring and fall abundance indices are presented in Tables 5.18-5.19. Indices of abundance at age were also calculated for seven important recreational species: bluefish (Table 5.22), scup (Table 5.23), striped bass (Table 5.24 age frequency, Table 5.25 indices at age), summer flounder (Table 5.26), tautog (Table 5.27), weakfish (Table 5.28) and winter flounder (Table 5.29). Bluefish and striped bass indices-at-age are based on the fall and spring surveys, respectively, whereas winter flounder indices-at-age are based on only the April and May cruises of the spring survey. Summer flounder, scup and weakfish indices-at-age are calculated and presented separately for each season. Modal distributions were used to calculate recruitment indices for bluefish and weakfish. Although age structures for bluefish are now being collected, it may take a few years before there is enough age data to construct a robust age key (see methods).

### **Species Richness by Group**

The number of cold temperate and warm temperate species captured in each tow was averaged by seasonal cruise (April-June and September-October) for each year from 1984-2017 as an indicator of annual biological diversity or species richness. Trends in these indicators were tested for statistical significance by regression analysis. Results (Figure 5.18) show that the average number of warm temperate species captured/tow in spring and fall cruises has increased ( $F=32.2$  and  $86.7$  respectively,  $p<0.0001$ ); while the average number of cold temperate species has decreased, especially in spring ( $F=52.5$ ,  $p<0.0001$ ) but also in fall cruises ( $F=20.2$ ,  $p<0.0001$ ).

### **MODIFICATIONS**

An analysis of the 30+ year time series of LISTS catch at age data for winter flounder is planned for the next project segment to determine how project resources will be allocated with respect to winter flounder ageing. Although winter flounder otoliths were collected in 2017 using the standard procedures outlined in the Methods, ageing of the structures was not completed for this project year due to work force limitations. Given expected further attrition in staffing levels, Project staff have begun looking at whether or not to continue the labor-intensive process of collecting, processing and ageing 400-900 winter flounder otoliths each year given the other demands upon Project resources. One alternative course of action may be to reduce the number of winter flounder ageing samples collected and/or processed. Another option may be to use a LISTS time-series pooled age key to assign ages to winter flounder lengths. Additional options may be to obtain age keys from neighboring states or use a regional key as is done for other species (such as summer flounder). Since winter flounder abundance in Long Island Sound has been decreasing for some time now (more than a decade), there is no longer a substantial

recreational (or commercial) fishery for it; therefore, Project resources may need to be allocated differently in the future.

Reallocation of staff resources may also be considered for ageing work performed on other species in addition to winter flounder. For example, in 2017, bluefish age structures collected by LISTS were sent to the Northeast Fisheries Science Center (NEFSC) for ageing. However, the resulting age data have not been evaluated by LISTS staff and bluefish ages in this report are still derived from the length frequency (see Methods). If sending bluefish age structures to NEFSC is deemed the best way to acquire the age structure information for bluefish in the future, the practice of sending the structures to them may continue. Sending age structures for other species to an outside lab for processing may also be considered.

As noted in previous reports, LISTS staff have been investigating options for converting the bulk of data collection from manual, paper-based to an electronic data acquisition system. Based on progress to-date, LISTS is hoping to move to mostly paperless data collection for the 2018 survey (see Job 6 in this report for details).

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**TABLES 5.1 - 5.29**  
**LISTS**

**Table 5.1. Specifications for the Wilcox 14 m high-rise trawl net and associated gear.**

<b>Component</b>	<b>Description</b>
<b>Headrope</b>	9.1 m long, 13 mm combination wire rope
<b>Footrope</b>	14.0 m long, 13 mm combination wire rope
<b>Sweep</b>	Combination type, 9.5 mm chain in belly, 7.9 mm chain in wing
<b>Floats</b>	7 floats, plastic, 203 mm diameter
<b>Wings</b>	102 mm mesh, #21 twisted nylon
<b>Belly</b>	102 mm mesh, #21 twisted nylon
<b>Tail Piece</b>	76 mm mesh, #21 twisted nylon
<b>Codend</b>	51 mm mesh, #54 braided nylon
<b>Ground Wires</b>	18.2 m long, 6x7 wire, 9.5 mm diameter
<b>Bridle Wires:</b>	top legs 27.4 m long, 6x7 wire, 6.4 mm diameter
<b>Bottom Legs</b>	27.4 m long, 6x7 wire, 11.1 mm, rubber disc type, 40 mm diameter
<b>Doors</b>	Steel "V" type, 1.2 m long x 0.8 m high, 91 kg
<b>Tow Warp</b>	6x7 wire, 9.5 mm diameter

**Table 5.2. The number of sites scheduled for sampling each month within the 12 depth-bottom type strata.**

<b>Bottom type</b>	<b>Depth Interval (m)</b>				<b>Totals</b>
	<b>0 - 9.0</b>	<b>9.1 - 18.2</b>	<b>18.3 - 27.3</b>	<b>27.4+</b>	
<b>Mud</b>	2	3	5	5	15
<b>Sand</b>	2	2	2	2	8
<b>Transitional</b>	3	5	5	4	17
<b>Totals</b>	<b>7</b>	<b>10</b>	<b>12</b>	<b>11</b>	<b>40</b>

**Table 5.3. Length and age data collected in 2017.**

*In addition to the species listed below, other rarely occurring species (typically totaling less than 30 fish/year each) were measured. During 2017, sixteen other species were measured during LISTS sampling as either rarely occurring species or for other research related projects*

Species measured	Measurement	# tows/day	# fish measured
Alewife	FL (cm)	All	min of 15 / tow
American lobster	CL (0.1 mm)	All	min of 50 / tow
American shad	FL (cm)	All	min of 15 / tow
anchovy, bay	FL (cm)	All	min of 10 / tow
Atlantic herring	FL (cm)	All	min of 15 YOY and min of 30 adults / tow
Atlantic menhaden	FL (cm)	All	min of 15 / tow
Atlantic sturgeon	FL (cm)	All	All
Blueback herring	FL (cm)	All	min of 15 / tow
Bluefish	FL (cm)	All	min of 30 YOY / tow, all adults
black sea bass	TL (cm)	All	All
butterfish	FL (cm)	All	min of 15 YOY and 15 adults / tow
cunner	TL (cm)	All	All
dogfish, smooth	FL (cm)	All	All
dogfish, spiny	FL (cm)	All	All
fourspot flounder	TL (cm)	All	min of 30 / tow
hake, red	TL (cm)	All	min of 30 / tow
hake, silver (whiting)	TL (cm)	All	min of 30 / tow
hake, spotted	TL (cm)	All	min of 30 / tow
hickory shad	FL (cm)	All	All
hogchoker	TL (cm)	All	min of 30 / tow
horseshoe crab	PW (cm)	All	All
northern searobin	FL (cm)	All	min of 30 / tow
moonfish	FL (cm)	All	min of 10 / tow
smallmouth flounder	TL (cm)	All	min of 10 / tow
skate, clearnose	TL (cm)	All	min of 30 / tow
skate, little	TL (cm)	All	min of 30 / tow
skate, winter	TL (cm)	All	All
striped bass	FL (cm)	All	All
striped searobin	FL (cm)	All	min of 30 / tow
scup	FL (cm)	All	min of 15 YOY and 30 / mode for age 1+
long-finned squid	ML (cm)	All	min of 30 / tow
summer flounder	FL (cm)	All	All
tautog	TL (cm)	All	All
weakfish	FL (cm)	All	min of 15 YOY / tow, all adults
whelk , channeled	PW (mm)	All	All
whelk , knobbed	PW (mm)	All	All
windowpane flounder	TL (cm)	All	min of 50 / tow
winter flounder	TL (cm)	All	min of 100 / tow

Species aged	Structure	Subsample
bluefish	scales / otoliths	Collected each season. For each season, minimum of 50 scale and otolith samples collected from full length distribution. Spring collection may use other means of sampling to obtain the required minimum.
menhaden	scales	Collected each season. For each season, minimum of 50 scale samples collected from full length distribution.
scup	scales	Collected every month. For each month scales are taken from the following: 3 fish/cm <20 cm; 5/cm from 20-29 cm; and all fish > 30 cm.
summer flounder	scales	all fish > = 60 cm: for fish < 60 cm, scales collected from 3 fish / cm
tautog	opercular bones otoliths or pelvic fin rays	Collected from a minimum of 200 fish/year. collected from minimum 50 fish/year
weakfish	scales / otoliths	Ageing/collections discontinued in October 2014
winter flounder	otoliths	Collected during April and May from two areas in the Sound: eastern-central and western. For each month and area, subsamples are taken as follows: in the eastern-central area 7 fish / cm < 30 cm, 14 / cm from 30-36 cm, all fish > 36 cm. In the western area 5 fish / cm < 30 cm, 10/cm from 30-36 cm, all fish > than 36 cm.

Notes: min = minimum; YOY = young-of-year; FL = fork length; TL = total length; CL = carapace length; ML = mantle length; PW = prosomal width.



**Table 5.4. Number of Long Island Sound Trawl Survey (LISTS) samples taken by year and cruise.**

*In 1984, thirty-five sites per monthly cruise from April through November were scheduled for sampling. Starting in 1985, forty sites per cruise were scheduled. In 1991, the Trawl Survey was modified to a spring (April - June) and fall (September - October) format--July, August and November sampling was suspended. In 1993 and 1994, an additional cruise of 40 sites was added to the fall period. The additional fall cruise was suspended in 1995. One hundred twenty tows were conducted in 2006 due to delays in rebuilding the main engine on the R/V John Dempsey (spring) and mechanical failure/overhaul of the hydraulic power take-off (fall). Delays in overhauling the transmission in the fall of 2008 resulted in missing September sampling. The June cruise and all of fall sampling in 2010 were canceled for an engine replacement in the R/V John Dempsey. Due to delays in engine replacement, begun in 2010 but not completed until late April 2011, April sampling in 2011 was abbreviated. In 2017, commencement of the spring survey was delayed until late-May due to repairs to the research vessel.*

Cruise	Year																																		
	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	
April	-	-	35	40	40	40	40	45*	-	40	40	40	40	40	40	40	40	40	40	40	40	40	-	40	40	40	40	12	40	40	40	40	36	-	
May	13	41	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	38	40	40	40	40	40	40	40	24
June	19	5	41	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	39	40	40	40	40	-	40	40	40	40	40	40	40	40	
July	35	40	40	40	40	40	17	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
August	34	40	40	40	40	40	40	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
September	35	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	41**	40	40	40	40	40	40	40	-	40	-	40	40	40	40	40	40	40	40
Sept/Oct	-	-	-	-	-	-	-	-	-	40	40	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
October	35	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	-	40	40	-	40	40	-	40	40	40	39	40	40	40	40	
November	29	40	40	40	40	40	40	-	-	-	-	-	-	-	-	-	-	-	-	40	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
<b>Total</b>	<b>200</b>	<b>246</b>	<b>316</b>	<b>320</b>	<b>320</b>	<b>320</b>	<b>297</b>	<b>205</b>	<b>160</b>	<b>240</b>	<b>240</b>	<b>200</b>	<b>200</b>	<b>200</b>	<b>200</b>	<b>200</b>	<b>201</b>	<b>200</b>	<b>200</b>	<b>200</b>	<b>199</b>	<b>200</b>	<b>120</b>	<b>200</b>	<b>160</b>	<b>200</b>	<b>78</b>	<b>172</b>	<b>200</b>	<b>200</b>	<b>199</b>	<b>200</b>	<b>196</b>	<b>144</b>	

**Table 5.5. Station information for LISTS April 2017.**

*Note: no tows were conducted for the April 2017 cruise (see Results and Discussion).*

Sample Number	Date	Site Number	Bottom Type	Depth Interva	Time Start	Duration (min)	Latitude	Longitude	S_Temp (sfc, C)	S_Salinity (sfc, ppt)	B_Temp (btm, C)	B_Salinity (btm, ppt)	Ave Speed (knots)	distance (nm)	Area Swept
		0010													
		0012													
		0018													
		0128													
		0212													
		0420													
		0421													
		0428													
		0515													
		0528													
		0617													
		0623													
		0526													
		0714													
		0719													
		0730													
		0823													
		0827													
		1028													
		0931													
		1128													
		1220													
		1235													
		1320													
		1325													
		1227													
		1333													
		1425													
		1437													
		1529													
		1533													
		5513													
		5709													
		5612													
		5614													
		0512													
		0511													
		0110													
		5812													
		0114													

**Table 5.6. Station information for LISTS May 2017.**

Standard LISTS tows in the spring begin with SP and fall begins with FA. Latitude (N) and Longitude (W) are displayed in decimal degrees. Surface and bottom temperature and salinity are labeled as S\_ and B\_, respectively. Area swept is estimated by assuming the effective sweep is 2/3rds of the footrope length.

Note: 24 tows were conducted for the May 2017 cruise (see Results and Discussion).

Sample Number	Date	Site Number	Bottom Type	Depth Interval	Time Start	Duration (min)	Latitude	Longitude	S_Temp (sfc, C)	S_Salinity (sfc, ppt)	B_Temp (btm, C)	B_Salinity (btm, ppt)	Ave Speed (knots)	distance (nm)	Area Swept (sq.nm)
SP2017001	5/22/2017	0830	S	4	14:02	30	41.1495	-72.4835	13.2	27.5	10.9	28.5	2.6	1.2976	0.0066
SP2017002	5/23/2017	1737	T	1	8:49	30	41.2917	-72.1980	12.3	29.5	12.1	29.6	3.3	1.6389	0.0083
SP2017003	5/23/2017	1740	T	2	12:11	30	41.2903	-72.0760	12.3	29.0	11.3	30.6	3.1	1.5497	0.0078
SP2017004	5/23/2017	1437	T	4	15:06	30	41.2445	-72.2130	12.4	26.4	11.2	30.2	2.8	1.4156	0.0072
SP2017005	5/24/2017	1738	T	2	9:07	30	41.2862	-72.1620	12.3	29.7	11.5	30.5	3.1	1.5698	0.0079
SP2017006	5/24/2017	0931	S	4	13:16	30	41.1608	-72.4663	12.3	28.3	11.4	29.2	2.0	0.9950	0.0050
SP2017007	5/24/2017	0929	S	3	15:08	30	41.1625	-72.5288	12.3	28.0	11.7	28.1	2.1	1.0737	0.0054
SP2017008	5/26/2017	1332	S	1	7:32	30	41.2308	-72.4221	11.8	28.0	11.8	28.1	2.2	1.1119	0.0056
SP2017009	5/26/2017	1427	T	1	9:30	30	41.2468	-72.6064	12.1	27.6	12.0	27.6	4.0	2.0013	0.0101
SP2017010	5/26/2017	1425	M	1	11:17	10	41.2380	-72.7293	13.0	27.1	12.8	27.3	2.9	0.4860	0.0025
SP2017011	5/26/2017	1026	T	4	13:05	30	41.1755	-72.6516	12.2	27.8	11.9	27.8	2.4	1.1961	0.0060
SP2017012	5/30/2017	1432	S	2	7:28	30	41.2340	-72.4040	12.4	27.3	12.2	28.2	1.9	0.9516	0.0048
SP2017013	5/30/2017	0128	T	2	10:04	30	41.0295	-72.5825	12.2	27.4	12.0	27.4	3.3	1.6613	0.0084
SP2017014	5/30/2017	0527	T	3	14:47	30	41.1028	-72.6168	12.6	27.8	12.6	27.8	3.2	1.6156	0.0082
SP2017015	5/31/2017	0728	S	3	9:14	30	41.1250	-72.5658	12.8	27.6	12.6	27.8	2.1	1.0715	0.0054
SP2017016	5/31/2017	0429	T	3	11:11	30	41.0758	-72.5742	12.9	27.2	12.7	27.7	2.4	1.2222	0.0062
SP2017017	5/31/2017	0426	T	3	14:10	30	41.0760	-72.6435	13.3	27.1	11.8	27.4	3.7	1.8352	0.0093
SP2017018	6/1/2017	0224	M	4	10:31	30	41.0488	-72.7451	14.4	26.9	10.5	27.5	2.7	1.3349	0.0067
SP2017019	6/1/2017	0023	M	4	12:41	30	41.0295	-72.7868	14.3	27.0	10.2	27.6	2.9	1.4670	0.0074
SP2017020	6/1/2017	0823	M	3	15:07	30	41.1430	-72.8583	15.1	27.4	12.6	27.5	2.6	1.3202	0.0067
SP2017021	6/2/2017	0717	M	2	8:43	30	41.1285	-73.0496	15.3	26.9	13.2	27.2	2.8	1.3988	0.0071
SP2017022	6/2/2017	0922	M	3	11:00	30	41.1631	-72.8320	14.6	27.3	12.8	27.4	2.5	1.2548	0.0063
SP2017023	6/2/2017	1021	M	2	13:31	30	41.1707	-72.8835	16.0	27.2	13.0	27.4	3.2	1.6149	0.0082
SP2017024	6/2/2017	1123	M	2	15:13	30	41.1820	-72.8393	15.7	27.3	13.1	27.4	2.9	1.4292	0.0072

**Table 5.7. Station information for LISTS June 2017.**

Standard LISTS tows in the spring begin with SP and fall begins with FA. Latitude (N) and Longitude (W) are displayed in decimal degrees. Surface and bottom temperature and salinity are labeled as S\_ and B\_, respectively. Area swept is estimated by assuming the effective sweep is 2/3rds of the footrope length.

Sample Number	Date	Site Number	Bottom Type	Depth Interval	Time Start	Duration (min)	Latitude	Longitude	S_Temp (sfc, C)	S_Salinity (sfc, ppt)	B_Tem p (btm,	B_Salinity (btm,	Ave Speed	distance (nm)	Area Swept (sq.nm)
SP2017025	6/12/2017	1737	T	1	8:10	30	41.2943	-72.1960	15.4	29.3	14.6	29.6	3.0	1.4993	0.0076
SP2017026	6/12/2017	1437	T	4	10:26	30	41.2357	-72.2592	15.0	25.1	13.7	30.1	2.3	1.1389	0.0058
SP2017027	6/12/2017	1738	T	2	12:04	30	41.2860	-72.1646	15.2	29.3	14.8	29.6	3.0	1.5031	0.0076
SP2017028	6/12/2017	1534	T	1	14:18	30	41.2488	-72.3153	15.2	28.0	14.5	29.1	2.1	1.0608	0.0054
SP2017029	6/13/2017	1332	S	1	10:03	30	41.2305	-72.3981	15.2	25.2	14.6	27.3	3.7	1.8429	0.0093
SP2017030	6/14/2017	1029	S	3	8:42	30	41.1723	-72.5313	17.8	27.3	14.4	28.2	2.4	1.2041	0.0061
SP2017031	6/14/2017	0827	T	3	10:04	30	41.1408	-72.6230	19.0	27.2	14.2	27.7	3.3	1.6576	0.0084
SP2017032	6/14/2017	0427	T	3	12:02	30	41.0770	-72.6528	20.2	27.1	14.7	27.4	2.4	1.2026	0.0061
SP2017033	6/14/2017	0730	S	4	13:48	30	41.1197	-72.5247	19.2	27.3	14.4	28.5	2.4	1.2209	0.0062
SP2017034	6/14/2017	0830	S	4	15:32	30	41.1386	-72.5206	17.2	27.8	14.3	28.8	3.0	1.4845	0.0075
SP2017035	6/15/2017	0929	S	3	8:27	30	41.1642	-72.5320	19.4	27.2	14.6	28.3	2.4	1.1770	0.0059
SP2017036	6/15/2017	5824	S	1	10:52	30	40.9758	-72.7548	19.1	26.6	13.7	27.1	3.7	1.8356	0.0093
SP2017037	6/15/2017	0022	M	4	12:34	30	41.0132	-72.8368	19.4	26.6	11.8	27.4	3.0	1.4802	0.0075
SP2017038	6/15/2017	0323	M	4	14:02	30	41.0616	-72.8456	19.5	26.6	12.9	27.4	2.7	1.3619	0.0069
SP2017039	6/15/2017	0524	T	4	15:31	30	41.0906	-72.7936	19.7	26.5	13.6	27.6	2.7	1.3533	0.0068
SP2017040	6/16/2017	1427	T	1	8:43	30	41.2353	-72.6580	16.9	27.4	16.2	27.5	3.4	1.7085	0.0086
SP2017041	6/16/2017	1327	T	2	10:19	30	41.2253	-72.6664	18.3	27.1	16.7	27.4	3.0	1.4862	0.0075
SP2017042	6/20/2017	0724	T	4	9:12	30	41.1237	-72.7376	19.2	27.0	15.1	28.0	2.7	1.3362	0.0068
SP2017043	6/20/2017	1025	T	3	10:53	25	41.1646	-72.7660	19.4	27.1	15.4	28.1	3.5	1.4730	0.0074
SP2017044	6/20/2017	1026	T	4	12:57	30	41.1653	-72.7131	19.7	27.2	15.7	28.2	3.0	1.5051	0.0076
SP2017045	6/21/2017	0515	M	2	8:26	30	41.0930	-73.1262	16.0	26.9	14.2	27.2	3.2	1.5850	0.0080
SP2017046	6/21/2017	0013	M	4	10:09	30	41.0098	-73.2081	20.1	26.5	12.8	27.3	2.7	1.3572	0.0069
SP2017047	6/21/2017	5513	S	2	11:44	30	40.9270	-73.2501	20.0	26.1	17.5	26.5	3.2	1.6155	0.0082
SP2017048	6/21/2017	5813	M	3	13:36	30	40.9683	-73.2688	21.3	26.6	13.6	27.1	3.4	1.6906	0.0085
SP2017049	6/22/2017	0514	M	2	8:38	25	41.0958	-73.1652	16.9	25.1	14.0	27.2	3.2	1.3532	0.0068
SP2017050	6/22/2017	5712	T	2	11:40	30	40.9590	-73.2473	20.8	26.5	13.5	27.2	2.9	1.4570	0.0074
SP2017051	6/22/2017	5709	S	2	13:35	30	40.9603	-73.4052	20.9	26.0	14.6	26.9	2.8	1.3910	0.0070
SP2017052	6/23/2017	0612	M	1	8:52	30	41.1092	-73.2728	19.6	26.1	17.5	26.7	3.5	1.7495	0.0088
SP2017053	6/23/2017	1100	T	3	10:42	30	41.0312	-73.3236	18.5	26.5	13.5	27.2	2.9	1.4351	0.0073
SP2017054	6/23/2017	0611	M	1	12:44	30	41.1027	-73.3173	20.9	26.5	15.5	26.9	3.5	1.7666	0.0089
SP2017055	6/26/2017	0315	M	3	8:40	30	41.0643	-73.1219	19.0	26.5	14.9	27.4	3.4	1.7060	0.0086
SP2017056	6/26/2017	0019	M	3	13:18	27	40.9920	-73.0406	19.7	26.5	14.5	27.4	3.2	1.4407	0.0073
SP2017057	6/27/2017	0820	M	3	8:03	30	41.1345	-72.9718	19.7	26.9	16.1	27.9	3.1	1.5348	0.0078
SP2017058	6/27/2017	0420	M	4	9:54	30	41.0860	-72.9195	19.3	26.7	15.5	27.9	3.5	1.7436	0.0088
SP2017059	6/27/2017	0521	M	4	12:24	30	41.0843	-72.9286	19.9	26.7	15.5	28.0	2.3	1.1735	0.0059
SP2017060	6/27/2017	0821	M	3	14:02	30	41.1027	-72.9243	20.4	26.7	16.2	27.8	3.1	1.5643	0.0079
SP2017061	6/28/2017	1323	M	2	8:49	30	41.2058	-72.9223	19.1	27.6	18.6	27.7	3.3	1.6645	0.0084
SP2017062	6/28/2017	1225	T	2	11:08	30	41.2070	-72.7188	19.8	27.6	18.4	27.9	3.7	1.8735	0.0095
SP2017063	6/28/2017	1126	T	3	12:41	30	41.1866	-72.7203	20.1	27.5	18.4	28.0	2.5	1.2563	0.0063
SP2017064	6/29/2017	0819	T	2	8:17	30	41.1358	-73.0197	19.4	27.3	16.2	27.8	3.3	1.6443	0.0083

**Table 5.8. Station information for LISTS September 2017.**

Standard LISTS tows in the spring begin with SP and fall begins with FA. Latitude (N) and Longitude (W) are displayed in decimal degrees. Surface and bottom temperature and salinity are labeled as S\_ and B\_, respectively. Area swept is estimated by assuming the effective sweep is 2/3rds of the footrope length.

Sample Number	Date	Site Number	Bottom Type	Depth Interval	Time Start	Duration (min)	Latitude	Longitude	S_Temp (sfc, C)	S_Salinity (sfc, ppt)	B_Temp (btm, C)	B_Salinity (btm, ppt)	Ave Speed	distance (nm)	Area Swept (sq.nm)
FA2017001	9/7/2017	1837	T	1	8:33	30	41.2853	-72.1986	20.2	30.0	19.8	30.3	.	.	.
FA2017002	9/7/2017	1840	T	1	10:48	30	41.3293	-72.0850	20.4	28.6	19.6	30.4	.	.	.
FA2017003	9/7/2017	1740	T	2	12:55	30	41.2952	-72.0721	19.6	30.5	19.3	30.7	.	.	.
FA2017004	9/11/2017	1437	T	4	7:40	30	41.2318	-72.2648	19.4	29.3	19.4	30.3	3.3	1.6730	0.0085
FA2017005	9/11/2017	1436	T	4	9:34	30	41.2473	-72.2228	19.5	29.3	19.3	30.3	2.8	1.3829	0.0070
FA2017006	9/11/2017	0931	S	4	11:37	30	41.1588	-72.4393	20.4	29.1	20.4	29.2	.	.	.
FA2017007	9/18/2017	0830	S	4	9:20	30	41.1487	-72.4791	20.5	29.3	20.2	29.7	.	.	.
FA2017008	9/18/2017	0126	T	3	11:13	30	41.0302	-72.6293	21.7	28.1	21.1	28.7	2.8	1.3980	0.0071
FA2017009	9/18/2017	0027	T	2	12:35	30	41.0081	-72.6490	21.6	28.0	21.3	28.2	3.4	1.6928	0.0086
FA2017010	9/18/2017	0129	S	2	14:40	30	41.0310	-72.5638	21.7	28.1	21.3	28.5	2.7	1.3739	0.0069
FA2017011	9/18/2017	0428	S	3	16:25	30	41.0826	-72.5765	21.7	28.2	21.0	28.7	3.1	1.5548	0.0079
FA2017012	9/25/2017	0529	S	3	8:58	30	41.0987	-72.5406	21.1	28.5	20.8	29.0	2.8	1.4095	0.0071
FA2017013	9/25/2017	5924	M	3	11:15	30	41.0023	-72.7310	22.1	28.3	21.1	28.2	.	.	.
FA2017014	9/25/2017	5824	S	1	13:03	30	40.9805	-72.7357	22.3	28.1	21.5	28.1	3.5	1.7290	0.0087
FA2017015	9/25/2017	5823	S	1	14:08	28	40.9786	-72.7881	22.1	28.1	21.3	28.0	3.3	1.5238	0.0077
FA2017016	9/25/2017	0123	M	4	15:31	30	41.0363	-72.7955	23.2	28.4	20.9	28.6	3.0	1.4973	0.0076
FA2017017	9/26/2017	0415	M	3	8:35	30	41.0723	-73.1404	22.5	27.8	21.3	28.0	2.9	1.4609	0.0074
FA2017018	9/26/2017	5912	M	3	10:08	30	40.9963	-73.2433	22.3	27.7	21.2	27.9	3.3	1.6393	0.0083
FA2017019	9/26/2017	5712	T	2	11:34	30	40.9478	-73.3019	22.3	27.7	21.6	27.7	3.0	1.5055	0.0076
FA2017020	9/26/2017	0113	M	4	13:12	30	41.0230	-73.2583	23.1	27.7	21.2	28.1	2.6	1.2774	0.0065
FA2017021	9/26/2017	5918	M	3	15:04	30	40.9886	-73.0385	22.8	27.8	21.2	28.1	3.0	1.4763	0.0075
FA2017022	9/27/2017	0412	M	2	9:04	30	41.0793	-73.2581	22.6	27.8	21.3	28.0	3.1	1.5257	0.0077
FA2017023	9/27/2017	0511	M	2	10:27	30	41.0923	-73.3131	23.1	27.9	21.8	27.8	3.1	1.5359	0.0078
FA2017024	9/27/2017	0110	T	3	12:02	30	41.0310	-73.3230	22.5	27.8	21.3	28.0	.	.	.
FA2017025	9/27/2017	0214	M	3	14:24	30	41.0400	-73.2186	22.9	27.8	21.1	28.2	.	.	.
FA2017026	9/29/2017	1319	M	1	7:42	30	41.1992	-73.0118	21.6	27.6	21.7	27.9	3.4	1.7238	0.0087
FA2017027	9/29/2017	0219	M	4	10:07	30	41.0405	-72.9985	21.2	28.3	20.9	28.6	3.2	1.5855	0.0080
FA2017028	9/29/2017	0118	M	4	11:41	30	41.0341	-72.9863	21.3	28.2	20.9	28.6	2.9	1.4503	0.0073
FA2017029	9/29/2017	0323	M	4	15:14	30	41.0608	-72.8400	21.4	28.6	20.9	28.7	2.6	1.2903	0.0065
FA2017030	10/2/2017	1021	M	2	8:13	30	41.1606	-72.9300	20.4	27.9	20.5	28.2	2.8	1.3888	0.0070
FA2017031	10/2/2017	0625	T	4	9:54	30	41.0996	-72.7560	20.3	28.6	20.7	28.9	3.1	1.5286	0.0077
FA2017032	10/2/2017	0526	T	3	11:19	30	41.0908	-72.6951	20.5	28.3	20.7	28.9	3.3	1.6702	0.0084
FA2017033	10/2/2017	0926	T	4	12:46	30	41.1483	-72.7036	20.2	28.7	20.3	28.8	3.6	1.7830	0.0090
FA2017034	10/2/2017	0827	T	3	14:21	30	41.1342	-72.6773	20.4	28.6	20.5	29.0	3.4	1.6842	0.0085
FA2017035	10/2/2017	1126	T	3	15:45	30	41.1883	-72.7091	20.6	28.4	20.5	28.6	2.9	1.4470	0.0073
FA2017036	10/3/2017	1327	T	2	8:58	26	41.2415	-72.6187	19.9	29.2	19.8	29.2	3.5	1.5110	0.0076
FA2017037	10/3/2017	1225	T	2	10:15	30	41.2082	-72.7138	20.1	28.5	20.3	28.8	3.1	1.5720	0.0079
FA2017038	10/3/2017	1427	T	1	11:41	30	41.2342	-72.6660	20.2	28.6	20.1	28.7	3.9	1.9573	0.0099
FA2017039	10/3/2017	1425	M	1	13:11	30	41.2370	-72.7213	20.3	28.2	20.0	28.2	2.8	1.3760	0.0070
FA2017040	10/3/2017	1433	S	2	15:49	30	41.2373	-72.4127	19.5	29.7	19.5	29.7	3.0	1.5104	0.0076

**Table 5.9. Station information for LISTS October 2017.**

Standard LISTS tows in the spring begin with SP and fall begins with FA. Latitude (N) and Longitude (W) are displayed in decimal degrees. Surface and bottom temperature and salinity are labeled as S\_ and B\_, respectively. Area swept is estimated by assuming the effective sweep is 2/3rds of the footrope length

Sample Number	Date	Site Number	Bottom Type	Depth Interval	Time Start	Duration (min)	Latitude	Longitude	S_Temp (sfc, C)	S_Salinity (sfc, ppt)	B_Temp (btm, C)	B_Salinity (btm, ppt)	Ave Speed (knots)	distance (nm)	Area Swept (sq.nm)
FA2017041	10/17/2017	1428	T	1	8:35	30	41.2481	-72.5765	18.7	29.2	18.8	29.4	3.6	1.8021	0.0091
FA2017042	10/17/2017	1427	T	1	10:02	30	41.2468	-72.6068	18.7	29.1	18.8	29.3	3.1	1.5333	0.0077
FA2017043	10/17/2017	1325	T	2	11:24	30	41.2260	-72.7264	19.1	28.7	19.1	28.8	2.5	1.2335	0.0062
FA2017044	10/17/2017	1126	T	3	12:35	23	41.1890	-72.7072	19.3	28.8	19.3	28.9	3.8	1.4546	0.0074
FA2017045	10/17/2017	1127	T	3	14:24	30	41.1810	-72.6541	19.5	28.9	19.3	29.1	3.8	1.8950	0.0096
FA2017046	10/18/2017	1327	T	2	8:11	30	41.2385	-72.5936	18.4	28.9	18.4	28.9	3.5	1.7641	0.0089
FA2017047	10/18/2017	1423	T	1	10:32	30	41.2401	-72.8069	18.1	28.4	18.1	28.5	2.9	1.4501	0.0073
FA2017048	10/18/2017	1022	M	2	11:52	30	41.1866	-72.8220	19.2	28.7	19.0	28.7	2.6	1.3087	0.0066
FA2017049	10/18/2017	0426	T	3	13:56	30	41.0648	-72.7008	19.6	28.7	19.3	28.8	3.8	1.8757	0.0095
FA2017050	10/19/2017	0929	S	3	8:50	30	41.1650	-72.5298	19.0	29.4	19.1	29.4	3.3	1.6499	0.0083
FA2017051	10/19/2017	0629	S	4	10:30	30	41.1017	-72.5663	19.1	29.4	19.1	29.4	2.2	1.1069	0.0056
FA2017052	10/19/2017	0429	T	3	12:39	30	41.0808	-72.5416	19.1	29.3	19.1	29.4	3.6	1.8138	0.0092
FA2017053	10/19/2017	0129	S	2	14:20	30	41.0295	-72.5668	19.1	28.6	19.1	28.7	2.0	0.9991	0.0051
FA2017054	10/20/2017	1335	T	4	7:45	30	41.2242	-72.3106	18.2	29.8	18.6	30.4	1.6	0.7772	0.0039
FA2017055	10/20/2017	0927	T	4	10:15	30	41.1675	-72.6108	18.9	22.6	19.0	29.2	3.4	1.7213	0.0087
FA2017056	10/20/2017	0920	T	2	12:56	30	41.1648	-72.9205	19.1	28.3	19.1	28.5	2.8	1.4061	0.0071
FA2017057	10/20/2017	1020	T	2	14:19	30	41.1801	-72.9240	19.0	28.2	18.9	28.3	2.4	1.2153	0.0061
FA2017058	10/23/2017	0417	T	3	8:16	30	41.0860	-73.0263	19.0	28.3	19.2	28.5	3.1	1.5646	0.0079
FA2017059	10/23/2017	0017	M	4	9:53	30	41.0180	-73.0240	19.2	28.4	19.3	28.6	3.2	1.6136	0.0082
FA2017060	10/23/2017	0015	T	4	11:49	21	41.0110	-73.1176	19.4	28.3	19.3	28.5	3.1	1.0708	0.0054
FA2017061	10/25/2017	0313	M	3	8:52	26	41.0570	-73.2156	19.2	28.0	19.5	28.4	2.9	1.2695	0.0064
FA2017062	10/25/2017	5513	S	2	10:33	30	40.9253	-73.2515	18.9	27.5	19.0	27.9	3.2	1.6091	0.0081
FA2017063	10/25/2017	5812	M	3	12:40	30	40.9743	-73.2933	19.4	28.0	19.3	28.2	2.9	1.4409	0.0073
FA2017064	10/25/2017	0311	T	2	14:52	30	41.0468	-73.3215	19.4	28.2	19.4	28.3	3.1	1.5306	0.0077
FA2017065	10/26/2017	0513	M	2	8:50	30	41.0981	-73.2116	18.6	27.3	19.3	28.3	3.1	1.5292	0.0077
FA2017066	10/26/2017	0212	M	3	10:45	19	41.0448	-73.2396	19.0	28.2	19.3	28.3	2.8	0.9019	0.0046
FA2017067	10/26/2017	0413	M	3	12:36	30	41.0603	-73.2646	18.7	28.0	19.4	28.3	2.8	1.4079	0.0071
FA2017068	10/26/2017	1119	M	2	14:56	30	41.1873	-73.0074	18.7	28.0	18.8	28.0	3.2	1.5914	0.0080
FA2017069	10/26/2017	1319	M	1	16:59	30	41.2013	-73.0023	18.4	27.9	18.5	28.0	3.4	1.6938	0.0086
FA2017070	11/1/2017	1320	M	1	7:57	30	41.2032	-72.9903	16.1	26.4	17.4	27.9	3.1	1.5713	0.0079
FA2017071	11/1/2017	0221	M	4	10:07	30	41.0352	-72.9360	17.4	28.3	17.9	28.7	3.1	1.5432	0.0078
FA2017072	11/1/2017	5922	M	3	11:55	30	40.9867	-72.8900	17.4	28.4	17.4	28.5	3.6	1.7782	0.0090
FA2017073	11/1/2017	0322	M	4	14:13	20	41.0500	-72.8806	17.3	28.3	17.9	28.6	3.1	1.0363	0.0052
FA2017074	11/1/2017	0728	S	3	16:15	30	41.1145	-72.6157	17.5	28.8	17.7	29.0	2.3	1.1454	0.0058
FA2017075	11/2/2017	0125	T	4	9:11	30	41.0211	-72.6898	17.6	28.7	17.7	28.7	3.2	1.5969	0.0081
FA2017076	11/2/2017	0323	M	4	11:13	30	41.0708	-72.7976	17.8	28.8	17.6	28.9	2.7	1.3504	0.0068
FA2017077	11/2/2017	0124	M	4	13:19	30	41.0290	-72.7530	17.8	28.7	17.7	28.9	2.2	1.1094	0.0056
FA2017078	11/2/2017	5825	S	1	14:59	30	40.9981	-72.7370	17.4	28.6	17.0	28.5	3.6	1.8047	0.0091
FA2017079	11/3/2017	1333	S	1	8:11	30	41.2318	-72.3938	17.1	28.7	17.1	28.7	3.4	1.7244	0.0087
FA2017080	11/3/2017	0830	S	4	10:08	30	41.1490	-72.4805	17.1	28.9	17.4	29.2	3.3	1.6740	0.0085

**Table 5.10. Samples with non-standard tow durations and reasons for incomplete tows, spring and fall 2017.***Standard LISTS tows begin with SP (spring) or FA (fall).*

Sample	Date	Site	Bottom Type	Depth Interval	Time	Duration	Reason	Comments
<b>MAY</b>								
SP2017010	5/26/2017	1425	M	1	11:17	10	speed drop	string of conch pots; no room to complete tow
<b>JUNE</b>								
SP2017043	6/20/2017	1025	T	3	10:53	25		
SP2017049	6/22/2017	0514	M	2	8:38	25	speed drop	tow done in multiple parts; snagged active gear in first part & ghost gear in second part; damage to net
SP2017056	6/26/2017	0019	M	3	13:18	27	ran out of room	started boost early because known hang ahead
<b>SEPT</b>								
FA2017015	9/25/2017	5823	S	1	14:08	28	ran out of room	started boost early because known hang ahead
FA2017036	10/3/2017	1327	T	2	8:58	26	hang	popped off during haul back; no damage to net
<b>OCT</b>								
FA2017044	10/17/2017	1126	T	3	12:35	23	ran out of room	hang ahead
FA2017060	10/23/2017	0015	T	4	11:49	21	speed drop	string of pot gear; major damage to net
FA2017061	10/25/2017	0313	M	3	8:52	26	pot gear	buoys on both doors; no pots in net
FA2017066	10/26/2017	0212	M	3	10:45	19	speed drop	string of pot gear; damage to net
FA2017073	11/1/2017	0322	M	4	14:13	20	speed drop	string of ghost gear; damage to net

**Table 5.11. Data requests by month.**

<b>MONTH</b>	<b>REQUEST</b>	<b>ORGANIZATION OR PURPOSE</b>
January	LISTS BSB data	ASMFC TC
	LISTS species richness data	media
February	LISTS HOR data	CT DEEP
	LISTS HOR data for Compliance Report	ASMFC TC
	LISTS abundance indices	Dominion
March	LISTS STB data	NY DEC
	LISTS WFL data	ASMFC TC
	LISTS BLF data	ASMFC TC
	LISTS ATH data for Compliance Report	ASMFC TC
	LISTS PGY data	ASMFC TC
April	LISTS BLF data for Compliance Report	ASMFC TC
	LISTS MEN data for Compliance Report	ASMFC TC
May	LISTS lobster lengths for Stock Assessment	ASMFC TC
	LISTS SFL data	ASMFC TC
	LISTS data for ALW, BBH	UC Santa Cruz
	LISTS indices of abundance various species	Normandeau Assoc.
	MEN data	Dominion
June	LISTS species indicators for LISS	EPA
	LISTS MKR data	ASMFC TC
	LISTS STB data for Compliance Report	ASMFC TC
	LISTS WFL age matrix	ASMFC TC
July	LISTS whelk data	NY DEC
	LISTS BKF data for Compliance Report	ASMFC TC
	LISTS data for ATS	ASMFC TC
August	LISTS invertebrate data	Norwalk Aquarium
	LISTS SPD data for Compliance Report	ASMFC TC
	LISTS LOB data for Compliance Report	ASMFC TC
	LISTS WKF data for Compliance Report	ASMFC TC
	WFL data	ASMFC TC
September	LISTS ATS data for Compliance Report	ASMFC TC
	LISTS BSB data for Compliance Report	ASMFC TC
	LISTS SFL data for Compliance Report	ASMFC TC
	LISTS PGY data for Compliance Report	ASMFC TC
	LISTS species indicators for LISS	EPA
October	MEN data	CT DEEP
November	LISTS WFL data for Compliance Report	ASMFC TC
	LISTS BADD index	EPA LISS
	LISTS LOB data	CT DEEP
December	LISTS indices of abundance various species	CT DEEP



**Table 5.12. Sample requests by month.**

<b>MONTH</b>	<b>REQUEST</b>	<b>ORGANIZATION OR PURPOSE</b>
May	squid & various finfish specimens for dissection class	Putnam High School
	hermit crabs	UConn
	variety of hardy fish & invertebrates for "Stormwater Classroom"	East Lyme School System
	variety of fish for x-ray of head structures for ageing manual	ASMFC
	tautog tissue samples for DNA study	VIMS
	channeled and knobbed whelk (conch)	NY DEC
June	channeled and knobbed whelk (conch)	NY DEC
	tautog tissue samples for DNA study	VIMS
	hermit crabs	UConn
September	channeled and knobbed whelk (conch)	NY DEC
October	squid & various finfish specimens for dissection class	Putnam High School
	channeled and knobbed whelk (conch)	NY DEC
	stripers for PCB study	NY DEC
November	channeled and knobbed whelk (conch)	NY DEC

**Table 5.13. List of finfish species observed in 2017.**

Forty-nine finfish species were observed in 2017. Since 1984, one hundred-eleven species of finfish have been identified in LISTS (see Appendix 5.1 for the full list of species).

Common Name	Scientific Name	Common Name	Scientific Name
anchovy, bay	<i>Anchoa mitchilli</i>	jack, crevalle	<i>Caranx hippos</i>
bigeye	<i>Priacanthus arenatus</i>	kingfish, northern	<i>Menticirrhus saxatilis</i>
black sea bass	<i>Centropristis striata</i>	lizardfish, inshore	<i>Synodus foetens</i>
blue runner	<i>Caranx crysos</i>	mackerel, Atlantic	<i>Scomber scombrus</i>
bluefish	<i>Pomatomus saltatrix</i>	mackerel, Spanish	<i>Scomberomorus maculatus</i>
butterfish	<i>Peprilus triacanthus</i>	menhaden, Atlantic	<i>Brevoortia tyrannus</i>
cod, Atlantic	<i>Gadus morhua</i>	moonfish	<i>Selene setapinnis</i>
cunner	<i>Tautoglabrus adspersus</i>	puffer, northern	<i>Sphoeroides maculatus</i>
dogfish, smooth	<i>Mustelus canis</i>	sand lance, American	<i>Ammodytes americanus</i>
dogfish, spiny	<i>Squalus acanthias</i>	scad, rough	<i>Trachurus lathami</i>
drum, black	<i>Pogonias cromis</i>	scup	<i>Stenotomus chrysops</i>
flounder, fourspot	<i>Paralichthys oblongus</i>	searobin, northern	<i>Prionotus carolinus</i>
flounder, smallmouth	<i>Etropus microstomus</i>	searobin, striped	<i>Prionotus evolans</i>
flounder, summer	<i>Paralichthys dentatus</i>	shad, American	<i>Alosa sapidissima</i>
flounder, windowpane	<i>Scophthalmus aquosus</i>	shad, hickory	<i>Alosa mediocris</i>
flounder, winter	<i>Pseudopleuronectes american</i>	skate, clearnose	<i>Raja eglanteria</i>
glasseye snapper	<i>Priacanthus cruentatus</i>	skate, little	<i>Leucoraja erinacea</i>
goby, naked	<i>Gobiosoma bosci</i>	skate, winter	<i>Leucoraja ocellata</i>
hake, red	<i>Urophycis chuss</i>	spot	<i>Leiostomus xanthurus</i>
hake, silver	<i>Merluccius bilinearis</i>	striped bass	<i>Morone saxatilis</i>
hake, spotted	<i>Urophycis regia</i>	sturgeon, Atlantic	<i>Acipenser oxyrinchus</i>
herring, Atlantic	<i>Clupea harengus</i>	tautog	<i>Tautoga onitis</i>
herring, alewife	<i>Alosa pseudoharengus</i>	toadfish, oyster	<i>Opsanus tau</i>
herring, blueback	<i>Alosa aestivalis</i>	weakfish	<i>Cynoscion regalis</i>
hogchoker	<i>Trinectes maculatus</i>		

Names taken from: Common and scientific names of fishes from the United States, Canada and Mexico, Sixth Edition (Nelson et al. 2004).

**Table 5.14. List of invertebrates observed in 2017.**

*In 2017, thirty-two invertebrate "species" were identified. In most cases, invertebrates are identified to species; however, species that are very similar are identified to genus, and in difficult cases, to a higher taxon.*

<b>Common Name</b>	<b>Scientific Name</b>	<b>Common Name</b>	<b>Scientific Name</b>
anemones	<i>anemomes spp.</i>	jellyfish, lion's mane	<i>Cyanea capillata</i>
arks	<i>Noetia-Anadara spp.</i>	lobster, American	<i>Homarus americanus</i>
bryozoan, bushy	<i>Phylum Bryozoa</i>	mussel, blue	<i>Mytilus edulis</i>
clam, hard clams	<i>Artica-Mercinaria-Pitar sp.</i>	northern moon snail	<i>Lunatia heros</i>
clam, surf	<i>Spisula solidissima</i>	oyster, common	<i>Crassostrea virginica</i>
clams, jingle shell	<i>Anomiidae sp.</i>	sea urchin, purple	<i>Arbacia punctulata</i>
coral, star	<i>Astrangia poculata</i>	shrimp, ghost	<i>Gilvossius setimanus</i>
crab, mud	<i>Family Xanthidae</i>	shrimp, mantis	<i>Squilla empusa</i>
crab, blue	<i>Callinectes sapidus</i>	shrimp, sand	<i>Crangon septemspinosa</i>
crab, flat claw hermit	<i>Pagurus pollicaris</i>	slipper shell, common	<i>Crepidula fornicata</i>
crab, horseshoe	<i>Limulus polyphemus</i>	sponge spp.	<i>sponge spp.</i>
crab, lady	<i>Ovalipes ocellatus</i>	sponge, boring	<i>Cliona celate</i>
crab, rock	<i>Cancer irroratus</i>	sponge, red bearded	<i>Microciona prolifera</i>
crab, spider	<i>Libinia emarginata</i>	squid, longfin inshore	<i>Loligo pealeii</i>
hydroid spp.	<i>hydroid spp.</i>	whelk, channeled	<i>Busycotypus canaliculatus</i>
jelly, comb	<i>Phylum Ctenophora</i>	whelk, knobbed	<i>Busycon carica</i>

**Table 5.15. Total number and weight (kg) of finfish and invertebrates caught in 2017.**

*Finfish species are in order of descending count. Invertebrate species are in order of descending weight (nc = not counted). Young-of-year anchovies and Gadids are neither separated by species nor quantified; young-of-year Atlantic herring and American sand lance are not quantified. Number of tows (sample size) = 144.*

species	count	%	weight	%	species	count	%	weight	%
scup	75,763	56.4	9,616.8	51.4					
butterfish	35,814	26.7	1,426.0	7.6	<b><u>Finfish not ranked</u></b>				
weakfish	5,904	4.4	311.2	1.7	anchovy spp, (yoy)				
striped searobin	3,942	2.9	1,400.0	7.5	Atlantic herring, (yoy)				
bluefish	2,408	1.8	263.6	1.4	American sand lance (yoy)				
smooth dogfish	1,624	1.2	3,391.3	18.1	gadid spp, (yoy)				
northern searobin	1,430	1.1	196.2	1.0					
spotted hake	1,253	0.9	111.2	0.6	<b><u>Invertebrates</u></b>				
bay anchovy	1,069	0.8	7.7	0.0	longfin inshore squid	14,186	96.5	584.5	54.5
black sea bass	980	0.7	714.8	3.8	horseshoe crab	112	0.8	224.4	20.9
windowpane flounder	974	0.7	127.1	0.7	spider crab	nc		129.4	12.1
hogchoker	391	0.3	50.1	0.3	boring sponge	nc		46.9	4.4
fourspot flounder	366	0.3	67.9	0.4	common slipper shell	nc		20.8	1.9
summer flounder	354	0.3	244.0	1.3	bushy bryozoan	nc		12.1	1.1
silver hake	309	0.2	12.3	0.1	flat claw hermit crab	nc		8.3	0.8
moonfish	273	0.2	4.2	0.0	knobbed whelk	36	0.2	7.3	0.7
Atlantic menhaden	239	0.2	72.2	0.4	mantis shrimp	173	1.2	7.3	0.7
American shad	230	0.2	21.0	0.1	blue crab	18	0.1	4.1	0.4
red hake	152	0.1	11.9	0.1	American lobster	12	0.1	4.0	0.4
spot	114	0.1	10.5	0.1	lion's mane jellyfish	102	0.7	3.7	0.3
little skate	113	0.1	63.0	0.3	lady crab	nc		3.5	0.3
winter flounder	112	0.1	27.7	0.1	blue mussel	nc		2.7	0.3
blueback herring	89	0.1	3.5	0.0	channeled whelk	18	0.1	2.4	0.2
tautog	77	0.1	99.0	0.5	sand shrimp	nc		1.6	0.1
clearnose skate	73	0.1	147.1	0.8	hard clams	5	0.0	1.2	0.1
striped bass	73	0.1	186.8	1.0	comb jelly spp	24	0.2	1.2	0.1
smallmouth flounder	44	0.0	2.0	0.0	hydroid spp.	nc		1.1	0.1
alewife	38	0.0	2.0	0.0	arks	6	0.0	1.1	0.1
winter skate	19	0.0	34.1	0.2	mud crabs	nc		1.1	0.1
northern kingfish	11	0.0	2.3	0.0	northern moon snail	nc		1.0	0.1
Atlantic herring	10	0.0	1.1	0.0	rock crab	nc		0.8	0.1
American sand lance	7	0.0	0.1	0.0	surf clam	10	0.1	0.8	0.1
rough scad	7	0.0	0.6	0.0	red bearded sponge	nc		0.5	0.0
Atlantic cod	4	0.0	0.1	0.0	purple sea urchin	3	0.0	0.4	0.0
cunner	4	0.0	0.5	0.0	star coral	nc		0.2	0.0
hickory shad	4	0.0	1.3	0.0	anemones	nc		0.1	0.0
northern puffer	4	0.0	0.7	0.0	ghost shrimp	1	0.0	0.1	0.0
Atlantic mackerel	3	0.0	1.3	0.0	jingle shell clams	1	0.0	0.1	0.0
spiny dogfish	3	0.0	15.6	0.1	common oyster	nc		0.1	0.0
black drum	2	0.0	0.2	0.0	mixed sponge species	nc		0.1	0.0
Atlantic sturgeon	1	0.0	60.9	0.3	<b>Total</b>	<b>14,707</b>		<b>1,072.9</b>	
blue runner	1	0.0	0.1	0.0	Note: nc= not counted				
bigeye	1	0.0	0.1	0.0					
crevalle jack	1	0.0	0.1	0.0					
glasseye snapper	1	0.0	0.1	0.0					
inshore lizardfish	1	0.0	0.1	0.0					
naked goby	1	0.0	0.1	0.0					
Spanish mackerel	1	0.0	0.1	0.0					
oyster toadfish	1	0.0	0.3	0.0					
<b>Total</b>	<b>134,295</b>		<b>18,710.9</b>						

**Table 5.16. Total counts and weight (kg) of finfish taken in the spring and fall sampling periods, 2017.**  
*Species are listed in order of descending count. Young-of-year bay anchovy, striped anchovy, Atlantic herring, American sand lance and Gadids are not included. Number of tows (sample sizes): Spring = 64 and Fall = 80.*

species	Spring				species	Fall			
	count	%	weight	%		count	%	weight	%
scup	47,393	79.3	7,472.3	65.8	butterfish	32,323	43.3	1,146.6	15.6
butterfish	3,491	5.8	279.4	2.5	scup	28,371	38.0	2,144.5	29.2
striped searobin	3,124	5.2	1,076.3	9.5	weakfish	5,816	7.8	274.8	3.7
northern searobin	1,231	2.1	168.9	1.5	bluefish	2,397	3.2	252.0	3.4
black sea bass	828	1.4	637.6	5.6	smooth dogfish	1,240	1.7	2,458.6	33.4
spotted hake	823	1.4	45.8	0.4	bay anchovy	920	1.2	6.9	0.1
windowpane flounder	544	0.9	74.6	0.7	striped searobin	818	1.1	323.7	4.4
smooth dogfish	384	0.6	932.7	8.2	spotted hake	430	0.6	65.4	0.9
fourspot flounder	359	0.6	66.0	0.6	windowpane flounder	430	0.6	52.5	0.7
silver hake	290	0.5	9.9	0.1	moonfish	273	0.4	4.2	0.1
hogchoker	212	0.4	24.6	0.2	American shad	227	0.3	20.1	0.3
summer flounder	185	0.3	125.9	1.1	northern searobin	198	0.3	27.3	0.4
bay anchovy	149	0.2	0.8	0.0	hogchoker	179	0.2	25.5	0.3
Atlantic menhaden	122	0.2	47.2	0.4	summer flounder	169	0.2	118.1	1.6
red hake	119	0.2	8.2	0.1	black sea bass	152	0.2	77.2	1.0
winter flounder	99	0.2	24.7	0.2	Atlantic menhaden	118	0.2	25.0	0.3
weakfish	88	0.1	36.4	0.3	spot	114	0.2	10.5	0.1
little skate	83	0.1	45.9	0.4	blueback herring	89	0.1	3.5	0.0
tautog	63	0.1	88.3	0.8	clearnose skate	53	0.1	111.1	1.5
striped bass	46	0.1	113.4	1.0	red hake	33	0.0	3.7	0.1
clearnose skate	19	0.0	36.0	0.3	alewife	30	0.0	1.2	0.0
smallmouth flounder	16	0.0	0.9	0.0	little skate	30	0.0	17.1	0.2
bluefish	11	0.0	11.6	0.1	smallmouth flounder	28	0.0	1.1	0.0
Atlantic herring	10	0.0	1.1	0.0	striped bass	27	0.0	73.4	1.0
alewife	8	0.0	0.8	0.0	silver hake	19	0.0	2.4	0.0
American sand lance	7	0.0	0.1	0.0	tautog	14	0.0	10.7	0.1
winter skate	6	0.0	8.6	0.1	winter flounder	13	0.0	3.0	0.0
Atlantic cod	4	0.0	0.1	0.0	winter skate	13	0.0	25.5	0.3
cunner	4	0.0	0.5	0.0	northern kingfish	10	0.0	2.1	0.0
American shad	3	0.0	0.9	0.0	fourspot flounder	7	0.0	1.9	0.0
spiny dogfish	3	0.0	15.6	0.1	rough scad	7	0.0	0.6	0.0
hickory shad	2	0.0	0.6	0.0	northern puffer	4	0.0	0.7	0.0
northern kingfish	1	0.0	0.2	0.0	Atlantic mackerel	3	0.0	1.3	0.0
<b>Total</b>	<b>59,727</b>		<b>11,355.9</b>		black drum	2	0.0	0.2	0.0
					hickory shad	2	0.0	0.7	0.0
					Atlantic sturgeon	1	0.0	60.9	0.8
					blue runner	1	0.0	0.1	0.0
					bigeye	1	0.0	0.1	0.0
					crevalle jack	1	0.0	0.1	0.0
					glasseye snapper	1	0.0	0.1	0.0
					inshore lizardfish	1	0.0	0.1	0.0
					naked goby	1	0.0	0.1	0.0
					Spanish mackerel	1	0.0	0.1	0.0
					oyster toadfish	1	0.0	0.3	0.0
					<b>Total</b>	<b>74,568</b>		<b>7,355.0</b>	

**Table 5.17. Total catch of invertebrates taken in the spring and fall sampling periods, 2017.**  
*Species are ranked by total weight (kg). Number of tows (sample sizes): Spring = 64 and Fall = 80.*

Spring					Fall				
species	count	%	weight	%	species	count	%	weight	%
spider crab	nc		117.9	44.4	longfin inshore squid	13,370	98.2	532.9	66.0
longfin inshore squid	816	74.7	51.6	19.4	horseshoe crab	95	0.7	189.6	23.5
horseshoe crab	17	2	34.8	13.1	boring sponge	nc		28.8	3.6
boring sponge	nc		18.1	6.8	spider crab	nc		11.5	1.4
common slipper shell	nc		12.3	4.6	bushy bryozoan	nc		8.8	1.1
mantis shrimp	107	10	4.4	1.7	common slipper shell	nc		8.5	1.1
bushy bryozoan	nc		3.3	1.2	flat claw hermit crab	nc		6.1	0.8
blue crab	14	1.3	3.2	1.2	knobbed whelk	20	0.1	5.0	0.6
American lobster	10	0.9	2.9	1.1	mantis shrimp	66	0.5	2.9	0.4
lady crab	nc		2.8	1.1	lion's mane jellyfish	7	0.1	1.4	0.2
lion's mane jellyfish	95	8.7	2.3	0.9	channeled whelk	7	0.1	1.3	0.2
knobbed whelk	16	1.5	2.3	0.9	hard clams	5	0.0	1.2	0.1
flat claw hermit crab	nc		2.2	0.8	comb jelly spp	24	0.2	1.2	0.1
blue mussel	nc		2	0.8	American lobster	2	0.0	1.1	0.1
sand shrimp	nc		1.6	0.6	blue crab	4	0.0	0.9	0.1
channeled whelk	11	1.0	1.1	0.4	hydroid spp.	nc		0.8	0.1
rock crab	nc		0.7	0.3	surf clam	10	0.1	0.8	0.1
northern moon snail	nc		0.7	0.3	lady crab	nc		0.7	0.1
arks	4	0.4	0.6	0.2	blue mussel	nc		0.7	0.1
mud crabs	nc		0.5	0.2	mud crabs	nc		0.6	0.1
hydroid spp.	nc		0.3	0.1	arks	2	0.0	0.5	0.1
purple sea urchin	2	0.2	0.1	0.0	red bearded sponge	nc		0.5	0.1
<b>Total</b>	<b>1,092</b>		<b>265.7</b>		northern moon snail	nc		0.3	0.0
Note: nc= not counted					purple sea urchin	1	0.0	0.3	0.0
					star coral	nc		0.2	0.0
					anemones	nc		0.1	0.0
					ghost shrimp	1	0.0	0.1	0.0
					jingle shell clams	1	0.0	0.1	0.0
					common oyster	nc		0.1	0.0
					rock crab	nc		0.1	0.0
					mixed sponge species	nc		0.1	0.0
					<b>Total</b>	<b>13,615</b>		<b>807.2</b>	

**Table 5.18. Spring indices of abundance for selected species, 1984-2017.**

*The geometric mean count per tow was calculated for 38 finfish and 2 invertebrates using April-June data. An asterisk next to the species name and time series mean, indicates that the spring index is a better estimate than the fall index (Simpson et al. 1991). Two asterisks indicate that both the spring and the fall indices provide good estimates.*

Table with 28 columns for years (1984-2017) and a final column for Mean. The first column lists various fish species. The data is organized by year, with a sub-header for 'Spring' above the years 2000-2017. Species include alewife, black sea bass, bluefish, butterfish, cunner, dogfish (smooth and spiny), flounder (various types), hake (various types), herring (Atlantic and blueback), hogchoker, kingfish, lobster, menhaden, moonfish, ocean pout, rockling, scud, sculpin, scup, sea raven, searobin, shad, skate (various types), spot, squid, striped bass, sturgeon, tautog, and weakfish. Each cell contains a numerical value representing the abundance index.









**Table 5.22. Bluefish indices of abundance, 1984-2017.**

*Using September and October length data, the geometric mean catch per tow was calculated for two age groups of bluefish: age-0 and all fish age 1 and older. Age-0 was defined as bluefish less than 30 cm fork length.*

Year	Fall			
	age 0 count / tow	age 0 kg / tow	ages 1+ count / tow	ages 1+ kg / tow
1984	20.34	2.51	1.61	2.03
1985	11.27	1.64	4.16	6.25
1986	8.05	1.13	3.77	5.96
1987	9.01	0.88	3.11	4.85
1988	10.73	1.59	2.20	4.43
1989	21.07	3.17	1.92	3.80
1990	12.82	2.09	6.14	8.92
1991	22.57	2.75	5.59	8.49
1992	9.23	1.27	8.44	14.88
1993	11.61	1.96	3.34	7.11
1994	24.85	2.54	3.07	6.09
1995	16.85	2.48	4.07	5.32
1996	13.85	2.27	2.34	4.09
1997	31.26	2.56	2.35	3.68
1998	25.89	2.08	1.65	2.70
1999	39.19	5.43	0.86	1.61
2000	14.67	2.97	2.18	3.75
2001	19.04	2.11	2.62	3.87
2002	12.35	2.25	3.63	4.81
2003	16.85	3.16	2.16	3.31
2004	13.30	2.39	10.38	13.96
2005	12.10	2.39	2.65	5.04
2006	12.43	1.49	2.14	2.74
2007	23.98	4.14	2.44	4.22
2008	6.14	0.82	4.52	8.18
2009	11.65	1.16	3.18	5.09
2010	-	-	-	-
2011	8.21	1.34	1.40	2.36
2012	13.11	1.86	0.97	1.67
2013	7.86	0.87	0.96	1.82
2014	16.54	2.22	0.88	1.47
2015	7.47	1.04	0.42	0.93
2016	8.83	1.20	1.25	1.65
2017	7.49	1.13	0.28	0.55
<b>84-16</b>				
<b>mean</b>	<b>15.41</b>	<b>2.12</b>	<b>3.01</b>	<b>4.85</b>



**Table 5.24. Age frequency of striped bass taken in spring, 1984-2017.**

*Ages were derived from trawl survey length data using the average of Hudson River and Chesapeake Bay von Bertalanffy parameters.*

Age	Year																																			
	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017		
1	0	0	0	0	0	0	0	0	2	0	0	3	0	0	0	1	0	2	1	1	0	0	2	11	5	0	1	11	0	0	0	2	0			
2	0	0	0	2	1	5	28	11	4	3	6	98	12	36	119	41	113	47	150	30	15	220	3	46	20	84	3	2	46	49	4	2	71	4		
3	0	0	0	0	1	3	8	7	8	7	10	26	97	116	122	87	20	41	76	38	38	54	25	109	15	54	7	2	13	33	94	13	5	10		
4	0	0	0	2	4	1	2	3	13	16	20	8	37	40	68	42	22	15	48	23	18	59	15	44	48	130	17	29	13	21	73	23	19	13		
5	0	0	0	2	0	1	1	5	5	14	18	7	14	17	28	95	22	28	45	39	21	33	22	44	41	64	24	50	19	12	20	17	23	8		
6	0	0	0	2	1	1	3	0	1	8	8	6	7	14	20	46	32	36	52	41	22	28	11	28	11	34	11	44	12	16	6	1	2	3		
7	0	0	0	0	0	0	0	2	0	7	1	1	8	9	3	17	12	13	25	23	14	16	10	9	7	10	6	29	5	10	1	1	3	3		
8	0	0	0	0	0	0	0	1	2	1	1	3	2	4	1	4	4	2	12	5	3	9	4	3	3	1	2	7	3	15	5	1	0	3		
9	0	0	0	0	0	0	0	2	1	1	1	0	3	2	1	0	1	2	3	7	2	1	3	1	1	0	0	1	2	1	1	0	2	1	0	
10	0	0	0	0	0	0	1	1	0	0	0	1	0	0	0	1	2	0	1	0	0	0	3	3	2	0	0	0	0	2	1	0	1	0	0	
11	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	0	0	0	0	1	1	1	0	0	0	0	1	1	0	1	0	1	0	1	
12	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	1	0	0
Total	0	0	0	8	7	11	43	32	34	59	65	150	184	238	362	334	229	184	414	207	135	421	97	289	159	382	70	166	125	160	205	59	129	46		

*Note: number of fish taken but not measured = one in 1984, one in 1988, two in 1990.*

**Table 5.25. Striped bass indices-at-age, 1984-2017.**

*Spring length data was converted to ages using the average of Hudson River and Chesapeake Bay von Bertalanffy parameters (Vic Crecco, pers comm). Indices-at-age were then determined by apportioning the spring indices (from Table 5.18) by the percentage of fish in each age.*

Year	Index	Spring											
		Age 1	Age 2	Age 3	Age 4	Age 5	Age 6	Age 7	Age 8	Age 9	Age 10	Age 11	Age 12
1984	0.02	0	0	0	0	0	0	0	0	0	0	0	0
1985	0.00	0	0	0	0	0	0	0	0	0	0	0	0
1986	0.00	0	0	0	0	0	0	0	0	0	0	0	0
1987	0.05	0	0.0125	0	0.0125	0.0125	0.0125	0	0	0	0	0	0
1988	0.04	0	0.0057	0.0057	0.0229	0	0.0057	0	0	0	0	0	0
1989	0.06	0	0.0273	0.0164	0.0055	0.0055	0.0055	0	0	0	0	0	0
1990	0.16	0	0.1042	0.0298	0.0074	0.0037	0.0112	0	0	0	0.0037	0	0
1991	0.15	0	0.0516	0.0328	0.0141	0.0234	0	0.0094	0.0047	0.0094	0.0047	0	0
1992	0.22	0	0.0259	0.0518	0.0841	0.0324	0.0065	0	0.0129	0.0065	0	0	0
1993	0.27	0.0093	0.0140	0.0326	0.0745	0.0652	0.0372	0.0326	0.0047	0.0047	0	0	0
1994	0.30	0	0.0277	0.0462	0.0923	0.0831	0.0369	0.0046	0.0046	0.0046	0	0	0
1995	0.59	0	0.3855	0.1023	0.0315	0.0275	0.0236	0.0039	0.0118	0	0.0039	0	0
1996	0.63	0.0103	0.0411	0.3321	0.1267	0.0479	0.0240	0.0274	0.0068	0.0103	0	0.0034	0
1997	0.85	0	0.1286	0.4143	0.1429	0.0607	0.0500	0.0321	0.0143	0.0071	0	0	0
1998	0.97	0	0.3189	0.3269	0.1822	0.0750	0.0536	0.0080	0.0027	0.0027	0	0	0
1999	1.10	0	0.1346	0.2857	0.1379	0.3119	0.1510	0.0558	0.0131	0	0.0033	0.0033	0
2000	0.84	0.0037	0.4163	0.0737	0.0811	0.0811	0.1179	0.0442	0.0147	0.0037	0.0074	0	0
2001	0.61	0	0.1558	0.1359	0.0497	0.0928	0.1193	0.0431	0.0066	0.0066	0	0	0
2002	1.30	0.0063	0.4722	0.2392	0.1511	0.1416	0.1637	0.0787	0.0378	0.0094	0.0031	0	0
2003	0.87	0.0042	0.1267	0.1605	0.0971	0.1647	0.1732	0.0971	0.0211	0.0296	0	0	0
2004	0.56	0.0042	0.0627	0.1588	0.0752	0.0878	0.0919	0.0585	0.0125	0.0084	0	0.0042	0
2005	1.17	0	0.6100	0.1497	0.1636	0.0915	0.0776	0.0444	0.0250	0.0028	0	0.0028	0
2006	0.61	0	0.0189	0.1572	0.0943	0.1384	0.0692	0.0629	0.0252	0.0189	0.0189	0.0063	0
2007	1.02	0.0071	0.1629	0.3860	0.1558	0.1558	0.0992	0.0319	0.0106	0.0035	0.0106	0	0
2008	0.57	0.0394	0.0717	0.0538	0.1721	0.1470	0.0394	0.0251	0.0108	0.0036	0.0072	0	0
2009	0.60	0.0078	0.1316	0.0846	0.2037	0.1003	0.0533	0.0157	0.0016	0	0	0	0
2010	0.40	0	0.0169	0.0394	0.0958	0.1352	0.0620	0.0338	0.0113	0	0	0	0
2011	0.48	0.0029	0.0058	0.0058	0.0839	0.1446	0.1272	0.0839	0.0202	0.0029	0	0	0.0029
2012	0.43	0.0381	0.1595	0.0451	0.0451	0.0659	0.0416	0.0173	0.0104	0.0069	0	0.0035	0
2013	0.67	0	0.2052	0.1382	0.0879	0.0503	0.0670	0.0419	0.0628	0.0042	0.0084	0.0042	0
2014	0.41	0	0.0080	0.1880	0.1460	0.0400	0.0120	0.0020	0.0100	0.0020	0.0020	0.0000	0
2015	0.20	0	0.0068	0.0441	0.0780	0.0576	0.0034	0.0034	0.0034	0.0000	0.0000	0.0034	0
2016	0.48	0.0074	0.2642	0.0186	0.0707	0.0856	0.0074	0.0112	0.0000	0.0074	0.0037	0	0.0037
2017	0.34	0	0.0296	0.0739	0.0961	0.0591	0.0222	0.0222	0.0222	0.0074	0.0000	0.0074	0
84-16 mean		0.0043	0.1264	0.1138	0.0844	0.0766	0.0528	0.0263	0.0109	0.0047	0.0023	0.0009	0.0002



**Table 5.27. Tautog indices-at-age, 1984-2015.**

Year and season specific age keys obtained from the LISTS spring and fall surveys were used to convert LISTS length frequencies to ages. Indices-at-age were then determined for each season by apportioning the spring and fall overall indices (from Table 5.18 and Table 5.19) by the percentage of fish in each age, and then summing the spring and fall indices-at-age. The age 1-20+ index is the sum of indices ages 1 – 20+. The age 20+ category includes 36 fish ranging from 20 to 30 years of age.

Year	Age										
	1 - 20+	1	2	3	4	5	6	7	8	9	10
1984	3.4691	0.0109	0.0816	0.1898	0.3030	0.4587	0.4955	0.2903	0.2852	0.3101	0.3529
1985	1.7967	0	0.0199	0.0962	0.1902	0.1651	0.1281	0.1836	0.3005	0.2020	0.0902
1986	1.7199	0.0012	0.0275	0.0961	0.0483	0.1029	0.2012	0.2409	0.2452	0.2863	0.1017
1987	1.2128	0.0237	0.0801	0.0594	0.0602	0.0999	0.1345	0.1910	0.1348	0.0957	0.0522
1988	0.9007	0.0031	0.0323	0.0474	0.0720	0.0445	0.0401	0.0755	0.1008	0.1641	0.0790
1989	1.2589	0	0.0433	0.0684	0.1365	0.0889	0.1154	0.1495	0.1600	0.1046	0.0817
1990	1.1615	0.0102	0.0829	0.1569	0.1117	0.1142	0.0498	0.0500	0.1245	0.0874	0.0623
1991	1.1466	0.0053	0.0251	0.0575	0.1184	0.1241	0.1486	0.0931	0.1253	0.1071	0.1067
1992	1.0254	0.0196	0.0489	0.0708	0.0414	0.0490	0.1231	0.1323	0.0849	0.0632	0.0636
1993	0.5695	0.0033	0.0212	0.0519	0.0302	0.0163	0.0606	0.0595	0.0423	0.0489	0.0522
1994	0.5837	0.0087	0.0368	0.0327	0.0678	0.0557	0.0551	0.0555	0.0799	0.0516	0.0312
1995	0.2530	0.0033	0.0093	0.0090	0.0295	0.0608	0.0267	0.0212	0.0346	0.0150	0.0219
1996	0.5628	0.0073	0.0518	0.0305	0.0086	0.0762	0.0452	0.0654	0.0712	0.0667	0.0609
1997	0.5079	0	0.0390	0.0675	0.0568	0.0574	0.0639	0.0491	0.0556	0.0486	0.0101
1998	0.6442	0	0.0425	0.0281	0.0701	0.0821	0.0876	0.0875	0.0848	0.0465	0.0575
1999	0.7614	0.0498	0.0792	0.0583	0.0666	0.1015	0.1379	0.0748	0.0843	0.0431	0.0203
2000	0.8004	0.0009	0.0468	0.0578	0.0832	0.0737	0.1403	0.1376	0.0897	0.0392	0.0467
2001	0.8946	0.0062	0.0305	0.0862	0.0830	0.1294	0.1197	0.1193	0.1058	0.0715	0.0454
2002	1.1665	0.0098	0.0237	0.0599	0.1009	0.1749	0.1972	0.1895	0.2091	0.0739	0.0419
2003	0.8977	0.0027	0.0132	0.0080	0.0598	0.1485	0.2385	0.1596	0.0893	0.0778	0.0185
2004	0.6936	0.0071	0.0209	0.0152	0.0360	0.0710	0.1930	0.1096	0.0494	0.0812	0.0441
2005	0.7596	0.0100	0.0367	0.0618	0.0261	0.0922	0.1437	0.1576	0.1064	0.0303	0.0268
2006	0.8405	0	0.0334	0.0345	0.1039	0.1274	0.1140	0.1196	0.1521	0.0620	0.0479
2007	0.6135	0.0034	0.0125	0.0170	0.0462	0.0478	0.0608	0.0918	0.0935	0.0966	0.0533
2008	0.7268	0.0061	0.0272	0.0439	0.0620	0.0848	0.1164	0.0708	0.0649	0.0831	0.0640
2009	0.4822	0.0145	0.0364	0.0070	0.0026	0.0394	0.0681	0.1013	0.0658	0.0319	0.0324
2010	0.2472	0	0.0053	0.0455	0.0093	0.0053	0.0315	0.0503	0.0294	0.0096	0.0093
2011	0.4456	0.0180	0.0401	0.0532	0.0303	0.0301	0.0612	0.0630	0.0415	0.0267	0.0167
2012	0.5809	0.0270	0.1148	0.0919	0.0808	0.0635	0.0389	0.0384	0.0499	0.0489	0.0115
2013	0.5781	0.0075	0.0653	0.0561	0.1211	0.0857	0.0912	0.0532	0.0386	0.0215	0.0214
2014	0.6958	0	0.0281	0.1540	0.0854	0.1112	0.1286	0.0754	0.0522	0.0243	0.0185
2015	0.6160	0.0422	0.0494	0.0710	0.0722	0.0758	0.0981	0.0900	0.0584	0.0266	0.0149
<b>84-14</b>											
<b>Mean</b>	<b>0.9031</b>	<b>0.0084</b>	<b>0.0405</b>	<b>0.0617</b>	<b>0.0755</b>	<b>0.0962</b>	<b>0.1179</b>	<b>0.1083</b>	<b>0.1049</b>	<b>0.0813</b>	<b>0.0562</b>

Year	Age									
	11	12	13	14	15	16	17	18	19	20+
1984	0.1259	0.2281	0.0933	0.0507	0.0448	0.0322	0.0468	0.0156	0.0006	0.0531
1985	0.1595	0.0982	0.0226	0.0994	0	0.0249	0.0039	0.0124	0	0
1986	0.1423	0.0863	0.0374	0.0522	0.0232	0.0071	0.0114	0.0003	0.0023	0.0061
1987	0.0606	0.0543	0.0479	0.0313	0.0246	0.0267	0.0105	0.0004	0.0048	0.0202
1988	0.0469	0.0395	0.0295	0.0225	0.0493	0.0086	0.0063	0.0055	0.0052	0.0286
1989	0.0569	0.0932	0.0430	0.0404	0.0348	0.0172	0.0067	0.0048	0	0.0136
1990	0.0979	0.0375	0.0568	0.0397	0.0221	0.0250	0.0089	0.0169	0.0035	0.0033
1991	0.0609	0.0258	0.0399	0.0361	0.0216	0.0007	0.0159	0.0117	0.0080	0.0148
1992	0.0599	0.0512	0.0440	0.0581	0.0236	0.0208	0.0167	0.0298	0.0167	0.0078
1993	0.0368	0.0351	0.0351	0.0129	0.0157	0.0152	0.0129	0.0097	0.0097	0
1994	0.0234	0.0238	0.0071	0.0118	0.0118	0.0096	0.0024	0.0047	0.0070	0.0071
1995	0.0036	0.0036	0.0073	0	0	0	0.0036	0	0	0.0036
1996	0.0230	0.0127	0.0103	0.0048	0.0099	0.0090	0.0086	0.0004	0.0001	0.0002
1997	0.0072	0.0119	0.0144	0.0048	0.0121	0.0071	0	0.0024	0	0
1998	0.0192	0.0164	0.0055	0.0055	0	0.0027	0.0055	0	0	0.0027
1999	0.0191	0.0090	0.0087	0.0029	0	0	0.0030	0.0029	0	0
2000	0.0213	0.0130	0.0123	0.0101	0.0084	0.0104	0.0023	0	0.0027	0.0040
2001	0.0407	0.0161	0.0152	0.0004	0.0053	0.0105	0.0036	0.0001	0.0026	0.0031
2002	0.0257	0.0185	0.0107	0.0070	0.0147	0.0039	0	0	0	0.0052
2003	0.0274	0.0088	0.0059	0.0184	0.0029	0.0124	0	0.0029	0	0.0031
2004	0.0204	0.0221	0.0119	0.0003	0.0028	0.0031	0.0026	0.0002	0	0.0027
2005	0.0347	0.0257	0.0039	0.0037	0	0	0	0	0	0
2006	0.0183	0.0200	0.0037	0	0.0037	0	0	0	0	0
2007	0.0294	0.0156	0.0194	0.0108	0.0019	0.0116	0	0.0019	0	0
2008	0.0322	0.0225	0.0228	0.0163	0.0098	0	0	0	0	0
2009	0.0343	0.0064	0.0091	0.0217	0.0070	0.0032	0.0011	0	0	0
2010	0.0192	0.0139	0.0048	0.0046	0.0046	0	0	0	0.0046	0
2011	0.0167	0.0161	0.0080	0.0080	0.0040	0	0.0040	0.0080	0	0
2012	0	0.0077	0.0038	0	0.0038	0	0	0	0	0
2013	0.0066	0	0	0.0033	0.0033	0.0033	0	0	0	0
2014	0.0148	0	0	0.0033	0	0	0	0	0	0
2015	0.0060	0.0016	0.0033	0.0049	0	0	0.0016	0	0	0
<b>84-14</b>										
<b>Mean</b>	<b>0.0414</b>	<b>0.0333</b>	<b>0.0205</b>	<b>0.0187</b>	<b>0.0118</b>	<b>0.0086</b>	<b>0.0057</b>	<b>0.0042</b>	<b>0.0022</b>	<b>0.0058</b>

**Table 5.28. Weakfish age 0 and age 1+ indices of abundance, 1984-2017.**

Using spring (May, June) and fall (September, October) length data, the geometric mean catch per tow was calculated for three groups of weakfish: fall age-0, spring - all fish age 1 and older (1+), and fall - all fish age 1 and older (1+). Weakfish less than 30 cm fork length in the fall were defined as age-0.

Year	Fall		Fall		Spring	
	age 0 count / tow	age 0 kg / tow	ages 1+ count / tow	age 1+ kg / tow	ages 1+ count / tow	ages 1+ kg / tow
1984	1.00	0.14	0.53	0.84	0.02	0.15
1985	6.19	0.74	0.24	0.46	0.00	0.10
1986	13.16	0.91	0.24	0.51	0.10	0.33
1987	0.63	0.13	0.11	0.16	0.02	0.11
1988	3.49	0.30	0.06	0.13	0.05	0.17
1989	8.69	0.94	0.02	0.10	0.04	0.16
1990	5.56	0.56	0.08	0.13	0.07	0.13
1991	11.95	1.44	0.31	0.41	0.28	0.26
1992	3.05	0.31	0.18	0.24	0.12	0.22
1993	4.08	0.46	0.12	0.18	0.10	0.15
1994	11.19	1.23	0.06	0.13	0.04	0.12
1995	5.22	0.84	0.70	0.64	0.18	0.16
1996	15.23	1.49	0.56	0.52	0.19	0.19
1997	12.38	1.03	0.89	0.81	0.42	0.34
1998	5.02	0.76	0.28	0.36	0.37	0.41
1999	30.93	3.21	0.39	0.51	0.45	0.59
2000	63.31	3.34	0.30	0.32	0.18	0.28
2001	40.09	2.20	0.52	0.54	0.27	0.26
2002	41.35	2.85	0.16	0.26	0.16	0.26
2003	49.41	1.77	0.07	0.17	0.04	0.14
2004	58.98	2.99	0.21	0.25	0.15	0.16
2005	25.86	2.50	0.12	0.18	0.27	0.23
2006	1.05	0.20	0.29	0.30	0.14	0.22
2007	63.93	3.86	0.06	0.14	0.11	0.22
2008	9.03	1.17	0.08	0.14	0.05	0.12
2009	6.48	0.57	0.30	0.22	0.08	0.16
2010	-	-	-	-	0.02	0.12
2011	11.64	0.87	0.68	0.55	0.10	0.15
2012	21.96	1.47	0.73	0.69	0.62	0.56
2013	7.01	0.59	0.52	0.52	0.52	0.44
2014	41.53	2.27	0.08	0.12	0.17	0.23
2015	30.91	3.11	0.46	0.35	0.03	0.11
2016	5.87	0.73	0.81	0.59	0.85	0.43
2017	8.2	0.94	0.43	0.40	0.57	0.42
<b>84-16</b>						
<b>mean</b>	<b>19.26</b>	<b>1.41</b>	<b>0.32</b>	<b>0.36</b>	<b>0.19</b>	<b>0.23</b>





**TABLES 5.30 - 5.66  
LENGTH FREQUENCIES  
LISTS**























**Table 5.40. Blueback herring length frequencies, spring and fall, 1 cm intervals, 1989-2017.**

*From 1989 - 1990, lengths were recorded from the first three tows of each day; since 1991, lengths have been recorded from every tow.*

length	Spring																												
	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
6	0	0	0	0	0	0	1	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	6	0	0
7	0	0	2	0	2	7	2	0	0	2	0	4	1	0	3	2	1	0	0	1	0	4	0	0	5	1	17	3	0
8	0	0	3	0	2	76	20	4	0	5	0	10	7	12	7	9	8	1	0	8	0	1	0	0	9	8	30	13	0
9	0	0	2	0	3	114	11	5	21	15	0	14	5	9	23	23	14	8	1	11	7	4	3	3	9	3	24	45	0
10	0	0	5	10	7	74	9	19	45	45	0	18	2	9	26	47	6	23	9	14	19	19	5	18	5	1	32	52	0
11	0	0	3	4	9	41	9	10	258	48	0	28	1	6	11	39	10	2	3	12	25	38	9	12	8	2	29	40	0
12	3	0	5	0	2	9	5	3	4	16	0	18	2	3	4	20	12	0	5	2	27	8	3	5	1	2	10	23	0
13	0	0	0	4	0	13	5	2	0	2	0	12	1	1	1	12	3	1	3	4	17	10	6	1	1	0	3	5	0
14	0	0	0	15	0	5	3	1	1	1	0	3	0	0	0	7	0	1	1	5	4	2	0	0	0	0	0	1	0
15	0	0	1	27	1	3	4	7	0	0	1	2	0	4	0	0	8	1	2	2	9	1	0	0	0	0	0	1	0
16	0	0	0	65	0	8	3	7	0	3	5	1	1	1	4	4	13	2	23	1	30	4	2	2	7	0	0	0	0
17	0	0	1	11	3	9	1	10	4	0	5	3	10	7	4	4	11	2	37	7	64	2	12	2	5	6	0	1	0
18	0	1	0	2	0	3	0	4	2	0	0	5	15	2	3	3	1	2	7	3	49	1	3	2	3	11	1	2	0
19	0	0	0	0	1	2	4	3	2	0	0	0	3	0	0	3	2	1	3	2	17	2	1	0	1	4	0	0	0
20	0	0	0	4	0	1	1	0	0	0	0	2	1	1	0	0	5	2	0	1	2	0	1	0	1	3	0	0	0
21	2	1	2	0	0	1	1	3	0	0	0	1	3	0	0	3	2	3	2	0	1	1	0	0	7	2	1	0	0
22	1	0	0	1	0	3	0	4	0	1	0	3	0	0	1	0	1	0	1	1	0	1	0	0	5	2	0	1	0
23	0	0	3	2	0	3	2	3	1	0	0	5	0	1	0	1	0	0	1	1	0	1	0	0	0	0	0	0	0
24	0	1	2	0	0	0	0	2	0	0	0	3	0	0	0	0	0	0	2	0	0	1	0	0	1	0	0	0	0
25	0	0	0	1	0	1	1	1	0	0	0	1	0	0	2	0	0	1	1	0	0	0	0	0	0	0	0	0	0
26	0	0	0	1	0	0	1	0	0	0	0	1	0	0	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0
27	0	0	0	0	0	0	0	2	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>Total</b>	<b>6</b>	<b>3</b>	<b>29</b>	<b>147</b>	<b>30</b>	<b>373</b>	<b>83</b>	<b>90</b>	<b>338</b>	<b>140</b>	<b>11</b>	<b>136</b>	<b>52</b>	<b>56</b>	<b>89</b>	<b>173</b>	<b>104</b>	<b>49</b>	<b>101</b>	<b>71</b>	<b>272</b>	<b>102</b>	<b>47</b>	<b>45</b>	<b>68</b>	<b>47</b>	<b>153</b>	<b>187</b>	<b>0</b>

length	Fall																													
	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	
5	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	0	0	0	0	0	0	0	
6	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	-	0	0	0	0	0	0	0	
7	0	0	0	0	0	0	5	0	2	0	0	0	0	0	0	1	0	0	0	0	0	-	0	0	0	0	0	0	0	
8	0	0	0	0	0	0	33	0	2	0	0	0	0	0	0	0	0	0	1	0	0	-	0	0	0	0	0	0	0	
9	0	0	0	0	0	0	21	3	2	2	1	0	0	0	0	0	0	0	1	0	2	-	0	0	0	0	0	0	1	
10	0	0	0	0	0	1	3	0	8	1	0	1	0	0	0	0	0	0	0	0	0	-	0	0	0	0	1	0	1	
11	0	0	0	0	3	13	4	0	3	0	0	0	0	0	0	0	0	0	0	0	0	-	0	0	0	0	1	0	0	
12	0	0	3	9	8	227	14	0	12	1	1	0	7	0	0	2	0	0	0	0	0	-	0	0	0	1	0	0	3	
13	38	1	4	11	24	225	48	0	117	18	0	0	36	2	0	15	2	2	0	0	0	-	0	1	0	1	0	17	0	
14	77	0	1	6	18	247	40	1	111	28	1	0	117	7	0	17	3	8	1	1	3	-	4	0	0	2	26	151	31	
15	24	0	0	1	20	94	3	3	34	16	0	3	52	3	4	6	2	4	14	2	5	-	9	0	0	3	60	92	37	
16	0	0	0	0	2	14	0	0	5	2	1	10	0	4	0	0	0	0	31	0	2	-	9	0	0	1	6	1	14	
17	0	0	0	0	0	2	0	0	0	1	1	2	2	0	1	0	0	0	7	0	1	-	3	0	0	2	0	0	1	
18	1	0	0	0	0	1	0	0	0	0	0	1	3	0	0	0	0	0	0	0	5	-	0	0	0	0	0	0	0	
19	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	0	0	0	0	0	0	0	
20	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	-	0	0	0	0	0	0	0	
21	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	1	0	0	0	0	-	0	0	0	0	0	0	0	
22	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	0	0	0	0	0	0	0	
23	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	0	0	0	0	0	0	0	0
24	0	1	0	0	1	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	-	0	0	0	0	0	0	0	0
25	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	0	0	0	0	0	0	0	0
<b>Total</b>	<b>140</b>	<b>2</b>	<b>9</b>	<b>27</b>	<b>76</b>	<b>827</b>	<b>172</b>	<b>7</b>	<b>292</b>	<b>72</b>	<b>8</b>	<b>8</b>	<b>227</b>	<b>12</b>	<b>9</b>	<b>42</b>	<b>8</b>	<b>14</b>	<b>55</b>	<b>3</b>	<b>18</b>	<b>0</b>	<b>25</b>	<b>1</b>	<b>0</b>	<b>10</b>	<b>94</b>	<b>261</b>	<b>88</b>	













**Table 5.46. Fourspot flounder length frequencies, spring and fall, 2 cm intervals (midpoint given), 1989, 1990, 1996-2017.**  
*Prior to 2014, Fourspot flounder lengths were recorded from the first three tows of each day; since 2014, lengths have been recorded from every tow.*

length	Spring																								
	1989	1990	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	
13	2	0	0	0	0	1	0	1	0	0	0	0	1	0	0	0	1	0	1	0	0	0	0	0	
15	5	2	0	0	5	5	0	0	3	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0	
17	21	8	1	3	8	12	1	2	17	2	13	0	0	6	0	0	6	2	5	1	1	0	3	0	
19	19	19	8	16	14	61	22	5	89	8	8	0	6	7	7	4	2	1	24	2	6	3	12	2	
21	17	42	31	60	13	28	26	4	99	6	4	1	18	11	9	10	3	10	42	11	5	1	51	6	
23	11	341	198	161	16	32	239	42	33	8	4	14	24	9	17	6	5	45	56	20	9	1	79	10	
25	56	528	279	353	105	72	422	181	84	124	26	71	29	44	39	37	33	157	258	185	64	19	211	53	
27	103	225	208	456	209	97	256	300	199	228	82	75	33	105	81	91	55	150	441	209	172	52	235	105	
29	120	139	193	392	233	81	201	245	191	187	129	64	44	170	108	127	55	107	461	189	179	87	185	104	
31	89	60	117	192	137	66	139	153	175	163	178	68	61	121	94	90	69	93	303	139	107	77	111	48	
33	51	27	54	76	60	60	81	45	89	88	113	52	36	52	70	51	36	49	92	100	78	41	69	15	
35	8	33	15	22	16	25	39	11	26	47	35	31	13	43	34	31	24	27	31	27	29	26	39	9	
37	2	12	6	3	4	7	12	8	7	12	5	11	4	9	11	7	9	9	4	16	8	6	10	6	
39	0	4	3	0	2	1	1	2	3	6	2	3	1	7	2	0	4	5	0	0	0	3	2	0	
41	0	0	0	0	0	0	0	0	0	0	0	0	2	1	0	0	1	0	0	0	0	1	0	0	0
43	0	0	0	0	0	0	0	0	0	0	0	1	0	1	0	0	0	0	1	0	0	0	0	0	0
45	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>Total</b>	<b>504</b>	<b>1,440</b>	<b>1,113</b>	<b>1,734</b>	<b>822</b>	<b>548</b>	<b>1,439</b>	<b>999</b>	<b>1,015</b>	<b>879</b>	<b>602</b>	<b>394</b>	<b>271</b>	<b>585</b>	<b>472</b>	<b>455</b>	<b>302</b>	<b>655</b>	<b>1,719</b>	<b>899</b>	<b>659</b>	<b>316</b>	<b>1,007</b>	<b>358</b>	

length	Fall																									
	1989	1990	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017		
5	0	0	0	0	0	0	0	1	0	0	0	0	2	0	0	1	-	0	0	0	0	0	0	0	0	
7	0	1	0	1	4	0	0	1	0	0	1	0	2	0	0	1	-	1	0	1	1	0	0	0	0	
9	5	0	0	23	19	0	2	2	0	4	1	0	2	1	1	7	-	4	0	0	3	1	0	0	0	
11	9	4	2	46	27	5	4	17	5	2	12	4	5	0	7	16	-	17	3	1	11	3	0	0	0	
13	10	15	5	68	22	24	6	25	3	3	9	9	13	2	8	59	-	28	4	11	26	20	3	0	0	
15	6	17	35	55	21	42	5	15	9	0	13	17	4	5	11	45	-	22	13	10	47	23	9	0	0	
17	0	0	42	16	3	16	1	0	3	0	1	26	3	2	16	20	-	4	12	2	49	11	8	0	0	
19	0	0	22	0	0	4	1	0	1	0	0	2	0	0	7	6	-	0	0	4	5	1	2	0	0	
21	0	0	0	2	2	3	2	0	2	0	1	0	0	1	0	0	-	0	0	1	0	0	0	0	0	
23	1	2	9	2	5	0	17	1	5	0	0	0	1	1	0	1	-	0	0	0	1	0	3	0	0	
25	0	3	42	7	16	5	58	3	7	3	4	1	0	6	1	2	-	2	3	0	1	0	1	0	0	
27	0	7	41	10	22	4	77	5	13	7	6	5	0	7	1	6	-	1	9	2	4	1	4	1	0	
29	0	3	24	5	22	5	54	10	18	11	13	5	0	20	6	8	-	1	11	2	4	4	9	3	0	
31	0	1	20	3	6	3	25	1	18	4	30	6	0	12	5	6	-	1	6	2	8	2	6	0	0	
33	0	0	6	1	1	1	7	1	13	7	19	2	1	3	1	11	-	3	6	0	0	5	1	2	0	
35	0	0	4	0	1	0	5	0	6	5	6	7	0	4	4	1	-	2	2	2	1	0	2	1	0	
37	0	0	0	0	0	0	2	1	3	0	2	0	0	0	0	1	-	1	0	0	0	0	1	0	0	
39	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1	-	0	0	0	0	0	0	0	0	0
<b>Total</b>	<b>31</b>	<b>53</b>	<b>252</b>	<b>239</b>	<b>171</b>	<b>112</b>	<b>266</b>	<b>83</b>	<b>106</b>	<b>46</b>	<b>118</b>	<b>85</b>	<b>33</b>	<b>64</b>	<b>68</b>	<b>192</b>	<b>-</b>	<b>87</b>	<b>69</b>	<b>38</b>	<b>161</b>	<b>71</b>	<b>49</b>	<b>7</b>	<b>0</b>	



**Table 5.48. Horseshoe crab length frequencies by sex, spring, 1 cm intervals, 1998-2017.**

*Horseshoe crabs were measured (prosomal width) from every tow.*

Sex	length	1998*	Spring																		
			1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
F	13		1	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0
F	14		1	3	0	1	2	0	1	0	0	0	0	0	0	0	0	0	1	0	0
F	15		0	0	0	1	1	0	0	0	0	1	0	0	0	0	0	0	0	0	0
F	16		1	0	0	3	2	1	1	0	0	1	0	0	0	1	0	2	0	0	0
F	17		1	0	2	2	1	4	1	0	1	1	0	0	1	0	0	1	0	0	0
F	18		2	1	0	3	2	4	0	0	2	1	1	0	0	0	2	3	1	0	0
F	19		4	1	2	2	5	5	0	0	3	4	1	0	0	2	0	5	1	2	0
F	20		5	2	0	7	1	2	3	0	3	2	0	0	1	2	0	4	0	0	0
F	21		8	2	1	8	6	2	1	0	3	8	1	0	3	5	4	5	3	4	0
F	22		8	6	4	13	10	7	2	0	10	4	6	0	3	3	2	3	3	2	0
F	23		14	15	18	19	22	17	3	2	9	14	4	3	4	9	7	14	7	4	4
F	24		15	7	15	32	29	25	5	4	15	11	12	6	3	15	19	13	3	5	3
F	25		15	10	23	25	22	20	8	5	11	16	10	9	9	14	19	11	11	14	4
F	26		23	13	28	26	22	23	3	2	16	12	10	4	16	14	17	26	9	4	0
F	27		15	9	18	18	18	18	8	4	10	9	9	5	18	11	8	22	10	6	2
F	28		8	6	9	6	7	4	2	2	5	4	10	3	8	10	13	9	3	2	1
F	29		3	0	3	4	4	4	0	3	5	1	3	4	1	3	2	3	1	0	1
F	30		1	0	3	2	0	0	3	2	0	2	1	1	4	0	1	1	1	0	0
F	31		0	0	0	0	4	0	0	0	0	1	1	0	0	0	0	0	0	0	0
F	32		0	0	0	0	1	0	1	0	0	0	0	0	0	0	0	1	0	0	0
M	14		0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0
M	15		0	0	0	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0
M	16		0	0	0	2	5	2	0	1	2	0	0	2	0	0	0	0	0	0	0
M	17		5	2	4	7	9	9	0	0	3	2	3	0	1	5	0	1	1	1	0
M	18		11	8	12	19	24	21	2	0	17	10	3	2	5	7	6	9	4	3	1
M	19		22	13	32	42	25	33	3	0	19	12	10	7	7	8	16	17	7	5	1
M	20		15	16	30	20	33	31	7	0	21	10	11	7	15	13	10	13	12	2	0
M	21		18	5	13	14	16	10	1	0	6	12	5	3	3	9	6	6	7	1	0
M	22		4	5	7	6	7	6	2	0	4	2	1	1	4	5	3	1	0	0	0
M	23		1	0	3	1	4	2	1	0	0	1	1	0	0	0	2	1	0	0	0
M	24		2	1	1	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0
M	25		0	0	0	0	0	1	2	0	0	0	0	0	0	0	0	3	1	0	0
M	26		0	0	0	1	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0
M	27		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
M	28		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
M	29		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0
M	30		0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
U	22		1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>Total</b>		<b>51</b>	<b>204</b>	<b>125</b>	<b>228</b>	<b>285</b>	<b>285</b>	<b>251</b>	<b>60</b>	<b>25</b>	<b>166</b>	<b>141</b>	<b>104</b>	<b>57</b>	<b>105</b>	<b>138</b>	<b>138</b>	<b>173</b>	<b>88</b>	<b>55</b>	<b>17</b>

**Table 5.49. Horseshoe crab length frequencies by sex, fall, 1 cm intervals, 1998-2017.**

*Horseshoe crabs were measured (prosomal width) from every tow.*

Sex	length	Fall																			
		1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
F	13	0	0	2	0	0	0	3	0	1	0	0	0	-	0	0	0	0	0	2	0
F	14	0	0	0	0	0	0	0	0	0	0	0	0	-	0	0	0	0	0	0	0
F	15	0	0	0	0	2	0	0	0	0	0	0	0	-	0	0	0	0	0	0	0
F	16	0	0	0	0	0	0	0	0	0	0	0	0	-	0	0	0	0	0	0	0
F	17	1	1	0	0	2	1	0	1	1	0	1	0	-	0	0	0	0	1	0	0
F	18	0	2	0	1	0	1	1	1	0	0	0	0	-	0	0	0	0	1	1	1
F	19	3	2	2	2	0	1	0	0	1	0	1	1	-	0	0	0	2	1	0	0
F	20	5	1	1	4	4	2	3	0	2	0	0	2	-	0	0	0	0	1	1	1
F	21	3	2	2	3	1	4	6	3	1	1	1	0	-	0	0	0	1	2	1	0
F	22	3	8	13	13	10	3	9	4	1	2	6	6	-	6	0	2	2	0	1	1
F	23	8	15	15	12	8	8	13	10	7	7	6	14	-	6	2	3	4	6	9	6
F	24	7	19	30	27	21	9	24	10	6	17	14	22	-	18	10	12	8	10	14	4
F	25	17	12	20	31	33	13	19	6	12	26	17	17	-	19	9	11	11	7	17	13
F	26	19	23	33	31	18	9	29	12	10	22	15	24	-	25	16	27	10	9	12	12
F	27	14	7	21	22	18	7	22	8	3	17	11	28	-	16	5	15	10	3	9	12
F	28	2	4	10	8	13	6	15	5	4	8	11	22	-	11	3	10	6	5	6	9
F	29	2	3	2	5	2	3	8	2	0	4	1	5	-	2	4	2	3	1	2	2
F	30	0	1	1	2	0	2	1	2	0	2	0	2	-	0	1	2	0	0	1	2
F	31	0	1	0	0	1	0	0	2	0	0	0	1	-	0	0	0	1	0	1	0
F	32	0	0	0	0	0	0	0	0	0	0	0	0	-	0	0	0	0	0	0	0
F	33	0	0	0	0	0	0	0	0	0	0	0	0	-	0	0	0	0	0	0	0
F	34	0	0	0	0	0	1	0	0	0	0	0	0	-	0	0	0	0	0	0	0
M	11	0	0	0	1	0	0	0	0	0	0	0	0	-	0	0	0	0	0	0	0
M	12	0	0	0	0	0	0	0	0	0	0	0	0	-	0	0	0	0	0	0	0
M	13	0	0	0	0	0	0	0	0	0	0	0	0	-	0	0	0	0	0	0	0
M	14	0	0	0	0	0	0	0	0	0	0	0	0	-	0	0	0	0	0	0	0
M	15	0	0	0	0	0	0	0	0	0	0	0	0	-	0	0	0	0	0	0	0
M	16	0	0	2	1	5	3	0	0	0	1	1	0	-	1	0	0	0	0	0	0
M	17	6	5	7	6	3	5	11	0	1	3	1	2	-	3	0	1	1	1	1	1
M	18	12	14	28	18	14	15	21	3	9	3	9	18	-	13	4	2	5	1	7	2
M	19	10	20	39	27	31	11	39	13	4	12	21	14	-	9	4	6	13	3	5	6
M	20	20	23	35	32	22	8	30	12	9	19	23	31	-	10	1	17	4	9	7	8
M	21	6	11	18	15	9	4	15	4	2	10	6	13	-	7	1	7	6	4	8	8
M	22	5	3	8	4	6	0	10	2	5	6	2	5	-	6	0	5	0	1	3	4
M	23	0	0	3	2	6	1	1	0	2	3	1	3	-	0	1	2	0	0	1	1
M	24	0	0	1	3	0	0	1	0	1	2	0	2	-	0	0	0	0	0	0	1
M	25	0	0	2	0	0	0	0	0	0	0	0	1	-	0	0	1	0	0	0	0
M	26	2	0	0	3	0	0	0	0	1	0	0	1	-	0	0	0	0	0	0	0
M	27	0	0	0	0	0	0	0	0	0	0	0	0	-	0	0	0	0	0	0	0
M	28	0	0	0	0	0	0	0	1	0	0	0	0	-	0	0	0	0	0	0	0
M	29	0	0	0	1	0	0	0	0	0	0	0	0	-	0	0	0	0	0	0	0
<b>Total</b>		<b>145</b>	<b>177</b>	<b>295</b>	<b>274</b>	<b>229</b>	<b>117</b>	<b>281</b>	<b>101</b>	<b>83</b>	<b>165</b>	<b>148</b>	<b>234</b>	<b>-</b>	<b>152</b>	<b>61</b>	<b>125</b>	<b>87</b>	<b>66</b>	<b>109</b>	<b>94</b>















**Table 5.56. Summer flounder length frequencies, spring, 2 cm intervals (midpoint given), 1984–2017.**

*All summer flounder taken in the Survey were measured, with the exception of one fish in 1990.*

length	Spring																																				
	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017			
11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0			
13	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0		
15	0	0	0	0	0	0	0	0	0	0	0	3	0	0	0	0	0	0	0	0	0	0	0	15	0	0	1	0	0	0	1	0	0	0	0		
17	0	0	0	6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	28	1	1	7	0	0	1	0	0	0	0	0		
19	0	0	0	36	0	0	1	0	0	0	0	1	1	0	0	0	2	0	0	2	1	0	0	37	1	3	10	0	0	0	1	5	1	0	0		
21	0	0	11	39	0	0	0	0	0	0	3	2	2	1	0	0	2	1	1	3	0	0	0	46	5	16	21	1	0	15	5	19	0	0	0		
23	0	0	10	31	1	0	1	3	2	0	9	1	2	2	0	0	0	6	1	13	1	2	1	37	3	21	38	4	2	21	15	35	0	0	0		
25	1	0	22	33	2	0	2	6	1	9	20	1	2	10	1	2	6	5	2	27	3	3	0	21	7	43	86	21	4	41	29	67	3	6	6		
27	8	0	43	25	20	0	7	12	6	22	32	3	11	10	2	14	7	26	13	79	8	14	0	11	13	55	94	50	22	58	61	87	7	18	18		
29	7	0	39	6	18	0	15	17	14	15	10	9	45	22	5	32	21	60	50	135	25	10	2	19	34	53	78	90	56	56	92	56	14	32	32		
31	9	1	17	3	18	0	19	23	12	12	19	12	44	27	4	42	23	53	89	104	14	19	5	19	28	24	37	92	51	33	74	49	25	11	11		
33	0	7	13	5	12	1	12	9	8	7	22	2	14	25	7	22	28	16	57	54	18	15	21	6	25	26	10	70	44	36	65	25	20	11	11		
35	2	8	4	2	13	3	1	5	6	7	16	2	12	11	11	22	22	10	41	49	13	12	17	9	14	20	7	81	58	35	50	21	23	18	18		
37	1	3	4	5	8	2	1	6	2	6	20	1	10	20	28	26	34	20	57	75	34	8	14	12	10	28	16	69	60	64	48	30	25	11	11		
39	3	3	3	4	5	1	2	5	2	7	7	0	12	16	38	18	36	12	61	71	51	9	10	22	14	36	20	55	66	62	33	27	17	15	15		
41	1	3	7	1	8	2	1	6	5	4	6	3	5	10	35	14	33	19	51	77	49	13	5	26	17	35	12	38	34	68	33	22	17	9	9		
43	0	1	3	0	2	2	0	0	2	4	6	7	6	6	22	16	22	24	28	58	48	10	5	30	13	28	13	25	43	46	29	20	14	7	7		
45	0	0	1	1	3	0	0	8	4	0	4	0	5	4	15	11	29	16	21	33	18	5	4	26	6	30	7	19	23	39	23	17	13	4	4		
47	0	0	3	3	3	1	1	4	2	1	3	0	1	6	9	10	18	14	20	43	28	12	3	25	14	14	16	26	24	28	16	12	14	9	9		
49	1	0	1	1	1	2	0	2	1	0	2	1	3	2	12	17	7	10	14	32	26	6	3	35	9	13	10	20	23	20	17	10	9	10	10		
51	0	0	5	0	1	0	0	1	1	0	1	0	1	3	15	9	8	12	19	19	13	8	7	26	15	16	9	15	15	18	16	8	8	4	4		
53	0	0	1	0	1	0	2	1	0	1	1	2	3	5	5	9	5	8	10	21	16	6	4	10	15	8	2	18	8	13	18	8	3	4	4		
55	0	2	1	0	1	1	0	0	1	2	1	0	3	2	6	8	8	8	14	10	13	5	2	11	18	14	2	15	8	12	17	4	5	4	4		
57	0	0	0	0	0	1	1	0	0	0	2	0	0	1	5	4	5	8	12	9	3	2	1	13	14	16	2	14	3	6	14	7	3	3	3		
59	0	0	0	0	1	1	0	0	0	2	0	0	2	3	3	8	8	2	6	12	8	4	1	5	5	17	3	7	8	9	3	7	5	5	5		
61	0	2	0	0	0	0	0	0	0	1	2	1	1	0	1	3	4	4	6	5	5	3	0	2	4	7	3	7	1	3	4	0	1	1	1		
63	0	0	0	0	0	0	0	0	0	1	0	0	0	1	2	0	2	1	7	10	9	0	4	6	5	8	2	8	6	3	3	1	4	1	1		
65	0	1	0	0	0	0	0	1	1	0	1	0	0	0	1	1	2	4	2	8	2	1	0	7	3	4	6	4	5	5	1	2	1	0	0		
67	0	1	0	0	0	0	1	0	0	0	0	0	0	0	1	0	1	2	3	5	4	0	1	1	1	1	1	6	0	1	1	1	1	0	0		
69	0	0	0	1	0	1	0	0	0	0	0	0	1	1	1	0	0	0	4	2	0	0	3	0	1	1	0	1	0	1	0	2	1	1	0	0	
71	0	0	0	0	0	0	0	0	1	0	0	0	0	0	1	0	1	1	2	0	3	4	0	0	0	0	0	0	1	3	3	0	1	1	1	1	
73	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	1	1	1	0	0	0	1	0	1	0	1	2	2	0	1	0	0	0	0	
75	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	2	0	0	0	1	2	0	1	1	0	0	0	0	0	1	0	0	
77	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	
79	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	33	32	189	203	118	18	67	109	72	101	188	51	186	188	230	289	334	342	588	962	416	172	110	512	297	538	516	758	569	696	675	541	236	184	184		

**Table 5.57. Summer flounder length frequencies, fall, 2 cm intervals (midpoint given), 1984–2017.**

*All summer flounder taken in the Survey were measured, with the exception of two fish in 1985.*

length	Fall																																		
	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	
11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	-	0	0	0	0	0	0	0	
13	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4	0	0	0	-	0	0	0	0	0	0	0	
15	0	0	1	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	3	2	0	1	-	0	0	0	0	0	0	0	
17	0	0	2	0	0	0	0	0	0	0	0	0	1	0	0	1	0	0	0	0	2	0	0	0	2	-	0	0	0	0	0	0	0	1	
19	0	3	3	0	0	0	0	0	0	2	0	0	1	0	0	1	0	0	0	0	0	0	2	1	1	5	-	0	0	0	0	0	0	0	
21	0	7	6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	0	2	0	0	1	4	8	-	0	0	2	0	0	1	1	
23	0	4	3	0	0	0	0	0	1	2	0	1	3	0	0	0	1	7	0	3	2	0	0	11	6	-	0	2	6	4	0	5	2		
25	0	6	0	0	0	0	0	2	0	4	0	0	2	0	0	1	1	0	5	0	5	0	0	3	5	7	-	3	1	5	3	0	2	2	
27	0	6	3	1	0	0	1	1	0	1	0	0	0	0	0	3	11	1	17	0	5	2	0	4	17	14	-	4	3	4	1	1	3	8	
29	0	2	2	7	0	0	0	1	0	1	1	0	1	0	1	2	1	19	0	10	1	0	6	8	6	-	5	5	13	5	5	1	13		
31	0	3	6	9	3	0	0	1	1	0	1	0	4	3	0	4	2	14	13	0	5	5	0	18	5	5	-	11	7	26	7	8	1	11	
33	10	0	10	30	10	0	3	3	3	8	8	8	12	17	1	16	3	28	14	3	6	33	5	14	3	8	-	29	34	45	10	27	8	15	
35	22	4	33	35	20	0	10	11	14	29	7	13	33	37	11	18	8	104	70	15	3	55	2	19	1	34	-	35	42	33	12	24	21	22	
37	21	17	44	28	41	0	14	21	19	31	10	6	33	44	10	39	23	109	106	29	6	37	6	15	8	34	-	38	58	37	27	40	23	20	
39	20	10	35	21	37	0	11	28	15	29	25	6	38	72	17	50	33	81	158	28	18	32	9	9	29	40	-	54	73	25	29	40	24	15	
41	16	11	26	16	36	1	18	30	12	37	10	16	49	54	21	52	31	61	119	16	21	57	10	20	36	34	-	41	55	46	23	43	23	10	
43	11	24	26	5	21	1	18	13	13	16	4	9	23	27	34	43	31	28	61	22	25	30	16	17	27	29	-	27	37	27	13	21	32	8	
45	3	16	9	3	18	1	15	13	9	6	5	2	15	10	32	22	13	16	77	21	32	25	13	14	9	20	-	17	23	33	14	15	21	5	
47	2	11	6	6	8	3	3	5	6	11	7	2	13	11	36	8	8	15	35	18	29	15	4	8	5	27	-	6	15	16	8	15	16	8	
49	3	12	1	2	3	3	3	3	8	3	7	1	8	7	15	4	18	23	24	10	26	15	8	13	5	20	-	9	11	19	4	6	17	9	
51	3	1	4	1	1	2	0	8	4	6	0	3	8	4	9	7	11	20	14	8	9	7	1	15	2	7	-	2	15	11	4	7	5	5	
53	1	1	2	2	1	4	1	7	4	3	1	0	3	5	7	12	7	8	5	5	7	8	4	16	1	10	-	1	11	8	6	3	6	5	
55	1	2	1	2	1	0	2	4	2	1	0	2	0	3	4	3	5	9	1	2	4	3	2	7	0	8	-	4	14	8	3	6	5	3	
57	2	0	1	2	1	0	1	0	1	2	1	1	1	2	2	2	2	5	10	2	4	1	2	3	1	2	-	1	0	4	3	2	3	1	
59	0	0	1	0	1	0	1	0	0	1	3	0	0	2	1	6	3	4	7	4	3	1	0	8	0	4	-	1	2	3	3	4	1	1	
61	0	0	0	1	0	0	1	0	0	1	0	0	0	1	2	1	2	0	1	2	0	1	0	2	0	4	-	4	1	2	2	0	2	3	
63	1	1	0	0	1	0	0	1	1	0	0	0	0	0	2	0	2	1	2	2	1	0	1	1	0	3	-	1	0	1	0	0	2	0	
65	0	0	0	0	0	1	0	1	0	0	0	0	0	0	2	0	1	1	1	1	0	1	1	1	0	0	-	0	0	2	0	1	1	0	
67	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	2	0	0	1	0	1	-	1	0	1	0	0	0	0	
69	0	0	0	0	0	0	0	0	1	0	2	0	0	0	0	0	0	1	0	0	0	0	0	0	0	2	-	0	0	0	0	2	0	1	1
71	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1	1	0	1	-	0	0	0	1	0	0	0	
73	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	-	0	0	0	0	0	0	0	0
75	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	0	0	0	0	0	0	-	0	0	0	0	0	0	0	0
Total	117	141	225	171	203	16	102	153	114	194	93	70	248	299	206	293	220	531	770	189	228	331	95	219	178	343	-	294	409	377	184	268	224	169	













**Table 5.63. Windowpane flounder length frequencies, fall, 1 cm intervals, 1989, 1990, 1994-2017.**

*Prior to 2014, lengths were recorded from the first three tows of each day; since 2014, lengths have been recorded from every tow.*

length	Fall																									
	1989	1990	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
6	1	0	1	0	0	0	0	0	3	1	0	0	3	0	0	0	0	1	-	0	0	0	0	0	0	0
7	5	0	5	0	6	0	1	0	0	0	0	2	0	0	0	0	0	4	-	1	0	0	0	0	0	0
8	8	3	18	5	24	15	1	0	6	9	0	5	11	14	5	4	0	15	-	4	2	2	1	0	0	0
9	25	2	28	6	70	17	2	2	2	2	0	21	15	49	2	6	2	15	-	2	3	1	4	3	0	0
10	18	11	78	10	165	50	2	4	3	9	1	20	22	67	1	14	5	17	-	9	6	7	9	1	0	0
11	15	9	60	22	227	75	31	11	7	14	0	13	27	111	5	18	3	24	-	19	1	7	13	1	2	0
12	16	12	50	15	270	107	33	6	9	9	1	6	16	155	2	26	15	29	-	31	5	6	7	0	1	0
13	23	6	30	10	285	173	47	3	11	9	6	0	14	145	8	44	43	19	-	19	10	10	14	0	5	0
14	33	14	11	13	306	154	48	5	23	6	0	4	8	109	3	36	58	27	-	36	14	10	14	4	9	3
15	58	23	23	9	250	110	39	6	18	3	5	8	3	62	2	37	38	25	-	43	18	11	10	12	15	3
16	140	38	15	16	181	60	34	3	11	3	5	9	3	33	0	30	28	31	-	41	19	13	24	8	24	5
17	188	44	35	26	112	78	33	11	30	7	14	4	9	12	7	21	20	35	-	72	37	13	19	11	66	16
18	91	53	47	48	101	119	54	11	15	12	8	11	2	8	19	19	16	47	-	70	19	19	28	16	63	34
19	46	46	49	47	145	179	95	44	29	6	10	7	11	20	32	26	10	45	-	52	44	31	12	19	86	48
20	49	28	39	48	131	213	96	67	30	13	9	6	18	30	39	39	31	24	-	41	50	29	18	18	62	93
21	21	11	23	24	125	165	69	38	52	18	9	11	35	50	25	36	40	28	-	35	87	23	27	21	20	86
22	14	14	16	19	65	123	37	18	28	22	21	2	25	48	25	42	25	26	-	51	58	28	34	23	8	51
23	3	10	20	6	67	63	32	12	37	30	39	6	10	14	12	32	27	20	-	47	79	30	43	29	13	24
24	9	4	7	9	25	49	13	11	33	19	39	11	15	13	9	19	32	23	-	40	45	15	55	24	9	8
25	4	3	6	3	22	28	9	6	18	19	25	14	8	10	10	6	9	9	-	16	24	29	50	28	14	13
26	2	0	8	3	19	29	9	4	16	9	10	18	4	3	4	8	16	6	-	18	22	17	29	25	15	15
27	6	2	3	1	11	17	8	3	5	11	12	17	4	5	3	4	5	4	-	7	14	16	21	24	21	8
28	2	1	4	1	3	12	1	1	4	5	6	9	2	3	3	3	2	7	-	9	1	13	7	5	5	12
29	2	2	0	1	2	17	0	1	6	3	1	4	2	3	1	3	2	1	-	2	0	2	4	9	5	5
30	2	1	2	1	0	5	0	0	1	2	2	0	1	1	1	0	0	0	-	3	1	2	2	2	2	6
31	0	0	0	0	0	0	0	0	0	1	0	3	1	2	0	0	2	1	-	0	0	1	1	3	0	0
32	1	0	0	1	0	0	0	0	0	0	0	2	0	1	0	0	0	1	-	0	1	0	0	0	0	0
33	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	-	0	0	0	0	0	0	0
<b>Total</b>	<b>782</b>	<b>337</b>	<b>578</b>	<b>344</b>	<b>2,613</b>	<b>1,858</b>	<b>694</b>	<b>267</b>	<b>397</b>	<b>242</b>	<b>223</b>	<b>215</b>	<b>268</b>	<b>968</b>	<b>218</b>	<b>473</b>	<b>429</b>	<b>484</b>	<b>-</b>	<b>668</b>	<b>560</b>	<b>335</b>	<b>446</b>	<b>286</b>	<b>445</b>	<b>430</b>

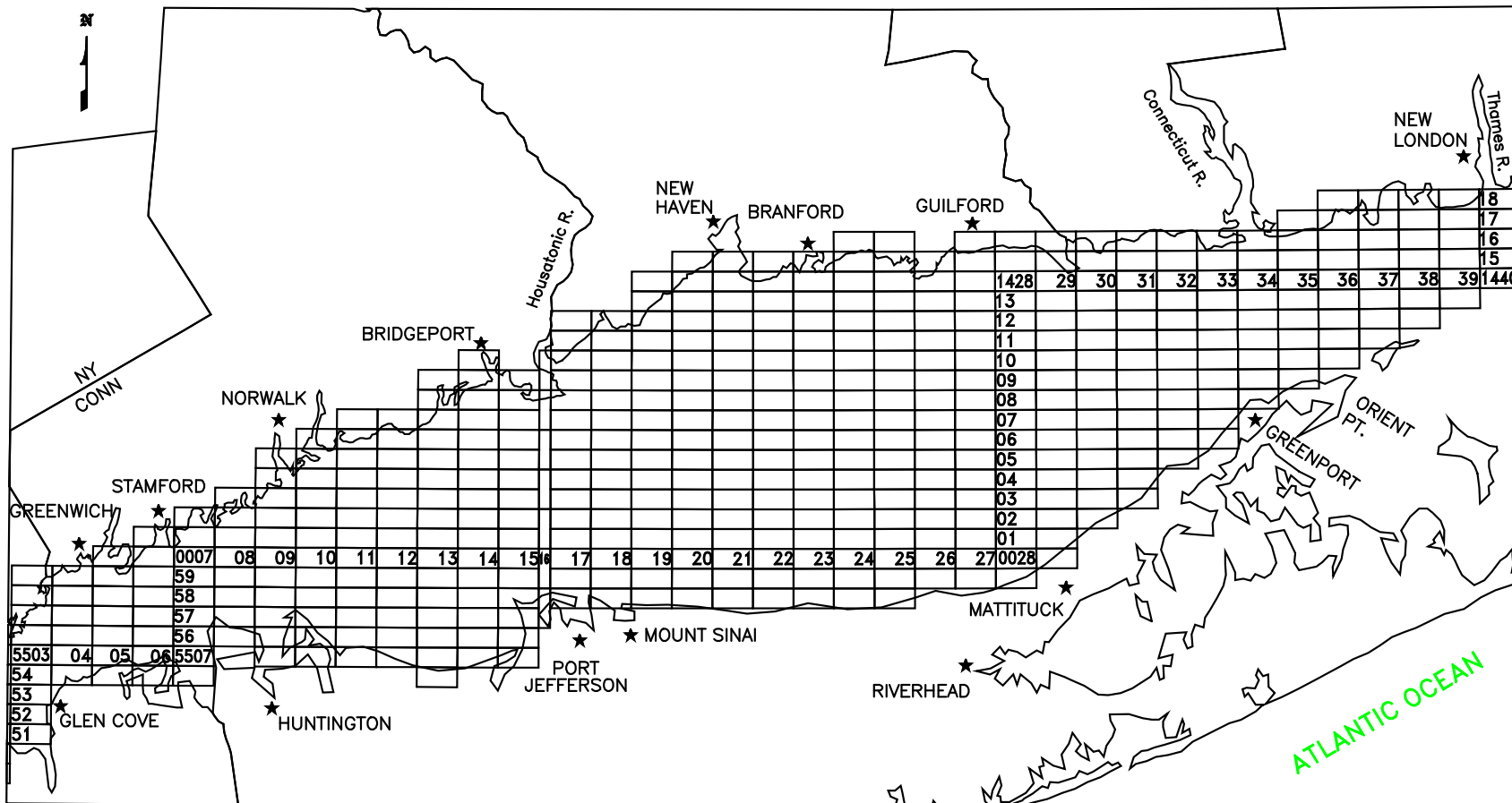






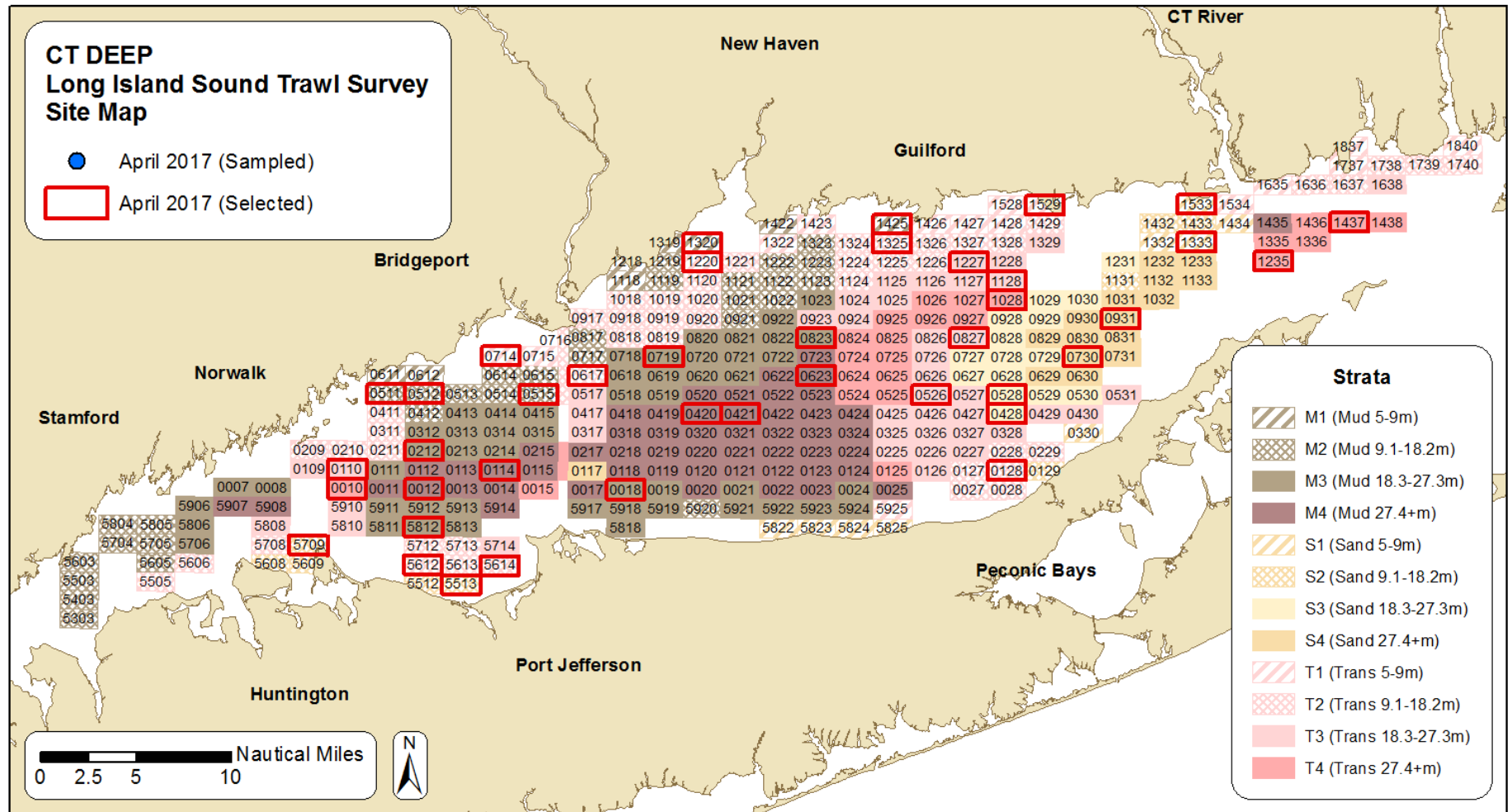
**FIGURES 5.1 - 5.18  
LISTS**





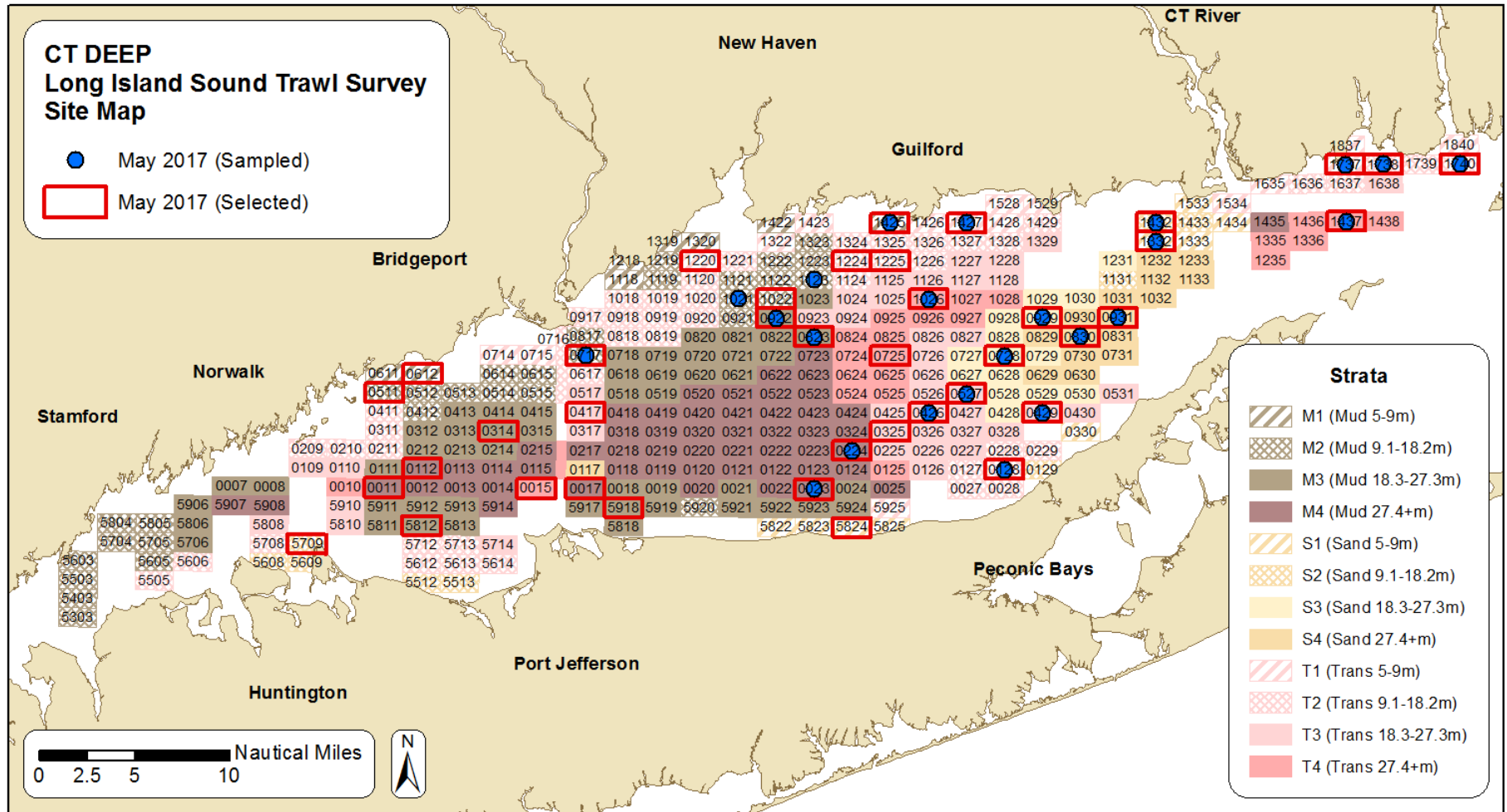
**Figure 5.1. Trawl Survey site grid.** Each sampling site is 1x2 nmi (nautical miles). A four-digit number identifies the site: the first two digits are the row numbers (corresponding to minutes of latitude) and the last two digits are the column numbers (corresponding to two nautical miles in length on the longitudinal axis). Examples: site 1428 near Guilford and 0028 near Mattituck. (Note: The sites in column 16 are approximately 2x1 nmi. The grid was drawn on the Eastern and Western Long Island Sound 80,000:1 nautical charts, which overlap by the area in column 16.)

**Figure 5.2. April 2017 sites selected and sampled.** The red outlined rectangles are the sites selected for the cruise and the blue dots are the sites sampled. Samples collected from a different site than published in the "Notice to Fishermen" are noted in table below map.



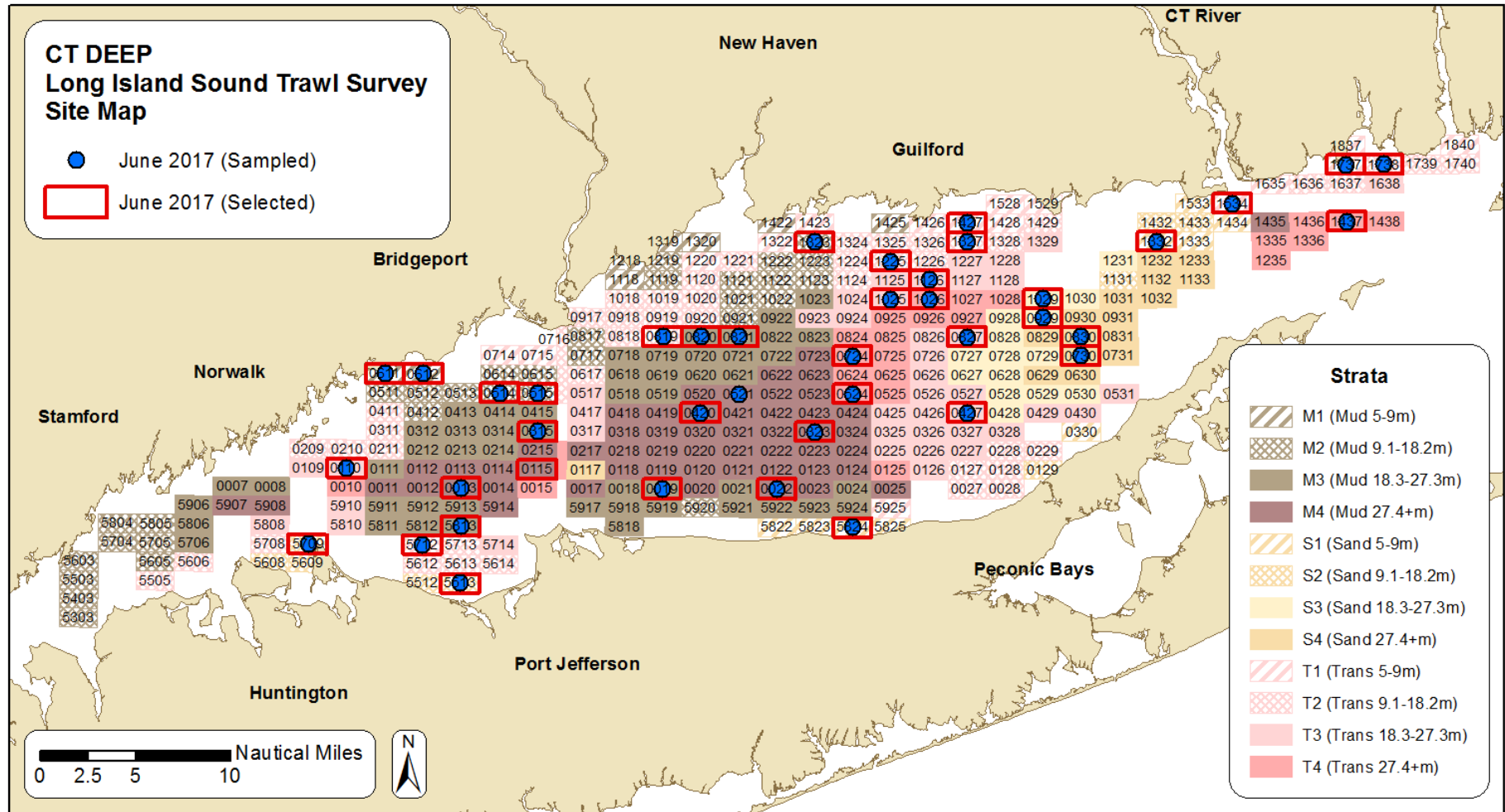
Month	Sample	Site Sampled	Sampled Strata	Site Selected	Selected Strata	Reason Moved
No sites were sampled during this cruise						

**Figure 5.3. May 2017 sites selected and sampled.** The red outlined rectangles are the sites selected for the cruise and the blue dots are the sites sampled. Samples collected from a different site than published in the “Notice to Fishermen” are noted in table below map.



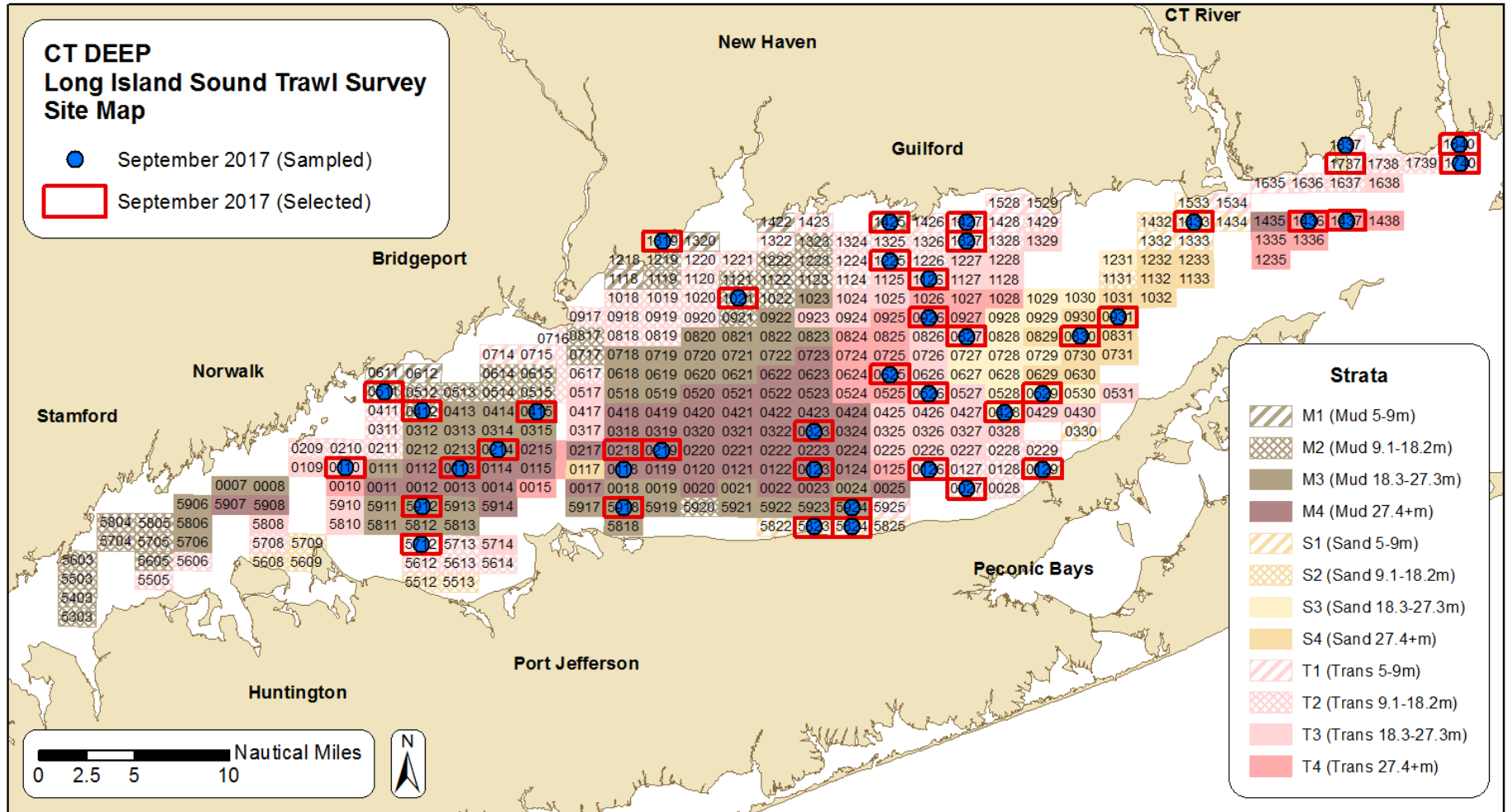
Sample	Site Sampled	Sampled Strata	Site Selected	Selected Strata	Reason Moved
SP2017024	1123	M2	1225	T2	mistakenly towed wrong coordinates
SP2017023	1021	M2	0511	M2	logistical issues and time constraints
not sampled due to time constraints					
	0011	0017	0325	0417	0725
	0015	0112	0314	0612	1022
					1220
					5812
					5824
					5709
					5918

**Figure 5.4. June 2017 sites selected and sampled.** The red outlined rectangles are the sites selected for the cruise and the blue dots are the sites sampled. Samples collected from a different site than published in the “Notice to Fishermen” are noted in table below map.



Sample	Site Sampled	Sampled Strata	Site Selected	Selected Strata	Reason Moved
SP2017059	0521	M4	0115	M4	moved after two failed attempts at selected site; encountered multiple strings of ghost gear and sustained damage to net

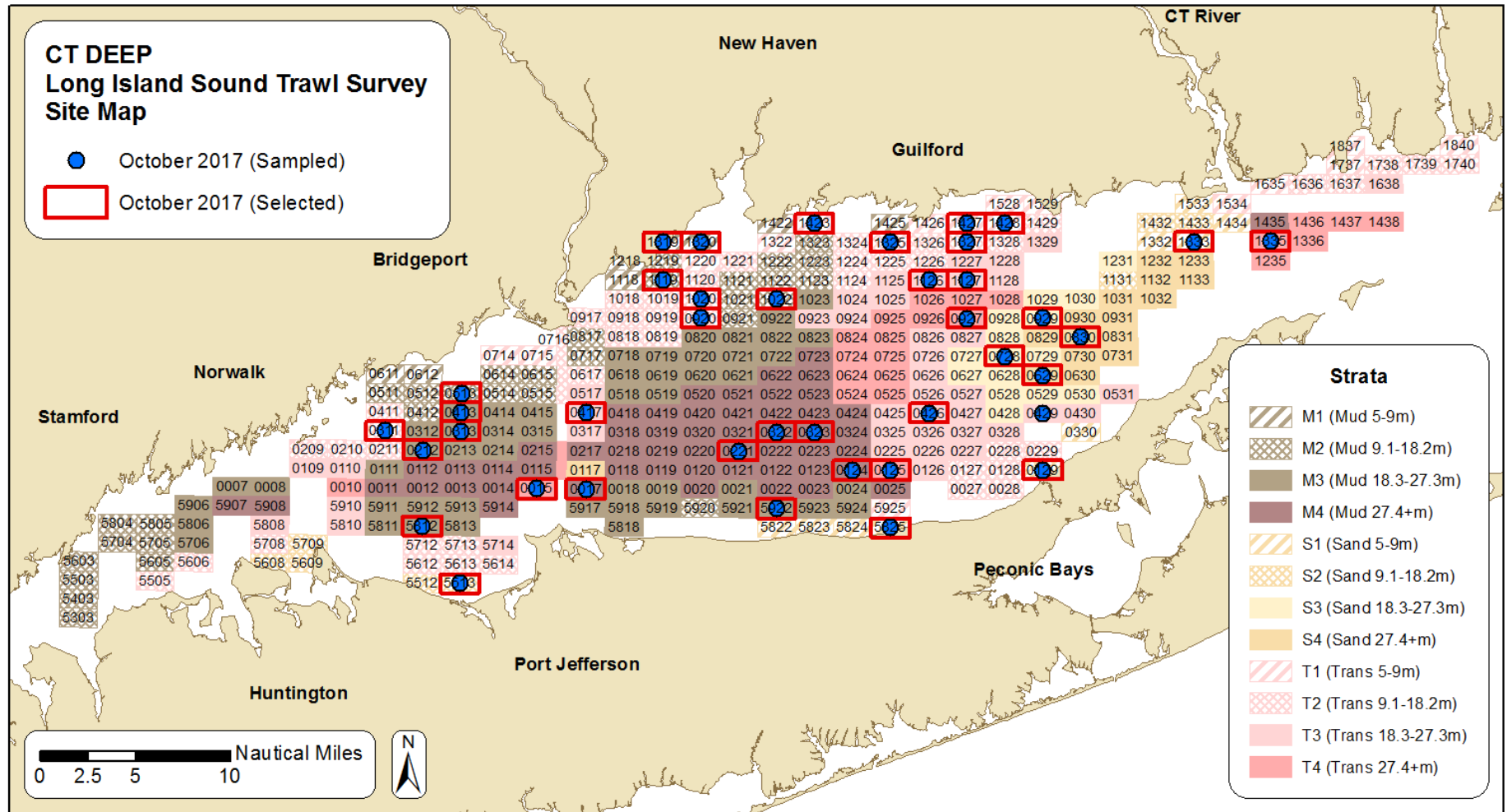
**Figure 5.5. September 2017 sites selected and sampled.** The red outlined rectangles are the sites selected for the cruise and the blue dots are the sites sampled. Samples collected from a different site than published in the “Notice to Fishermen” are noted in table below map.



Sample	Site Sampled	Sampled Strata	Site Selected	Selected Strata	Reason Moved
FA2017001	1837	T1	1737	T1	mistakenly towed wrong coordinates
FA2017028	0118	T1	0218	T1	history of trashing net at this site in recent years

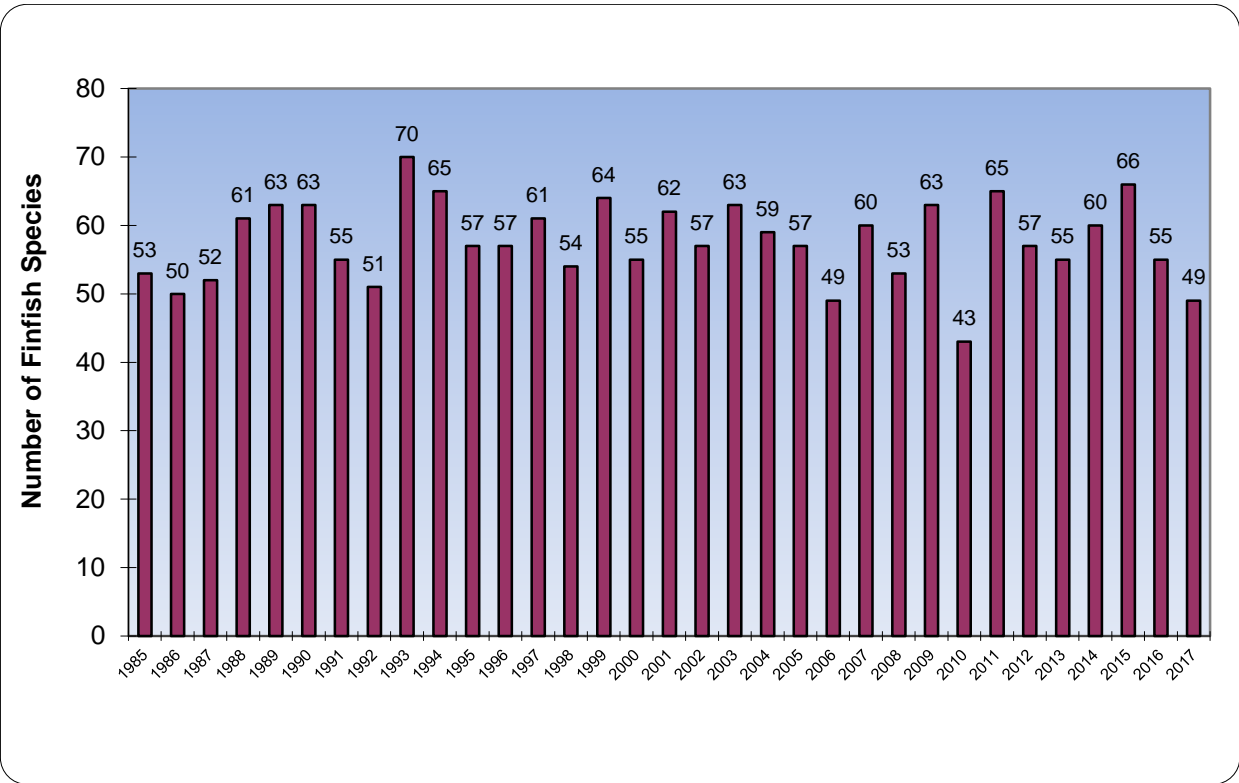


**Figure 5.6. October 2017 sites selected and sampled.** The red outlined rectangles are the sites selected for the cruise and the blue dots are the sites sampled. Samples collected from a different site than published in the "Notice to Fishermen" are noted in table below map.

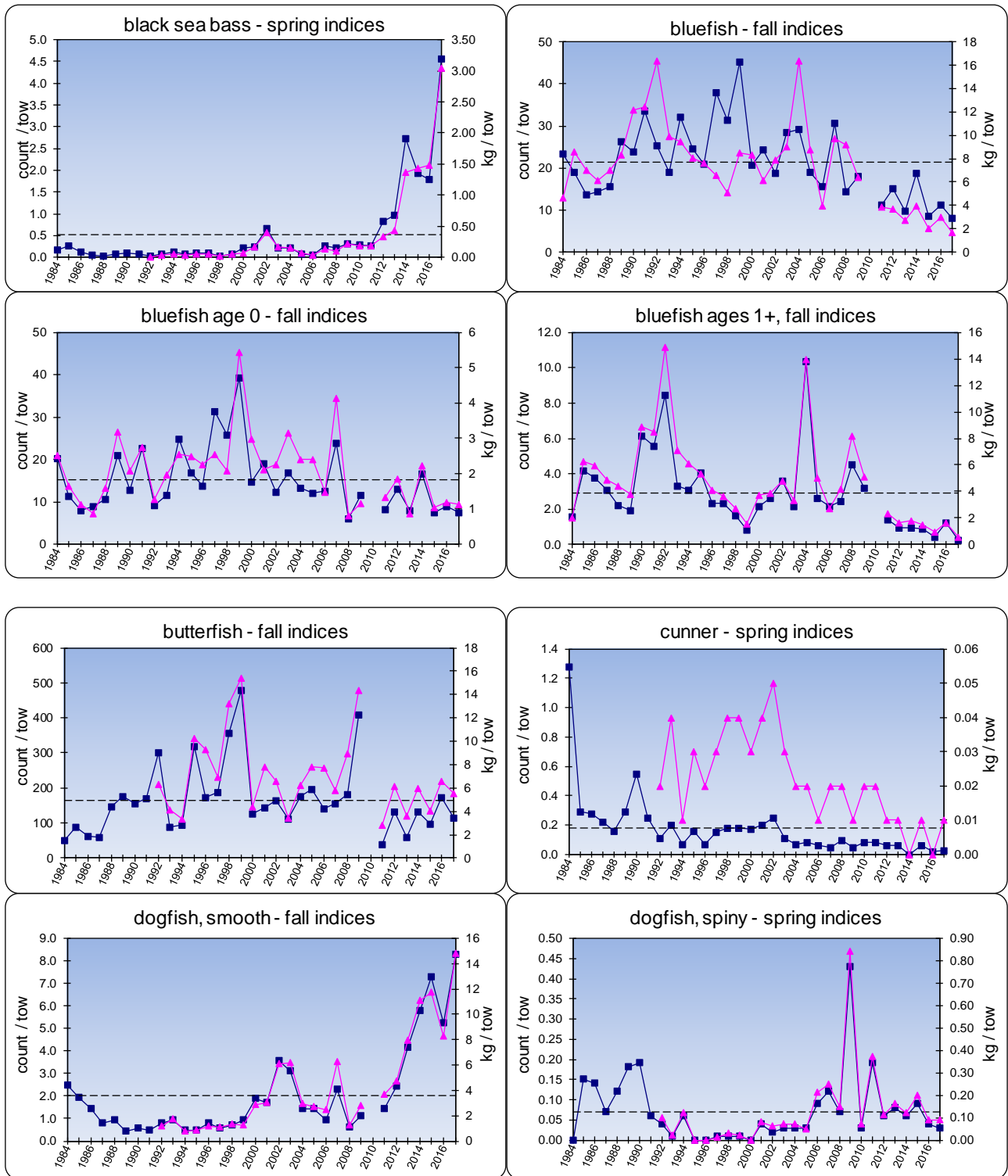


Sample	Site Sampled	Sampled Strata	Site Selected	Selected Strata	Reason Moved
No sites were moved during this cruise.					

**Figure 5.7. Number of finfish species observed annually, 1984-2017.** *Note: not all years have the same number of tows. See Table 5.4 for details on number of tows completed each year. Average number of finfish species caught per year is 57.5 for the time-series*



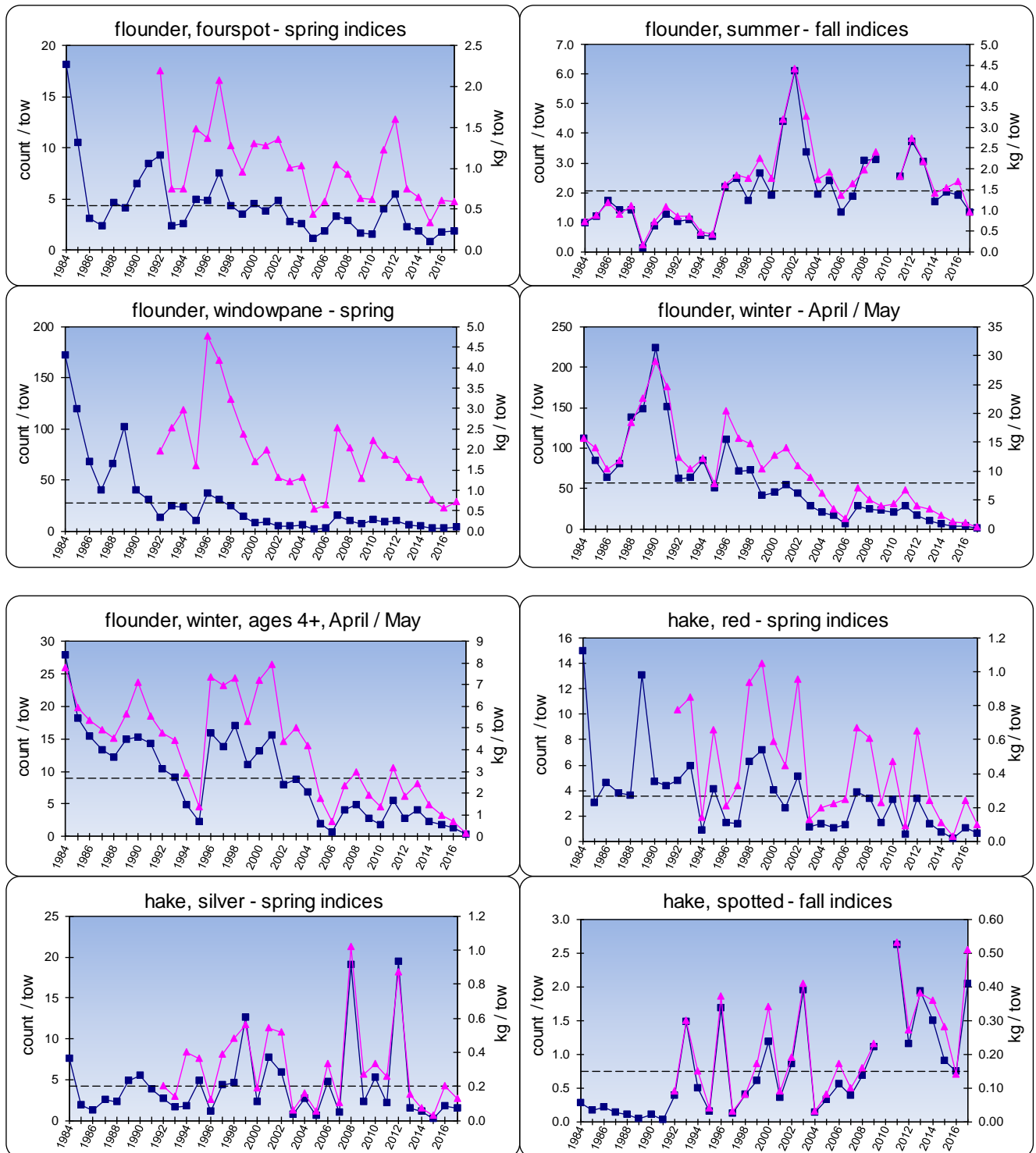
**Figure 5.8. Plots of abundance indices for: black sea bass, bluefish (total, age 0, and ages 1+), butterfish, cunner, and dogfish (smooth and spiny).**



Legend:  
■ = count / tow  
▲ = kg / tow  
 ---- = mean count / tow



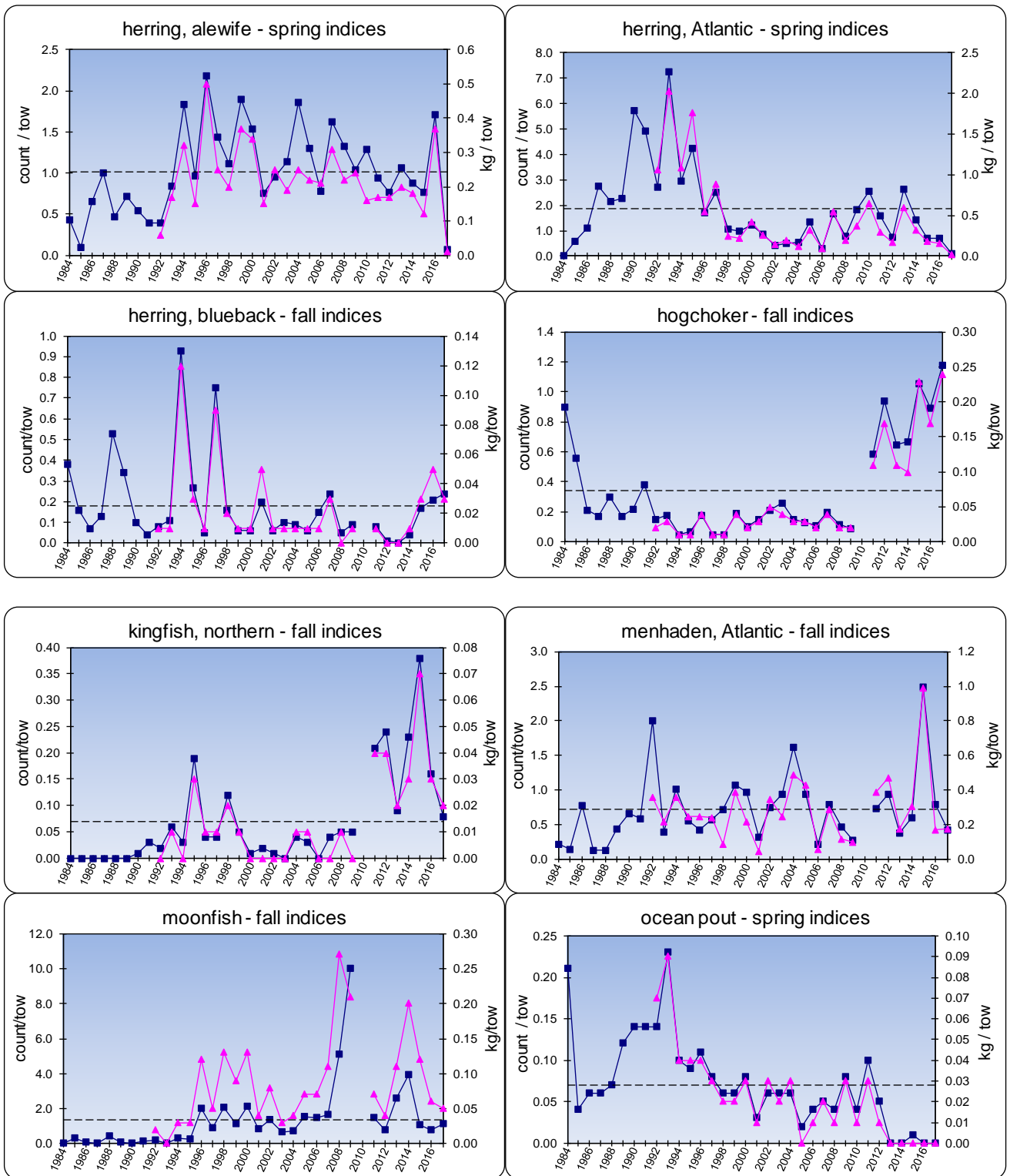
**Figure 5.9. Plots of abundance indices for: flounders (fourspot, summer, windowpane, winter, and winter ages 4+) and hakes (red, silver, and spotted).**



Legend:

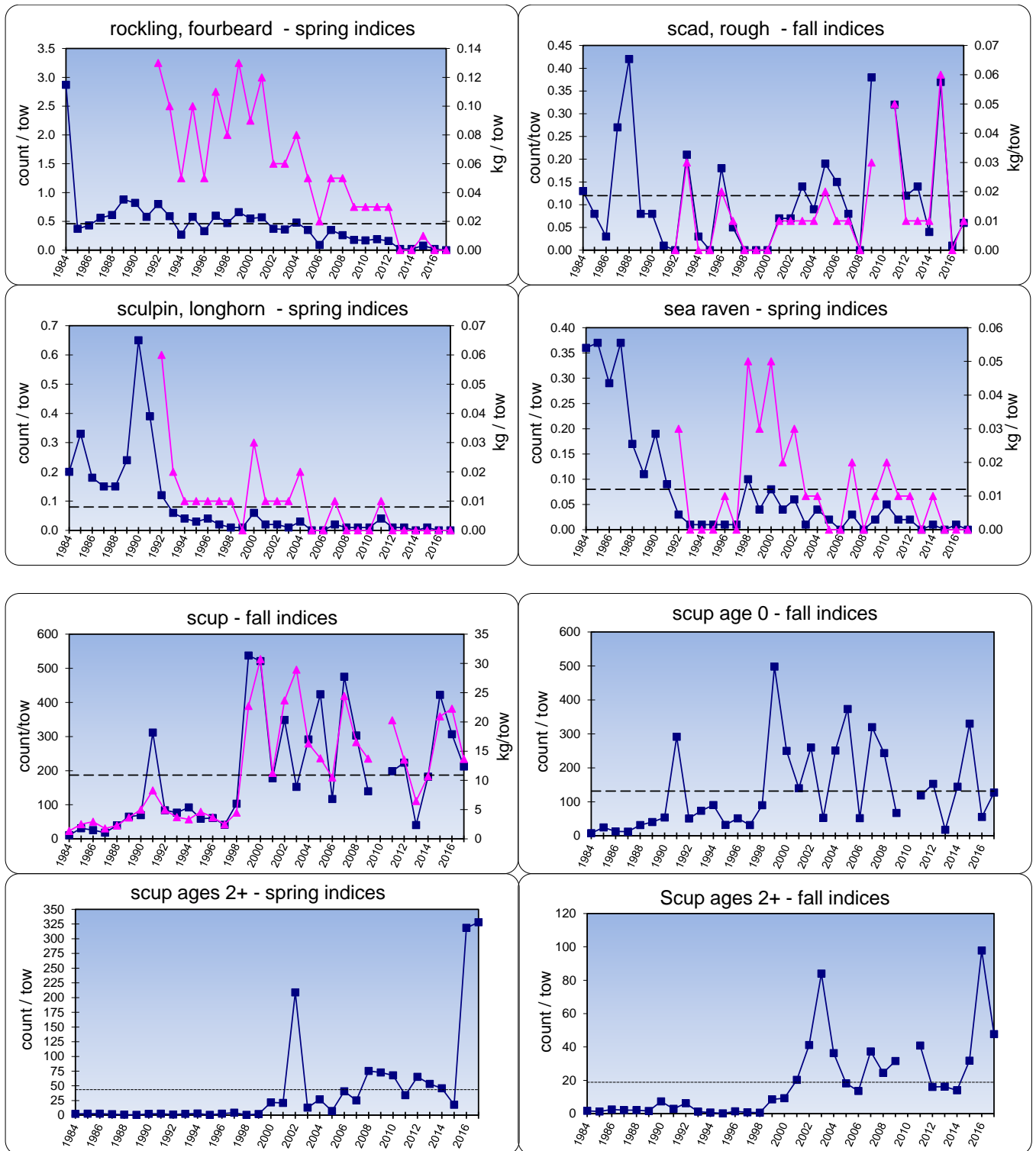
- = count / tow
- ▲ = kg / tow
- = mean count / tow

**Figure 5.10. Plots of abundance indices for: herrings (alewife, Atlantic, and blueback), hogchoker, Northern kingfish, Atlantic menhaden, moonfish, and ocean pout.**



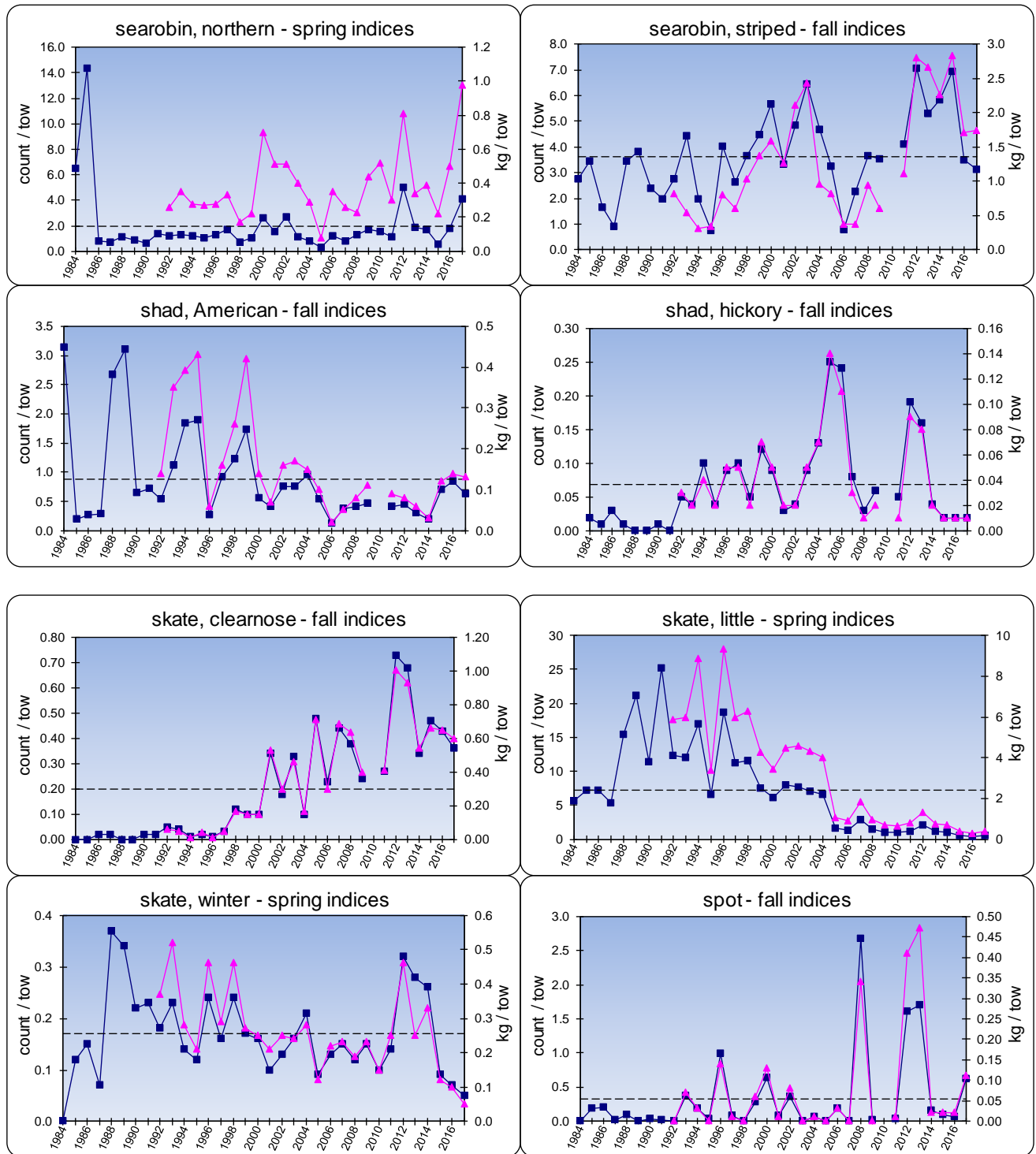
Legend:  
■ = count / tow  
▲ = kg / tow  
 ---- = mean count / tow

**Figure 5.11. Plots of abundance indices for: fourbeard rockling, rough scad, longhorn sculpin, sea raven, and scup (all ages, age 0, and ages 2+).**



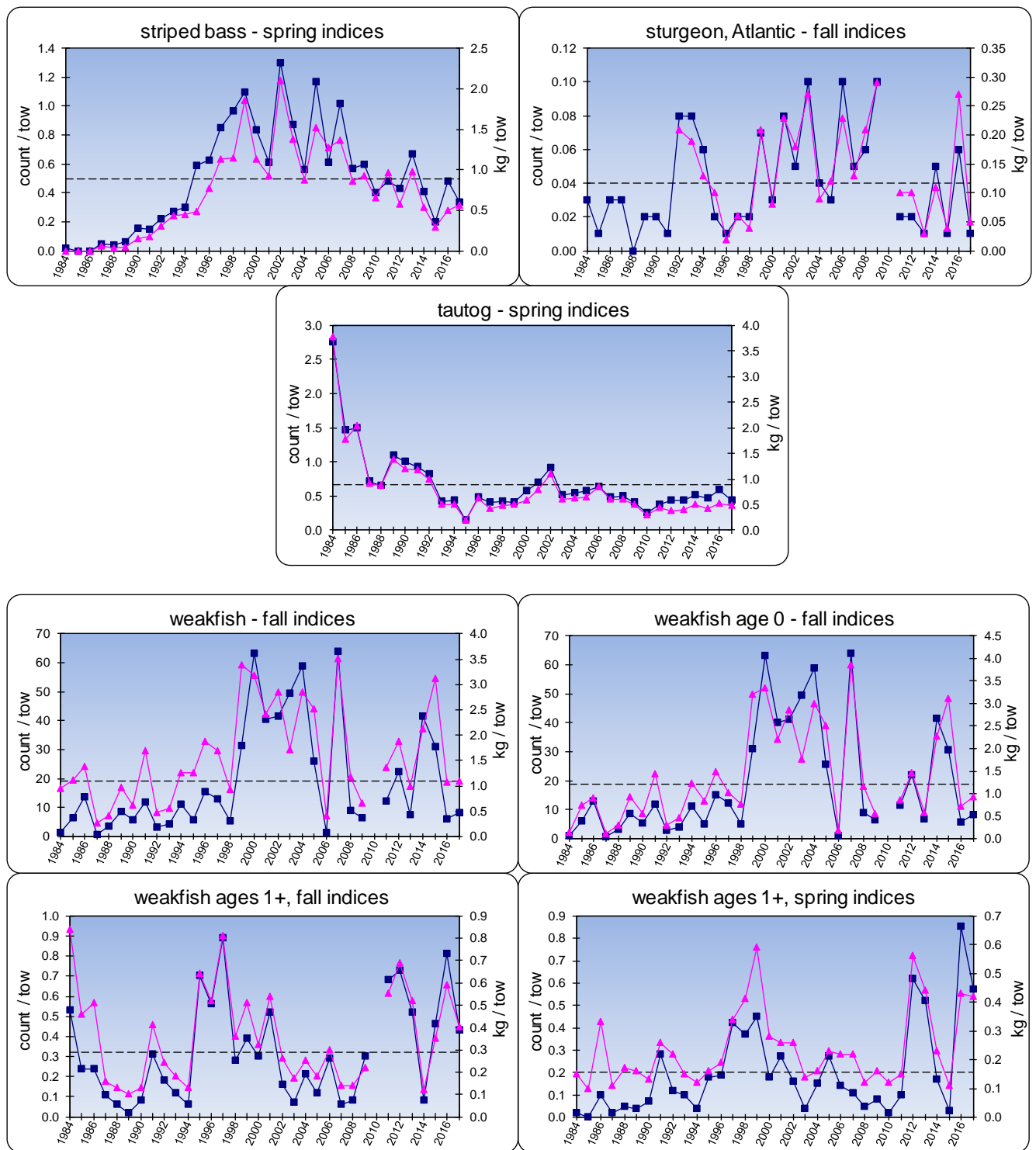
Legend:  
■ = count / tow  
▲ = kg / tow  
 ---- = mean count / tow

**Figure 5.12. Plots of abundance indices for: searobins (striped and northern), shad (American and hickory), skates (clearnose, little, and winter), and spot.**



Legend:  
 ■ = count / tow  
 ▲ = kg / tow  
 --- = mean count / tow

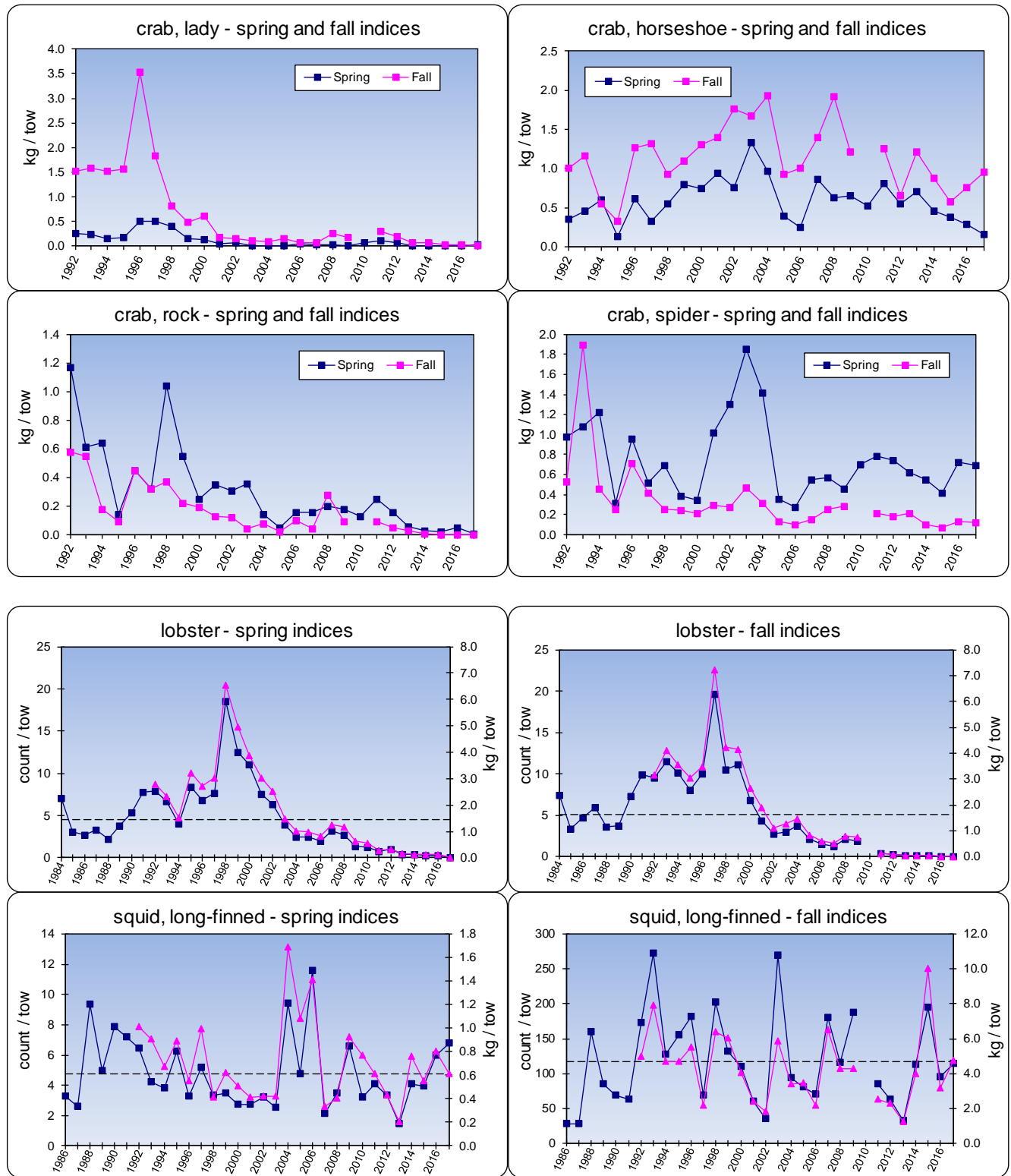
**Figure 5.13. Plots of abundance indices for: striped bass, Atlantic sturgeon, tautog, and weakfish (all ages, age 0, and ages 1+).**



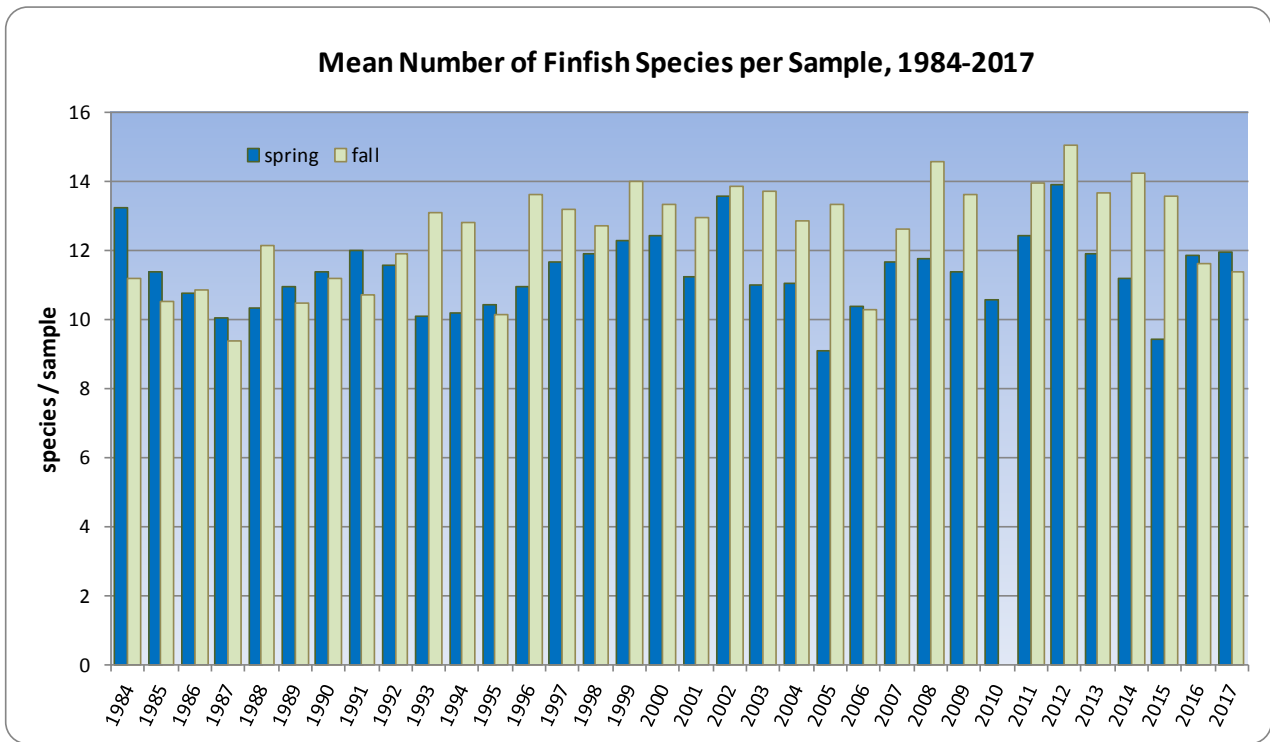
Legend:

- = count / tow
- ▲ = kg / tow
- = mean count / tow

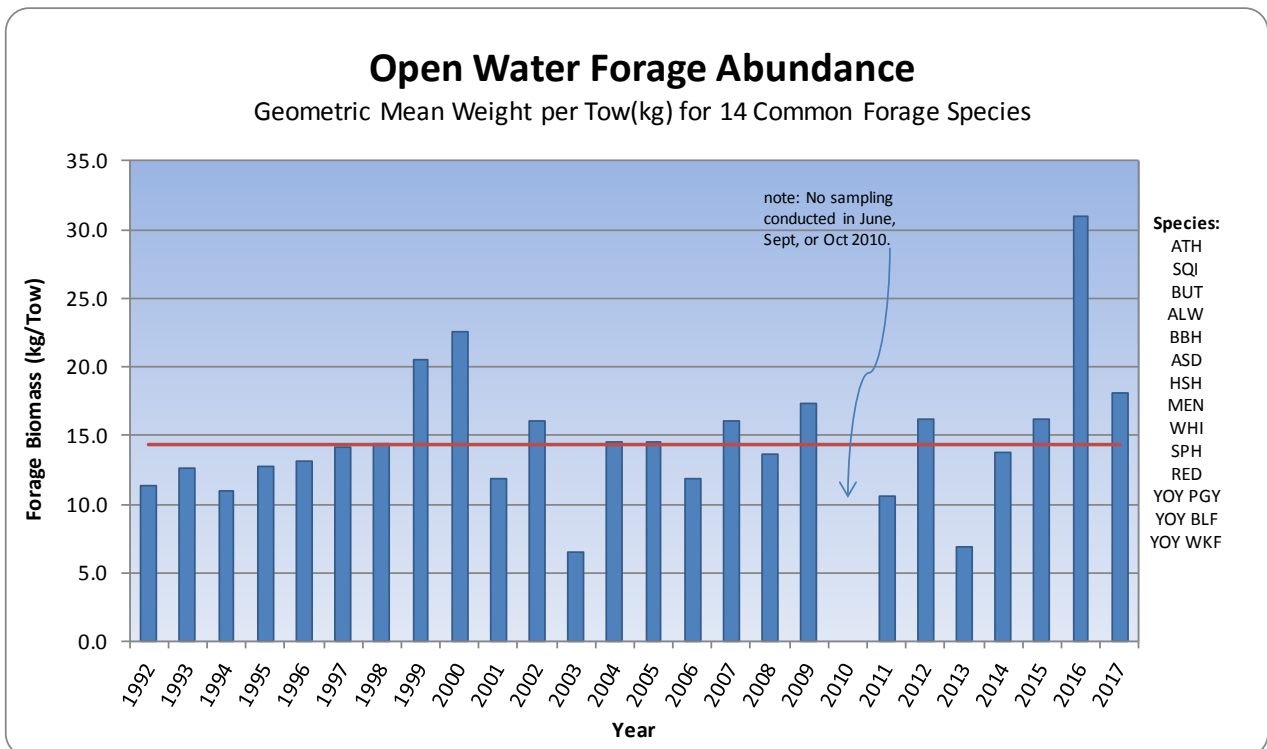
**Figure 5.14. Plots of abundance and biomass indices for: crabs (lady, rock, and spider), horseshoe crab, American lobster, and long-finned squid.**



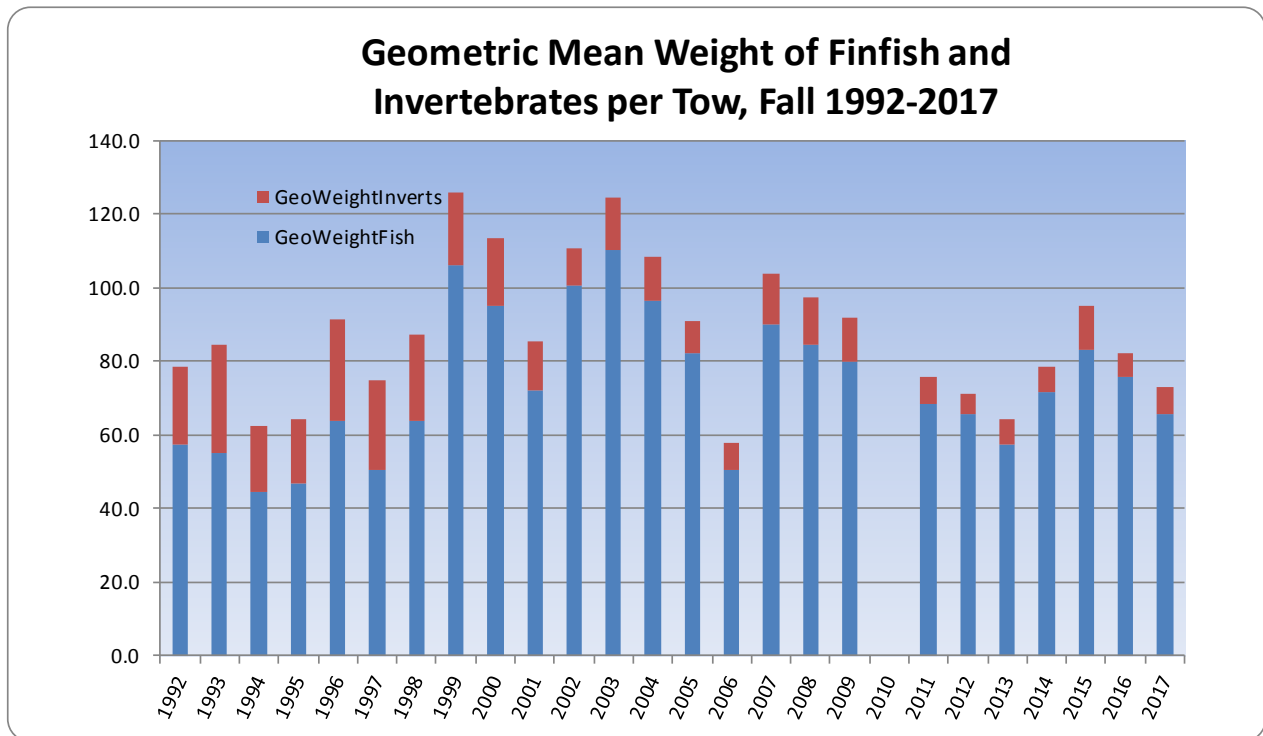
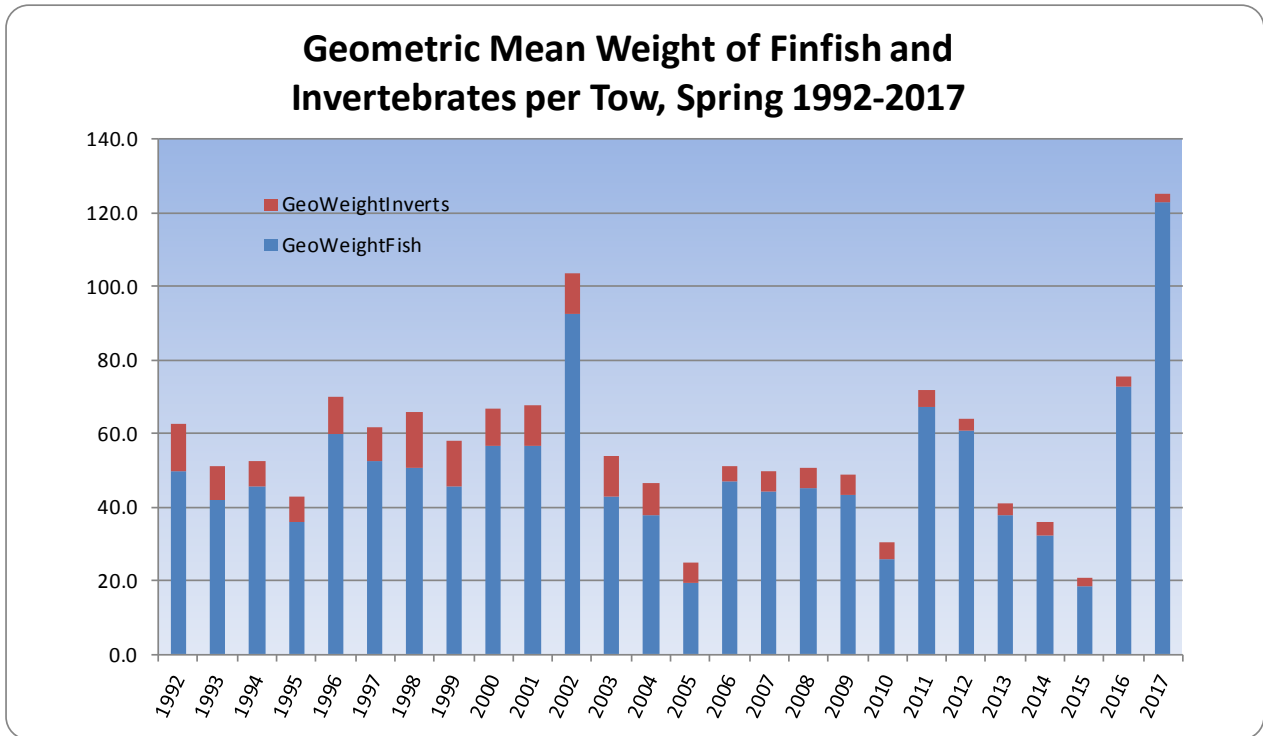
**Figure 5.15. Mean number of finfish species per sample, spring and fall, 1984-2017.** This index measures the diversity of species supported within the Sound's various habitats.



**Figure 5.16. Open water forage abundance, 1992-2017.** The geometric mean is calculated as the aggregate sample biomass per tow of 14 of the most common forage species sampled in the survey. This index measures the available food base which supports both resident and migratory species. The average since 1992 is 14.71 kg/tow (red line).

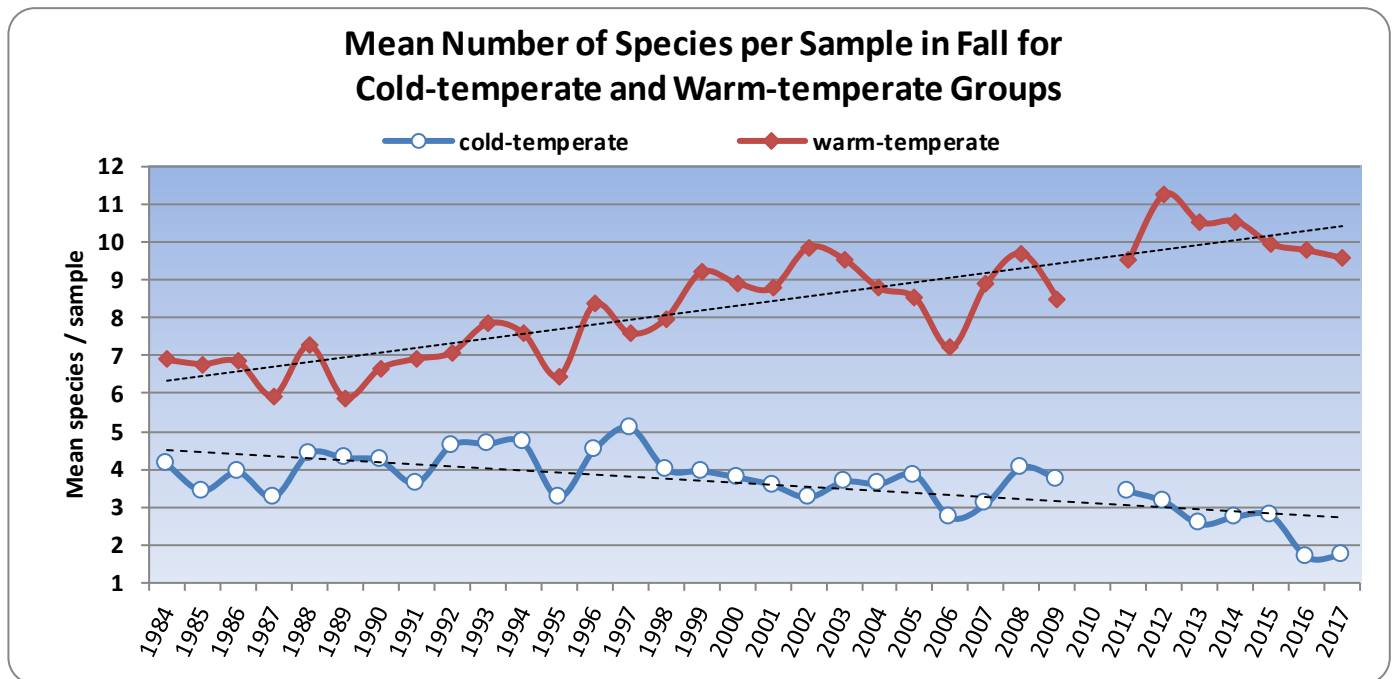
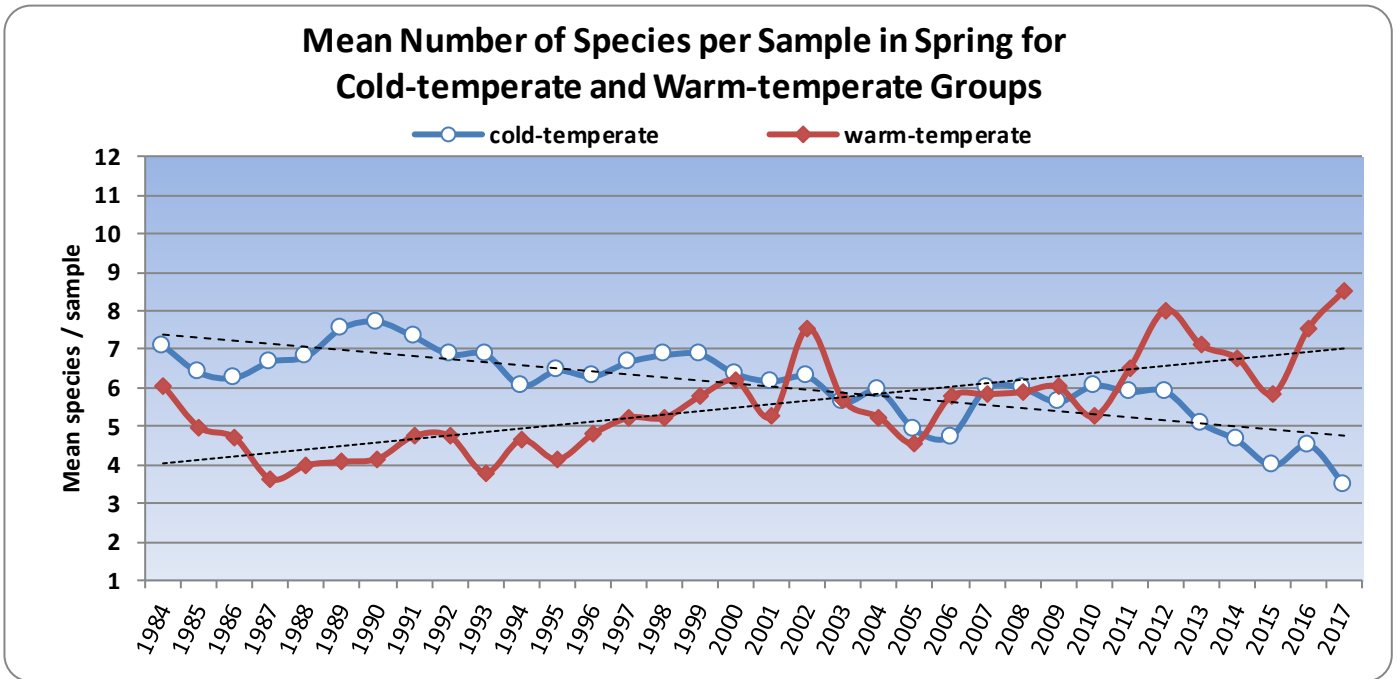


**Figure 5.17. Geometric mean biomass of finfish and invertebrates per sample, spring and fall, 1992-2017.**  
 This index measures the diversity of species supported within the Sound's various habitats.





**Figure 5.18. Trends in the number of cold temperate versus warm temperate species per sample captured in spring and fall LIS Trawl Surveys.** See Appendix 2.5 for list of species included in analysis.



**APPENDICES  
LISTS**

**Appendix 5.1. List of finfish species identified by A Study of Marine Recreational Fisheries in Connecticut (F54R) and other CT DEEP Marine Fisheries programs.** LISTS has collected one hundred-eleven (111) finfish species from 1984-2017.

This appendix contains a list of 154 species identified from all sampling programs conducted since 1984 **except** Marine Angler Surveys (Jobs 1-3). Species are listed alphabetically by common name (Nelson et al. 2004). Sampling program abbreviations, survey time periods and gear type are as follows:

Survey Abbreviation	Survey Description	Time Period	Gear Type
CTR	CT River Creel Survey	1997-1998	bus stop creel survey mainstem of CT River
EPA	cooperative sampling in western LIS with EPA	1986-1990	used LISTS net
ESS (F54R)	Estuarine Seine Survey	1988 to present	7.6m (25 ft) beach seine
IS (F54R)	Inshore Survey of Juvenile Winter Flounder	1990-1994	beam trawls (also a little data from 1995-1996)
ISS (non-F54R & F54R)	Inshore Seine Surveys in CT and/or TH rivers	1979 to present	15.2m (50 ft) bag seine set by boat
LISTS (F54R)	Long Island Sound Trawl Survey	1984 to present	14m (50 ft) trawls with 2" codend mesh
MISC	misc sampling conducted on R/V Dempsey	various	various
NCA	"inshore" EPA NCA C2K sampling	2000	skiff trawls
NRRWS	sampling in western end of LIS, the "Narrows"	2000-2007	14m (50 ft) trawls with 2" codend mesh
SNFH (F54R)	Study of Nearshore Finfish Habitat	1995-1996	plankton net
SS (F54R)	Summer Survey	1991-1993, 1996	14m (50 ft) trawls with codend liner in LIS
TN	Trap Net Survey	1997-1998	trap nets in rivers

Common Name	Scientific Name	Survey
anchovy, bay	<i>Anchoa mitchilli</i>	LISTS;NRRWS;ESS;ISS;IS;SS;NCA;MISC
anchovy, striped	<i>Anchoa hepsetus</i>	LISTS;ESS;IS;SS
banded rudderfish	<i>Seriola zonata</i>	LISTS;ESS
bass, largemouth	<i>Micropterus salmoides</i>	ISS;ESS;TN;CTR
bass, rock	<i>Ambloplites rupestris</i>	ISS; TN;CTR
bass, smallmouth	<i>Micropterus dolomieu</i>	ISS; TN;CTR
bass, striped	<i>Morone saxatilis</i>	LISTS;NRRWS;ESS;ISS; SS;NCA;MISC;EPA;TN;CTR
bigeye	<i>Priacanthus arenatus</i>	LISTS;IS
bigeye, short	<i>Pristigenys alta</i>	LISTS
black sea bass	<i>Centropristis striata</i>	LISTS;NRRWS;ESS;IS; SS;NCA;MISC;EPA
blenny, feather	<i>Hypsoblennius hentz</i>	LISTS;ESS
bluefish	<i>Pomatomus saltatrix</i>	LISTS;NRRWS;ESS;ISS;SS;MISC;EPA;CTR
bluegill	<i>Lepomis macrochirus</i>	TN;CTR
bonefish	<i>Albula vulpes</i>	ISS
bonito, Atlantic	<i>Sarda sarda</i>	LISTS;EPA
bullhead, brown	<i>Ameiurus nebulosus</i>	ISS;NCA;TN;CTR
burrfish, striped	<i>Chilomycterus schoepfi</i>	LISTS;ESS
burrfish, web	<i>Chilomycterus antillarum</i>	ESS
butterfish	<i>Peprilus triacanthus</i>	LISTS;NRRWS;ESS;ISS;IS; SS;NCA;MISC;EPA
carp	<i>Cyprinus carpio</i>	ISS;NCA;TN;CTR
catfish, channel	<i>Ictalurus punctatus</i>	ISS;NCA;TN;CTR
catfish, white	<i>Ameiurus catus</i>	NCA;TN;CTR
cod, Atlantic	<i>Gadus morhua</i>	LISTS;SS
cornetfish, bluespotted	<i>Fistularia tabacaria</i>	LISTS;ESS;IS
cornetfish, red	<i>Fistularia petimba</i>	LISTS;IS
crappie, black	<i>Pomoxis nigromaculatus</i>	ISS;NCA;TN;CTR
crappie, white	<i>Pomoxis annularis</i>	TN;CTR
croaker, Atlantic	<i>Micropogonias undulates</i>	LISTS;ISS;IS
cunner	<i>Tautoglabrus adspersus</i>	LISTS;NRRWS;ESS;ISS;IS; SS;MISC;EPA
cusk-eel, fawn	<i>Lepophidium profundorum</i>	LISTS
cusk-eel, striped	<i>Ophidion marginatum</i>	LISTS;SS
darter, tessellated	<i>Etheostoma olmstedi</i>	ISS
dogfish, smooth	<i>Mustelus canis</i>	LISTS;NRRWS;ESS;IS;SS;MISC;EPA
dogfish, spiny	<i>Squalus acanthias</i>	LISTS;NRRWS;MISC
drum, black	<i>Pogonias cromis</i>	LISTS
eel, American	<i>Anguilla rostrata</i>	LISTS;NRRWS;ESS;ISS;IS;SNFH;SS;NCA;EPA;TN;CTR
eel, conger	<i>Conger oceanicus</i>	LISTS;IS;SS
fallfish	<i>Semotilus corporalis</i>	ISS
filefish, orange	<i>Aluterus schoepfi</i>	LISTS;IS;SS
filefish, planehead	<i>Stephanolepis hispidus</i>	LISTS;EPA
filefish, scrawled	<i>Aluterus scriptus</i>	IS
flounder, American plaice	<i>Hippoglossoides platessoides</i>	LISTS
flounder, fourspot	<i>Paralichthys oblongus</i>	LISTS;NRRWS;IS;SS;MISC;EPA

**Appendix 5.1 cont.**

<b>Common Name</b>	<b>Scientific Name</b>	<b>Survey</b>
flounder, smallmouth	<i>Etropus microstomus</i>	LISTS;NRRWS;ESS;IS;SS;NCA;MISC
flounder, summer	<i>Paralichthys dentatus</i>	LISTS;NRRWS;ESS;ISS;IS;SS;NCA;MISC;EPA;TN;CTR
flounder, windowpane	<i>Scophthalmus aquosus</i>	LISTS;NRRWS;ESS;ISS;IS;SS;NCA;MISC;EPA;TN;CTR
flounder, winter	<i>Pseudopleuronectes americanus</i>	LISTS;NRRWS;ESS;ISS;IS;SNFH;SS;NCA;MISC;EPA;TN;CTR
flounder, yellowtail	<i>Limanda ferruginea</i>	LISTS;IS
goatfish, dwarf	<i>Upeneus parvus</i>	LISTS
goatfish, red	<i>Mullus auratus</i>	LISTS
goby, code	<i>Gobiosoma robustum</i>	IS
goby, naked	<i>Gobiosoma bosc</i>	LISTS;ESS;ISS;IS
goldfish	<i>Carassius auratus</i>	CTR
goosefish	<i>Lophius americanus</i>	LISTS;IS;SS;MISC
grubby	<i>Myoxocephalus aeneus</i>	LISTS;ESS;ISS;IS;SNFH;SS;EPA
gunnel, banded	<i>Pholis fasciata</i>	ESS;IS
gunnel, rock	<i>Pholis gunnellus</i>	LISTS;ESS;ISS;IS;SNFH;SS
gurnard, flying	<i>Dactylopterus volitans</i>	ESS
haddock	<i>Melanogrammus aeglefinus</i>	LISTS;SS
hake, red	<i>Urophycis chuss</i>	LISTS;NRRWS;IS;SS;MISC;EPA
hake, silver	<i>Merluccius bilinearis</i>	LISTS;NRRWS;SS;MISC;EPA
hake, spotted	<i>Urophycis regia</i>	LISTS;NRRWS;ESS;IS;SS;MISC;EPA
harvestfish	<i>Peprilus paru</i>	LISTS
herring, Atlantic	<i>Clupea harengus</i>	LISTS;NRRWS;ISS;IS;SNFH;SS;MISC;EPA
herring, Atlantic thread	<i>Opisthonema oglinum</i>	LISTS
herring, alewife	<i>Alosa pseudoharengus</i>	LISTS;NRRWS;ESS;ISS;SNFH;SS;MISC;EPA;TN;CTR
herring, blueback	<i>Alosa aestivalis</i>	LISTS;NRRWS;ESS;ISS;IS;SNFH;SS;EPA;TN;CTR
herring, round	<i>Etrumeus teres</i>	LISTS;EPA
hogchoker	<i>Trinectes maculatus</i>	LISTS;NRRWS;ESS;ISS;IS;SS;MISC;EPA;TN
jack, blue runner	<i>Caranx crysos</i>	LISTS;EPA;ESS;ISS
jack, crevalle	<i>Caranx hippos</i>	LISTS;NRRWS;ESS;ISS;EPA
jack, yellow	<i>Caranx bartholomaei</i>	LISTS;NRRWS;ESS;IS;MISC;EPA
killifish, rainwater	<i>Lucania parva</i>	ESS
killifish, striped	<i>Fundulus majalis</i>	ESS;IS
kingfish, northern	<i>Menticirrhus saxatilis</i>	LISTS;NRRWS;ESS;ISS;IS;SS;EPA
lamprey, sea	<i>Petromyzon marinus</i>	LISTS;IS;TN
lizardfish, inshore	<i>Synodus foetens</i>	LISTS;NRRWS;ESS;ISS;IS;SS;MISC
lookdown	<i>Selene vomer</i>	LISTS;ISS
lumpfish	<i>Cyclopterus lumpus</i>	LISTS;IS;SNFH
mackerel, Atlantic	<i>Scomber scombrus</i>	LISTS;ISS;SS;EPA
mackerel, Spanish	<i>Scomberomorus maculatus</i>	LISTS;SS;EPA
menhaden, Atlantic	<i>Brevoortia tyrannus</i>	LISTS;NRRWS;ESS;ISS;IS;SNFH;SS;NCA;MISC;EPA
minnow, sheepshead	<i>Cyprinodon variegatus</i>	ESS;ISS
moonfish	<i>Selene setapinnis</i>	LISTS;NRRWS;ESS;SS;MISC;EPA
mullet, striped	<i>Mugil cephalus</i>	ISS
mullet, white	<i>Mugil curema</i>	LISTS;ESS;ISS
mummichog	<i>Fundulus heteroclitus</i>	ESS;ISS;IS
needlefish, Atlantic	<i>Strongylura marina</i>	ESS;ISS
ocean pout	<i>Zoarces americanus</i>	LISTS;NRRWS;MISC;EPA
oyster toadfish	<i>Opsanus tau</i>	LISTS;NRRWS;ESS;ISS;IS;SNFH;SS;EPA
perch, white	<i>Morone americana</i>	LISTS;NRRWS;ESS;ISS;IS;SNFH;NCA;TN;CTR
perch, yellow	<i>Perca flavescens</i>	ISS;SNFH;TN;CTR
perch, silver	<i>Bairdiella chrysoura</i>	LISTS;ESS
pickerel, chain	<i>Esox niger</i>	ISS;TN
pike, northern	<i>Esox lucius</i>	ISS;TN;CTR
pinfish	<i>Lagodon rhomboides</i>	LISTS
pipefish, northern	<i>Syngnathus fuscus</i>	LISTS;NRRWS;ESS;ISS;IS;SNFH;SS;NCA;EPA
pollock	<i>Pollachius virens</i>	LISTS;NRRWS;SNFH;SS;EPA
pompano, African	<i>Alectis ciliaris</i>	LISTS;ISS
puffer, northern	<i>Sphoeroides maculatus</i>	LISTS;NRRWS;ESS;ISS;IS;SS
pumpkinseed	<i>Lepomis gibbosus</i>	ESS;ISS;NCA;TN;CTR
radiated shanny	<i>Ulvaria subbifurcata</i>	SNFH

**Appendix 5.1 cont.**

<b>Common Name</b>	<b>Scientific Name</b>	<b>Survey</b>
ray, bluntnose stingray	<i>Dasyatis say</i>	LISTS
ray, bullnose	<i>Myliobatis freminvillei</i>	LISTS
ray, roughtail stingray	<i>Dasyatis centroura</i>	LISTS
rockling, fourbeard	<i>Enchelyopus cimbrius</i>	LISTS;NRRWS;ESS;IS;SNFH;SS;MISC;EPA
salmon, Atlantic	<i>Salmo salar</i>	LISTS;TN
sand lance, American	<i>Ammodytes americanus</i>	LISTS;ESS;IS;SNFH;SS
scad, bigeye	<i>Selar crumenophthalmus</i>	LISTS;SS;MISC
scad, mackerel	<i>Decapterus macarellus</i>	LISTS;SS
scad, rough	<i>Trachurus lathami</i>	LISTS;NRRWS;SS;MISC;EPA
scad, round	<i>Decapterus punctatus</i>	LISTS;NRRWS;ESS
sculpin, longhorn	<i>Myoxocephalus octodecemspinosus</i>	LISTS;NRRWS;ISS;SNFH;MISC
scup	<i>Stenotomus chrysops</i>	LISTS;NRRWS;ESS;ISS;IS;SS;NCA;MISC;EPA
sea raven	<i>Hemitripterus americanus</i>	LISTS;SNFH;MISC;EPA
seahorse, lined	<i>Hippocampus erectus</i>	LISTS;ESS;IS
searobin, northern	<i>Prionotus carolinus</i>	LISTS;NRRWS;ESS;IS;SNFH;SS;MISC;EPA
searobin, striped	<i>Prionotus evolans</i>	LISTS;NRRWS;ESS;ISS;IS;SS;NCA;MISC;EPA
seasnail	<i>Liparis atlanticus</i>	LISTS;SNFH
sennet, northern	<i>Sphyræna borealis</i>	LISTS;ESS
shad, American	<i>Alosa sapidissima</i>	LISTS;NRRWS;ESS;ISS;SS;MISC;EPA;TN;CTR
shad, gizzard	<i>Dorosoma cepedianum</i>	LISTS;NRRWS;ESS;ISS;TN
shad, hickory	<i>Alosa mediocris</i>	LISTS;NRRWS;ISS;SS;MISC;EPA;CTR
shark, sand tiger shark	<i>Carcharias taurus</i>	LISTS
shark, sandbar (brown) shark	<i>Carcharhinus plumbeus</i>	LISTS
sharksucker	<i>Echeneis naucrates</i>	LISTS
shiner, golden	<i>Notemigonus crysoleucas</i>	ISS;TN
shiner, spottail	<i>Notropis hudsonius</i>	ISS;NCA;TN;CTR
silverside, Atlantic	<i>Menidia menidia</i>	LISTS;NRRWS;ESS;ISS;IS;SNFH;SS;MISC;EPA
silverside, inland	<i>Menidia beryllina</i>	SNFH
skate, barndoor	<i>Dipturus laevis</i>	LISTS
skate, clearnose	<i>Raja eglanteria</i>	LISTS;NRRWS;IS
skate, little	<i>Leucoraja erinacea</i>	LISTS;NRRWS;ESS;IS;SS;NCA;MISC;EPA;CTR
skate, winter	<i>Leucoraja ocellata</i>	LISTS;NRRWS;SS;MISC
skilletfish	<i>Gobiesox strumosus</i>	ESS
smelt, rainbow	<i>Osmerus mordax</i>	LISTS;ESS;IS;SNFH;SS;TN;CTR
snapper, glasseye	<i>Heteropriacanthus cruentatus</i>	LISTS
snapper, grey	<i>Lutjanus griseus</i>	ESS;IS
snapper, mahogany	<i>Lutjanus mahogoni</i>	LISTS
spot	<i>Leiostomus xanthurus</i>	LISTS;NRRWS;ESS;ISS;IS;SS;MISC;EPA
stargazer, northern	<i>Astroscopus guttatus</i>	LISTS;ESS
stickleback, blackspotted	<i>Gasterosteus wheatlandi</i>	ESS
stickleback, four-spine	<i>Apeltes quadracus</i>	ESS;IS
stickleback, nine-spine	<i>Pungitius pungitius</i>	ESS;IS
stickleback, three-spine	<i>Gasterosteus aculeatus</i>	ESS;IS;TN
sturgeon, Atlantic	<i>Acipenser oxyrinchus</i>	LISTS
sucker, white	<i>Catostomus commersonii</i>	ISS;NCA;TN;CTR
tautog	<i>Tautoga onitis</i>	LISTS;NRRWS;ESS;ISS;IS;SS;NCA;MISC;EPA
tomcod, Atlantic	<i>Microgadus tomcod</i>	LISTS;NRRWS;ESS;ISS;IS;SNFH;SS;EPA;CTR
triggerfish, gray	<i>Balistes capriscus</i>	LISTS
trout, brook	<i>Salvelinus fontinalis</i>	TN;CTR
trout, brown	<i>Salmo trutta</i>	CTR;ISS
walleye	<i>Sander vitreus</i>	TN
weakfish	<i>Cynoscion regalis</i>	LISTS;NRRWS;ESS;ISS;IS;SS;NCA;MISC;EPA





Appendix 5.2 cont.

Total count of finfish, lobster, horseshoe crab and squid taken in the LISTS, 1984-2017.

Year	Tows	Total Count
1984	200	122,527
1985	246	152,574
1986	316	153,383
1987	320	136,139
1988	320	216,479
1989	320	294,026
1990	297	277,183
1991	200	174,235
1992	160	186,975
1993	240	230,301
1994	240	204,795
1995	200	163,532
1996	200	165,756
1997	200	170,761
1998	200	258,082
1999	200	392,831
2000	200	271,608
2001	200	172,622
2002	200	229,284
2003	200	131,812
2004	199	250,439
2005	200	200,991
2006	120	109,330
2007	200	215,638
2008	120	164,948
2009	200	239,154
2010	78	39,340
2011	172	146,254
2012	200	170,798
2013	200	102,413
2014	199	177,250
2015	200	211,566
2016	196	293,181
2017	144	162,833
	7,087	6,589,040







**Appendix 5.4. Total number and weight (kg) of finfish and invertebrates caught in LISTS in 1984.**

*Finfish species are in order of descending count. Number of tows (sample size)=102.*

<b>species</b>	<b>count</b>	<b>%</b>	<b>weight</b>	<b>%</b>	<b>species</b>	<b>count</b>	<b>%</b>	<b>weight</b>	<b>%</b>
butterfish	18,700	31.0	.	.	Atlantic mackerel	48	0.1	.	.
windowpane flounder	13,746	22.8	.	.	spotted hake	46	0.1	.	.
winter flounder	6,847	11.4	.	.	sea raven	32	0.1	.	.
bluefish	6,738	11.2	.	.	ocean pout	25	0	.	.
scup	3,225	5.4	.	.	rough scad	22	0	.	.
fourspot flounder	1,868	3.1	.	.	longhorn sculpin	12	0	.	.
little skate	1,491	2.5	.	.	black sea bass	11	0	.	.
red hake	1,323	2.2	.	.	moonfish	7	0	.	.
American shad	982	1.6	.	.	Atlantic sturgeon	6	0	.	.
blueback herring	925	1.5	.	.	round herring	5	0	.	.
striped searobin	697	1.2	.	.	spiny dogfish	4	0	.	.
silver hake	575	1.0	.	.	American eel	2	0	.	.
smooth dogfish	534	0.9	.	.	striped bass	2	0	.	.
tautog	472	0.8	.	.	oyster toadfish	2	0	.	.
northern searobin	448	0.7	.	.	goosefish	1	0	.	.
fourbeard rockling	303	0.5	.	.	northern sennet	1	0	.	.
weakfish	260	0.4	.	.	northern puffer	1	0	.	.
hogchoker	252	0.4	.	.	red goatfish	1	0	.	.
cunner	220	0.4	.	.	<b>Total</b>	<b>60,230</b>			
summer flounder	150	0.2	.	.					
alewife	108	0.2	.	.	<b><u>Invertebrates</u></b>				
hickory shad	71	0.1	.	.	American lobster	2865	100	.	.
Atlantic menhaden	67	0.1	.	.	<b>Total</b>	<b>2,865</b>			

**Appendix 5.4. cont. Total number and weight (kg) of finfish and invertebrates caught in LISTS in 1985.**  
*Finfish species are in order of descending count. Number of tows (sample size)=126.*

<b>species</b>	<b>count</b>	<b>%</b>	<b>weight</b>	<b>%</b>	<b>species</b>	<b>count</b>	<b>%</b>	<b>weight</b>	<b>%</b>
butterfish	34,512	41.4	.	.	spot	26	0	.	.
scup	12,155	14.6	.	.	round herring	15	0	.	.
windowpane flounder	11,194	13.4	.	.	rough scad	14	0	.	.
winter flounder	7,980	9.6	.	.	Atlantic mackerel	13	0	.	.
bluefish	5,302	6.4	.	.	spiny dogfish	13	0	.	.
weakfish	2,650	3.2	.	.	winter skate	13	0	.	.
northern searobin	2,098	2.5	.	.	alewife	9	0	.	.
little skate	1,705	2.0	.	.	planehead filefish	7	0	.	.
fourspot flounder	1,289	1.5	.	.	rock gunnel	4	0	.	.
striped searobin	1,078	1.3	.	.	oyster toadfish	4	0	.	.
red hake	573	0.7	.	.	goosefish	3	0	.	.
Atlantic herring	504	0.6	.	.	ocean pout	3	0	.	.
smooth dogfish	405	0.5	.	.	Atlantic bonito	2	0	.	.
tautog	323	0.4	.	.	crevalle jack	1	0	.	.
American shad	280	0.3	.	.	grubby	1	0	.	.
silver hake	250	0.3	.	.	gray triggerfish	1	0	.	.
summer flounder	175	0.2	.	.	hickory shad	1	0	.	.
hogchoker	163	0.2	.	.	orange filefish	1	0	.	.
moonfish	142	0.2	.	.	northern puffer	1	0	.	.
blueback herring	100	0.1	.	.	Atlantic sturgeon	1	0	.	.
longhorn sculpin	80	0.1	.	.	Atlantic tomcod	1	0	.	.
cunner	51	0.1	.	.	<b>Total</b>	<b>83,395</b>			<b>-</b>
sea raven	50	0.1	.	.					
fourbeard rockling	44	0.1	.	.					
Atlantic menhaden	38	0	.	.	<b>Invertebrates</b>				
black sea bass	35	0	.	.	American lobster	1589	100	.	.
spotted hake	27	0	.	.	<b>Total</b>	<b>1,589</b>			<b>-</b>

**Appendix 5.4. cont. Total number and weight (kg) of finfish and invertebrates caught in LISTS in 1986.**

*Finfish species are in order of descending count. Invertebrate species are in order of descending weight. Number of tows (sample size)=196.*

<b>species</b>	<b>count</b>	<b>%</b>	<b>weight</b>	<b>%</b>	<b>species</b>	<b>count</b>	<b>%</b>	<b>weight</b>	<b>%</b>
butterfish	25,192	28.0	.	.	winter skate	32	0	.	.
windowpane flounder	18,848	20.9	.	.	spotted hake	30	0	.	.
winter flounder	15,341	17.0	.	.	black sea bass	28	0	.	.
scup	7,910	8.8	.	.	spot	25	0	.	.
weakfish	5,427	6.0	.	.	Atlantic mackerel	19	0	.	.
little skate	3,210	3.6	.	.	moonfish	14	0	.	.
bluefish	2,789	3.1	.	.	ocean pout	14	0	.	.
red hake	2,657	3.0	.	.	oyster toadfish	9	0	.	.
Atlantic herring	1,999	2.2	.	.	hickory shad	6	0	.	.
fourspot flounder	1,487	1.7	.	.	rough scad	5	0	.	.
striped searobin	886	1.0	.	.	Atlantic sturgeon	4	0	.	.
silver hake	723	0.8	.	.	clearnose skate	2	0	.	.
tautog	566	0.6	.	.	American eel	1	0	.	.
smooth dogfish	430	0.5	.	.	goosefish	1	0	.	.
summer flounder	414	0.5	.	.	grubby	1	0	.	.
northern searobin	396	0.4	.	.	northern pipefish	1	0	.	.
American shad	344	0.4	.	.	northern puffer	1	0	.	.
Atlantic menhaden	318	0.4	.	.	smallmouth flounder	1	0	.	.
blueback herring	256	0.3	.	.	striped bass	1	0	.	.
alewife	216	0.2	.	.	<b>Total</b>	<b>90,031</b>		-	
fourbeard rockling	123	0.1	.	.					
cunner	76	0.1	.	.					
sea raven	70	0.1	.	.	<b><u>Invertebrates</u></b>				
hogchoker	60	0.1	.	.	American lobster	2,553	28.1	.	.
longhorn sculpin	51	0.1	.	.	long-finned squid	6,537	71.9	.	.
spiny dogfish	47	0.1	.	.	<b>Total</b>	<b>9,090</b>		-	

**Appendix 5.4. cont. Total number and weight (kg) of finfish and invertebrates caught in LISTS in 1987.**

*Finfish species are in order of descending count. Invertebrate species are in order of descending weight. Number of tows (sample size)=200.*

<b>species</b>	<b>count</b>	<b>%</b>	<b>weight</b>	<b>%</b>	<b>species</b>	<b>count</b>	<b>%</b>	<b>weight</b>	<b>%</b>
winter flounder	15,600	25.6	.	.	longhorn sculpin	32	0.1	.	.
butterfish	14,674	24.1	.	.	spotted hake	22	0	.	.
windowpane flounder	11,031	18.1	.	.	spiny dogfish	19	0	.	.
scup	5,029	8.3	.	.	ocean pout	14	0	.	.
bluefish	2,611	4.3	.	.	black sea bass	13	0	.	.
little skate	2,140	3.5	.	.	winter skate	13	0	.	.
red hake	1,729	2.8	.	.	striped bass	10	0	.	.
Atlantic herring	1,628	2.7	.	.	Atlantic tomcod	8	0	.	.
fourspot flounder	1,298	2.1	.	.	smallmouth flounder	7	0	.	.
silver hake	906	1.5	.	.	moonfish	6	0	.	.
alewife	754	1.2	.	.	rock gunnel	4	0	.	.
striped searobin	543	0.9	.	.	Atlantic sturgeon	4	0	.	.
summer flounder	374	0.6	.	.	spot	3	0	.	.
American shad	371	0.6	.	.	clearnose skate	2	0	.	.
tautog	363	0.6	.	.	hickory shad	2	0	.	.
Atlantic menhaden	329	0.5	.	.	Atlantic bonito	1	0	.	.
smooth dogfish	257	0.4	.	.	Atlantic mackerel	1	0	.	.
weakfish	248	0.4	.	.	round herring	1	0	.	.
fourbeard rockling	241	0.4	.	.	sea lamprey	1	0	.	.
northern searobin	220	0.4	.	.	<b>Total</b>	<b>60,862</b>		-	
sea raven	86	0.1	.	.					
blueback herring	79	0.1	.	.	<b>Invertebrates</b>				
cunner	79	0.1	.	.	American lobster	3,544	25.1	.	.
hogchoker	61	0.1	.	.	long-finned squid	10,552	74.9	.	.
rough scad	48	0.1	.	.	<b>Total</b>	<b>14,096</b>		-	

**Appendix 5.4. cont. Total number and weight (kg) of finfish and invertebrates caught in LISTS in 1988.**

*Finfish species are in order of descending count. Invertebrate species are in order of descending weight. Number of tows (sample size)=200.*

<b>species</b>	<b>count</b>	<b>%</b>	<b>weight</b>	<b>%</b>	<b>species</b>	<b>count</b>	<b>%</b>	<b>weight</b>	<b>%</b>
butterfish	45,983	36.7	.	.	ocean pout	30	0	.	.
winter flounder	25,695	20.5	.	.	Atlantic mackerel	24	0	.	.
windowpane flounder	19,497	15.6	.	.	spot	18	0	.	.
scup	10,184	8.1	.	.	black sea bass	17	0	.	.
little skate	6,539	5.2	.	.	striped bass	17	0	.	.
bluefish	3,688	2.9	.	.	yellowtail flounder	6	0	.	.
fourspot flounder	2,478	2.0	.	.	grubby	5	0	.	.
red hake	1,933	1.5	.	.	rock gunnel	5	0	.	.
weakfish	1,287	1.0	.	.	rainbow smelt	5	0	.	.
silver hake	1,210	1.0	.	.	crevalle jack	4	0	.	.
striped searobin	1,194	1.0	.	.	bigeye scad	2	0	.	.
Atlantic herring	1,193	1.0	.	.	bigeye	2	0	.	.
American shad	1,187	0.9	.	.	planehead filefish	2	0	.	.
northern searobin	474	0.4	.	.	hickory shad	2	0	.	.
tautog	455	0.4	.	.	northern puffer	2	0	.	.
smooth dogfish	385	0.3	.	.	Atlantic sturgeon	2	0	.	.
summer flounder	320	0.3	.	.	Atlantic tomcod	2	0	.	.
fourbeard rockling	302	0.2	.	.	Atlantic bonito	1	0	.	.
blueback herring	164	0.1	.	.	dwarf goatfish	1	0	.	.
alewife	153	0.1	.	.	goosefish	1	0	.	.
moonfish	137	0.1	.	.	northern pipefish	1	0	.	.
rough scad	128	0.1	.	.	short bigeye	1	0	.	.
longhorn sculpin	103	0.1	.	.	striped cusk-eel	1	0	.	.
winter skate	101	0.1	.	.	sea lamprey	1	0	.	.
spotted hake	87	0.1	.	.	<b>Total</b>	<b>125,344</b>			<b>-</b>
hogchoker	75	0.1	.	.					
Atlantic menhaden	69	0.1	.	.					
sea raven	50	0	.	.	<b>Invertebrates</b>				
cunner	48	0	.	.	American lobster	2,114	8.5	.	.
spiny dogfish	39	0	.	.	long-finned squid	22,769	91.5	.	.
smallmouth flounder	34	0	.	.	<b>Total</b>	<b>24,883</b>			<b>-</b>

**Appendix 5.4. cont. Total number and weight (kg) of finfish and invertebrates caught in LISTS in 1989.**

*Finfish species are in order of descending count. Invertebrate species are in order of descending weight. Number of tows (sample size)=200.*

species	count	%	weight	%	species	count	%	weight	%
butterfish	47,089	29.3	.	.	sea raven	34	0	.	.
winter flounder	32,361	20.2	.	.	black sea bass	15	0	.	.
windowpane flounder	25,109	15.6	.	.	rough scad	11	0	.	.
scup	17,391	10.8	.	.	striped bass	11	0	.	.
bluefish	8,649	5.4	.	.	yellow jack	11	0	.	.
little skate	7,079	4.4	.	.	goosefish	9	0	.	.
red hake	5,689	3.5	.	.	smallmouth flounder	9	0	.	.
weakfish	5,496	3.4	.	.	rock gunnel	8	0	.	.
American shad	1,977	1.2	.	.	grubby	7	0	.	.
fourspot flounder	1,877	1.2	.	.	spotted hake	7	0	.	.
striped searobin	1,763	1.1	.	.	rainbow smelt	4	0	.	.
silver hake	1,697	1.1	.	.	planehead filefish	3	0	.	.
Atlantic herring	1,154	0.7	.	.	Atlantic sturgeon	3	0	.	.
tautog	600	0.4	.	.	Atlantic tomcod	3	0	.	.
fourbeard rockling	397	0.2	.	.	bigeye	2	0	.	.
blueback herring	307	0.2	.	.	American eel	2	0	.	.
northern searobin	297	0.2	.	.	short bigeye	2	0	.	.
Atlantic mackerel	237	0.1	.	.	oyster toadfish	2	0	.	.
Atlantic menhaden	230	0.1	.	.	white perch	2	0	.	.
smooth dogfish	202	0.1	.	.	northern sennet	1	0	.	.
alewife	190	0.1	.	.	northern puffer	1	0	.	.
longhorn sculpin	107	0.1	.	.	banded rudderfish	1	0	.	.
cunner	106	0.1	.	.	Spanish mackerel	1	0	.	.
hogchoker	91	0.1	.	.	<b>Total</b>	<b>160,581</b>			-
winter skate	91	0.1	.	.					
spiny dogfish	66	0	.	.					
ocean pout	58	0	.	.	<b>Invertebrates</b>				
bigeye scad	45	0	.	.	American lobster	3,447	19.9	.	.
moonfish	42	0	.	.	long-finned squid	13,883	80.1	.	.
summer flounder	35	0	.	.	<b>Total</b>	<b>17,330</b>			-



**Appendix 5.4. cont. Total number and weight (kg) of finfish and invertebrates caught in LISTS in 1990.**

*Finfish species are in order of descending count. Invertebrate species are in order of descending weight. Number of tows (sample size)=200.*

<b>species</b>	<b>count</b>	<b>%</b>	<b>weight</b>	<b>%</b>	<b>species</b>	<b>count</b>	<b>%</b>	<b>weight</b>	<b>%</b>
winter flounder	47,184	31.1	.	.	seasnail	8	0	.	.
butterfish	45,373	29.9	.	.	planehead filefish	7	0	.	.
scup	15,393	10.2	.	.	moonfish	7	0	.	.
windowpane flounder	9,825	6.5	.	.	rock gunnel	7	0	.	.
Atlantic herring	8,779	5.8	.	.	yellow jack	7	0	.	.
little skate	6,456	4.3	.	.	grubby	4	0	.	.
bluefish	4,688	3.1	.	.	spot	4	0	.	.
fourspot flounder	3,270	2.2	.	.	Atlantic sturgeon	4	0	.	.
silver hake	2,334	1.5	.	.	oyster toadfish	4	0	.	.
red hake	2,237	1.5	.	.	goosefish	3	0	.	.
weakfish	1,921	1.3	.	.	smallmouth flounder	3	0	.	.
striped searobin	866	0.6	.	.	Atlantic tomcod	3	0	.	.
tautog	554	0.4	.	.	clearnose skate	2	0	.	.
American shad	406	0.3	.	.	lookdown	2	0	.	.
fourbeard rockling	299	0.2	.	.	red goatfish	2	0	.	.
longhorn sculpin	243	0.2	.	.	rainbow smelt	2	0	.	.
northern searobin	232	0.2	.	.	bigeye scad	1	0	.	.
Atlantic menhaden	219	0.1	.	.	bigeye	1	0	.	.
smooth dogfish	209	0.1	.	.	hickory shad	1	0	.	.
summer flounder	170	0.1	.	.	mackerel scad	1	0	.	.
cunner	168	0.1	.	.	northern kingfish	1	0	.	.
alewife	160	0.1	.	.	northern puffer	1	0	.	.
spiny dogfish	150	0.1	.	.	red cornetfish	1	0	.	.
hogchoker	84	0.1	.	.	sandbar shark	1	0	.	.
winter skate	61	0	.	.	sea lamprey	1	0	.	.
blueback herring	46	0	.	.	yellowtail flounder	1	0	.	.
striped bass	45	0	.	.	<b>Total</b>	<b>151,600</b>			<b>-</b>
sea raven	42	0	.	.					
ocean pout	39	0	.	.					
black sea bass	27	0	.	.	<b><u>Invertebrates</u></b>				
spotted hake	21	0	.	.	American lobster	5,369	27.0.	.	.
Atlantic mackerel	10	0	.	.	long-finned squid	14,538	73.0.	.	.
rough scad	10	0	.	.	<b>Total</b>	<b>19,907</b>			<b>-</b>

**Appendix 5.4. cont. Total number and weight (kg) of finfish and invertebrates caught in LISTS in 1991.**

*Finfish species are in order of descending count. Invertebrate species are in order of descending weight. Number of tows (sample size)=200.*

species	count	%	weight	%	species	count	%	weight	%
scup	45,790	29.9	.	.	moonfish	24	0	.	.
butterfish	40,537	26.4	.	.	smallmouth flounder	20	0	.	.
winter flounder	26,623	17.4	.	.	sea raven	19	0	.	.
windowpane flounder	8,482	5.5	.	.	spiny dogfish	14	0	.	.
little skate	6,479	4.2	.	.	yellow jack	11	0	.	.
bluefish	5,845	3.8	.	.	goosefish	8	0	.	.
weakfish	4,320	2.8	.	.	northern puffer	5	0	.	.
Atlantic herring	4,003	2.6	.	.	northern kingfish	4	0	.	.
fourspot flounder	3,553	2.3	.	.	Atlantic tomcod	4	0	.	.
red hake	2,085	1.4	.	.	Atlantic sturgeon	3	0	.	.
silver hake	1,537	1.0	.	.	clearnose skate	2	0	.	.
striped searobin	865	0.6	.	.	Atlantic mackerel	2	0	.	.
northern searobin	609	0.4	.	.	mackerel scad	2	0	.	.
tautog	501	0.3	.	.	rainbow smelt	2	0	.	.
American shad	361	0.2	.	.	Spanish mackerel	2	0	.	.
Atlantic menhaden	348	0.2	.	.	spot	2	0	.	.
summer flounder	263	0.2	.	.	bigeye scad	1	0	.	.
smooth dogfish	193	0.1	.	.	planehead filefish	1	0	.	.
fourbeard rockling	163	0.1	.	.	hickory shad	1	0	.	.
longhorn sculpin	139	0.1	.	.	red goatfish	1	0	.	.
hogchoker	104	0.1	.	.	rough scad	1	0	.	.
alewife	103	0.1	.	.	sea lamprey	1	0	.	.
cunner	75	0	.	.	oyster toadfish	1	0	.	.
spotted hake	73	0	.	.	<b>Total</b>	<b>153,389</b>			-
winter skate	50	0	.	.					
ocean pout	42	0	.	.	<b>Invertebrates</b>				
black sea bass	39	0	.	.	American lobster	8,524	40.9	.	.
blueback herring	38	0	.	.	long-finned squid	12,322	59.1	.	.
striped bass	38	0	.	.	<b>Total</b>	<b>20,846</b>			-

**Appendix 5.4. cont. Total number and weight (kg) of finfish and invertebrates caught in LISTS in 1992.**

*Finfish species are in order of descending count. Invertebrate species are in order of descending weight (nc = not counted). Number of tows (sample size)=160.*

species	count	%	weight	%	species	count	%	weight	%
butterfish	95,961	65.7	1,357.3	11.7	black sea bass	5	0	1.8	0
scup	13,646	9.3	837.7	7.2	northern pipefish	5	0	0.4	0
winter flounder	9,548	6.5	1,344.8	11.5	Atlantic mackerel	4	0	1.0	0
bluefish	5,269	3.6	2,462.9	21.1	sea raven	4	0	3.9	0
Atlantic herring	4,565	3.1	797.5	6.8	northern kingfish	2	0	0.2	0
little skate	3,495	2.4	1,389.0	11.9	round herring	2	0	0.2	0
windowpane flounder	2,980	2.0	286.1	2.5	yellow jack	2	0	0.2	0
fourspot flounder	2,774	1.9	382.4	3.3	Atlantic silverside	1	0	0.1	0
red hake	1,606	1.1	127.7	1.1	conger eel	1	0	0.1	0
weakfish	1,317	0.9	94.8	0.8	northern puffer	1	0	0.1	0
Atlantic menhaden	1,115	0.8	60.6	0.5	Spanish mackerel	1	0	1.5	0
striped searobin	857	0.6	305.1	2.6	<b>Total</b>	<b>146,035</b>		<b>11,648.2</b>	
silver hake	544	0.4	22.0	0.2					
American shad	380	0.3	63.3	0.5	<b>Invertebrates</b>				
northern searobin	313	0.2	35.6	0.3	American lobster	8,160	19.9	1,537.9	28.6
smooth dogfish	304	0.2	863.2	7.4	blue mussel	nc	nc	1,157.1	21.5
tautog	265	0.2	508.3	4.4	long-finned squid	32,780	80.1	844.9	15.7
summer flounder	186	0.1	142.1	1.2	horseshoe crab	nc	nc	514.1	9.6
blueback herring	175	0.1	8.5	0.1	lady crab	nc	nc	375.4	7.0
fourbeard rockling	150	0.1	12.8	0.1	rock crab	nc	nc	239.1	4.5
alewife	122	0.1	9.2	0.1	boring sponge	nc	nc	225.5	4.2
spotted hake	68	0	10.3	0.1	spider crab	nc	nc	186.0	3.5
moonfish	62	0	1.5	0	starfish spp.	nc	nc	148.6	2.8
hogchoker	61	0	5.6	0	whelks	nc	nc	57.5	1.1
striped bass	42	0	89.4	0.8	flat claw hermit crab	nc	nc	34.7	0.6
longhorn sculpin	31	0	9.0	0.1	bluecrab	nc	nc	18.1	0.3
winter skate	31	0	105.3	0.9	mantis shrimp	nc	nc	10.3	0.2
cunner	30	0	3.7	0	northern moon snail	nc	nc	8.6	0.2
Atlantic sturgeon	30	0	244.8	2.1	common oyster	nc	nc	7.3	0.1
ocean pout	18	0	7.7	0.1	lion's mane jellyfish	nc	nc	2.4	0
hickory shad	12	0	4.9	0	surf clam	nc	nc	1.7	0
smallmouth flounder	12	0	0.6	0	hard clams	nc	nc	1.2	0
goosefish	10	0	2.5	0	bushy bryozoan	nc	nc	1.0	0
clearnose skate	8	0	10.3	0.1	purple sea urchin	nc	nc	0.4	0
Atlantic tomcod	8	0	1.3	0	mud crabs	nc	nc	0.3	0
mackerel scad	6	0	0.2	0	star coral	nc	nc	0.1	0
spiny dogfish	6	0	30.7	0.3	<b>Total</b>	<b>40,940</b>		<b>5,372</b>	

**Appendix 5.4. cont. Total number and weight (kg) of finfish and invertebrates caught in LISTS in 1993.**

*Finfish species are in order of descending count. Invertebrate species are in order of descending weight (nc = not counted). Number of tows (sample size)=200.*

species	count	%	weight	%	species	count	%	weight	%
butterfish	35,361	33.0	847.8	7.1	goosefish	3	0	0.3	0
scup	18,785	17.6	581.4	4.8	American sand lance	3	0	0.3	0
winter flounder	16,090	15.0	1,855.7	15.4	Atlantic bonito	2	0	6.4	0.1
windowpane flounder	7,953	7.4	547.6	4.6	lumpfish	2	0	0.2	0
Atlantic herring	6,269	5.9	1,119.8	9.3	moonfish	2	0	0.2	0
little skate	5,186	4.8	2,172.3	18.1	sea lamprey	2	0	1.0	0
bluefish	4,402	4.1	1,343.2	11.2	Atlantic salmon	1	0	0.1	0
red hake	3,963	3.7	232.0	1.9	American eel	1	0	1.6	0
fourspot flounder	1,262	1.2	182.3	1.5	northern sennet	1	0	0.1	0
weakfish	1,142	1.1	60.3	0.5	orange filefish	1	0	0.1	0
striped searobin	1,079	1.0	165.4	1.4	round herring	1	0	0.1	0
northern searobin	935	0.9	96.8	0.8	red cornetfish	1	0	0.1	0
American shad	791	0.7	101.1	0.8	red goatfish	1	0	0.1	0
alewife	788	0.7	48.2	0.4	short bigeye	1	0	0.1	0
silver hake	500	0.5	21.1	0.2	sea raven	1	0	0.6	0
spotted hake	331	0.3	36.7	0.3	yellow jack	1	0	0.1	0
smooth dogfish	283	0.3	857.6	7.1	<b>Total</b>	<b>107,035</b>		<b>12,012.4</b>	
Atlantic menhaden	271	0.3	94.1	0.8					
fourbeard rockling	241	0.2	15.6	0.1	<b>Invertebrates</b>				
summer flounder	224	0.2	137.9	1.1	American lobster	10,306	20.6	2,173.5	34.4
tautog	157	0.1	308.2	2.6	long-finned squid	39,723	79.4	1,176.5	18.6
Spanish mackerel	136	0.1	2.2	0	blue mussel	nc	nc	945.1	15.0
blueback herring	96	0.1	4.3	0	horseshoe crab	nc	nc	673.8	10.7
rough scad	92	0.1	3.8	0	spider crab	nc	nc	511.2	8.1
striped bass	78	0.1	198.7	1.7	lady crab	nc	nc	428.0	6.8
ocean pout	66	0.1	16.4	0.1	rock crab	nc	nc	155.9	2.5
cunner	64	0.1	6.1	0.1	flat claw hermit crab	nc	nc	45.7	0.7
Atlantic sturgeon	60	0.1	633.6	5.3	starfish spp.	nc	nc	37.4	0.6
winter skate	59	0.1	213.2	1.8	boring sponge	nc	nc	36.6	0.6
spot	57	0.1	4.5	0	whelks	nc	nc	34.0	0.5
hogchoker	56	0.1	5.2	0	mantis shrimp	nc	nc	31.6	0.5
Atlantic silverside	54	0.1	1.0	0	lion's mane jellyfish	nc	nc	27.6	0.4
northern puffer	23	0	0.4	0	bluecrab	nc	nc	20.0	0.3
smallmouth flounder	23	0	2.1	0	northern moon snail	nc	nc	8.9	0.1
Atlantic croaker	20	0	1.1	0	common oyster	nc	nc	2.0	0
black sea bass	16	0	5.0	0	surf clam	nc	nc	1.0	0
spiny dogfish	14	0	58.4	0.5	hard clams	nc	nc	0.9	0
Atlantic mackerel	11	0	0.9	0	purple sea urchin	nc	nc	0.7	0
longhorn sculpin	11	0	3.2	0	arks	nc	nc	0.7	0
planehead filefish	9	0	0.7	0	mud crabs	nc	nc	0.4	0
hickory shad	9	0	4.1	0	star coral	nc	nc	0.3	0
northern pipefish	9	0	0.4	0	blood star	nc	nc	0.2	0
rainbow smelt	9	0	0.6	0	common slipper shell	nc	nc	0.2	0
crevalle jack	5	0	0.4	0	sand shrimp	nc	nc	0.1	0
northern kingfish	5	0	0.6	0	sand dollar	nc	nc	0.1	0
Atlantic tomcod	5	0	0.8	0	northern red shrimp	nc	nc	0.1	0
clearnose skate	4	0	7.7	0.1	polychaetes	nc	nc	0.1	0
white perch	4	0	0.3	0					
conger eel	3	0	0.2	0	<b>Total</b>	<b>50,029</b>		<b>6,313</b>	

**Appendix 5.4. cont. Total number and weight (kg) of finfish and invertebrates caught in LISTS in 1994.**

*Finfish species are in order of descending count. Invertebrate species are in order of descending weight (nc = not counted). Number of tows (sample size)=200.*

species	count	%	weight	%	species	count	%	weight	%
butterfish	33,538	28.7	776.8	6.3	longhorn sculpin	7	0	1.6	0
scup	25,451	21.8	660.8	5.4	grubby	5	0	0.3	0
winter flounder	20,615	17.6	1,992.2	16.2	mackerel scad	4	0	0.4	0
bluefish	7,703	6.6	1,159.8	9.4	Atlantic silverside	3	0	0.3	0
windowpane flounder	6,062	5.2	574.5	4.7	bigeye scad	2	0	0.2	0
little skate	5,604	4.8	2,565.3	20.9	lookdown	2	0	0.2	0
Atlantic herring	3,836	3.3	768.6	6.3	northern puffer	2	0	0.2	0
weakfish	3,320	2.8	160.0	1.3	Atlantic tomcod	2	0	0.3	0
silver hake	1,703	1.5	112.9	0.9	bigeye	1	0	0.1	0
fourspot flounder	1,494	1.3	195.6	1.6	clearnose skate	1	0	1.8	0
American shad	1,289	1.1	133.2	1.1	inshore lizardfish	1	0	0.1	0
alewife	1,211	1.0	75.0	0.6	northern pipefish	1	0	0.1	0
blueback herring	1,052	0.9	26.6	0.2	rock gunnel	1	0	0.1	0
striped searobin	927	0.8	183.6	1.5	sea raven	1	0	0.2	0
northern searobin	800	0.7	63.7	0.5	white perch	1	0	0.3	0
red hake	490	0.4	54.0	0.4	yellow jack	1	0	0.1	0
smooth dogfish	310	0.3	816.3	6.6	<b>Total</b>	<b>117,002</b>		<b>12,284.5</b>	
Atlantic menhaden	276	0.2	61.4	0.5					
summer flounder	242	0.2	141.6	1.2	<b>Invertebrates</b>				
tautog	207	0.2	346.5	2.8	American lobster	7,057	31.6	1,533.9	38.6
spotted hake	148	0.1	25.7	0.2	long-finned squid	15,299	68.4	594.8	15.0
moonfish	93	0.1	2.6	0	horseshoe crab	nc	nc	386.7	9.7
fourbeard rockling	92	0.1	8.4	0.1	blue mussel	nc	nc	377.5	9.5
striped bass	81	0.1	198.6	1.6	lady crab	nc	nc	338.5	8.5
Atlantic sturgeon	60	0.1	848.6	6.9	spider crab	nc	nc	335.0	8.4
spiny dogfish	55	0	186.2	1.5	rock crab	nc	nc	136.8	3.4
ocean pout	42	0	9.1	0.1	starfish spp.	nc	nc	124.6	3.1
hogchoker	36	0	3.8	0	flat claw hermit crab	nc	nc	51.4	1.3
black sea bass	33	0	10.9	0.1	northern moon snail	nc	nc	34.6	0.9
winter skate	33	0	101.5	0.8	common oyster	nc	nc	18.4	0.5
American sand lance	25	0	0.6	0	whelks	nc	nc	14.1	0.4
Spanish mackerel	25	0	1.7	0	mantis shrimp	nc	nc	9.8	0.2
cunner	18	0	1.3	0	lion's mane jellyfish	nc	nc	4.2	0.1
smallmouth flounder	15	0	1.3	0	bluecrab	nc	nc	3.7	0.1
hickory shad	14	0	3.7	0	arks	nc	nc	3.0	0.1
rough scad	13	0	0.2	0	boring sponge	nc	nc	1.9	0
Atlantic mackerel	11	0	0.9	0	hard clams	nc	nc	1.3	0
spot	11	0	1.1	0	bushy bryozoan	nc	nc	0.6	0
rainbow smelt	9	0	0.6	0	mud crabs	nc	nc	0.3	0
crevalle jack	8	0	0.5	0	surf clam	nc	nc	0.3	0
goosefish	8	0	2.0	0	purple sea urchin	nc	nc	0.1	0
northern kingfish	7	0	0.5	0	<b>Total</b>	<b>22,356</b>		<b>3,972</b>	

**Appendix 5.4. cont. Total number and weight (kg) of finfish and invertebrates caught in LISTS in 1995.**

*Finfish species are in order of descending count. Invertebrate species are in order of descending weight (nc = not counted). Number of tows (sample size)=200.*

species	count	%	weight	%	species	count	%	weight	%
butterfish	64,930	50.1	1,664.5	15.2	spot	3	0	0.3	0
winter flounder	15,558	12.0	1,614.7	14.7	Atlantic cod	2	0	0.1	0
scup	13,985	10.8	770.5	7.0	conger eel	2	0	1.2	0
Atlantic herring	9,135	7.0	1,631.7	14.9	haddock	2	0	0.2	0
bluefish	5,524	4.3	1,156.1	10.5	northern pipefish	2	0	0.1	0
windowpane flounder	3,815	2.9	356.2	3.2	sea raven	2	0	0.7	0
weakfish	2,881	2.2	275.7	2.5	African pompano	1	0	0.1	0
fourspot flounder	2,584	2.0	402.9	3.7	crevalle jack	1	0	0.1	0
little skate	2,372	1.8	1,055.3	9.6	grubby	1	0	0.1	0
red hake	1,977	1.5	145.6	1.3	Atlantic mackerel	1	0	0.1	0
silver hake	1,941	1.5	61.6	0.6	mackerel scad	1	0	0.1	0
northern searobin	1,317	1.0	166.9	1.5	northern puffer	1	0	0.1	0
American shad	755	0.6	81.4	0.7	oyster toadfish	1	0	0.5	0
striped searobin	682	0.5	277.5	2.5	yellowtail flounder	1	0	0.1	0
alewife	386	0.3	24.6	0.2	<b>Total</b>	<b>129,609</b>		<b>10,966.8</b>	
Atlantic menhaden	318	0.2	41.9	0.4					
blueback herring	255	0.2	7.5	0.1	<b><u>Invertebrates</u></b>				
fourbeard rockling	169	0.1	14.7	0.1	American lobster	9,944	29.3	2,141.9	55.1
smooth dogfish	168	0.1	566.8	5.2	long-finned squid	23,974	70.7	796.4	20.5
striped bass	165	0.1	185.3	1.7	lady crab	nc	nc	535.0	13.8
summer flounder	121	0.1	79.6	0.7	horseshoe crab	nc	nc	116.8	3
American sand lance	95	0.1	0.4	0	spider crab	nc	nc	95.4	2.5
spotted hake	72	0.1	6.5	0.1	lion's mane jellyfish	nc	nc	78.3	2
tautog	61	0	95.1	0.9	rock crab	nc	nc	47.0	1.2
cunner	41	0	4.4	0	blue mussel	nc	nc	14.0	0.4
winter skate	41	0	89.2	0.8	flat claw hermit crab	nc	nc	12.8	0.3
Atlantic silverside	39	0	0.9	0	boring sponge	nc	nc	11.2	0.3
moonfish	33	0	2.1	0	whelks	nc	nc	10.8	0.3
yellow jack	32	0	2.1	0	mantis shrimp	nc	nc	8.1	0.2
ocean pout	30	0	6.5	0.1	bluecrab	nc	nc	6.0	0.2
northern kingfish	25	0	2.5	0	northern moon snail	nc	nc	5.8	0.1
smallmouth flounder	19	0	1.2	0	starfish spp.	nc	nc	4.7	0.1
hogchoker	17	0	1.7	0	arks	nc	nc	1.4	0
black sea bass	12	0	4.7	0	hard clams	nc	nc	0.7	0
hickory shad	6	0	2.5	0	purple sea urchin	nc	nc	0.7	0
Atlantic sturgeon	6	0	145.5	1.3	sand shrimp	nc	nc	0.4	0
longhorn sculpin	5	0	1.3	0	ghost shrimp	nc	nc	0.3	0
clearnose skate	4	0	11.0	0.1	mud crabs	nc	nc	0.2	0
goosefish	4	0	3.3	0	common razor clam	nc	nc	0.1	0
rainbow smelt	4	0	0.3	0	shore shrimp	nc	nc	0.1	0
Atlantic tomcod	4	0	0.8	0	<b>Total</b>	<b>33,918</b>		<b>3,888</b>	

**Appendix 5.4. cont. Total number and weight (kg) of finfish and invertebrates caught in LISTS in 1996.**

*Finfish species are in order of descending count. Invertebrate species are in order of descending weight (nc = not counted). Number of tows (sample size)=200.*

species	count	%	weight	%	species	count	%	weight	%
butterfish	49,360	37.0	1,844.7	12.4	northern puffer	3	0	0.3	0
winter flounder	22,722	17.0	3,335.0	22.5	rock gunnel	3	0	0.2	0
scup	16,087	12.0	739.4	5.0	short bigeye	3	0	0.3	0
windowpane flounder	14,116	10.6	1,223.6	8.2	Atlantic sturgeon	3	0	19.9	0.1
bluefish	6,705	5.0	1,118.2	7.5	bigeye scad	2	0	0.1	0
weakfish	6,375	4.8	414.9	2.8	grubby	2	0	0.2	0
little skate	6,203	4.6	2,801.8	18.9	sea raven	2	0	1.5	0
fourspot flounder	2,815	2.1	407.2	2.7	Atlantic tomcod	2	0	0.3	0
alewife	1,402	1.0	134.6	0.9	clearnose skate	1	0	1.7	0
striped searobin	1,008	0.8	278.7	1.9	conger eel	1	0	0.1	0
Atlantic herring	972	0.7	189.8	1.3	gizzard shad	1	0	0.1	0
moonfish	921	0.7	11.6	0.1	goosefish	1	0	0.1	0
red hake	872	0.7	95.5	0.6	sea lamprey	1	0	0.7	0
northern searobin	672	0.5	57.4	0.4	spiny dogfish	1	0	2.1	0
American shad	501	0.4	36.2	0.2	white perch	1	0	0.1	0
silver hake	489	0.4	20.0	0.1	<b>Total</b>	<b>133,546</b>		<b>14,835.2</b>	
summer flounder	434	0.3	266.4	1.8	<b>Invertebrates</b>				
spotted hake	384	0.3	42.6	0.3	American lobster	9,490	29.5	2,113.5	39.1
smooth dogfish	275	0.2	862.8	5.8	lady crab	nc	nc	1,160.4	21.5
striped bass	232	0.2	373.5	2.5	long-finned squid	22,720	70.5	720.4	13.3
spot	195	0.1	14.1	0.1	horseshoe crab	nc	nc	717.0	13.3
tautog	136	0.1	225.9	1.5	spider crab	nc	nc	293.9	5.4
fourbeard rockling	109	0.1	8.6	0.1	rock crab	nc	nc	162.7	3.0
blueback herring	97	0.1	6.2	0	lion's mane jellyfish	nc	nc	42.7	0.8
Atlantic menhaden	88	0.1	40.5	0.3	blue mussel	nc	nc	42.5	0.8
winter skate	88	0.1	212.7	1.4	flat claw hermit crab	nc	nc	39.4	0.7
hogchoker	45	0	5.4	0	whelks	nc	nc	33.0	0.6
smallmouth flounder	41	0	2.3	0	mantis shrimp	nc	nc	20.9	0.4
rough scad	35	0	1.5	0	boring sponge	nc	nc	19.2	0.4
hickory shad	29	0	10.2	0.1	bushy bryozoan	nc	nc	15.2	0.3
black sea bass	27	0	12.1	0.1	starfish spp.	nc	nc	6.2	0.1
ocean pout	26	0	7.2	0	arks	nc	nc	4.3	0.1
cunner	17	0	2.6	0	northern moon snail	nc	nc	4.3	0.1
striped anchovy	11	0	0.2	0	bluecrab	nc	nc	4.0	0.1
longhorn sculpin	7	0	2.1	0	hard clams	nc	nc	3.2	0.1
northern kingfish	6	0	0.6	0	surf clam	nc	nc	1.4	0
yellow jack	6	0	0.5	0	mud crabs	nc	nc	0.3	0
Atlantic mackerel	5	0	0.5	0	purple sea urchin	nc	nc	0.1	0
planehead filefish	3	0	0.3	0	<b>Total</b>	<b>32,210</b>		<b>5,405</b>	
mackerel scad	3	0	0.1	0					

**Appendix 5.4. cont. Total number and weight (kg) of finfish and invertebrates caught in LISTS in 1997.**

*Finfish species are in order of descending count. Invertebrate species are in order of descending weight (nc = not counted). Number of tows (sample size)=200.*

species	count	%	weight	%	species	count	%	weight	%
butterfish	70,985	50.3	2,017.2	15.5	American sand lance	2	0	0.1	0
winter flounder	14,701	10.4	2,439.4	18.8	short bigeye	2	0	0.2	0
bluefish	10,815	7.7	977.6	7.5	yellow jack	2	0	0.2	0
windowpane flounder	10,324	7.3	986.1	7.6	bigeye scad	1	0	0.1	0
scup	9,582	6.8	530.5	4.1	Atlantic cod	1	0	0.3	0
fourspot flounder	4,122	2.9	615.3	4.7	haddock	1	0	0.1	0
little skate	4,068	2.9	1,945.8	15.0	northern pipefish	1	0	0.1	0
weakfish	3,904	2.8	362.0	2.8	northern puffer	1	0	0.1	0
Atlantic herring	3,455	2.4	515.1	4.0	rougthead stingray	1	0	50.6	0.4
silver hake	1,973	1.4	70.8	0.5	sea lamprey	1	0	0.1	0
alewife	1,194	0.8	81.3	0.6	Atlantic tomcod	1	0	0.1	0
American shad	922	0.7	66.8	0.5	yellowtail flounder	1	0	0.3	0
striped searobin	819	0.6	230.5	1.8	<b>Total</b>	<b>141,040</b>		<b>12,974.6</b>	
red hake	748	0.5	80.5	0.6					
blueback herring	630	0.4	16.5	0.1	<b><u>Invertebrates</u></b>				
northern searobin	579	0.4	60.4	0.5	American lobster	16,467	55.3	3,800.9	64.6
summer flounder	486	0.3	326.0	2.5	lady crab	nc	nc	592.5	10.1
striped bass	319	0.2	509.9	3.9	long-finned squid	13,048	43.8	515.2	8.8
moonfish	287	0.2	4.6	0	horseshoe crab	204	0.7	472.4	8.0
fourbeard rockling	199	0.1	17.3	0.1	spider crab	nc	nc	188.3	3.2
tautog	190	0.1	271.8	2.1	rock crab	nc	nc	94.1	1.6
smooth dogfish	167	0.1	527.3	4.1	lion's mane jellyfish	nc	nc	88.0	1.5
Atlantic menhaden	116	0.1	38.5	0.3	bushy bryozoan	nc	nc	28.0	0.5
spotted hake	77	0.1	19.0	0.1	flat claw hermit crab	nc	nc	21.7	0.4
rough scad	65	0	2.0	0	boring sponge	nc	nc	16.5	0.3
smallmouth flounder	58	0	2.4	0	whelks	22	0.1	14.8	0.3
winter skate	48	0	109.7	0.8	bluecrab	33	0.1	13.6	0.2
cunner	43	0	4.1	0	mantis shrimp	nc	nc	9.3	0.2
hickory shad	25	0	9.1	0.1	starfish spp.	nc	nc	7.3	0.1
black sea bass	22	0	10.5	0.1	hard clams	nc	nc	3.8	0.1
hogchoker	15	0	1.8	0	blue mussel	nc	nc	3.5	0.1
ocean pout	15	0	4.8	0	northern moon snail	nc	nc	3.3	0.1
grubby	11	0	0.7	0	northern comb jelly	nc	nc	2.0	0
spot	10	0	1.1	0	arks	nc	nc	1.8	0
Atlantic mackerel	8	0	1.7	0	common oyster	nc	nc	1.8	0
northern kingfish	7	0	0.9	0	surf clam	nc	nc	0.9	0
spiny dogfish	7	0	13.7	0.1	common slipper shell	nc	nc	0.7	0
Atlantic sturgeon	5	0	37.8	0.3	mud crabs	nc	nc	0.6	0
clearnose skate	4	0	7.4	0.1	sand shrimp	nc	nc	0.2	0
longhorn sculpin	4	0	0.8	0	common razor clam	nc	nc	0.2	0
white perch	4	0	0.9	0	blood star	nc	nc	0.1	0
crevalle jack	3	0	0.6	0	star coral	nc	nc	0.1	0
sea raven	3	0	0.4	0	northern red shrimp	nc	nc	0.1	0
Atlantic silverside	2	0	0.1	0	shore shrimp	nc	nc	0.1	0
goosefish	2	0	1.6	0	purple sea urchin	nc	nc	0.1	0
inshore lizardfish	2	0	0.2	0	<b>Total</b>	<b>29,774</b>		<b>5,882</b>	
round scad	2	0	0.2	0					



**Appendix 5.4. cont. Total number and weight (kg) of finfish and invertebrates caught in LISTS in 1998.**

*Finfish species are in order of descending count. Invertebrate species are in order of descending weight (nc = not counted). Number of tows (sample size)=200.*

species	count	%	weight	%	species	count	%	weight	%
butterfish	136,926	64.0	3,661.1	24.4	goosefish	3	0	3.2	0
scup	23,742	11.1	740.5	4.9	oyster toadfish	3	0	0.9	0
winter flounder	15,697	7.3	2,450.3	16.3	gray triggerfish	2	0	2.3	0
bluefish	8,814	4.1	899.0	6.0	longhorn sculpin	2	0	1.0	0
windowpane flounder	6,483	3.0	741.1	4.9	bigeye scad	1	0	0.1	0
little skate	4,305	2.0	2,085.5	13.9	inshore lizardfish	1	0	0.1	0
weakfish	3,495	1.6	268.2	1.8	mackerel scad	1	0	0.1	0
red hake	3,015	1.4	217.5	1.4	rougtail stingray	1	0	3.4	0
fourspot flounder	1,908	0.9	306.0	2.0	<b>Total</b>	<b>214,025</b>		<b>15,005.7</b>	
silver hake	1,870	0.9	88.3	0.6					
striped searobin	1,321	0.6	509.7	3.4	<b>Invertebrates</b>				
moonfish	1,188	0.6	13.4	0.1	American lobster	16,211	36.7	3,873.9	60.2
American shad	901	0.4	60.2	0.4	long-finned squid	27,443	62.1	767.0	11.9
Atlantic herring	893	0.4	74.6	0.5	horseshoe crab	303	0.7	489.4	7.6
alewife	456	0.2	35.1	0.2	blue mussel	nc	nc	309.0	4.8
summer flounder	436	0.2	431.3	2.9	lady crab	nc	nc	291.2	4.5
striped bass	400	0.2	484.2	3.2	rock crab	nc	nc	241.4	3.8
northern searobin	360	0.2	39.4	0.3	spider crab	nc	nc	157.2	2.4
smooth dogfish	310	0.1	989.8	6.6	lion's mane jellyfish	nc	nc	63.1	1.0
Atlantic menhaden	306	0.1	9.2	0.1	flat claw hermit crab	nc	nc	56.0	0.9
blueback herring	211	0.1	5.1	0	bushy bryozoan	nc	nc	55.6	0.9
tautog	194	0.1	347.1	2.3	boring sponge	nc	nc	24.9	0.4
spotted hake	142	0.1	12.2	0.1	knobbed whelk	51	0.1	22.5	0.3
fourbeard rockling	133	0.1	11.6	0.1	starfish spp.	nc	nc	18.2	0.3
smallmouth flounder	97	0	6.4	0	bluecrab	49	0.1	12.8	0.2
cunner	65	0	8.1	0.1	channeled whelk	40	0.1	10.1	0.2
winter skate	62	0	180.7	1.2	whelks	52	0.1	9.8	0.2
hickory shad	40	0	15.9	0.1	northern moon snail	nc	nc	8.6	0.1
round herring	31	0	0.6	0	mantis shrimp	nc	nc	5.6	0.1
sea raven	30	0	11.3	0.1	common oyster	nc	nc	5.4	0.1
northern puffer	28	0	0.5	0	hard clams	nc	nc	3.7	0.1
clearnose skate	20	0	36.8	0.2	arks	nc	nc	2.0	0
black sea bass	18	0	10.6	0.1	red bearded sponge	nc	nc	1.4	0
spiny dogfish	18	0	44.5	0.3	surf clam	nc	nc	1.1	0
Atlantic sturgeon	17	0	189.7	1.3	sea grape	nc	nc	0.8	0
northern kingfish	15	0	1.3	0	mud crabs	nc	nc	0.7	0
Atlantic mackerel	13	0	1.1	0	boreal squid	18	0	0.7	0
ocean pout	13	0	2.7	0	purple sea urchin	nc	nc	0.6	0
hogchoker	12	0	1.9	0	common slipper shell	nc	nc	0.5	0
haddock	7	0	0.5	0	star coral	nc	nc	0.4	0
yellow jack	6	0	0.7	0	moon jelly	nc	nc	0.2	0
grubby	5	0	0.3	0	ghost shrimp	nc	nc	0.1	0
round scad	4	0	0.3	0	<b>Total</b>	<b>44,167</b>		<b>6,434</b>	
American sand lance	4	0	0.3	0					

**Appendix 5.4. cont. Total number and weight (kg) of finfish and invertebrates caught in LISTS in 1999.**

*Finfish species are in order of descending count. Invertebrate species are in order of descending weight (nc = not counted). Number of tows (sample size)=200.*

<b>species</b>	<b>count</b>	<b>%</b>	<b>weight</b>	<b>%</b>	<b>species</b>	<b>count</b>	<b>%</b>	<b>weight</b>	<b>%</b>
butterfish	191,100	54.1	4,171.6	21.9	goosefish	2	0	0.3	0
scup	101,095	28.6	3,641.3	19.1	grubby	2	0	0.2	0
weakfish	12,416	3.5	771.3	4.0	northern pipefish	2	0	0.1	0
winter flounder	10,288	2.9	2,011.7	10.6	longhorn sculpin	2	0	0.3	0
bluefish	7,843	2.2	1,218.0	6.4	oyster toadfish	2	0	1.8	0
silver hake	5,126	1.5	99.6	0.5	Atlantic silverside	1	0	0.1	0
windowpane flounder	4,643	1.3	594.2	3.1	gizzard shad	1	0	0.1	0
little skate	3,686	1.0	1,829.6	9.6	haddock	1	0	0.1	0
red hake	2,973	0.8	226.5	1.2	round scad	1	0	0.1	0
Atlantic herring	2,511	0.7	45.4	0.2	striped cusk-eel	1	0	0.1	0
striped searobin	1,690	0.5	497.0	2.6	sharksucker	1	0	0.3	0
alewife	1,393	0.4	107.6	0.6	Spanish mackerel	1	0	0.2	0
fourspot flounder	1,393	0.4	203.9	1.1	Atlantic tomcod	1	0	0.7	0
Atlantic menhaden	1,187	0.3	90.9	0.5	white perch	1	0	0.4	0
American shad	987	0.3	117.3	0.6	<b>Total</b>	<b>353,203</b>		<b>19,054.7</b>	
moonfish	645	0.2	9.6	0.1					
summer flounder	582	0.2	459.8	2.4					
bay anchovy	548	0.2	5.6	0	<b>Invertebrates</b>				
northern searobin	547	0.2	52.0	0.3	American lobster	13,922	38.1	3,397.9	61.6
striped bass	397	0.1	815.4	4.3	long-finned squid	21,580	59.0	826.4	15.0
spotted hake	381	0.1	38.8	0.2	horseshoe crab	384	1.1	634.1	11.5
smooth dogfish	305	0.1	923.0	4.8	lady crab	nc	nc	159.7	2.9
fourbeard rockling	233	0.1	28.8	0.2	rock crab	nc	nc	118.6	2.2
tautog	217	0.1	326.6	1.7	spider crab	nc	nc	95.4	1.7
striped anchovy	216	0.1	6.1	0	bushy bryozoan	nc	nc	78.0	1.4
American sand lance	178	0.1	0.3	0	flat claw hermit crab	nc	nc	32.5	0.6
smallmouth flounder	96	0	5.2	0	knobbed whelk	61	0.2	24.8	0.4
hickory shad	56	0	19.4	0.1	bluecrab	89	0.2	21.3	0.4
cunner	51	0	5.9	0	channeled whelk	81	0.2	21.1	0.4
black sea bass	50	0	17.2	0.1	mantis shrimp	376	1.0	19.3	0.4
spot	45	0	5.7	0	boring sponge	nc	nc	19.3	0.4
winter skate	41	0	89.8	0.5	lion's mane jellyfish	61	0.2	16.7	0.3
hogchoker	39	0	5.0	0	blue mussel	nc	nc	14.1	0.3
Atlantic sturgeon	39	0	498.6	2.6	northern moon snail	nc	nc	9.1	0.2
clearnose skate	22	0	39.4	0.2	starfish spp.	nc	nc	8.8	0.2
bigeye scad	21	0	1.4	0	common oyster	nc	nc	4.7	0.1
Atlantic mackerel	21	0	3.1	0	arks	nc	nc	2.8	0.1
yellow jack	20	0	1.9	0	common slipper shell	nc	nc	1.8	0
blueback herring	19	0	1.1	0	mud crabs	nc	nc	1.7	0
ocean pout	17	0	3.9	0	hard clams	nc	nc	1.5	0
northern puffer	14	0	1.1	0	sand shrimp	nc	nc	1.0	0
spiny dogfish	10	0	51.1	0.3	purple sea urchin	nc	nc	1.0	0
sea raven	9	0	4.9	0	northern red shrimp	nc	nc	0.9	0
crevalle jack	8	0	0.7	0	surf clam	nc	nc	0.4	0
inshore lizardfish	7	0	0.5	0	sea grape	nc	nc	0.2	0
northern kingfish	6	0	0.6	0	star coral	nc	nc	0.1	0
northern sennet	6	0	0.5	0	common razor clam	nc	nc	0.1	0
planehead filefish	3	0	0.3	0	moon jelly	nc	nc	0.1	0
bigeye	2	0	0.2	0	nemerteans	nc	nc	0.1	0
conger eel	2	0	0.5	0	<b>Total</b>	<b>36,554</b>		<b>5,514</b>	

**Appendix 5.4. cont. Total number and weight (kg) of finfish and invertebrates caught in LISTS in 2000.**

*Finfish species are in order of descending count. Invertebrate species are in order of descending weight (nc = not counted). Number of tows (sample size)=200.*

species	count	%	weight	%	species	count	%	weight	%
scup	101,464	44.4	6,679.0	34.9	northern kingfish	2	0	0.3	0
butterfish	60,490	26.5	1,458.3	7.6	round scad	2	0	0.2	0
weakfish	23,595	10.3	554.5	2.9	bigeeye	1	0	0.1	0
winter flounder	8,867	3.9	1,921.4	10.0	Atlantic cod	1	0	0.1	0
bluefish	6,135	2.7	1,408.0	7.3	goosefish	1	0	0.2	0
little skate	3,340	1.5	1,604.7	8.4	inshore lizardfish	1	0	0.1	0
striped searobin	3,129	1.4	1,036.1	5.4	lined seahorse	1	0	0.1	0
fourspot flounder	2,590	1.1	398.6	2.1	white perch	1	0	0.2	0
windowpane flounder	2,488	1.1	368.8	1.9	yellowtail flounder	1	0	0.1	0
red hake	2,393	1.0	162.6	0.8	<b>Total</b>	<b>228,425</b>		<b>19,156.5</b>	
bay anchovy	2,303	1.0	12.2	0.1					
northern searobin	2,014	0.9	251.2	1.3	<b>Invertebrates</b>				
moonfish	1,817	0.8	15.0	0.1	American lobster	10,481	36.0	2,184.5	49.9
alewife	1,572	0.7	96.0	0.5	horseshoe crab	420	1.4	689.4	15.8
spotted hake	1,425	0.6	92.3	0.5	long-finned squid	16,585	57.0	582.3	13.3
Atlantic herring	770	0.3	124.1	0.6	lady crab	nc	nc	308.4	7.1
silver hake	679	0.3	28.8	0.2	spider crab	nc	nc	99.4	2.3
summer flounder	555	0.2	471.3	2.5	bushy bryozoan	nc	nc	95.2	2.2
Atlantic menhaden	492	0.2	31.8	0.2	rock crab	nc	nc	60.4	1.4
smooth dogfish	467	0.2	1,038.5	5.4	boring sponge	nc	nc	58.6	1.3
American shad	316	0.1	25.8	0.1	mantis shrimp	1,086	3.7	49.0	1.1
striped bass	293	0.1	602.6	3.1	blue mussel	nc	nc	36.8	0.8
tautog	287	0.1	463.5	2.4	lion's mane jellyfish	223	0.8	36.4	0.8
spot	204	0.1	17.8	0.1	channeled whelk	138	0.5	32.0	0.7
fourbeard rockling	185	0.1	14.7	0.1	knobbed whelk	76	0.3	29.9	0.7
blueback herring	143	0.1	6.8	0	starfish spp.	nc	nc	29.0	0.7
black sea bass	69	0	22.6	0.1	flat claw hermit crab	nc	nc	26.0	0.6
smallmouth flounder	61	0	2.7	0	bluecrab	104	0.4	19.3	0.4
cunner	50	0	5.3	0	northern moon snail	nc	nc	9.7	0.2
hickory shad	42	0	17.1	0.1	hydroid spp.	nc	nc	4.8	0.1
hogchoker	40	0	5.9	0	fan worm tubes	nc	nc	3.4	0.1
winter skate	31	0	66.5	0.3	hard clams	nc	nc	3.3	0.1
sea raven	19	0	9.2	0	arks	nc	nc	3.1	0.1
clearnose skate	18	0	37.9	0.2	mud crabs	nc	nc	2.8	0.1
ocean pout	18	0	4.9	0	sand shrimp	nc	nc	2.7	0.1
longhorn sculpin	14	0	5.0	0	common slipper shell	nc	nc	2.4	0.1
Atlantic sturgeon	7	0	79.0	0.4	purple sea urchin	nc	nc	2.3	0.1
oyster toadfish	6	0	2.5	0	common oyster	nc	nc	1.4	0
northern pipefish	4	0	0.2	0	sea grape	nc	nc	1.1	0
northern puffer	4	0	0.4	0	blood star	nc	nc	0.2	0
American sand lance	4	0	0.3	0	northern comb jelly	nc	nc	0.1	0
spiny dogfish	4	0	9.9	0.1	common razor clam	nc	nc	0.1	0
rock gunnel	3	0	0.2	0	northern cyclocardia	nc	nc	0.1	0
yellow jack	3	0	0.2	0	northern red shrimp	nc	nc	0.1	0
Atlantic silverside	2	0	0.1	0	surf clam	nc	nc	0.1	0
Atlantic mackerel	2	0	0.8	0	<b>Total</b>	<b>29,113</b>		<b>4,374</b>	

**Appendix 5.4. cont. Total number and weight (kg) of finfish and invertebrates caught in LISTS in 2001.**

*Finfish species are in order of descending count. Invertebrate species are in order of descending weight (nc = not counted). Young-of-year bay anchovy, striped anchovy, and American sand lance and Atlantic herring are not quantified. Number of tows (sample size)=200.*

species	count	%	weight	%	species	count	%	weight	%
scup	58,325	37.7	5,828.4	30.7	American eel	1	0	0.6	0
butterfish	45,264	29.3	1,834.0	9.7	planehead filefish	1	0	0.1	0
weakfish	12,739	8.2	415.0	2.2	goosefish	1	0	0.4	0
winter flounder	9,826	6.4	1,993.6	10.5	naked goby	1	0	0.1	0
little skate	4,311	2.8	2,022.6	10.6	northern sennet	1	0	0.1	0
bluefish	3,986	2.6	751.2	4.0	rock gunnel	1	0	0.1	0
silver hake	3,945	2.6	152.2	0.8	red goatfish	1	0	0.1	0
windowpane flounder	3,065	2.0	475.5	2.5	rougtail stingray	1	0	2.5	0
fourspot flounder	2,167	1.4	362.7	1.9	short bigeye	1	0	0.1	0
striped searobin	2,061	1.3	861.0	4.5	yellowtail flounder	1	0	0.2	0
northern searobin	1,594	1.0	222.7	1.2	<b>Total</b>	<b>154,514</b>		<b>18,997.8</b>	
red hake	1,382	0.9	109.7	0.6					
summer flounder	875	0.6	628.1	3.3	<b><u>Finfish not ranked</u></b>				
alewife	638	0.4	41.7	0.2	American sand lance, yoy				
spotted hake	606	0.4	34.9	0.2	anchovy spp, yoy				
smooth dogfish	598	0.4	1,407.6	7.4	Atlantic herring, yoy				
Atlantic herring	497	0.3	72.6	0.4					
bay anchovy	443	0.3	3.6	0	<b><u>Invertebrates</u></b>				
tautog	319	0.2	491.2	2.6	American lobster	5,626	35.1	1,531.2	39.2
blueback herring	279	0.2	11.1	0.1	horseshoe crab	503	3.1	870.7	22.3
fourbeard rockling	251	0.2	21.5	0.1	long-finned squid	9,080	56.6	346.2	8.9
moonfish	225	0.1	3.8	0	spider crab	nc	nc	302.5	7.7
striped bass	214	0.1	472.5	2.5	bushy bryozoan	nc	nc	162.9	4.2
black sea bass	134	0.1	74.8	0.4	starfish spp.	nc	nc	154.7	4.0
American shad	109	0.1	9.6	0.1	rock crab	nc	nc	86.3	2.2
smallmouth flounder	98	0.1	3.8	0	blue mussel	nc	nc	84.7	2.2
Atlantic menhaden	86	0.1	4.7	0	lady crab	nc	nc	79.0	2.0
hogchoker	85	0.1	10.5	0.1	flat claw hermit crab	nc	nc	57.6	1.5
clearnose skate	65	0	132.4	0.7	knobbed whelk	118	0.7	53.3	1.4
cunner	51	0	5.9	0	channeled whelk	190	1.2	48.0	1.2
spiny dogfish	48	0	128.6	0.7	boring sponge	nc	nc	30.0	0.8
striped anchovy	47	0	1.2	0	lion's mane jellyfish	182	1.1	25.9	0.7
winter skate	38	0	112.2	0.6	northern moon snail	nc	nc	17.5	0.4
inshore lizardfish	21	0	2.2	0	mantis shrimp	304	1.9	16.5	0.4
Atlantic sturgeon	18	0	270.6	1.4	bluecrab	38	0.2	6.2	0.2
hickory shad	14	0	6.7	0	sea grape	nc	nc	6.1	0.2
spot	13	0	1.3	0	common slipper shell	nc	nc	5.3	0.1
rough scad	10	0	0.7	0	hydroid spp.	nc	nc	5.0	0.1
northern puffer	8	0	0.7	0	arks	nc	nc	4.0	0.1
sea raven	7	0	4.1	0	mud crabs	nc	nc	3.6	0.1
ocean pout	6	0	2.3	0	hard clams	nc	nc	3.0	0.1
round herring	5	0	0.1	0	sand shrimp	nc	nc	2.8	0.1
longhorn sculpin	5	0	1.5	0	common oyster	1	0	1.2	0
fawn cusk-eel	4	0	0.2	0	fan worm tubes	nc	nc	1.0	0
northern pipefish	4	0	0.3	0	purple sea urchin	nc	nc	0.8	0
American sand lance	4	0	0.3	0	moon jelly	nc	nc	0.4	0
seasnail	4	0	0.3	0	ghost shrimp	nc	nc	0.3	0
yellow jack	3	0	0.3	0	bobtail squid	1	0	0.1	0
conger eel	2	0	0.3	0	common razor clam	nc	nc	0.1	0
northern kingfish	2	0	0.2	0	northern red shrimp	nc	nc	0.1	0
oyster toadfish	2	0	0.4	0	surf clam	nc	nc	0.1	0
Atlantic silverside	1	0	0.1	0	<b>Total</b>	<b>16,043</b>		<b>3,907</b>	

**Appendix 5.4. cont. Total number and weight (kg) of finfish and invertebrates caught in LISTS in 2002.**

*Finfish species are in order of descending count. Invertebrate species are in order of descending weight (nc = not counted). Young-of-year bay and striped anchovy are neither separated by species or quantified; young-of-year Atlantic herring are not quantified. Number of tows (sample size)=200.*

species	count	%	weight	%	species	count	%	weight	%
scup	100,481	47.0	13,814.1	46.0	inshore lizardfish	1	0	0.1	0
butterfish	66,550	31.1	1,924.2	6.4	northern kingfish	1	0	0.2	0
weakfish	10,713	5.0	442.0	1.5	rock gunnel	1	0	0.1	0
winter flounder	6,884	3.2	1,584.1	5.3	rainbow smelt	1	0	0.1	0
little skate	4,242	2.0	2,121.9	7.1	rougtail stingray	1	0	24.4	0.1
bluefish	3,450	1.6	1,099.7	3.7	<b>Total</b>	<b>213,796</b>		<b>30,062.0</b>	
striped searobin	2,394	1.1	1,065.0	3.5					
northern searobin	2,123	1.0	267.3	0.9	<b>Finfish not ranked</b>				
red hake	2,103	1.0	206.6	0.7	anchovy spp, yoy				
silver hake	2,013	0.9	89.6	0.3	Atlantic herring, yoy				
windowpane flounder	1,991	0.9	343.3	1.1					
fourspot flounder	1,859	0.9	326.9	1.1	<b>Invertebrates</b>				
summer flounder	1,356	0.6	989.3	3.3	blue mussel	nc	nc	2,497.8	43.9
smooth dogfish	1,019	0.5	2,814.3	9.4	American lobster	3,880	29.7	1,005.7	17.7
bay anchovy	992	0.5	6.6	0	horseshoe crab	517	4.0	862.9	15.2
alewife	855	0.4	70.2	0.2	spider crab	nc	nc	348.4	6.1
spotted hake	798	0.4	48.2	0.2	long-finned squid	8,034	61.5	279.9	4.9
American shad	593	0.3	40.3	0.1	lady crab	nc	nc	117.0	2.1
tautog	565	0.3	921.1	3.1	starfish spp.	nc	nc	91.8	1.6
striped bass	469	0.2	855.2	2.8	bushy bryozoan	nc	nc	85.0	1.5
moonfish	424	0.2	7.4	0	boring sponge	nc	nc	83.9	1.5
black sea bass	394	0.2	188.3	0.6	rock crab	nc	nc	74.6	1.3
Atlantic menhaden	366	0.2	96.3	0.3	flat claw hermit crab	36	0.3	55.8	1.0
Atlantic herring	365	0.2	63.9	0.2	channeled whelk	174	1.3	43.6	0.8
smallmouth flounder	139	0.1	4.9	0	northern moon snail	nc	nc	40.3	0.7
fourbeard rockling	106	0	9.7	0	knobbed whelk	40	0.3	19.1	0.3
hogchoker	100	0	13.3	0	bluecrab	84	0.6	16.1	0.3
blueback herring	68	0	2.4	0	lion's mane jellyfish	71	0.5	12.3	0.2
clearnose skate	59	0	107.3	0.4	mantis shrimp	226	1.7	11.2	0.2
cunner	55	0	7.2	0	arks	nc	nc	7.8	0.1
spot	52	0	7.2	0	common slipper shell	nc	nc	7.3	0.1
hickory shad	45	0	19.6	0.1	hydroid spp.	nc	nc	7.3	0.1
winter skate	45	0	133.5	0.4	sea grape	nc	nc	5.3	0.1
Atlantic sturgeon	18	0	275.3	0.9	hard clams	3	0	5.2	0.1
spiny dogfish	17	0	48.0	0.2	mud crabs	nc	nc	4.7	0.1
ocean pout	13	0	4.3	0	purple sea urchin	nc	nc	2.3	0
yellow jack	13	0	1.4	0	sand shrimp	nc	nc	1.6	0
sea raven	11	0	4.1	0	rubbery bryozoan	nc	nc	1.0	0
rough scad	10	0	0.7	0	surf clam	nc	nc	1.0	0
oyster toadfish	8	0	4.7	0	deadman's fingers sponge	nc	nc	0.5	0
northern puffer	6	0	0.3	0	blood star	nc	nc	0.4	0
Atlantic mackerel	5	0	2.5	0	common oyster	nc	nc	0.4	0
short bigeye	5	0	0.2	0	mixed sponge species	nc	nc	0.4	0
goosefish	3	0	0.6	0	northern red shrimp	nc	nc	0.3	0
American sand lance	3	0	0.1	0	anemones	nc	nc	0.1	0
longhorn sculpin	3	0	0.9	0	bobtail squid	1	0	0.1	0
northern sennet	2	0	0.2	0	ghost shrimp	nc	nc	0.1	0
northern pipefish	2	0	0.2	0	ribbed mussel	nc	nc	0.1	0
Atlantic bonito	1	0	2.4	0	sea cucumber	1	0	0.1	0
crevalle jack	1	0	0.1	0	<b>Total</b>	<b>13,067</b>		<b>5,691</b>	
gizzard shad	1	0	0.1	0					
grubby	1	0	0.1	0					

**Appendix 5.4. cont. Total number and weight (kg) of finfish and invertebrates caught in LISTS in 2003.**

*Finfish species are in order of descending count. Invertebrate species are in order of descending weight (nc = not counted). Young-of-year bay and striped anchovy are neither separated by species or quantified; young-of-year Atlantic herring are not quantified. Number of tows (sample size)=160.*

species	count	%	weight	%	Species	count	%	weight	%
butterfish	25,483	34.4	524.6	3.7	barndoor skate	1	0	0.4	0
scup	17,552	23.7	4,389.3	30.6	Planehead filefish	1	0	0.1	0
weakfish	5,596	7.6	131.9	0.9	rainbow smelt	1	0	0.1	0
winter flounder	4,245	5.7	1,276.5	8.9	sea lamprey	1	0	1.3	0
bluefish	3,717	5.0	655.0	4.6	Spanish mackerel	1	0	2.1	0
little skate	2,867	3.9	1,554.1	10.8	<b>Total</b>	<b>74,107</b>		<b>14,323.6</b>	
bay anchovy	2,254	3.0	12.5	0.1					
windowpane flounder	1,858	2.5	333.9	2.3	<b>Finfish not ranked</b>				
fourspot flounder	1,658	2.2	327.7	2.3	anchovy spp, yoy				
striped searobin	1,529	2.1	687.0	4.8	Atlantic herring, yoy				
northern searobin	1,468	2.0	240.7	1.7					
summer flounder	1,151	1.6	825.0	5.8	<b>Invertebrates</b>				
red hake	681	0.9	31.1	0.2	Horseshoe crab	399	1.7	670.5	23.2
alewife	608	0.8	49.4	0.3	spider crab	nc	nc	640.6	22.2
smooth dogfish	552	0.7	1,508.8	10.5	American lobster	1,958	8.3	479.7	16.6
spotted hake	527	0.7	41.6	0.3	long-finned squid	19,231	81.9	421.3	14.6
Atlantic herring	448	0.6	87.8	0.6	boring sponge	nc	nc	107.5	3.7
American shad	305	0.4	23.5	0.2	rock crab	nc	nc	80.9	2.8
silver hake	217	0.3	8.3	0.1	starfish spp.	nc	nc	73.7	2.6
striped bass	215	0.3	542.1	3.8	flat claw hermit crab	nc	nc	61.3	2.1
tautog	210	0.3	325.4	2.3	channeled whelk	334	1.4	58.8	2.0
Atlantic menhaden	121	0.2	16.1	0.1	bushy bryozoan	nc	nc	54.3	1.9
fourbeard rockling	111	0.1	9.0	0.1	lion's mane jellyfish	1,307	5.6	40.6	1.4
blueback herring	98	0.1	3.4	0	knobbed whelk	96	0.4	35.1	1.2
moonfish	97	0.1	1.3	0	sea grape	nc	nc	31.1	1.1
hogchoker	89	0.1	8.3	0.1	northern moon snail	nc	nc	20.9	0.7
black sea bass	57	0.1	45.7	0.3	blue mussel	nc	nc	19.7	0.7
Atlantic cod	57	0.1	2.7	0	common slipper shell	nc	nc	16.8	0.6
clearnose skate	55	0.1	105.9	0.7	lady crab	nc	nc	12.0	0.4
smallmouth flounder	38	0.1	2.4	0	hydroid spp.	nc	nc	9.6	0.3
winter skate	38	0.1	90.6	0.6	ribbed mussel	nc	nc	8.8	0.3
cunner	36	0	5.9	0	sand shrimp	nc	nc	6.8	0.2
haddock	26	0	1.3	0	arks	nc	nc	6.5	0.2
Atlantic sturgeon	23	0	391.9	2.7	mud crabs	nc	nc	6.5	0.2
hickory shad	22	0	10.3	0.1	rubbery bryozoan	nc	nc	6.0	0.2
American sand lance	19	0	0.2	0	mantis shrimp	110	0.5	4.9	0.2
ocean pout	14	0	2.9	0	bluecrab	24	0.1	4.3	0.1
rough scad	12	0	0.5	0	hard clams	nc	nc	3.9	0.1
oyster toadfish	9	0	5.0	0	star coral	nc	nc	1.9	0.1
spiny dogfish	7	0	34.8	0.2	coastal mud shrimp	4	0	0.7	0
rock gunnel	6	0	0.4	0	purple sea urchin	nc	nc	0.6	0
round scad	4	0	0.3	0	blood star	nc	nc	0.4	0
glasseye snapper	3	0	0.1	0	northern red shrimp	2	0	0.4	0
conger eel	3	0	1.1	0	Japanese shore crab	4	0	0.3	0
Atlantic mackerel	3	0	0.3	0	anemones	nc	nc	0.1	0
crevalle jack	2	0	0.2	0	sand dollar	1	0	0.1	0
northern pipefish	2	0	0.2	0	common razor clam	1	0	0.1	0
northern puffer	2	0	0.2	0	moon jelly	nc	nc	0.1	0
longhorn sculpin	2	0	0.9	0	northern cyclocardia	nc	nc	0.1	0
sea raven	2	0	1.3	0	mixed sponge species	nc	nc	0.1	0
striped anchovy	2	0	0.1	0	<b>Total</b>	<b>23,471</b>		<b>2,887</b>	
Atlantic silverside	1	0	0.1	0					

**Appendix 5.4. cont. Total number and weight (kg) of finfish and invertebrates caught in LISTS in 2004.**

*Finfish species are in order of descending count. Invertebrate species are in order of descending weight (nc = not counted). Young-of-year bay and striped anchovy are neither separated by species or quantified; young-of-year Atlantic herring are not quantified. Number of tows (sample size)=199.*

species	count	%	weight	%	species	count	%	weight	%
butterfish	94,735	46.7	1,842.7	9.7	American plaice	1	0	0.1	0
scup	61,521	30.3	6,801.1	35.7	conger eel	1	0	0.1	0
weakfish	17,505	8.6	426.9	2.2	gizzard shad	1	0	0.1	0
bluefish	6,504	3.2	2,140.6	11.2	goosefish	1	0	0.1	0
winter flounder	4,021	2.0	839.9	4.4	pollock	1	0	0.1	0
little skate	3,044	1.5	1,689.8	8.9	rougtail stingray	1	0	4.1	0
windowpane flounder	2,275	1.1	333.7	1.8	oyster toadfish	1	0	0.8	0
bay anchovy	1,523	0.8	10.3	0.1	yellow jack	1	0	0.1	0
silver hake	1,417	0.7	27.3	0.1	<b>Total</b>	<b>202,887</b>		<b>19,056.6</b>	
fourspot flounder	1,406	0.7	309.3	1.6					
striped searobin	1,308	0.6	465.4	2.4	<b><u>Finfish not ranked</u></b>				
alewife	859	0.4	56.1	0.3	anchovy spp, yoy				
Atlantic herring	851	0.4	58.3	0.3	Atlantic herring, yoy				
red hake	829	0.4	51.6	0.3					
northern searobin	784	0.4	112.0	0.6	<b><u>Invertebrates</u></b>				
Atlantic menhaden	746	0.4	110.7	0.6	long-finned squid	23,022	86.5	953.4	28.8
summer flounder	644	0.3	627.2	3.3	horseshoe crab	534	2.0	873.4	26.4
smooth dogfish	503	0.2	1,435.3	7.5	American lobster	1,843	6.9	481.5	14.5
striped bass	378	0.2	811.8	4.3	spider crab	nc	nc	355.5	10.7
American shad	356	0.2	24.2	0.1	blue mussel	nc	nc	250.2	7.6
tautog	232	0.1	353.7	1.9	bushy bryozoan	nc	nc	50.9	1.5
spotted hake	230	0.1	37.8	0.2	flat claw hermit crab	nc	nc	42.4	1.3
blueback herring	218	0.1	6.5	0	channeled whelk	199	0.7	42.3	1.3
moonfish	182	0.1	3.4	0	starfish spp.	nc	nc	41.7	1.3
fourbeard rockling	173	0.1	13.0	0.1	boring sponge	nc	nc	41.7	1.3
black sea bass	124	0.1	40.5	0.2	rock crab	1	0.0	35.2	1.1
hogchoker	83	0	9.5	0	lion's mane jellyfish	803	3.0	34.0	1.0
American sand lance	70	0	0.2	0	common slipper shell	nc	nc	22.9	0.7
winter skate	53	0	100.3	0.5	sea grape	nc	nc	16.4	0.5
smallmouth flounder	50	0	2.8	0	lady crab	nc	nc	14.5	0.4
hickory shad	39	0	14.2	0.1	northern moon snail	nc	nc	11.5	0.3
spiny dogfish	38	0	104.7	0.5	knobbed whelk	21	0.1	7.7	0.2
Atlantic cod	33	0	4.7	0	mantis shrimp	159	0.6	7.0	0.2
clearnose skate	22	0	48.2	0.3	arks	nc	nc	7.0	0.2
cunner	21	0	3.7	0	mud crabs	nc	nc	5.4	0.2
ocean pout	18	0	5.4	0	sand shrimp	nc	nc	4.7	0.1
rough scad	14	0	0.7	0	bluecrab	13	0	2.8	0.1
round scad	11	0	0.3	0	hard clams	nc	nc	2.3	0.1
spot	8	0	0.9	0	surf clam	5	0	1.0	0
Atlantic sturgeon	8	0	117.6	0.6	purple sea urchin	nc	nc	0.8	0
haddock	7	0	0.6	0	mixed sponge species	nc	nc	0.6	0
sea raven	7	0	2.4	0	hydroid spp.	nc	nc	0.6	0
northern kingfish	5	0	0.5	0	deadman's fingers sponge	nc	nc	0.5	0
northern puffer	5	0	0.4	0	rubbery bryozoan	nc	nc	0.4	0
longhorn sculpin	5	0	3.4	0	star coral	nc	nc	0.3	0
seasnail	4	0	0.2	0	northern red shrimp	nc	nc	0.3	0
crevalle jack	2	0	0.2	0	northern cyclocardia	nc	nc	0.2	0
northern pipefish	2	0	0.2	0	blood star	nc	nc	0.1	0
rock gunnel	2	0	0.2	0	coastal mud shrimp	1	0	0.1	0
Atlantic tomcod	2	0	0.2	0	sea cucumber	2	0	0.1	0
white perch	2	0	0.5	0	<b>Total</b>	<b>26,603</b>		<b>3,309.4</b>	

**Appendix 5.4. cont. Total number and weight (kg) of finfish and invertebrates caught in LISTS in 2005.**

*Finfish species are in order of descending count. Invertebrate species are in order of descending weight (nc = not counted). Young-of-year bay and striped anchovy are neither separated by species or quantified; young-of-year Atlantic herring are not quantified. Number of tows (sample size)=200.*

species	count	%	weight	%	species	count	%	weight	%
butterfish	92,996	52.2	2,097.3	16.8	haddock	2	0	0.2	0
scup	52,642	29.6	3,080.7	24.7	seasnail	2	0	0.2	0
weakfish	9,191	5.2	449.9	3.6	glasseye snapper	1	0	0.1	0
bluefish	6,532	3.7	1,333.8	10.7	inshore lizardfish	1	0	0.1	0
winter flounder	4,692	2.6	566.1	4.5	lookdown	1	0	0.1	0
windowpane flounder	1,982	1.1	177.5	1.4	pollock	1	0	0.1	0
little skate	1,317	0.7	682.5	5.5	<b>Total</b>	<b>178,073</b>		<b>12,474.3</b>	
Atlantic herring	1,168	0.7	131.1	1.1					
bay anchovy	814	0.5	5.8	0	<b>Finfish not ranked</b>				
striped searobin	757	0.4	183.7	1.5	anchovy spp, yoy				
alewife	742	0.4	47.6	0.4	Atlantic herring, yoy				
fourspot flounder	688	0.4	125.9	1					
red hake	585	0.3	56.0	0.4	<b>Invertebrates</b>				
summer flounder	506	0.3	406.1	3.3	blue mussel	nc	nc	971.0	32.6
striped bass	469	0.3	675.1	5.4	long-finned squid	17,542	83.2	683.5	22.9
smooth dogfish	467	0.3	1,421.7	11.4	American lobster	1,389	6.6	364.3	12.2
moonfish	356	0.2	6.0	0	horseshoe crab	161	0.8	304.2	10.2
northern searobin	265	0.1	21.3	0.2	starfish spp.	nc	nc	198.4	6.7
Atlantic menhaden	235	0.1	77.9	0.6	lion's mane jellyfish	1,806	8.6	97.3	3.3
spotted hake	234	0.1	17.4	0.1	spider crab	nc	nc	92.0	3.1
tautog	179	0.1	269.2	2.2	bushy bryozoan	nc	nc	64.6	2.2
American shad	177	0.1	18.2	0.1	lady crab	nc	nc	48.8	1.6
silver hake	165	0.1	7.1	0.1	boring sponge	nc	nc	26.1	0.9
hickory shad	136	0.1	43.1	0.3	flat claw hermit crab	nc	nc	23.1	0.8
blueback herring	111	0.1	5.4	0	channeled whelk	101	0.5	23.0	0.8
fourbeard rockling	106	0.1	6.8	0.1	common slipper shell	nc	nc	12.2	0.4
clearnose skate	102	0.1	187.1	1.5	rubbery bryozoan	nc	nc	11.0	0.4
rough scad	62	0	1.9	0	knobbed whelk	23	0.1	9.7	0.3
hogchoker	61	0	8.7	0.1	rock crab	nc	nc	9.3	0.3
smallmouth flounder	44	0	2.4	0	ribbed mussel	nc	nc	7.6	0.3
black sea bass	42	0	26.4	0.2	hard clams	nc	nc	7.2	0.2
spiny dogfish	41	0	102.0	0.8	northern moon snail	nc	nc	4.7	0.2
Atlantic mackerel	37	0	5.7	0	sea grape	nc	nc	4.5	0.2
winter skate	31	0	59.9	0.5	mantis shrimp	64	0.3	3.8	0.1
yellow jack	28	0	3.0	0	arks	nc	nc	3.5	0.1
cunner	24	0	4.1	0	hydroid spp.	nc	nc	3.4	0.1
round scad	12	0	0.3	0	mud crabs	nc	nc	2.5	0.1
Atlantic cod	10	0	0.9	0	sand shrimp	nc	nc	2.1	0.1
rock gunnel	9	0	0.6	0	deadman's fingers sponge	nc	nc	1.1	0
Atlantic sturgeon	9	0	152.7	1.2	purple sea urchin	nc	nc	0.7	0
northern sennet	8	0	0.7	0	bluecrab	3	0	0.6	0
American sand lance	6	0	0.2	0	mixed sponge species	nc	nc	0.4	0
northern puffer	5	0	0.3	0	surf clam	nc	nc	0.4	0
northern kingfish	4	0	0.6	0	star coral	nc	nc	0.3	0
northern pipefish	4	0	0.3	0	sand dollar	1	0	0.2	0
ocean pout	3	0	0.7	0	northern red shrimp	nc	nc	0.2	0
sea raven	3	0	0.5	0	boreal squid	1	0	0.1	0
crevalle jack	2	0	0.2	0	Japanese shore crab	5	0	0.1	0
gizzard shad	2	0	0.2	0	northern cyclocardia	nc	nc	0.1	0
goosefish	2	0	0.7	0	common oyster	nc	nc	0.1	0
grubby	2	0	0.2	0	<b>Total</b>	<b>21,096</b>		<b>2,982.1</b>	



**Appendix 5.4. cont. Total number and weight (kg) of finfish and invertebrates caught in LISTS in 2006.**

*Finfish species are in order of descending count. Invertebrate species are in order of descending weight (nc = not counted). Young-of-year bay and striped anchovy are neither separated by species or quantified; young-of-year Atlantic herring and American sand lance are not quantified. Number of tows (sample size)=120.*

<b>species</b>	<b>count</b>	<b>%</b>	<b>weight</b>	<b>%</b>	<b>species</b>	<b>count</b>	<b>%</b>	<b>weight</b>	<b>%</b>
butterfish	50,022	54.3	1,631.4	15.5					
scup	28,829	31.3	4,636.1	44.2					
bluefish	2,100	2.3	358.6	3.4	<b><u>Finfish not ranked</u></b>				
winter flounder	1,699	1.8	271.2	2.6	anchovy spp. yoy				
bay anchovy	1,492	1.6	8.3	0.1	Atlantic herring, yoy				
silver hake	1,267	1.4	37.7	0.4	American sand lance (yoy)				
windowpane flounder	1,077	1.2	128.9	1.2					
northern searobin	630	0.7	74.5	0.7					
red hake	625	0.7	37.4	0.4					
little skate	593	0.6	310.6	3	<b><u>Invertebrates</u></b>				
alewife	573	0.6	49.5	0.5	long-finned squid	7,802	83.4	326	32.5
fourspot flounder	466	0.5	88.1	0.8	horseshoe crab	109	1.2	205.8	20.5
striped searobin	366	0.4	113.5	1.1	American lobster	748	8	197.9	19.7
moonfish	361	0.4	3.5	0	boring sponge	nc	nc	51.3	5.1
smooth dogfish	332	0.4	1,176.6	11.2	spider crab	nc	nc	50.6	5
spotted hake	321	0.3	24.3	0.2	lion's mane jellyfish	558	6	45.4	4.5
weakfish	241	0.3	52.2	0.5	rock crab	nc	nc	40.4	4
summer flounder	203	0.2	180.5	1.7	bushy bryozoan	nc	nc	17.8	1.8
tautog	186	0.2	301.4	2.9	blue mussel	nc	nc	7.6	0.8
striped bass	144	0.2	418.7	4	channeled whelk	41	0.4	7.6	0.8
hickory shad	75	0.1	19.1	0.2	lady crab	nc	nc	7.5	0.7
American shad	68	0.1	6.1	0.1	deadman's fingers sponge	nc	nc	6.8	0.7
Atlantic herring	66	0.1	10.3	0.1	hydroid spp.	nc	nc	5.9	0.6
blueback herring	63	0.1	2.5	0	flat claw hermit crab	nc	nc	5.7	0.6
clearnose skate	36	0	52.4	0.5	starfish spp.	nc	nc	4.8	0.5
Atlantic menhaden	28	0	5.5	0.1	rubbery bryozoan	nc	nc	4	0.4
winter skate	23	0	60	0.6	common slipper shell	nc	nc	3.9	0.4
hogchoker	22	0	3.2	0	mantis shrimp	70	0.7	3.4	0.3
Atlantic sturgeon	21	0	368.7	3.5	mud crabs	nc	nc	2.1	0.2
black sea bass	19	0	9.3	0.1	blue crab	11	0.1	1.8	0.2
fourbeard rockling	14	0	1.5	0	knobbed whelk	5	0.1	1.2	0.1
rough scad	14	0	0.5	0	sand shrimp	nc	nc	0.6	0.1
spot	14	0	1.2	0	mixed sponge species	nc	nc	0.6	0.1
spiny dogfish	11	0	47	0.4	moon jelly	2	0	0.5	0
cunner	8	0	1.3	0	sea grape	nc	nc	0.5	0
smallmouth flounder	7	0	0.6	0	arks	nc	nc	0.4	0
ocean pout	5	0	0.9	0	purple sea urchin	2	0	0.4	0
glasseye snapper	4	0	0.1	0	star coral	nc	nc	0.3	0
inshore lizardfish	4	0	0.4	0	hard clams	1	0	0.3	0
northern pipefish	3	0	0.2	0	northern red shrimp	1	0	0.3	0
rock gunnel	2	0	0.1	0	red bearded sponge	nc	nc	0.2	0
yellow jack	2	0	0.1	0	fan worm tubes	nc	nc	0.2	0
Atlantic bonito	1	0	3.2	0	northern moon snail	nc	nc	0.2	0
planehead filefish	1	0	0.1	0	surf clam	1	0	0.2	0
goosefish	1	0	1.2	0	brown shrimp	1	0	0.1	0
pollock	1	0	0.1	0	ghost shrimp	nc	nc	0.1	0
oyster toadfish	1	0	1.2	0	Japanese shore crab	nc	nc	0.1	0
yellowtail flounder	1	0	0.4	0	northern cyclocardia	nc	nc	0.1	0
<b>Total</b>	<b>92,042</b>		<b>10,500.2</b>		<b>Total</b>	<b>9,352</b>		<b>1,002.6</b>	

**Appendix 5.4. cont. Total number and weight (kg) of finfish and invertebrates caught in 2007.**

*Finfish species are in order of descending count. Invertebrate species are in order of descending weight (nc = not counted). Young-of-year bay and striped anchovy are neither separated by species or quantified; young-of-year Atlantic herring and American sand lance are not quantified. Number of tows (sample size)=200.*

species	count	%	weight	%	species	count	%	weight	%
scup	75,681	42.6	5,333.5	30.4	grubby	1	0	0.1	0
butterfish	49,137	27.6	1,446.2	8.2	pollock	1	0	0.1	0
weakfish	17,386	9.8	584.8	3.3	rock gunnel	1	0	0.1	0
bluefish	9,378	5.3	1,801.3	10.3	striped burrfish	1	0	0.5	0
winter flounder	4,550	2.6	951.3	5.4	sea lamprey	1	0	0.1	0
windowpane flounder	4,051	2.3	510.8	2.9	yellowtail flounder	1	0	1.0	0
red hake	2,788	1.6	200.4	1.1					
bay anchovy	2,440	1.4	14.5	0.1	<b>Finfish not ranked</b>				
Atlantic herring	1,932	1.1	234.2	1.3	anchovy spp. yoy				
alewife	1,537	0.9	101.3	0.6	Atlantic herring, yoy				
little skate	1,277	0.7	697.0	4.0	American sand lance (yoy)				
fourspot flounder	1,094	0.6	224.9	1.3					
moonfish	979	0.6	12.0	0.1	<b>Invertebrates</b>				
striped searobin	755	0.4	217.0	1.2	long-finned squid	24,212	88.2	773.6	30.8
summer flounder	733	0.4	590.9	3.4	horseshoe crab	333	1.2	596.4	23.7
northern searobin	691	0.4	74.2	0.4	American lobster	1,648	6.0	396.5	15.8
smooth dogfish	580	0.3	2,110.2	12.0	spider crab	nc	nc	165.5	6.6
Atlantic menhaden	426	0.2	63.9	0.4	lion's mane jellyfish	660	2.4	129.8	5.2
striped bass	422	0.2	888.0	5.1	bushy bryozoan	nc	nc	107.4	4.3
spotted hake	340	0.2	23.9	0.1	mixed sponge species	nc	nc	84.5	3.4
silver hake	290	0.2	14.6	0.1	rock crab	nc	nc	41.4	1.6
tautog	280	0.2	551.4	3.1	channeled whelk	196	0.7	33.4	1.3
American shad	236	0.1	15.8	0.1	flat claw hermit crab	nc	nc	27.5	1.1
blueback herring	156	0.1	9.1	0.1	blue mussel	nc	nc	20.4	0.8
black sea bass	116	0.1	46.8	0.3	starfish spp.	nc	nc	20.3	0.8
clearnose skate	97	0.1	193.3	1.1	boring sponge	nc	nc	17.7	0.7
fourbeard rockling	87	0	7.6	0	blue crab	68	0.2	13.0	0.5
hogchoker	78	0	11.4	0.1	mantis shrimp	264	1.0	12.1	0.5
smallmouth flounder	48	0	2.6	0	deadman's fingers sponge	nc	nc	11.5	0.5
winter skate	44	0	117.8	0.7	lady crab	nc	nc	11.5	0.5
hickory shad	37	0	10.4	0.1	knobbed whelk	23	0.1	11.1	0.4
spiny dogfish	32	0	122.3	0.7	common slipper shell	nc	nc	9.3	0.4
American sand lance	30	0	0.3	0	mud crabs	nc	nc	4.3	0.2
Atlantic sturgeon	18	0	336.4	1.9	northern moon snail	nc	nc	4.3	0.2
cunner	16	0	3.0	0	sand shrimp	nc	nc	3.5	0.1
rough scad	13	0	0.7	0	sea grape	nc	nc	3.5	0.1
ocean pout	12	0	3.2	0	arks	2	0	2.7	0.1
Atlantic mackerel	9	0	0.8	0	hydroid spp.	nc	nc	2.5	0.1
glasseye snapper	8	0	0.7	0	hard clams	1	0	2.2	0.1
northern puffer	8	0	0.5	0	rubbery bryozoan	nc	nc	1.4	0.1
striped anchovy	6	0	0.1	0	common oyster	nc	nc	1.1	0
sea raven	5	0	3.6	0	surf clam	10	0	1.0	0
oyster toadfish	5	0	2.0	0	anemones	16	0.1	0.6	0
yellow jack	5	0	0.4	0	purple sea urchin	2	0	0.6	0
northern kingfish	4	0	0.4	0	red bearded sponge	nc	nc	0.5	0
round scad	3	0	0.3	0	star coral	nc	nc	0.4	0
longhorn sculpin	3	0	0.8	0	water jelly	1	0	0.3	0
American eel	2	0	0.9	0	jonah crab	1	0	0.2	0
inshore lizardfish	2	0	0.2	0	northern red shrimp	1	0	0.2	0
mackerel scad	2	0	0.1	0	blood star	nc	nc	0.1	0
northern sennet	2	0	0.2	0	coastal mud shrimp	1	0	0.1	0
northern pipefish	2	0	0.2	0	green sea urchin	1	0	0.1	0
Atlantic silverside	1	0	0.1	0	Japanese shore crab	nc	nc	0.1	0
gizzard shad	1	0	0.1	0	tunicates, misc	1	0	0.1	0
<b>Total</b>	<b>177,841</b>		<b>17,540.3</b>		<b>Total</b>	<b>27,441</b>		<b>2,512.7</b>	

Note: nc= not counted

**Appendix 5.4. cont. Total number and weight (kg) of finfish and invertebrates caught in 2008.**

*Finfish species are in order of descending count. Invertebrate species are in order of descending weight (nc = not counted). Young-of-year bay and striped anchovy are neither separated by species or quantified; young-of-year Atlantic herring and American sand lance are not quantified. Number of tows (sample size)=120.*

species	count	%	weight	%	species	count	%	weight	%
scup	53,560	38	6,509.9	45.7	sea lamprey	1	0	0.8	0
butterfish	48,766	34.6	1,442.0	10.1	striped anchovy	1	0	0.1	0
American sand lance	7,495	5.3	7.2	0.1	<b>Total</b>	<b>140,777</b>		<b>14,239.8</b>	
silver hake	6,587	4.7	208.5	1.5					
winter flounder	4,973	3.5	751.9	5.3	<b>Finfish not ranked</b>				
windowpane flounder	3,511	2.5	524.0	3.7	anchovy spp. yoy				
weakfish	2,531	1.8	116.1	0.8	Atlantic herring, yoy				
red hake	1,723	1.2	141.3	1.0	American sand lance (yoy)				
bluefish	1,699	1.2	641.4	4.5					
spotted hake	1,267	0.9	65.8	0.5	<b>Invertebrates</b>				
bay anchovy	1,128	0.8	7.7	0.1	horseshoe crab	289	2.2	496.8	29.2
alewife	931	0.7	51.1	0.4	long-finned squid	10,490	80.5	330.1	19.4
fourspot flounder	902	0.6	186.3	1.3	American lobster	1,096	8.4	314.1	18.5
northern searobin	809	0.6	58.8	0.4	spider crab	nc	nc	145.8	8.6
moonfish	689	0.5	13.4	0.1	rock crab	nc	nc	64.0	3.8
little skate	682	0.5	327.4	2.3	bushy bryozoan	nc	nc	54.2	3.2
striped searobin	612	0.4	263.0	1.8	lady crab	nc	nc	36.3	2.1
summer flounder	477	0.3	398.0	2.8	starfish spp.	nc	nc	32.1	1.9
American shad	405	0.3	20.2	0.1	boring sponge	nc	nc	30.1	1.8
Atlantic herring	356	0.3	52.1	0.4	channeled whelk	177	1.4	29.3	1.7
smooth dogfish	328	0.2	1,134.2	8.0	mixed sponge species	nc	nc	27.8	1.6
spot	308	0.2	21.3	0.1	hydroid spp.	nc	nc	24.6	1.4
striped bass	199	0.1	456.3	3.2	flat claw hermit crab	nc	nc	22.8	1.3
tautog	179	0.1	309.4	2.2	common slipper shell	nc	nc	15.7	0.9
black sea bass	122	0.1	29.8	0.2	lion's mane jellyfish	520	4	14.3	0.8
smallmouth flounder	89	0.1	3.2	0	mantis shrimp	244	1.9	9.1	0.5
fourbeard rockling	81	0.1	7.1	0	sea grape	nc	nc	6.6	0.4
blueback herring	74	0.1	3.2	0	arks	124	1	6.1	0.4
winter skate	51	0	140.8	1.0	knobbed whelk	17	0.1	5.9	0.3
Atlantic menhaden	47	0	10.4	0.1	blue mussel	nc	nc	5.8	0.3
hogchoker	38	0	5.6	0	northern moon snail	1	0	5.6	0.3
clearnose skate	37	0	78.1	0.5	sand shrimp	nc	nc	4.0	0.2
spiny dogfish	35	0	127.7	0.9	blue crab	16	0.1	3.8	0.2
cunner	26	0	3.6	0	mud crabs	nc	nc	3.5	0.2
inshore lizardfish	10	0	0.5	0	rubbery bryozoan	nc	nc	3.1	0.2
ocean pout	9	0	2.1	0	common oyster	1	0	2.1	0.1
Atlantic sturgeon	7	0	111.3	0.8	hard clams	8	0.1	1.4	0.1
hickory shad	5	0	1.1	0	purple sea urchin	15	0.1	0.9	0.1
feather blenny	4	0	0.2	0	northern red shrimp	21	0.2	0.7	0
white perch	4	0	0.1	0	deadman's fingers sponge	nc	nc	0.6	0
northern kingfish	3	0	0.4	0	surf clam	9	0.1	0.6	0
oyster toadfish	3	0	1.9	0	red bearded sponge	nc	nc	0.4	0
Atlantic silverside	2	0	0.2	0	Jonah crab	2	0	0.4	0
rock gunnel	2	0	0.2	0	star coral	nc	nc	0.3	0
longhorn sculpin	2	0	0.3	0	sea cucumber	2	0	0.3	0
yellowtail flounder	2	0	0.4	0	tunicates, misc	nc	nc	0.3	0
Atlantic croaker	1	0	0.1	0	anemones	nc	nc	0.2	0
planehead filefish	1	0	0.1	0	coastal mud shrimp	1	0	0.1	0
glasseye snapper	1	0	0.1	0	green crab	1	0	0.1	0
pollock	1	0	0.1	0	moon jelly	1	0	0.1	0
rougtail stingray	1	0	3.0	0	northern cyclocardia	1	0	0.1	0
					<b>Total</b>	<b>13,036</b>		<b>1,700.1</b>	

**Appendix 5.4. cont. Total number and weight (kg) of finfish and invertebrates caught in 2009.**

*Finfish species are in order of descending count. Invertebrate species are in order of descending weight (nc = not counted). Young-of-year bay and striped anchovy are neither separated by species or quantified; young-of-year Atlantic herring and American sand lance are not quantified. Number of tows (sample size)=200.*

species	count	%	weight	%	species	count	%	weight	%
butterfish	108,087	53.6	3,186.9	17	striped cusk-eel	1	0	0.1	0
scup	46,991	23.3	6,332.1	33.8	spot	1	0	0.2	0
bay anchovy	11,128	5.5	35.3	0.2	northern stargazer	1	0	0.1	0
Atlantic herring	6,330	3.1	239.2	1.3	Atlantic tomcod	1	0	0.1	0
winter flounder	4,068	2	524.0	2.8	white perch	1	0	0.1	0
bluefish	3,657	1.8	1,157.4	6.2	yellow jack	1	0	0.1	0
weakfish	2,604	1.3	108.7	0.6	yellowtail flounder	1	0	0.2	0
moonfish	2,575	1.3	19.5	0.1	<b>Total</b>	<b>201,476</b>		<b>18,750</b>	
windowpane flounder	2,496	1.2	342.8	1.8					
northern searobin	2,012	1	194.3	1	<b>Finfish not ranked</b>				
striped searobin	1,507	0.7	471.8	2.5	anchovy spp, yoy				
American sand lance	1,227	0.6	2.0	0	Atlantic herring, yoy				
alewife	1,175	0.6	96.0	0.5	American sand lance (yoy)				
fourspot flounder	1,036	0.5	169.8	0.9					
silver hake	947	0.5	50.0	0.3	<b>Invertebrates</b>				
red hake	897	0.4	59.5	0.3	long-finned squid	24,130	91.4	648.4	30.2
summer flounder	881	0.4	694.4	3.7	horseshoe crab	340	1.3	645.8	30
little skate	709	0.4	390.0	2.1	American lobster	853	3.2	244	11.3
smooth dogfish	588	0.3	2,213.3	11.8	spider crab	.	.	144.1	6.7
striped bass	466	0.2	897.4	4.8	lion's mane jellyfish	641	2.4	89.3	4.2
American shad	422	0.2	28.9	0.2	lady crab	.	.	63.6	3
spotted hake	327	0.2	32.1	0.2	rock crab	.	.	42.4	2
blueback herring	291	0.1	14.6	0.1	common slipper shell	.	.	37	1.7
tautog	163	0.1	285.4	1.5	flat claw hermit crab	.	.	33.8	1.6
spiny dogfish	148	0.1	545.7	2.9	bushy bryozoan	.	.	33.3	1.5
black sea bass	121	0.1	59.5	0.3	starfish spp.	.	.	26.6	1.2
smallmouth flounder	96	0	4.7	0	channeled whelk	127	0.5	26	1.2
clearnose skate	69	0	148.5	0.8	hydroid spp.	.	.	25.7	1.2
Atlantic menhaden	69	0	18.0	0.1	knobbed whelk	39	0.1	11.6	0.5
rough scad	59	0	2.8	0	mantis shrimp	215	0.8	10.7	0.5
fourbeard rockling	47	0	3.9	0	Tubularia, spp.	.	.	9	0.4
winter skate	44	0	108.5	0.6	northern moon snail	.	.	7.2	0.3
hogchoker	39	0	4.5	0	anemones	.	.	5.6	0.3
blue runner	34	0	2.3	0	mixed sponge species	.	.	5.4	0.3
ocean pout	22	0	4.8	0	sea grape	.	.	5.0	0.2
Atlantic sturgeon	18	0	286.6	1.5	boring sponge	.	.	4.2	0.2
cunner	18	0	1.8	0	blue crab	19	0.1	4.1	0.2
pollock	18	0	0.8	0	sand shrimp	.	.	3.8	0.2
Atlantic cod	15	0	1.0	0	deadman's fingers sponge	.	.	3.5	0.2
hickory shad	13	0	3.6	0	blue mussel	8	0	3.5	0.2
northern kingfish	7	0	0.4	0	mud crabs	.	.	3.1	0.1
glasseye snapper	6	0	0.6	0	common oyster	1	0	3.1	0.1
Atlantic mackerel	5	0	0.4	0	arks	2	0	2.5	0.1
northern sennet	5	0	0.4	0	surf clam	18	0.1	1.7	0.1
northern puffer	5	0	0.4	0	hard clams	4	0	1.1	0.1
sea raven	5	0	1.7	0	red bearded sponge	.	.	0.8	0
striped anchovy	5	0	0.4	0	purple sea urchin	4	0	0.8	0
Atlantic silverside	3	0	0.3	0	rubbery bryozoan	.	.	0.6	0
oyster toadfish	3	0	0.8	0	star coral	.	.	0.2	0
inshore lizardfish	2	0	0.2	0	ghost shrimp	2	0	0.2	0
northern pipefish	2	0	0.2	0	coastal mud shrimp	2	0	0.1	0
rock gunnel	2	0	0.2	0	northern cyclocardia	1	0	0.1	0
longhorn sculpin	2	0	0.3	0	northern red shrimp	1	0	0.1	0
crevalle jack	1	0	0.1	0	sea cucumber	1	0	0.1	0
planehead filefish	1	0	0.1	0	tunicates, misc	1	0	0.1	0
round scad	1	0	0.1	0	<b>Total</b>	<b>26,409</b>		<b>2,148.2</b>	

Note: nc= not counted

**Appendix 5.4. cont. Total number and weight (kg) of finfish and invertebrates caught in 2010.**

*Finfish species are in order of descending count. Invertebrate species are in order of descending weight (nc = not counted). Young-of-year bay and striped anchovy are neither separated by species or quantified; young-of-year Atlantic herring and American sand lance are not quantified. Number of tows (sample size)=78.*

species	count	%	weight	%	species	count	%	weight	%
American sand lance	13,061	35.3	5.2	0.1	<b><u>Invertebrates</u></b>				
scup	7,157	19.3	1,971.6	44.3	long-finned squid	1,906	62.9	161.4	28.4
butterfish	2,894	7.8	166.9	3.7	horseshoe crab	58	1.9	112.2	19.8
windowpane flounder	2,850	7.7	449.3	10.1	American lobster	293	9.7	83.6	14.7
winter flounder	2,579	7.0	450.5	10.1	spider crab	.	.	81.6	14.4
silver hake	1,747	4.7	35.4	0.8	bushy bryozoan	.	.	23.1	4.1
Atlantic herring	1,318	3.6	179.0	4	rock crab	.	.	16.7	2.9
northern searobin	1,128	3	149.5	3.4	starfish spp.	.	.	15.1	2.7
red hake	990	2.7	64.3	1.4	common slipper shell	.	.	11.2	2
spotted hake	665	1.8	15.8	0.4	lion's mane jellyfish	401	13.2	7.8	1.4
summer flounder	517	1.4	229.6	5.2	lady crab	.	.	7.7	1.4
bay anchovy	475	1.3	2.8	0.1	flat claw hermit crab	.	.	6.8	1.2
fourspot flounder	402	1.1	92.0	2.1	hydroid spp.	.	.	6.7	1.2
little skate	281	0.8	148.3	3.3	channeled whelk	33	1.1	4.5	0.8
alewife	172	0.5	14.3	0.3	northern moon snail	.	.	4.1	0.7
American shad	165	0.4	8.6	0.2	blue mussel	.	.	3.1	0.5
striped searobin	141	0.4	66.4	1.5	common oyster	.	.	2.9	0.5
blueback herring	101	0.3	3.4	0.1	sea grape	.	.	2.7	0.5
striped bass	71	0.2	173.2	3.9	sand shrimp	.	.	2.3	0.4
tautog	53	0.1	83.1	1.9	deadman's fingers sponge	.	.	2.3	0.4
black sea bass	37	0.1	20.1	0.5	blue crab	10	0.3	2.0	0.4
fourbeard rockling	35	0.1	2.9	0.1	arks	.	.	1.6	0.3
hogchoker	34	0.1	4.4	0.1	mud crabs	.	.	1.6	0.3
smallmouth flounder	31	0.1	1.4	0	rubbery bryozoan	.	.	1.2	0.2
rock gunnel	29	0.1	0.5	0	mantis shrimp	19	0.6	1.1	0.2
Atlantic cod	21	0.1	2.1	0	Unknown Jellyfish	300	9.9	0.8	0.1
winter skate	16	0	37.7	0.8	Tubularia, spp.	.	.	0.5	0.1
cunner	11	0	1.3	0	anemones	5	0.1	0.4	0.1
smooth dogfish	10	0	34.4	0.8	surf clam	2	0.1	0.4	0.1
Atlantic menhaden	7	0	2.7	0.1	knobbed whelk	1	0	0.3	0.1
ocean pout	6	0	1.4	0	mixed sponge species	.	.	0.3	0.1
sea raven	6	0	1.6	0	northern comb jelly	1	0	0.2	0
northern pipefish	4	0	0.3	0	purple sea urchin	4	0.1	0.2	0
spiny dogfish	3	0	16.2	0.4	boring sponge	.	.	0.1	0
bluefish	2	0	6.1	0.1	red bearded sponge	.	.	0.1	0
hickory shad	2	0	0.4	0	coastal mud shrimp	.	.	0.1	0
pollock	2	0	0.1	0	star coral	.	.	0.1	0
American plaice	1	0	0.1	0	hard clams	.	.	0.1	0
Atlantic silverside	1	0	0.1	0	sea cucumber	.	.	0.1	0
Atlantic sturgeon	1	0	5.6	0.1	<b>Total</b>	<b>3,033</b>		<b>567.0</b>	
clearnose skate	1	0	4.5	0.1	Note: nc= not counted				
longhorn sculpin	1	0	0.4	0					
weakfish	1	0	1.0	0					
<b>Total</b>	<b>37,029</b>		<b>4,455</b>						

**Finfish not ranked**

- anchovy spp, yoy
- Atlantic herring, yoy
- American sand lance (yoy)

**Appendix 5.4. cont. Total number and weight (kg) of finfish and invertebrates caught in 2011.**

*Finfish species are in order of descending count. Invertebrate species are in order of descending weight (nc = not counted). Young-of-year bay and striped anchovy are neither separated by species or quantified; young-of-year Atlantic herring and American sand lance are not quantified. Number of tows (sample size)=172.*

species	count	%	weight	%	species	count	%	weight	%
butterfish	42,141	36.7	1,600.8	9.9	striped burrfish	1	0	0.5	0
scup	34,458	30.0	6,759.0	41.7	striped anchovy	1	0	0.1	0
American sand lance	9,535	8.3	7.5	0.0	silver perch	1	0	0.1	0
bay anchovy	4,693	4.1	10.5	0.1	oyster toadfish	1	0	0.2	0
winter flounder	3,092	2.7	613.8	3.8	white perch	1	0	0.1	0
windowpane flounder	2,831	2.5	395.9	2.4	white mullet	1	0	0.1	0
bluefish	2,765	2.4	584.7	3.6	yellowtail flounder	1	0	0.3	0
weakfish	2,583	2.3	192.6	1.2	<b>Total</b>	<b>114,706</b>		<b>16,210.3</b>	
striped searobin	1,630	1.4	558.7	3.4					
Atlantic herring	1,482	1.3	199.4	1.2	<b><u>Finfish not ranked</u></b>				
fourspot flounder	1,400	1.2	224.2	1.4	anchovy spp, yoy				
summer flounder	1,051	0.9	713.0	4.4	Atlantic herring, yoy				
silver hake	948	0.8	40.3	0.2	American sand lance (yoy)				
northern searobin	803	0.7	85.5	0.5					
spotted hake	725	0.6	76.8	0.5	<b><u>Invertebrates</u></b>				
little skate	674	0.6	359.4	2.2	horseshoe crab	257	1.7	505.2	33.5
moonfish	640	0.6	6.3	0	long-finned squid	13,020	86.4	370.7	24.6
smooth dogfish	613	0.5	2,031.7	12.5	spider crab	.	.	151.8	10.1
alewife	512	0.4	29.8	0.2	lady crab	.	.	132.4	8.8
red hake	278	0.2	25.1	0.2	American lobster	230	1.5	52.0	3.4
American shad	271	0.2	17.5	0.1	rock crab	.	.	45.5	3.0
striped bass	243	0.2	721.9	4.5	hydroid spp.	.	.	30.5	2.0
Atlantic menhaden	181	0.2	69.8	0.4	mantis shrimp	971	6.4	29.6	2.0
rough scad	150	0.1	6.8	0	bushy bryozoan	.	.	24.9	1.7
hogchoker	147	0.1	16.8	0.1	knobbed whelk	62	0.4	23.8	1.6
Atlantic cod	109	0.1	9.2	0.1	flat claw hermit crab	.	.	22.1	1.5
tautog	106	0.1	151.7	0.9	channeled whelk	99	0.7	19.0	1.3
black sea bass	91	0.1	54.2	0.3	starfish spp.	.	.	14.4	1.0
blueback herring	72	0.1	3.2	0	blue crab	69	0.5	12.4	0.8
smallmouth flounder	67	0.1	3.5	0	lion's mane jellyfish	345	2.3	11.3	0.7
spiny dogfish	58	0.1	203.5	1.3	mixed sponge species	.	.	11.0	0.7
clearnose skate	56	0	109.8	0.7	blue mussel	1	0	6.7	0.4
inshore lizardfish	43	0	4.6	0	northern moon snail	.	.	5.6	0.4
fourbeard rockling	43	0	4.0	0	boring sponge	.	.	5.5	0.4
winter skate	37	0	101.2	0.6	hard clams	.	.	5.3	0.4
northern kingfish	34	0	3.7	0	common slipper shell	.	.	5.2	0.3
ocean pout	27	0	4.5	0	sand shrimp	.	.	4.5	0.3
blue runner	24	0	1.7	0	Tubularia, spp.	.	.	3.5	0.2
cunner	14	0	1.9	0	mud crabs	.	.	2.6	0.2
northern puffer	9	0	0.9	0	rubbery bryozoan	.	.	1.7	0.1
longhorn sculpin	9	0	2.0	0	common oyster	1	0	1.6	0.1
hickory shad	8	0	1.5	0	sea grape	.	.	1.5	0.1
Atlantic sturgeon	5	0	181.9	1.1	arks	.	.	1.4	0.1
pollock	5	0	0.5	0	surf clam	7	0	1.0	0.1
spot	5	0	0.7	0	purple sea urchin	3	0	0.6	0
crevalle jack	4	0	0.4	0	red bearded sponge	.	.	0.3	0
grubby	4	0	0.1	0	northern comb jelly	.	.	0.3	0
northern pipefish	4	0	0.3	0	anemones	6	0	0.2	0
rock gunnel	4	0	0.2	0	star coral	.	.	0.2	0
conger eel	3	0	1.1	0	coastal mud shrimp	1	0	0.1	0
sea raven	3	0	0.9	0	common razor clam	1	0	0.1	0
striped cusk-eel	2	0	0.2	0	ghost shrimp	1	0	0.1	0
Atlantic tomcod	2	0	0.2	0	northern red shrimp	1	0	0.1	0
American plaice	1	0	0.1	0	polychaetes	.	.	0.1	0
Atlantic croaker	1	0	0.2	0	tunicates, misc	.	.	0.1	0
northern sennet	1	0	0.1	0	water jelly	1	0	0.1	0
round scad	1	0	0.1	0	<b>Total</b>	<b>15,076</b>		<b>1,505.0</b>	
rougtail stingray	1	0	13.0	0.1					

Note: nc= not counted

**Appendix 5.4. cont. Total number and weight (kg) of finfish and invertebrates caught in 2012.**

Finfish species are in order of descending count. Invertebrate species are in order of descending weight (nc = not counted). Young-of-year bay and striped anchovy are neither separated by species or quantified; young-of-year Atlantic herring and American sand lance are not quantified. Number of tows (sample size)=200.

species	count	%	weight	%	species	count	%	weight	%
butterfish	60,539	37.9	1,891.3	10.8	longhorn sculpin	1	0	0.2	0
scup	53,119	33.2	6,170.2	35.1	white perch	1	0	0.2	0
silver hake	7,519	4.7	171.0	1.0	white mullet	1	0	0.1	0
weakfish	6,785	4.2	409.2	2.3	<b>Total</b>	<b>159,770</b>		<b>17,570.3</b>	
bluefish	3,851	2.4	532.7	3.0					
northern searobin	3,642	2.3	405.2	2.3	<b>Finfish not ranked</b>				
windowpane flounder	3,536	2.2	501.1	2.9	anchovy spp. yoy				
winter flounder	3,365	2.1	604.9	3.4	Atlantic herring, yoy				
striped searobin	2,973	1.9	1,086.4	6.2	American sand lance (yoy)				
fourspot flounder	2,597	1.6	454.5	2.6					
red hake	1,720	1.1	148.6	0.8	<b>Invertebrates</b>				
little skate	1,406	0.9	657.9	3.7	horseshoe crab	199	1.7	385.8	30.6
bay anchovy	1,296	0.8	8.6	0.0	long-finned squid	9,767	84.5	333.9	26.5
summer flounder	980	0.6	718.5	4.1	spider crab	.	.	162.4	12.9
spot	858	0.5	107.5	0.6	American lobster	349	3.0	70.0	5.6
alewife	708	0.4	47.0	0.3	boring sponge	.	.	47.9	3.8
spotted hake	626	0.4	64.2	0	lady crab	.	.	45.3	3.6
smooth dogfish	610	0.4	1,833.3	10.4	rock crab	.	.	40.7	3.2
Atlantic herring	571	0.4	61.5	0.4	mantis shrimp	846	7.3	26.6	2.1
Atlantic menhaden	426	0.3	144.6	0.8	bushy bryozoan	.	.	20.4	1.6
black sea bass	410	0.3	141.0	0.8	flat claw hermit crab	.	.	18.3	1.5
hogchoker	340	0.2	30.7	0.2	blue crab	72	0.6	14.5	1.2
American shad	321	0.2	25.3	0.1	knobbed whelk	36	0.3	13.8	1.1
clearnose skate	280	0.2	491.7	3	channeled whelk	76	0.7	13.7	1.1
moonfish	262	0.2	3.6	0.0	blue mussel	1	0.0	9.4	0.7
smallmouth flounder	258	0.2	7.5	0.0	common slipper shell	.	.	9.4	0.7
striped bass	170	0.1	278.0	1.6	mixed sponge species	.	.	7.4	0.6
tautog	135	0.1	128.9	0.7	Tubularia, spp.	.	.	5.0	0.4
winter skate	97	0.1	179.8	1	hydroid spp.	.	.	4.8	0.4
northern kingfish	59	0.0	8.4	0	lion's mane jellyfish	50	0.4	4.4	0.3
northern puffer	47	0.0	3.1	0.0	mud crabs	.	.	3.9	0.3
blueback herring	46	0	1.6	0.0	starfish spp.	.	.	3.3	0.3
fourbeard rockling	43	0	3.5	0	northern red shrimp	118	1.0	3.0	0.2
hickory shad	42	0	14.1	0	northern moon snail	.	.	1.8	0.1
blue runner	27	0	2.7	0.0	sand shrimp	.	.	1.7	0.1
cunner	20	0	2.8	0	arks	.	.	1.4	0.1
rough scad	19	0	1.1	0	hard clams	3	0	1.3	0.1
spiny dogfish	16	0	62.8	0	red bearded sponge	.	.	1.2	0.1
ocean pout	14	0	2.0	0	sea grape	.	.	1.1	0.1
Atlantic sturgeon	7	0	154.2	1	deadman's fingers sponge	.	.	0.8	0.1
sea raven	5	0	1.1	0	purple sea urchin	7	0	0.8	0
northern sennet	3	0	0.3	0	common oyster	.	.	0.8	0
striped anchovy	3	0	0.2	0.0	surf clam	10	0.1	0.8	0
crevalle jack	2	0	0.2	0	star coral	.	.	0.4	0
goosefish	2	0	0.8	0	rubbery bryozoan	.	.	0.4	0
pinfish	2	0	0.2	0	sea cucumber	3	0	0.4	0
round herring	2	0	0.1	0	tunicates, misc	16	0	0.4	0
American sand lance	2	0	0.2	0	water jelly	4	0	0.3	0
African pompano	1	0	0.1	0	coastal mud shrimp	1	0	0.2	0
conger eel	1	0	0.3	0	northern comb jelly	.	.	0.1	0
gizzard shad	1	0	0.1	0	moon jelly	.	.	0.1	0
northern pipefish	1	0	0.1	0	<b>Total</b>	<b>11,558</b>		<b>1,257.9</b>	
rock gunnel	1	0	0.1	0					
rougtail stingray	1	0	5.0	0					

Note: nc= not counted

**Appendix 5.4. cont. Total number and weight (kg) of finfish and invertebrates caught in 2013.**

Finfish species are in order of descending count. Invertebrate species are in order of descending weight (nc = not counted). Young-of-year gadids, bay and striped anchovy are neither separated by species or quantified; young-of-year Atlantic herring and American sand lance are not quantified. Number of tows (sample size)=200.

species	count	%	weight	%	species	count	%	weight	%
butterfish	29,569	35.4	1,252.5	7.9					
scup	24,961	29.9	5,945.6	37.5					
Atlantic herring	3,566	4.3	321.2	2.0					
striped searobin	2,724	3.3	1,112.5	7.0					
windowpane flounder	2,096	2.5	326.6	2.1					
weakfish	1,964	2.4	203.7	1.3					
northern searobin	1,934	2.3	161.7	1.0					
spot	1,917	2.3	195.4	1.2					
winter flounder	1,912	2.3	576.8	3.6					
bluefish	1,829	2.2	517.7	3.3					
bay anchovy	1,350	1.6	6.8	0.0					
fourspot flounder	1,144	1.4	203.4	1.3					
summer flounder	1,071	1.3	726.6	4.6					
smooth dogfish	1,051	1.3	2,162.3	13.6					
spotted hake	927	1.1	66.8	0.4					
moonfish	868	1.0	10.0	0.1					
red hake	849	1.0	61.1	0.4					
little skate	583	0.7	317.8	2.0					
silver hake	519	0.6	23.6	0.1					
black sea bass	449	0.5	181.2	1.1					
alewife	376	0.5	34.1	0.2					
hogchoker	250	0.3	27.2	0.2					
Atlantic menhaden	234	0.3	87.5	0.6					
American shad	222	0.3	15.3	0.1					
clearnose skate	218	0.3	387.0	2.4					
striped bass	200	0.2	421.0	2.7					
tautog	161	0.2	160.8	1.0					
smallmouth flounder	128	0.2	5.2	0.0					
winter skate	91	0.1	111.2	0.7					
blueback herring	68	0.1	4.3	0.0					
hickory shad	33	0.0	10.8	0.1					
rough scad	28	0.0	1.3	0.0					
red goatfish	21	0.0	0.5	0.0					
spiny dogfish	21	0.0	91.5	0.6					
cunner	20	0.0	1.8	0.0					
northern kingfish	14	0.0	2.3	0.0					
American sand lance	7	0.0	0.1	0.0					
haddock	5	0.0	0.4	0.0					
oyster toadfish	5	0.0	0.9	0.0					
Atlantic sturgeon	4	0.0	98.0	0.6					
Atlantic silverside	3	0.0	0.3	0.0					
northern puffer	3	0.0	0.3	0.0					
fourbeard rockling	3	0.0	0.2	0.0					
bullnose ray	2	0.0	5.7	0.0					
harvestfish	2	0.0	0.2	0.0					
northern pipefish	2	0.0	0.2	0.0					
conger eel	1	0.0	1.2	0.0					
Atlantic croaker	1	0.0	0.1	0.0					
glasseye snapper	1	0.0	0.1	0.0					
pollock	1	0.0	0.1	0.0					
round scad	1	0.0	0.1	0.0					
red cornetfish	1	0.0	0.1	0.0					
longhorn sculpin	1	0.0	0.4	0.0					
striped anchovy	1	0.0	0.1	0.0					
northern stargazer	1	0.0	0.1	0.0					
<b>Total</b>	<b>83,413</b>		<b>15,843.7</b>						
					<b>Finfish not ranked</b>				
					anchovy spp. (yoy)				
					Atlantic herring. (yoy)				
					American sand lance (yoy)				
					gadid spp. (yoy)				
					<b>Invertebrates</b>				
					blue mussel	3	0.0	622.1	31.9
					horseshoe crab	265	3.4	531.8	27.3
					long-finned squid	5,393	69.6	170.8	8.8
					spider crab	nc		156.5	8.0
					lion's mane jellyfish	1,067	13.8	150.0	7.7
					common slipper shell	nc		61.0	3.1
					American lobster	144	1.9	37.3	1.9
					bushy bryozoan	nc		26.8	1.4
					boring sponge	nc		26.1	1.3
					mantis shrimp	646	8.3	21.6	1.1
					flat claw hermit crab	nc		21.4	1.1
					knobbed whelk	51	0.7	18.7	1.0
					channeled whelk	95	1.2	18.6	1.0
					hydroid spp.	nc		13.2	0.7
					lady crab	nc		13.2	0.7
					rock crab	nc		13.0	0.7
					blue crab	52	0.7	10.4	0.5
					Tubularia, spp.	nc		6.7	0.3
					common oyster	nc		5.3	0.3
					mud crabs	nc		3.5	0.2
					sand shrimp	nc		2.9	0.1
					northern moon snail	nc		2.9	0.1
					surf clam	8	0.1	2.4	0.1
					starfish spp.	1	0.0	2.1	0.1
					sea grape	nc		2.1	0.1
					arks	nc		1.9	0.1
					hard clams	6	0.1	0.9	0.0
					comb jelly spp	nc		0.8	0.0
					red bearded sponge	nc		0.6	0.0
					rubbery bryozoan	nc		0.5	0.0
					purple sea urchin	10	0.1	0.5	0.0
					coastal mud shrimp	4	0.1	0.3	0.0
					deadman's fingers sponge	nc		0.3	0.0
					mixed sponge species	nc		0.3	0.0
					star coral	nc		0.2	0.0
					sea cucumber	2	0.0	0.2	0.0
					fan worm tubes	nc		0.1	0.0
					ghost shrimp	1	0.0	0.1	0.0
					Japanese shore crab	1	0.0	0.1	0.0
					northern red shrimp	1	0.0	0.1	0.0
					ribbed mussel	nc		0.1	0.0
					<b>Total</b>	<b>7,750</b>		<b>1,947.4</b>	

Note: nc= not counted



**Appendix 5.4. cont. Total number and weight (kg) of finfish and invertebrates caught in 2014.**

Finfish species are in order of descending count. Invertebrate species are in order of descending weight (nc = not counted). Young-of-year gadids, bay and striped anchovy are neither separated by species or quantified; young-of-year Atlantic herring and American sand lance are not quantified. Number of tows (sample size)=199.

species	count	%	weight	%	species	count	%	weight	%
butterfish	69,372	45.3	1,707.6	10.6					
scup	45,705	29.9	5,161.4	31.9					
weakfish	10,477	6.8	334.8	2.1					
bluefish	4,457	2.9	522.7	3.2					
northern searobin	2,584	1.7	225.9	1.4					
striped searobin	2,544	1.7	1,020.8	6.3					
moonfish	2,200	1.4	23.2	0.1					
windowpane flounder	2,191	1.4	365.6	2.3					
Atlantic herring	1,838	1.2	91.2	0.6					
bay anchovy	1,424	0.9	9.4	0.1					
winter flounder	1,372	0.9	459.7	2.8					
black sea bass	1,295	0.8	543.3	3.4					
smooth dogfish	1,197	0.8	2,799.2	17.3					
summer flounder	859	0.6	567.4	3.5					
fourspot flounder	820	0.5	145.0	0.9					
little skate	770	0.5	428.2	2.6					
Atlantic menhaden	723	0.5	267.8	1.7					
alewife	555	0.4	43.2	0.3					
spotted hake	505	0.3	59.5	0.4					
red hake	398	0.3	33.5	0.2					
silver hake	323	0.2	10.6	0.1					
striped bass	255	0.2	407.5	2.5					
hogchoker	246	0.2	27.8	0.2					
tautog	194	0.1	192.5	1.2					
American shad	162	0.1	12.3	0.1					
smallmouth flounder	152	0.1	6.0	0.0					
clearnose skate	104	0.1	207.7	1.3					
winter skate	82	0.1	133.8	0.8					
blueback herring	58	0.0	4.2	0.0					
northern kingfish	51	0.0	3.2	0.0					
hickory shad	30	0.0	10.5	0.1					
inshore lizardfish	30	0.0	2.8	0.0					
spot	20	0.0	1.8	0.0					
spiny dogfish	15	0.0	62.2	0.4					
Atlantic sturgeon	13	0.0	272.4	1.7					
American sand lance	12	0.0	0.2	0.0					
blue runner	10	0.0	0.9	0.0					
northern puffer	10	0.0	1.3	0.0					
striped cusk-eel	6	0.0	0.6	0.0					
Atlantic cod	5	0.0	0.3	0.0					
rough scad	5	0.0	0.5	0.0					
planehead filefish	4	0.0	0.4	0.0					
fourbeard rockling	4	0.0	0.4	0.0					
crevalle jack	2	0.0	0.2	0.0					
Atlantic croaker	2	0.0	0.2	0.0					
cunner	2	0.0	0.2	0.0					
Atlantic mackerel	2	0.0	0.2	0.0					
silver perch	2	0.0	0.2	0.0					
oyster toadfish	2	0.0	0.6	0.0					
Atlantic silverside	1	0.0	0.1	0.0					
black drum	1	0.0	0.1	0.0					
blue spotted cornetfish	1	0.0	0.1	0.0					
lookdown	1	0.0	0.1	0.0					
mackerel scad	1	0.0	0.1	0.0					
northern pipefish	1	0.0	0.1	0.0					
round scad	1	0.0	0.1	0.0					
red goatfish	1	0.0	0.1	0.0					
banded rudderfish	1	0.0	0.4	0.0					
sea raven	1	0.0	1.5	0.0					
white perch	1	0.0	0.2	0.0					
<b>Total</b>	<b>153,100</b>		<b>16,173.8</b>						
					<b>Finfish not ranked</b>				
					anchovy spp. (yoy)				
					Atlantic herring. (yoy)				
					American sand lance (yoy)				
					gadid spp. (yoy)				
					<b>Invertebrates</b>				
					longfin inshore squid	13,436	86.3	582.3	37.9
					horseshoe crab	261	1.7	497.3	32.4
					spider crab	nc		145.6	9.5
					blue mussel	nc		52.2	3.4
					lion's mane jellyfish	1,262	8.1	48.2	3.1
					American lobster	178	1.1	31.5	2.1
					bushy bryozoan	nc		24.8	1.6
					mixed sponge species	nc		20.6	1.3
					common slipper shell	nc		18.8	1.2
					mantis shrimp	332	2.1	14.4	0.9
					flat claw hermit crab	nc		14.0	0.9
					knobbed whelk	34	0.2	12.3	0.8
					lady crab	nc		9.3	0.6
					sea grape	nc		7.3	0.5
					channeled whelk	29	0.2	5.9	0.4
					hydroid spp.	nc		5.3	0.3
					rock crab	nc		4.8	0.3
					northern moon snail	nc		4.6	0.3
					Tubularia, spp.	nc		4.6	0.3
					boring sponge	nc		4.3	0.3
					sand shrimp	nc		4.1	0.3
					blue crab	18	0.1	3.0	0.2
					arks	nc		2.7	0.2
					mud crabs	nc		2.6	0.2
					starfish spp.	2	0.0	1.6	0.1
					ribbed mussel	nc		1.6	0.1
					comb jelly spp	nc		1.4	0.1
					star coral	nc		0.7	0.0
					purple sea urchin	4	0.0	0.6	0.0
					surf clam	4	0.0	0.5	0.0
					coastal mud shrimp	1	0.0	0.3	0.0
					rubbery bryozoan	nc		0.3	0.0
					tunicates, misc	nc		0.3	0.0
					anemones	5	0.0	0.2	0.0
					brown shrimp	2	0.0	0.2	0.0
					common razor clam	1	0.0	0.2	0.0
					hard clams	nc		0.2	0.0
					common oyster	nc		0.2	0.0
					red bearded sponge	nc		0.1	0.0
					deadman's fingers sponge	nc		0.1	0.0
					ghost shrimp	1	0.0	0.1	0.0
					water jelly	1	0.0	0.1	0.0
					<b>Total</b>	<b>15,571</b>		<b>1,529.2</b>	

Note: nc= not counted

**Appendix 5.4. cont. . Total number and weight (kg) of finfish and invertebrates caught in 2015.**

Finfish species are in order of descending count. Invertebrate species are in order of descending weight (nc = not counted). Young-of-year gadids, bay and striped anchovy are neither separated by species or quantified; young-of-year Atlantic herring and American sand lance are not quantified. Number of tows (sample size)=200.

species	count	%	weight	%	species	count	%	weight	%
scup	80,534	49.3	6,045.5	38.7	round scad	1	0.0	0.1	0.0
butterfish	53,265	32.6	1,011.2	6.5	rock gunnel	1	0.0	0.1	0.0
weakfish	10,077	6.2	530.4	3.4	rougtail stingray	1	0.0	7.8	0.0
striped searobin	2,728	1.7	1,058.2	6.8	short bigeye	1	0.0	0.1	0.0
bluefish	2,650	1.6	324.4	2.1	sea lamprey	1	0.0	1.2	0.0
smooth dogfish	1,438	0.9	2,804.1	17.9	Atlantic thread herring	1	0.0	0.1	0.0
winter flounder	1,340	0.8	319.7	2.0	<b>Total</b>	<b>163,223</b>		<b>15,625</b>	
Atlantic menhaden	1,279	0.8	361.2	2.3	<b>Finfish not ranked</b>				
windowpane flounder	1,150	0.7	191.1	1.2	anchovy spp, (yoy)				
black sea bass	1,109	0.7	678.0	4.3	Atlantic herring, (yoy)				
moonfish	891	0.5	14.6	0.1	American sand lance (yoy)				
summer flounder	808	0.5	449.3	2.9	gadid spp, (yoy)				
northern searobin	805	0.5	133.2	0.9	<b>Invertebrates</b>				
Atlantic herring	630	0.4	71.8	0.5	longfin inshore squid	28,266	97.0	1366.2	69.6
alewife	485	0.3	30.5	0.2	horseshoe crab	159	0.5	288.3	14.7
red hake	480	0.3	44.5	0.3	spider crab	nc		133.3	6.8
bay anchovy	399	0.2	3.1	0.0	common slipper shell	nc		29.8	1.5
little skate	387	0.2	192.0	1.2	American lobster	92	0.3	24.0	1.2
fourspot flounder	386	0.2	76.3	0.5	knobbed whelk	37	0.1	15.7	0.8
tautog	308	0.2	339.7	2.2	bushy bryozoan	nc		10.1	0.5
spotted hake	302	0.2	40.1	0.3	mantis shrimp	187	0.6	9.8	0.5
American shad	275	0.2	24.7	0.2	flat claw hermit crab	nc		8.1	0.4
hogchoker	255	0.2	31.2	0.2	sea grape	1	0.0	7.8	0.4
blueback herring	249	0.2	7.1	0.0	boring sponge	nc		7.6	0.4
striped bass	187	0.1	405.2	2.6	lion's mane jellyfish	347	1.2	6.5	0.3
rough scad	144	0.1	7.1	0.0	mixed sponge species	nc		6.3	0.3
clearnose skate	131	0.1	225.0	1.4	channeled whelk	26	0.1	5.8	0.3
silver hake	100	0.1	6.5	0.0	blue crab	22	0.1	4.7	0.2
northern kingfish	97	0.1	7.1	0.0	blue mussel	nc		4.2	0.2
smallmouth flounder	73	0.0	3.6	0.0	northern moon snail	1	0.0	4.0	0.2
blue runner	68	0.0	6.7	0.0	hydroid spp.	nc		3.9	0.2
winter skate	30	0.0	51.8	0.3	rock crab	nc		3.8	0.2
fourbeard rockling	20	0.0	2.0	0.0	sand shrimp	nc		3.7	0.2
spiny dogfish	19	0.0	80.8	0.5	mud crabs	nc		2.9	0.1
red cornetfish	14	0.0	0.6	0.0	starfish spp.	nc		2.5	0.1
spot	14	0.0	1.7	0.0	lady crab	nc		2.4	0.1
cunner	13	0.0	1.8	0.0	arks	nc		1.5	0.1
hickory shad	12	0.0	5.5	0.0	common oyster	nc		0.8	0.0
northern puffer	11	0.0	0.8	0.0	rubbery bryozoan	nc		0.7	0.0
Atlantic croaker	6	0.0	1.5	0.0	Tubularia, spp.	nc		0.5	0.0
Atlantic silverside	5	0.0	0.4	0.0	coastal mud shrimp	2	0.0	0.4	0.0
Atlantic cod	5	0.0	4.7	0.0	surf clam	2	0.0	0.4	0.0
crevalle jack	4	0.0	0.4	0.0	red bearded sponge	nc		0.3	0.0
Atlantic mackerel	4	0.0	0.4	0.0	deadman's fingers sponge	nc		0.3	0.0
American sand lance	4	0.0	0.1	0.0	fan worm tubes	nc		0.3	0.0
bigeye scad	3	0.0	0.3	0.0	hard clams	1	0.0	0.3	0.0
planehead filefish	2	0.0	0.2	0.0	polychaetes	nc		0.3	0.0
glasseye snapper	2	0.0	0.1	0.0	brown shrimp	2	0.0	0.2	0.0
goosefish	2	0.0	0.1	0.0	comb jelly spp	nc		0.2	0.0
ocean pout	2	0.0	0.5	0.0	star coral	nc		0.2	0.0
northern pipefish	2	0.0	0.2	0.0	ghost shrimp	1	0.0	0.2	0.0
longhorn sculpin	2	0.0	0.7	0.0	purple sea urchin	2	0.0	0.2	0.0
striped anchovy	2	0.0	0.1	0.0	anemones	nc		0.1	0.0
oyster toadfish	2	0.0	0.9	0.0	sand dollar	1	0.0	0.1	0.0
yellowtail flounder	2	0.0	0.7	0.0	common razor clam	1	0.0	0.1	0.0
Atlantic sturgeon	1	0.0	15.8	0.1	tunicates, misc	nc		0.1	0.0
bigeye	1	0.0	0.1	0.0	<b>Total</b>	<b>29,150</b>		<b>1,958.6</b>	
conger eel	1	0.0	0.3	0.0	Note: nc= not counted				
mahogany snapper	1	0.0	0.1	0.0					
round herring	1	0.0	0.1	0.0					

**Appendix 5.4. cont. . Total number and weight (kg) of finfish and invertebrates caught in 2016.**

Finfish species are in order of descending count. Invertebrate species are in order of descending weight (nc = not counted). Young-of-year gadids, bay and striped anchovy are neither separated by species or quantified; young-of-year Atlantic herring and American sand lance are not quantified. Number of tows (sample size)=196.

species	count	%	weight	%	species	count	%	weight	%
scup	175,632	63.4	16,006.2	56.2					
butterfish	65,596	23.7	2,036.1	7.1	<b><u>Finfish not ranked</u></b>				
striped searobin	5,886	2.1	1,964.4	6.9	anchovy spp. (yoy)				
weakfish	4,689	1.7	297.6	1.0	Atlantic herring. (yoy)				
northern searobin	3,178	1.1	452.1	1.6	American sand lance (yoy)				
alewife	2,811	1.0	132.0	0.5	gadid spp. (yoy)				
bluefish	2,793	1.0	1,118.7	3.9					
spotted hake	2,456	0.9	113.8	0.4	<b><u>Invertebrates</u></b>				
windowpane flounder	1,593	0.6	154.7	0.5	longfin inshore squid	12,424	94.1	464.4	41.1
smooth dogfish	1,338	0.5	2,785.6	9.8	horseshoe crab	164	1.2	315.5	28.0
bay anchovy	1,239	0.4	8.7	0.0	spider crab	nc		140.6	12.5
black sea bass	1,181	0.4	823.4	2.9	lion's mane jellyfish	221	1.7	72.1	6.4
winter flounder	1,108	0.4	261.0	0.9	American lobster	74	0.6	25.2	2.2
fourspot flounder	1,056	0.4	175.3	0.6	common slipper shell	nc		19.2	1.7
American shad	944	0.3	46.2	0.2	bushy bryozoan	nc		11.2	1.0
silver hake	891	0.3	32.9	0.1	mantis shrimp	206	1.6	9.5	0.8
Atlantic menhaden	876	0.3	69.4	0.2	knobbed whelk	23	0.2	8.8	0.8
red hake	668	0.2	50.3	0.2	flat claw hermit crab	nc		8.7	0.8
summer flounder	462	0.2	386.4	1.4	boring sponge	nc		7.4	0.7
blueback herring	448	0.2	12.2	0.0	rock crab	nc		6.8	0.6
little skate	377	0.1	193.1	0.7	channeled whelk	29	0.2	6.0	0.5
hogchoker	354	0.1	41.8	0.1	hydroid spp.	nc		5.9	0.5
Atlantic herring	340	0.1	37.1	0.1	blue crab	20	0.1	5.0	0.4
tautog	306	0.1	288.5	1.0	hard clams	22	0.2	3.2	0.3
moonfish	265	0.1	5.2	0.0	mud crabs	nc		2.5	0.2
striped bass	167	0.1	261.9	0.9	mixed sponge species	nc		1.9	0.2
smallmouth flounder	148	0.1	4.2	0.0	sand shrimp	nc		1.8	0.2
clearnose skate	134	0.0	228.7	0.8	lady crab	nc		1.7	0.2
goosefish	70	0.0	23.3	0.1	Tubularia, spp.	nc		1.5	0.1
northern kingfish	31	0.0	4.8	0.0	northern moon snail	nc		1.3	0.1
hickory shad	18	0.0	4.2	0.0	arks	3	0.0	1.3	0.1
winter skate	17	0.0	31.6	0.1	starfish spp.	1	0.0	0.9	0.1
blue runner	15	0.0	1.5	0.0	blue mussel	1	0.0	0.8	0.1
Atlantic sturgeon	12	0.0	318.3	1.1	common oyster	5	0.0	0.6	0.1
spot	12	0.0	1.7	0.0	surf clam	1	0.0	0.5	0.0
spiny dogfish	9	0.0	43.6	0.2	comb jelly spp	nc		0.2	0.0
striped anchovy	8	0.0	0.5	0.0	star coral	nc		0.2	0.0
northern puffer	5	0.0	0.9	0.0	ghost shrimp	1	0.0	0.2	0.0
cunner	4	0.0	0.5	0.0	anemones	nc		0.1	0.0
inshore lizardfish	4	0.0	0.3	0.0	bobtail squid	1	0.0	0.1	0.0
oyster toadfish	4	0.0	1.7	0.0	red bearded sponge	nc		0.1	0.0
Atlantic silverside	3	0.0	0.3	0.0	common razor clam	1	0.0	0.1	0.0
fourbeard rockling	3	0.0	0.3	0.0	Japanese shore crab	1	0.0	0.1	0.0
striped cusk-eel	3	0.0	0.1	0.0	polychaetes	1	0.0	0.1	0.0
northern sennet	2	0.0	0.2	0.0	tunicates, misc	nc		0.1	0.0
bluntnose stingray	1	0.0	0.6	0.0	purple sea urchin	nc		0.1	0.0
Atlantic cod	1	0.0	4.9	0.0	water jelly	1	0.0	0.1	0.0
crevalle jack	1	0.0	0.1	0.0	<b>Total</b>	<b>13,200</b>		<b>1,125.8</b>	
haddock	1	0.0	0.1	0.0	Note: nc= not counted				
pinfish	1	0.0	0.1	0.0					
pollock	1	0.0	0.1	0.0					
rougthead stingray	1	0.0	45.4	0.2					
rough scad	1	0.0	0.1	0.0					
sea raven	1	0.0	0.2	0.0					
sand tiger shark	1	0.0	21.8	0.1					
<b>Total</b>	<b>277,166</b>		<b>28,495</b>						

**Appendix 5.4. cont. . Total number and weight (kg) of finfish and invertebrates caught in 2017.**

Finfish species are in order of descending count. Invertebrate species are in order of descending weight (nc = not counted). Young-of-year gadids, bay and striped anchovy are neither separated by species or quantified; young-of-year Atlantic herring and American sand lance are not quantified. Number of tows (sample size)=144.

species	count	%	weight	%	species	count	%	weight	%
scup	75,763	56.4	9,616.8	51.4					
butterfish	35,814	26.7	1,426.0	7.6	<b><u>Finfish not ranked</u></b>				
weakfish	5,904	4.4	311.2	1.7	anchovy spp. (yoy)				
striped searobin	3,942	2.9	1,400.0	7.5	Atlantic herring. (yoy)				
bluefish	2,408	1.8	263.6	1.4	American sand lance (yoy)				
smooth dogfish	1,624	1.2	3,391.3	18.1	gadid spp. (yoy)				
northern searobin	1,430	1.1	196.2	1.0					
spotted hake	1,253	0.9	111.2	0.6	<b><u>Invertebrates</u></b>				
bay anchovy	1,069	0.8	7.7	0.0	longfin inshore squid	14,186	96.5	584.5	54.5
black sea bass	980	0.7	714.8	3.8	horseshoe crab	112	0.8	224.4	20.9
windowpane flounder	974	0.7	127.1	0.7	spider crab	nc		129.4	12.1
hogchoker	391	0.3	50.1	0.3	boring sponge	nc		46.9	4.4
fourspot flounder	366	0.3	67.9	0.4	common slipper shell	nc		20.8	1.9
summer flounder	354	0.3	244.0	1.3	bushy bryozoan	nc		12.1	1.1
silver hake	309	0.2	12.3	0.1	flat claw hermit crab	nc		8.3	0.8
moonfish	273	0.2	4.2	0.0	knobbed whelk	36	0.2	7.3	0.7
Atlantic menhaden	239	0.2	72.2	0.4	mantis shrimp	173	1.2	7.3	0.7
American shad	230	0.2	21.0	0.1	blue crab	18	0.1	4.1	0.4
red hake	152	0.1	11.9	0.1	American lobster	12	0.1	4.0	0.4
spot	114	0.1	10.5	0.1	lion's mane jellyfish	102	0.7	3.7	0.3
little skate	113	0.1	63.0	0.3	lady crab	nc		3.5	0.3
winter flounder	112	0.1	27.7	0.1	blue mussel	nc		2.7	0.3
blueback herring	89	0.1	3.5	0.0	channeled whelk	18	0.1	2.4	0.2
tautog	77	0.1	99.0	0.5	sand shrimp	nc		1.6	0.1
clearnose skate	73	0.1	147.1	0.8	hard clams	5	0.0	1.2	0.1
striped bass	73	0.1	186.8	1.0	comb jelly spp	24	0.2	1.2	0.1
smallmouth flounder	44	0.0	2.0	0.0	hydroid spp.	nc		1.1	0.1
alewife	38	0.0	2.0	0.0	arks	6	0.0	1.1	0.1
winter skate	19	0.0	34.1	0.2	mud crabs	nc		1.1	0.1
northern kingfish	11	0.0	2.3	0.0	northern moon snail	nc		1.0	0.1
Atlantic herring	10	0.0	1.1	0.0	rock crab	nc		0.8	0.1
American sand lance	7	0.0	0.1	0.0	surf clam	10	0.1	0.8	0.1
rough scad	7	0.0	0.6	0.0	red bearded sponge	nc		0.5	0.0
Atlantic cod	4	0.0	0.1	0.0	purple sea urchin	3	0.0	0.4	0.0
cunner	4	0.0	0.5	0.0	star coral	nc		0.2	0.0
hickory shad	4	0.0	1.3	0.0	anemones	nc		0.1	0.0
northern puffer	4	0.0	0.7	0.0	ghost shrimp	1	0.0	0.1	0.0
Atlantic mackerel	3	0.0	1.3	0.0	jingle shell clams	1	0.0	0.1	0.0
spiny dogfish	3	0.0	15.6	0.1	common oyster	nc		0.1	0.0
black drum	2	0.0	0.2	0.0	mixed sponge species	nc		0.1	0.0
Atlantic sturgeon	1	0.0	60.9	0.3	<b>Total</b>	<b>14,707</b>		<b>1,072.9</b>	
blue runner	1	0.0	0.1	0.0	Note: nc= not counted				
bigeye	1	0.0	0.1	0.0					
crevalle jack	1	0.0	0.1	0.0					
glasseye snapper	1	0.0	0.1	0.0					
inshore lizardfish	1	0.0	0.1	0.0					
naked goby	1	0.0	0.1	0.0					
Spanish mackerel	1	0.0	0.1	0.0					
oyster toadfish	1	0.0	0.3	0.0					
<b>Total</b>	<b>134,295</b>		<b>18,710.9</b>						

**Appendix 5.5: Endangered Species Interactions:** One (1) Atlantic sturgeon was captured on one (1) of the 144 tows completed in 2017; a lower encounter rate (0.69%) than average for the LISTS time series of tows (2.3%). The capture occurred at a site off the North shore of Long Island in 60-90' of water over mud bottom, and was reported to NMFS within 24 hours. The fish was released alive and uninjured. Details are provided below:

Sample	Date	Site	Tow Start	Duration (min)	Species	Total Length	Fork Length	Weight (kg)	Left Pec T-bar	Dorsal T-bar	PIT	Tissue Sample	Photo	Release time	Release lat (N)	Release lon (W)
FA2017013	9/25/2017	59-24	11:15	30	ATS	2,275	2,020	*			ADDED	YES	YES	12:10	40.9903	72.7898
* fish was too large to weigh																

**Appendix 5.6: Cold and warm temperate species captured in LISTS.** Thirty-three (33) species are included in the cold temperate group, while thirty-four (34) species are included in the warm temperate group. Cold temperate species are defined as being more abundant north of Cape Cod, MA than south of New York, behaviorally adapted to cold temperatures including subfreezing but prefers ~3-15<sup>0</sup>C, and spawns at lower end of temperature tolerance. Warm temperate species are defined as being more abundant south of New York than north of Cape Cod, MA, behaviorally avoids temperatures < 7-10<sup>0</sup>C; prefers ~11-22<sup>0</sup>C, and spawns at higher end of temperature tolerance.

Cold Temperate Group		Warm Temperate Group	
Common Name	Scientific Name	Common Name	Scientific Name
alewife	<i>Alosa pseudoharengus</i>	American eel	<i>Anguilla rostrata</i>
American plaice	<i>Hippoglossoides platessoides</i>	American shad	<i>Alosa sapidissima</i>
Atlantic herring	<i>Clupea harengus</i>	Atlantic bonito	<i>Sarda sarda</i>
Atlantic cod	<i>Gadus morhua</i>	Atlantic croaker	<i>Micropogonias undulates</i>
Atlantic mackerel	<i>Scomber scombrus</i>	Atlantic silversides	<i>Menidia menidia</i>
Atlantic salmon	<i>Salmo salar</i>	black seabass	<i>Centropristis striata</i>
Atlantic seasnail	<i>Liparis atlanticus</i>	blueback herring	<i>Alosa aestivalis</i>
Atlantic sturgeon	<i>Acipenser oxyrinchus</i>	bluefish	<i>Pomatomus saltatrix</i>
Atlantic tomcod	<i>Microgadus tomcod</i>	butterfish	<i>Peprilus triacanthus</i>
bamdoor skate	<i>Dipturus laevis</i>	clearnose skate	<i>Raja eglanteria</i>
cunner	<i>Tautoglabrus adspersus</i>	conger eel	<i>Conger oceanicus</i>
fawn cusk-eel	<i>Lepophidium profundorum</i>	gizzard shad	<i>Dorosoma cepedianum</i>
fourspot flounder	<i>Hippoglossina oblonga</i>	hickory shad	<i>Alosa mediocris</i>
grubby	<i>Myoxocephalus aeneus</i>	hogchoker	<i>Trinectes maculatus</i>
haddock	<i>Melanogrammus aeglefinus</i>	lined seahorse	<i>Hippocampus erectus</i>
little skate	<i>Leucoraja erinacea</i>	menhaden	<i>Brevoortia tyrannus</i>
longhorn sculpin	<i>Myoxocephalus octodecemspinosus</i>	naked goby	<i>Gobiosoma bosc</i>
lumpfish	<i>Cyclopterus lumpus</i>	northern kingfish	<i>Menticirrhus saxatilis</i>
monkfish (goosefish)	<i>Lophius americanus</i>	northern puffer	<i>Sphaeroides maculatus</i>
northern pipefish	<i>Syngnathus fuscus</i>	northern searobin	<i>Prionotus carolinus</i>
ocean pout	<i>Zoarces americanus</i>	oyster toadfish	<i>Opsanus tau</i>
pollock	<i>Pollachius virens</i>	scup (porgy)	<i>Stenotomus chrysops</i>
rainbow smelt	<i>Osmerus mordax</i>	sea lamprey	<i>Petromyzon marinus</i>
red hake	<i>Urophycis chuss</i>	smallmouth flounder	<i>Etropus microstomus</i>
rock gunnel	<i>Pholis gunnellus</i>	smooth dogfish	<i>Mustelus canis</i>
rockling	<i>Enchelyopus cimbrius</i>	spot	<i>Leiostomus xanthurus</i>
searaven	<i>Hemitripteris americanus</i>	spotted hake	<i>Urophycis regia</i>
spiny dogfish	<i>Squalus acanthias</i>	striped bass	<i>Morone saxatilis</i>
whiting (silver hake)	<i>Merluccius bilinearis</i>	striped cusk-eel	<i>Ophidion marginatum</i>
windowpane	<i>Scophthalmus aquosus</i>	striped searobin	<i>Prionotus evolans</i>
winter flounder	<i>Pseudopleuronectes americanus</i>	summer flounder	<i>Paralichthys dentatus</i>
winter skate	<i>Leucoraja ocellata</i>	tautog (blackfish)	<i>Tautoga onitis</i>
yellowtail flounder	<i>Limanda ferruginea</i>	white perch	<i>Morone Americana</i>
		weakfish	<i>Cynoscion regalis</i>