

Annual Report North Carolina CRFL Projects

Project No: 2143

Project Title: **North Carolina Division of Marine Fisheries Five-Year Project for Reoccurring Funds from the Marine Resource Fund**

Grant Duration: Start Date: 1 July 2007 End Date: 30 June 2012

Period Covered by This Report: Start Date: 1 July 2008 End Date: 30 June 2009

Project Costs:				
Proposed	CRFL: \$344,217	Grantee:	Total: \$344,217	
This Period	CRFL: \$205,553	Grantee:	Total: \$205,553	

Study/Job Title: **Job 4: Fisheries Independent Assessment Program**

Study/Job Objectives:

Objectives:

The Fisheries Reform Act of 1997 established a process for preparing coastal Fisheries Management Plans (FMP) in North Carolina. The goal of these plans is to ensure the long-term viability of the state's economically important species or fisheries. The purpose of this study is to augment the North Carolina Division of Marine Fisheries (NCDMF) ability to collect and analyze essential data used to produce the FMPs for recreationally important species and to help determine overfishing status, levels of spawning stock biomass, mortality, recruitment, and sustainable harvest levels which form the basis for all management actions recommended in FMPs. Specific objectives are:

1. To calculate annual indices of abundance in major North Carolina rivers and Atlantic Ocean for the following target species: American shad (*Alosa sapidissima*), Atlantic croaker (*Micropogonias undulatus*), bluefish (*Pomatomus saltatrix*), red drum (*Sciaenops ocellatus*), southern flounder (*Paralichthys lethostigma*), southern kingfish (*Menticirrhus americanus*), Spanish mackerel (*Scomberomorus maculatus*), spot (*Leiostomus xanthurus*), spotted seatrout (*Cynoscion nebulosus*), striped bass (*Morone saxatilis*), and weakfish (*Cynoscion regalis*). Catch per unit effort (CPUE) data from fishery independent surveys that standardizes effort will provide an unbiased relative index of abundance to track stock status. Target species may vary by river system.
2. To supplement samples for age, growth, and reproduction studies in order to determine age structure, sex ratios, and relative cohort size for the target species.
3. To evaluate catch rates and species distribution for identifying and resolving management problems in five North Carolina river systems and the Atlantic Ocean.
4. To characterize habitat use in those five river systems.

The goal is to maintain long-term fisheries independent surveys that will provide data on CPUE, catch composition, abundance, size, age, maturity, and mortality in the Neuse, Pamlico, Pungo, New, and Cape Fear rivers and Atlantic Ocean for important recreational species. Maintaining the integrity of and adding to existing times series will provide for improved stock assessments and, through more effective FMPs, the long-term viability of the recreational finfish fisheries.

Activity This Period (by River System):

Approach:

With the initiation of CRFL funds, ongoing Fisheries Independent Assessment (FIA) sampling in the Neuse, Pamlico and Pungo rivers continued with no break in coverage beginning in October 2007. Similar sampling in the two other rivers (New and Cape Fear) and the Atlantic Ocean had not occurred prior to CRFL funding and thus study personnel and equipment had to be procured and constructed as well as field testing a comparable sampling design suited to the southern area of the state. Thus, actual field sampling in the southern area did not begin until May 2008.

While the CRFL funds are awarded on a fiscal year basis the target species catch rates (and most assessments) are computed on an annual or calendar year basis. This progress report documents the sampling completed from July 2008 through June 2009. In addition, annual catch rates, species composition, and other statistics for 2007 (Pamlico area only) and 2008 (all systems) are computed. Each subsequent progress report will be similarly formatted, covering the previous calendar year. Data from adjacent river systems are reported on in the aggregate (Pamlico area and southern area).

The FIA employed a stratified-random sampling design based on area and water depth for each system. Sampling in the estuarine waters was divided into three regions: Pamlico/Pungo Region included areas of Pamlico River from Washington, North Carolina to the mouth of the Pamlico Sound (south of Wade Point) and the upper portion of the Pungo River from Haystack Point and west to Belhaven and south to Jordan Creek; Neuse Region included the Neuse River from New Bern to Oriental, North Carolina (from Old House Point south to Sandy Point); and Southern Region included New and Cape Fear rivers. Each region was overlaid with a one-minute by one-minute grid system (equivalent to one square nautical mile) and delineated into shallow (≤ 6 feet) and deep (> 6 feet) strata using bathymetric data from NOAA navigational charts and field observations. NCDMF staff also considered such factors as obstructions to fishing, safety, and accessibility when evaluating each grid for inclusion in the sampling. After grid delineation, each of the two regions was further segregated into four similar sized areas to insure that samples were evenly distributed throughout each region (Figure 1). In the Pamlico/Pungo region areas were assigned as follows: upper Pamlico (Washington, NC to Ragged Pt.), middle Pamlico (Ragged Pt. to Gum Pt.), lower Pamlico (Gum Pt. to Wades Pt.), and Pungo (Haystack Pt. south to Sandy Pt.). In the Neuse region areas were assigned as follows: upper Neuse (New Bern to Bay Pt.), upper-middle Neuse (Bay Pt. to Kennel Beach), lower-middle Neuse (Kennel Beach to Wilkinson Pt.), and lower Neuse (Wilkinson Pt. to Gum Thicket Shoal). The New River included an upper portion from Wilson Bay to Hines Point (line extending eastward to French's Creek) and a lower portion from Hines Point to the intersection of New River and the Intracoastal Waterway. The Cape Fear River was considered as one area from the northern end of US Army Corps of Engineer's Island 13 south to the mouth of the river.

The SAS procedure PLAN was used to randomly select sampling grids within each area (SAS Institute 1985). Sampling gear consists of an array of nets consisting of 30-yard segments of 3, 3½, 4, 4½, 5, 5½, 6, and 6½ inch stretched mesh webbing (240 yards of gill net per sample).

Catches from the array of gill nets combined together comprise a single sample. Gear was typically deployed within an hour of sunset and fished the following morning to keep all soak times at a standard 12 hours.

Physical and environmental conditions including surface and bottom water temperature ($^{\circ}\text{C}$), salinity (ppt), dissolved oxygen (mg/L), bottom composition, as well as a qualitative assessment of sediment size were recorded upon retrieval of the nets on each sampling trip. All attached submerged aquatic vegetation (SAV) in the immediate sample area was identified to species and density of coverage was estimated visually when possible. Additional habitat data recorded included distance from shore, presence or absence of sea grass or shell, and substrate type. All finfish groups were enumerated and an aggregate weight (nearest 0.01 kilogram (kg)) was obtained for most species. Individuals were measured to the nearest millimeter for either fork or total length according to the morphology of the species. Selected species were retained and taken to the lab where age structures (otoliths and/or scales) were removed and sex and maturity stage of gonads were determined. Stomach content was also recorded for several species. Live Atlantic sturgeon (*Acipenser oxyrinchus*), red drum, and striped bass captured in good condition were to be tagged and released in support of other Division studies.

Catch rates of target species were calculated annually and expressed as an overall catch per unit effort (CPUE) along with corresponding length class distributions. The overall CPUE gives an estimate of abundance showing availability of each species to the study, while the length distribution estimates show the size structure of each species for a given year. The overall CPUE was defined as the number of a species of fish captured per sample and was further expressed as the number of a species of fish at length per sample, with a sample being one array of nets. The Southern Region CPUE was defined as the number of a species of fish captured per sample hour and was further expressed as the number of a species of fish at length per sample hour. Due to disproportionate sizes of each strata and region, the final CPUE estimate was weighted. The total area of each region by strata was quantified using the one-minute by one-minute grid system and then used to weight the observed catches for calculating the abundance indices. The weighting factors by region and for the three regions are:

Pamlico/Pungo River 1: Shallow water - 44 square nautical miles
Pamlico/Pungo River 2: Deep water - 38 square nautical miles
Neuse River 1: Shallow water - 36 square nautical miles
Neuse River 2: Deep water - 31 square nautical miles
New River 1: Shallow water - 12 square nautical miles
New River 2: Deep water - 12 square nautical miles
Cape Fear River: Shallow water - 14 square nautical miles

The core samples taken each month ($n=32$) were used in the calculations of the annual weighted CPUE index (see Appendix 1 for additional details).

The Atlantic Ocean was separated into three areas including the Topsail Area which was designated from a line extending southwest off New River Inlet south to a line extending southwest off Rich's Inlet; Masonboro Area extended from Rich's Inlet to Frying Pan Shoals; and Brunswick Area extended from Frying Pan Shoals to the North Carolina/South Carolina border.

The SAS procedure PLAN was used to randomly select sampling grids within each area (SAS Institute 1985). Sampling gear consists of an array of nets consisting of 30-yard segments of 2

½, 3, 3½, 4, 4½, 5, 5½, 6, and 6½ inch stretched mesh webbing (270 yards of gill net per sample). Catches from the array of gill nets combined together comprise a single sample. Gear was typically deployed within an hour of sunset and fished the following morning to keep all soak times at a standard 12 hours during from October through March and two hours from April through September (sampling was modified in July 2008).

The Atlantic Ocean CPUE was defined as the number of a species of fish captured per sample hour and was further expressed as the number of a species of fish at length per sample hour. Due to disproportionate sizes of each strata and region, the final CPUE estimate was weighted. The total area of each region by strata was quantified using the one-minute by one-minute grid system and then used to weight the observed catches for calculating the abundance indices. The weighting factors by region and for the three areas are:

Topsail: 86 square nautical miles
Masonboro: 76 square nautical miles
Brunswick: 90 square nautical miles.

Details for the calculation of the CPUE are given in Appendix 1.

Results:

Pamlico/Pungo and Neuse Rivers Sampling Results:

For the Neuse and Pamlico/Pungo rivers 32 samples were completed (8 areas x twice a month x 2 samples-shallow and deep) each full month (Figure 1 and Table 1). With the winter hiatus in sampling (15 December- 15 February), a total of 320 samples were obtained yearly. Samples collected in 2007 and 2008 included 160 shallow and 160 deep samples in Pamlico/Pungo rivers, and 160 shallow and 160 deep samples in Neuse River (Table 1).

Pamlico/Pungo and Neuse Rivers Environmental Data Results:

In 2007 the annual average salinities were similar in Pamlico/Pungo (mean: 9.6 ppt; range: 0.1-20.9 ppt) and Neuse rivers (mean: 10.5 ppt; range: 0.1-22.1 ppt) (Table 2). The highest mean salinities occurred during December for Pamlico/Pungo rivers (18.7 ppt) and for Neuse River (17.3 ppt) while the lowest average salinities occurred in March for both Pamlico/Pungo rivers (4.0 ppt) and Neuse River (2.9 ppt). Water temperatures were similar in both areas, with the mean seasonal temperatures ranging from 5.3-33.7 °C in Pamlico/Pungo rivers and 5.8-32.8 °C in Neuse River. The coldest mean monthly water temperatures occurred during February for both areas. The warmest mean water temperatures occurred during August for both Pamlico/Pungo rivers and Neuse River. The lowest mean dissolved oxygen level occurred in July for Pamlico/Pungo rivers at 5.6 mg/L and in October for Neuse River at 6.0 mg/L. Dissolved oxygen levels were similar in both regions throughout the sample year and were generally lowest during the late summer months when water temperatures were highest.

In 2008 the annual average salinities were similar in Pamlico/Pungo (mean: 13.5 ppt; range: 0.1-23.5ppt) and Neuse rivers (mean: 12.5 ppt; range: 0.2-26.1 ppt) (Table 2). The highest mean salinities occurred during November for Pamlico/Pungo rivers (18.8 ppt) and August for Neuse River (18.2 ppt) while the lowest average salinities occurred in May for both Pamlico/Pungo rivers (8.4 ppt) and Neuse River (7.7 ppt). Water temperatures were similar in

both areas, with the mean seasonal temperatures ranging from 6.8-32.6 °C in Pamlico/Pungo rivers and 7.4-33.3 °C in Neuse River. The coldest mean monthly water temperatures occurred during December for both areas. The warmest mean water temperatures occurred during August for both Pamlico/Pungo rivers and Neuse River. The lowest mean dissolved oxygen level occurred in June and September for Pamlico/Pungo rivers at 5.1 mg/L and in July for Neuse River at 5.3 mg/L. Dissolved oxygen levels were similar in both regions throughout the sample year and were generally lowest during the late summer months when water temperatures were highest.

Pamlico/Pungo and Neuse Rivers Species Composition:

In 2007 31,856 individuals, including 56 fish species were captured from 320 samples (Table 3). Atlantic menhaden (*Brevoortia tyrannus*) was the most abundant species and accounted for 62.5% of the total catch by number. Target species represented 13.9% of the total catch by number and included American shad (0.2%), Atlantic croaker (0.8%), bluefish (6.4%), red drum (2.1%), southern flounder (1.7%), southern kingfish (<0.1%), Spanish mackerel (<0.1%) spot (0.8%), spotted seatrout (0.5%), striped bass (1.3%), and weakfish (0.2%). Anadromous species such as hickory shad (*A. mediocris*, 1.5%) were available to the survey for a short period of time during their spring spawning migrations. Cownose ray (*Rhinoptera bonasus*, 1.6%) was the most common shark/ray species. Invertebrate species of interest included blue crab (*Callinectes sapidus*, 2.8%) and horseshoe crab (*Limulus polyphemus*, <0.1%). Other species of interest included, striped mullet (*Mugil cephalus*, 3.4%) and summer flounder (*Paralichthys dentatus*, <0.1%).

In 2008 22,559 individuals, including 62 finfish species, were captured from 320 samples (Table 4). Atlantic menhaden was the most abundant species and accounted for 29.3% of the total catch by number. Target species represented 18.4% of the total catch by number and included American shad (0.1%), Atlantic croaker (0.8%), bluefish (8.0%), red drum (1.7%), southern flounder (3.8%), southern kingfish (0.1%), Spanish mackerel (0.6%), spot (1.1%), spotted seatrout (0.6%), striped bass (1.4%), and weakfish (0.2%). Anadromous species such as and hickory shad (*A. mediocris*, 1.6%) were available to the survey for a short period of time during their spring spawning migrations. Cownose ray (*Rhinoptera bonasus*, 3.8%) was the most common shark/ray species. Invertebrate species of interest included blue crab (*Callinectes sapidus*, 2.9%) and horseshoe crab (*Limulus polyphemus*, <0.1%). Other species of interest included striped mullet (*Mugil cephalus*, 1.8%) and summer flounder (*Paralichthys dentatus*, <0.1%).

Pamlico/Pungo and Neuse Rivers Species Habitat Use:

Species abundance and weighted CPUE estimates for both regions and years demonstrated higher catch rates in shallow water habitat (≤ 6 ft) versus deep water habitat (> 6 ft) for most of the target species (Tables 5 and 6). From the 160 shallow and 160 deep samples collected in 2007 (shallow:deep ratio) American shad (0.11:0.41), Atlantic croaker (1.38:0.15), red drum (3.92:0.07), southern flounder (2.73:0.71), spot (1.49:0.06), spotted seatrout (0.68:0.34), and striped bass (2.15:0.51) were all more abundant in the shallow habitat. Bluefish (2.54:10.22) southern kingfish (0.01:0.03), Spanish mackerel (0.01:0.52), and weakfish (0.08:0.27) were more abundant in the deep habitats.

From the 160 shallow and 160 deep samples collected in 2008 (shallow:deep) Atlantic croaker (1.57:0.14), red drum (3.08:0.27), southern flounder (5.26:2.54), spotted seatrout (0.75:0.50),

spot (2.08:0.17) and striped bass (2.08:0.71) were all more abundant in the shallow habitat. American shad (0.07:0.19), bluefish (3.55:12.06), southern kingfish (0.01:0.12), Spanish mackerel (0.03:1.18), and weakfish (0.07:0.30) were more abundant in the deep habitats.

Pamlico/Pungo and Neuse Rivers Gill Net Mortality and Regulatory Bycatch:

In 2007 and 2008 mortality rates for most target species in large mesh gill nets ($\geq 5''$ stretch mesh) were highest during the summer and decreased with decreasing water temperatures in the spring/fall and winter (Tables 7 and 8). The spring/fall and summer periods had the highest mortality rates for bluefish (63-95%), spotted seatrout (38-49%), striped bass (18-100%), and weakfish (33-100%). For all seasons the lowest species mortality rates were for southern flounder (0-36%). While mortality rates were generally lowest in the winter fewer fish were collected in large mesh gill nets during this period. Red drum captured under the legal size limit ($<18''$ TL) had the highest mortality rates in the summer (50%) and the lowest in the winter (4%). Red drum over the legal size limit ($>27''$ TL) had mortality rates of 0% in winter, 50% in the spring/fall, and 33% in the summer; although it should be noted these results are based on a low sample number ($n=11$), with only 1 individual captured in the winter. No sub-legal spotted seatrout ($<12''$ TL) were taken in large mesh gill nets during 2007 and 2008. Nine sub-legal striped bass ($<18''$ TL) were taken in large mesh gill nets during 2007 and 2008. Sub-legal weakfish ($<12''$ TL) had high mortality rates ranging from 100% in spring/fall and 86% in the summer.

In 2007 and 2008 overall mortality rates by season for small mesh gill nets ($<5''$ stretch mesh) were slightly higher for most species when compared to the corresponding mortality rates for large mesh gill nets (Tables 9 and 10). Mortality rates fluctuated seasonally for bluefish (38-100%), spotted seatrout (0-66%), striped bass (26-88%), weakfish (40-100%), and during the spring/fall and summer periods for Atlantic croaker (33-67%) and red drum (30-65%). Southern flounder mortality rates were the lowest ranging from 0-42%. Sub-legal fish taken in small mesh gill nets made up a larger percentage of the overall catch, and generally had higher mortality rates, than did sub-legal fish taken in large mesh gill nets. Sub-legal red drum accounted for 78% of all red drum captured and mortality rates ranged from 17-72% by season. For all seasons combined dead sub-legal red drum accounted for 13% of all red drum captured in small mesh gill nets. Fourteen red drum were captured that exceeded the legal size limit with an overall 7% mortality. The small mesh gill net mortality rate for sub-legal striped bass varied by season (25-91%). Sub-legal striped bass comprised 47% of all striped bass captured. Undersized southern flounder ($<14''$ TL) accounted for 85% of all southern flounder in small mesh captured. Mortality ranged from a high of 43% in summer to a low of 0% in winter. No undersized spotted seatrout were taken by small mesh gill net samples during 2007 or 2008. Mortality rates were highest for sub-legal weakfish during the spring/fall and summer (67-100%).

Pamlico/Pungo and Neuse Rivers Weighted CPUE Estimates by Size Class Distribution:

In 2007 American shad had an annual weighted CPUE of 0.21 individuals per sample (Table 11). Lengths ranged from 206-488 mm TL (Figure 2). In 2008 American shad had an annual weighted CPUE of 0.13 individuals per sample (Table 11). Lengths ranged from 271-501 mm TL (Figure 2).

In 2007 Atlantic croaker had an annual weighted CPUE of 0.81 individuals per sample (Table 11). Lengths ranged from 99-340 mm TL (Figure 3). In 2008 Atlantic croaker had an annual

weighted CPUE of 0.91 individuals per sample (Table 11). Lengths ranged from 91-410 mm TL (Figure 3).

In 2007 bluefish was the most abundant target species captured with a weighted CPUE of 6.09 individuals per sample (Table 11). Bluefish ranged from 90-460 mm FL, with a mean length of 248 mm FL (Figure 4). In 2008 bluefish was the most abundant target species captured with a weighted CPUE of 7.49 individuals per sample (Table 11). Bluefish ranged from 94-484 mm FL, with a mean length of 272 mm FL (Figure 4).

In 2007 red drum had a weighted CPUE of 2.13 individuals per sample, the second highest for target species. Red drum ranged in length from 211-1,207 mm FL, with most individuals between 330-650 mm FL (Table 11; Figure 5). In 2008 red drum had a weighted CPUE of 1.78 individuals per sample, the third highest for target species. Red drum ranged in length from 200-1,244 mm FL, with most individuals between 330-550 mm FL (Table 11; Figure 5).

In 2007 southern flounder annual weighted CPUE was 1.79 individuals per sample (Table 11). Overall lengths ranged from 166-570 mm TL with a mean length of 318 mm TL (Figure 6). In 2008 southern flounder annual weighted CPUE was 3.99 individuals per sample (Table 11). Overall lengths ranged from 140-570 mm TL, with a mean length of 311 mm TL (Figure 6).

In 2007 southern kingfish had an annual weighted CPUE of 0.02 individuals per sample (Table 11). Lengths ranged from 220-271 mm TL. In 2008 American shad had an annual weighted CPUE of 0.06 individuals per sample (Table 11). Lengths ranged from 205-325 mm TL. Due to low sample sizes length frequency was not provided for southern kingfish.

In 2007 Spanish mackerel had an annual weighted CPUE of 0.24 individuals per sample (Table 11). Lengths ranged from 201-553 mm TL (Figure 7). In 2008 Spanish mackerel had an annual weighted CPUE of 0.57 individuals per sample (Table 11). Lengths ranged from 138-598 mm TL (Figure 7).

In 2007 spot was the fourth most abundant target species taken in the study with an annual weighted CPUE of 0.83 individuals per sample (Table 11). Sizes ranged from 128-390 mm FL with over 90% of the individuals ranging from 200-250 mm (Figure 8). In 2008 spot was the fifth most abundant target species taken in the study with an annual weighted CPUE of 1.19 individuals per sample (Table 11). Sizes ranged from 117-326 mm FL with over 90% of the individuals ranging from 200-250 mm (Figure 8).

In 2007 spotted seatrout weighted catch rates were 0.52 individuals per sample (Table 11). Sizes ranged from 262-684 mm FL, with a mean length of 405 mm FL (Figure 9). In 2008, spotted seatrout weighted catch rates were 0.63 individuals per sample (Table 11). Sizes ranged from 262-706 mm FL, with a mean length of 417 mm FL (Figure 9).

In 2007 striped bass was the third most abundant target species captured with a weighted CPUE of 1.39 individuals per sample (Table 11). Striped bass ranged from 162-685 mm FL, with a mean length of 444 mm FL. A few larger striped bass (>600 mm FL) were captured (Figure 10). In 2008 striped bass was the fourth most abundant target species captured with a weighted CPUE of 1.45 individuals per sample (Table 11). Striped bass ranged from 250-1,136 mm FL, with a mean length of 450 mm FL. A few larger striped bass (>750 mm FL) were captured (Figure 10).

In 2007 weakfish annual weighted CPUE was 0.17 individuals per sample (Table 11). Sizes ranged from 151-414 mm FL, with a mean length of 286 mm FL (Figure 11). In 2008 weakfish annual weighted CPUE was 0.18 individuals per sample (Table 11). Sizes ranged from 169-550 mm FL, with a mean length of 319 mm FL (Figure 11).

Annual weighted CPUE for target species from 2003 to 2008 for the Pamlico/Pungo and Neuse rivers in Figure 12 provide species abundance trends through time. Among the target species southern flounder, bluefish and spotted seatrout have increased in recent years while spot, Atlantic croaker, red drum, striped bass and weakfish have remained relatively steady.

Pamlico/Pungo and Neuse Rivers Collection of Age Structures and Tagging

From February 15, 2007 through December 15th, 2008 1,638 specimens were processed and sent to the age and growth laboratory in Morehead City for analysis. In all 1,638 age structures (otoliths and/or scales) along with fish length and weight (kg) measurements were collected (Table 12). Age samples collected are incorporated into existing aging programs for each species. When appropriate sex and maturity stages were macroscopically determined from gonads and incorporated into existing life history programs. Age samples for American shad, Atlantic croaker, red drum, southern flounder, spot, spotted seatrout, Spanish mackerel, and weakfish are available for annual age-length keys. Also, 333 red drum and 96 striped bass were tagged throughout these rivers.

New and Cape Fear Rivers Results:

For the Southern Region (New and Cape Fear rivers) 12 samples were completed (New River 2 areas x twice a month x 2 samples-shallow and deep and Cape Fear - 1 area x twice a month x 2 shallow samples) most months (Table 13). Fifty-two samples were collected from New River with 26 from the upper and 26 from the lower (Figure 13). Twenty-eight samples were collected from the Cape Fear River. In the first half of 2009, all sampling targets have been reached.

New and Cape Fear Rivers Environmental Data Results:

Environmental parameters were similar among the two river systems in the Southern Region in 2008 (Table 14). Salinities averaged 20.9 ppt and ranged from 6.5 to 33.1 ppt. The highest mean salinity occurred in October in the New River (23.3 ppt) and August in the Cape Fear River (23.8 ppt). The lowest mean salinity occurred in May in the New (16.4 ppt) and Cape Fear rivers (15.4 ppt). The water temperature in the two river systems averaged 23.5 °C and ranged from 9.3 to 34 °C. The warmest mean water temperature occurred in August in the New (31.3 °C) and Cape Fear rivers (29.5 °C). The coldest mean water temperatures were observed in December in both rivers (11.2 °C). The dissolved oxygen averaged 6.3 mg/L and ranged from 1.5 to 9.8 mg/L. The highest mean dissolved oxygen occurred in December in the New (9.0 mg/L) and Cape Fear rivers (8.9 mg/L). The lowest mean dissolved oxygen occurred in August in the New River (5.0 mg/L) and July and August in the Cape Fear (5.0 mg/L). New River typically had lower minimum and higher maximum dissolved oxygen levels than the Cape Fear River from May to October.

New and Cape Fear Rivers Species Composition:

In 2008, 4,402 individuals including 47 fish species were observed (Table 15a and 15b). The most abundant species was Atlantic menhaden (1,083) and accounted for 24.6% of the total

number of individuals. The targeted species accounted 32.0% of the total number of individuals and included American shad (0%), Atlantic croaker (1.5%), bluefish (9.9%), red drum (9.0%), southern flounder (5.7%), southern kingfish (0.2%), Spanish mackerel (1.3%), spot (3.0%), spotted seatrout (1.2%), striped bass (<0.1%), and weakfish (0.2%),. The most abundant shark/ray species was the Atlantic sharpnose shark (*Rhizoprionodon terraenovae*, 6.0%). Invertebrate species of interest included blue crab (10.6%), Florida stone crab (*Menippe mercenaria*, 0.3%), and horseshoe crab (<0.1%). Other species of interest include Atlantic sturgeon (*Acipenser oxyrinchus*) (<0.1%), Gulf (*Paralichthys albigutta*) and summer flounders (<0.1%), and Kemp's ridley seaturtle (*Lepidochelys kempi*) (<0.1%).

New and Cape Fear Rivers Habitat Use:

Species abundance was higher in the deep water habitats (>6 ft, 32 samples) than the shallow water habitats ($\leq$ 6 ft, 60 samples) when total number of target fish was adjusted for the unbalanced number of samples (Table 16). The ratio of weighted CPUE for targeted species (shallow water habitats:deep water habitats) were usually similar among habitats although a higher number of targeted species had higher weighted CPUEs in deep water habitats. Atlantic croaker (0.20:0.05), red drum (0.81:0.15), southern kingfish (0.01:<0.01), and striped bass (<0.01:0.00) had higher CPUEs in shallow water habitats. Bluefish (0.22:1.52), southern flounder (0.33:0.41), Spanish mackerel (0.01:0.37), spot (0.20:0.30), spotted seatrout (0.07:0.08), and weakfish (<0.01:0.03) had higher CPUEs in deep water habitats.

New and Cape Fear Rivers Gill Net Mortality and Regulatory Bycatch:

The small mesh gill nets (<5 inch stretched mesh) had a higher number of individuals and species caught than larger mesh gill nets ($\geq$ 5 inch stretched mesh, Table 17). In the small mesh nets, the mortality rates for the targeted species was usually higher over all seasons (Table 18). Atlantic croaker mortality rates were similar to spot in large mesh nets (67% and 0%). Atlantic croaker caught in small mesh nets ranged from 38% (summer) to 67% (spring and fall). Bluefish had high mortality rates over all seasons ranging from a low of 79% to a high of 90%. Red drum mortality rates were lowest in the winter (25%) and increased during the rest of the year (43-64%) in both mesh sizes. Southern flounder had mortalities less than 14% over all seasons in large and small mesh gillnets. Few spot were observed in large mesh nets. Spot caught in large mesh during April, May, October, and November had a mortality of 57% while in summer (June-September) no mortalities were observed in the four fish caught. Spot caught in small mesh nets had modest mortality rates ranging from 18 to 22%. Only one spotted seatrout was observed in large mesh nets. Spotted seatrout caught in small mesh nets had high mortalities (52-69%). Very few striped bass were caught (n=3) in the Southern Region. Two of these fish died in large mesh gill nets in the Cape Fear River where there is a harvest moratorium on striped bass. Weakfish were only caught in small mesh nets and had high mortality rates (50-52%).

A total of 429 individuals from only two of the targeted species (red drum and southern flounder) were under or over legal size limits. Most of the individuals were undersized red drum in small mesh gill nets (221 fish). These undersized red drum had mortalities ranging from 29% in the winter to a high of 63% mortality in May, October, and November. One mortality of an oversized red drum occurred in a small mesh gill net during the summer. Southern flounder typically had low discard mortality rates in both mesh sizes. The highest discard mortality rate occurred in small mesh gill nets during the summer (16%). Spotted seatrout and weakfish had no discards of undersized fish.

New and Cape Fear Rivers Weighted CPUE Estimates by Size Class Distribution:

No American shad were caught in New or Cape Fear rivers in 2008.

Atlantic croaker were the eleventh most abundant fish species and had an annual weighted CPUE of 0.16 individuals per sample hour in 2008 (Table 19). Atlantic croaker had a modal size of 260 mm TL and ranged from 120 to 334 mm TL (Figure 14).

Bluefish were the second most abundant fish species and had an annual weighted CPUE of 0.62 individuals per sample hour in 2008 (Table 19). Bluefish had a modal size of 280 mm FL and ranged from 106 to 717 mm FL (Figure 15).

Red drum were the third most abundant fish species and had an annual weighted CPUE of 0.58 individuals per sample hour in 2008 (Table 19). Red drum had a modal size of 350 mm FL and ranged from 155 to 702 mm FL (Figure 16).

Southern flounder were the seventh most abundant fish species and had an annual weighted CPUE of 0.35 individuals per sample hour in 2008 (Table 19). Southern flounder had a modal size of 290 mm TL and ranged from 185 to 680 mm TL (Figure 17).

Southern kingfish had an annual weighted CPUE of 0.01 individuals per sample hour in 2008. Only eight southern kingfish were caught (Table 19). The lengths ranged from 294 to 418 mm TL (Figure 18).

Spanish mackerel had an annual weighted CPUE of 0.12 individuals per sample hour in 2008 (Table 19). Spanish mackerel had a modal size of 360 mm FL and ranged from 195 to 597 mm FL (Figure 19).

Spot were the eighth most abundant fish species and had an annual weighted CPUE of 0.23 individuals per sample hour in 2008 (Table 19). Spot had a modal size of 260 mm FL and ranged from 120 to 334 mm FL (Figure 20).

Spotted seatrout had an annual weighted CPUE of 0.08 individuals per sample hour in 2008 (Table 19). Spotted seatrout had a modal size of 350 mm FL and ranged from 243 to 633 mm FL (Figure 21).

Striped bass had an annual weighted CPUE of <0.01 individuals per sample hour in 2008 (Table 19). Only three striped bass were caught with lengths of 648, 698, and 705 mm FL.

Weakfish had an annual weighted CPUE of 0.01 individuals per sample hour in 2008 (Table 19). Only six weakfish were caught with lengths ranging from 323 and 421 mm FL (Figure 22).

New and Cape Fear Rivers Collection of Age Structures and Tagging

From May through December 15th, 2008, 1,156 specimens were processed and sent to the age and growth laboratory in Morehead City for analysis. Age structures (otoliths and/or scales) were taken from Atlantic croaker, bluefish, gulf flounder, red drum, southern flounder, Spanish mackerel, spot, spotted seatrout, striped mullet, summer flounder, and weakfish along with fish

length and weight (kg) measurements (Table 20). Age samples collected were incorporated into existing aging programs for each species. When appropriate sex and maturity stages were macroscopically determined from gonads and incorporated into existing life history programs.

Atlantic Ocean Results:

The Atlantic Ocean should have consisted of 6 samples to be completed each quarter (3 areas twice per quarter, Table 21). The three areas included the Topsail, Masonboro, and Brunswick areas (Figure 23). Only three samples during the first half of the year because sampling did not begin until May half way through the second sampling period. In July 2008, a sea turtle was captured in the ocean and to minimize interactions sampling was reduced during that sampling period. Sampling was redesigned to have two hours sets in the early morning. These sets differ from the estuarine sets in the Southern Region because of the additional safety concerns with sampling in the ocean. In the Fall 2008 sampling period (October-December), sampling shifted back to overnight sets and all samples were completed. In the first half of 2009, all sampling targets (n=12) have been reached.

Atlantic Ocean Environmental Data Results:

The salinities in the Atlantic Ocean averaged 33.5 ppt on the sampling days (Table 22). The highest average salinity occurred in the Summer sampling period (July-September, 34.6 ppt). The lowest average salinity occurred in the Fall sampling period (October-December, 32.8 ppt). The average temperature was 34.8 C. The highest average temperature occurred in the Summer sampling period. The lowest average temperature occurred in the Fall sampling period. The average dissolved oxygen level was 6.6 mg/L. The highest mean dissolved oxygen level occurred in Fall period (7.6 mg/L). The lowest mean dissolved oxygen occurred in Summer sampling period (5.2 mg/L).

Atlantic Ocean Species Composition:

A total of 1,541 individuals was captured in 2008 including individuals from 50 fish species (Tables 23 a-c). Atlantic sharpnose shark accounted for the greatest number of individuals (503). Atlantic croaker accounted for the highest number of individuals for the targeted species (104). Totals for the other targeted species included: American shad (0), bluefish (23), red drum (0), southern flounder (9), southern kingfish (103), Spanish mackerel (39), spot (37), spotted seatrout (0), and weakfish (23). Sharks and rays accounted for 940 individuals (61.0%). Invertebrate species of interest included blue crab (5), Florida stone crab (2), horseshoe crab (3), and white shrimp (4). Other species of interest included black sea bass (12), Gulf flounder (1), smooth dogfish (58), spiny dogfish (194), summer flounder (1), and Kemp's ridley seaturtle (1).

Atlantic Ocean Gill Net Mortality and Regulatory Bycatch:

Very few target species were observed in the large mesh gill nets (18 fish, Table 24). The small mesh gill nets captured 327 individuals of the targeted species (Table 25). Gill net mortality in small mesh gill nets varied by species but most species had an at net mortality rate greater than 50%. Atlantic croaker had the highest mortality rate during the spring (94%) and lowest rate in the fall (32%). Bluefish had mortality rates of 100% in the spring and fall and was slightly lower

in the summer (75%). Southern flounder had mortality rates ranging from 33 to 50% but few southern flounder were observed (5 fish). Southern kingfish experienced high mortality rates across all seasons ranging from 89 to 100%. Spanish mackerel experienced 100% mortality rates over all seasons. Spot had lowest mortality rate in the summer (29%) and increased to 100% in the spring. Weakfish had a mortality rate of 70% in the fall and 100% in the spring.

A total of 22 fish were below legal size limits for three of the targeted species (southern flounder, Spanish mackerel, and weakfish). Sub-legal southern flounder experienced a 33% mortality at the net. Only one sub-legal Spanish mackerel was caught. Sub-legal weakfish were caught in large (1 fish) and small mesh gillnets (14 fish). The one sub-legal weakfish in large mesh gill nets was alive upon net retrieval. Over 90% of the sub-legal weakfish in the small mesh gill nets were dead upon net retrieval.

Atlantic Ocean Weighted CPUE Estimates by Size Class Distribution:

No American shad were caught in ocean.

Atlantic croaker had an annual weighted CPUE of 0.67 individuals per sample hour (Table 26). Atlantic croaker had a modal size of 210 mm TL and ranged from 140 to 242 mm TL (Figure 24).

Bluefish had an annual weighted CPUE of 0.13 individuals per sample hour (Table 26). Bluefish had a modal size between 240 and 250 mm FL and ranged from 230 to 327 mm FL (Figure 25).

No red drum were caught in the ocean.

Southern flounder had an annual weighted CPUE of 0.05 individuals per sample hour (Table 26). Southern flounder had only nine measurements and no modal size. Southern flounder ranged from 237 to 442 mm TL (Figure 26).

Southern kingfish had an annual weighted CPUE of 0.74 individuals per sample hour (Table 26). Southern kingfish had a modal size of 300 mm TL and ranged from 235 to 397 mm TL (Figure 27).

Spanish mackerel had an annual weighted CPUE of 0.27 individuals per sample hour (Table 26). Spanish mackerel had a modal size of 320 mm FL and ranged from 298 to 489 mm FL (Figure 28).

Spot had an annual weighted CPUE of 0.20 individuals per sample hour (Table 26). Spot had a modal size of 190 mm FL and ranged from 158 to 206 mm FL (Figure 29).

No spotted seatrout were caught in the ocean.

No striped bass were caught in the ocean.

Weakfish had an annual weighted CPUE of 0.15 individuals per sample hour (Table 26). Weakfish had a modal size of 275 mm FL and ranged from 200 to 375 mm FL (Figure 30).

Atlantic Ocean Collection of Age Structures and Tagging

From May through December 2008, 286 specimens were processed and sent to the age and growth laboratory in Morehead City for analysis. Age structures (otoliths and/or scales) were taken from Atlantic croaker, bluefish, Gulf flounder, Gulf kingfish, northern kingfish, southern flounder, southern kingfish, Spanish mackerel, spot, summer flounder, and weakfish along with fish length and weight (kg) measurements (Table 27). Age samples collected were incorporated into existing aging programs for each species. When appropriate sex and maturity stages were macroscopically determined from gonads and incorporated into existing life history programs.

Neither red drum nor striped bass were captured or tagged in the ocean. Four sharks from three species were tagged in a cooperative agreement with National Marine Fisheries Service COASTSPAN Project.

Deviations:

Pamlico/Pungo and Neuse Rivers:

None, all sampling requirements were successfully completed.

New and Cape Fear Rivers:

The sampling regime changed due to interactions with sea turtles in July 2008. In order to minimize turtle interactions, future sampling for the southern area will be divided into two sampling designs with different net soak times. Gillnet samples during the fall and winter (October to March) will be set overnight (~12 hours). Samples from the spring and summer (April to September) will be set for four hours beginning two hours before sunset. This change in the effort parameter will hinder CPUE analysis for data collected prior to August 2008. Sampling took place in the upper part of New River in July 2008 to determine if early morning or late evening sets would catch the highest number of fish. It was determined that the sunset catches were higher; and therefore, the preferred sampling time period. Additionally, target species such as red drum and spotted seatrout were higher.

Atlantic Ocean:

Only three samples were taken during the initial sampling period. Time constraints (sampling did not begin until May) and weather conditions did not allow the completion of all anticipated samples. Similar to the Southern Region river sampling design, the ocean sampling had to be changed due to interactions with sea turtles. Future sampling for the ocean in the southern area will be divided into two sampling designs with different net soak times. Gillnet samples during the fall and winter (October to March) will be set overnight (~12 hours). Samples from the spring and summer (April to September) will be set for two to three hours beginning one hour after sunrise. This change in the effort parameter will hinder CPUE analysis for data collected prior to August 2008.

Planned Activities:

Neuse, Pamlico, and Pungo Rivers:

Completion of 32 samples each month, equipment maintenance, data recording and quality control measures, review, and analysis of 2009 data to be reported in 2010 CRFL Progress Report.

New and Cape Fear Rivers:

Completion of 12 samples each month, equipment maintenance, data recording and quality control measures, review, and analysis of 2009 data to be reported in 2010 CRFL Progress Report.

Atlantic Ocean:

Completion of 6 samples quarterly, equipment maintenance, data recording and quality control measures, review, and analysis of 2009 data to be reported in 2010 CRFL Progress Report.

Sea Turtle Interactions:

A total of 4 sea turtle interactions has occurred during this project (Table 28). One sea turtle interaction took place from July 1, 2007 to June 30, 2009 in the Neuse River. In June and July 2008, three Kemp's ridley turtle were taken with one each in the New River, Cape Fear River, and Atlantic Ocean. To minimize future interactions and to limit future alterations of sampling, sampling in the Southern Region and Atlantic Ocean was changed to have staff in close proximity of the gillnets while nets were set. Staff remains with gill nets from June through September to immediately remove any sea turtles entangled in gill nets.

Benefits:

The Fisheries Reform Act of North Carolina requires that North Carolina develop fishery management plans for all commercially and recreationally significant species. The primary benefit of this kind of survey will be realized in the development of fishery management plans once enough years of data are collected to develop long-term indices of abundance. This project will provide independent data to tune and calibrate stock assessments, provide age samples to describe age composition, estimate length and age at maturity, describe species habitat utilization patterns, and define management units for fishery management plans. Data from this project have been used in the development of a state FMP for spotted seatrout and will be used in upcoming FMP revisions for estuarine striped bass, southern flounder and blue crabs. Recent Atlantic States Marine Fisheries Commission (ASMFC) stock assessments for Atlantic croaker and red drum have incorporated FIA indices into their assessments. Annual abundance indices are now provided as part of the ASMFC compliance reports for horseshoe crabs, Atlantic sturgeon, bluefish, red drum, and weakfish.

Habitat data, which includes distance from shore, presence or absence of sea grass or shell, and substrate type, have been recorded during this study. Habitat data of this type is an important factor in the Division's analysis to establish Strategic Habitat Areas (SHA) designations. This study has documented capture location and habitat data from 413 samples in 2008 that captured over 50 species of fish and several species of invertebrates. The SHA designation process can combine abundance data with habitat maps to determine the benefit of protecting certain habitats. Currently SHAs are being designated using the MARXAN program which utilizes decision-based algorithms. The more data that can be provided to the model, the more likely the results of the model will accomplish the goals of establishing the SHA designation process.

Age and growth studies of several species and tagging studies have been benefited by this program. Aging samples were collected over a wide area and broad time frame to provide information on age composition, seasonal growth patterns, and seasonal maturity throughout the state. Tagging studies conducted in North Carolina now have consistent sampling effort to

mark and recapture a variety of fishes including Atlantic sturgeon, red drum, striped bass, and a variety of shark species. This information can be used to describe migration patterns for these species as well as define stock structure and management units for North Carolina and federal fishery management plans. Although the current time frame only encompasses two years of data for the FIA program, overtime the data collected in FIA program will provide North Carolina with a sampling program to provide critical data for successful and sustainable fisheries management.

Table 1. Number of gill net samples collected from February 2007-June 2009, in Pamlico/Pungo and Neuse rivers, NC. A sample consisted of an array (240-yards) of nets set for 12 hours. Results are broken down by region, area, and depth (shallow ≤ 6 ft and deep > 6 ft).

Year	Month	Stratum	Pamlico/Pungo rivers					Neuse River				
			Area					Area				
			1	2	3	4	All	1	2	3	4	All
2007	Feb	Shallow	1	1	1	1	4	1	1	1	1	4
		Deep	1	1	1	1	4	1	1	1	1	4
	Mar	Shallow	2	2	2	2	8	2	2	2	2	8
		Deep	2	2	2	2	8	2	2	2	2	8
	Apr	Shallow	2	2	2	2	8	2	2	2	2	8
		Deep	2	2	2	2	8	2	2	2	2	8
	May	Shallow	2	2	2	2	8	2	2	2	2	8
		Deep	2	2	2	2	8	2	2	2	2	8
	Jun	Shallow	2	2	2	2	8	2	2	2	2	8
		Deep	2	2	2	2	8	2	2	2	2	8
	Jul	Shallow	2	2	2	2	8	2	2	2	2	8
		Deep	2	2	2	2	8	2	2	2	2	8
	Aug	Shallow	2	2	2	2	8	2	2	2	2	8
		Deep	2	2	2	2	8	2	2	2	2	8
	Sep	Shallow	2	2	2	2	8	2	2	2	2	8
		Deep	2	2	2	2	8	2	2	2	2	8
	Oct	Shallow	2	2	2	2	8	2	2	2	2	8
		Deep	2	2	2	2	8	2	2	2	2	8
	Nov	Shallow	2	2	2	2	8	2	2	2	2	8
		Deep	2	2	2	2	8	2	2	2	2	8
	Dec	Shallow	1	1	1	1	4	1	1	1	1	4
		Deep	1	1	1	1	4	1	1	1	1	4
	All	Shallow	20	20	20	20	80	20	20	20	20	80
		Deep	20	20	20	20	80	20	20	20	20	80
		All	40	40	40	40	160	40	40	40	40	160
2008	Feb	Shallow	1	1	1	1	4	1	1	1	1	4
		Deep	1	1	1	1	4	1	1	1	1	4
	Mar	Shallow	2	2	2	2	8	2	2	2	2	8
		Deep	2	2	2	2	8	2	2	2	2	8
	Apr	Shallow	2	2	2	2	8	2	2	2	2	8
		Deep	2	2	2	2	8	2	2	2	2	8
	May	Shallow	2	2	2	2	8	2	2	2	2	8
		Deep	2	2	2	2	8	2	2	2	2	8

Jun	Shallow	2	2	2	2	8	2	2	2	2	8
	Deep	2	2	2	2	8	2	2	2	2	8

Table 1. (cont.)

Year	Month	Stratum	Pamlico/Pungo rivers					Neuse River				
			Area					Area				
			1	2	3	4	All	1	2	3	4	All
	Jul	Shallow	2	2	2	2	8	2	2	2	2	8
		Deep	2	2	2	2	8	2	2	2	2	8
	Aug	Shallow	2	2	2	2	8	2	2	2	2	8
		Deep	2	2	2	2	8	2	2	2	2	8
	Sep	Shallow	2	2	2	2	8	2	2	2	2	8
		Deep	2	2	2	2	8	2	2	2	2	8
	Oct	Shallow	2	2	2	2	8	2	2	2	2	8
		Deep	2	2	2	2	8	2	2	2	2	8
	Nov	Shallow	2	2	2	2	8	2	2	2	2	8
		Deep	2	2	2	2	8	2	2	2	2	8
	Dec	Shallow	1	1	1	1	4	1	1	1	1	4
		Deep	1	1	1	1	4	1	1	1	1	4
	All	Shallow	20	20	20	20	80	20	20	20	20	80
		Deep	20	20	20	20	80	20	20	20	20	80
		All	40	40	40	40	160	40	40	40	40	160
2009	Feb	Shallow	1	1	1	1	4	1	1	1	1	4
		Deep	1	1	1	1	4	1	1	1	1	4
	Mar	Shallow	2	2	2	2	8	2	2	2	2	8
		Deep	2	2	2	2	8	2	2	2	2	8
	Apr	Shallow	2	2	2	2	8	2	2	2	2	8
		Deep	2	2	2	2	8	2	2	2	2	8
	May	Shallow	2	2	2	2	8	2	2	2	2	8
		Deep	2	2	2	2	8	2	2	2	2	8
	Jun	Shallow	2	2	2	2	8	2	2	2	2	8
		Deep	2	2	2	2	8	2	2	2	2	8
	All	Shallow	9	9	9	9	36	9	9	9	9	36
		Deep	9	9	9	9	36	9	9	9	9	36
		All	18	18	18	18	72	18	18	18	18	72

Table 2. Environmental data collected during 2007 and 2008 by river (Pamlico/Pungo and Neuse rivers) and month from the Fisheries Independent Assessment Program.

Year	River	Month	Salinity (ppt)			DO (mg/L)			Temp. (°C)		
			Mean	Min	Max	Mean	Min	Max	Mean	Min	Max
2007	Neuse	Feb	3.4	0.1	8.0	11.0	9.9	13.9	9.2	5.8	12.1
		Mar	2.9	0.1	8.5	10.8	4.8	14.8	14.6	10.5	18.6
		Apr	3.2	0.2	8.4	9.2	5.0	12.3	16.8	12.7	23.7
		May	8.1	2.7	13.7	7.6	0.6	12.7	21.5	17.7	26.4
		Jun	8.1	2.7	13.1	6.3	2.6	9.3	26.6	24.2	29.7
		Jul	12.0	4.7	18.6	7.3	5.1	9.8	28.4	25.7	31.3
		Aug	15.3	10.3	21.2	6.5	3.0	11.2	29.6	26.7	32.8
		Sep	15.7	10.7	21.6	6.4	3.8	9.5	26.4	23.3	29.2
		Oct	15.0	10.8	19.6	6.0	2.5	16.0	23.1	19.4	28.1
		Nov	14.9	7.4	20.7	8.7	4.5	11.3	14.8	12.1	17.9
		Dec	17.3	12.8	22.1	10.1	7.9	10.9	11.7	8.2	16.3
All		10.5	0.1	22.1	8.0	0.6	16.0	21.2	5.8	32.8	
2008		Feb	9.6	0.2	20.3	8.0	6.4	9.4	12.2	11.1	13.9
		Mar	9.4	0.4	17.4	8.7	6.8	11.5	14.2	11.7	17.1
		Apr	8.9	1.4	15.5	7.9	3.6	9.9	16.9	14.7	20.6
		May	7.7	0.6	15.2	8.3	5.7	14.9	21.6	18.4	24.7
		Jun	12.4	3.0	17.7	6.3	0.1	13.8	27.9	24.5	31.6
		Jul	13.6	5.2	26.1	5.3	1.4	7.1	28.3	21.0	31.3
		Aug	18.2	12.0	23.2	5.8	0.5	14.6	29.2	26.4	33.3
		Sep	14.7	0.8	23.7	6.8	0.2	10.7	26.3	21.0	31.3
		Oct	13.3	5.0	21.5	7.7	2.7	11.2	20.8	14.7	25.2
		Nov	14.8	6.2	20.2	7.6	4.9	9.8	15.2	10.1	17.4
		Dec	14.9	11.2	18.2	8.6	6.0	9.9	9.5	7.4	10.8
All		12.5	0.2	26.1	7.3	0.1	14.9	21.1	7.4	33.3	
2007	Pamlico/Pungo	Feb	4.3	1.3	8.1	12.0	9.9	13.5	8.8	5.3	12.4
		Mar	4.0	0.1	8.8	11.2	8.7	14.7	14.2	9.5	20.8
		Apr	5.9	1.5	7.9	9.0	4.7	11.8	16.5	12.3	22.4
		May	5.8	1.8	8.8	8.4	6.7	10.7	22.3	14.3	26.7
		Jun	6.7	2.4	9.9	6.7	2.4	8.5	26.4	23.4	29.7
		Jul	8.7	5.4	12.1	5.6	0.1	8.7	27.9	24.5	30.3
		Aug	10.3	4.9	15.2	6.3	3.5	11.3	29.5	27.7	33.7
		Sep	12.4	8.8	17.8	6.2	1.8	8.7	26.4	23.4	29.5
		Oct	14.2	9.5	18.0	6.6	3.8	9.4	24.4	21.9	28.7
		Nov	16.6	11.3	19.9	8.2	6.3	10.6	15.5	12.0	20.3
		Dec	18.7	16.1	20.9	9.5	6.6	10.6	10.2	7.4	12.4
All		9.6	0.1	20.9	7.9	0.1	14.7	21.3	5.3	33.7	

Table 2. (cont.)

Year	River	Month	Salinity (ppt)			DO (mg/L)			Temp. (°C)		
			Mean	Min	Max	Mean	Min	Max	Mean	Min	Max
2008	Pamlico/Pungo	Feb	12.3	0.2	17.9	9.9	9.0	10.6	11.7	10.2	14.2
		Mar	10.7	0.1	18.3	9.4	6.5	11.9	13.7	11.1	16.8
		Apr	10.2	0.9	15.7	8.1	4.5	9.8	16.4	12.8	22.2
		May	8.4	0.3	13.1	6.7	1.5	11.2	21.9	18.1	25.7
		Jun	11.6	6.9	14.1	5.1	0.1	7.8	27.2	24.0	32.6
		Jul	12.3	8.0	16.6	6.2	3.3	10.5	28.0	24.9	31.5
		Aug	14.8	8.0	17.7	6.9	4.0	9.2	29.1	25.6	32.1
		Sep	15.5	10.1	20.2	5.1	0.1	12.0	27.0	21.2	30.3
		Oct	18.0	9.6	23.5	6.7	0.7	9.1	20.4	13.3	25.1
		Nov	18.8	0.7	23.2	8.8	7.0	11.5	13.9	8.8	17.0
		Dec	17.7	10.9	21.9	10.5	9.3	12.5	8.3	6.8	10.0
	All		13.5	0.1	23.5	7.3	0.1	12.5	20.8	6.8	32.6
	All 2007		10.1	0.1	22.1	7.9	0.1	16.0	21.2	5.3	33.7
	All 2008		13.0	0.1	26.1	7.3	0.1	14.9	20.9	6.8	33.3

Table 3. Species composition from Pamlico/Pungo and Neuse rivers from the Fisheries Independent Assessment Program for 2007 (n=320).

Species	Common name	Number		Biomass (kg)	
		Total	Percent	Total	Percent
<i>Brevoortia tyrannus</i>	Atlantic menhaden	19,995	62.5	2,200.1	26.4
<i>Dorosoma cepedianum</i>	gizzard shad	2,526	7.9	1,024.3	12.3
<i>Pomatomus saltatrix</i>	bluefish	2,035	6.4	504.6	6.1
<i>Mugil cephalus</i>	striped mullet	1,077	3.4	592.7	7.1
<i>Callinectes sapidus</i>	blue crab	889	2.8	125.0	1.5
<i>Lepisosteus osseus</i>	longnose gar	698	2.2	1,091.8	13.1
<i>Sciaenops ocellatus</i>	red drum	661	2.1	777.5	9.3
<i>Paralichthys lethostigma</i>	southern flounder	546	1.7	241.7	2.9
<i>Rhinoptera bonasus</i>	cownose ray	523	1.6	.	.
<i>Alosa mediocris</i>	hickory shad	490	1.5	262.8	3.2
<i>Morone saxatilis</i>	striped bass	418	1.3	493.1	5.9
<i>Ameiurus catus</i>	white catfish	371	1.2	224.1	2.7
<i>Leiostomus xanthurus</i>	spot	246	0.8	53.3	0.6
<i>Micropogonias undulatus</i>	Atlantic croaker	246	0.8	56.7	0.7
<i>Cynoscion nebulosus</i>	spotted seatrout	159	0.5	119.6	1.4
<i>Morone americana</i>	white perch	135	0.4	58.4	0.7
<i>Pogonias cromis</i>	black drum	107	0.3	38.7	0.5
<i>Scomberomorus maculatus</i>	Spanish mackerel	86	0.3	46.8	0.6
<i>Lagodon rhomboides</i>	pinfish	76	0.2	6.5	0.1
<i>Alosa sapidissima</i>	American shad	69	0.2	88.1	1.1
<i>Peprilus alepidotus</i>	harvestfish	65	0.2	9.1	0.1
<i>Cynoscion regalis</i>	weakfish	54	0.2	15.5	0.2
<i>Amia calva</i>	bowfin	47	0.1	83.1	1.0
<i>Elops saurus</i>	ladyfish	33	0.1	6.1	<0.1
<i>Penaeus setiferus</i>	white shrimp	31	0.1	1.4	0.1
<i>Micropterus salmoides</i>	largemouth bass	28	0.1	19.5	0.2
<i>Bairdiella chrysoura</i>	silver perch	22	0.1	1.5	0.1
<i>Dasyatis sabina</i>	Atlantic stingray	21	0.1	.	.
<i>Cyprinus carpio</i>	common carp	19	0.1	78.8	0.9
<i>Moxostoma spp.</i>	Moxostoma suckers	18	0.1	21.4	0.3
<i>M. saxatilis x chrysops</i>	striped bass x white bass	16	0.1	13.3	0.2
<i>Peprilus triacanthus</i>	butterfish	15	<0.1	2.8	<0.1
<i>Trachinotus carolinus</i>	Florida pompano	12	<0.1	7.1	0.1
<i>Ictalurus furcatus</i>	blue catfish	10	<0.1	8.5	0.1
<i>Paralichthys dentatus</i>	summer flounder	10	<0.1	4.7	0.1
<i>Lepomis gibbosus</i>	pumpkinseed	8	<0.1	1.3	<0.1
<i>Lepomis macrochirus</i>	bluegill	7	<0.1	1.9	<0.1
<i>Archosargus probatocephalus</i>	sheepshead	7	<0.1	3.4	<0.1
<i>Ameiurus natalis</i>	yellow bullhead	6	<0.1	4.8	0.1
<i>Menticirrhus americanus</i>	southern kingfish	6	<0.1	1.2	<0.1
<i>Dasyatis americana</i>	southern stingray	5	<0.1	.	.

<i>Moxostoma anisurum</i>	silver redhorse	5	<0.1	6.1	<0.1
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Table 3. (cont.)

Species	Common name	Number		Biomass (kg)	
		Total	Percent	Total	Percent
<i>Ictalurus punctatus</i>	channel catfish	5	<0.1	2.9	<0.1
<i>Esox niger</i>	chain pickerel	4	<0.1	5.3	0.1
<i>Trachemys scripta</i>	common slider	4	<0.1	.	.
<i>Aythya affinis</i>	lesser scaup duck	4	<0.1	.	.
<i>Acipenser oxyrhynchus</i>	Atlantic sturgeon	3	<0.1	3.7	<0.1
<i>Lepomis microlophus</i>	redeer sunfish	3	<0.1	0.4	<0.1
<i>Perca flavescens</i>	yellow perch	3	<0.1	1.5	<0.1
<i>Menticirrhus saxatilis</i>	northern kingfish	3	<0.1	0.6	<0.1
<i>Trinectes maculatus</i>	hogchoker	3	<0.1	0.4	<0.1
<i>Petromyzon marinus</i>	sea lamprey	2	<0.1	0.1	<0.1
<i>Astroscopus y-graecum</i>	southern stargazer	2	<0.1	1.2	<0.1
<i>Scomber scombrus</i>	Atlantic mackerel	2	<0.1	1.3	<0.1
<i>Chelydra serpentina</i>	common snapping turtle	2	<0.1	.	.
<i>Podilymbus podiceps</i>	pied billed grebe	2	<0.1	.	.
<i>Oxyura jamaicensis</i>	ruddy duck	2	<0.1	.	.
<i>Limulus polyphemus</i>	horseshoe crab	1	<0.1	2.5	<0.1
<i>Opisthonema oglinum</i>	Atlantic thread herring	1	<0.1	0.1	<0.1
<i>Synodus foetens</i>	inshore lizardfish	1	<0.1	0.2	<0.1
<i>Catostomidae</i>	suckers	1	<0.1	0.2	<0.1
<i>Moxostoma macrolepidotum</i>	shorthead redhorse	1	<0.1	0.4	<0.1
<i>Ameiurus nebulosus</i>	brown bullhead	1	<0.1	0.5	<0.1
<i>Atherinidae</i>	silversides	1	<0.1	<0.1	<0.1
<i>Centrarchus macropterus</i>	flier	1	<0.1	0.4	<0.1
<i>Chaetodipterus faber</i>	Atlantic spadefish	1	<0.1	1.1	<0.1
<i>Chrysemys scripta</i>	yellowbelly turtle	1	<0.1	0.7	<0.1
<i>Caretta caretta</i>	loggerhead sea turtle	1	<0.1	.	.
<i>Phalacrocorax auritus</i>	double-crested cormorant	1	<0.1	.	.
<i>Mergus serrator</i>	red breasted merganser	1	<0.1	.	.
<i>Tursiops truncatus</i>	bottle nose dolphin	1	<0.1	.	.
<i>Enteromorpha sp.</i>	unid hollow green weed	.	.	.	.
<i>Cnidaria sp.</i>	jellyfish	.	.	.	.

Table 4. Species composition from Pamlico/Pungo and Neuse rivers from the Fisheries Independent Assessment Program for 2008 (n=320).

Species	Common name	Number		Biomass (kg)	
		Total	Percent	Total	Percent
<i>Brevoortia tyrannus</i>	Atlantic menhaden	9,350	29.3	1,325.2	15.9
<i>Pomatomus saltatrix</i>	bluefish	2,563	8.0	798.5	9.6
<i>Dorosoma cepedianum</i>	gizzard shad	1,863	5.8	893.5	10.7
<i>Paralichthys lethostigma</i>	southern flounder	1,217	3.8	486.3	5.8
<i>Rhinoptera bonasus</i>	cownose ray	1,209	3.8	.	.
<i>Callinectes sapidus</i>	blue crab	925	2.9	149.4	1.8
<i>Lepisosteus osseus</i>	longnose gar	856	2.7	1,491.4	17.9
<i>Mugil cephalus</i>	striped mullet	573	1.8	351.2	4.2
<i>Sciaenops ocellatus</i>	red drum	555	1.7	667.5	8.0
<i>Alosa mediocris</i>	hickory shad	507	1.6	250.5	3.0
<i>Pogonias cromis</i>	black drum	447	1.4	379.8	4.5
<i>Morone saxatilis</i>	striped bass	442	1.4	595.3	7.1
<i>Leiostomus xanthurus</i>	spot	366	1.1	74.8	0.9
<i>Micropogonias undulatus</i>	Atlantic croaker	268	0.8	62.2	0.7
<i>Morone americana</i>	white perch	247	0.8	69.1	0.8
<i>Cynoscion nebulosus</i>	spotted seatrout	196	0.6	162.5	1.9
<i>Scomberomorus maculatus</i>	Spanish mackerel	195	0.6	83.4	1.0
<i>Ameiurus catus</i>	white catfish	168	0.5	150.6	1.8
<i>Lagodon rhomboides</i>	pinfish	71	0.2	4.8	0.1
<i>Peprilus triacanthus</i>	butterfish	67	0.2	9.0	0.1
<i>Cynoscion regalis</i>	weakfish	57	0.2	24.3	0.3
<i>Alosa sapidissima</i>	American shad	43	0.1	50.9	0.6
<i>Amia calva</i>	bowfin	33	0.1	60.1	0.7
<i>Peprilus alepidotus</i>	harvestfish	32	0.1	4.3	0.1
<i>Elops saurus</i>	ladyfish	28	0.1	5.4	0.1
<i>Bairdiella chrysoura</i>	silver perch	25	0.1	1.2	<0.1
<i>Dasyatis sabina</i>	Atlantic stingray	24	0.1	.	.
<i>Micropterus salmoides</i>	largemouth bass	21	0.1	14.8	0.2
<i>Erimyzon oblongus</i>	creek chubsucker	19	0.1	24.8	0.3
<i>Menticirrhus americanus</i>	southern kingfish	19	0.1	5.3	0.1
<i>Cyprinus carpio</i>	common carp	16	0.1	56.9	0.7
<i>Ictalurus punctatus</i>	channel catfish	13	<0.1	27.6	0.3
<i>Pomoxis nigromaculatus</i>	black crappie	11	<0.1	4.6	0.1
<i>Trinectes maculatus</i>	hogchoker	11	<0.1	0.7	<0.1
<i>Moxostoma spp.</i>	Moxostoma suckers	10	<0.1	9.7	0.1
<i>Pylodictis olivaris</i>	flathead catfish	8	<0.1	12.7	0.2
<i>Lepomis macrochirus</i>	bluegill	8	<0.1	1.9	<0.1
<i>Archosargus probatocephalus</i>	sheepshead	8	<0.1	4.2	0.1
<i>Menticirrhus saxatilis</i>	northern kingfish	8	<0.1	2.2	<0.1
<i>Limulus polyphemus</i>	horseshoe crab	7	<0.1	3.5	<0.1
<i>M. saxatilis x chrysops</i>	striped bass x white	7	<0.1	8.5	0.1

<i>Menticirrhus spp.</i>	kingfishes	6	<0.1	1.8	<0.1
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Table 4. (cont.)

Species	Common name	Number		Biomass (kg)	
		Total	Percent	Total	Percent
<i>Anchoa hepsetus</i>	striped anchovy	5	<0.1	0.1	<0.1
<i>Ameiurus nebulosus</i>	brown bullhead	5	<0.1	3.2	<0.1
<i>Trachinotus carolinus</i>	Florida pompano	5	<0.1	2.5	<0.1
<i>Agkistrodon piscivorus</i>	cottonmouth	5	<0.1	3.8	<0.1
<i>Caranx hippos</i>	crevalle jack	4	<0.1	0.4	<0.1
<i>Penaeus setiferus</i>	white shrimp	3	<0.1	0.1	<0.1
<i>Penaeus aztecus</i>	brown shrimp	2	<0.1	<0.1	<0.1
<i>Raja eglanteria</i>	clearnose skate	2	<0.1	.	.
<i>Hippocampus erectus</i>	lined seahorse	2	<0.1	.	.
<i>Lepomis spp.</i>	Lepomis sunfishes	2	<0.1	0.5	<0.1
<i>Lepomis microlophus</i>	redear sunfish	2	<0.1	0.2	<0.1
<i>Perca flavescens</i>	yellow perch	2	<0.1	0.7	<0.1
<i>Chaetodipterus faber</i>	Atlantic spadefish	2	<0.1	0.1	<0.1
<i>Evorthodus lyricus</i>	lyre goby	2	<0.1	0.3	<0.1
<i>Paralichthys dentatus</i>	summer flounder	2	<0.1	0.4	<0.1
<i>Oxyura jamaicensis</i>	ruddy duck	2	<0.1	.	.
<i>Acipenser oxyrhynchus</i>	Atlantic sturgeon	1	<0.1	1.3	<0.1
<i>Alosa pseudoharengus</i>	alewife	1	<0.1	0.1	<0.1
<i>Dorosoma petenense</i>	threadfin shad	1	<0.1	<0.1	<0.1
<i>Opisthonema oglinum</i>	Atlantic thread herring	1	<0.1	0.2	<0.1
<i>Esox niger</i>	chain pickerel	1	<0.1	1.0	<0.1
<i>Synodus foetens</i>	inshore lizardfish	1	<0.1	0.6	<0.1
<i>Notemigonus crysoleucas</i>	golden shiner	1	<0.1	0.1	<0.1
<i>Ameiurus natalis</i>	yellow bullhead	1	<0.1	0.5	<0.1
<i>Menidia spp.</i>	Menidia silversides	1	<0.1	<0.1	<0.1
<i>Lepomis gibbosus</i>	pumpkinseed	1	<0.1	0.1	<0.1
<i>Astroscopus guttatus</i>	northern stargazer	1	<0.1	0.4	<0.1
<i>Chrysemys scripta</i>	yellowbelly turtle	1	<0.1	.	.
<i>Gavia immer</i>	common loon	1	<0.1	4.2	0.1
<i>Ulva spp.</i>	sea lettuce	.	.	.	.
<i>Halodule wrightii</i>	shoal grass	.	.	.	.
<i>Cnidaria</i>	Jellyfish	.	.	.	.
<i>Hippocampus spp.</i>	seahorses	.	.	.	.

Table 5. Species abundance and weighted CPUE (# fish per sample) by region (Pamlico/Pungo and Neuse rivers) and water depth for target species from Fisheries Independent Assessment Program in 2007. Shallow $\leq$ 6 feet and deep $>$ 6 feet.

Common name	River	Shallow ¹			Deep ¹			Combined ²		
		Total number	CPUE	PSE	Total number	CPUE	PSE	Total number	CPUE	PSE
American shad	Neuse	12	0.15	45	18	0.23	42	30	0.18	33
	Pamlico/Pungo	6	0.08	40	33	0.41	31	39	0.23	26
	Combined	18	0.11	27	51	0.33	24	69	0.21	19
Atlantic croaker	Neuse	129	1.61	26	5	0.06	44	134	0.90	24
	Pamlico/Pungo	95	1.19	19	17	0.21	41	112	0.74	18
	Combined	224	1.38	16	22	0.15	33	246	0.81	15
Bluefish	Neuse	200	2.50	25	795	9.94	21	995	5.94	17
	Pamlico/Pungo	204	2.55	35	836	10.45	27	1,040	6.21	23
	Combined	404	2.53	23	1,631	10.22	18	2,035	6.09	15
Red drum	Neuse	443	5.54	16	5	0.06	52	448	3.00	16
	Pamlico/Pungo	207	2.59	24	6	0.08	52	213	1.42	23
	Combined	650	3.92	14	11	0.07	43	661	2.13	13
Southern flounder	Neuse	212	2.65	14	39	0.49	31	251	1.65	13
	Pamlico/Pungo	223	2.79	15	72	0.90	18	295	1.91	12
	Combined	435	2.73	10	111	0.71	15	546	1.79	9
Southern kingfish	Neuse	0	0.00	-	3	0.04	57	3	0.02	50
	Pamlico/Pungo	1	0.01	100	2	0.03	100	3	0.02	50
	Combined	1	0.01	100	5	0.03	67	6	0.02	50
Spanish mackerel	Neuse	1	0.01	100	55	0.69	29	56	0.32	28
	Pamlico/Pungo	0	0.00	-	30	0.38	34	30	0.17	35
	Combined	1	0.01	100	85	0.52	21	86	0.24	21
Spot	Neuse	110	1.38	28	4	0.05	49	114	0.76	26
	Pamlico/Pungo	126	1.58	41	6	0.08	40	132	0.88	40
	Combined	236	1.49	26	10	0.06	33	246	0.83	25
Spotted seatrout	Neuse	37	0.46	23	22	0.28	41	59	0.38	21
	Pamlico/Pungo	69	0.86	20	31	0.39	32	100	0.64	17
	Combined	106	0.68	15	53	0.34	24	159	0.52	13
Striped bass	Neuse	147	1.84	20	30	0.38	59	177	1.16	19
	Pamlico/Pungo	192	2.40	24	49	0.61	46	241	1.57	22
	Combined	339	2.15	17	79	0.51	35	418	1.39	15
Weakfish	Neuse	5	0.06	44	12	0.15	41	17	0.10	30
	Pamlico/Pungo	7	0.09	55	30	0.38	33	37	0.22	27
	Combined	12	0.08	38	42	0.27	26	54	0.17	24

¹- 80 shallow and 80 deep samples collected and 160 deep samples collected from combined systems

²- 160 samples from the Neuse and 160 samples from the Pamlico/Pungo, 320 combined samples collected during sampling period

Table 6. Species abundance and weighted CPUE (# fish per sample) by region (Pamlico/Pungo and Neuse rivers) and water depth for target species from Fisheries Independent Assessment Program in 2008. Shallow $\leq$ 6 feet and deep $>$ 6 feet.

Common name		Shallow ¹			Deep ¹			Combined ²		
		Total number	CPUE	PSE	Total number	CPUE	PSE	Total number	CPUE	PSE
American shad	Neuse	9	0.11	52	18	0.23	35	27	0.16	31
	Pamlico/Pungo	3	0.04	57	13	0.16	40	16	0.10	30
	Combined	12	0.07	43	31	0.19	26	43	0.13	23
Atlantic croaker	Neuse	98	1.23	26	7	0.09	46	105	0.70	24
	Pamlico/Pungo	148	1.85	23	15	0.19	32	163	1.08	21
	Combined	246	1.57	18	22	0.14	29	268	0.91	16
Bluefish	Neuse	302	3.78	18	1301	16.26	26	1,603	9.55	21
	Pamlico/Pungo	269	3.36	34	691	8.64	28	960	5.81	22
	Combined	571	3.55	19	1,992	12.06	19	2,563	7.49	15
Red drum	Neuse	327	4.09	18	40	0.50	42	367	2.43	16
	Pamlico/Pungo	181	2.26	21	7	0.09	42	188	1.25	21
	Combined	508	3.08	14	47	0.27	37	555	1.78	13
Southern flounder	Neuse	372	4.65	20	97	1.21	22	469	3.06	17
	Pamlico/Pungo	460	5.75	19	288	3.60	47	748	4.75	20
	Combined	832	5.26	14	385	2.53	37	1,217	3.99	15
Southern kingfish	Neuse	0	0.00		4	0.05	61	4	0.02	50
	Pamlico/Pungo	1	0.01	100	14	0.18	50	15	0.09	44
	Combined	1	0.01	100	18	0.12	42	19	0.06	33
Spanish mackerel	Neuse	1	0.01	100	97	1.21	30	98	0.57	30
	Pamlico/Pungo	4	0.05	79	93	1.16	39	97	0.57	37
	Combined	5	0.03	67	190	1.18	25	195	0.57	25
Spot	Neuse	209	2.61	25	10	0.13	36	219	1.46	25
	Pamlico/Pungo	131	1.64	19	16	0.20	38	147	0.97	18
	Combined	340	2.08	16	26	0.17	29	366	1.19	16
Spotted seatrout	Neuse	47	0.59	21	36	0.45	35	83	0.52	19
	Pamlico/Pungo	70	0.88	26	43	0.54	22	113	0.72	18
	Combined	117	0.75	19	79	0.50	20	196	0.63	14
Striped bass	Neuse	143	1.79	28	50	0.63	35	193	1.25	23
	Pamlico/Pungo	186	2.33	21	63	0.79	59	249	1.61	21
	Combined	329	2.08	17	113	0.71	38	442	1.45	16
Weakfish	Neuse	3	0.04	74	15	0.19	30	18	0.11	27
	Pamlico/Pungo	7	0.09	87	32	0.40	28	39	0.23	30
	Combined	10	0.07	57	47	0.30	23	57	0.18	22

¹- 80 shallow and 80 deep samples collected and 160 deep samples collected from combined systems

²- 160 samples from the Neuse and 160 samples from the Pamlico/Pungo, 320 combined samples collected during sampling period

Table 7. Mortality rates for target species at net retrieval (12 hour soak times) in large mesh gill nets ($\geq 5''$ stretch mesh) for 2007 in the Fisheries Independent Assessment Program (Pamlico/Pungo and Neuse rivers). Mortality rates are reported overall and for regulatory discards due to size limits. Separate mortality rates are reported for the three seasons spring/fall (Apr-May; Oct-Nov), summer (Jun-Sep), and winter (Dec 1-15; Feb 15-Mar). *

Season	Common name	Number collected	Percent dead	Number sub-legal collected	Percent sub-legal dead	Number over legal collected	Percent over legal dead
Spring/fall	American shad	12	83	.	.	.	.
	Atlantic croaker	3	33	.	.	.	.
	Bluefish	214	85	0	0	.	.
	Red drum	99	33	30	30	0	0
	Southern flounder	97	1	24	0	.	.
	Southern kingfish	0	0	.	.	.	.
	Spanish mackerel	5	100	2	100	.	.
	Spot	1	1	.	.	.	.
	Spotted seatrout	8	38	0	0	.	.
	Striped bass	16	44	0	0	.	.
	Weakfish	10	100	6	100	.	.
Summer	American shad	4	100	.	.	.	.
	Atlantic croaker	15	67	.	.	.	.
	Bluefish	550	93	0	0	.	.
	Red drum	63	57	14	57	3	33
	Southern flounder	112	8	25	4	.	.
	Southern kingfish	0	0	.	.	.	.
	Spanish mackerel	9	100	8	100	.	.
	Spot	1	100	.	.	.	.
	Spotted seatrout	7	42	0	0	.	.
	Striped bass	3	100	1	100	.	.
	Weakfish	3	67	3	67	.	.
Winter	American shad	27	81	.	.	.	.
	Atlantic croaker	0	0	.	.	.	.
	Bluefish	0	0	0	0	.	.
	Red drum	29	10	21	5	1	0
	Southern flounder	11	0	1	0	.	.
	Southern kingfish	0	0	.	.	.	.
	Spanish mackerel	0	0	0	0	.	.
	Spot	0	0	.	.	.	.
	Spotted seatrout	0	0	0	0	.	.
	Striped bass	56	70	1	100	.	.
	Weakfish	0	0	0	0	.	.

*Size Limits

No size limit for American shad, southern kingfish, Atlantic croaker, bluefish, or spot.; Red drum – 18" TL minimum and 27" TL maximum; Southern flounder – 14" TL minimum; Weakfish – 12" TL minimum; Spotted seatrout – 12" TL minimum; Striped bass – 18" TL minimum, Spanish mackerel-12" TL minimum

Table 8. Mortality rates for target species at net retrieval (12 hour soak times) in large mesh gill nets ($\geq 5''$ stretch mesh) for 2008 in the Fisheries Independent Assessment Program (Pamlico/Pungo and Neuse rivers). Mortality rates are reported overall and for regulatory discards due to size limits. Separate mortality rates are reported for the three seasons spring/fall (Apr-May; Oct-Nov), summer (Jun-Sep), and winter (Dec 1-15; Feb 15-Mar). *

Season	Common name	Number collected	Percent dead	Number sub-legal collected	Percent sub-legal dead	Number over legal collected	Percent over legal dead
Spring/fall	American shad	8	100	.	.	.	.
	Atlantic croaker	1	0	.	.	.	.
	Bluefish	134	63	0	0	.	.
	Red drum	49	16	27	7	4	50
	Southern flounder	155	3	46	4	.	.
	Southern kingfish	1	0	.	.	.	.
	Spanish mackerel	4	100	2	100	.	.
	Spot	2	0	.	.	.	.
	Spotted seatrout	8	0	0	0	.	.
	Striped bass	71	18	2	50	.	.
	Weakfish	3	33	0	0	.	.
Summer	American shad	0	0	.	.	.	.
	Atlantic croaker	14	43	.	.	.	.
	Bluefish	738	84	0	0	.	.
	Red drum	37	65	6	33	3	33
	Southern flounder	236	36	46	39	.	.
	Southern kingfish	0	0	.	.	.	.
	Spanish mackerel	30	100	27	100	.	.
	Spot	6	83	.	.	.	.
	Spotted seatrout	7	43	0	0	.	.
	Striped bass	8	88	1	100	.	.
	Weakfish	5	80	4	100	.	.
Winter	American shad	17	90	.	.	.	.
	Atlantic croaker	0	0	.	.	.	.
	Bluefish	37	25	0	0	.	.
	Red drum	31	19	16	0	0	0
	Southern flounder	20	0	5	0	.	.
	Southern kingfish	0	0	.	.	.	.
	Spanish mackerel	0	0	0	0	.	.
	Spot	0	0	.	.	.	.
	Spotted seatrout	1	0	0	0	.	.
	Striped bass	41	24	4	50	.	.
	Weakfish	0	0	0	0	.	.

*Size Limits

No size limit for American shad, southern kingfish, Atlantic croaker, bluefish, or spot.; Red drum – 18" TL minimum and 27" TL maximum; Southern flounder – 14" TL minimum; Weakfish – 12" TL minimum; Spotted seatrout – 12" TL minimum; Striped bass – 18" TL minimum, Spanish mackerel-12" TL minimum

Table 9. Mortality rates for target species at net retrieval (12 hour soak times) in small mesh gill nets ($\leq 5''$ stretch mesh) for 2007 in the Fisheries Independent Assessment Program (Pamlico/Pungo and Neuse rivers). Mortality rates are reported overall and for regulatory discards due to size limits. Separate mortality rates are reported for the three seasons spring/fall (Apr-May; Oct-Nov), summer (Jun-Sep), and winter (Dec 1-15; Feb 15-Mar). *

Season	Common name	Number collected	Percent dead	Number sub-legal collected	Percent sub-legal dead	Number over legal collected	Percent over legal dead
Spring/fall	American shad	9	100	.	.	.	.
	Atlantic croaker	62	67	.	.	.	.
	Bluefish	438	86	0	0	.	.
	Red drum	191	42	165	44	0	0
	Southern flounder	100	0	75	0	.	.
	Southern kingfish	0	0	.	.	.	.
	Spanish mackerel	14	86	2	67	.	.
	Spot	178	34	.	.	.	.
	Spotted seatrout	91	49	0	0	.	.
	Striped bass	206	73	102	71	.	.
Summer	Weakfish	35	80	18	83	.	.
	American shad	1	100	.	.	.	.
	Atlantic croaker	166	61	.	.	.	.
	Bluefish	832	95	0	0	.	.
	Red drum	173	48	87	70	6	0
	Southern flounder	218	11	182	12	.	.
	Southern kingfish	6	67	.	.	.	.
	Spanish mackerel	58	100	21	100	.	.
	Spot	66	58	.	.	.	.
	Spotted seatrout	44	58	0	0	.	.
Winter	Striped bass	51	80	17	88	.	.
	Weakfish	6	100	6	100	.	.
	American shad	16	50	.	.	.	.
	Atlantic croaker	0	0	.	.	.	.
	Bluefish	1	100	0	0	.	.
	Red drum	106	33	92	34	0	0
	Southern flounder	8	0	6	0	.	.
	Southern kingfish	0	0	.	.	.	.
	Spanish mackerel	0	0	0	0	.	.
	Spot	0	0	.	.	.	.
	Spotted seatrout	9	22	0	0	.	.
	Striped bass	86	48	35	40	.	.
	Weakfish	0	0	0	0	.	.

*Size Limits

No size limit for American shad, southern kingfish, Atlantic croaker, bluefish, or spot.; Red drum – 18" TL minimum and 27" TL maximum; Southern flounder – 14" TL minimum; Weakfish – 12" TL minimum; Spotted seatrout – 12" TL minimum; Striped bass – 18" TL minimum, Spanish mackerel-12" TL minimum

Table 10. Mortality rates for target species at net retrieval (12 hour soak times) in small mesh gill nets ($\leq 5''$ stretch mesh) for 2008 in the Fisheries Independent Assessment Program (Pamlico/Pungo and Neuse rivers). Mortality rates are reported overall and for regulatory discards due to size limits. Separate mortality rates are reported for the three seasons spring/fall (Apr-May; Oct-Nov), summer (Jun-Sep), and winter (Dec 1-15; Feb 15-Mar). *

Season	Common name	Number collected	Percent dead	Number sub-legal collected	Percent sub-legal dead	Number over legal collected	Percent over legal dead
Spring/fall	American shad	10	90	.	.	.	.
	Atlantic croaker	18	33	.	.	.	.
	Bluefish	433	78	0	0	.	.
	Red drum	255	30	221	34	0	0
	Southern flounder	153	8	121	7	.	.
	Southern kingfish	15	50	.	.	.	.
	Spanish mackerel	9	100	.	0	.	.
	Spot	169	17	.	0	.	.
	Spotted seatrout	88	42	0	0	.	.
	Striped bass	180	56	76	63	.	.
	Weakfish	35	80	6	83	.	.
Summer	American shad	1	100	.	.	.	.
	Atlantic croaker	235	59	.	.	.	.
	Bluefish	1220	91	0	0	.	.
	Red drum	120	65	88	72	8	13
	Southern flounder	635	42	561	43	.	.
	Southern kingfish	6	83	.	.	.	.
	Spanish mackerel	152	97	57	95	.	.
	Spot	188	54	.	.	.	.
	Spotted seatrout	87	66	0	0	.	.
	Striped bass	108	88	65	91	.	.
	Weakfish	10	60	9	67	.	.
Winter	American shad	7	29	.	.	.	.
	Atlantic croaker	0	0	.	.	.	.
	Bluefish	13	38	0	0	.	.
	Red drum	63	17	58	17	0	0
	Southern flounder	19	0	13	0	.	.
	Southern kingfish	0	0	.	.	.	.
	Spanish mackerel	0	0	0	0	.	.
	Spot	1	0	.	.	.	.
	Spotted seatrout	5	0	0	0	.	.
	Striped bass	35	26	20	25	.	.
	Weakfish	5	40	0	0	.	.

*Size Limits

No size limit for American shad, southern kingfish, Atlantic croaker, bluefish, or spot.; Red drum – 18" TL minimum and 27" TL maximum; Southern flounder – 14" TL minimum; Weakfish – 12" TL minimum; Spotted seatrout – 12" TL minimum; Striped bass – 18" TL minimum, Spanish mackerel-12" TL minimum

Table 11. Annual weighted CPUE, total number collected (n), mean size (mm), and size range (mm) for target species during 2007 and 2008 in the Fisheries Independent Assessment Program (Pamlico/Pungo and Neuse rivers).

Year	Common name	CPUE	PSE	n	Mean size (mm)	Size range (mm)
2007	American shad	0.21	19	69	423	206-488
	Atlantic croaker	0.81	15	246	245	99-340
	Bluefish	6.09	15	2,035	248	90-460
	Red drum	2.13	13	661	437	211-1,207
	Southern flounder	1.79	9	546	318	166-570
	Southern kingfish	0.02	50	6	249	220-271
	Spanish mackerel	0.24	21	86	348	201-553
	Spot	0.83	25	246	220	128-390
	Spotted seatrout	0.52	13	159	405	262-684
	Striped bass	1.39	15	418	444	162-685
	Weakfish	0.17	24	54	286	151-414
2008	American shad	0.13	23	43	414	271-501
	Atlantic croaker	0.91	16	268	251	91-410
	Bluefish	7.49	15	2,563	272	94-484
	Red drum	1.78	13	555	425	200-1,244
	Southern flounder	3.99	15	1,217	311	140-570
	Southern kingfish	0.06	33	19	281	205-325
	Spanish mackerel	0.57	25	195	321	138-598
	Spot	1.19	16	366	223	117-326
	Spotted seatrout	0.63	14	196	417	262-706
	Striped bass	1.45	16	442	450	250-1,136
	Weakfish	0.18	22	57	319	169-550

Table 12. Number of specimens collected from the Fisheries Independent Assessment Program (Pamlico/Pungo and Neuse rivers) for age determination by species in 2007 and 2008.

Year	Species	Neuse	Pamlico/Pungo	Total
2007	American shad	9	28	37
	Atlantic croaker	14	6	20
	Bluefish	16	24	40
	Northern kingfish	0	0	0
	Red drum	60	35	95
	Summer flounder	0	0	0
	Southern flounder	42	30	72
	Southern kingfish	0	2	2
	Spanish mackerel	15	2	17
	Spot	5	16	21
	Spotted seatrout	24	44	68
	Striped bass	46	38	84
	Striped mullet	18	1	19
	Weakfish	2	26	28
Total		251	252	503
2008	American shad	25	20	45
	Atlantic croaker	25	62	87
	Bluefish	58	72	130
	Northern kingfish	2	19	21
	Red drum	67	39	106
	Summer flounder	0	2	2
	Southern flounder	85	149	234
	Southern kingfish	3	4	7
	Spanish mackerel	21	12	33
	Spot	60	41	101
	Spotted seatrout	44	72	116
	Striped bass	47	57	104
	Striped mullet	38	76	114
	Weakfish	11	24	35
Total		486	649	1135

Table 13. Gill net samples collected from May 2008-June 2009, in New and Cape Fear rivers, NC. A sample consisted of an array (240-yards) of nets set. Results are broken down by river, area, and depth (shallow <6 ft and deep >6 ft).

			New River			Cape Fear		
			Area			Area		
Year	Month	Stratum	1	2	All	1	All	
2008	May	Shallow	2	2	4	4	4	
		Deep	2	2	4			
	Jun	Shallow	2	2	4	4	4	
		Deep	2	2	4			
	Jul	Shallow	2	2	4	2	2	
		Deep	2	2	4			
	Aug	Shallow	2	2	4	4	4	
		Deep	2	2	4			
	Sep	Shallow	2	2	4	4	4	
		Deep	2	2	4			
	Oct	Shallow	2	2	4	4	4	
		Deep	2	2	4			
	Nov	Shallow	2	2	4	4	4	
		Deep	2	2	4			
	Dec	Shallow	1	1	2	2	2	
		Deep	1	1	2			
		All	Shallow	13	13	26	28	28
			Deep	13	13	26		
Total			26	26	52	28	28	
2009	Feb	Shallow	1	1	2	2	2	
		Deep	1	1	2			
	Mar	Shallow	2	2	4	4	4	
		Deep	2	2	4			
	Apr	Shallow	2	2	4	4	4	
		Deep	2	2	4			
	May	Shallow	2	2	4	4	4	
		Deep	2	2	4			
	Jun	Shallow	2	2	4	4	4	
		Deep	2	2	4			
	All	Shallow	9	9	18	18	18	
		Deep	9	9	18			
Total			18	18	36	18	18	

Table 14. Environmental data collected during 2008 for New and Cape Fear rivers by month from the Fisheries Independent Assessment Program.

River	Year	Season	Salinity			DO			Temp.		
			(ppt)			(mg/L)			(°C)		
			Mean	Min	Max	Mean	Min	Max	Mean	Min	Max
New	2008	May	15.4	8.9	18.8	5.9	4.7	6.5	22.7	20.9	25
		Jun	26.7	20.8	31.5	5.5	3.5	6.5	28.7	26	30.6
		Jul	28	24.6	29.6	5	4.1	5.7	28.9	27.8	29.7
		Aug	23.8	18.9	33.1	5	3.7	7.8	29.5	28.8	30.7
		Sep	17.2	6.5	29.2	5.4	4.1	6.3	26.6	24.3	29.7
		Oct	23.8	17.2	31.4	6.2	5.4	7	20.4	17	23.8
		Nov	18.8	10.5	25.1	7.4	6.4	7.9	15.2	12.5	18
		Dec	10.2	9	11.3	8.9	8.8	9	11.2	11.1	11.3
All		20.7	6.5	33.1	6.1	3.5	9	23.3	11.1	30.7	
Cape Fear	2008	May	16.4	7.1	28.1	6.6	2.7	7.9	24.6	23	27.8
		Jun	19.5	11.5	31.2	5.5	1.9	8.8	28.8	26.6	32.8
		Jul	*	*	*	*	*	*	*	*	*
		Aug	22.7	15.1	29.4	5	2.1	7.5	31.3	28.5	34
		Sep	23	15.8	29.9	6.1	2.9	7.8	27.6	24.6	30.4
		Oct	23.3	17	31.9	6.3	1.5	8.3	21.1	15.7	26.8
		Nov	20.8	17.2	24.9	7.8	5.8	9.2	14.5	9.3	18.3
		Dec	21.7	17.7	28.8	9	7.3	9.8	11.2	9.4	12.7
All		21	7.1	31.9	6.4	1.5	9.8	23.6	9.3	34	
Combined		May	16.1	7.1	28.1	6.3	2.7	7.9	24	20.9	27.8
		Jun	21.9	11.5	31.5	5.5	1.9	8.8	28.8	26	32.8
		Jul	28	24.6	29.6	5	4.1	5.7	28.9	27.8	29.7
		Aug	23	15.1	33.1	5	2.1	7.8	30.7	28.5	34
		Sep	21.1	6.5	29.9	5.8	2.9	7.8	27.3	24.3	30.4
		Oct	23.5	17	31.9	6.3	1.5	8.3	20.9	15.7	26.8
		Nov	20.1	10.5	25.1	7.7	5.8	9.2	14.8	9.3	18.3
		Dec	17.9	9	28.8	8.9	7.3	9.8	11.2	9.4	12.7
All		20.9	6.5	33.1	6.3	1.5	9.8	23.5	9.3	34	

Table 15a. Species compositions observed in the Fisheries Independent Assessment Program from the New River during 2008 (n=52).

Species	Common Name	Number		Biomass (kg)	
		Total	Percent	Total	Percent
<i>Brevoortia tyrannus</i>	Atlantic menhaden	969	29.4	155.7	9.4
<i>Pomatomus saltatrix</i>	bluefish	396	12.0	187.8	11.3
<i>Sciaenops ocellatus</i>	red drum	359	10.9	319.7	19.2
<i>Callinectes sapidus</i>	blue crab	266	8.1	38.6	2.3
<i>Pogonias cromis</i>	black drum	266	8.1	300.8	18.1
<i>Mugil cephalus</i>	striped mullet	242	7.3	126.9	7.6
<i>Paralichthys lethostigma</i>	southern flounder	212	6.4	66.0	4.0
<i>Leiostomus xanthurus</i>	spot	105	3.2	22.1	1.3
<i>Rhizoprionodon terraenovae</i>	Atlantic sharpnose shark	76	2.3	49.2	3.0
<i>Lepisosteus osseus</i>	longnose gar	70	2.1	150.6	9.1
<i>Trachinotus carolinus</i>	Florida pompano	60	1.8	39.4	2.4
<i>Scomberomorus maculatus</i>	Spanish mackerel	56	1.7	37.8	2.3
<i>Dorosoma cepedianum</i>	gizzard shad	53	1.6	27.1	1.6
<i>Cynoscion nebulosus</i>	spotted seatrout	33	1.0	29.1	1.8
<i>Micropogonias undulatus</i>	Atlantic croaker	31	0.9	6.7	0.4
<i>Elops saurus</i>	ladyfish	21	0.6	14.0	0.8
<i>Rhinoptera bonasus</i>	cownose ray	12	0.4	40.3	2.4
<i>Gymnura micrura</i>	smooth butterfly ray	11	0.3	4.1	0.2
<i>Dasyatis sabina</i>	Atlantic stingray	8	0.2	14.5	0.9
<i>Lagodon rhomboides</i>	pinfish	8	0.2	0.6	<0.1
<i>Cynoscion regalis</i>	weakfish	7	0.2	3.2	0.2
<i>Peprilus alepidotus</i>	harvestfish	5	0.2	1.0	0.1
<i>Menippe mercenaria</i>	Florida stone crab	4	0.1	0.9	0.1
<i>Rachycentron canadum</i>	cobia	4	0.1	4.8	0.3
<i>Archosargus probatocephalus</i>	sheepshead	4	0.1	1.3	0.1
<i>Libinia spp.</i>	Libinia spider crabs	3	0.1	0.4	<0.1
<i>Penaeus setiferus</i>	white shrimp	2	0.1	0.1	<0.1
<i>Sphyrna tiburo</i>	bonnethead shark	2	0.1	9.4	0.6
<i>Ameiurus catus</i>	white catfish	2	0.1	1.8	0.1
<i>Majidae</i>	spider crabs	1	<0.1	0.1	<0.1
<i>Callinectes similis</i>	lesser blue crab	1	<0.1	0.1	<0.1
<i>Dasyatis americana</i>	southern stingray	1	<0.1	0.3	<0.1
<i>Dasyatis say</i>	bluntnose stingray	1	<0.1	0.5	<0.1
<i>Myliobatis freminvillei</i>	bullnose ray	1	<0.1	2.4	0.1
<i>Synodus foetens</i>	inshore lizardfish	1	<0.1	0.1	<0.1
<i>Bairdiella chrysoura</i>	silver perch	1	<0.1	0.1	<0.1

<i>Menticirrhus americanus</i>	southern kingfish	1	<0.1	0.6	<0.1
<i>Chaetodipterus faber</i>	Atlantic spadefish	1	<0.1	0.1	<0.1

Table 15a. (cont)

Species	Common Name	Number		Biomass (kg)	
		Total	Percent	Total	Percent
<i>Paralichthys dentatus</i>	summer flounder	1	<0.1	0.2	<0.1
<i>Paralichthys albigutta</i>	Gulf flounder	1	<0.1	0.5	<0.1
<i>Trinectes maculatus</i>	hogchoker	1	<0.1	0.1	<0.1
<i>Lepidochelys kemp</i>	Kemp's ridley double-crested	1	<0.1	3.8	0.2
<i>Phalacrocorax auritus</i>	cormorant	1	<0.1	*	*
<i>Zostrea marina</i>	eel grass	*	*	*	*
Total		3,301	100.0	1,661.9	99.8

*Noted but count and/or weight was not recorded.

Table 15b. Species compositions observed in the Fisheries Independent Assessment Program from the Cape Fear River during 2008 (n=28).

Species	Common Name	Number		Biomass (kg)	
		Total	Percent	Total	Percent
<i>Callinectes sapidus</i>	blue crab	200	18.2	29.6	3.5
<i>Rhizoprionodon terraenovae</i>	Atlantic sharpnose shark	190	17.3	101.4	12.1
<i>Brevoortia tyrannus</i>	Atlantic menhaden	114	10.4	27.2	3.2
<i>Rhinoptera bonasus</i>	cownose ray	84	7.6	122.7	14.7
<i>Sphyrna tiburo</i>	bonnethead shark	61	5.5	188.1	22.5
<i>Mugil cephalus</i>	striped mullet	46	4.2	27.2	3.2
<i>Pomatomus saltatrix</i>	bluefish	39	3.5	19.6	2.3
<i>Sciaenops ocellatus</i>	red drum	37	3.4	43.5	5.2
<i>Paralichthys lethostigma</i>	southern flounder	37	3.4	25.6	3.1
<i>Micropogonias undulatus</i>	Atlantic croaker	35	3.2	7.4	0.9
<i>Gymnura micrura</i>	smooth butterfly ray	29	2.6	12.8	1.5
<i>Lepisosteus osseus</i>	longnose gar	28	2.5	57.1	6.8
<i>Pogonias cromis</i>	black drum	28	2.5	20.0	2.4
<i>Leiostomus xanthurus</i>	spot	26	2.4	5.2	0.6
<i>Elops saurus</i>	ladyfish	23	2.1	15.3	1.8
<i>Cynoscion nebulosus</i>	spotted seatrout	22	2.0	17.2	2.1
<i>Archosargus probatocephalus</i>	sheepshead	13	1.2	9.5	1.1
<i>Dasyatis sabina</i>	Atlantic stingray	12	1.1	12.6	1.5
<i>Chaetodipterus faber</i>	Atlantic spadefish	12	1.1	1.5	0.2
<i>Menippe mercenaria</i>	Florida stone crab	8	0.7	2.1	0.3
<i>Mustelus canis</i>	smooth dogfish	7	0.6	6.7	0.8
<i>Menticirrhus americanus</i>	southern kingfish	7	0.6	3.1	0.4
<i>Dorosoma cepedianum</i>	gizzard shad	5	0.5	2.1	0.2
<i>Malaclemys terrapin</i>	diamondback turtle	5	0.5	0.7	0.1
<i>Carcharhinus plumbeus(milberti)</i>	sandbar shark	3	0.3	18.9	2.3
<i>Dasyatis say</i>	bluntnose stingray	3	0.3	3.2	0.4
<i>Morone saxatilis</i>	striped bass	3	0.3	14.0	1.7
<i>Lobotes surinamensis</i>	tripletail	3	0.3	3.9	0.5
<i>Lagodon rhomboides</i>	pinfish	3	0.3	0.3	<0.1
<i>Gymnura spp.</i>	butterfly rays	2	0.2	1.2	0.1
<i>Stomolophus meleagris</i>	jelly bomb	1	0.1	0.0	<0.1
<i>Limulus polyphemus</i>	horseshoe crab	1	0.1	1.2	0.1
<i>Carcharhinus acronotus</i>	blacknose shark	1	0.1	2.4	0.3
<i>Carcharhinus limbatus</i>	blacktip shark	1	0.1	6.0	0.7
<i>Carcharhinus isodon</i>	finetooth shark	1	0.1	19.0	2.3
<i>Dasyatis spp.</i>	Dasyatis stingrays	1	0.1	0.5	0.1

<i>Acipenser oxyrinchus</i>	Atlantic sturgeon	1	0.1	2.6	0.3
<i>Anguilla rostrata</i>	American eel	1	0.1	0.3	<0.1

Table 15b. (cont)

Species	Common Name	Number		Biomass (kg)	
		Total	Percent	Total	Percent
<i>Rachycentron canadum</i>	cobia	1	0.1	0.6	0.1
<i>Trachinotus carolinus</i>	Florida pompano	1	0.1	0.8	0.1
<i>Cynoscion regalis</i>	weakfish	1	0.1	0.5	0.1
<i>Bairdiella chrysoura</i>	silver perch	1	0.1	0.2	<0.1
<i>Ancylopsetta quadrocellata</i>	ocellated flounder	1	0.1	0.2	<0.1
<i>Trinectes maculatus</i>	hogchoker	1	0.1	0.1	<0.1
<i>Lepidochelys kemp</i>	Kemp's ridley	1	0.1	3.3	0.4
<i>Sterna hirundo</i>	common tern	1	0.1	0.5	0.1
<i>Detritus</i>	detritus	*	*	*	*
<i>Ulva spp.</i>	sea lettuce	*	*	*	*
Total		1101	100.0	836.7	100.0

*Noted but count and/or weight was not recorded.

Table 16. Species abundance and weighted CPUE (# fish per sample) in the Southern Region (New and Cape Fear rivers) and water depth for target species from Fisheries Independent Assessment Program in 2008. Shallow $\leq$ 6 feet and deep $>$ 6 feet.

Common Name	River	Shallow			Deep			Combined		
		Total Number	CPUE	PSE	Total Number	CPUE	PSE	Total Number	CPUE	PSE
American shad	New	0	0.00	.		0.00	.	0	0.00	.
	Cape Fear	0	0.00	.				0	0.00	.
	Combined	0	0.00	.	0	0.00	.	0	0.00	.
Atlantic croaker	New	23	0.17	56	8	0.06	55	31	0.12	44
	Cape Fear	35	0.23	40				35	0.23	40
	Combined	58	0.20	33	8	0.06	55	66	0.16	31
bluefish	New	47	0.23	36	349	1.52	31	396	0.87	29
	Cape Fear	39	0.20	56				39	0.20	56
	Combined	86	0.22	33	349	1.52	31	435	0.62	26
red drum	New	334	1.45	21	25	0.15	60	359	0.80	23
	Cape Fear	37	0.21	38				37	0.21	38
	Combined	371	0.81	22	25	0.15	60	396	0.58	17
southern flounder	New	126	0.52	20	86	0.41	29	212	0.46	17
	Cape Fear	37	0.15	23				37	0.15	23
	Combined	163	0.33	18	86	0.41	29	249	0.35	14
southern kingfish	New	0	0.00	.	1	0.00	100	1	0.00	100
	Cape Fear	7	0.03	58				7	0.03	58
	Combined	7	0.01	59	1	0.00	100	8	0.01	100
Spanish mackerel	New	5	0.02	100	51	0.38	59	56	0.20	58
	Cape Fear	0	0.00	.				0	0.00	.
	Combined	5	0.01	100	51	0.38	59	56	0.12	58
spot	New	62	0.28	28	43	0.30	54	105	0.13	36
	Cape Fear	26	0.13	36				26	0.29	31
	Combined	88	0.20	23	43	0.30	54	131	0.23	26
spotted seatrout	New	18	0.05	37	15	0.08	39	33	0.07	27
	Cape Fear	22	0.09	29				22	0.09	29
	Combined	40	0.07	23	15	0.08	39	55	0.08	25
striped bass	New	0	0.00	.	0	0.00	.	0	0.00	.
	Cape Fear	3	0.01	100				3	0.01	100
	Combined	3	0.00	100	0	0.00	.	3	0.00	.
weakfish	New	0	0.00	.	7	0.03	64	7	0.01	65
	Cape Fear	1	0.00	100				1	0.00	100
	Combined	1	0.00	100	7	0.03	64	8	0.01	100

Table 17. Mortality rates for target species at net retrieval in large mesh gill nets ($\geq 5'$ stretch mesh) for 2008 in the Fisheries Independent Assessment Program (New and Cape Fear rivers). Mortality rates are reported overall and for regulatory discards due to size limits. Separate mortality rates are reported for the three seasons spring/fall (Apr-May; Oct-Nov), summer (Jun-Sep), and winter (Dec 1-15; Feb 15-Mar). *

Season	Common name	Number collected	Percent dead	Number sub-legal collected	Percent sub-legal dead	Number over legal collected	Percent over legal dead
Spring/Fall	American shad	0					
	Atlantic croaker	3	67				
	bluefish	49	92				
	red drum	51	43	30	37		
	southern flounder	50	4	17	6		
	southern kingfish	0					
	Spanish mackerel	1	100	0			
	spot	7	57				
	spotted seatrout	1	0	0			
	striped bass*	3	67	*	*	*	*
	weakfish	0					
Summer	American shad	0					
	Atlantic croaker	4	0				
	bluefish	66	80				
	red drum	43	44	12	8		
	southern flounder	21	14	4	0		
	southern kingfish	0					
	Spanish mackerel	0					
	spot	4	0				
	spotted seatrout	0					
	striped bass	0					
	weakfish	0					
Winter	American shad	0					
	Atlantic croaker	0					
	bluefish	0					
	red drum	8	25	0			
	southern flounder	9	0	4	0		
	southern kingfish	0					
	Spanish mackerel	0					
	spot	0					
	spotted seatrout	0					
	striped bass	0					
	weakfish	0					

*Size Limits

No size limit for American shad, southern kingfish, Atlantic croaker, bluefish, or spot.; Red drum – 18" TL minimum and 27" TL maximum; Southern flounder – 14" TL minimum; Weakfish – 12" TL minimum; Spotted seatrout – 12" TL minimum; Striped bass – No harvest in Cape Fear River and 18" TL minimum in the New River, Spanish mackerel-12" TL minimum

Table 18. Mortality rates for target species at net retrieval in small mesh gill nets ($\leq 5''$ stretch mesh) for 2008 in the Fisheries Independent Assessment Program (New and Cape Fear rivers). Mortality rates are reported overall and for regulatory discards due to size limits. Separate mortality rates are reported for the three seasons spring/fall (Apr-May; Oct-Nov), summer (Jun-Sep), and winter (Dec 1-15; Feb 15-Mar). *

Season	Common name	Number collected	Percent dead	Number sub-legal collected	Percent sub-legal dead	Number over legal collected	Percent over legal dead
Spring/Fall	American shad	0					
	Atlantic croaker	6	67				
	bluefish	152	83				
	red drum	183	65	162	63		
	southern flounder	88	6	73	5		
	southern kingfish	3	100				
	Spanish mackerel	16	94				
	spot	50	18				
	spotted seatrout	29	77	0			
	striped bass	0					
	weakfish	6	100	0			
Summer	American shad	0					
	Atlantic croaker	53	40				
	bluefish	168	83				
	red drum	103	53	52	52	1	100
	southern flounder	69	13	58	16		
	southern kingfish	5	100				
	Spanish mackerel	37	100	2	100		
	spot	68	23				
	spotted seatrout	25	57	0			
	striped bass	0					
	weakfish	2	50	0			
Winter	American shad	0					
	Atlantic croaker	0					
	bluefish	0					
	red drum	8	25	7	29		
	southern flounder	12	0	10	0		
	southern kingfish	0					
	Spanish mackerel	0					
	spot	2	0				
	spotted seatrout	0					
	striped bass	0					
	weakfish	0					

*Size Limits

No size limit for American shad, southern kingfish, Atlantic croaker, bluefish, or spot.; Red drum – 18" TL minimum and 27" TL maximum; Southern flounder – 14" TL minimum; Weakfish – 12" TL minimum; Spotted seatrout – 12" TL minimum; Striped bass – No harvest in Cape Fear River and 18" TL minimum in the New River, Spanish mackerel-12" TL minimum

Table 19. Annual weighted CPUE, total number collected (n), mean size (mm), and size range (mm) for target species during 2008 in the Fisheries Independent Assessment Program (New and Cape Fear rivers).

Year	Common name	CPUE	PSE	n	Mean size (mm)	Size range (mm)
2008	American shad	0	.	0		
	Atlantic croaker	0.16	31	66	245	120-334
	bluefish	0.62	26	435	308	106-717
	red drum	0.58	17	396	416	155-702
	southern flounder	0.35	14	249	306	185-680
	southern kingfish	0.01	100	8		294-418
	Spanish mackerel	0.12	58	56	393	195-597
	spot	0.23	26	131	227	114-387
	spotted seatrout	0.08	25	55	425	243-633
	striped bass	0.00	.	3		648-705
	weakfish	0.01	100	8		323-421

Table 20. Number of specimens collected from the Fisheries Independent Assessment Program (New and Cape Fear rivers) for age determination by species in 2008.

Year	Common name	Sample Number
2008	bluefish	264
	croaker	56
	Gulf flounder	1
	red drum	252
	southern flounder	173
	southern kingfish	6
	Spanish mackerel	53
	spot	102
	spotted seatrout	50
	striped mullet	192
	summer flounder	2
	weakfish	5
Total		1,156

Table 21. Gill net samples collected from May 2008 to June 2009 in the Atlantic Ocean. A sample consisted of an array of nets (270-yards). Results are broken down by area. Winter=January-March, Spring=April-June, Summer=July-September, Fall=October-December.

Year	Season	Area			Combined
		Topsail	Masonboro	Brunswick	
2008	Winter				
	Spring		2	1	3
	Summer	4			4
	Fall	2	2	2	6
2009	Winter	2	2	2	6
	Spring	2	2	2	6
Total		10	8	7	25

Table 22. Environmental data collected during 2008 for the Atlantic Ocean by month from the Fisheries Independent Assessment Program. Spring=April-June, Summer=July-September, Fall=October-December.

Area	Season	Salinity (ppt)			DO (mg/L)			Temperature (C)		
		Mean	Min	Max	Mean	Min	Max	Mean	Min	Max
Topsail	Spring									
	Summer	34.6	34.2	34.8	5.2	4.5	5.8	27	26.2	27.8
	Fall	32.6	32.6	32.6	7.8	7.8	7.8	13.7	13.7	13.7
	All	34.2	32.6	34.8	5.7	4.5	7.8	24.3	13.7	27.8
Masonboro	Spring	34.2	34.2	34.2	6.2	6	6.3	26	26	26
	Summer									
	Fall	32.9	32.4	33.4	7.4	7	8.1	20.7	13.9	24.5
	All	33.4	32.4	34.2	6.9	6	8.1	22.8	13.9	26
Brunswick	Spring	32.7	32.7	32.7	6.8	6.8	6.8	24	24	24
	Summer									
	Fall	32.6	32.5	32.6	7.8	7.8	7.8	13.8	13.8	13.8
	All	32.6	32.5	32.7	7.5	6.8	7.8	17.2	13.8	24
Combined	Spring	33.7	32.7	34.2	6.4	6	6.8	25.3	24	26
	Summer	34.6	34.2	34.8	5.2	4.5	5.8	27	26.2	27.8
	Fall	32.8	32.4	33.4	7.6	7	8.1	17.2	13.7	24.5
	All	33.5	32.4	34.8	6.6	4.5	8.1	22.1	13.7	27.8

Table 23a. Species composition from Topsail Area in the Atlantic Ocean from the Fisheries Independent Assessment Program for 2007 (n=6).

Species	Common name	Number		Biomass (kg)	
		Total	Percent	Total	Percent
<i>Squalus acanthias</i>	spiny dogfish	115	26.9	343.3	29.3
<i>Rhizoprionodon terraenovae</i>	Atlantic sharpnose	74	17.3	162.0	13.8
<i>Sphyrna tiburo</i>	bonnethead shark	32	7.5	88.7	7.6
<i>Brevoortia tyrannus</i>	Atlantic menhaden	25	5.8	4.0	0.3
<i>Carcharhinus acronotus</i>	blacknose shark	22	5.1	163.5	14.0
<i>Leiostomus xanthurus</i>	spot	21	4.9	2.6	0.2
<i>Micropogonias undulatus</i>	Atlantic croaker	21	4.9	2.4	0.2
<i>Larimus fasciatus</i>	banded drum	17	4.0	2.0	0.2
<i>Carcharhinus limbatus</i>	blacktip shark	16	3.7	124.7	10.6
<i>Mustelus canis</i>	smooth dogfish	12	2.8	28.8	2.5
<i>Lagodon rhomboides</i>	pinfish	11	2.6	0.6	0.1
<i>Centropristis striata</i>	black sea bass	8	1.9	1.4	0.1
<i>Pomatomus saltatrix</i>	bluefish	7	1.6	1.5	0.1
<i>Scomberomorus maculatus</i>	spanish mackerel	6	1.4	2.4	0.2
<i>Paralichthys lethostigma</i>	southern flounder	5	1.2	1.5	0.1
<i>Peprilus alepidotus</i>	harvestfish	4	0.9	0.3	<0.1
<i>Caranx crysos</i>	blue runner	3	0.7	1.3	0.1
<i>Cymnura micrura</i>	smooth butterfly ray	2	0.5	0.7	0.1
<i>Synodus fotes</i>	inshore lizardfish	2	0.5	0.4	<0.1
<i>Urophycis floridana</i>	southern hake	2	0.5	0.7	0.1
<i>Stenotomus caprinus</i>	longspine porgy	2	0.5	0.1	<0.1
<i>Menticirrhus americanus</i>	southern kingfish	2	0.5	0.7	0.1
<i>Calappa flammea</i>	falme box crab	1	0.2	0.1	<0.1
<i>Callinectes sapidus</i>	blue crab	1	0.2	0.2	<0.1
<i>Arbacia punctulata</i>	Atlantic purple sea urchin	1	0.2	*	*
<i>Galeocerdo cuvier</i>	tiger shark	1	0.2	225.0	19.2
<i>Carcharhinus isodon</i>	finetooth shark	1	0.2	8.6	0.7
<i>Sphyrna lewini</i>	scalloped hammerhead	1	0.2	1.6	0.1
<i>Raja eglanteria</i>	clearnose skate	1	0.2	0.2	<0.1
<i>Myliobatis freminvillei</i>	bullnose ray	1	0.2	0.7	0.1
<i>Rhinoptera bonasus</i>	cownose ray	1	0.2	0.1	<0.1
<i>Prionotus scitulus</i>	leopard searobin	1	0.2	0.1	<0.1
<i>Trachinotus carolinus</i>	Florida pompano	1	0.2	0.4	<0.1
<i>Haemulon aurolineatum</i>	tomtate	1	0.2	0.1	<0.1
<i>Orthopristis chrysoptera</i>	pigfish	1	0.2	0.1	<0.1
<i>Cynoscion regalis</i>	weakfish	1	0.2	0.2	<0.1
<i>Chaetodipterus faber</i>	spadefish	1	0.2	0.1	<0.1
<i>Peprilus triacanthus</i>	butterfish	1	0.2	0.1	<0.1
<i>Paralichthys dentatus</i>	summer flounder	1	0.2	0.1	<0.1
<i>Scophthalmus aquosus</i>	windowpane	1	0.2	0.2	<0.1
<i>Lepidochelys kempi</i>	Kemp's Ridley turtle	1	0.2	*	*

Table 23b. Species composition from Masonboro Area in the Atlantic Ocean from the Fisheries Independent Assessment Program for 2007 (n=4).

Species	Common name	Number		Biomass (kg)	
		Total	Percent	Total	Percent
<i>Rhizoprionodon terraenovae</i>	Atlantic sharpnose	298	46.1	588.0	48.8
<i>Micropogonias undulatus</i>	Atlantic croaker	80	12.4	8.3	0.7
<i>Menticirrhus americanus</i>	southern kingfish	61	9.4	15.4	1.3
<i>Carcharhinus acronotus</i>	blacknose shark	27	4.2	175.1	14.5
<i>Scomberomorus maculatus</i>	Spanish mackerel	26	4.0	7.6	0.6
<i>Calappa flammea</i>	falme box crab	18	2.8	3.9	0.3
<i>Pomatomus saltatrix</i>	bluefish	14	2.2	3.5	0.3
<i>Sphyrna tiburo</i>	bonnethead shark	13	2.0	42.0	3.5
<i>Leiostomus xanthurus</i>	spot	10	1.5	0.9	0.1
<i>Carcharhinus limbatus</i>	blacktip shark	9	1.4	100.0	8.3
<i>Cymnura micrura</i>	smooth butterfly ray	9	1.4	2.9	0.2
<i>Lagodon rhomboides</i>	pinfish	9	1.4	0.5	<0.1
<i>Larimus fasciatus</i>	banded drum	8	1.2	0.9	0.1
<i>Libinia spp</i>	spider crab	7	1.1	0.6	<0.1
<i>Dasyatis say</i>	bluntnose stingray	6	0.9	2.5	0.2
<i>Sphyrna lewini</i>	scalloped hammerhead	5	0.8	24.2	2.0
<i>Rhinoptera bonasus</i>	cownose ray	5	0.8	12.8	1.1
<i>Myliobatis freminvillei</i>	bullnose ray	4	0.6	4.8	0.4
<i>Paralichthys lethostigma</i>	southern flounder	4	0.6	1.8	0.1
<i>Dasyatis sabina</i>	Atlantic stingray	3	0.5	8.7	0.7
<i>Centropristis striata</i>	black sea bass	3	0.5	0.7	0.1
<i>Cynoscion regalis</i>	weakfish	3	0.5	0.6	<0.1
<i>Carcharhinus brevipinna</i>	spinner shark	2	0.3	27.9	2.3
<i>Synodus fottens</i>	inshore lizardfish	2	0.3	0.4	0.0
<i>Rachycentron canadum</i>	cobia	2	0.3	1.7	0.1
<i>Selene setapinnis</i>	Atlantic moonfish	2	0.3	0.4	<0.1
<i>Orthopristis chrysoptera</i>	pigfish	2	0.3	0.2	<0.1
<i>Penaeus setiferus</i>	white shrimp	1	0.2	0.1	<0.1
<i>Arenaeus cribarius</i>	speckled crab	1	0.2	0.1	<0.1
<i>Callinectes spp.</i>	swimming crab	1	0.2	0.1	<0.1
<i>Ovalipes ocellatus</i>	lady crab	1	0.2	0.1	<0.1
<i>Menippe mercenaria</i>	Florida stone crab	1	0.2	0.3	<0.1
<i>Odontaspis taurus</i>	sand tiger shark	1	0.2	158.9	13.2
<i>Carcharhinus altimus</i>	bignose shark	1	0.2	7.2	0.6
<i>Raja eglanteria</i>	clearnose skate	1	0.2	0.8	0.1
<i>Brevoortia tyrannus</i>	Atlantic menhaden	1	0.2	0.1	<0.1
<i>Centropristis philadelphica</i>	rock sea bass	1	0.2	0.2	<0.1
<i>Remora remora</i>	remora	1	0.2	0.4	<0.1
<i>Trachinotus carolinua</i>	Florida pompano	1	0.2	0.1	<0.1
<i>Haemulon aurolineatum</i>	tomtate	1	0.2	0.1	<0.1
<i>Peprilus alepidotus</i>	harvestfish	1	0.2	0.1	<0.1
<i>Paralichthys albigutta</i>	Gulf flounder	1	0.2	0.6	<0.1

Table 23c. Species composition from Brunswick Area in the Atlantic Ocean from the Fisheries Independent Assessment Program for 2007 (n=3).

Species	Common name	Number		Biomass (kg)	
		Total	Percent	Total	Percent
<i>Rhizoprionodon terraenovae</i>	Atlantic sharpnose	131	28.2	312.6	34.5
<i>Squalus acanthias</i>	spiny dogfish	79	17.0	234.0	25.8
<i>Brevoortia tyrannus</i>	Atlantic menhaden	77	16.6	8.3	0.9
<i>Mustelus canis</i>	smooth dogfish	46	9.9	238.2	26.3
<i>Menticirrhus americanus</i>	southern kingfish	41	8.8	13.9	1.5
<i>Cynoscion regalis</i>	weakfish	19	4.1	4.0	0.4
<i>Micropogonias undulatus</i>	Atlantic croaker	9	1.9	1.1	0.1
<i>Raja eglanteria</i>	clearnose skate	7	1.5	7.9	0.9
<i>Scomberomorus maculatus</i>	Spanish mackerel	7	1.5	4.2	0.5
<i>Sphyrna tiburo</i>	bonnethead shark	6	1.3	16.9	1.9
<i>Leiostomus xanthurus</i>	spot	6	1.3	0.6	0.1
<i>Larimus fasciatus</i>	banded drum	6	1.3	0.6	0.1
<i>Callinectes sapidus</i>	blue crab	4	0.9	0.8	0.1
<i>Arbacia punctulata</i>	Atlantic purple sea urchin	4	0.9	*	*
<i>Limulus polyphemus</i>	horseshoe crab	3	0.6	10.9	1.2
<i>Penaeus setiferus</i>	white shrimp	3	0.6	0.1	<0.1
<i>Libinia spp</i>	spider crab	2	0.4	0.1	<0.1
<i>Portunus spinimanus</i>	blotched crab	2	0.4	0.2	<0.1
<i>Pomatomus saltatrix</i>	bluefish	2	0.4	0.5	0.1
<i>Calappa flammea</i>	falme box crab	1	0.2	1.5	0.2
<i>Menippe mercenaria</i>	Florida stone crab	1	0.2	0.5	0.1
<i>Asterias forbesi</i>	Forbes sea star	1	0.2	*	*
<i>Carcharhinus acronotus</i>	blacknose shark	1	0.2	7.2	0.8
<i>Carcharhinus limbatus</i>	blacktip shark	1	0.2	20.8	2.3
<i>Rhinoptera bonasus</i>	cownose ray	1	0.2	20.0	2.2
<i>Urophycis earlii</i>	Carolina hake	1	0.2	0.3	<0.1
<i>Centropristis striata</i>	black sea bass	1	0.2	0.3	<0.1
<i>Centropristis striata</i>	rock sea bass	1	0.2	0.1	<0.1
<i>Menticirrhus littoralis</i>	Gulf kingfish	1	0.2	0.3	<0.1
<i>Scophthalmus aquosus</i>	windowpane	1	0.2	0.2	<0.1

Table 24. Mortality rates for target species at net retrieval in large mesh gill nets ($\geq 5'$ stretch mesh) for 2008 in the Fisheries Independent Assessment Program (Atlantic Ocean). Mortality rates are reported overall and for regulatory discards due to size limits. Separate mortality rates are reported for the three seasons spring (May and June), summer (July-September), and fall (October-December).

Season	Common name	Number collected	Percent dead	Number sub-legal collected	Percent sub-legal dead
Spring	American shad				
	Atlantic croaker	8	100		
	bluefish				
	red drum				
	southern flounder	1	0	1	0
	southern kingfish	2	100		
	Spanish mackerel				
	spot				
	spotted seatrout				
	striped bass				
	weakfish				
Summer	American shad				
	Atlantic croaker	1	100		
	bluefish				
	red drum				
	southern flounder	2	0	1	0
	southern kingfish				
	Spanish mackerel				
	spot				
	spotted seatrout				
	striped bass				
	weakfish				
Fall	American shad				
	Atlantic croaker				
	bluefish	1	0		
	red drum				
	southern flounder	1	0		
	southern kingfish	1	0		
	Spanish mackerel				
	spot				
	spotted seatrout				
	striped bass				
	weakfish	1	0	1	0

*Size Limits

No size limit for American shad, southern kingfish, Atlantic croaker, bluefish, or spot.; Red drum – 18" TL minimum and 27" TL maximum; Southern flounder – 14" TL minimum; Weakfish – 12" TL minimum; Spotted seatrout – 12" TL minimum; Striped bass – 18" TL minimum, Spanish mackerel-12" TL minimum

Table 25. Mortality rates for target species at net retrieval in small mesh gill nets ($\leq 5''$ stretch mesh) for 2008 in the Fisheries Independent Assessment Program (Atlantic Ocean). Mortality rates are reported overall and for regulatory discards due to size limits. Separate mortality rates are reported for the three seasons spring (May and June), summer (July-September), and fall (October-December).

*

Season	Common name	Number collected	Percent dead	Number sub-legal collected	Percent sub-legal dead
Spring	American shad				
	Atlantic croaker	73	94		
	bluefish	6	100		
	red drum				
	southern flounder				
	southern kingfish	33	100		
	Spanish mackerel	23	100		
	spot	4	100		
	spotted seatrout				
	striped bass				
	weakfish	2	100	2	100
Summer	American shad				
	Atlantic croaker	6	67		
	bluefish	7	75		
	red drum				
	southern flounder	3	33	2	50
	southern kingfish	1	100		
	Spanish mackerel	6	100		
	spot	21	29		
	spotted seatrout				
	striped bass				
	weakfish				
Fall	American shad				
	Atlantic croaker	22	32		
	bluefish	9	100		
	red drum				
	southern flounder	2	50	2	50
	southern kingfish	67	89		
	Spanish mackerel	10	100	1	100
	spot	12	58		
	spotted seatrout				
	striped bass				
	weakfish	20	70	12	92

*Size Limits

No size limit for American shad, southern kingfish, Atlantic croaker, bluefish, or spot.; Red drum – 18" TL minimum and 27" TL maximum; Southern flounder – 14" TL minimum; Weakfish – 12" TL minimum; Spotted seatrout – 12" TL minimum; Striped bass – 18" TL minimum, Spanish mackerel-12" TL minimum

Table 26. Annual weighted CPUE and the associated PSE, total number collected by area, mean size (mm), and size range (mm) for target species in 2008 in the Fisheries Independent Assessment Program (Atlantic Ocean).

Common name	CPUE	PSE	Total number			Mean size (mm)	Size range (mm)
			Topsail	Masonboro	Brunswick		
American shad	0	.	0	0	0		
Atlantic croaker	0.67	40	21	80	9	214	140-242
bluefish	0.13	31	7	14	2	272	230-327
red drum	0	.	0	0	0		
southern flounder	0.05	40	5	4	0	313	237-442
southern kingfish	0.74	18	2	61	41	293	235-397
Spanish mackerel	0.27	37	6	26	7	361	298-489
spot	0.2	50	21	10	6	191	158-206
spotted seatrout	0	.	0	0	0		
striped bass	0	.	0	0	0		
weakfish	0.15	53	1	3	19	276	215-387

Table 27. Number of specimens collected from the Fisheries Independent Assessment Program (Atlantic Ocean) for age determination by species in 2008.

Year	Common name	Total
2008	Atlantic croaker	69
	bluefish	34
	Gulf flounder	1
	Gulf kingfish	30
	northern kingfish	3
	southern flounder	12
	southern kingfish	75
	Spanish mackerel	24
	spot	14
	summer flounder	10
	weakfish	14
Total		286

Table 28. Protected species interactions from July 1, 2007 - June 30, 2009 in the Fisheries Independent Assessment Program (All Areas).

Date	Species	Condition	Water depth (feet)	Location	Latitude	Longitude	Stretch mesh (in)
7/13/2007	Loggerhead	alive	2.4	Neuse River	350014	765309	6.5
6/6/2008	Kemp's ridley	dead	8.5	New River	343615	772145	4.5
7/9/2008	Kemp's ridley	dead	3.3	Cape Fear River	340249	775610	6.5
7/2/2008	Kemp's ridley	dead	59	Atlantic Ocean	342814	772554	5.0

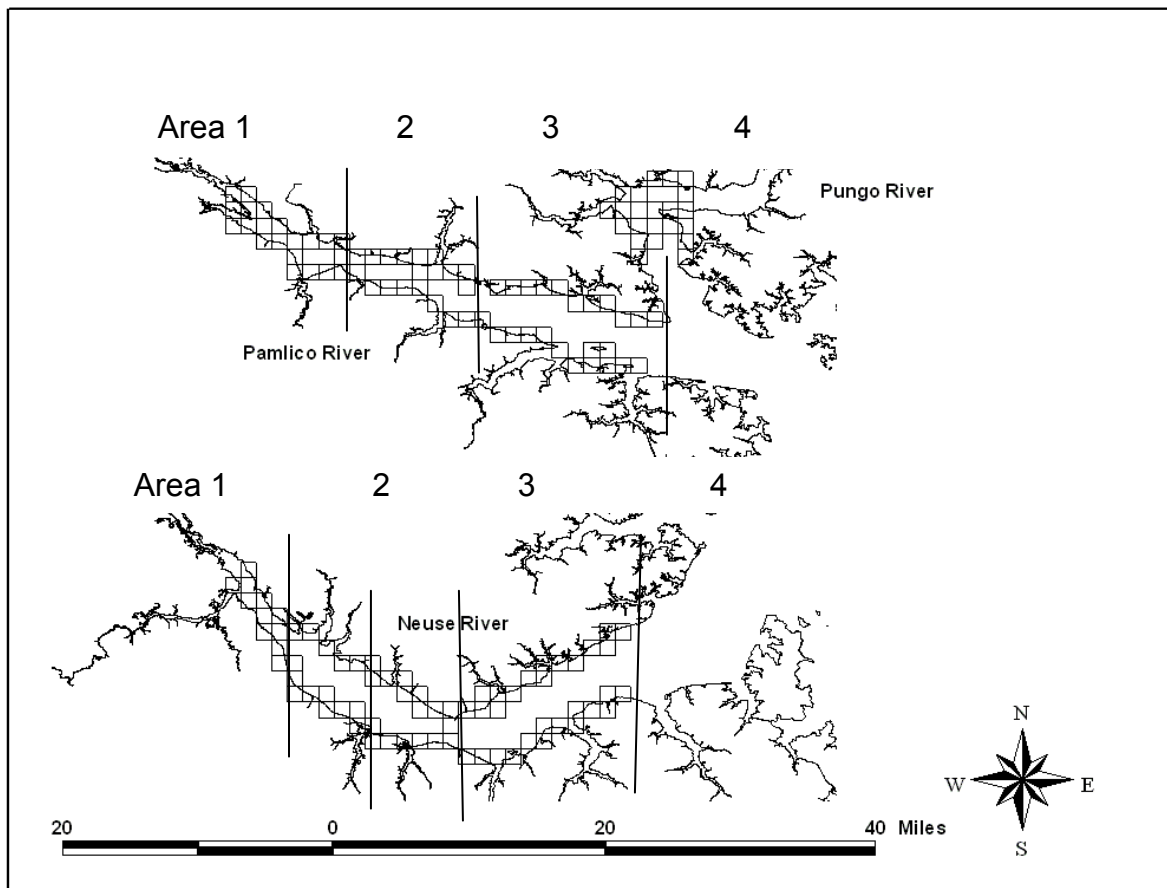


Figure 1. The sample regions and grid system for the Fisheries Independent Assessment Program (Pamlico/Pungo and Neuse rivers) of North Carolina during 2007 and 2008 with areas numbered (Pamlico/Pungo: 1-Upper, 2-Middle, 3- Lower, 4- Pungo; Neuse: 1-Upper, 2-Upper-middle, 3-Lower-middle, 4-Lower).

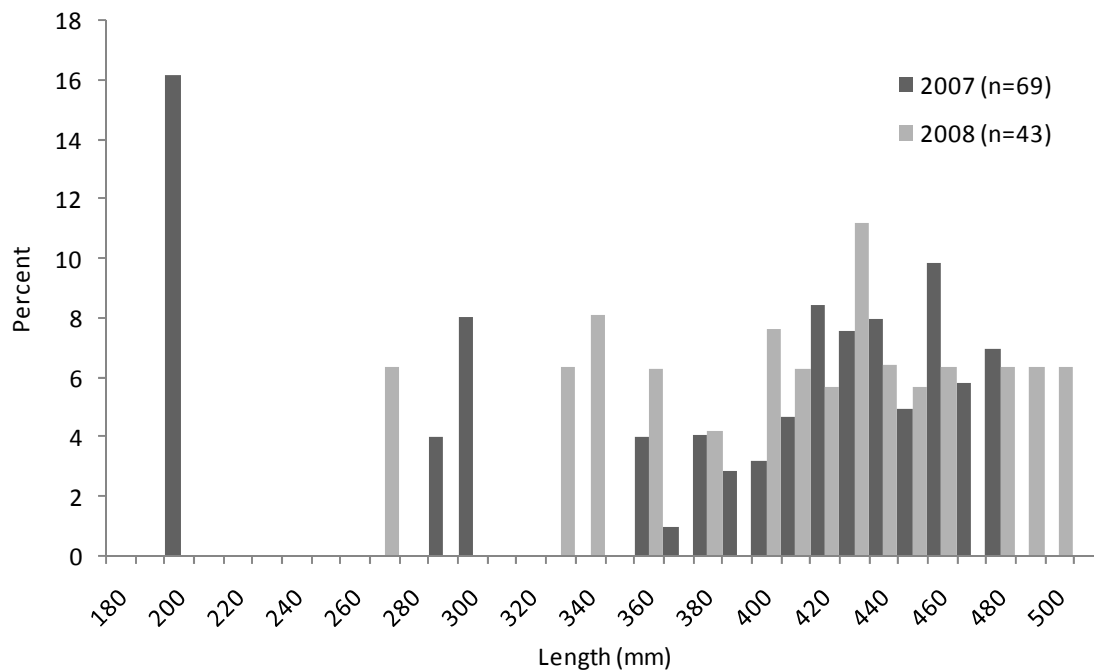


Figure 2. Weighted CPUE length distribution (%) of American shad (*Alosa sapidissima*) for the Fisheries Independent Assessment Program (Pamlico/Pungo and Neuse rivers) 2007 and 2008.

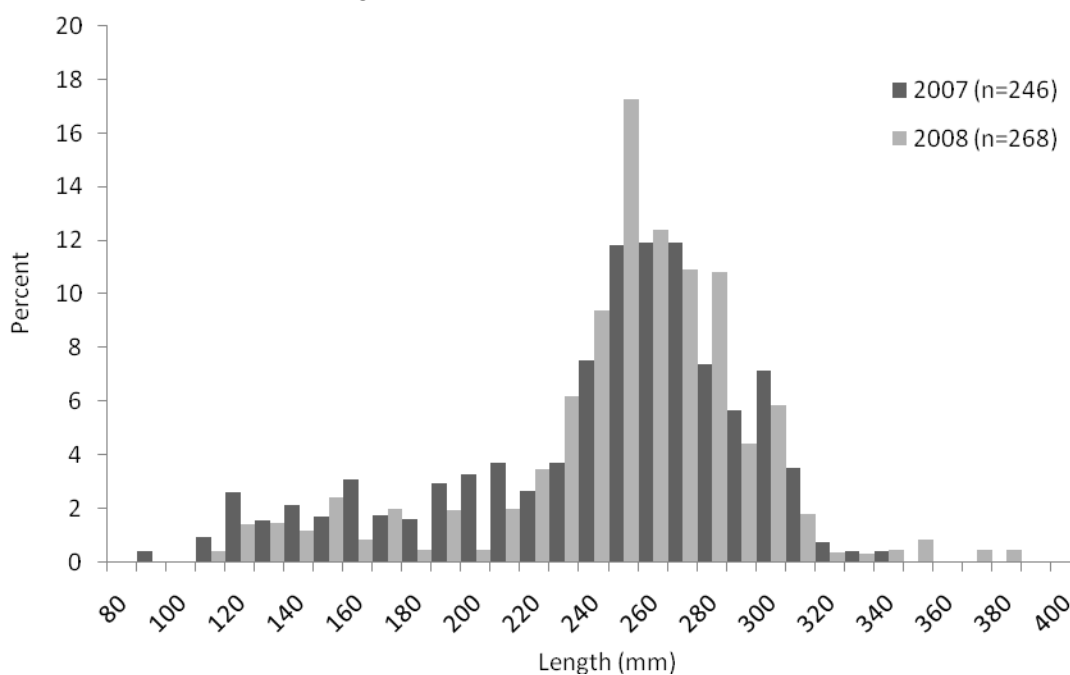


Figure 3. Weighted CPUE length distribution (%) of Atlantic croaker (*Micropogonias undulatus*) for the Fisheries Independent Assessment Program (Pamlico/Pungo and Neuse rivers) 2007 and 2008.

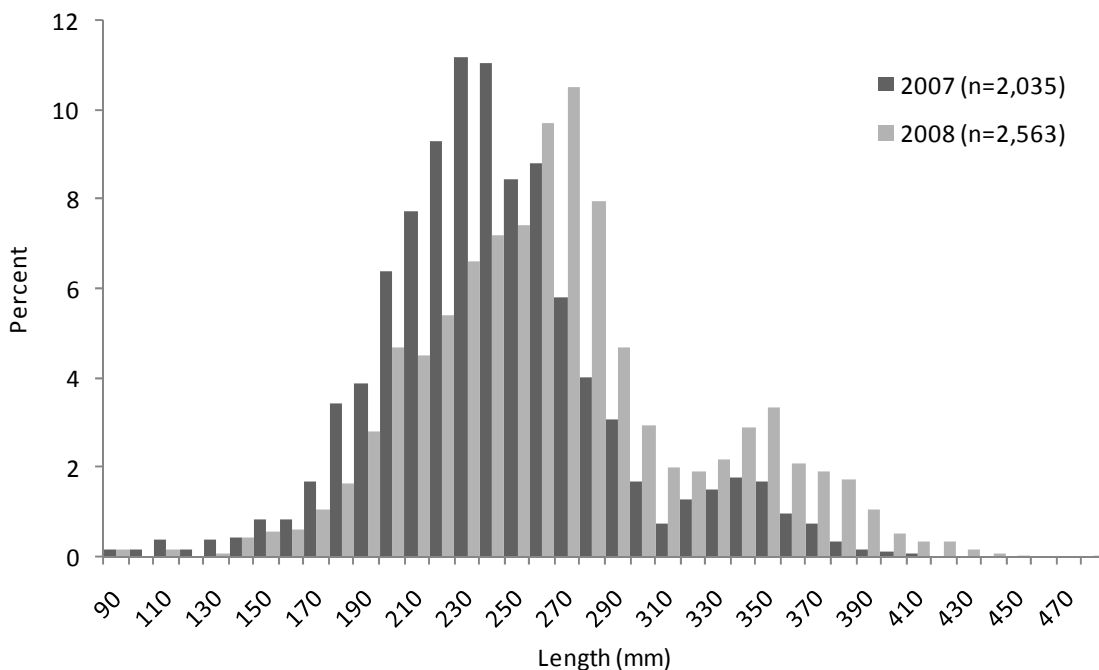


Figure 4. Weighted CPUE length distribution (%) of bluefish (*Pomatomus saltatrix*) for the Fisheries Independent Assessment Program (Pamlico/Pungo and Neuse rivers) 2007 and 2008.

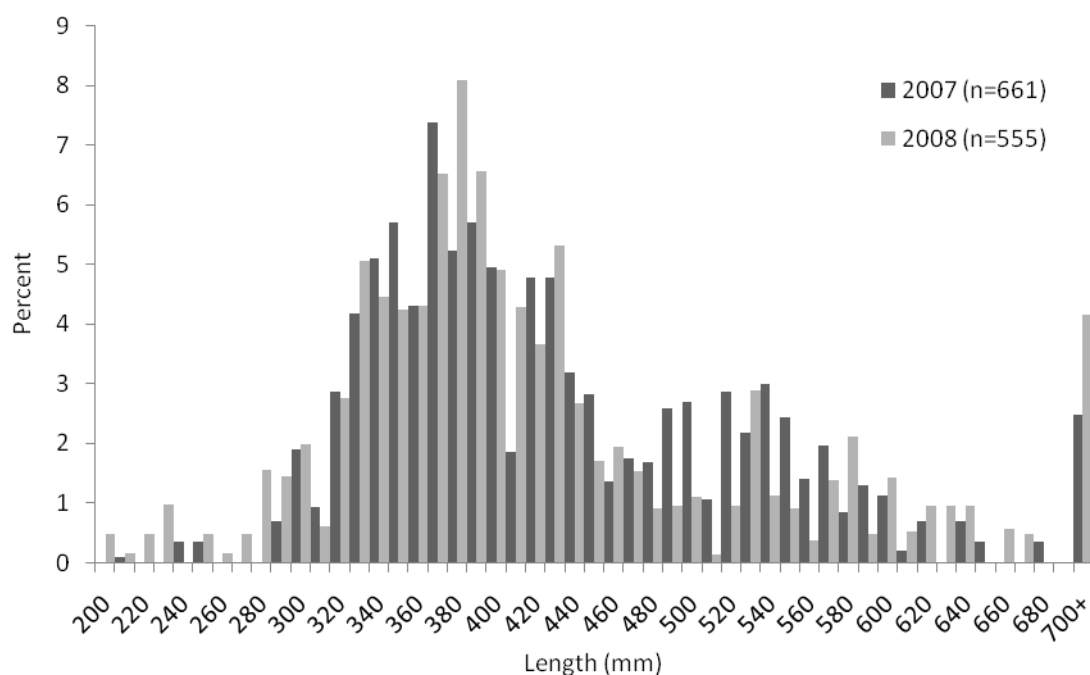


Figure 5. Weighted CPUE length distribution (%) of red drum (*Sciaenops ocellatus*) for the Fisheries Independent Assessment Program (Pamlico/Pungo and Neuse rivers) 2007 and 2008.

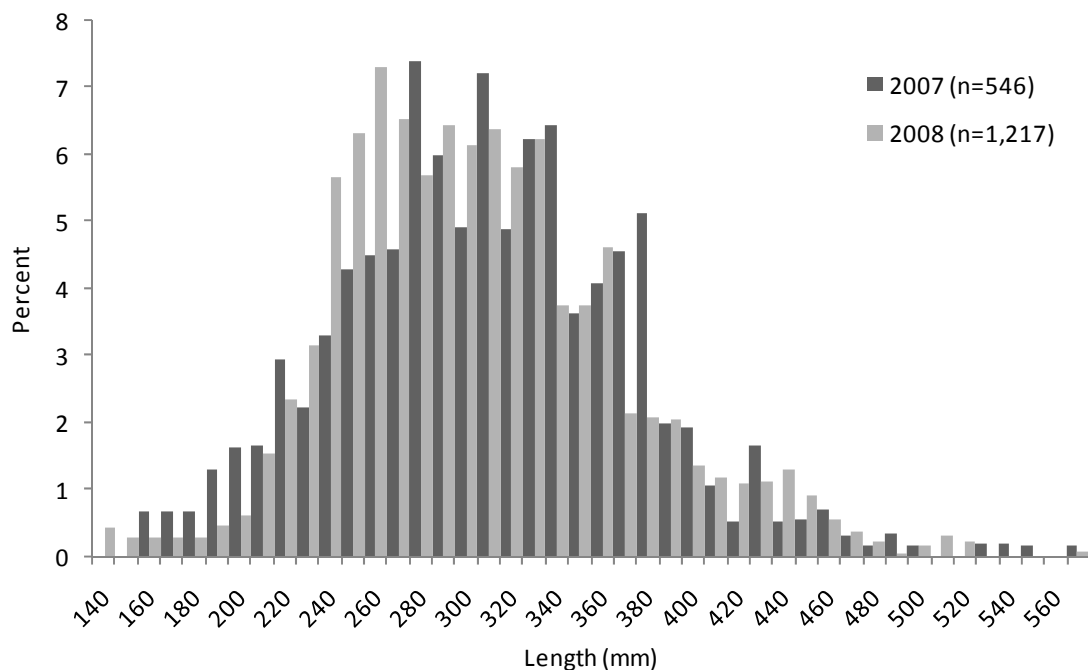


Figure 6. Weighted CPUE length distribution (%) of southern flounder (*Paralichthys lethostigma*) for the Fisheries Independent Assessment Program (Pamlico/Pungo and Neuse rivers) 2007 and 2008.

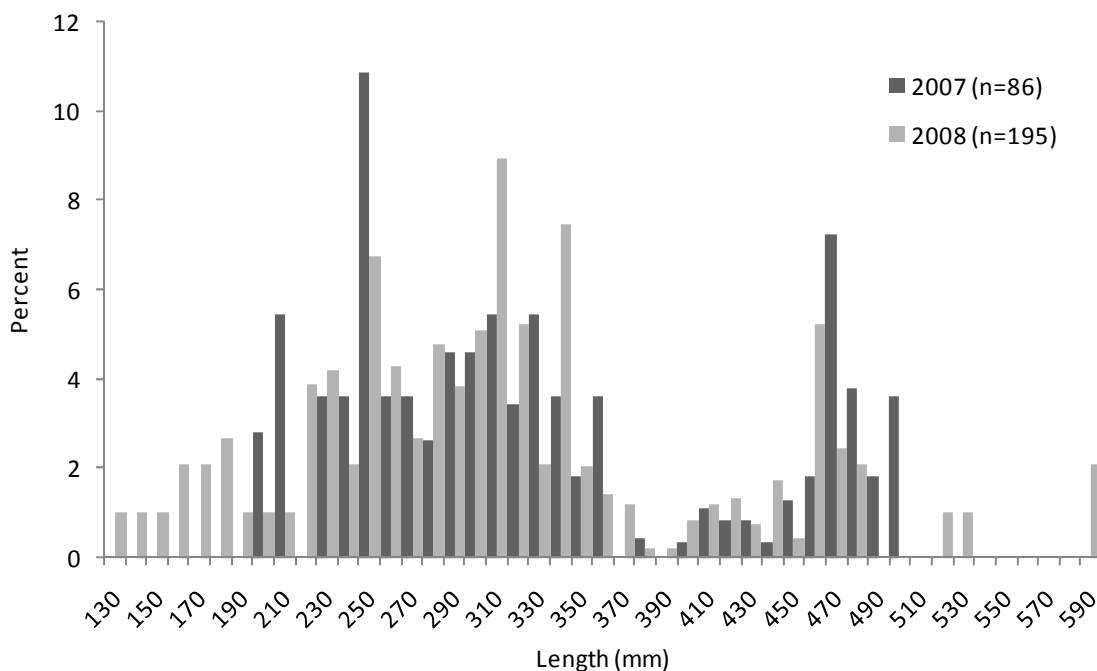


Figure 7. Weighted CPUE length distribution (%) of Spanish mackerel (*Scomberomorus maculatus*) for the Fisheries Independent Assessment Program (Pamlico/Pungo and Neuse rivers) 2007 and 2008.

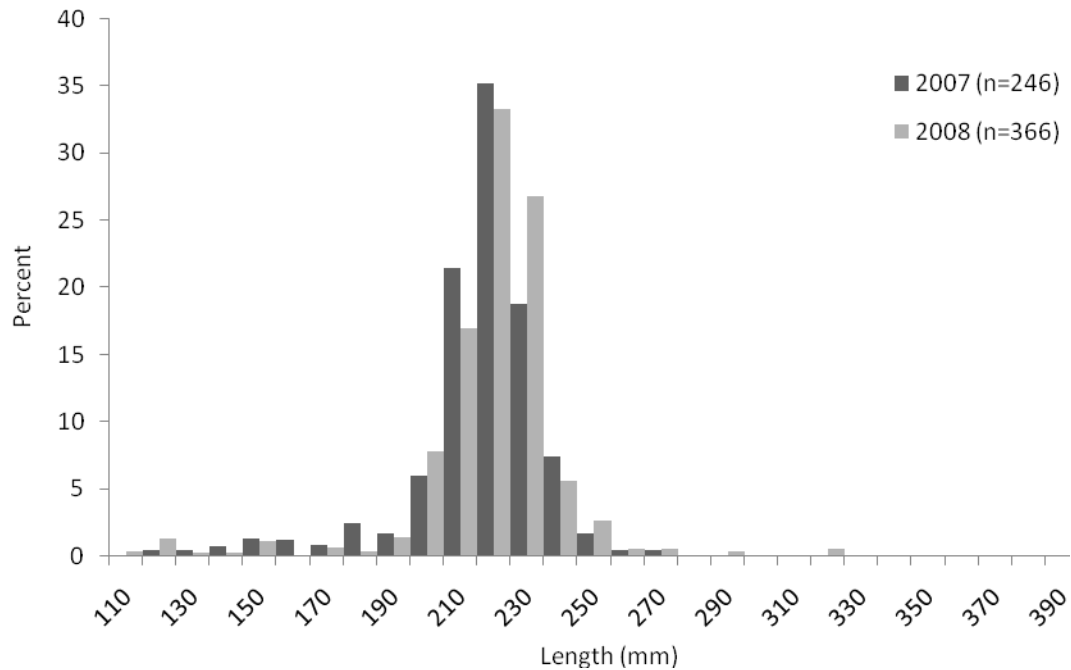


Figure 8. Weighted CPUE length distribution (%) of spot (*Leiostomous xanthurus*) for the Fisheries Independent Assessment Program (Pamlico/Pungo and Neuse rivers) 2007 and 2008.

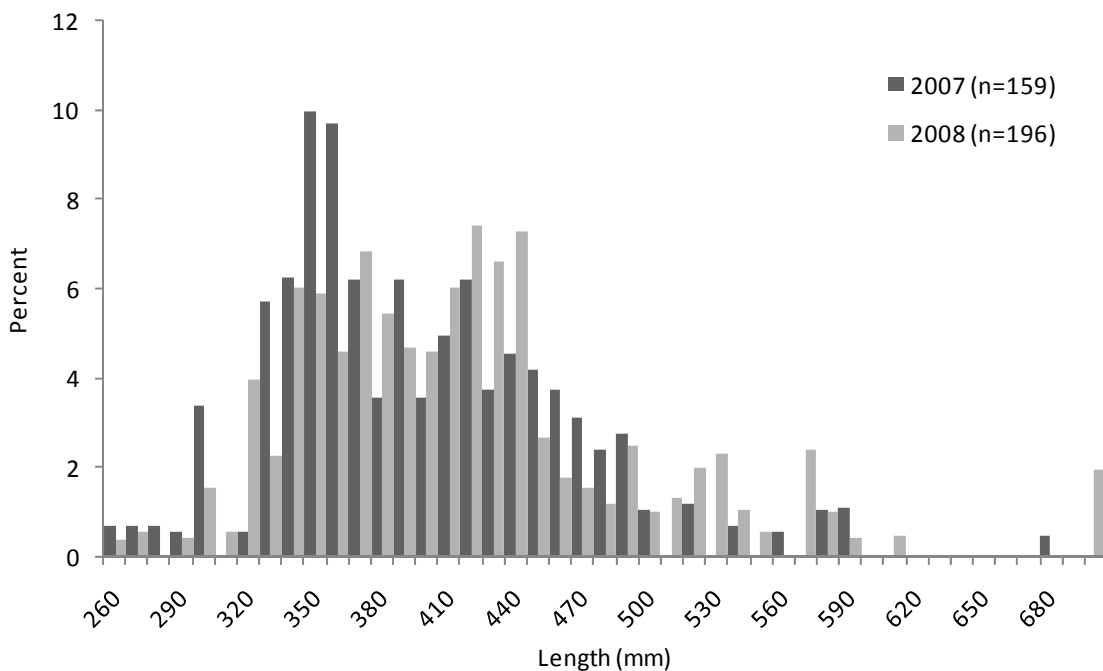


Figure 9. Weighted CPUE length distribution (%) of spotted seatrout (*Cynoscion nebulosus*) for the Fisheries Independent Assessment Program (Pamlico/Pungo and Neuse rivers) 2007 and 2008.

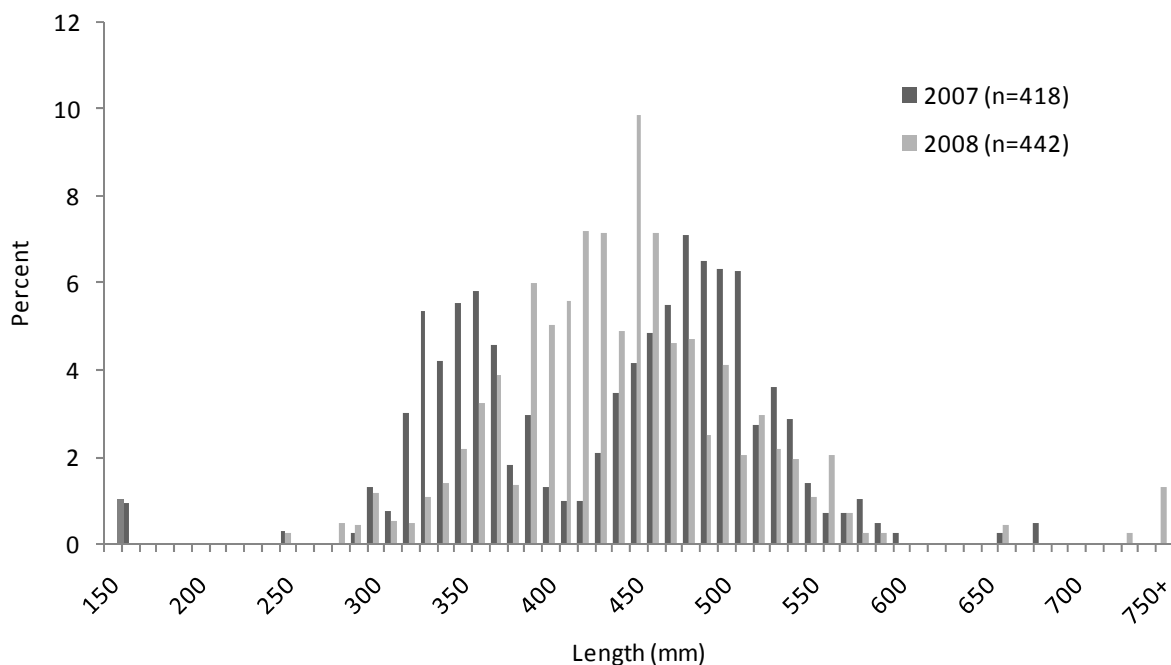


Figure 10. Weighted CPUE length distribution (%) of striped bass (*Morone saxatilis*) for the Fisheries Independent Assessment Program (Pamlico/Pungo and Neuse rivers) 2007 and 2008.

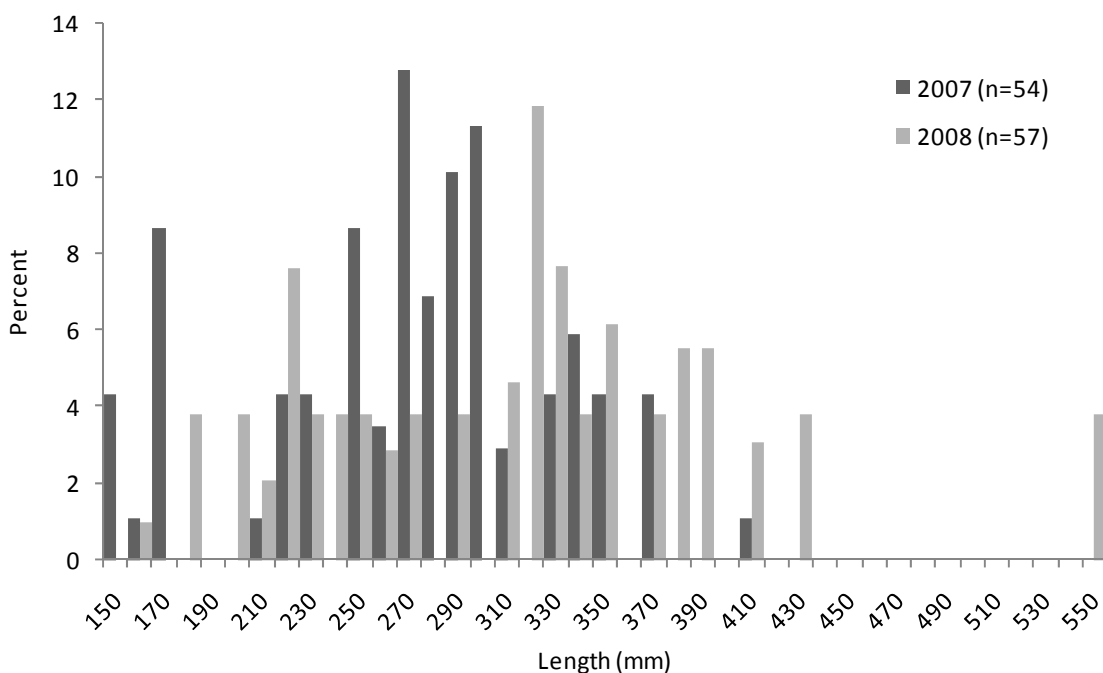


Figure 11. Weighted CPUE length distribution (%) of weakfish (*Cynoscion regalis*) for the Fisheries Independent Assessment Program (Pamlico/Pungo and Neuse rivers) 2007 and 2008.

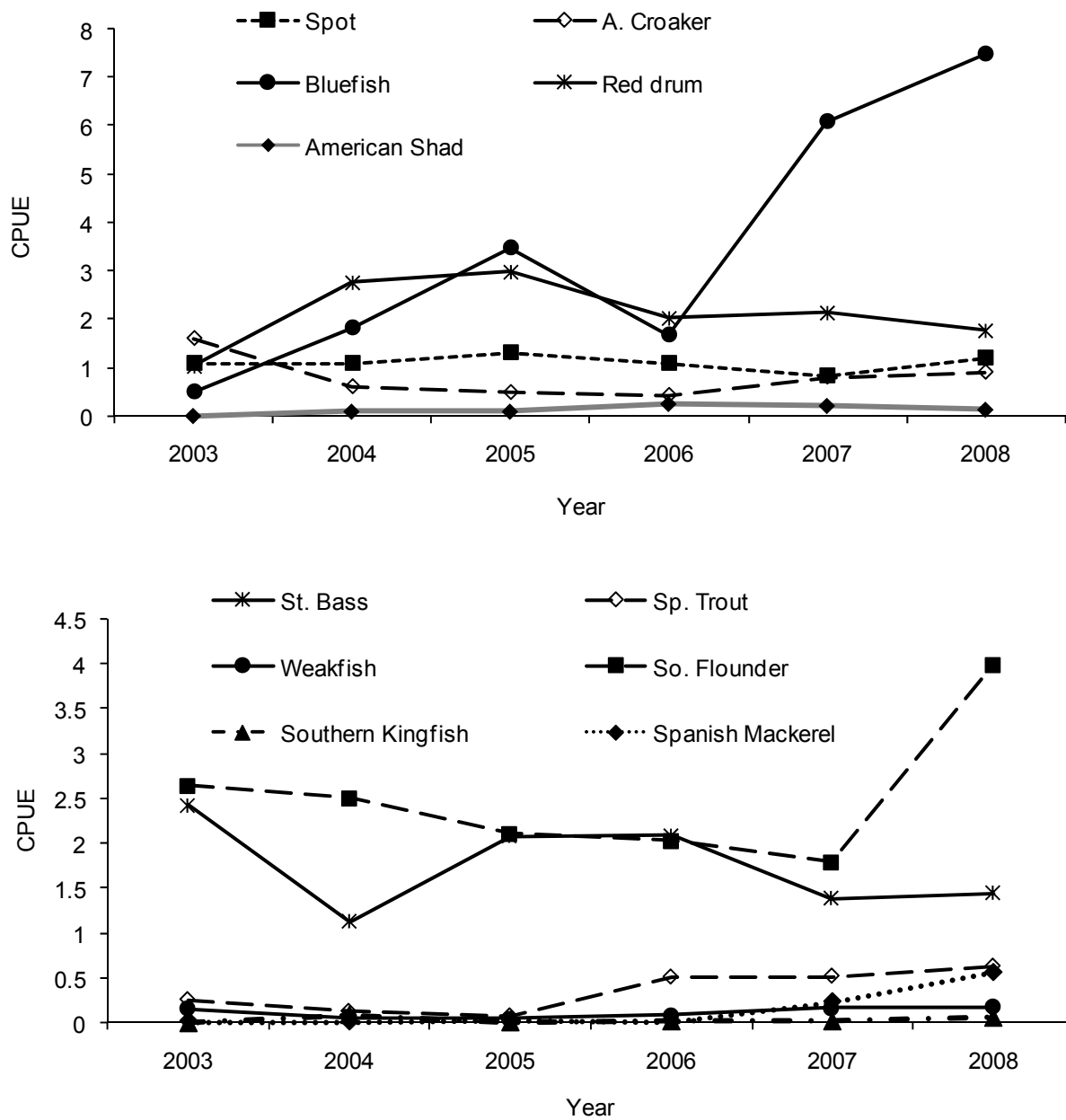


Figure 12. Annual weighted CPUE for target species from 2003 to 2008 in the Fisheries Independent Assessment Program (Pamlico/Pungo and Neuse rivers).

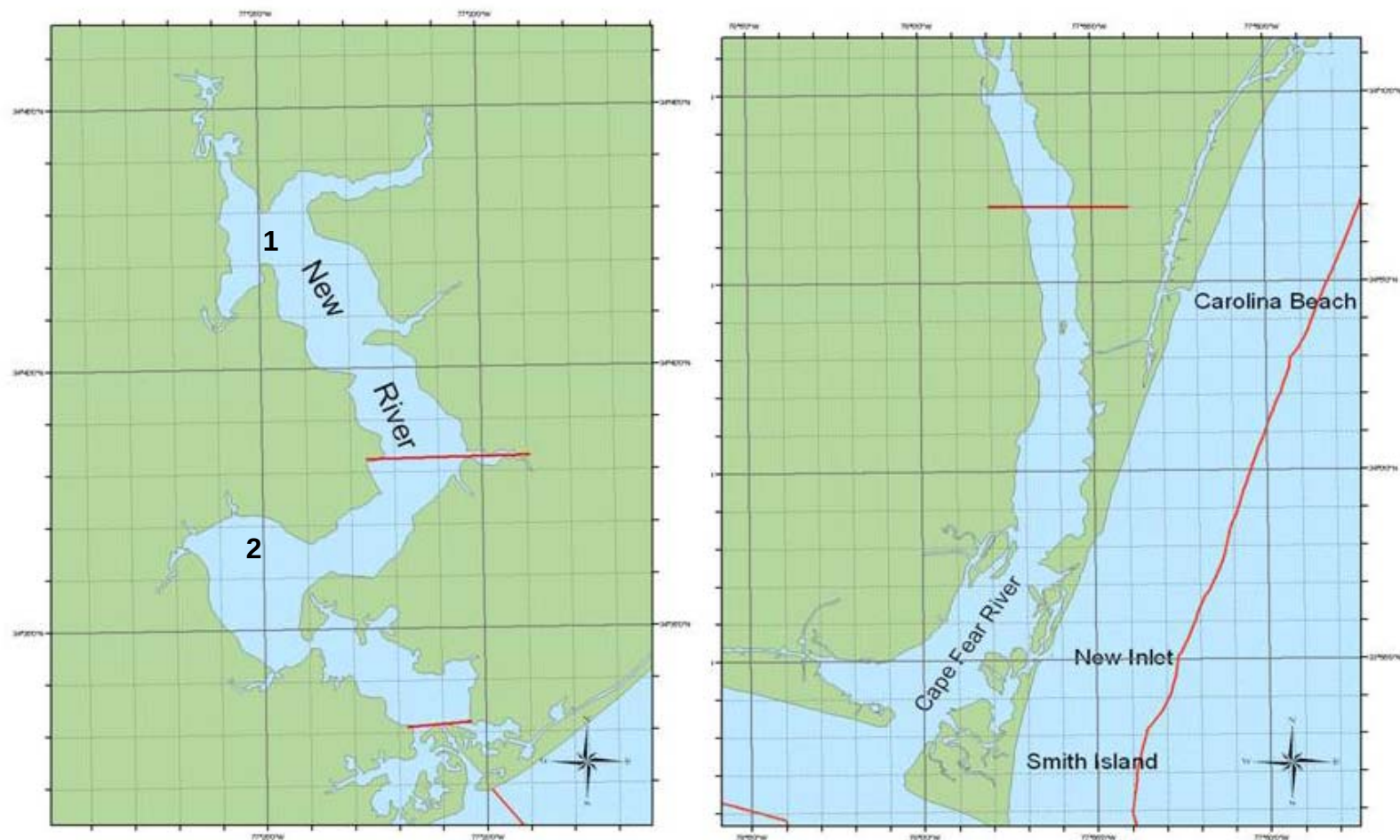


Figure 13. The sample regions and grid system for the Fisheries Independent Assessment Program (New and Cape Fear rivers) of North Carolina during 2008 with areas numbered (New: 1-Upper, 2-Lower; Cape Fear).

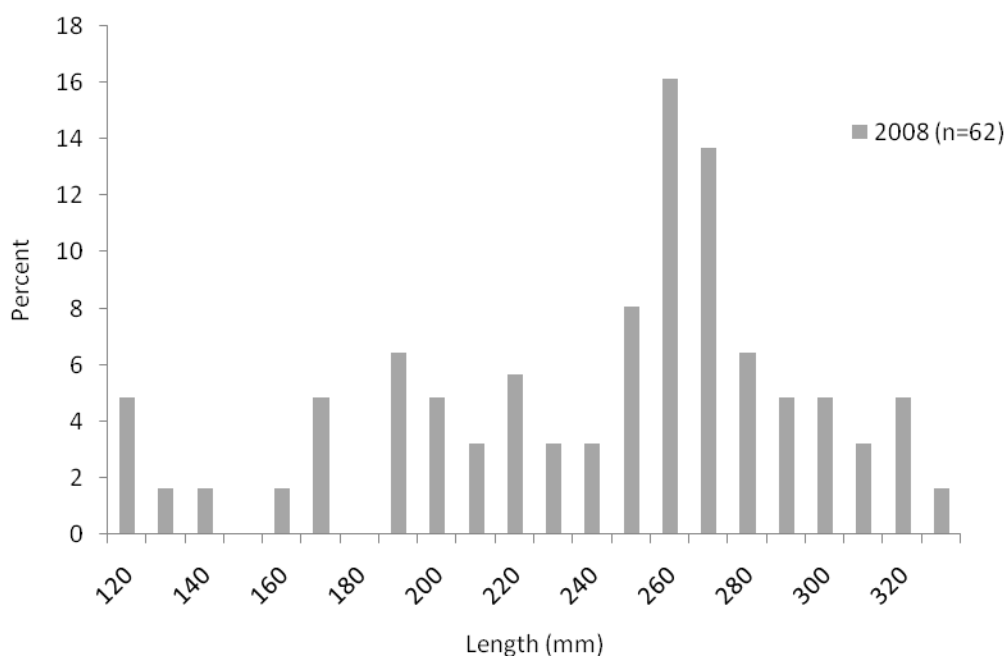


Figure 14. Weighted CPUE length distribution (%) of Atlantic croaker (*Micropogonias undulatus*) for the Fisheries Independent Assessment Program (New and Cape Fear rivers) in 2008.

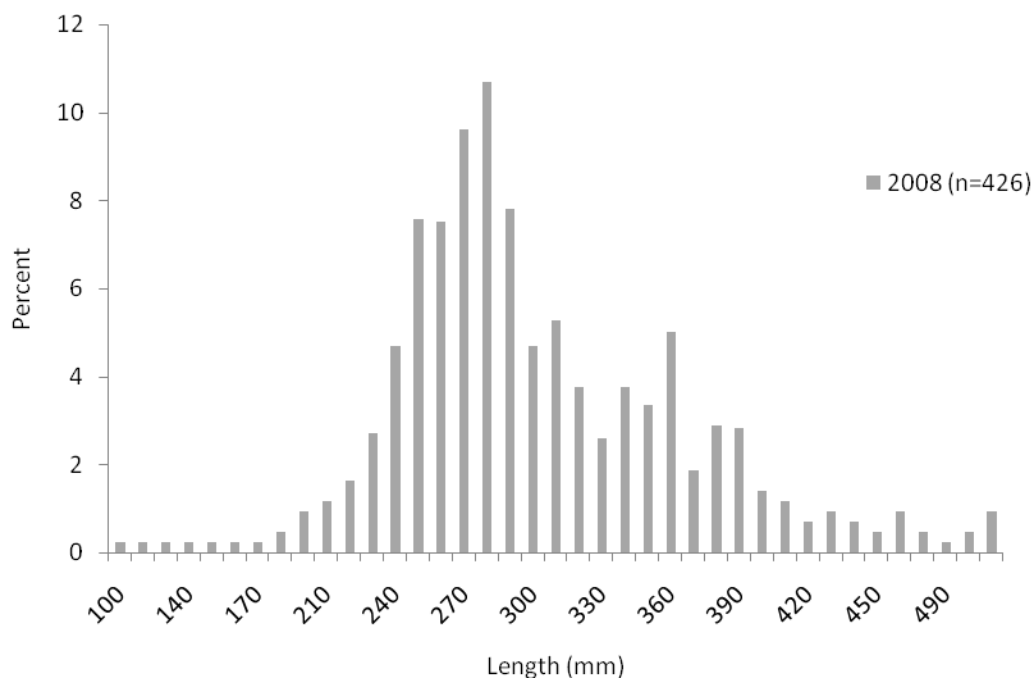


Figure 15. Weighted CPUE length distribution (%) of bluefish (*Pomatomus saltatrix*) for the Fisheries Independent Assessment Program (New and Cape Fear rivers) in 2008.

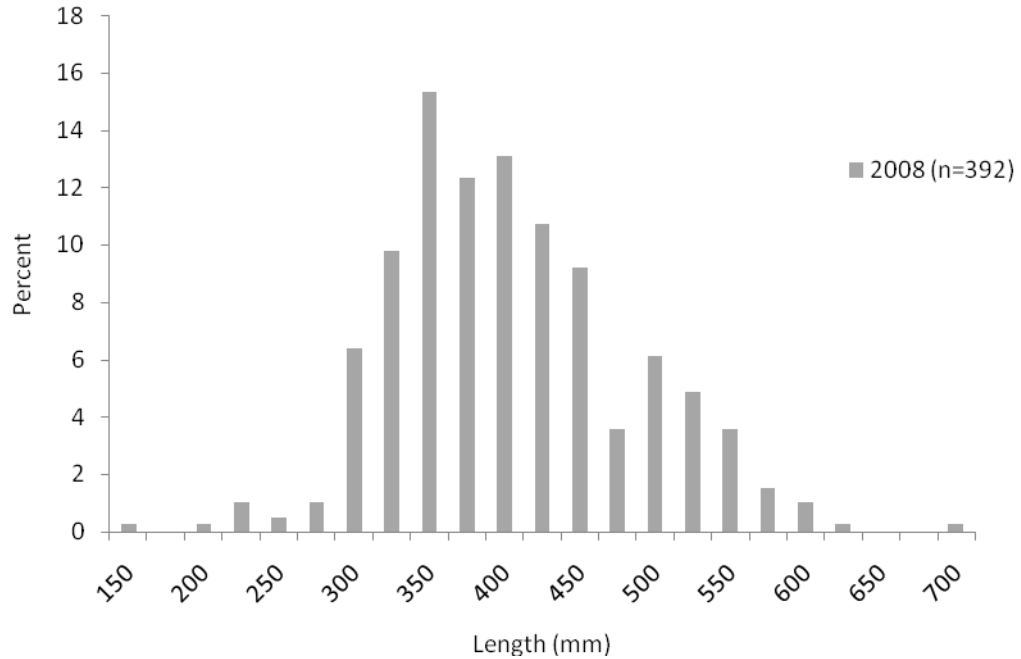


Figure 16. Weighted CPUE length distribution (%) of red drum (*Sciaenops ocellatus*) for the Fisheries Independent Assessment Program (New and Cape Fear rivers) in 2008.

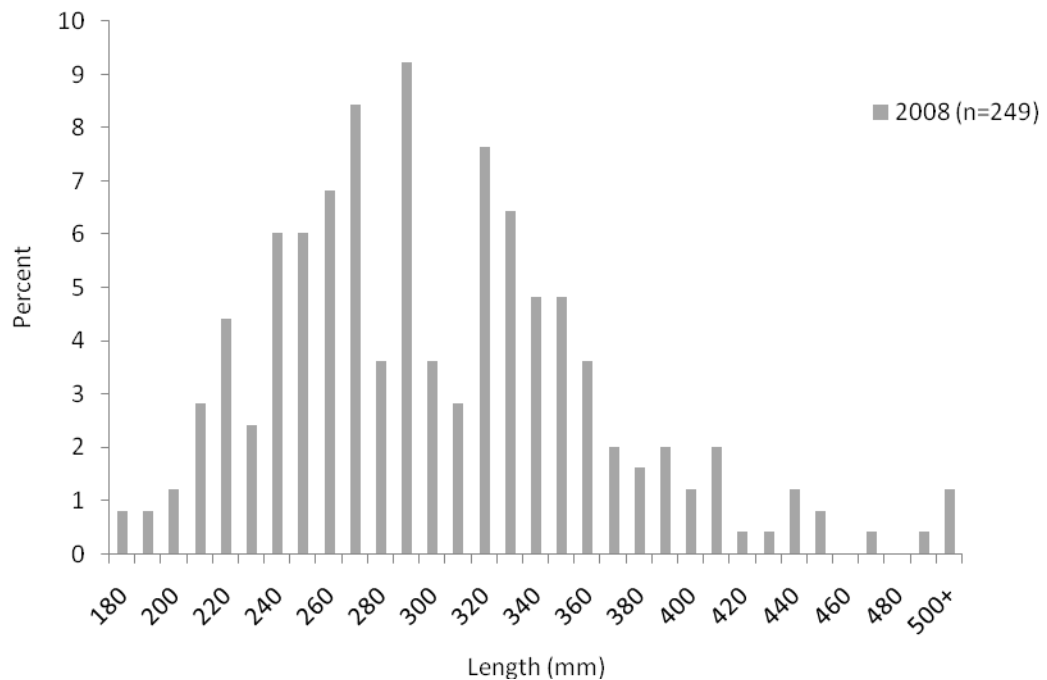


Figure 17. Weighted CPUE length distribution (%) of southern flounder (*Paralichthys lethostigma*) for the Fisheries Independent Assessment Program (New and Cape Fear rivers) in 2008.

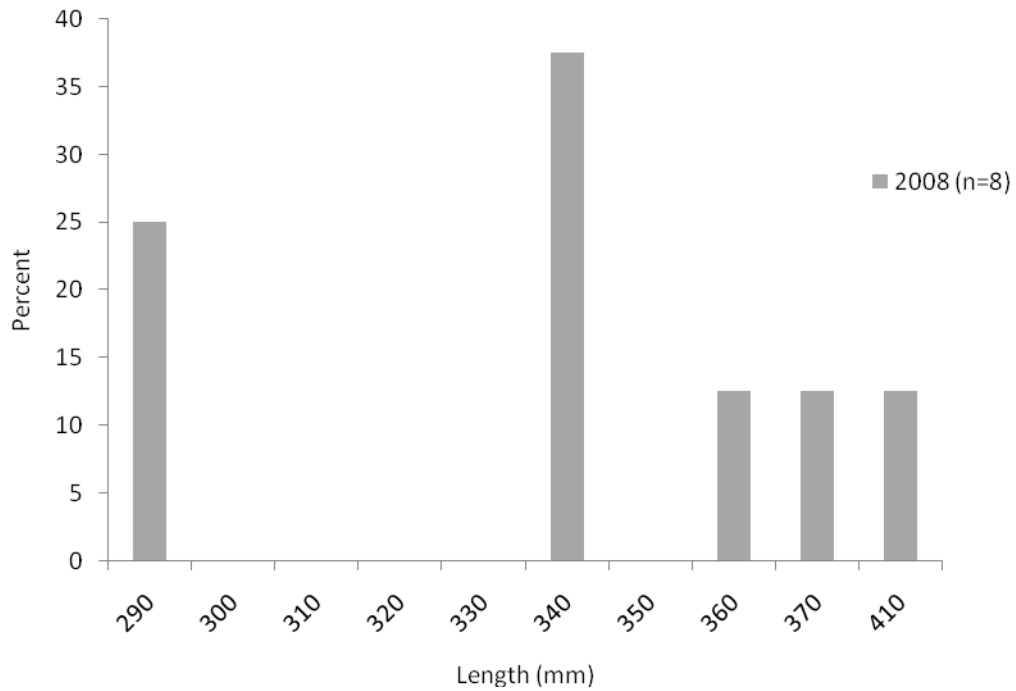


Figure 18. Weighted CPUE length distribution (%) of southern kingfish (*Menticirrhus americanus*) for the Fisheries Independent Assessment Program (New and Cape Fear rivers) in 2008.

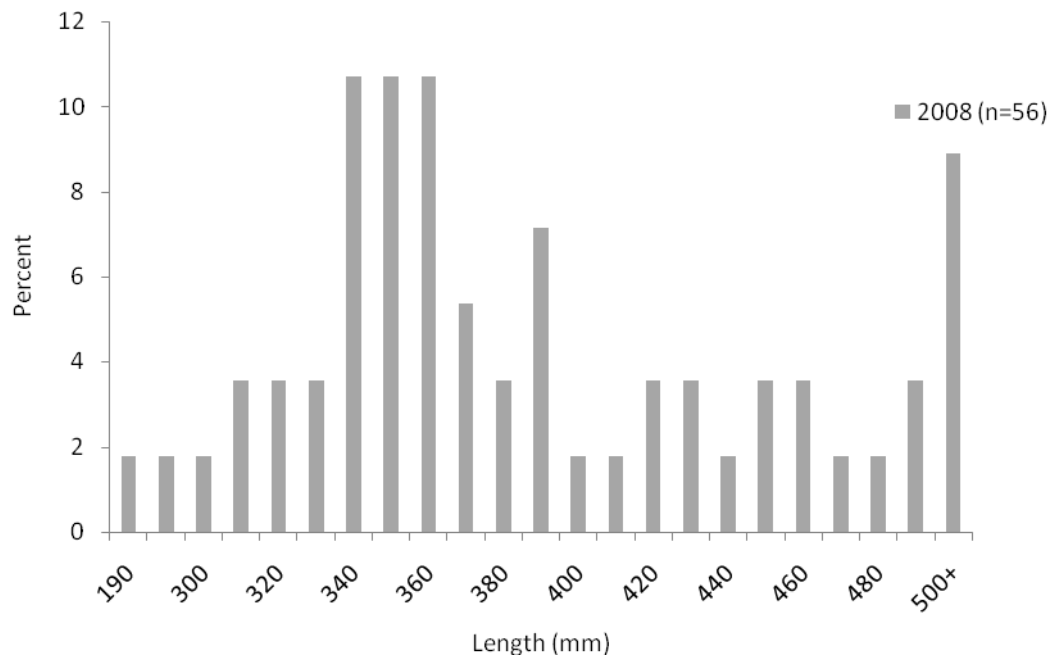


Figure 19. Weighted CPUE length distribution (%) of Spanish mackerel (*Scomberomorus maculatus*) for the Fisheries Independent Assessment Program (New and Cape Fear rivers) in 2008.

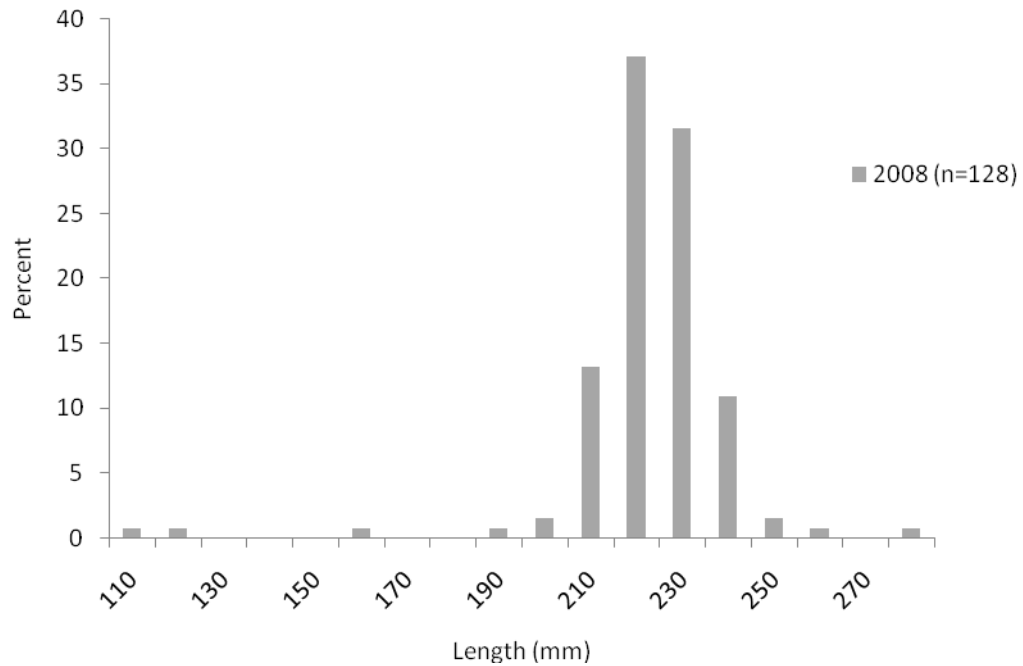


Figure 20. Weighted CPUE length distribution (%) of spot (*Leiostomous xanthurus*) for the Fisheries Independent Assessment Program (New and Cape Fear rivers) in 2008.

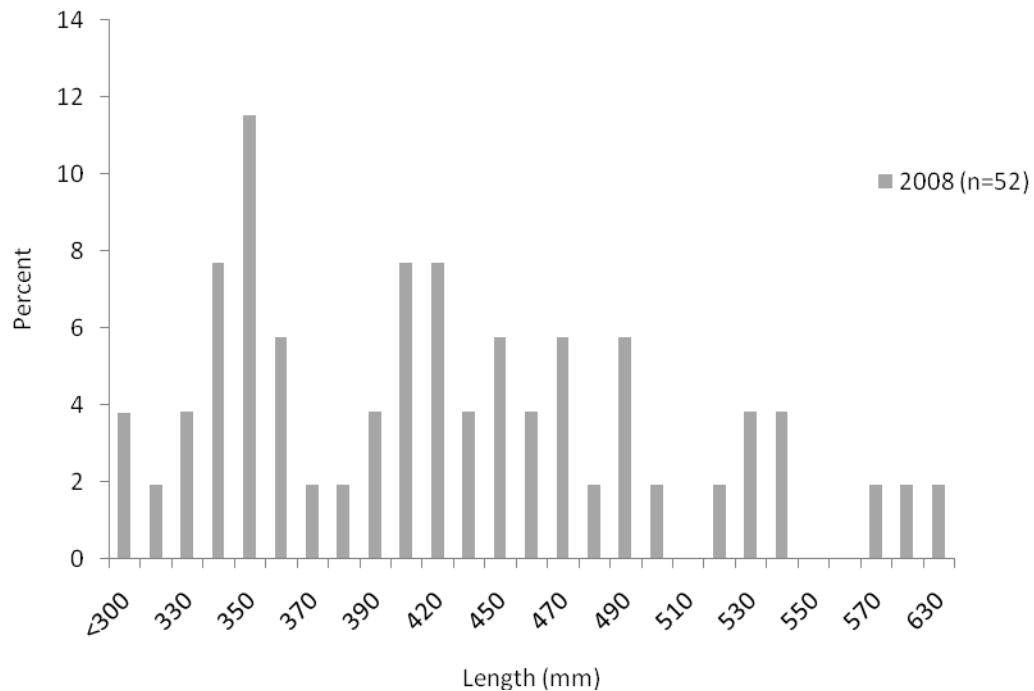


Figure 21. Weighted CPUE length distribution (%) of spotted seatrout (*Cynoscion nebulosus*) for the Fisheries Independent Assessment Program (New and Cape Fear rivers) in 2008.

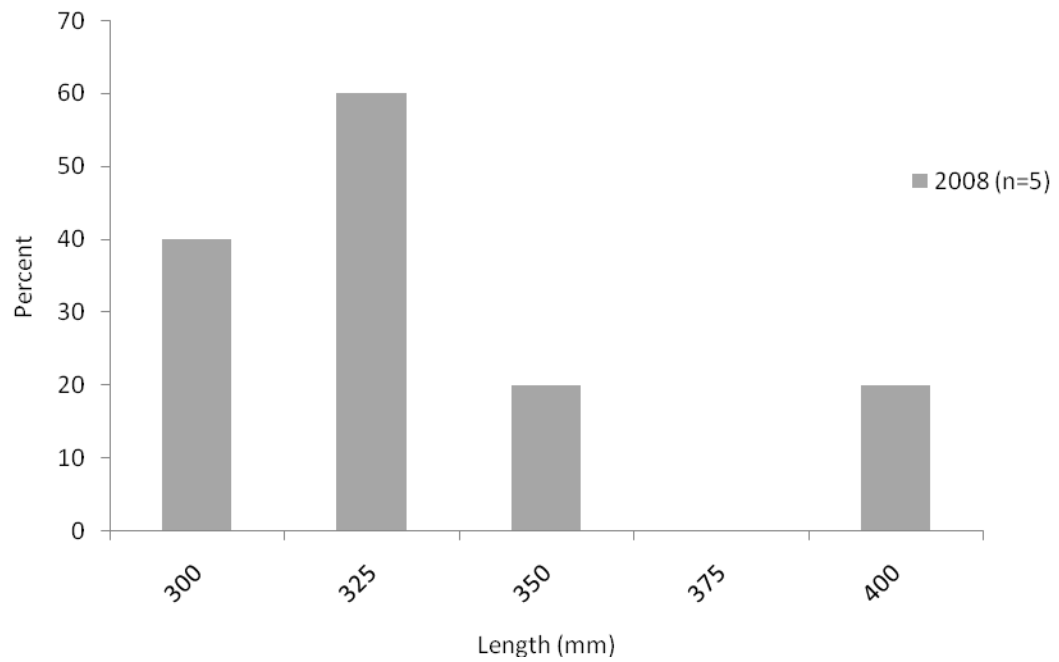


Figure 22. Weighted CPUE length distribution (%) of weakfish (*C. regalis*) for the Fisheries Independent Assessment Program (New and Cape Fear rivers) in 2008.

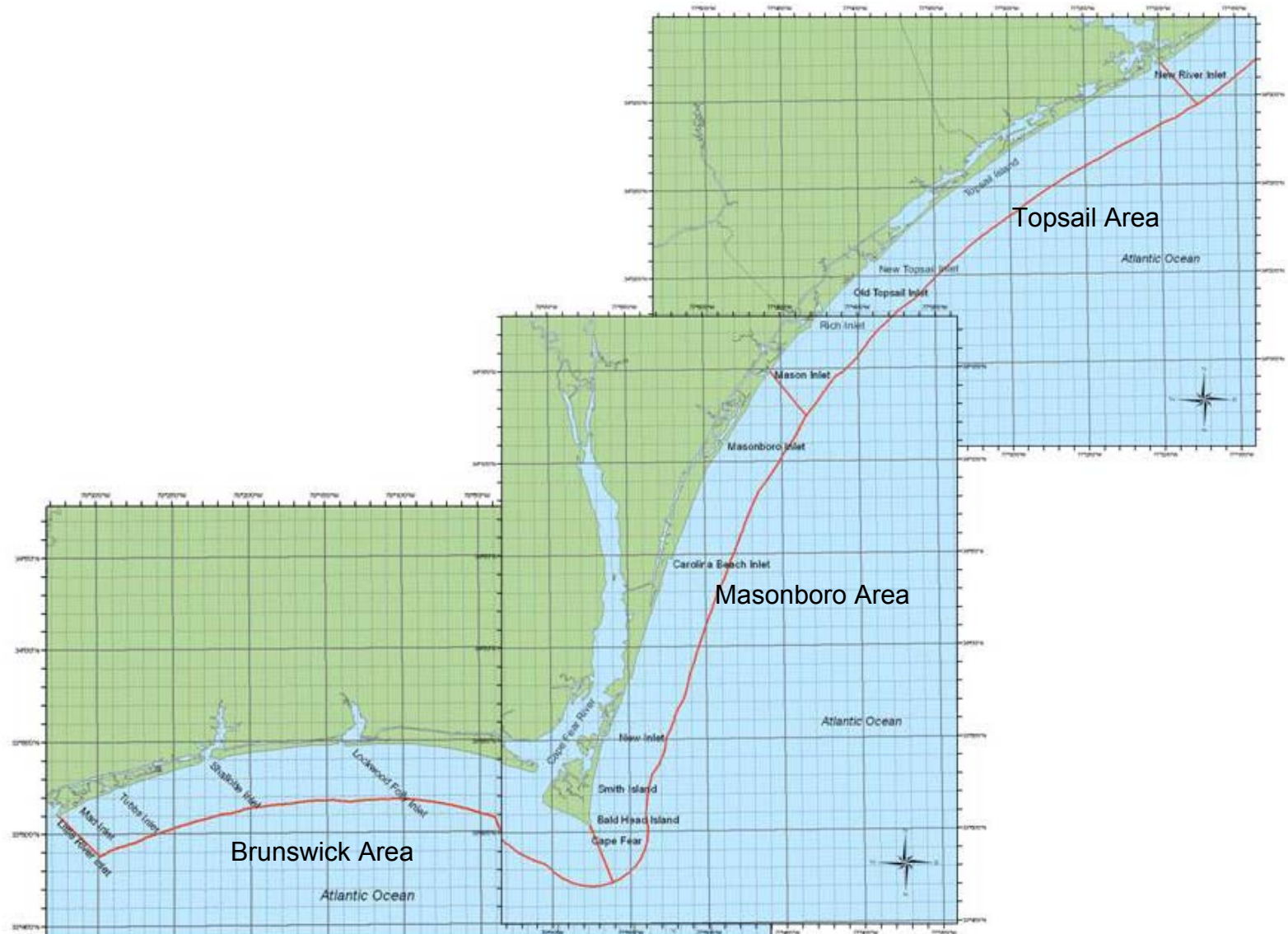


Figure 23. The sample regions and grid system for the Fisheries Independent Assessment Program (Atlantic Ocean) of North Carolina during 2008 including the Topsail, Masonboro, and Brunswick areas.

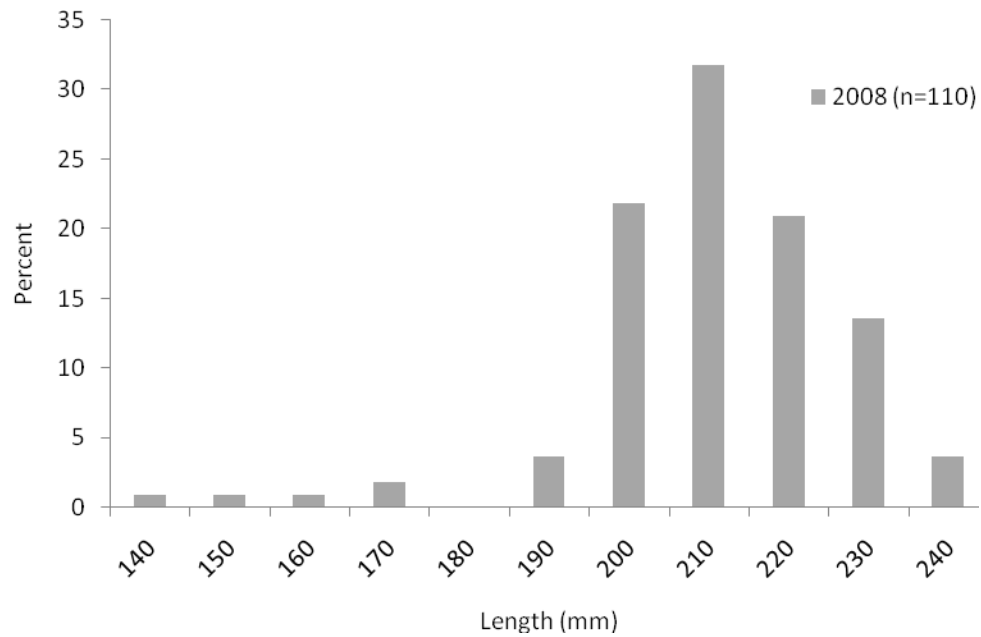


Figure 24. Weighted CPUE length distribution (%) of Atlantic croaker (*Micropogonias undulatus*) for the Fisheries Independent Assessment Program (Atlantic Ocean) in 2008.

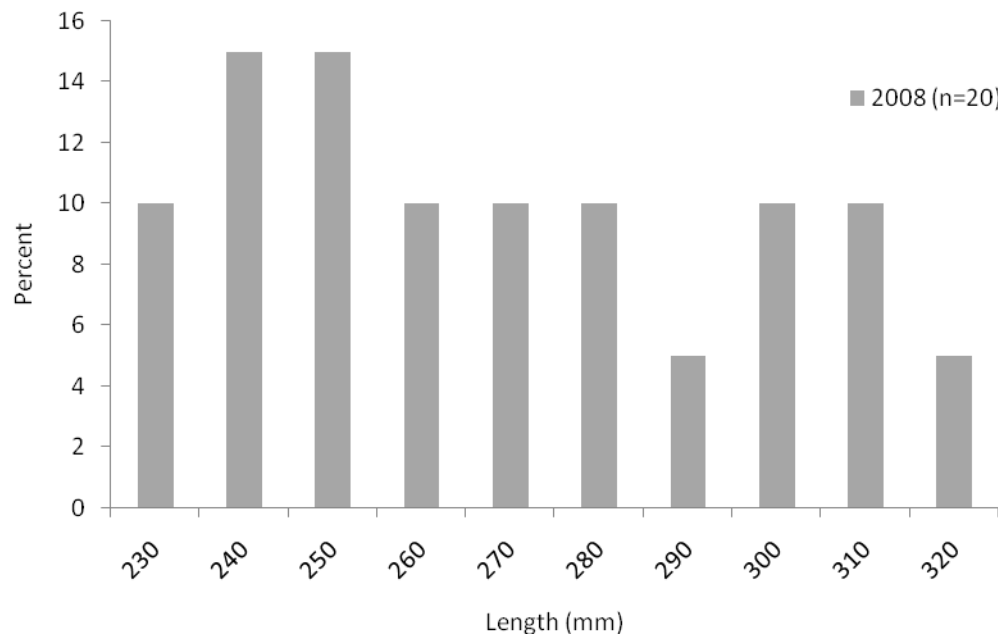


Figure 25. Weighted CPUE length distribution (%) of bluefish (*Pomatomus saltatrix*) for the Fisheries Independent Assessment Program (Atlantic Ocean) in 2008.

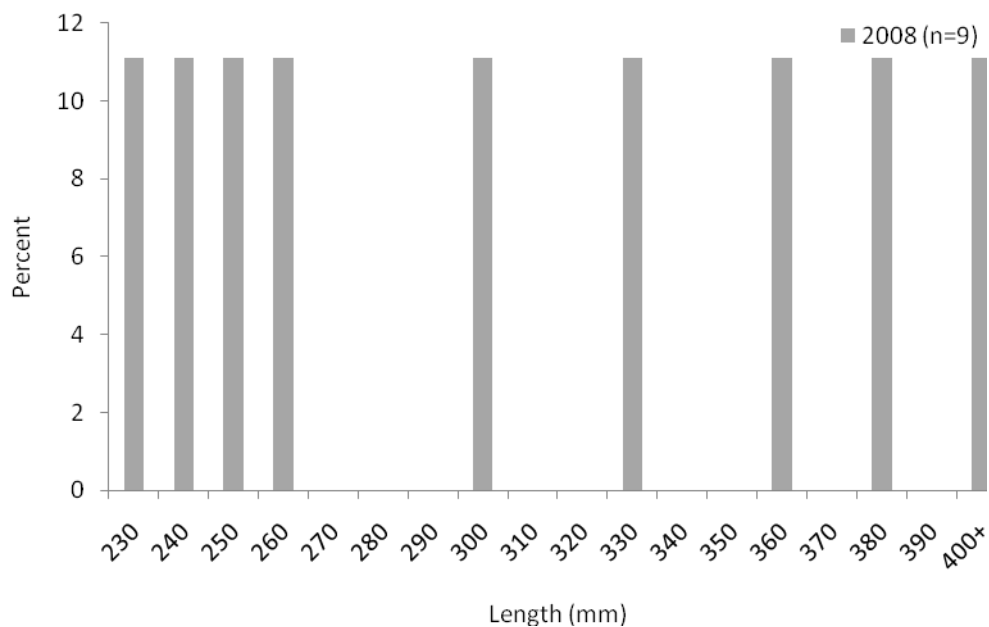


Figure 26. Weighted CPUE length distribution (%) of southern flounder (*Paralichthys lethostigma*) for the Fisheries Independent Assessment Program (Atlantic Ocean) in 2008.

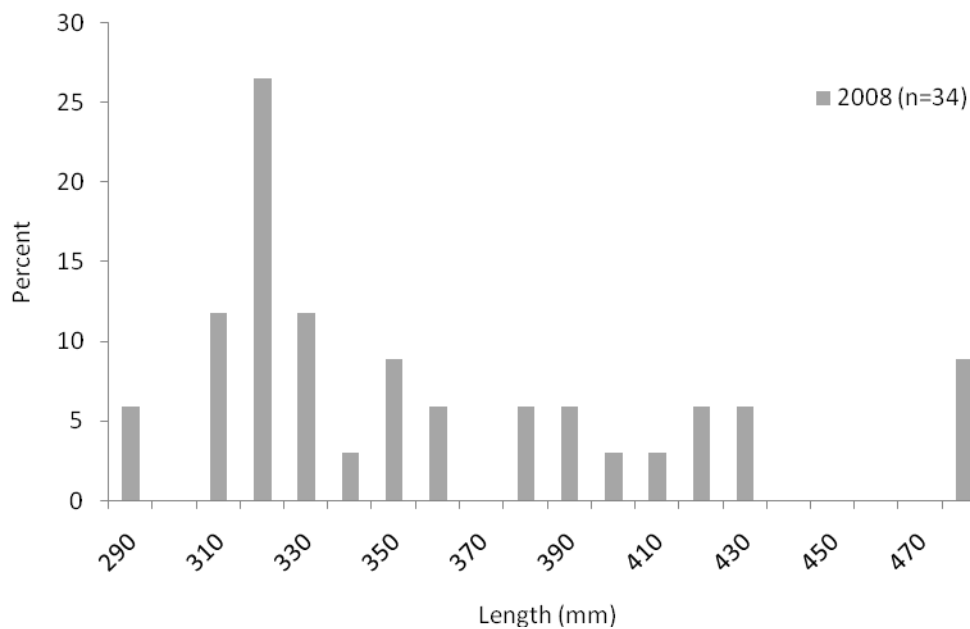


Figure 27. Weighted CPUE length distribution (%) of Spanish mackerel (*Scomberomorus maculatus*) for the Fisheries Independent Assessment Program (Atlantic Ocean) in 2008.

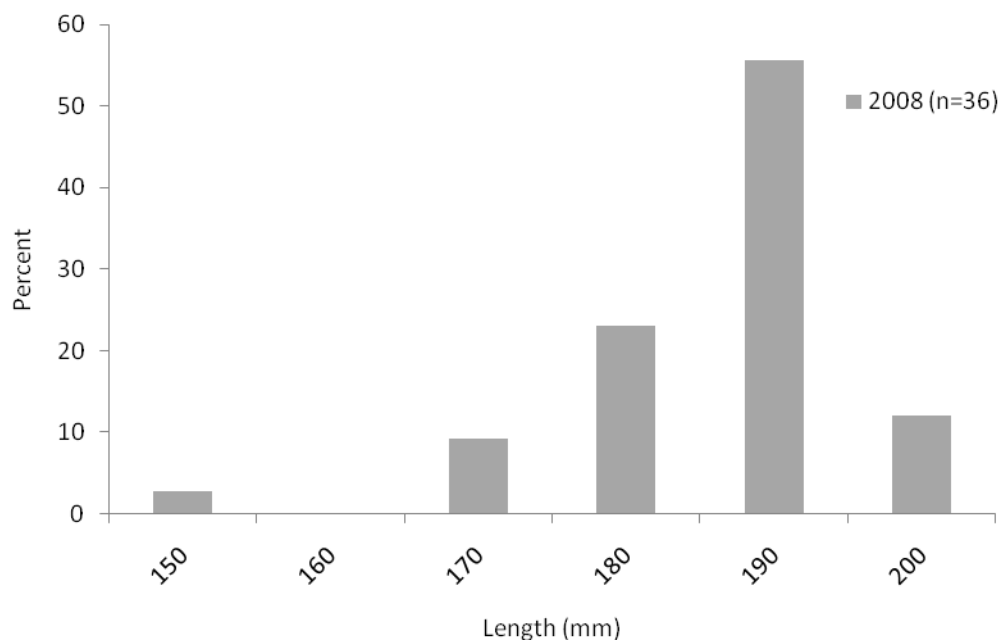


Figure 28. Weighted CPUE length distribution (%) of spot (*Leiostomous xanthurus*) for the Fisheries Independent Assessment Program (Atlantic Ocean) in 2008.

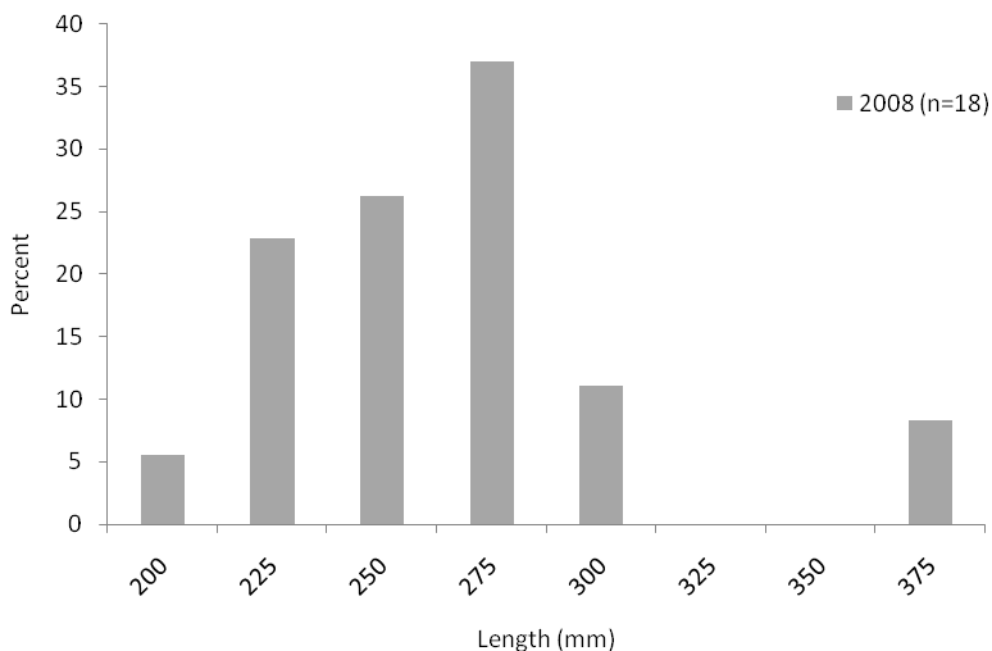


Figure 29. Weighted CPUE length distribution (%) of weakfish (*Cynoscion regalis*) for the Fisheries Independent Assessment Program (Atlantic Ocean) in 2008.

Appendix 1.

The following procedures were followed to produce the weighted CPUE estimates by length and age. The annual abundance index calculation for each target species was as follows:

- 1) Pool all of a species records across mesh sizes for each sample.
- 2) Compute a length frequency distribution for that species to obtain a number at each size class ($S_{szclass}$). In cases where subsampling occurred the total number of measured fish was expanded to the total catch. Any non-measurable fish (i.e. parts) were distributed proportionately across all size classes of a given species.
- 3) Sum all the $S_{szclass}$ for all strata by region ($T_{szclass\ by\ SR}$).
- 4) For all strata by region divide the $T_{szclass}$ by the total number of sampling trips that occurred (T_{SR}) to obtain a catch estimate by size class (mean and standard deviation) for each strata by region ($S_{szclass\ by\ SR}$). All effort, including samples with zero catch, was factored into the index.
- 5) Multiply the $S_{szclass\ by\ SR}$ by the total number of grids occurring in all strata by region ($TG_{by\ SR}$) to obtain a weighted estimate for each size class ($WS_{szclass\ by\ SR}$).
- 6) Sum all $WS_{szclass\ by\ SR}$ by species (SW_{all}).
- 7) Divide SW_{all} by the total number of grids in all areas sampled to obtain a project-wide weight catch at length estimate for each species.
- 8) The overall annual CPUE by species is calculated by summing the catch-at-length estimates for each species across all available lengths.
- 9) Multiply each weighted catch-at-length estimate for each species by the proportion at age to obtain catch-at-age.