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SEAMAP ENVIRONMENTAL AND BIOLOGICAL ATLAS OF THE GULF OF MEXICO, 2016

Edited by

Jeffrey K. Rester
Gulf States Marine Fisheries Commission

Manuscript Design and Layout

Ashley P. Lott
Gulf States Marine Fisheries Commission

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GULF STATES MARINE FISHERIES COMMISSION
COMMISSIONERS

ALABAMA
Chris Blankenship
Alabama Department of Conservation
and Natural Resources
64 North Union Street
Montgomery, AL 36130-1901

Steve McMillan
P.O. Box 337
Bay Minette, AL 36507

Chris Nelson
Bon Secour Fisheries, Inc.
P.O. Box 60
Bon Secour, AL 36511

FLORIDA
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FL Fish and Wildlife Conservation Commission
620 South Meridian Street
Tallahassee, FL 32399-1600

Representative Jay Trumbull
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402 South Monroe Street
Tallahassee, FL 32399

TBA

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P.O. Box 98000
Baton Rouge, LA 70898-9000

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Joe Gill Consulting, LLC
910 Desoto Street
Ocean Springs, MS 39566-0535

TEXAS
Carter Smith, Executive Director
Texas Parks and Wildlife Department
4200 Smith School Road
Austin, TX 78744

Troy B. Williamson, II
P.O. Box 967
Corpus Christi, TX 78403

Representative Wayne Faircloth
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2121 Market Street, Suite 205
Galveston, TX 77550

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National Marine Fisheries Service
Pascagoula Laboratory

Mr. John Mareska
Alabama Department of Conservation and Natural Resources/ Marine Resources Division

Mr. Jeff Rester
SEAMAP Coordinator
Gulf States Marine Fisheries Commission

DATA COORDINATING WORK GROUP

Mr. Lloyd Kirk, Leader
Gulf States Marine Fisheries Commission

Mr. David Hanisko
National Marine Fisheries Service
Pascagoula Laboratory

Mr. Charles Weber
National Marine Fisheries Service
Pascagoula Laboratory

Mr. Michael Harden
Louisiana Department of Wildlife and Fisheries

Mr. John Anderson
USM/Gulf Coast Research Laboratory

Mr. Michael Murphy
Florida Fish and Wildlife Conservation Commission
Florida Fish and Wildlife Research Institute

INTRODUCTION

The Southeast Area Monitoring and Assessment Program (SEAMAP) is a State/Federal/university program for the collection, management, and dissemination of fishery-independent data (information collected without direct reliance on statistics reported by commercial or recreational fishermen) in United States waters of the Gulf of Mexico (Eldridge 1988). A major SEAMAP objective is to provide a large, standardized database needed by management agencies, industry, and scientists to make sound management decisions and further develop fishery resources in a cost-efficient manner. To accomplish this goal, survey data must be disseminated in a useful format to SEAMAP participants, cooperators, and other interested organizations.

The SEAMAP Program began in March 1981 when the National Marine Fisheries Service (NMFS), Southeast Fisheries Science Center (SEFSC), presented a SEAMAP Strategic Plan (1981) to the Gulf States Marine Fisheries Commission (GSMFC). This strategic plan outlined the proposed program organization (goals, objectives, procedures, resource requirements, etc.). A SEAMAP Subcommittee was then formed within the existing framework of the GSMFC. The Subcommittee consists of one representative from each state fishery management agency [Florida Fish and Wildlife Conservation Commission (FWC); Alabama Department of Conservation and Natural Resources (ADCNR); Mississippi Department of Marine Resources (MDMR) represented by the University of Southern Mississippi, Gulf Coast Research Laboratory (USM/GCRL); Louisiana Department of Wildlife and Fisheries (LDWF); and Texas Parks and Wildlife Department (TPWD)], one from NMFS SEFSC and a non-voting member representing the Gulf of Mexico Fishery Management Council (GMFMC). The Subcommittee has organized and successfully coordinated numerous resource surveys from 1982 through 2015 (Table 1). The resultant data are published in atlases for the surveys in 1982 (Stuntz et al. 1985); 1983 (Thompson and Bane 1986a); 1984 (Thompson and Bane 1986b); 1985 (Thompson et al. 1988); 1986 (Sanders et al. 1990a); 1987 (Sanders et al. 1990b); 1988 (Sanders et al. 1991a); 1989 (Sanders et al. 1991b); 1990 (Sanders et al. 1992); 1991 (Donaldson et al. 1993); 1992 (Donaldson et al. 1994); 1993 (Donaldson et al. 1996); 1994 (Donaldson et al. 1997a); 1995 (Donaldson et al. 1997b); 1996 (Donaldson et al. 1998); 1997 (Rester et al. 1999); 1998 (Rester et al. 2000); 1999 (Rester et al. 2001); 2000 (Rester et al. 2002); 2001 (Rester et al. 2004); 2002 (Rester et al. 2008); 2003 (Rester et al. 2009); 2004 (Rester 2009); 2005 (Rester 2010); 2006 (Rester 2010); 2007 (Rester 2010); 2008 (Rester 2011); 2009 (Rester 2011); 2010 (Rester 2012); 2011 (Rester 2014); 2012 (Rester 2014), 2013 (Rester 2015), 2014 (Rester 2017), and 2015 (Rester 2017). Environmental assessment activities that occurred with each of the surveys can be found in Table 1. All data are available to researchers or interested individuals. Details about how to obtain SEAMAP data can be found in the Data Request section of this document.

In early 2016, the SEAMAP Subcommittee identified and began to plan the year's SEAMAP survey activities for the Gulf of Mexico. In keeping with the program goal of establishing a coordinated long-term resource database, it was decided to continue the same types of survey activities conducted in 1982 through 2015. Overall survey objectives in 1982 to 2016 were to assess the distribution and abundance of recreational and commercial organisms collected by plankton, video, bottom longlines, hook and line, and trawl gears, and document environmental factors that might affect their distribution and abundance. Data from plankton surveys are used for detection and assessment of fishery resources; in the determination of spawning seasons and areas; in investigations of early survival and recruitment mechanisms; and in estimation of the abundance of a stock based on its spawning production (Sherman et al. 1983). Assessment of the Texas Closure (Nichols 1982, 1984; Nichols and Poffenberger 1987) was the rationale for the establishment of the trawl surveys and to establish a seasonal database to assess the abundance and distribution of the shrimp and groundfish stocks across the northern Gulf of Mexico. The Reef Fish Survey is designed to determine the relative abundance of reef fish populations and habitat using a video recording system (Russell, unpublished report).

A major purpose of SEAMAP is to provide resource survey data to State and Federal management agencies and universities participating in SEAMAP activities. This thirty-fifth in a series of SEAMAP environmental and biological atlases presents such data, in a summarized form, collected during the 2016 SEAMAP surveys.

MATERIALS AND METHODS

Methodology for the 2016 SEAMAP surveys is similar to that of the 1982 through 2015 surveys. Sampling was conducted within the U.S. Exclusive Economic Zone (EEZ) and state territorial waters. The NOAA Ship OREGON II collected plankton and environmental data during the Spring Plankton Survey from April 30 – May 30. Vessels that participated in collecting plankton and environmental data during the Fall Plankton Survey included the NOAA Ship PISCES (September 5-30), the Alabama vessel ALABAMA DISCOVERY (September 8), the Louisiana vessel R/V DEFENDER (September 15-20), and USM/GCRL vessel TOMMY MUNRO (September 12 and September 29).

Vessels that participated in the Summer Shrimp/Groundfish Survey and concurrently sampled plankton and environmental data included the USM/GCRL vessel TOMMY MUNRO (May 30 – June 1), Florida using the TOMMY MUNRO (June 9 – July 1), Louisiana using the POINT SUR (June 7-9), and the NOAA Ship OREGON II (June 9 – July 19). The Alabama vessel ALABAMA DISCOVERY (June 24) did not sample plankton in conjunction with the summer survey.

The NOAA ship PISCES participated in the Reef Fish Survey from April 6 – May 31 while the SOUTHERN JOURNEY sampled from June 14 – September 8. Florida conducted seven reef fish cruises aboard the R/V GULF MARINER (5/18-5/20; 6/22-6/24; 6/27-6/30; 7/11-7/13; 7/19-7/21; 7/25-7/28; 8/2-8/4) and one day-trip (6/15) on the R/V NO FRILLS.

Vessels that participated in the Fall Shrimp/Groundfish Survey and collected environmental data included the NOAA Ships OREGON II (October 9 – November 19), the USM/GCRL vessel TOMMY MUNRO (October 3-4), and the Louisiana vessel PELICAN (October 25-26).

Alabama, Mississippi, Louisiana, and Texas conducted bottom longline sampling monthly from April to September as part of the Bottom Longline Survey.

Alabama, Louisiana, and Texas sampled reef fish over artificial reefs, oil and gas platforms, and natural habitat from April through October during the Vertical Line Survey.

PLANKTON SURVEYS

Since 1982, SEAMAP resource surveys have been conducted by the National Marine Fisheries Service in cooperation with the states of Florida, Alabama, Mississippi, Louisiana, and Texas. Plankton sampling is carried out during these surveys at predetermined SEAMAP stations arranged in a fixed, systematic grid pattern across the entire Gulf of Mexico. Most but not all SEAMAP stations (designated by a unique SEAMAP number) are located at ~56 km or ½-degree intervals along this grid. Some SEAMAP stations are located at < 56 km intervals especially along the continental shelf edge, while others have been moved to avoid obstructions, navigational hazards, or shallow water. Most SEAMAP plankton samples are taken during either dedicated plankton or shrimp/bottomfish (trawl) surveys, but over the years additional samples were taken using SEAMAP gear and collection methods at locations other than designated SEAMAP stations and/or outside established SEAMAP surveys, e.g. during Louisiana seasonal trawl surveys, SEAMAP Squid/Butterfish survey; and other serendipitous or special projects.

The sampling gear and methodology used to collect SEAMAP plankton samples are similar to those recommended by Kramer et al. (1972), Smith and Richardson (1977) and Posgay and Marak (1980). A 61 cm bongo net fitted with 0.333 (0.335)[1] mm mesh netting is fished in an oblique tow path from a maximum depth of 200 m or to 2-5 m off the bottom at depths less than 200 m. A mechanical flowmeter is mounted off-center in the mouth of each bongo net to record the volume of water filtered. Volume filtered ranges from ~20 to 600 m^3, but is typically 30 to 40 m^3 at the shallowest stations and 300 to 400 m^3 at the deepest stations. A single or double 2x1 m pipe frame neuston net fitted with 0.947 (0.950)[1] mm mesh netting is towed at the surface with the frame half-submerged for 10 minutes. Samples are taken upon arrival on station regardless of time of day. At each station either a bongo and/or neuston tow are made depending on the specific survey. Samples are routinely preserved in 5 to 10% formalin and later transferred after 48 hours to 95% ethanol for long-term storage. During some surveys, selected samples are preserved initially in 95% ethanol and later transferred to fresh ethanol.

Initial processing of one bongo sample and one neuston sample from each SEAMAP station was accomplished at the Sea Fisheries Institute, Plankton Sorting and Identification Center (ZSIOP), in Szczecin, Poland, under a Joint Studies Agreement with NMFS. Wet plankton volumes of bongo net samples were measured by displacement to estimate net-caught zooplankton biomass (Smith and Richardson 1977). Fish eggs and larvae were removed from bongo net samples, and fish larvae only from neuston net samples. Fish eggs were not identified further, but larvae were identified to the lowest possible taxon (to family in most cases). Body length (either notochord or standard length) was measured.

Sorted ichthyoplankton specimens from ZSIOP were sent to the SEAMAP Archiving Center, managed in conjunction with the FWC, for long-term storage under museum conditions. Sorted ichthyoplankton samples from 1982 through 2015 are available for loan to researchers throughout the country. The alternate bongo and neuston samples from each station are retained at USM/GCRL as a backup for those samples transshipped to ZSIOP in case of loss or damage during transit. These backup unsorted plankton samples are curated and housed at the SEAMAP Invertebrate Plankton Archiving Center, managed in conjunction with USM/GCRL, and are available for use by researchers.

See the SEAMAP Operations Manual for a more detailed description of sampling methods and protocols. You can also refer to the vessel cruise reports for more specific information on the individual SEAMAP Plankton Surveys conducted during 2016.

ENVIRONMENTAL DATA

[1] Mesh size change in database does not represent an actual change in gear but only a change in the accuracy at which plankton mesh aperture size can be measured by the manufacturer.

Standardized methodology was used although the actual parameters measured varied among vessels participating in each survey. These parameters were measured based on equipment availability. The following parameters were recorded:

Vessel: Vessel code for each vessel.
Station: Station identifiers varied by state and vessel.
Cruise: Cruise numbers varied by state and vessels.
Date: Month/Day/Year.
Time: Local time and time zone, recorded at the start of sampling.
Latitude/longitude: Recorded to seconds.
Barometric pressure: Recorded in millibars.
Wave height: Estimated visually in meters.
Wind speed and direction: Recorded in knots with direction recorded in compass degrees from which the wind was blowing.
Air temperature: Recorded in degrees Celsius.
Cloud cover: Estimated visually in percent cloud cover.
Secchi depth: Secchi depth in meters, estimated at each daylight station. Standard oceanographic 30-cm white discs were lowered until no longer visible, and then raised until visible. If different depths were recorded, an average was used.
Water Color: Gross water color data were recorded.

The following parameters were measured at the surface, mid-depth, and bottom; for bottom depths greater than 200 m, samples were taken at surface, 100 m and 200 m:

Water temperature: Temperatures were measured by a hand-held thermometer or by in situ electronic sensors onboard ship. No attempt was made to intercalibrate the various instruments used on individual vessels although several vessels did sample together to calibrate other sampling gear. Some error can be expected.
Salinity: Salinity samples were collected by Niskin bottles and stored for laboratory analysis with a salinometer. Conductivity probes or refractometers were used on some vessels. Salinity samples were also measured with in situ electronic sensors.
Chlorophyll: Chlorophyll samples were collected and frozen for later laboratory analysis. The general procedure for shipboard collection of chlorophyll was to collect more than 9 liters of water from the surface. This was kept stirred by bubbling air through it while filtration was being done. Three samples, to each of which a 1 ml, 1% (W/V), suspension of $MgCO_3$ was added, of up to 3 liters of water from the 9 liter sample were filtered through GF/C filters. The three filters were placed individually in Petri dishes, wrapped in opaque material and frozen until analysis. Each of the three samples was analyzed separately in the laboratory.

Laboratory analyses for chlorophyll a and phaeophytin a (chlorophyll degradation product) were conducted by fluorometry and spectrophotometry. The general extraction procedures prior to measurement were similar. Samples analyzed by spectrophotometer included other chlorophyllous products, but these have not been included as data in this report. The methodology used is described in Strickland and Parsons (1972) and Jeffrey and Humphrey (1975). Some of the values have been deleted from the database because of analytical errors. In addition, chlorophyll samples data were also collected using a CTD. This method only obtains measures of chlorophyll a and is a measure of fluorescence.

Dissolved oxygen: Dissolved oxygen values were measured by electronic probes or by the Winkler titration method. No attempts were made to intercalibrate the methods. When oxygen was measured in samples collected from a Niskin sampler, the oxygen bottles were allowed to overflow a minimum of 10 seconds to eliminate oxygen contamination. The tubing which delivered the water sample was inserted to the bottom of the bottle and withdrawn while the sample was still flowing. The oxygen bottles were sealed with a ground-glass stopper and analyzed onboard the vessels.

Turbidity: Turbidity values were measured by electronic probes when equipment was available.

TRAWL SURVEYS

Summer Shrimp/Groundfish Survey

In the fall of 2008, NMFS changed their method of selecting sampling sites. The states adopted this change beginning in 2010. Diurnal stratifications were dropped in the selection process, and geographic strata (which were mostly 2 to 3 statistical zone groupings) were changed to single statistical zones (Figure 1). Both station selection methods, the old and the new, are probability based designs. With probability sampling, each unit in the survey population has a known, positive probability of selection. This property of probability sampling avoids selection bias and enables one to use statistical theory to make valid inferences from the sample to the survey population. More specifically, the new method employs probability proportional to size sampling. In this type of sampling, a unit's selection probability is proportional to its size measure which in this case is geographical surface area. For example, if Unit A has twice the surface area of Unit B, then Unit A will have twice the probability of having a sample selected from it than B. The end result is that Unit A will have about twice the number of samples as B. Even though diurnal strata were dropped in the sampling site selection process, this information is not lost since samples can be post-stratified. Following is an example of how sampling sites are now selected.

Bathymetry data were downloaded from the National Geophysical Data Center (NGDC) web site (Divins, D.L., and D. Metzger, NGDC Coastal Relief Model, http://www.ngdc.noaa.gov/mgg/coastal/coastal.html). Because of the magnitude of data, they were downloaded by single NMFS Shrimp Statistical Zones (Figure 1). The download process allows for the definition of a desired data block through user supplied latitude and longitude boundaries. Since the data definition process is controlled by latitude and longitude only, some undesired depths were included in downloads (i.e., for NMFS, depths less than five or greater than sixty fathoms). These records were deleted later through a Statistical Analysis System (SAS) program. Each bathymetric record represents a 3 arc-second element of data ($\approx$ 0.05-by-0.05 minutes of latitude and longitude); therefore, the number of data records was used as a measure of size for each respective statistical zone. The bathymetry data were then used as input to a SAS program which performed three functions; defined the sampling universe, determined the sampling proportions according to sizes of statistical zones, and randomly selected the sample sites according to the defined proportions.

Thirty minutes was selected as a tow time standard that was long enough to obtain a good sample, but short enough to maintain the efficiency of the surveys. Therefore all SEAMAP vessels now use a standard tow time of 30 minutes.

All *Litopenaeus setiferus*, *Farfantepenaeus aztecus*, and *Farfantepenaeus duorarum* were separated from the trawl catch at each station. Total count and weight by species were recorded for each station. A sample of up to 200 shrimp of each species from every trawl was sexed and measured to obtain length-frequency information. Estimated total numbers were derived from the total weights of those processed. Other species of fish and invertebrates were identified, enumerated, and weighed. Weights and individual measurements on selected species, other than commercial shrimp, were also recorded.

Fall Shrimp/Groundfish Survey

The design of the Fall Survey was similar to the Summer Shrimp/Groundfish Survey. During the Fall Survey trawl stations were made with the standard 42-ft SEAMAP nets and covered NMFS shrimp statistical zones 2 through 21 (Figure 1). Catch rates on all the vessels sampling were treated in the same manner as the Summer Shrimp/Groundfish Survey, with the exception to shrimp catches, where only 20 shrimp of each species from every trawl were measured, although Louisiana measures a minimum of 50 shrimp.

REEF FISH SURVEY

The primary purpose of this survey is to assess relative abundance and compute population estimates of reef fish found on natural reef fish habitat in the Gulf of Mexico. For the NMFS portion of the Reef Fish Survey, a two-stage procedure was used to select sample sites. Sample blocks were first selected using stratified random sampling, with strata defined by region of the Gulf of Mexico and size. Reef sites within each block were then selected randomly from previously collected bathymetric data. Video gear was used to assess relative abundance and length frequencies and consisted of paired black-and-white Videre stereo cameras along with a color mpeg camera housed in cylindrical pressure housings. The camera array consisted of four housings positioned orthogonally and center mounted 51 cm above the bottom of the array. The camera array was baited with squid and was retrieved 40 minutes after deployment.

For the Florida portion of the survey, a survey of bottom habitat was conducted using side-scan sonar that covered a distance of 1 nm east and west of each randomly-selected sampling site. Side-scan sonar data were analyzed to determine the quantity of reef habitat and number of targets where gear could be set within each 0.1 nm x 0.3 nm sampling unit. A target was defined as identified reef fish habitat with a minimum of 100 m spacing between targets. Within each survey, a random selection procedure was followed to select transects from all transects containing at least two targets. Sampling occurred at a minimum for the first selected transect followed by other transects (alternates) if time allowed. All cameras were separated from any other deployed gear by approximately 100 m. All camera arrays were freshly baited with Atlantic mackerel prior to deployment. The stationary video camera array was equipped with a pair of underwater camera units positioned at an angle of 180º from one another to maximize the total field of view. Each camera unit consisted of an underwater housing that contained computer hardware and connections to two video cameras each within underwater housings separated by 30 cm. The stationary video camera array was allowed to soak at the bottom for a minimum of thirty-five minutes to assure that twenty minutes of continuous video and stereo images were recorded.

Associated environmental data collected at each site usually includes profiles of salinity, temperature, and surface chlorophyll; and may include profiles of dissolved oxygen, light transmittance, and fluorescence. Additional environmental and meteorological observations taken on stations follow standard SEAMAP methodology.

BOTTOM LONGLINE SURVEY

Until 2014 each partner randomly selected stations off their coast independent of other states. There were discrepancies among the partners regarding number of stations sampled, the frequency of sampling, the size of the sampling universe, and the depth strata targeted. In an effort to make the bottom longline data as useful as possible in federal and state stock assessments, the SEAMAP Subcommittee began an effort in 2014 to develop a standardized protocol for station selection procedures. This effort sought to better standardize the sampling effort among the partners and develop a more uniform design and resultant data set. At the March 2015 SEAMAP Subcommittee meeting, firm station selection protocols were established.

Sampling now occurs during three seasons Spring (April-May), Summer (June-July), and Fall (August-September). Sampling is conducted in waters defined by the 3-10m depth contour. NMFS Statistical Zones (Figure 1) are used as guides to ensure effective distribution of sampling effort. Stations are proportionally allocated and randomly distributed within the 3-10m depth contour in each statistical zone based on the proportion of those depths present. Since the 3-10m depth strata is smaller in some statistical zones relative to other statistical zones, each statistical zone is allocated at least two stations during each season in order to ensure adequate sampling coverage. Partners usually survey the stations that occur off their state boundaries for each season. When seasonal effort cannot be accomplished due to weather or mechanical problems the partners should decrease effort proportionally across their area. The Gulf States Marine Fisheries Commission selects all stations for all seasons and annually distributes them to the partners.

Given the limited number of samples that can be conducted during the Bottom Longline Survey, the large area of the statistical zones, and spatial autocorrelation of most fish species, station locations are buffered 4 nautical miles. Sampling effort by each partner must have a two week buffer between consecutive seasons. For example, if the last day of spring sampling was conducted on May 30th, summer sampling should not begin until June 15th.

The longline gear consisted of a 1.6 km (426 kg test monofilament) mainline with 100 gangions (3.66 m, 332 kg test monofilament) containing #15/0 circle hooks (0 offset) and baited with Atlantic mackerel, *Scomber scombrus*. The mainline was weighted down with a beginning, midpoint, and endpoint weight. Radar high-flyers with strobe bullet buoys were used to mark the longline locations. A hydraulic longline reel was used for setting and retrieving the mainline. The longline was fished for 1-hr and then retrieved.

VERTICAL LINE SURVEY

The Vertical Line Survey design was standardized in 2016. The SEAMAP Subcommittee decided to divide the Gulf offshore waters between 10 and 150m into 150x150m grid blocks. Unknown habitat, known natural reef (hard bottom), presumed reef either natural or artificial, oil/gas platforms, and artificial reefs were the five habitat classifications developed by the SEAMAP Subcommittee. Each 150x150m grid block is assigned a habitat classification based upon several different datasets used to develop the sampling universe. A grid block can be classified as more than one habitat type if it has more than one habitat located within it.

For the station selection process, the total amount of habitat within the three depth zones (10-20m, 20-40m, and 40-150m) is computed. The percentage of area covered by each depth zone determines the percentage of the total stations that will be sampled within each depth zone (i.e. if a depth zone contains 40% of the total area, 40% of the total stations will be assigned to that depth zone). The total area of each habitat classification is calculated within each depth stratum. The total of each habitat classification, excluding unknown habitat, is then used to calculate the percentage of habitats within the depth zone. This percentage is used to determine how many stations are assigned to each habitat type within the depth zone. Stations are randomly selected based upon the habitat classification percentages within each depth zone.

All partners use three 22-foot backbones containing ten 18-inch gangions outfitted with either an 8/0, 11/0 or 15/0 circle hook (each backbone has only one hook size), and terminating in a 10 pound lead weight. Three bandit reels deploy the gear simultaneously on or near a reef structure and, once locked in at depth, are allowed to fish for 5 minutes. All bandit reels then retrieve the lines simultaneously. Catch data are collected once the lines are onboard. Environmental data is collected upon completion of fishing at each station.

RESULTS

PLANKTON SURVEYS

Plankton stations for the Spring Plankton Survey are shown in Figure 2. Plankton stations for the Fall Plankton Survey are shown in Figure 3.

TRAWL SURVEYS

Summer Shrimp/Groundfish Survey

Shrimp and groundfish sampling was conducted from May through July from south Florida to Brownsville, Texas. Figure 4 shows station locations. The Summer Shrimp/Groundfish Survey consisted primarily of biological trawl data and concomitant environmental and plankton data. A species composition listing from the 42-ft trawls is presented in Table 2, ranked in order of abundance, within the categories of finfish, crustaceans, and other invertebrates.

Fall Shrimp/Groundfish Survey

Shrimp and groundfish sampling was conducted from October through November from south Florida to Brownsville, Texas. Figure 5 shows the station locations. The Fall Shrimp/Groundfish Survey consisted of biological trawl data and concomitant environmental data. A species composition listing from the 42-ft trawls is presented in Table 3, ranked in order of abundance, within the categories of finfish, crustaceans, and other invertebrates.

REAL-TIME DATA MANAGEMENT

The SEAMAP Subcommittee agreed it was imperative to the success of the SEAMAP Program to distribute data on a near real-time basis to the fishing industry and others interested in SEAMAP. Summarized data were distributed weekly to approximately 125 individuals during the Summer Shrimp/Groundfish Survey. The summarized data in the form of computer plots and data listings were sent to management agencies and industry members. These plots showed station locations, catches of Brown, Pink, and White Shrimp in lb/hr and count/lb, and total finfish catch in lb/hr.

REEF FISH SURVEY

Station locations are plotted in Figure 6. Video tapes from all sources were analyzed using NMFS standardized protocols.

BOTTOM LONGLINE SURVEY

Station locations for the Bottom Longline Survey are plotted in Figure 7. A species composition list is presented in Table 4. The species list is ranked in order of abundance.

VERTICAL LINE SURVEY

Station locations for the Vertical Line Survey are plotted in Figure 8. A species composition list, ranked in order of abundance, is presented in Table 5.

DISCUSSION

The quasisynoptic SEAMAP sampling program and the intended long-term nature of the sampling programs have been designed to provide the baseline data set needed for fishery management and conservation. In 1985, the SEAMAP long-term baseline data was disrupted by the loss of the Spring Plankton Survey. In 1986, the SEAMAP Subcommittee renewed its commitment for the collection of baseline plankton data. These ichthyoplankton samples are and will continue to be used by researchers studying taxonomy, age and growth, bioenergetics, and other life history aspects, as well as spawning biomass and recruitment. Information on species' relative distributions within the Gulf of Mexico can be analyzed with respect to environmental data to assess population abundance as a function of environmental change.

Similar analyses and investigations are being undertaken with Summer and Fall Shrimp/Groundfish Survey data. These data sets are being utilized in resource management decisions, and because of the program's ability to process data quickly, the capability exists to optimize some fisheries on a real-time basis. The long-term data set on all of the species collected, not just those of commercial and recreational importance, offers an opportunity to examine ecological relationships, with the eventual goal of developing management models that take into account the multi-species nature of most Gulf fisheries. The value of the SEAMAP program lies in its use for both immediate and long-range management goals.

Much use has already been made of SEAMAP data. For example, during the past SEAMAP surveys an area of very low dissolved bottom oxygen was found off Louisiana in the summers of 1982, 1985-2016. The presence of this phenomenon and some of the related conditions and biological effects were reported by Leming and Stuntz (1984) and Hanifen et al. (1995), and during such occurrences, SEAMAP has distributed special environmental bulletins and news releases to management agencies and the shrimp industry. In addition, SEAMAP data were used to assist in the identification of the minimum 1997 reduction in Red Snapper shrimp trawl bycatch mortality rate that would enable the Red Snapper fishery to still recover to the 20% spawning potential ratio (SPR) by the year 2019 (Goodyear 1997). This analysis was requested and supported by the Gulf of Mexico Fishery Management Council to address the issue of Red Snapper bycatch. SEAMAP data were also used by some coastal states to determine the status of shrimp stocks and their movements just as the shrimping seasons were to be opened and SEAMAP data were used to develop a guide to the grouper species of the western North Atlantic Ocean (Grace et al. 1994). The primary purpose of the guide is for species identification with projects that deploy underwater video camera systems.

Since SEAMAP's inception in 1982, the goal of plankton activities in the Gulf of Mexico has been to collect data on the early life stages of fishes and invertebrates that will complement and enhance the fishery-independent data gathered on the adult life-stage (Lyczkowski-Shultz and Brasher 1996). An annual larval index for Atlantic Bluefin Tuna and Skipjack Tuna is generated each year from the Spring Plankton Survey and is used by the International Commission for the Conservation of Atlantic Bluefin Tunas to estimate stock size (Scott et al. 1993). Larval indices generated from the Summer Shrimp/Groundfish and Fall Plankton Surveys have now become an integral part of the King Mackerel assessment in the Gulf (Gledhill and Lyczkowski-Shultz 2000). Larvae from SEAMAP collections have formed the basis for formal descriptions of larval development for fishes such as the snappers, Cobia, Tripletail, and Dolphin (Drass et al. 2000; Ditty and Shaw 1992; Ditty and Shaw 1993; Ditty et al. 1994). Data on distribution and relative abundance of larvae of all Gulf fishes captured during SEAMAP surveys have been summarized by Richards et al. 1984, Kelley et al. 1985, Kelley et al. 1990, and Kelley et al. 1993.

The SEAMAP data collected during the Summer Shrimp/Groundfish Survey continues to be used extensively for fishery management purposes. In 1981, the Gulf of Mexico Fishery Management Council's plan for shrimp was implemented (Center for Wetland Resources 1980), with one management measure calling for the temporary closure to shrimping in the EEZ off Texas. This closure complements the traditional closure of the Texas territorial sea, normally May 15 through early July of each year. The GMFMC determined that this type of closure would allow small Brown Shrimp to be protected from harvest, but would still allow the taking of larger Brown Shrimp by fishermen in deeper waters.

The National Marine Fisheries Service was charged with evaluating the effects of the Texas Closure and submitted a report to the GMFMC in January 2016. This report contained the results and an overview of the effect of the 2015 Texas Closure. After review of these data and other information, the GMFMC voted to continue the Texas Closure for 2016.

Data from all SEAMAP surveys have been used in the SouthEast Data, Assessment, and Review (SEDAR) process. SEDAR is a cooperative Fishery Management Council process initiated in 2002 to improve the quality and reliability of fishery stock assessments. SEDAR seeks improvements in the scientific quality of stock assessments and greater relevance of quantities information available to address existing and emerging fishery management issues. SEAMAP data have been used in stock assessments for Greater Amberjack, Almaco Jack, Lesser Amberjack, Snowy Grouper, Speckled Hind, King Mackerel, Red Snapper, Vermillion Snapper, Gray Triggerfish, Gag Grouper, Red Grouper, Mutton Snapper, Lane Snapper, Wenchman, Blacknose Shark, Atlantic Sharpnose Shark, Bonnethead Shark, Smoothhound Sharks, small coastal sharks, and Blacktip Shark.

DATA REQUESTS

It is the policy of the SEAMAP Subcommittee that all verified non-confidential SEAMAP data, collected specimens, and samples shall be available to all SEAMAP participants, other fishery researchers, and management organizations. This atlas presents, to those individuals interested in the data or specimens, a chance to review the data in a summary form.

Data and specimen requests from SEAMAP participants, cooperators and others will normally be handled on a first-come, first-served, and time-available basis. Because of personnel and funding limitations, however, certain priorities must be assigned to the data and specimen requests. These priorities are reviewed by the SEAMAP Subcommittee. For further information on SEAMAP data management, see the Southeast Area Monitoring and Assessment Program (SEAMAP) Management Plan: 2016-2020 (ASMFC 2017).

Data requests and inquiries, as well as requests for plankton samples, can be made by contacting Jeff Rester, the SEAMAP Coordinator, Gulf States Marine Fisheries Commission, 2404 Government Street, Ocean Springs, MS 39564; (228) 875-5912 or via e-mail at jrester@gsmfc.org.

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Table 1. List of SEAMAP survey activities from 1982 to 2016.

			SEAMAP SURVEY ACTIVITIES			
	WINTER	SPRING	SPRING	SUMMER		FALL
YEAR	SHRIMP/GROUNDFISH	PLANKTON	SHRIMP/GROUNDFISH	SHRIMP/GROUNDFISH	BUTTERFISH	PLANKTON
1982	--	APRIL-MAY	--	JUNE-JULY	--	--
1983	--	APRIL-MAY	--	JUNE-JULY	--	--
1984	--	APRIL-MAY	--	JUNE-JULY	--	AUGUST
1985	--	--	--	JUNE-JULY	JULY-AUGUST	SEPTEMBER
1986	--	APRIL-MAY	--	JUNE-JULY	MAY-JUNE	SEPTEMBER
1987	--	APRIL-MAY	--	JUNE-JULY	--	SEPTEMBER
1988	--	MARCH-MAY	--	JUNE-JULY	--	SEPTEMBER-OCTOBER
1989	--	APRIL-MAY	--	JUNE-JULY	--	SEPTEMBER-OCTOBER
1990	--	APRIL-MAY	--	JUNE-JULY	--	SEPTEMBER-OCTOBER
1991	--	APRIL-MAY	--	JUNE-JULY	--	AUGUST-SEPTEMBER
1992	--	APRIL-MAY	--	JUNE-JULY	--	AUGUST-OCTOBER
1993	--	APRIL-MAY	--	JUNE-JULY	--	SEPTEMBER-OCTOBER
1994	--	APRIL-MAY	--	JUNE-JULY	--	SEPTEMBER-OCTOBER
1995	--	APRIL-JUNE	--	JUNE-JULY	--	SEPTEMBER
1996	--	APRIL-JUNE	--	JUNE-JULY	--	SEPTEMBER-OCTOBER
1997	--	APRIL-JUNE	--	JUNE-JULY	--	SEPTEMBER-OCTOBER
1998	--	APRIL-JUNE	--	JUNE-JULY	--	SEPTEMBER-OCTOBER
1999	--	APRIL-MAY	--	JUNE-JULY	--	SEPTEMBER-OCTOBER
2000	--	APRIL-MAY	--	JUNE-JULY	--	SEPTEMBER-OCTOBER
2001	--	APRIL-MAY	--	JUNE-JULY	--	AUGUST-OCTOBER
2002	--	APRIL-MAY	--	JUNE-JULY	--	AUGUST-OCTOBER
2003	--	MAY	--	JUNE-JULY	--	AUGUST-OCTOBER
2004	--	APRIL-JUNE	--	JUNE-JULY	--	SEPTEMBER
2005	--	APRIL-MAY	--	JUNE-AUGUST	--	--
2006	--	APRIL-MAY	--	JUNE-JULY	--	AUGUST-SEPTEMBER
2007	--	MARCH-JUNE	--	JUNE-AUGUST	--	AUGUST-SEPTEMBER
2008	--	APRIL-JUNE	APRIL	JUNE-AUGUST	--	SEPTEMBER
2009	JANUARY-FEBRUARY	APRIL-JUNE	MARCH	JUNE-JULY	--	AUGUST-SEPTEMBER
2010	FEBRUARY	APRIL-MAY	APRIL	JUNE-AUGUST	--	AUGUST-SEPTEMBER
2011	FEBRUARY	MAY	--	JUNE-JULY	--	AUGUST-SEPTEMBER
2012	--	APRIL-MAY	--	MAY-JULY	--	AUGUST-SEPTEMBER
2013	--	MAY	--	JUNE-JULY	--	AUGUST-SEPTEMBER
2014	--	MAY	--	JUNE-JULY	--	AUGUST-SEPTEMBER
2015	--	MAY	--	MAY-JULY	--	AUGUST-SEPTEMBER
2016	--	APRIL-MAY	--	MAY-JULY	--	SEPTEMBER

Table 1. List of SEAMAP survey activities from 1982 to 2016 (continued).

	SEAMAP SURVEY ACTIVITIES				
YEAR	FALL SHRIMP/GROUNDFISH	WINTER PLANKTON	BOTTOM LONGLINE	VERTICAL LINE	REEF FISH
1982	--	--	--		--
1983	--	DECEMBER	--		--
1984	--	DECEMBER	--		--
1985	SEPTEMBER-DECEMBER	--	--		--
1986	OCTOBER-DECEMBER	--	--		--
1987	SEPTEMBER-DECEMBER	--	--		--
1988	OCTOBER-DECEMBER	--	--		--
1989	OCTOBER-DECEMBER	--	--		--
1990	OCTOBER-DECEMBER	--	--		--
1991	SEPTEMBER-DECEMBER	--	--		--
1992	OCTOBER-DECEMBER	--	--		MAY-JUNE
1993	OCTOBER-DECEMBER	JANUARY-FEBRUARY	--		MAY-JULY, SEPT., NOV.
1994	OCTOBER-NOVEMBER	--	--		MAY-JULY, AUG.-OCT., DEC.
1995	OCTOBER-DECEMBER	--	--		JAN., JUNE-AUG., DEC.
1996	OCTOBER-DECEMBER	DECEMBER	--		JULY, AUGUST, NOVEMBER
1997	OCTOBER-DECEMBER	--	--		JUNE, JULY, AUG., NOV.
1998	OCTOBER-NOVEMBER	--	--		MAY, JULY, AUGUST
1999	OCTOBER-NOVEMBER	--	--		JAN., AUG., OCT., DEC.
2000	OCTOBER-DECEMBER	--	--		OCTOBER, NOVEMBER
2001	OCTOBER-DECEMBER	--	--		MAY, JUNE, OCTOBER
2002	OCTOBER-DECEMBER	--	--		FEBRUARY-MAY, OCTOBER
2003	OCTOBER-DECEMBER	--	--		OCTOBER-NOVEMBER
2004	OCTOBER-DECEMBER	JANUARY	--		FEBRUARY-MARCH
2005	OCTOBER-NOVEMBER	--	--		FEBRUARY-JULY, OCTOBER
2006	OCTOBER-DECEMBER	--	--		FEBRUARY-AUGUST
2007	OCTOBER-DECEMBER	--	--		FEBRUARY-MAY
2008	SEPTEMBER-NOVEMBER	FEBRUARY-MARCH	MARCH-OCTOBER		FEBRUARY-AUGUST
2009	SEPTEMBER-NOVEMBER	FEBRUARY-MARCH	MARCH-OCTOBER		APRIL-AUGUST
2010	SEPTEMBER-NOVEMBER	FEBRUARY-MARCH	MARCH-OCTOBER	APRIL-DECEMBER	MARCH-SEPTEMBER
2011	OCTOBER-NOVEMBER	--	MARCH-OCTOBER	MAY-DECEMBER	APRIL-JULY
2012	OCTOBER-NOVEMBER	JANUARY-FEBRUARY	MARCH-OCTOBER	MARCH-OCTOBER	JANUARY-AUGUST
2013	OCTOBER-DECEMBER	FEBRUARY	MARCH-OCTOBER	FEBRUARY-OCTOBER	FEBRUARY-OCTOBER
2014	OCTOBER-NOVEMBER	--	MARCH-OCTOBER	MAY-OCTOBER	MAY-SEPTEMBER
2015	OCTOBER-NOVEMBER	MARCH-APRIL	APRIL-OCTOBER	MAY-OCTOBER	MAY-OCTOBER
2016	OCTOBER-NOVEMBER	--	APRIL-SEPTEMBER	APRIL-OCTOBER	APRIL-SEPTEMBER

Table 2. 2016 Summer Shrimp/Groundfish Survey species composition list, 351 trawl stations, for those vessels that used a 42-ft trawl.
Species with a total weight of less than 0.0227 kg (0.05 lb) are indicated on the table as 0.0 kg.

GENUS/SPECIES	COMMON NAME	TOTAL NUMBER CAUGHT	TOTAL WEIGHT CAUGHT (KG)	NUMBER OF TOWS WHERE CAUGHT	% FREQUENCY OCCURRENCE
Finfishes					
Micropogonias undulatus	Atlantic Croaker	65593	1626.1	118	33.6
Peprilus burti	Gulf Butterfish	16161	667.9	137	39
Stenotomus caprinus	Longspine Porgy	15229	501.5	116	33
Prionotus longispinosus	Bigeye Searobin	12565	131	143	40.7
Chloroscombrus chrysurus	Atlantic Bumper	7910	332.9	81	23.1
Trichiurus lepturus	Atlantic Cutlassfish	6483	258.1	111	31.6
Lagodon rhomboides	Pinfish	5170	243.2	96	27.4
Syacium papillosum	Dusky Flounder	4256	208.4	137	39
Leiostomus xanthurus	Spot	4062	268	46	13.1
Centropristis philadelphicus	Rock Sea Bass	3311	76	117	33.3
Selene setapinnis	Atlantic Moonfish	2969	80.1	105	29.9
Lutjanus synagris	Lane Snapper	2830	407.6	92	26.2
Cynoscion arenarius	Sand Seatrout	2678	80.7	85	24.2
Haemulon aurolineatum	Tomtate	2638	222.4	81	23.1
Cynoscion nothus	Silver Seatrout	2281	64.2	65	18.5
Synodus foetens	Inshore Lizardfish	2060	247	231	65.8
Scorpaena calcarata	Smoothhead Scorpionfish	2002	38.6	59	16.8
Serranus atrobranchus	Blackear Bass	1954	22.1	77	21.9
Saurida brasiliensis	Largescale Lizardfish	1807	9.3	88	25.1
Eucinostomus gula	Silver Jenny	1599	45.1	22	6.3
Syacium gunteri	Shoal Flounder	1342	26.6	83	23.6
Diplectrum formosum	Sand Perch	1337	132.2	138	39.3
Steindachneria argentea	Luminous Hake	1296	4.4	4	1.1
Peprilus paru	Harvestfish	1198	9.6	42	12
Pristipomoides aquilonaris	Wenchman	1021	66.5	65	18.5
Halieutichthys		1004	5.1	60	17.1
Calamus proridens	Littlehead Porgy	976	187.2	65	18.5

Table 2. Species composition list (continued)

GENUS/SPECIES	COMMON NAME	TOTAL NUMBER CAUGHT	TOTAL WEIGHT CAUGHT (KG)	NUMBER OF TOWS WHERE CAUGHT	% FREQUENCY OCCURRENCE
Upeneus parvus	Dwarf Goatfish	934	34.6	67	19.1
Larimus fasciatus	Banded Drum	855	39.9	38	10.8
Harengula jaguana	Scaled Herring	826	43.1	39	11.1
Anchoa hepsetus	Broad-striped Anchovy	817	14	36	10.3
Lutjanus campechanus	Red Snapper	793	240.2	125	35.6
Trachurus lathami	Rough Scad	791	21	57	16.2
Prionotus stearnsi	Shortwing Searobin	780	9.8	58	16.5
Trichopsetta ventralis	Sash Flounder	760	16.2	50	14.2
Rhomboplites aurorubens	Vermilion Snapper	735	62.9	71	20.2
Etrumeus teres	Atlantic Red Herring	691	4.9	6	1.7
Trachinocephalus myops	Bluntnose Lizardfish	648	36.8	70	19.9
Anchoa lyolepis	Dusky Anchovy	627	8.5	11	3.1
Bellator militaris	Horned Searobin	605	5.9	44	12.5
Centropristis ocyurus		602	22.9	53	15.1
Lepophidium brevibarbe	Blackedge Cusk-eel	539	16.1	49	14
Synodus macrostigmus		519	36.4	82	23.4
Prionotus paralatus	Mexican Searobin	487	10	35	10
Porichthys plectrodon	Atlantic Midshipman	469	10.6	81	23.1
Sphoeroides spengleri	Bandtail Puffer	431	15.4	69	19.7
Diplectrum bivittatum	Dwarf Sand Perch	428	9.9	40	11.4
Stephanolepis hispida		425	26.6	66	18.8
Decapterus punctatus	Round Scad	420	5.9	21	6
Equetus lanceolatus	Jackknife Fish	417	39.1	73	20.8
Lepophidium jeannae	Mottled Cusk-eel	398	20.2	19	5.4
Haemulon plumierii	White Grunt	389	57.5	23	6.6
Acanthostracion quadricornis	Scrawled Cowfish	381	65.3	91	25.9
Bothus robinsi	Twospot Flounder	358	9.5	71	20.2
Scorpaena brasiliensis	Barbfish	348	27.3	51	14.5
Aluterus schoepfii	Orange Filefish	321	184.4	53	15.1
Pterois volitans	Lion Fish	313	61.3	53	15.1
Anchoa mitchilli	Bay Anchovy	309	0.5	8	2.3

Table 2. Species composition list (continued)

GENUS/SPECIES	COMMON NAME	TOTAL NUMBER CAUGHT	TOTAL WEIGHT CAUGHT (KG)	NUMBER OF TOWS WHERE CAUGHT	% FREQUENCY OCCURRENCE
Etropus crossotus	Fringed Flounder	307	4.8	43	12.3
Sphoeroides dorsalis	Marbled Puffer	295	7.6	62	17.7
Synodus poeyi	Offshore Lizardfish	284	2.6	79	22.5
Lagocephalus laevigatus	Smooth Puffer	278	7.8	53	15.1
Prionotus roseus	Bluespotted Searobin	258	5.7	49	14
Serranus phoebe	Tattler	250	8.8	32	9.1
Eucinostomus	Mojarras	233	7.2	3	0.9
Ophidion holbrookii	Bank Cusk-eel	226	20.8	30	8.5
Sphoeroides parvus	Least Puffer	222	1.6	36	10.3
Citharichthys spilopterus	Bay Whiff	202	2.4	40	11.4
Prionotus scitulus	Leopard Searobin	201	5.5	22	6.3
Orthopristis chrysoptera		201	21.4	17	4.8
Serranus notospilus	Saddle Bass	201	1.1	22	6.3
Urophycis floridana		200	12.1	34	9.7
Scorpaena agassizii	Longfin Scorpionfish	198	3.7	16	4.6
Cyclopsetta chittendeni	Mexican Flounder	183	16.7	53	15.1
Ogcocephalus declivirostris	Slantbrow Batfish	170	3.3	34	9.7
Engraulis eurystole	Camiguana Anchovy	165	1.4	2	0.6
Saurida normani	Shortjaw Lizardfish	155	10.1	15	4.3
Chaetodon ocellatus	Spotfin Butterflyfish	155	12.5	55	15.7
Etropus cyclosquamus	Shelf Flounder	129	1.4	3	0.9
Bollmannia communis	Ragged Goby	122	0.5	18	5.1
Opisthonema oglinum	Atlantic Thread Herring	119	12.3	19	5.4
Lutjanus griseus	Gray Snapper	119	53.5	36	10.3
Synodus intermedius	Sand Diver	116	8	35	10
Prionotus ophryas	Bandtail Searobin	113	6.4	40	11.4
Symphurus diomedeanus		111	3	38	10.8
Calamus arctifrons	Grass Porgy	111	10.9	11	3.1
Ariopsis felis	Hardhead Catfish	103	19.9	9	2.6
Eucinostomus harengulus	Tidewater Mojarra	94	5.5	18	5.1
Microgobius thalassiunus		175	0.5	2	0.5

Table 2. Species composition list (continued)

GENUS/SPECIES	COMMON NAME	TOTAL NUMBER CAUGHT	TOTAL WEIGHT CAUGHT (KG)	NUMBER OF TOWS WHERE CAUGHT	% FREQUENCY OCCURRENCE
Symphurus civitatium		93	1.7	16	4.6
Etropus		87	1	10	2.8
Symphurus plagiusa	Blackcheek Tonguefish	87	1.9	17	4.8
Monacanthus ciliatus	Fringed Filefish	87	1.8	35	10
Prionotus alatus	Spiny Searobin	86	3.1	22	6.3
Calamus nodosus	Knobbed Porgy	82	19.3	22	6.3
Stellifer lanceolatus	Star Drum	82	1.6	8	2.3
Haemulon striatum	Striped Grunt	81	2.3	5	1.4
Nicholsina usta	Emerald Parrotfish	79	6.6	24	6.8
Kathetostoma albigutta	Lancer Stargazer	77	2.6	27	7.7
Etropus microstomus	Smallmouth Flounder	77	0.8	3	0.9
Rhynchoconger flavus		76	4.4	16	4.6
Neomerinthe hemingwayi	Spinycheek Scorpionfish	75	3.7	8	2.3
Epinephelus morio	Red Grouper	75	47.9	35	10
Prionotus martis	Barred Searobin	68	3.4	13	3.7
Gymnothorax saxicola	Honeycomb Moray	67	7.1	38	10.8
Cyclopsetta fimbriata	Spotfin Flounder	67	7.3	40	11.4
Prionotus tribulus	Bighead Searobin	66	2.9	14	4
Halieutichthys aculeatus	Pancake Batfish	65	0.6	31	8.8
Antennarius radiosus	Big-eyed Frogfish	63	0.5	25	7.1
Pagrus pagrus	Red Porgy	58	11.1	21	6
Pterois	Lion Fishes	57	13.8	14	4
Mullus auratus	Red Goatfish	56	2.3	23	6.6
Citharichthys macrops	Spotted Whiff	56	2	25	7.1
Prionotus rubio	Blackfin Searobin	55	9.8	22	6.3
Urophycis cirrata	Gulf Hake	54	1.5	14	4
Brevoortia patronus	Gulf Menhaden	54	2.8	6	1.7
Centropristis striata	Black Sea Bass	53	8.5	8	2.3
Calamus leucosteus	Whitebone Porgy	51	18.8	4	1.1
Menticirrhus americanus	Jewsharp Drummer	49	5.9	12	3.4
Balistes capriscus	Gray Triggerfish	48	22.8	30	8.5

Table 2. Species composition list (continued)

GENUS/SPECIES	COMMON NAME	TOTAL NUMBER CAUGHT	TOTAL WEIGHT CAUGHT (KG)	NUMBER OF TOWS WHERE CAUGHT	% FREQUENCY OCCURRENCE
Pareques umbrosus	Cubbyu	46	3	22	6.3
Apogon affinis	Bigtooth Cardinalfish	45	0.3	12	3.4
Eucinostomus argenteus	Spotfin Mojarra	44	1.7	9	2.6
Sardinella aurita	Round Sardinella	44	1.9	16	4.6
Ophidion selenops	Mooneye Cusk-eel	43	0.5	4	1.1
Chaetodon sedentarius	Reef Butterflyfish	42	2.1	17	4.8
Diplodus holbrookii	Spottail Pinfish	41	3	4	1.1
Ancylopsetta dilecta	Three-eye Flounder	40	2.2	18	5.1
		39	2.3	3	0.9
Chromis enchrysura	Yellowtail Reeffish	39	0.7	15	4.3
Serranus tortugarum	Chalk Bass	38	0.3	3	0.9
Brotula barbata	Bearded Brotula	36	6	20	5.7
Ancylopsetta ommata	Ocellated Flounder	35	6	25	7.1
Xyrichtys novacula	Pearly Razorfish	34	1.6	17	4.8
Ophidion josephi	Crested Cusk-eel	34	1.6	9	2.6
Pomacanthus arcuatus	Gray Angelfish	33	15.2	21	6
Chaetodipterus faber	Atlantic Spadefish	33	3.2	4	1.1
Engyophrys senta	Spiny Flounder	31	0.1	13	3.7
Lachnolaimus maximus	Hogfish	31	9.2	10	2.8
Neobythites gilli		30	0.1	6	1.7
Chilomycterus schoepfii	Burrfish	29	4.9	12	3.4
Trinectes maculatus	Hogchoker	28	0.4	2	0.6
Bregmaceros atlanticus	Antenna Codlet	27	0	8	2.3
Calamus penna	Sheepshead Porgy	27	7.5	2	0.6
Raja texana	Roundel Skate	27	8.6	22	6.3
Holacanthus bermudensis	Blue Angelfish	26	10.5	17	4.8
Canthigaster rostrata		26	0.1	10	2.8
Hoplunnis macrura	Freckled Pike-conger	25	0.2	6	1.7
Caulolatilus intermedius	Anchor Tilefish	24	2.4	9	2.6
Ophidion holbrookii	Longnose Cusk-eel	23	1.6	12	3.4
Apogon quadrisquamatus	Sawcheek Cardinalfish	22	0.1	4	1.1

Table 2. Species composition list (continued)

GENUS/SPECIES	COMMON NAME	TOTAL NUMBER CAUGHT	TOTAL WEIGHT CAUGHT (KG)	NUMBER OF TOWS WHERE CAUGHT	% FREQUENCY OCCURRENCE
Paralichthys albigutta	Gulf Flounder	22	8.5	13	3.7
Ophidion grayi	Blotched Cusk-eel	22	0.6	5	1.4
Sphyraena guachancho	Guaguanche	22	3.1	14	4
Aluterus heudelotii		21	6.9	15	4.3
Priacanthus arenatus	Bigeye	21	2.9	11	3.1
Synodus synodus	Red Lizardfish	20	0.1	4	1.1
Selene vomer	Lookdown	20	0	3	0.9
Gymnachirus texae	Fringed Sole	19	0.2	6	1.7
Pareques iwamotoi	Blackbar Drum	18	1.3	8	2.3
Paraconger caudilimbatus	Margintail Conger	18	1	7	2
Gastropsetta frontalis	Shrimp Flounder	18	1.1	15	4.3
Bothus ocellatus	Eyed Flounder	17	0.3	9	2.6
Hippocampus erectus	Lined Seahorse	17	0.2	16	4.6
Pseudupeneus maculatus	Spotted Goatfish	17	1.1	6	1.7
Sphyrna tiburo	Bonnethead	15	52.8	4	1.1
Selar crumenophthalmus	Bigeye Scad	15	1.5	6	1.7
Mycteroperca phenax	Scamp	14	6.5	9	2.6
Symphurus urospilus	Spottail Tonguefish	14	0.4	6	1.7
Halichoeres bathyphilus	Greenband Wrasse	14	0.4	1	0.3
Rhizoprionodon terraenovae	Atlantic Sharpnose Shark	14	21.8	11	3.1
Rypticus maculatus	Whitespotted Soapfish	13	0.6	12	3.4
Ogcocephalus parvus	Roughback Batfish	13	0.1	11	3.1
Bathyanthias mexicanus	Yellowtail Bass	12	0.2	6	1.7
Mustelus sinusmexicanus	Gulf Smoothhound	12	11	10	2.8
Hoplunnis diomediana	Blacktail Pike-conger	12	0.1	3	0.9
Apogon	Cardinalfishes	12	0	4	1.1
Ogcocephalus cubifrons		12	3.3	10	2.8
Pristigenys alta	Short Bigeye	11	2.3	9	2.6
Paralichthys squamilentus	Broad Flounder	11	3.6	7	2
Ogcocephalus pantostictus	Spotted Batfish	11	1.3	5	1.4
Sphoeroides	Common Puffers	11	0	2	0.6

Table 2. Species composition list (continued)

GENUS/SPECIES	COMMON NAME	TOTAL NUMBER CAUGHT	TOTAL WEIGHT CAUGHT (KG)	NUMBER OF TOWS WHERE CAUGHT	% FREQUENCY OCCURRENCE
Lonchopisthus micrognathus	Swordtail Jawfish	10	0.1	5	1.4
Synodus	Lizard Fishes	10	0.1	7	2
Parablennius marmoreus	Seaweed Blenny	10	0	1	0.3
Bellator egretta	Streamer Searobin	10	0	4	1.1
Gymnothorax nigromarginatus	Blackedge Moray	10	1.1	6	1.7
Hemanthias vivanus	Red Barbier	10	0.3	2	0.6
Opsanus pardus	Leopard Toadfish	9	0.2	6	1.7
Helicolenus dactylopterus	Blackbelly Rosefish	9	0.1	2	0.6
Raja eglanteria	Clearnose Skate	9	4.7	8	2.3
Otophidium omostigma	Polka-dot Cusk-eel	9	0.1	4	1.1
Sargocentron bullisi	Deepwater Squirrelfish	9	0.2	2	0.6
Uroconger syringinus	Threadtail Conger	9	0.2	2	0.6
Apogon pseudomaculatus	Twospot Cardinalfish	9	0.1	8	2.3
Opsanus beta	Gulf Toadfish	8	0.4	6	1.7
Calamus calamus	Saucereye Porgy	8	2.4	4	1.1
Ogcocephalus cubifrons	Polka-dot Batfish	8	3.6	7	2
Hoplunnis		8	0	1	0.3
Scomberomorus maculatus	Atlantic Spanish Mackerel	8	2.9	3	0.9
Calamus bajonado	Jolthead Porgy	8	12.5	5	1.4
Prognathodes aya	Bank Butterflyfish	7	0.1	4	1.1
Cynoscion	Sea Trout	7	0	2	0.6
Antennarius ocellatus	Ocellated Frogfish	7	0.3	6	1.7
Caranx crysos	Blue Runner	7	0.6	7	2
Bellator brachychir	Shortfin Searobin	6	0	3	0.9
Acanthostracion polygonius	Honeycomb Cowfish	6	2.6	3	0.9
Gobiesox strumosus	Skilletfish	6	0	4	1.1
Rhinobatos lentiginosus	Atlantic Guitarfish	6	3.5	6	1.7
Ophidion	Cusk-eels	6	0.3	4	1.1
Paralichthys lethostigma	Southern Flounder	6	1.6	6	1.7
Echeneis	Sharksuckers	6	2.8	3	0.9
Urophycis regia	Spotted Codling	6	0.2	3	0.9

Table 2. Species composition list (continued)

GENUS/SPECIES	COMMON NAME	TOTAL NUMBER CAUGHT	TOTAL WEIGHT CAUGHT (KG)	NUMBER OF TOWS WHERE CAUGHT	% FREQUENCY OCCURRENCE
Caranx hippos	Crevalle Jack	6	0.9	3	0.9
Physiculus fulvus	Hakeling	5	0	3	0.9
Pontinus longispinis	Longspine Scorpionfish	5	0	3	0.9
Bagre marinus	Gafftopsail Catfish	5	0.5	2	0.6
Achirus lineatus	Lined Sole	5	0	2	0.6
Sphyraena borealis	Northern Sennet	5	0.9	4	1.1
Myrophis punctatus	Speckled Worm Eel	5	0	2	0.6
Ogcocephalus corniger	Longnose Batfish	5	0.1	5	1.4
Syacium micrurum	Channel Flounder	5	0.1	2	0.6
Sphoeroides nephelus	Southern Puffer	5	0.5	5	1.4
Serranus annularis	Orangeback Bass	5	0	2	0.6
Apogon aurolineatus	Bridle Cardinalfish	5	0	3	0.9
Citharichthys cornutus	Horned Whiff	4	0	2	0.6
Decodon puellaris	Red Hogfish	4	0.2	3	0.9
Antennarius striatus	Striated Frogfish	4	0.1	4	1.1
Peprilus paru	Harvestfish	4	0.4	3	0.9
Scomberomorus cavalla	King Mackerel	4	0	3	0.9
Scomber japonicus	Chub Mackerel	4	0.1	1	0.3
Bregmaceros cantori	Striped Codlet	4	0	1	0.3
Holocentrus adscensionis	Squirrelfish	4	0.4	2	0.6
Syngnathus louisianae	Chain Pipefish	4	0	2	0.6
Seriola zonata	Banded Rudderfish	4	0.7	3	0.9
Echiophis intertinctus	Spotted Spoon-nose Eel	3	1.1	3	0.9
Gymnothorax kolpos	Blacktail Moray	3	0.7	2	0.6
Rypticus bistrispinus	Freckled Soapfish	3	0	3	0.9
Hoplunnis tenuis	Spotted Pike-conger	3	0	2	0.6
Hyporthodus flavolimbatus		3	0.3	2	0.6
Bairdiella chrysoura	Silver Perch	3	0.2	2	0.6
Seriola dumerili	Greater Amberjack	3	0.6	2	0.6
Leucoraja lentiginosa	Speckled Skate	3	1.8	3	0.9
Mustelus canis	Dusky Smooth-hound	3	2.4	3	0.9

Table 2. Species composition list (continued)

GENUS/SPECIES	COMMON NAME	TOTAL NUMBER CAUGHT	TOTAL WEIGHT CAUGHT (KG)	NUMBER OF TOWS WHERE CAUGHT	% FREQUENCY OCCURRENCE
Citharichthys gymnorhinus	Anglefin Whiff	3	0	3	0.9
Echeneis naucrates	Sharksucker	3	1.4	2	0.6
Echeneis neucratoides	Whitefin Sharksucker	3	1.3	2	0.6
Ariomma regulus	Spotted Driftfish	3	0.7	3	0.9
Lepophidium		3	0	3	0.9
Halichoeres caudalis	Painted Wrasse	3	0.2	3	0.9
Scorpaena	Scorpionfishes	2	0	2	0.6
Canthigaster jamestyleri		2	0	2	0.6
Ophichthus puncticeps	Palespotted Eel	2	0.1	1	0.3
Squatina dumeril	Atlantic Angel Shark	2	0.6	2	0.6
Mustelus norrisi	Florida Smoothhound	2	1	2	0.6
Cryptotomus roseus	Bluelip Parrotfish	2	0	2	0.6
Menticirrhus littoralis	Gulf Kingfish	2	0.1	1	0.3
Hypleurochilus bermudensis	Barred Blenny	2	0	2	0.6
Carcharhinus limbatus	Blacktip Shark	2	2.3	1	0.3
Gymnachirus melas	Naked Sole	2	0.1	2	0.6
Prionotus	North American Searobins	2	0	2	0.6
Mugil cephalus	Striped Mullet	2	0.1	1	0.3
Serraniculus pumilio	Pygmy Sea Bass	2	0	2	0.6
Serranus subligarius	Belted Sandfish	2	0	2	0.6
Hypoplectrus puella	Barred Hamlet	2	0.1	1	0.3
Peristedion gracile	Slender Searobin	2	0	1	0.3
Hemanthias leptus	Longtail Bass	2	0	2	0.6
Dasyatis say	Bluntnose Stingray	2	3.7	1	0.3
Bodianus pulchellus	Spotfin Hogfish	2	0.1	1	0.3
Sparisoma		2	0	1	0.3
Bregmaceros		2	0	1	0.3
Diodon holocanthus	Balloonfish	2	0.6	1	0.3
Dasyatis americana	Southern Stingray	2	7.3	2	0.6
Schultzea beta	School Bass	2	0	2	0.6
Urophycis chuss	Red Hake	2	0.1	1	0.3

Table 2. Species composition list (continued)

GENUS/SPECIES	COMMON NAME	TOTAL NUMBER CAUGHT	TOTAL WEIGHT CAUGHT (KG)	NUMBER OF TOWS WHERE CAUGHT	% FREQUENCY OCCURRENCE
Mustelus	Smooth Hound Sharks	1	0.5	1	0.3
Mugil	Gray Mullets	1	0	1	0.3
Foetorepus agassizii	Spotfin Dragonet	1	0	1	0.3
Pronotogrammus martinicensis		1	0	1	0.3
Hemicaranx amblyrhynchus	Bluntnose Jack	1	0	1	0.3
Myliobatis freminvillii	Bullnose Ray	1	1.4	1	0.3
Ginglymostoma cirratum	Nurse Shark	1	50	1	0.3
Ophichthus gomesii	Shrimp Eel	1	0.2	1	0.3
Chromis scotti	Purple Reeffish	1	0	1	0.3
Chaetodon	Butterflyfishes	1	0	1	0.3
Aluterus scriptus	Scrawled Filefish	1	0.4	1	0.3
Stegastes variabilis	Cocoa Damselfish	1	0	1	0.3
Ariosoma selenops		1	0.1	1	0.3
Seriola rivoliana	Almaco Jack	1	0.4	1	0.3
Gymnachirus		1	0	1	0.3
Epinephelus	Groupers	1	0.1	1	0.3
Apogon maculatus	Flamefish	1	0	1	0.3
Fistularia tabacaria	Bluespotted Cornetfish	1	0.2	1	0.3
Caulolatilus cyanops	Blackline Tilefish	1	0.2	1	0.3
Halichoeres	Wrasses	1	0	1	0.3
Hemanthias aureorubens	Streamer Bass	1	0	1	0.3
Sparisoma atomarium	Greenblotch Parrotfish	1	0	1	0.3
Scorpaena elachys	Dwarf Scorpionfish	1	0	1	0.3
Neoniphon marianus	Longjaw Squirrelfish	1	0.1	1	0.3
Aluterus monoceros	Unicorn Filefish	1	1.5	1	0.3
Dactylopterus volitans	Flying Gurnard	1	0.6	1	0.3
Cheilopogon heterurus		1	0.1	1	0.3
Caulolatilus chrysops	Goldface Tilefish	1	0.1	1	0.3
Emblemaria piratula	Pirate Blenny	1	0	1	0.3
Urophycis earllii	Carolina Hake	1	0.1	1	0.3
Ocyurus chrysurus	Yellowtail Snapper	1	0.3	1	0.3

Table 2. Species composition list (continued)

GENUS/SPECIES	COMMON NAME	TOTAL NUMBER CAUGHT	TOTAL WEIGHT CAUGHT (KG)	NUMBER OF TOWS WHERE CAUGHT	% FREQUENCY OCCURRENCE
Carcharhinus acronotus	Blacknose Shark	1	0.7	1	0.3
Chromis		1	0	1	0.3
Lutjanus analis	Mutton Snapper	1	5	1	0.3
Chasmodes saburrae	Florida Blenny	1	0.2	1	0.3
Dasyatis centroura	Clam Cracker	1	239	1	0.3
Lutjanus vivanus	Silk Snapper	1	0.1	1	0.3
Halichoeres bivittatus	Slippery Dick	1	0.1	1	0.3
Narcine brasiliensis	Lesser Electric Ray	1	0.2	1	0.3
Seriola fasciata	Lesser Amberjack	1	0	1	0.3
Opsanus tau	Oyster Toadfish	1	0.5	1	0.3
Rhinoptera bonasus	Cownose Ray	1	1.1	1	0.3
Phaeoptyx xenus	Sponge Cardinalfish	1	0	1	0.3
Elacatinus xanthiprora	Yellowprow Goby	1	0	1	0.3
Scorpaena plumieri	Spotted Scorpionfish	1	0.2	1	0.3
Serranidae	Groupers	1	0	1	0.3
Astrapogon alutus	Bronze Cardinalfish	1	0	1	0.3
Ahlia egmontis	Key Worm Eel	1	0	1	0.3
Epinephelus itajara	Goliath Grouper	1	21.7	1	0.3
Coryphopterus		1	0	1	0.3
Ophichthidae	Snake Eels	1	0	1	0.3
Astroscopus y-graecum	Southern Stargazer	1	0	1	0.3
Crustaceans					
Farfantepenaeus aztecus	Brown Shrimp	27080	383.6	167	47.6
Callinectes similis	Lesser Blue Crab	25969	250.4	111	31.6
Rimapenaeus similis	Roughback Shrimp	23006	96.3	78	22.2
Squilla empusa	Mantis Shrimp	12756	100.5	103	29.3
Portunus spinicarpus	Longspine Swimming Crab	7399	39.2	132	37.6
Farfantepenaeus duorarum	Northern Pink Shrimp	4578	82.6	71	20.2
Sicyonia brevirostris	Brown Rock Shrimp	3273	33.3	91	25.9

Table 2. Species composition list (continued)

GENUS/SPECIES	COMMON NAME	TOTAL NUMBER CAUGHT	TOTAL WEIGHT CAUGHT (KG)	NUMBER OF TOWS WHERE CAUGHT	% FREQUENCY OCCURRENCE
Sicyonia dorsalis	Lesser Rock Shrimp	1966	6.2	49	14
Rimapenaeus constrictus		1920	6.4	20	5.7
Portunus gibbesii	Iridescent Swimming Crab	1888	9.1	86	24.5
Squilla chydaea		1676	9.1	69	19.7
Solenocera vioscai	Humpback Shrimp	1542	6.6	44	12.5
Litopenaeus setiferus	Northern White Shrimp	1130	38.1	56	16
Parapenaeus politus	Deep-water Rose Shrimp	1093	2	24	6.8
Xiphopenaeus kroyeri	Atlantic Seabob	692	4.9	4	1.1
Chirostylus spinifer		607	0.3	1	0.3
Solenocera atlantidis	Dwarf Humpback Shrimp	570	0.9	30	8.5
Metapenaeopsis goodei	Caribbean Velvet Shrimp	477	1	33	9.4
Anasimus latus	Stilt Spider Crab	406	1.8	65	18.5
Portunus spinimanus	Blotched Swimming Crab	250	8.3	57	16.2
Calappa sulcata	Yellow Box Crab	245	26.6	54	15.4
Raninoides louisianensis	Gulf Frog Crab	168	1.3	41	11.7
Callinectes sapidus	Blue Crab	159	24.7	56	16
Stenorhynchus seticornis	Yellowline Arrow Crab	147	0.3	65	18.5
Scyllarus chacei	Chace Slipper Lobster	129	0.4	38	10.8
Ovalipes floridanus	Florida Lady Crab	115	1.2	21	6
Munida pusilla		114	0.1	1	0.3
Sicyonia typica	Kinglet Rock Shrimp	94	1.4	7	2
Iliacantha liodactylus		87	0.4	26	7.4
Pseudorhombila quadridentata	Flecked Squareback Crab	85	0.7	19	5.4
Scyllarides nodifer	Ridged Slipper Lobster	83	19.2	27	7.7
Leiolambrus nitidus	White Elbow Crab	76	0.2	37	10.5
Portunus ordwayi		71	0.5	14	4
Speocarcinus lobatus	Gulf Squareback Crab	49	0.2	14	4
Paguristes sericeus	Blue-eye Hermit	42	0.1	25	7.1
Cryptodromiopsis antillensis	Decorator Crab	42	0.2	31	8.8
Euphrosynoplax clausa	Craggy Bathyal Crab	38	0.4	16	4.6
Platylambrus granulata	Bladetooth Elbow Crab	35	0.1	26	7.4

Table 2. Species composition list (continued)

GENUS/SPECIES	COMMON NAME	TOTAL NUMBER CAUGHT	TOTAL WEIGHT CAUGHT (KG)	NUMBER OF TOWS WHERE CAUGHT	% FREQUENCY OCCURRENCE
Hepatus epheliticus	Calico Box Crab	29	1	13	3.7
Dardanus insignis	Red Brocade Hermit	29	0.1	14	4
Myropsis quinquespinosa	Fivespine Purse Crab	28	0.1	12	3.4
Mithrax hispidus	Coral Clinging Crab	27	0.1	17	4.8
Mithrax		26	0	10	2.8
Dardanus fucosus	Bareye Hermit	21	0	9	2.6
Persephona crinita	Pink Purse Crab	19	0	9	2.6
Petrolisthes galathinus	Banded Porcelain Crab	19	6	5	1.4
Calappa flammea	Flame Box Crab	19	4.8	12	3.4
Sicyonia burkenroadi	Spiny Rock Shrimp	18	0	8	2.3
Mesopenaeus tropicalis	Salmon Shrimp	17	0	3	0.9
Pilumnus sayi	Spineback Hairy Crab	16	0.1	11	3.1
Gibbesia neglecta		15	0.1	4	1.1
Stenocionops furcatus	Furcate Spider Crab	15	0.3	14	4
Libinia emarginata	Portly Spider Crab	14	1.1	8	2.3
Collodes robustus		14	0	5	1.4
Podochela sidneyi	Shortfinger Neck Crab	14	0	9	2.6
Libinia dubia	Longnose Spider Crab	13	0	5	1.4
Paguristes triangulatus		12	0	5	1.4
Petrochirus diogenes	Giant Hermit	12	0.3	8	2.3
Pseudomedaeus agassizii	Rough Rubble Crab	12	0.1	7	2
Pagurus bullisi		11	0	5	1.4
Xanthidae	Mud Crabs	11	0	5	1.4
Plesionika longicauda		10	0	4	1.1
Porcellana sayana	Spotted Porcelain Crab	9	0	3	0.9
Squilla rugosa		9	0	5	1.4
Leiolambrus granulosus		8	0	5	1.4
Macrocoeloma trispinosum	Spongy Decorator Crab	8	0.1	7	2
Portunus sayi	Sargassum Swimming Crab	8	0	3	0.9
Mithrax pleuracanthus	Shaggy Clinging Crab	8	0	7	2
Plesionika		7	0	1	0.3

Table 2. Species composition list (continued)

GENUS/SPECIES	COMMON NAME	TOTAL NUMBER CAUGHT	TOTAL WEIGHT CAUGHT (KG)	NUMBER OF TOWS WHERE CAUGHT	% FREQUENCY OCCURRENCE
Galathea rostrata		7	0	3	0.9
Alpheus normanni	Green Snapping Shrimp	6	0	1	0.3
Pilumnus floridanus	Plumed Hairy Crab	6	0	5	1.4
Alpheus floridanus	Sand Snapping Shrimp	6	0	2	0.6
Macrocoeloma		5	0	4	1.1
Ethusa microphthalma	Broadback Sumo Crab	5	0	3	0.9
Munida forceps		5	0	4	1.1
Iliacantha subglobosa	Longfinger Purse Crab	5	0	5	1.4
Squilla deceptrix		4	0	4	1.1
Acanthocarpus alexandri	Gladiator Box Crab	4	0	3	0.9
Palicus faxoni	Finned Stilt Crab	4	0	3	0.9
Alpheus formosus	Striped Snapping Shrimp	4	0	2	0.6
Nemausa acuticornis	Sharphorn Clinging Crab	4	0	3	0.9
Gonodactylus bredini		4	0	4	1.1
Portunus		4	0	4	1.1
Paguristes tortugae	Bandeye Hermit	4	0	3	0.9
Alpheidae	Snapping Shrimps	4	0	3	0.9
Pyromaia cuspidata	Dartnose Pear Crab	3	0	3	0.9
Cronius ruber	Blackpoint Sculling Crab	3	0.1	2	0.6
Metoporhaphis calcarata	False Arrow Crab	3	0	2	0.6
Porcellana		3	0	3	0.9
Pasiphaeidae	Glass Shrimps	3	0	1	0.3
Mithraculus forceps	Red-ridged Clinging Crab	3	0	3	0.9
Stenocionops furcatus coelatus		3	0.1	2	0.6
Dardanus		3	0	1	0.3
Macrocoeloma eutheca		3	0	3	0.9
Persephona mediterranea	Mottled Purse Crab	3	0	1	0.3
Stenocionops spinimanus	Prickly Spider Crab	3	0.3	3	0.9
Dromidia		2	0	1	0.3
Plesionika ensis	Gladiator Striped Shrimp	2	0	1	0.3
Parthenope		2	0	2	0.6

Table 2. Species composition list (continued)

GENUS/SPECIES	COMMON NAME	TOTAL NUMBER CAUGHT	TOTAL WEIGHT CAUGHT (KG)	NUMBER OF TOWS WHERE CAUGHT	% FREQUENCY OCCURRENCE
Synalpheus townsendi	Townsend Snapping Shrimp	2	0	1	0.3
Calappa		2	0	2	0.6
Calappa ocellata	Ocellate Box Crab	2	0.1	1	0.3
Arenaeus cribrarius	Speckled Swimming Crab	2	0.1	1	0.3
Podochela riisei	Longfinger Neck Crab	2	0	2	0.6
Gonodactylus torus		2	0	1	0.3
Lobopilumnus agassizii	Areolated Hairy Crab	2	0	2	0.6
Manucomplanus ungulatus		2	0	2	0.6
Macrocoeloma camptocerum	Florida Decorator Crab	2	0	2	0.6
Alpheus		2	0	2	0.6
Eurytium limosum	Broadback Mud Crab	2	0	1	0.3
Parthenope agona		1	0	1	0.3
Euryplax nitida	Glabrous Broadface Crab	1	0	1	0.3
Sicyonia parri		1	0	1	0.3
Stenopus		1	0	1	0.3
Podochela lamelligera		1	0	1	0.3
Tyche		1	0	1	0.3
Leiolambrus		1	0	1	0.3
Stomatopoda	Mantis Shrimp	1	0	1	0.3
Platylambrus pourtalesii	Spinous Elbow Crab	1	0	1	0.3
Danielum ixbauchac		1	0	1	0.3
Parthenopidae	Elbow Crabs	1	0	1	0.3
Stenocionops spinosissimus	Tenspine Spider Crab	1	0	1	0.3
Synalpheus minus	Minor Snapping Shrimp	1	0	1	0.3
Parasquilla coccinea		1	0	1	0.3
Raninoides loevis	Furrowed Frog Crab	1	0	1	0.3
Stenopus scutellatus	Golden Coral Shrimp	1	0	1	0.3
Hepatus princeps		1	0.1	1	0.3
Glyptoxanthus erosus	Eroded Mud Crab	1	0	1	0.3
Porcellana sigsbeiana	Striped Porcelain Crab	1	0	1	0.3
Euchirograpsus americanus	American Talon Crab	1	0	1	0.3

Table 2. Species composition list (continued)

GENUS/SPECIES	COMMON NAME	TOTAL NUMBER CAUGHT	TOTAL WEIGHT CAUGHT (KG)	NUMBER OF TOWS WHERE CAUGHT	% FREQUENCY OCCURRENCE
Others					
Doryteuthis plei	Arrow Squid	7800	114.5	162	46.2
Amusium papyraceum	Paper Scallop	5842	58.9	68	19.4
Lolliguncula brevis	Atlantic Brief Squid	5635	58.1	101	28.8
Doryteuthis pealeii	Longfin Inshore Squid	3461	63.6	105	29.9
Pitar cordatus	Corded Pitar	585	11.7	41	11.7
Polystira tellea	Delicate Giant-turris	254	2.7	15	4.3
Doryteuthis		247	3.9	3	0.9
Anadara baughmani	Skewed Ark	171	2.6	17	4.8
Polystira albida	White Giant-turris	130	1.6	12	3.4
Neverita duplicata	Shark Eye	98	0.6	6	1.7
Argopecten gibbus	Atlantic Calico Scallop	40	0.2	16	4.6
Lirophora clenchi		38	0.4	10	2.8
Octopus vulgaris	Common Octopus	32	6.8	22	6.3
Sconsia striata	Royal Bonnet	29	0.4	11	3.1
Macoma brevifrons	Short Macoma	25	0.2	8	2.3
Euvola raveneli		24	0.1	8	2.3
Strombus alatus	Florida Fighting Conch	21	1.7	4	1.1
Trochidae		17	0.1	2	0.6
Semirossia		16	0.1	1	0.3
Laevicardium laevigatum	Eggcockle	16	0.6	5	1.4
Distorsio clathrata	Atlantic Distorsio	16	0.1	11	3.1
Laevicardium mortoni	Yellow Eggcockle	15	0.4	8	2.3
Tonna galea	Giant Tun	15	2.4	10	2.8
Aplysia morio	Sooty Seahare	15	1.2	9	2.6
Lindapecten muscosus	Rough Scallop	13	0.2	2	0.6
Conus austini		11	0.1	5	1.4
Narcissia trigonaria		7	0.6	6	1.7
Aplysia brasiliana	Mottled Seahare	7	0.2	5	1.4
Arca zebra	Turkey Wing	6	0.4	2	0.6

Table 2. Species composition list (continued)

GENUS/SPECIES	COMMON NAME	TOTAL NUMBER CAUGHT	TOTAL WEIGHT CAUGHT (KG)	NUMBER OF TOWS WHERE CAUGHT	% FREQUENCY OCCURRENCE
Oliva sayana	Lettered Olive	6	0.1	3	0.9
Eucrassatella speciosa	Beautiful Crassatella	6	0.1	4	1.1
Atrina seminuda	Half-naked Penshell	5	0.3	3	0.9
Agriopoma texasiana		5	0	2	0.6
Atrina serrata	Sawtooth Penshell	5	0.3	3	0.9
Euvola		5	0.1	4	1.1
Hexaplex fulvescens	Giant Eastern Murex	5	0	4	1.1
Calliostoma		4	0	3	0.9
Ficus communis	Atlantic Figsnail	4	0.4	4	1.1
Engina turbinella	White-spot Engina	4	0	1	0.3
Murex		3	0.1	1	0.3
Anadara ovalis	Blood Ark	3	0	2	0.6
Stramonita haemastoma		3	0	2	0.6
Chicoreus florifer		3	0	3	0.9
Spathochlamys benedicti	Benedict Scallop	3	0	3	0.9
Arca imbricata	Mossy Ark	2	0	2	0.6
Pinctada		2	0.5	1	0.3
Spondylus americanus	Atlantic Thorny Oyster	2	1.9	1	0.3
Calliostoma jujubinum	Mottled Topsnail	2	0	2	0.6
Macrocallista maculata	Calico Clam	2	0.1	2	0.6
Nodipecten		2	0.2	2	0.6
Aplysia dactylomela	Spotted Seahare	2	0.4	1	0.3
Bursatella leachii pleii	Ragged Seahare	2	0.3	2	0.6
Rossia bullisi	Gulf Bobtail Squid	2	0	1	0.3
Macoma pulleyi	Delta Macoma	1	0	1	0.3
Macoma		1	0	1	0.3
Conus cancellatus	Cancellate Cone	1	0	1	0.3
Aplysia		1	0.1	1	0.3
Pectinidae		1	0	1	0.3
Amaea mitchelli		1	0	1	0.3
Fasciolaria lilium	Banded Tulip	1	0	1	0.3

Table 2. Species composition list (continued)

GENUS/SPECIES	COMMON NAME	TOTAL NUMBER CAUGHT	TOTAL WEIGHT CAUGHT (KG)	NUMBER OF TOWS WHERE CAUGHT	% FREQUENCY OCCURRENCE
Tagelus		1	0.1	1	0.3
Pitar		1	0	1	0.3
Melongenidae		1	0.2	1	0.3
Nemocardium transversum	Transverse Micro-cockle	1	0	1	0.3
Musculus lateralis	Lateral Mussel	1	0	1	0.3
Cerithium atratum	Dark Cerith	1	0	1	0.3
Anadara notabilis	Eared Ark	1	0	1	0.3
Octopus burryi	Brownstripe Octopus	1	0	1	0.3
Abra		1	0	1	0.3
Distorsio constricta mcgintyi		1	0	1	0.3
Pleurobranchaea		1	0	1	0.3
Conus daucus	Carrot Cone	1	0	1	0.3
Turridae		1	0	1	0.3
Cypraea cinera		1	0	1	0.3
Papyridea		1	0	1	0.3
Aequipecten		1	0	1	0.3
Aequipecten glyptus	Red-ribbed Scallop	1	0	1	0.3
Pleuroploca gigantea	Horse Conch	1	0.1	1	0.3
Fasciolaria tulipa	True Tulip	1	0	1	0.3
Argopecten		1	0	1	0.3
Aplysia juliana		1	0	1	0.3
Cancellaria reticulata		1	0	1	0.3
Cypraea cervus	Atlantic Deer Cowrie	1	0	1	0.3
Latirus infundibulum	Brown-line Latirus	1	0	1	0.3

Table 3. 2016 Fall Shrimp/Groundfish Survey species composition list, 198 trawl stations, for those vessels that used a 42-ft trawl.
Species with a total weight of less than 0.0227 kg (0.05 lb) are indicated on the table as 0.0 kg.

GENUS/SPECIES	COMMON NAME	TOTAL NUMBER CAUGHT	TOTAL WEIGHT CAUGHT (KG)	NUMBER OF TOWS WHERE CAUGHT	% FREQUENCY OCCURRENCE
Finfishes					
Micropogonias undulatus	Atlantic Croaker	85638	3497.2	120	60.6
Chloroscombrus chrysurus	Atlantic Bumper	25029	646.1	98	49.5
Stenotomus caprinus	Longspine Porgy	8001	317.7	90	45.5
Peprilus burti	Gulf Butterfish	4576	255.6	95	48
Syacium papillosum	Dusky Flounder	4416	210.8	66	33.3
Prionotus longispinosus	Bigeye Searobin	3730	88.6	105	53
Leiostomus xanthurus	Spot	3114	249.3	73	36.9
Anchoa hepsetus	Broad-striped Anchovy	2733	40.8	44	22.2
Cynoscion nothus	Silver Seatrout	2547	151.9	78	39.4
Syacium gunteri	Shoal Flounder	2003	35.7	59	29.8
Lutjanus campechanus	Red Snapper	1952	192.1	100	50.5
Centropristis philadelphicus	Rock Sea Bass	1942	70.3	97	49
Serranus atrobranchus	Blackear Bass	1832	21.6	55	27.8
Synodus foetens	Inshore Lizardfish	1749	194.4	142	71.7
Lagodon rhomboides	Pinfish	1526	100.4	81	40.9
Trichiurus lepturus	Atlantic Cutlassfish	1391	74.7	51	25.8
Scorpaena calcarata	Smoothhead Scorpionfish	1377	24.1	42	21.2
Bellator militaris	Horned Searobin	1203	20.6	27	13.6
Pristipomoides aquilonaris	Wenchman	1149	69.7	59	29.8
Trachurus lathami	Rough Scad	1037	64.8	36	18.2
Larimus fasciatus	Banded Drum	1022	68.3	38	19.2
Prionotus stearnsi	Shortwing Searobin	933	11.7	29	14.6
Trichopsetta ventralis	Sash Flounder	853	17.6	36	18.2
Cynoscion arenarius	Sand Seatrout	795	67.3	65	32.8
Upeneus parvus	Dwarf Goatfish	756	28.6	46	23.2
Diplectrum formosum	Sand Perch	737	56.5	63	31.8
Ariopsis felis	Hardhead Catfish	663	122.6	41	20.7

Table 3. Species composition list (continued)

GENUS/SPECIES	COMMON NAME	TOTAL NUMBER CAUGHT	TOTAL WEIGHT CAUGHT (KG)	NUMBER OF TOWS WHERE CAUGHT	% FREQUENCY OCCURRENCE
Haemulon aurolineatum	Tomtate	635	55.2	38	19.2
Trachinocephalus myops	Bluntnose Lizardfish	619	47.3	47	23.7
Decapterus punctatus	Round Scad	618	12.7	22	11.1
Rhomboplites aurorubens	Vermilion Snapper	556	68.7	22	11.1
Cyclopsetta chittendeni	Mexican Flounder	543	41	58	29.3
Selene setapinnis	Atlantic Moonfish	532	26.4	75	37.9
Peprilus paru	Harvestfish	517	21.7	27	13.6
Harengula jaguana	Scaled Herring	517	24	40	20.2
Lutjanus synagris	Lane Snapper	513	61.6	48	24.2
Prionotus roseus	Bluespotted Searobin	506	21.5	40	20.2
Sphoeroides dorsalis	Marbled Puffer	463	16.9	41	20.7
Chaetodipterus faber	Atlantic Spadefish	463	35.5	61	30.8
Synodus macrostigmus		438	33.6	35	17.7
Halieutichthys		405	2.9	69	34.8
Caranx crysos	Blue Runner	397	19.8	51	25.8
Sphoeroides parvus	Least Puffer	394	2.7	38	19.2
Etropus cyclosquamus	Shelf Flounder	384	5.6	16	8.1
Stellifer lanceolatus	Star Drum	382	5.9	12	6.1
Saurida brasiliensis	Largescale Lizardfish	360	1.1	33	16.7
Synodus poeyi	Offshore Lizardfish	353	3.1	42	21.2
Diplectrum bivittatum	Dwarf Sand Perch	338	6.8	24	12.1
Lepophidium jeannae	Mottled Cusk-eel	320	17	14	7.1
Prionotus scitulus	Leopard Searobin	311	10.4	23	11.6
Eucinostomus gula	Silver Jenny	294	7.5	38	19.2
Bothus robinsi	Twospot Flounder	254	5.9	41	20.7
Opisthonema oglinum	Atlantic Thread Herring	253	15	32	16.2
Pterois volitans	Lion Fish	238	43.3	22	11.1
Citharichthys spilopterus	Bay Whiff	226	3.7	40	20.2
Monacanthus ciliatus	Fringed Filefish	225	2.6	25	12.6
Calamus proridens	Littlehead Porgy	223	44.4	15	7.6
Scorpaena brasiliensis	Barbfish	216	17.3	27	13.6

Table 3. Species composition list (continued)

GENUS/SPECIES	COMMON NAME	TOTAL NUMBER CAUGHT	TOTAL WEIGHT CAUGHT (KG)	NUMBER OF TOWS WHERE CAUGHT	% FREQUENCY OCCURRENCE
Lepophidium brevibarbe	Blackedge Cusk-eel	204	6.8	29	14.6
Etropus crossotus	Fringed Flounder	186	3.2	40	20.2
Centropristis ocyurus		183	12.1	29	14.6
Prionotus paralatus	Mexican Searobin	172	5.8	21	10.6
Acanthostracion quadricornis	Scrawled Cowfish	169	28	39	19.7
Ogcocephalus declivirostris	Slantbrow Batfish	166	3.3	30	15.2
Ophidion holbrookii	Bank Cusk-eel	153	15.8	25	12.6
Sphoeroides spengleri	Bandtail Puffer	147	4.9	35	17.7
Equetus lanceolatus	Jackknife Fish	145	5.2	21	10.6
Porichthys plectrodon	Atlantic Midshipman	126	2.4	44	22.2
Prionotus ophryas	Bandtail Searobin	121	4.8	28	14.1
Citharichthys macrops	Spotted Whiff	117	3.6	16	8.1
Cyclopsetta fimbriata	Spotfin Flounder	110	9	31	15.7
Stephanolepis hispida		106	3.9	22	11.1
Orthopristis chrysoptera		105	9	19	9.6
Prionotus rubio	Blackfin Searobin	104	7.5	17	8.6
Lutjanus griseus	Gray Snapper	104	31.7	9	4.5
Serranus phoebe	Tattler	86	7	6	3
Gastropsetta frontalis	Shrimp Flounder	86	5.7	17	8.6
Kathetostoma albigutta	Lancer Stargazer	82	3.4	31	15.7
Sardinella aurita	Round Sardinella	76	4.3	5	2.5
Rhynchoconger flavus		60	3.8	16	8.1
Pareques umbrosus	Cubbyu	58	3.1	19	9.6
Aluterus schoepfii	Orange Filefish	56	38.3	13	6.6
Bagre marinus	Gafftopsail Catfish	51	10.1	12	6.1
Pareques iwamotoi	Blackbar Drum	51	2.6	18	9.1
Symphurus diomedeanus		51	1.2	16	8.1
Gonichthys cocco		49	0.2	1	0.5
Balistes capriscus	Gray Triggerfish	49	7.9	24	12.1
Lagocephalus laevigatus	Smooth Puffer	48	4.9	25	12.6
Chaetodon ocellatus	Spotfin Butterflyfish	45	3.3	13	6.6

Table 3. Species composition list (continued)

GENUS/SPECIES	COMMON NAME	TOTAL NUMBER CAUGHT	TOTAL WEIGHT CAUGHT (KG)	NUMBER OF TOWS WHERE CAUGHT	% FREQUENCY OCCURRENCE
Anchoa mitchilli	Bay Anchovy	45	0	1	0.5
Synodus	Lizard Fishes	42	0.9	4	2
Selar crumenophthalmus	Bigeye Scad	42	1.7	11	5.6
Calamus leucosteus	Whitebone Porgy	41	13	6	3
Chaetodon sedentarius	Reef Butterflyfish	40	1.7	7	3.5
Brotula barbata	Bearded Brotula	40	2.2	17	8.6
Ophidion josephi	Crested Cusk-eel	39	1.7	10	5.1
Synodus synodus	Red Lizardfish	38	0.5	3	1.5
Haemulon plumierii	White Grunt	35	9.5	4	2
Mullus auratus	Red Goatfish	35	2	10	5.1
Menticirrhus americanus	Jewsharp Drummer	32	5.7	13	6.6
Scorpaena agassizii	Longfin Scorpionfish	32	0.7	5	2.5
Ariomma regulus	Spotted Driftfish	31	1.6	8	4
Aluterus heudelotii		30	5.2	7	3.5
Gymnothorax saxicola	Honeycomb Moray	30	3.6	16	8.1
Prionotus alatus	Spiny Searobin	29	0.9	8	4
Ogcocephalus parvus	Roughback Batfish	28	0.3	14	7.1
Bellator brachychir	Shortfin Searobin	28	0.1	8	4
Haemulon striatum	Striped Grunt	28	1	3	1.5
Saurida normani	Shortjaw Lizardfish	27	2.7	4	2
Xyrichtys novacula	Pearly Razorfish	27	1.5	9	4.5
Brevoortia patronus	Gulf Menhaden	25	2.9	11	5.6
Prionotus tribulus	Bighead Searobin	25	2.3	9	4.5
Nicholsina usta	Emerald Parrotfish	24	1.9	6	3
Bathyanthias mexicanus	Yellowtail Bass	24	0.2	7	3.5
Symphurus civitatium		23	0.5	9	4.5
Pagrus pagrus	Red Porgy	23	5.1	6	3
Neobythites gilli		21	0.1	4	2
Synodus intermedius	Sand Diver	21	2.1	9	4.5
Engyophrys senta	Spiny Flounder	21	0.1	9	4.5
Caulolatilus intermedius	Anchor Tilefish	20	1.6	8	4

Table 3. Species composition list (continued)

GENUS/SPECIES	COMMON NAME	TOTAL NUMBER CAUGHT	TOTAL WEIGHT CAUGHT (KG)	NUMBER OF TOWS WHERE CAUGHT	% FREQUENCY OCCURRENCE
Ancylopsetta ommata	Ocellated Flounder	20	3.4	16	8.1
Raja texana	Roundel Skate	19	6.7	15	7.6
Etropus microstomus	Smallmouth Flounder	19	0.2	3	1.5
Synagrops spinosa		17	0.3	1	0.5
Apogon affinis	Bigtooth Cardinalfish	14	0.1	5	2.5
Scomberomorus cavalla	King Mackerel	14	3.4	9	4.5
Antennarius radiosus	Big-eyed Frogfish	14	0.2	8	4
Eucinostomus harengulus	Tidewater Mojarra	13	0.7	1	0.5
Paralichthys lethostigma	Southern Flounder	13	7.1	10	5.1
Bollmannia communis	Ragged Goby	13	0	3	1.5
Echeneis naucrates	Sharksucker	13	8.1	9	4.5
Sphyrna tiburo	Bonnethead	13	10.5	9	4.5
Decodon puellaris	Red Hogfish	13	0.5	6	3
Caranx hippos	Crevalle Jack	12	0.7	4	2
Pristigenys alta	Short Bigeye	12	0.3	8	4
Rypticus maculatus	Whitespotted Soapfish	11	0.5	7	3.5
Chilomycterus schoepfii	Burrfish	11	4.6	9	4.5
Serranus notospilus	Saddle Bass	11	0	1	0.5
Urophycis floridana		10	0.9	4	2
Holacanthus bermudensis	Blue Angelfish	10	5.5	5	2.5
Neomerinthe hemingwayi	Spinycheek Scorpionfish	9	4.2	5	2.5
Saurida caribbaea	Smallscale Lizardfish	9	0.3	3	1.5
Gymnothorax nigromarginatus	Blackedge Moray	9	1.1	6	3
Urophycis regia	Spotted Codling	9	0.7	3	1.5
Antennarius ocellatus	Ocellated Frogfish	9	0.2	3	1.5
Etrumeus teres	Atlantic Red Herring	9	0.3	6	3
Hemicaranx amblyrhynchus	Bluntnose Jack	9	1.5	1	0.5
Sphyraena guachancho	Guaguanche	8	0.9	5	2.5
Monacanthus tuckeri	Slender Filefish	8	0.1	1	0.5
Pomacanthus arcuatus	Gray Angelfish	8	4	5	2.5
Mustelus sinusmexicanus	Gulf Smoothhound	8	7.7	6	3

Table 3. Species composition list (continued)

GENUS/SPECIES	COMMON NAME	TOTAL NUMBER CAUGHT	TOTAL WEIGHT CAUGHT (KG)	NUMBER OF TOWS WHERE CAUGHT	% FREQUENCY OCCURRENCE
Rypticus bistrispinus	Freckled Soapfish	8	0.2	6	3
Ogcocephalus corniger	Longnose Batfish	8	0.2	3	1.5
Apogon pseudomaculatus	Twospot Cardinalfish	7	0	5	2.5
Aluterus scriptus	Scrawled Filefish	7	1.1	6	3
Epinephelus morio	Red Grouper	7	1.9	4	2
Gymnachirus texae	Fringed Sole	7	0.1	7	3.5
Citharichthys gymnorhinus	Anglefin Whiff	7	0	3	1.5
Hoplunnis macrura	Freckled Pike-conger	7	0.1	6	3
Apogon aurolineatus	Bridle Cardinalfish	7	0	6	3
Ancylopsetta dilecta	Three-eye Flounder	7	0.3	5	2.5
Selene vomer	Lookdown	7	0.3	5	2.5
Serranus tortugarum	Chalk Bass	6	0	1	0.5
Paralichthys squamilentus	Broad Flounder	6	0.9	3	1.5
Hippocampus erectus	Lined Seahorse	6	0.1	5	2.5
Rhizoprionodon terraenovae	Atlantic Sharpnose Shark	6	10.8	6	3
Cryptotomus roseus	Bluelip Parrotfish	6	0.1	3	1.5
Ogcocephalus cubifrons		6	2.9	3	1.5
Etropus		5	0.1	1	0.5
Menticirrhus saxatilis	Gulf Minkfish	5	0.8	2	1
Urophycis cirrata	Gulf Hake	5	0.2	3	1.5
Chromis enchrysura	Yellowtail Reeffish	5	0.1	2	1
Holocentrus rufus	Longspine Squirrelfish	5	0.2	2	1
Ogcocephalus pantostictus	Spotted Batfish	5	2.7	5	2.5
Priacanthus arenatus	Bigeye	5	0.5	5	2.5
Calamus arctifrons	Grass Porgy	5	0.4	4	2
Bothus ocellatus	Eyed Flounder	4	0.3	1	0.5
Steindachneria argentea	Luminous Hake	4	0	1	0.5
Scomberomorus maculatus	Atlantic Spanish Mackerel	4	1.4	1	0.5
Gymnachirus melas	Naked Sole	4	0.1	3	1.5
Opsanus pardus	Leopard Toadfish	4	0.3	3	1.5
Calamus nodosus	Knobbed Porgy	3	1.3	2	1

Table 3. Species composition list (continued)

GENUS/SPECIES	COMMON NAME	TOTAL NUMBER CAUGHT	TOTAL WEIGHT CAUGHT (KG)	NUMBER OF TOWS WHERE CAUGHT	% FREQUENCY OCCURRENCE
Acanthostracion polygonius	Honeycomb Cowfish	3	2.4	1	0.5
Echiophis intertinctus	Spotted Spoon-nose Eel	3	0.5	2	1
Pseudupeneus maculatus	Spotted Goatfish	3	0.2	2	1
Mycteroperca phenax	Scamp	3	2.5	2	1
Pontinus longispinis	Longspine Scorpionfish	3	0	1	0.5
Trachinotus carolinus	Florida Pompano	3	0.9	3	1.5
Rachycentron canadum	Cobia	2	1.1	2	1
Paralichthys albigutta	Gulf Flounder	2	0.8	2	1
Echiophis punctifer	Snapper Eel	2	0.7	2	1
Lonchopisthus micrognathus	Swordtail Jawfish	2	0	2	1
Calamus bajonado	Jolthead Porgy	2	3.2	1	0.5
Lachnolaimus maximus	Hogfish	2	0.4	1	0.5
Ocyurus chrysurus	Yellowtail Snapper	2	0.5	1	0.5
Gobiesox strumosus	Skilletfish	2	0	2	1
Hypleurochilus		2	0	1	0.5
Sphoeroides nephelus	Southern Puffer	2	0.4	1	0.5
Eucinostomus argenteus	Spotfin Mojarra	2	0.1	2	1
Echeneis	Sharksuckers	2	2.2	1	0.5
Symphurus plagiusa	Blackcheek Tonguefish	2	0	2	1
Carcharhinus acronotus	Blacknose Shark	2	4.5	1	0.5
Calamus pennatula	Pluma	2	0.6	1	0.5
Sparisoma atomarium	Greenblotch Parrotfish	2	0	1	0.5
Diodon holocanthus	Balloonfish	2	0.4	1	0.5
Conodon nobilis	Barred Grunt	2	0.7	2	1
Dasyatis say	Bluntnose Stingray	2	1.3	2	1
Lophiodes reticulatus	Reticulate Goosefish	2	0.1	2	1
Hoplunnis diomediana	Blacktail Pike-conger	2	0	2	1
Halichoeres bathyphilus	Greenband Wrasse	1	0	1	0.5
Chilomycterus antennatus	Bridled Burrfish	1	0.2	1	0.5
Phaeoptyx pigmentaria	Dusky Cardinalfish	1	0	1	0.5
Antennarius striatus	Striated Frogfish	1	0	1	0.5

Table 3. Species composition list (continued)

GENUS/SPECIES	COMMON NAME	TOTAL NUMBER CAUGHT	TOTAL WEIGHT CAUGHT (KG)	NUMBER OF TOWS WHERE CAUGHT	% FREQUENCY OCCURRENCE
Sargocentron poco		1	0	1	0.5
Holocentrus adscensionis	Squirrelfish	1	0.4	1	0.5
Chromis insolatus		1	0	1	0.5
Muraena retifera	Reticulate Moray	1	0	1	0.5
Dasyatis americana	Southern Stingray	1	1.7	1	0.5
Neoepinnula americanus		1	0	1	0.5
Parablennius marmoreus	Seaweed Blenny	1	0	1	0.5
Aluterus monoceros	Unicorn Filefish	1	0.2	1	0.5
Sciaenops ocellatus	Red Drum	1	10	1	0.5
Hoplunnis		1	0	1	0.5
Halichoeres poeyi	Blackear Wrasse	1	0	1	0.5
Bregmaceros		1	0	1	0.5
Raja eglanteria	Clearnose Skate	1	1	1	0.5
Epigonus		1	0	1	0.5
Engyophrys		1	0	1	0.5
Pomatomus saltatrix	Bluefish	1	0.3	1	0.5
Gymnothorax kolpos	Blacktail Moray	1	0.6	1	0.5
Sphyraena borealis	Northern Sennet	1	0.1	1	0.5
Elops saurus	Ladyfish	1	0.6	1	0.5
Uraspis secunda	Cottonmouth Jack	1	0.1	1	0.5
Rhinoptera bonasus	Cownose Ray	1	2	1	0.5
Squatina dumeril	Atlantic Angel Shark	1	0.3	1	0.5
Ariomma bondi	Silver-rag	1	0	1	0.5
Canthigaster jamestyleri		1	0	1	0.5
Oligoplites saurus	Leatherjack	1	0	1	0.5
Paralepididae	Barracudinas	1	0	1	0.5
Narcine brasiliensis	Lesser Electric Ray	1	0.6	1	0.5
Opistognathus lonchurus	Moustache Jawfish	1	0	1	0.5
Peprilus paru	Harvestfish	1	0.1	1	0.5
Rhynchoconger		1	0.1	1	0.5
Physiculus fulvus	Hakeling	1	0	1	0.5

Table 3. Species composition list (continued)

GENUS/SPECIES	COMMON NAME	TOTAL NUMBER CAUGHT	TOTAL WEIGHT CAUGHT (KG)	NUMBER OF TOWS WHERE CAUGHT	% FREQUENCY OCCURRENCE
Lophius americanus	Goosefish	1	0.1	1	0.5
Trinectes maculatus	Hogchoker	1	0	1	0.5
Hemanthias aureorubens	Streamer Bass	1	0	1	0.5
Myliobatis freminvillii	Bullnose Ray	1	0.3	1	0.5
<u>Crustaceans</u>					
Farfantepenaeus aztecus	Brown Shrimp	7437	193.9	112	56.6
Portunus spinicarpus	Longspine Swimming Crab	3049	19.1	78	39.4
Callinectes similis	Lesser Blue Crab	2659	49.6	81	40.9
Sicyonia brevirostris	Brown Rock Shrimp	2165	34.6	54	27.3
Squilla empusa	Mantis Shrimp	1071	13.3	52	26.3
Litopenaeus setiferus	Northern White Shrimp	907	26.7	41	20.7
Solenocera vioscai	Humpback Shrimp	747	4.1	20	10.1
Farfantepenaeus duorarum	Northern Pink Shrimp	665	18.8	32	16.2
Portunus gibbesii	Iridescent Swimming Crab	414	8.4	49	24.7
Munida		203	0.1	4	2
Anasimus latus	Stilt Spider Crab	191	1.2	31	15.7
Squilla chydaea		169	1.1	32	16.2
Solenocera atlantidis	Dwarf Humpback Shrimp	160	0.2	13	6.6
Portunus spinimanus	Blotched Swimming Crab	155	6.2	42	21.2
Raninoides louisianensis	Gulf Frog Crab	138	1	31	15.7
Sicyonia dorsalis	Lesser Rock Shrimp	133	0.5	9	4.5
Metapenaeopsis goodei	Caribbean Velvet Shrimp	131	0.2	13	6.6
Portunus ordwayi		125	0.8	19	9.6
Parapenaeus politus	Deep-water Rose Shrimp	105	0.2	11	5.6
Stenorhynchus seticornis	Yellowline Arrow Crab	103	0.3	37	18.7
Calappa sulcata	Yellow Box Crab	102	19.5	34	17.2
Rimapenaeus similis	Roughback Shrimp	70	0.2	22	11.1
Sicyonia typica	Kinglet Rock Shrimp	39	0.2	2	1
Callinectes sapidus	Blue Crab	37	5.5	21	10.6

Table 3. Species composition list (continued)

GENUS/SPECIES	COMMON NAME	TOTAL NUMBER CAUGHT	TOTAL WEIGHT CAUGHT (KG)	NUMBER OF TOWS WHERE CAUGHT	% FREQUENCY OCCURRENCE
Rimapenaeus constrictus		34	0.1	8	4
Leiolambrus nitidus	White Elbow Crab	34	0.1	12	6.1
Mesopenaeus tropicalis	Salmon Shrimp	31	0.1	2	1
Scyllarides nodifer	Ridged Slipper Lobster	30	7.1	12	6.1
Myropsis quinquespinosa	Fivespine Purse Crab	28	0.1	14	7.1
Scyllarus chacei	Chace Slipper Lobster	28	0.1	13	6.6
Iliacantha liodactylus		23	0.1	5	2.5
Gibbesia neglecta		20	0.1	5	2.5
Hepatus epheliticus	Calico Box Crab	20	1.2	13	6.6
Cryptodromiopsis antillensis	Decorator Crab	17	0.1	10	5.1
Persephona crinita	Pink Purse Crab	17	0.1	8	4
Squilla rugosa		16	0.1	1	0.5
Pseudorhombila quadridentata	Flecked Squareback Crab	15	0.1	10	5.1
Scyllarus depressus	Scaled Slipper Lobster	13	0	2	1
Plesionika longicauda		12	0	5	2.5
Porcellana sayana	Spotted Porcelain Crab	12	0	2	1
Calappa flammea	Flame Box Crab	12	2.1	9	4.5
Dardanus insignis	Red Brocade Hermit	9	0	5	2.5
Libinia emarginata	Portly Spider Crab	9	0.7	6	3
Euphrosynoplax clausa	Craggy Bathyal Crab	9	0.1	8	4
Sicyonia burkenroadi	Spiny Rock Shrimp	9	0	5	2.5
Stenocionops furcatus	Furcate Spider Crab	8	0.2	6	3
Mithrax		7	0	2	1
Pseudomedaeus agassizii	Rough Rubble Crab	7	0	3	1.5
Persephona mediterranea	Mottled Purse Crab	7	0	7	3.5
Sicyonia parri		7	0	5	2.5
Paguristes triangulatus		7	0	5	2.5
Petrochirus diogenes	Giant Hermit	7	0.1	4	2
Petrolisthes armatus	Green Porcelain Crab	7	0	1	0.5
Xanthidae	Mud Crabs	6	0	4	2
Leiolambrus granulosus		6	0	2	1

Table 3. Species composition list (continued)

GENUS/SPECIES	COMMON NAME	TOTAL NUMBER CAUGHT	TOTAL WEIGHT CAUGHT (KG)	NUMBER OF TOWS WHERE CAUGHT	% FREQUENCY OCCURRENCE
Pagurus bullisi		6	0	5	2.5
Pilumnus sayi	Spineback Hairy Crab	5	0	4	2
Lysmata wurdemanni	Peppermint Shrimp	5	0	1	0.5
Paguristes sericeus	Blue-eye Hermit	5	0	2	1
Acanthocarpus alexandri	Gladiator Box Crab	5	0	2	1
Solenocera necopina	Deepwater Humpback Shrimp	4	0	1	0.5
Macrocoeloma		4	0	3	1.5
Portunus floridanus		4	0	2	1
Panulirus argus	Caribbean Spiny Lobster	4	3.4	3	1.5
Alpheidae	Snapping Shrimps	4	0	4	2
Palicus		3	0	1	0.5
Collodes		3	0	3	1.5
Plesionika edwardsii	Soldier Striped Shrimp	3	0	1	0.5
Dardanus fucosus	Bareye Hermit	3	0	2	1
Stenocionops spinimanus	Prickly Spider Crab	3	1	2	1
Lysiosquilla scabricauda		2	0.2	2	1
Munida forceps		2	0	1	0.5
Porcellana sigsbeiana	Striped Porcelain Crab	2	0	1	0.5
Petrolisthes galathinus	Banded Porcelain Crab	2	0	2	1
Decapoda	Crabs	2	0	1	0.5
Stenocionops		2	0	2	1
Pagurus impressus	Dimpled Hermit	2	0	1	0.5
Stenocionops furcatus coelatus		2	0	2	1
Portunus		2	0	1	0.5
Podochela		2	0	2	1
Majidae	Spider Crabs	1	0	1	0.5
Albunea gibbesii	Surf Mole Crab	1	0	1	0.5
Raninoides loevis	Furrowed Frog Crab	1	0	1	0.5
Podochela riisei	Longfinger Neck Crab	1	0	1	0.5
Platylambrus granulata	Bladetooth Elbow Crab	1	0	1	0.5
Stenopus scutellatus	Golden Coral Shrimp	1	0	1	0.5

Table 3. Species composition list (continued)

GENUS/SPECIES	COMMON NAME	TOTAL NUMBER CAUGHT	TOTAL WEIGHT CAUGHT (KG)	NUMBER OF TOWS WHERE CAUGHT	% FREQUENCY OCCURRENCE
Pagurus pollicaris	Flatclaw Hermit	1	0	1	0.5
Podochela sidneyi	Shortfinger Neck Crab	1	0	1	0.5
Isopoda	Isopods	1	0	1	0.5
Cyclozodion angustum	Nodose Box Crab	1	0	1	0.5
Glyptoxanthus erosus	Eroded Mud Crab	1	0	1	0.5
Danielum ixbauchac		1	0	1	0.5
Scyllarides delfosi	Three-spot Slipper Lobster	1	0	1	0.5
Paguristes hummi		1	0	1	0.5
Others					
Amusium papyraceum	Paper Scallop	5409	75.1	48	24.2
Doryteuthis plei	Arrow Squid	1686	22.9	64	32.3
Doryteuthis pealeii	Longfin Inshore Squid	514	16.1	56	28.3
Pitar cordatus	Corded Pitar	403	8.4	26	13.1
Lolliguncula brevis	Atlantic Brief Squid	312	2.6	20	10.1
Anadara baughmani	Skewed Ark	234	3.8	13	6.6
Polystira tellea	Delicate Giant-turris	138	1.2	17	8.6
Lirophora clenchi		99	1.3	10	5.1
Laevicardium laevigatum	Eggcockle	71	1.6	3	1.5
Austraeolis		37	12.4	1	0.5
Octopus vulgaris	Common Octopus	36	3.8	23	11.6
Nudibranchia	Nudibranchs	33	0.5	3	1.5
Polystira albida	White Giant-turris	29	0.3	9	4.5
Argopecten gibbus	Atlantic Calico Scallop	28	0.2	8	4
Sconsia striata	Royal Bonnet	27	0.5	8	4
Gastropoda	Gastropods	24	0.4	7	3.5
Distorsio clathrata	Atlantic Distorsio	19	0.2	7	3.5
Laevicardium mortoni	Yellow Eggcockle	16	0.4	9	4.5
Conus austini		15	0.2	4	2
Arcinella cornuta	Florida Spiny Jewelbox	11	0	1	0.5

Table 3. Species composition list (continued)

GENUS/SPECIES	COMMON NAME	TOTAL NUMBER CAUGHT	TOTAL WEIGHT CAUGHT (KG)	NUMBER OF TOWS WHERE CAUGHT	% FREQUENCY OCCURRENCE
Macoma brevifrons	Short Macoma	9	0.2	4	2
Pectinidae		7	0	1	0.5
Doryteuthis		6	0	2	1
Euvola raveneli		5	0	3	1.5
Atrina seminuda	Half-naked Penshell	5	0	2	1
Anadara transversa	Transverse Ark	5	0.3	2	1
Atrina serrata	Sawtooth Penshell	5	0.5	2	1
Pomacea		4	0	1	0.5
Tonna galea	Giant Tun	4	0.7	3	1.5
Cantharus cancellarius	Cancellate Cantharus	4	0	3	1.5
Ficus communis	Atlantic Figsnail	3	0.2	3	1.5
Argopecten		3	0	1	0.5
Anadara ovalis	Blood Ark	2	0	1	0.5
Spondylus americanus	Atlantic Thorny Oyster	2	0.5	2	1
Lindapecten muscosus	Rough Scallop	2	0	1	0.5
Hexaplex fulvescens	Giant Eastern Murex	2	0	2	1
Narcissia trigonaria		2	0.2	2	1
Pteria colymbus	Atlantic Wing-oyster	2	0.1	1	0.5
Latirus infundibulum	Brown-line Latirus	1	0	1	0.5
Globivenus rigida	Rigid Venus	1	0	1	0.5
Pisidiidae	Peaclams	1	0	1	0.5
Cymatium parthenopeum	Giant Triton	1	0	1	0.5
Fasciolaria lilium	Banded Tulip	1	0	1	0.5

Table 4. 2016 Bottom Longline Survey species composition list. Species with no weight recorded were too large to measure.

GENUS/SPECIES	COMMON NAME	TOTAL NUMBER CAUGHT	TOTAL NUMBER WEIGHED	TOTAL WEIGHT
Finfishes				
Bagre marinus	Gafftopsail Catfish	646	591	919.55
Carcharhinus limbatus	Blacktip Shark	511	405	6466.26
Rhizoprionodon terraenovae	Atlantic Sharpnose Shark	333	283	854.78
Carcharhinus leucas	Bull Shark	272	214	4344.92
Sciaenops ocellatus	Red Drum	258	232	2137.16
Carcharhinus brevipinna	Spinner Shark	144	135	1019.93
Dasyatis americana	Southern Stingray	107	12	408.94
Carcharhinus isodon	Finetooth Shark	35	29	264.96
Unid.fish		26	2	23.6
Ariopsis felis	Hardhead Catfish	17	13	5.8
Negaprion brevirostris	Lemon Shark	12	8	450.1
Carcharhinus acronotus	Blacknose Shark	7	7	63.6
Pogonias cromis	Black Drum	5	5	47.56
Carcharhinidae	Requiem Sharks	5	0	
Sphyrna mokarran	Great Hammerhead	5	2	40
Rachycentron canadum	Cobia	4	3	8.8
Sphyrna tiburo	Bonnethead	3	2	2.9
Caranx hippos	Crevalle Jack	3	2	19.56
Caretta caretta	Loggerhead	3	1	57.6
Remora remora	Common Remora	2	2	2.7
Scomberomorus maculatus	Atlantic Spanish Mackerel	2	2	0.86
Galeocerdo cuvier	Tiger Shark	2	1	31.4
Lepidochelys kempii	Atlantic Ridley	2	2	24.2
Dasyatis say	Bluntnose Stingray	2	0	
Echeneidae	Remoras	1	0	
Carcharhinus falciformis	Silky Shark	1	1	5.6
Dasyatis sabina	Atlantic Stingray	1	1	5
Trachichthyidae	Redfishes	1	1	0.2

Table 4. 2016 Bottom Longline Survey species composition list. Species with no weight recorded were too large to measure.

GENUS/SPECIES	COMMON NAME	TOTAL NUMBER CAUGHT	TOTAL NUMBER WEIGHED	TOTAL WEIGHT
Dasyatis centroura	Clam Cracker	1	1	17.6

Table 5. 2016 Vertical Line Survey species composition list. Species with no weight recorded were too large to measure.

GENUS/SPECIES	COMMON NAME	TOTAL NUMBER CAUGHT	TOTAL NUMBER WEIGHED	TOTAL WEIGHT
Finfishes				
Lutjanus campechanus	Red Snapper	804	797	1277.81
Balistes capriscus	Gray Triggerfish	19	19	31.99
Pagrus pagrus	Red Porgy	18	18	17.84
Cynoscion arenarius	Sand Seatrout	12	12	4.14
Pristipomoides aquilonaris	Wenchman	10	10	1.58
Ariopsis felis	Hardhead Catfish	8	6	1.36
Sciaenops ocellatus	Red Drum	7	7	34.64
Rhomboplites aurorubens	Vermilion Snapper	7	7	3.53
Carcharhinus brevipinna	Spinner Shark	5	0	
Lutjanus synagris	Lane Snapper	4	4	3.57
Rhizoprionodon terraenovae	Atlantic Sharpnose Shark	3	3	4.74
Caranx crysos	Blue Runner	3	1	1.04
Bagre marinus	Gafftopsail Catfish	3	2	1.74
Seriola rivoliana	Almaco Jack	2	2	1.38
Cynoscion nebulosus	Spotted Seatrout	2	2	1.03
Mycteroperca phenax	Scamp	2	2	4.08
Pomatomus saltatrix	Bluefish	1	0	
Seriola fasciata	Lesser Amberjack	1	1	1.3
Seriola dumerili	Greater Amberjack	1	1	4.36
Lutjanus griseus	Gray Snapper	1	1	0.79
Sphyraena guachancho	Guaguanche	1	1	0.32

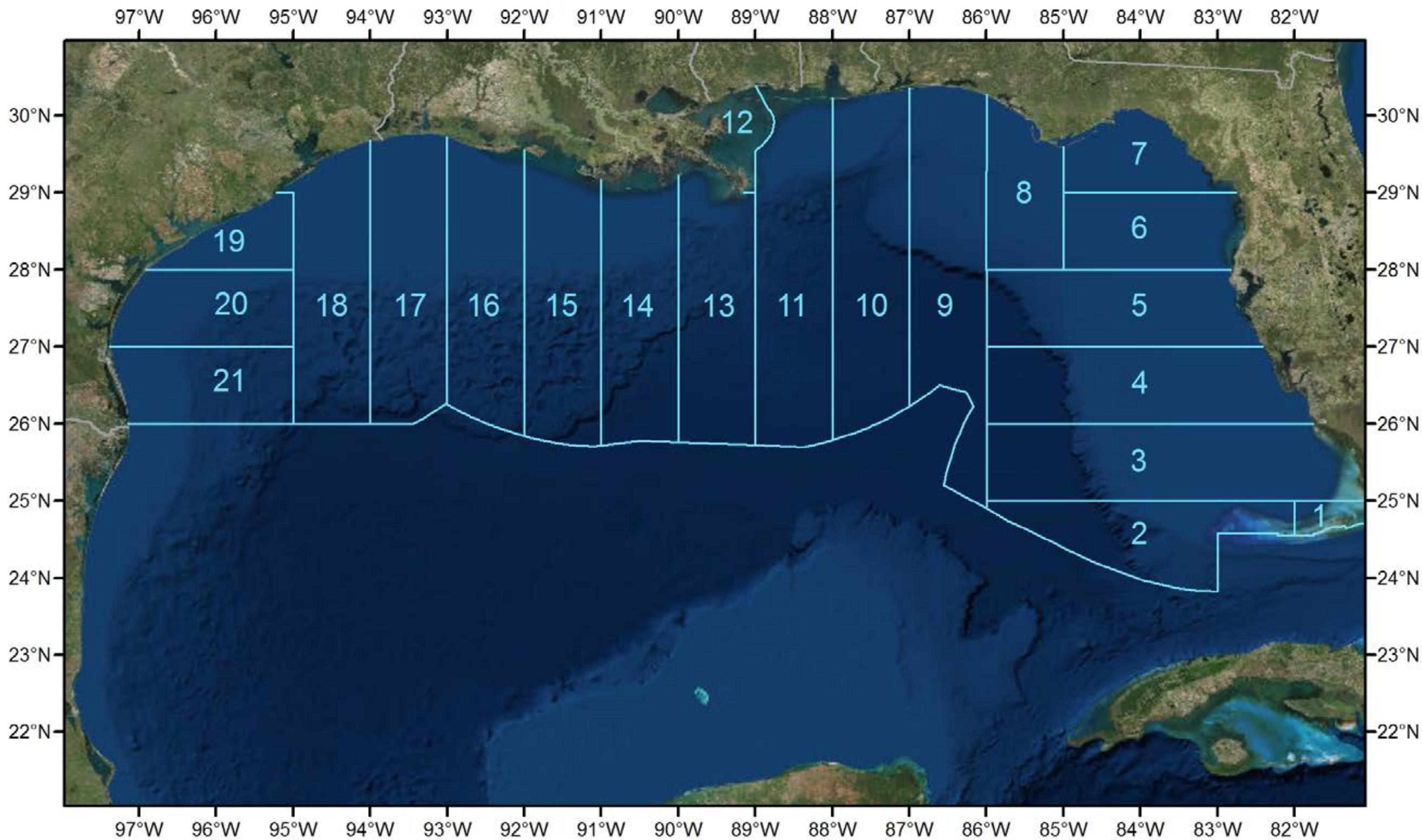

Figure 1. Statistical zones for shrimp in the Gulf of Mexico.

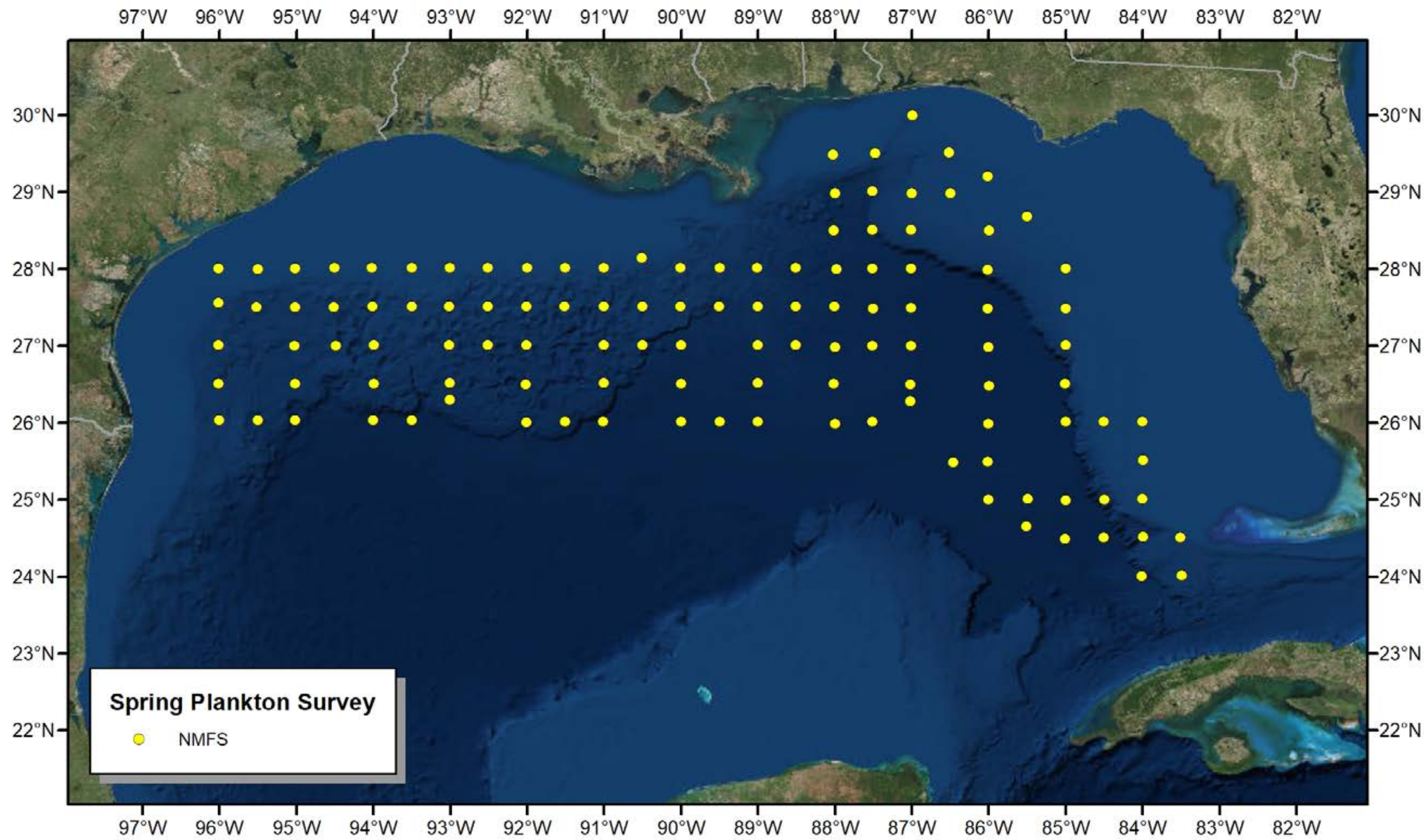

Figure 2. Locations of plankton and environmental stations during the 2016 Spring Plankton Survey.

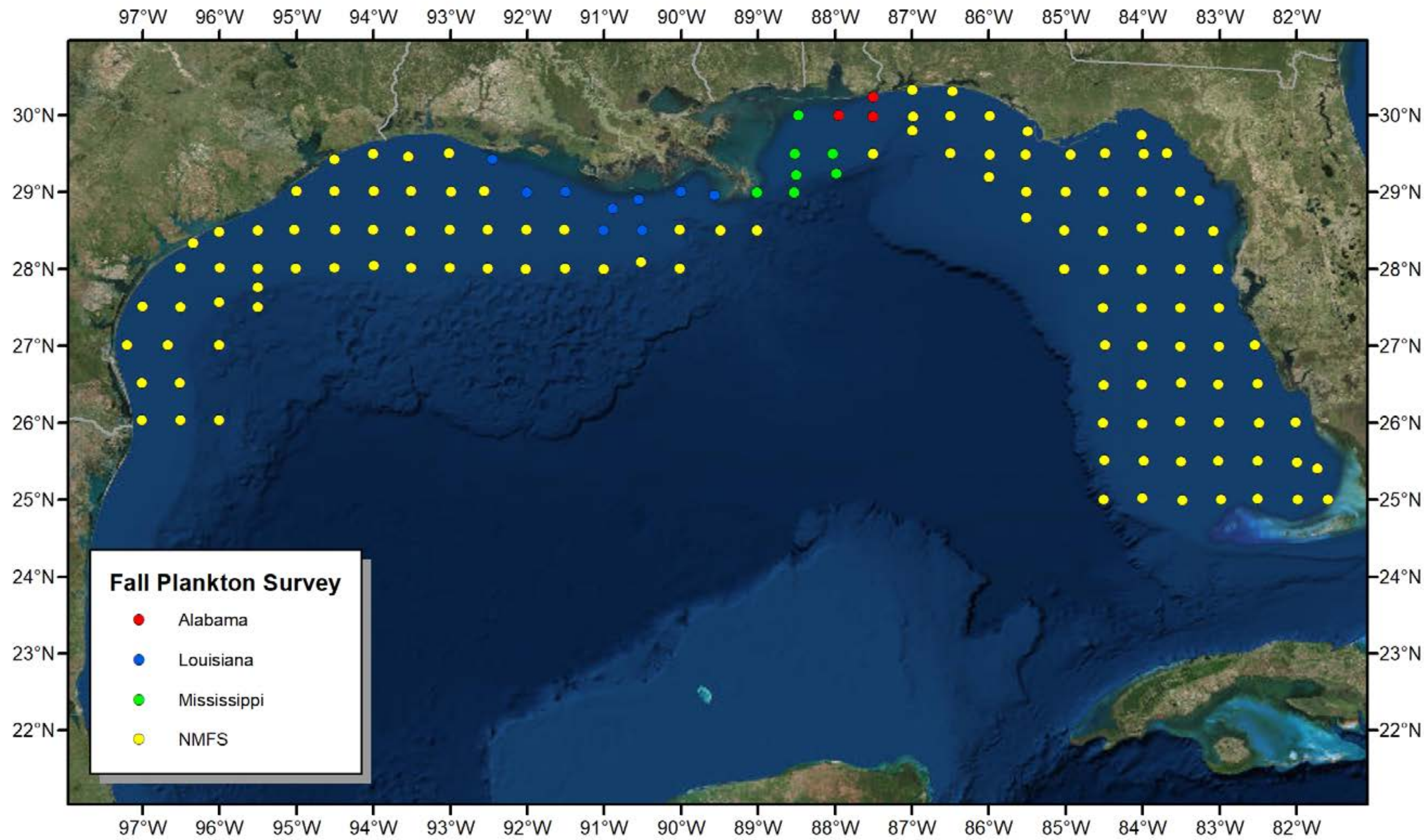

Figure 3. Locations of stations during the 2016 Fall Plankton Survey.

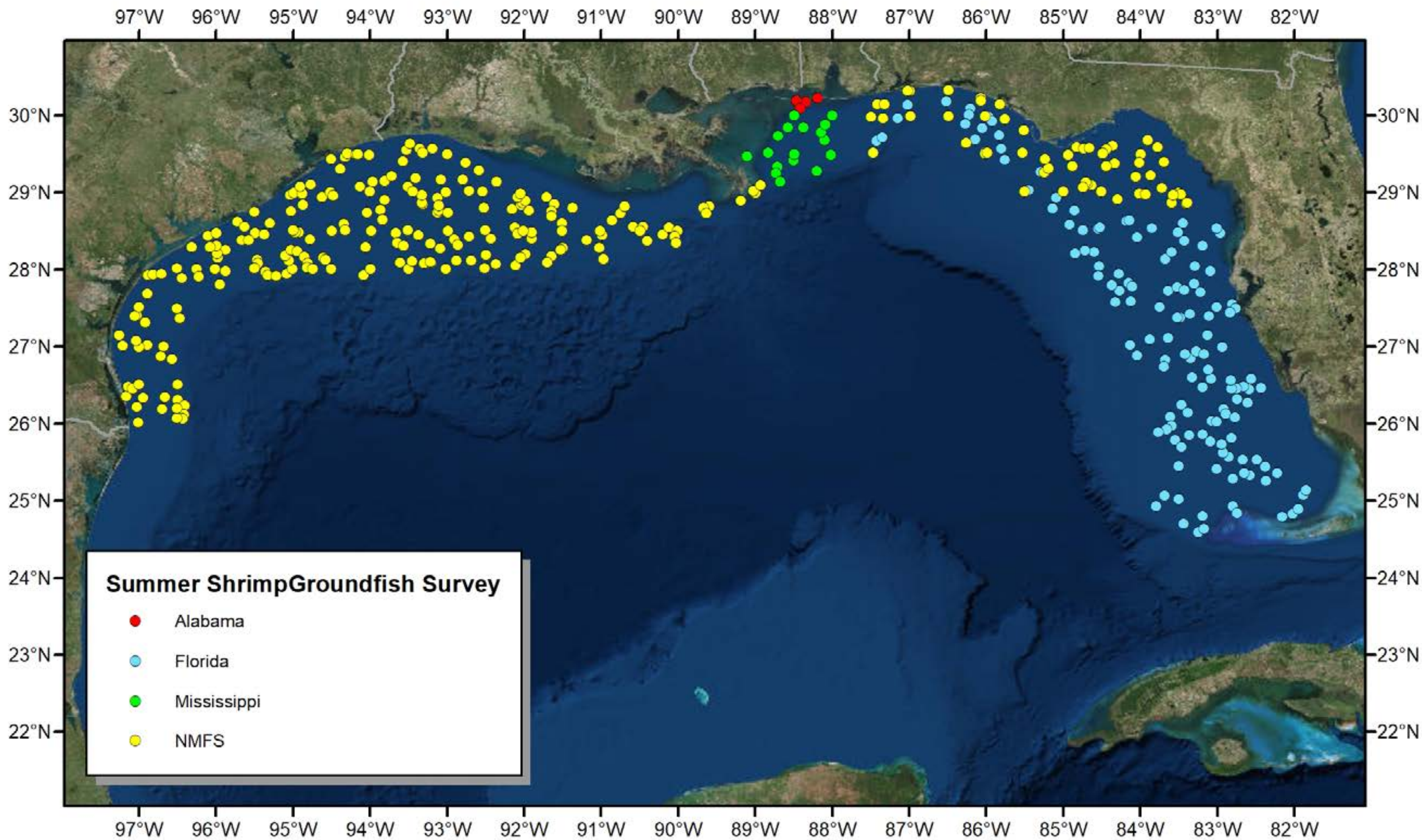

Figure 4. Locations of stations during the 2016 Summer Shrimp/Groundfish Survey.

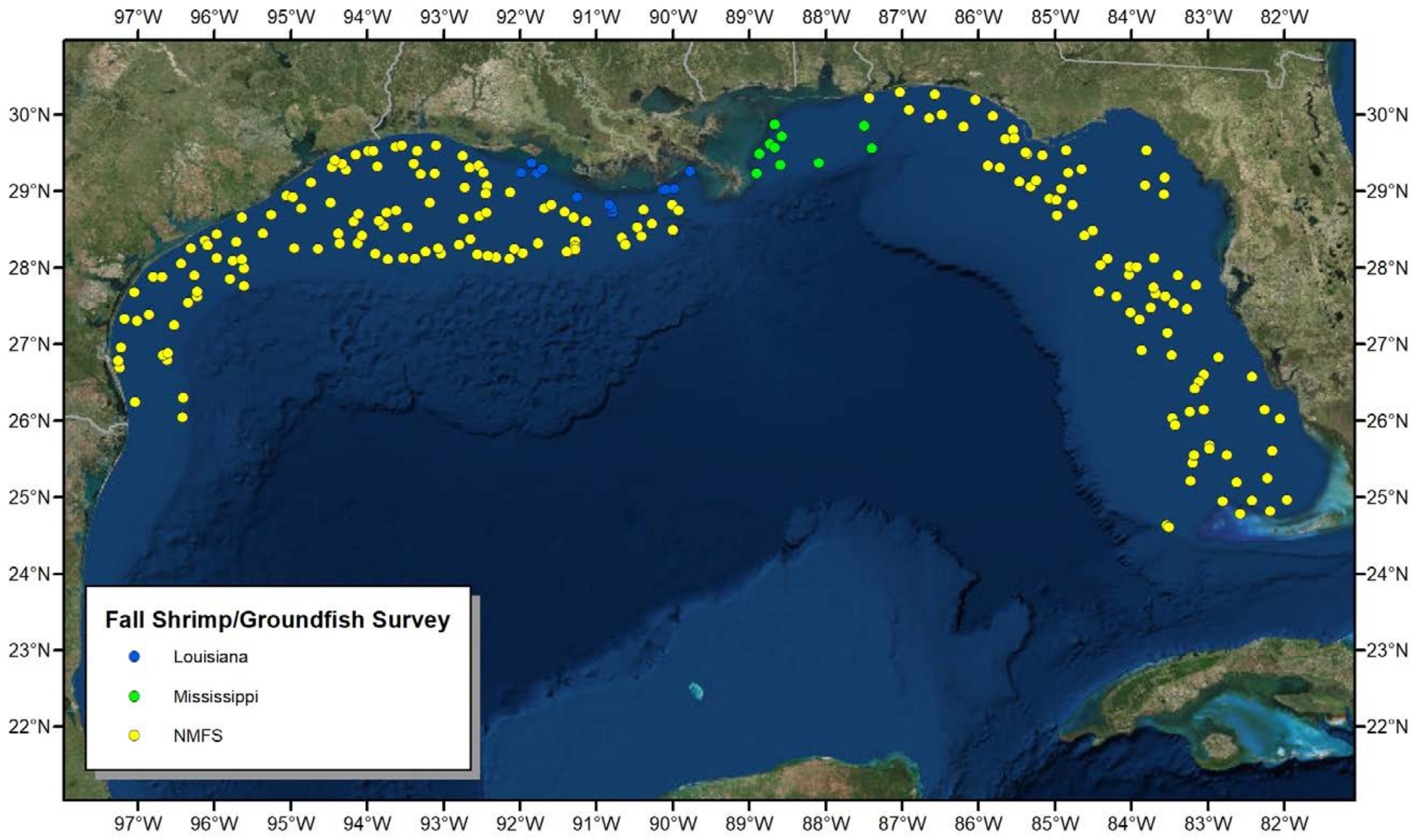

Figure 5. Locations of stations during the 2016 Fall Shrimp/Groundfish Survey.

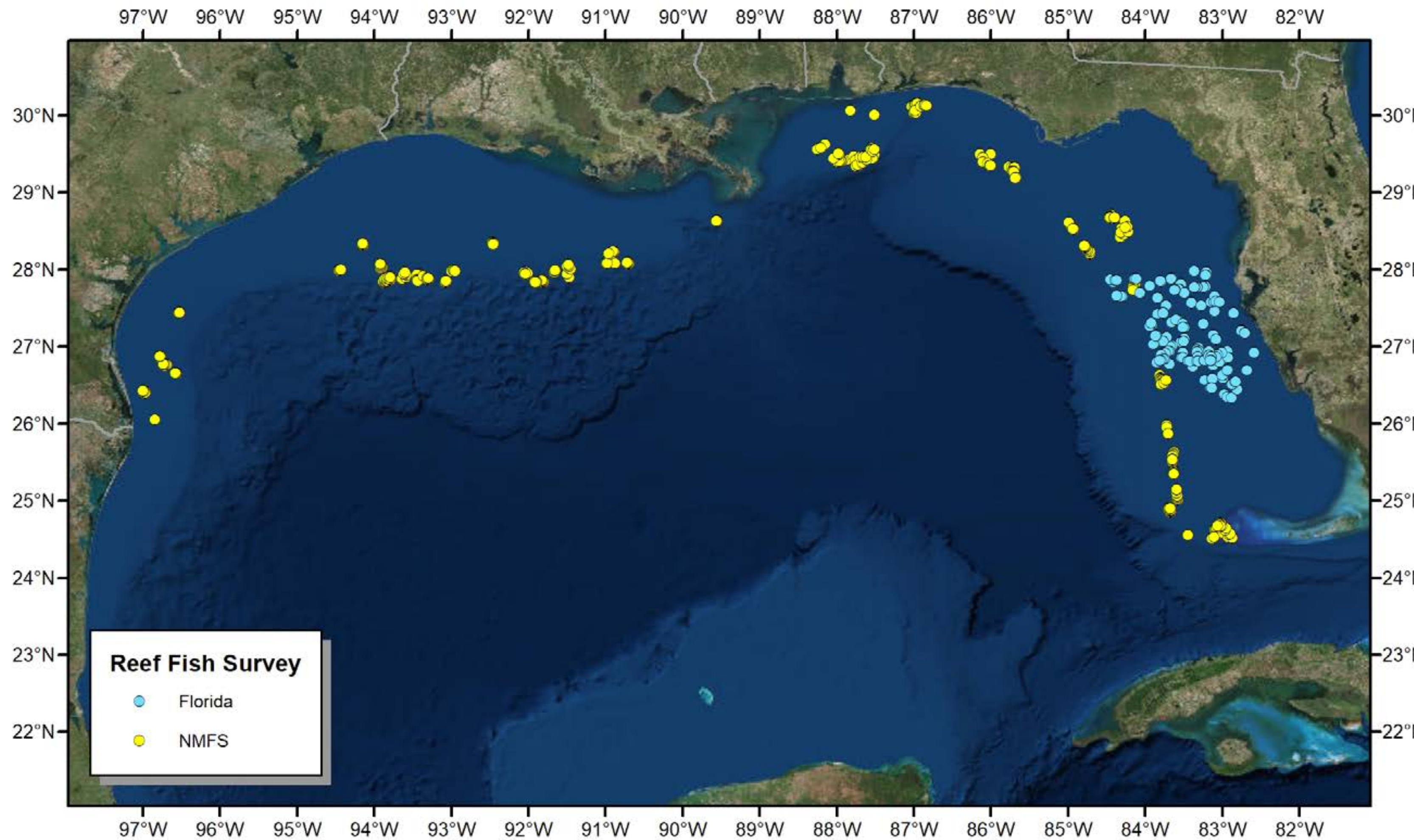

Figure 6. Locations of stations during the 2016 Reef Fish Survey.

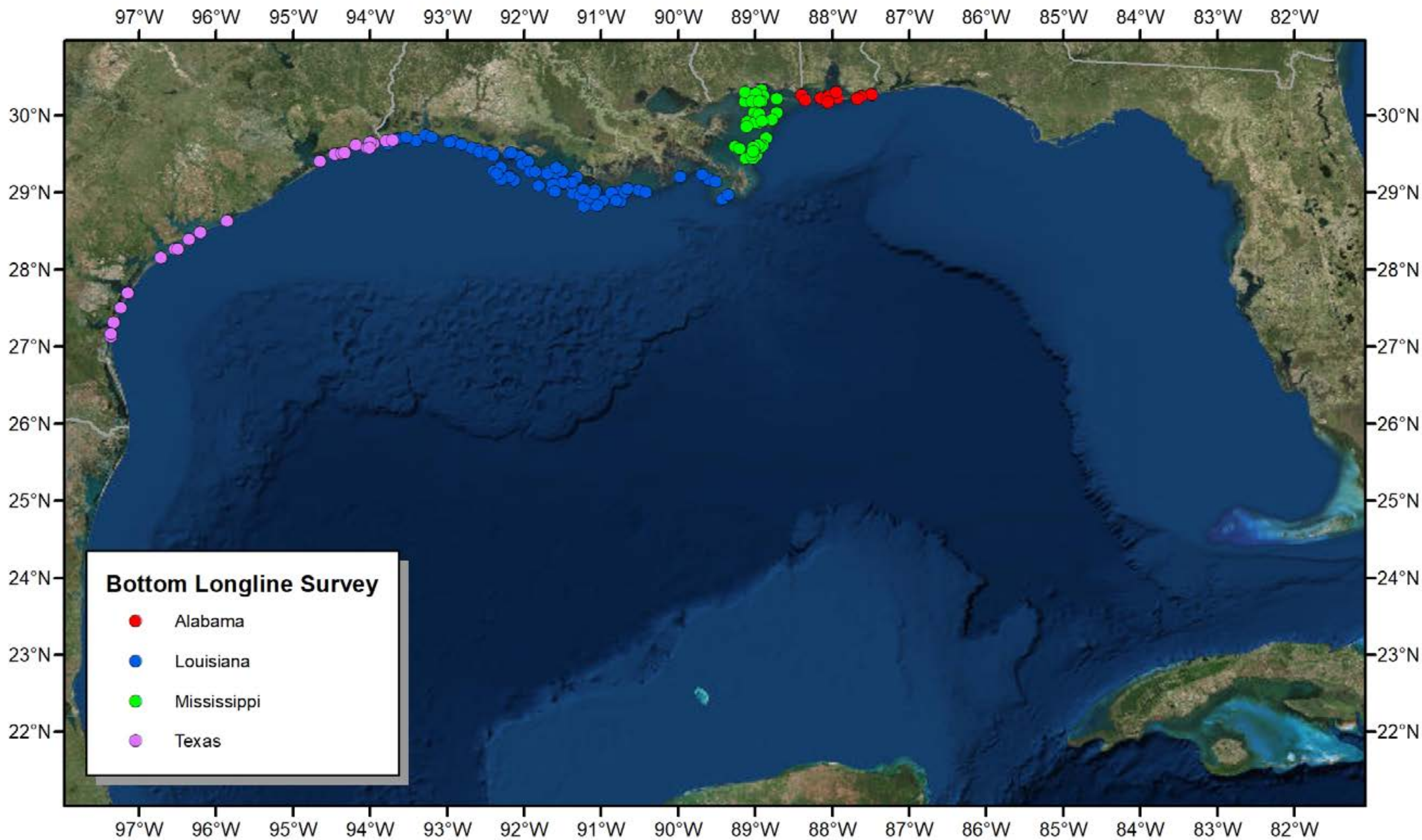

Figure 7. Locations of stations during the 2016 Bottom Longline Survey.

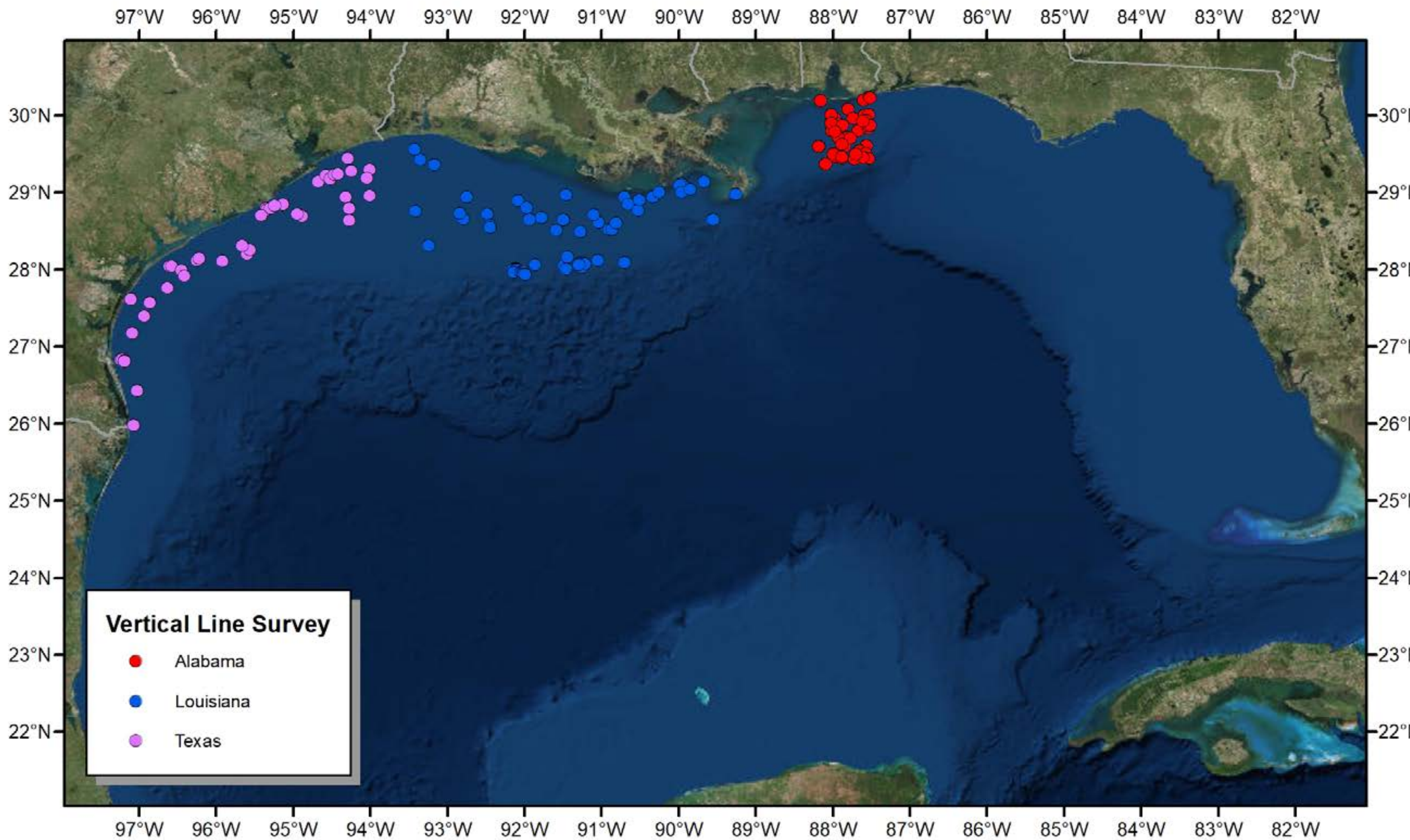

Figure 8. Locations of stations during the 2016 Vertical Line Survey.