



ANNUAL REPORT

OF THE
SOUTHEAST AREA MONITORING
AND ASSESSMENT PROGRAM
(SEAMAP)

OCTOBER 1, 2014 - SEPTEMBER 30, 2015

SEAMAP - Gulf of Mexico
Gulf States Marine Fisheries Commission

SEAMAP - South Atlantic
Atlantic States Marine Fisheries Commission

SEAMAP - Caribbean
Puerto Rico Sea Grant College Program

JOINT ANNUAL REPORT

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Southeast Area Monitoring and Assessment Program

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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 and information in the southeastern United States. The program presently consists of three operational components: SEAMAP-Gulf of Mexico, which began in 1981; SEAMAP-South Atlantic, implemented in 1983; and SEAMAP-Caribbean, formed in 1988.

Each SEAMAP component operates independently, planning and conducting surveys and information dissemination in accordance with administrative policies and guidelines of the National Marine Fisheries Service's Southeast Regional Office (SERO). Agencies and organizations directly involved with SEAMAP are shown in Table 1.

Federal programmatic funding for SEAMAP activities and administration was appropriated in Federal Fiscal Years 1985-2015. Funding allocations to participants for FY1985-FY2015 were handled through State/Federal cooperative agreements, administered by SERO and the Southeast Fisheries Science Center (SEFSC), National Marine Fisheries Service (NMFS).

This report provides an overview of the SEAMAP Gulf, South Atlantic, and Caribbean programs. It outlines the program management, resource survey operations, information services activities, and publications for FY2015 and proposed activities for FY2016.

PROGRAM MANAGEMENT

Activities and operations of each SEAMAP component are wholly defined by the respective managing units: the SEAMAP-Gulf Subcommittee of the Gulf States Marine Fisheries Commission's (GSMFC) Technical Coordinating Committee, the SEAMAP-South Atlantic Committee of the Atlantic States Marine Fisheries Commission's South Atlantic State-Federal Fisheries Management Board, and the SEAMAP-Caribbean Committee of the University of Puerto Rico Sea Grant College Program. The Gulf and South Atlantic committees consist of designated representatives from each member state, NMFS, and the Gulf of Mexico and South Atlantic Fishery Management Councils. In addition, the SEAMAP-South Atlantic committee includes a representative from the Atlantic States Marine Fisheries Commission (ASMFC). The Caribbean component consists of members from the Puerto Rico Department of Natural and Environmental Resources, Virgin Islands Department of Planning and Natural Resources, Puerto Rico Sea Grant College Program, NMFS, U.S. Fish and Wildlife Service, and Caribbean Fishery Management Council. Each committee meets yearly to review operations, examine priorities, and plan future activities. Daily operations are carried out by the respective SEAMAP coordinators, assisted by staffs of the two Commissions and Puerto Rico Sea Grant College Program and personnel associated with the SEAMAP Information System, SEAMAP-South Atlantic Data Management System (DMS), SEAMAP Archiving Center, SEAMAP Invertebrate Plankton Archiving Center (SIPAC), and the Southeast Regional Taxonomic Center (SERTC).

SEAMAP-Gulf of Mexico

Major SEAMAP-Gulf Subcommittee meetings were held in October 2014 and March 2015 in conjunction with the Annual Meeting of the GSMFC. All meetings included participation by various work group leaders, the Coordinator, the Program Monitor, and other GSMFC staff. Representatives from the Gulf program also met with the South Atlantic and Caribbean representatives in August 2015 to discuss respective program needs and priorities for FY2016.

TABLE 1.

SEAMAP ORGANIZATION		
Program	Administering Organization	Participating Agencies
SEAMAP-Gulf of Mexico	Gulf States Marine Fisheries Commission	Alabama Department of Conservation and Natural Resources Florida Fish and Wildlife Conservation Commission Louisiana Department of Wildlife and Fisheries Mississippi Department of Marine Resources/USM/Gulf Coast Research Laboratory Texas Parks and Wildlife Department National Marine Fisheries Service/Southeast Fisheries Science Center Gulf of Mexico Fishery Management Council
SEAMAP-South Atlantic	Atlantic States Marine Fisheries Commission	Florida Fish and Wildlife Conservation Commission Georgia Department of Natural Resources North Carolina Department of Environment and Natural Resources South Carolina Department of Natural Resources National Marine Fisheries Service/Southeast Fisheries Science Center South Atlantic Fishery Management Council U.S. Fish and Wildlife Service Atlantic States Marine Fisheries Commission
SEAMAP-Caribbean	Puerto Rico Sea Grant College Program	Puerto Rico Department of Natural and Environmental Resources Puerto Rico Sea Grant College Program Virgin Islands Division of Fish and Wildlife National Marine Fisheries Service/Southeast Fisheries Science Center U.S. Fish and Wildlife Service Caribbean Fishery Management Council

Coordination of program surveys and distribution of quick-report summaries of a Gulf-wide survey to management agencies and industry were major functions of SEAMAP management in 2015. Other important management activities included coordinating data provision and specimen loans, preparing publications and documents, and assisting in the preparation of State/Federal cooperative agreements, including amendments to permit extension of activities previously not detailed in the agreements.

SEAMAP-South Atlantic

Three committee meetings and several conference calls were held in FY2015. Additional tasks included fulfilling data requests, preparation of annual program reports and State/Federal Cooperative Agreements, and distribution of publications.

The SEAMAP-South Atlantic Committee held their annual meeting August 10-11th, 2015, prior to the joint annual meeting. The meeting included participation by the work group leaders and coordinator. The Committee developed the SEAMAP-South Atlantic (SEAMAP-SA) budget and research program priorities for FY2016. The Committee also reviewed progress by the Crustacean, Data Management, Bottom Mapping, Coastal Survey, and Fish Habitat Characterization and Assessment Work Groups and provided direction where necessary. The major discussions centered on the development of the 2016-2020 Management Plan and budget constraints moving forward.

SEAMAP-Caribbean

During FY2015, liaison activities included data collection and management and dissemination of fishery independent data. Five SEAMAP-Caribbean (SEAMAP-C) committee meetings and one conference call were coordinated alternately in Puerto Rico and the US Virgin Islands (USVI). The purpose of these meetings was to review programmatic surveys carried out in Puerto Rico and the USVI concerning conch, lobster, and reef fish populations. The five committee meetings were held on the following dates: December 12 in Puerto Rico, March 13 in St. Thomas, July 10 in Puerto Rico, August 11 in Ocean Springs, MS, and September 2 in St. Thomas. A conference call was held on September 11. In addition, the SEAMAP-C committee members participated in the SEAMAP joint annual meeting held on August 12 in Ocean Springs, MS.

As part of the coordination section efforts, two SEAMAP-C posters and educational brochures on conch, whelk, lobster, and reef fish were distributed as outreach materials. The color posters entitled “SEAMAP-Caribbean in Puerto Rico” and “SEAMAP-Caribbean in the Virgin Islands”, summarized the main studies of SEAMAP in each region. These posters have been used during several fisheries workshops for fishermen and other targeted groups in Puerto Rico. They also have been given to the general public during visits to coastal communities. These materials have been updated to include the results from the most recent surveys. Lastly, a new printout is on order and scheduled to begin in early 2016.

During this reporting period, a PhD graduate student was contracted to continue updating the Caribbean sampling protocols and to summarize the information from all projects conducted by the Caribbean program. All SEAMAP-C study reports, including the Caribbean sampling protocols and related information has been made available for public dissemination at the blog site <http://prsgfisheriesoutreach.wordpress.com>. The main goal was to have a clear and uniform sampling protocol and to make the information accessible for dissemination and outreach.

A Master’s Degree graduate student from the Department of Marine Sciences (DMS), was hired through a part-time contract, to provide professional services with the ROV during fish spawning aggregation samplings and to provide collaboration on other SEAMAP-C sampling, equipment maintenance, and hydro-acoustic bottom data-loggers deployment and retrieval. In addition, a DMS student assistantship was provided to conduct post-processing of hydro-acoustic bottom data-loggers data collected at fish spawning aggregations in Puerto Rico and the USVI. Courtship associated sounds were recorded by four data-loggers in Puerto Rico and three in the USVI. The Virgin Islands’ data-loggers were deployed at the Grammanik Bank and the historic Nassau-Hind Bank site in St.

Thomas, and Lang Bank in St. Croix. The Puerto Rico data-loggers were deployed at two different depths at the “Bajo de Cico” and “Abrir la Sierra” fish spawning grounds. Two DMS Master Thesis using SEAMAP-C data were successfully defended; one based on the Puerto Rico conch survey and a second based on hydro-acoustic data collected from the Nassau Grouper (*Epinephelus striatus*) spawning aggregations in Puerto Rico and the USVI. The titles of these theses are: “Effectiveness of management regulation and update analysis of population health and trends of Queen Conch (*Strombus gigas*) in Puerto Rico”, and “Use of Passive Acoustic Recordings to Quantify Abundance Relationship from Courtship Associated Sounds of the Nassau Grouper (*Epinephelus striatus*) at Spawning Aggregation Sites in Puerto Rico and the US Virgin Islands”. Currently, the most recent hydro-acoustic data is under post-processing evaluation for monitoring the sound production of Red Hind (*Epinephelus guttatus*) at spawning aggregation sites in the Caribbean (Puerto Rico & USVI). In addition, the hydro-acoustic bottom data-loggers are being prepared for deployment during the start of the next fish spawning aggregation season in December 2015.

RESOURCE SURVEYS

In FY2015, collection of resource survey information continued for the thirty-fourth consecutive year. Surveys by each program component reflect distinct regional needs and priorities; however, survey operations in one geographic area often provide information useful to researchers in all three regions. Because of the diverse scope and target species involved in the SEAMAP survey operations, activities are discussed here by geographic region.

SEAMAP-Gulf of Mexico

Fall Shrimp/Groundfish Survey

The Fall Shrimp/Groundfish Survey was conducted from October 1 to November 26, 2014 from off southwest Florida to the U.S.-Mexican border. Two hundred ninety-one trawl stations were sampled during the survey. Vessels sampled waters out to 60 fm with trawls and plankton nets in addition to environmental sampling. While not funded by SEAMAP, Florida did participate in the Fall Shrimp/Groundfish Survey and collected data at one hundred thirty-six trawl stations. The objectives of the survey were to sample the northern Gulf of Mexico to determine abundance and distribution of demersal organisms from inshore waters to 60 fm; obtain length-frequency measurements for major finfish and shrimp species to determine population size structures; collect environmental data to investigate potential relationships between abundance and distribution of organisms and environmental parameters; and collect ichthyoplankton samples to determine relative abundance and distribution of eggs and larvae of commercially and recreationally important fish species.

NOAA Fisheries, Mississippi, and Louisiana vessels collected ichthyoplankton data at 65 stations with bongo and/or neuston nets at sample sites occurring nearest to half-degree intervals of latitude/longitude. Florida sampled 37 ichthyoplankton stations during the Fall Shrimp/Groundfish Survey. The Polish Sorting and Identification Center will sort the samples. Once sorted, the specimens and data will be archived at the SEAMAP Archiving Center.

Winter Plankton Survey

The SEAMAP Winter Plankton Survey took place from March 3 to April 2, 2015. NOAA Fisheries collected ichthyoplankton samples at 113 SEAMAP stations. The objectives of the survey were to assess the occurrence, abundance and geographical distribution of the early life stages of winter

spawning fishes from mid continental shelf to deep Gulf waters; measure the vertical distribution of fish larvae by sampling at discrete depths in the water column using a 1-meter Multiple Opening and Closing Net Environmental Sensing System (MOCNESS); and sample the size fraction of fishes that are underrepresented in bongo and neuston samples using a juvenile (Methot) fish trawl.

Spring Plankton Survey

The SEAMAP Spring Plankton Survey was conducted from May 1 to May 31, 2015. One hundred twenty-five stations were sampled during the survey. This was the thirty-fourth year for the survey and participants included NOAA Fisheries, Louisiana, and Mississippi. The objectives of the survey were to collect ichthyoplankton samples for estimates of the abundance and distribution of Atlantic bluefin tuna larvae and collect environmental data at all ichthyoplankton stations.

Plankton samples were taken with standard SEAMAP bongo and neuston samplers. The bongo sampler consisted of two conical 61-cm nets with 333-micron mesh. Tows were oblique, surface to near bottom (or 200 m) and back to surface. 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 approximately 20 to 600 m³ but is typically 30 to 40 m³ at the shallowest stations and 300 to 400 m³ at the deepest stations. A single or double 2x1 m pipe frame neuston net fitted with 0.947 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. Preservation protocol called for the right bongo samples to be preserved in 10% formalin and then transferred to fresh 95% ethanol after 36 hours. The original standard SEAMAP method of initial preservation in 10% formalin for 48 hours was changed to 36 hours in order to improve long term storage for genetic analysis. The left bongo and neuston samples are initially preserved in 95% ethanol and then transferred to fresh 95% ethanol after 24 hours. In addition, hydrographic data (surface chlorophylls, salinity, temperature and dissolved oxygen from surface, midwater and near bottom, and Forel-ule color) were collected at all stations.

Bottom Longline Survey

This nearshore survey complements an existing long-term fisheries independent survey currently being conducted by NOAA Fisheries, by targeting shark and finfish species within the shallow waters of the Gulf of Mexico. The objectives of the survey are to collect information on shark and finfish abundances and distribution with a 1-mile longline and to collect environmental data.

In an effort to standardize the Bottom Longline Survey as much as possible, the SEAMAP Subcommittee revised the sampling universe and station selection method during this reporting period. The Subcommittee decided to sample 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 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.

The Bottom Longline Survey recently completed the first year of using this standardized station selection protocol. Texas, Louisiana, Mississippi, and Alabama all sampled 142 stations from April

9 to October 7, 2015 in waters off their coasts in 3-10m. Florida will use NFWF funding next year to participate in the Bottom Longline Survey during the Fall time period.

Vertical Line Survey

In FY2015, Texas, Louisiana, and Alabama conducted vertical line sampling for reefish. In Alabama, they sampled 81 stations over artificial reefs and natural hardbottom off their coast from May 7 to September 3, 2015. Vertical lines with ten hooks are baited with Atlantic mackerel and are fished for five minutes. Fish may be retained and processed for age and fecundity. All fish are sacrificed for otoliths at stations deeper than 60 m. In water depth less than 60 m, stations may be assigned as tag and release or collection sites.

In Louisiana, the sampling frame is subdivided into three sampling blocks based on depth between 89 degrees longitude and 91 degrees longitude, with the water depth ranging from 60 to 360 feet. Each block is sampled quarterly in a rotation. Within these sampling blocks, there is a possibility of randomly selecting 40 different corridors within the block. The actual sites are randomly selected within the corridor boundary and sampled at the chief scientist's discretion. The sites roughly consist of artificial reefs, natural bottom, and petroleum production platforms. Louisiana sampled 109 stations from May 1 to August 22, 2015.

Texas began participating in the Vertical Line Survey this year. Texas sampled 37 stations from August 25 to October 14, 2015.

Reef Fish Survey

The primary purpose of this survey was to assess relative abundance and compute population estimates of reefish found on natural reefish habitats in the Gulf of Mexico. Video stereo cameras were used during the survey since they enabled the measurement of length frequencies. Each stereo camera contained paired black-and-white video stereo still cameras along with a color mpeg camera in a cylindrical pressure housing. Four of these were mounted in a camera array and were positioned orthogonally with the center of the camera mounted 51 cm above the bottom of the array. A chevron fish trap, that measured 1.76m x 1.52m x 0.61m; 28cm throat diameter; 3.81cm vinyl-clad mesh, was used to capture fish for ageing and other life history studies. Both the fish trap and camera array were baited with squid. The camera array was allowed to soak on the bottom for 30 minutes, and the fish trap soaked for one hour. Florida sampled 618 stations on the west Florida shelf from June 1 to October 2, 2015 while NOAA Fisheries sampled around the Gulf of Mexico in May and August.

Summer Shrimp/Groundfish Survey

The overall sampling strategy during the 2014 SEAMAP Summer Shrimp/Groundfish Survey was to work from the eastern Gulf to the Texas/Mexico border, in order to sample during or prior to migration of Brown Shrimp from bays to the open Gulf area. The SEAMAP Summer Shrimp/Groundfish Survey was conducted from May 30 to July 18, 2015. Three hundred eighty-five trawl stations were completed in this year's survey. Ninety-nine plankton stations were also sampled during the Summer Shrimp/Groundfish Survey. This was the thirty-fourth year for the survey. Objectives of the survey were to monitor size and distribution of penaeid shrimp during or prior to migration of Brown Shrimp from bays to the open Gulf; aid in evaluating the "Texas Closure" management measure of the Gulf Council's Shrimp Fishery Management Plan; and provide information on shrimp and groundfish stocks across the northern Gulf of Mexico from inshore waters to 60 fm.

Fall Plankton Survey

The Fall Plankton cruise took place from August 24 to September 10, 2015 with NOAA Fisheries, Alabama, and Mississippi all participating. Sixty-nine stations were sampled this year. The objective of this survey was to collect ichthyoplankton samples with bongo and neuston gear for the purpose of estimating abundance and defining the distribution of eggs, larvae, and small juveniles of Gulf of Mexico fishes, particularly king and Spanish mackerel, lutjanids and sciaenids.

Gear and methods used during the Fall Plankton Survey are the same as those used in the Spring Plankton Survey.

SEAMAP-South Atlantic

Coastal Survey

The Coastal Trawl Survey, conducted by the South Carolina Department of Natural Resources (SCDNR), continued as the long-standing core component of SEAMAP-South Atlantic survey activity. The overall goal of this survey is to continue to build a long-term database to provide data for stock assessments and to aid in management of stocks off the coast of the southeastern U.S. Initiated as a pilot project in 1986, this fishery-independent study was designed to monitor the distribution, abundance, and life history aspects of coastal species in the South Atlantic Bight, and to measure associated environmental parameters in nearshore coastal waters. Sampling was standardized in 1990 and in January of 2001, the sampling design was changed based on the results of an external program review. Offshore strata were discontinued, and additional stations were added to inshore strata for all three (spring, summer and fall) cruises to reduce variability in the abundance estimates for priority species. In 2009 through 2012 the seasonal effort was increased again by 10%. However, as of spring 2013, seasonal effort was reduced to pre-2009 levels as a result of funding. Note that as a result of cumulative cost savings the seasonal effort allowed for a one-time effort return to 2009-2012 levels in 2015.

The objectives of the survey were to collect data on annual, seasonal, and latitudinal distribution, abundance, and biomass of most species encountered; collect additional size data on priority finfish, sharks, decapod crustaceans, xiphosurans, and sea turtles; collect additional data on sex and gonad development of White, Pink, and Brown Shrimp and Blue Crabs; and collect otoliths and gonad tissues from selected finfish specimens.

Three multi-legged seasonal cruises were conducted between Cape Hatteras, North Carolina, and Cape Canaveral, Florida, during this reporting period (fall 2014, spring 2015, and summer 2015). A total of 102 stations in nearshore latitudinal strata (4.6 to 9.2 m depths) were sampled during fall 2014, 109 of 112 stations were sampled during spring of 2015, and 112 stations were sampled during the 2015 summer cruise. All samples were collected during daylight hours, a decision made in 1989 to maximize the collection of juvenile mackerels.

The fall 2014 cruise constituted the completion of the 25th full year of standardized sampling under a stratified random survey design. Sampling was conducted from September 30 to October 30, 2014. A total of 147 taxa were identified in fall trawls. Total estimated abundance of all individuals ($n=175,718$ or $1,722/\text{tow}$) continued to decrease for a third consecutive year. The Atlantic Bumper, *Chloroscombrus chrysurus*, was the most abundant species, representing 18% of the total abundance. The Atlantic Croaker, *Micropogonias undulatus*, was the second most abundant species

(15%), followed by species in the genus *Anchoa* (14%), the Spot, *Leiostomus xanthurus* (8%), and the White Shrimp, *Litopenaeus setiferus* (6%). This was a reversal of dominance for the top two species, and a substantial reduction (from 70% down to 59%) of the top five species to overall abundance. Catches in Raleigh Bay once again yielded the highest regional CPUE, yielding an average of 2,469 individuals per tow (n=22,225). Neighboring Onslow Bay had the second largest fall CPUE (2,319/tow). The Cannonball Jelly, *Stomolophus meleagris* (n=4,309 or 42/tow) made a substantially lower contribution to miscellaneous invertebrate biomass, comprising only 34% of the 2,745 kg total. Despite its number two ranking overall and almost 50% lower abundance in fall 2014, the Atlantic Croaker was still the most abundant sciaenid of interest observed (n=27,007 or 264/tow). The highest regional estimate of abundance of Atlantic Croaker was found in Onslow Bay (n=13,068 or 726/tow), and was only slightly lower than reported for this region for the previous fall. The second most abundant sciaenid, also almost 50% less abundant than fall 2013, was the Spot (n=14,885 or 146/tow). Over 50% of Spot were collected from Raleigh Bay, while Onslow Bay recorded the second highest estimated abundance and CPUE (n=7,550 or 839/tow and n=2,412 or 134/tow, respectively).

Collection of reproductive tissues from King Mackerel was discontinued as the vast majority sampled to date had been so immature that sex determination, even by histological methods, had been inconclusive. Diet sampling was discontinued, due to funding issues. Samples were collected from Weakfish (140 otoliths), Southern Kingfish (449 otoliths), Atlantic Croaker (314 otoliths), King Mackerel (94 otoliths), Spanish Mackerel (177 otoliths and 137 gonads), and Bluefish (41 otoliths and 38 gonads). Estimated abundance of fall Brown Shrimp, *Farfantepenaeus aztecus*, (n=472 or 4.6/tow) increased only slightly from the very poor 2013 fall. Brown Shrimp were collected in all regions, however Onslow Bay accounted for nearly 87% of the total abundance (n=410 or 22.8/tow). While the Pink Shrimp, *Farfantepenaeus duorarum*, is typically the least abundant commercially important penaeid species observed by the Coastal Survey, it is typically at least present in fall catches. This was the second year in a row that it was absent from all fall trawls throughout all regions. The estimated fall abundance of White Shrimp, *Litopenaeus setiferus*, was approximately 9,866 individuals and a CPUE of 96.7 individuals per tow. This was an increase from the fall of 2013, which yielded the lowest estimated fall abundance and CPUE since 2003. South Carolina and Georgia yielded the highest estimated regional abundances and CPUEs (n=4,719 or 278/tow and n=3,278 or 131/tow, respectively). These two regions accounted for 81% of total White Shrimp abundance. Raleigh Bay yielded the lowest regional abundance with only 4 specimens captured.

The 2015 spring cruise for the SEAMAP-Coastal Survey began on April 13 and was completed on May 21, 2015. It was determined that available funds made it possible to return to 112 stations per season for calendar year 2015. However, during spring, only 109 stations could be completed before the available sampling window closed. The full complement of stations was completed in all but two strata and all strata received some effort. But, one stratum on either side of Cape Lookout received reduced sampling. A total of 139 taxa were identified in spring trawls. The Atlantic Croaker was the most abundant species, constituting 31% of the total abundance. The Atlantic Bumper was the second most abundant species constituting 22% of the total abundance, followed by Spot, which accounted for 12% of the total abundance. This was a substantial shift in abundance for both Spot and Bumper from spring 2014. Estimated abundance of individuals taken in trawls decreased from the previous spring (n=279,505 or 2,564/tow). It should be noted that two stations in stratum 65, located in Raleigh Bay, and one station in stratum 63, located in Onslow Bay, were not sampled during the spring of 2015, lowering the overall abundance and possibly catch per unit effort for those regions. However, total fishing effort for spring 2015 increased by 7 stations over the previous spring making the decrease in both abundance and CPUE more notable. Catches off Florida yielded the

highest regional abundance with an estimated 95,315 individuals captured and a CPUE of 3,971 individuals per tow. Onslow Bay had the second greatest regional abundance with an estimated 82,104 individuals captured and a slightly higher CPUE of 4,321 individuals per tow. Miscellaneous invertebrate biomass was estimated at 7,297 kg (67 kg/tow), which represents an increase of more than three times the CPUE and quadruple the biomass observed the previous spring. The Cannonball Jelly composed 91% of the miscellaneous invertebrate biomass with the majority being taken in South Carolina waters (n=15,755 or 875 /tow, early in the season. The Atlantic Croaker was the most abundant sciaenid of interest captured (n=87,084 or 799/tow), with the seasonal CPUE decreasing from the previous spring's CPUE which was the highest recorded by the Coastal Trawl Survey. The majority (60%) of Atlantic Croaker were taken from Onslow Bay (n=51,913 or 2,732/tow). Spot was the second most abundant sciaenid of interest (n=32,665 or 300/tow), followed by the Southern Kingfish (n=6,461 or 59 /tow) and the Weakfish (n=1,985 or 18/tow). These values represented drastic declines for all priority sciaenids reported, except Southern Kingfish, which experienced a modest increase. A total of 8 King Mackerel were taken this spring, (0.07/tow). Since 2007, King Mackerel spring CPUE has remained well below the historical mean spring CPUE of 0.95 individuals per tow.

Collection of otolith samples from sciaenids and King Mackerel continued during the spring season, as did otolith and reproductive tissue sampling from Spanish Mackerel and Bluefish. Samples were collected from Weakfish (278 otoliths), Southern Kingfish (537 otoliths), Atlantic Croaker (242 otoliths), King Mackerel (8 otoliths), Spanish Mackerel (63 otoliths and 54 gonads), and Bluefish (135 otoliths and 95 gonads). Spring seasonal abundance of Brown Shrimp (n=46 or 0.4/tow) rebounded a bit relative to spring 2014, but was still low. Brown Shrimp were captured in the waters off of South Carolina, Georgia and Florida, however virtually all abundance and CPUE occurred off Florida (n=44 or 1.83/tow). Spring seasonal abundance of Pink Shrimp (n=429 or 3.94/tow) increased for the second spring in a row. Pink Shrimp were present in all regions except Georgia. Onslow Bay once again produced the majority (88%) of the seasonal catch with a total abundance of 377 individuals, and a CPUE of 19.84 individuals per tow. Seasonal abundance of White Shrimp (n=6,147 or 56.4/tow) increased dramatically from previous year's spring abundance and was the highest since 2009, which was a peak year for catches of White Shrimp. White Shrimp were collected in all regions, but the majority (72%) were caught in the waters off of Georgia (n=4,412 or 157.6/tow).

The summer cruise season for the SEAMAP-South Atlantic Coastal Survey began on July 6 and was completed on July 29, 2015. A total of 137 taxa were identified in summer catches. Atlantic Croaker was the most abundant species, representing 30% of the total abundance. The Spot was the second most abundant species (16%), followed by Atlantic Bumper (11%). Abundance of individuals taken in summer trawls decreased from the peak abundance encountered during summer 2014 to a total estimated abundance of 333,200 individuals and a mean CPUE of 2,975 individuals per tow. Catches off Florida yielded the highest regional abundance with an estimated 93,311 individuals and a CPUE of 3,888 individuals per tow. Onslow Bay showed the second highest regional abundance with an estimated 85,230 individuals captured and a CPUE of 4,262 individuals per tow. Miscellaneous invertebrate biomass, which includes miscellaneous benthic and nektonic invertebrates combined with the biomass of Horseshoe Crabs, *Limulus Polyphemus*, and Cannonball Jellies, was estimated at 1,516.94 kg (13.5 kg/tow), representing a decrease from the biomass observed the previous summer for this group.

The collection of otolith samples from sciaenids continued during the summer season. Samples were collected from Weakfish (otoliths: n=143), Southern Kingfish (otoliths: n=437), and Atlantic Croaker (otoliths: n=378). Samples from King Mackerel (49 otoliths) and Spanish Mackerel (91

otoliths, 62 gonads) were retained at sea and brought back to the lab for processing. Otoliths (n=78) and gonads (n=47) were collected from Bluefish specimens for ongoing life history research. The estimated seasonal abundance of Brown Shrimp (n=36,004 or 321/tow) more than doubled, over the previous summer's high abundance; establishing a new peak summer abundance level for this species, within the life of the survey.

During the reporting period, SEAMAP-SA Coastal Trawl Survey staff provided data for the Menhaden and Bluefish Benchmark Stock Assessments, conducted by the Atlantic States Marine Fisheries Commission (ASMFC). Trawls survey data were also provided for various compliance reports to the Commission. Staff also provided data to and participated in a SEDAR Regional Procedural Workshop on Shrimp (August 22-24, N. Charleston, SC).

Coastal Survey Diet Studies

The scope of the diet studies within the Trawl Survey was significantly reduced due to funding. No new samples were collected, but processing continued at a reduced level. During the reporting period, 644 back-logged Bluefish (*Pomatomus saltatrix*) stomach samples collected from 2011-2013 were processed. Of these, a total of 487 contained prey items. Bluefish diets consisted primarily of a wide range of teleost species, the largest portion of which representing the genus *Anchoa*. Bluefish diets also consisted of penaeid shrimp, squid (*Loligo* spp.), jellyfishes, polychaete worms, swimming crabs (family Portunidae), and various other invertebrates. Analyses and a literature review were contributed to the Atlantic States Marine Fisheries Commission (ASMFC) in support of a benchmark stock assessment for Bluefish.

Pamlico Sound Survey

The Pamlico Sound survey provides a long-term fishery independent database for the waters of the Pamlico Sound, and the lower Neuse, Pamlico, and Pungo rivers. Data collected from the survey provides juvenile abundance indices and long-term population parameters for interstate and statewide stock assessments of recreationally and commercially important fish stocks. Annually, 108 randomly selected stations are trawled for 20 minutes using double rigged demersal mongoose trawls. Sampling occurs over a two-week period in June and September each year. During FY2015, the North Carolina Division of Marine Fisheries (NCDMF) continued the ongoing Pamlico Sound Survey. The survey sampled 54 stations each in June (8th – 11th and 15th – 18th) and September into the beginning of October (September 14th – 17th and September 28th – October 1st) of 2015.

Bottom Mapping and Species Characterization

In FY2015, the Florida Fish and Wildlife Research Institute (FWRI) provided technical support and infrastructure for maintaining and distributing GIS data products of habitat, species and fisheries including bottom habitats and fishery independent surveys in the South Atlantic region. Online access of SEAMAP mapping products is available via the South Atlantic Habitat and Ecosystem Atlas (http://ocean.floridamarine.org/safmc_atlas/). The Atlas integrates multiple services including spatial presentation of SEAMAP and other fishery independent data through http://ocean.floridamarine.org/SA_Fisheries/ and SEAMAP bottom mapping information through the SAFMC EFH service at http://ocean.floridamarine.org/sa_efh/.

The Bottom Mapping, Fish Habitat Characterization and Assessment Workgroup met during 2015 in conjunction with the South Atlantic Fishery Management Council Meeting in St. Simons Island, Georgia on March 3. The Workgroup accessed the South Atlantic Council's Digital Dashboard

(http://ocean.floridamarine.org/safmc_dashboard/) to review updates to the South Atlantic Habitat and Ecosystem Atlas including those completed response to previous Workgroup recommendations. In addition, the Workgroup discussed and the ongoing development of the Regional Mapping Repository of multi-beam and habitat mapping for the South Atlantic Region and updates and additions including; new multi-beam mapping collected aboard the NOAA Okeanos Explorer spanning from southern Georgia to Florida, a total of 2800 square miles; new bathymetry for some deepwater MPAs; a mosaic image containing the MPA bathymetry datasets from NOAA fisheries; NGDC Coastal Relief Model; and the 2010 USACE Lidar data for the SA Coast. In addition to the incorporation of new layers there were additions to the deep water SEAMAP Bottom Mapping database to use deep water proxy species to classify new grids based on their presence. The Workgroup was provided an update on further expansion of the South Atlantic fishery-independent surveys including habitat mapping and characterization conducted during the SouthEast Reef Fish Survey (SERFS), a collaboration of MARMAP/SEAMAP and SEFIS whose focus is in collecting data for commercially and recreationally important fish and crustacean species for stock assessments. The Workgroup discussed developing recommendations and priorities for a South Atlantic Mapping Strategy for inclusion into the Fishery Ecosystem Plan (FEP) II. The Workgroup also discussed the process underway to update/refine species, Essential Fish Habitat (EFH) and fishery operations information for the developing Fishery Ecosystem Plan (FEP) II and EFH 5-year review and update.

Fish Habitat Characterization and Assessment

Reef fish sampling - In 2015, priorities agreed upon by the various parties involved in the Reef Fish Survey were aimed at continuing the chevron trap survey and the short bottom long line (SBLL) survey and resuming the long bottom long line (LBLL) survey. The halting of the SBLL survey for 2012, 2013, and the first half of the 2014 sampling season mostly affected data collection for snowy grouper and several other deep water species. In addition, it significantly restricted data collection in areas of high vertical relief and Marine Protected Areas. Note that the MARMAP program provided partial funding for the short and long bottom long line survey.

In this reporting period, we conducted sampling for the Reef Fish Survey from April 21 – to October 23. A total of 25.5 sea days were realized for the SEAMAP-SA Reef Fish Survey, with the vast majority of these sea days used for reef fish monitoring, capturing specimens for diet studies, and short bottom ling line efforts, with very limited effort towards investigating new reef habitat. In addition, MARMAP funded 23.5 realized sea days.

During the 2015 sampling season, SEAMAP-SA researchers identified a few additional areas with natural reef habitat, collected samples for diet analysis (see section below), and collected information on bycatch mortality of several snapper grouper species. Limited surveys for new reef habitat were conducted using fathometry, reconnaissance trap deployments (with cameras) and short bottom long-line deployments. Hook and line fishing efforts (95 deployments on the R/V Palmetto) were mostly conducted for diet and bycatch mortality studies. Hook and line and bathymetry efforts were conducted during both day- and night-time hours, while other sampling activities occurred during day-time hours only. Sampling efforts for monitoring purposes with chevron traps by the MARMAP and SEAMAP-SA programs totaled 579 deployments (including 34 reconnaissance deployments). During each trap deployment, a 60-90 minute video was recorded by two under water cameras detailing habitat and fish populations near each trap. The chevron traps were equipped with one to four Go-Pro video cameras and a total of 1,552 video recordings were made during the 2015 season, 594 of which will be used for index development.

The Reef Fish Survey resumed SBLL sampling for species in deeper hard bottom habitat (>90m) with significant relief. A total of 103 SBLL stations (including 18 reconnaissance deployments) were sampled. Between 18 August and 17 September, 45 LBLL were deployed.

Following any collections, hydrographic data (water temperature, salinity, etc.) were recorded during 130 CTD deployments (MARMAP and SEAMAP-SA combined).

Preliminary analysis of the 2015 sampling season data indicated that a total of 19,220 individual fish, representing 80 species, were captured by the MARMAP and SEAMAP-SA Reef Fish Survey (all gears combined). Just over 27% of the captured specimens (5,213) were retained for life-history work-up. The vast majority of the fish (96%) was caught in the chevron traps, but note that most (118 fish or 87%) of the Snowy Groupers were caught on the SBLL. The LBLL targeted predominantly Golden Tilefish, but catches remained very low (only 5 fish) during the sampling season, and we actually caught more Golden Tilefish (12 fish) on the SBLL than the LBLL.

Juvenile Gag Ingress - The Gag ingress study was halted in July 2015 due to funding. The 2015 spring sampling season was the last sampling season and in June of 2015, collaborations for this project with partners at GA-DNR and NC-DMF ended. During 2015, fifteen sites were sampled between March and July to monitor ingress of juveniles of winter spawning commercially and recreationally important fish species, in particular Gag (*Mycteroperca microlepis*). Sampling sites were in the vicinity of Swansboro, NC; Wilmington, NC; Georgetown, SC; Charleston, SC; Beaufort, SC; Savannah, GA; and Brunswick, GA.

Diet studies - During the reporting period, targeted species for diet studies were grouper/hind species (family Serranidae), Black Sea Bass (*Centropristis striata*), Squirrelfish (*Holocentrus adscensionis*), White Grunt (*Haemulon plumieri*), and Blueline Tilefish (*Caulolatilus microps*). Although rarely encountered with standard survey gear, diet samples from Lionfish (*Pterois* spp.) were also collected opportunistically due to their growing ecological impact. Fishes were collected using hook and line fishing gear and chevron traps. For species caught in large numbers (Black Sea Bass and White Grunt) a stratified sampling design was employed, targeting up to 20 specimens from 24 individual zones. Each zone consisted of one of three depth strata (0-20m, 21-50m, and >50m) and one of eight 1-degree latitudinal strata (from 27° N through 34° N). In total, 281 stomachs (53 groupers/hinds, 184 Black Sea Bass, 15 Squirrelfish, 14 White Grunt, 8 Blueline Tilefish, and 7 Lionfish) were collected.

Stomachs were excised from the posterior end of the esophagus (near the mouth) to the pyloric sphincter, and preserved in 10% Formalin. After 2 weeks, stomachs were rinsed with fresh water and contents of individual guts were removed and placed into separate containers and submerged in 70% ETOH. All contents from each stomach were then sorted, counted, measured (if whole), and weighed. Prey items were identified to the lowest possible taxon. Stomach samples for grouper/hind species, whose prey items have frequently been found in advanced stages of digestion, were frozen upon collection to facilitate genetic sequencing of prey items not identifiable by traditional visual methods. For each species, to quantify feeding habits, the relative contribution of food items to the total diet will be determined using % frequency of occurrence (F), % composition by number (N), and % composition by weight (W). These measures will be used to calculate an index of relative importance (IRI). Once all prey items are identified for a particular species, more analyses will be completed (i.e., examining prey composition by predator size class, depth zone, latitude and between species).

During the reporting period, 238 diet samples were processed. Black Sea Bass diets consisted primarily of crabs and juvenile fishes. White Grunt consumed a variety of hard-bottom associated crustaceans including stomatopods, snapping shrimp (Alpheidae), and brachyuran crabs. Squirrelfish preyed primarily upon shrimp and demersal crabs (subfamily Inachinae). Blueline Tilefish diets were mainly piscivorous. Small teleosts including dragonets (Callionymidae) were observed in Lionfish diets.

Assessment of Adult Red Drum Populations on the Southeast Atlantic Coast

The primary objectives of this survey are to conduct fishery-independent longline sampling on adult Red Drum to develop information on catch per unit effort (CPUE); collect biological information (size, sex, etc.) and samples (otoliths, gonads, muscle, fin clips, etc.) from random sub-samples of the Red Drum catch in order to determine size at age, recruitment to the spawning population, mercury contamination, and genetic composition of the stock; tag adult Red Drum for the collection of migratory and stock identification data; disseminate accomplishments and results to the ASMFC and NMFS for inclusion in stock assessments; and produce an annual summary report. Secondary objectives are to tag and measure small and large coastal sharks caught during longlining, for inclusion in the COASTSPAN (Cooperative Atlantic States Shark Popping and Nursery Survey) database and to respond to external requests for samples and/or data.

South Carolina – During the 2014/2015 sampling season, 355 longline sets were made in four strata along the coast of South Carolina. The season was separated into three periods, defined to maximize catches of Red Drum (August 1 – September 15, September 16 - October 31, November 1 – December 15). In this report, for the 2014 sample season only the later part of time period II and the whole of time period III are considered (October through December); in 2015 only the first time period (August through mid-September) and the initial part of the second time period (mid-September through end of September). Each time period and stratum were sampled with equal effort. During sampling, 636 Red Drum were caught. Four hundred and seventy-six Red Drum were tagged and released, 17 were recaptured, 125 were sacrificed for age/growth and reproductive investigations, and 18 Red Drum were released without tags (fish that are too stressed are released without tags to reduce mortality). Fin clips were taken from all individuals for genetic investigations (e.g. determination of stocked fish, recaptured fish that have lost external and PIT tags). Stomach samples were also collected for diet determination. Some Red Drum were also screened for parasite fauna. Most shark species were tagged and released, with the exception of Atlantic Sharpnose and large Nurse Sharks. During this reporting period, 343 sharks were tagged and released.

North Carolina – For 2015, North Carolina conducted sampling in Pamlico Sound from July through September. Sampling occurred as part of a standardized, stratified-random sample design that has occurred in North Carolina since 2007. This design divides a large portion of the Pamlico Sound estuary into 12 similarly sized regions. From July through September, samples were taken from randomly selected grids (1 square nautical mile) within each region during each of three four-week intervals. All samples were conducted with a 1,500 meter mainline, with gangions placed at 15 meter intervals (100 hooks/set) during nighttime hours starting at sunset. On average, four sets were made per night. Two samples were collected from each randomly chosen sample site.

Random sampling occurred in July (n=16 sets), August (n=24 sets), and September (n=28 sets) and yielded 319 Red Drum (40, 112, and 167 respectively). Sixty-two Red Drum were sacrificed to determine age composition and for other biological investigations. Two-hundred forty-three fish were tagged and released to track migration, stock ID and growth rates. Sampling during this period resulted in eight recaptures of Red Drum previously tagged from this study. Shark species included

six blacktip sharks, four sharpnose sharks and two sandbar sharks. Of the sharks captured, both sandbar sharks and three of the six blacktip sharks were tagged upon release.

Georgia – For the current reporting period, sampling occurred off southeast Georgia and northeast Florida during the fall months (October – December) of 2014 and the spring and summer months (May – September) of 2015. A total of 225 longline sets were deployed over the two seasons with 93 sets made during fall 2014 and 132 sets during the spring and summer of 2015. A total of 106 adult Red Drum were captured; 102 during fall 2014, and 4 during the spring and summer of 2015. Prior to release, 102 Red Drum were tagged with conventional dart tags, 50 of which we also tagged with PIT tags. Five Kemps Ridley sea turtles (1 during fall 2014; 4 during spring/summer 2015) and 1 Loggerhead sea turtle (spring 2015) were caught during the study period. All turtles were released in excellent conditions with all hooks removed.

SEAMAP-Caribbean

Acoustic Hydrophones

Data from three hydro-acoustic bottom data-loggers was downloaded from the Grammanik Bank and historic Nassau grouper site in St. Thomas, and Lang Bank in St. Croix. The original SD cards were sent to Puerto Rico for data processing and analysis. The data-loggers are expected to be redeployed at these locations for the next spawning aggregation season.

Queen Conch Survey

The Queen Conch (*Strombus gigas*) population was visually surveyed using scooter transects around the U.S. Virgin Islands. Transects were 4 meters in width and varied in length depending on the water depth. A total of 108 scooter transects were sampled at 56 sites/stations around the territory. At the start of each site, two divers were deployed to collect data along parallel line transects along a predetermined compass bearing. One diver towed a surface float that was followed by the support vessel. GPS coordinates of diver entry and surface return were recorded by onboard personnel. Records were kept on start/stop times, depths, habitat type, time of each habitat change, and length and lip thickness of each conch encountered. Conch shell measurements were used to classify individuals into maturity categories and to assess stage composition. A total of 56 sites (24 sites for St. Thomas/St. John and 32 sites for St. Croix) were surveyed from September 2014 to October 2014. A total of 883 Queen Conch were observed of which greater than 75% were adults. Over 90% of the survey sites in the US Virgin Islands contained conch. Overall average conch density for the territory was 169.46 (conch/ha). Mean conch density was higher around St. Croix (248.09 conch/ha) compared to St. Thomas (216.6 conch/ha) and St. John (43.7 conch/ha). The highest conch abundances and densities occurred in seagrass habitat which is the preferred habitat for conch across all three islands. Based on results from this study the queen conch population is increasing in the U.S. Virgin Islands. The high densities observed around the territory remain capable of supporting viable conch fisheries and current fishing activities.

Juvenile Spiny Lobster Survey

Artificial habitat sites were re-established in St. Thomas, but not in St. Croix. The St. Thomas district contains two artificial habitat sites, one deep (20 m) and one shallow (10 m) each containing ten artificial shelters. The St. Croix district contains one shallow artificial habitat site (less than 10 m) with eight artificial shelters. St. Thomas sites were surveyed monthly by divers from February 2014 through December 2014. St. Croix performed surveys from April 2014 through January 2015.

The surveys found no spiny lobster (*Panulirus argus*) in the shelters; although a variety of reef fishes, mollusks, echinoderms, and crustaceans were recorded each month totalling 2,788 and 338 individuals for St. Thomas and St. Croix, respectively.

The benthic composition of the deep site in St. Thomas changed drastically over the survey period from a predominant sandy bottom to a sandy bottom and mixed algae plain consisting mostly of the invasive *Halophila stipulacea*, *Thalassia testudinum*, *Syringodium filiforme*, and *Halodule wrightii*. It is possible that a combination of inappropriate block size and poor habitat quality contributed to the juvenile lobster recruitment failure. An attempt was made to deploy blocks with smaller openings, but construction materials could not be obtained in a timely manner. Use of subsurface collectors for pueruli is being planned to allow monitoring of post-larval supply to the sites.

Puerto Rico

Juvenile Spiny Lobster Survey

The structures that were deployed during 2007 at six stations off the west coast of Puerto Rico were visited to reassess the status of the structures. At each station 10 casitas are deployed. Casitas are deployed at six sites off the west coast that includes Boquerón, Bramadero, El Negro, El Ron, Fanduca and Punta Aguila. The casitas monitoring finally started in December 2014 after deploying the new casitas near the old ones that were buried by sand. Sampling of the casitas will be completed in December 2015.

A total of 168 individuals have been recorded ranging in size from 0.25" to 3" in carapace length (CL). Most of the juveniles recorded (97.6%) were collected between 0.5" – 2.5" of CL. The highest amount of juveniles was caught measuring 0.75" and 1" CL. A total of 74 octopus and 197 morays have been removed from the casitas.

Larvae Collector Survey

All larvae collectors were deployed at six sites close to the casitas. At each site two collectors have been deployed at different depths. Sampling started in April 2015 and will continue up to March 2016. Larvae are classified as transparent, transparent pigmented, pueruli and juveniles. Larvae were recorded at all sites and collectors. A total of 897 individuals were recorded between April and September 2015 with the highest amount being pueruli (497), followed by juveniles (310) and transparent pigmented (62). Meanwhile transparent larvae's were the lowest amount of individuals (28) caught. June has been the most productive month with 344 individuals recorded, April with 194, May with 175 and July with 87.

Reef Fish Survey

During the sampling period of November 19, 2014 to June 4, 2015, a total of 25 stations were sampled at least once off the west coast of Puerto Rico. Hook and line sampling yielded 35 species representing 16 families weighing over 247 kg. The categories of fish that dominate the catch in terms of number were the groupers, followed by snappers, jacks and porgies. Five species of groupers comprised 27.51% of which three species made up 27.17%. The snappers were represented by six species making up 15.78% of total catch, of which two species represented 15.22% in terms of number.

For the sampling period of April 29, 2015 to September 28, 2015, a total of 9 stations were sampled

at least once off the east coast. A total of 17 species representing 9 families weighing 73 kg were collected. Two groups of fish constituted most of the catch, the groupers with 55.56% and the jacks 14.94% of the total catch by number.

Three species constituted the bulk of the east coast catch by number and weight 68.6% and 51.6%, respectively. The coney (*Cephalopholis fulva*, 38.31%) was the most caught species; followed by the blue runner (*Caranx crysos*, 16.58%), the red hind (*Epinephelus guttatus*, 16.09%) of total catch per number. Snappers and groupers which are considered the most valuable commercial species group represented 66.3% of the total catch.

Species composition by sampled stations varied according to two factors: area and depth. Species composition collected at the west coast was comprised by groupers (27.5%), followed by the porgies (16.1%), snappers (15.8%); jacks (13.6%), sand tilefish (9.8%), squirrelfishes (9.0%), grunts (4.6%), triggerfishes (1.4%) and representation of 14 families made the other category (2.1%) in terms of number of individual caught. In terms of weight the species composition was led by the groupers (26.0%), followed by the jacks (19.5%), porgies (13.8%), snappers (10.3%), sand tilefish (9.0%), the triggerfishes (4.2%), the squirrel fishes (4.1%), the grunts (3.7%) and the other category of fishes made up 9.4%.

The east coast species composition was comprised of groupers (55.6%), followed by snappers (10.7%), jacks (14.9%), porgies (3.4%), squirrelfishes (11.1%), grunts (2.7%), sand tilefish (0.8%) triggerfishes (0.4%) and others (0.4%) in terms of number. In terms of weight the groupers (57.4%) was the dominant group, followed by the jacks (17.7%) and the snappers (9.8%),

SPECIAL STUDIES

In addition to the regularly scheduled surveys, SEAMAP participates in a variety of other projects. The SEAMAP provides guidance, personnel, and other contributions to these studies for enhancement and protection of the marine resources.

Winter Trawling and Fish Tagging Cruise

The long running Cooperative Winter Tagging Cruise (Cruise) conducted only hook-and-line based striped bass tagging during 2014 due to a delay in funding notification caused in part by the government shutdown. Funding from a North Carolina Coastal Recreational Fishing License (CRFL) grant was available for matching a Saltonstall-Kennedy (S-K) grant which had been submitted; however notification that the S-K grant was awarded did not arrive until March 28, too late to conduct trawling. Partners did conduct hook-and-line striped bass tagging operations using the CRFL funds and with help of state and federal partners and volunteer anglers. Historically funded by NOAA Fisheries (through use of one of its survey vessels, or provision of charter funds) and supported with in-kind contributions from the U.S. Fish and Wildlife Service (USFWS), the Atlantic States Marine Fisheries Commission (ASMFC), Maryland DNR-Fisheries Service, North Carolina Division of Marine Fisheries and numerous additional state fishery agencies and universities, the Cruise provides important monitoring data for the striped bass stock assessment, as well as data on other ASMFC species. Since 2011, the Cruise has employed charter sport fishing vessels and tagged striped bass caught on hook-and-line gear, using the protocol supplied by the Massachusetts Division of Marine Fisheries. The fishing vessel used for the ten day-long trips conducted this year was the privately-owned FV Midnight Sun. Tagging operations in 2014 resulted in a total of 921 striped bass tagged and released, including one that weighed in at 74 pounds. All fish this year were located in the federal waters off Virginia. None were captured and tagged in

waters off North Carolina. This number was below last year's total but considerably above the two prior years.

Cruise partners continue working together to secure long-term funding to maintain tagging using a research vessel with traditional trawl gear, and hook-and-line. Use of the trawl gear has proven not only efficient, but also enables the collection of data on multiple ASMFC-managed species, including Atlantic sturgeon, Spiny Dogfish, Weakfish, Summer Flounder and *Alosine* species, such as shad and river herring. Collection of the fish via hook and line provides data only for striped bass. The successful S-K proposal will provide funding for the project during 2015 and 2016. A new CRFL proposal has been submitted to request matching funding to the S-K grant for 2016. Discussions have been initiated with ASMFC and other partners regarding future sources of funding for 2017 and beyond.

INFORMATION SERVICES

Information from the SEAMAP activities is provided to user groups through the program administration and complementary systems: the SEAMAP Information System, SEAMAP-South Atlantic Data Management System, SEAMAP Archiving Center, and SERTC. Products resulting from SEAMAP activities can be grouped into two major categories: data sets (including broadly, digital data and collected specimens) managed by the SEAMAP Information System, SEAMAP-South Atlantic Data Management System, SEAMAP Archiving Center, and SERTC; and program information. Program information is discussed in the PROGRAM MANAGEMENT Section of this report.

SEAMAP Information System

Biological and environmental data from all SEAMAP-Gulf surveys are included in the SEAMAP Information System, managed by GSMFC and NMFS-SEFSC. Raw data are edited by the collecting agency and verified by the SEAMAP Data Manager prior to entry into the system. Data from all SEAMAP-Gulf surveys during 1982-2014 have been entered into the system and data from 2015 surveys are in the process of being verified, edited, and entered for storage and retrieval. Verified, non-confidential SEAMAP data are available conditionally to all requesters.

Requested SEAMAP data were used for a multitude of purposes in 2015:

- Evaluating the abundance and size distribution of penaeid shrimp in federal and state waters to assist in determining opening and closing dates for commercial fisheries;
- Assessing the impact of the Deepwater Horizon oil spill on the Gulf of Mexico ecosystem;
- Evaluating and plotting the size of the hypoxic (Dead Zone) area off of Louisiana;
- Assessing shrimp and groundfish abundance and distribution and their relationship to such environmental parameters as temperature, salinity, and dissolved oxygen;
- Identifying environmental parameters associated with concentrations of larval finfish;
- Assessing the potential impact of liquefied natural gas facilities on marine fish stocks;
- Assessing the potential impact of the Deepwater Horizon oil spill on marine fish stocks; and
- Compiling the 2015 SEAMAP Environmental and Biological Atlas.

Real-time Data

A major function of the SEAMAP Information System is the processing of catch data from the Summer Shrimp/Groundfish Survey as near-real-time data. Data were transmitted weekly to the

GSMFC for inclusion. Plots of station locations and catch rates of shrimp, squid and dominant finfish species were prepared, edited, and processed by GSMFC for weekly distribution to management agencies, fishermen, processors and researchers. SEAMAP real-time data plots were produced during the 2015 Summer Shrimp/Groundfish Survey. Seven weekly mailings were produced and distributed to approximately 125 interested individuals. These plots were also available through the SEAMAP web page.

SEAMAP-South Atlantic Data Management System

The SEAMAP-SA data management system goal is a web based information system that facilitates data capture, error checking, data extraction, and dissemination of fishery-independent data and information for all ongoing SEAMAP-SA surveys and special studies. The SEAMAP-SA database is now publically available for data exploration and extraction via the ASMFC-maintained (www.seamap.org/) site and the SCDNR-maintained based Oracle relational database (www.dnr.sc.gov/seamap/). The SEAMAP website also includes general links, information, and documentation (surveys, reports, metadata, and special studies) for SEAMAP-SA programs. The Oracle database is constructed to provide access to “normalized data” for a number of fishery-independent programs including, but not limited to, SEAMAP Coastal Survey, the NCDMF Pamlico Sound trawl survey, the Coastal Longline surveys, the Reef Fish Survey (conducted in conjunction with MARMAP), and eventually the SEAMAP Cooperative Winter tagging cruises. Spatial presentations of SEAMAP and other South Atlantic fishery-independent data (http://ocean.floridamarine.org/sa_fisheries/) are available through a developing regional GIS service managed by Florida Fish and Wildlife Research Institute for the South Atlantic Fishery Management Council (SAFMC Fisheries Viewer). The custom GIS Web mapping application supports data display, interactive querying, geocoding and printing. Users may download GIS shapefiles and associated metadata.

In this reporting period, the Web interface structure was refined so that links to program documentation and metadata are available on the data extraction pages. A series of data request pages were created, including user registration and data report extraction pages with query filters for downloading selected data. Administrative tools were developed and tested. These include applications which allow uploads to code and data tables and the deletion of records through the upload of a deletion file. Report and data downloads have been included among the administrative tools as well.

A significant accomplishment in FY2015 was the integration of the data from the NEERS Ichthyoplankton Collaborative Research Group into the SEAMAP-SA Oracle database. Using funding outside SEAMAP-SA, this was completed in the early summer, and this data set can now be explored in the online SEAMAP-SA database via a dedicated extraction page. This page was specifically created and modified to reflect the needs of the Ichthyoplankton data provider group.

Southeast Regional Taxonomic Center (SERTC)

As a result of funding, SERTC activities were reduced during this reporting period. Work on the second prey identification guide for the SEAMAP-SA Reef Fish diet study continued, but completion is expected to be delayed or work may be possibly halted. This guide was to be similar in format and content to the Coastal Survey guide, but will focus on a different set of prey items consumed by the following 16 reef fish predator species: Gray Triggerfish (*Balistes capriscus*), Black Sea Bass (*Centropristis striata*), Graysby (*Cephalopholis cruentata*), Coney (*Cephalopholis fulva*), Rock Hind (*Epinephelus adscensionis*), Speckled Hind (*Epinephelus drummondhayi*), Red

Hind (*Epinephelus guttatus*), Red Grouper (*Epinephelus morio*), Snowy Grouper (*Epinephelus niveatus*), White Grunt (*Haemulon plumierii*), Squirrelfish (*Holocentrus adscensionis*), Red Snapper (*Lutjanus campechanus*), Gag Grouper (*Mycteroperca microlepis*), Scamp Grouper (*Mycteroperca phenax*), Red Porgy (*Pagrus pagrus*), and Vermillion Snapper (*Rhomboplites aurorubens*). Identifications of SEAMAP-SA's Reef Fish diet study voucher collection are being verified as part of this project. In addition to providing assistance to SEAMAP diet study personnel, SERTC provided taxonomic expertise, image loans, photographic assistance, and general information to members of the public and researchers both in and outside of the SCDNR.

Program Documents

The following documents were published and distributed by the SEAMAP program in FY2015:

Bacheler, N. M., D. J. Berrane, W. A. Mitchell, C. M. Schobernd, Z. H. Schobernd, B. Z. Teer, and J. C. Ballenger. 2015. Environmental conditions and habitat characteristics influence trap and video detection probabilities for reef fish species. *Marine Ecology Progress Series*. Vol. 517:1-14.

Rester, J.K., S. Madsen, and E. Ojeda Serrano. 2015. Annual Report of the Southeast Area Monitoring and Assessment Program (SEAMAP), October 1, 2013 to September 30, 2014. Gulf States Marine Fisheries Commission, Atlantic States Marine Fisheries Commission, Puerto Rico Sea Grant College Program. No. 242, GSMFC, Ocean Springs, MS. 17pp.

Rester, J.K. 2015. SEAMAP Environmental and Biological Atlas of the Gulf of Mexico 2012. No. 237, GSMFC, Ocean Springs, MS.

Rester, J.K. 2015. SEAMAP Environmental and Biological Atlas of the Gulf of Mexico 2013. No. 239, GSMFC, Ocean Springs, MS.

Rester, J.K. 2015. SEAMAP Annual Report to the Technical Coordinating Committee. Gulf States Marine Fisheries Commission, No. 246, GSMFC, Ocean Springs, MS.

SEAMAP-SA Coastal Survey, Cruise Report, Fall 2014.

SEAMAP-SA Coastal Survey, Cruise Report, Spring 2015.

SEAMAP-SA Coastal Survey, Cruise Report, Summer 2015.

Willis, C.M., J. Richardson, T. Smart, J. Cowan, and P. Biondo. 2015. Diet composition, feeding strategy, and diet overlap of three sciaenids along the southeastern United States. *Fisheries Bulletin*. Vol. 113:290-301.

PROPOSED SEAMAP ACTIVITIES, FY2016

Last year, total program allocations for all three SEAMAP components, Gulf, South Atlantic and Caribbean, was approximately \$4.37 million. At the August 2015 meeting, the SEAMAP components based their allocations for 2016 on level funding of \$4.37 million. Proposed FY2016 activities for all participants are shown in Table 2.

Table 2.

PROPOSED SEAMAP ACTIVITIES, FY2016					
	Fall	Winter	Spring	Summer	
Gulf of Mexico Activities					
Resource Surveys:					
Spring Plankton Survey			X		
Reef Fish Survey			X	X	
Summer Shrimp/Groundfish Surveys				X	
Fall Shrimp/Groundfish Surveys	X				
Fall Plankton Survey	X				
Winter Plankton Survey		X			
Plankton and Environmental Data Surveys			X	X	
Bottom Longline Survey	X		X	X	
Vertical Line Survey			X	X	
Information Operations:					
Biological and Environmental Atlas		X			
FY2015 Joint Annual Report		X			
Real-time Data Summaries		X		X	
Data Input and Request Processing	X	X	X	X	
Specimen Archiving and Loan	X	X	X	X	
Program Administration	X	X	X	X	
South Atlantic Activities					
Resource Surveys:					
Coastal Survey	X		X	X	
Pamlico Sound Survey	X			X	
Winter Trawling and Fish Tagging Cruise		X			
Bottom Mapping Project	X	X	X	X	
Fish Habitat Characterization and Assessment	X	X	X	X	
Adult Red Drum Longline Survey	X		X	X	
Information Operations:					
Data Input and Request Processing	X	X	X	X	
Data Analysis and Utilization	X	X	X	X	
Program Administration	X	X	X	X	
Joint Planning Activities	X	X	X	X	
Caribbean Activities					
Resource Surveys:					
Lobster Juvenile Artificial Shelter Survey (VI)	X				
Lobster Juvenile Artificial Shelter Survey (PR)	X	X	X	X	
Lobster Postlarvae Collector Survey (PR & VI)	X	X	X	X	
Parrotfish Reproductive Cycle Survey (VI)	X	X	X	X	
Yellowtail Snapper H&L Survey (PR & VI)	X	X	X	X	
Deep Water Snapper H&L Survey (VI)	X	X	X	X	
Information Operations:					
Preliminary Data Analysis and Quality Control	X	X	X	X	
Research Programs	X	X	X	X	
Information Dissemination	X	X	X	X	
Program Administration					
Joint Planning Activities	X	X	X	X	

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