9.2.1.2 SEAMAP

The Southeast Area Monitoring and Assessment Program (SEAMAP) is a cooperative State/Federal/university program for collection, management and dissemination of fishery-independent data and information in the southeastern United States. The organizational structure of the program presently includes 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. Funding allocations to participants are administered through State/Federal cooperative agreements, managed by SERO and the Southeast Fisheries Science Center (SEFSC), National Marine Fisheries Service (NMFS).

SEAMAP has sponsored long-term (1982 to present) and standardized research vessel surveys that have become the backbone of fisheries and habitat management in the region. The long-term dataset obtained through SEAMAP surveys provides the only region-wide, inter-jurisdictional mechanism for monitoring the status of populations and habitats. Through its cooperative nature, SEAMAP has the ability to sample the entire coastline from North Carolina through Texas during the same time period and describe the distribution and abundance of fish populations throughout their range in order to better evaluate the status of recreational and commercially utilized fish stocks.

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. In the South Atlantic region, surveys include Coastal Survey (previously known as the Shallow Water Trawl Survey), Pamlico Sound Survey, and Bottom-Mapping and Fish Characterization and Assessment (all described further below). In addition to these surveys, SEAMAP participates in a variety of other projects such as the Cooperative Winter Tagging Survey Cruise, a coordination role for assessing striped bass population structure and estimating fishing rates of the migratory Atlantic Coast stock. SEAMAP-SA also has a Crustacean Workgroup that continues to be a forum for state biologists and scientists from the South Atlantic region to discuss and address issues regarding shrimp and blue crab management and research.

SEAMAP-SA Coastal Survey

The SEAMAP-SA Coastal Survey collects fishery-independent data concerning species abundance, distribution, and habitat, which provide valuable fishery information to managers, scientists, and students in the South Atlantic Bight region. The South Atlantic Coastal Survey samples waters from 0-10 fathoms from Cape Canaveral, Florida to Cape Hatteras, North Carolina during the three seasonal quarters of spring, summer, and fall. Gear and survey

procedures are standardized to ensure collection of quality data with a synoptic view of the relative abundance and distribution of the stocks. Effort is made to obtain age-growth and reproductive stage data, as well as analyze gut contents of key sciaenid species (weakfish, Atlantic croaker, and southern kingfish).

Current state surveys are directed primarily at shrimp and are sufficient for some basic management needs; however, the coordinated, standardized SEAMAP survey provides fishery and ecological data covering the entire region. Most sciaenids, king and Spanish mackerel, menhaden, mullet, bluefish, blue crabs, herrings, jacks, horseshoe crabs, sea turtles and numerous forage species spend part or most of their early life in shallow shrimp trawling grounds in the South Atlantic area. These species have immense commercial and recreational value and form the basis of many of the principal South Atlantic fisheries. Community level data obtained via the Coastal Survey are applicable to management and monitoring of all sampled species. Data collected include distribution and abundance of various life history stages, recruitment to nursery grounds and subsequent recruitment to fisheries, spawning stock size, and the effects of various environmental fluctuations on abundance and distribution.

FWC-FWRI is poised to assist South Carolina Department of Natural Resources (SCDNR) to enhance database usability and dissemination through the creation of GIS products. The SEAMAP data and associated GIS have been incorporated into the South Atlantic Habitat and Ecosystem Internet Mapping System (IMS) of the South Atlantic Fishery Management Council. This system is being developed in cooperation with the Florida Fish and Wildlife Research Institute. The IMS is a living repository of historic and current information to be used by the general public, recreational and commercial fishermen, researchers and resource managers.

North Carolina Pamlico Sound Survey

The North Carolina Pamlico Sound Survey (PSS) is a program component of the SEAMAP South Atlantic and is conducted by the North Carolina Division of Marine Fisheries (NCDMF). This seasonal trawl survey is designed to provide a long-term (since 1989) fishery-independent database on the distribution, relative abundance, and size composition of target species of estuarine fish and decapod crustaceans for the waters of Pamlico-Albemarle Sound. Cruises sample approximately 52 stations each in June and September. The data are processed by NCDMF and are made available to the SEAMAP DMS.

During FY 2007, fifty five species of finfish, and invertebrates, were captured during the June cruise. The top five species that are considered economically important include: spot, Atlantic croaker, blue crab, Callinectes sapidus, weakfish, and white shrimp which made up 91% of the catch by number. Seventy-one species of finfish and invertebrates were captured during the September cruise. The top five species of spot, Atlantic croaker, weakfish, pink shrimp and southern kingfish made up 84% of the total catch by number. More information on the results of these surveys is available at www.asmfc.org under the Research & Statistics section of the website.

Bottom-Mapping and Fish Characterization and Assessment

- *Mapping and Assessment of Hard Bottom Resources (Biotic and Abiotic)*

Because substrate is a major determinant of faunal distribution and composition, a detailed description of superficial geology is being compiled for the South Atlantic area. Knowledge of the presence and extent of hard bottom areas, coupled with fish abundance estimates from certain areas, are essential to determine standing stocks or carrying capacity estimates for reef species. A protocol for mapping hard bottom habitats has been developed by SEAMAP-SA (Ross et al. 1987a and b). Features of the data include the location and extent of hard bottom, water depth, relief of bottom type, and detailed information on the source and type of information available in order to facilitate investigators in querying original data sources. Once existing data sources are summarized to document known hard bottom areas, future surveys will focus on areas where no data exist and on determining whether hard bottom areas are stable, increasing, or diminishing due to both natural factors, such as storm waves and shifting sands, and human activities, such as mining and trawling. The Minerals Management Service, as well as other state and federal agencies have already gathered a great deal of information, but it has not been made generally available. The area from the shoreline to the 200m-depth contour from Cape Hatteras southward to Florida has been examined, and the data are included in the SEAMAP Information System, and are published in two SEAMAP-SA completion reports, and on a CD-ROM in a GIS format.

The South Atlantic Bottom Mapping Work Group has compiled a database of bottom habitats from North Carolina to the Florida Keys, in a searchable GIS format available on CD-ROM. Those data were adopted as the primary definition of essential fish habitat by the SAFMC. In addition, all SEAMAP surveys record data on the distribution of fish both geographically and within environmental variables such as temperature and salinity, which is the first step in defining environmental limits in essential habitats utilized by each species of fish. SEAMAP hardbottom data have been used by the SAFMC to develop alternative management options to protect coral areas from rock shrimp trawling, define essential fish habitat, and investigate marine protected areas.

- *Assessment of Adult Red Drum Populations on the Southeast Atlantic Coast*

SEAMAP-SA is designating some new funds towards work supporting the states of South Carolina, Georgia and Florida to continue their adult red drum survey. These efforts contribute to the understanding of adult red drum populations along the southeastern Atlantic coast (North Carolina to Florida) by expanding the currently available data, thereby allowing for more effective and responsible management of the stock. Access to important information on the red drum stock could be used for a coastal sharks assessment in the South Atlantic.

The expansion of adult red drum sampling, both spatially and temporally, is essential to the development of area specific information on stock status. Fishery-independent surveys will allow for determination of catch per unit effort (CPUE), which is necessary to determine population size and trends in abundance. Age structure of the spawning stock permits the estimation on the level recruitment (escapement) into the spawning population. This will act as a

check on the results of available assessments based on data for sub-adults. Additionally, better estimates of escapement and age composition will allow comparison of the findings with the recommended Spawning Potential Ratio (SPR). Tagging and releasing efforts will assist with identifying migration within and among strata. Combined efforts from North Carolina to Florida will be utilized to gain a better understanding of stock size, composition and movement so the species can be managed responsibly.

The proposed research was developed and adopted by the South Atlantic Committee to address high priority assessment needs for the region as highlighted by the SEDAR research and monitoring needs report.

- *Collaboration with MARMAP*

A major tenet of the SEAMAP program is to "maximize effective capability of fishery independent and associated survey activities to satisfy data and information needs of living marine resource management and research organizations in the region. The primary means of performing that task is to optimize coordination and deployment of sampling platforms used in the region to obtain regional, synoptic surveys and provide access to the collected data through documents and accessible computerized databases." Also, while the foundation of the program is in long-term data series, SEAMAP is also involved with special resource and environmental studies that may enhance survey information and are important to the region. Furthermore, the coupling of activities maximizes the cost-effectiveness of survey activities.

Forthcoming SEAMAP projects complement and expand from MARMAP sampling to address high priority needs for providing access to data and supporting refined stock assessments in the region. This collaboration between programs maximizes researchers' ability to collect data for high priority over-fished species in the snapper grouper complex managed by the South Atlantic Fishery Management Council in cooperation with their South Atlantic State partners.

Recommendations from a recent SEDAR report involve expanding and modifying the MARMAP and SEAMAP programs as well as initiating new programs. Besides developing comprehensive independent surveys in South Atlantic areas, it is also recommended that spatial and age composition information should be enhanced for existing surveys. Concerns have been raised with the MARMAP survey primarily related to geographic and temporal coverage and thus SEAMAP funds could include additional sites to expand this coverage.

SEAMAP-SA plans to develop a phased in SEAMAP sampling protocol for a nearshore ocean larval/sub-adult/adult finfish survey associated with live/hard bottom habitat from Cape Hatteras, North Carolina to Sebastian Inlet, Florida to complement offshore sampling conducted through the MARMAP survey. In addition, additional expansion of offshore site sampling through SEAMAP will result in more complete coverage and address identified shortfalls of the MARMAP sampling regime. Standardized regional fishery-independent sampling of representative live/hard bottom habitat identified in the bottom mapping project would provide extremely useful data that will enhance stock assessments and refine essential fish habitat information on early life stages use of nearshore live/hard bottom habitat. The SEAMAP survey

would target larval, juvenile, sub-adult and adult finfish dependant on live/hard bottom habitat on a year-round basis with high priority target species including black sea bass, gag and red drum. Regional fishery-independent sampling through SEAMAP supported surveys will provide essential stock identification and characterization data (geographic distribution, relative abundance) needed to improve overall abundance indices and assessments of southeastern finfish populations and fully complement ongoing management and research efforts. The project would also conduct phase 1 of juvenile tagging to track movement through inlets to nearshore and mid-shelf bottom habitats (supplement North Carolina effort with companion test in South Carolina) and tagging of emigrants out of estuaries into nearshore and mid-shelf benthic habitats.

Additionally the SEAMAP-South Atlantic has been working towards complete bottom mapping in coastal waters (shore-200m) with associated bottom type -sediment and/or live bottom (including coral, leptogorgia, hydroids, SAV, shell bottoms, etc). Along with the mapping, fish/habitat characterization needs to be refined and thus coordination on this topic with MARMAP is very important. Expanding the scope of fishery independent sampling through a collaboration of MARMAP and SEAMAP program data collection would meet stock assessment needs and address several SEDAR recommendations, demonstrating the importance of new SEAMAP surveys and data collection.