Several new studies are underway at MRRI including:

OCEAN EXPLORATION

A study to assess reef fish habitats as important spawning areas off the coast of South Carolina.

George Sedberry, Senior Marine Scientist and Assistant Director of MRRI, was recently awarded a grant from the National Oceanic and Atmospheric Administrations Office of Ocean Exploration to map important deep reef habitats. The project will use high-resolution multibeam and side scan sonar and remotely operated vehicles (ROVs) equipped with video cameras to produce detailed maps of important fish habitats. The project will focus on mapping areas along the outer continental shelf, in particular a reef that spans the South Carolina coast at a depth of 200 feet, and stretches from the North Carolina border south to northern Florida. They will also look at the upper continental slope and will map areas at depths as great as 2,000 feet.

Mapping the distribution of the reef fish and their habitats is an important step in recognizing their complex habitat and determining why reef fish choose these areas to live, feed and spawn. The shelf-edge reef is a particularly important spawning ground, and we don't fully understand what characteristics make this reef so attractive to spawning fishes.

Currently, many of the known spawning sites for these economically important fish, including tilefish, snowy grouper, red grouper and gray triggerfish, are found in proposed Marine Protected Areas, which are in the process of being designated being by federal fishery management agencies as areas where bottom fishing will not be allowed. A broader understanding of these topographical areas is one of the primary goals of the research, which will assist with sound fishery management decisions and plans. Maps of areas surrounding the Marine Protected Areas will also be configured, so that researchers can determine the distribution of habitats and associated reef fishes in relation to proposed closed areas. These maps will help evaluate the effectiveness of the regulations in protecting economically valuable species off South Carolina.

The multi-disciplinary approach to the project will use sonar mapping of features found on the ocean floor to determine the characteristics of reefs that are important spawning grounds, and to locate similar unmapped grounds. Features to be mapped found include deepwater coral reefs, rocky reefs, reefs constructed by worms that build hard carbonate tubes, and depressions and

burrows formed by nest-building and burrowing fish. The sonar mapping will help to produce habitat maps for the region, and will provide high resolution images of these areas and the features that are essential fish habitats.

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DIADROMOUS FISH STUDIES (Sturgeon/Eels/Shad)

Annual juvenile Atlantic sturgeon recruitment index

An annual juvenile Atlantic sturgeon recruitment index is being conducted in the Edisto River estuary using drifting gillnets. Sampling has been standardized to May-September. Recruitment appears highly variable, and current research is focused on relating recruitment with environmental factors.

American shad spawning migrations

American shad spawning migrations are being sampled annually, rotating between the Waccamaw, Santee, and Edisto rivers. Fish are tagged by biologists, and commercially caught fish are sampled for sex ratios and ages.

Population status of the shortnose sturgeon

Shortnose sturgeon, an Endangered Species, will be tagged in the Savannah River in order to assess the status of that population.

Life History of adult Atlantic sturgeon

A former commercial sturgeon fisherman is collaborating with SCDNR to capture and tag adult Atlantic sturgeon in the Edisto River. Catch rates are higher than anticipated. Valuable life history information is being collected by biologists who inspect each fish.

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MARICULTURE

National Initiative for Aquaculture Development and Fishery Enhancement of Cobia, Rachycentron canadum

This project utilizes a multi-disciplinary effort to evaluate growth rates, reproduction and population dynamics of cobia in the Broad River and St. Helena Sound. In addition, the study will determine if there are genetic differences between fish caught along the coast of the Southeast United States. This information is necessary for managing wild stocks. In addition, cobia will be captured from the wild and spawned in the laboratory and the resulting offspring used to evaluate the potential for stock enhancement of this species. Tagged fish that are released into the wild will provide information on seasonal migration patterns and behavior.

Striped Bass Population Restoration in the Charleston Harbor Estuary

Historically, South Carolina's estuaries, including Charleston Harbor, supported large populations of striped bass. Restoring a key indicator species like striped bass to this estuary would be an important step toward the state conservation goal of reestablishing and maintaining the historic biodiversity. The goal of the project is to stock two sizes of juveniles from SCDNR and US Fish and Wildlife Service hatcheries in the Ashley River. DNA fingerprinting will be used to discriminate hatchery from wild fish collected during monthly electro-shocking and trammel net sampling. This study will allow us to determine strategies for re-introducing through stock enhancement this important recreational fish in South Carolina's marine estuaries.

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Organic Farming of Marine Shrimp: A Holistic Approach to Management of Feeds & Microbial Dynamics

The US Department of Agriculture's Integrated Organic Program awarded SCDNR's Mariculture Section a grant to develop techniques for culturing organic certifiable shrimp that can command competitive prices and can be raised in a sustainable manner that ensures high nutritional quality, safety from chemical contamination, and minimal environmental impact from wastes. This is the first aquaculture proposal funded in the three years the Integrated Organic Program has been in existence. The project will develop, disseminate, and demonstrate protocols for a holistic approach to driving the functional dynamics of microbial floc communities in zero-exchange shrimp aquaculture systems by managing feed formulations and nutrient inputs. This ecosystem based approach will increase shrimp growth, productivity and product quality by carefully integrating feed formulation with naturally derived nutritional supplementation. It will also

reduce waste export to the environment through enhanced nutrient cycling and reduce both economic risk and livestock stress by stabilizing water chemistry. With the pending establishment of USDA standards for organic aquaculture, the timing of dissemination of practical results of this research will be opportune to yield verifiable increases in organic shrimp production.

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Commercialization of Bait Shrimp Farming Based on Specific Pathogen Free Stocks

Funded by the National Oceanic and Atmospheric Administration's Marine Aquaculture Program this research will contribute significantly to the development and viable commercialization of the farm-raised bait shrimp industry. Working with native white and brown shrimp, this work will develop specific-pathogen-free breeding stocks that can be used to raise and disseminate larval shrimp for public and private sector bait production. Experiments will be used to evaluate the commercial production potential of these two species under environmentally and financially sustainable culture conditions. Following a market survey and a financial feasibility analysis, information products for US farm-raised live bait shrimp will be developed and disseminated through outreach, extension, and demonstration projects. While directed by scientists at SCDNR, this work is being accomplished through collaboration with specialists in Alabama, Florida, Mississippi, and Texas.

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ENVIRONMENTAL RESEARCH

Monitoring of the Kiawah Island East End Erosion Project

The Environmental Research Section received funding from the Town of Kiawah to monitor the invertebrate communities around a lagoon that supports a significant overwintering population of endangered piping plovers. The Town of Kiawah recently modified the lagoon to prevent erosion of beaches to the west, but the modifications could place the piping plover habitat in peril. SCDNR together with the US Fish and Wildlife Service are studying the plover population and their primary food source (invertebrates) in order to prevent the loss of this important bird habitat.

Biological Monitoring of the Hilton Head Beach Nourishment Project
The Environmental Research Section received funding from the Town of Hilton Head to monitor the physical and biological responses of Hilton Head's beaches and nearshore sand shoals to recent beach nourishment activities. ERS is funded to monitor sand charcateristics and ghost crab populations on the beach and sand characteristics and invertebrate communities on the nearshore shoals. This information can then be used to improve nourishment practices throughout the state and the southeast.

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SHELLFISH RESEARCH

Oyster Restoration Study
The Shellfish Research Section has received a grant from the National Fish and Wildlife Federation to conduct oyster restoration research in the Cape Romain area of the state, in collaboration with the North Inlet-Winyah Bay National Estuarine Research Reserve and The Nature Conservancy. The 18 month project will begin in fall 2006.

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