

South Carolina Fishery-Independent Research

An Ecosystem View

Dale Theiling

Covered Earlier

SEAMAP Shallow Water Trawl Survey

- To monitor status and trends of economically important coastal species - Cape Hatteras to Cape Canaveral

MARMAP

- To monitor the status and trends of offshore reef fish populations - NC to Florida

Covered Later

Caro-COOPS

The *Carolina Coastal Ocean Observing and Prediction System*

- Development of remote Ocean Observing Systems to monitor
 - storm surge
 - oceanographic conditions
 - fish populations
 - measure conditions that might help predict fish catches

Marine Artificial Reef Program

Samples two experimental reef sites to assess

- finfish colonization
- finfish production
- migration patterns
- invertebrate colonization

Covered Later

South Carolina Estuarine and Coastal Assessment Program (SCECAP)

- ◆ To evaluate overall estuarine habitat quality and biotic condition throughout the coastal zone integrated and complementary to SCDHEC Water Quality Monitoring Program.

Fisheries Independent Activities Support

- **State Fisheries Management and Resource Protection Responsibilities**
- **Inter-jurisdictional Fisheries Management via**
 - Atlantic States Marine Fisheries Commission
 - South Atlantic Fishery Management Council

Components of the SC DNR Division of Marine Resources

OFFICE OF FISHERIES MANAGEMENT

- responsible for managing marine resources and their associated habitats, including integration of economic and social benefits provided by these resources, and the equitable utilization of fishery resources.

MARINE RESOURCES RESEARCH INSTITUTE

Works closely with the Office of Fisheries Management to conduct research and monitoring programs to assess the condition of coastal resources and provide data required to address policy and management issues related to those resources.

Shellfish Management

- Assessments of intertidal resources for suitability for clam and oyster harvesting
- Assessments on Public Grounds to set priorities for cultch planting and cultivation
- Whelk resources assessments for a commercial whelk fishery

Research Coordination with Marine Resources Research Institute

- assess intertidal oyster beds
- collect samples for disease analysis
- work with NOAA's Coastal Services Center to employ imagery, imagery analysis, and ground truthing to assess intertidal oyster populations

Dolphin Fish Tagging Study

- ◆ To document dolphin movements and migration in the NW Atlantic US east coast
- ◆ Acquire data on temporal and spatial distribution in US waters
- ◆ Employs fishery dependent and independent tagging
- ◆ Data used by NOAA in ID of stocks and development of a stock assessment model

Environmental Management Section

Provides thorough reviews, documentation, and comments on anthropogenic and natural changes that could negatively affect the natural resources of the coastal zone

Sea Turtle Project

- ◆ four year, federally funded
- ◆ trawl net survey
- ◆ to develop an index of abundance for sea turtles
- ◆ to examine migratory behavior of juvenile loggerheads, using satellite tags

Cooperative Research Program

- four year cooperative research program
- to develop cooperative research projects with recreational and commercial fishermen
- fishermen can provide assistance in addressing management issues and research questions

Hammock Island Project

- ◆ Ecological characterization of coastal hummock islands
 - ◆ part of a larger study mapped all islands
 - ◆ stakeholder group to review regulations related to island development
 - ◆ to document the diversity of habitats including freshwater depressions and wetlands.
- Concluded relative biological importance of islands related to:
- ◆ size
 - ◆ shape
 - ◆ elevation
 - ◆ presence of freshwater
 - ◆ location
 - ◆ degree of development.

Fisheries Research Programs

- To conduct monitoring and assessment projects that evaluate the status of stocks of economically valuable species
- To develop and evaluate new technology and methods to determine the status and trends of fish populations
- To conduct research to determine factors influencing the abundance and distribution of key fishery species
- To initiate programs with OFM staff to assess effectiveness of management actions and evaluate management alternatives.

NOAA Ocean Exploration expedition, "From the Estuary to the Abyss"

- submersible dives
- sonar surveys
- plankton stations
- bottom sampling with nets
- deep reefs 180 to 3000 feet
- educational materials developed

Described

- deep coral mounds
- deep reef fishes and their habitats
- associated invertebrates

Research on the Charleston Bump

- Tracking currents generated by Gulf Stream flow over the Bump
- Over deep-reef spawning grounds for important fishes
 - gag
 - snowy grouper
 - red porgy
- Satellite-tracked drift bottles
 - to track currents over the spawning grounds
 - to determine role of Charleston Bump in early life history of continental shelf reef fishes
- Satellite tagging of billfishes
 - Charleston Bump
 - Georgetown Hole
 - other billfish hotspots

Inshore Recreational Fish Surveys

- Monitor recreationally important estuarine finfish
- to derive indices of relative abundance
 - red drum
 - black drum
 - spotted seatrout
 - southern flounder
 - sheephead

Employs

- trammel net surveys
- tag & recapture studies
- electrofishing surveys

Adult Red Drum Research

- Longline sets to evaluate the performance of external tag types
- Tag, recapture and age to validate the annual nature of otolith ring formation and refine aging techniques for adult fish.
- Fin clips for Genomics Program analysis as non-lethal means to distinguish natural stock from stock enhancement

Coastal Shark Research

NMFS Coop Atlantic States Shark Pupping and Nursery Survey (COASTSPAN)

- Estuarine sampling with longline and gillnet
- Ocean sampling in conjunction with the red drum longline sampling
- Bonnethead tag returns utilized to describe site fidelity and migratory behavior
- Longline CPUE submitted to NMFS for updated large coastal stock assessment
- Support of a regional comparison of environmental contaminant loading in bonnetheads

Diadromous Fish Research

- collection of diets information
- samples for genetic comparison of fish from various rivers
- standardized sampling of sturgeons to determine long-term abundance trends of young
- Shad research included both fishery-dependent and -independent sampling
- To monitored abundance, determined the age distribution, collected genetic samples, and angling success
- Shad data employed in a 5-year ASMFC stock assessment
- Standardized sampling of elver abundance

Arthropod/Crustacean Investigations

Shrimp and Blue Crab Monitoring

- ◆ to monitor abundance of shrimp and blue crab life stages in inshore waters to provide information on shrimp as they begin migrating toward the ocean
- ◆ to forecast harvest prediction

Horseshoe Crabs

- ◆ Biological data from regular trawl sampling
- ◆
- ◆ ASMFC compliance report detailing biological and biomedical facility observations

Molluscan Shellfish Research Programs

- To conduct research and related monitoring to assess oyster resources and habitats:
- To utilizing novel assessment methods, including high resolution imagery
- synthesizing research data on reefs as critical habitat
- evaluating statewide oyster restoration efforts
- monitoring shellfish disease
- continuing a statewide community-based oyster restoration program (SCORE)
- characterizing shoreline erosion and documenting causative agents

Molluscan Shellfish Monitoring and Assessment

- Examining oyster spat success as indicator of recruitment potential & site quality
- Assessing the status of harvested grounds and undesignated oyster areas
- Limited disease assessment

Oyster Restoration Programs

- Planting new oyster and whelk shell to establish or enhance oyster populations
- Recommending sites and methods for planting harvest areas
- Define ecological functions of intertidal oyster reefs
- To help establish criteria for successful oyster reef restoration.

Southeastern Regional Taxonomic Center (SERTC)

- ◆ Marine invertebrate specimen collection

- ◆ material from

- offshore cruises

- local estuaries

- the College of Charleston invertebrate collection

- donations of specimens from MRD projects

- the public

Digitally-catalogued collection and database

- ◆ 2100+ specimen lots

- ◆ 1600 collection events

Electronically cataloged taxonomic literature collection

- ◆ 3000+ articles and books

Catalogued fish collection

- ◆ from Grice Marine Laboratory

- ◆ 3500+ species records

SERTC website

- ◆ extensive photo gallery

- ◆ species fact sheets

- ◆ online identification keys

- ◆ workshop advertisements

ENVIRONMENTAL AND WETLAND HABITAT RESEARCH

Conducts studies to evaluate consequences of human-related activities on marine and estuarine resources

Projects:

- to assess the condition of SC estuaries
- to evaluate the impact of non-polluting anthropogenic activities on critical habitats and communities
- to monitoring algal communities and blooms
- to conduct water quality and wetland studies in the ACE Basin NERR

ENVIRONMENTAL AND WETLAND HABITAT RESEARCH PROGRAMS

**Monitoring and Assessment
Program for NOAA's
Oceans and Human
Health Initiative**

Studies linkages between
land use and the
environmental and
biological quality of
associated tidal creeks

**ACE Basin NERR
Research Program**

- biological and environmental monitoring efforts
- to monitor water quality and weather conditions
- habitat classification pilot study

Harmful Algal Bloom and Phytoplankton Research Projects

- to survey the statewide causes, distribution and prevalence of Harmful Algal Blooms (HAB) and their impacts on natural resources and human health.
- to document algal blooms and related fish kills
- to understand the causative agents of harmful algal blooms

Coastal Ocean Studies

- ◆ *Study to Evaluate the Effects of Beach Nourishment at Folly Beach*
- ◆ *The Effects of Open Water Disposal of Sediments in the Charleston Ocean Dredged Material Disposal Site (ODMDS)*
- ◆
- ◆ *An Environmental Monitoring Study of Hard Bottom Reef Areas near the Charleston Dredged Material Disposal Site*

Mariculture Project - Red Drum Stocking Study

In part

- to examine red drum natural variability as well as impacts of stocking
- to assess the contribution of hatchery-reared red drum on wild stocks

Marine Genomics

Genetic studies of several marine finfish, oysters, shrimps and shrimp viruses, including application of genetic tags to assess the contribution of hatchery-reared red drum to the wild stock.

Fishery Independent Research Support Functions

- ◆ Information Technology
- ◆ GIS Lab
- ◆ Fisheries Statistics
- ◆ Resource Economics
- ◆ Vessel Operations
- ◆ Scientific Permitting