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Collaborations

A monthly report on collaborative research projects in the northwest Atlantic Ocean.

Photo courtesy of SMAST

SMAST AND FISHERMEN BREAK NEW GROUND WITH SCALLOP RESEARCH

By Michael Crocker

It's how collaborative fisheries research is supposed to work: Government managers say a stock is depleted. Fishermen disagree. Scientists and fishermen work together to find the truth of the matter, whatever it may be, and a brighter picture of the stock's health emerges.

So far this has been the story of the collaborative sea scallop surveys done by scientists at the University of Massachusetts Dartmouth, School for Marine Science and Technology (SMAST) and members of the New Bedford commercial scallop industry.

Four years ago, the team proved that historic scallop fishing grounds on Georges Bank, which had been closed to protect depleted groundfish stocks since 1994, contained some of the highest densities and largest scallops ever recorded. Consequently, the National Marine Fisheries Service permitted scalloping in areas that were previously off-limits.

In fact, the video survey technique used was so effective and efficient, the scientists and fishermen dreamed a little bigger and designed a survey that would cover the species' entire commercial range, from Georges Bank to Virginia.

Last summer more than 120 scallop vessel owners, processors, and equipment suppliers pooled their resources to cover the cost of food, fuel and crew needed for the most comprehensive survey of sea scallops ever undertaken.

Four fishing vessels—Huntress, Nordic Pride, Liberty, and Friendship—served as research platforms and the Massachusetts Division of Marine Fisheries provided funds for scientific personnel and equipment. Additional support was provided from vessels across the mid-Atlantic.

In fact, the video survey technique used on Georges Bank was so efficient, the scientists and fishermen dreamed a little bigger and designed a survey that would cover a large portion of the sea scallops natural range, from Georges to Virginia.

"A scientific project of this scope is made possible by working with fishermen, from start to finish," said Dr. Kevin Stokesbury, a biologist at the University of Massachusetts Dartmouth, School for Marine Science and Technology (SMAST).

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Scallops (continued)

Between May 27 and August 25, nine weeklong cruises were conducted, covering 16,600 square nautical miles of scallop habitat. The effort provides the best information on the distribution and abundance of scallops and their habitat available to date, and the knowledge gained will further conservation of scallops for years to come.

Atlantic sea scallops (Placopecten magellanicus) are found in the waters along the continental shelf from Cape Hateras, North Carolina, to northern Canada. Traditionally, the National Marine Fisheries Service estimates their abundance during a series of surveys, using a commercial-style dredge modified for research.

But how well these estimates reflect the actual number of scallops beneath the waves depends on a number of sometimes intractable variables, such as bottom-type, scallops' ability to avoid capture, and the duration of tows.

The SMAST survey attempts to bring a greater measure of control to surveys by using underwater video. The device records live footage of scallops, allowing for accurate counts, sizes, and detailed habitat information. It can be mounted on any commercial fishing vessel of sufficient size.

The system was designed by Stokesbury and, Brad Harris, a graduate student and former Alaska fisherman at SMAST with help from the fishing industry.

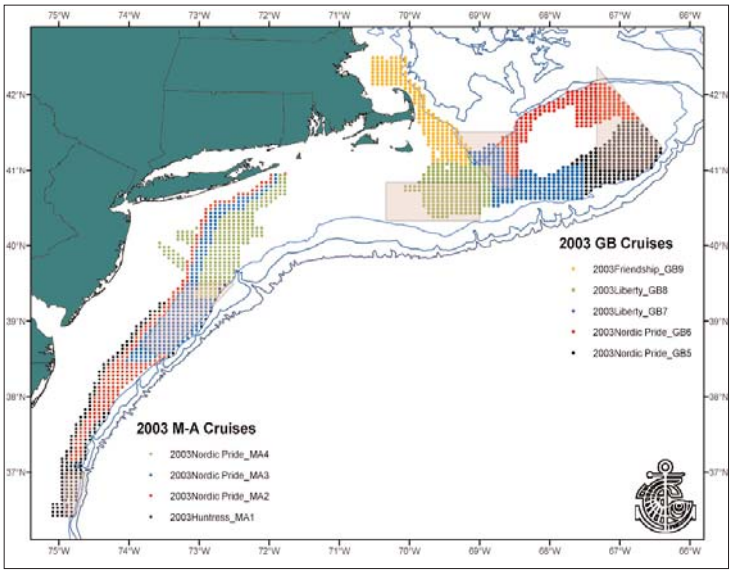
It works like this: A 1000-pound "sampling pyramid," equipped with underwater cameras and lights, is lowered to the sea bottom at a series of stations set three miles a part in scallop habitat. The procedure is repeated four times at each station to achieve a high level of accuracy. Live video is recorded at sea, and still images of each sample are digitized in the lab. Scallops are counted and measured by technicians using calibrated image analysis software.

The total number of scallops in the survey area is estimated by multiplying the number observed in the 13 meter square sample by the area of each station (9 nautical miles). This provides an abosolute estimate of abundance and is a relatively straightforward calculation. Because no animals are collected and the seafloor isn't disturbed, no permits are required.

"The objective of this survey was to provide an estimate of absolute scallop abundance and size structure at a high degree of accuracy and precision," said Harris. "Our hope is that the information will give the most accurate and precise picture of the scallop resource to date. Because, in the long run, the more precise we are with our surveys the better it is for scallops and fishermen."

Scientists are still compiling the data gathered for analysis on a GIS mapping system that will allow multiple data sets—scallop size and abundance, habitat type, and others—to be viewed simultaneously. Preliminary results already suggest the presence of more and bigger scallops than previously indicated.

Sea scallops are the second largest fishery in the north-eastern United States, with an average landings value of $ 100 million. Since 1999, Stokesbury and his students have worked in collaboration with the scallop industry to complete 31 video surveys.



(*Images courtesy of SMAST) Top: A GIS-based image of the sample area shows the project's enormous scope, from Georges Bank to Virginia. Each dot represents an individual sample station. Bottom: Dr. Kevin Stokesbury stands with the "sampling pyramid." The device supports video cameras at a fixed distance from the base.*

Michael Crocker

The Northern Shrimp Demonstration Project

By Michael Crocker

Scientists with The Gulf of Maine Northern Shrimp Demonstration Project are asking fishermen for assistance with a project that will bring together comprehensive information about the Northern shrimp fishery on a new interactive website.

"In order to better understand and manage the fishery it is critical to integrate various data sets on shrimp biomass and environmental conditions in the Gulf of Maine," said Tom Shyka, a scientist at the Gulf of Maine Ocean Observing System (GoMOOS).

"Fishermen are an important source of information about shrimp catch and the factors that influence the northern shrimp population."

For many New England fishermen, shrimp are an important component of a year's work that may also include harvesting groundfish and lobster. But, over the past two decades shrimp landings have fluctuated widely, prompting scientists, fishermen, and managers to search for an explanation.

It has long been thought that because shrimp are at their southern limit in Maine, even subtle environmental changes, such as water temperature or salinity, could significantly impact shrimp populations. But with so much information from so many sources to consider it has been difficult to prove the relationship with the scientific certainty necessary for management.

The Northern shrimp project would like to change that, by compiling an enormous volume of data related to the fishery from a variety of sources.

The partnership of scientists and technicians from GoMOOS, the University of Maine, Maine's Department of Marine Resources, NOAA's Northeast Fisheries Science Center, and the Atlantic States Marine Fisheries Commission have already begun coordinating information from shrimp trawl surveys, landings reports, oceanographic models and monitoring buoys, fishery independent surveys, and fishermen.

By December, the information will be dynamically incorporated on an interactive Internet mapping site, according to Shyka.

"The map will allow users to follow the shrimp catches and review information from multiple data sources on a single easy-to-use map. They will also be able to overlay other relevant information such as bathymetry and sea surface temperature from satellite imagery," he said.

"The hope is that with all this information together, important patterns about the relationship between environment and shrimp populations will emerge. Such an understanding would allow us to bring more stability to a resource that so many New England fishermen depend on."

The $125,000 pilot project is funded by the National Virtual Ocean Data System (NVODS), a consortium of public and private science institutions from across the country that works to present oceanographic and other scientific information in a format accessible to government managers and the general public.

To learn more...

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