

Public-private partnership helps monitor fish populations

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Researchers Jameson Gregg, Kristene Parsons, and Greg Mears of the Virginia Institute of Marine Science sort the catch during a recent NEAMAP Trawl Survey cruise. Credit: Photo by Rosemary Hicks/VIMS.

Managing commercial and recreational fisheries is a complex and sometimes contentious process in which fishing interests, scientists, and regulatory agencies don't always see eye-to-eye.

Researchers from the Virginia Institute of Marine Science (VIMS) are now working with commercial fishermen to collect and share fisheries data in a cooperative venture that promises to build trust and foster the mutual goal of sustainable and profitable fisheries in the Mid-Atlantic and New England regions.

The VIMS team, led by fisheries scientists Rob Latour, Chris Bonzek,

and Jim Gartland, is a key part of NEAMAP—the NorthEast Area Monitoring and Assessment Program. The NEAMAP Mid-Atlantic/Southern New England Near Shore Trawl Survey team at VIMS also includes Jameson Gregg, Evan McOmber, Deb Gauthier, Melanie Chattin, Greg Mears, Kristene Parsons, and Kevin Spanik.

Since 2007, the VIMS team has partnered for one spring and one fall survey each year with the crew of the fishing vessel *Darana R*, a 90-foot commercial trawler out of Hampton, Virginia. The boat is captained by Jimmy Ruhle from Wanchese, North Carolina, with help from mates Bobby Ruhle and Rigo Rodriguez. When not doing survey work, the trio mainly fishes squid and herring.

Gartland, who leads the VIMS team at sea, says "The way we conduct our survey—cooperative research where scientists team up with commercial fishermen—is coming more into favor. One of its big advantages is that it allows us, as scientists, to do what we're best at—data collection and analysis, and lets the fisherman do what they're best at—fishing and making the gear work correctly and consistently. Putting that together makes a great partnership."

Each survey keeps the team at sea for four to five weeks depending on weather and other factors. They tow a trawl net for 20 minutes at 150 randomly selected sites per cruise, in inshore waters from Cape Hatteras north to Cape Cod. All told, they've spent 262 days at sea during the last 4 years, plus countless hours in the lab at VIMS processing samples and analyzing data.

Their data—recording factors such as length, weight, age, sex ratio, and diet—have now been used to help manage commercially and recreationally important species throughout the coastal waters of the northeastern U.S. These include spot, croaker, drum, summer flounder, and weakfish in the more southerly waters, and black sea bass, scup,

squid, spiny dogfish, and winter flounder toward the north. NOAA's latest estimate of the annual ex-vessel value of commercial landings from these waters is \$283 million (2008 data).

"The selection of a team from VIMS to manage this interstate survey reflects the reputation our scientists have earned through decades of monitoring work in Chesapeake Bay," says VIMS Dean and Director John Wells. "Their work helps ensure sustainable fisheries not only along the Atlantic seaboard, but also in the Bay, since many of the fishes they monitor spend considerable time in local waters both as juveniles and adults."

Praise for the survey also comes from U.S. Senator Charles Schumer, who in a letter to former U.S. Commerce Secretary Gary Locke wrote "The Inshore Ocean Trawl Survey is a model of cooperative research... Along with New York, NEAMAP surveys will benefit all of the Atlantic coast states north of South Carolina."

Even though the researchers keep only five [fish](#) of each species and size group (small, medium, and large) for full analysis per tow—quickly identifying, weighing, measuring, and releasing the rest—their workload rapidly adds up. In 2010 alone, they caught and released 1,087,000 fishes weighing approximately 171,961 pounds, recorded the length of 143,642 of those, and spent months in the lab studying the stomach contents of 7,586 fishes and using ear bones to age 10,434 others. All told, the team has so far recorded 146 different species, including boreal, temperate, and tropical forms.



Researchers Cameron Ward and Jameson Gregg from the Virginia Institute of Marine Science process fish samples in the on-board lab during a NEAMAP Trawl Survey cruise. Credit: Photo by David Malmquist/VIMS.

Fishery-Independent Data

An important aspect of the VIMS NEAMAP survey is that it provides "fishery-independent" data. Unlike "fisheries-dependent" data—information from fishermen and dealers regarding catch, landings, and effort—fisheries-independent data are designed to be free from vagaries introduced by changes in factors such as fuel costs, fishing gear, market price, and consumer demand. They are thus much more suitable for assessing the true population characteristics of a particular species.

"Fisheries-dependent data give managers and scientists a picture of the fishery," says Bonzek, "while fisheries-independent data, over the long term, provide information on the stock status of a species."

The NEAMAP team ensures the validity of their data by sampling in a consistent manner from cruise-to-cruise and year-to-year. Whereas commercial fishermen will readily change to a more efficient net and move to where the fish are in an attempt to optimize their target catch, NEAMAP teams always use a standardized trawl net and sample

randomly within their study area.

"We select our tows using a stratified random design," says Gartland. "That means we break the survey up into different regions and use a computer to randomly select tows within each. That ensures that we have good spatial coverage and statistical validity."

The team's net—a 3-bridle, 4-seam bottom trawl—was specifically designed for survey work by an advisory panel that included commercial fishermen, trawl-gear manufacturers, academic scientists, and federal researchers at the Northeast Fisheries Science Center (NEFSC).

During each tow, the scientists and crew use electronic sensors to ensure that the net's "wingspread," "door-spread," and "headrope height" remain within accepted values. "When you're working with a survey net you want consistency so that your data are comparable across tows and surveys," says Gartland. "That way, you can tell if a species is on the increase, the decrease, or holding steady."

"Consistency in the performance of the survey gear ensures consistency in the catch data," adds Latour. "The more robust and sound the data, the more effective the fisheries management program."

Filling a "Data Gap"

NEAMAP was established in 2006 to meet the needs of fisheries management and stock assessment in the marine waters of the northeastern U.S. It complements a similar program called SEAMAP (Southeast Area Monitoring and Assessment Program), which operates from Cape Hatteras south into the Gulf of Mexico and Caribbean.

Neither NEAMAP nor SEAMAP was designed to replace existing fishery programs, but rather to coordinate and standardize procedures

and improve data quality and accessibility among existing programs—whether state or federal.

The impetus for this NEAMAP survey, which was established by the Atlantic States Marine Fisheries Commission in 2003, was a concern that existing surveys weren't collecting enough data from inshore waters to effectively manage certain fisheries along the lengthy stretch of seaboard between Cape Hatteras and the U.S.-Canadian border.

"When we sat down and mapped out which groups were sampling where, we realized that we had a problem in the coastal Mid-Atlantic and Southern New England regions," says Gartland. "New Jersey is the only state running a survey in their coastal waters, and the federal government—the NEFSC—was about to abandon their sampling of the near shore zone because their new boat had a very deep draft. These inshore waters support abundant populations and a rich diversity of fishes, and in turn valuable commercial and recreational fisheries, so ignoring these areas could make it difficult to generate reliable stock assessments and management plans for certain species. Our survey was designed to fill this sampling gap by providing high quality data to assessment scientists and managers for this critical area. So far we've been successful."

The VIMS component of NEAMAP—the Mid-Atlantic/Southern New England Near Shore Trawl Survey—currently supplements and extends the federal [survey](#), with responsibility for sampling all waters shallower than 60 feet between Cape Hatteras and Cape Cod—an area of roughly 4,500 square miles.

In addition to NEAMAP, VIMS researchers also operate ChesMMAP—the Chesapeake Bay Multispecies Monitoring and Assessment Program. Data from the ChesMMAP surveys help quantify major links in the Bay's food web, estimate population sizes for

recreationally, commercially, and ecologically important species, and identify their geographic and seasonal distribution.

Provided by Virginia Institute of Marine Science

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