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ALLIANCE FOR THE CHESAPEAKE BAY

NOAA takes stock of assessment scientists and comes up short

Number of experts able to analyze data is decreasing as role of fishery management is increasing

By Karl Blankenship

It's well-known that there's a shortage of many fish and shellfish in the Bay, and around the world, as stocks have been hit by overfishing, habitat loss and pollution.

Now, it turns out that there's a shortage of scientists to tell us that there's a shortage of fish.

A new federal report warns that the nation is facing a critical shortage of stock assessment scientists, the specialists who crunch numbers from various surveys to estimate the abundance of various fish populations.

Federal, state and regional fishery management agencies are likely to need 180-340 new fishery stock assessment scientists in the next 10 years, but a new report from the National Oceanic and Atmospheric Administration and the Education Department warns that educational institutions are on track to produce only about half of that number over the next decade-a shortage that could hinder efforts to improve fishery management.

"Fishery stock assessment people are an important cog in the sustainable management of marine resources because they report on the status of stocks and make recommendations about the options that managers have as far as regulating stocks and whether those plans will work," said Steven Murawski, director of science programs and chief science advisor for NOAA's Fisheries Service.

The National Marine Fisheries Service is the single largest employer of stock assessment scientists, but their numbers have declined over the last decade through retirements or like Murawski, promotions. Often, those positions have not been filled because of budget constraints.

Meanwhile, demand for stock assessments is increasing at the federal, state and regional levels as agencies struggle to end past overfishing practices and rebuild depleted stocks.

The federal need for stock assessment scientists was increased when the Magnuson-Stevens Act, was reauthorized last year. It required that the overfishing of stocks in federal waters-those more than 3 miles offshore-be ended by 2010. And, it required that the management plan for each of more than 200 species being managed to specify annual catch limits that ensure overfishing will not take place-something that takes detailed stock assessments.

At the same time, fewer stock assessment scientists are being trained because there are only a few institutions have people with the expertise to teach them. Further, the profession requires a master's degree, with a doctorate preferred. There's a shortage of research grants and fellowships available to help students get necessary real-world training.

Although NOAA has programs to help address those issues, the report said they are not adequate to meet future needs.

Another problem, the report said, is that most students lack the extensive math, statistical and

computer training needed to do stock assessments.

"It takes a student who is willing to take extra courses or at least do a lot of extra work on top of all their marine science work," said Rob Latour, associate professor of marine science at the Virginia Institute of Marine Science. "Most students want to go out in the field and touch fish and be in the environment. They don't want to sit behind a computer and crunch numbers."

While the bulk of stock assessment scientists are hired by the federal government-which pays roughly $50,000 a year for one with a master's, and more than $60,000 for a scientist with a doctorate-the problem also affects states and regional fishery management agencies.

"The states have a difficult time competing with the federal salaries," said Robert Beal, director of the Interstate Fisheries Management Program with the Atlantic States Marine Fisheries Commission. The commission does stock assessments and management plans for species such as shad, menhaden and striped bass, which migrate along the Atlantic Coast.

Although it has some stock assessment scientists of its own, the commission also relies on scientists from the states because it builds support for sometimes- difficult decisions.

"If the state assessment folks are working on the assessments, and you bring the state knowledge to the table, I think it helps the buy-in and the trust of the science a little bit more as well," Beal said.

A lack of stock assessment scientists also forces the commission to decide whether resources should be used to keep assessments current for high-value species such as striped bass, or be used to assess some stocks that have never been examined, he said.

The shortage is magnified because stock assessments today are often more complex than those done a decade ago Beal said. "Even if we had the same amount of individuals working and the same amount of talent level, each assessment is taking longer and longer, and is more sophisticated and more difficult to do."

Stock assessments can be time- consuming as scientists have to sort through various monitoring data- which were often collected for other purposes- combine it with information about fishing pressure and the life history of the species, and then incorporate it into complex mathematical models, which estimate the size of the stocks and how they might react to different management actions.

Depending on the complexity, a stock assessment can take several scientists months to complete. With a growing backlog of stock assessments, scientists have little time to evaluate the assumptions used in the assessments, or consider alternate approaches to the assessment, which might produce different results.

"When you are time-limited and you have a number of projects hanging over your head, you just sort of 'turn the crank' on the way you did it last time and add a couple more years of data and move on, rather than switch models, or do something entirely different," Beal said. "That's unfortunate, but it's the reality we're dealing with."

In effect, instead of getting the best information, the assessments provide the best analysis scientists have time to provide-which may leave a higher level of uncertainty about the analysis.

"What you lose is clarity on how much risk you are absorbing when you make a decision. When you lose the ability to understand how risky what you are doing is, you either shortchange the stakeholders because they could be doing more, or you shortchange the resource," said Lynn Fegley, a stock assessment scientist with the Maryland Department of Natural Resources.

Assessments perform another important role by identifying which monitoring data are most useful and what information gaps should be targeted in the future.

"When you don't analyze the data that is being collected, you can have surveys that have been going on for years and years and years, and nobody can tell whether the data the surveys are collecting are of any utility," said Tom Miller, a fisheries scientist with the University of Maryland Center for Environmental Science.

Several surveys in the Bay have monitored the blue crab population over the years, but a stock assessment completed in 2005 found that the annual winter dredge survey was the most important indicator of the blue crab stock-and best predictor of upcoming harvests.

"As financial times get tight, we can defend it and say this is necessary," Miller said.

The Bay region is better off than many areas. It has four institutions that can produce stock assessment scientists: Virginia Tech, Old Dominion University, the Virginia Institute of Marine Science, and the Chesapeake Biological Laboratory of the University of Maryland's Center for Environmental Science.

Nonetheless, Miller noted that many important species that live entirely in the Chesapeake have never had stock assessments, including such species as oysters, soft clams, razer clams, horseshoe crabs, catfish and white perch,

"All would be eminently suitable candidates for an assessment, but there simply are not the staff around to do it," he said.

A 2004 report, *Fisheries Ecosystem Planning for the Chesapeake Bay*, showed that of 22 species important to the Chesapeake Bay, 10 had no stock assessment. Those for many other species were years old.

And for many of those species, the assessment covers the entire range of the fish. "There aren't that many Chesapeake Bay-specific assessments," said Derek Orner, a fisheries biologist with NOAA's Chesapeake Bay Office. "A lot of them are coastwide looks at the species."

The lack of that kind of data was apparent in recent years as NOAA's Chesapeake Bay Office has supported the development of an fisheries ecosystem model for the Bay. Development has taken nearly seven years, because of both a lack of data and people able to analyze it so that it was useful, said Howard Townsend, an ecosystem model specialist with the office.

"There are things in the Bay that could use stock assessments," Townsend said. "And for species like striped bass, which spend so much of their life history here, it would be nice to have existing assessments with some type of spatial component that takes that into account."

In the future, analyses may become even more complex as management models will increasingly need to take into account the interaction between fisheries and other ecosystem components, such as birds, which in some cases are major predators of fish. Already, Townsend said, ASMFC is supporting an analysis of interactions between horseshoe crabs and the red knot, a bird that depends on the crabs' eggs during migration.

That type of creative work, while viewed as increasingly important by fisheries managers, will likely suffer as the shortage of assessment professionals persists, Beal said.

"Things like multi-species assessments and the creative thinking and evolution of fishery managements

is going to be slowed down a little bit unless we can get more and more talent to deal with those complicated models," he said.

Karl is the Editor of the Bay Journal.