

American Shad Focus of Unique Study

By James Schultz

A highly migratory fish like the American shad doesn't remain in one place too long. This behavior has made it difficult for researchers to determine the kind of environments shad prefer as nursery areas for their young.

Exactly what kind of habitats shad prefer is the subject of a three-year study conducted by VIMS Ph.D. candidate Donna Marie Bilkovic. Reproductive vitality is of particular concern because shad populations have been on a slow but steady decline for more than 100 years. Although recent surveys indicate that shad levels in the York and Rappahannock rivers have stabilized, apparently due to a fishing moratorium, questions remain about the shad's long-term prospects.

Beginning in spring 1997, Bilkovic, colleagues and volunteers collected shad eggs and larvae from the Mattaponi and Pamunkey rivers—relatively pristine tributaries whose prevalence of shad, while low by historical standards, is at the highest level of other Virginia estuaries—in order to map the shad's use of the rivers as spawning and nursery grounds. Bilkovic is now in the process of developing a habitat-suitability index, based on shad egg and



Ph.D. student Donna Bilkovic collecting shad eggs and larvae.

larval distribution, and incorporating within the index computerized data on river flow, current, geographies and patterns of land use.

"Although these fish have been under moratorium for years, the populations are still low," Bilkovic says. "Obviously, traditional fisheries management hasn't been completely effective. We're trying to figure out what habitat is essential if this population is to expand."

Initial findings indicate that shallow, fast-current areas with high levels of dissolved oxygen seem to be ideal spawning spots. Consistently fewer shad eggs were found in deep, sluggish water. Topographic features above and below the waterline also seem to play an important role. Preliminary analysis indicates an abundance of eggs in reaches of sandy sediments and gravels, wide and shallow sandbars, and extensive falls of dead trees and branches.

"What we're doing is picking apart the shad's life cycle and looking at critical stages," says Bilkovic's faculty advisor Carl Hershner, director of the VIMS Center for Coastal Resources Management. "Everybody acknowledges that if we're going to be successful in managing the fishery, we're

going to need to be effective in protecting habitat. It's not merely a matter of throwing a fence around tidal rivers and not messing them up anymore. It's a matter of figuring out what conditions enable the fisheries to survive and thrive."

Hershner says that Bilkovic's investigation, co-funded by the American Fisheries Society and VIMS, is the first of its kind to be conducted in Virginia and is notable for its acknowledgment of ecosystem complexity. Boosting shad populations will not simply be a matter of isolating one key variable and then modifying that variable to change the existing equation. Rather, the entirety of the complex interactions of a complete ecosystem must be accounted for and integrated within models to encourage a holistic approach to resource management.

"It's a brand new approach to the issue," Hershner says. "You have to go in with a basic concept and be willing to change on the basis of your findings. We know more about the American shad than when we started. Now we're learning new ways to make shad-habitat management much more effective."

Cobia
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providing information on handling and holding cobia in captivity.

Using funding from a National Sea Grant aquaculture initiative grant, personnel from the VIMS finfish aquaculture program arranged for the capture of broodstock fish by recreational cobia fishermen and transferred the fish to holding facilities at the VIMS Gloucester Point campus.

Once at VIMS, the fish were administered a hormonal implant to stimulate the release of eggs and sperm, and were placed in a 7,500 gallon recirculating water system equipped with filtration units and egg collection devices. Within 48-hours of the hormonal implants, the six female cobia (several weighing close to 50 pounds) and three male cobia began spawning.

"We collected fertilized eggs on June 15, and on June 16 the fish were still producing eggs. Literally, the fish have produced millions of eggs," Oesterling explained. "The eggs were

then taken to our larval culture facility for hatching and further on-growth."

The overall goal of the cobia culture project is to produce juvenile fish and investigate the requirements for commercial culture. Additionally, vital life history information will be obtained during the larval and early juvenile stages of the cobia. As the young cobia grow, they will be the subject of different growth studies aimed at providing valuable information for the continued culture of cobia.



Marine Scientist Jeff Tullock and Aquaculture Specialist Mike Oesterling examine cobia eggs in VIMS' Marine Finfish Facility.

VIMS Annual Fund Board Named

Great news from the Development Office! VIMS' very first Annual Fund Board of Directors is hard at work. Charter members of this Board are John Dayton (chairman), Hallieford; Weston Conley, Morattico; Carrie Garland, Arlington; George Grant, Gloucester Point; Wade Hayhurst, Kilmarnock; Peter McHugh, Hampton; Jackie Partin, Gloucester; Austin Roberts, Kilmarnock; Jack O'Shaughnessy, White Stone; and Virginia Lascara, Yorktown.

This group will focus on community outreach and expanding unrestricted gifts to VIMS.