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DR. JOHN T. WELLS
Dean and Director
Virginia Institute of Marine Science
School of Marine Science
The College of William and Mary

DR. TROY HARTLEY
Director
Virginia Sea Grant Program

DR. WILLIAM DUPAUL
Director
Marine Extension Program

MARGARET PIZER
Editor



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Cover: Latanya Blythe picks deep-sea red crabs at Casey's Seafood in Newport News during and experimental picking trial run by Virginia Sea Grant researchers. Photo © Dan Kauffman/VASG

FROM THE EDITOR

Welcome Back! Those are two words we hope you will be echoing as you dive into this issue of *Virginia Marine Resource Bulletin*, our first since 2007.

A lot has changed for Virginia Sea Grant since then, and we've entered an exciting period of renewal and rejuvenation that will allow us to better serve Virginia's coastal and marine resources and communities. Our program headquarters has officially moved to the Virginia Institute of Marine Science, and we've welcomed a new Sea Grant director and other new staff.

We've also initiated a strategic planning process that will help Virginia Sea Grant continue to excel in our traditional areas of strength while ensuring that we are positioned to seize future opportunities and face growing challenges such as global climate change, coastal community resilience, and socioeconomic trends.

This issue of *Virginia Marine Resource Bulletin* profiles a selection of exemplary projects that span our program's current areas of emphasis in marine literacy and education, seafood science, recreational and commercial fisheries, basic research, and coastal community development. Think of it as a re-introduction to some of the work that has made Virginia Sea Grant a leader in conducting, applying, and spreading the word about the cutting-edge coastal and marine science that is critical for decision makers at the national, regional, state, and local levels.

As we build on past work and refine our vision for the future, one of the most important things we will be doing is listening to you—the scientists, industry representatives, community leaders, and concerned citizens who we collaborate with and serve. What challenges are you facing? What do you value about Virginia Sea Grant and the *Virginia Marine Resource Bulletin*? We will be soliciting your feedback soon through a variety of listening sessions, conversations, and communications.

Stay tuned to our website at www.vims.edu/seagrant to find out how you can assist us in improving our work, and thank you for your help and support.

— Margaret Pizer

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Can the deep-sea red crab go from “generic crabmeat” to certified sustainable delicacy? Captain Jon Williams thinks so, and he’s enlisted the help of Virginia Sea Grant extension agents for research into methods of keeping the crabs alive onshore, as well as cooking, packaging, and marketing them.

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From Deadliest Catch to Sustainable Catch

by Phil Marsosudiro

Captain Jon Williams is no stranger to risk. He spent ten years on the Bering Strait as a captain on king crab and snow crab vessels, the likes of which are now featured on television's *Deadliest Catch*. After that, he took a chance in starting an east coast crabbing company—running ships, crew, and cargo from North Carolina to Maine. In his latest venture, he's set up shop in Virginia, where he hopes to create a new market for sustainably harvested red crab.

Since 1996, Williams and his Benthic Fishing Corp. have made a business out of capturing red crab at Norfolk Canyon off the mid-Atlantic shoreline. But until recently, few Virginians had heard of the red crab, in part because no one was landing them here. Instead, Williams and his boats would take their catch directly to Massachusetts. From there, most of their crabs would proceed to Canadian processing houses and eventual sale to Red Lobster as “generic crab meat.”

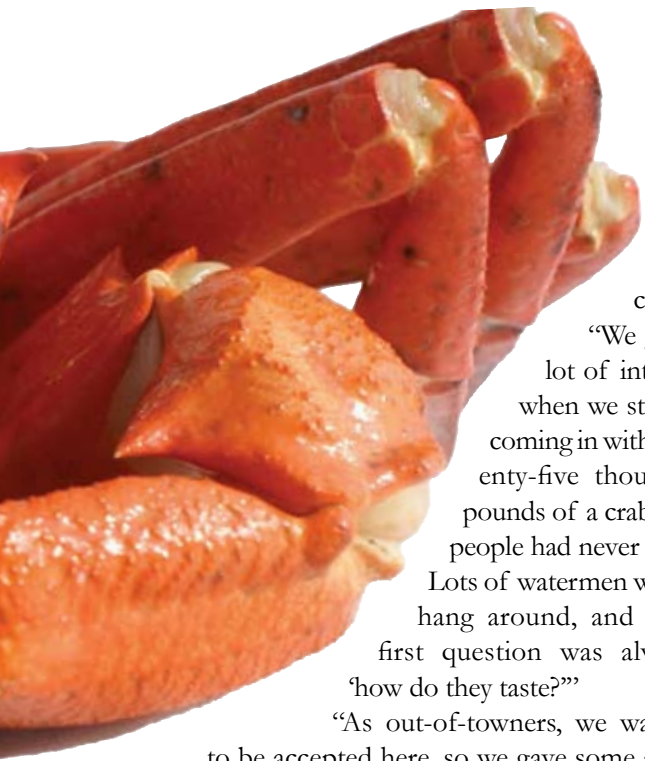
“Red crab is a deep water crab,” explains Williams, which means that no one catches red

crabs unless they're really trying. Most red crabs are harvested off the continental shelf, between 1,200 and 2,400 feet deep, and it's not the kind of fishery that a small crab operation is equipped to harvest.

The generic crab market has always been ready to purchase Williams' catch from the relatively modest red crab fishery, but by 2005, it became clear that his longtime business model wasn't working out. “Steaming three hundred miles back and forth from Virginia to Massachusetts was already costing us money in lost fishing time. But with added pressure from rising fuel costs, we had to come up with a new plan.” So in November 2006, Williams started landing his crab at Newport News with plans to transport everything by truck at a modestly better cost. That's when Virginians started noticing the red crab.

Virginia Meets Its Own Red Crab

Williams recalls the early encounters between Virginians and the unfamiliar animal caught off their



own coast.

“We got a lot of interest when we started coming in with seventy-five thousand pounds of a crab that people had never seen.

Lots of watermen would hang around, and their first question was always, ‘how do they taste?’”

“As out-of-towners, we wanted to be accepted here, so we gave some away, here and there to guys who unloaded the boats.” They soon learned what Williams had known for years: red crab tastes great, with a sweet flavor and meaty texture. “It quickly got to the point where guys would be down with their coolers and bushel baskets whenever our boat came in. I had to start charging for the crab, but that was no problem. They’d buy three or four hundred pounds at a time.”

These positive encounters made Williams think that there might be an opportunity to move the red crab “up market.” Instead of remaining a low-priced source of generic crabmeat, the red crab might find its own niche among specialty crabs.

Williams then connected with a Newport News distributor to see how the crabs would sell. “We got some newspaper coverage, and many people came by to get two or three pounds because they were curious about the crab they’d never heard of.

The next day, they’d come back and say, ‘That’s the best crab I’ve ever eaten.’ And they’d go home with fifty pounds.”

It was one thing to sell a few hundred pounds of crab each weekend; selling seventy-five thousand pounds at a time would be something else. It would take a lot more customer interest and a means to keep the red crabs alive on shore or to process them efficiently into a high-quality product.

Fortunately, nearby partners were easy to find. Williams soon assembled a team of Virginia Sea Grant extension agents from the Virginia Institute of Marine Science (VIMS) at Gloucester Point, and Virginia Tech’s Seafood Agricultural Research and Extension Center (VSAREC) in Hampton, along with picking houses and others who would benefit from a successful red crab market.

Crab Science

At VIMS, Bob Fisher was pleased to get a call from Captain Williams. “The red crab is sweeter than the snow crab, with a texture much like the Dungeness,” says Fisher. It’s not a crab that belongs in the generic crab market where the process for extracting the meat destroys much of its flavor. However, there are technical challenges in moving from a primarily machine-produced minced meat market to a higher value hand-picked and live market.

One challenge of taking a deep water crab into the live market is keeping them alive and



Left: Captain Jon Williams with a truckload of red crabs.

Right: Picked red crab meat.
Photos © Dan Kauffman/VASG.

healthy. “To keep red crab healthy for five or more days in a live market, we have to develop entirely new ways for managing their water chemistry: controlling for temperature, ammonia concentrations, pH, and many other factors,” says Fisher. He and his team are looking at many options, including limiting how much menhaden bait the crabs eat,

while maintaining catch efficiency. “Menhaden is an oily, fatty fish,” says Fisher, “and that makes for high ammonia content when the red crabs purge in the holding tank. If we can reduce their access to the menhaden after they enter the traps at sea, we can reduce the amount of ammonia we have to deal with during on-board and shore-side holding.”

At VSAREC, Drs. Dan Kauffman and Mike Jahncke are assisting with the development of appropriate cooking, packaging, and processing protocols. Much of that work is being done at Casey’s Seafood in Newport News. Kauffman explains “trials are being conducted in the picking

With proper marketing and a bit of luck, Williams thinks that the red crab may emerge as a viable product in the current seafood market. But there’s a powerful wildcard that could turn the red crab into a premium, limited-quantity product: certification from the Marine Stewardship Council (MSC).

MSC and Premium Pricing

Williams has always believed that the red crab could be a high-demand specialty item, but “It’s been very frustrating to me over the years because we have this great product that has no name recognition.” An “Eco-label” MSC certification would get the red crab recognized in an instant.

The MSC was established in 1997 to identify fisheries that are managed for sustainable consumption. As consumers have increased their demand for sustainably harvested seafood, MSC certification has become a fast ticket to premium pricing and bigger markets. Retailers from Whole Foods to Wal-Mart are constantly looking for more MSC-certified products.

The potential benefit of an MSC label is a big motivator for Williams. As Kauffman notes, “It’s an expensive and data-intensive process to create and prove a sustainability plan.

That’s not what fishermen normally spend their time and money doing. Jon is making a big personal investment in this.”

There is no guarantee that the MSC will certify his fishery, even though their early evaluations have been promising. As of 2008, the MSC has certified fewer than forty fisheries around the world, with none yet on the U.S. east coast. For a fishery to qualify for certification, objective third parties must attest to the MSC that it is being managed in a sustainable way with verifiable limits on the total tonnage harvested.

Williams is careful not to overpromise on the odds of success, but he can’t help but notice the buzz about certification. “Even now when we’re only partway through the process, our red crabs are getting international attention,” says



Left: Red crabs on the marquee at Madison’s in Grafton, VA.

Right: Off-loading live red crab from the *FV Diamond Girl* at the small boat harbor in Newport News, VA. Photos © Bob Fisher/VASG.

bacteria counts are being done in the lab. We’re also looking at new packaging with wrappers that breathe so that the red crabs go to market fresh, or else with a barrier film that allows for pasteurizing.”

The million dollar question is the market price. As Fisher puts it, “We don’t think of the red crab as a substitute for the blue crab, which has its own value and its own market. The red crab can occupy a niche all its own.”

houses, comparing boiled and steamed red crab to see what hand-picked yields are obtained. Structurally, red crab is very different from the blue crab they’ve been used to, so this is no small challenge. Shelf-life tests and



Williams. “People have read the MSC’s worldwide press releases, and we’re already getting calls from Europe and South America. I’m getting requests for samples from California grocery chains who never ever would have called had they not seen our progress with the MSC.” If all goes well, the fishery will get its certification by June 2009.

At Home in the Commonwealth

Whether or not the MSC certification comes to fruition, Williams credits the Sea Grant staff at Virginia Tech and VIMS for their help turning the red crab into a new product to sell out of Virginia instead of sending up to Canada. “Working with this team has been great. I’ve worked with scientists for years and years, but it’s never been like this. Many watermen from New England look at marine biologists and scientists as more like the enemy than the advocate. But when I called the folks in Virginia, they said, ‘come on in and let’s see what we can do.’ And they’re moving us forward much, much faster than I could have ever done on my own.”

Williams and his employees at Benthic Fishing Corp. are happy to be in Virginia, particularly when compared to life on the Bering Sea. “Up there, your whole life was nothing but catching crab for months at a time. Some of my crew were on the *Deadliest Catch* television show, but they like it here because they can actually have a life other than just the boat.” If Williams succeeds in creating a profitable and sustainable red crab market, they can have a good life here for as long as they like. ✓

NO ORDINARY CRAB

The sight of big, bright red crabs on the docks in Newport News elicits a lot of questions, says Bob Fisher of Virginia Sea Grant and VIMS. “People want to know where they come from.”

Deep-sea red crabs (*Chaceon quinque-dens*) live along the edge of the continental shelf from Nova Scotia south along the U.S. East Coast and into the Gulf of Mexico. They occur at depths from 200 to more than 1,800 meters and water temperatures between 5°C and 8°C. Male crabs reach a maximum shell width of about 180 mm (7.1 in.), while the females only grow to about 120 mm (4.7 in.).

Males, females, and juvenile crabs are found at different depths, although there is some overlap in their ranges. Juveniles occur in the deepest waters, followed by males, with females at the shallowest depths.

Because of these size and depth differences, the red crab fishery targets only large male crabs. A consistent red crab fishery got underway in the mid-1990s, and about 2,000 metric tons of crab are now landed each year.

Many basic details of the red crab’s biology remain unstudied, according to Richard Wahle, a senior research scientist at Bigelow Laboratory for Ocean Sciences in Boothbay Harbor, Maine. Captain Jon Williams contacted Wahle in 2000 out of concern about a lack of data to form the basis of a fishery management plan for the species. In the summers of 2003 to 2005, Wahle and his colleagues set out to survey crab populations off southern New England and compare the results to a similar study done in 1974.

“Despite pretty intensive fishing, our estimate of overall abundance was greater than in the early ’70s, and even the abundance of harvestable males is on a par with what it was back then,” says Wahle. He concludes that the population seems to be in pretty good shape, “But we don’t know how fast these crabs grow and that’s going to have an important bearing on yield and response to fishing pressure.” Wahle plans to work with Williams to tag individual crabs and measure their growth to try to answer some of these remaining questions.

For More Information:

Wahle, R.A. et. al. 2008. *The Northwest Atlantic deep-sea red crab (Chaceon quinque-dens) population before and after the onset of harvesting*. ICES Journal of Marine Science 65(6):862–872.

Chute, A. 2006. *Status of Fishery Resources off the Northeastern US: Deep Sea Red Crab*. Northeast Fisheries Science Center Resource Evaluation and Assessment Division. <http://www.nefsc.noaa.gov/sos/spsyn/iv/redcrab>.

TEACHERS NAVIGATE THE WEB

Vicki Clark remembers how she and other Sea Grant educators used to illustrate the powers and pitfalls of the Internet for teachers: they would type “dolphin” into a search engine like Google and watch as more than a million results came back. That was back in the late 1990s. Now the same search returns an even more overwhelming avalanche of pages—58.4 million of them to be precise. “And a lot of them are about the football team,” Clark points out.

Now imagine a middle school teacher rushing to prepare a lesson on dolphins during a fifty-minute prep period. A teacher may have a degree in biology or another area of science, and a good dose of common sense, but how can teachers sort through the clutter to find Web sites with

reliable, useful information at the right grade level?

This is exactly the situation for which the Bridge was developed. The Bridge (www.marine-ed.org/bridge) is an online clearinghouse that links to more than 1,200 Web pages that provide marine science information for teachers. In 1998, Virginia Sea Grant educators, including Clark, Lee Larkin, and Lisa Ayers Lawrence, launched the Web site to provide teachers with accurate, useable marine science resources at the click of a mouse. A grant from the National Oceanographic Partnership Program and a partnership with the National Marine Educators Association (NMEA) got the site off the ground. This year, the Bridge is celebrating ten successful years by debuting a

by Margaret Pizer



www.marine-ed.org/bridge

redesigned site that is more dynamic and easier to search than the original.

The Bridge was named to evoke the wheelhouse of a ship—putting teachers at the helm in “an ocean of marine education resources” as the site’s new tagline puts it. “This is the place where everything is happening, you’re in command, and you can see everything,” explains Larkin, who now serves as Virginia Sea Grant’s assistant director. But the site also forms a bridge between scientists and teachers, translating scientific data into forms that can be used in the classroom.

“I know that the lessons posted on the Bridge are accurate and appropriate, so that has always been a safety net for me,” says Mellie Lewis, a retired teacher who volunteers helping teachers develop an oceanography unit for gifted fifth graders in Howard County, Maryland. A peer review process is at the heart of the Bridge’s success. Lewis and other teachers sign on as TROLLs (Teacher Reviewers of On-Line Learning) and review Web sites before they are listed on the Bridge. “We evaluate them for hands-on content, accuracy, grade level, and usability,” says Lewis.

Sea Grant staff make sure the sites come from scientifically reputable sources, and additional scientists (STARs or Scientific and Technical Advisory Reviewers) are available to review the sites for scientific accuracy if needed. Sites that pass the review make it onto the Bridge’s lists of resources, which are categorized by subject matter and grade level. “Anybody can put up a Web site, and they don’t have to know what they’re talking about,” says North Carolina Sea Grant Marine Education Specialist Terri Kirby Hathaway. “On the Bridge, you know the sites have been checked out and have valuable information that is current and correct. There’s no other search engine I know of that does that for you.”

Another popular feature of the Bridge is the DATA (Data Analysis Teaching Activity) series. For years, Virginia Sea Grant staff have regularly posted marine science datasets and associated classroom activities. The archive of DATAs covers topics from bycatch to tsunamis. “The DATAs came the year after we launched the Bridge,” says Larkin. “There was a lot of conversation about how great the Internet was for science education because

for the first time real scientific datasets were available online, but the question in the teacher’s mind was ‘what do I do with them?’ We started posting little snippets of ideas for classroom activities using real oceanographic data and have moved more toward full-scale lesson plans because that’s what the teachers said they wanted.”

Educators Chris Petrone and Lisa Ayers Lawrence develop DATAs and maintain the Bridge, researching new content, managing the review process, and moderating Scuttlebutt, an electronic mailing list for marine educators.

Usage statistics for the Bridge show an upward, but cyclical trend, with more visitors using the site during the school year, and the number of visits increasing steadily over its ten-year lifetime, reaching nearly 26,000 visitors a month during the 2007–2008 school year. Traffic on Scuttlebutt has also exploded over the past couple of years, says Ayers Lawrence. “We plateaued at 500 subscribers for a while, but now we are up to 1,300, and while we used to get one or two messages a week, now there are at least two to three a day.”

Subscribers from around the world use Scuttlebutt to post information about upcoming workshops and professional development

DEAR SCUTTLEBUTT... LOOK WHAT I FOUND!



Scuttlebutt subscribers often send in photos of unidentified items they find in their explorations of the oceans and coasts. Can you name the ones shown here? (Answers on page 9.)

Photos (clockwise from top left): © Diego Lopez, Eric Lenz, Cara Heitz, JoAnne Powell/NC Maritime Museum.

OCEANS OF DATA



© Carol Hopper-Brill/VASG

It looks solitary, but a buoy in the Chesapeake Bay off of Stingray Point, Virginia, is actually part of a worldwide network of data stations—the Integrated Ocean Observing System (IOOS)—that has sprung up over the last decade. Every ten minutes, the buoy and five others in the Bay measure meteorological and oceanographic variables like wind speed, water temperature, and wave height and relay the information to a Web site (www.buoybay.org) where the public can see it in real time.

This torrent of data seems like a gold mine for teachers, but it can also be overwhelming. “Teachers love to use real data, but they really

don’t have time to find it, digest it, and make up an activity,” says Virginia Sea Grant educator Chris Petrone. To overcome this barrier, Virginia Sea Grant offers workshops that build on the DATAs and links provided on the Bridge.

In the summer of 2007, twelve teachers participated in a three-day workshop on coastal observing systems, particularly the Chesapeake Bay Interpretive Buoy System (CBIBS), of which the Stingray Point buoy is a part. The workshop was funded by the NOAA Chesapeake Bay Office Bay Watershed Education and Training program. At the end, teachers took home a backpack full of instruments for studying water quality with their classes—from an anemometer and a global positioning system to kits to test water pH, nitrate, and phosphate—along with classroom activities and insight on how to better use real-time data in the classroom.

This year, nine teachers returned to VIMS, bringing eight new recruits. They attended lectures by oceanographers who use the IOOS for research, learned about Bridge activities that use CBIBS data, and took a research cruise and practiced using water-quality monitoring gear.

In addition to the CBIBS workshop, this summer Sea Grant educators offered a week-long, hands-on experience for teachers at the VIMS Eastern Shore Lab and a one-day workshop on submerged aquatic vegetation that had teachers wade-deep in seagrass beds collecting data on the grass and the animals living in and around it.



© NOAA

Top: Teachers analyze water samples on the RV Pelican.

Bottom: Workers deploy the Stingray Point buoy.

opportunities for teachers, to share recommendations for textbooks and other resources, and to ask for help identifying animals or answering puzzling scientific questions. Long Island teacher and TROLL Kimberly Williams uses Scuttlebutt to get her classes more engaged. “Last year one of my students wanted to know if there is a place on Earth where the Coriolis force is negligible, so we asked on Scuttlebutt. I shared the responses with the kids, and they loved that someone was responding to them—not just other teachers but scientists who use this stuff every day.”

While some of the uptick in traffic on the Bridge and Scuttlebutt could stem from an increase in the number of teachers offering marine science courses, it also likely results from dramatic changes over the past decade in the use of online resources in the classroom. According to the National Center for Education Statistics, in 1994 only 35% of public schools had Internet access. By 1998, when the Bridge launched, that number had risen to 89%, and in 2005, the most recent year for which data are available, more than 99.5% of public schools had Internet access. Over the same period, the percent of classrooms with Internet access rose from 3% in 1994 to 51% in 1998 to 94% in 2005. Now, on average, there is one computer with Internet access in the schools for every four students.

The prevalence of Internet-connected computers in classrooms has allowed teachers to make use of the Bridge in ways they might not have imagined ten years ago. “When the Internet first came to schools, you had one computer available to many different teachers,” says Williams. Teachers had to print out any Web pages they thought they might use because they didn’t know when they would next have an opportunity to go online.

Now Williams can project Web pages on a screen in her classroom or conduct her class in a computer lab where each student has access to the Internet. “One fear that teachers always have is that computers will replace hands-on learning, but I’ve found that they add to it,” she says. The Bridge and other online resources also help Williams reach students who don’t want to touch animals or who are overstimulated in the classroom. “You put them in front of a computer and all of a

MEET THE NEW BRIDGE



A redesigned Bridge premiered over the summer (right), replacing the old design (left).

sudden everyone's gathered around them watching them put a graph together or track a hurricane on a map. When we get back in the classroom, they're excited about it."

Jean May-Brett, the Math Science Partnership Program coordinator for Louisiana, agrees that the Bridge can be an important tool for getting students engaged. "If we've had a tsunami in Asia or a fish kill in Louisiana or grandma and grandpa have gone to Florida and encountered a harmful algal bloom, the Bridge is the perfect location for a teacher to send a student to look up information or for the teacher to find it easily," she says.

Bridge staff are constantly upgrading the site to accommodate more content and address these new uses. The site now lists more than 1,200 online resources, and over the past few years, they have made the transition to running the site from a database to allow for easier updating of materials and links and better search functions. This year at the NMEA convention, Bridge staff unveiled a redesigned site with a sleek new look.

Other improvements in the works include refining the DATA series into complete lesson plans with objectives, time requirements, grade levels, and other information that teachers are used to seeing. The lesson plans will be available as PDFs

for printing. "It's amazing how little time teachers have for planning," says Petrone. "They need 'one stop shopping,' so we try to make the Bridge as ready-to-go as possible." The Bridge staff also hopes to provide resources and activities in Spanish, to show teachers ways of relating Bridge activities to ocean literacy educational standards, and to develop more DATAs that use data from ocean observing systems.

The future looks bright for the Bridge. The growth of Google and increased Internet literacy among teachers has only increased the value of this resource. "Everybody can go to Google and look something up now, whereas ten years ago that wasn't everyone's immediate first response," says Ayers Lawrence. "What we offer is resources all in one place and reviewed by teachers." Teachers still have limited time and often lack the background expertise to parse inaccurate Web sites from scientifically sound ones, so they still go to the Bridge first to find useful resources faster.

So what can teachers find about dolphins on the Bridge? Links to aquaria, summer camps and training programs for aspiring marine mammalogists, scientific information from research labs and resource management agencies—thirty-one peer-reviewed Web sites—and some inspiration to get students excited about ocean science. ✓

Answers from page 7 (clockwise from top left): Pre-production plastic nurdles found on a beach; Water chestnut (*Trapa natans*) seed pods; Frilled anemone (*Metridium senile*); Fin spine from a spadefish.



TEAMING UP

Scientists Join Forces for Regional Fisheries Research

by Jessica Smits, with
additional reporting
by Margaret Pizer



IT'S AN ACT OF NATURE that goes largely unnoticed. Every year, larval fish—barely visible to the naked eye—leave their birthplace in the offshore Atlantic and make their way into the waters of the Delaware and Chesapeake bays. Survivors of the journey find food and shelter in the bays' nursery areas and, ultimately, grow to become important parts of the ecosystem. Not to mention its recreational and commercial fisheries.

And although this movement ultimately determines what fishermen find at the end of their lines, we know little about how the larvae find their way to each bay. What forces drive their movement? Do these forces differ between the Delaware and Chesapeake bays? And what could an increased understanding of them mean for fisheries management?

These are questions that keep researchers like John Olney, chair of the Fisheries Science Department at VIMS, up at night—quite literally. For much of the past year, Olney and members of his research team, including VIMS scientists Brian

Watkins, Pat Crewe, and Ashleigh Rhea, have gotten up at all hours of the night, trudged to the end of the VIMS research pier, and collected samples of larval fish from the York River. Likewise, biologists from the University of Delaware have conducted similar late-night fishing trips at the mouth of the Broadkill River in Delaware Bay.

“This is not very sophisticated sampling. We stand at the end of a dilapidated pier and throw a net over the side,” says Olney. “But it’s cost effective and we end up with huge quantities of fish larvae.” The sampling is done at night because that is when the larval fish are most active in the water column. Once they are caught in the researchers’ nets, the tiny larvae are carefully sorted, counted, and preserved to create a weekly record of larval abundances and sizes.

By comparing these data over the course of years and between the two bays, the researchers hope to get a better handle on when and where larvae are coming in to each estuary. Data from this simple record of larval abundances and sizes will be fed into a complex oceanographic model that should give scientists a better idea of why the larvae arrive when they do.

THIS EFFORT IS THE WORK OF A TEAM of ichthyologists, physical oceanographers, and computer modelers from Delaware, Maryland, and Virginia that has come together to combine data from the two estuaries. Funded by Sea Grant programs in each of the three states with additional support from the National Oceanographic and Atmospheric Administration, the scientists are collaborating to study patterns in the abundance and movement of fish larvae (ichthyoplankton)—particularly Atlantic croaker (*Micropogonias undulates*), Atlantic menhaden (*Brevoortia tyrannus*), and American eel (*Anguilla rostrata*). These species spawn offshore, then enter the Delaware and Chesapeake bays in fall and winter.

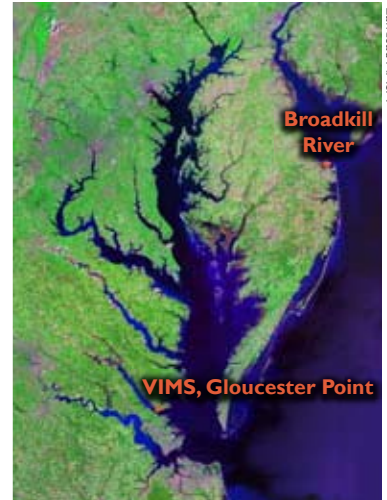
The results of this regional project should help fisheries managers better understand fluctuations in fish populations—an essential variable in harvest quota decisions. Fish populations can vary wildly. One year may bring a large group of larvae into the estuaries, while the next year may bring relatively few.

Given this uncertainty in what scientists call

recruitment, it’s a challenge for managers to set harvest guidelines that support fisheries and maintain sustainable populations. Understanding factors that guide young croaker, menhaden, and eel into Delaware and Chesapeake bays should help managers make more informed decisions.

IN ADDITION TO SHORE sampling at VIMS pier and on the Broadkill River, during the 2007–2008 recruitment season, the team conducted plankton tows across the mouths of both bays aboard the Research Vessel Hugh R. Sharp. By comparing data gathered on board the *RV Sharp* with shore-based station data, researchers got an idea of how accurately the shore-based stations depict the abundance of fish larvae moving into the estuary. It turns out that shore samples and vessel-based samples give similar results in terms of larval abundances and sizes, so for the next two years, the shore sampling will continue weekly to create a longer record of information about where the larvae are going and when.

Although plankton tows and station sampling give insights into the timing, abundance, and kinds of larvae moving into the estuaries, they do little to uncover the factors that direct



Landsat/NASA

Chesapeake and Delaware Bays.

Facing Top: John Olney rinses a plankton net while sampling fish larvae in the York River. Photo © Margaret Pizer/VASG.

Facing Bottom: Delaware Sea Grant researchers aboard the *RV Sharp* pull up a plankton sample from Delaware Bay. Photo © Tammy Beeson/DESG.

Below: Larvae (from top) of American eel, Atlantic menhaden, and Atlantic croaker.



© Eric Hilton



Elizabeth North logs cruise details aboard the RV Sharp.

this movement. To get a clearer picture of possible relationships between larval fish movement and physical conditions, researchers turn to oceanographic instruments that measure properties such as salinity, temperature, and the direction and speed of water movement.

The scientists hypothesize that these physical factors—winds, tides, and freshwater flow—influence circulation patterns and interact with larval behavior to determine when and how the larvae

move into the bays.

To test the specifics of their hypotheses, Elizabeth North, a fisheries oceanographer at the University of Maryland Center for Environmental Science (UMCES) Horn Point Laboratory, uses data gathered on the cruises, as well as data recorded year-round by Delaware Bay and Chesapeake Bay Observing System stations. North builds computer models that explain possible mechanisms of larval movement into the two bays. The simulations will help the researchers understand how winds, tides, and river flow pull or push larvae into the bays.

WILL THESE FUNDAMENTAL DRIVERS have the same effect in both the Chesapeake and the Delaware? Maybe not.

The two bays have markedly different physical conditions, North says. Tidal currents at the mouth of the Delaware can be over one-and-a-half times stronger than those at the mouth of the Chesapeake, while freshwater inflow to the Chesapeake is four times greater than in the Delaware. Since freshwater is less dense than saltwater, North thinks it's a factor that could affect circulation at the estuary's mouth, which could in turn affect how fish enter the estuary.

Being able to compare the two bays, North says, will greatly extend knowledge of the recruit-

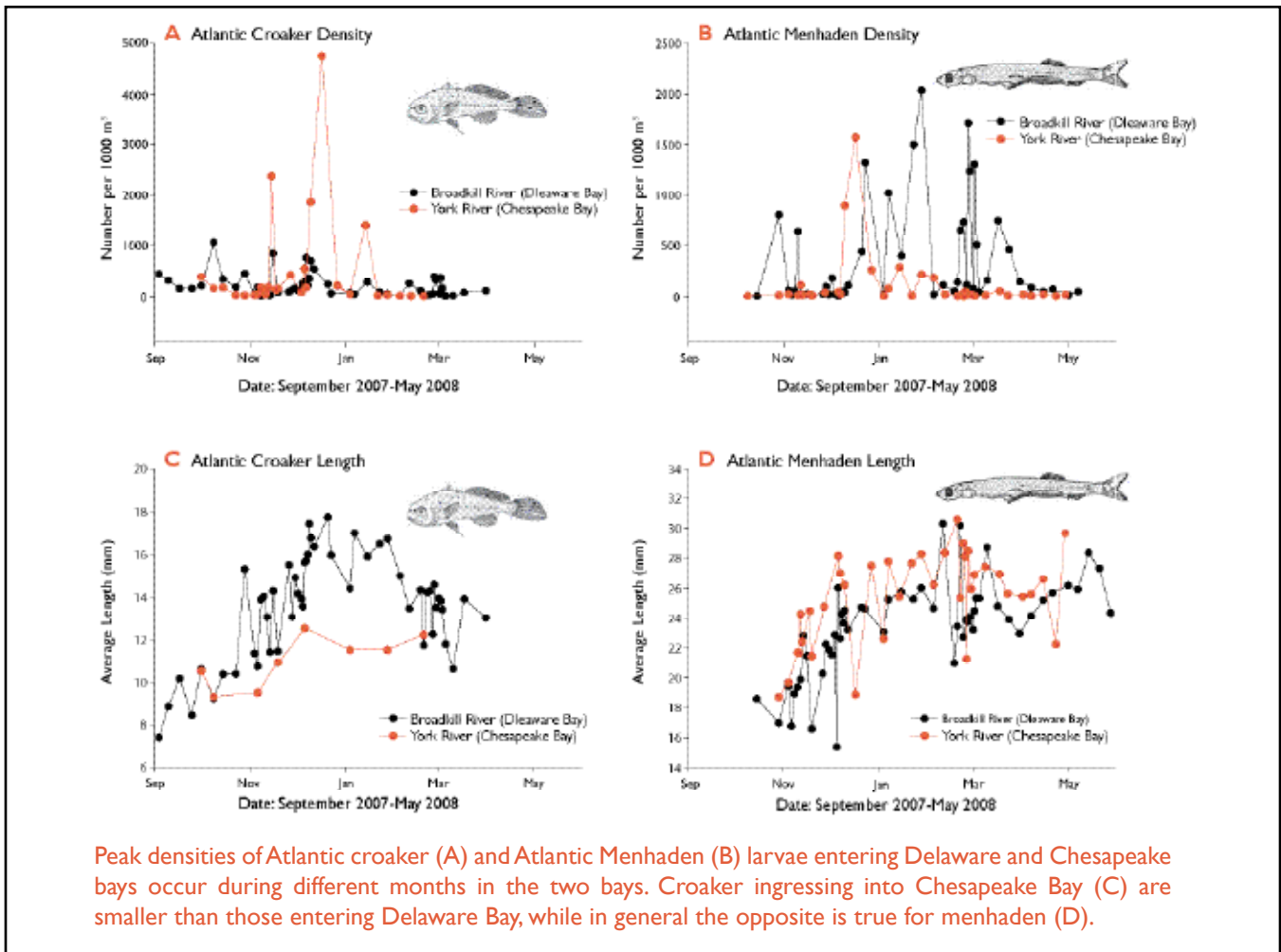
ment process. "Comparison gives you power." Understanding the differences and similarities of how larvae move into the Chesapeake and Delaware will give insight into the environmental and physical conditions that drive coastwide population fluctuations—insight that would be harder to achieve by looking at just one bay, she says.

Preliminary results indicate that the timing and size of larval fish at entry differs between the Delaware and Chesapeake bays.

While glass eels seem to enter both bays at similar times and sizes, croaker entering Delaware Bay are larger on average than those entering Chesapeake Bay and the opposite is true of menhaden larvae—they are larger as they ingress into Chesapeake Bay. Presumably, larger larvae are older, and the differences in size may reflect differences in spawning locations. If larvae have to travel farther from the spawning location to one bay than to the other, they should be older and larger when they reach the more distant bay. Researchers also found that peaks in abundance of the different types of larvae happened at different times in the two bays.

Thus, says North, differences in larval distributions may have implications for understanding stock structure and spawning patterns of adults, factors that ultimately control juvenile recruitment and how coastal fish populations may respond to climate change. Menhaden larvae, for example, have been becoming scarcer in the past twenty years in Chesapeake Bay, but not in Delaware Bay. The hope is that North's models will help researchers understand how changes in spawning location and timing could interact with physical conditions to cause such a change.

IT IS THIS TYPE OF LARGE-SCALE comparative analysis that the Delaware, Virginia, and Maryland Sea Grant programs had in mind when they developed the funding opportunity for scientists in the three states to design a joint project that addresses an issue of regional priority. An opportunity that, North says, is unique in fostering collaboration, rather than the usual competition between research labs in the region. The Delaware-Chesapeake comparison is one component of a broader study comparing larval abundances



and sizes along the coast from New Jersey to North Carolina.

In addition to Olney and North, the project's leaders include physical oceanographers Bill Boicourt from UMCES Horn Point Laboratory and John Brubaker from VIMS and fisheries biologists Ed Houde from UMCES Chesapeake Bay Biological Laboratory and Tim Targett from University of Delaware College of Marine & Earth Studies. VIMS ichthyologist Eric Hilton has joined the research team for the two-year continuation of the project. The late Richard Garvine from University of Delaware was also a part of the research team, and the project will serve as the master's thesis work of University of Delaware graduate student Ed Hale.

Working with four institutions across three states and two bays does have its challenges. Developing compelling scientific questions and combining them into a proposal, "That's fun stuff.

That's like planning a party," North says. The hard part, she notes, is coordinating administrative logistics, things like overhead and budgets, for their respective state's Sea Grant programs.

The result has led to rewarding science says marine biologist Targett. "It allows these programs to do things that are larger than any one program could do alone."

Olney agrees that the collaborative aspects of the project make it special. "One of the strengths of this program is that we've combined modeling, physical oceanography, and biology," he says. This should allow the team to really get to the bottom of questions that span the three disciplines. Until they do, the late-night sampling, sorting, and cataloging of larvae will continue.

This article originally appeared as an online NOAA Research Spotlight (<http://www.oar.noaa.gov/spotlite/archive>).



Fish Stories

By Mail

by Phil Marsosudiro

Bill Knapp has heard a lot of fish stories, but this one beat them all. Last fall he got news that a black sea bass that he'd caught in 2006 at Lynnhaven Inlet Bridge had spent the following year growing a half inch and swimming 500 miles to Jones Inlet, New York, before being caught by another angler.

Every day, Knapp makes an expectant trip to his mailbox in Virginia Beach. He's looking for news about "his" fish—the ones he's caught, tagged, logged, and released over the last four years. On a typical news day, he might read that a triggerfish he caught in May grew a quarter of an inch before it got picked up by another angler in June. On other days, there's no fish report, and he'll toss his pile of regular mail—magazines, bills, and anything else—on the table to look at later. They're just not that important, and meanwhile, he's got a day's worth of fishing to log: a dozen

or so fish newly tagged or recaptured and ready to go into the data files at the Virginia Game Fish Tagging Program.

Last year, Knapp captured and tagged more than 650 fish. As far as he's concerned, these are his fish from now on, and he'll want to know what happens to them. And thanks to the Game Fish Tagging Program, he will. In 2007, 108 fish Knapp had tagged, that year or in previous years, were caught and reported by other anglers—or by Knapp himself.

Virginia Game Fish Tagging Program

The dedication of anglers like Knapp makes the tagging program a serious force in fisheries conservation. Since the program's start in 1995, its citizen scientists have caught, tagged, and logged more than 140,000 fish, with nearly 14,000 of those fish recaptured and reported at least once.

Jon Lucy is the program's co-administrator and co-founder at Virginia Sea Grant and VIMS. According to Lucy, "Data from this program are of direct interest to anglers and are providing new information about fish movement and habitat use patterns."

Lucy recalls that when the Virginia Marine Resources Commission and VIMS created the program, "There were no guarantees that there would be enough support from the fishing public. We knew that success would depend on the avidity and hard work of experienced anglers. But we had no idea just how enthusiastic some of these people would prove to be."

What Drives the Dedication?

Nearly two hundred anglers are actively tagging fish for the program each year. Many of these volunteers devote hundreds of hours per year to the program, painstakingly measuring and recording their catches with the care that's required for good science. Why are they so dedicated? According to Lucy, one big reason is that they feel the program belongs to them just as much as it belongs to the Commonwealth.

Knapp joined the program four years ago when he noticed that the unregulated sheepshead fishery that he and his friends had been enjoying for years was suddenly taking a hit from overzealous new anglers. "Until three or four years ago, I was consistently catching ten-pound sheepshead, on average," says Knapp. "But then the cat got out of the bag, and we started seeing boats coming through with twenty or thirty world-class sheepshead in their coolers, and the population started shrinking quickly." When Knapp asked Virginia officials why there weren't any protective regulations for sheepshead, they told him, "Well, we don't yet know enough about them." In the course of these conversations, Knapp also learned about the tagging program and its recent inclusion of the sheepshead as a target species, so he signed on.

"Eventually we got some sheepshead rules, and, hopefully, they won't be too little too late," says Knapp. "I know my data assisted," he says, "but even more it was the lobbying, as friends and I went to more of these meetings, and as we stood up and said 'we've got to do something.' Com-

mercial guys said we don't know enough about the sheepshead and whether the population could sustain an open fishery. But we supported our lobbying with tagging data and showed regulators how serious we were. That opened their eyes and got them to move."

Putting the Data to Work

Knapp also happens to be the state's leading tautog tagger, and his data are being used in the current Atlantic Coast debate about that fishery. "The federal government is setting new rules as a result of tautog overfishing in the north, from New York to Rhode Island. But we know we have a localized species, because out of more than 14,000 tautog tagged, only two have been captured outside of our waters," says Knapp.

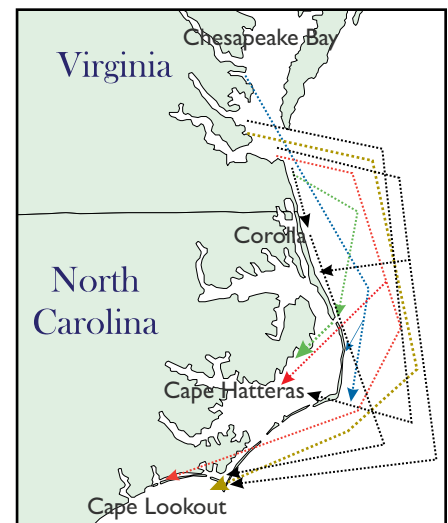
Lucy explains, "Putting tighter limits on tautog in Virginia won't do anything to help overfishing in northern waters where the problems are. Their fish aren't the same as our fish."

In contrast to the tautog fisheries, the program has identified some fisheries that are clearly shared across state lines, and that, therefore, need a cooperative management plan. "Our data show that approximately 15% of speckled trout tagged in Virginia waters were recaptured in North Carolina waters," says Lucy. "Because of our hard data on trout migration back and forth between our waters, North Carolina is starting a tagging program for this important species and will ultimately include Virginia in its fishery management plan for trout."

Like Knapp, York County tagger Ed Shepherd also appreciates how his efforts support science, recreation, and conservation in Virginia. Now retired from the Air Force, Shepherd spends four or five hours a day, seven days a week, fishing,

Facing Page: Bill Knapp holds a citation-sized speckled trout, which he immediately tagged and released. Photo © Bill Knapp.

Below: Interstate travel of speckled trout, 2004–2007. Twenty-eight Virginia-tagged fish traveled to North Carolina.



Top: Records for flounder tagged at Gloucester Point fishing pier in 2007 and recaptured multiple times, demonstrating that many fish survive the catch-and-release process.

Bottom: A tautog tagged by veteran tagger “Kayak Kevin” Whitley.

tagging, logging data, and telling others about the program. He’s held the program’s tagging record for the last several years, logging more than 4,300 fish in 2007. But as Shepherd will be the first to say, the record isn’t what’s important. “I’m interested in fish, and how they survive, and where they travel to. And I like making a difference.”

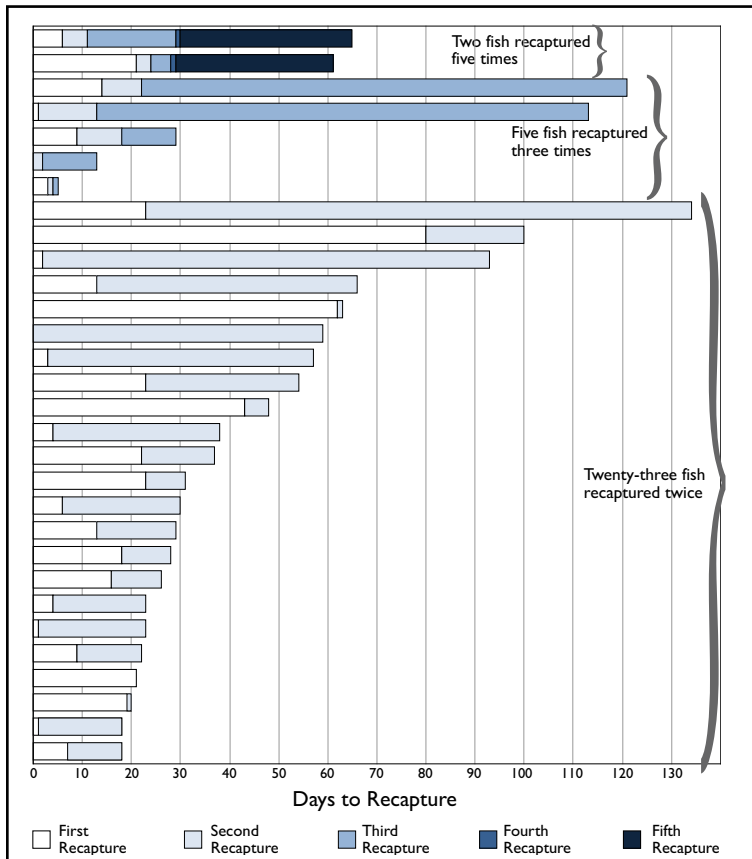
Shepherd notes that people used to argue that catch-and-release regulations weren’t legitimate because fish wouldn’t survive after handling, especially if they were injured during the catch. “We’ve proven that false time and time again. Many times I’ll land a flounder with its guts up in his throat, pulled there by my fishing hook. Following Virginia’s catch-and-release guidance, I’ll undo the hook, push the guts down with my pliers’ handle, and let him go. Months later, I’ll see in the program reports that the same fish got caught again. I’ve always thought that flounder could go to the bottom and just sit there and convalesce.” Now he’s proven it’s true.

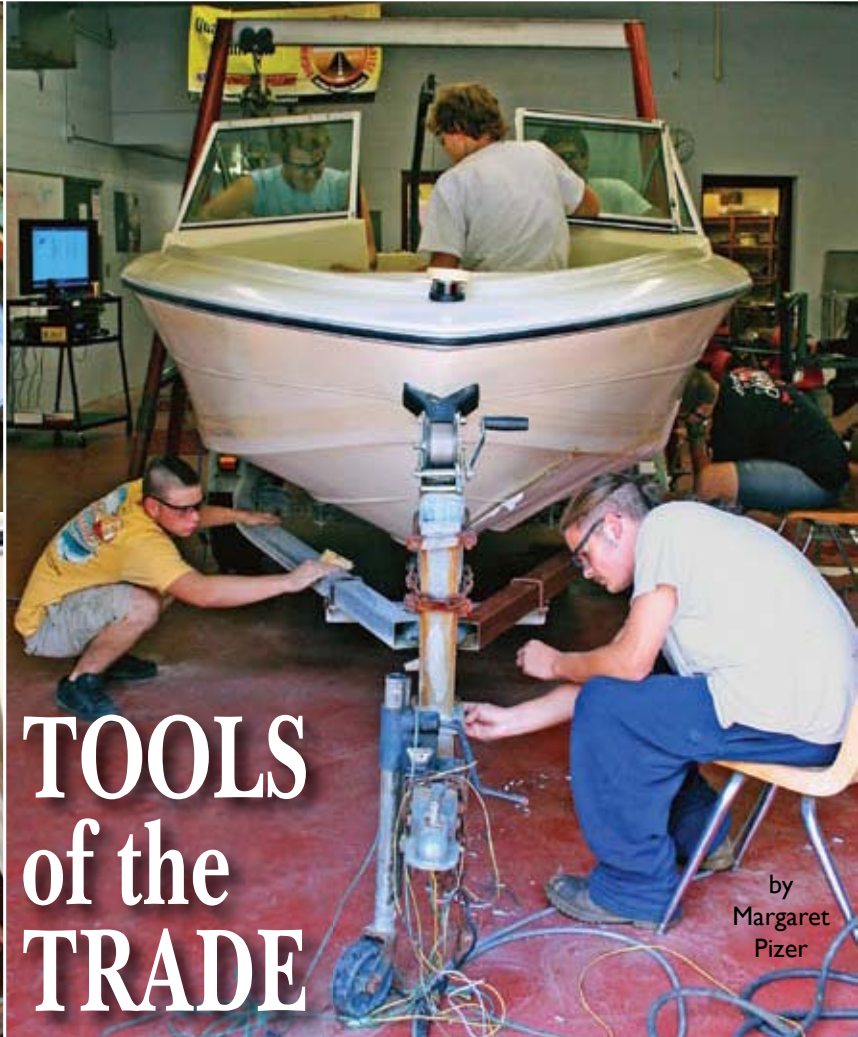
Fisheries for the Future

Virginia taggers are citizens-scientists who want to preserve fisheries not only for themselves, but also for future generations. Knapp, a father in his early 30s, says, “I’ve been fishing in the Bay area since I was five years old. I’ve got a four-year-old boy who I want to have the same opportunities I had when my father started taking me fishing.”

Shepherd shares the same connection with kids when he fishes from his favorite piers on the York River. “I explain what I’m doing and why, and the kids seem to appreciate this. If a kid is nearby when I need to tag a fish, I’ll put the gun in their hands and they pull the trigger. Some kids have told me, ‘I wanna be a marine biologist when I grow up!’ Well I’m not a marine biologist, but I’m glad to help them on their way.”

The biologists who founded the program in 1995 certainly hoped their one-year experiment would grow into a long-term resource for fisheries science and management. Thirteen years later, they might be surprised to realize that their program has grown into a fine promoter of Virginia citizenship, as anglers like Shepherd get to enjoy their days fishing in public waters while they also contribute to the Commonwealth as scientists, teachers, and conservationists. And even, sometimes, as the public conscience. As Shepherd observes, “When the taggers are out, people say, ‘well, since you’re here, I guess I have to throw these undersized ones back in.’ We don’t tell them otherwise.”





TOOLS of the TRADE

by
Margaret
Pizer

© Tom Martin/RCC

Last June, Morgan Oliver and seven of his classmates became the first graduates of Rappahannock Community College's (RCC's) new dual-enrollment program in marine trades. But more than a year before he graduated, Oliver could already thank the marine trades program for getting his career as a marine mechanic off to a roaring start. After one year in the program, which Oliver started as a high school senior, RCC Instructor Mark Drexler alerted him to a job opportunity at Chesapeake Boat Basin in Kilmarnock, and, according to Oliver, "he set us up the first year with knowledge to help us get an entry-level job and be very proficient."

And that's just what Oliver did, combining school and work to complete the second year of the program, which offers students both high school and college credit. Drexler and other in-

structors teach students about small motors, basic engine theory, rules and regulations for marine mechanics, and a variety of other practical skills, right down to dealing with customers and the day-to-day operations of boat dealerships and marinas.

The owner of York River Marine in Mataponi, Drexler says, "The problem that I've had in the business ever since the first day we opened the doors was not having any qualified workers." So when RCC began to develop its programs in marine trades training, Drexler signed on to teach. "I figured I knew what I needed in an employee and I knew what other people were looking for. So far we're really producing a lot of qualified workers who can get jobs that are close to home."

The need to train new members to join the aging marine workforce was one of the main mo-

tivations for offering a marine trades program in Virginia, says Tom Murray, a marine business specialist at the VIMS. Back in 2001 and 2002, Murray was hearing from people in the industry that “the largest impediment was a lack of qualified young people.”

To quantify this need, Murray coordinated a survey that was sent out through Sea Grant programs in Virginia, Maryland, North Carolina, Delaware, and New Jersey to marine businesses in each state. The respondents included 320 boatyards, marinas, and other marine firms, with a total full-time workforce of 5,765. At the time the survey was completed, the firms identified 470

studied other marine trades education programs around the country and developed a curriculum, which RCC used to get its program off the ground.

According to RCC Vice President for Workforce Development Nancy Lloyd, the first thing the school did was to offer American Boat and Yacht Council (ABYC) certification exams. Next, in 2006, the dual enrollment program got up and running. Currently, about 40 students are enrolled in the two-year program, which is offered at the RCC Glens Island campus and at Northern Neck Technical Center in Warsaw. Last summer, additional open-enrollment marine trades courses were inaugurated for adult learners. The RCC marine trades program is now one of four ABYC-recognized training centers in the nation.

Both Lloyd and Oliver emphasize the value of marine trades for everyone in coastal Virginia. A self-professed “motor fanatic,” Oliver has started a new job as head marine mechanic at Morningstar Marina in Glens Island. Having graduated from the dual enrollment program, he has set his sights on advanced certifications from motor manufacturers like Mercury.

He and his fellow graduates have fared well on the job market, despite generally poor economic conditions. “On the Northern Neck and the Middle Peninsula, we’re surrounded by water, and people make a living on the water every day,” says Oliver. “Their stuff is going to break down. It’s a very good field to get into.” This claim is borne out by the results of the 2004 needs assessment, in which marine businesses ranked certified outboard and diesel mechanics as their most pressing needs.

But Oliver says you don’t have to be interested in a career in the marine industry to benefit from the dual-enrollment program. Students who want to learn to do general maintenance on their own boats can learn it through the program while getting high school and college credit.

Lloyd concurs, adding that the open-enrollment courses also welcome boat owners who want to gain a better understanding of how their vessels work. “There are something like 15,000 boats registered in Gloucester, Matthews, and Middlesex counties,” she says. “That’s a lot of boat owners. I want them all to come to class.”



© Tom Martin/RCC

Mark Drexler (center) works on a motor with RCC students.

open full-time positions in need of qualified candidates—86 of those openings were in Virginia. “The results showed widespread agreement that vocational training and certification were needed, and businesses were willing to pay for the training.”

In Virginia, 83% of the companies were willing to pay to send employees out for training. Murray estimated that the economic benefit to Virginia of training new employees to fill its 86 vacant positions would be an increase in \$3.44 million in Virginia boatyard output, \$1.62 million in Virginia employee wages and compensation, and \$626,000 in boatyard proprietor’s income.

Armed with this data, Murray worked with Virginia’s Tidewater Marine Trades Association to form a steering committee of industry representatives. Calling themselves the Atlantic Boat and Yacht Trade School Committee, the group

NEWS FROM THE POINT



© Margaret Pizer/VASG

Troy Hartley joined Virginia Sea Grant in September as our new director. Bulletin editor Margaret Pizer sat down with Troy for an interview to introduce him to readers.

First, can you introduce yourself and describe your background?

I'm a biologist turned social scientist. My research focuses on the communication networks and links among people participating in coastal and marine resource management. After receiving a BS in zoology from the University of Vermont and working for six years on environmental policy and management at a federal agency, I earned a master's degree from George Mason University with a focus on environmental dispute resolution and a PhD in natural resource and environmental policy from the University of Michigan.

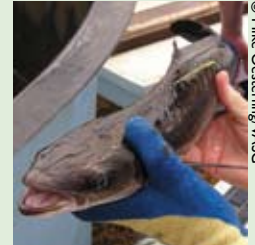
For the past six-and-a-half years, I was a research faculty member at the University of New Hampshire and an administrator of the Northeast Consortium, a collaborative coastal, marine, and fisheries research funding program focused on the Gulf of Maine and Georges Bank. The Consortium was designed and developed through the New Hampshire Sea Grant program. We sought to advance collaboration in research between scientists and the private sector to meet critical scientific needs for management.

Why did you want to be the Virginia Sea Grant director?

From my exposure to Sea Grant at the Northeast Consortium and later as a principal investigator on a Sea Grant research project, I learned how exciting, effective, and critically needed Sea Grant has become nationwide. Sea Grant brings science-based information to decision makers so that they promote the sustainable use of

Cobia Tagging

In June of 2008, more than 500 one-year-old cultured cobia (*Rachycentron canadum*), each about twenty inches long, were tagged and released into the York



© Mike Oesterling/VASG

River and Mobjack Bay. Through September of 2008, 110 of the tagged fish had been recaptured and reported to Mike Oesterling, project coordinator for the Virginia Sea Grant Marine Extension Program at VIMS.

According to Oesterling, "These returns document how young cobia disperse throughout lower Chesapeake Bay and interact with their wild counterparts." Tagged cobia were recaptured in commercial fishing gear and by recreational anglers on both the eastern and western sides of the Chesapeake Bay and even into Maryland waters. Field measurements made by recreational anglers illustrated the growth potential for cultured cobia in the wild, with length increases of six inches in just over one month of freedom being common.

The tag-return data will allow an analysis of where the cobia occur at different times of the year, shedding light on their movement patterns. The tagging program is also aimed at determining whether cultured cobia can be effectively used to enhance wild stocks. For more information, contact Mike Oesterling at 804-684-7165 or mike@vims.edu.



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Scallop Surveys

In July and August of 2008, researchers led by Virginia Sea Grant Marine Extension Program Director Bill DuPaul conducted dredge

surveys and measured scallop abundance, size, and biomass in the DelMarVa Closed Area and Georges Bank Closed Area II. These two areas are currently closed to scallop fishing, but are slated to reopen in 2009. The loca-

tion of the DelMarVa closed area—a 1,700-square-mile region located off the coast of Virginia and Maryland—makes it an important resource for the Virginia scallop fishery, which in 2006 valued over \$52 million (the state’s most valuable fishery).



A formal rotation of closed areas for scallop management was instituted in 2004. Areas are closed for several years to allow a large number of young, small scallops to grow. Once scallops in a closed area reach a large size, the area is opened to regulated fishing for one to three years and then closed again to allow for recovery and growth.

The results of the dredge surveys will help managers determine the level of fishing intensity that will be allowed when the closed areas open. DuPaul and Dave Rudders have submitted a report on the survey’s findings to the National Marine Fisheries Service.



Workboat Races
Each summer, Marine Recreation Specialist Jon Lucy assists in organizing workboat events as part of Virginia Sea Grant’s efforts to enhance

waterfront communities’ economic activity and promote the development of maritime heritage festivals. In the late 1980s, the state legislature made the Chesapeake deadrise workboat the official boat of the Commonwealth of Virginia. This special designation has encouraged waterfront communities to include traditional workboats in their waterfront festivals.

In June of 2008, more than forty workboats gathered to race along a quarter-mile course at Norfolk’s Harborfest. In July, more than thirty boats participated in fifteen race heats and three runoff races for “Top Dog Workboat” in outboard, gas, and diesel classes at the Watermen’s Museum’s Watermen’s Heritage Celebration on the Yorktown waterfront. A day of races in Poquoson during mid-October rounded out the workboat racing season.

coastal and marine resources. It integrates across research, extension, and communication to achieve more than the sum of its parts. When the director’s position was announced, I knew it would be a wonderful professional opportunity and a chance to make a real difference. I had experience with some of the staff here through my work in New England and had a lot of respect for them and what they were doing.

What is your vision for Virginia Sea Grant?

The leaders of Virginia Sea Grant need to provide a clear vision and be communicative, open, transparent, and rigorous in everything we do. We also need to challenge ourselves to reflect upon what works and what doesn’t and adapt accordingly, and we need to be entrepreneurial and grasp opportunities for innovation and leveraging.

We are at an exciting point of renewal and rejuvenation in the Virginia Sea Grant program. We have a new home here at the Virginia Institute of Marine Science, one of the premier coastal and marine research and education institutions in the world, and we have outstanding institutional partners at William & Mary, Virginia Tech, Old Dominion University, and the University of Virginia. We are designing a new oversight and advisory committee structure to advance a cohesive Virginia Sea Grant program and to promote inclusiveness and dialogue among our end-users, constituents, and stakeholders. We are undertaking a strategic planning process to assess needs and opportunities across the Commonwealth’s coastal and marine communities and to explore opportunities to address those needs.

The capacity exists in this state to be one of the top Sea Grant programs nationally—that’s my vision for Virginia Sea Grant. We will be one of the premier Sea Grant programs in the nation.

What opportunities and challenges do you see ahead?

Several current trends create not only challenges but also opportunities in Virginia’s coastal and marine environment, including coastal land use transformation, changing socioeconomic conditions, climate change, and energy development. Declines in some fisheries, national security concerns along the coast, seafood safety, and ecosystem health threats are all emerging issues. These issues are bigger than Sea Grant, but we can be a catalyst, an enabler, and an incubator of innovation by supplying and leveraging the financial and human resources, organizational capacity, and networks needed to create healthy and sustainable coastal and marine communities.

We need to be inclusive, listen to many stakeholders, and strategically find the place to leverage our strengths and coordinate with others so we achieve more than each partner could do alone. We need to be committed to reflecting upon what works, to employing state-of-the-art program monitoring and evaluation, and to learning as an organization so we can adapt accordingly.

Virginia Sea Grant has tremendous existing strengths, especially in the areas of safe and sustainable seafood, sustainable coastal communities and development, and ocean literacy. We have research, extension, education, and communication resources and capacity. We administer prestigious graduate fellowship programs and are linked in to a national network of Sea Grant programs and resources. Our strategic planning and Commonwealth-wide dialogue will identify the specific opportunities, but I'm confident that Virginia Sea Grant is uniquely positioned to use those resources, and our network of contacts, to explore strategic and synergistic partnerships that will make a real difference.

In closing, what idea do you want to leave with *Virginia Marine Resource Bulletin* readers?

I'm excited about the possibilities. We are a new Virginia Sea Grant program, building on all of our past strengths with a renewed outlook on the future. I'm looking forward to meeting *Bulletin* readers and learning about the issues you face so that we can tailor our programs and products to the Commonwealth's coastal and marine resource needs.

New Faces



© Margaret Pizer/VASG

Anne Smith, Marina Specialist

Anne joins Sea Grant and VIMS from the Virginia Department of Health, where she was a marina consultant with responsibilities for enforcing the Commonwealth of Virginia Sanitary Regulations for Marinas and Boat Moorings, coordinating the Clean

Vessel Act education and outreach program, and assisting with the Boating Infrastructure Grant program. As marina specialist, she will direct the Virginia Clean Marina Program and lead clean boating outreach activities. Anne grew up in Gloucester and graduated from the College of William & Mary with a degree in fine arts.



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Margaret Pizer, Communicator

Margaret is a newcomer to Virginia, having moved here from Maine to join Virginia Sea Grant, where she will edit the *Virginia Marine Resource Bulletin* and lead other communication efforts, including a Web redesign. She has worked in marketing and

communications for The Nature Conservancy, as an editor of science and conservation magazines, and as a sign writer and exhibit developer for the North Carolina Zoo. Margaret holds a BA in biology from the University of Chicago, an MA in biology from Duke University, and a certificate in editing from the University of Washington.



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Bill DuPaul Wins Wick Award

The William Q. Wick Sea Grant Extension Award recognizes outstanding individuals for the vision and leadership that they

have dedicated to Sea Grant and Marine Extension efforts around the nation. Virginia Sea Grant Marine Extension Program Director Dr. Bill DuPaul received the Wick award this September in recognition of his thirty-year career as a leader and innovator in applied marine research and education. In the early 1980s, Dr. DuPaul initiated a groundbreaking sea scallop research effort in cooperation with the scallop industry. As Marine Extension program director, Dr. DuPaul has overseen the development of nationally recognized Sea Grant programs in areas including marine education, coastal community development, and aquaculture.

Chef's Symposium

More than 150 chefs and culinary students gathered at VIMS on October 14, 2008, for the 18th annual Chef's Seafood Symposium. The morning featured



© Margaret Pizer/VASG

two talks by VIMS faculty about the science behind Virginia's marine resources. Rochelle Seitz discussed her research on declining blue crab populations, and Roger Mann described the potential impacts of climate change on Virginia's seafood industry. Chef John Maxwell of J. Sargent Reynolds Community College outlined international travel opportunities for chefs and demonstrated two dishes fusing international cuisines with Virginia ingredients (pictured here are his seared scallops with ponc cakes and borscht salsa).

A lunch prepared by culinary students from Hermitage Technical Center in Henrico County was followed by more cooking demonstrations using local seafood, including cownose ray. The afternoon ended with an Iron Chef style cooking competition in which a scallop dish prepared by students at Chesterfield Technical Center "reigned supreme."



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