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Spadefish Aquaculture
Marine Spatial Planning
Scientists in the Classroom

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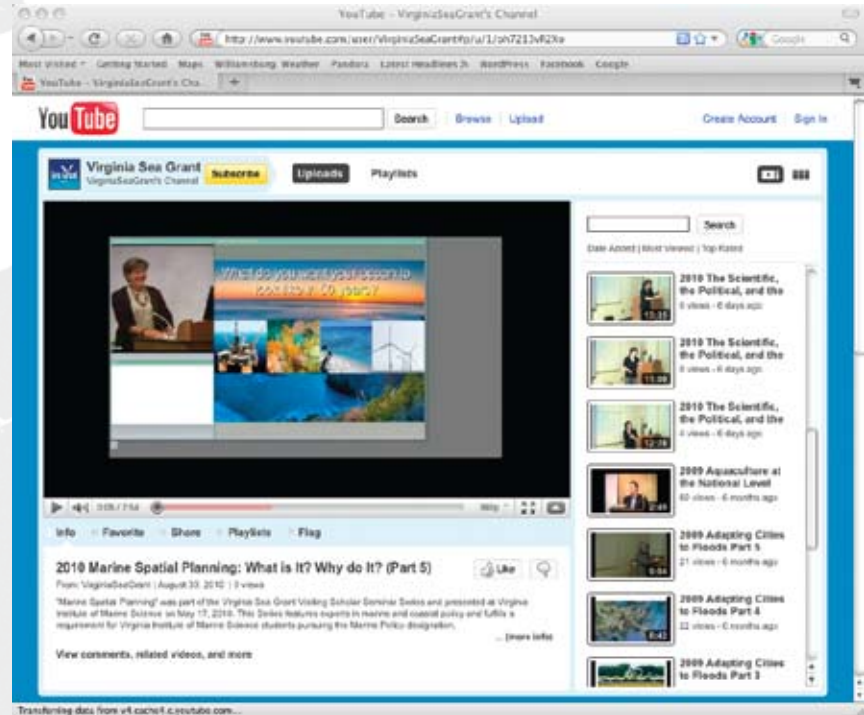
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Virginia Sea Grant's YouTube channel includes video of all our Visiting Scholar Seminars as well as short segments about the PERFECT GK-12 program, the Chef's Seafood Symposium, game fish tagging, and spadefish feeding. Check it out!



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Cover: Spadefish being prepared to spawn in VIMS aquaculture facility.
Photo ©Gabriella March/VASG

IN THIS ISSUE

Scientists in the Classroom.....2

The PERFECT Program is taking marine science graduate students out of their labs and into K-12 classrooms. Last year, nine VIMS students taught in local schools and developed their science communication skills in the process. This fall, a new cohort of scientists-in-training is poised to enter the program.

Spadefish Aquaculture.....8

VIMS and Virginia Sea Grant researchers have reared this popular sportfish through the entire life cycle in captivity, opening the way to farming the species for food, for the aquarium trade, or for stock enhancement.

Planning Underwater.....10

More and more communities in Virginia and across the nation are using marine spatial planning to resolve conflicts over ocean and coastal resources and ensure that they are used sustainably.

News from the Point.....14

The latest news from Virginia Sea Grant, including our most recent fellows and interns, new publications and websites, and Jon Lucy's retirement. We'll miss you, Jon!

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Summer 2010

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EXACERATION

WISCONSIN
ATHLETICS
RAY SAVER

THE PLEASANT...
THE PLEASANT...
THE PLEASANT...

THE PLEASANT...
THE PLEASANT...
THE PLEASANT...

Explain Yourself
Vocabulary

They swim and sing
The love in giant are
That call the ocean
It has all the fish
Just like mine and so



scientists in the classroom

a PERFECT fit

by Janet Krenn

What does underwater mud eight time zones away have to do with a middle school English class in Virginia?

As a graduate student at the Virginia Institute of Marine Science (VIMS), Lila Rose studies sediment off the coast of New Zealand. But as a fellow in the National Science Foundation's (NSF) Graduate Science, Technology, Engineering, and Math Fellows in K-12 Education Program (GK-12), she finds ways to use her scientific expertise to enrich middle school students' learning experience.

"It's hard for me to incorporate a lot of my own research into the classroom," says Rose. Rose spent the 2009–2010 academic year partner-teaching in Kimberly Denmark's seventh grade English class at Booker T. Washington Middle School, a marine science magnet school in Newport News. But when it came time for students to read *Esperanza Rising*, a novel about a young girl's journeys through North America, Rose found that she could introduce a bit of science by teaching students how to use a mapping tool to study literature. "I thought it would be really cool to show them how to use Google Earth to plot the main character's journey," Rose said, "and then 'travel' and make a literature trip."

The literature trip enabled the class to go on a virtual journey to learn about real places in the story while simultaneously expanding the way students think about science.

Changing the ways that students think about science is just one of the goals of the GK-12 Program. The program provides funding for graduate students studying math or science to teach in kindergarten through high school classes while pursuing their graduate education. It is intended to help budding scientists improve their communication skills and benefit local schools by providing

professional development for teachers, enriched curriculum for students, and stronger connections between universities and local school districts.

The VIMS version of the GK-12 Fellowship is the PERFECT Program (Partnership between Educators and Researchers For Enhancing Classroom Teaching), a proposed 5-year effort that started in 2009. It's the only GK-12 project in the Chesapeake region focusing on marine science. And after just one year, PERFECT is already accomplishing many of the GK-12 goals.

Teaching Students

Teaching students in grades K-12 requires patience and the ability to translate complicated topics into terms that students can grasp. Yet the PERFECT Fellows discovered that their first challenge was simply getting up in front of the kids that first day.

"I was so nervous. I thought I was going to make a fool of myself," Rose says. Her sentiment was reflected by other fellows, too.

"I was completely overwhelmed," says Dan Dutton of his first experience as a PERFECT Fellow. Dutton, a masters student studying marlin, taught biology and chemistry to gifted high school students at the Chesapeake Bay Governor's School in Glenss. He saw the PERFECT Program as an opportunity to test his interest in teaching, but he got a shock during that initial experience, a weekend camping orientation that included students from all three Governor's Schools. "I hadn't been around high school kids for a long time, and here I'm faced with three campuses-worth of them—100 and some kids."

Like Dutton, other fellows cited interest in teaching as their main motivation for pursuing the fellowship. Creating opportunities for VIMS students to gain teaching experience was an im-

portant concern for Kam Tang, the VIMS Biological Sciences professor who led the charge to bring a GK-12 Program to the Institute.

At other colleges and universities, graduate students gain teaching experience by assisting professors with undergraduate courses. VIMS, however, hosts very few undergraduate students, making teaching opportunities hard to come by. Tang says the GK-12 Program “gives the graduate students at VIMS the teaching experience that they need to be competitive in the future job market” as university professors.

By the end of their teaching experience, fellows feel at ease in the classroom. As Rose says, “I no longer worry about making a fool of myself in front of kids.” Dutton, who hadn’t taught before becoming a PERFECT Fellow, found that with preparation, his teaching anxiety turned into excitement. He challenged himself to develop methods to engage students, especially those who seemed uninterested, and he was encouraged by students’ creativity. For example, after his lecture on cave biology, Dutton asked the students to use what they had learned to design their own cave animal. The students shared their animals with the class.

“One student took creativity to a whole new level,” Dutton remembers. “[His animal] had this amazingly intricate Latin name. It was invincible, and it had all these crazy breeding strategies and fighting and hiding abilities... I was really excited about how well that lesson turned out, and it pumped me up for future lessons, too.”

The teacher-partners say that the fellows, once they get past the discomfort of public speaking and learn to aim their lessons at the right level, make great contributions to the classroom.

“[Our fellows] kicked the curriculum up a bit,” says Sara Beam, who teaches at the Governor’s School and has worked with fellows David Elliot, Noelle Relles, and Dutton. “Because they’re experts in their field and they’ve been able to add depth to those topic areas... I think it’s added just a lot of richness to what we already do.”

Denmark, Rose’s teacher-partner, agrees that the fellows were a very helpful resource in the classroom. “[Rose], of course, knows her science very well... She’s really been

Previous page: Students at Booker T. Washington Middle School write poetry inspired by marine artifacts (pictured here a piece of whale baleen).

Looking Back o

Congratulations to the first class of PERFECT GK-12 Fellows on their completion of a successful year! For some, like **Dan Dutton**, participating in the GK-12 program led to a new career path. Other fellows, like **Lila Rose**, improved or discovered new skills that will help them in their careers as future professional scientists. Still others found the experience helped them to narrow down their professional interests.

Some considered teaching as a career...

Christian Hauser applied for the PERFECT Fellowship because he thought he might be interested in teaching as a career. By the end of the Fellowship, he decided that teaching was not going to be his future career path, but he says he has improved his communication skills, particularly in conveying scientific information to less technical audiences. Hauser studies restoration ecology under advisor Jim Perry. He taught in Judith Gwartney-Green’s life science class at Page Middle School in Gloucester.

Patrick McGrath’s goals for his PERFECT Fellowship were to hone his teaching skills and see whether he enjoyed teaching at the precollege level. Through his experience, he learned classroom management skills. He says that he now feels more confident and comfortable in front of a group and adds that he would like to continue teaching, but at the collegiate level. McGrath studies the life history of longnose gar under advisor Eric Hilton. He taught in Sherry Rollins’s life science class at Page Middle School in Gloucester.

n the 2009–2010 PERFECT Fellowship



GK-12 Fellows and teachers (left-right, top-bottom): Christian Hauser and Judith Gwartney-Green; Kimberly Denmark and Lila Rose; Noelle Relles and James Beam; Sherry Pettyjohn and Dan Dutton; Patrick McGrath and Sherry Rollins; Tim Jones and Erica Holloman; Sara Beam and David Elliot; Heidi Geisz and Amber LaMonte; Lindsey Kraatz and Kristin Lynn Kelly. Photos ©Carol Hopper Brill/VASG

Some missed working with young people...

Erica Holloman developed and taught hands-on science programs for youth and adults during her pre-VIMS days working at a small nonprofit agency. She applied for the PERFECT Fellowship to get another opportunity to interact with kids. Holloman finds that her science communication skills have improved, and she's reaffirmed her interest in working with students. She hopes to apply her new skills to develop after school science programs. Holloman studies environmental risk assessment and environmental justice under advisor Mike Newman. She taught in Tim Jones's life science class at Booker T. Washington Middle School in Newport News.

Lindsey Kraatz was a GK-12 Fellow while conducting her masters research at the University of North Carolina at Wilmington, and she enjoyed it so much that she applied for the PERFECT Fellowship when she came to VIMS. Kraatz was surprised by the technological resources teachers and students have in their classrooms, and she learned how to use visual tools, such as YouTube, to augment her communication and teaching. As she continues to pursue a career in science, Kraatz believes the communication skills she's learned will help her discuss her work with members of the public. Kraatz studies sedimentology under advisor Carl Friedrichs. She taught in Kristin Lynn Kelly's earth science class at York High School in Yorktown.

Some wanted to improve their communication skills...

Noelle Relles applied for the PERFECT Fellowship because she wanted to more effectively communicate her research while getting more involved with the community. During the fellowship, she learned how to better structure her talks and improve her use of visuals. She believes her new skills will help her as she moves forward in the sciences. Relles studies coral reefs under advisor Mark Patterson. She taught in James Beam's fundamentals of science class at the Chesapeake Bay Governor's School in Glens.

David Elliot wanted to develop teaching and communication skills that could help him foster a positive public attitude toward science. Through the PERFECT Fellowship, he learned to back away from the details that usually engross him in his research and focus on the basic science that students need to understand. Elliot believes his newfound communication skills will be an asset as he continues to pursue a career in

science. This spring, Elliot received his PhD in estuarine zooplankton ecology under advisor Kam Tang. He taught in Sara Beam's marine environment class at Chesapeake Bay Governor's School in Glens.

Heidi Geisz applied for the PERFECT Fellowship because she realized that members of the public might not understand science well, and she wanted to help increase their understanding by improving her communication skills. During the fellowship, Geisz found that a balance of examples, experiments, lecture, and interaction was more effective than the traditional PowerPoint presentation. She believes the Fellowship will help her as she moves forward to pursue a career along the interface of science and public policy. Geisz studies pollutants under advisor Rebecca Dickhut. She taught in Amber LaMonte's biology and environmental science classes at York High School in Yorktown.

For more information
 PERFECT program website:
www.vims.edu/education/teaching/gk12
 NSF GK-12 website:
www.gk12.org

2010–2011 | PERFECT Fellows



Six new and two returning fellows make up the entering class in the PERFECT program.

New Fellows (pictured above from left to right)

Candi Spier, who studies immunology and environmental chemistry under advisors Steve Kattari and Mike Unger, will teach in Sherry Pettyjohn's classroom at the Chesapeake Bay Governor's School.

Matt Whalen studies food web ecology under advisor Emmett Duffy and will teach in Sherry Rollins's classroom at Page Middle School.

Stephanie Salisbury, who studies marine organic geochemistry under advisor Liz Canuel, will teach in Justin DeWall's classroom at Booker T. Washington Middle School.

Daniel Maxey studies estuarine nutrient cycling under advisor Iris Anderson. He will teach in Tim Jones's classroom at Booker T. Washington Middle School.

Sam Lake, who studies water quality and ecosystem modeling under advisor Mark Brush, will teach in Amy Holtschneider's classroom at York High School.

Lara Gates studies impacts of aquaculture on bottom communities under advisor Mark Luckenbach, and will teach in Judy Gwartney-Green's classroom at Page Middle School.

Returning Fellows

Lindsey Kraatz will remain in Kristin Kelly's earth science class at York High School.

Noelle Relles will remain at the Chesapeake Bay Governor's School, but this year she will teach in Sara Beam's marine environment class.

invaluable as far as making the content more challenging for students.”

The students also enjoy having fellows as part of their class. “The students ask me all the time, ‘Is Miss Rose coming today? Is Miss Rose coming?’” says Denmark.

Beam says that at the end of the year, students did something remarkable. Each student had to present their own research project to the class, and after their presentations, “They each thanked the fellows for helping them in their acknowledgments, which was totally of their own accord! There definitely had to be an impact there.”

Talking Science

Many scientists struggle to explain their work in a clear, engaging manner. The terminology alone sometimes is like a foreign language. Giving graduate students the skills to translate science into language the general public can understand is one of the goals of the GK-12 Program.

“That’s really hard for all of us,” says Iris Anderson, VIMS Dean of Graduate Students, who worked with Tang to apply for the funding to start the PERFECT Program. “If you’ve ever been asked what you do by mom or grandma, you know how difficult it is to explain to them in simple terms what you’re doing and why it’s important... Scientists aren’t taught to do that.”

PERFECT Fellows are, however, trained in communication before they enter the classroom. Vicki Clark and Carol Hopper Brill are educators with VIMS and Virginia Sea Grant who serve as the PERFECT Program’s project managers. They act as mentors throughout the fellowship and teach the fellows’ course in science teaching and communication. Clark says this course helps fellows think about science from a nonscientist’s point-of-view. “What the GK-12 Program does,” she explains, “is challenge the scientists to look at their science and then consider the methods of good teachers and good communicators who can communicate any kind of information.”

And the PERFECT Program seems to be making a big difference in fellows’ communication skills. Both Rose and Dutton believe that they’ve become more comfortable in communicating science and in public speaking. “I think—I hope—that I’m a better communicator,” Rose says. As the only PERFECT Fellow teaching in an

English classroom, she finds that moving science out of the laboratory has been a great experience: “I think some people are amazed, ‘How can you integrate science and English?’” But she argues that the skills students learn in an English class are the same ones that make a good scientist. “So bringing them together was easy.”

Fellows’ research advisors at VIMS have also seen signs of improved communication. John Graves, Dutton’s research advisor, says he’s seen a big change in Dutton’s communication abilities. Graves remembers a presentation Dutton gave before his PERFECT Fellowship started.

“He did a good job, but he wasn’t comfortable as a presenter. It was very clear to me,” says Graves. But after Dutton completed the PERFECT Fellowship, Graves observed, “What a change a year has made... . His presentation style, his demeanor, he was just at ease in front of the audience, and it was just like night and day. I couldn’t believe it!”

As one of the project managers for the PERFECT Program, Hopper Brill receives similar feedback about the students’ progress. She says, “Their sense of confidence and poise and their persona is more collected—and some of those comments came from their major advisors.”

Managing Time

With all the benefits of the PERFECT Fellowship comes a big challenge: time management. Fellows face many of the same challenges that confront first-year teachers.

“The first year is always the hardest because you haven’t got anything in your trick bag yet. You’re starting from scratch... .” Clark observes. “When [the fellows] started, they thought, ‘Ten hours a week in the classroom. I think I can do that.’ But then, that first month, I was hearing ‘It took me 20 hours to get ready!’”

Now combine this commitment with the responsibilities of a graduate-level researcher, and you can see why PERFECT Fellows find that time is officially not on their side. This affects not only the fellows but their research advisors as well.

“As an advisor, I realize that if a student is going to participate in this program, that’s pretty much what they’re going to do,” says Graves. “I think, realistically, they’re losing two-thirds to three-fourths of a year’s worth of research by doing it.”

NSF requires fellows to spend an average of 15 hours per week on teaching and preparation, but Tang notes that many opt to spend more than the required time. To ensure that fellows’ research is not stalled by their participation in the PERFECT program, applicants must have completed their core courses and have their research well underway. So far, this strategy seems to be working. “Among the first cohort of nine fellows, four graduated in 2009, on schedule, and the others are also well on track toward graduation,” said Tang.

Both Dutton and Rose agreed that the PERFECT Fellowship required a larger time commitment than they initially had expected. But looking back, both said the extra time was worth the benefits of the program.

This fall, Rose will be finishing her PhD dissertation. Dutton will have graduated and will enter the workforce—as a high school science



©Sherry Perryjohn

teacher at the Chesapeake Bay Governor’s School—while he pursues a teaching certificate.

Meanwhile, a new class of PERFECT Fellows has spent the summer preparing for the program, and the eight fellows will enter local middle and high schools this fall.

“The first year went better than we expected,” says Tang. “We have some experienced fellows in the second-year group, and we are also more experienced than we were in the first year. So I think, overall, there’s a lot to look forward to in year two.” ✓

Dan Dutton teaches in a biology lab at the Chesapeake Bay Governor’s School.

SPADEFISH AQUACULTURE Throughout the Life Cycle

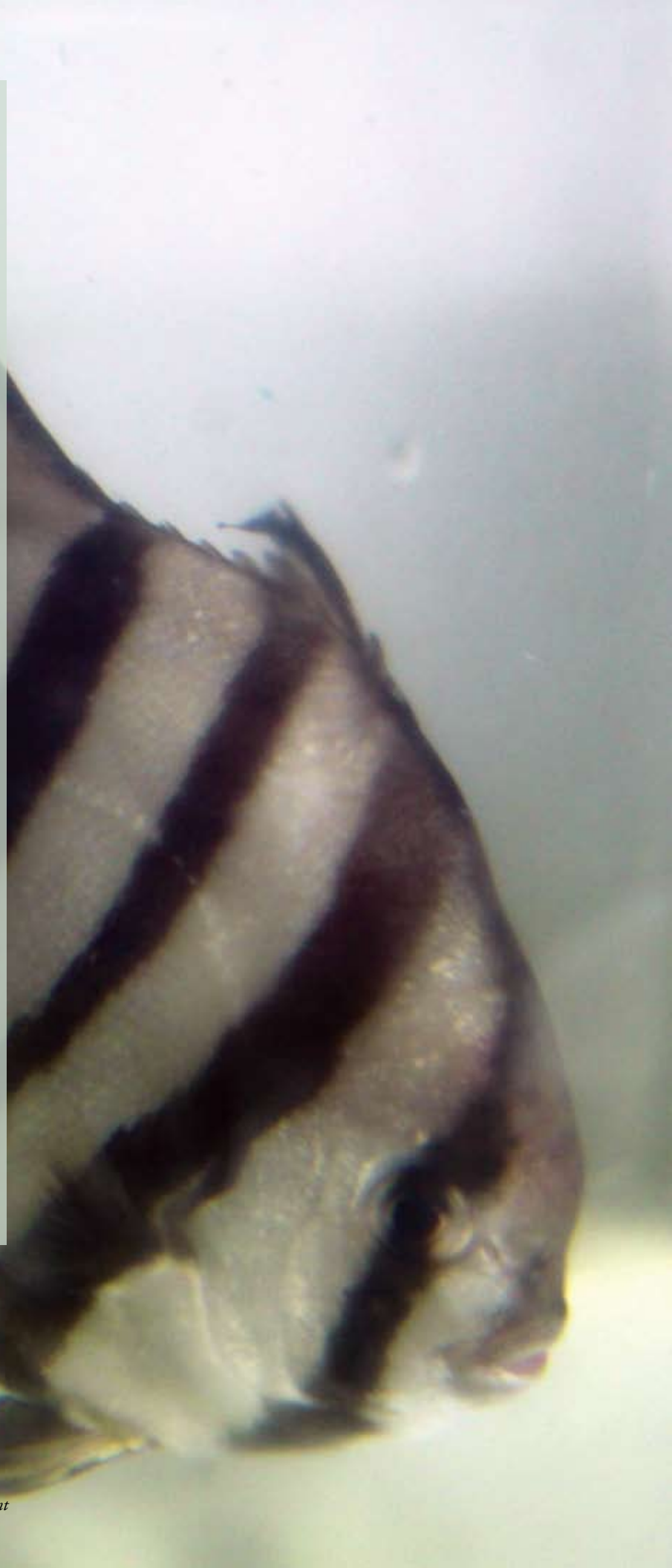
Virginia Sea Grant and Virginia Institute of Marine Science (VIMS) aquaculture specialists Mike Oesterling and Dan Sennett have made a breakthrough in growing spadefish in the lab. They are the first researchers to raise spadefish from eggs to adulthood and then spawn those fish, leading to a second generation of lab-raised fish. The photos on the facing page show the steps Oesterling and Sennett followed.

Spadefish are popular with Virginia sport fishermen because of their large size, attractive striped appearance, and the fight they put up on the line. Aquacultured juvenile spadefish could potentially be sold as ornamentals, while larger farmed fish might be marketable as food. The ability to grow the species in the lab also means that farmed fish can be released into the wild for stock enhancement if necessary in the future.

To raise larval spadefish in the lab, Oesterling and Sennett produce a mini food chain in the lab. They grow not only the microscopic rotifers and brine shrimp (*Artemia*) that spadefish larvae eat but also the single-celled algae that the rotifers eat.

You can watch a movie of spadefish feeding on our YouTube channel (www.youtube.com/VirginiaSeaGrant).

Photos ©Mike Oesterling/VASG and Gabriella March/VASG



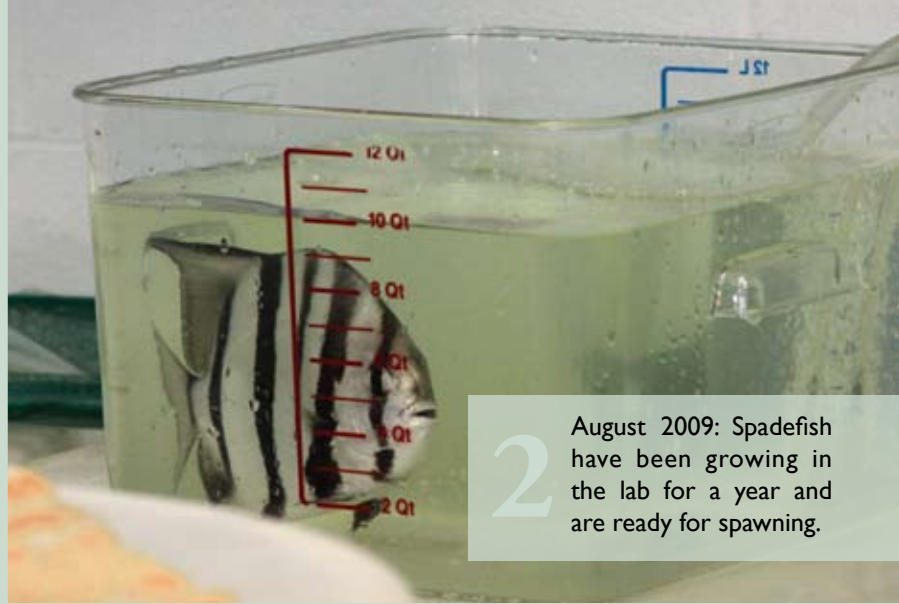
1

August 2008: Thumbnail-sized young spadefish are caught by dip net in the VIMS boat basin. These become broodstock for the 2009 spawning.



2

August 2009: Spadefish have been growing in the lab for a year and are ready for spawning.



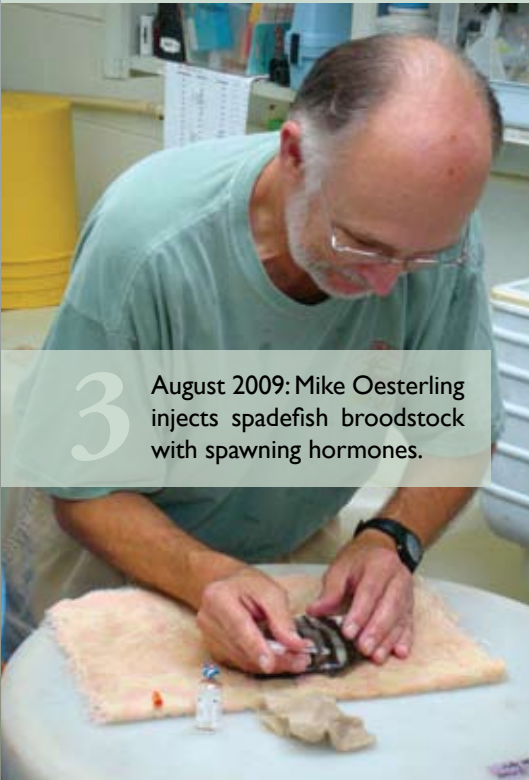
4

August 2009: Spadefish eggs are spawned and collected.



3

August 2009: Mike Oesterling injects spadefish broodstock with spawning hormones.



5

October 2009: Juvenile spadefish from August spawning are a few inches long.



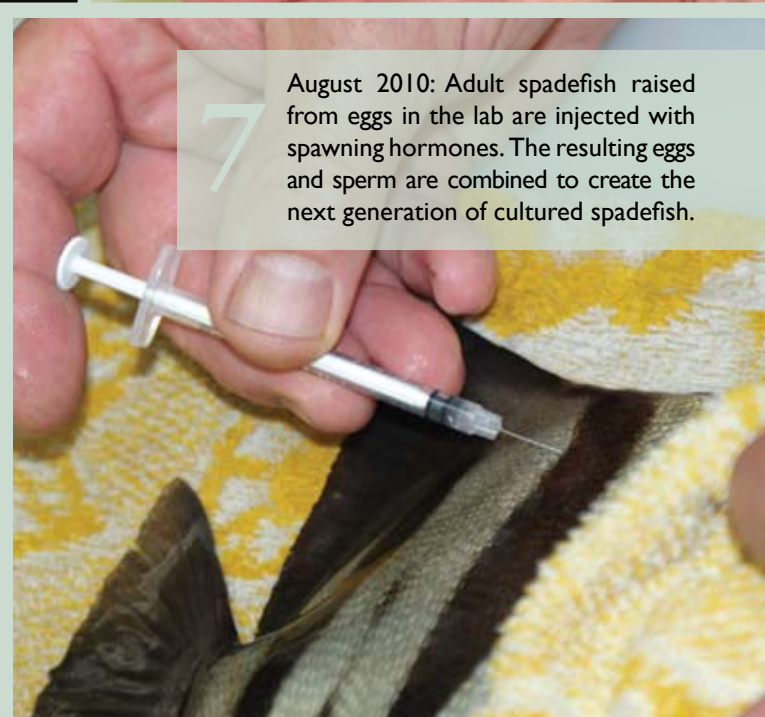
6

April 2010: Biggest fish from 2009 spawn is 8.7 inches long.



7

August 2010: Adult spadefish raised from eggs in the lab are injected with spawning hormones. The resulting eggs and sperm are combined to create the next generation of cultured spadefish.



Planning Underwater

Balancing ocean uses

by Margaret Pizer

A couple of years ago, the terms *ocean zoning* and *marine spatial planning* evoked a visceral negative reaction from most people in marine industry.

“Their view was, ‘This is a plot by the environmental community. They’re just putting a new spin on wanting to close off the ocean—we won’t be allowed to do anything, and it’s going to be the end of ocean uses,’” said Morgan Gopnik, a marine policy expert who spoke at Virginia Institute of Marine Science in May as the Virginia Sea Grant Visiting Scholar. But Gopnik and a cadre of other policy makers and planners are beginning to turn the tide of opinion on marine spatial planning.

Marine spatial planning addresses conflicts over the use of marine and coastal resources and identifies compatible uses. Typically, the planning process includes (1) bringing together representa-

tives of a wide variety of groups with an interest in an area; (2) mapping current and potential future ocean uses, habitats, and characteristics; (3) discussing conflicts and compatibilities; and (4) agreeing on a management plan.

“The first thing that people need to understand—right off the bat—is that this is not a tool to promote any one particular use of the marine environment,” says Laura McKay, director of the Virginia Coastal Zone Management (CZM) Program, which is funding several marine spatial planning efforts in Virginia and the Mid Atlantic region. “It’s a tool to coordinate those uses and to ensure that all of the uses that the public wants are carried out in appropriate locations and in a way that promotes the sustainability of the marine system.”



National and State Efforts

Marine spatial planning efforts have been underway for about 20 years in Europe and are well established in New Zealand and Australia, but they have been less prevalent in the United States. Now federal government initiatives are combining with local interest to create momentum for marine spatial planning activities at national, regional, and local levels.

President Obama and Jane Lubchenco, head of the National Oceanic and Atmospheric Administration (NOAA), have identified marine spatial planning as one of their highest marine policy priorities. On July 19, the President signed an executive order establishing a National Ocean Council. This order also directs federal agencies to “participate in the process for coastal and

marine spatial planning and comply with Council certified coastal and marine spatial plans.”

The new National Ocean Council will establish guidelines for marine spatial planning at the regional level, where numerous multistate councils have been set up to work on ocean issues. The Mid Atlantic Regional Council on the Ocean (MARCO) was established in 2009 by agreement among the governors of New York, New Jersey, Delaware, Maryland, and Virginia. A central component of MARCO is the creation of a regional portal for spatial information. The portal will bring together data on a wide variety of marine and coastal resources, environmental conditions, and human activities, enabling managers, planners, and the public to make customized maps of coasts and offshore waters. The Virginia CZM

Program has funded The Nature Conservancy to create an online regional system similar to CZM's Coastal Geospatial Education Mapping System (GEMS), which houses maps and data about activities and resources in Virginia waters. (CZM's Coastal GEMS can be accessed at www.deq.state.va.us/coastal/coastalgems.html.)

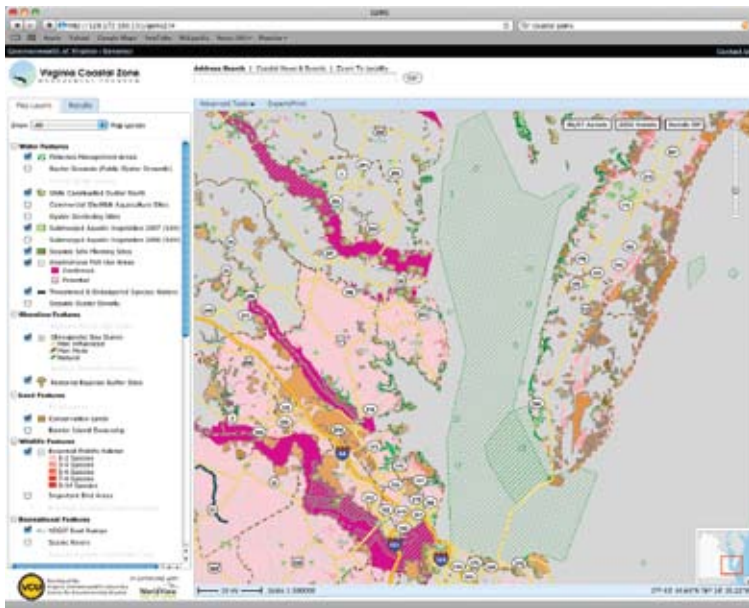
CZM's McKay explains that these tools allow anyone to visualize established uses and help resource managers plan future uses that are equitable and sustainable. "Marine spatial planning is providing everyone a fair opportunity to have a voice in what kind of uses are appropriate where," she says. "Letting things go on the way they are is just begging for more conflict and more degradation."

With that attitude in mind, officials at state agencies in Virginia have also begun targeted

mammals, and oyster grounds. The commission determined that none of the state waters (within three miles of shore) would be ideal for large-scale wind development, but according to VMRC's Tony Watkinson, the report could be used by some coastal communities as they seek to develop community-scale wind projects in local waters.

Watkinson points out that elements of marine spatial planning—mapping marine activities and using those maps to plan for the future—have been going on at VMRC and other agencies for years. "We've just not used the term," he says.

Virginia Sea Grant Director Troy Hartley agrees. "What is truly unique and innovative in the latest discussions is the promotion of a comprehensive view that simultaneously considers multiple sectors (for example, recreational activities, maritime industries, the energy sector, public access and use, conservation, and restoration) and seeks to understand both competing uses for the same space and where opportunities might arise by planning and staging uses in time and space."



Screenshot from Coastal GEMS (www.deq.state.va.us/coastal/coastalgems.html).

efforts to use marine spatial planning tools to address siting and use-conflict issues. In 2009, for example, the state legislature ordered the Virginia Marine Resource Commission (VMRC) to evaluate opportunities for wind energy development in state waters. The commission used many principles of marine spatial planning, including working with stakeholders and analyzing use conflicts with the aid of detailed maps. The resulting report classifies the degree of impact wind turbines would have on existing uses, such as commercial and recreational fishing, and resources, such as birds, marine

Acting Locally

One of the most exciting recent developments in marine spatial planning in Virginia comes from Gloucester and Mathews Counties. In 2007, with help from the Virginia Sea Grant and Virginia CZM Program, the Middle Peninsula Planning District Commission (MPPDC) convened a group to consider the future management of their waters. The York River Use Conflict Committee brought together a wide range of stakeholders—from commercial fishermen to marina owners and from duck hunters to conservation groups and state agency representatives. "We spent probably the next year and a half just getting folks to understand the concept of what marine spatial planning is," says Lewie Lawrence, Director of Regional Planning for the MPPDC. "Then we began to explore what tools the General Assembly has granted to local government to help deal with marine spatial planning."

The committee released seven recommendations for Gloucester County, including recommendations that the County should define a Coastal Living Policy, map and delineate its territorial boundaries in the water, and support and plan for working waterfront infrastructure and

public access to the water. The Coastal Living Policy “articulates the value system of a coastal community: that workboats start up early in the morning, that commercial crab pots smell when they’re left out on the deck of a boat... that we’re going to keep it that way because it’s our coastal cultural identity,” says Lawrence. He explains that defining local jurisdictions in the water empowers local government to become more active in managing its waters and to identify specific tools at its disposal to do that.

Since the Use Conflict Committee completed its report in 2008, all seven recommendations have been adopted by the Gloucester County Board of Supervisors, and most have been incorporated into the comprehensive planning processes of both Mathews and Gloucester Counties. In 2009, Mathews County took the Committee’s recommendations as a jumping off point for a unique project: an underwater aquaculture business park.

“We asked all the industry folks, ‘Tell us about your business model and where your problems are, and then let us as the planners think about how public policy can be changed to help fix your problems,’” says Lawrence. With those issues in mind, Mathews County officials are hoping to purchase the rights to a large underwater area where they can establish the infrastructure and policies necessary to make the area an “aquaculture enterprise zone.”

The project is generating excitement within the aquaculture industry and among policy makers who see it as a testing ground for innovative planning at the local scale. “We’re the only Virginia planning district commission that’s actively doing anything with [marine spatial planning] in the Bay,” says Lawrence. “It’s happening in earnest at the local level right here on our coast.”

It’s also happening on the Atlantic coast, or “Seaside,” of Virginia’s Eastern Shore. The Virginia CZM Program has been funding a multiyear Seaside Special Area Management Plan (SAMP) since 2008. This project is taking a marine spatial planning approach to determining best locations for various uses in a dynamic environment where habitat types can shift after every major storm and barrier islands are rolling toward the mainland. Clam aquaculturists, habitat restoration specialists,

recreationists, conservationists, and resource managers are working together to map current and potential future resources and uses. Ultimately, they hope to create a holistic management plan that will maximize the economic and ecological vitality of the Seaside.



Wildlife, recreation, aquaculture, and offshore energy are just a few of the uses that marine spatial planning processes have to balance.

This is the kind of progress that Morgan Gopnik and other marine policy experts have been working toward. “We held a series of meetings with industry representatives over the course of the last two years, trying to explain what marine spatial planning is,” says Gopnik, “that it’s not meant to close off the ocean—it’s meant to create balance—and that they’d be involved as stakeholders.”

Industry members had a number of important and legitimate concerns and articulated their goals for marine spatial planning—the need for clearly agreed upon objectives, maximum use of existing regulatory bodies rather than additional bureaucracy, and zoning for multiple, compatible uses instead of restricting areas to a single use.

Whether it’s at the national, regional, state, or local level, acceptance of marine spatial planning seems to be growing among industry representatives, regulators, scientists, and policy makers. After two years of talking to industry leaders about marine spatial planning, Gopnik reports, “We’ve definitely seen a shift in attitudes.”

NEWS FROM THE POINT

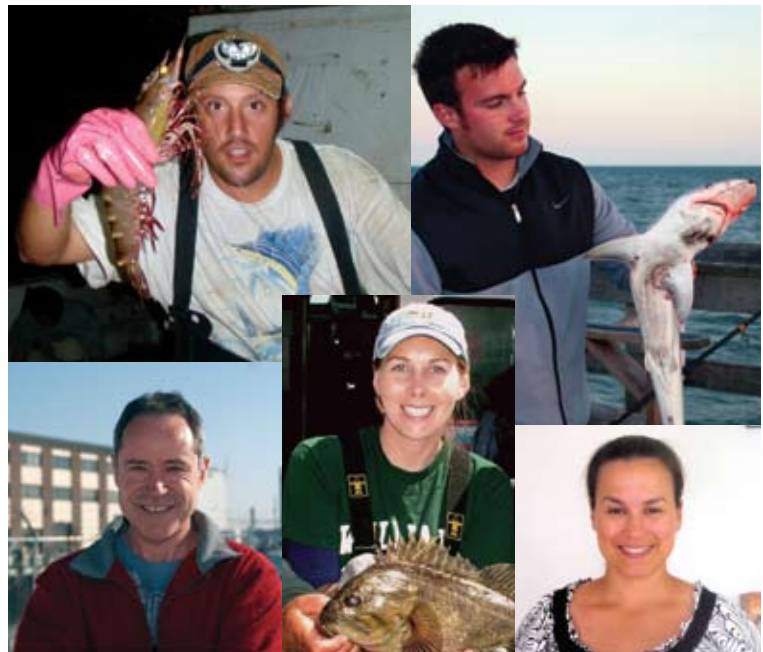
Visiting Scholar Seminars

Virginia Sea Grant hosted two Visiting Scholar Seminars this spring. On March 22, Anne Khademian (Alexandria Program Director for the Center for Public Administration and Policy at Virginia Tech) spoke about issues of multiple stakeholders and public policy during her talk “The Scientific, the Political, and the Local.” On May 17, Morgan Gopnik (independent marine spatial planning consultant) discussed “Marine Spatial Planning: What is it? Why do it?” Both talks are archived and available for viewing on our YouTube channel (www.youtube.com/VirginiaSeaGrant).

Knauss Fellows

The National Sea Grant Program announced that five Virginia students are finalists for the prestigious John D. Knauss Marine Policy Fellowship. Virginia was second only to California in the number of students that made it to the finalist stage this year. Finalists will proceed to Placement Week in November to determine where they might work during the Fellowship. The Finalists are Staci Hudy (Virginia Tech), Heidi Geisz (VIMS), Abigail Graefe (James Madison University), Kimberly Holzer (University of Virginia), and Anna Huntly (VIMS). The Knauss Marine Policy Fellowship matches highly qualified graduate students with hosts in the legislative or executive branch of government located in the Washington, D.C., area for a one-year paid fellowship.

©Kevin McCoy



New fellowship supports student collaboration with fishermen

Five graduate students have been named Collaborative Fisheries Research Graduate Fellows for the 2010–2011 school year. This new fellowship provides an academic year of funding for research projects that involve members of the fishing industry and aim to develop new fishing gear or conservation equipment. The fellowship is sponsored by Virginia Sea Grant, Virginia Institute of Marine Science (VIMS), the University of New Hampshire, the University of Massachusetts Dartmouth, the Northeast Consortium, and the NOAA Southeast Fisheries Science Center.

Craig O’Connell (top right) will be conducting his PhD research at the University of Massachusetts Dartmouth to learn whether permanent magnets could be used to reduce bycatch of spiny dogfish and smooth-hound dogfish in commercial fisheries intended to target other species. O’Connell has studied sharks in the Bahamas, South Carolina, Malta, and Massachusetts. In addition to presenting at several scientific conferences, he has lent his expertise to television specials about sharks on the History Channel, National Geographic, and Discovery Channel. O’Connell holds a master’s in elasmobranch conservation from Coastal Carolina University and a bachelor’s in marine science from Boston University.

Sally Roman (bottom right) will be conducting her master's research at the University of Massachusetts Dartmouth to develop new fishing gear that will reduce bycatch of young, undersized fish. Roman has worked closely with industry in the past. She began her marine science career as a fisheries observer in the Northeast for NOAA's National Marine Fisheries Service. As a project manager for the Study Fleet Project, Roman oversaw surveys of groundfish populations and designed survey strategies. Through these experiences, Roman saw the importance of working with industry to implement change. Roman holds a bachelor's in marine science from Jacksonville University.

Noelle Yochum (bottom middle) is a PhD candidate at Oregon State University proposing to research how the implementation of a new regulation will affect the gear that fishermen use. Yochum first became interested in fishing gear in Baja, California, and she was fascinated by how catch is determined by the combination of fish behavior and the gear used. She went on to conduct other research involving fishing gear, always striving to involve members of the fishing industry as much as possible. Yochum holds a master's in marine science from VIMS and a bachelor's in biology from the University of California, San Diego.

Steve Eayrs (bottom left) will conduct his PhD research at the University of New Hampshire, possibly on how trawl nets could be improved to reduce the catch of small fish while lowering drag on the net, thereby reducing fuel costs. Eayrs has been involved in the commercial fishing industry for more than 25 years, beginning his career as a commercial fisherman in Australia. Since then, he has gone on to lecture at Australian Maritime College and Gulf of Maine Research Institute in Portland, Maine. He has also conducted research and has written five books and more than 30 articles on fish behavior and fishing technology research, improvement, and testing. Eayrs holds a master's in fisheries and a bachelor's in fisheries technology, both from Australian Maritime College.

Michel "Tony" Nalovic (top left) will begin his master's research at VIMS to test new gear for further reducing sea turtle bycatch in the shrimp trawling industry. When the fishing industry is invited into the research process, Nalovic has seen something amazing. Industry begins to lead government and nongovernmental organizations in developing more sustainable practices and gear. Nalovic, a native of French Guiana, has been a scientist working with industry and NGOs around the world for nearly ten years. He has tested gear in Africa, evaluated pollution in Iraq, studied fuel consumption of shrimp vessels, and worked with the World Wildlife Fund to establish common objectives in the shrimp and finfish industries.

High School Research Award

Grace A. Perkins, a student at the Chesapeake Bay Governor's School, won the Virginia Sea Grant Program Award for outstanding high school marine or coastal research. Her study, "A Comparison of Fish Populations in a *Spartina cynosuroides* vs. *Phragmites australis* Marsh," showed that native marsh grasses, *Spartina*, contained more fish overall and more small fish than the invasive *Phragmites* grasses. "Application of the data may allow speculations on how marshes are being utilized by wildlife, which is crucial knowledge for preservation of these ecosystems," says Perkins in her report. The Virginia Sea Grant Program Award is administered annually by the Virginia Junior Academy of Science.



Summer Interns

This summer, Virginia Sea Grant welcomed one communications intern, Gabriella March (left), and two policy interns, Jennifer Reichle (middle) and Jessica Eckerlin (right). March graduated from Tulane University in New Orleans in spring 2010 with a bachelor's degree in geology. This summer, she edited and produced videos for our website. Reichle is a law student at William & Mary, and Eckerlin recently completed a joint master's in environmental science and forestry from State University of New York and environmental policy from the Maxwell School at Syracuse University. The policy interns spent the summer mapping and creating a directory of regulatory agencies in Chesapeake Bay that will be used as Bay managers seek ecosystem-based approaches to fisheries management.



Chesapeake Bay Days

Virginia Sea Grant educator Vicki Clark and several GK-12 Fellows shared their knowledge of marine and coastal science during Booker T. Washington Middle School's Chesapeake Bay Days on June 14. Clark spoke to middle schoolers about careers in marine-related fields, covering the gamut from scientists to Coast Guard officers to videographers. In light of the recent oil spill in the Gulf of Mexico, GK-12 Fellows Sam Lake, Daniel Maxey, and Stephanie Salisbury spoke about oil's effect on underwater life and how oil spreads through ocean currents.



Blue Crab Bowl

Students from Bishop Sullivan Catholic High School (Virginia Beach) emerged victorious at the 13th annual Blue Crab Bowl tournament on Saturday March 6 at Old Dominion University. Other competitors this year included Grafton High School (Yorktown) in second place, Chesapeake Bay Governor's School (Warsaw Campus) in third place, and St. Christopher's School (Richmond) in fourth. Sixteen schools from across Virginia participated.



Public Access Website

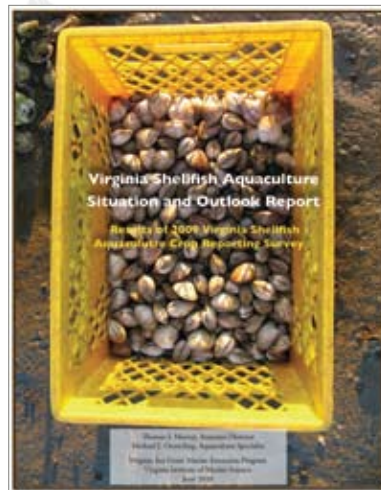
The Middle Peninsula Public Access Authority and Virginia Sea Grant have launched a website to aid communities as they address issues related to water access. Accessing the Virginia Coast (screenshot shown above) brings together resources for private waterfront landowners, government and public groups, and waterfront users. You can find the website at www.virginiacoastalaccess.net.

Scallop Stock Assessment

This July, Dr. David Rudders and Dr. William DuPaul, VIMS and Virginia Sea Grant Marine Scientists, conducted scallop surveys aboard the Fishing Vehicle (F/V) Celtic (New Bedford, MA) and the F/V Pursuit (Seaford, VA). The data gathered during these trips will help set catch limits in two areas typically closed to fishing but scheduled to open for a limited time in spring 2011. Conducting surveys of these areas before opening them to fishing supplies the managers with accurate and up-to-date information that should help keep the scallop industry in good standing. Rudders and DuPaul surveyed Georges Bank, in federal waters off the coast of Massachusetts, and Hudson Canyon, in federal waters off the Delmarva Peninsula. Rudders and DuPaul received funding to conduct these surveys through the Scallop Research Set-Aside Awards program, funded by scallop industry members and administered by the National Marine Fishery Service and New England Fishery Management Council.

New Publications

Shellfish Report: Sales of Virginia-grown shellfish showed a mixed response to the slowing economy, according to the Virginia Shellfish Aquaculture Situation and Outlook Report for 2009, released this June. Oyster sales increased by 26 percent, but the difficulty of hatchery production has led to lower-than-expected oyster seed production and planting this year. Clam sales decreased 24 percent, but the industry seems to be retooling and investing in hatchery production, which has increased by 41 percent this year. Industry members expect oyster and clam hatchery production and plantings to increase in 2010, with oyster seed production expected to increase three-fold and Virginia clam seed production on track for continued growth. The annual shellfish survey is conducted by Virginia Sea Grant Marine Extension Leader Tom Murray and Aquaculture Specialist Mike Oesterling. This year's study included responses from 91 Virginia clam and oyster growers, which Murray and Oesterling estimate includes 90 percent of all shellfish aquaculture operations in the state.



Water Harvest Guide: Paige and Jimmy Hogge of Buster's Seafood are continuing their work to encourage and support watermen interested in selling their seafood at farmers' markets. Last summer, they began the Water Harvest Program with Virginia Department of Agriculture and Consumer Services, and this year they've been holding workshops and open houses to show other watermen how they've gone from selling exclusively to wholesalers to selling at farmers' markets. The Hogges have also prepared a manual to help other watermen overcome barriers and navigate procedures for bringing their catch directly to customers. "Getting Started with the Water Harvest Program" will be available on the Virginia Sea Grant homepage www.vims.edu/seagrant.



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Norfolk Harborfest

Virginia Sea Grant cosponsored the 34th annual Harborfest on the Norfolk waterfront June 11 through 13. Hundreds of thousands turned out for a very hot weekend of food, music, and fireworks featuring the annual workboat races and parade. Virginia Sea Grant's Jon Lucy was recognized by the City of Norfolk for his long-term contributions, as both organizer and major partner since Harborfest's inception in 1972.



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Jon Lucy Retires

Virginia Sea Grant and VIMS Marine Recreation Specialist Jon Lucy retired in June after 38 years of service. Lucy cofounded the Virginia Game Fish Tagging Program, which involves recreational fishermen in collecting scientific data that helps conserve the fish species they pursue. Lucy was also involved in initiating Norfolk's annual Harborfest. As part of Harborfest, Lucy has now organized nearly 20 annual Harborfest workboat parades and races. Happy fishing, Jon!

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