East Coast Shellfish Growers Association

The East Coast Shellfish Growers Association represents over 1,000 shellfish farmers from Maine to Florida. These proud stewards of the marine environment produce sustainable, farmed shellfish while providing thousands of jobs in rural coastal towns.

The ECSGA informs policy makers and regulators to protect a way of life.

1623 Whitesville Rd.
Toms River, NJ 08755
www.ecsga.org

Executive Director
Bob Rheault
(401) 783-3360
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The Mouth of the Bay

Growers, Let's All Work Together

Executive Director Bob Rheault

In our world of tribes and cliques we have a tendency to subdivide into ever smaller groups so we can work within an association whose members all share the same beliefs. In our little world of aquaculture we have state aquaculture associations (sometimes more than one in a state), we have regional shellfish associations (ECSGA, PCSGA and GOIC), we have species associations like the U.S. Trout Farmers Association and Catfish Farmers of America. And of course we have national groups like the National Aquaculture Association, the National Fisheries Institute and most recently, the Coalition of U.S. Seafood Production (CUSP).

State, regional and species associations can be very effective in dealing with local issues, but if we really want to move the dial on broader national issues we will need to work together as a broad coalition. Small groups going to D.C. with their own agendas can dilute the message and end up getting little done.

I believe that we could get movement on several national issues if we could set aside those issues that divide us and work together. For instance, we were just four votes short of getting aquaculture crops designated as Specialty Crops under the last Farm Bill. And I think we can all agree that the National Marine Fisheries Service should be spending more than one percent of its budget on aquaculture research. Likewise, we would all benefit from the passage of national aquaculture legislation to help us increase production and stem the rising tide of seafood imports.

I also believe we need aggressive investments in selective breeding programs to meet the challenges of climate change and a growing global appetite for seafood.

To move forward we need to ignore the issues that divide us and focus on ways we can help each other. One example I often point to is the Farm Bureau. Many ECSGA members are also Farm Bureau members, and it makes sense to participate in one of the most powerful lobbying groups in the U.S. But it is tough to accept that the Farm Bureau led the charge on lawsuits to block clean water initiatives in Chesapeake Bay because they feared limits to fertilizer. So while I don't agree with everything the Farm Bureau supports, I remain a member because I recognize the potential power of such an alliance. It was with the help of the Farm Bureau that we almost pushed through that amendment to the Farm Bill that would have given us Specialty Crop status, and the research and

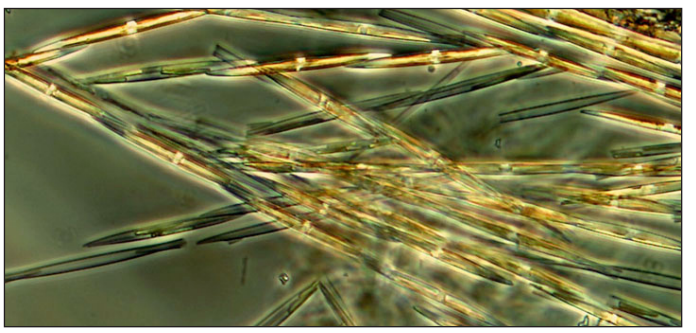
— Continued on page 7

Recent *Pseudo-Nitzschia*/ASP Closures in Southern New England

by Gary H. Wikfors,
Phytoplankton Enthusiast

Now that the dust has settled following shellfish-harvest closures in Rhode Island and Massachusetts due to the risk of biotoxin contamination from the domoic-acid-producing diatom, genus *Pseudo-nitzschia*, it may be a good time to put this risk in biological, ecological and regulatory perspectives. Species within the genus *Pseudo-nitzschia* are capable of producing domoic acid, an amino acid and potent neurotoxin that affects both vertebrate and invertebrate animals. Domoic acid can accumulate in shellfish feeding on *Pseudo-nitzschia*, posing a risk to human consumers. One need only read closure notices from state regulatory agencies to appreciate the severity of neurological symptoms that can result from eating seafood contaminated with domoic acid. The syndrome is termed "amnesic shellfish poisoning," or ASP, because one symptom can be temporary, or even permanent, loss of memory.

One scientifically fascinating aspect of domoic acid production by *Pseudo-nitzschia* species, though vexing in terms of regulatory controls, is the observation that ***most* Pseudo-nitzschia *species produce little or no domoic acid most of the time***. Our lab has conducted



NOAA FISHERIES

Pseudo-nitzschia are naturally occurring marine algae that sometimes produce a potent neurotoxin called domoic acid. The toxin can cause amnesiac shellfish poisoning (ASP) resulting in temporary, or even permanent, memory loss.

research to explore possible environmental triggers for domoic-acid up-regulation in *Pseudo-nitzschia* (Fuentes and Wikfors, Control of domoic acid toxin expression in *Pseudo-nitzschia* multiseries by copper and silica: Relevance to mussel aquaculture in New England (USA), Marine Environmental Research, Volume 83, February 2013, Pages 23-28.).

Breaking down our findings to the simplest terms, our results indicate that copper and silica concentrations very distorted from typical environmental levels can lead to domoic-acid expression in the species we tested – probably the most common species in our region. Under "normal" circumstances, the diatom produces no toxin, but the capability to become toxic

— Continued on page 16

Member Profile:

Samuels and Son Seafood

by Robert Rheault,
ECSGA Executive Director

Earlier this year I had a chance to visit with new member Joe Lasprogata, vice president and resident marine biologist with Samuels and Son in Philadelphia, Pa. While Samuels has been in the wholesale seafood delivery business only since 1989, the family has a long history in seafood going back the 1920s, when they operated a retail seafood store in South Philly.

Lasprogata was hired in 1989 to establish the firm's focus on premium quality products, and has seen the company grow from a small shop with one truck to one of the best seafood distributers on the East Coast. The business now employs more than 450 people, operating 85 trucks and delivering seafood to seven states with a few satellite operations in Las Vegas, Pittsburgh and South Florida. In 2009 they opened a new, state-of-the-art, 60,000-square-foot facility on Philadelphia's Lawrence Street, just blocks from the Delaware River and the Walt Whitman bridge.

Samuels is still a family-owned business, with four of Samuel D'Angelo's children working in purchasing, marketing and sales. They sell just about anything that swims: fresh, frozen, domestic or imported. When it comes to shellfish, Samuels carries some 300 varieties of oysters, clams, mussels and cockles. On any given day they will likely have 75 varieties of shellfish to offer, and they move about 50,000 oysters and clams each day. Lasprogata attributes the firm's rapid growth to the company's commitment to quality and service.

Despite such an extensive product line, Lasprogata still tries to market the "merroir" of each brand, celebrating the differences of the various growing areas and culture methods. He says he loves to sell oysters because "you know when people are eating oysters they are having a good time. It's a high-end product that is a proven money-maker for the restaurants.

"Our shellfish program really took off here at Samuels when our Crustacean Specialist, Scott Marshall, joined in 2010. Scott expanded our product offerings by sourcing the best new varieties of oysters available: East Coast, West Coast and Europe. But more importantly, the overall growth really came through by educating our staff and customers alike, and by offering the most unique products."

Lasprogata has seen a huge change in the shellfish business since he started with Samuels more than 25 years ago. He explained that, "We used to get bushels of wild oysters with rocks inside, and you never knew what you were getting. Now we have all these great, high-quality, uniform, beautiful oysters to sell. Everyone has shellfish on their menu now. We know this because when there was a big freeze on the East Coast a few years back and we couldn't source any oysters or mussels we had about 80 percent of our customers screaming at us. I bet that 20 years ago it would have been maybe 20 percent" of unhappy customers, he said.

SAMUELS AND SON SEAFOOD

When I asked him why he felt it was important to join the ECSGA, he replied, "It's important to support an association that supports the industry. Shellfish is an important product line for us, and we need a strong industry and workable regulations that work for us and our customers. A strong association is part of that equation."

Lasprogata applauded the ECSGA for being a great source of timely information. "Being well informed is critical to being a good salesperson," he noted. Responding to my question about his take on the current regulatory environment, he said, "It is largely because of the stiff regulations that we now have a product

— Continued on page 7

Everything You Always Wanted to Know About Oyster Herpesvirus **But Were Afraid to Ask*

by Colleen Burge, Institute of Marine & Environmental Technology and the University of Maryland Baltimore County

What is Ostreid herpesvirus 1 (OsHV-1)?

OsHV-1 is an emerging viral pathogen of Pacific oysters and other bivalves. Many strains of OsHV-1 exist and can vary in virulence, including those considered "µvar" (a specific OsHV-1 variant) or µvars (variants of OsHV-1 similar, but not identical to µvar).

Pacific oysters in all their life stages are the primary species known to suffer from mass mortalities caused by OsHV-1. But many species of bivalves are susceptible to the virus while in the larval life stage, and the virus can be transmitted within and between life stages. Some OsHV-1 strains cause losses in clams and adult scallops in China.

Will I get OsHV-1 from eating an oyster?

No, although OsHV-1 is a herpesvirus, it is distinct from human herpesviruses (and those infecting other vertebrates) and will not infect you. This is the most frequent question I get asked!

What is the scale of the problem?

From the early 1990s to 2008, mortalities associated with OsHV-1 mainly impacted oyster larvae and seed. Sporadic mass mortalities of seed Pacific oysters caused by OsHV-1 have occurred yearly in France and in the United States (Tomales and Drakes Bays in California) in the summer months since 1993. In California, **the extent and magnitude of mortalities can vary, averaging between 50 and 60 percent each year, but it's possible to see a 100 percent mortality rate in a particular stock.** Survival depends on several factors, including outplant time, size and oyster stock.

Since 2008, the OsHV-1 µvars have been linked to economically devastating mortalities of seed and adult Pacific oysters in France, and have spread into many other European countries (Ireland, Spain, England, Italy, the Netherlands, Portugal, Sweden and Norway) both with transfers of infected oysters and by unknown causes (possibly through larval transport and colonization of new areas).

In New Zealand and Australia, OsHV-1 µvars causing Pacific oyster mortalities were first detected in 2010. So far in New Zealand, the virus has been found only in the North Island, and was spread between farms through animal transfers. Although OsHV-1 has spread in Australia, both within New South Wales, and in 2016 to Tasmania, neither the initial emergence nor the spread of the virus has been linked to animal transfers. The 2016 emergence in Tasmania was economically devastating to the Australian oyster industry, where mortalities are called "Pacific Oyster Mortality Syndrome" or POMS. It's hypothesized that viruses in Australia are being transferred via ballast water. (Visit oysterhealthsydney.wordpress.com for information on the current work in Australia.)

Multiple studies have shown variation among strain types globally, and even though Asia may be the possible point of origin, more information is needed to understand the initial emergence of OsHV-1 and the continued spread of variants.

Do we know if OsHV-1 impacts Eastern oysters?

Anecdotal information from growers in California indicates that Eastern oyster seed do not suffer mortality events. OsHV-1 has

OYSTERHEALTHSYDNEY.WORDPRESS.COM

A dead Pacific oyster in Australia after succumbing to Pacific Oyster Mortality Syndrome (POMS) caused by infection with Ostreid herpesvirus 1 (OsHV-1). In 2011-2012 the Aquatic Animal Health team on the Faculty of Veterinary Science at the University of Sydney conducted experiments on oysters hit by a POMS outbreak to determine if age or husbandry practices had any effect on infection and mortalities.

— Continued on page 6

Miss American Oyster Beauty Pageant

NACE/Milford Conference
Providence Omni Hotel
Thursday evening, January 12, 2017

Only one *Crassostrea virginica* entry per grower

Contestants must pre-register: contact bob@ecsga.org

Oysters will be judged unshucked (it's not a taste test)

One attendee one vote
(And you thought the election was over!)

We may collect an entry fee (to go to a good cause)

Coveted prizes – not to mention bragging rights – will be awarded

URI marketing students will record the results and conduct a morphometric analysis to see if different demographics have different preferences for size and shape. They may also ask a few questions about your perceptions on *Vibrios*.

For more info visit Northeastaquaculture.org

Help Us Help You: Join the ECSGA

Supporting the ECSGA by being a member is good for your business and good for our industry as a whole. Your membership dues helps pay for an executive director who looks out for your interests every day by working with regulators, educating lawmakers and helping the media get the story straight. Whether it's dealing with the Interstate Shellfish Sanitation Conference, Food and Drug Administration, NOAA, the Army Corps of Engineers or even local regulators, the ECSGA is constantly striving to ensure that regulations are workable and rational.

Our Listserv has 650 subscribers, we reach more than 1,000 people on FaceBook and we have 800 Twitter followers. But only a tiny fraction of that audience are dues-paying members.

Thinking about becoming a member for the first time?

Join now and your membership will be good through 2017! Remember that we work hard for you, and your support determines how much we can do for you and our industry.

We are stronger together!

Check out the membership info and form on the next page. You can snail-mail your application and check to the office in Toms River, N.J., or pay electronically by clicking on the Join button at ECSGA.org

ECSGA Membership Categories and Dues

Growers, dealers and equipment suppliers enjoy full voting rights. (If you are both a grower and a dealer simply ask yourself where most of your revenue comes from.) If you don't fall into one of these industry categories please consider joining as a non-voting associate member.

Member Type	Gross Annual Sales	Dues
Grower	$0 to 50,000	$100
Grower	$50,000 to $100,000	$200
Grower	$100,000 to 300,000	$500
Grower	$300,000 to 3 million	$1,000
Grower	Over $3 million	$1,500
Shellfish Dealers and Equipment Suppliers		$250
Restaurant Ally		$100
Non-voting Associate		$35

You can pay online using PayPal or your credit card on our website www.ECSGA.org.
Or you can mail in this form with your check to: ECSGA, 1623 Whitesville Rd, Toms River, NJ 08755.

Name _____

Company _____

Street Address _____

City, State, Zip _____

Email _____

Phone _____

Member Type and Level*_____

* Rest assured your sales information will be closely guarded and will not be shared!

— *Continued from page 3*

Oyster Herpesvirus FAQs

been detected in the tissues of Eastern oysters planted alongside Pacific oysters in California. To date, OsHV-1 testing of Eastern oysters on the East Coast and Gulf Coast has been limited, and the virus has not been detected. Larval or young seed may be the most susceptible life stage to OsHV-1.

How do I know if OsHV-1 is impacting my oysters?

Infection of an oyster crop with herpesvirus causes abnormally high mortalities (as high as 100 percent) of larval and seed oysters over a short time period (three to 15 days until death). The severity of the mortality rate depends on the strain, oyster genetics and environmental factors. Mortalities occur in the summer months, and are often associated with warm water temperatures. Larval mortalities can be preceded by abnormal swimming behavior or a detached velum, where larvae swim slowly and settle on the bottom of the tank. Seed mortalities are often detected by finding an abnormal number of empty shells and/or moribund oysters; a clanking empty shell noise is common. Handling of oysters infected with the herpesvirus during a mortality event can increase mortalities, which can be variable across affected beds even within the same stocks.

The only way to determine whether your farm is infected by OsHV-1 is to submit samples for testing. Collecting moribund and live oysters during or right after a mortality event is the best way to detect the virus.

What management strategies are helpful?

A prudent choice is to destroy infected stocks and to limit movement of infected stocks and oysters from the same location (i.e., broodstock that may have a low-level and latent infection). A breeding program in France run by IFREMER has been successful in producing Pacific oysters that are more resistant to OsHV-1, and breeding programs in other countries affected by the virus are now underway.

How is OsHV-1 measured or detected?

The virus can be detected in tissues or in seawater using sensitive and specific molecular methods, primarily a quantitative Polymerase Chain Reaction test (PCR). It's possible to use other microscopic methods, but they are less sensitive. Current methods allow high-throughput testing (i.e., qPCR) for the presence of OsHV-1, but do not target specific variants. To determine the variant responsible for mortalities, sequence analysis is necessary.

Colleen Burge and her team of researchers (including Carolyn Friedman, Kimberly Reece and others) were recently awarded a National Sea Grant Aquaculture grant titled, "Development of tools to support sustainable production of bivalve aquaculture in the face of an emerging virus."

She is happy to answer questions and can be reached at colleenb@umbc.edu.

JOE LASPROGATA/SAMUELS AND SON

This recent photo showing a pink Rhode Island oyster may look shocking, but it's actually quite normal and perfectly safe to eat. I have seen this phenomenon in my oysters often over the years. While it usually occurs in the spring when blooms of red phytoplankton dominate, we apparently had a bloom of red algae in Rhode Island a few weeks ago. If the shucker happens to nick the stomach (or more accurately, the digestive diverticulum) then the red algae will escape into the liquor and it can look as if the oyster is bleeding.

I would often get calls from alarmed customers asking if oysters like this were safe for consumption. After I explained the cause, I would usually ask whether the oyster tasted OK. The answer was invariably "yes," but some customers still balked. Remember, the customer is always right (even when they are wrong), but phytoplankton come in a wide range of colors, and they will concentrate the pigment in their guts. If you nick the gut, the plankton will escape and discolor the liquor. *Isn't biology cool!*

— RBR

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ECSGA-SWAPMEET is the LIST for you!

In an effort to keep the main Listserv relevant for folks interested in issues, growing tips and news you can use, please refrain from cluttering it up with job inquiries and "looking for seed" requests.

Use the new ECSGA-SWAPMEET list instead.

To subscribe visit

http://listserv.uri.edu/cgi-bin/wa?SUBED1=ECSGA-SWAPMEET&A=1

— *Continued from page 2*

Samuels and Son

that is safe to eat raw. The industry is doing a great job of ensuring food safety, and the customers won't tolerate anything less."

Although he would like to see recalls happen faster so that we might actually be able to prevent illnesses instead of reacting to them after the fact, he recognized the challenges involved. "Hopefully technology will eventually allow us to get out in front of problems before they occur. You must protect people from illness in this litigious environment," Lasprogata said.

When asked if he thought the industry is at risk of overproducing, he replied that even though oyster production has doubled in the past

SAMUELS AND SON SEAFOOD

five to six years, demand has kept pace and prices remain strong.

"Eventually, you may need to lower prices so you can penetrate the mid-scale and inexpensive seafood establishments," he said, adding that, "there may be a bit of oversaturation with so many names. It is hard to be credible when you are trying to sell the differences between a dozen different products grown in the same area."

— *Continued from page 1*

Let's Work Together

marketing block grants that come with that.

I get frustrated when growers insist that their state associations are a better investment than participating in a larger group. This is not an either/or proposition. You need both! Your state association can be responsive to local needs, but you shouldn't ignore the impact that larger associations can have on national issues like the Interstate Shellfish Sanitation Conference, Food and Drug Administration, Environmental Protection Agency, U.S. Fish and Wildlife Service or research investments by the National Marine Fisheries Service and the U.S. Department of Agriculture.

As the new administration prepares to move in down in Washington, D.C., I suggest it is time for aquaculture growers to start looking at the big picture. We cannot afford to present a fragmented message. Let's set aside our differences and concentrate on the issues that we all agree on.

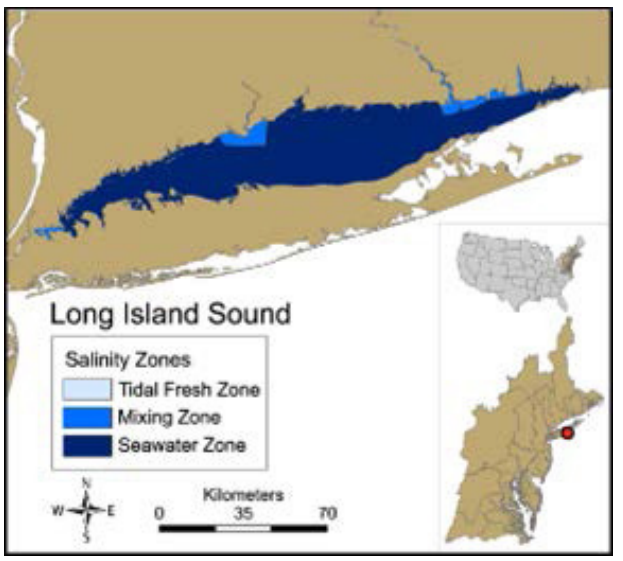
You may not concur with everything that finfish farmers, soybean producers and fishermen espouse, but still we share much in the way of common threats and opportunities. If we team up and work together in D.C. on the issues we can all get behind, we will have a much better chance of moving the dial in a significant way for the benefit of all. But if we continue to focus on the issues that divide us, it should come as no surprise when we wind up achieving little.

Modeling Nitrogen Removal by Shellfish

by Robert Rheault,
ECSGA Executive Director

Over the past five years I have been working with a large team of researchers on an EPA-funded project led by the National Oceanic and Atmospheric Admnistration (NOAA) to assess the potential nitrogen removal capability of shellfish – a process referred to as bio-extraction – in Long Island Sound and in the Great Bay-Piscataqua Region Estuaries of New Hampshire. In most of our nation's estuaries excessive nutrient input (nitrogen and phosphorus) is now listed as the leading cause of declining water quality and habitat loss. In marine systems, excess nitrogen leads to a cascade of impacts (called eutrophication) that includes excessive phytoplankton blooms, low oxygen, and in extreme cases, fish kills and the loss of habitat such as eelgrass.

We know that large populations of shellfish can mitigate the symptoms of eutrophication by grazing down phytoplankton populations, improving light penetration and assimilating



NOAA NATIONAL CENTERS FOR COASTAL OCEAN SCIENCE

some of the plant nitrogen into tissue and shell protein.

Our team used a number of models to evaluate the magnitude and the economic value of nutrient bioextraction by shellfish as a complement to reduction of nitrogen inputs from land-based sources such as agriculture and wastewater treatment plants (WWTPs). **Our work showed that nitrogen removal by shellfish aquaculture compares favorably to removal by existing agricultural and storm-water Best Management Practices (BMPs)**. We modeled the impact of existing shellfish culture efforts and performed an analysis of the dollar value of these ecosystem services.

In a nutshell, we found that shellfish aquaculture is removing less than two percent of the total nitrogen flowing into Long Island Sound and the Great Bay-Piscataqua Estuaries. This may seem like a relatively small amount, but **the dollar value of estimated nitrogen removal (based on avoided costs) ranges from $8.5 million to $230.3 million.** This range of values is large because the alternative (avoided costs) nitrogen reduction methods (from storm water management to fertilizer application BMPs and WWTP upgrades) also encompass a wide range of costs. For instance, removing 90 percent of the nitrogen from a WWTP is relatively affordable, while removing the last one- or two- percent is incredibly expensive (on a per pound of nitrogen basis).

We also modeled the nutrient removal in the Great Bay-Piscataqua River system in New Hampshire and we projected the impact of doubling the size of the oyster culture efforts in both locations.

These modeling efforts provide a useful starting point in understanding the potential of shellfish aquaculture in removing nitrogen and in the valuation of these ecosystem services. The actual implementation of shellfish nutrient bioextraction as a water-quality management tool would benefit from further model validation and possibly some changes to the legal interpretation of the Clean Water Act. The idea, however, is gaining momentum.

For example, the Chesapeake Bay Program Oyster Best Management Practices Panel recently released recommendations about the way oysters can be "credited" with nutrient removal, a first step toward including growers in a nutrient-trading program. Potential inclusion of shellfish in a nutrient-trading program would also require documentation of each grower's harvest biomass.

Nevertheless, ***t*his valuation of the ecosystem services associated with shellfish culture should help raise public awareness of current water quality issues, and encourage increased opportunities for shellfish aquaculture.** Expanding shellfish culture would also help stimulate local economies while providing additional sustainable, local seafood and improving water quality.

Obviously, there is far more in the 154-page report that I don't have space to dive into here. That report is posted online, but I must warn you, it is pretty thick sledding and some of the modeling work can be tough to follow. Nonetheless, the findings of our work are encouraging and could pave the way for including shellfish aquaculture in future nutrient-credit-trading programs.

Download the full report at: www.coastalscience.noaa.gov/publications/detail?resource=O0hdKo2k2hSWOxLGFRcu/feoeR4U4RM-469gysLLrINQ=

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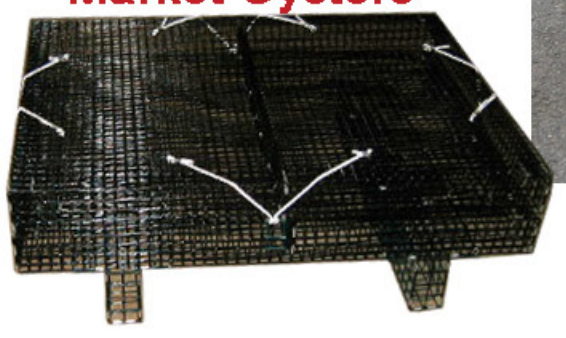

Tools to Build and Maintain Your Gear

Rope, Buoys, Boots, Anchors,
Clothing, Gloves, Hardware
and More for the Pro Grower

R.I's Jon Hare Named New NEFSC Director

The National Oceanic and Atmospheric Administration (NOAA) has appointed agency veteran Jonathan A. "Jon" Hare, Ph.D, Science and Research Director for its Northeast Fisheries Science Center (NEFSC). Hare replaces Dr. Bill Karp, who served as director from 2012 until his retirement in September. According to a NOAA news release, in his role as director, Hare will continue the work of planning, developing, and managing a multidisciplinary program of basic and applied research on the living marine resources of the Northeast Continental Shelf Ecosystem, encompassing waters from the Gulf of Maine to Cape Hatteras, N.C.

Leading the Northeastern labs and field stations is the culmination of more than 20 years working for NOAA Fisheries in various capacities, where Hare won many awards for his leadership, administrative capabilities and research.

Recently he served as Supervisory Research Oceanographer and Acting Ecosystems Processes Division Chief for the NEFSC Narragansett (R.I.) Laboratory. In this role he managed division research, while also managing personnel and research resources for five different locations in the center.

Hare previously held the position of Supervisory Research Oceanographer and Oceanography Branch Chief for seven years, contributing to the center's tactical and strategic planning while establishing and maintaining relationships both across the agency and externally. He also provided NEFSC leadership guidance on climate change.

Hare received a B.A. in Biology from Wesleyan University in 1987, and a Ph.D. in Oceanography from the State University of New York at Stony Brook in 1994.

WWW.NMFS.NOAA.GOV

New NEFSC Director Jon Hare says he's committed to aquaculture science and to the Milford Lab.

When reached by email, Hare talked about aquaculture and the importance of NOAA's Milford (Conn.) Laboratory:

"A main element of NOAA Fisheries' mission is 'productive and sustainable fisheries,' which includes both wild-captured and cultured fisheries. Aquaculture is also prominent in the NEFSC Strategic Plan as part of the sustainable fisheries theme. I am committed to aquaculture science and I am committed to the Milford Laboratory.

"The [lab] was founded in 1931 and is a leader in aquaculture, providing research, methods and material support to industry on the East Coast, nationally and globally. I have tremendous respect for the accomplishments of the Milford Laboratory and I want to help the lab continue its leadership as aquaculture moves into new areas such as probiotics, offshore operations and providing vital ecosystem services, [such as] food and clean water. I also want to help the lab maintain its support for shellfish aquaculture on the East Coast.

"Over the years, different components of the NEFSC have separated from each other. One of my goals as director is to better integrate all aspects of our science, including the capabilities and experiences of staff at the Milford Laboratory. In Milford specifically, this would integrate the aquaculture science with habitat, ecosystem, fisheries and protected-species science conducted in other parts of the Center. Such integration will help the NEFSC across all of its mission elements.

"It is a challenging time no doubt: increasing science demands, flat or declining budgets, and aging facilities. The Northeast Fisheries Science Center has facilities in five locations: Sandy Hook (N.J.), Milford, Narragansett, Woods Hole (Mass.), and Orono (Me.). Being spread regionally has great value to the NEFSC – [it helps] us understand the needs and issues across the region. But all the facilities have immediate needs. We are addressing them as we can, with staff safety and security a priority. With remaining funds, we are improving work conditions and science capabilities."

Jon Hare has also done much of the research documenting the northward range shifts seen in local New England stocks in response to warming. He also played a large role in a recent study prepared for NOAA by a team of scientists assessing the vulnerability of 82 fish and invertebrate species to climate change on the Northeast U.S. continental shelf.

To read the entire study, visit journals.plos.org/plosone/article?id=10.1371/journal.pone. 0146756

Mechanical Shellfish Harvesting: Separating Fact From Fiction

by Robert Rheault,
ECSGA Executive Director

For many years the controversy surrounding mechanical harvest methods, which include scallop drags, "scrapes," hydro-dredges, escalator dredges and suction dredges designed to harvest shellfish, has been a thorn in the side of the shellfish aquaculture industry. The term "dredging" is itself unfortunate, since it conjures up images of harbor maintenance dredging, which is a totally different process.

While environmental non-governmental organizations generally love cultured shellfish, they often refuse to green-light operations that use dredge harvest techniques because of the perception that the practice is injurious to the environment. Numerous publications have documented the damage wrought by deep-water fish trawls and heavy scallop dredges tearing through habitats with vertical structure, which is defined as anything that sticks up off the bottom, such as corals, oysters, grasses, and even rubble and rocky reefs. These vertical structures are often designated as "critical habitat" because the nooks and crannies provide places where juvenile fish can hide from predators.

But dredging of cultured product on leased aquaculture grounds is very different for many reasons. For one, growers typically operate in shallow, high-energy environments with a sand or mud bottom. Any vertical structure in leased grounds is there because growers planted oysters there. The organisms inhabiting these zones have evolved over millennia to survive in the face of regular, periodic storms that turn their world upside down, cloud the water with fine silt, move boulders and shift beaches, often wiping out entire populations. These organisms spawn prolifically and recruit rapidly, so we often see these communities recover fully within a few weeks after being harvested by mechanical means.

The science on this recovery is well established, as shown by four literature reviews covering over four hundred studies. Mitch Tarnowski conducted one such review for the Maryland Department of Natural Resources, noted ecologist Loren Coen conducted another one for the South Carolina Department of Natural Resources, and I did one for a chapter I wrote on the subject in Sandy Shumway's book, *The Environmental Impacts of Shellfish Aquaculture*. (Visit drive.google.com/open?id=0B2joK7eNYTUyakpraEpJdlR3czA

Most recently, Ron Goldberg of the Milford Lab wrote a fourth literature review and conducted another study on the effects of hydraulic shellfish dredging on the ecology of a cultivated clam bed. (Visit www.int-res.com/articles/aei2013/3/q003p011.pdf)

While the science on cultured shellfish dredging is clear, there is no question that the average person naturally assumes that dredging wreaks havoc on the environment. From a human viewpoint this is a natural conclusion: it's easy to imagine what would happen if a potato harvester churned through your garden, and it is not a pretty picture.

Most people do not understand that these communities are well adapted to tolerate these sorts of disturbances and to rapidly spring back. Disruptions are natural and almost predictable, and the organisms have adapted over millions of years to respond and recolonize. From our human viewpoint as terrestrial organisms, it is difficult to appreciate the forces of a strong storm, but if we lived in an area where four-foot waves blasted though our homes a few times every year, we certainly would have adapted ways to deal with it too.

Some folks may be tempted to draw a false equivalence between a dredge and 80 bullrakes, saying the "damage" is the same. The reality is that both harvest methods cause minimal disturbance; any impacts are undetectable in a few weeks (as long as you are not tearing up vertical structure, which we are not).

There are, however, some notable differences between harvesting farmed shellfish and wild product. Growers typically operate in a systematic fashion, harvesting their crop when it has reached market size. On the other hand, wild harvest fishermen continually move around looking for the highest densities, not knowing where other harvesters have been and repeatedly disturbing the same ground. Following harvest, a grower re-plants tens-of-thousands of dollars worth of seed per acre to ensure a sustainable harvest, and then leaves it to grow for months or even years. Few wild harvesters

— *Continued on page 16*

Save the Date NACE & Milford Jan. 11-13, 2017

The joint meeting of the biennial Northeast Aquaculture Conference and Expo (NACE) and the 37th annual Milford Aquaculture Seminar is set for Jan. 11-13, 2017, at the Omni Providence Hotel, Providence, R.I.

Highlights include:

- ECSGA annual meeting and elections, along with a policy round-table discussion
- *Miss American Oyster Pageant:* growers, save your most beautiful unshucked oyster to enter in the contest
- Special session: *Deterring Shellfish Theft*
- trade show with more than 20 vendors
- six field trips

For more info visit:
www.northeastaquaculture.org

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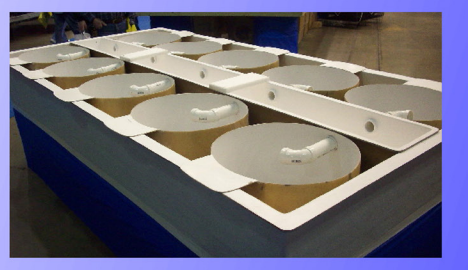

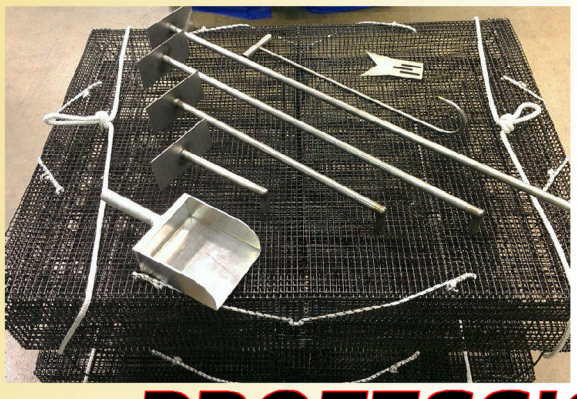

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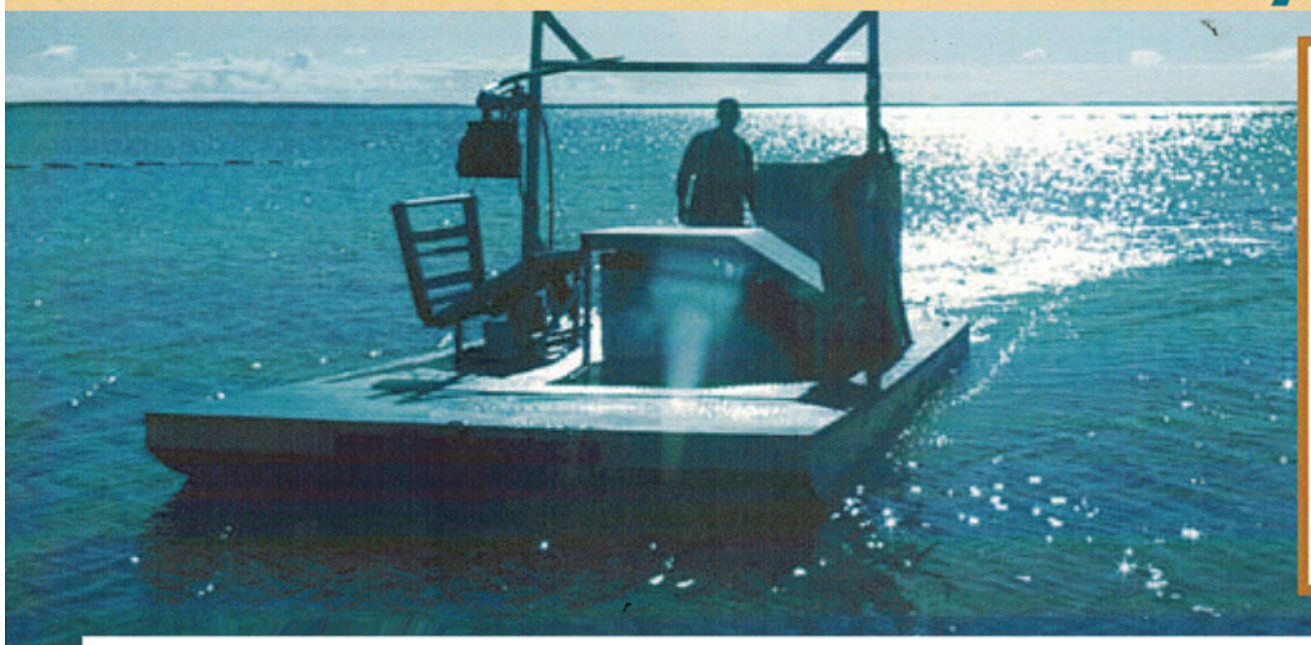
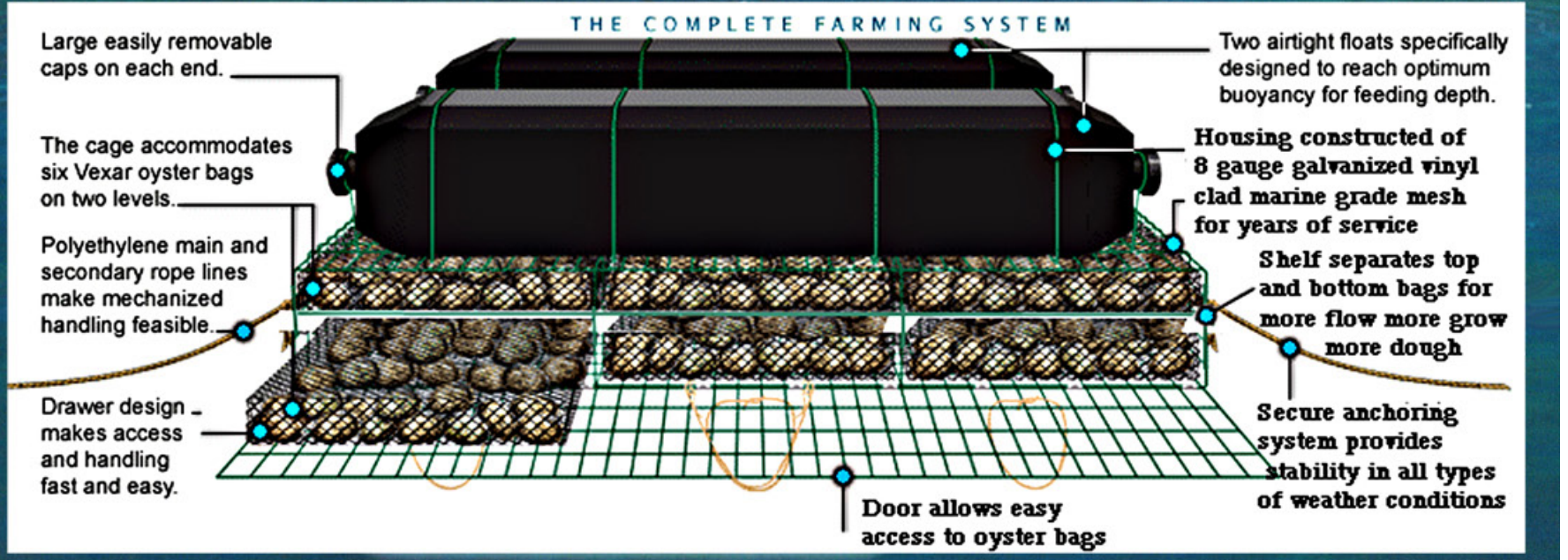


WHAT

OysterGro® consists of a compact housing with floats that provide the versatility, efficiency, and effectiveness on which business success depends. Every component is designed for strength, durability, and convenience.



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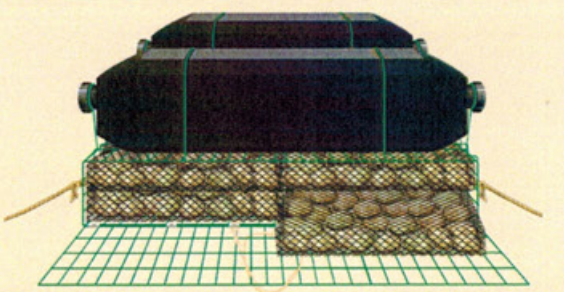

SOUTH CAROLINA SEA GRANT CONSORTIUM

Representatives from four Southeastern states gathered in Charleston, S.C., in mid-November to discuss the merits of starting a shellfish initiative. Organizers are hoping to generate excitement by highlighting the good aspects of shellfish activities, including restoration, aquaculture, water-quality improvements, wild harvest and research.
The hope is to bring people out of their silos to see what's going on in other sectors, while fueling synergies and opening up opportunities for working together and advancing common interests. While they typically do not garner federal support, shellfish initiatives often can attract state funding, as in Washington's Blue Ribbon Ocean Acidification Panel.

Did You Know That Oysters, Clams and Other Live Seafood May Be Excluded from Your Spoilage Insurance?

Seafood is more susceptible to spoilage than many other foods, so spoilage insurance to protect your inventory while you transport or hold it for sale is vitally important. However, even if you have spoilage coverage, be sure to ask your insurance agent if your policy excludes "live animals."

AP/WWW.CTPOST.COM

Of all the types of seafood that remain alive when in storage or at the point of sale, oysters and clams top the list. Unfortunately, most standard insurance policies exclude all kinds of live animals, meaning that if you suffer a devastating fire or if your refrigeration equipment breaks down, your stock may not be insured.

If you're concerned about this potential exposure, talk to your insurance agent. Policies can be adjusted so that live animals are still covered. If you hold live animals, you need coverage for equipment breakdown/spoilage, and contents/stock.

For more information, call David McCaleb at Bankers Insurance LLC, (757) 442-6187 or visit www.easternshoreinsurance.com.seafood.html.

— Continued from page 1

Pseudo-nitzschia *Closures*

is very real. So, if domoic acid production by *Pseudo-nitzschia* common in our region is unexpected, why the closures? The answer lies in the relative ease of recognizing *Pseudo-nitzschia* cells under the microscope and the difficulty of quantifying domoic acid in shellfish tissues.

The regulatory sequence is to close harvest areas when high prevalence of *Pseudo-nitzschia* is detected by phytoplankton-monitoring programs and to immediately send sentinel bivalves (often blue mussels held in bags at strategic locations) to remote labs with the capability to quantify domoic acid. Beds remain closed to harvest until the (usually) non-detect result for domoic acid is reported by the testing lab. We saw this logical sequence at work this fall in Massachusetts and Rhode Island.

Questions occurring to many affected by the 2016 ASP-risk closures in southern New England have included, *What causes these blooms? Is this something new? Will it get worse?*
From my own, personal perspective, I do not see the presence of *Pseudo-nitzschia* in our region as unusual or troubling.

The earliest phytoplankton records from our region, (such as species accounts reported by Conover and Riley in the 1950s) listed a diatom then referred to as "*Nitzschia seriata*," now known to be among the domoic-acid-producing *Pseudo-nitzschia* clade, as a common member of the autumn flora in coastal New England. Subsequent phytoplankton lists of southern New England waters, including my own infrequent observations, have consistently reported this organism in the autumn plankton.

Indeed, the autumn diatom bloom is a well-known feature of temperate-coastal ecology and is the nutritional foundation that makes oysters and other shellfish so delicious in this season – the glycogen stored by shellfish gorging on blooming diatoms imparts a sweet flavor to the meats. However, what is new is the knowledge that *Pseudo-nitzschia*, under unusual circumstances, does have the capacity to become toxigenic and to threaten seafood consumers with a serious illness.

So, the simple answers are: These blooms are part of the long-term ecology of our region. They are not new, and there is no evidence that the new closures are a result of "worsening" conditions, but rather result from improved scientific understanding of a previously-unrecognized risk coupled with effective regulatory application of this new knowledge.

— Continued from page 11

Mechanical Harvest of Shellfish

invest in seed for a future harvest, although some will advocate for publicly-funded municipal hatcheries or relays.

Despite the literature and numerous studies suggesting that mechanical harvesting of cultured shellfish is benign, we seem to be stuck fighting this battle over and over again. Baymen worked to ban dredging in Long Island Sound about a decade ago. The ECSGA pushed for Congress to fund another study, and the Milford Lab conducted another literature review and field study, both of which support our claims that this is simply not a big deal.

LARRY WILLIAMS

Tessa Getchis of Conn. SeaGrant hauling a load of quahogs for transplanting using a hydraulic clam dredge.

Most recently, F.M. Flower and Sons has come under attack by baymen on Long Island intent on revoking their leases. The ECSGA is committed to defending mechanical harvest of cultured shellfish and to bringing the best available science to bear. Wild harvest shellfishermen are usually restricted to using hand rakes as a resource preservation tool, and often complain that it's unfair to allow growers working leased bottom to use mechanical harvest methods. They have repeatedly worked to ban the practice, alleging environmental damage. Waterfront homeowners hoping to prevent any commercial activities in their viewscape have often piled on, and we have struggled to protect our right to harvest using dredges.

But make no mistake. Even if our industry proposed using an army of bullrakes instead of dredges to harvest all of our cultured shellfish, the wild-harvest shellfishermen and waterfront homeowners would still be out there trying to do away with our leases. I like to compare the outlawing of dredges to the absurdity of forcing farmers to hand-harvest potatoes.

But critically, the biodiversity on a potato farm is a tiny fraction of the forest that came before it, while a clam or oyster farm is orders of magnitude more diverse and productive than the typical sand flat. Using almost any metric, shellfish farming has far fewer environmental impacts than just about any type of land farming.

There is no doubt that dredging on farm leases in shallow, high-energy environments without vertical structure is a sustainable practice. But conveying this concept to lay people is a battle we seem destined to fight over and over again.

Again, with a disclaimer that this is my own opinion, I think what we saw in Mass. and R.I. this fall was a great example of a surveillance system functioning to assure the safety of those of us who love to eat fresh oysters and other shellfish when they are at their peak of quality. Certainly there was a short disruption in harvest and a fair amount of hand-wringing over *What Ifs?* but the last thing those of us who work to bring shellfish to the tables of eager consumers want to hear is, "I can't remember the last time I ate New England shellfish."