

National Shellfisheries Association Quarterly Newsletter



Est. 1908

2014 (1)

President's Message

Winter greetings from the chilly coast of Maine. As I write this column, the thermometer continues to hover in the negative numbers (on the Fahrenheit scale mind you), snow storms, sea smoke and creaking ice abound and **I can't wait for Jacksonville!**

With that in mind, I hope you will join me in looking forward to this year's annual gathering to report on our research results, reconnect with our colleagues, and generally have an enjoyable time. This year's 106th Annual Meeting at the Hyatt Regency Hotel on the Riverfront in Jacksonville, Florida is shaping up to be a great conference thanks to many people's efforts including those of our conference committee led by Sandy Shumway. Furthermore, these meetings could not run smoothly without the considerable work put in by the Student Recruits who you will see doing everything from running flash drives full of presentations from room to room, to manning the registration and SEF tables to assisting with the SEF Student Auction. This they do in addition to preparing to give their student presentations! Keeping our annual meetings affordable is a continual challenge made easier by the generous financial support of our sponsors which include the Louisiana, Florida, South Carolina and Mississippi-Alabama Sea Grant agencies, Mote Marine Laboratory, Florida Atlantic University's Harbor Branch Oceanographic Institution and NSA's long-time supporter, the Sheridan Press.



This past year, the Student Awards Committee led by Lisa Milke and Stan Allen has greatly improved the judging process. Judges knowledgeable in specific research areas will now be assigned to critique all talks within their discipline, which will result in a fairer and more manageable process. Students competing for the Nelson and Gunter Awards should visit the NSA web site to review the revised judging guidelines.

See you in Jacksonville!

Chris Davis, President



Jacksonville is on the Horizon!

Plans are well in place for the 106th Annual Meeting in Jacksonville, Florida, March 29- April 2, 2014. The Program can be viewed on the Web page, www.shellfish.org and it is a full one. We have 250 presentations including 60 posters and over 60 student presentations! In what has become a popular forum, we will welcome 4 exciting plenary speakers: Brian Bayne (Honored Life Member), Nicki Holmyard, João Ferreria, and Eddie Allison to open the program each day.

NOTE: this year the meeting is beginning on SATURDAY evening with the President's Reception, and ending on WEDNESDAY. We'll have all the regular features of our meetings - President's Reception (Saturday), Student Breakfast (Sunday), Auction (Monday), Business Lunch (Tuesday), and two poster sessions with Happy Hours (Monday and Tuesday). The Recruits are planning some fun activities, and be sure to attend the student orientation on Saturday evening before the Reception and the student breakfast on Sunday morning. Check with Maria Rosa (Maria.rosa@uconn.edu) and Allison Mass Fitzgerald (allison.mass@csi.cuny.edu) or www.shellfish.org for details.

The Hyatt Jacksonville is a great venue, on the St. John's River, and just a block from Jacksonville Landing where

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Recruits' Corner

Hello, Recruits!

We hope this newsletter finds everyone well, gathering great data and preparing for our next Annual Meeting in Jacksonville, FL. We look forward to seeing you all in March! There are several great events prepared for the meeting to get Recruits involved in the meeting itself, and to get to know your fellow Recruits. We will be experiencing the flavors of downtown Jacksonville by visiting some restaurants, as well as organizing teams for the annual Scavenger Hunt. A list of all activities will be available in the student packet, so be sure to try and come out for the orientation meeting (right before the President's Reception), where we will discuss all activities and resources for the students at the meeting.



If you received a registration or lodging award from the Student Endowment Fund, keep an eye out for an email from us to organize your volunteer sessions. Anyone who did not receive an award, but would like help finding a fellow Recruit to room-share with, please email us ASAP!

Also, we are in need of volunteers to help man the NSA sales booth and help during the auction; we can't run the meeting without help from the Recruits. Remember, proceeds from the sales booth and the auction fund ALL student awards (i.e. research, publication, and travel) and help to keep the student registration fees low.

We are very excited to meet all the new Recruits, and catch up on research projects with the Recruits we met last year. This year, we will be welcoming our new Recruits co-chair, Hillary Lane from the University of Maryland. Look for us in Jacksonville, and don't be shy! We'd love to meet you! Be sure to email us with any questions prior to the meeting.

Your Chairs,

Maria Rosa and Allison Fitzgerald
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allison.mass@csi.cuny.edu

**Just because you are reading this
Newsletter does not mean your NSA
2014 dues have been paid!**

**Please keep your membership
current by visiting:
www.shellfish.org**

Aaron Rosenfield (1924-2013)

NSA Past-President and Honored Life Member Aaron Rosenfield of Easton, Md. passed away on October 6, 2013. He was born on October 14, 1924 in Boston, Massachusetts. After serving in World War II he pursued his studies, receiving a BS and MS at the University of Massachusetts, and his Ph.D. at the University of Texas at Austin. Dr. Rosenfield spent much of his career at the NOAA Oxford Laboratory serving as director of its Shellfish Mortality Program. In later years he was appointed Laboratory Director, and was an early leader in oyster disease studies, fish pathology, aquaculture development, and study of the effects of introduction of non-native marine species. He published in 1992 (with Roger Mann) the volume "Dispersal of Living Organisms into Aquatic Ecosystems".



Later in his career, he served as a liaison between academia and government, with faculty appointments at Johns Hopkins, Georgetown, and the University of Maryland. Dr. Rosenfield organized numerous conferences, was a writer and editor of many scientific publications and travelled extensively. He served NSA as President in 1979-80 and was awarded the Honored Life Member Award in 1991. A full memorial will appear in the *Journal of Shellfish Research* at a later date.

Joth Davis

**The NSA Student
Auction needs your
donations**

**Don't forget to bring some auction-
able items to Jacksonville. If you
cannot attend the meeting, please
send your items to Sandy Shum-
way to arrive no later than March
10 (See the back page for Sandy's
contact information).**

2013 Michael Castagna Student Research Grant Update

Awardee: Allison M. Colden

“Structural Effects of Restored Oyster Reefs on Persistence and Ecological Function”

Oyster reef restoration is often complicated by several factors, including disease, substrate limitation, and sedimentation. Reef burial by sediment can cause significant loss of restored reef habitat; therefore, it is critical to understand how reefs affect sediment transport. The objective of my project is to determine how oyster reefs influence local flow and sediment transport processes, how sediment influences oysters on the reef, and how sediment-induced changes in oyster vital rates feed back into hydrodynamics. This information is critical to improving restoration outcomes and maximizing the ecological benefits of restoration projects.



Six experimental oyster reefs were built in the Piankatank River in Virginia in June 2011. Reefs were constructed of seasoned oyster shell obtained from local seafood processors. Reefs were designed to mimic three historic reef forms present in lower Chesapeake Bay: shallow, shoal-like reefs oriented perpendicular to tidal currents, deeper along-channel reefs oriented parallel to tidal currents, and circular reefs located mostly in the bay main stem. Parallel and perpendicular experimental reefs were 1m x 5m x 0.4m and circular “patch” reefs were 2.5 m x 0.4 m in diameter at construction.

To examine the effects of differing reef configurations on sediment transport, I deployed a platform equipped with acoustic and optical instruments, including an acoustic Doppler velocimeter (ADV), laser in-situ scattering transmissometer (LISST), and a YSI 6600 series data sonde. These instruments measured current velocity, suspended sediment concentration, grain size distribution, and environmental parameters including temperature, salinity, dissolved oxygen, and water depth. The platform was deployed upstream of each of the three reef types, on the crest of the perpendicular reef, and at a soft-bottom reference site. The platform was deployed at slack tide before spring flood tide and retrieved during the subsequent slack tide.

In addition to the stationary platform, float-mounted acoustic Doppler current profiler (ADCP) transects were taken over the entire study area to improve spatial velocity data coverage. Acoustic backscatter from the ADCP was used

as a proxy of suspended sediment concentration in the water column.

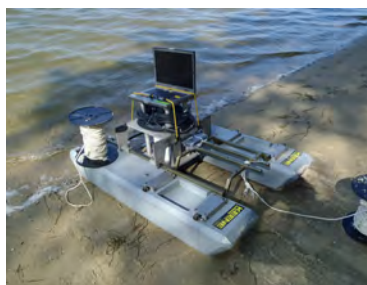
Current velocity was determined by the ADV and ranged from 0.05-6.5 cm sec⁻¹. Current velocities were similar throughout the 5-day sampling period. Maximum velocities were observed during periods of flood tide.

Sediment volume concentrations in the water column were determined from optical backscatter from the LISST. Over the 5-day sampling period, volume concentration ranged from 10-90 $\mu\text{L L}^{-1}$. Sediment concentrations on circular and parallel reefs and on the perpendicular reef crest were consistently low, ranging from 10-20 $\mu\text{L L}^{-1}$, similar to concentrations observed at the control site. Concentrations upstream of the perpendicular reef were 6-fold higher than those observed on any other reef or at the control site. The perpendicular reef site was also the only site to show a clear relationship between sediment concentration and current velocity, with sediment concentration increasing steadily and reaching a peak at maximum flood tide.

Acoustic backscatter profiles from the ADCP corroborated the observations from the LISST. Sediment concentrations were slightly higher over perpendicular reef crests, but generally did not differ from surrounding water column concentrations.

Grain size distributions followed a similar general pattern to that of sediment concentration. Overall, grain sizes were small, ranging from silt to very fine sands. Circular and parallel reefs and the perpendicular reef crest displayed similar grain size distributions as the control site. At the perpendicular reef site, there was a shift in grain size with time, corresponding to maximum flood tide. As tidal currents increased, the proportion of larger particles (>300 μm) also increased. Following maximum flood tide, the proportion of larger particles in suspension decreased significantly.

Sediment concentrations and grain size distributions on circular and parallel reefs were similar to those observed at the reference site. This implies that these reef types have little to no effect on sediment transport, and that flow over these reef types is similar to flow over sediments. Conversely, both sediment concentration and grain size distribution showed clear relationships with current velocity on the perpendicular reef. The observed increase in sediment concentration correlated with an increase in particle size suggests resuspension of large particles upstream of perpendicular reefs. These larger particles are likely oyster biodeposits accumulated upstream of the reef



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West Coast Shellfish Update - Geoducks in the News

US West coast shellfish have been in the international news feeds as of late. On December 3rd, 2013 Chinese health authorities suspended all “double shell aquatic animals” from entering China based on a pair of geoduck clam samples, examined for PSP and arsenic, respectively, during routine health inspections for geoducks harvested in Washington and Alaska. The ban affects a large region, FAO Fishing Area 67, an internationally defined region that spans the waters of Alaska, British Columbia, Washington, Oregon and northern California, south to latitude 40° 30'. The ban does not impact Canadian shellfish. Import restrictions were instituted unilaterally with officials in the United States left scrambling to try and determine the source of the problems. It was subsequently relayed by Chinese health authorities that a shipment of geoduck harvested from a commercial geoduck tract in Poverty Bay, Washington (near the city of Tacoma) contained a reportedly excessive amount of arsenic. The second sample came from geoducks harvested from a tract near Ketchikan, AK having a reportedly high level of PSP. Although no farmed geoduck was implicated in the case the ban also affects all aquaculture production of bivalves.

US health officials initially disputed the reported results, based on a lack of transparency of the methods used by the Chinese health authorities making the claims. Chinese health officials subsequently provided additional information on their testing methods but focused on US shellfish safety standards as being deficient in “regulating and monitoring the safety and hygiene for geoduck export to China.” Subsequent to the import restriction, WA State Health Department and scientists with NOAA’s Seafood Inspection Program initiated sampling for arsenic from geoducks harvested from Poverty Bay. They found no edible tissues exceeding the 0.5 ppm Chinese standard for arsenic though a lone sample, conducted on a single geoduck for whole body arsenic content, exceeded the international standard. Whole body testing included sampling the periostracum covering the siphon and mantle tissue but this is not generally eaten in either the United States or China. While this information was immediately provided, China has not eased restrictions on imports and essentially lobbed the issue back to the US. NOAA has recently reported that “Multiple state and federal agencies continue to be actively engaged in a coordinated effort to resolve this issue. The states and federal agencies are working hard to answer China’s latest request for information so that U.S. companies can resume shipping these seafood products to China.”

All of the implicated product was harvested from wild geoduck beds that contain mixed-age populations and there is widespread hope that farmed geoduck, harvested at 5-7 years old, may be exempted. Stay tuned though this dispute is likely to be drawn out and intertwined with political considerations relating to US-Chinese relations generally.

Pacific Coast Section News

The call for papers and meeting announcement has been issued for the 68th Annual Meeting of NSA’s Pacific Coast Section and Pacific Coast Shellfish Growers Association to be held at the Hilton Hotel in Vancouver, Washington from September 23-25, 2014. The conference hotel is just across the Columbia River from Portland and we’ll likely be sponsoring a pub crawl to some of the finer places for the best microbrews in that city again! The planning committee is still ironing out the rest of the entertainment as well as keynote speakers for the conference. We are open to suggestions so please contact us with ideas (brett.dumbauld@oregonstate.edu). The conference committee invites both undergraduate and graduate students to submit their abstracts. NSA-PCS will once again present an award for best student presentation at the meeting. Some financial assistance for registration and lodging will be available to NSA student members through the Ken Chew Student Endowment and potentially other sources. Students requiring assistance should contact Bethany Stevick (bethany.stevick@dfw.wa.gov, 206-851-6805). The conference planning committee will be assigning chairs for several sessions so hopefully you will be contacted by these leads, but if not please submit titles on your topic of choice anyway. We encourage contributed talks on all shellfish related topics. Our website is still under construction but will hopefully soon be hosted at the NSA site. Visit www.pcsga.org to submit titles and find more information or call 360-754-2744.

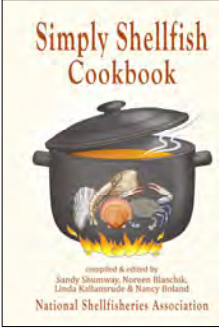
May 1, 2014 – Abstract titles due

August 1, 2014 – Full abstracts due

Brett Dumbauld, Pacific Coast Section, Chair

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APRIL, 2014

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Cookbook**

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2013 Melbourne Carriker Student Research Grant Update

Awardee: Emily W. Grason

“Risk Recognition and Behavioral Plasticity in Invasive Oyster Drills”

You show up in a new place, and everything around you is entirely unfamiliar. Different smells and sights than you are used to, new food, strange people. How do you cope? How do you survive not knowing who to trust, or how to get along in this new world?

My research on invasive oyster drills tries to answer these questions from a snail’s point of view. Few, if any, of us are all that sympathetic to the plight of a bewildered expatriate oyster drill, but understanding how they are so successful in unfamiliar situations could improve our ability to control the damage they do to oysters, and help us mitigate the effects of other invasive species.



In the Pacific Northwest, both the Atlantic and Japanese oyster drills (*Urosalpinx cinerea* and *Ocenebra inornata*) arrived as hitchhikers on early imports of cultch of Eastern and Pacific Oysters. They continue to pose a threat for aquaculture and for restoration efforts of the native Olympia oyster. We have a host of native predatory crabs here, including the big bruiser rock crabs, *Cancer productus*. I have watched even small rock crabs crush drills. With such effective, abundant, local predators, why are drills so prolific? Part of the answer might be the drills’ ability to recognize the unfamiliar crab as a threat – stranger danger.

Prey use many different signals to tell when they are in danger (eg. sound, smell, sight, etc.). But being overly jumpy and paranoid could mean prey spend too much time and energy on self-protection, and not enough eating and reproducing. Many prey have evolved the ability to recognize very specific indicators of danger, to increase the likelihood that they are accurately assessing risk. For instance, oyster drills could potentially respond to the odors from predators, or from other prey that have been injured by predators in the area, or they might require a combination of signals to be really certain they are in danger before they invest in a defensive structure or behavior. The native predatory snail, *Nucella lamellosa*, makes overall heavier shells when it chemosenses native rock crabs, but it will only make a thicker lip to the

shell (good for protecting against crab chipping) if it also chemosenses crabs eating other *Nucella* (Bourdeau 2009 Oecol). When predators and prey evolve together, natural selection generally favors very finely tuned signal responses for prey. But what about invasives? Strangers in strange lands with no local knowledge?

My research asks whether there is anything different about how non-native species use various information sources to assess risk. To do this, I have tested how the two invasive drills react to these signals that might indicate danger. I thought it might be easiest to report the results thus far in a Q&A format:

Q: Do they respond at all to chemosensory cues indicating predation has happened?

A: Yes! Both species hide more and eat less when they detect crabs eating drills of the same species. Believe it or not, this was actually a surprise to us, as there are few reports that non-native species respond to a predation threat from a native predator, although the number is growing.

Q: Do the drills recognize the actual crab when it senses only the crab chemicals?

A: Even more surprisingly, yes! Even though both species share only a short history with native crabs, they do respond



to crab scent by hiding more. However, this response isn’t as strong as the response to the scent of crabs eating other drills. It’s not clear, yet, how they are able to recognize crabs. It’s entirely possible that drills adapted very

rapidly in the 100 years or so since they were introduced, or it could be a case where young drills learn to associate the scent of crabs with danger. Or it could be that they recognize some “crabby” scent that is similar to crabs from their native ranges.

Q: Is anything different about the way these drills respond to various signals compared to the native snails?

A: The most surprising thing is that, for both drills, scents emanating from other injured drills are the most important trigger of defensive behavior. They respond more strongly than to any other cue, on par with the “scariest” scent of crabs eating other drills. This refutes theory of what should be optimal for prey. So, is this just a case of a predator-prey relationship that is out of balance? Or, is it possible that this type of reactivity actually ends up

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Castagna Grant Update... *continued from page 3.*

due to tidal asymmetry in the area. The differential transport of oyster biodeposits over restored oyster reefs represents an important consideration for future restoration projects.

I would like to thank the Coastal Hydrodynamics and Sediment Dynamics lab at VIMS for their invaluable assistance on this project. For more information and updates, please see my talk at the Annual Meeting in Jacksonville.

Carriker Grant Update... *continued from page 5.*

being beneficial for non-native organisms out of their element?

To answer this last question, I have been benefitting from the support of the Carriker Student Research Grant, testing these responses for native and non-native snails, trying to see if these tantalizing patterns hold up across many species. Fortunately for me, though not, perhaps, for Washington State, we have more non-native snails here than any other state, so there is plenty of work to be done.

Jacksonville Meeting... *continued from page 1.*

you will find restaurants, shops, pubs, and a large food court. The River City Brewery is just across the bridge (river taxi available), and there's a nearby mechanical bull at Maverick's. Book your rooms now at the Hyatt (direct link on the NSA web page). Please use the conference venue hotel - your support guarantees that NSA can take advantage of all the amenities the hotel has to offer!

BE SURE TO CHECK THE WEBSITE FOR IMPORTANT INSTRUCTIONS REGARDING PRESENTATIONS AND POSTERS.

Don't forget to bring your donations for the auction! We look forward to seeing you all in Jacksonville!

Sandy Shumway
Karolyn Hansen
Steve Allen
Leroy Creswell



30 YEARS

AQUACULTURE CANADA^{OM} 2014
JUNE 1-4, 2014
ST. ANDREWS, NEW BRUNSWICK

"AAC 30TH ANNIVERSARY – EXCELLENCE IN RESEARCH & INNOVATION"

This is an exciting year for the Aquaculture Association of Canada as it marks our 30th Anniversary! There have been numerous innovations in the aquaculture industry over the past 30 years and we want to celebrate the contributions that the Association and its members have had on the successful development of the industry in Canada.

The annual conference serves as the main event for the Association and is Canada's national forum to bring together the business, science and technology of aquaculture.

OF EXCELLENCE
IN RESEARCH
& INNOVATION



AQUACULTURE ASSOCIATION OF CANADA | ASSOCIATION AQUACOLE DU CANADA

Conference coordinator:
Joanne Burry
Tel : 709-437-7203
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www.aquacultureassociation.ca

Remembering the Work of David Wallace

Honored Life Member David Wallace was instrumental in linking together academia, government, and the oyster industry in the mid-1950s. Wallace began doing research in Maryland in fisheries, and transitioned to the oyster industry, becoming a beloved director of the Oyster Institute of North America (OINA) from 1950-1962. At this time, OINA was primarily comprised of industry members, whereas NSA was focused more on the academic aspects of shellfish. Wallace suggested the merging of meetings, and encouraged scientists to make their talks more accessible to industry members, thus allowing for scientists to reach the industry members and influence current practices.

Wallace's legacy rests on uniting academia with government and industry members. Prior to his encouragement, these factions were largely separate and the oyster industry did not profit; however, Wallace saw the need for research to help repair the flagging industry of the 1950s-1960s. His overtures to unite the fields helped to usher in another boom for the oyster industry, especially in Chesapeake Bay. He was not out to improve aquaculture practices, but to improve relationships between the government and academia—he realized how important that relationship was to all involved, and he worked tirelessly to



unite all sides. He helped to overcome the first MSX outbreak (1960s), and realized the need for safety practices to prevent the spread of disease.

Wallace chaired a group while at OINA which established research programs between both government and academia, as well as industry. These working groups introduced several bills to the US Congress which allowed federal money to become available for biological, technical, and marketing studies of shellfish, including imported shellfish from Europe and Asia. Forging strong relationships between the oyster growers' associations (many of whom were involved with NSA), academia, and the governmental agencies in charge of the shellfish industry in the USA and abroad was an important step that allowed the industry to grow to what it is today.

Much of Wallace's work came about after he left the Directorship of OINA, and became the Director of Marine Fisheries for New York State. He attended many meetings, including NSA annual meetings, industry and government board meetings, discussing and promoting the relationship between shellfish and the government. In 1980, NSA established an award in his name, which honors those members who promote 'cooperation between industry, government, and academia relative to shellfish matters'. He will be forever remembered as a passionate member of NSA, and one who led the organization into a new era where academia, industry, and government worked together to provide a strong unit of leadership with respect to the modernization of the shellfish industry.

Bivalve Aquaculture Methods - June 23-26, 2014

Darling Marine Center, Walpole, Maine

A one week hands-on residential course exploring the theory and practice of marine bivalve aquaculture. Bivalve taxonomy, anatomy, reproductive biology and genetics; algal culture; larval and juvenile rearing techniques, site selection, water quality and human health issues are among the topics to be covered. College credit is available through the University of Maine. For more information, contact Linda Healy, Course Coordinator, (lhealy@maine.edu), or visit: <http://www.dmc.maine.edu>.

Upcoming Events

New England Estuarine Research Society Annual Meeting. May 1-3, 2014, Salem Waterfront Hotel, Salem, MA. For more information, visit: <http://www.neers.org>.

World Aquaculture 2014. June 7-11, 2014, Adelaide Convention Center, Adelaide, South Australia. For more information, visit: <https://www.was.org/meetings/default.aspx?code=WA2014>.

NSA-PCS & PCSGA Conference & Tradeshow. Sept. 21-24, 2014, Vancouver, WA. For more information, visit <http://www.pcsqa.org>. Abstract titles due May 1st.

16th Annual Conference on Harmful Algae. October 27-31, 2014, Wellington, New Zealand. Paper submission deadline: May 15, 2014. For more information, visit: www.icha2014nz.com.

107th Annual Meeting of the National Shellfisheries Association. March 21 -26, 2015, Monterey, CA USA.

If you would like to announce a meeting, conference, workshop, or publication that might be of interest to NSA members, please contact the *QNL* Editors, Joth Davis (jothpdavis@mail.com) or LeRoy Creswell (creswell@ufl.edu).

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