

Upcoming Events

Aquaculture America 2021: Aug. 11-14, 2021. San Antonio, TX. For more information: www.was.org

Physiomar 2021: Sept. 7-10, 2021. Nelson, New Zealand. For more information: <https://confer.eventsair.com/physiomar-2020/>

Aquaculture Canada/WAS North America 2021: POSTPONED. *Watch for new dates.* St. John's, Newfoundland, Canada. For more information: www.was.org

Global Conference on Aquaculture Millennium +20: Sept. 22-27, 2021. Shanghai, China. For more information: <https://aquaculture2020.org/registration/>

Aquaculture Europe 2021: Oct. 5-8, 2021. Funchal, Madeira, Portugal. For more information: www.aquaeas.org

Aquaculture 2022 (Triennial): Feb. 28-Mar. 4, 2022. San Diego, CA. For more information: www.was.org

23rd International Pectinid Workshop: Apr. 20-26, 2022. Douglas, Isle of Man. For more information: www.internationalpectinidworkshop.org

Aquaculture America 2023: Feb. 19-22, 2023. New Orleans, Louisiana. For more information: www.was.org

115th NSA Annual Meeting: Mar. 21-25, 2023. Baltimore, Maryland. For more information: www.shellfish.org

If you would like to announce a meeting, conference, workshop, or publication that might be of interest to NSA members, please contact the *QNL* Editor, Steven Allen (sallen@bowdoin.edu).



President's Message



Well, the first (and hopefully only) virtual meeting of the NSA is now history. I would like to thank everyone who contributed to the success of this unique event. Our office and meeting staff, by dint of a heroic effort, managed to overcome all obstacles and allow all of us to participate in our 113th annual meeting. The plenary speakers and all who contributed a paper or poster were instrumental in accomplishing the primary mission of the meeting – exchange of information among the members of the NSA. One of the things that I find most appealing about the NSA is the breadth of interests of our members. This society is the primary platform for all aspects of the biology and aquaculture of anything that is not a fish. I always learn quite a bit from the meeting. The missing element of this meeting was seeing everyone in person and being able to network, gossip, and catch up with how we have all managed to cope with the pandemic. I urge all of you to make up for the loss of the personal touch this year, and last year, by making plans to attend the Triennial joint meeting with the World Aquaculture Society in San Diego, California in 2022. Think about organizing a session in your area of expertise, the more representation we have at the meeting, the better.

I am honored to have been elected to serve as President of the NSA. The Executive Committee is slowly bringing the NSA into the current century by establishing a presence on social media with an eye toward increasing public awareness of the Association. We are wrestling with how to establish mechanisms to balance entertainment value and science on these platforms, and we welcome ideas, suggestions, and participation. I also intend to continue to have some event at the annual meeting that will highlight the commitment of our members to increasing awareness of issues of inclusion, diversity, and social justice.

Those of you who joined us in New Orleans for the 112th annual meeting may recall that the Mississippi River was running high during the meeting. During the spring and summer of that year a lot of that water was released into Lake Ponchartrain by opening of the Bonnet Carre spillway.

This mass of fresh water eventually made its way into the Mississippi Sound off the coasts of eastern Louisiana and western Mississippi with devastating effects on local oyster beds. Louisiana has established a task force to address the issue of fresh water inundation of oyster leases. One of the goals is to breed oysters that are more resistant to low salinity. My suggestion is that they read up on the limits to natural selection. The issue of increasing freshwater release into oyster habitat is particularly touchy in the Bayou State since the only way to stabilize the rapidly eroding coastline is to divert sediment-rich water from the Mississippi River into brackish marshes. The increasing frequency of rain events and hurricanes of unusual intensity due to climate change are other factors. It is these sorts of issues that our membership can address, and where the NSA can have considerable impact on our future. The NSA is your professional association and I hope that each and every one of you will continue as members. Get vaccinated and laissez les bon temps rouler.

Lewis Deaton, *President*

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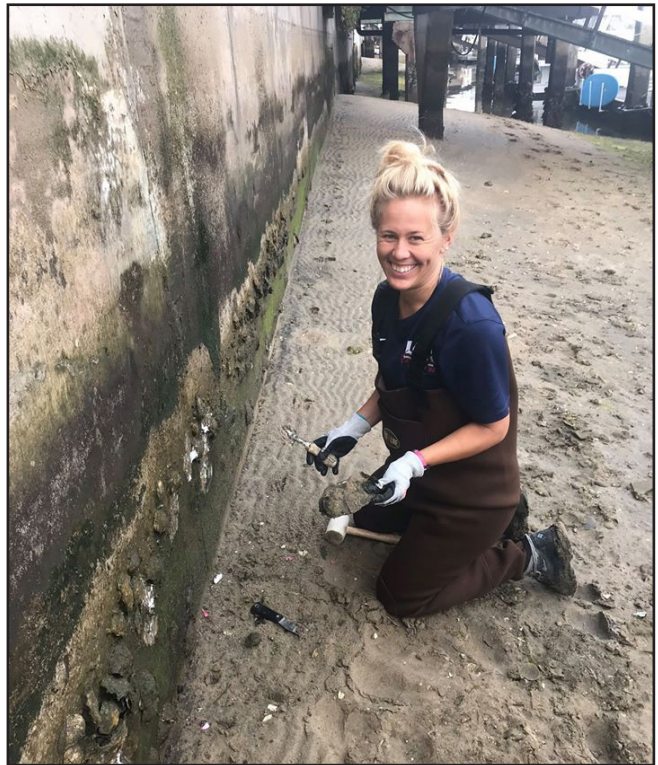
- *Virtual Meeting Recap*
- *NSA Student Awards Announced*
- *Aquaculture 2022 - Triennial Update*
- *Michael Castagna Student Research Grant Update*
- *Introducing Project MEER:Reflection*
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2020 Michael Castagna Student Research Grant Update

Awardee: Emily Cooksey
University of Arizona

“Prevalence and human health risk associated
with *Vibrio* spp. in Pacific oysters”

Vibriosis infections resulting from the consumption of contaminated seafood cause approximately 80,000 illnesses, 500 hospitalizations, and 100 deaths in the United States each year, at a cost of \$30M in medical expenses and lost productivity. As vibriosis infection rates are increasing, it is imperative to understand the human health risk associated with exposures to *Vibrio* spp. and to predict and prevent cases of vibriosis; however, there is limited information on vibriosis risk associated with oysters locally grown and harvested in southern California.



This project was designed to understand the prevalence, exposure, and human health risk associated with *Vibrio* spp. in oysters grown in southern California. The prevalence of *V. vulnificus* and *V. parahaemolyticus* in Pacific oysters was measured and evaluated, and a quantitative microbial risk assessment (QMRA) model was developed to assess the human health risks from consumption of oysters.

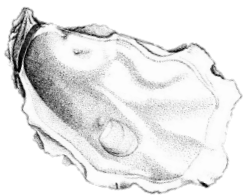
During the summer of 2019, in collaboration with Southern California Coastal Water Research Project (SCCWRP), 1000 Pacific oysters were collected from

Newport Bay, depurated, and transplanted back into Newport Bay at 12 sites. During a six-week period at four time points, a subset of oysters and a water sample were taken at each site to evaluate the presence of *V. parahaemolyticus* and *V. vulnificus*. Total and pathogenic *V. parahaemolyticus* and *V. vulnificus* were assessed with a culture-based enumeration method followed by confirmation PCR. Spearman rank correlation coefficient tests were used to evaluate the relationships of *V. parahaemolyticus* and *V. vulnificus* in the oysters and water samples with temperature, salinity, and chlorophyll-*a*.

There were higher concentrations of both *V. parahaemolyticus* and *V. vulnificus* in the surrounding water compared to the oysters. Additionally, there was a large variability of concentrations of *V. parahaemolyticus* and *V. vulnificus* throughout Newport Bay. There was no pathogenic *V. parahaemolyticus* detected, and a low detection frequency of pathogenic *V. vulnificus* in the oysters. Pathogenic *V. parahaemolyticus* (trh+) and *V. vulnificus* (pilF+) was frequently detected in water samples. There was no correlation between levels of *V. vulnificus* in the oysters and environmental co-variates. There were correlations between the concentration of *V. vulnificus* in the surrounding water and *V. parahaemolyticus* present in the oysters and water with water temperature, salinity, and chlorophyll-*a*.

Following the field study, a quantitative microbial risk assessment (QMRA) framework was used to understand risk associated with consumption of *V. parahaemolyticus* in raw oysters and to assist in identifying key places for public health interventions. The QMRA has been used extensively to understand microbial risk in drinking water, agriculture water, recreational water, and in food. The QMRA model that was developed used concentrations of *V. parahaemolyticus* found in recreationally harvested oysters in Newport Bay in conjunction with input parameters from the supply chain and consumption behavior from the literature. Input parameters from the supply chain included time and temperature of oyster shipments from the Pacific Northwest. Consumption behavior assessed number and size of oysters consumed. The input parameters allowed for illness risk to be calculated.

Results from this regional study demonstrated the median risk to be 10 illnesses for every 1 million serving of oysters (95% confidence interval $5.33 \times 10^{-7} - 2.12 \times 10^{-4}$). A sensitivity analysis highlighted key locations for public health interventions to reduce *V. parahaemolyticus* risk. The initial concentration of total *V. parahaemolyticus* in the oysters, percent of pathogenic *V. parahaemolyticus*, and the number of oysters consumed were critical factors in driving risk. Mitigation strategies during harvest may help reduce *V. parahaemolyticus* illness risk from consumption of raw oysters.



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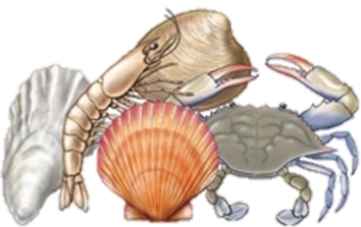
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MEER:ReflEction: A Climate Change Solutions Framework Using Marine Bivalves

Worsening climate indicators in 2020 are a sobering wake up call. Temperature and atmospheric methane records hit all-time highs despite a reduction in anthropogenic CO₂ emissions facilitated by the pandemic. The trends are consistent with additional locked-in warming, the cooling effects of short-lived anthropogenic aerosol pollution, and warming-induced natural methane sources. In short, immediately ending all fossil fuel emissions appears no longer enough and may instead cause rapid, further warming. Cooling the planet while mitigating emissions are urgent needs. Excited by the challenge of an apparent paradox, Rowland Fellow Ye Tao developed Mirrors for Earth's Energy Rebalancing (MEER:ReflEction) as a comprehensive engineering framework to reconcile these apparently conflicting tasks. Six volunteer scientists and engineers formed the Ocean Deacidification team at MEER:ReflEction to find that collaborating and bolstering marine bivalves with solar technologies will likely offer us the best shot for efficient carbon capture.

W. Roy, B. Jones, and D. Lira, rising seniors in chemistry, environmental science, and marine biology when joining the Ocean Deacidification team at the start of the pandemic, have exhaustively reviewed the literatures on anthropogenic perturbations to ocean chemistry and biology, and proposals for intervention targeting ocean acidification. The team examined and quantified a variety of threats to identify that a reduction in ocean pH this century will exacerbate marine heatwave threats to marine species, reducing larvae growth, influencing adaptive migration, and inducing harmful algal blooms, hypoxic zones and shell dissolution. Industrial engineering proposals include ocean liming using calcium oxide from limestone. The team found the approach would create an unsustainable open loop system to permanently alter marine calcium chemistry and alkalinity. Other mineral-based approaches appear either not scalable or kinetically too slow on the relevant time scale.

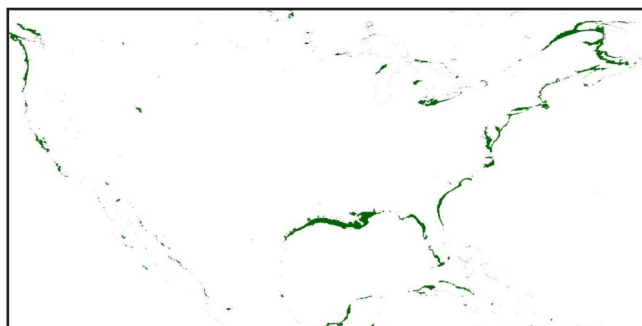


Figure 1. Map of high chlorophyll levels around continental US. Green areas have [chlorophyll-a] $\geq 3 \text{ mg m}^{-3}$ for a consecutive period of at least 6 months during 2019-2020.

The central challenge of climate change is its immense scale. Oceans, covering 70% of our planet's surface, have borne the brunt of impacts, absorbing most excess heat and CO₂ via a massive surface area and volume. The team realized that the same surface area has enabled the ocean to perform, for free, the most material and energy-intensive steps in industrial CO₂ direct air capture (DAC). These include separating CO₂-molecules from the air and collecting them in a concentrated form. The most densely concentrated form of carbon in the ocean are the shells of calcifying organisms, including marine bivalves, of which 20 Megatons yr⁻¹ are harvested for human consumption. The associated carbon flux is 10x higher than projected flux of DAC in the 2030s assuming optimistic engineering advances and government financing.

Prospects for superior efficiency and scalability led the Ocean Deacidification team to expand to include polymath K. Donnellan of Dublin Ireland and engineers extraordinaire H.T. Le and M. Hathi of Cambridge, MA. In a first step, Donnellan is analyzing the physical and phytoplankton primary production carrying capacities for scaling marine bivalve mariculture in pelagic environments towards fulfilling the needs of a global carbon-neutral, circular energy system. This task relies on data collected by the Moderate Resolution Imaging Spectroradiometer (MODIS) on the NASA Aqua satellite (Figure 1). Vast expanses of coastal oceans seem suitable for bivalve mariculture, while respecting ecological and social carrying capacities. Bivalves provide water-cleaning, phytoplankton growth stimulation, and bloom control ecosystem service in areas with high chlorophyll concentration. At least 2 million km² display chlorophyll-a concentration greater than 3 mg m⁻³ sustained for at least 6 consecutive months between 2019-2020 (Figure 2). Globally,

half of this area, the size of Egypt, is in territorial waters 22 kilometers from shore and lose to human settlement (Figure 2). Implementing oysters and scallop mariculture in these areas would fix 100 Megaton carbon yr⁻¹ in shells for typical fixing rates between 80-120 g m⁻² yr⁻¹. Transportation of this carbon is free when incorporating the meat into people's diet to replace calories from animal agriculture, leading to additional GHG mitigation.

Le and Hathi are prototyping solar furnaces to calcinate bivalve shells and to measure the kinetics of the hydration heat release from the resulting CaO. They estimate that the solar heat captured and stored in CaO can more than satisfy the global energy needs of coastal fishing and aquaculture

communities, offering local energy resilience. Another 100 Megaton yr⁻¹ of carbon emissions is eliminated globally together with savings from reducing land agriculture. A total of 200 Megaton carbon represents 2% of the current anthropogenic emissions and is roughly equal to the annual emissions of the airline industry or the international shipping industry. Expanding bivalve mariculture therefore has the potential to enable sustainable carbon-neutrality in sectors that are impossible to electrify.

Brittany Jones, Western Washington University
Kieran Donnellan, freelance software engineer & architect, Dublin, Ireland
Mohan Hathi, Cambridge Rindge & Latin School
Hoa Thanh Le, Harvard University

Wrishija Roy, Emory University
Drew Lira, Scripps Institute of Oceanography
Ye Tao, Harvard University

AQUACULTURE 2022

Town & Country Resort & Convention Center
San Diego, California
February 28 – March 4, 2022

The next annual meeting of the National Shellfisheries Association will be held as part of AQ '22, the Triennial meeting of the AFS (Fish Culture Section), WAS, and NSA, and we look forward to your participation. Plans are underway for another great conference, trade show, and social functions, and most especially, to see all our colleagues in person.

1090 days, or 2 years, 11 months, 22 days -- That's the time between the last in-person meeting of NSA members (AQ 2019) and the upcoming AQ 2022. It is time to get together and share research findings, have lively discussions, and enjoy happy hours and personal networking. The Town and Country Resort & Convention Center just completed a multi-million dollar renovation which was highlighted in a recent [Meetings Today Magazine article](#).

If you are interested in organizing a session for the conference, contact Sandy Shumway, Steve Allen, or Jay Parsons (see email addresses on back page). Planning has already started and more sessions of specific interest to shellfish folks are still needed.

AQUACULTURE 2022 is a long-overdue opportunity to interact with fellow NSA members and to explore new topics. And don't forget the trade show – something for everyone there.

See you in San Diego!

NSA Membership Continues to Increase



The membership drive has been very successful with members recruiting over 160 individuals. The NSA is now up to 647 current members (419 regular, 220 student, and 8 sustaining).

Thanks to the following individuals for their recruitment efforts: Brian Callam, David Bushek, Susan Laramore, Ximing Guo, Juliana Harding, Barry Costa-Pierce, Dorothy Leonard, Acacia Alcivar-Warren, John Scarpa, Maureen Krause, Rick Karney, Danielle Zacherl, Chris Langdon, Dan Speiser, Bassem Allam, Peter Kingsley-Smith, Mike Doall, Dave Eggleston, Alexandra Marquardt, George Waldbusser, Kwang-Sik Choi, Tim Bean, Eric Schott, Sandy Shumway, Steve Jones, J. Sook Chung, Gulnihal Ozbay, Jan McDowell, Jonathan Puritz, J. Scott Borsum, William Walton, Tim Green, Chris Davis, Brett Dumbauld, John Carroll, Shannon Hood, and Gary Fleener.

Congratulations to the following who recruited 5 new members and will receive one year of free membership.

Ed Catapane
Christian Alcivar-Marcillo
Daniela Espinoza
Nitsara Karoonuthaisiri
Jose Riascos
Lisett Herrera Gonzalez
Suhua Shi
Laura Urdes
Fernando Aveiga
Lissett Roman-Serrano

Gober Asuncion
Daphne Munroe
Kathy Tang
Roberto Arredondo
Lilibeth Bucol
Brandon Quintana
Tze Chiew Christie Soo
Iris Hernandez
Jianhai Xiang
Jorge Echevarria-Flores

Consider asking a colleague, student, or anyone interested in shellfish to join. Be sure they credit you for joining so you can earn a free NSA membership. There were many entries stating they were recruited by 'an NSA member', but never provided a name. Questions, contact secretariat@shellfish.org.

Digital Tagging of Shellfish: What we have learned Chip Terry, Oyster Tracker



We started thinking about shellfish tagging a couple of years ago. We were watching folks spend endless hours filling out harvester/dealer tags, log books, and generally dealing with tons of paperwork. After talking to a lot of farmers, dealers, regulators, and reading the 487 pages of the Model Ordinance, we launched our tagging solution in March of 2020 - just as every farm shut down for COVID-19. Despite the headwinds of a pandemic, we had over 90 farms using our system a year later. So what have we learned?

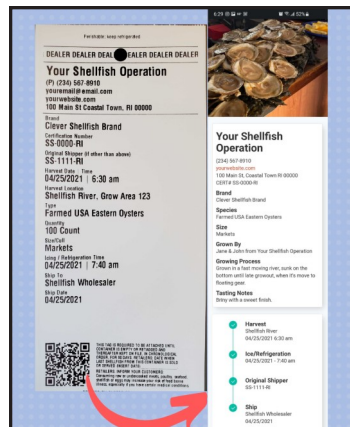


2) Variation between States: Despite the Model Ordinance, most states have slightly different regulations (or interpretations of regulations). For example, Washington State wants you to collect water or animal temperature at harvest. Florida wants to know what type of cooling you have. Virginia wants a landing time. Others want bulk tags handled differently. We ended up building a rules engine for each state so we can respond to state-by-state regulations.

3) Paper is painful: We (I) thought finding waterproof paper would be the easy part. Turns out getting it on the right size rolls with the right perforation and in the right orientation is a lot harder than expected. We sent 100s of useless rolls back to the factory.

4) Distributors need a solution: As we learned more about shellfish supply chains, we realized that distributors need a similar solution. Many of them report spending 100s of hours on compliance - and still 50% of tracebacks fail. Tracking every lot of shellfish from receipt to shipping is a huge burden and only getting tougher with new regulations coming. We now have a growing number of distributors using our new Track and Trace solution - saving time and improving compliance.

5) Digital chains open storytelling opportunities: With a digital supply chain, restaurants/shuckers/consumers can now learn about their shellfish just by scanning the QR code. From meeting the farmer to learning about how the product is grown, consumers can now have a more direct connection with the sources of their food than ever before.



Bottom line: Complying with shellfish regulations can be easier for everyone and it doesn't have to be just a time sink. A digital supply chain really does save time and opens opportunities for your business. For more information on Oyster Tracker, visit: <https://www.oystertracker.com/>

2021 NSA Student Presentation Awards

The 113th Annual Meeting of NSA had strong student participation from both undergraduate and graduate attendees. In advance of the meeting, the SEF received 32 applications from student members seeking funds to support their meeting registration. The SEF and Conference Management were able to provide registration waivers to 10 students and the FUCOBI Foundation generously sponsored 22 applications.

A total of 24 posters were eligible for the Gunter Award and 74 talks were eligible for the Nelson Award. The SEF is grateful to everyone who contributed their time, energy, and expertise to the judging process. Fifty-one individuals volunteered at registration (although less than half (28) ultimately submitted scores). Following the meeting, judging scores were standardized across different judges, averaged, and ranked to identify outstanding presentations. A limited amount of scoring data as well as an absence of an outstanding poster presentation meant that the Committee elected not to give out the Gunter Award at the 2021 meeting. A concerted effort will be made specifically to recruit poster judges in the future and poster presenters are encouraged to think about how to improve their submissions to elevate them to an outstanding level.



On a more positive note, the **Thurlow C. Nelson Outstanding Oral Presentation Award** was awarded to two students: Victoria Agnew, University of Maryland Baltimore County, for her presentation on "The effects of temperature on Pacific oyster filtration as a sink and potential source of an eelgrass pathogen, *Labyrinthula zosterae*", and Daniel Chappell, University of South Carolina for his presentation on "Panoramic spatial vision in the bay scallop, *Argopecten irradians*".



Many congratulations to these awardees who will receive two years of NSA membership as well as a great résumé builder marking this achievement.

Congratulations Victoria and Daniel!!!

**Peter Kingsley-Smith
Melissa Southworth
Student Endowment Fund Committee**



Recruits' Corner

Fellow Recruits,

It was a pleasure meeting many of you in March at our virtual meeting! It was an extremely busy and fulfilling week, with fascinating sessions, exciting plenaries, a thought-provoking discussion on DEI in shellfisheries, a student job panel, and fun social events. We are happy to report that 143 students gave either an oral presentation or presented a poster. Twenty-nine student-mentor pairs also met throughout the conference,



creating a great path for networking and building relationships between our student members and professionals established within the field - thanks to all who participated. Thank you to our student volunteers who donated their time to help run poster sessions at the meeting, we could not have done it without you.

Congratulations to Mingli Zhao, Tyler Griffin, Elizabeth Bourchard, and Elizabeth Underwood, who received the George R. Abbe Student Research Grant, Melbourne R. Carriker Student Research Grant, Michael Castagna Student Research Grant, and the Sandra E. Shumway Award for the outstanding student paper published in the *Journal of Shellfish Research*, respectively. The awardees' research will be featured in upcoming social media posts, so be sure to watch the NSA Facebook and Instagram pages for these highlights. The NSA awards three grants to students every year, each of which provides \$1,250 towards research. The Abbe Grant supports projects in crustacean biology and fisheries, the Carriker Grant supports a research project in any area of shellfisheries, and the Castagna Grant supports applied shellfisheries projects. **Applications for all three grants are due November 1st, 2021.** All student Recruits are highly encouraged to apply. See the NSA website Student Page for more details as well as the list of awardees: <https://www.shellfish.org/student-members>.



Save the date for the 2022 Triennial Meeting: February 28th- March 4th, 2022, San Diego, California. This joint meeting with the World Aquaculture Society and Fish Culture Section of the American Fisheries Society is looking to be an exciting one, and we are thrilled to meet you all in person. Stay tuned for more information in the coming months.

We hope you are gearing up for a productive and exciting field season. As always, stay up to date by keeping an eye on the student Recruits page (<https://www.shellfish.org/student-members>), the Recruits Facebook group (<https://www.facebook.com/groups/2216454881732029>), and on Instagram (@nationalshellfisheries).

Please email Hannah (hannah.i.collins@uconn.edu) or Alex (armarquardt@vims.edu) if you have any ideas, concerns, or questions.

Hannah and Alex

NSA Pacific Coast Section News Greetings from the Pacific Coast!

Greetings once again from the Left Coast! With all the goings-on of the past year, you may have missed out on the 74th Annual Shellfish Conference, jointly held by the National Shellfisheries Association-Pacific Coast Section (NSA-PCS) and the Pacific Coast Shellfish Growers Association (PCSGA) Oct 6-8, 2020. [Chair's note: below we recap that meeting and hope to whet your appetite for the upcoming 75th Annual Shellfish Conference to be held remotely September 20-22, 2021].

Over 200 people registered for the 74th Annual Shellfish Conference. The meeting included more than 48 contributed oral presentations and posters across 12 sessions, as well as three workshops. This was the first virtual meeting of the annual conference, and it required substantial additional planning on the part of the organizing committee. In particular, NSA-PCS would like to acknowledge the herculean efforts of Margaret Pilaro and Connie Smith of PCSGA.

NSA-PCS organized the plenary session that focused on COVID-related challenges to shellfisheries and aquaculture, including a keynote by Dr. Jessica Gephart, American University, entitled, "Building back better: COVID-19 and the future of seafood". We also provided funding to support the participation of 19 students. The 2020 NSA-PCS Best Student Presentation award went to Tori Agnew, University of Maryland, for her presentation titled, "The effects of temperature on Pacific oyster filtration as a sink and potential source of an eelgrass pathogen, *Labyrinthula zosterae*". Noel Clark, California Polytechnic State University, received an honorable mention for her presentation titled, "Age and growth of the pismo clam (*Tivela stultorum*) in California". Natalie Lowell, University of Washington, received the Best Poster award for her presentation, "Population structure and adaptive differentiation in the purple-hinged rock scallop and their implications for aquaculture". Support for students to attend the meeting was generously provided by the Dr. Ken Chew Student Scholarship Fund, Arcadia Point Seafoods, Chuckanut Shellfish, Hama Hama Company, J.J. Brenner Oyster Company, Pacific Shellfish Institute, Rock Point Oyster Company, Seapa, Swinomish Indian Tribal Community, and The Nature Conservancy of Washington.

Plans are underway for the 75th Annual Shellfish Conference (NSA-PCS/PCSGA joint meeting). The call for oral and poster presentations is now open and we look forward to your submission. In addition to revisiting our session on race, inclusion, and diversity in shellfish science, we are planning several special sessions and workshops. Sessions may include: Climate Change, Ocean Chemistry, Acidification; Marine Pathogens, Shellfish Disease, Harmful Algal Blooms; Human Health Issues; Emerging Species: Beyond Bivalves; Kelp, Seaweed; Restoration and Protection Efforts (Species and Habitat); Estuarine Habitat, Ecosystem Services, Multitrophic Interactions; Genetics, Broodstock Development; Wild Stock Management; Public Engagement, Education and Outreach; Markets, Trade; and Marine Debris, Microplastics. Abstracts on additional research topics will be considered. We hope to see you all (virtually) in September!

As a reminder, the NSA-PCS Twitter feed and Facebook page are your best resources for news and information about the PCS and the 75th Annual Shellfish Conference. Please join our community online.

**P. Sean McDonald
Pacific Coast Section Chair**



BioOne: Supporting the Scientific Community During the Pandemic

By: Christine Orr, BioOne Director of Sales and Marketing

In March 2020, BioOne was making plans to join the NSA at your annual meeting in Baltimore. As a relatively new member of the BioOne team, I was looking forward to meeting NSA members and getting to understand your research and needs a bit better (and truth be told, to eating some delectable Maryland shellfish).

Needless to say, cracking crabs in Baltimore was only the start of the long list of things we didn't do last year. Most of the 100+ societies in the BioOne community cancelled planned annual conferences, seminars, and board meetings. Research projects were impacted, and teaching faculty had to reinvent how they connected with students. The entire research community looked for new ways to collaborate, instruct, and carry on as much critical work as possible. I'm proud to share with you some ways that BioOne continued to serve our publishers, their members, and the broader bioscience community this past year.

Remote Access

BioOne's platform provides the 600+ members of the NSA with access to the *Journal of Shellfish Research*, and more than 3,500 institutions around the globe access the full BioOne Complete collection. Last year we worked with our subscribing libraries to establish remote access to that body of content, serving researchers and students who suddenly found themselves working from anywhere but their labs, libraries, and classrooms.

Members of the NSA can access the *JSR* from anywhere in the world via the NSA site, but if you are at a subscribing institution, you can also get access to the full BioOne collection of 200+ related journals - as well as the *JSR* archive. **Simply visit BioOne Complete via your library's portal**, or affiliate your personal BioOne login with your institution's access. Email us at helpdesk@bioone.org or follow the instructions at <https://bioone.org/help/managing-your-account>.*

Financial Sustainability

Conferences typically generate significant society revenue, but in 2020 and 2021 so many organizations like the NSA were forced to cancel such events. In their absence, society publishers found the financial contributions from institutional library subscriptions to be more critical than ever.

BioOne worked tirelessly to ensure strong global renewals of the BioOne Complete collection and saw solid results in 2020 - allowing us to return nearly 60% of the net BioOne Complete subscription revenue to our participating publishers. Since 2007, BioOne has returned more than \$630,000 from institutional subscriptions to the NSA. *If your library does not subscribe to BioOne Complete, please encourage them to do so.*

Not sure if your library or research institution subscribes? See our [list of subscribing institutions](#). If you would like to recommend that your library subscribe to BioOne Complete and provide this full collection of research content to your colleagues and students, fill out this [Library Recommendation Form](#).

Expanding the BioOne Community

In 2021, we are proud to welcome a new marine science title: [Aquatic Ecosystem Health & Management](#) is published by Michigan State University Press on behalf of the Aquatic Ecosystem Health and Management Society. Other societies contributing marine sciences content include the Crustacean Society, the Institute of Malacology, the American Fisheries Society, Muséum National d'Histoire Naturelle, and the Coastal Education and Research Foundation. BioOne Complete forms a critical mass of high-quality content that is easy for libraries to add to their collections. It thus reaches faculty and students in markets that many individual publishers like the NSA would be unable to penetrate on their own.

By adding relevant high-quality content to the collection, we expand the community and aim to benefit all participating publishers. This broader exposure is not only critical for distributing knowledge, it can grow your journal's readership, your author base, and generate additional article citations. Since joining BioOne in 2007, the *JSR* has registered more than 1.6 million hits, reaching an ever-widening audience. The *JSR* impact factor has likewise risen significantly from 0.479 in 2007 to 0.933 today.

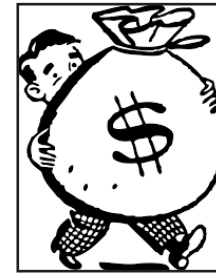
See you (hopefully) soon!

While we planned to see you at your 2020 meeting, we look forward to sponsoring and supporting your next in-person conference. It is a pleasure to work on behalf of the NSA community and BioOne staff always welcome your feedback. Stay up to date on BioOne Complete news, content, and resources by following us on [Twitter](#), [Facebook](#), [LinkedIn](#), and [YouTube](#). You can reach me at christine@BioOne.org.

(*Editor's note: it is very important to the NSA and support for the *JSR* that, if possible, you access BioOne via your library portal)



Treasurer's Report (FY 2020)



The most recent completed fiscal year (FY) for NSA was from October 1, 2019 through September 30, 2020, which encompassed the cancelled meeting scheduled for Baltimore, MD. Revenues and expenses were \$363,855.40 and \$411,033.00, respectively, which resulted in a net loss of \$47,177.60. This was due, in part, to no revenues being realized from the Annual Meeting, but incurring some fixed costs in organizing the meeting. Total end of FY assets were \$560,815.96, which included \$154,732.09 in the Student Endowment Fund. We still maintain assets above the prior 10-year average annual expenses of \$291,101.04, which the Executive Committee recommends for maintaining association security for unanticipated events, such as last year. Thank you to all those members that contributed to the Student Endowment Fund even without the auction and meeting.

Lastly, on behalf of the NSA, I would like to acknowledge and offer our sincere thanks to Linda Kallansrude (Secretariat) for her many years of service and her efforts on behalf of the NSA. We wish her well in her retirement.

Jay Parsons

NEW DATES



**23RD INTERNATIONAL
PECTINID WORKSHOP**
APRIL 20TH - 26TH 2022
DOUGLAS, ISLE OF MAN

<http://www.internationalpectinidworkshop.org>

**LOOK WHO'S GOT
SHELLFISH**



Dr. John Icely, Portugal

Submit a photo wearing your NSA t-shirt to newsletter@shellfish.org to be featured in a future issue.

2021 NSA Student Research Awards

Thank you to the students who applied for research awards this year. These competitive grants provide \$1250 in support funding earmarked for student research projects as well as for the Outstanding Student Paper published in the *JSR*.

The Melbourne R. Carriker Award supports a student research project in any topic of shellfisheries. The 2021 Carriker Award was awarded to Tyler Griffin, University of Connecticut, for his research on "Functional analysis of the bivalve gut microbiome: experimental perturbations and contribution to detoxification of pesticides".



The George R. Abbe Award for student research is an award devoted to the area of crustacean biology and fisheries management. Winning this year was Mingli Zhao, University of Maryland Baltimore County, for her proposal, "Assessing the potential for interstate blue crab imports to introduce crab pathogens into new ecosystems".

The Michael Castagna Award for student research is an award devoted to the area of applied shellfisheries. Winning this year was Elizabeth Bouchard, Rutgers University, for her proposal entitled, "The effect of oyster aquaculture on the distribution of horseshoe crab eggs in Delaware Bay and its implications for the threatened rufa red knot".



Judging of the Sandra E. Shumway Award for Outstanding Student Paper published in the *Journal of Shellfish Research* has specific selection and evaluation criteria: (1) The lead author must have been a student when the work was completed, (2) the paper must present the student's work, not that of a co-author, (3) it will be evaluated on the quality of science and writing, and (4) the importance of the work to the field of shellfish research. A panel of judges evaluated 23 papers, and the award was presented to Elizabeth Underwood for her manuscript:

Underwood, E., Darden, T.L., O'Donnell, T.P., and Kingsley-Smith, P.K. 2019. Population genetic structure and diversity of the invasive island apple snail *Pomacea maculata* (Perry, 1810) in South Carolina and Georgia. *Journal of Shellfish Research*, 38(1): 163 – 175.

Thank you, again, to all the students for submitting their proposals and for the reviewers for evaluating each these proposals and student papers so thoughtfully.

Application deadline is November 1, 2021.

Start planning now! Details are available at www.shellfish.org.

Steven Allen
Senior Past-President

The 113th Annual Meeting - A Virtual ODYSSEY

As you can well imagine, this has been an adventure like no other and none of it would have been possible without the technical expertise and patience of Eric Heupel and Noreen Favreau. They spent countless hours answering questions, repairing files, setting up the systems, and making sure that every presentation and registration was successful. A huge thanks to our sponsors, many of whom kindly rolled over their sponsorships planned for Baltimore and Charlotte. Sponsor support is an integral part of the success of all of our conferences and especially this one. We also had several trade show participants with videos played during the lunch periods – please take the time to visit their websites and support them where you can. Finally, thank you to all of the participants for their patience and understanding during this mutual learning experience.

There were 585 registrants, 383 presentations, 4 plenary speakers, a diversity lecture and discussion, and several live workshops and panels. Those 585 registrants connected from 929 devices and 34 countries. There were 12,368 web page views and consumption of 6 TB of video from 11,500 separate video plays of 285 videos – an average of 21 web site page views per registrant. Desktops were the most frequently used device (87%) with 11% on phones, 62% using Windows, 25% on MacOS, 8% on iOS, 4% on Android Phones, and 0.5% on Linux. This means that either ~ 300 people were viewing the meeting on two different devices, or, more likely, the meeting link was shared with non-paying registrants. This may seem harmless, but it cost the NSA anywhere between \$30-50K in revenue. Discord was very popular – 358 registrants signed in posting 1858 individual messages (not including announcements or other messages by Admin/moderator).

An anonymous post-meeting survey was sent to all registrants, 333 of whom opened the email and 90 took the time to provide feedback (20 students, 17 early-career, 24 mid-career, 22 senior, 5 retired, and 2 other). Most comments were favorable and summed up by one of our favorite responses, “what a great job under sh*tty circumstances”. There were a few general areas of frustration noted including the limited time for Q&A, difficulty with access, and timing of presentations. While it would have been preferable to have Q&A after every talk, that would have extended the meeting for almost two weeks and would have been impossible to implement live with the available staff for the number of concurrent sessions, and not to mention the global time zone differences. Difficulty with access was more a matter of individuals not reading the emails they received with detailed instructions on how to do this and waiting until the morning of the first session to open their email (several admitted to this and the web page confirms it). One of the most frequently received email queries during the conference was from people in different time zones indicating that they couldn’t access the live zoom sessions – this because they did not note the time differences.

Other comments included, “communication wasn’t as frequent as I would have liked”, “I don’t think participation was encouraged or promoted as much as it could have been”, and “I feel that the cost should have been reduced or free for the experience”. Comments such as these are disheartening. The conference was advertised on many websites, listservs, in print media, and repeatedly to the NSA membership. Email updates were sent to all presenters and to the NSA membership on numerous occasions, and explicit instructions were sent to all registrants on March 19 (Friday) to visit the conference website before the meeting started. Of the 585 registrants, 120 never opened that email. As for free, nobody works for free and conferences - even virtual ones - require time and money. There is a common misconception that ‘virtual’ simply means pushing a button and it all just happens. There was a website to design, platform system to rent, a company to engage to handle all of the zoom (live) presentations, labor costs to fix over 70% of the videos submitted in an effort to make the presentations, all of the costs associated with program preparation and printing (well over half of the participants requested a printed program), and a separate system to handle the auction and on-line bidding and payments. Nothing is free.

Every effort was made to make the live presentations available to as wide an audience as possible, but given the global time zones involved, not possible to please everyone. Some indicated that ‘it would be nice if the talks were available after the meeting’ – clearly these people didn’t read their emails where it was noted repeatedly that the entire conference would be made available to full registrants for two weeks post meeting. Only 79 registrants took advantage of the opportunity.

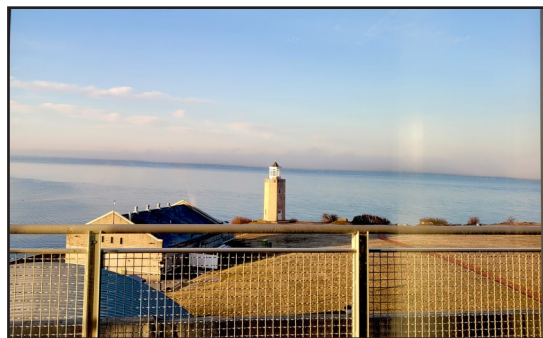
There were no standouts among sessions identified as most useful or interesting, many were noted specifically and numerous respondents said ‘all’. Two things emerged as the most important thing people took away for the conference: 1) the importance of networking and 2) the desire for in-person meetings.

There were technical difficulties with the posters and we apologize for that. All posters were part of the meeting materials posted after the conference, but access during the actual sessions was difficult in some cases, and all were made available in the post-meeting postings.

The Auction was a success—over \$2500 was raised for the SEF. A big thank you to all of the very generous donors, buyers, and individuals who made cash donations.

While this virtual meeting was a great success, it was no substitute for meeting in person, random conversations, and happy hours, leisurely poster viewing, or enthusiastically bidding on auction items. Plans are already underway for the upcoming Triennial (February 28 – March 4, 2022) – SEE YOU IN SAN DIEGO!

The Conference Management Team



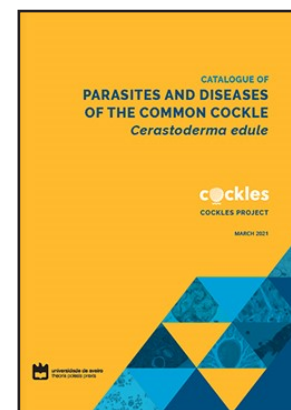
View from Virtual Headquarters at the 113th Annual Meeting. Photo credit: Noreen Favreau

A PLEA FOR FUTURE MEETINGS

All meetings have their glitches, but many of those encountered during preparation for this virtual meeting could easily have been avoided if people took the time to open and read their emails, follow instructions, and honor deadlines. Most conferences provide a deadline for abstract submission and then shut down the web site at the appointed hour. NSA members seem to believe that deadlines are vagaries and think nothing of submitting abstracts after the deadline and then assume they will be incorporated in the program. These traits were far too common! While we do all we can to accommodate these delinquencies, this time it was more difficult as time went on because of all the technical aspects of preparation. In addition, because so many people did not follow instructions for preparing their videos (or seemingly even check them before submitting), many had poor volume, resolution, and had to be either resubmitted or repaired – it took a lot of unnecessary hours and expense to make them ready for presentation.

So, a gentle plea for the future: Read the notices that are sent, follow the instructions, and honor the deadlines. It makes things run more smoothly and will be greatly appreciated by the conference organizers for all future meetings.

Sandy Shumway
Conference Manager



New Guide on Cockle Pathogens

“Catalogue of Diseases and Parasites of the Common Cockle *Cerastoderma edule*” provides thorough information on each identified pathogen threatening cockle beds along the Atlantic Area. For each pathogenic agent, the geographic distribution of species’ prevalence and abundance, individual and population pathogenicity, and risk

assessment and management recommendations are provided. It was produced within the project COCKLES (<https://cockles-project.eu>), and funded by the European Union through INTERREG-Atlantic Area. It is now available for download: <https://cockles-project.eu/news/view/59>

GOOD NEWS.....

At long last, there is no longer an added fee for publishing color in the
Journal of Shellfish Research

NO CHARGE

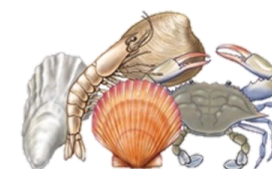
2021 NSA Resolutions

Each year, the National Shellfisheries Association recognizes individuals for special contributions to the society in the form of Resolutions. Each begins with the same introduction:

Whereas, the National Shellfisheries Association, Inc. (NSA) is a Not-for Profit Corporation, and Whereas, members serve as officers and committee members on a voluntary basis, Be It Resolved that on the 24th of April, 2021, the National Shellfisheries Association formally recognizes and thanks.

This year, the following Resolutions were presented.

- **R. LeRoy Creswell:** for his decades of devoted service to the continued success of the NSA. His guidance, commitments, and selfless giving as a Past President and Editor of the *Quarterly Newsletter* provided the NSA with exceptional leadership and wisdom.
- **Linda Kallansrude:** for her decades of outstanding support, dedication, and expertise in her role as Secretariat. Her willingness to go the extra mile and her understanding of societal needs has contributed greatly to the continued success of NSA – and always done with talent, efficiency, and a smile. The NSA wishes her all good things in her retirement.
- **Noreen Blaschik and Eric Heupel:** for their talent, expertise, and dedication to preparation of the 113th Annual Conference. Their abilities and willingness to go the extra mile and attend to a myriad of details and unexpected issues has made the production of a virtual conference a reality. The NSA commends them and thanks them heartily for all their efforts.
- **Kim Salois:** for her 20 years of outstanding support, dedication, and expertise in her role as Account Manager guiding the publication of the *Journal of Shellfish Research*. Her willingness to go the extra mile and her understanding of societal needs has contributed greatly to the continued success of the *Journal* – and always done with great talent, efficiency, and a smile.
- **The Sheridan Press:** for another year of outstanding service and collaboration publishing the *Journal of Shellfish Research*. We especially recognize Joyce Coulter, Susan Parente, Kim Salois, and Lisa Small for their efforts on behalf of the *Journal* and the National Shellfisheries Association, which are gratefully acknowledged and appreciated.





A huge THANK YOU to Dr. Acacia Alcivar-Warren and the FUCOBI Foundation for their generosity in sponsoring 22 NSA students, and for their continued efforts to provide scientific information to under-developed regions and to increase diversity within the NSA.



Photo credit: Laura Urdes, Murdoch University

NSA Welcomes New Honored Life Member

The National Shellfisheries Association acknowledged the career contributions of Dr. Ximing Guo at the 113th Annual Meeting. A full biography will be published in the a future issue of the *Journal of Shellfish Research*.



"This award is really special to me because the NSA is an organization that I respect immensely. The NSA values diversity, always promoted participation from students, women, and minority groups, and always welcomed international students and scholars. I came to America as a young student over 30 years ago. The inclusive culture at the NSA always made me feel at home. It is heartening for me to receive this award when there is so much racial tension in America."

"The annual meeting of the NSA is the one conference that I always enjoy attending. Many of the ideas for my research came from this meeting, from listening to talks or from talking with colleagues, students, and farmers. I really appreciate the Association for such great opportunities to meet and connect with so many of colleagues and friends over the past 30+ years. I am grateful for the support from many colleagues, including two dear friends, Susan Ford and Daniel Cohen, who passed on in recent years."

Congratulations Ximing!

THANK YOU TO OUR SPONSORS



THE 113th ANNUAL MEETING (Virtual)

