

# CERF's Up!

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**A new wave  
of information from  
the Coastal and Estuarine  
Research Federation**



*Environmental DNA reveals 2000-year history of coastal plant communities in a temperate wetland in South Australia*

Photo: Nicole Foster

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## Life and CERF in the time of COVID-19



Jim Fourqrean

Greetings from my new office/lab/lecture hall/broadcasting studio, ideally located 10m from my bedroom and 3m from my kitchen. I have to say, the commute is great! I share this space with the other members of my family: a professor, a middle school teacher, a college senior and a high school sophomore who are all competing with me for quiet space for videoconference meetings and internet bandwidth. We are managing much better than we all feared. So many of us are anxious about contracting the virus, or having our friends or loved ones affected. My heart goes out to CERF members who have been directly affected by COVID-19. We are all wishing for CERFers to stay safe, healthy, and sane! I feel incredibly lucky that I work for an institution that could accommodate my working remotely full-time while we follow social distancing guidelines. Many people in my community are not nearly so lucky—and I know many CERF members are unexpectedly finding themselves without a job or paycheck coming in. The coastal and estuarine students with whom I interact are feeling different impacts from this new normal, depending on their stage along their degree track. Mid-stream students are seeing whole field seasons scrubbed and are now looking at extending their programs by at

least another year, while those lucky enough to be writing up may actually find the new normal makes their work analyzing data and writing go more quickly. I hope that we soon get back to normal life and work conditions and that all of us recover quickly from lost wages and lost productivity.

COVID-19 has had many impacts on CERF and affiliate society activities. The CERF Governing Board meeting, the first scheduled in-person meeting of the board responsible for guiding CERF to build value for members since CERF 2019 in Mobile, has been reimagined as a video conference meeting. All of the affiliate society meetings scheduled for this spring and early summer had to be canceled, postponed, or converted to virtual meetings. The chance to network and develop personal relationships with other estuarine scientists always tops the list of things CERF members enjoy about our in-person meetings, but rest assured we are working to make our virtual meetings as meaningful as possible until we can gather again. Understanding that we all will really need great events to reconnect with our colleagues and friends when life and budgets return to normal, we will work even harder on upcoming affiliate society meetings and CERF 2021 in Richmond! Planning for these events is well under way.

Please stay healthy and sane while we weather what we hope will be the tail end of the new normal in response to COVID-19. Keep your family, friends, and colleagues close; help those around you in need; and make sure to rely on your support networks for your own sanity. And maybe this would be a great time to catch up on those promised manuscript reviews and to read back issues of *Estuaries and Coasts* while you work on new manuscripts for submission? The dedicated editorial board is working efficiently from home! Furthermore, the Governing Board and I would love to hear your suggestions about how CERF can help you cope with staying current, connected, and productive during these interesting times.

*Editors' Note: We are interested to hear how the COVID-19 crisis is impacting your work, your research and teaching interests, your life as a CERFer. Please consider sharing your trials—and triumphs!—with us by emailing [newsletter@cerfscience.org](mailto:newsletter@cerfscience.org), or using the hashtag #CERFersvsCOVID on social media posts.*

# Science and Social Justice at the Caño Martín Peña Estuary in San Juan, Puerto Rico

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Installing water level loggers at a house on the Caño Martín Peña estuary Photo: Alana Hanson

When it rains, it floods in the Caño Martín Peña communities. Water fills streets, homes, and schools. In some neighborhoods, storm drains, which are ordinarily filled to the brim with standing water, bubble up and become fountains of sewage-enriched urban runoff. It's almost like living in Venice, except that the water is gray and cloudy, and the noxious smell is unsettling.

But the people who live here, in and amongst the floodwaters, are not victims and this story is not a tragedy. Rather, my colleagues and I are in awe of these communities. They are organized, thoughtful, and deliberate in their pursuit of change. The solution to the problem of the Caño and associated stagnant, unhealthy water is clear: it needs to be dredged. This will unclog the system, improving both human health as well as the health of the whole San Juan Bay

Estuary. But, to do this, the footprint of the adjacent communities will have to change. Some people will have to move. The ENLACE Project<sup>1</sup> has been conducting their own Habitat for Humanity-style efforts to fix up abandoned properties, within communities but on higher land. Those most vulnerable to the flood waters are moved to safe and newly renovated homes. The impact of these efforts is now visible in aerial photos.

The Caño communities provide lower-income housing to the working class in intact, vibrant neighborhoods. And they are only minutes from some of the most expensive real estate on the island. When the dredging happens, land values will skyrocket. Up until recently, individual homes, which were originally built as part of squatter settlements, didn't have land rights, making them vulnerable to exploitation, gentrification, and

displacement. To address this the ENLACE Project received formal recognition in 2009 as the first urban land trust, winning them a UNESCO World Habitat Award and creating a framework that is being adopted by socially vulnerable communities across the globe. The ENLACE Project has been successfully maintaining community structure and campaigning the government (local and federal) to dredge the Caño.

It is important to understand how quickly the Caño filled in and the situation evolved. The adjacent mangroves were cut down and squatter communities established up through the 1960s, but the canal didn't fully fill in until the last 20 or so years. One of our EPA colleagues fondly recalls a fanboat ride through the length of the Caño in the mid-1990s. Now, 25 years later, it's difficult to tell where the canal is in some stretches. It looks like a wetland. Elderly members of the communities have watched the evolution occur from their front porches. Everyone understands what has happened, and generally when, but this area is overlooked and underserved.

Our part in all of this is twofold. First, we want to understand how the closure of the Caño Martín Peña is impacting the San Juan Bay Estuary as a whole. We are doing this by trying to understand the biogeochemical cycling in the estuary, particularly for nitrogen, and by measuring contaminants of emerging concern. Second, we are working to document the flooding of the Caño communities. It seems illogical, but the resources have not previously been available to define the frequency, duration, and extent of flooding in this area. We

1. The ENLACE project: <http://cano3punto7.org/nuevo/index-english.html>

are using a combination of water level loggers and inexpensive water-detecting sensors to do this. This past November, we put these small sensors on fences and signposts and have tucked them behind rocks and into the brush at brownfields sites. We chatted with homeowners, dodged flooded streets, and occasionally snapped photos of the urban menagerie of free-ranging potbellied pigs, chickens, iguanas, dogs, and innumerable cats.

And now we wait. As we do this, we appreciate the parallels between our science and social justice movements. So much of this work is persistence; daily efforts by many participants towards small incremental changes, and resilience in the face of always expected, but often unanticipated, setbacks. When there are successes, such as a new discovery or an improvement in a family's quality of life, it feels fortuitous even though the work has been slowly progressing for years or even decades. And we hope for many such surprises in this work.



*Aerial photos showing the de-urbanization of a stretch of the Caño Martín Peña. Photos: ENLACE Project's Facebook page (Proyecto ENLACE del Caño Martín Peña)*

## CERF 2019 Winner, CERF haiku

*Kellyn LaCour (@KellynLaCour), Louisiana Coastal Protection and Restoration Authority*

Oh CERF, have mercy  
I thought my talk was Thursday  
But it is...today

*Editors' Note: The four winning haikus from the CERF 2019 Conference that appear in this issue were submitted by Julian Damashek, CERF 2017-2019 Social Media Team Chair.*

# Get Your Boots Wet

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**CERF Job Board**

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# Environmental DNA Reveals 2000-year History of Coastal Plant Communities in a Temperate Wetland

Nicole Foster

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Mangrove site

Photo: Nicole Foster

Buried in the sediments of our coastal plant communities is a time capsule of information relating to changes in mangrove, saltmarsh, and seagrass communities. This information tells the story of how our coastlines have been altered as a result of modern human influence. Armed with this data, we can make restoration goals achievable for coastal plant communities and tailor management strategies that are more likely to be successful. This information is preserved in the form of DNA. When coastal plant communities grow, they shed their DNA, which is deposited into the soil column. Over time, sediment layers accumulate, forming a chronology of ecosystem composition.

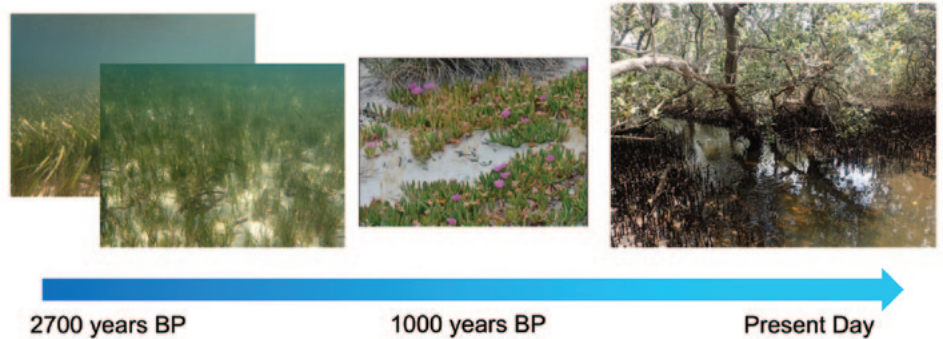


Photo: Nicole Foster

*Environmental DNA reveals a change in coastal plant communities in a temperate wetland over the last approximately 2000 years from a seagrass community, to a coastal dune plant community, to a mangrove community that we observe at the site today*



Salt marsh site

Photo: Nicole Foster

My PhD research is developing methods to access the DNA stored in coastal sediments and analyse this to draw conclusions about coastal plant changes over time. I have optimised an extraction protocol to obtain plant DNA from sediments which I then analyse using a hybridisation capture approach.

For the CERF 2019 conference in Mobile, Alabama, I presented my recent findings on a sediment core collected from a protected wetland in South Australia. By reconstructing the 2000-year history of this site, I uncovered strong evidence to support a shift from a predominately seagrass environment, dominated by *Posidonia* and *Zostera*, to the mangrove habitat that we see at the site today. This result highlights a dynamic system as these changes have occurred in the space of only a few thousand years, small in geological terms.

This means the system is likely to undergo further changes in the coming years which may not be a result of direct human interference as we usually expect. We will need to consider facilitating this change by fostering connectivity and recruitment rather

### Torrens Island, Adelaide, South Australia



Sediment cores were collected and analysed for environmental DNA at a temperate wetland in Adelaide, South Australia

than trying to prevent it. By obtaining ecosystem level information that spans informative time scales we can uncover the natural variability within a system and thus prevent wasting resources and energy fighting against this.

Further work is being conducted to assess the spatial variability of the site and to refine results. This site was selected for analysis as a means of testing the methodology to ensure the approach was robust and reflec-

tive of the true community composition. Additional sites to be analysed include one that has had a significant history of human alteration, and thus historical reconstruction will be used to inform restoration goals.

*Editors' Note: Nicole's presentation at the CERF 2019 Conference received one of the top three Graduate Student Oral Presentation Awards.*

# Engaging the Next Generation of Scientists with Seagrass-focused Activities

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Students observing a sea urchin consume seagrass

Seagrass ecosystems reduce erosion, increase fisheries, and sequester nutrients—benefiting societies economically and culturally. However, seagrass coverage is declining globally, largely due to human activity.<sup>1</sup> Reversing these trends requires public understanding and appreciation of seagrass systems and their value. Educating young people about the impact of human activity on coastal ecosystems could generate support for seagrass management, restoration, and citizen science projects as well as greater commitment to living shorelines and seagrass-conscious boating practices. Since Florida contains two of the largest contiguous seagrass beds in the continental United States, we wanted to increase awareness of the importance and vulnerability of seagrasses among Florida K–12 students, thereby also increasing science engagement and participation.

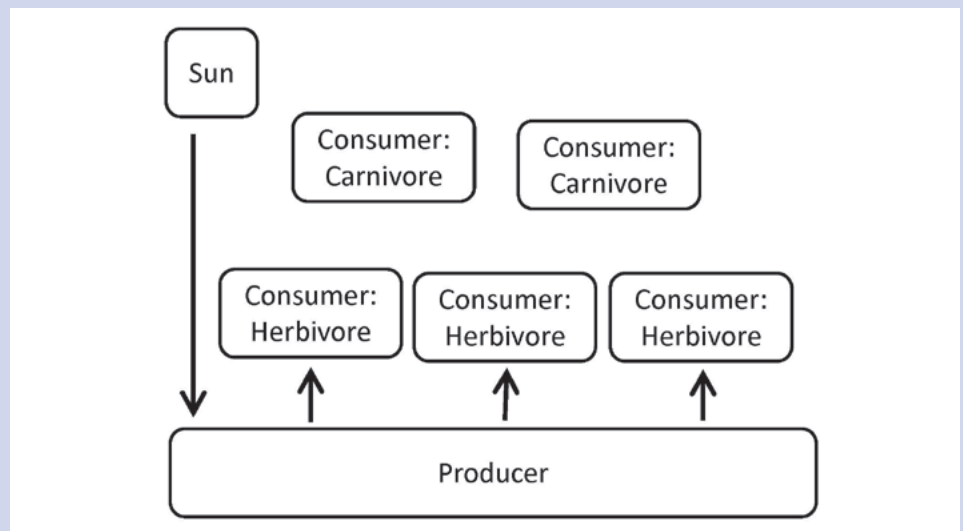
Using seagrass systems as a model ecosystem, we led one-hour activities at four different afterschool science clubs (3rd–7th grade) in east Gainesville, FL, an area with high poverty rates and low educa-

tional performance and educational achievement.<sup>2</sup> These science clubs, organized by the Gainesville Cultural Arts Coalition, help students have fun learning science, while successfully improving standardized test scores. The activities<sup>3</sup> focused on food webs, ecosystem services, and the effects of human activity on natural ecosystems. Change in student understanding of these topics was assessed using anonymous pre- and post-lesson surveys.

After discussing key terms and introducing seagrass ecosystems, including information about the benefits seagrasses provide and how humans impact seagrass, students watched a short video showing a large seagrass meadow and a simple food chain (seagrass → green turtles → tiger sharks). The students engaged with a live sea urchin; one student reported “my favorite thing was to see a real sea urchin and look at it eat.” Even in Florida, where the majority of students live within 60 miles of the coast, most students had never seen

seagrass or sea urchins!

Two interactive activities were intended to solidify knowledge of the various roles in a seagrass food web and demonstrate the complexity of natural ecosystems. In the first activity, students received a blank outline of a simple food web and were asked to draw or paste in coastal organisms and then add arrows in the direction of the energy transfer. In the second activity, students were assigned a seagrass-associated organism and given yarn to connect themselves to classmates based on interactions within the ecosystem, creating a web of yarn demonstrating the interdependence among the organisms. Once the web was complete, students assigned a producer organism were asked to drop their yarn, and the web unraveled, emphasizing the importance of producers and facilitating a discussion of how humans impact seagrass. The students were excited to get up and moving, although they often preferred to be assigned the role of a consumer rather than pro-



Food web outline that students completed



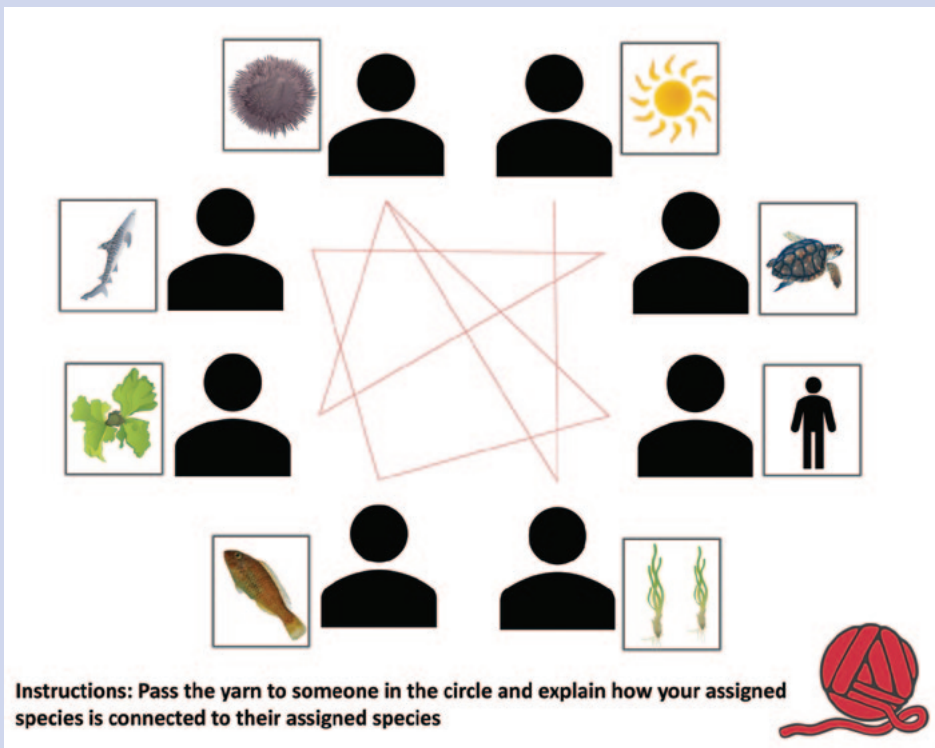


Diagram of the yarn activity

ducer. As one student reported, “The ecosystem game was amazing! I loved it very much! But the only part I didn’t like was that I was the first one to die because I was the seagrass.”

To conclude the lesson, students were offered smoked mullet dip made from mullet that lived in Florida seagrasses, noting that by consuming the dip, students would be joining the seagrass food web. This highlighted one of the valuable ecosystem services that seagrasses provide: habitat and resources for commercial and recreational fishery species.

Survey results revealed that students significantly improved their understanding of seagrass ecosystems, ecological roles, and ecosystem services. Most students already knew that ecosystems consist of living and non-living elements and that humans can hurt seagrass. Afterwards, students left with a better understanding that: (1) seagrass is found in the ocean and requires saltwater, (2) seagrass gets energy from the sun, (3) sea urchins are herbivores, and (4) seagrass ecosystems provide benefits to humans, animals, and the environment.

While students improved their understanding of many concepts during these relatively brief one-hour lessons, a longer engagement would be useful for solidifying new material and extending the topics covered. After the activities, 96% of students knew that seagrass gets energy from the sun, but only 84% of students correctly identified that seagrasses are producers, indicating that more attention should be given to the term “producer.” Activities can also be adapted and extended to address state learning standards at many different grade levels, with younger students focusing on habitat requirements for seagrasses and the differences between plants and animals, and older students focusing on top-down and bottom-up control of ecosystems, trophic cascades, the function of seagrass physical structures and organelles (including how these relate to ecosystem services), adaptations to saltwater, and reproduction of flowering plants. All students would benefit from increased focus on how climate change and human activities impact natural systems.

For more information and access to handouts, activity books, and addi-

tional activities, visit: <https://jamilas-roth.wixsite.com/mysite/outreach>

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2. [https://www.bebr.ufl.edu/sites/default/files/Research%20Reports/ri1\\_baseline\\_report.pdf](https://www.bebr.ufl.edu/sites/default/files/Research%20Reports/ri1_baseline_report.pdf)
3. This project was supported by a Thompson Earth Systems Institute Grant for Education and Outreach.

*Editors’ Note: Jamila’s poster at the CERF 2019 conference received one of the top three Graduate Student Poster Presentation Awards. Jamila also was awarded the CERF Legacy Fund Scholarship.*

## CERF 2019 Runner up, CERF haiku

*Sophia Hoffman (@soemhoffman),  
Texas A&M-Corpus Christi*

Grad student at CERF

Imposter syndrome? So real.

We all belong here.

# High Schoolers Learn the Importance of Louisiana Wetlands

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*Marsh Maneuvers attendees enjoying a morning airboat ride as part of the immersive summer curriculum at the Rockefeller Wildlife Refuge base summer camp in Grand Chenier, Louisiana*

Photo: Brookes Washington

Marsh Maneuvers, an educational summer camp highlighting Louisiana's coastal wetlands, marked its 32nd anniversary in 2019. Louisiana Sea Grant, the LSU AgCenter, and the Louisiana Department of Wildlife and Fisheries host the program, which provides high school-aged 4-H students from across the state an opportunity to combine classroom knowledge and first-hand coastal experiences. Over the month of July, four camp sessions are held with about 16 students each week.

"Marsh Maneuvers is a coastal ecology camp for high school kids. We bring them out to the marsh for a week and teach them all about estuaries, and about the productiv-

ity of the environment," stated Mark Shirley, the Louisiana Sea Grant and LSU AgCenter Extension agent who established the camp in 1987. "We look at some of the interactions with man, how channels have been built, the hydrology changes that have been made. We talk coastal restoration and coastal protection."

Marsh Maneuvers originally was held at State Wildlife Refuge on Vermilion Bay and later in the Barataria watershed at Grand Terre Island. In 2005, the camp moved to the Rockefeller Wildlife Refuge. That move provided the program with a curriculum makeover and further expanded it to include coastal biodiversity.

"We take the kids on night hikes to shine for alligators and look at animal activity. We do some crabbing, fishing, and look at some water control structures. We talk about restoration projects such as bank stabilization and oyster reef development," Shirley said.

Those activities happen over four days, giving the young minds a rush of knowledge that will help prepare them for activities such as 4-H presentations and demonstrations at club meetings or at school. "The immediate impact is that these teenagers can go back and actually use some of this knowledge in writing term papers and giving speeches, and just letting others know how impor-

# Securing Sustainability and Resilience for Coastal Fisheries: Lessons Learned from the Gulf of Mexico

Just Cebrian<sup>1</sup>, LaDon Swann<sup>2</sup>, and Melissa Partyka<sup>3</sup>

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Many coastal fisheries around the world are in trouble. Human impacts such as overfishing, degraded water quality, climate change, and habitat destruction have led to the demise of many coastal fisheries. Because of that, there is much current research to better understand the sustainability and resilience of coastal fisheries in the face of these changing global conditions. More importantly, there is a need to work together across disciplines and stakeholder groups, including the academic, fishing, outreach and education, and regulatory and management communities, to find viable solutions that can secure the sustainability of coastal fisheries.

With that in mind, a Coastal Fisheries Town Hall was held at the 2019 CERF

conference in Mobile, Alabama, with the specific objectives of:

- (1) summarizing the most important common threats and challenges for coastal fisheries,
- (2) identifying possible solutions to secure sustainable coastal fisheries, and
- (3) determining how stakeholder groups can work together more effectively to implement the identified solutions.

Four panelists representing the research, fishing, outreach/education, and regulatory/management communities presented insights on the challenges faced by coastal fisheries management as well as potential solutions to ensure healthy, sustain-

able coastal fisheries. The panelists were Marcus Drymon, Assistant Extension Professor at Mississippi State University; Scott Bannon, Director of the Alabama Department of Conservation and Natural Resources; Julie Lively, Associate Professor at Louisiana State University; and Ronnie Daniels, charter fishing operator at Fisher-Man Guide Service. Recognizing the complex and multi-disciplinary nature of coastal fisheries management, we invited two additional experts in the topic: Ken Heck, Senior Marine Scientist Emeritus at the Dauphin Island Sea Lab; and Bobby Abruscato, charter fishing guide and tournament angler.

The panelist presentations were followed by a moderated discussion

## High schoolers learn the importance of Louisiana Wetlands *(continued)*

tant the coastal wetlands of Louisiana really are," Shirley noted.

Campers like Elena Templet, a 4-H student from St. Bernard Parish, said she will never forget her experience. "Marsh Maneuvers is the best trip I've ever been on. It not only teaches you about Louisiana's marshes, but also immerses you deeper into the reality of our coast. With new friendships, a beautiful wildlife refuge to explore, and a one-of-a-kind education, there is never a boring moment," she said.

John-Garrett Patrick, from Concordia Parish, mirrors Templet's enthusiasm. "Marsh Maneuvers was such a fun experience that allowed me to get a firsthand look at what we all read

and learn about in textbooks. It also allowed me to expand my horizons and venture out and tackle new challenges that I would have never thought I could possibly handle. I loved every minute of camp and made memories to last a lifetime," he said.

One of Marsh Maneuvers' goals is to spark an interest and desire in the students to use the knowledge and the skills that they have gained from the program to help mold a better coastal future for Louisiana. "Long-term, we have had students that 5, 10, and 15 years after the program have gone on to become wetland scientists, teachers, and science teachers.

So, they actually used this knowledge and it's spurred some of the kids' interests in a long-term career," said Shirley.

Attending Marsh Maneuvers can create doors of opportunity, like an Advanced Marsh Maneuvers camp that is open to a select group of 16 past participants. The winter camp gives students a more in-depth look into the value of freshwater marshes further inland from the coast. The focus is on managing this habitat for waterfowl and other migratory birds, in addition to alligators and freshwater fisheries.

## Securing Sustainability and Resilience... (continued)

between the panelists and audience. Just Cebrian from Mississippi State University moderated the Town Hall and Melissa Partyka from the Mississippi Alabama Sea Grant Consortium took notes on the panelist presentations and discussion with the audience. The focus was on the Gulf of Mexico, but with important implications and relevance for other regions in the US and worldwide. Below we summarize salient take-home messages along with supportive text verbatim from participants. For a complete transcription of the notes, see <https://www.cerf.science/post-conference-resources>.

### Take-home messages

1) Due to pollution, habitat destruction, climate change, and overfishing, many fisheries (e.g., oysters) in the Gulf of Mexico have experienced major losses over the past few decades despite serious efforts to curb such declines. Other species, however, have recovered substantially (e.g., red snapper and red drum), which proves that sustained efforts with appropriate management policies and cross-disciplinary collaborations may be effective in fisheries recovery. Regardless, making a living as a traditional commercial fisherman in the Gulf of Mexico, which is often based on circular fishing (i.e., alternating fisheries over seasons), remains challenging and sometimes unviable.

"People are the problem, but they are also the solution" (Scott Bannon)

"Places I fished growing up no longer exist and my kids will no longer see them" (Ronnie Daniels)

"Can't make a living doing circular fishing" (Scott Bannon)

2) Fewer young people from traditional fisheries families are following up with the family fisheries business. Instead, many jobs in the traditional

fisheries business are done by immigrants to the region. Large, persistent fisheries declines, along with the uncertainty surrounding the recovery of such fisheries, are at the base of this change in the demographics of the traditional commercial fisheries work force.

"We are a fishing community, but there are no young people coming up in the business... A lot of work going to immigrants and not locals" (Scott Bannon)

"Every state has seen an aging of the commercial fleet" (Julie Lively)

"Commercial fishermen are dying off, hard to get someone excited about going into this industry when they see their families beat down" (Ronnie Daniels)

3) Some traditional commercial fishermen are turning to recreational charter fishing. However, most of the increase in recreational charter fishing seen recently is due to recreational fishers transitioning into guided charter fishing for supplementary economic income.

"Handful of guys have moved from commercial to guides, but most are recreational guys coming over" (Ronnie Daniels)

"You've not seen a move from commercial to guides, more recreational fishers have gone to guides as supplemental money" (Bobby Abruscato)

4) Aquaculture may offer solutions to augment the supply of fresh domestic seafood, but several challenges remain such as potential environmental damage, viability and effectiveness of fish production, and locating profitable markets.

"Pond-raised fish don't do as well for some of the species" (Scott Brannon)

"Need for niche market, some of these fishers are going to need to

work with local restaurants to promote different types of fish" (Ronnie Daniels)

"Different proteins being marketed. This particular consumer is looking for a more refined product and they're willing to pay for it" (Marcus Drymon)

5) Paramount to identifying successful management policies for coastal fisheries is to work together across disciplines (research, fishing, education and outreach, and management and regulatory sectors); communicating in a transparent and effective way; building and maintaining trust among all parties; and ensuring a culture of sustained collaboration with agreeable adaptive management strategies to satisfactorily deal with unforeseen change.

"Misinformation is a problem. Have to be clear about what you're saying. Fishers need to be able to understand what you are saying" (Ronnie Daniels)

"There is common ground that can be found, but when fishermen feel they've been betrayed by other scientists it requires long-term maintenance" (Marcus Drymon)

"Need to learn all of the user groups, sit in on council meetings so that you can hear how the other sides are feeling about things. Don't just check the box, really listen" (Julie Lively)

## CERF 2019 Winner, Research haiku

*Katie Castagno (@kacastagno),  
Northeastern University*

Where did the marsh go?

Missing: Seven hundred years

If found, please return.

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## CERF Angels and Sustainers

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*From 1 January to 31 December 2019, the following Federation members donated to the William E. Odum Fund, Donald W. Pritchard Fund, CERF Enhancement Fund, Scott W. Nixon Fund, and/or CERF Legacy Fund.*

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*Many thanks to the members who joined or renewed at the Sustaining Member level in 2019. Your extra efforts on behalf of CERF will ensure the future of the Federation.*

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*Thanks to all of you for your generosity. Your contributions of time, energy and support make the Federation great. If you'd like to make a donation to CERF, please visit [cerf.science/donate](http://cerf.science/donate).*

# Estuaries and Coasts Editors' Choice Papers

## January 2020

Smith, E.P. Ending Reliance on Statistical Significance Will Improve Environmental Inference and Communication.<sup>1</sup> *Estuaries and Coasts* 43: 1–6 (2020). <https://doi.org/10.1007/s12237-019-00679-y>

### Abstract

Recently, there has been much discussion about the role of the p-value in scientific research. The American Statistical Association has published an editorial that presents guidelines for the use and interpretation of p-values. Numerous authors have commented and criticized its use as a means to identify scientific importance of results and have called for an end to using the term “statistical significance.” Recent articles in *Estuaries and Coasts* were evaluated for reliance on the use of statistical significance and reporting errors were identified. Suggestions are made for improving what is reported related to statistical testing. Focus should be on scientific importance of estimates, estimation of the size of the effect and the certainty in the size of the effect instead of simply reporting

a p-value and relying on hypothesis tests.

## March 2020

Myllykangas, J., S. Hietanen, & T. Jilbert. Legacy Effects of Eutrophication on Modern Methane Dynamics in a Boreal Estuary.<sup>2</sup> *Estuaries and Coasts* 43: 189–206 (2020). <https://doi.org/10.1007/s12237-019-00677-0>

### Abstract

Estuaries are important conduits between terrestrial and marine aquatic systems and function as hot spots in the aquatic methane cycle. Eutrophication and climate change may accelerate methane emissions from estuaries, causing positive feedbacks with global warming. Boreal regions will warm rapidly in the coming decades, increasing the need to understand methane cycling in these systems. In this three-year study, we investigated seasonal and spatial variability of methane dynamics in a eutrophied boreal estuary, both in the water column and underlying sediments. The estuary and the connected archipelago were consistently a source of methane to the atmosphere, although the origin of

emitted methane varied with distance offshore. In the estuary, the river was the primary source of atmospheric methane. In contrast, in the adjacent archipelago, sedimentary methanogenesis fueled by eutrophication over previous decades was the main source. Methane emissions to the atmosphere from the study area were highly variable and dependent on local hydrodynamics and environmental conditions. Despite evidence of highly active methanogenesis in the studied sediments, the vast majority of the upwards diffusive flux of methane was removed before it could escape to the atmosphere, indicating that oxidative filters are presently still functioning regardless of previous eutrophication and ongoing climate change.

## May 2020

Hyun, J., K. Choi, K. Lee, et al. Climate Change and Anthropogenic Impact Around the Korean Coastal Ecosystems: Korean Long-term Marine Ecological Research (K-LTMER). *Estuaries and Coasts* 43: 441–448 (2020). <https://doi.org/10.1007/s12237-020-00711-6>

### No abstract

1. <https://rdcu.be/b3FHZ> 2. <https://rdcu.be/b3FH2> 3. <https://rdcu.be/b3FH6>

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## The Latest Coastal & Estuarine Sciences News (CESN)

Merryl Alber, Managing Editor

Janet Fang, Science Writer/Coordinating Editor

CESN is an electronic newsletter that is put out on a bimonthly basis (6 issues per year) and serves as a companion to the journal *Estuaries and Coasts*. Each issue of CESN provides a summary of four articles from the journal, written for an audience of coastal managers and other interested stakeholders and emphasizing the management applications of scientific findings. Issues are posted online and emailed to subscribers. Go to the CESN website at [www.cerf.science/cesn](http://www.cerf.science/cesn) to read the full summaries and sign up to have future issues delivered to your email inbox.



*Meet Janet Fang, CERF's new Coastal and Estuarine Science News (CESN) Science Writer/Coordinating Editor!*

Janet is a science writer based in Los Angeles. She has master's degrees in earth and environmental sciences and journalism from Columbia, where she analyzed the fossilized shells of tiny organisms called foraminifera to chart ocean temperature changes over millions of years. While studying biology and English at UC Berkeley, she realized the importance of making science more accessible: She added to online biodiversity databases for the Museum of Vertebrate Zoology, explained the physics of roller coasters to children, and prepared local students for Coastal Cleanup Day. Her writing has appeared in publications such as *Nature*, *Discover*, and *Conservation*. After more than a decade in New York, she recently returned to California, where she shares a view of the mountains with a dog, two cats, and a ball python.

### MARCH 2020

#### **The End of "Statistical Significance"? An analysis of scientific reliance on p-values**

Source: Smith, E.P. 2019. Ending Reliance on Statistical Significance Will Improve Environmental Inference and Communication. *Estuaries and Coasts*. DOI: 10.1007/s12237-019-00679-y

<https://cerf.memberclicks.net/cesn-march-2020#Article1>

#### **It's Complicated: Constructed Oyster Reefs and Wave Height Reefs can both reduce and amplify waves**

Source: Zhu, L. et al. 2020. Field Observations of Wind Waves in Upper Delaware Bay with Living Shorelines. *Estuaries and Coasts*. DOI: 10.1007/s12237-019-00670-7

<https://cerf.memberclicks.net/cesn-march-2020#Article2>

#### **Not Too Shallow, Not Too Deep: Helping Seagrass to Shine Knowing where to plant seagrass makes for smarter restoration**

Source: Aoki, L.R. et al. 2020. Depth Affects Seagrass Restoration Success and Resilience to Marine Heat Wave Disturbance. *Estuaries and Coasts*. DOI: 10.1007/s12237-019-00685-0

<https://cerf.memberclicks.net/cesn-march-2020#Article3>

#### **A Regional Model for Wetlands Restoration Categorizing wetlands can facilitate analysis**

Source: Stein, E.D. et al. 2019. Establishing Targets for Regional Coastal Wetland Restoration Planning Using Historical Ecology and Future Scenario Analysis: The Past, Present, Future Approach. *Estuaries and Coasts*. DOI: 10.1007/s12237-019-00681-4

<https://cerf.memberclicks.net/cesn-march-2020#Article4>



# An Update from the Pacific Estuarine Research Society (PERS)



*Netarts Bay, Oregon (Oregon ShoreZone)*

PERS remains engaged in our communities and science and stewardship of coastal and estuarine ecosystems from afar. While fieldwork, outreach, and other activities are curtailed as we stay home to save lives amidst the COVID-19 pandemic, we take time to reflect, catch up on our writing, and continue to cultivate our skills in the teleworking arts.

As with most social gatherings, we cancelled the joint PERS/CAERS annual meeting in Florence, Oregon, scheduled for 2-4 April 2021. We optimistically look towards the fall to reschedule. The theme for the meeting is “Shellfish to Salmon: Science in the Face of Changing Ocean Conditions.” PERS also has a new look for conference and membership registration and abstract submission. This change streamlines the process, making it easier for participants and vendors.

Coming soon is a white paper on student training and preparedness for future jobs in estuarine science. “Building the Estuary Science Workforce of Tomorrow” was the PERS 2019 conference theme in Fidalgo Bay, Washington. Partnering with Oregon State University through the Oregon State STEM Hub and Hatfield Marine Science Center, attendees participated in a workshop to assess the skills required for the future jobs in estuarine science and gaps in training. Students from different institutions served as ethnographers during the workshop to provide context for the data. A sneak peek into the results finds that there were several skillsets that crossed job categories. The greatest training gaps identified by this group pertained to communication, budget and grants, and project/program management. This workshop and white paper serve to

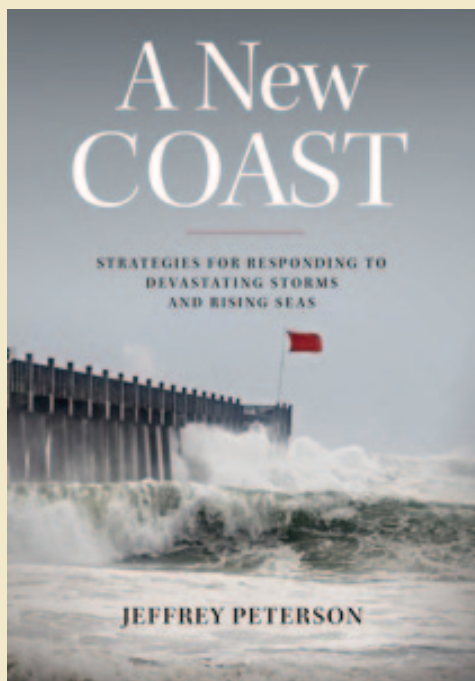
start the conversation about career development and student training for the future of estuarine science and will be available to CERF and Affiliate Societies.

## **CERF 2019 Runner up, Research haiku**

*Melissa Kardish (@MelissaKardish),  
University of California-Davis*

For microbiome,  
where to matters, where from not;  
transplanting eelgrass.

## Books of Interest



1. <https://islandpress.org/books/new-coast>

Hurricanes, rising seas, what to do? In his 2019 book, *A New Coast: Strategies for Responding to Devastating Storms and Rising Seas* (Island Press), Jeffrey Peterson discusses the impact of more severe storms and rising seas on the American coastline. The book shows how governments can work with the private sector and citizens to prepare for the coming inundation.

Peterson explains how current policies fall short of what is needed to prepare for these changes.<sup>1</sup> He argues for a new approach to topics such as “how to revise flood insurance and disaster assistance programs; when to step back from the coast rather than build protection structures; how to steer new development away from at-risk areas; and how to finance the transition to a new coast.”

*Editors' Note: In this issue, we have started a “Books of Interest” section where the newsletter will run short paragraphs describing new books that might appeal to CERF members.*

### **Wanted: Book Reviewers, Artists, and Photographers**

Calling all book reviewers, artists, and photographers. Please help us increase the appeal of this newsletter by sending us your perceptive book reviews, enticing artwork, and striking photographs. Check the submission guidelines at <https://www.cerf.science/cerf-s-up-contribution-information>



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