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Wrack Lines Volume 20, Number 2 Diverse Perspectives in the Environment We Share

Katrina McKelvin

Gerald Torres
Yale University

Judy Preston
University of Connecticut

Judy Benson
University of Connecticut

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WHERE CONNECTICUT MEETS THE SOUND



DIVERSE PERSPECTIVES IN THE ENVIRONMENT WE SHARE

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Connecticut Sea Grant
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From the EDITOR

Mist from the light rain clouded my camera lens as I took pictures of the Beard family.



I didn't realize it until I looked at the photos later, but sort of liked the effect. It seemed fitting for a brief but friendly encounter on that overcast day in early September. Strangers shared a moment in a place we had all come to love, despite the heavy clouds of 2020 under which we were all living.

I met Robert and Rebecca Beard and their 9-year-old daughter Juliana at Ocean Beach Park in New London three days after Labor Day. They had come from their home in Norwich for a respite from computer screens after Juliana's day of virtual schooling had ended. They strolled the boardwalk, watched ferries to Long Island pass offshore and let themselves be lulled by the salt air and surf.

"We came here a couple of times this summer," Robert Beard said.

I told him I lived just a mile and a half away, but this was my first time here all summer. Past summers, I visited the beach often. This year, discomfort with being in large groups during the pandemic kept me away.

"I understand," he said, nodding.

But being back at Ocean Beach now reminded me how much I'd missed it. It's a welcoming space for all kinds of people with all kinds of ways to enjoy being outdoors. You'll see women in saris wading into the water, hear families speaking Chinese or Spanish as they search for crabs in Alewife Cove, and mix with families of all colors finding their own place to belong near the sea. Along the boardwalk there's miniature golf, kiddie rides and a splash park, and at the western end a lovely nature trail through salt marshes along the cove.

Later, I remembered I *had* been to Ocean Beach once this summer, but not to swim or sunbathe. On June 28, I had joined about 100 others, our chairs widely spaced and our faces masked under a covered pavilion. We came to listen to the mother of Eric Garner, whose death in 2014 sparked the "I Can't Breathe" police reform movement, talk about her work since then to prevent similar tragedies. Gwen Carr's appearance there was the local NAACP's alternative to the Black Lives Matter protests that had arisen since the death of George Floyd in late May, one that brought together a wide cross section of the community.

"Just looking at all of you under one roof, this is the way it should be," she said. "We do all live under one roof, and we should be treated as one."

Like the pandemic, effects of the national reckoning sparked by Floyd's death spilled into many corners of our lives. I joined an online book group to discuss Ibram X. Kendi's book, "How to be an Antiracist." At work, CT Sea Grant Director Sylvain De Guise and Associate Director Nancy Balcom made time for the staff to have heartfelt discussions about what we were feeling and how our organization should take more proactive steps to walk the walk of diversity in all we do, a continuation of an initiative that started several years ago. These discussions were sometimes difficult, but made me grateful to work with such caring, thoughtful people. As James Baldwin, author of "Notes of a Native Son," "Go Tell it on the Mountain," and other significant works exploring race and racism once said, "Not everything that is faced can be changed, but nothing can be changed until it is faced."

As I write this, my co-workers and I are still having those discussions and deciding our course. I expect this will always be a work in progress. But this issue of *Wrack Lines* is one in a series of actions. With the theme of "Diverse Perspectives in the environment we share," we bring in the voices and talents of writers and photographers of different ages, races and backgrounds to tell stories we hope can help build bridges across the things that divide us.

This isn't about political correctness. It's about making a better world for everyone by recognizing, seeking and embracing a diversity of perspectives.

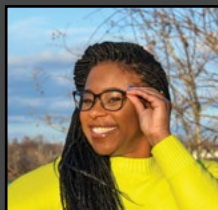


Judy Benson, editor
judy.benson@uconn.edu

Above photo: Robert and Rebecca Beard and their daughter Juliana enjoy the view from the boardwalk at Ocean Beach Park in New London on an early September afternoon. Photo: Judy Benson

Cover photo: Taylor Mayes, who talks about improving diversity in the sciences on page 6, leans on a viewing scope at Lighthouse Point Park in New Haven in the central portrait photo by Teala Avery. Surrounding her are images of the writers, photographers, sources and places found in this issue. Cover design: Maxine Marcy

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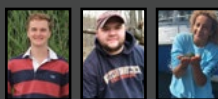
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TALK TO US

Send comments and questions about this issue to:
judy.benson@uconn.edu. We'll share as many as possible,
along with our responses, at: seagrant.uconn.edu

About our contributors



KATRINA MCKELVIN

Katrina McKelvin is a high school English teacher, freelance writer and tutor. Before becoming a teacher, she was a town reporter and feature writer at *The Day* for 16 years. She earned her bachelor's degree from Bryant University and her master's degree in secondary education from Sacred Heart University. She enjoys reading, listening to music and most things chocolate. McKelvin lives in New London with her husband and two children.



GERALD TORRES

Gerald Torres is professor of environmental justice at Yale School of the Environment and Yale Law School. He is former president of the Association of American Law Schools and taught at Stanford and Harvard. Torres served as counsel to the U.S. Attorney General on environmental matters and Indian affairs, on the Board of the Environmental Law Institute and the EPA's National Environmental Justice Advisory Council, and was the founding chairman of the Advancement Project. He is board chair of the Earth Day Network and was a consultant to the United Nations.



TEALA AVERY

Teala Avery is a freshman at Spellman College in Atlanta and 2020 graduate of Norwich Free Academy, where she studied photography for three years. In April the Otis Library exhibited a collection of her photographs titled, "Acts that Shape Us: Photographs by Teala Avery of Norwich Youth Making a Difference." She won the Gold Key Award in the Connecticut Regional Scholastic Art Awards competition and a bronze medal for photography in the National NAACP's ACT-SO contest. She has been active in the local NAACP Youth Council, traveled with People to People and participated in ALA Girls State.



EFRA FIGUEROA

Efra Figueroa is photographer and cameraman working with the Emmy Award-winning TV series "Geoambiente" and "Aventura Científica." As a videographer and photographer, he specializes in marine, nature, environment and underwater images. He has more than 30 years of experience in the SCUBA diving tourism industry. His credits include feature films, national broadcast programs, educational and promotional video programs. He works as a videographer/photographer contractor for the Puerto Rico Sea Grant Program, The University of Puerto Rico Mayagüez Campus Marine Sciences Department and Caribbean Coastal University of Puerto Rico, among others.



JUDY PRESTON

Judy Preston conducts public engagement and education programs for the Long Island Sound Study at Connecticut Sea Grant. In partnership with the UConn Master Gardener program, she runs the Coastal Certificate program that teaches sustainable gardening practices. She lives, plays and volunteers in conservation efforts at the mouth of the Connecticut River. She has an undergraduate degree in geology from Skidmore College, a Master of Science in botany from the University of Vermont and Master of Environmental Management from Yale University.



JUDY BENSON

Judy Benson has been communications coordinator at Connecticut Sea Grant and editor of *Wrack Lines* since 2017. Before that, she was a newspaper reporter and editor, concluding her journalism career at *The Day* of New London covering health and the environment. Her creative nonfiction essays and opinion articles have been published in *Appalachia*, *Connecticut Woodlands*, *Connecticut Hearst newspapers*, the *Connecticut Mirror* and *The Day*. She earned both a bachelor's degree in journalism and a Master of Science in natural resources from UConn. She and her husband live in New London.

Bringing more diversity to the sciences starts in the classroom

NEED SEEN FOR MORE TEACHERS OF COLOR, MORE INCLUSIVE APPROACHES TO LESSONS

By Katrina T. McKelvin

It wasn't until seventh grade that I had a teacher who looked like me.

Mr. Green taught science at New London Junior High School and he was pretty much a legend. Lots of students liked him and, although science was not my favorite subject, he made every class interesting.

After junior high, I did not have another Black instructor until I earned my master's degree in English. That was 2013. I was 39.

The lack of minority faces at the front of classrooms is not a new phenomenon. What's even more disconcerting is the scarcity of those instructors leading science classes.

Jeanette Davis, a marine microbiologist who works on science and policy at a federal agency, is the author of *Science is Everywhere: Science is for Everyone*. Initially geared toward elementary students, the book explains how the different pathways of science can be found in everyday life.

The concept for the book first came to Davis four years ago, when she attended a workshop on professional and personal development. Participants were asked to “dig deep” to discover how to motivate themselves to achieve their stated goals.

“It came out of a need for me to contribute to science in a way that was not limited to a science experiment,” said

Davis, who earned her doctorate in marine microbiology from the University of Maryland. “I also wanted to fill the void that exists with Black women and science. People don't look like me and I (wanted to answer the question) ‘why is that?’”

Growing up in Wilmington, Del., Davis wasn't exposed to a variety of sciences, but she always thought the subject was “cool.” She was the kid who asked questions in class. However, it wasn't until fifth grade—with Mr. Holder — that it all clicked.

A high achiever, Davis routinely earned perfect scores on her science assignments and completed extra credit tasks. Mr. Holder, said Davis, made science fun. He helped her recognize that all the things she found interesting—flowers, ants and dirt—were aspects of science.

“That is why the book emphasizes that science is all around us. We think of science as this abstract, complicated thing, but it's all about curiosity and asking questions,” Davis said. “As a young person, you are naturally curious. You naturally explore. All of these are attributes and skills you need as a scientist, and all kids have them.

“I think it's innate. I think we love to explore and create. The problem is in how we teach it,” she

“We think of science as this abstract, complicated thing, but it's all about curiosity and asking questions,” Davis said.



"As a young person, you are naturally curious. You naturally explore. All of these are attributes and skills you need as a scientist, and all kids have them."



Top photo: Jeanette Davis holds a copy of her book during a book-signing event in Wilmington, Del., in February 2020. Photo: Ki-Jana Hodges

Left: Lauren Watler, a math interventionist, encourages minority students to believe they can excel in math and science. Photo courtesy of Lauren Watler

Right: Taylor Mayes, communications coordinator and field organizer for the Connecticut Roundtable on Climate and Jobs, believes classroom role models and relevant lessons can motivate more minority students to pursue science careers. Photo: Teala Avery



continued. “They (kids) need to know that asking that question is their hypothesis.”

In the book, readers get a glimpse of the natural sciences, such as geology (study of the planet), anatomy (study of bodily structure), botany (study of plants), astronomy (study of celestial objects), and zoology (study of animals). The narrator explains that science is “taking medicine when we are sick. To grow food, drive cars, and fly across the air. Science is cool, science solves problems, science is everywhere.”

The challenge, Davis said, is overcoming minority students’ misguided beliefs that they are incapable of becoming scientists.

Taylor Mayes, communications coordinator and field organizer for the Connecticut Roundtable on Climate and Jobs, agreed, saying more effort should be focused on attracting minorities to the classroom setting.

“For me, the main thing is that we are not paying teachers enough,” said Mayes, whose mother is a science teacher and math coach. “A lot of people going into the STEM (Science, Technology, Engineering & Mathematics) fields go into pharmacy or technology, or other high-paying jobs, instead of science education.”

Canceling student debt could be one way to incentivize potential teachers, she suggested, as could increasing funding for science classes and offering science instruction at an earlier age.

“Children are encouraged by what they see in the classroom,” she said. “They can see themselves in that role at an older age. If we are connecting to the community, making it more relevant, kids will see the purpose.”

Minority students are often limited in exposure and experiences when it comes to science, so it makes sense that they don’t see themselves in an educational role. Currently a math interventionist, Lauren Watler previously taught science and math for three years in Washington, D.C.

Watler found that giving her students the opportunity to present what they’ve

learned in the method that works for them is the best way to reinforce classroom instruction.

“My kids were making presentations every month, whether it’s a Google slide, a skit, a rap. The power of choice ... allowed them to be independent,” she said.

Science is needed in education because it helps students develop the “power of the question,” a skill that is developed through practice and rigor, Watler said. Minority students need to see people who resemble themselves leading instruction so that they know the education field is also an option for them.

“Our kids tend to think that they aren’t smart enough, that science is only meant for foreigners or white people. But science is not a cognitive ability, it’s a mindset that is all based on experience,” explained Watler.

Part of that experience can be found within their own neighborhoods, she said. Kids should be encouraged to think about what is going on outside of their homes — for example, how pollution impacts our breathing or marine life.

“I tell my kids that they don’t have to put themselves in a box. They think they can only be a nurse, not a doctor,” Watler said. “Our kids are limited in exposure and experiences, but once they get a taste ... That’s why I love her (Davis’) book. The characters in the book look like us.”

The 14-page picture book depicts girls with braided pigtails and Afro puffs and boys with short-cropped cuts and blowouts. Their eyes and noses are different shapes. And their skin tone ranges from light tan to dark brown. One girl, a tribute to Davis’ Muslim nieces, is wearing a hijab.

During her education, training, and travel, and her newly developed presence on social media, Davis said she’s noticed a common refrain from people who shared their life stories: “I wanted to be a marine biologist, but I didn’t because I didn’t see anyone who looked like me.”

“For me, my thought was, ‘How do I change that?’ A lot of that really is

shifting the narrative around what a scientist is and what one looks like,” she explained.

During her travels for research, Davis has visited more than a dozen countries, and a tradition she maintains is bringing back souvenirs for her eight nephews and three nieces. They are aware that she’s a scientist, but they often don’t make the connection between who she is and the places she visits, so Davis looks for local books to help her describe the locations. But too often, her searches came up empty.

“I couldn’t find them to articulate what I was trying to explain to them, and if I did, the characters didn’t look like them. When I was in Granada, Spain, I could see Morocco (in northwestern Africa), a place that had so much history of these people of color. But the books had all white people.

“There were no people of color and it was misleading,” Davis recalled. “I wanted books for them to feel included and to know they have contributed to this field.”

To that end, Davis made sure that her book’s illustrations mirrored what she saw in her mind.

“I wanted it to be diverse characters, but look like actual children,” she explains. “I wanted it to be as inclusive as possible with a range of colors. Initially, I was not going to have any white characters, but then I thought ‘If science is everywhere and science is for everyone, then everyone should be included.’ I wrote what the illustrations should look like and they brought it to life.”

The book has gained Davis popularity with young students, who refer to her as “Dr. Ocean,” a name she uses on social media. Although she didn’t have a title or specific characters, *Science is Everywhere: Science is for Everyone* was written in 10 minutes. Davis attributes that to her required academic work on many of the sciences featured in the book — all of which connect to marine science.

“To understand marine science, you have to have a knowledge of a variety of sciences. Ocean science is chemistry, physics, biology, meteorology, botany ...

most of the plants are ones that you can't see," she explained.

"The chemistry of the ocean, the physical changes of the ocean and how it drives the climate, how life relates to the currents. If you look at a globe of the planet, 70 percent is the ocean. You can understand so much of what is going on in the world by studying the ocean."

Davis initially planned to study marine biology and environmental science while an undergraduate student at Hampton University, but she "fell more in love" with marine biology. Every summer she had an internship and she learned how to sail on a boat with a 13-member crew. During one internship, Davis met her mentor, who would eventually become her doctoral advisor.

Davis traveled back and forth to a research site in Hawaii for six years, where she ultimately discovered a bacterium that lives on sea slugs that produces anti-cancer compounds.

"I'm like CSI for the ocean. I study the things that you can't see," she said.

The book has been a conduit for Davis to

continued on page 8 ►

Bottom: Georgina Colon, left, and Jennifer Villa are former students of Susan Meabh Kelly who attended the Society of Women Engineers meeting with her in Minneapolis, Minn., in 2018. Photo: Susan Meabh Kelly



DANBURY TEACHER SAYS DRAWING ON HER STUDENTS' EXPERIENCES MAKES SCIENCE RELEVANT

In teaching earth science and physics at the Henry Abbott Technical High School in Danbury, Susan Meabh Kelly draws on the diverse backgrounds of her students.

"I try to bring in their own lived experience," said Kelly, a teacher for 17 years.

Her students' families come from Central and South America, Jamaica and the Dominican Republic, and many travel to those countries to visit family. In lessons about weather and climate, she asks them to collect data from their homes in Connecticut, and the homes of their grandparents, aunts, uncles and cousins overseas. She recalled one boy sharing that his grandmother's house in the mountains of the Dominican Republic stayed cool, which led to a lesson about how elevation affects climate.

In the technical school, her students are studying trades such as plumbing, heating and cooling. Those subjects are ideal starting points to explore more science questions: why are there high radiation levels in local groundwater? Who's being most impacted by high ozone pollution?

"You need to look at what students are doing and who they are from an asset-based perspective, and get ideas about what will be relevant," she said. "And you have to open up your ideas about who does science."

Her father, a New York City firefighter, did applied science every day at work, and the same is true for many other tradesmen and women. That understanding guides her teaching.

Kelly is a board member of the Connecticut Science Teachers Association and district director for its parent organization, the National Science Teaching Association. Both groups have begun addressing the need to make the teaching of science more appealing to diverse students and ultimately help diversify the workforce of science teachers and science professionals, she said. Two resolutions related to equity passed at this summer's National Congress on Science Education.

"There's a movement towards seeing the benefits of having more diverse perspectives in the sciences," she said. "Historically the people in the majority have been emphasized in science. But science is for all. That's our emphasis."

— Judy Benson

MORE INFORMATION:

"Who Does Science? Using data to explore society, inequality and social justice in the context of science" from *The Science Teacher*, July/August 2020, posted on the website of the National Science Teaching Association:

<https://www.nsta.org/science-teacher/science-teacher-julyaugust-2020/who-does-science>

To read the equity resolutions passed at the National Congress on Science Education, held virtually in July, visit: <https://docs.google.com/document/d/1OdhCYCjtQ8nADJwzbTvBSJ9BmLYLVlsdUlo1TUjJf8/edit>, click "2020 Virtual," then "Equity: Issue Forum II," then "Final Resolutions."



Susan Meabh Kelly

mentor the parents of minority students. Some of them would be sending the family's first generation to college. She shares her experiences as a marine biologist with parents: traveling extensively, authoring White House papers and speaking to student groups.

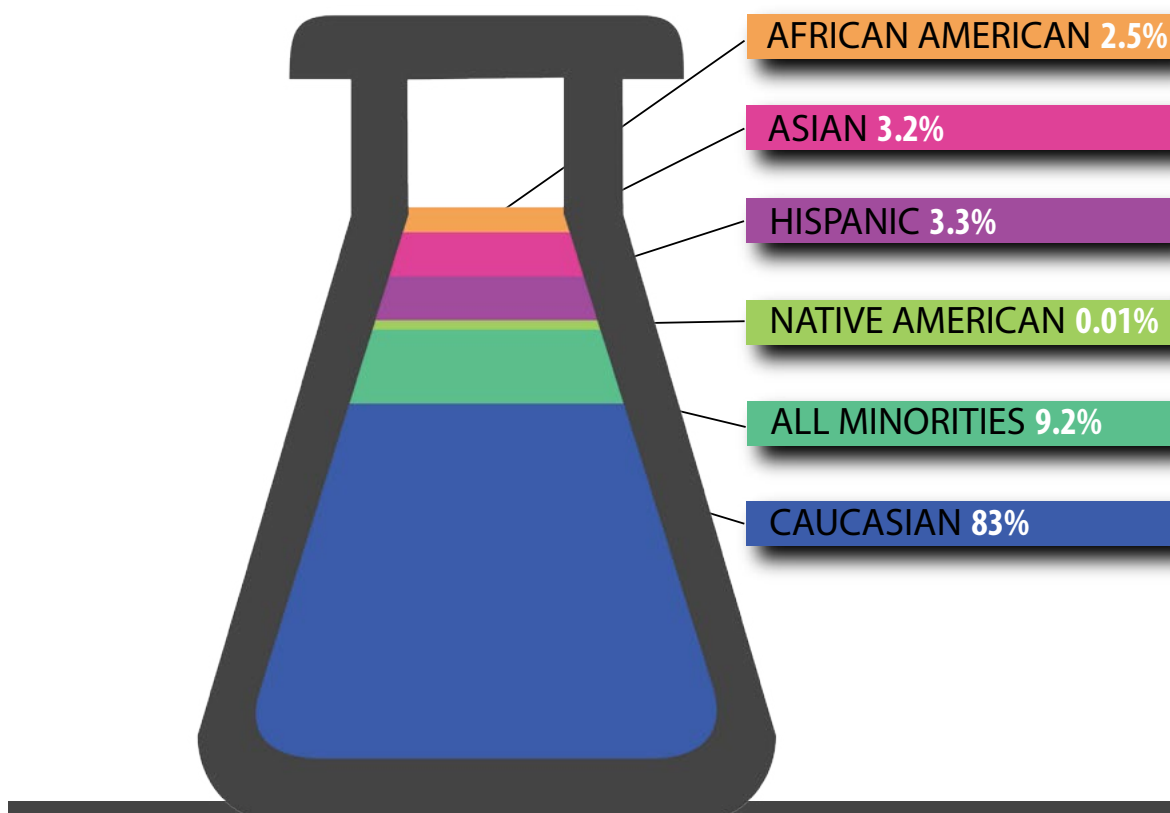
"For me, it's all about being who I am and bringing it to the field," she said. "My job does not require me to write a book, but I felt there was a void and I wanted to fill it."

"...science is not a cognitive ability, it's a mindset that is all based on experience."

EDITOR'S NOTE:

As a past Sea Grant Fellow, Jeanette Davis works with the National Sea Grant Office to diversify the Sea Grant Knauss Fellowship program. Her book, *Science is Everywhere, Science is for Everyone*, is available through your local bookstore, library or online purchase. To learn more about her book and efforts to diversify science—which are personal projects undertaken outside of her current position with the National Oceanic and Atmospheric Administration—visit her website, www.drjeannedavis.com.

RACIAL DISTRIBUTION OF CT SCIENCE TEACHERS



Actual Count: Total 2,135; Minorities 197

Breakdown: African American 54; Asian 69; Hispanic 71; Native American 3; White 1,773

Not Available were 7.7% - 165

The racial distribution percentages for Connecticut science teachers closely mirror the percentages for the state's teaching population overall.

Source: Connecticut Department of Education
Infographic: Maxine Marcy



Student Valery Orrego begins her drawing of an animal from Long Island Sound in the “Think Globally, Act Locally” class at the Joseph Melillo Middle School.



Teacher Maureen O'Day, left, works with eighth grader Sophia Santiago as Melissa Cangiano, restorative practices specialist, looks on during an assignment to use what they had recently learned about Long Island Sound in an art project.



Student Zach Gutierrez works on a drawing of a sea turtle in the “Think Globally, Act Locally” class. All photos: Judy Benson



Alain Ojedas, an eighth grader in the “Think Globally, Act Locally” class at the Joseph Melillo Middle School in East Haven, works on assignment about Long Island Sound on Sept. 18. The assignment required students to incorporate information from a presentation given the previous day by Connecticut Sea Grant Associate Director Nancy Balcom into a drawing and message about what they had learned.



Getting to know Gerald Torres

GERALD TORRES JOINED THE FACULTY OF THE YALE UNIVERSITY SCHOOL OF THE ENVIRONMENT AND THE YALE LAW SCHOOL IN NEW HAVEN LESS THAN A YEAR AGO, THE LATEST CHAPTER IN HIS DISTINGUISHED CAREER AS ONE OF THE NATION'S LEADING SCHOLARS AND ADVOCATES OF ENVIRONMENTAL JUSTICE. AS HE GETS ACQUAINTED WITH HIS NEW HOME IN CONNECTICUT, PROFESSOR TORRES AGREED TO ANSWER QUESTIONS POSED BY WRACK LINES EDITOR JUDY BENSON.

Q When did you join the faculty at Yale, and what is your current position there?

A I joined the faculty of the Yale School of the Environment (YSE, then Forestry & Environmental Studies) in January 2020 as a professor of environmental justice. I also have a secondary appointment at the Yale Law School.

Q What were some key positions before your appointment to Yale, and how has the focus of your teaching and research changed since moving to Connecticut?

A I am a former president of the Association of American Law Schools, and I have taught at Stanford Law School

and at Harvard Law School, where I served as the Oneida Nation visiting professor of law. Immediately before coming to Yale, I was the Jane M.G. Foster professor at Cornell Law School. Before that, I was on the faculty at the University of Texas at Austin. I served as counsel to the Attorney General on environmental matters and Indian affairs at the U.S. Department of Justice and helped establish the [Office of Tribal Justice](#) and helped draft the [Executive Order on Environmental Justice \(EO 12898\)](#). I have served on the board of the [Environmental Law Institute](#), the Environmental Protection Agency's [National Environmental Justice Advisory Council](#), as well as the [National Petroleum Council](#). I am board chair of [Earth Day Network](#) and founding chairman of the [Advancement Project](#), the leading civil rights advocacy organization in the country. I currently sit on the board

Above photo: Gerald Torres had a long and distinguished career as an academic and advocate for environmental justice before joining the Yale University faculty in early 2020. Photo: Judy Benson

of the [Urban Peace Institute](#) and [Clean Water Action](#). I am a trustee of the [Natural Resources Defense Council](#). I have also served as a consultant to the United Nations on environmental matters, and I am a life member of the [American Law Institute](#) and the [Council on Foreign Relations](#).

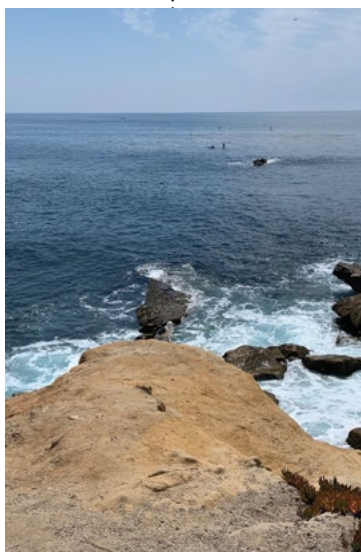
Q Please describe the types of classes you teach and how your courses fit into the broader context of various programs in the School of the Environment.

A I teach courses in Environmental and Climate Justice, Critical Race Theory and Federal Indian Law. I also intend to teach a class on tribal regulation of natural resources and a course on water law. One of the marvelous things about the Yale School of the Environment is that it has interdisciplinarity baked into its design. The classes I teach are part of the policy framework that we expect students, especially those in the Master of Environmental Management program, to understand. Because we want graduates to be conversant in the science and policy of environmental management, we offer a range of courses in the social sciences as well as the hard sciences. (I also bring in some aspects of the humanities to round out their preparation.)

Q What is the significance of having environmental justice courses incorporated within the nation's original School of Forestry, and its expansion over the years into more areas of environmental science and policy?

A Environmental justice is the entry point for a range of concerns that implicate many of the traditional areas of study. To take just a single example, this summer we produced a webinar on health concerns facing wildland firefighters in light of COVID-19, and the way the medical insurance schemes ill-fit those firefighters. Environmental justice research which revealed the unequal impact of COVID-19 on the nation's population led directly to questions about how it affected various environmental subpopulations. When climate disruption was factored in, several things emerged. First was the prediction (now being revealed as fact) that the fire season in the West was likely to be more intense; and second, that it would produce new kinds of pressures on those charged with fighting those fires. In another example, the impact of redlining (the discriminatory practice of denying loans or other services in minority neighborhoods) has produced the circumstances that have a direct impact on the kind of urban studies we do here in YSE. The insights from environmental justice inform the kinds of research questions that the hard sciences and social sciences in YSE must address.

Heisler Park in Laguna Beach, Calif., is popular for its walking trails and ocean views. Gerald Torres grew up in Laguna Beach, and as a youth spent a lot of time on local hiking trails and beaches. Photo: Tisha Salas / California Sea Grant



Gerald Torres speaks at the annual Public Interest Environmental Law Conference at the University of Oregon in 2017. The conference is sponsored by Land, Air, Water, the nation's oldest and largest student environmental law society. Photo courtesy of the University of Oregon

Q What is the interplay between the study of environmental justice and more technically-focused topics in forestry, wetlands ecology and other areas of natural science in the School of the Environment? How does the one inform the others, and visa-versa?

A The social consequences that follow from the management of natural systems can no longer be viewed as an unintended consequence but must be integrated early in the planning process. Forest and wetland ecology, to take two examples, are deeply affected by climate change and that in turn affects the social impacts of management study. Change in coastal flooding, reduction in some species of trees and the susceptibility to invasive species may seem like purely natural issues, but each of those examples have a direct impact on people in the state. Reduction in maple sugaring, for example, will have important economic consequences for the state. Maintenance of urban green spaces and tree cover has a direct impact on things like prevalence of asthma or resistance to heat stress. All of these kinds of issues speak directly to the things we do at YSE.

Q What is your personal background as it relates to your career path?

A I have been an environmentalist all my life. I am old enough to remember when the Sierra Club really was a club. My love for the outdoors comes from growing up in southern California and spending much of my childhood outdoors. My grandparents lived in the high desert where they raised animals on a small farm. They lived near the river we would race off to and I remember the hand pump by the sink in my grandmother's kitchen.

My environmentalism was later informed by my activism in the Civil Rights Movement

and the movement for racial justice. In law school, environmental law was not yet a subject. After working for the [Children's Defense Fund](#), I left to study environmental law with Professor Joseph Sax at the University of Michigan. Joe is often regarded as the father of environmental law. I studied with him for two years. He taught me what it means to be an engaged scholar in the very best sense.

Q What are some of your favorite outdoor experiences, and how does time in the outdoors inform your academic life?

A I spent a great deal of my youth either hiking in the foothills around my hometown or at the beach. I often joke that I misspent my youth at Laguna Beach. Loving the outdoors was tempered by the deepening air pollution that, by the time I was in high school, made smog alerts regular occurrences. I grew up in a valley surrounded by mountains that were invisible due to smog for many months out of the year. To this day, there is a "bathtub" ring on the foothills that mark where the smog killed the pines. Confronting the environmental consequences of the car culture in southern California led directly to my environmental activism and later to my environmental scholarship.

In addition to this, the continual worry about water shortages animated my interest in studying water systems and water allocation regimes. I am still astounded by people who take access to potable water for granted.

Q Please describe any key experiences that prompted you to want to study and teach about environmental justice.

A There is no single event or experience that moved me in the direction of environmental justice. My work in civil rights naturally led me to understand that there was a link between various injustices that I observed and the maldistribution of environmental burdens. I knew that the differing consequences of pollution were not naturally occurring phenomena but were the results of social and political decisions. The economic incentives that permitted some communities to bear a disproportionate share of the burdens of our industrial society flowed from social decision-making that my research revealed. My interaction with community activists reinforced my decision to study environmental justice.

Q Please describe one or two of your recent research projects.

A I am currently working on two projects. My interest recently has focused on the role of social movements in the production of durable legal change. I am currently working on how the environmental justice movement has transformed how we understand the objects of environmental regulation. The second project is on food resilience. I was one of the first legal scholars to study agricultural law and policy and to write about the environmental regulation of production agriculture. What recent events have revealed is the fragility of our current food systems. I am working on a paper that explores the roots of that fragility.

Q Have recent events highlighting racial injustice influenced the content of your current courses, and if so, how?

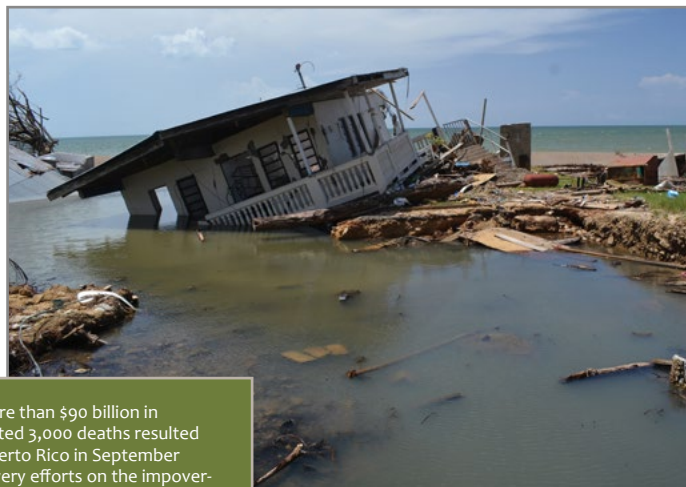
A Recent events have merely highlighted the power of social movements to influence the broader policy debates across many substantive areas. They have also affected my exploration of the questions about how we understand the direct material impact of policy decisions.

Q Please share any relevant projects you have been or are currently involved in outside of Yale.

A In my role as a trustee of NRDC and as board chair of Earth Day Network, I have been engaged in work to support sound environmental policies. We analyze all issues across many dimensions, and environmental justice is one of them. Climate change is perhaps the defining challenge of our times. But if we ignore the justice implications of



Residents in Flint, Mich., volunteer at a bottled water distribution site in October 2016. Torres identified that city's public water crisis as one of the most important environmental justice events in recent years. Photo: Lance Cheung / USDA



Widespread power outages, more than \$90 billion in property damage and an estimated 3,000 deaths resulted when Hurricane Maria struck Puerto Rico in September 2017. Massive cleanup and recovery efforts on the impoverished island are still underway, and thousands of residents have left the U.S. territory. Gerald Torres views inadequate response in the aftermath of the Category 4 hurricane as a significant environmental justice issue. Photos: Efra Figueroa / Puerto Rico Sea Grant



our responses, we will not have done a complete analysis. Of course, in some of the more technical responses, a direct environmental justice component will not be apparent. Nonetheless, by keeping the general framework of environmental justice in mind, all actions will reflect better decision-making.

Q What are some of the most important recent environmental justice events and issues nationally and internationally?

A The two most important national events have been the water crisis in Flint and the inadequate response to Hurricane Maria in Puerto Rico. On top of those events, you could place the struggle over the Keystone pipeline and the battles in Canada over the protection of the boreal forests. The devastating cyclones in India and Bangladesh are all environmental justice events. It is not just the natural (or socially precipitated) event, but the populations that bear the brunt of the harm. You must always ask, 'Why that group?' What decisions, public and private, led to them having to take the consequences of environmental damage? Of course, we could go back to the Bhopal, India, tragedy in 1984 to see an early example of modern environmental injustice. (The Indian government estimates 15,000 people died as a result of the toxic gas release from a U.S. pesticide manufacturing plant.)

Author Mike Davis captures many examples of how colonialism produced the foundation for the kinds of injustices we see in his book, *Late Victorian Holocausts: El Niño and the Making of the Third World*.

Q Are there particular examples of current events or issues that have not been commonly viewed through an environmental justice lens, but that you believe should be?

A While environmental justice activism originally grew out of concern over siting decisions, in many ways, the current design of cities reflects old concerns about racial and income-based housing patterns. A recent article in the New York Times, for example, [<https://www.nytimes.com/interactive/2020/08/06/climate/climate-change-inequality-heat.html?referringSource=articleShare>], illustrates how the impact of global warming is the result of design decisions that were ill-considered or, in some cases, not even really part of a plan. The effect of those decisions, whether they are reflected in greater exposure to heat extremes or brutal losses caused by more intense storms are, in my view, examples of environmental injustice. Merely because they are related to old decisions and unrelated to identifiable decisions to disadvantage specific communities does not exempt them from environmental justice analysis.



Smith's Acres employee Julio Vasquez, right, helps Natalie Guarin of New London purchase sweet potatoes, onions and other vegetables grown at the East Lyme farm at the New London Farmers Market in early September. Gerald Torres has been involved in food resilience projects and is working on a paper that explores the fragility of our current food system. Photo: Judy Benson

The most vivid illustration based on current events is the unequal distribution of morbidity and mortality associated with the SARS-COVID pandemic. Environmental justice advocates and epidemiologists studying the spread of the virus have shown that the hardest-hit populations are in areas that are also overburdened by pollution, poverty and the illnesses associated with poverty. In addition to the preexisting health conditions that increase risk, when illness strikes, these communities have fewer medical resources. That, in my view, is also susceptible to an environmental justice analysis.

What books or articles would you recommend for interested members of the general public to gain a better understanding of environmental justice broadly and as it pertains to specific events and issues?

I could do no better than to send your readers to the following reading list compiled by the Environmental Law Institute. ELI has long been regarded as the most reliable non-partisan environmental legal research organization.

<https://www.eli.org/environmental-justice/environmental-justice-reading-list>

Please name one or two of your own writings that you would recommend.

“Environmental Burdens and Democratic Justice,” *Fordham Urban Law Journal*: <https://ir.lawnet.fordham.edu/ulj/vol21/iss3/2>

“Who Owns the Sky?” 2001 Garrison Lecture, *Pace Environmental Law Review*: <https://digitalcommons.pace.edu/cgi/viewcontent.cgi?article=1266&context=pelr>

What is the most effective way for people concerned about the environment to better incorporate environmental justice concepts into their efforts?

The simplest way is to ask: what are the social impacts of the particular solutions you are considering? Are some communities already burdened with a higher concentration of environmental harms? How broad is your conception of what constitutes an environmental problem? For example, is access to greenspaces an environmental issue or a recreational problem? How is human well-being affected by more accessible natural spaces? What are local atmospheric issues that are affected by tree cover or lack thereof? Should mental health and other psychological burdens be considered in making land use or other regulatory decisions?

The [Center for Food Safety](#), to take one example, has plans for Climate Victory Gardens. These plans enable anyone, even if they only have a window box, to plant a garden that produces beauty, food, and carbon sequestration—a small step, for sure, but something that everyone can do.

How can groups such as local land trusts and conservation organizations become more inclusive in their outreach and involvement with people of color?

Most of the mainstream environmental groups are going through the process of reviewing their internal and external policies to ensure that diversity and inclusion become integral to their practices. Even local groups can go through this process. I have consulted with a local land trust that is thinking about managing their holdings to support activities that benefit native communities and communities of color. Just being conscious of the native people on whose land the state and the various towns sit is an excellent first step. The map of New England is festooned with native names. This is true of the entire country. It would be useful to discover more about the people whose place names we take for granted.

Editor's note: Groton, CT, where *Connecticut Sea Grant* is based, is located on Mohegan and Pequot tribal land, according to the *Land Acknowledgement website*: bit.ly/landackn

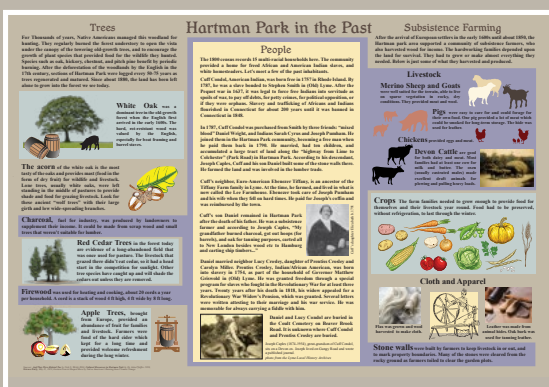
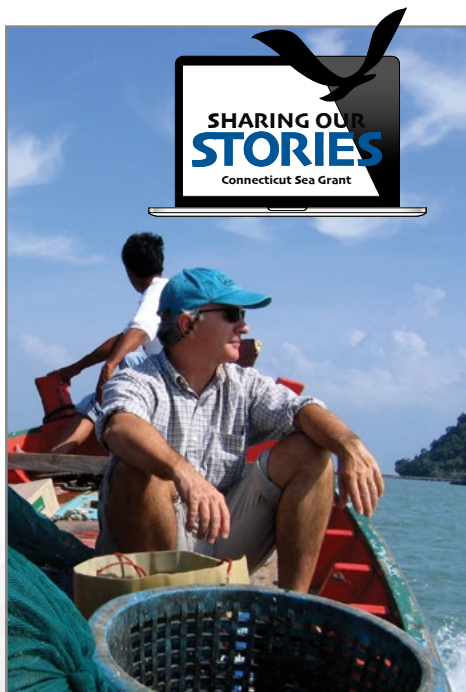


Image courtesy of Town of Lyme

This recently installed sign at Hartman Park in Lyme tells the history of Native Americans and African Americans, some of whom had been enslaved, who once lived there and left many of the foundations, stone walls and ceremonial structures found along the hiking trails. It is an example of acknowledgement of the native people and other people of color who once lived in the community that Torres believes is “an excellent first step” that land trusts and conservation organizations can take to advance environmental justice. To view a larger image of the sign, visit: <https://seagrant.uconn.edu/wp-content/uploads/sites/1985/2020/11/Hartman-24-x-36-sign2019LORES.pdf>. To view a sign about Native American ceremonial cairns at the park, visit: https://seagrant.uconn.edu/wp-content/uploads/sites/1985/2020/11/Hartman.park_cairns.stonewalls.pdf



Bob Pomeroy: dedicated to improving the lives of fishermen and marine ecosystems around the world

By Judy Benson

Growing up on Cape Cod, Bob Pomeroy spent many hours sailing, clamming and fishing.

He knew commercial fishermen personally, and appreciated their frankness.

“They always said they hated the government telling them what to do,” he recalled.

The more he listened, he began to wonder: was there a better way to ensure the preservation of both fish and fishermen? Could a partnership of fishermen and government regulators work better than the top-down approach?

Finding answers to those questions became a lifelong pursuit. It took him far physically for months at a time from the waters of the boyhood home he loved, but never in spirit. Honoring relationships with both the people and environment of the sea would always guide him.

“It’s really been an exciting life,” said Pomeroy. “I’ve traveled and worked in more than 70 countries. I’ve had this nomad life. I’ve had a lot of homes but I really love the Philippines (where he met his wife Leni). I have family there and a lot of friends.”

At age 67, Pomeroy is looking back with satisfaction on his career of working on research

and development projects with small-scale fisheries in Southeast Asia, Africa, Latin America and the Caribbean. This spring he retired from his position as an extension specialist and marine resource economist with Connecticut Sea Grant and UConn, a unique position that allowed him to tap outside grants to fund his overseas work, while also contributing to Connecticut Sea Grant projects. He’s not planning on a sedentary retirement, though. Between regular visits from his home in southeastern Connecticut to Cape Cod, where his parents still live, he will consult on a fishery co-management project in Myanmar, among others.

Connecticut Sea Grant Director Sylvain De Guise has traveled twice with Pomeroy to Vietnam and Cambodia to learn about his projects. There, he witnessed first-hand the kind of impacts Pomeroy has had through the influence of his research and direct involvement on the lives of millions of men and women



Pomeroy, center, leaves for a boat trip across Tonlé Sap Lake in Cambodia in 2015 to visit fishing communities. Photo: courtesy of Bob Pomeroy



A group including Bob Pomeroy and Connecticut Sea Grant Director Sylvain De Guise, third and sixth, respectively, from bottom right, gathers for dinner after a working session to summarize project accomplishments in Quy Nhon province, Vietnam, in November 2017. Photo courtesy of Sylvain De Guise

Top left: Bob Pomeroy heads out onto Phang Nga Bay in southern Thailand to meet with small-scale fishermen in 2012. Photo: John Parks



Women buyers check freshly-caught small pelagic and coral reef fish for sale at the Port of Bitung in Northern Sulawesi, Indonesia. Photo: Tetra Tech / USAID Oceans

in impoverished communities who depend on the sea to feed their families.

“The outcome of a lot of the work he’s done has helped feed the poor,” De Guise said. “There’s a social justice aspect that is really integrated in the biological management and regulatory processes. He’s helped develop alternative ways of managing fisheries. His work focuses on the intersection of economics and balancing what we harvest from the sea and can grow with protecting the ecosystem.”

He’s been effective, De Guise said, because he builds relationships of respect that cross cultures, language barriers and social divides. Whether that means crowding into a slender canoe to access an aquaculture pond, singing karaoke with fishermen, or meeting with local mayors, national government officials, environmental groups and appealing to the United Nations, Pomeroy has built bridges with them all.

“He has broad recognition and respect from people in fishing communities, NGOs (non-governmental organizations), government agencies and academics,” De Guise said. “He’s one of the few people I know who is recognized and respected in all four of these areas.”

Pomeroy is quick to credit the many partners he’s worked with. Those range from non-profit agencies to universities in Southeast Asia to the governments of Denmark, the United States and other countries, which helped fund projects to build sustainable fisheries. His work has helped convince fishermen to stop using explosives on sensitive coral reefs to draw fish into their nets; advanced the establishment of tracing systems to ensure sustainable harvests; empowered women in aquaculture operations and fostered cooperation between fishermen to avoid crucial spawning areas so that everyone could benefit from catching fish elsewhere.

“Bob did some very groundbreaking, thoughtful research that really shaped my thinking about how we manage the ocean and fisheries resources,” said John Parks, marine scientist with [Tetra Tech](#), one of the groups Pomeroy has worked with. “He’s become a friend and mentor.”

Pomeroy has brought not only a deep understanding of economics and fisheries to his projects, but also an endearing personality that makes others want to work with him, Parks said.

“He’s such a humble, sincere person, and very passionate about his work,” Parks said. “And he will always call it like he sees it.”

He recalled one project focusing on conserving coral reefs while enacting a sustainable fisheries management program in an area where high-value species such as grouper, sardines and anchovies were being caught.

“Bob kept asking, ‘what about the people?’ He was concerned about peoples’ livelihoods and food security.”

In the end, Parks said, “Bob’s truth” prevailed, and a plan was developed that addressed the needs of both the reefs and the fishermen.

An experience early in his career cemented Pomeroy’s desire to make an impact overseas, where it was needed most. After a few years as an extension agent in South Carolina, he returned to school for his doctorate in natural resource economics from Cornell



An aquaculture worker feeds his fish in Vietnam in October 2008. Many small aquaculture farmers raising snakehead fish in ponds such as this one are now using a soy-based formula Pomeroy and several partners helped to develop. Photo: Sylvain De Guise.

University. There he met Peace Corps volunteers working on fisheries projects in Southeast Asia, and was immediately intrigued.

“I started to rethink what I wanted to do,” he recalled.

This led to an assignment with the [U.S. Agency for International Development \(USAID\)](#) to a rural fishing community in Leyte Province in the Philippines.

“I lived in this bamboo hut, next to the poorest fishermen,” he said, recalling how young men in the village would sometimes serenade their sweethearts at night from outside their windows. “These were people who gave me everything. I fell in love with the work. I wanted to help empower fishermen to manage their own fish.”

His connection to USAID and other groups working in the Philippines would continue for the rest of his career. Rebecca Guieb, regional and coastal marine specialist for the agency in the Philippines, Pacific and Mongolia, recalled first meeting Pomeroy in the early 1990s when she was part of an NGO and he was working for the WorldFish Center.

“We started our collaboration of fisheries co-management,” she said in an email message. “It was a thoughtful and strategic action that demonstrated the value he places on partnerships.”

In 2005, the two collaborated on a book about fisheries co-management that is still considered a key reference on the subject. In addition to the book, together they also provided technical assistance to Cambodia, Vietnam and the Philippines about sustainable management of fisheries that preserves people’s livelihoods.

“Our collaboration involved the entire fisheries sector of the Philippines,” she said, adding that it involves multiple species of fish and contributes billions annually to the nation’s economy. “I have been blessed to have Bob as a technical co-collaborator and friend for many years and now I can vouch for his genuine love and concern for the fisheries sector, particularly the small scale fishers globally.”



In Vietnam, Pomeroy’s impact has been felt on the ocean tuna fishery, which employs millions there, said Nguyen Thu Hue, founder of the [Center for Marinelife Conservation and Community Development](#). Pomeroy worked with her recently on a value chain analysis for the fishery and on creating a workable electronic system to document and trace the catch. The work was essential in lifting European Union sanctions against the fishery and enacting reforms so that it could be considered “sustainable and modernized,” Hue said.

“Bob is a trusted friend,” she said in an email message. “He always provides good



Pomeroy and Nguyen Thu Hue, seen at a USAID Oceans and Fisheries Partnership workshop in Bangkok, Thailand in 2019, worked together on a value chain analysis for Vietnam’s tuna fishery, among other projects. Hue is director of the Center for Marinelife Conservation and Development in Vietnam. Photo courtesy of Nguyen Thu Hue

connections, opportunities and nurtured young talent in developing countries for local sustainability in fisheries.”

Nancy Balcom, associate director of Connecticut Sea Grant, described Pomeroy as “the diamond you found and just kept polished.”

She takes pride in knowing that Sea Grant could do its part to help him



Workers sort and prepare fish for small-scale processing in a coastal community along the Celebes Sea, on Mindanao, Southern Philippines. Photo: Tetra Tech / USAID Oceans

continue doing the kind of work that changes lives for the better.

“He really wants to help people help themselves, to help them to be thoughtful about how they fished,” she said. “I’ve just been in awe of the kinds of changes he has been instrumental in making with his partnerships.”

One of the most significant achievements of his career culminated in 2016 in Cambodia and Vietnam. In those countries, hundreds of thousands of people make their livings by raising snakehead fish through small-scale aquaculture. For many years the fish farmers fed their crop with small “trash fish” that many very poor people also

continued on inside back cover ►



Aziz Dehkan is the recently hired executive director of the Shoreline Greenway Trail, the organization's first.

Mile by mile, shoreline trail pieces together expanded coastal access for variety of uses

By Judy Preston

The Hammonasset section of the Shoreline Greenway Trail in Madison is my favorite. It's easy to get to, with plenty of parking, and is wide enough and even-surfaced enough to accommodate the many people and uses it receives.

This section winds through woods, passes Route 1 in a few spots, and hugs the edge of Hammonasset Beach State Park as it enters bird-filled tidal marshes with the glint of Long Island Sound beyond.

On the first really crisp day of the fall season, I met bikers, joggers and a lot of people out with their dogs. Most expressed appreciation for the opportunity to get outside—made that much more important by the returning surge of COVID-19. And most were from local coastal towns, with only a couple first-time visitors. Angela Werner and her husband, from Madison, walk the Hammonasset section of the trail every day with their corgi.

"We adore it," she said. "My husband is a photographer and this is such a good place to find birds."

Brittany Ciarcia, from Clinton, comes to the Hammonasset section often, but this was the first time for Shawn Punzalan, who is from Niantic. Both were walking their energetic dogs. When asked if the shoreline trail feels like access to Long Island Sound, they said they enjoyed the proximity, but Ciarcia said she opts for the state park when she wants to be near the sea.

"I usually take the dogs into the park to get to enjoy the shore," she said.

Judy Miller, from Branford, is chair of the Shoreline Greenway Trail's volunteer Board of Directors and an early advocate.

"One of our goals is to provide a means of alternative transportation for shoreline residents, and these trails are part of that system," she said.

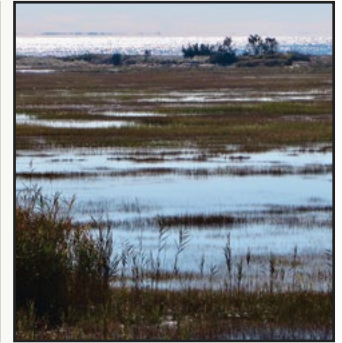
In 2001 a handful of volunteers came up with the idea of a trail across the Connecticut coastline—not the entire stretch, but a modest 25-mile distance through four towns: East Haven to Madison, which includes Branford and Guilford. The effort was incorporated into The Shoreline Greenway Trail in 2003, the same year groundbreaking was celebrated for the first section of the trail in East Haven. Now there are trail segments in three of the four towns, and work to connect them and expand farther continues to gain momentum.

The Shoreline Greenway Trail vision is not just about coastal access, although that is central to its appeal. The overall vision, as Miller explained, is for a connecting corridor to provide access to the visual amenities of the coast that is also a means for commuters to get to work, and town centers to benefit from tourists seeking exercise and amenities such as food, drink and shops. It's seen as a way for nature enthusiasts to access tidal marshes and coastal woodlands, and for residents and visitors alike to get physical activity while exploring the Connecticut shoreline in something other than a car on the interstate.

In Connecticut, where most of the coastal landscape is spoken for, that means being creative and working with existing access and trails. It requires working with towns and land trusts, for example, and connecting the possibilities. Each town has something to offer.

"Each of our trail sections is unique," Miller said.

Access to Long Island Sound is of great interest to Connecticut Sea Grant and the other partners in the Long Island Sound Study—all working together to protect this national estuary through research, education and efforts to ensure the stewardship and restoration of its coastal resources. The 350 years of colonization since Adrian Block first explored Connecticut's coastline has led to a complex pattern of development and ownership resulting in limited public access to the Sound. This is particularly true for urban



FARM RIVER STATE PARK

MADISON



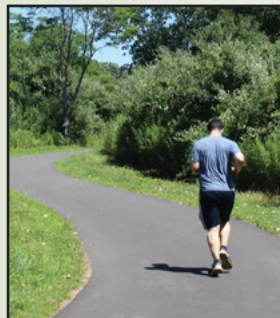
EAST HAVEN

populations and underserved communities, including those further inland and up the watershed that need to travel to the coast.

Giving more people the chance to experience the Sound is essential to advancing the goal of protecting the estuary. Of Connecticut's 332 miles of coastline, estimates suggest only 36% is publicly owned. Our public beaches—such as those at Hammonasset State Park—are well-used, and few and far between for a state that hosts one of the densest coastal populations in the country.

Walking farther along the trail that fall day, I encountered another local couple walking their dog who also use the Hammonasset section often. They noted that this past summer when the capacity of the park was reduced to allow for social distancing, visitors parked nearby in residential neighborhoods (until “no parking” signs went up). Others used a local town park and walked along the narrow shoulder of Route 1. Clearly people want to get to the coast, and Long Island Sound, and finding safe trails is key.

But the challenges are considerable. Private property along the coast is expensive, and shoreline towns rely on the property taxes these parcels generate. Private land owners who are willing to provide public access across their property may reconsider when faced with the potential for liability if someone is hurt, and there can be concern (justifiable or not) about property damage. Even Amtrak has been unwilling to take on liability for public access to its admittedly preeminent piece of real estate through the coastal landscape.



BRANFORD

Clockwise from top: Perching ospreys and views of the Farm River greet walkers on the Farm River State Park trail section, as dog-walkers, runners and roller-bladers pass views of tidal marshes on the Madison portion. On the Branford section, Judy Miller has led efforts there, where a labyrinth and fresh water pond can be found along the path. In East Haven, Barbara Brow has been helping provide access through woodlands for cyclists, hikers and others. Photos: Teala Avery, Judy Benson, Judy Preston

For the organizers and volunteers involved with the Shoreline Greenway Trail, maneuvering through the complexities of local land use commissions in Connecticut's towns makes every effort to find land and access for a trail system downright daunting.

"Trails teach you to be persistent," said Barbara Brow, a longtime organizer who has been involved in the East Haven section of the trail since the beginning.

In July of 2020 the Shoreline Greenway Trail's Board of Directors announced the next bold step for the initiative: hiring its first part-time executive director. Aziz Dehkan, a native of New York City, brings a wealth of expertise to the job. In the announcement of his selection, he was described as a "change-maker and ardent advocate for public space." His other hat, incidentally, is leading the Connecticut Roundtable on Climate and Jobs, and he recently addressed the Governor's Council on Climate Change about progress on mitigation strategies.

Dehkan recognizes the challenges not only inherent in the shoreline trail concept, but in finding ways to engage people that are pandemic safe. Hosting first-Saturday-of-the-month walks—which took place in September and October on the Branford and Madison sections—is a start. The events tapped into the extraordinary increase in public use of trails throughout the state as a means of socially distant, outdoor exercise. The Hammonasset section of the Shoreline Greenway Trail saw a 115% increase in use in 2020: in March 2019, an embedded trail counter recorded 5,199 users. In March 2020, that number grew to 11,145—360 people a day.

Though challenging, the possibilities of a shoreline trail system is, like any great idea, worth the effort, and what makes it visionary. The group's long-term concept is of an interconnected shoreline trail from New Haven to the Connecticut River.

Dehkan cites the power of collaboration: connecting with many organizations—perhaps Connecticut Sea Grant and other partners in the Long Island Sound Study, and towns and individuals who will benefit. Statewide, there are a variety of open space areas designated as "greenways," but the Shoreline Greenway Trail is unique among them, Dehkan believes.

"Long Island Sound differentiates us," he said.

Miller said that the shoreline trail was able to build on existing trails and access areas as starting points.

"The Shoreline Greenway Trail is fortunate to have trails so close to the shoreline," she said.

Organizers, she noted, are also embarking on complementary projects, including a butterfly-pollinator garden in conjunction with local groups. Although not all the trails can be as accommodating as the Hammonasset section, the Shoreline Greenway Trail is an idea ahead of its time, and with the persistence and vision of its volunteers will continue to grow.

MORE INFORMATION:

SHORELINEGREENWAYTRAIL.ORG/

MADISON

In Madison, the Shoreline Greenway Trail stands out on the Hammonasset section, where the first segment was opened in 2014. It is the showpiece for the idea of the trail system, illustrating what's possible. Completed in 2016, it is now nearly one mile long, and one of the most popular walking and biking trails in Connecticut. In fact, the segment is one of the top four most-used trails in the state.

"People can walk, run, bike, stroll, wheel and cross-country ski, taking in the spectacular scenery in and adjacent to the Hammonasset State Park," according to the trail's website. It also allows travel between the park, downtown, Madison's beaches and shoreline recreational and tourist destinations while avoiding the more congested area of Route 1.

Trail map from Hammonasset Beach State Park: <https://shorelinegreenwaytrail.org/wp-content/uploads/2020/10/SGT-Madison-Trail-Map.pdf>

Trailhead address: 1288 Boston Post Rd, South of I-95 Exit 62, Madison, CT 06443-3444

EAST HAVEN

This section of the Shoreline Greenway Trail provides visitors with a beautiful place to walk, hike, bike, stroll, wheel, cross-country ski and connect with nature. To date, approximately one mile of trail has been completed, connecting the former D.C. Moore School (82 Elliot St.) to Short Beach Road via Pevetty Drive and the scenic Farm River State Park (<https://portal.ct.gov/-/media/DEEP/stateparks/maps/FarmRiverpdf.pdf>). The Shoreline Greenway Trail is helping the town of East Haven use this trail segment to provide students with exercise and recreation, and teach them about science and nature while building environmental awareness.

Trail map: (<https://shorelinegreenwaytrail.org/wp-content/uploads/2020/10/SGT-East-Haven-Trail-Map.pdf>)

North Entrance: From East Haven center follow Main Street (Route 100) east and turn south on Hemingway Avenue/Route 142. Follow Route 142 for 1.6 miles to parking area on the right (south) side of Route 142 (now Short Beach Road) between Fairview Avenue and Stone Pillar Road.

Mansfield Grove Road Entrance: follow Main Street (Route 100) east from East Haven center and turn right (south) on Route 142. Follow for 1.4 miles to Mansfield Grove Road. Turn right (south) on Mansfield Grove Road and travel for two-thirds mile to gravel parking area on left (east). Access is vehicle restricted but can be arranged (foot traffic okay; 1,500 foot walk to river).

Directions to Farm River State Park: <https://portal.ct.gov/DEEP/State-Parks/Parks/Farm-River-State-Park/Getting-Here>

BRANFORD

In Branford, existing trails (<https://branfordlandtrust.org>) have provided the foundation of the Shoreline Greenway Trail. To date, about one half-mile of Shoreline Greenway Trail has been completed in two sections—Pine Orchard/Birch Road and Tilcon Drive.

Trail map: <https://shorelinegreenwaytrail.org/wp-content/uploads/2020/10/SGT-Branford-Trail-Map.pdf>

Trail end points: Tilcon Road (Pine Orchard) and Thimble Island Road (Stony Creek).

Trolley Trail: <https://branfordlandtrust.org/wp-content/uploads/2014/01/TrolleyTrailGossVedder.pdf>

Fellowship supports diversity in marine, coastal research

By Judy Benson



From left, Andrew Tienken, Larissa Tabb and James Hannon are the first recipients of Connecticut Sea Grant's new undergraduate research fellowships for underrepresented and underserved students in marine and coastal sciences. Photos: Judy Benson (Tienken); Kamaria Miller (Tabb); Samantha Hannon (Hannon)

Three undergraduate students helping pave the way for greater diversity in the sciences have been chosen as the first recipients of Connecticut Sea Grant's new undergraduate research fellowships for underrepresented and underserved students in marine and coastal scientific research.

UConn students Andrew Tienken and Larissa Tabb and Western Connecticut State University (WCSU) student James Hannon were each chosen to receive a \$5,000 stipend to conduct research projects over the summer under the guidance of a faculty mentor.

"We are pleased to support more students in their pursuit of a career in the sciences and look forward to learning about the outcomes of their individual projects," said Nancy Balcom, associate director of CT Sea Grant.

The program is designed to provide early career experience, training and mentorship to underrepresented minorities and socioeconomically disadvantaged students as well as students of color, indigenous students, members of the LGBTQ community and students with disabilities.

"This fellowship is the result of several years of visioning efforts that I was involved in within the National Sea Grant program which focused on enhancing diversity, equity and inclusion," said Syma Ebbin, who led the creation of the program as CT Sea Grant's research coordinator. "Funding was made available from the National Sea Grant program for state programs to push this visioning agenda forward. The motivating idea is that in order to have greater diversity in marine and coastal sciences, more efforts are needed to engage and mentor students earlier on in their academic careers. This

effort is being made to prime the pipeline, so to speak, so in the future there will be a greater diversity of highly trained individuals working in marine research."

Tienken, Hannon and Tabb, who are all juniors majoring in environmental science, biology and marine science, respectively, said they are grateful for the support Connecticut Sea Grant is providing to help increase diversity in their fields of interest.

"There aren't that many minorities in marine science, and I want to be an inspiration and help to change that," said Tabb, a New Britain resident who is African American.

Tienken and Hannon shared similar experiences of being one of very few students in their programs identifying with the LGBTQ community. The fellowship gives them the chance to advance their prospects for future success and longevity in their fields, ultimately serving as role models for future students.

"It's a really, really wonderful opportunity," said Hannon, a Danbury resident.

The three were chosen for the fellowships in the spring of 2020. Due to restrictions on undergraduate field research due to the COVID-19 pandemic, Tabb and Hannon elected to defer beginning their projects until the summer of 2021. Tienken, however, worked with his faculty advisor, Professor Beth Lawrence, to revise his original plan for field research into a data analysis project he could do from his home in Wilton.

He used data collected in 2017 at 20 wetlands sites along the Connecticut coast by Lawrence and her research team, Aidan Barry and Sean Ooi, both of whom have since earned their master's degrees. With that information, Tienken spent last summer quantifying the ecosystem services of the common reed grass phragmites. Although it is an invasive species, phragmites can remove excess carbon and nitrogen from the environment. He also assessed the carbon and nitrogen removal functions of native grasses.

"I've been wanting to do this work for some time," said Lawrence. "It was just waiting for the right student and opportunity to come along."

Tienken said the project required him to learn how to use ArcGIS software to combine data from individual marshes with marsh maps and determine which areas are colonized primarily by phragmites and which by native grasses. Ten restored and 10 unrestored marshes were compared. Both he and Lawrence hope the work will ultimately contribute to a better understanding of the important services of wetlands and how they should best be managed and preserved, especially in light of climate change.

"I've been fascinated by how efficient wetlands are at sequestering carbon," Tienken said at the start of the project last June. "These are efficient and powerful ecosystems."

As the fall semester began in late August, Tienken reflected on his first experience doing independent research. Weekly web meetings with Lawrence and graduate students involved in similar projects provided a helpful way to check in and confirm his processes, he said, and he was hoping to present his preliminary findings at a campus forum for undergraduate research.

He found that restored wetlands that have larger proportions of phragmites than unrestored wetlands can help the soil hold higher levels of organic carbon and ultimately improve soil quality. But those dominated by native grasses host more robust microbial communities that help move excess nitrogen into the air. Ultimately, this work could inform more nuanced approaches to wetlands restoration and management, in which the valuable services of both phragmites and native grasses are recognized.

"This was the first time I dipped my toe in wetlands science, and it was really, really rewarding," Tienken said.



Professor Beth Lawrence, right, works with a student to collect data at Barn Island Wildlife Management Area in Stonington. Data collected by Lawrence and her students from Barn Island and other marshes in the state was used by Andrew Tienken, one of the diversity fellowship recipients, in his research project. Photo: Emily Couture

For his project, Hannon, working with WCSU Professor Michelle Monette, will be collecting Atlantic killifish from Long Island Sound and placing them in tanks in labs at WCSU with water at various temperatures and salinities. After exposure, tissue samples from the fish will be extracted and examined to determine how various conditions impact these important forage fish, also called mummichog. The different temperatures and salinities will mimic how marine waters could

change due to climate change. Hannon said the project could help answer an important question about the future fate of killifish.

"As these fish are being pushed to their thermal limits, are they going to be overwhelmed by rising water temperatures and maybe not able to survive?" he asked.

Tabb, for her project, will be working with Professor Evan Ward to study whether types of plastic that are labeled as biodegradable actually break down when exposed to water and soil, and whether microbes are consuming them. These will be compared with the fate of plastics not identified as biodegradable that will also be exposed to water and soil.

Having worked on other research projects involving plastics in Ward's lab at UConn's Avery Point campus in Groton, Tabb is very aware that plastics are a major issue in the marine environment and a critical area of research.

"Seeing the effects of plastics on the oceans is so concerning," she said. "I'm glad to be part of any effort we can make to learn more about it."

Professor Lawrence said the new fellowship program not only benefits these three students, but also the quality of the science and research they are involved in.

"It's great that Connecticut Sea Grant is promoting diversity in the sciences," she said. "We need scientists from different backgrounds to ask better questions. We need a diversity of perspectives."

Balcom said the program is slated to continue.

"We look forward to supporting more undergraduate students through this mentored research fellowship opportunity in 2021 and beyond," she said.

For information about the program, visit: <https://seagrants.uconn.edu/funding/fellowships/>.

Sea Grant sponsors a variety of marine research, outreach and education projects, primarily through the 34 state Sea Grant programs.



Bunches of eel grass and shells of slipper snails define the wrack line on the beach at Harkness Memorial State Park in Waterford on an early October day. Photo: Judy Benson

What's in our names?

What are wrack lines? The word wrack is a term for various kinds of seaweed, and wrack lines are the collections of organic matter (sea grass, shells, feathers, seaweed and other debris) that are deposited on shore by high tides. More generally, wrack lines are where the sea meets the land.

With our magazine *Wrack Lines*, we tell stories about the intersection of the land, sea and Connecticut Sea Grant. So what is Connecticut Sea Grant? One of 34 Sea Grant programs across the country, it helps residents make the most of our coastal resources and inland waterways.

It addresses the challenges that come with living by the water or within a Long Island Sound watershed, in a state with 332 miles of shoreline and three major tidal rivers. This NOAA-state partnership based at UConn's Avery Point campus works with aquaculture farmers, fishermen and seafood purveyors to help their businesses prosper.

It funds research essential to understanding and managing our changing coastal and inland environments. It provides communities and local leaders with the information they need to make better land and shoreline decisions that result in more resilient communities and healthier watersheds. It educates students as well as teachers and adults of all ages about the marine environment.

Connected to experts and residents who live, work and recreate in the Sound and its watershed, it brings diverse interests together around a common purpose of working for mutually beneficial solutions to problems.

Small in staff but big in impact, Connecticut Sea Grant is like a pilot boat that navigates the way for large vessels toward safe harbors. Since 1988, Connecticut Sea Grant has supported "Science Serving the Connecticut Coast."

Bob Pomeroy, *continued from page 17*

depended on as a main source of protein. Catches were starting to dwindle.

To stop further depletion of the small fish populations, the Cambodian government closed the snakehead fishery in 2005. A year later, Pomeroy began working with USAID and the [AquaFish Innovation Lab](#) at Oregon State University to find a solution. A partnership with Can Tho University in Vietnam and other groups was formed.

"We asked, 'Can we develop a formula feed to substitute as the food source and a sustainable management system for the trash fish?'" Pomeroy recalled.

A rice and soy-based feed was developed by researchers at Can Tho University. At first, the fish farmers were reluctant to use it, and the snakehead weren't eager consumers either. But with some coaxing, they both came around.

"The fish actually had to be taught to eat it, through different life cycles," Pomeroy said. "We started working with the people, and the farmers started to like the feed."

Feed producers in the United States benefited, too, when they started producing the product. By 2016, the snakehead fishery in Cambodia reopened. Farmers in both Vietnam and Cambodia could once again support themselves by growing fish.

"We changed the lives of thousands of people, and allowed wild stocks of fish to recover," Pomeroy said. "I still have a World Bank-supported project going on in the Mekong River in Cambodia."

LEARN MORE ABOUT BOB POMEROY'S WORK IN THESE ARTICLES:

- "Combating Illegal Fishing to Strengthen Maritime Security and Environmental Sustainability" https://seagrant.uconn.edu/wp-content/uploads/sites/1985/2020/09/NMIO-Technical-Bulletin_V13_Apr2019.pdf
 - "Projected Economic Impact of Climate Change on Marine Capture Fisheries in the Philippines" <https://seagrant.uconn.edu/wp-content/uploads/sites/1985/2020/09/fishCCimpactsphilippines.pdf>
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Boats docked at a marina on the Farm River are visible from the section of the Shoreline Greenway Trail that traverses Farm River State Park in East Haven.
Photo: Judy Benson



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