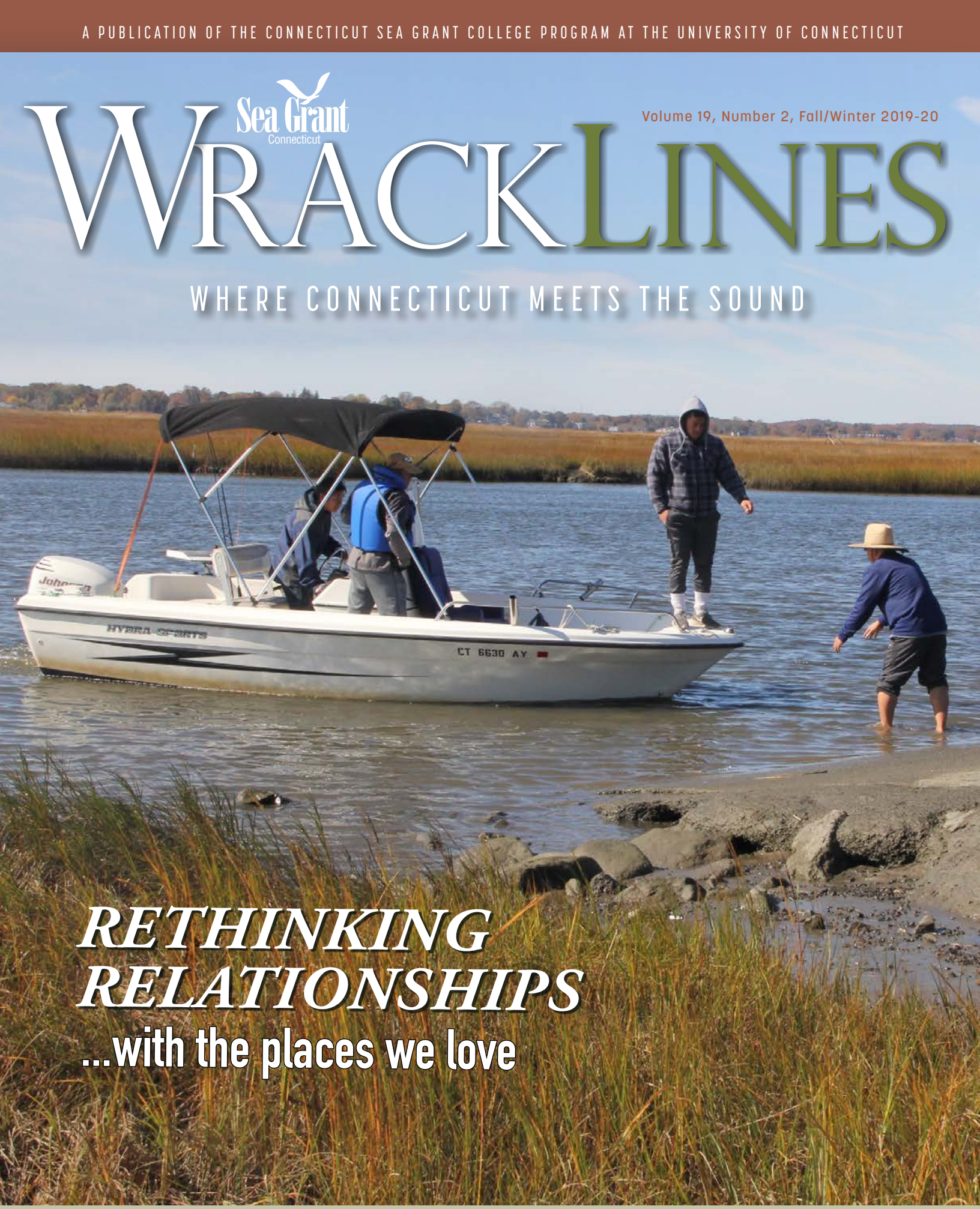
A PUBLICATION OF THE CONNECTICUT SEA GRANT COLLEGE PROGRAM AT THE UNIVERSITY OF CONNECTICUT

Sea Grant Connecticut

WRACK LINES

Volume 19, Number 2, Fall/Winter 2019-20

WHERE CONNECTICUT MEETS THE SOUND



RETHINKING RELATIONSHIPS

...with the places we love

LONG ISLAND SOUND BLUE PLAN • DISCOVERY ON THE HUDSON RIVER • MARSH MIGRATION

Sea Grant Connecticut

Volume 19, No. 2 Fall/Winter 2019-20

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WRACK LINES is published twice a year or as resources allow by the Connecticut Sea Grant College Program at the University of Connecticut. Any opinions expressed therein are solely those of the authors.

Electronic versions of this issue and past issues of Wrack Lines can be found at: https://seagrant.uconn.edu/publications/wrack-lines/

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Change of address, subscription information, cancellation requests or editorial correspondence should be sent to the address below:

Connecticut Sea Grant
Communications Office
University of Connecticut
1080 Shennecossett Rd.
Groton, CT 06340-6048

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CTSG-19-08
ISSN 2151-2825 (print)
ISSN 2151-2833 (online)

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From the EDITOR

Relationships can be powerful forces to shape the future, sometimes in profound ways.

This summer I learned a fascinating story that demonstrates that truism, when I visited the Roosevelt Campobello International Park in New Brunswick, Canada, just across the border from Lubec, Maine.

In the visitor's center there, a birch bark canoe that looks to be about 18 feet long hangs from the ceiling. A park ranger told my husband and me that the canoe was made by Tomah Josef, an elder of the Passamaquoddy tribe, for Franklin Delano Roosevelt in his youth. The figure of an owl, the animal Tomah Josef chose as his spirit helper, is etched into the bow, beside the phrase "Remember Me" written in his native language.

At the park, we hiked one of the beautiful seacoast trails and toured the home where FDR summered from boyhood through the early days of his political career. We heard how he first became ill there with what was long assumed to be polio. Now, though, there's some evidence it was another crippling disease. But that's a different story.

The Tomah Josef tale was completely new to me, and I had to know more. After leaving the park, I found the rest of the story on the Internet. Tomah Josef lived on a reservation in Eastport, Maine, and each summer canoed to Campobello with his family to camp, fish and collect medicinal plants. When FDR was 10 years old, his father hired Tomah Josef to teach his son how to paddle a canoe. The two became friends.

Tomah Josef told the boy about his native customs, and how he and his people wanted to keep them and their communities intact. At the time, the U.S. government was carrying out forced assimilation policies on native tribes, but Tomah Josef told young FDR that his people didn't want to leave the reservation. He also told the boy he would one day be a leader.

When Tomah Josef died in 1914, FDR was a 32-year-old assistant secretary of the Navy in Pres. Woodrow Wilson's administration, at the beginning of his storied political career. But Tomah Josef's message wouldn't be left behind. When he became president in 1933, FDR chose Native American advocate John Collier to lead the Office of Indian Affairs. The forced assimilation policies ended, and an Indian division of the Civilian Conservation Corps was set up to employ Indian men. Collier's Indian New Deal, supported by FDR, returned land to Native American tribes along with their right of self-determination.

Now, consider the power of relationships in a different context — our relationships with the lands and waterways we love. That could be Long Island Sound, the lower Connecticut River, the tidal marshes along the coast or our own lawns and backyard gardens. Just as Tomah Josef made a lasting impression on a young boy that helped change history, we can be deliberate about our relationships with these places, with an eye towards a better future. That's what the Long Island Sound Blue Plan and the Connecticut NERR proposal are basically all about, as the articles in this issue describe. It's also what's behind the research into marsh migration, the Coastal Certificate classes and the movement to replace lawns with native gardens, also explored in this issue.

Don't underestimate the power of relationships. Let's make them count not just in the here and now, but long into the future.

Judy Benson, editor
judy.benson@uconn.edu

This issue is dedicated to the memory of Karen Berman, contributing editor.

Above photo: Tomah Josef paddles his canoe in this detail of an 1894 photo. *Museum Collection. Courtesy of the Peabody Museum of Archaeology and Ethnology, Harvard University, PM 2004.29.6060*
Cover photo: Alem Tiden, on bow of boat, reaches out to Ronald Lapaan, far right, as he wades into the waters at the Great Island State Boat Launch in Old Lyme. Tiden and his father, Wilfred, at wheel, of Old Saybrook, were heading out for a day of fishing with friends Lapaan, of Bristol, and Randy Milan of East Harford, center, on Oct. 26. Photo: Judy Benson

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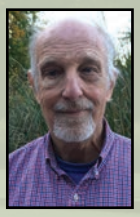
About our contributors

JIM SIRCH
Jim Sirch is education coordinator for the Yale Peabody Museum of Natural History, a trained naturalist and Connecticut master gardener. Jim lectures widely on gardening for pollinators.

WILLOW SIRCH
Willow Sirch is a writer for the Connecticut Fund for the Environment/Save the Sound, author of *EcoWomen: Protectors of the Earth*, and an avid gardener.

They are slowly removing invasives and adding wildlife-attracting native plants on a former dairy farm in New Haven County.

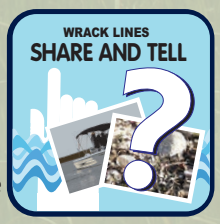


BILL LEUKHARDT
Bill Leukhardt, a Waterbury native, was a daily newspaper reporter in Connecticut for 41 years. Now retired, he helps teach newswriting one day a week at the University of Connecticut. Exploring the Hudson reserve was a treat. He urges others to visit that lovely tidal river.

NANCY BALCOM
Nancy Balcom is the associate director and extension program leader for Connecticut Sea Grant and a senior extension educator with UConn Extension. Her extension interests range from safe seafood handling and safety at sea to disaster risk communication and community resilience. She earned her undergraduate degree from UConn and her masters in marine fisheries from the Virginia Institute of Marine Science, College of William & Mary.

JUDY BENSON
Judy Benson has been the communications coordinator of Connecticut Sea Grant and editor of *Wrack Lines* since 2017. Prior to that, she was a reporter and editor at The Day of New London for many years, including more than a dozen covering health and the environment. Exploring the tidal marshes, islands and natural beaches of Long Island Sound by kayak and on foot is one of her favorite pursuits. She earned both her undergraduate degree in journalism and her Master of Science in natural resources from UConn.

SHARE AND TELL



Send us your photos, comments and questions about the places, people, plants, animals, habitats and articles in this issue.

We'll post and respond to as many as possible on our website at: **https://seagrant.uconn.edu** under "Wrack Lines Share and Tell."

Email your submissions to: **judy.benson@uconn.edu.**

On the Hudson River, a place to discover eels, hogchokers and the value of estuaries

Connecticut seeking its own research reserve on the southeastern coast

By Bill Leukhardt

Every coastal New England state but one has a NERR — a National Estuarine Research Reserve.

Connecticut is the one. (Vermont isn't eligible — no seacoast or tidal lake.)

The Nutmeg State is one of two saltwater coastal states in the country without one. Louisiana is the other.

But the outcome of a pending application with the National Oceanic and Atmospheric Administration could change that. Connecticut hopes to create a NERR out of five areas along the southeastern coast. It would be the 30th one nationwide if approved.

Still, despite hearings, meetings and news reports about a Connecticut NERR, most state residents know little about the reserve.

A visit to New York's Hudson River National Estuarine Research Reserve helps explain what a NERR is. While every NERR is unique, learning how an existing one is being used for education, research and conservation provides a window into understanding what a NERR could mean for Connecticut.

All 29 are the result of a federal program started in 1972 to protect, preserve and learn more about estuaries, crucial to the survival of fish, birds, invertebrates, plants and anything else in the ecosystems of coastal regions.

Florida and California have the most NERR sites — three in each state. There are freshwater ones in Ohio and Wisconsin on the Great Lakes, bodies of water so large they have tides and are wreathed with lighthouses to guide shipping traffic in dangerous storms.

Puerto Rico has one on its south shore. In all, there are 1.3 million acres of estuarine land and water within boundaries of the 29 reserves.

The Hudson NERR was created in 1982. The reserve includes 5,000 acres of tidal habitats in four sites — Piermont Marsh, Iona Island, Tivoli Bays and Stockport Flats/Nutten Hook. There is an environmental center at Norrie Point in Staatsburg, north of Hyde Park.

"The Hudson River National Estuarine Research Reserve promotes education, research, training and stewardship to understand and protect the many resources of the Hudson River estuary," Stephanie Mossey of the N.Y. Department of Conservation said in an email.

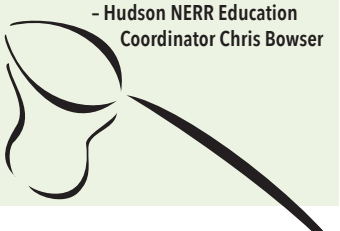
"The four component sites represent some of the largest areas of tidal wetlands found along the Hudson River estuary," Mossey wrote. "They also represent an interesting gradient of salinity from the brackish waters of Piermont to the freshwater but still tidal area of Stockport and Nutten Hook."

The N.Y. state agency is the partner with NOAA in the Hudson Reserve. In Connecticut, the state's Department of Energy and Environmental Protection and UConn would partner and have that role.

The Hudson NERR mission includes education, research that includes citizen-scientists and schools, as well as training and stewardship.

A NERR does not seize private land, does not impose new federal rules and regulations or ban

> 'People love to interact with the water. The big hit with everyone 5 to 85 is when they use nets and the nets come up with whatever they've caught.'
>
> – Hudson NERR Education Coordinator Chris Bowser



Left, students from Poughkeepsie High School examine eels from Fallkill Creek, a tributary of the Hudson, as part of the Eel Project. Photo: Chris Bowser

state-permitted activities. Connecticut DEEP has made those points clear in meetings about the state's reserve application.

"Technical know-how is shared with engineers, planners, decision-makers and others so communities have the best tools possible to conserve and utilize their estuaries," Mossey said. "The NERR doesn't change how we use the river but it does remind us of vital areas that support the estuary in so many ways."

One key reserve goal is public education on what an estuary is and how important these are to nature and people. This includes school programs, citizen research, canoe and kayak trips on the Hudson, hikes along the shore and sample netting of river life.

Data collected by citizens and students are part of the Hudson Reserve scientific findings. They're used in national studies of coastal habitats, water quality and climate change.

Stuart Findlay, senior environmental scientist at the non-profit Cary Institute of Ecosystem Studies in nearby Millbrook, N.Y., said the Hudson Reserve research is helpful.

Getting similar data from a reserve in Connecticut will add more insight into changing conditions in the country's coastal shores and wetlands, said Findlay. He's studied the Hudson for 34 years and says estuaries are crucial resources.

"Two-thirds of the fish and shellfish caught in the U.S. depend on estuaries for their survival," the National Estuarine Reserve Research Association says about the key role of estuaries and wetlands.

Education, partnerships with schools, citizen involvement and public programs are tools the Hudson reserve uses to make people aware of the river's ecological importance and the need to preserve it, Hudson NERR Education Coordinator Chris Bowser said.

"People love to interact with the water. The big hit with everyone 5 to 85 is when they use nets and the nets come up with whatever they've caught," Bowser said one recent sunny Friday outside the reserve's Norrie Point Environmental Center.

Students from Poughkeepsie High School and staff of the Hudson NERR wade into Fallkill Creek as part of the Eel Project, now in its 12th year. Photo: Chris Bowser

Glass eels are a crowd pleaser. So are the river oddities — seahorses, oyster toadfish and the "perennial favorite" hogchoker. (The latter is a small flat "trash fish" that settlers often fed to pigs, which had trouble swallowing the fish because of their sharp, rough scales.) Non-native species such as Chinese mitten crabs, soft-shell turtles and weatherfish (a fish-like leech) are interesting surprises, he said.

The Hudson is high school science teacher Lee Magadini's favorite classroom, even though it is 43 miles from the Berkshire Waldorf High School in Stockbridge, Mass., where she teaches.

On the Hudson, her students put on hip waders and cast seine nets for the tiny glass eels migrating 1,500 miles from the Sargasso Sea to the Hudson where they will grow before returning to the Sargasso to spawn.

This eel project is very popular with all students who cast nets into the Hudson, Bowser said. The eel is his favorite river creature. Mark Angevine, a science teacher at nearby Poughkeepsie High School, is so interested in eels he uses Eel Man Two as his online nickname. Bowser is Eel Man One.

A Vassar College student got so enamored with eels after volunteering with the Hudson River Eel Project to count eels at the Crum Elbow Creek eel ladder that she wrote a comic book about eels and eel conservation. A large copy of Bella Dalton-Frenkl's "The Crum Elbow Eel Ladder" is displayed in the Norrie Point Center. (Crum Elbow is a creek that flows through Hyde Park into the Hudson.)

While Magadini and her students enjoy learning about eels, their river exploration also extends to water chemistry and other species that depend on the river. Her students check the tidal river water for salinity, dissolved oxygen and collect other valuable data in an outdoor classroom that has bald eagles overhead and shortnose sturgeon, oyster toadfish and other fishy treasures swimming below.

"We've been coming here for 16 years," Magadini said one recent Friday when she stopped in the Norrie Point office of the reserve in Staatsburg to get materials for this year's lesson plans.

"This is a fabulous center. Students love this day," she said.

In a nearby room that day, 16 junior and senior students from a Poughkeepsie school were busy talking about their day's work — netting river creatures, hiking by the shore to study wetlands, viewing birds with Norrie Point telescopes and entering water sample results from their research.

Some sat next to aquariums choked with invasive plants including water celery. A display on a nearby wall explains that tides rise and fall about 3 to 5 feet twice a day along 153 miles from Manhattan to Troy. Another tells how the Hudson is often muddy because it gets up to 1.5 million tons of sediment yearly from tributaries, mostly the Mohawk River upstate, and that 79 tributaries flow into the Hudson along its length from Troy to Manhattan.

"I can give my students a wonderful introduction into chemistry and they can do interesting, important research," Magadini said. "We have

16 years of data from our school's trips here and we can see how river conditions might be changing. It's fascinating. They make a connection of their work here to research."

Every year, 10,000 students and teachers from New York, New Jersey, Massachusetts and Connecticut use Hudson reserve education programs, according to the N.Y. conservation department.

The biggest single event is the annual Day in the Life of the Hudson program in October, which draws 6,000 students at 90 river sites, Bowser said.

Findlay, the Cary Institute scientist, said Hudson NERR work research is "valuable, excellent long-term monitoring at key locations that are preserved and protected. They have solid water quality, turbidity, plant, sea level data. They pick up new things, information that helps us all."

Findlay said the NERR emphasis on public participation and citizen science prepares "the next generation to judge information."

Nationwide, NEER data help provide a snapshot of the country's coastal estuaries and on the Great Lakes.

Findlay likened the value of the NERR data to a researcher focused on just one part of an organism who steps back to learn about the rest of his subject's body.

"You might know about the right leg but it's good to know what's going on in the left one," he said.

The findings of the Hudson reserve, combined with research of many other groups monitoring the Hudson, provide lawmakers and policymakers with new information to improve regulations and conservation policy.

The hope is that this work will help preserve the river. The reality is that it has, Bowser said.

"We all work to protect the river," he said.

Mark MacCormack of Stockport had no idea what a NERR is or its role in the cleanup of the Hudson, which was dirtier when he swam in it and roamed its shores in his youth.

He noticed the river's improvement when he came back to Stockport recently from Texas where he'd moved years ago for work. He was interviewed near a small pavilion in Stockport Flats, just downriver from the NERR, watching his sons early on a warm, late summer afternoon.

An egret and two herons were wading in shallow water, hunting for food.

"When I was a kid, the bald eagle was endangered," he said. "You hardly ever saw one. You come down now and you can see them on that peninsula out there."

He pointed to a small island close to shore, not far from the Hudson reserve's Stockport kayak and canoe put-in.

"It's definitely a lot cleaner now."

Connecticut's NERR plan:

The Connecticut site would extend from Old Lyme to Mystic – from the lower Connecticut River including Lord Cove and Great Island wildlife management areas and submerged areas at the mouth of the river, to submerged areas of the Thames and Mystic rivers, to Bluff Point and Haley Farm state parks in Groton.

Connecticut's application to NOAA includes a site selection report submitted in January 2019, prepared through a two-year effort by a team led by DEEP, the University of Connecticut and Connecticut Sea Grant. The site selection was approved by the NOAA administrator on Sept. 27, 2019. The next steps include an environmental impact study and the drafting of a management plan, leading to the full designation, expected in two to three years.

To learn more about the proposed Connecticut NERR, visit: www.ct.gov/deep/NERR

To view a map of the proposed CT NERR sites, visit: *https://seagrant.uconn.edu/wp-content/uploads/sites/1985/2018/11/NERRmap.jpg*

To learn more about the Hudson River NERR, visit: *https://www.dec.ny.gov/lands/4915.html*

To learn more about the National Estuarine Research Reserve System, visit: *https://coast.noaa.gov/nerrs/*

Left, the Tivoli Bays reserve shoreline, one of four sites that are part of the Hudson River NERR, is seen looking west from a riverbank hill. Photo: Chris Bowser

Above, an egret wades through the marshes at Bluff Point State Park in Groton, proposed to be part of the Connecticut NERR. Photo: Nancy Balcom

How big is the Hudson River Estuary? To find out and see more photos, visit https://seagrant.uconn.edu/?p=5626

Long Island Sound Blue Plan: a guide for the estuary's future created from many voices

By Judy Benson

Suppose a wind energy company wants to lay an underwater cable to carry power from turbines in the North Atlantic into Long Island Sound to a transmission station somewhere along the Connecticut coast.

This isn't a far-fetched possibility, given that there are several plans in the works for offshore wind farms to produce power for the Northeast. But how would the best east-west route of this hypothetical cable be decided by the developers and regulators? They'd want to avoid shellfish and eelgrass beds, fishing hotspots and main navigation routes for submarines, among other sensitive areas. How would they know the locations?

Until now, they'd have to take a cumbersome and piecemeal approach to finding the answers, and risk missing some critical pieces of information. But thanks to the Long Island Sound Blue Plan, completed this fall and now with the state Legislature for final review and approval, that's no longer the case. The 514-page document, with interactive maps and resource inventories, puts all the characteristics of the estuary — from cold water coral colonies to popular sailboat racing routes — in one place where they are identified, described, displayed and accessible to everyone.

"The Blue Plan is meant to protect what we care about, and reduce conflict in the future," said Sylvain De Guise, director of Connecticut Sea Grant. "Its guiding principles are that it be science-based, embrace public engagement and transparency, and strike a balance between economic benefits and environmental protection."

De Guise, along with Brian Thompson, director of the Land and Water Resources Division for the state Department of Energy and Environmental Protection, and his team, and Nathan Frohling, director of coastal and marine initiatives for The Nature Conservancy, led the four-year project to produce the Blue Plan. They tapped the expertise of scientists, fishermen, marina owners and dozens of others who live, work and play on what DEEP Commissioner Katie Dykes recently called "the state's most important natural resource."

Often referred to as a marine spatial plan, the Blue Plan is the first of its kind for the estuary. If that term doesn't resonate, think of the city or town where you live, and how the commercial, residential, mixed-use, industrial and open space areas are kept more-or-less distinct. That's because, somewhere on a shelf in the Town Hall sits the current plan of development for the community. That's the document that guides how a proposal from a would-be developer of a big-box store might be handled — the areas he or she might be directed to that are considered suitable, with proper road access, water and sewer lines and away from public drinking water reservoir protection land, for example.

In the same way, the Long Island Sound Blue Plan is intended to guide new development that impacts the submerged lands and waters of the estuary, while protecting current uses and users. It's a resource the public, regulators and developers alike can use to help make good decisions about the Sound. Everyone with an interest in this natural treasure should take a dive into the plan, get to know its many resources and maybe learn something new about the Sound.

People with many different perspectives contributed to creation of the Blue Plan. Eleven of those who were involved at various levels were asked to answer two questions about the plan:

- **What was your role in the creation of the Blue Plan and why did you want to be involved?**
- **What's the significance of the plan to the way you use and experience Long Island Sound?**

Following are their answers:

Penny Howell, retired marine biologist with the state Department of Energy and Environmental Protection:

I was part of the Ecological Experts Working Group, based on my 38-year career at Connecticut DEEP doing fisheries stock assessments and climate modeling. My role was shepherding DEEP's extensive fisheries database to identify ecologically significant areas for the more than 150 marine species using the Sound.

The plan literally brings home through digital maps decades of data I worked on, tying the Sound's ecological features to the health of the system. I grew up on the Sound, playing and working. I witnessed the degradation of its resources but now I can point to its renaissance.

Chris Elphick, professor of ecology and evolutionary biology, University of Connecticut:

I was asked to be involved because of my scientific work on Long Island Sound ecosystems, especially coastal marshes and the birds that live in region. I agreed because it provided an opportunity to ensure that the best scientific knowledge helped inform the plan. As a researcher working in coastal ecosystems, the plan helps me see where there is need for new scientific work. By pulling together data on many types of resources and uses, the plan also helps researchers make connections that might not otherwise have been obvious. From a personal perspective the plan has great potential to improve cost-effective management of the Sound, which matters to me as someone who cares deeply about protecting natural ecosystems, but also recognizes the need to do that in ways that are consistent with economic and recreational activities.

Bill Gardella, owner of Rex Marine, Norwalk:

As a "lifer" in the Connecticut recreational boating industry, I was honored to be selected by state Sen. Bob Duff to be an Advisory Committee member representing recreational boating interests. My role was to offer recreational boating industry perspective to increase understanding among Advisory Committee members and others who were part of Blue Plan creation. This was important to prevent unintended consequences to our industry, our employees and our customers from the adoption of the Blue Plan.

Long Island Sound is a national resource and treasure, among the many jewels Americans are blessed to use, and take good care of in perpetuity. The Blue Plan was envisioned as one more tool to better ensure the Sound remains more or less as she is now, with limits to high intensity uses and/or over-commercialization, such as the intended, rejected floating Broadwater liquefied natural gas terminal project. Responsible usage will continue, while the trade-offs for proposals that could adversely impact current users can be better evaluated.

Alicia Mozian, conservation director, Westport:

I was appointed to be on the Blue Plan committee as a municipal representative. The reason I was pleased to be appointed is because I think the plan can serve as a way to avoid potential problems when trying to locate competing uses within the Sound. As a person who serves in a local regulatory authority capacity, I have experienced first-hand the conflict that arises when applications for "development" have occurred in areas that were plagued with problems that could've been avoided if only a better location were chosen. I am hoping that the Blue Plan will reduce these types of conflicts.

The significance of the plan as to the way I use and experience Long Island Sound is somewhat answered above. I would add that there can be competing uses that can co-exist without necessarily sacrificing one for the other. This is what the Blue Plan hopes to achieve. Personally, I use the Sound for recreational purposes but I also enjoy eating shellfish and one day, I hope to have cheaper electric rates from the use of wind power. If there is a way that all of these benefits can co-exist without harm to the environment, I would be happy. Again, this is what I hope the Blue Plan can help achieve.

Jerry Morgan, owner, Capt. Morgan's Bait & Tackle, Madison:

My role in the creation of the Blue Plan was simple. Being involved in active roles with fisheries at federal and state levels, including identifying resource inventory species, it was apparent that protecting Long Island Sound's fisheries and its related habitat was paramount. One of those ways was being instrumental in crafting language such as, "significant displacement of recreational fishing and related activity by other activity, or permanent structures shall be avoided to the maximum extent practicable."

From my input, the Blue Plan now opens the door to artificial reefs as potential habitat generators. As a steward, stakeholder and user, that would be a step toward enhancing our Sound for recreational use and enjoyment for generations to come.

Ben Goetsch, sales and nursery manager, Briarpatch Industries, Milford:

I got involved with the Blue Plan in order to ensure that the commercial shellfish industry's interests would be well served by the plan as I felt our industry was not well represented at the Advisory Board level. The plan is only as good as the information that it captures so I wanted to help contribute what I knew about the present and future needs of the industry. The Blue Plan protects the historical use of Long Island Sound by shellfishermen but the plan could have a significant impact on the future expansion of shellfish aquaculture in Connecticut. For example, the plan must be taken into consideration for any new leases in town or state waters and for any new permit applications that utilize grow-out gear in open water deeper than 10 feet.

Bill Lucey, Long Island Soundkeeper, Connecticut Fund for the Environment/ Save the Sound:

I joined the group as one of Save the Sound's representatives. As a past coastal planner I had to rely on fragmented data sources when evaluating project proposals and permits so the utility of a marine spatial plan was readily apparent to me.

The Blue Plan sets the framework as a "one-stop-shopping" information hub for people interested in what happens on the Sound. The plan can highlight areas that are appropriate for development and the type that makes sense. It can tell us where information is lacking or which areas merit protection. I hope the Blue Plan becomes a go-to resource for people in the region.

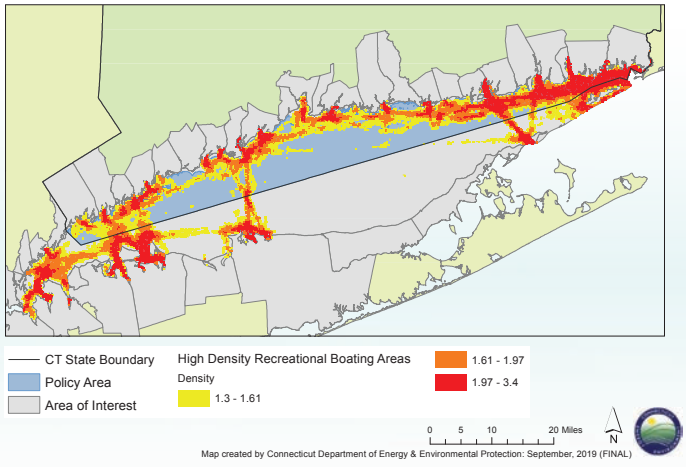
Christine Nelson, town planner, Old Saybrook:

I had a small role on the Blue Plan Advisory Committee, which was to represent coastal municipalities' interests and to share my experience as a town planner. I've worked mostly with conservation or development of land that affects near-shore activity, and I had an interest in aiding municipal shellfish operations and preserving historic and archaeological features of the Sound. So, I participated in the broader aspects of engaging stakeholders in these significant human use areas. But, it was observing the deeper dive into gathering spatial data for the Long Island Sound Inventory that I found most fascinating — the enthusiasm of the various users of the Sound was captured through their interactions with The Nature Conservancy, DEEP and Connecticut Sea Grant as they pulled together the interactive map of the Sound. It's an invaluable tool for working towards the goal of compatibility among ocean uses in the Blue Plan policy area. And, for townspeople living and working in the upland, the Blue Plan is a significant counterpart to depict how uses of the offshore environment connect with uses in the coastal zone.

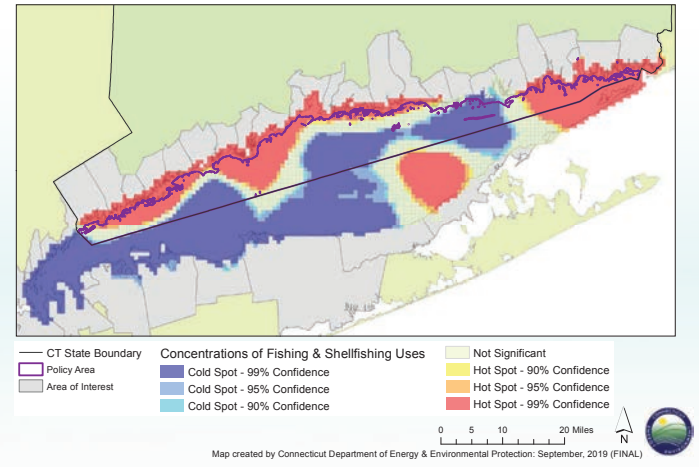
Joe Gilbert, owner, Empire Fisheries:

Brian Thompson of the state Department of Energy and Environmental Protection, Nathan Frohling of the Connecticut Fund for the Environment/Save the Sound, Sylvain De Guise of Connecticut Sea Grant and the whole team all did an excellent job in crafting the Blue Plan. I was afforded every opportunity to offer my input, through a collaborative process that considered current and historic data as well as fishermen's direct observations and opinions. I, and the fishermen of Connecticut, wanted to be involved in order to give an accurate first-hand account of the resources we rely on, the nature and scope of our activities, and our concerns for the future.

Significant Human Use Area Map: High Density Recreational Boating Areas



Significant Human Use Area Map: Concentrations of Fishing & Shellfishing Uses



These are two of the many maps included in the Blue Plan.

It is a very diverse and dynamic marine resource. The Blue Plan will help ensure that I and many others can continue to enjoy our recreational and commercial activities in balance with increasing demands on marine resources.

Catherine Finneran, director of environmental affairs, Eversource:

At Eversource we understand the tremendous natural resource Long Island Sound is for our customers and employees. As New England's largest energy provider, we also know the Sound is home to critical energy infrastructure. By lending our perspective and sharing information with others, we hope to create a beneficial tool that can be consulted to determine the compatibility of potential future uses with the overall health of the Sound.

We have electric transmission cables in Long Island Sound that connect Connecticut to New York. These cables also connect to the larger power grid to help ensure clean, reliable power for our region. It's our hope the Blue Plan will support better, well-informed planning and decision-making for potential critical energy infrastructure and other uses.

Peter Auster, senior research scientist, Mystic Aquarium; professor emeritus, UConn Marine Sciences:

My principal role was serving on the Ecological Experts Working Group, although I also participated as a member of the public at multiple commission meetings. I am a marine ecologist by training and practice and have been conducting studies in the Sound for nearly 40 years. Perhaps equally important to my interests is that I look at the underwater landscape and wildlife here like many others view such public spaces on land, as I have been diving in the Sound since I was 16 years old. This is a special place and management needs to account for both conservation and sustainable use. The Blue Plan will provide a level playing field, in terms of available information, for both managers and stakeholders to address the risks and benefits involved of using this part of the public commons.

The plan represents a hopeful pathway for addressing the expanding uses of our piece of coastal ocean while conserving our natural heritage.

Blue Plan Essentials

The Blue Plan goals are simple.

They aim to protect important ecological resources and existing human uses, and serve as a tool to reduce conflicts in the future.

The Blue Plan is place-based.

Through the concept of marine spatial planning, the Blue Plan is meant to gather science-based and stakeholder/expert-vetted information to map the most important locations for special ecological features and human uses of Long Island Sound, so they can be recognized and taken into account in order to make better decisions now and in the future.

The Blue Plan is not a new regulatory program.

If an activity does not require a permit now, it will not require a permit under the Blue Plan. The Blue Plan will only apply to new permits under the existing regulatory programs listed in CGS § 25- 157t(h). Permit review under these programs will undergo the same general processes, but will now use the information and standards contained in the Blue Plan. There will not be an additional Blue Plan permit.

The Blue Plan was shaped by meaningful public input.

The Blue Plan Development Team hosted 3 public hearings, several regional meetings in CT and NY, and almost 100 meetings and webinars; responded to countless individual inquiries by email, phone, and in person; and addressed 37 written comments received during the 90-day public comment period.

The Blue Plan is not retroactive.

The Blue Plan is meant to apply to future decisions, and will not affect existing activities.

LONG ISLAND SOUND
BLUE PLAN
Sustainable Ecosystems - Compatible Uses

The Blue Plan provides greater access to information.

Through the Blue Plan process, a large amount of information has been gathered on where important ecological features and human uses occur in Long Island Sound. This information is collated, synthesized, and made broadly available through the Blue Plan documents, including the Long Island Sound Resource and Use Inventory and online map viewer. Using these tools, stakeholders, project proponents and permitting authorities all have the same information to evaluate and substantiate more objective and well-informed decisions.

The Blue Plan is meant to support water-dependent activities.

The Plan specifically recognizes existing human uses in Long Island Sound and maps the most important places they occur and depend on. In addition to increased recognition, the Blue Plan is meant to afford protection of such important human uses, so that future activities can be sited in a manner that will minimize conflicts.

The Blue Plan applies to deeper waters.

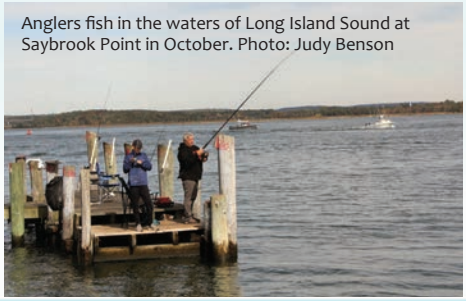
Under the legislation mandating the creation of the Blue Plan (CGS § 25-157t), its policies are meant to apply to activities taking place in waters seaward of a 10' depth line. While more technical information is contained in the Blue Plan documents, efforts have been made to define this line and display it on a map (easily available via the Blue Plan viewer). As a result, the Blue Plan does not apply, and was never intended to apply, to a large number of regulated coastal activities such as private docks or protection of salt marshes already managed under the existing Coastal Management Program. However, the Blue Plan gathered some upland information, beyond the policy boundary, so that decisions in deeper water can consider important coastal and upland features.

The Blue Plan is meant to be a living document.

Recognizing that things change, the statute mandating the creation of the Blue Plan requires the plan to be revised at least every 5 years, with a public hearing to be held every year. The Blue Plan Advisory Committee is also required to advise the Commissioner of DEEP on the operation, implementation, and updating of the Inventory and Plan. In short, if information changes or the process does not work as planned, there are opportunities to fix it. Stakeholder input and feedback are encouraged to recognize and address issues.

Learn more about the Long Island Sound Blue Plan at:

https://www.ct.gov/deep/cwp/view.asp?q=574290



Anglers fish in the waters of Long Island Sound at Saybrook Point in October. Photo: Judy Benson

Keeping up with sea level rise: natural and human influence on salt marsh migration

by Nancy Balcom

When my sons were small, we often vacationed on Cape Cod. At low tide, the bay side offered opportunities to walk far out from our beach blanket to look for critters and examine the unusual patterns of bird footprints and snail trails in the wet sand. Once the tide turned, however, we needed to pay closer attention to our meanderings and work our way back to the dry sand faster than the incoming waters were rising, or be overtaken.

This anecdote could serve as an extended metaphor for migrating salt marshes and accelerating sea level rise. Like my sons and I dodging the incoming tide, rising seas persistently nudge nearby landscapes to move out of the way, or be subsumed. But exactly how is that working in the real world, and what are the challenges to successful marsh migration — widely seen as essential to preserving these critical habitats? Two researchers funded by Connecticut Sea Grant probed these questions to yield some significant and applicable findings.

"It makes good sense to combine social science and ecological data into conservation planning and policy," said Chris Elphick, one of the researchers.

Tucked in along the fringes of the coastline, salt marshes provide important ecosystem services. Many fish species utilize marshes as nursery areas. Certain bird species nest among the marsh grasses. Crabs and other small invertebrates, birds and mammals find food and shelter in tidal salt marshes. The dense root systems and peat of these marshes trap contaminants, sediments and nutrients and absorb water and wave energy during storms. Various marsh grasses and plants differentiate by elevation into distinct zones, as the tidal cycles inundate these vibrant and picturesque landscapes and then recede. But a thriving marsh can shift to barely surviving when changing conditions outpace the ability of a salt marsh to adjust, or the marsh is blocked from naturally moving upslope and landward ahead of rising sea level.

Shimon Anisfeld studies the ability of tidal salt marshes to migrate under accelerated sea level rise conditions. A senior lecturer and research scientist in the Yale School of Forestry and Environmental Studies, he conducted fieldwork in marshes at Hammonasset Beach State Park in Madison and Sherwood Island State Park in Westport starting in 2014. While his work there seeks to understand the mechanism of a key environmental phenomenon, it's also a labor of love.

"To me," said Anisfeld, "while aesthetics is in the eye of the beholder, there is a beauty and charm to salt marshes that hopefully people notice."

Working with postdoctoral researcher Andrew Kemp (now an assistant professor at Tufts University) and graduate student Katharine Cooper, Anisfeld examined the upslope progression of marshes into different upland types, specifically wooded areas and mowed lawns. They discovered that the type of marsh vegetation colonizing the two areas was quite different, and found some evidence suggesting that marshes might be able to move more quickly into lawns, given the lack of shading and the shorter lifespan of lawn grasses compared to trees. Prioritizing low-slope lawn areas for protection may help facilitate marsh migration as sea level rises.

The team also worked with park staff to create "no-mow zones" in marsh-adjoining lawns.

"To figure out the extent of marsh in the mowed areas, we had to get down and look closely at the plants in mowed areas to differentiate the marsh grasses from regular grasses," Anisfeld recalled. "Once we established the upper edge of the marsh, we suggested adding 10 to 20 meters (about 30 to 60 feet) to the new no-mow zone to give the marsh somewhere to move."

From a practical land management perspective, the researchers concluded that establishing no-mow zones is an effective strategy to facilitate migration.

"There are two benefits to no-mow zones adjacent to a marsh," said Anisfeld. "First, marsh plants can grow to their full height, improving the marsh habitat and increasing its ability to attenuate storm effects. In addition, woody marsh plants that cannot withstand mowing, such as marsh elder and groundsel trees, will start to grow in the migrating marsh."

This succession of marsh plants can be seen in both parks. At Sherwood Island, park supervisor James Beschle reflected on the no-mow areas of the lawn adjacent to the marsh one day this fall.

"It's important to find a balance that protects both nature's and people's interests in the park," he said. "The marsh provides important protection during storms. If we keep mowing the uplands, then there's no natural seeding of marsh plants, so we have to do what we can."

A model airplane club uses the short paved runways installed on part of the expansive lawn area adjacent to the marsh for takeoffs and landings. Beschle believes that over the long-

Above: A kayaker paddles near the marshes at Bluff Point State Park.

Left: Chris Field (photo courtesy of Chris Field)

Center: Shimon Anisfeld

Right: Jim Beschle, park supervisor at Sherwood Island State Park, stands near one of the "no-mow" zones adjacent to the salt marsh. Photos: Nancy Balcom

term, the park will be able to accommodate the hobbyists' ongoing use of the runways while allowing the marsh to continue to expand naturally into the no-mow zones.

Anisfeld plans to alternate annual visits to see the continued effect of the no-mow zones in each park. Both Beschle and William Mattioli, director of facilities at Hammonasset, believe that it's important to permit researchers to utilize the parks as living laboratories to learn lessons that can potentially be applied elsewhere.

Anisfeld and Kemp, together with graduate student Jamie O'Connell, also developed a new approach to reconstructing salt marsh migration. Typically aerial photographs are analyzed to determine changes in the landward extent of marshes over time. However, in areas where upper marsh edges intersect mowed areas of land or are obscured by trees, plant species cannot be differentiated using aerial photos to determine the actual marsh edge.

The marshes in the two parks are adjacent to mowed lawn, rendering aerial photographs useless in determining how far "up" and "in" these marshes have migrated over time. Anisfeld and his co-workers collected sediment cores at regular intervals across the marsh-to-upland continuum, and tested the cores for the presence of foraminifera, single-celled marine organisms with shells that are preserved in marsh but not upland sediments. The researchers used the presence of foraminifera to identify wedges of salt marsh peat lying overtop pre-existing upland soil. They also used radioactive isotope tracing to identify where the marsh-upland surface boundary was in 1963.The process identified the depth in the sediment of the layer of cesium-137, a time marker left from the atmospheric deposition of the isotope from nuclear weapons testing that peaked in 1963. Further calculations enabled the researchers to determine the total vertical ("up") and lateral ("in") distance each marsh migrated between 1963 and 2016.

The Avalonia Land Conservancy, with assistance from Connecticut Sea Grant and the Mystic Aquarium, has been creating a marsh migration buffer at Dodge Paddock / Beal Preserve in Stonington. Photo: Juliana Barrett

They found that the Sherwood Island marsh migrated inland 42 to 51 meters (138 to 167 feet) and the Hammonasset marsh 4 to 5 meters (13 to 16 feet) over the 53-year period. Vertical migration was about 35 cm (14 inches) for the Sherwood marsh and around 10 cm (4 inches) at Hammonasset. Averaged over time, the rate of vertical migration was 6 mm (0.2 inches) per year at Sherwood and 2 mm (.08 inches) per year at Hammonasset.

The presence of foraminifera can be considered a "leading indicator" of marsh migration. Overall, both marshes were migrating roughly in tandem with local sea level rise. However, variations in migration rate over time cannot be determined using this technique. Major coastal storms can play a role in accelerating local marsh migration over the short term. Sherwood Island was impacted by much higher storm surge in 2012 from Superstorm Sandy than Hammonasset, potentially accounting for its faster rate of vertical migration.

Modeling can help predict how a particular marsh may react to rising seas. Warren Pinnacle Consulting, located in Waitsfield, Vt., developed a mathematical model called Sea Level Affecting Marshes Model (SLAMM) that simulates the potential impact of long-term sea level rise on wetlands and shorelines. The Connecticut Department of Energy and Environmental Protection and the University of Connecticut Center for Land Use Education and Research recently collaborated on developing a new interactive SLAMM viewer that shows the impact of sea level rise on the state's 21 largest tidal marshes as well as shoreline roads (see SLAMM viewer: https://cteco.uconn.edu/viewer/index.html?viewer=slamm). The viewer shows the predicted extent of sea-level rise in 15-year intervals starting in 2025.

"Research like mine over time can help verify SLAMM's predictions." Anisfeld said. "Some of our marshes are very hemmed in — both naturally through their location in glacial pockets and anthropogenically, with pretty much nowhere to go as sea level rises."

Indeed, marshes need somewhere to go or rising seas may overtake them. One major complication, however, is that it's just as likely the adjacent landowner is a private citizen as it might be the state, a town or a land conservation organization. The future of tidal salt marshes in Connecticut (and elsewhere) will be largely influenced by adjacent landowners whose activities and decisions could promote or block marsh migration. Connecticut Sea Grant supported a researcher interested in examining the human side of the complicated marsh migration equation.

Elphick, professor in the Department of Ecology and Evolutionary Biology at the University of Connecticut, considers himself a conservation biologist, applied ecologist and ornithologist. Through his research, he tries to determine how ecologists can best guide management decisions that balance conservation of biological diversity with human activities.

Elphick, working with then-doctoral student Christopher Field, who is now at the National Socio-Environmental Synthesis Center, and Ashley Dayer, now at Virginia Tech, set out in 2014 to survey landowners whose properties abut salt marshes in Connecticut. They were asked about their attitudes regarding different types of conservation agreements that could protect migrating marshes.

"We wanted to know whether landowners might be willing to enter into conservation agreements to give nearby marshes somewhere to migrate with sea level rise, or would they be more inclined to protect their upland properties by hardening their shorelines with seawalls," Elphick said.

These agreements include conservation easements where the incentive value is based on the median for the study area; outright purchases at market value; restrictive covenants whereby an entire neighborhood enters a binding agreement to forgo shoreline protection; and future interest agreements. For the latter, if flooding reduces a property's value by 50 percent, ownership of the property transfers to a conservation organization at the fair market value on the date of the agreement.

In addition to assessing the level of support for different agreements, the researchers collected information on demographic and geographic traits, attitudes and beliefs of the landowners to tease out factors that might influence behavior or intentions with respect to these agreements.

"We found that conservation easements, a popular strategy for land protection, are unlikely to be sufficient to mitigate losses from sea level rise," said Elphick. "Some less common conservation strategies like restrictive covenants and future interest agreements appear more likely to be adopted by landowners. However, these are unproven in practice and are likely to be more expensive."

The researchers concluded that failure to factor human behavior into ecosystem modeling and conservation planning can lead to an overly optimistic view of the potential for successful marsh migration. Strategies frequently used by conservation practitioners to increase participation in conservation agreements — such as strengthening beliefs in climate change and increasing awareness of the ecosystem services provided by marshes — had weak or mixed effects on landowner attitudes.

"More than half of coastal landowners were concerned that conservation groups might not act fairly in their efforts to encourage marsh migration," said Field, the lead author of the study. "But fortunately, addressing this prevailing attitude might be relatively straightforward, and could have a big impact on how many people are willing to participate in adaptation options."

Landowners with stronger beliefs about increased flooding or marsh migration indicated a greater inclination to build shoreline protection like seawalls, potentially leading to greater loss of natural coastline habitats. Overall, 22 percent of landowners said they were likely to harden their shoreline within 20 years. On the other hand, landowners whose homes flooded during Superstorm Sandy in 2012 were more inclined to consider selling outright.

"Research that combines social science and ecology is challenging," Field said. "But the insights we can gain into how landowners are likely to determine the future of coastal ecosystems are critical for better understanding conservation and policy options as coastal communities continue to adapt to sea level rise."

Solving the marsh migration equation is far more complicated than dodging the incoming tide.

To learn more about Shimon Anisfeld's work, visit: https://environment.yale.edu/profile/anisfeld/

To learn more about Chris Elphick's work, visit: https://elphick.lab.uconn.edu/

Marsh elder and cedar trees are filling in the marsh upland at Hammonasset Beach State Park in 2019, five years after it became a "no-mow" zone as part of the project. Photo: Nancy Balcom

Gardening for the bees, butterflies and birds

CLASSES PROMOTE PLANTING YARDS, PUBLIC SPACES TO BENEFIT THE WHOLE ENVIRONMENT

By Judy Benson

Beachgoers by the thousands have already made Hammonasset Connecticut's busiest state park. But thanks to some dedicated volunteer gardeners with a benevolent bias for native plants, it's also become popular with bees, butterflies and other pollinators.

"My favorite part of this is the educational value of the gardens — showing people what a beautiful natural garden is," said Liz Shore, as she and fellow volunteers led visitors through the 10 theme gardens they've helped build next door to the park's nature center. "It's really important for biodiversity and the health of our planet. If everybody did just a little bit, it would make a big difference."

Shore, who travels to the Long Island Sound shoreline park in Madison from neighboring Guilford, is one of about a dozen volunteers who regularly practice their love of gardening at Hammonasset in cooperation with park staff. The products of their passion, in turn, draw many of the 50,000 people who annually visit the Meigs Point Nature Center to stop and admire the sweet pepperbush, dogwoods, milkweed and other native shrubs and flowers that populate the plots. As couples and families wander the pathways between the gardens, they can't help but notice all the painted lady butterflies, monarchs, bumble bees and other insects important for pollination and as food for birds docked onto the blossoms, fueling up with protein-rich pollen or laying eggs.

"If you're there for just five minutes, you'll see that there's life on every flower out there," said Russell Miller, who runs the nature center for the state Department of Energy and Environmental Protection. "I use the gardens in a lot of my programs. Every view at Hammonasset is amazing, but the gardens — I can't tell you how many people take pictures of the gardens."

The first garden there was started by the Madison Garden Club, then adopted and expanded by the Friends of Hammonasset in 2015, said Maureen Egan, garden chair of the Friends group. As they built new gardens, Egan, Shore and other members applied the principles they learned in the Coastal Certificate classes led by Judy Preston, Long Island Sound outreach coordinator for the Long Island Sound Study and Connecticut Sea Grant. The particular approach espoused in the classes, and then put into practice in this and dozens of other outreach projects around the state, puts gardening in a big-picture context of public service for the larger environment. Instead of planting spaces for the sole purpose of pleasing the human eye, Coastal Certificate students are urged to create gardens dominated by native plants that provide the best habitats for birds, insects and other creatures. Native plants can also do without the fertilizers, pesticides and excess water inputs required of non-natives that evolved elsewhere, making them more economical, easier and better for the environment — especially Long Island Sound, the state's most important natural asset.

"Everything is connected — plants, land use and waterways," Preston told her 36 students on the first night of the spring session of the classes, which met at the Yale Peabody Museum of Natural History in New Haven. "Anything that flows off the land gets into Long Island Sound. Sound gardening benefits many life forms — it sets the table. What we do matters — what we do on an individual level."

Preston began offering the classes at different coastal locations annually in 2013, each year bringing in up to three dozen new students, many of them graduates of Master Gardener programs looking to take their avocation to the next level. The evening classes consist of four three-hour sessions over two weeks. Each one features speakers with expertise in wildlife, soil care, organic landscaping, the Long Island Sound estuary and successful programs that embody the Coastal Certificate approach.

"The whole idea was to bring experts from academia, experts from the field and industry practitioners in with something to share that's all tied to water quality," Preston said.

At the end of the four classes, students are asked to develop an outreach project that will share what they've learned with the public, and are invited on a field trip to an interesting natural site. This year's class visited Horse Island, one of the Thimble Islands in Branford harbor that is owned by Yale University. The program culminated with a graduation ceremony in October.

"The people who take this class tend to be lifelong learners,"

said Preston. "They become the people who diffuse the information to others in their outreach projects."

Jack Leary is a retired Pfizer chemist who took the class because he and his wife both love gardening but also love the Sound. They've been transitioning their small yard in downtown Mystic to an organic landscape, he said, with more native plants and less lawn, and are already seeing the benefits.

"We're definitely seeing an increase in pollinators in our yard, which is great," he said. "This class is reinforcing what we're already doing, and giving me some new ideas."

For this year's class, Preston chose the theme of the American lawn as the opposite of landscapes that contribute to the larger environment. She traced its roots in feudal Europe then recounted the development of the lawnmower in America and the sociology of private yards with their perpetual maintenance requirements. Building from there, she advocated that lawns be understood for what they are — "not that interesting, very resource intensive and pervasive" outdoor spaces that fragment natural habitats.

Guest speakers included Mary-beth Hart of DEEP, who explained efforts to encourage cities and towns to adopt land use practices that reduce the use of fertilizers that pollute the Sound with excess nitrogen. Homeowners can do their part, too, she said, by buffering shorelines and riverbanks with native plants, and using no fertilizer or applying only small amounts at the correct time, among other steps.

'Everything is connected – plants, land use and waterways... what we do matters – what we do on an individual level.'

– Judy Preston

"We can do things better," she said. "We can do things in a smarter way."

For the next class, Preston reviewed the "silliness of how much time and resources it takes us to keep our lawns" as the introduction to three talks about alternatives to the lawn – one a bird-friendly habitat and two approaches to creating pollinator friendly habitats.

"So who wants more birds in their yard?" asked Katherine Blake, bird-friendly communities manager for Audubon Connecticut. "Our main goal is to help inspire people to connect and restore habitats in both urban and suburban settings."

Even small areas, she said, can be transformed into stopover habitats for migratory birds with layers of native plants that include winterberry, spicebush and other fruit-bearing plants, oaks that support many caterpillar species that are a main food for birds, as well as bee balm, cardinal flower and other blossoming plants that provide nectar.

From speaker Mary Ellen Lemay, students learned about the Pollinator Pathways project that has fostered the creation of wildlife-friendly corridors in 25 urban and suburban towns between the Hudson and Housatonic rivers in New York state and Connecticut. The pathways project combines municipal outreach, land protection, private landowner engagement and training in organic gardening practices in an effort to "heal the landscape" into one more hospitable to butterflies, bees and birds, she said. All it takes is connecting larger conservation parcels with corridors planted for pollinators

Friends of Hammonasset President Maureen Egan, third from right, talks with other members of the Friends group and Russell Miller, far left, director of the Meigs Point Nature Center, about the newest of the 10 theme gardens there.

Blossoming milkweed, left, and daisies grow around a small pond in one of the theme gardens at Hammonasset. Photos: Judy Benson

Coastal Certificate #s

215 Number of students trained in Coastal Certificate classes since 2013

2000+ Number of volunteer outreach project hours given by Coastal Certificate graduates

$65 Cost to students

350+ Outreach audience reached in 2019

8 Number of times Coastal Certificate Program has run since 2013

— some as small as a whiskey barrel on a back deck.

"The message is simple — rethink your lawn, plant native plants, and no pesticides," she said. "We want people to understand it's not just creating pathways, but protecting biodiversity. Pollinators can use our back yards as stepping stones to a connected landscape."

Along with the information presented in the talks, students also get lists of native plants and other resources to tap for gardening at home and in outreach projects. Melissa Funaro, a medical librarian from Branford, said she came away from the classes inspired with a new sense of mission about gardening. For her outreach project, she was considering working with the Friends of the Farm River group she is part of.

"I just want to learn all I can about gardening for the environment and minimizing pollution," she said. "I want to educate my neighbors about how important native plants are."

Both Egan and Shore of the Friends of Hammonasset said they, too, have been inspired by what they learned in the Coastal Certificate classes and the work they've done in the state park's gardens for their outreach project.

"This is five years going strong and it's still growing," Egan said. "We've only been able to scratch the surface as far as education, but all of the things we're learning and the response we're seeing inspire you to do more and think differently."

Added Shore: "My whole gardening paradigm has changed. There's no going back."

For information about the Coastal Certificate program, contact Judy Preston at: judy.preston@uconn.edu.

Some guidelines for sustainable gardening:

- Practice minimal soil disturbance.
- Choose a diversity of native plants.
- Use gardens as a tool to benefit the environment.
- Choose plants that bloom at different times throughout the growing season.
- Stratify vegetation to create layers.
- Keep current on invasive species.
- Use plants as bird feeders.
- Rethink "messy."
- Allow for change and natural recruitment.

Top Right: Queen Anne's lace and coreopsis blossom alongside dill, chives and other herbs in the colonial spiral herb garden. Photo: Judy Benson

Bottom right: Students in the 2019 Coastal Certificate class visited Horse Island in the Thimble Islands this summer for their field trip. Photo: Judy Preston

Facing page, top: A goldfinch perches on a coneflower in the purple martin meadow garden. Photo: Judy Benson

Facing page, bottom: Bob Kuchta, a volunteer garden designer with Friends of Hammonasset, looks for monarch butterfly eggs on a milkweed pod. Photo: Judy Benson

Let it Bee: Our Freedom Lawn Can Be Yours Too

By Jim and Willow Sirch

A carpenter bee gathers pollen from meadow phlox growing in the Sirchs' yard. Photo: Jim Sirch

We bought our first house when we were married and ended up living in it for 19 years. The best thing about it — it had no lawn! Nestled on a rocky ledge, it was entirely landscaped with mountain laurels and mature oaks. As the trees and our family grew, however, we longed for a guest room, a larger-than-galley-sized kitchen and a sunny spot for gardening.

In time, we found and moved to our dream house — a circa 1850 "fixer-upper" farmhouse (which we're still fixing up) with plenty of gardening space and enough grass to more than make up for our years of lawn sloth. We figured out pretty quickly that we would need something other than the traditional approach to maintaining our yard. For one thing, we wanted to nurture, rather than harm, the birds and pollinators that shared our new space. What's more, our first spring, we were thrilled by the colors of the many native flowers that were part of this former pasture. Ours was not to be a dull expanse of green — and we liked that!

Where some people find lawns aesthetically pleasing, all we see is a dead zone. Coming from an environmental perspective in our respective training and work lives, we knew a chemically-based lawn was not for us. Unfortunately, today's turf culture advocates the use of:

- dangerous chemical pesticides that kill not only the insects that birds eat, but the birds themselves
- overuse of heavy-duty fertilizers that wreak havoc in our waterways by causing a build-up of algae that robs the water of oxygen, thereby killing organisms
- frequent mowing, and time and money spent, while providing nothing for bird or pollinator survival.

There's even some debate as to whether letting your children run barefoot through a chemically treated lawn is a good idea. Some towns have banned certain pesticides, herbicides and fertilizers to reduce the dangers associated with their use. Pesticides and fertilizers have been implicated in a wide range of physical and neurological symptoms in human beings as well as serious symptoms in animals. America's agricultural landscape is now 48 times more toxic to honeybees and other insects than 25 years ago almost entirely due to the widespread use of systemic neonicotinoid pesticides, according to a study in the Journal PLOS O1. These pesticides are not only deadly to bees and other insects. They can remain toxic in the environment for up to three years.

Harvard entomologist E. O. Wilson famously called insects "the little things that run the world." Without them, the natural world as we know it would grind to a halt. Many pollinator populations, in particular, are declining. Why do pollinators matter? For one thing, they help feed us. Next time you bite into an apple or a juicy peach, just think: for about one-third of the food that you eat, including fruit, vegetable and cereal crops, you can thank a native bee or honeybee. Many pollinators are also beneficial to home agriculture, controlling pest insects found in our gardens and yards. Pollinators are also integrally tied to the larger food web. Butterfly and moth caterpillars constitute more than 90 percent of what birds feed their young during the nesting season. The loss of these insects is tied to declines in songbird populations and other wildlife.

With our new home, we knew we needed a new paradigm for our lawn. We wanted to, as entomologist Doug Tallamy puts it, "give ecological purpose to our landscape[s]." A natural or "freedom lawn," is how we chose to benefit the ecology of our corner of the world, reduce time spent on lawn maintenance, and also save money.

GETTING STARTED

Here are some easy things we did right away and continue to do:

• We set our mower level high — 3" to 4" is good — and our grass thanks us by growing stronger root systems that withstand drier conditions and consequently need less mowing. Often, people set their mower low, resulting in sunburnt patches. By keeping our lawn length high, we don't have to water it at all.

• When we mow, we don't bag our clippings. Mulching them right from the mower provides a natural fertilizer for our lawn, so we skip the chemical fertilizers altogether.

• In some areas of our lawn, we have reduced turf by using ground covers like creeping thyme, clover or violets. All these low growing, flowering plants provide nectar and pollen for bees and require virtually no maintenance.

• In the fall, instead of raking our leaves and getting rid of them, we run our lawn mower over the dried leaves to chop them up. Leaving a thin layer of chopped leaves on the grass improves the soil. Or, we bag the chopped leaves in paper leaf bags, store them and use them as a nutritious garden mulch.

KEEP IT NATURAL

Then there are things we have done over time. One way we improved our lawn for pollinators is by allowing the natural "weeds" to seed in among the turf — then leaving them alone. In spring, our lawn is a carpet of humble blue violets, followed soon thereafter by swaths of yellow buttercups. We give our neighbors a good chuckle as we swerve our lawn mower around these colorful patches, avoiding what's in bloom. A lawn that includes flowering plants, along with typical Kentucky bluegrass and fescues, can promote more soil diversity, while providing ecosystem services for bees and butterflies.

Willow Sirch mows a strip of lawn beside a native wildflower garden that includes dark purple New York ironweed and light purple Joe Pye weed. Photo: Jim Sirch

Many native plants can find their way into a natural lawn. These include: common blue violet *Viola sororia*, which is the larval food plant of the beautiful orange great spangled fritillary butterfly; field or plantain-leaved pussytoes (*Antennaria spp.*) which is the food plant of the American lady butterfly; and lance-leaved coreopsis (*Coreopsis lanceolate*) which is a good all-around nectar plant for bees and butterflies. Although not native to our region, white clover, (*Trifolium repens*) is not invasive in our lawns, has a lovely little white flower and is a great bee plant. It can actually improve soil by fixing and increasing nitrogen through the symbiotic soil bacteria that live in nodules on clover roots. Self-heal (*Prunella vulgaris*), is another non-native that is not invasive, yet provides an early source of nectar for native bees.

We tested our soil. You can do it either through the Connecticut Agricultural Experiment Station or UConn Extension. Lawns, like garden plants, are built from the soil up. If we need to add lime or use a natural fertilizer such as compost, testing helps us know what we need where and how much. Besides supplying necessary plant nutrients, the benefits of compost include improved soil structure, soil biodiversity, increased water retention and reduced runoff.

Many homeowners think they need to apply chemical pesticides to eliminate Japanese beetle larvae that kill turf. Often, pesticides that kill grubs can actually set up a vicious cycle. You use this pesticide which also kills the natural biome — the unique microbe community of the soil — which means you need to apply more fertilizer to get a green lawn. Frequently, you end up with as many grubs as ever. Natural grub killers, like milky spore and nematodes, are a better alternative but need to be applied properly.

LOSE THE LAWN

Another way we improved our lawn for pollinators is simply by getting rid of some of it. Where feasible, we have replaced lawn with native shrubs, trees and herbaceous plants. Losing the lawn or part of it can have great effects. For instance, when our daughter was in third grade, we received a Lowe's Small Toolbox for Education grant to replace part of the lawn in front of her elementary school with a pollinator garden. Before we even got started, parents expressed concern: would it lead to children being stung by bees? We assured them that if the students didn't bother the bees, the bees wouldn't bother the students. Our daughter is now a freshman in college. Recently, the school principal assured us that no one has been stung – ever. The teachers and students, however, still love watching hummingbirds, bees and butterflies in their schoolyard garden.

At home, we remove a bit of lawn each year and plant the space with pollinator plants. We have found that an easy way to get rid of lawn is to cover it with cut up cardboard, spray it

Jim Sirch shows a milkweed pod growing in his yard to two young neighbors. Photo: Willow Sirch

down with a hose, cover with at least four inches of compost, then a two-inch layer of chopped up leaves. (Remember, we ran over our fall leaves, chopping them up with the mower and bagging them for just such a use.) A good time to do this is in late summer/early fall. Let it sit through the winter, then in spring just punch through where you would like to plant. This no-till method of planting preserves the vital soil biome.

We decided to also help monarch butterflies, whose caterpillars eat only milkweeds, by putting in a few plants of common milkweed (*Asclepias syriaca*.) This plant spreads by rhizomes and soon we had a dedicated patch. We just decided to let the grass grow and added other native plants such as gayfeather (*Liatris spp*.), Joe Pye weed (*Eutrochium maculatum*) and other great pollinator magnets. Other Connecticut native milkweeds that don't "run" are the pink or white swamp milkweed (*Asclepias incarnate*) and the orange butterfly weed (*Asclepias tuberosa*).

GET TO KNOW YOUR NEIGHBORS

Your pollinator neighbors, that is. In Connecticut, there are more than 300 native bees and 120 butterflies. About 75 percent of native bees are ground nesting species which are solitary and very unaggressive, unlike hornets such as yellow jackets which are not bees, but are social insects and can be aggressive.

The rest of our native bees are tunnel nesters, making their homes in dead trees. We enjoy watching the tiny native bees swarm over our pollinator plants gathering nectar and pollen. They either can't or don't want to sting and their small size belies their importance in pollinator services. Many are specialists, some only coming to certain species of goldenrods and asters, which are two of the best groups of plants for bees. But, don't forget that native trees and shrubs have more flowers as well as leaves for caterpillars to munch on, and can help even more. Our oaks are food plants for more than 400 kinds of moths and butterflies, and bring in the birds.

A monarch butterfly lights on butterfly weed in the Sirchs' yard. Photo: Jim Sirch

KICK OUT THE THUGS

We are diligent about making sure that our natural lawn is not taken over by invasives like Japanese stilt grass (*Microstegium vimineum*) The battle, we have to admit, is constant. Our friend recently asked us what those pretty little white flowers in her lawn were. Unfortunately, they were garlic mustard (*Alliaria petiolate*) another really ugly invasive. We had to tell her. As we know too well, invasive plants take over native plants and don't provide any ecosystem services as our native insects haven't evolved to feed on them.

A natural lawn is good for the local ecology, and good for homeowners who want to save time and money. Ours pays back our investment of time and energy many times over in our enjoyment of the birds and pollinators that find an oasis in our yard. What's more, the knowledge that we are improving the land and water where we live just can't be beat.

For more information:

PESTICIDES:

- Penn State Extension: https://extension.psu.edu/potential-health-effects-of-pesticides
- PLOS 01: https://journals.plos.org/plosone/article?id=10.1371/journal.pone.0220029

COMPOSTING:

- Environmental Protection Agency: https://www.epa.gov/recycle/composting-home

POLLINATORS AND BEST NATIVE PLANTS:

- Connecticut Agricultural Experiment Station, Pollinator Portal: https://portal.ct.gov/CAES/Publications/Publications/Pollinator-Information

INVASIVE PLANTS:

- Connecticut Invasive Plant Working Group: https://cipwg.uconn.edu

INSECTS AND LANDSCAPING:

- *The Little Things that Run the World, (The Importance and Conservation of Invertebrates)*, by Edward O. Wilson
- http://cthort.org/beyond-the-rock-garden-giving-ecological-purpose-to-your-landscape-by-douglas-w-tallamy/

Doreen Abubakar of New Haven presses wildflower seeds into the soil in her milk jug planter during the "Propagating Native Wildflowers from Seed" class at the Yale Peabody Museum on Nov. 1. Photo: Judy Benson

Wildflowers out of milk jugs: a simple way to help pollinators

First came the "doom and gloom."

A bumble bee common just a few decades ago is now extirpated. Invasive species are supplanting the native trees and wildflowers pollinators need. Native habitats are compromised.

"Now let's think about how we can fix this," said Jim Sirch about 10 minutes into his presentation to the 25 students. They had gathered for a two-hour course, "Propagating Native Wildflowers from Seed," in a classroom at the Yale Peabody Museum in New Haven.

So what if Sirch, Peabody's education coordinator, was preaching to the choir – a choir, that is, of gardeners eager to use their own yards as havens for the wildflowers that native bees, butterflies and birds need to pollinate, lay eggs and find food? His students clearly wanted to help him spread the message with their actions, aided by his simple instructions, easily obtained materials and offerings from his hand-collected stores of more than a dozen varieties of wildflower seeds.

Sirch demonstrated his method for starting them from seed to mimic the conditions they've evolved under. Unlike those from cultivated or non-native varieties, native wildflower seeds should be planted in the fall and kept outside through the winter.

"Wildflower seeds require a cold, moist period," he explained. "They have this built-in mechanism to keep from sprouting until spring."

Following his direction, the students each took a translucent plastic milk jug and box cutter and poked drainage holes in the bottom. They sliced their jugs almost completely in half, leaving one section under the handle attached. The bottom halves were then filled with soil. Then the chosen seeds were pressed into the dirt.

"The rule of thumb is that you plant a seed as deep as it is wide," Sirch said.

A thin layer of sand was dusted over the seeds to retain moisture. Finally, the top of the jug was replaced and the sliced midsection sealed with duct tape, with the cap left off so moisture can get in.

"This is an inexpensive way to get lots of wildflower plants," Sirch said. "Plus, it's a very satisfying thing to do."

At home, the jugs should be placed outside, facing east, Sirch told them.

"Then we're to just leave them out there until spring?" one student asked.

"You are," he said. "Have faith!"

—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.

The wrack line is clearly visible on a small beach near one of the trails at Roosevelt Campobello International Park. Photo: Judy Benson

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."

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Bicyclists enjoy views of Long Island Sound at Saybrook Point in Old Saybrook this fall.
Photo: Judy Benson

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