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WRACKLINES

WHERE CONNECTICUT MEETS THE SOUND



*P*ast, Present and Future
on our
Coastal Waters



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From the EDITOR

MARKING A SIGNIFICANT ANNIVERSARY



As a young mother 30 years ago, I had different priorities than I do today. Quitting my job as a daily newspaper reporter for the first year of my daughter's life, I met the challenges of taking care of my child and making ends meet on my husband's modest income by limiting my world to little beyond my immediate household. Then, the poor state of Long Island Sound and the elevation of a force to help restore its health stayed mostly outside that small scope. But the ensuing years changed that.



That year, 1988, marked a turning point for the Sound. A mass fish die-off caused by oxygen depletion in the western Sound the previous summer caught everyone's attention. People who cared about the Sound realized that without immediate action, the state's most important waterway would continue to deteriorate, perhaps beyond repair. That same year, the University of Connecticut was designated as a Sea Grant College, the highest status attainable in the National Sea Grant network. That enabled it to become fully engaged with other partners in the work of restoring and protecting the Sound.

Starting in the 1970s as a modest extension effort, where the latest science is applied to practical economic and environmental projects, Connecticut Sea Grant grew into a full-fledged public-service organization focused on research, education, and outreach. Since becoming a Sea Grant College Program, Connecticut Sea Grant has funded numerous research projects on the Sound and its watershed; partnered with communities along the shoreline and inland on habitat restoration and climate resiliency projects; educated hundreds of teachers about how to incorporate marine science and the Sound into their classrooms; helped keep commercial and recreational shellfish beds productive while fostering new endeavors in kelp farming; and communicated with the public through this magazine, educational publications, events and its website.

Over the last three decades, as my personal awareness of environmental challenges in Connecticut grew, I developed an attachment to the Sound. My family was lucky enough to be able to move close to the shoreline, and started spending many hours in our small boat exploring the sandy beaches, islands and marshes in Sound's eastern end. In the "way leads on to way" of things observed by Robert Frost, my journalism career eventually moved into covering the environment full time and pursuing a complementary master's degree. In those years, I came to know and admire Connecticut Sea Grant's work and mission, and accepting a job here felt like a natural progression.

My journey and the evolution of this organization can be considered converging episodes of environmental history. That, according to the American Society of Environmental History, is the discipline of "the interaction between humans and the natural world, or among humans and nonhumans, through time." Now, as Connecticut Sea Grant marks a significant anniversary year, this issue reflects on the parallel environmental history of the Sound over those 30 years. From the harbors of Norwalk and New Haven to Niantic, the Sound is much cleaner, but ongoing challenges remain. Two iconic species – lobsters and American shad – have gone in opposite directions in their survival stories. As the articles in this issue point out, there is much to celebrate, much to mourn, and no time for complacency.

Judy Benson

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Above: Norwalk wrack line. Photo: Dave Sigworth/
The Maritime Aquarium

Cover, Top: Wrack line at Lighthouse Point New Haven.
Photo: Judy Benson

Cover, Center: Oystercatcher trio in flight near
Cockenoe Island. Photo: A.J. Hand



Niantic wrack line. Photo: Judy Preston

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Photo: Judy Preston



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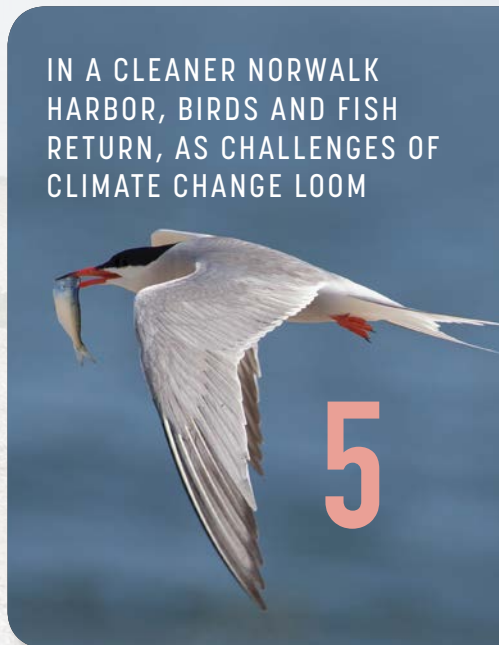


Photo: A.J. Hand

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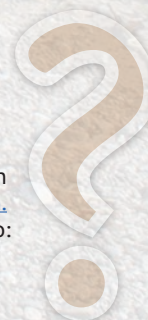
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ASK WRACK LINES

Send us your questions about the articles. Depending on volume, we'll answer as many as possible in a new column on our website, seagrants.uconn.edu. Email your questions to: judy.benson@uconn.edu.



WHAT'S IN OUR NAMES?

What are wrack lines? Specifically, the lines of organic matter (sea grass, shells, feathers, seaweed and other debris) that are deposited on shore by high tides. More generally, it's where the sea meets the land. The photo above shows a wrack line in Niantic. On the opposite page is one from Norwalk, and the cover shows one in New Haven.

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 33 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."

Long Island Sound: better today, but always a work in progress

By Judy Benson

“NEVER FINISHED” MIGHT BE THE NAME OF A NEW CHAPTER IN THIS FINE PIECE OF WATER, TOM ANDERSEN’S 2002 BOOK ABOUT THE ENVIRONMENTAL HISTORY OF LONG ISLAND SOUND.

As a follow-up to the book’s final five chapters (titled “Sprawling Suburbs,” “The Brink of Disaster,” “Sewage,” “The Cleanup,” and “The New Sound”), this new section would recount the progress made in the last 16 years as well as the continuing challenges.

“For years we got away with doing nothing, and then there was this low point,” said Andersen, who began gathering material for the book in the late 1980s, when he was a newspaper reporter in Westchester County, N.Y. That low point came just as Andersen was starting the book, when raw sewage discharges and mass fish die-offs in oxygen-starved waters prompted lawsuits and public outcry.

“That was the crisis that got everyone’s attention, when it started to turn around,” said Andersen, now communications director for the Connecticut Audubon Society.

Today, 30 years later, hypoxia – when dissolved oxygen levels are depleted and marine life suffocates – happens only in small areas of the far western Sound. That’s because of the millions of dollars invested in sewage treatment plants from Greenwich to Stonington. The investments modernized the plants with equipment that removes more of the nitrogen fueling the algal blooms that consume all the dissolved oxygen. Along with that,

SOUND PROGRESS BY THE NUMBERS:

42 million pounds
REDUCTION in annual amount of NITROGEN entering the Sound in 2016 compared to peak years in the early 1990s

N⁷
Nitrogen

NEARLY
62%

REDUCTION in NITROGEN from human sources being discharged into Long Island Sound from sewage treatment plants today compared to 2001

1750 acres
of tidal wetlands and forest restored in the Connecticut and New York sides of the Long Island Sound watershed from 1998 to 2015

335 miles
of migratory fish passage restored by dam removals and installation of fish ladders from 1998 to 2015

Source: Long Island Sound Study

more than 1,000 acres of tidal wetlands and coastal forests have been restored, and dams removed to allow migratory fish to swim upriver to spawn.

As Connecticut Sea Grant marks its 30th anniversary year, taking a look at the last three decades on the state’s signature water body seems a fitting way to mark the occasion. Profiles of three areas of the Sound – Norwalk Harbor in the west, New Haven Harbor in the center, and Niantic Harbor in the east – tell stories of substantial progress, but also ongoing challenges.

“It’s a problem that’s never going to be fixed,” said Andersen.

Mark Tedesco, Long Island Sound Office director for the Environmental Protection Agency, said that while there is much to be proud of when comparing the Sound today with 30 years ago, the work is far from over. True, sewage treatment plants have improved, but now the attention is on reducing polluted runoff from urban stormwater and fertilizers that are degrading water quality in the harbors, bays, coves and other embayments of the estuary.

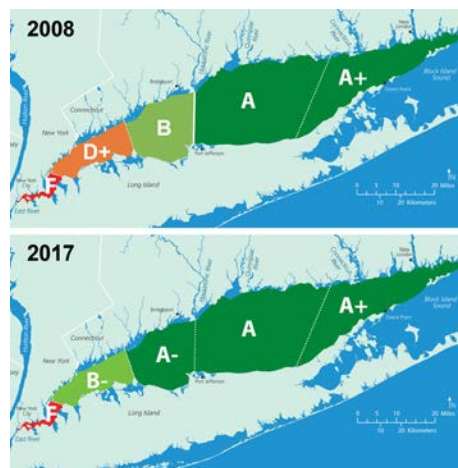
And there are the new threats – warming waters from climate change, sea level rise and invasive species, to name a few.

“We’re grappling with how to become resilient to climate change, environmental justice, sustainability and increasing green infrastructure” that filters pollutants before they reach the Sound, Tedesco said.

“As soon as you say you can stop trying to solve the problem, you get behind,” said Andersen.

As an urban sea continually under stress from the 8 million people who reside in the Sound’s watershed, it needs the people who live, work and play on it to keep paying attention.

“As soon as you say you can stop trying to solve the problem, you get behind,” said Andersen.



Maps prepared by Save the Sound for its Long Island Sound Report Card 2018 show a trend of improving water quality in most of the estuary from 2008 to 2017. The 2018 report gave a grade of A+ to the Eastern Basin; A to the Central Basin; A- to the Western Basin; B- to Eastern Narrows; and an F to the Western Narrows. That area is heavily impacted by nitrogen pollution from human waste and stormwater runoff, dense development, high population and little exchange with the Atlantic Ocean. The grades are calculated based on these indicators: dissolved oxygen, water quality, chlorophyll a and dissolved organic carbon.

In a cleaner Norwalk Harbor, birds and fish return, as the challenges of climate change loom

By Robert Miller



Nesting terns gather on Cockenoe Island, part of the Norwalk Islands, last spring. Photo: A.J. Hand

There were common terns clustered on a sandbar – a spot too small to qualify as one of the Norwalk Islands. But cluster the terns did.

The trick, said A.J. Hand, who was piloting his skiff around the islands with Tina Green, was to settle in the prime real estate above the high-tide mark – the wrack line. Then they could nest safely, without worry about being flooded out. A Westport resident, Hand is an avid birder and bird photographer.

“The first to get here always take the top,” he said.

Nearby was Cockenoe Island, owned by the town of Westport. It’s the best rookery in Long Island Sound for wading birds like egrets and night herons. As

Hand’s skiff approached, the plumage of the big white birds – great and snowy egrets alike – shone as they perched in the summer trees or waded at the back of a green grass-filled inlet.

Nearby was an American oystercatcher – black-headed, bright-eyed, orange beaked. A decade or so ago, they were rare birds in the Sound. Now they’ve come back.

At nearby Goose Island, the double-crested cormorants ruled, gathering on the rocky beach, standing proudly on the sign that marks the island as part of the Stewart B. McKinney National Wildlife Refuge.

“There’s so little habitat for these birds,” said Green, former president of the Connecticut Ornithological Society.

“Especially in Fairfield County.”

There are 25 rocky outcroppings in the archipelagos that make up the Norwalk Islands chain. Some are privately owned, some public property, some part of the McKinney refuge. In the summer, birds nest there. In the winter, harbor seals haul out on the outcroppings.

That the waters of Norwalk Harbor – and the western end of Long Island Sound in general – are supporting this much life is a testament to things getting better. In waters surrounded by millions of people – not even counting the 8.5 million in New York City – and their cars and boats and parking lots and over-fertilized lawns – there are surprising amounts of life in its still-polluted waters.



In recent years, there have been thick schools of menhaden (also called bunker) in the Sound – baitfish for birds and bigger fish alike.

“There are seals here in the winter,” said David Hudson, research scientist at the Maritime Aquarium in Norwalk, which draws about 500,000 visitors a year. “We’ve had humpback whales three years running. There was a pod of 50 dolphins here. We’ve had sand tiger sharks near Bridgeport.”

The harbor is the center of the state’s oyster industry. Norm Bloom & Son harvest oysters from large beds in Norwalk Harbor and beyond, along the length of the state’s shoreline. But all his boats bring what they’ve raked up back to Norwalk for sorting, bagging and sale.

Oysters don’t grow in one spot. Bloom’s crews are constantly moving them from one site to another to ensure their growth from seed oyster to harvestable bivalve. The water quality in the Sound determines where the crews work and what they can do. Sometimes, after heavy rains fill rivers and stormwater-laden rivers pour into Norwalk Harbor, some areas have to shut down completely for a few days until the pollution clears.

“Water quality is everything,” Bloom said. “The quality of the oysters depends on it.”

For the last two years, there haven’t been fish kills in Norwalk

Harbor. Its waters haven’t become hypoxic, when the oxygen levels drop so low that fish can’t live.

“It’s been close,” said Dick Harris, who has been studying water quality in Norwalk Harbor and its tributaries for more than 30 years and now works for Bloom & Son. “But it hasn’t happened.”

Tessa Getchis, aquaculture extension educator for Connecticut Sea Grant, has worked with Bloom and other commercial shellfishermen across the state for the past two decades. She also understands the importance of the water quality

monitoring efforts that are essential to keeping both commercial and recreational shellfish beds healthy.

“Safe seafood harvest is dependent upon clean water,” she said. “Monitoring is necessary to ensure clean water and identify areas that may be impaired by land-based pollution, and is carried out by a collaboration of industry and local and state environmental managers.”

Now, there are even plans to establish a kelp farm off Sheffield Island, the largest

of the Norwalk chain. So there are many reasons to be happy.

“There seems to be a trend where things are getting better,” said James Ammerman, science coordinator for the Long Island Sound Study, which combines the work of Connecticut, New York and the federal Environmental Protection Agency on research in the Sound. Connecticut Sea Grant is part of the consortium of participating organizations.

“It’s a remarkable, remarkable success story,” said Patrick Comins, president of the Connecticut Audubon Society, about the return of bird life in the Sound.

But there is this: Persistent water quality problems plague places like Norwalk Harbor, and they are not going away.

Earthplace, which runs the Harbor Watch program that studies the water quality of the harbor and its tributaries in 17 towns, recently published a study in the journal *Estuaries and Coasts*. It looked at water quality and fish-netting data it had collected in Norwalk Harbor from 1987 to 2016.

The study found that water temperatures and salinity in the harbor’s waters have increased over those 30 years, while oxygen levels have declined. It also found that over those years, Harbor Watch researchers collected fewer demersal fish – fish that live near the bottom of the Sound. That decline included important commercial species such as winter flounder.

Sarah Crosby, who directs the Harbor Watch program, said she agrees that there are reasons for optimism when animals like oystercatchers and whales show up in the Sound.

“But we’re scientists,” she said. “We have to look at the data.”

And that data point in at least one direction.

“We’re losing the cold-water species,” Crosby said.

Ammerman of the Long Island Sound Study said climate change, with its rising ocean levels, higher water temperatures and higher levels of salinity, could alter Norwalk Harbor and the Sound in ways no one is prepared for.

“It’s sort of the 800-pound gorilla that’s sitting in the living room,” he said.

One of the many rocky inlets on the Connecticut coastline, Norwalk Harbor has no sweeping beaches, thanks to the great collisions of ancient continents and the push and retreat of glaciers.



Norm Bloom, owner of Norm Bloom & Son and Copps Island Oysters, stands on one of his docks in Norwalk beside one of the company’s boats. Photo: John Pirro



Kayakers paddle past the Manresa Island power plant in Norwalk harbor last spring. The coal-fired plant closed in 2013. Photo: Judy Benson



A worker at Norm Bloom & Son sorts oysters. Photo: John Pirro

Long Island Sound was itself a glacial lake until its ends broke open and let the Atlantic Ocean in.

“People don’t always connect us with being part of the Atlantic Ocean,” said Dave Sigworth, associate director of communications for the Maritime Aquarium.

That is especially true at the western end where the Sound’s tidal flow – its coming and going – has to pass through a narrow run by Throg’s Neck, into the East River and New York Harbor to reach the Atlantic.

That means that it can take a while for the Atlantic to recharge the waters at the western end of the Sound.

“It’s sort of like Las Vegas,” Sigworth said. “What goes into the Sound tends to stay in the Sound for a while.”

And, what comes into the Sound comes via the rivers flowing north to south.

The Norwalk River is Norwalk Harbor’s largest tributary. It runs 21 miles from Ridgefield, Redding and Wilton before it reaches Norwalk and the Sound.

By and large, it’s an urban river. For several miles, Route 7 – the busiest transportation corridor from Danbury to Norwalk – runs alongside it. Three sewage treatment plants release their effluent into the river. Stormwater – carrying fertilizer from lawns and oil and antifreeze from the roads – drains into it and then, into the Sound.

“It’s our Number One problem,” Louise Washer, president of the Norwalk River Watershed Association, said of all the storm runoff the river carries.

That’s repeated along the intensely populated Connecticut shoreline.

“The Norwalk River isn’t different than any

of our other rivers,” said Hudson, the aquarium’s research scientist.

Combatting all the ways people can pollute the harbor has taken years of persistent work. The city of Norwalk cleaned up its act, and the effluent from its sewage treatment plant. There’s less nitrogen – which feeds algal blooms and leads to hypoxia – coming into the harbor’s water.

Harris, who ran the water testing program for Harbor Watch for 30 years, said the staff there has been dedicated to finding smaller spills – from broken sewer lines to leaking septic systems, and reporting them to Norwalk officials and the state Department of Energy and Environmental Protection, which then acts to stop the pollution. Harbor Watch now tests water quality in 20 rivers and 17 towns.

“You have to check on it, if you see it, if you smell it,” Harris said.

It takes vigilance, in part because the urban infrastructure is very old, too often neglected and therefore prone to leaking.

“The city of Norwalk is going to need an enormous investment to replace it,” said Crosby of Harbor Watch.

To further reduce pollution, the nonprofit East Norwalk Blue Inc. has a fleet of boats that go out and meet other boats in the harbor to collect their sewage. Less freely pumped sewage, less pollution. Started two and a half years ago, the organization operates four boats in Norwalk Harbor and one in Bridgeport Harbor.

Starting in 2017, a new program run by Save the Sound called the Unified Water Study has organized 20 groups to take water quality samples in 33 bays and inlets along the length of the Sound in both Connecticut and New

Climate change is altering ecosystems – in Norwalk, in Long Island Sound, in our world – as we live and breathe.

York. By using the same testing protocols at each site, the study's leaders hope to provide the Sound's communities with the most comprehensive water quality data available.

"We've had some exceptional groups studying water quality in different bays," said Peter Linderoth, water quality program manager for Save the Sound. "Now we have standard testing procedures, and we can have comparable data that will allow us to make studies from bay to bay."

But all this work – and all the improvements in water quality in Norwalk Harbor and the Sound in general – will be put to the test by climate change.

Ammerman of the Long Island Sound Study said that as Connecticut's summers get hotter, so will the Sound's waters. That will mean more stratification of the water column, less mixing of water within the column, less oxygen in the overall mix and potentially more fish kills.

"We've done all this work to reduce nitrogen levels and now climate change is trying to undo it," he said.

Climate change will also mean changes in the harbor's ecology, as salt water moves further onshore.

"The marshes are moving inland," said Hudson of the Maritime Aquarium.

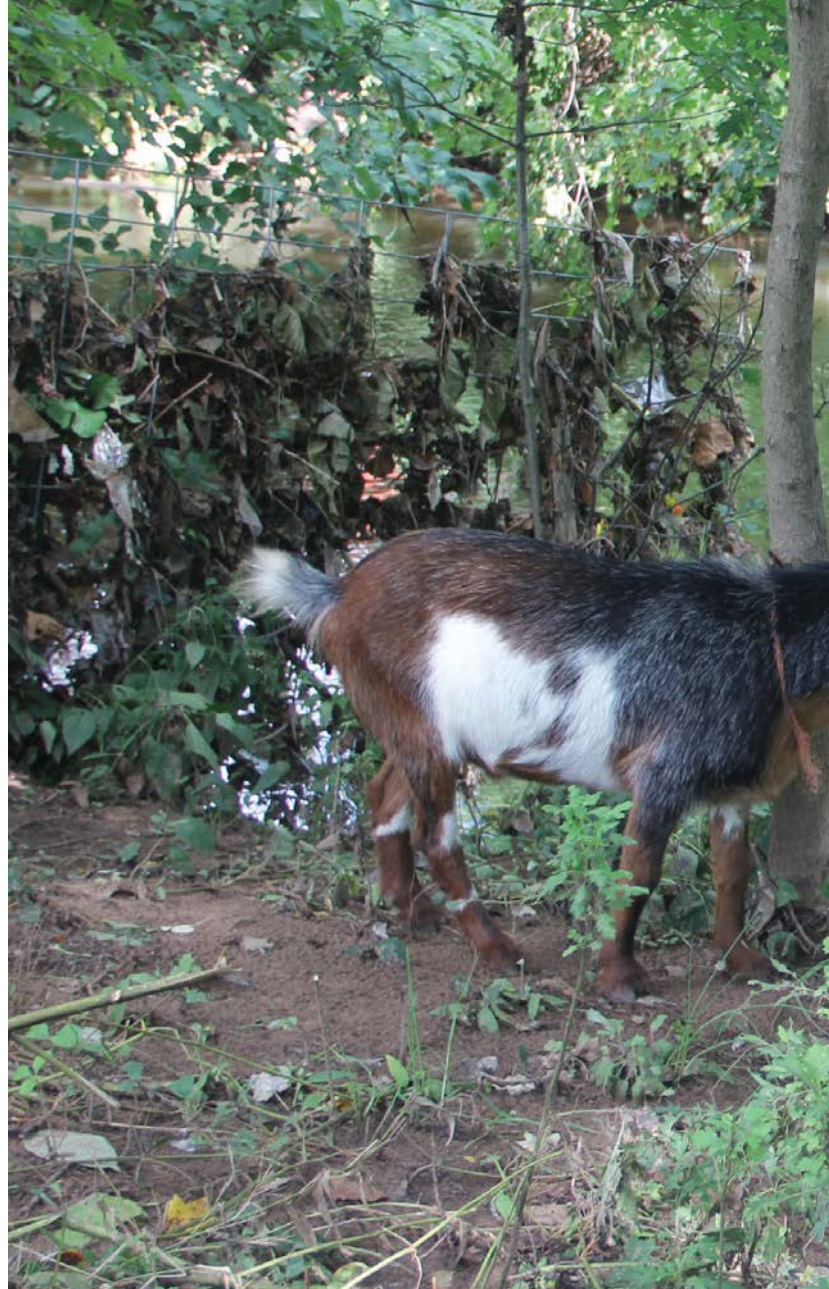
And that will mean changes in the fish populations and the lives of the people who harvest those fish and shellfish. Winter flounder may be leaving, Hudson said, but southern species like black sea bass are arriving. Lobsters have all but disappeared in the Sound. Blue crabs may take their place.

And none of this is hypothetical. Climate change is altering ecosystems – in Norwalk Harbor, in Long Island Sound, in our world – as we live and breathe.

"It's happening right before our eyes," Hudson said.



Oysters shells are piled near the Norm Bloom & Son docks in Norwalk. Photo: John Pirro



Goats that spent last summer feasting on invasive plants at a New Haven city park are just the latest actors in the story of how this urbanized coastal landscape is reducing its burden on Long Island Sound.

"We're trying to make Edgewood Park better for everybody," said Stephanie FitzGerald, president of the Friends of Edgewood Park.

By consuming thick stands of Japanese knotweed, bittersweet, multiflora rose and other non-native flora, the six goats, loaned from a farm in Rhinebeck, N.Y., are clearing the way for the return of native plants that will in turn benefit native insects, birds and other wildlife. That will lead to a healthier environment – and more food for the resident fish, turtles and frogs – along the West River, which flows through the park and ultimately into the Sound. It's one more piece of the complex puzzle of how this coastal city is connecting the dots between what happens on land and the health of its harbor, where productive shellfish beds and popular swimming

As New Haven takes a green-first approach, the harbor gains too

Story and photos by Judy Benson



One of six goats brought to Edgewood Park in New Haven grazes on invasive plants along the banks of the West River this fall.

Inset: David Hill and his daughter Makenna Hill, 3, enjoy the beach at Lighthouse Point Park in New Haven with Jackie Ruiz and her son Jaiden Freytes, all of the Springfield, Mass., area, in July. “The water is excellent,” David Hill said.



beaches share the waters with oil tankers and cargo ships. The busiest shipping port between New York and Boston, this city of 130,000 residents that’s home to one of the nation’s great universities prides itself on its environmental as well as its industrial and academic identities.

“I go to Lighthouse Point beach all the time, and there are very, very, very rarely beach closures,” said FitzGerald. Also serving on the West River Watershed Coalition, she understands how the health of the river matters to the water quality downstream where she likes to swim, “so we’re trying to make sure the river gets cleaner and cleaner.”

The efforts by the Edgewood Park and West River

watershed groups complement larger initiatives throughout the city – by municipal, nonprofit and academic groups working together and independently – to revamp the built environment to lessen its impact on rivers, marshes and the Sound, and at the same time reduce flood risk in residential and commercial areas. In recognition of its efforts, in July the city was named the 2018 recipient of the Roy Family Award for Environmental Partnerships from the Kennedy School of Government at Harvard University.

“It’s become a green-first approach in all our departments,” said Dawn Henning, project manager in the city’s Engineering Department.

Starting in 2013, she said, the city began installing bioswales – recessed areas with soils and plantings



The self-regulating tide gates installed on the West River five years ago allow salt water to flow upstream, restoring a tidal marsh and reducing flooding in the surrounding area.



Families enjoy swimming on a hot July day at Lighthouse Point Park in New Haven.



Workers from Emerge Connecticut Inc. construct a bioswale near the intersection of Wall and Church streets in New Haven in October.



Gaboury Benoit, who teaches environmental chemistry at Yale University, walks past a completed bioswale in full bloom in July.

that capture and store stormwater. These trap road pollutants and excess nutrients from fertilizers and pet waste before they get into waterways. In the 600-acre downtown area alone, 40 bioswales have been built and 160 more are slated to be constructed by next summer. Founded in 1784, New Haven, like many cities in the Northeast, has aging infrastructure ill-equipped to handle the more frequent intense storms happening with climate change, nor was it designed with the health of the Sound in mind. The bioswales and other green infrastructure are, Henning said, “retrofits added on to the old infrastructure, so they’re siphoning off the flows that would have been going into the sewer system” or flooding neighborhoods, and eventually emptying into the Sound.

For Henning, being part of projects that help keep the estuary clean is personal. She grew up in neighboring Milford, where she often enjoyed swimming in the Sound.

“That’s what drives me to do what we do to work to improve it,” she said.

Michael Dietz, associate extension educator with Connecticut Sea Grant and UConn Extension, works with cities and towns around the state on new approaches to stormwater management that help keep polluted runoff out of waterways. New state regulations that took effect in 2017 are a main motivator for urbanized communities to take this on, he said, but some have embraced it more than others.

“New Haven is a model and

a leader,” said Dietz, who also directs the Connecticut Institute of Water Resources.

Stormwater, he said, “has been called out as a major source of pollution into Long Island Sound,” second only to sewage treatment plants. “But we’ve made leaps and bounds with stormwater over the last five years.”

So, too, with sewage treatment plants, said Curt Johnson, president of the Connecticut Fund for the Environment/Save the Sound, which has its offices in New Haven. Johnson grew up in the Fair Haven section of the city, and remembers the “worst hypoxic event” to happen in the Sound in modern times that came 30 years ago. Fish kills in the western Sound were a wake-up call, he said, prompting major investments in sewage treatment plants to remove more nitrogen from treated effluent before it was discharged. Excessive nitrogen was spurring algal blooms, which led to the oxygen-starved waters that killed marine life.

“We’re removing 60 percent of the nitrogen now,” he said. “Certainly challenges remain for New Haven Harbor and the Sound, but if we hadn’t made the clean water investments in Long Island Sound starting in the 1990s after that huge hypoxia event, I’m convinced on a gut level that we would have lost the central and western Sound. Instead we’re seeing it rebounding.

“For the last two summers,” he continued, “we’ve had humpback whales in Long Island Sound. That’s because now there’s something for them to feed on. If you set the table, these animals will come back.”

One of the most important New Haven projects Johnson’s organization spearheaded focused on the West River downstream from Edgewood Park, along with the tidal marshes in between. About five years ago, CFE/Save the Sound received a federal grant to replace tide gates on the river that had been cutting off saltwater flows into upstream areas, effectively killing brackish marsh areas. New self-regulating gates that now allow marine waters into the marshes “restored the tidal flushing” and helped prevent

flooding of some nearby commercial streets and buildings. Once the new tide gates were installed, they were turned over to the city.

For Gaboury Benoit, Yale professor of environmental chemistry, the return of tidal flows into the West River marshes provided an ideal laboratory for documenting the value of restoration projects to the environment. Funded by Sea Grant, he is now researching how heavy-metal contaminants are captured in sediments of tributaries flowing into the Sound, keeping them out of the estuary.

“I’m looking at the hydrology and the chemistry of it,” he said, while he and a graduate assistant collected water and sediment samples for the project one day last summer. “It’s possible that now this system is acting as a trap, so it’s providing ecosystem services.”

The restored marsh areas are also providing spawning habitat for migratory herring, shad and alewives. The old tide gates, installed a century ago in a misguided attempt at flood and mosquito control, prevented fish passage.

“We’re observing fish all the way up to Konolds Pond in Woodbridge,” said Gwen MacDonald, director of Green Projects for CFE/Save the Sound. “There’s a diverse wetland community there that didn’t exist before.”

The 2015 removal of a dam in another section of the West River, on a preserve owned by the New Haven Land Trust, has further improved water quality.

For retired coastal ecologist Ron Rozsa, seeing the condition of the West River and its marshes today compared to 30 years ago validates the many years of work he and others did to call attention to the need to restore coastal habitats for the health of Long Island Sound. Rozsa, who worked for the state Department of Energy and Environmental Protection, identified the West River and 14 other degraded tidal areas as restoration priorities in the early 1980s.

“We set up a series of restoration policies for coastal wetlands, tidal flats and tidal wetland restoration,” he said.

Today, Robert Granfield, a commercial fisherman who raises clams and oysters in beds in New Haven and Milford harbors, is among the beneficiaries of these multiple efforts. The progress he’s seen over the last 30 years he’s been making a living on the water has allowed him to keep doing what he loves.

“Over the years the water quality has really improved,” he said. “There are a lot more fish in the Sound, and the shellfish areas are very, very productive. Of course there are still things that need to be watched carefully.”



The 26-acre Cranberry Meadow Farm in East Lyme is within the Niantic River watershed. Owners Tom and Nancy Kalal are local advocates for sustainable land use within the watershed.

It takes a watershed to save a bay

From its headwaters to the beach, Niantic Bay needs everyone’s effort to safeguard it into the future

Story and photos by Judy Preston

Tom and Nancy Kalal live in the Niantic River watershed, in the town of East Lyme. Their driveway winds through fenced-in pasture, past rows of brightly painted beehive boxes. Surrounded by outbuildings, the house is nestled among flower and vegetable gardens and signs for local honey and beef, the products of Cranberry Meadow Farm.

Tom Kalal graduated from UConn with a degree in ornamental horticulture, while his wife grew up on a dairy farm just down the road. It’s clear that they love their farm, but he said that it wasn’t until he took the UConn Master Gardening program, and then the advanced Master Gardener Coastal Certificate program, that his thinking began to really change. In 2011, he sold his lawn-care business in Waterford, and the two of them have become advocates for sustainable land use within the watershed – be that farm, residential backyard or municipal property.

“I don’t think people in the watershed are aware of the bay, except the people who can see it,” Tom Kalal said, seated at their kitchen table.

Their awareness of what it means to live in a watershed has



McCook Point, overlooking Niantic Bay and Long Island Sound, is at the southern end of the Niantic River watershed.

grown over time. Cranberry Brook leaves their land and runs into Latimer Brook, one of the two primary tributaries that join the Niantic River on the way to Niantic Bay and Long Island Sound.

There was a time when focusing on a river's entire watershed as a means to protect water quality was new, but that is not the case today. That doesn't mean that it's gotten any easier. In 2006, a state-initiated Niantic River Watershed Protection Plan, covering all the areas of East Lyme, Waterford, Salem and Montville that drain into the river, was adopted. Following that, the Niantic River Watershed Protection Committee convened in 2008.

"It's one of the best-studied watersheds in the state," according to Judy Rondeau, watershed coordinator for the Eastern Connecticut Conservation District. "Our board of directors [of the protection committee] is so dynamic and committed. It's made up of shellfish and harbor management commissioners, environmental professionals, land use board members, teachers and professors and business professionals."

But she agrees that "our greatest challenge is up the watershed."

"So much of the focus is on the tidal areas," said Stephen Gephard, fisheries biologist with the state Department of Energy and Environmental Protection. "Watershed is still a tough concept."

It means getting the residents of Montville, for example, to appreciate that development there can impact the Golden Spur – a village at the head of the river 20 miles to the south – as well as the waters further downstream, he said.

Latimer Brook hosts important diadromous fish runs that include alewife, American eel and sea-run brown trout. One of the state's oldest fishways is operated by the DEEP at an old milldam a half mile east of Flanders Four Corners, one of two commercial centers in East Lyme.

Good water quality and the protection of habitat along these waterways are important to protecting these fishery resources, according to Gephard. Migratory fish are useful examples of the ecological connections between the inland portions of a river's



Good water quality and the protection of habitat are important to protecting our fishery resources.

– Steve Gephard



One of a pair of oxen used by Nancy and Tom Kalal on Cranberry Meadow Farm.



The 450-acre Oswegatchie Hills Nature Preserve provides hiking opportunities through lush vegetated slopes and past impressive stone ledges. While the property is protected, another 238 acres adjacent to it are vulnerable to development.

watershed and the estuarine resources of Long Island Sound. They could be poster children for the importance of protecting all of the watershed landscape, not just what's within view of the bay. Gephard believes that the main cause of the decline of migratory fish in Latimer Brook is mortality in the ocean. But that makes access to good-quality inland spawning sites that much more important.

Fred Grimsey has lived along the Niantic River for 53 years, and worked to protect the Oswegatchie Hills – 650 acres of rugged upland abutting Niantic Bay – for the past 13 years. While more than 400 acres are now a Nature Preserve, an adjacent area of 238 acres is threatened with development. There aren't many other large forested tracts left along the bay. Early on, Grimsey and several others got involved with water quality, working with the Ledge Light Health District.

"After a rainfall, we'd get readings and take samples from five spots on the river and I'd drive to New London with the samples to have them tested," he recalled.

Some of those readings ended up being five to seven times over the bacterial limit that triggers the closure of the town beach.

Today some of the biggest threats to the Niantic River and its water quality are coming from development of the land surrounding the headwaters. In 2015, 35,000 solar panels were erected on agricultural land near the Kalal farm in East Lyme. A second proposal by the same company on nearly 100 acres will involve clearing forestland. The Kalals and others are concerned that sediment-laden runoff from the property flows into the streams that feed the Niantic River.

Nancy Kalal, who along with others in the area mobilized in an effort to prevent the initial solar farm, recalled the words of another local farmer who warned: "You dig a shovel in there and you're going to know downstream."

While sediment is a long-standing threat to aquatic life in watersheds, it's what is attached to those sediment particles – especially excess nutrients such as nitrogen – that cause the greatest cumulative impacts downstream. And while polluted runoff has been identified in the Watershed Plan as the greatest water quality challenge to the Niantic River, the



plan also states: “It is the most manageable of all the potential sources of pollution to the river.”

According to one fisherman on the river, Niantic Bay scallops were once “available on menus as far away as Europe” and fabled for their sweetness. But water quality variables – including excessive nitrogen, increased water temperatures and disease – have taken their toll on the river’s ecology. As the eelgrass beds central to healthy scallop populations declined, so too went this once important fishery.

Many of the residential areas of the lower watershed along the bay have been hooked up to sewers, but septic systems elsewhere in the watershed likely still contribute to the total nitrogen load that is impacting the bay.

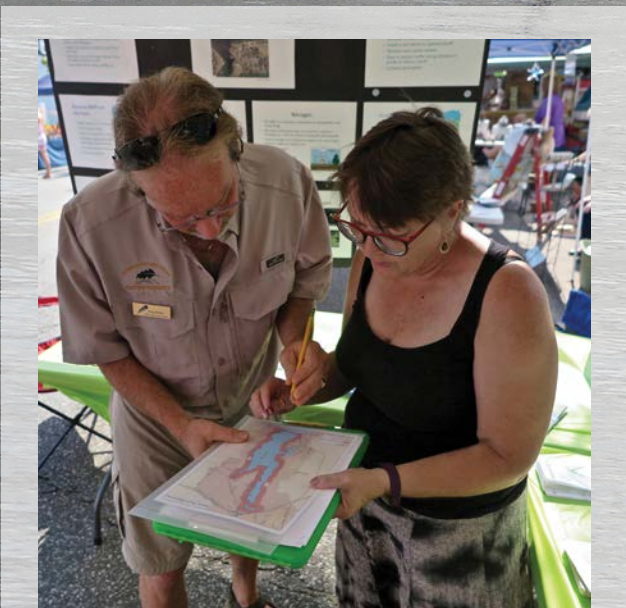
Downstream in neighborhoods with a view of the bay, Robert Burg and a small group of volunteers have been going door-to-door in East Lyme and Waterford. They are asking residents if they would be willing to adopt river-friendly lawn care practices to protect Niantic Bay.

Of the 96 people they have talked with, 68 agreed to put a sticker on their trash or recycling bin, declaring their support for and adoption of lawn care practices that can make a difference for water quality. That kind of success rate is unusually good. Burg, communications coordinator with the Long Island Sound Study, is pleased.

“People really care about a healthy and safe lawn in their community that also protects Niantic Bay,” he said.

It’s been twelve years since the Niantic River Watershed Protection Plan came out. Rondeau, the watershed coordinator, will be working this spring with the many partners from the four towns with land that drains into the bay to revisit the plan, evaluate what has and hasn’t been done, and how to move forward. The 2006 plan cites the “incremental and cumulative changes in land use that contribute to nonpoint pollution” as one of the greatest challenges that the watershed faces. It will take the efforts of the entire watershed to realize the goal of a clean river, bay and Sound.

But Rondeau is optimistic. When asked what the best part of her job is, she replies, “I love getting out and talking to people. I’ll say, I’m part of the Niantic River Watershed Committee, have you heard of us? And more and more, the answer is, yes.”



Niantic River and Bay are popular spots for sailors and fishermen. Above, Judy Rondeau, Niantic River watershed coordinator, talks with Greg Decker, president of the Oswegatchie Hills Nature Preserve, at the Celebrate East Lyme day festival in July, where information about watershed protection efforts is shared with the public.





A lobster from southern New England is offered for sale at the Fulton Fish Market in New York City in 1943. Source: Library of Congress archives

Long Island Sound to lobsters: is this farewell?

By Christine Woodside

Twenty years ago, Long Island Sound was home to a thriving fishery of the American lobster. Hundreds of lobster boats brought in 3.7 million pounds worth more than \$12 million to the Connecticut side, and almost double that catch arrived in New York ports. In a half-century, Connecticut-landed lobsters had increased twelvefold (from 226,300 pounds in 1950). It was a tiny economy next to the much larger Maine lobster fishery, but it represented the top of a boom for the Sound and a livelihood for hundreds of fishers.

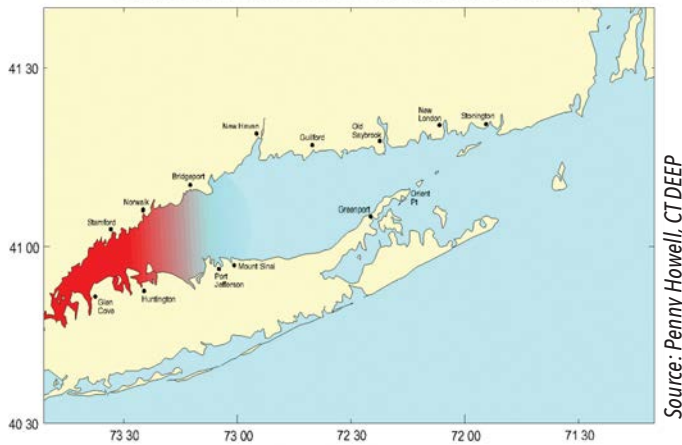
And then, in 1999, something went terribly wrong. More than half of lobsters commercial fishers pulled up were dead in the traps or died before they could get to market. In the years since, 99 percent of the lobstermen in the once lobster-abundant waters of the western Sound have gone out of business. What caused this? Scientists have spent the years

since then gathering data with the help of lobster trappers and coming up with an answer.

Three potential causes have been identified and studied, but the evidence points strongly to one factor in particular. It's temperature. The Sound today is too warm too often for this cold-adapted species. Despite some years of slight increases in their numbers, Long Island Sound lobsters have failed to recover from the 1999 die-off, when the warm conditions persisted for more than 60 days.

There is no better public example of climate change in Long Island Sound than the lobster. Its demise connects directly to warmer temperatures. Perhaps the most poignant detail in this tragedy is that these lobsters eventually die out in situ, wired by instinct not to relocate. They are not migratory animals. The remnant population remains here. Every instinct tells these lobsters not to move.

PRINCIPAL AREA AFFECTED BY LOBSTER DIE-OFF IN 1999



Source: Penny Howell, CT DEEP

What happened

Scientists from the Connecticut Department of Energy and Environmental Protection, the University of Connecticut and other institutions have tracked three stressors that hit the ecosystem at once in that dramatic year of 1999.

First came pesticides. West Nile virus, a bird-carried pathogen from Africa whose presence was confirmed for the first time that year in birds and mosquitoes in the New York-Connecticut region, was the spark. The potentially fatal virus soon would spread to horses and people, and in response to what seemed a potentially dangerous threat, several cities and towns began floating solid cakes of the chemical methoprene in storm drains. New York and Connecticut officials also sprayed other mosquito-killing chemicals from airplanes.

Although some of the pesticides do hurt lobsters in laboratories, several studies failed to find a link between pesticide use and the lobsters' demise, according to Penny Howell, a retired DEEP fisheries biologist who spent the last part of her career studying what happened to the lobsters. The worst

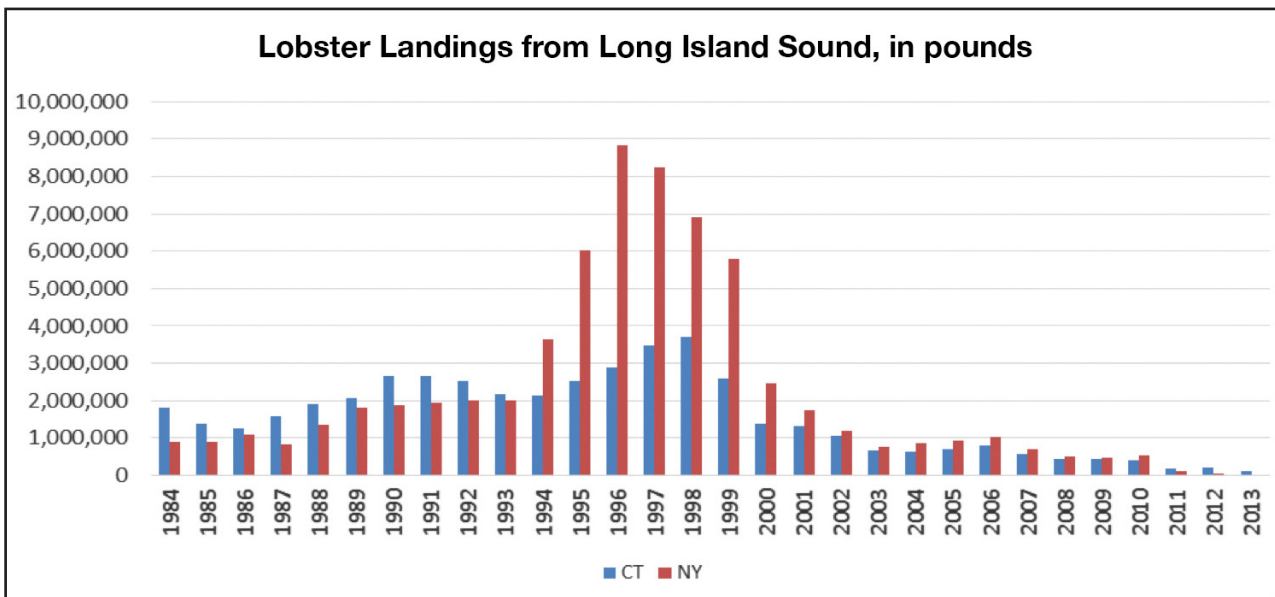
of the pesticides used to kill mosquitoes, malathion, could have hurt lobsters in the extreme western Sound, scientists from DEEP, Connecticut and New York Sea Grant and the University of Connecticut found.

"We really thought that was just too minimal to be a real cause," Howell said. "It was not a wide enough an area and long enough in duration to really be the principal cause."

Hypoxia, or low levels of dissolved oxygen in the water, does not kill lobsters either unless the levels are very low, 2 milligrams per liter of dissolved oxygen, she said.

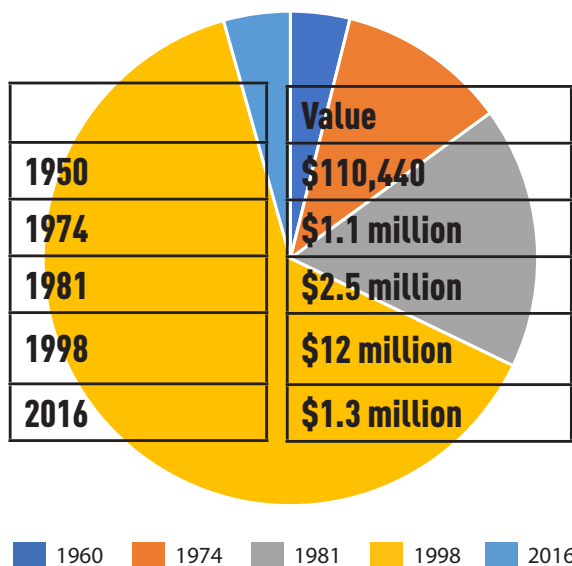
Diseases were a second major stressor. Epizootic shell disease, an infection causing lesions, hit lobsters badly in eastern Long Island Sound in 1999. They looked mottled and weak when pulled out of the water. This was the focus of a study published this fall in the *American Naturalist* by scientists from Millstone Nuclear Power Station in Waterford and the Virginia Institute of Marine Science at the College of William and Mary. It looked at market data over 34 years and concluded that warmer water causes lobsters to molt quickly in the spring, making them more vulnerable to shell disease. First warmth, then comes vulnerability to shell disease. These conditions may also have accelerated the growth of a strain of parasitic amoeba that actually killed many of the lobsters that year. More than 90 percent of lobsters examined that year were infected.

This leads to the last and most significant stressor that killed lobsters in 1999. For about two months that year, the Sound warmed to temperatures higher than lobsters can tolerate. At the high point, the temperature measured nearly 72° F (about 22° C), about 3° warmer than the hottest temperature *Homarus americanus* can stand. The previous winter was also warmer than normal. Warmer water in the Sound has become the norm. The *American Naturalist* study noted what many scientists now agree is the reality: The American lobster "is declining at its southern geographic limit."



Source: Penny Howell, CT DEEP

Value of CT lobsters



The temperature in the Sound is increasing at about 0.8° F (about 0.47° C) per decade, that study reported. James O'Donnell, professor of marine sciences at UConn, reported that the warming over the last 100 years is about 1.8° F (about 1° C).

"This trend is resulting in profound impacts on biological communities such as fish and shellfish," the University of Connecticut and Connecticut Department of Energy and Environmental Protection reported in their joint Long Island Sound Resource Center climate change monitoring report (available at: <http://www.sound.uconn.edu/lissm/climatechange.html#temperature>).

This trend is having profound impacts on biological communities such as fish and shellfish.

Since the 1990s, lobster landings from Long Island Sound have decreased sharply. Basically, just a remnant commercial fishery still exists. Howell now gives public talks summarizing the surveys and studies she coordinated on the lobster demise.

The 1990s were "a big boom," she said. "The lobster really is a cold-water animal that can't tolerate [warm water]."

Landings of lobsters for sale in markets hovered around 2 million to 3 million

in Connecticut in the 1980s and 1990s. Since then, the numbers of lobsters landed have dropped so significantly that they don't show on the state's graphs of lobster landings over time. This crash cannot be blamed on the lobster trappers. It's not the fishery's fault, Howell said.

A short economic history

The commercial lobster industry in the Connecticut waters of Long Island Sound peaked and then began to decline over a relatively short period.

Although lobsters have served as food ever since civilizations here devised ways to trap them, selling them on a large scale grew only after World War II. The number pulled out of the Sound for sale grew steadily from 1950, peaked 48 years later, and by 2016 had dipped back to about the 1950 number. Even as they begin what could be a final decline, lobsters remain a valuable delicacy.

New York landings from the Sound trend higher in more recent years, possibly because the figures are estimates, but for the most part the New York landings match Connecticut's.

The rate of harvesting was "pretty high when the population went high," Howell said. "We saw a brief increase in abundance which the fishery took advantage of in 2005. It's no great demise in harvest rate through 2013, but it's hard to say that overharvesting caused the problem, because we should have seen some kind of an increase in 2002, 2003 and 2004, and we didn't. It's getting the fishery off the hook. It's not their fault."

The heat

Lobsters become sluggish in warmer water. One 2006 study found that

lobsters in too-warm waters become sick. The animals can adjust to a warmer average temperature, but the result then is that they suffer heart problems during cold spells, the study concluded. They become less resilient.

Beyond the Sound and north of Cape Cod, lobsters are doing well. In Maine the population seems to be enjoying an incredible boom. But that boom is feared to end at some point. Scientists are watching the water temperature trends in the Gulf of Maine and Georges Bank. More and more researchers and resource managers are starting to investigate the effects of environmental changes on American lobsters in northern New England waters.

Could lobsters from the Sound simply crawl their way to colder waters? Probably not. Lobsters are not migratory animals. Studies have shown consistently that the lobsters in the Sound tend not to move much.

But they would move if they could find a food source in colder water, Howell explained. The trouble is the way the Sound is set up. With cooler water coming in from the East River at the western end and the Atlantic Ocean at the eastern end, a whole lot of warmer water gets sandwiched in the center, and the lobsters don't realize there's anywhere else to go.

When the Sound warms up, she said, it warms up in the middle first and then at both ends, because cold water comes in from either end. Those lobsters on the mud bottom of the western Sound can't get out to the open ocean unless they migrate east through the warmer central Sound and toward the Race, the narrow opening to the Atlantic Ocean at the eastern end. But lobsters will never go toward warm water if given a choice.

"What we realized was that when the Sound warms up, it warms up from the middle and then the edges," she said. "That means that these animals here would have to go from warm water to warmer water and we do have published laboratory behavioral experiments that

69°F | 20.5°C

Maximum temperatures that lobsters survive



Lobster with shell disease. Photo: National Oceanic and Atmospheric Administration

show that if you put a lobster in a setup where the animals choose between very small changes of temperature, two streams of water coming at it, it will always go to colder water. It will never go to warmer water.”

She added, “They would have to be very good navigators in order to get out. They only will go if there’s no food. And they only will go if there’s a way for them to get out.”

The People Side of the Lobster Disaster



Tarsila Seara, assistant professor and coordinator of marine affairs at the University of New Haven, has recently

been awarded funding from Connecticut Sea Grant to study the impact of the collapse of the lobster population on lobstermen. More photos of Connecticut lobstermen, along with a Q&A with Seara, can be found at: <https://seagrants.uconn.edu/?p=4300>.



Photo: John Collins / UConn





Had any shad lately?

It's time to rediscover Connecticut's state fish

Story and photos by Judy Benson

Last August a very important meeting happened in our fair state, right here in my office at UConn's Avery Point campus.

Never mind that I was the only one attending, and appointed myself Empress for Life of this new group I'm calling SECT. Once word gets out about Shad Enthusiasts of Connecticut, I'm sure the organization will be pulling in members more numerous than the American shad that school by the thousands in the Connecticut River each spring.

OK, perhaps that's an exaggeration. And I really didn't start SECT (though I do like the title of "Empress for Life"). But maybe a group like it should be created to spread the word about shad. For now, let's just pretend SECT exists, and this article is the first step in carrying out its mission.

After all, American shad are the official State Fish, and Connecticut has the last commercial shad fishery among the six New England states and New York. Until the first half of the 20th century, this species supported hundreds of commercial fishermen all along the East Coast and into Maritime Canada, yet today only remnant fisheries remain in a few mid-Atlantic and Southern states. In Connecticut, some people term its commercial shad fishery a "relic,"

hanging on with just six or seven active fishermen.

"The resource itself is in good shape. It's the tradition of shad eating that's dying," said Stephen Gephard, supervising fisheries biologist at the state Department of Energy and Environmental Protection.

The shad population in the Connecticut River, where the commercial fishery lingers, is healthy enough to support many more fishermen than the few who currently set their nets there, he said. Whenever he gets a chance, Gephard likes to encourage people to partake of local shad, calling it "guilt-free eating" that helps maintain the state's cultural heritage with responsibly harvested, fresh, nutritious seafood. In 2017, Connecticut's commercial shad harvest totaled just below 50,000 pounds. Compare that to Connecticut Sea Grant's inaugural year in 1988, when the harvest was 400,000 pounds, and to 1952, when it was 475,000 pounds.

"The only reason our shad numbers are low is because there are so few people fishing," Gephard said. But with growing interest in local food, the time is ripe to educate potential customers about this short-season fish, found in markets and on



John Smoloski steers his skiff on the Connecticut River near Portland on a May night during shad fishing season.

restaurant menus only from the end of April through early June.

"There are those who claim the Connecticut River shad tastes better because it has the coolest water" compared to shad from the other remaining commercial fisheries, Gephard said.

Shad, he noted, are an anadromous species, spending winters in the salty Atlantic until their primal clocks trigger them to swim into Long Island Sound, then upriver into fresh water to spawn. In the Connecticut River, a main thoroughfare for this member of the herring family, they historically would travel as far upstream as Vermont and New Hampshire, turning the waters into a fertile soup as they expelled eggs and sperm along the way.

Alicea Charamut, river steward for the Connecticut River Conservancy, sides with Gephard when it comes to shad and shad eating. Her group's

advocacy for New England's major river has included support for removal of the dams that blocked shad migration and truncated their spawning habitat.

"The population really started dropping off in the late 1800s when the Holyoke [Massachusetts] dam was built," she said. "They came in by the millions, until the rivers were dammed up."

With dam removals and new fish ladders built over remaining dams in recent decades, shad numbers have climbed back. Fluctuating with yearly conditions, recent numbers are hovering between 270,000 and 536,000 fish counted yearly at the Holyoke Dam fishlift. Though the numbers are moving in the right direction, they're still a ways from the 1.5 million to 2 million fish that is the long-term goal for restoration of the species – a key component of the food web on which ospreys, eagles, otters and other wildlife depend.

If humans become a greater part of this food web, so much the better, Charamut said. More people eating Connecticut River shad means more people caring about the health of the river.

"It's part of our culture. It's a good thing," she said. "It's something that our ecosystem can provide that's an important part of our maritime and ecological history."

Shad fishermen couldn't agree more. With locally produced fruits and vegetables, cheeses and craft beers winning all the popularity contests, they want Connecticut-caught shad to retake its rightful place, as sought-after as fresh-picked corn on the cob from the neighborhood farm stand in the summer.

"We need more people eating shad," said longtime shad fisherman Dan Russell of East Haddam, who's witnessed the shad fishery go from 100 boats or more in the river to its current handful. Among his main customers these days, he said, are the annual shad bake in Essex sponsored by the Rotary Club and the Connecticut River Museum, and families of Indian and Pakistani descent who appreciate it as a similar substitute for a fish native to those countries. But too many other Connecticut residents have never tried it.

"People need to be made aware of it," said Russell's wife, Sue. "It's our Connecticut fish that comes up our rivers to spawn. But this generation is hardly even aware of it."

Now, enter SECT to help educate people about this native delicacy, especially delicious grilled in foil or in the traditional way, on an oak or cedar plank. It can also be baked, smoked, pickled or fried. Last spring the Empress for Life-to-be traveled around the lower Connecticut River learning about shad and the people who want to see the shad tradition in this state not just barely alive, but revived. Interspersed with these visits were stops at local fish markets to buy shad, to then cook and enjoy it with family and friends – several of whom

were tasting it for the first time. Everyone was a convert, especially after learning it's higher in healthy omega-3 fatty acids than wild salmon.

The first stop on my shad tour was a visit to the Haddam Shad Museum, housed in a former "shad shack" market, with a weathered Brockway skiff that was once the standard vessel for the fishery parked outside.

There, I met one active commercial shad fisherman, Jeremiah Lundgren, four former commercial shad fishermen, and one who still fishes for shad with a pole and shad darts (recreational shad fishing is allowed on the Connecticut River from April 1 to June 15). Inside are displayed maps showing the section of the river with the prime fishing grounds, from Middletown to Higganum Reach, boat lanterns and sets of boning knives – shad are notoriously boney – alongside yellowed newspaper articles and a video about shad fishing. The men reminisced about the heyday of the fishery in the 1950s when trucks from New York City would gather in the village center to buy the catch – whole fish, boned fillets and the rich-tasting dark orange roe sacks, the most valued part. Because it's a short-season fishery, none counted on shad for their entire livelihoods. They talked about the boom after World War II, when Connecticut River shad were being exported to Europe to feed populations short on food as they tried to rebuild.

"I worked in construction, and a lot of times I'd get laid off, and my brother would go out with me and fish," said Robert Nettleton of Higganum. "I did it for 18 years altogether, after I was out of the service. I'd be out there when it was windy and raining and bring in 1,400 pounds of fish in one night."

At one time, huge nets hauled in with a capstan (a motorized cylinder) were set across entire sections of the river, but eventually these were banned because they were capturing virtually all the shad trying to reach spawning grounds.

Today, Lundgren and other shad fishermen use an 800-foot monofilament net cast from their boats, signaled by the April full moon and water above 50 degrees to start the yearly ritual.

"It's all temperature dependent," Lundgren said.

Now in his 50s, he started fishing for shad as a teenager, learning from his uncle, and has been doing it ever since.

"I do everything, from start to finish," he said. "I fish, I bone, I fillet, I sell the roe, I smoke it. It's backbreaking work, hauling in the net full of fish. But it's something that gets ingrained in you."

“Backbreaking” is no understatement. It also demands upending your entire life for a five- to six-week stretch. After talking with Lundgren and the others at the Shad Museum, I met John Smoloski and his deckhand at a marina in Portland, and learned more about what it takes to be a commercial shad fisherman.

I arrived at the marina around 9:30 on an early May night, when the boatyard was dark and quiet and many of the boats were still shrink-wrapped for the winter season. Commercial shad fishing, Smoloski explained, is done at night on the incoming tide, the best time because of their schooling habits and extreme sensitivity to light. By the time I met up with him, it was his 14th night out for the season, starting each time well past dark, fishing until dawn. Then he’d spend the early morning hours at the dock boning and filleting the fish and getting them to the wholesaler before going home to bed for a few hours – and then start the routine over again. For the five- or six-week shad season, he puts his home renovation business on hold.

“Shad fishing is a substantial part of my income,” he said.

Now 57, Smoloski is a fourth-generation shad fisherman, starting when he was 16 years old. He remembers his biggest hauls in the 1980s.

“One night I had 1,000 pounds in one set,” he said. “I was about 25 years old. I was there for over an hour hauling the net in, but I was really motivated.”

On this night, he and his crewman set the net by lantern light, then drift for about 45 minutes before pulling it in. The size of the spaces between the nylon mesh, he said, ensures that only fish of marketable size get caught in the net. The fish average about four and a half pounds each.

On this night’s first haul, he pulls in 30 or 40 shad, along with a few catfish



Former shad fishermen Bob Nettleton, left, and Richard Watral, center, both of Higganum, and current shad fisherman Jeremiah Lundgren help preserve the history of shad fishing at the Haddam Shad Museum with exhibits including the Brockway skiff parked outside.



Boning knives are among the items displayed at the Haddam Shad Museum.

and a striped bass that get thrown back. Before morning, he would set the net three or four more times.

A few weeks later, he tallied up his catch for the year: 1,300 roe (female) shad; 60 buck (male) shad, for a total of 4,500 pounds of fish.

“It was nothing like it was in the eighties, when we were catching three times that much,” he said. “But it was an OK year. Pricewise it was decent, but the market seems to be shrinking a bit every year. Maybe this local food thing is an opportunity for us.”

Next I caught up with fisherman Dan Russell at Hale’s Shad, a small market he owns in Rocky Hill that still bears the name of its former owner. With an upstairs apartment where Russell stays during shad season, the market is within sight of where he docks his custom-made 23-foot fishing skiff. It was early morning after he had been fishing through the night, and he and five workers were practicing the increasingly arcane and unique skill involved in boning and filleting shad to prepare the catch for sale. Now 66, he’s hauled shad nets nearly every year since 1967, taking time off from



his work as a relief captain on an offshore commercial fishing boat.

“One day I went fishing with my father and his dad, and I fell in love with it immediately,” he said. “I just saw all these fish coming over the side of the boat and that was it.”

He worries that no one new is coming into the fishery, and that if the shad fishery disappears, an important connection to our country’s history will be lost.

“It’s the founding fish,” said Russell, referencing the title of a book by the beloved nonfiction writer John McPhee. “People fed their slaves and servants with it.”

In *The Founding Fish*, published in 2002, McPhee tells how George Washington fished for shad in the Potomac River at Mount Vernon, and how the spring shad run helped save the troops at Valley Forge from starvation. He recounts tales of shad from the Bay of Fundy to Florida to the Pacific Northwest – where a population was established after it was transplanted from the East Coast in the 1800s – along with his own shad-fishing adventures and misadventures on the Delaware River and elsewhere. The last chapter is recipes.

“What’s dying,” said Russell, “is the fishermen. They stopped making us, people who like to work a million hours a week.” Contacted a few weeks later, he said the 2018 catch was below his average. A cool spring and late April full moon meant a shortened season.



A member of the Essex Rotary Club prepares shad fillets for the annual shad bake it runs with the Connecticut River Museum in June.



Shad fisherman Dan Russell fillets a freshly caught shad at the market he owns in Rocky Hill, Hale’s Shad.

Oven-Broiled Butter-Enhanced Shad Fillets Serves 2

Aluminum foil, crumpled

- 1 large or 2 medium shad fillets (about ½ to 1 pound each)
- Salt, pepper and garlic salt to taste (optional)
- ½ stick of butter

1. Remove the shad and butter from the refrigerator one-half hour before cooking.
2. When you are ready to cook, preheat the broiler. Spread the crumpled foil to cover the broiler rack or pan.
3. Place the shad on the foil. Sprinkle with salt, pepper and garlic salt, if desired.
4. After 4 to 5 minutes, check to see if the surface of the fish is drying. When dry, coat the entire surface with some of the softened butter. Broil for 10 minutes, or until golden brown.
5. Remove the shad from the oven, and using a fresh butter knife or spreader, coat with the remaining softened butter. Serve immediately.

Recipe courtesy of the Haddam Shad Museum

Whole Baked Shad Serves 2-3

- 1 whole shad (about 4.5 pounds, scales, head and organs removed, but not boned)

Milk to cover (up to 2 cups, depending on the size of the pan)

Accompaniment: toasts or crackers

1. Preheat the oven to 275° F.
2. Place the shad into a baking dish.
3. Cover the shad with milk (the milk will make the bones edible).
4. Bake for 4 hours. Serve hot with toasts or crackers.

Recipe courtesy of Hale’s Shad



More shad recipes can be found at:
<https://seagrant.uconn.edu/?p=4282>

About our Contributors



A.J. Hand is a retired editor/writer/photographer for *Popular Science* magazine. He has spent many hours exploring Long Island Sound, first as a fisherman, and now as a birder and photographer. His area of focus is the Norwalk Islands, especially Cockenoe, where he has become involved with the protection of nesting terns, American oystercatchers, piping plovers and other shorebirds.



Before retiring in 2014, **Robert Miller** worked as a newspaper reporter for 36 years. Of that, he worked for 22 years at *The News Times* in Danbury. He spent most of his time there covering health, science and the environment. In 2006, he began writing “Earth Matters,” a weekly column about the environment. He has continued to write the column after retiring, typing away for 12 years and counting.



John Pirro is a Connecticut native who worked for 37 years as a newspaper reporter and photographer. Now retired, he lives in Litchfield with his wife and two cats.



Christine Woodside is a writer and editor who writes about the environment and the history of ordinary Americans and their clashes with nature. Her most recent book, *Libertarians on the Prairie*, was published in 2016. She worked for newspapers for 18 years, and since 2005 has been the editor of *Appalachia*, a journal published by the Appalachian Mountain Club. She writes for the Connecticut Health Investigative Team and is the former longtime editor of *Connecticut Woodlands*. She is earning a master’s in history from Arizona State University.



Judy Preston conducts public engagement and education 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 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.

Shad, continued from page 21

Still, by summer he was already looking forward to shad season the following spring.



Dan Russell’s custom-built aluminum skiff is docked next to his market, Hale’s Shad, on the Connecticut River in Rocky Hill.

“This is what I do,” he said. “Next year will be better, because the full moon will be on April 22, instead of on April 29. They start the run on the April moon.”

The Empress for Life of SECT is looking forward to it, too.

To learn more about that status of Connecticut River shad, visit:

https://seagrant.uconn.edu/wp-content/uploads/sites/1985/2018/11/shad_DEEPReport.2017.pdf

WINNERS OF PHOTO CONTEST

1st place photo (back cover): Sailboats and kayaks are blanketed in snow after a storm in February 2017 at Jennings Beach in Fairfield.

2nd place photo: A lobster boat and traps are reflected in the water off the docks at the Guilford Lobster Pound at the Guilford Town Marina on an early morning in April 2017.

3rd place photo: Recreational clammers gather just offshore from the Surf Club in Madison during the Madison Shellfish Commission’s spring clam dig in June 2018, as town Shellfish Commission Chairman Stephen Nikituk, left, looks on.

Honorable mention: Barn Island Wildlife Management Area in Stonington is the site of a research project set up in May 2018 by UConn students testing the effects of sea level rise and plant species on salt marsh carbon and nitrogen cycling.



Illuminated sculptures of right whales will be created by Kristian Brevik, recipient of a 2018 arts grant.

Connecticut Sea Grant Arts Support Awards Program

The Connecticut Sea Grant Arts Support Awards Program awards up to \$1000 to an artist or group of artists through this competitive funding program. The winning submission will be selected on the basis of its aesthetic quality, relevance to coastal and marine environments and Connecticut Sea Grant themes, as well as its potential impact on non-traditional audiences.

ELIGIBILITY: Artists who live in Connecticut, or whose work relates to the Connecticut coast or is Long Island Sound-based. **DEADLINE** for applications: **May 13, 2019.**

FOR MORE INFORMATION, visit: <https://seagrant.uconn.edu/?p=1108> or email **Dr. Syma A. Ebbin**, research coordinator, at: syma.ebbin@uconn.edu

2nd Place
Ben Kuropat



3rd Place
Kevin Clark



Winners of Connecticut Sea Grant's 30th Anniversary Photo Contest

*Scenes of how we work,
play and enjoy the
natural beauty of
Long Island Sound*

*First Place on
Back Cover*
Sally Harold



Honorable Mention
Beth Lawrence

Many thanks to everyone who submitted entries.

*Please visit <https://seagrant.uconn.edu/?p=4252>
to see a selection of the other beautiful photos
submitted to the contest.*

UConn

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First Place Photo Contest Winner
Sally Harold

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