RHODE ISLAND'S OCEAN AND COASTAL MAGAZINE • VOL 11 NO 2 SPRING 2019

41°N

THE HARVEST ISSUE

A PUBLICATION OF RHODE ISLAND SEA GRANT & THE COASTAL INSTITUTE AT THE UNIVERSITY OF RHODE ISLAND • A SEA GRANT INSTITUTION

41°N

EDITORIAL STAFF

Monica Allard Cox, Editor
Judith Swift
Alan Desbonnet
Meredith Haas
Amber Neville

ART DIRECTOR
Ernesto Aparicio

PROOFREADER
Lesley Squillante

PUBLICATIONS MANAGER
Tracy Kennedy

COVER
Portrait of Stephanie Hryzan by Jesse Burke

ABOUT 41°N
41° N is published twice per year by the Rhode Island Sea Grant College Program and the Coastal Institute at the University of Rhode Island (URI). The name refers to the latitude at which Rhode Island lies.

Rhode Island Sea Grant is a part of the National Oceanic and Atmospheric Administration and was established to promote the conservation and sustainable development of marine resources for the public benefit through research, outreach, and education

The URI Coastal Institute works in partnerships to provide a neutral setting where knowledge is advanced, issues discussed, information synthesized, and solutions developed for the sustainable use and management of coastal ecosystems. The Coastal Institute works across and beyond traditional structures to encourage new approaches to problem solving.

Change of address, subscription information, or editorial correspondence: 41° N, Rhode Island Sea Grant, University of Rhode Island, Narragansett Bay Campus, Narragansett, RI 02882-1197. Telephone: (401) 874-6805. E-mail: 41N@gso.uri.edu

Reprinting material from 41° N is encouraged, but we request that you notify us of your intentions, give credit to 41° N and the article's author(s), and send us a copy of your final publication.

THE UNIVERSITY OF RHODE ISLAND
GSO COASTAL INSTITUTE Sea Grant Rhode Island

A NOTE TO OUR FANS

IT CAN BE HARD FOR US TO KNOW HOW YOU, OUR READERS, VALUE *41°N* since it is delivered free to all subscribers—and to markets and libraries across the state. So it was with a great sense of hopefulness that we first asked you, a year ago, to consider supporting the magazine with a voluntary contribution. The donations that we received in return have not only allowed us to invest more in the high-quality reporting and photography we seek to bring you, but also affirmed your interest in *41°N* and the ocean and coastal issues we cover. Not least important were the notes you included with your checks or jotted on your envelopes telling us you care about the places we write about, you share the magazine with friends and family, you love the stories and the photography, and even that you think *41°N* "is the nicest publication published in the state of RI" (Thank you, G.S.).

Now we turn to you once again with an annual appeal to consider donating whatever you are able to afford to help bring *41°N* to readers throughout Rhode Island. We, in turn, continue our commitment to covering, in depth, stories about Narragansett Bay, Rhode Island's coastal communities, our environment, our maritime heritage and marine economy, and the many other topics that matter to life in the Ocean State.

Thank you,

—MONICA ALLARD COX
Editor

Donations are tax deductible. Gifts of $25 or more will receive a set of eight notecards as a token of our thanks.

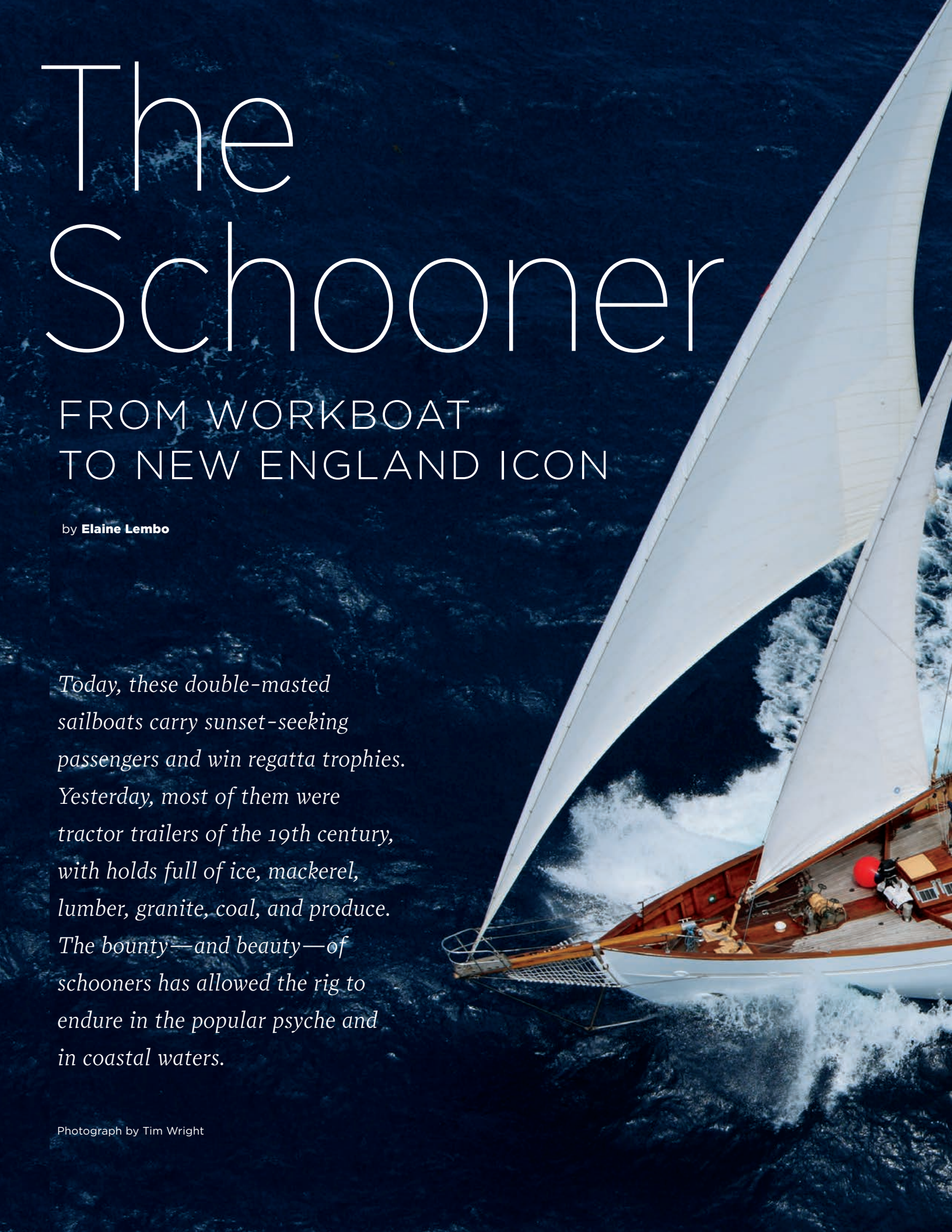
Contents

The Schooner

FROM WORKBOAT TO NEW ENGLAND ICON

by **Elaine Lembo**

Today, these double-masted sailboats carry sunset-seeking passengers and win regatta trophies. Yesterday, most of them were tractor trailers of the 19th century, with holds full of ice, mackerel, lumber, granite, coal, and produce. The bounty—and beauty—of schooners has allowed the rig to endure in the popular psyche and in coastal waters.



Photograph by Tim Wright

THOUGH EDWARD W. SMITH EARNED THE FIRST degree awarded in chemical engineering from the University of Pennsylvania in the late 1800s, it was a range of other interests that drew him back each summer to his ancestral home in the Point neighborhood of Newport, Rhode Island, and to *Kingfisher*, the family catboat.

An avid photographer, Smith trained his lens on the commercial and fishing schooners that plied Rhode Island waters toward the end of the 19th century.

Newport was, and remains, a playground for the wealthy's gold platers, with its deep-water harbor, steady breezes, and relief from stifling Manhattan heat. Decades earlier, schooner *America*, representing the New York Yacht Club, out-performed 18 British yachts in the circumnavigation of the Isle of Wight for the Hundred Guinea Cup, the forerunner of the America's Cup.

But, like other, larger cities, Newport was also a port for commerce, and the glass plates Smith produced from a box camera while sailing were of the market fleet. They became the foundation of *Workaday Schooners*, compiled by his son and published in 1975.

These sturdy rigs, carrying fish, lumber, ice, granite, lime, produce, dry stores, and mail—the coasting schooners—called in from Virginia, Maryland, Delaware, New York, Connecticut, Maine, Massachusetts including Martha's Vineyard and Nantucket, and Block Island.

In capturing the images, Smith had no idea his photographs would have any historical value outside his family. "They will never be worth a thing to anyone," he'd told his son.

But his century-old photos are testament to a time-honored aspect of Rhode Island heritage that today continues to inspire, inform, and influence. Sails dominated the bay hundreds of years ago, as they still do, and the schooner fleet remains a part of that scene.

Eighteen-wheelers of the age

Post-Civil War, industrial development—and with that, rail construction and the rise of the steam-powered vessel—led to a revived need for coastal shipping. Schooners, already a part of a young nation, answered the call.

Members of an unaffiliated, wider schooner fleet—including one on the West Coast that had also been moving goods globally—the New England coasting schooners chased their harvest and moved merchandise along the U.S. East Coast through Newfoundland, Canada. Like their West Coast brethren, they, too, on occasion sailed around the world on the job.

In Rhode Island, "schooners and sloops were easily the most common rigs that sailed Narragansett Bay and the Eastern Seaboard during the 18th and 19th centuries," says Tim Cranston, historian for North Kingstown. "I refer to them as the 18-wheelers of the day, as they were the primary movers of goods up and down the coast during that period."

Cranston's research into sailing vessels built in and homeported out of Rhode Island, specifically North Kingstown, indicates that most of the vessels, except for large ones, were designed and constructed to be multi-use.

"Vessels that began their lives as coastal fishers, as indicated in the port registries of Newport, Providence, and Bristol—Wickford being assigned to Newport—also spent lots of time registered as coastal traders or deep-water traders," he says. "They might later be put back into coastal fishing when the opportunities and financial incentives were right."

Beginning in the 1800s, packet runs moving people were established out of Wickford, Providence, and Newport, Cranston says.

"These were dedicated runs on set schedules between two or three ports, and they were primarily about freight and perishable and non-perishable commodities," he says. "Ancillary to this freight service, most packets could also carry a limited number of passengers, so if someone needed to get to New York, Boston, or Baltimore fairly quickly, and was willing to pay a premium, they would approach the appropriate packet master to arrange for travel."

The rig

Any discussion of the schooner must include an explanation of its rig—the spars, including masts and booms that run along the vessel centerline; the sails, or the material that catches the wind; and the lines and wires that support the sails and spars and help the hull move through water.

On at least one point about schooners historians and shipwrights are unanimous: Schooners were purpose built. Their distinct types and designs are indigenous to the locations in which they were constructed. While it's true that a schooner is a specific type of sailboat, it is also true that within the class, there is a multitudinous subset. A Gloucester offshore fishing schooner, accustomed to heading to the deep waters of Georges Bank for cod or haddock, varies from a Delaware Bay oyster schooner, built to mine coastal waters for shellfish.

As well, the number of masts ranged from predominantly two or three, with the mainmast taller than the fore, to, at most, seven, as in the case of the *Thomas W. Lawson*, a steel-hulled, 395-foot, seven-masted schooner launched in 1902.

Sail configurations and shapes have also evolved from the layer of square-shaped topsails at the masthead to the present-day Bermuda, or triangular-

Edward W. Smith photographed this schooner, and scores of others, in the late 1800s.
Photograph courtesy of George Zachorne

shaped, sails. Emerging hull forms included a deep-keel, shoal with centerboard, and a hermaphroditic form—a deep hull with a centerboard.

Local examples of a geographic-based configuration, according to Wickford shipwright George Zachorne, an expert in traditional craft, include the Block Island cowhorn and the oyster schooners of mid Narragansett Bay.

Sitting outside the entrance of his shop at the Wickford Shipyard one summer afternoon, he pointed to *Saudades*, a 19-foot schooner-rigged sailboat formerly used for fishing off Block Island. It's now used as a pleasure boat and is sailed singlehanded by its owner.

Zachorne, an avid collector of nautical books and ephemera, reminisced about the history of his former workshop site at nearby Pleasant Street Wharf boatyard. "I have photos of some of the oyster schooners that sailed between Prudence Island, Davisville, and Quonset, from the north end of Jamestown," he says. "The bottom of the bay was seeded as oyster beds in the late 19th and early 20th centuries, and the schooners built for oystering would come into Wickford, to the Beacon Oyster Company, which is now Pleasant Street."

The schooner *Aurora* sails under the Newport Bridge.
Photograph by Onne van der Wal

America's national rig

So where did the schooner originate? It's a question marine historians relish. Answers start with Karl Heinz Marquardt, author of *The Global Schooner: Origins, Development, Design and Construction 1695–1845*.

Marquardt, a marine artist, model maker, and researcher, studied the schooner in Europe, America, and Australia. The first two-masted vessels with gaff sails, forerunners of the schooners, were the speeljachts of the Netherlands, a country marked by networks of waterways and canals, he posits. The Dutch word speeljacht means play or pleasure yachts; these were the years of the Dutch Golden Age, when the Republic dominated as a sea power; water recreation played a year-round role in citizens' lives.

"If one looks to the speeljacht as the grandfather of the schooner," Marquardt writes, "then nobody earns the title of father more than the *Royal Transport*."

The *Royal Transport* is widely cited as a critical benchmark in the evolution of the schooner.

According to Marquardt, in the late 1600s, against a backdrop of a regular flow of traffic between England and Holland, as well as the British reign of the Dutch-born William of Orange, the 90-foot *Royal Transport* was launched, in 1695. *Royal Transport* gained favor quickly, and the rig trend jumped from Britain and Europe to North America—and back.

"The preference for the schooner rig was due to its better suitability for a long and small vessel and the lesser number of deckhands needed in comparison to a sloop rig," Marquardt writes.

"As with the experiment with the *Royal Transport*, the mercantile use of the schooner rig was such a successful combination that it not only became America's 'national rig' for a few decades, but spread widely in Europe as well," according to Marquardt. Britain's Royal Navy bought six American-built schooners in 1764, he notes.

In North America, Dutch and English settlers adapted their shipbuilding know-how to local needs, Marquardt explains. "The distances between coastal settlements and the risks associated with an undeveloped road system gave trade and traffic on the American East Coast an overwhelming maritime character," he writes.

At this time, from the New England colonies to the Chesapeake Bay area and beyond to the Caribbean, schooners engaged in trade as well as in slaving, privateering, and blockade running.

As for the actual word schooner, Marquardt draws a connection between the Dutch word *schoon*, which means "beautiful, nice, good looking," and comments of admiration made by Dutch citizens observing the speeljacht rig sail by. "Sometimes names, considered mysterious, have a very simple explanation, and schooner seems to be one of these," he writes.

Come sail away

Historical records allow us to explore every nook and cranny of the schooner story. But what of the ineffable quality of the rig—the parallelism of masts, the cluster of narrow-edged sails filled with wind—that captures our imagination?

"There's nothing particularly unique from any other type of vessel rig in the schooner's ability to harvest the wind," says Ray Ashley, executive director and curator of ships for the San Diego Maritime Museum. "It's really no different."

What is different is how the perception of the schooner changed, sometime after 1850.

"That's actually when the fun part starts," Ashley says. "That's when the designation of what a schooner is jumps off the rails. People start calling all sorts of vessels schooners. The square-rigged vessels are on the demise, especially with the rise of steam-powered ships. Steam ships are complements to railroads and transport of goods."

Against this backdrop, the last true wind ships are schooners, the holdout from the age of sail, Ashley explains. They're used in the aforementioned lumber, cargo, and fishing trades on the coasts and in the Caribbean.

Yet something else happens, beyond the cargo hold. "Gradually the meaning of the word changes from a specific type of ship to a ship you go on a quest aboard," he says. "The schooner acquires an aura. It's the kind of vessel that generates popular expectations about quest and romance."

It's plausible: From news of a racing schooner winning the forerunner to the America's Cup to the silver screen featuring a Gloucester fishing schooner, where much of the activity in the 1937 film *Captains Courageous* takes place, the schooner undergoes a psychic transformation, Ashley contends.

Need another example? Look no further than actor

Sterling Hayden, who famously challenged divorce lawyers when he headed to Tahiti aboard the schooner *Wanderer* in the 1950s with his four children aboard.

"What was Hayden aboard?" asks Ashley. "A schooner, not a sloop or cutter. It's more than a ship rig. It's a popular symbol of quest."

That same aura is what lured Paul Gray of the American Schooner Association (ASA) to the rig.

"I fell in love with them when I grabbed the wheel of the *Lettie G. Howard* at South Street Seaport in New York during my middle elementary school years," he recalls. "I felt like I had come home. I laughingly tell people it was a 'yes, maybe reincarnation is a thing' moment."

That inspiration led Gray and others in Maine's recreational sailing community to form the ASA in 1972.

"It primarily served as a 'virtual' yacht club, bringing like-minded folks together," says Gray, who is secretary/treasurer. A total of about 200 members today hail from the U.S., Canada, and Europe, with a significant number in the northern half of the U.S. East Coast, sharing information with each other and supporting schooner-centric educational programs for young people.

Schooners today

One needn't look beyond the 400-mile-long coast of the Ocean State to know that the schooner rig still plies its waters. They may no longer carry coal, lumber, or oysters, but they call in at nearly every port along Narragansett Bay and beyond, whether owners use them privately, race them, put them out for charter—or some combination of all. Still others are teaching platforms. A few owners and crew took time to share their stories.

Eros

While countless schooners have found new life in the day trade, still others take passengers for longer terms, from a week to several. Berthed at the Herreshoff Museum dock in Bristol in summer is *Eros*. Its design is based on a Gloucester fishing schooner. It was built in 1939 by a private owner for pleasure sailing.

Eros has been used in the charter trade in the Caribbean and New England for decades; her current owners, who've had her since 2016, have undertaken improvements for her passengers, who range from families to couples and groups of friends.

What's at the root of her appeal? Owner Cameron Riddell, whose parents sailed in the Pacific in the 1950s and spent time with Sterling Hayden, offered up his thoughts.

"I think most people, even if they don't know much about sailboats, can tell that schooners are an old-fashioned rig," he says. "Even at the dock, they look more historic. We have novices come up to us all the time and express their love for the boat."

"People see that schooners are enchanting," he adds. "They also see that a boat like this can get you out of your humdrum life and take you back to a simpler place in time."

Fortune

Schooners can also transport you across the finish line in high style.

In 1974, business partners and experienced sailors Don Glassie and John Taft of Newport were on the hunt for a "gentleman's yacht" to race in the classic yacht regatta circuit. They took it upon themselves to campaign *Fortune*, a sleek but neglected schooner built by Crowninshield in 1926.

First, they had to fix up the wood-hulled boat, which was a "complete mess," according to Taft. They did that and what followed was a string of awards at regattas and races all over New England and Cowes, on the Isle of Wight, where they shipped the boat for the 150th America's Cup Jubilee commemorative celebration. Despite Glassie's passing in 2011, *Fortune* has never missed a racing season since the duo bought her.

"We have a lot of fun on her," Taft says during a visit to the Yankee Peddler Inn. "She's never been out of the water for a season."

For insight about the rig, Taft paints a picture of a busy Newport waterfront during one of its signature events. "When I'm at the jazz festival aboard my own motor boat, I look around," he says, "and I appreciate the extreme diversity of the boats out there. I think there's something about the sail plan of a schooner that is aesthetically so attractive that people stop and look. With a sloop, which is more than 90 percent of the boats, one sail is in front of the mast, and one sail is behind the mast."

"With a schooner, you have a range of options, some six sails you can put up depending on wind direction and strength," he says. "On *Fortune*, we typically have four sails up, which means we have a lot to pay attention to, and visually, it's a beautiful thing."

Echoing contemporary and historic admirers, those who gushed as the speeljachts glided by, harvesting the wind for a transformative experience, Taft adds, "The play of light on canvas is so attractive. For people who see schooners under sail, there's just something magical about it."

John Taft races the schooner *Fortune* throughout coastal New England and beyond.
Photograph by Carol Vernon

"A BOAT LIKE THIS…CAN TAKE YOU BACK TO A SIMPLER PLACE IN TIME"

KEEPING THE PAST ALIVE

Working aboard Aurora

by **Meredith Haas**

THE BRIGHT RED SAILS CATCH THE LATE OCTOBER sun as they are hauled one by one up the massive, 86-foot masts. They tower over the smaller, more modern sailboats and motorboats cruising through Newport Harbor. There's a steady southwest wind that fills the last of the six sails and draws the 102-foot schooner slowly out into the bay. It's the last sail of the season for the schooner *Aurora*, the only vessel in the bay with Nantucket red sails, as she softly heels to her starboard side and quietly carries passengers away on one of the last warm evenings of the year.

"It's almost magical in a sense because you're on this vessel that you got off the dock with teamwork effort and you are now moving it with just the wind," says Brain Simas, who has been a deckhand on *Aurora* for two seasons. "It's rewarding and you never really get tired of it or jaded."

Part of the magic is the nostalgia for the past, says Justin Berhnart, who has been *Aurora's* captain for the last seven years. "[Schooners] are like a working active museum because they're still being sailed and you can see the rigging the same as it would've worked way back when."

Before she was the *Aurora*, she was named *Louanne*, and was built in 1947 in Thomaston, Maine. "She was built as a motor vessel, known as an eastern dragger, that was used in the fishing industry for sardines, and probably some other kind of white fish as well," says Bernhart, adding that these types of vessels were popular in the region. "This was how cargo was carried around New England and various other places 100 years ago, and the boat is essentially the same."

For 40 years, the *Louanne* brought in sardines for a cannery until she sunk one night on the way back into port. According to the story, says Berhnart, the insurance company salvaged the boat because the fish in the hold were worth more than the boat itself. An old schoonerman came by the shipyard, saw that it was for sale and bought it despite there being a big hole in one side and all the mechanical aspects destroyed. The boat was outfitted with a sailing rig and turned into a daysailer because the hull shape was the same as a schooner.

"I always joke that those old Maine shipwrights didn't know how to build anything but a schooner hull," laughs Bernhart. "[It] was easily converted into sail … in the late '80s or early '90s."

The *Louanne* was renamed the *Francis Todd* and sailed out of Bar Harbor before being brought to Newport as the *Aurora* for day sails and charters. Although she wasn't always a sailing vessel, the *Aurora's* traditional rig and history draws many to become crew. "Crew on schooners or traditional vessels start without a whole lot of experience on the water, but they're just drawn to the nostalgia," says Bernhart. "They don't have a lot of qualifications … They come in pretty green and a lot of them get hooked on it and often don't leave even for the extra money they would make on yachts or racing sailboats."

"It was my first boat that I ever sailed on," says Melissa Conlon, who has been working on the *Aurora* for three seasons. Conlon, who had been working in film and media before working on boats, says that she wasn't very athletic growing up and didn't feel there was a place for her in the sailing community until she discovered the *Aurora*. "I was never someone who thought she could [sail]. So when I did get out on the water, it was refreshing, like, 'Oh, I'm using my body but also doing this craft that's very traditional,'" she says, adding that it's the type of industry that draws an eclectic crew. "It's a group of misfits who've come from all types of life experiences, so they're a little bit more of a weathered soul, usually."

Like Conlon, Simas didn't know about the tallship industry before working on the *Aurora*. He had been working on smaller skiffs but was more focused on his art of printmaking. "I didn't really know that kind of scene was still happening … I thought that age of sail [had] ended." Simas agrees with Conlon that there's a satisfaction with having to use your whole body when sailing a schooner. "Nowadays on sailboats, the sails will go up with the push of a button or the flick of the

Traditional schooners like *Aurora* make fans of passengers and crew alike.
Photograph courtesy of Newport Experience

switch, whereas [on] these old schooners the sails go up by you untying and getting the line off the pin and raising it with your bare hands, getting it cinched and tight by dropping your bodyweight into the line. And when you have to maneuver, tack and jib the boat, it's all using your body, using your hands. There's no switch."

And like most schooners, the *Aurora* isn't known for speed when compared to other boats in the bay, which are sleeker and lighter. That's because the *Aurora,* being made of wood, weighs nearly 77 tons with about 40,000 pounds of ballast, and has a greater sail area that is carried lower than the sails on modern vessels, says Bernhart. "The shape of the sail isn't square but it's more square … It takes more sail area to move a big heavy schooner through the water than a modern, sleek hydrodynamic racing hull, or a modern rigged vessel."

The fastest the *Aurora* has sailed in Bernhart's experience was a little over 9 knots, which he says is a high speed for that kind of boat.

"If we go 8 knots, we get all giddy like it's Christmas Day," says Simas, explaining the feeling of when the boat heels. "You have these monstrous red sails that are towering above you … and the whole vessel is lopsided and you're struggling for balance. You think you're going to tip over, which is people's first fear, but you won't—not on a boat that size, unless you're going to sail into a hurricane."

But today is not that kind of day. Winds remain steady from the southwest at around 15 knots as heavy fog settles over the bay and the sun begins to dip. The *Aurora* looks like a ghost ship returning to port as she passes Fort Adams in Newport through the mist. After today, some of the crew will head south or elsewhere to work other boats in warmer waters during the winter season. Some, however, will stay to remove all of the rigging and prep the vessel for being hauled out of the water for winter maintenance and repairs.

"Working on a vessel like this, I feel like I'm making a difference at the end of the day," says Simas. "You are part of the boat, so if you're short one man it's going to make all the difference. You do matter and there's that sense of teamwork and community…you're part of this living history. You're doing the same kind of things and have the same kind of worries that other sailors have had for the past thousands of years."

Second Harvest

FROM SNEAKERS TO CEMENT, NEW PRODUCTS ARE BEING BORN OUT OF MARINE DEBRIS

by **Ellen Liberman**

GALILEE PORT MANAGER DANIEL COSTA, ATOP the dumpster, and Jason Howell, the superintendent of state piers, manning the front loader, wrestled a clot of discarded otter trawl nets into the 30-yard receptacle in the Port of Galilee. For three months, the fishing fleet had been dropping off their worn gear and other industry detritus picked up at sea and depositing it in one of two giant recycling bins—one for plastic, one for metal—on a sliver of vacant lot across from the Block Island ferry terminal.

The August morning was fry-an-egg-on-the-sidewalk hot, but the trash was on its way to a hotter place still. Rather than end its useful life in "wet storage," ghost fishing to no purpose, this gear would vanish in a furnace and be converted to electricity.

Fishing for Energy, a public-private partnership, is one of the many innovative ways governments, trade associations, non-profits, eco-entrepreneurs, and other businesses are finding value in ocean trash. All kinds of marine debris—natural and manmade—is finding a second life in everyday products as varied as jewelry, skateboards, and compost. But, some in the business of recycling marine waste say these secondary products are worth far more than their market price as conversation-starters about the health of the oceans and as change-agents for consumers and manufacturers.

"At Parley, we see current plastic as a design failure. It's like alien matter that doesn't belong on this planet, and certainly not in the way we use it," says Cyrill Gutsch, founder of Parley for the Oceans, an environmental organization that has joined athletic shoemaker Adidas to turn plastic waste into sneakers.

The scope of the problem of man-made debris and its effects on the environment are vast.

Carlie Herring, a research analyst for the National Oceanic and Atmospheric Administration's (NOAA) Marine Debris Program, says, "Marine debris can be any number of items from things as large as derelict vessels to those as small as the microplastics you would need a microscope to see. The impacts to organisms

Bureo collects used fishing nets (opposite page)**, shreds them, and turns them into pellets** (at left) **that are molded into products such as sunglasses and skateboards.**
Photographs courtesy of Bureo

and wildlife are numerous—two of the most common are entanglements and ingestion of debris. Researchers are also looking into physical presence of plastic and the chemicals added to it because the ocean acts like a sponge to absorb them."

NOAA, which periodically convenes conventions on marine debris, and other environmental agencies and groups have concentrated most of their efforts on prevention, removal, research, and education.

"A lot of the focus is on turning off the tap—stopping the flow of debris from getting into the ocean," Herring says. "There are only a handful of organizations that have used plastics already in the ocean to make new products."

Yet, this small group is aiming to have an outsized impact.

"It is important for all of us to realize what is going on in the environment and take a stand and say no to single-use products," says David Stover, co-founder and CEO of Bureo, which recycles ocean plastic into

Jenga ® Ocean is made from recycled fishing nets.
Photograph courtesy of Bureo

skateboards, sunglasses, and other products. "It's the consumers who are going to have to make a change, and we are encouraging people to look at sustainably produced products and have a long-term view of the ocean."

Running on Ocean Plastic

In 2015, Jenna Jambeck, an assistant professor of environmental engineering at the University of Georgia, and her research team published an estimate of the amount of plastic in the ocean. The paper, *Plastic waste inputs from land into the ocean*, featured in that February's issue of *Science*, quantified the scope of what had become tangible in the public imagination as the Great Garbage Patch. Jambeck's numbers—between 4.7 and 12 metric tons of plastic waste were entering the oceans each year and were projected to reach as much as 250 metric tons in a decade—were, for many, a clear call to action.

By then, designer and environmentalist Cyrill Gutsch was already three years into his effort to entirely reshape the way products are imagined, made, and packaged. Inspired by the exploits of Paul Watson, CEO and founder of Sea Shepherd, a marine conservation organization that espouses "direct action" campaigns, Gutsch founded Parley for the Oceans in 2012 to bring together a network of "creators, thinkers, and leaders" who shared his commitment to save the oceans.

Over the last six years, Parley has worked with rapper and fashion designer Pharrell Williams and German shoe company Adidas, among others, to find uses for its Ocean Plastic, a trademarked material made of ocean plastic spun into thread. Parley intercepts plastic before it can enter the oceans and collects other plastic washed ashore in the Maldives, an archipelagic nation in the Indian Ocean. The materials are cleaned, baled, and transported to its Taiwanese supplier that transforms it into a synthetic fiber.

Gutsch, who had worked with Adidas in the past as a designer, found a perfect application in athletic gear. In November 2016, Parley and Adidas officially released the first marketable shoe using Ocean Plastic woven into the shoes' uppers. Adidas' Parley products have been so successful that Parley is ramping up production to an expected 7 million pairs this year from 1.3 million in 2017, and the companies have expanded into athletic wear, including shorts, tank tops, and football jerseys. Parley is now working with American Express to offer a credit card made of Ocean Plastic and with brewer Anheuser-Busch on taking the virgin plastic out of Corona packaging. The beer maker has also committed to cleaning up plastic pollution in 100 islands in Mexico, the Maldives, Australia, Chile, Italy, and the Dominican Republic.

"The long-term solution for marine plastic pollution isn't in recycling alone, but in the redesign of the harmful material itself," Gutsch said in a written statement. "We need to redesign and replace plastic and the system and thinking behind it."

Net Worth

Five years ago, Rob and Brittany Webster were walking down the beach in Eleuthera, Bahamas, talking about the impact of marine debris—especially old nets, which continue to trap and kill wildlife long after they are separated from their owners. At the time, the couple were leading eco-adventures for young adults as the co-founders of Wild Studies. They had been collecting as much ghost gear as they could find on the shoreline and exploring the idea of creating a memento for their students, when Rob plucked a piece of rope out of the sand and tied it around his wife's wrist.

"How about this?" he asked.

That playful gesture was the genesis of Planet Love Life, a company that turns old fishing nets into colorful bracelets adorned with durable hardware. Robert Webster, with a degree in marketing, was an entrepreneur with several businesses. Brittany Webster, a marine science educator, had an eye for fashion and design. The couple decided to bundle their skills and social consciousness into a for-profit business and started amassing old nets and ropes. After stuffing them into overhead bins on flights from the Bahamas to Florida and shepherding them through customs, the Websters began working with organizations that were already collecting ghost gear. Like-minded individuals sent them nets, expanding the footprint of their inventory to points as far away as the United Kingdom, Japan, and Portugal. Planet Love Life also recycles monofilament fishing line—another ubiquitous source of ocean plastic.

In 2015, the company opened for business; to date, it has sold more than 10,000 bracelets. Reaching a finished product requires a steady supply of raw materials—the wear and tear on the nets renders only 1 percent as useable for the bracelets. The rest is recycled or used for other decorations.

"To me, it's not a solution," Webster says. "It's about creating awareness that leads to action. It's all about telling the story—that we can lean on each other even though we are miles apart."

David Stover, a Block Island native, had a similar revelation. In 2012, he was working for Ernst & Young, analyzing the financial prospects of coal mines in Australia, and spending his free time surfing. But, his work was unsatisfying, and he was disturbed by the omnipresence of plastic as he caught the swells off the Australian coast. Stover eventually connected with Ben Kneppers, a sustainability entrepreneur originally from Cape Cod living in Chile, and Kevin Ahearn, a fellow Lehigh University graduate from Montauk, New York, to develop a business around recycling ocean plastic.

The result was Bureo. Based in California and Chile, Bureo turns plastic nets into skateboard decks, Costa sunglasses, and Jenga game sets. It took the trio and fellow Rhode Islander Greg Swienton two years of study and experimentation to come up with a specific plastic source and an end product.

> "WE NEED TO REDESIGN AND REPLACE PLASTIC AND THE THINKING BEHIND IT."

"There are many types of plastic floating in the ocean, and it's not a simple venture to melt everything down together," Stover says. "You have to have a really clean, really consistent source of plastic, and that's not really what's out there."

They considered recycling plastic bottles, but "we didn't want to be duplicative, so we started looking further down the line," he recalls. Kneppers, who was studying sustainability in Chile's wild-caught fishing industry, asked the fishermen about the types of waste they saw. Their answer: nets. Bureo won a small grant from the Chilean government and began engaging the fishing community in collecting and cleaning old gear.

Their first product was skateboard decks, but the founders quickly realized that they couldn't sell enough to support Bureo's true mission: recycling ocean plastic. They weighed "thousands" of ideas as they started looking for other manufacturing associates. With venture capital support from outdoor gear company Patagonia, Bureo continues to scout other collaborators and to expand the product line to include bicycle components, surfboard fins, and office furniture. The company is also taking its net collection operation to other parts of the world. In its first year, Bureo recycled 10 tons of plastic; in 2018 they recycled 150 tons.

"Our goals were to have high-value products that have an end-of-life solution. Costa Del Mar sunglasses is a good example," Stover says. "They have a big consumer market and an established brand. And it was an opportunity to make customers aware of the problem and be a part of the solution." Customers can recycle the sunglasses, which sell for around $200, by sending them off to a third party.

Nets are also being converted into energy. In 2008, NOAA, in conjunction with Covanta, the National Fish

Earth Care Farm incorporates clam, oyster, and mussel shells into their compost.
Photograph courtesy of Earth Care Farm

and Wildlife Foundation, and Schnitzer Steel, launched Fishing for Energy, a program to support the collection and disposal of discarded fishing gear. NOAA reports that in the last decade, the program has awarded $1.65 million in grants, matched by $964,000 in state funds for 27 projects. Bins at 54 ports in nine states have collected and recycled more than 3.8 million pounds of fishing gear. Schnitzer Steel sorts the materials for metals recycling. The rest goes to one of Covanta's waste-to-energy facilities, where 1 ton of derelict nets equals enough electricity to light a home for nearly a month.

In Rhode Island, the bins, located in Point Judith and Newport, are dumped four times annually. In 2017, the state collected 29.3 tons of old gear, making it the second highest port in the program, which spans both the East and West coasts.

"The fishermen very much appreciate it—not only is it convenient, but it's also a great way to take derelict and ghost gear and dispose of it responsibly," says Daniel Costa, the Rhode Island Department of Environmental Management's state port manager. "The popularity is growing every year. The commercial fishing fleet is becoming better stewards of their own environment."

Tackling the Big Stuff

One of the most intractable trash problems in coastal areas is that of discarded and abandoned recreational boats. According the 2017 U.S Recreational Boats Statistical Abstract, more than 2.9 million recreational craft were retired between 2006 and 2017—and the vast majority sported fiberglass hulls. Like other states, Rhode Island enacted legislation creating a process and a fund to remove shipwrecked, abandoned, and derelict vessels from local waterways. Still, they pose a serious and costly disposal problem. According to an October 2017 news story, a Florida state legislator estimated that Hurricane Irma created 1,500 derelict vessels with a $37.5 million disposal price tag. Hulls accepted at state landfills take up huge amounts of space.

For the last few years, Rhode Island Sea Grant and the Rhode Island Marine Trades Association have been studying better end-of-life options for fiberglass hulls. Their efforts culminated in the Rhode Island Fiberglass Vessel Recycling (RIFVR) pilot project, which is exploring how to dismantle fiberglass vessels and process the material into cement in a way that is both environmentally sound and economically feasible.

Last spring, the RIFVR team presented an update on its progress at the Sixth International Marine Debris Conference, coordinated by NOAA and the United Nations Environment Programme.

"We are continuing to answer critical questions surrounding the lifecycle of recreational boats and the sustainable reuse of fiberglass waste," says project manager Evan Ridley, who has been studying the issue since he was a research assistant at Rhode Island Sea Grant. "Boats constructed with composite materials offer an incredible opportunity for our state to establish a new network for the collection and recycling of high-value waste."

Material Challenge

Reaping this second harvest is not easy—finding a consistent source of raw materials, identifying the right end product, containing the costs of materials preparation and transport, and selling the environmental message are complex challenges. But those who take them on feel that they have no choice.

"We are part of a movement that has recognized the problem and is working not only to get a solution, but working on how we stop plastic from getting into the ocean," says Bureo's Stover. "We are just one link in the chain."

BENEFI-SHELL RECYCLING

by **Ellen Liberman**

Jayne Merner Senecal roots through a buzzing pile of rich brown compost to pluck out one of the most powerful components in the mix—a clam shell, with the slick sheen of viscera and a vein of green sand. Shells, a natural marine byproduct that ends up on land as waste, find a second life underfoot and on the wall. For 30 years, the Merner family has been using clam, oyster, and mussel shells, along with smaller amounts of seaweed and fish scurry, to boost the nutritive value of its Earth Care Farm compost.

The written historical record of using shells and other marine waste to amend soil is silent, but many researchers have established the connection between shell waste and healthy soil. For example, in 1847 Canadian geologist Abraham Gesner suggested that a compost could be made of prehistoric shell middens (trash piles) burned, ground up, and mixed with peat. More recently, a 2014 study by scientists at Smithsonian Environmental Research Center, published in *Landscape Ecology*, documented "the legacy of ancient human practices" and its effect on "modern ecosystems." The archaeologists unearthed 3,000-year-old shell middens in the Chesapeake Bay area that promoted diversity among native plant species, helping them survive and thrive. Soils eventually created by these composting middens had nearly 45 times more calcium and 6.7 times more nitrate than soil samples taken elsewhere.

Today, few landfills will accept fresh shell waste, says Senecal. "It's smelly and wet, and it's too hard for them to handle—but we are really good at it."

Twice a week, shellfish processors dump up to 30 metric tons of mussel and clam waste at Earth Care Farm's Charlestown facility. Earth Care workers immediately scoop it into carbon bowls created within an active compost pile and cover it with more brown materials such as leaves, straw, and wood chips. Then, workers fully incorporate the wet mixture. The whole process only takes about an hour, and even on a stifling hot day, there is little odor from a recent delivery. The shells take a year to break down, and the larger pieces are screened out of Earth Care's finished product.

"The shells are full of micronutrients that are hard to come by from land resources—a wonderful source of calcium. The traditional Rhode Island soil has a low pH of 5. Our shells, as they break down, release lime and naturally increase the pH to get to the neutral 7 that most garden plants thrive on" she adds. "We are lucky to get it by the truck-full."

Landscape materials suppliers also sell crushed shells as mulch and driveway cover. Carpenter's Farm in South Kingstown has long been a source for local beach houses.

"We sell hundreds and hundreds of yards of shells—sometimes up to 80 yards in a week," says Carpenter's Farm's Meg McCallig. "People like them because they go with their beach vibe."

In Boston, the humble oyster shell has been elevated to an art piece of enormous presence. Patrons of Island Creek Oyster Bar on Commonwealth Avenue may perceive the 70-by-15-foot wall of white ridges as some trick of stucco, but closer inspection reveals that the effect is created by thousands of oyster shells stacked in a grid of gabion cages. The sculpture began as an idea from the restaurant's architect to decorate a blank expanse enclosing a staircase.

Shore Gregory, a co-founder of Island Creek, says they misunderstood the architect's vision at first, "We thought, OK, we'll glue some oyster shells to the wall. We couldn't have been more wrong."

Instead, they launched a months-long campaign to collect the shucked oyster shells and truck them back to their Duxbury, Massachusetts, oyster farm where they were cleaned and sterilized. The wall had to be reinforced to hold the weight of 37 two-by-four-foot steel mesh cages freighted with oyster shells.

"That sense of discovery is powerful and so fun—[customers] may not understand until they are right in front of it and they see all those oyster shells," he says. "People are really intrigued by it, and it really is a great representation of the products and the farm. We wanted people to have our interpretation of the experience of an oyster bar, and that wall is one piece of that."

SKIMMING A PLASTIC WAVE

by **Cathy Shufro** Portrait by **Dana Smith**

WHAT'S THE BEST WAY TO PREVENT TRASH IN THE OCEAN FROM BECOMING PART OF OUR DIET?

RHODE ISLAND ENVIRONMENTALIST JAMIE RHODES eats plastic. Granted, he's only eating little specks, enclosed in oysters. But still, says Rhodes, "I *am* eating plastic. If you are going to eat shellfish, you are going to get microplastics into your body."

Actually, we're all eating plastic. Tiny bits of it are present in nearly all U.S. drinking water. It's in sea salt. It's in beer.

Plastics are also in the ocean, and they gradually break down. Eventually they get small enough to be called microplastics—that is, fragments smaller than about 1/5 inch (or 5 millimeters). Microplastics float in waters from the Arctic to the Antarctic, including Narragansett Bay. As Save The Bay Advocacy Director Topher Hamblett puts it, "It's eye-popping to see—to hold up a jar of bay water and identify small bits of plastic floating in it."

What's worrying many Rhode Islanders—from the governor on down—is how ocean plastics will affect ecosystems, the fishing industry, and human health.

Meanwhile, more plastics are pouring into the ocean here and around the world: 8.8 million tons *each year,* according to a 2015 study in *Science*. Lead author Jenna Jambeck, an environmental engineer, has described what 8.8 million tons would look like: five plastic-crammed plastic grocery bags on every foot of coastline on Earth.

Picking up the pieces

The remedy closest at hand is to get plastic off beaches, and Rhode Islanders have been showing up at cleanups for decades. It was a hot Saturday morning when college student Claire Rigaud peered between two boulders on a stretch of shore in Providence. "Can you hand me that big stick?" she asked her friend. "It's kind of like being a contortionist," said Rigaud as she wedged her arm between the two rocks. The math major was one of a dozen volunteers from Providence College who took part in a September 15 cleanup near the headquarters of Save The Bay. Rigaud managed to retrieve a box cutter with a plastic handle marked "Laurel Farmers' Auction, Laurel, DE."

Andrew Lee came to the cleanup from Coventry, motivated by the floating garbage he'd seen while rowing on the bay. Brown University doctoral student Sarah Brown brought her 2-year-old, Elliot: "We're trying to teach our kids to get involved in our community," she said.

Volunteers like Rigaud, Lee, and Brown took part in nearly 140 Save The Bay beach cleanups by year's end. In September and October, as part of the annual International Coastal Cleanup, the trash pickers kept counts of what they picked up. Save The Bay contributed those data to the Ocean Conservancy's annual report on ocean trash worldwide.

By late morning, five cleanup participants from Boston had found so many plastic shards that they had to squeeze in an extra line of hash marks beside "plastic pieces" on the collection form. "It's not even possible to work on a tiny place and clear it because there are so many tiny pieces of plastic," said Aine Cole of Brighton, Massachusetts. "It's discouraging." She'd come with friends from Avery Dennison, a packaging and labeling company that told employees about the cleanup as part of its sustainability program.

At noon, they began to head out with two black sacks of garbage. But progress was slow because every few feet along the rocky shore, someone would find more detritus. A woman called out: "Straw, piece of glass, piece of plastic." Avery Dennison engineer Yael Rosenblum made one mark for glass and two for plastic. "Lighter, bottle cap … plastic thermometer!" yelled a man. More hash marks.

Providence resident John Gomes found himself between two cleanup crews as he cast his fishing line. Gomes said that he always brings home garbage in his

cooler after fishing. "We just have to outlaw the plastic that we use constantly," he said.

Clean Ocean Access co-founder Dave McLaughlin agrees. "We cannot be making single-use packaging out of material that's meant to last a lifetime—the lifetime of the planet," he said. His Middletown nonprofit promotes ocean access and improved water quality, and it sponsors cleanups even in cold weather. The group also operates four trash skimmers in Newport Harbor. People flock to see these floating garbage collectors, which are powered by small engines. Most of the garbage corralled is too oily to recycle.

McLaughlin makes a prediction: "When the aliens show up, they're going to say, 'Oh, they made plastic.'"

The economics of trash

Jamie Rhodes compares cleaning beaches to mopping a bathroom floor while water gushes from an overflowing bathtub. He concedes that cleanups call people's attention to the influx of plastic and provide information on what's being thrown away. But Rhodes says the priority should be turning off the tap.

Rhodes is a lawyer and program director at UPSTREAM, a small advocacy group with a Rhode Island office. Its aim is to drastically reduce single-use packaging and products, especially plastics. Rhodes argues that corporations, not consumers, have fueled the worldwide explosion of low-value, single-use packages. The reason? They've found a new way to profit from ethane gas, a waste product of natural gas production that was previously flared off. Gas and oil companies now sell ethane to plastics makers like Dow and Unilever, who turn it first into plastic resins and then into thin, pliable material. That lightweight plastic is used for products such as snack bags, transparent clamshells, and shampoo sachets.

"The producers have no interest in shutting off the tap," says Rhodes. "They have directed a lot of our attention to the flood in the bathroom," suggesting that we recycle more. On the face of it, this seems reasonable: Nationwide, only 9 percent of all plastic gets recycled, and 1 percent of plastic bags. But plastics numbered 3-7 are actually difficult or impossible to recycle. Plastics manufacturers also promote burning plastic. However, burning produces not only energy but also greenhouse gases and toxins.

"I tell people, every day, 'This is not your fault,'" says Rhodes. "The problem has been created by industry, by marketing to us a single-use, disposable culture. The solution needs to include industry."

OPPOSITE
Beachcomber Collection
Photograph by Jim Golden

Microplastics under the microscope

University of Connecticut (UConn) biologist Evan Ward specializes in how bivalves eat, and he recently looked for plastics in local mussels. Ward sampled mussels harvested at UConn's Groton campus, where he heads the marine sciences program. His team did find particles in 70 percent of the 37 mussels sampled, but most of them contained only a few plastic bits. Ward is now studying oysters he collected near Norwalk, Connecticut; he doesn't have results yet, but other U.S. researchers have found a maximum of four particles in oysters they examined. "Even if it's a couple of particles, it's a letdown," Ward acknowledged. Still, he said, "The bottom line is, I don't think there's a problem with eating bivalves in the United States in 2018. Twenty years from now, who knows?" In polluted areas in China, some oysters contain 100 particles.

Ward is also investigating how oysters and other filter feeders sort plastic particles, ingesting some while rejecting others. He believes that nanoplastics might prove more worrisome for human beings than microplastics. At 0.1 micrometer or smaller, nanoplastics can travel into the organs of living things. "Some of these particles are the size of the DNA in the cells of your body," Ward said.

At the U.S. Environmental Protection Agency's marine ecology lab in Narragansett, oceanographer Kay T. Ho and Ph.D. student Michaela Cashman are measuring the quantity of microplastic in sediments. Sediments supply valuable information about quantity because even floating plastic eventually sinks. This happens as algae and bacteria grow on plastic fragments, adding weight.

"We are at the beginning of understanding microplastics," says Ho. The next task, said Ho's colleague, physical scientist Robert Burgess, will be to study the effects of plastic on the health of living things.

That kind of research is fundamental, says University of Rhode Island assistant professor of political science Elizabeth Mendenhall. No one is even sure what proportion of ocean plastics come from ships, from discarded fishing gear, from natural disasters, and from rivers, writes Mendenhall in the October issue of *Marine Policy*. We know little about how fast different plastics break down, which types leach toxins and which absorb them, and how much plastic enters food chains.

Mendenhall is one of four social scientists observing United Nations negotiations for a new treaty on marine biodiversity beyond national jurisdictions. She said that although the men and women working toward the treaty are painfully aware of the influx of plastics into the world's oceans, "it is not on the agenda at all." U.N. officials have told Mendenhall that because plastic invades the oceans from land controlled by nations, each government must take responsibility for its contribution. Mendenhall disagrees. She likens plastics pollution to climate change. "It's truly a collective global problem," she says. However, "because we are all to blame, no individual country will take the blame."

Slowing the flow

Last July, Governor Gina Raimondo issued an executive order called "Tackling Plastics." Her order cited the impact of plastic on ocean ecosystems and on the fishing industry, its contribution to litter, and the disruption to recycling caused by plastic bags and films. Raimondo called for a task force to address these issues. "I meet with environmentalists frequently, and the topic of single-use plastics kept coming up," Raimondo wrote in an email.

The task force comprises two dozen members from government, environmental groups, academia, and business, including retailers and marina operators. According to Raimondo, "One of the benefits of Rhode Island's size is that you're able to get representatives from across the state in one room."

The problem can seem daunting, task force member Dennis Nixon told the *Jamestown Press,* "We read a lot about the mid-ocean gyres that contain massive amounts of plastic debris, and it can make the situation sound hopeless," said Nixon, a marine lawyer who directs Rhode Island Sea Grant. "Clearly more needs to be done in the nations that produce most of the plastics entering the world's oceans. But that doesn't mean we should be complacent here in Rhode Island."

The task force's report, issued in February, proposed a statewide ban on plastic grocery bags. (A handful of coastal communities have already banned them.) It also called for a fee for paper bags, which have triple the carbon footprint of plastic bags.

The case of Washington, D.C., suggests that people respond to a bag fee by bringing their own reusable bags. A 5-cent charge for single-use shopping bags in D.C. has, since 2010, cut consumption of throw-away bags by 50 to 70 percent. Moreover, far fewer plastic bags end up in the Anacostia River.

Reducing plastic bag use in Rhode Island would bolster recycling efforts because plastic bags, which can be returned to grocery stores for recycling but not placed in residential recycling bins, can render an entire recycling load useless. Such "recycling diversions" not only squander recyclable material but also cost taxpayers money. For instance, Providence pays an estimated $1 million annually in fees and fines to Rhode Island Resource Recovery, the quasi-public company that oversees recycling.

State Representative Carol Hagan McEntee believes that businesses with many locations in the state would welcome a statewide policy on shopping bags. Now,

Photograph by Lycia Walter, Shutterstock

for example, the Stop & Shop in North Kingstown can't offer plastic bags because the town has banned them, while its sister store in Cranston may. "We have a very good chance of getting some version of a [bag] bill passed in this next legislative session," McEntee said. "We have to protect our environment every which way we can."

The report also calls for voluntary reduction of single-use plastics such as beverage containers and straws. Johnathan Berard, who co-chairs the group, also directs the Rhode Island office of Clean Water Action. He describes plastic packaging as a systemic problem: "Producers just put this crap out into the economy, and the social and economic costs fall to governments, and thus to taxpayers," he said. "The problem lies much father up the chain, with Dart Container [maker of foam cups and containers] and Nestlé and Coca Cola. They come up with this stuff."

One legal remedy that has been proposed (and failed) in Rhode Island would make producers of plastic packaging responsible for its disposal or reuse. Thirty-three states have such "extended producer responsibility" (EPR) laws for products other than packaging. In Rhode Island, manufacturers must handle disposal of electronics, thermostats, and auto switches. But EPR for plastics, says Berard, "is super complex. It involves a lot of moving parts. You're talking about everything from beverage containers and Styrofoam clamshells to blister packs for razors and flexible packaging from Amazon."

Meanwhile, the flood is worsening. "Somehow we lived without single-use plastics until the 1980s," notes Berard, but three decades later, human beings buy a million plastic water bottles a minute. That estimate comes from the World Economic Forum, which predicts that by 2050, business as usual will result in more plastic than fish (by weight) in the world's oceans.

Ocean plastics are having their moment in the public eye. Recent documentaries include *A Plastic Ocean*, *The Smog of the Sea*, and an episode of the BBC's *Blue Planet II*. Last June, *National Geographic*'s cover story reported on plastics in the ocean.

Are we at a turning point? Oyster eater Jamie Rhodes hopes so. "Imagine the human race 1,500 years from now, doing samples of the ocean floor and getting this layer of plastic all around the world. I hope when they look back, they'll say, 'Man, I'm glad our ancestors stopped doing that.'"

Catching Quahog Cro

MARINE UNIT PATROLS NARRAGANSETT BAY—AND THE INTERNET—LOOKING FOR SHELLFISH SCOFFLAWS

by **Emily Greenhalgh** Photographs by **Jesse Burke**


oks

IT'S A BEAUTIFUL FALL DAY ON NARRAGANSETT BAY. After a week of humid, 80-degree days, temperatures have dropped to the mid-60s. Chill runs through the air, but no wind. Environmental police officers Kevin Snow and Charlie Jackman—members of the Rhode Island Department of Environmental Management's (DEM) Marine Unit—are happy to take advantage of the cool skies and calm waters to patrol the bay.

The Marine Unit is responsible for policing everything from rod and reel fishing and recreational boating to commercial vessels in state waters. Today, they're focused on the bay's commercial shellfishermen. And for Rhode Island, commercial shellfishing is synonymous with quahogs.

Quahogs, a species of hard clam (*Mercenaria mercenaria),* are such a Rhode Island staple that they were named the state shell in 1987. The Ocean State has 11 commercially available shellfish species, but quahogs make up the biggest chunk of that by far. In 2016, shellfishermen harvested 28 million quahogs in Rhode Island, compared with a paltry 8 million oysters.

Today is expected to be a slow one for Snow and Jackman. A collapsed sewer line in Warwick that discharged 300,000 gallons of sewage directly into the bay has forced DEM to ban shellfishing from Conimicut Point all the way to Prudence Island's Nayatt Point. Quahogs, being filter feeders, are especially susceptible to environmental effects. Through the filtering process, quahogs absorb pollutants, bacteria, and viruses in the water—it's why DEM is so diligent about closures. (The upside is that, because quahogs are such efficient filter feeders, once the pollutant is removed, the animals can decontaminate themselves through their naturally occurring filtering.)

Digging muscles

Besides monitoring closed areas, the marine patrol makes routine stops of shellfishing boats, a process that may include checking the operator's shellfishing license, making sure all the required safety gear is on board, and ensuring there isn't any undersized catch. Any confiscated shellfish are tossed right back in the water.

"LIKE ANY INDUSTRY, 90 PERCENT ARE HONEST GUYS"

When the DEM vessel pulls up to inspect the first boat of the day, a man in his mid-70s waves the officer on board and starts to haul his gear—a long metal rake—up from the bottom. This is a mean feat considering he's doing it the old-fashioned way: arm power. A retired carpenter, the man has been shellfishing on the side for decades to supplement his income.

"He told me he tries to get out here every day, even if it's just for an hour," says Snow. "Said it keeps him young."

On the surface, it looks like there's very little difference between how shellfish are harvested now and how they were harvested decades ago. The boats are a little larger, gadgets (like GPS systems and fish-finders) are more prevalent, but the tools of the trade are very much the same. Bullraking has been the go-to form of quahogging in Rhode Island for more than 50 years. The state's commercial shellfish industry relies on nonmechanized tools to harvest the state's resources in an "efficient, yet sustainable manner," according to the state's shellfish management plan—a comprehensive document providing policy guidance on management and protection measures for shellfish in the state's marine waters.

A bullrake is a tool designed specifically for pulling clams up from depth. Its long pole is designed to reach to the bay's silty bottom where shellfish live. The spikes on the welded cage basket at the end of the pole are designed to dig into the soft surface of the seafloor and guide the clams into the basket. After throwing a rake over the side of the boat, a quahogger pulls the rake through the mud as the tide moves the boat along, rocking the rake back and forth until quahogs land in the basket. Then comes the heavy work of drawing it back to the boat.

Until 1999, it was illegal to use any mechanized devices while quahogging. Quahoggers pulled in their rakes by hand. But since the turn of the century, many of the state's shellfishermen have opted to attach their rakes to ropes strung through a lobster pot hauler to save some energy—and their backs.

While vessel commercial shellfishing has remained much the same, there's a different story going on under the waves. Since the 1970s, when scuba became mainstream, divers have harnessed the power of their wetsuits to break into the commercial shellfish market. Even though visibility in the bay isn't the best, there's definitely a bonus to being able to see exactly what you're trying to harvest.

As one might expect, the new intrusion wasn't a welcome one. And in the early 1990s, the Rhode Island Shellfisherman's Association even pushed for legislation that would ban shellfish diving. The legislation ultimately failed. However other than the technology

needed to breathe underwater, shellfish divers are prohibited from using mechanized devices to aid in their endeavors.

Officers Snow and Jackman say that DEM has had reports of divers breaking that rule for years, but they haven't been able to catch anyone. They've heard rumors that some divers are known to take an extra compression hose down with them and use the extra air to blow the silt off the clams—a much easier solution than digging for them with neoprene-covered hands.

In addition to monitoring commercial fishermen in boats and divers under the waves, DEM is responsible for keeping an eye on both commercial and recreational shellfish harvesters working from shore.

"We're involved in almost every aspect of a commercial harvest," Officer Adam Hill, a 12-year veteran of DEM's Environmental Police, said over the phone.

What constitutes illegal harvest? Well, it depends on what you're doing and where you're doing it. For commercial harvesters, anyone who is shellfishing unlicensed, with an expired license, or trying to sell their haul without a license runs afoul of the rules. If they do have a license, they may not exceed the permitted daily catch limit. If they're taking in only their allotted amount, all their shellfish must be within size restrictions.

It may sound like a lot, but, for the most part, commercial harvesters are happy to follow the rules. "Like any industry, 90 percent are honest guys trying to make a living," says Snow.

Rhode Island Shellfisherman's Association President Mike McGiveney agrees. "Illegal harvesting of shellfish can damage the sterling reputation Rhode Island has in regards to the quality and safety of its shellfish," he says. "Fortunately, this activity has been greatly reduced over the years due to increased awareness by the shellfishermen of its dangers and stiffer penalties given if one was to be caught by DEM


ENVIRONMENTAL POLICE
DEM
LICE
ICOM
LIGHTS
WAIL
OVERRIDE
AUX
YELP
MENU
CLEAR
20.8
14:22
Home
GARMIN


DEM Dispatch
16
19.4
258
262
20.9
14:22
DE
PO

enforcement officers. Currently the vast majority of shellfishermen understand the importance of maintaining Rhode Island's reputation of having the highest quality shellfish."

Nevertheless, it's that last small percent that can cause trouble.

Poaching penalties

"If we run into violations commercially, it's willfully and knowingly breaking the rules," said Hill. "These guys are held to a higher standard because it could become a public health issue."

When shellfishermen sell their goods, they're required to tag them from the area they harvest. They then sell their stock to a dealer, who will, in turn, sell to the public. Dealers must keep those tags on file for 30 days, partially to help track any outbreaks in case people get sick.

Enforcement in relation to public safety is strict. For smaller infractions, like a lapsed license or undersized catch, officers will likely issue a ticket or sometimes just a warning if it's a first offense. But anyone found harvesting at night will be fined up to $1,000, face up to three years in prison, or both. According

Marine officers Kevin Snow and Charlie Jackman patrol Narragansett Bay to monitor commercial shellfishing, among other activities.

to the state's shellfish management plan, fishing at night is a "serious offense" that can even bring felony convictions.

This is because night shellfishing has been one way for scofflaws to harvest from closed areas and sell to unscrupulous dealers or unwitting consumers. "It is a serious public health risk when a poacher uses the cover of darkness to take shellfish from a polluted area," says Kurt Blanchard, deputy chief of DEM's Division of Law Enforcement. "Additionally, if we were to have an illness-related event, not only does the consumer suffer but our industry suffers an economic hardship."

Stringent law enforcement efforts over the last several decades sharply curtailed such activity, but not without some resistance, Blanchard says, recalling back in the 1980s "organized groups doing counter surveillance on our officers' homes and setting up lookouts, all in an effort not to get caught."

In her book, *Rhode Island's Shellfish Heritage: An Ecological History*, author Sarah Schumann discusses the state's infamous "quahog pirates" of decades ago:

> *"The ongoing battle of wits and wills between [quahog pirates and enforcement] gave rise to all manner of daring exploits—ramming of boats, high-speed chases, sting operations, and more. Pirate quahoggers sometimes wore masks while digging or repainted their boats with a different color every night to avoid identification. At least one had his wife push his catch to the dealer in a baby carriage, disguised as an infant, to escape notice. Some dealers turned a blind eye to the origin of the quahogs they bought."*

Though the quahog pirates are largely a thing of the past, one of the biggest shellfish enforcement stories of the last decade happened in 2015. Two men were charged with stealing oysters from a Narragansett oyster farm. The farm's owner chased the men by boat, only to miss catching them as they docked their skiff and fled on foot, though two suspects were later apprehended.

Jackman says he thinks there's another reason people are less likely to lay it all on the line with crazy schemes—there's a lot less opportunity for it.

"A lot of the places these guys used to go [to illegally harvest] in the '80s are just much more built up," said Jackman. "They're better lit, there's more marinas, and more people. So, is it happening? Probably. But it's not as common."

Snow says dealers know they'll lose their livelihoods if they take illegally harvested product. So, he said what's happening is direct deals to restaurants or direct sales to consumers. If you're someone with 12 bushels of ill-gotten shellfish, how would you get rid of it? The internet, of course.

One way these illegal shellfishermen are getting rid of their stock is by reaching out to their buyers online. You can actually troll Craigslist and find ads for bushels of quahogs. The Marine Police have had a couple of successful stings, catching people who post their illegal catch online.

"You'll see a post on Craigslist, or even Facebook Marketplace," says Snow. As Snow described, the stings are pretty straightforward: officers find the post, call the phone number in the ad, plan the meet up, and boom! Compromised shellfish off the streets.

Cooperative enforcement

With only 14 officers on DEM's Marine Patrol, they're spread thin. "We wear a lot of hats; shellfishing enforcement is just one small piece of that," says Hill, even though Rhode Island's shellfishing and aquaculture industry brings in millions of dollars annually.

Recognizing its importance, the state agencies that manage the shellfish resource called for the development of a shellfish management plan, which Rhode Island Sea Grant and the University of Rhode Island Coastal Resources Center (CRC) spearheaded. The plan, which includes enforcement and regulatory policies, was formulated with a lot of input from shellfish growers and harvesters, says Azure Cygler, extension specialist for Sea Grant and CRC. The plan "is a living set of action items that the industry helped develop alongside the state agencies and others at the table."

With limited personnel to cover all of Rhode Island's marine waters, enforcement officers benefit from the collaborative spirit embodied in the plan.

The patrol unit relies heavily on tips called in from the public and from fellow shellfishermen, says Snow. The industry is good about policing itself, he adds. "If someone is screwing up, someone else is going to report them."

SPREADING THE LOVE ABOUT SEAWEED

by **Hugh Markey** Photographs by **Dana Smith**

LIKE MOST FARMERS, CINDY WEST OF MOONSTONE OYSTERS is ready for work before the sun is up. It's early April, and she and her crew are dressed in plenty of layers against the chill. There's chatter about last night's Bruins game as they load equipment. Among the crew of four is Lindsay Green-Gavrielidis, a post-doctoral fellow from the University of Rhode Island's Department of Natural Resources. Despite the early hour, she is smiling and greets West warmly. Just as the sun begins to glow over the water, the group boards, and the boat heads to the first stop—a patch of kelp in Point Judith Pond. It's all part of a URI research project into an important trend: seaweed aquaculture.

"My role is serving as seaweed expert," Green-Gavrielidis explains. "I grow the material in the lab, work with farmers to plant it, monitor the growth, teach them about what to look for and how to measure growth, and help with the harvest." The research is the result of a grant URI obtained in 2017 to learn about kelp farming. Green-Gavrielidis says worldwide farming of various seaweeds is increasing 5 to 10 percent annually, and local farmers have expressed an interest in getting involved with the trend. She points to the health benefits of consuming seaweed.

"A lot of people say it's better to eat lower on the food web, and it can't get any lower in the ocean than seaweed. They don't have a lot of fat in terms of things we think of as 'bad' in your diet. They're not exactly equivalent to something like spinach, but some people do refer to them as a 'sea vegetable.' Kelp, in particular, is very well-known as being a source of iodine. Protein comprises up to 50 percent of the volume of nori, the Japanese weed used in sushi. That's one of the highest content ratios we know. It also contains a lot of vitamin C as well as taurine, an important amino acid," she says.

"They all have their healthy aspects, and they're all sustainable, as long as if you're buying wild harvest they're using a sustainable methodology. Buying farmed product is the best way to go in terms

of buying a sustainable product. The largest crop of seaweeds are the kelps in terms of weight, and that is overwhelmingly used for human food, including miso soup and kelp salad."

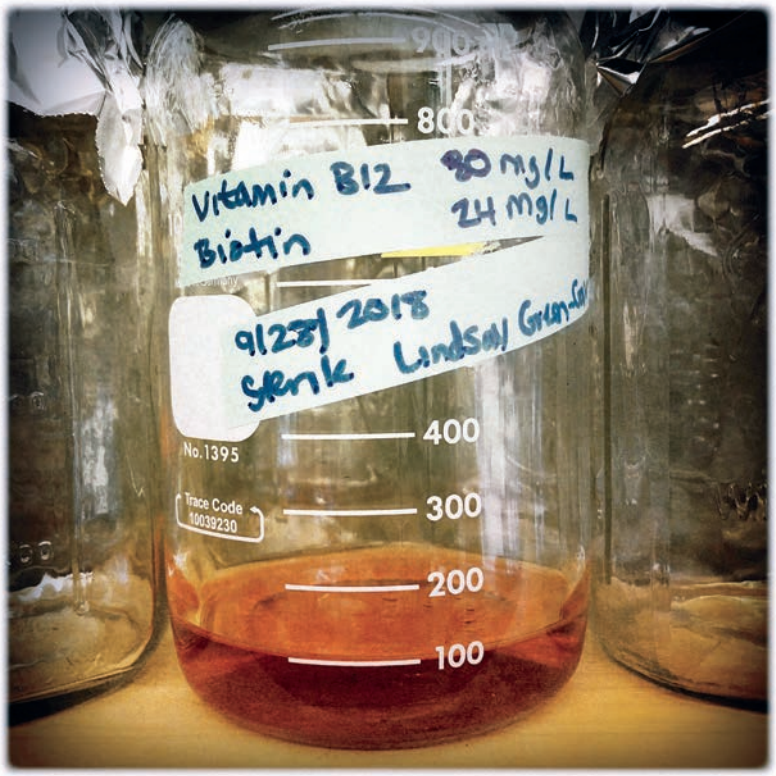
The crew deftly maneuvers around in the 25-foot boat, which is crowded with baskets, line, kelp bags, and an open well in the center. Each of the morning's sites comprises eight 240-foot lines. Each rope is strung along the bottom and is upheld by a series of buoys. The lines are pulled in by hand at first, then hooked to a winch that stands about 6 feet high at the stern. As the line is retrieved, the crew slices off the kelp blades and places each in the baskets. It doesn't take long for the deck to have all the traction of an ice rink.

"The project is designed to set up six farms across Rhode Island, each with different conditions, including varying hydrodynamics, nutrient content, and depth," Green-Gavrielidis says. "The theory is that if we grow them in varying conditions and measure the growth and output, we can use the information that we gather to create a model for the best conditions to grow kelp. In theory, we may be able to construct maps that will be available to farmers to help them choose the most productive regions in the bay."

Green-Gavrielidis has been involved with the entire process of the experiment. The first part involved scuba diving to obtain the raw material. The blades she harvested were brought to a lab and slightly dried; that stressed the seaweed, forcing it to release its spores. From there, the spores were placed in 20-gallon tanks, where they later attached themselves to PVC tubes wrapped with cotton line. After about six weeks of careful monitoring, the apparatus was ready for placement in open water.

Once a month, Green-Gavrielidis checked on the collection. She collected samples and measured length by making a hole, like a paper punch, in the kelp blade. Her research revealed that a blade can grow several inches in a few days. The monitoring began in late fall and continued until the early spring harvest.

Aboard the Moonstone Oyster boat, Cindy West is concerned about the forecasted wind increase as well as the tide, and she phones another team to come and help at this site. Soon the area is a hive of activity: knives slicing through the kelp fronds, orange baskets filling with the harvest, and black plastic bags to hold the bounty. Those are quickly passed to the second boat, which soon fills from stem to stern. West smiles and quizzes the crew on pop music trivia but pushes them to keep moving. "Work and talk, work and talk," she calls.



Lindsay Green-Gavrielidis is trying to figure out the best ways to grow seaweed in Rhode Island.

This batch will go to a processing plant in Maine. The trimmings, smaller scraps of kelp, will be used for fertilizer. The longer blades will be used in creating noodle products, and some will be processed and frozen into blocks to augment smoothies and yogurt.

Green-Gavrielidis has braced against the chill by wrapping herself from head to toe in warm clothes and foul weather gear. She harvests a particularly long blade of kelp and a big smile shows through all the layers. "Look how beautiful this is!" she calls.

She has high hopes for this form of aquaculture. "I think that it is a good alternative to growing nutritious food for a growing population in the future. It has less impact than crops grown on land, where there is competition for space or for water. It has its own challenges such as climate change. But in terms of agricultural land space, we don't have a whole lot more that we can use, so in the future it would be good to explore some of these methods of producing food."

Today, Green-Gavrielidis is focused on kelp, but she's passionate about seaweeds in general. "They're just so interesting, and they have such diverse strategies for surviving in a changing world. And they're found everywhere, from Antarctica to the tropics," she says.

"It's something that's really underappreciated, so you have more of a positive impact if you sort of spread the love."

THE GRAYING OF THE BAY

COMMERCIAL FISHERIES SEEK YOUNG RECRUITS

by **Hugh Markey**

Photographs by **Jesse Burke**

THERE'S A STATUE THAT STANDS IN THE COURTYARD of the Warwick Public Library. It's an oversized depiction of a quahogger, rake in hand, two bulging bags of the shellfish by his side, and a Labrador Retriever for company. The statue is called "The Warwick Quahogger: A Day's Catch." When the statue was dedicated in 1998, quahogs were plentiful, and there were dozens of shellfishermen making a living from them. Then-mayor Lincoln Chaffee said, "Just as lobsters are to Maine and crabs are to Maryland, the quahog is a symbol of Rhode Island."

Yet in the decades that followed, there were fewer and fewer boats on the water. The causes were a blend of regulatory changes, fishing ground closures, and indirect contributors like high health care costs. Longtime shellfishermen with families to consider were forced to leave the industry in search of more steady income and medical benefits. For a while, it looked like an entire lifestyle might be lost.

"There's a whole generation of people that have no idea about how to get into the industry," says Mike McGiveney, president of the Rhode Island Shellfisherman's Association. Those dwindling numbers are why both the association and the Commercial Fisheries Center of Rhode Island have created recruiting and training programs.

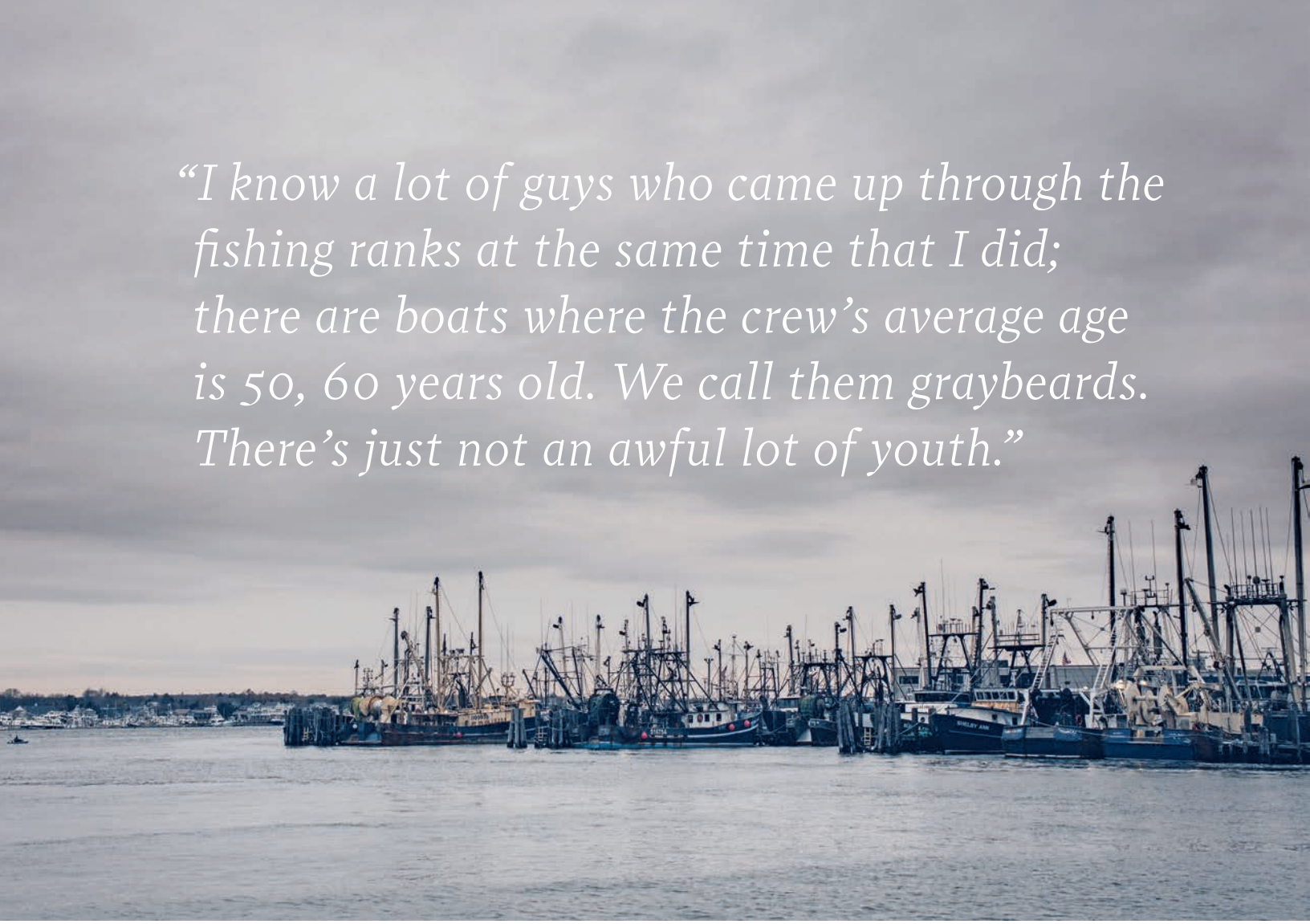
Funding for the shellfishing internship program came through the Local Agricultural and Seafood Act Grants Program from the Rhode Island Department of Environmental Management (DEM). The department's own data showed that, as of five years ago, the average age of a licensed shellfisherman was 57, which made it even more important to encourage youngsters. "The idea was to bring young people on the water and show them what it's like to quahog," McGiveney says. Participants came from an assortment of backgrounds including law enforcement personnel and military veterans. All were curious but, as McGiveney says, "Frankly, you gotta be young. Personally, I fell in love with quahogging when I was at URI [University of Rhode Island]. I loved working outdoors, being your own boss."

Some of the grant money paid for applicants to spend the day on the water, providing them with important information. "You'd be surprised to learn what you didn't know you don't know," says McGiveney. He tells the story of someone who brought his newly acquired boat on the water and proceeded to dig with the wind in the wrong direction. The boat was drifting into the rake, making it nearly impossible to dig. That's the sort of rookie error that can be avoided if someone has been out with a seasoned veteran. "Things like having the proper length of pole for digging, picking an area to dig depending on the weather, and which waters are closed because of the rain," McGiveney explains.

How many licenses are enough?

Once a candidate decides he or she would like to become a shellfisherman, the next step is to obtain a license. John Lake, marine supervising biologist with DEM, says his office works closely with an advisory committee of fishing industry representatives to decide how many licenses will be given out each year.


GRUNDÉNS



"We generally take a lot of advice on issuing licenses." Each year, Lake reviews the number of inactive (retired) licenses. The norm from some years past was that for every two licenses retired, DEM issued one new license. However, the past two years have seen the ratio changed to 1:1, and Lake says 33 new licenses went out in each of those years. Further alterations may be in the works, with the possibility of issuing two licenses for every one turned in.

"We make our decisions based on what response we get from the industry," Lake says. "We don't like to see abrupt change. If we issue too many licenses, the industry says the prices are down too far, and if too few, the supply line is changed."

Until recently, all licenses had to be renewed by the end of February, but, McGiveney says, "We found that kids weren't really thinking about what to do during the summer in February. We went through the legislature and changed the deadline for student licenses to June 30. That was done with the idea of getting more young people into the industry."

Lake says DEM fully supports getting more people into the business. "I do think the internship program is a great idea. Right now, after two years with a student license, you're eligible for a commercial license (which allows the license holder to work more months of the year). There's actually been discussion that perhaps next year we should change that to being active for just one year, to really facilitate getting that license and give them that opportunity to get in."

Keeping the numbers of shellfishermen steady benefits more than the individual industry members themselves, says McGiveney.

"Shellfishermen are part of the economic and social fabric of various harbors and marinas. There are a number of mechanics and shop owners who say that if it weren't for the shellfishing industry, they'd have to lay people off or shut their doors during the wintertime. In the case of the marinas, people like us because we're a second set of eyes. If a dock breaks off or thievery occurs, we're out there and can help."

Hey, can you take me fishing?

Shellfishing is not the only commercial fisheries sector with an aging demographic.

"For the longest time the talk [among fishermen]

was about overregulation. Then, about two or three years ago, all that changed. It became 'Do you know anyone who can go fishing? You know any young crews?'" says Fred Mattera, retired commercial fisherman and executive director of the Commercial Fisheries Center of Rhode Island, describing an emerging need in the trawl fishery and other sectors. "It prompted me to think that we should start an apprenticeship program. I know a lot of guys who came up through the fishing ranks at the same time that I did; there are boats where the crew's average age is 50, 60 years old. We call them graybeards. There's just not an awful lot of youth."

Still, fishermen don't want to hire just anyone. "The problem is, you have a greenhorn come down to the dock and say, 'Hey, can you take me fishing?' The first thing the captain will say is, 'Have you been fishing before and on what boats?' 'I've never been fishing before, this is my first time.' Even though you need people, you don't want to babysit." A captain hiring a "greenhorn" is faced with someone with no experience, unproven reliability, and one challenge even the most sincere candidates may not be aware of. "I would say that 50 to 60 percent of the people I've taken out end up seasick and never want to go out again."

"We wanted people who were committed"

Mattera says "an economic lull in the fishery as we've gone through the [stock] rebuilding periods" was in part to blame for the declining numbers. "You get less and less access to fish, so it's hard to attain a good steady income. With that came a steady exit of crew members. But actually, fishing has improved in the last several years. Some species have really become prolific."

The realization that there were more boats than crew members sparked the next move. "I started to talk to more and more people, we started talking to the state, and I came to the fisheries center here. We submitted a grant application to National Fish and Wildlife Foundation, and we received the funding for an apprenticeship program," which, Mattera says, became the first of its kind on the East Coast.

The process of interviewing applicants was, by Mattera's description, a rigorous one. "We wanted people who were committed, not just young people who wanted to try fishing for the summer. We wanted to know that you were in this for the long term, that you were in it to be a commercial fisherman."

In its first year, the program had a dozen individuals, most of whom were in their 20s. Ten stayed for the duration. The graduates included two women who are still working.

That phase was successful enough to prompt further discussion about continuing the program. Meetings were held with DEM Director Janet Coit and with representatives from the governor's office and Real Jobs Rhode Island, from the Department of Labor and Training. Together, they hammered out an application for last year's funding. The application was granted, and in 2018, the program trained 15 people.

Fishing bootcamp

The four-week program included topics like safety, which ran for seven days and put students through their paces with using flares, fighting fires, and keeping watch. Three days were spent mending twine, splicing, and knot tying. Time was spent learning the finer points of diesel engines. Still more with welding. There was basic seamanship, which included teaching the proper nomenclature, how to go up and down ladders, and throwing dock lines. Mattera says the group did well. "They liked it, they liked the challenge. They wanted to get better and better. There was good clean competition."

One of the biggest challenges was charting a course without electronics. "We gave them a map with a last known position, and no GPS, no nothing. 'Here's your last known position, take parallel rules, dividers, use them to find the compass rose, and draw me a line and give me a heading.'"

They also spent two to three days at sea, working at trawling and lobstering. Students chose the type of fishing they wanted to do, and Mattera found boats that would take them out.

Replenishing the stocks

Mattera compares the sustenance of the industry to replenishing fish stocks: "You have to start with the young, and they will come up through the ranks. Five or 10 years down the road, they're ready to become captains and own their own boat. There are an awful lot of guys in their 50s who are ready to pass the baton to the next generation. All you're looking for is some vigorous, driven individuals ... And it's not just a Rhode Island thing. I've had calls from all over New England just begging for qualified help."

"I love [the program]," Mattera continues. "It's hard to believe that 40-something years ago I was just like them. You grow with this, and you see those who are naturals, you see some who you'll have to work with a bit, and you see those who you wonder whether they'll ever make a go of it. It's inspiring to me. There's nothing that makes you feel better than hearing about one of your guys coming back after three or four days at sea and the captain's calling and saying they're absolutely outstanding. We taught them well.

"Wouldn't it be nice if I'm around here in 10 years and a half dozen of these kids have their own boats? The opportunities are right here!"

Meet the Apprentices

by **Jacob Rousseau** with **Meredith Haas** and **Monica Allard Cox**

Photographs by **Jesse Burke**

Evan Adams

"I COULDN'T FEEL MY HANDS AND they hurt to bend. I had never used my hands that way before," says Evan Adams, describing how he felt after his first week as a deckhand on the fishing vessel *Harvest Moon* out of Point Judith. "I didn't want to do it anymore because I was so tired … the only thing that kept me going after the first week was seeing the paycheck."

As a deckhand, Adams' primary job is to make sure the lobster pots are set correctly and that the rope is running clear so it's not wrapped up around anything or anyone. After his body acclimated to the physical demands of these tasks, Adams says that what now keeps bringing him back to the dock is the love of fishing and of the ocean. "I've always wanted to be a fisherman and this is me wanting to do something with my life."

Adams knew exactly what he wanted to be as kid, inspired by his dad and their fishing trips. "When I was younger I used to go [recreational] fishing with my dad all of the time," he says. "In the sixth grade, I told my teacher that my occupation would be a fisherman." But that path wasn't always clear, as Adams had no connections through friends or family to the commercial industry. This is what Adams thinks prevents others from entering the profession.

"The things I think that are holding younger kids from becoming fishermen are not knowing how to become [one] … I had no idea how to get into it."

After graduating high school, Adams says he was working dead-end jobs until a friend tagged him in a Facebook post for an apprenticeship program by the Commercial Fisheries Center of Rhode Island and the University of Rhode Island. The program is aimed at training "greenhorns" to become commercial fishermen in order to sustain a workforce that is getting older. Adams, who is 21, was the youngest of 12 to be accepted for the program's first run in 2017 and is now working his second season as a deckhand.

"[The apprenticeship] was probably the most helpful thing I have ever done," he says. "They taught us how to mend nets, how to hook up lines, how to hook up hooks. They taught us all about the management of fish, the population [of fish], what's decreasing, and what's increasing."

But a lot of the training at the time focused on the skills needed for working on draggers and not on lobster boats. "Everything I learned on the lobster boat was brand new to me," he says, adding that the apprenticeship now includes introductions to scalloping and lobstering. "It took me a little while to learn running and stacking the pots the right way, but [my captain] showed me multiple times until I got it 100 percent."

While he has progressed over the last year, Adams says he still faces challenges. To get through 24-hour-long days when his boat goes offshore scalloping, he drinks soda to stay awake. And occasionally he still gets seasick, something he says crew members always need to be prepared for. "[Seasickness] the worst thing you can imagine … it drains your whole body. You have to keep moving."

Despite all this, Adams isn't deterred from his ambition to be a captain himself one day. "I've actually been talking to my captain the last couple of months about getting my own boat and starting with my own conch license," he says, perhaps working up to a multipurpose license, which could cost $20,000.

"I'm in to be in it. I'm not just looking to make quick money and leave. I plan on doing this for multiple years."

Stephanie Hryzan

"FISHING IS BY FAR—AND I'VE DONE a lot of different things—it is the most physically demanding, most exhausting job I could have had or that I could imagine having," says Stephanie Hryzan. And yet, she wakes up every morning ready to return to work on the *Cody,* a dragger docked in Point Judith.

Hryzan never pictured herself in commercial fishing when she was growing up in Charlestown, although her father is a fisherman. "I barely saw my dad when I was a kid when he was at the plant or out fishing."

Like her father, Hryzan says she always loved the ocean growing up and was "obsessed with marine life" —so much so that she decided to pursue a degree in marine biology at the University of Tampa. But she soon realized, however, that research labs were not for her. "I like the hands-on aspect," she says, adding that in order for her get a job in the field, such as in the Rhode Island Department of Environmental Management (DEM), she would need a master's degree, and she was looking at $100,000 of debt just from her undergraduate education.

She instead pursued a degree in sociology, and after graduation found herself back in Rhode Island selling cars. But working on the water was always in the back of her mind. Hryzan left sales to become an observer on a scallop vessel, and discovered that not only did she enjoy being out on a commercial fishing boat, but also that fishermen could earn a good salary—the kind that could finally help pay off some credit card debt that had accumulated in addition to the student loans. Hryzan saw an advertisement on Facebook by the Commercial Fisheries Center of Rhode Island promoting the commercial fishing apprenticeship and applied right away.

As a member of the program's first class of students, Hryzan says, "I learned a lot that I wouldn't have known," but adds that most of her education has been hands-on aboard the *Cody*. Nevertheless, she says, "They did the best they could for testing out this new program with 12 random people," half of whom are still fishing.

When asked about any mistakes she may have made in her first fishing trip, Hryzan laughs.

"I still make mistakes, it's never ending," she says. "A lot of it comes second nature to you after a while. Getting used to hooking up the door and setting wire … and then when you have to change nets over at sea, dealing with ground cables and top legs and bottom legs. All that stuff honestly still confuses me when we're doing it out there because you just end up with a big pile of gear on deck. And there's a lot of tension, you've got four different personalities (on deck). I have a very patient captain, and that helps."

She credits the captain and the rules of conduct on her boat for keeping her crew together for a year—a long time in the fishing industry, where, she says, people often hop from one boat to another due to personality conflicts. She herself plans to stick with the industry for at least a few more years: "For the most part I enjoy being on the water, not having to punch a clock every day, so to speak. I mean, come wintertime, I'll be complaining about that, wishing I had a land job. Now that I've had a taste the last few years of being out on the water and … making better money than I've ever made at a land job … I think that's how people get sucked into fishing."

Still, she says, she does not want to be a captain. "I don't say that because I'm not ambitious; it's not me. There's a lot of pressure on those guys to be captain and it's a kind of stress … it's a sacrifice you make," she says. "I think you also need to really start from a younger age. A lot of these guys have been doing it since they were right out of high school, whereas I started 15 years after that. There's a lot to learn."

As for the future, "I don't think I'll do it the rest of my life, because I want to *have* a life … I don't know what I would actually want to do for a career, without having that master's degree to get that DEM job," she says.

"In which case I still would be making less money than I am now."

A BITE OF THE OCEAN

Cookbook authors encourage consumers to seek less-loved seafood species

by **Hugh Markey** Photographs by **Jesse Burke**

It's August, and we're finally getting a day without stifling humidity. The flowers outside Chef Rizwan Ahmed's home seem renewed by the recent rain. The decline in temperatures means the chef can entertain with the windows open, a gentle breeze tickling the lace curtains as he cooks. It's a perfect afternoon for chowder and crab cakes.

But here's the thing: there are no clam or quahog shells lying around. Instead, on the counter near the sink is a neat mound of slipper limpets, sometimes called slipper shells. And the crab cakes are not from the usual blue crab: they're Jonah crabs, long regarded by lobstermen as bycatch. Yet these choices were not made because the usual ingredients were sold out; in fact, they symbolize the whole purpose behind *Simmering the Sea*, a new cookbook intended to introduce home cooks to sustainable eating.

Mitonnez la Mer

When University of Rhode Island Graduate School of Oceanography professor Jeremy Collie met French fisheries scientist Marie-Joëlle Rochet at a conference, he made an interesting discovery. Rochet had teamed up with other fisheries scientists to produce a cookbook focusing on underutilized fish resources. Its name? *Mitonnez la Mer*, or *Simmering the Sea.* The idea for a similar book geared for a New England audience was born, and the two teamed up to begin the process. Later, they would partner with Eating with the Ecosystem, including Sarah Schumann and Kate Masury. The nonprofit is dedicated to developing ways for people to support "the region's marine ecosystems and the people who depend on them," according to their website. Schumann and Masury would do some of the writing, maintaining an approach to the American version that was like that of the French.

"URI researchers were looking into the production of the ecosystems and comparing that with consumer use and fish availability," Masury says. "We wanted to find out what species were out there and why some species may not typically be found in our local marketplace." The foundation of *Simmering the Sea* was about to be established.

Fish finders

Most cookbooks are created in a relatively straightforward manner: The author may simply choose recipes from the latest trends or from what's selling in a restaurant. Not so in this case.

"We enlisted citizen scientists for our research," Masury says. "We had people from all over New England recording the availability of different fish species at markets. Every week they had an assignment that we called a 'fish list' of about four species of fish that they would try to find at three different markets. The list was randomly generated from a list of 52 species, including the usual suspects like lobster or cod, but also unusual ones like dogfish or scup or skate. We'd send them out and ask whether a market had it. They recorded whether the market carried it, [and] if they did, the citizens were asked to buy it and prepare it at home, later reporting on their result. It ended up being a really cool project, and it had the added effect of getting a number of managers to stock the fish, saying, 'Hey, you asked about that fish last week, and now we have it!'"

In addition to learning about the availability of species, the research had the added benefit of informing the team about which species might be challenging to work with. Citizens were asked about their experiences cooking these fish: Did they like it? Were they successful? For example, Masury says many people struggled with butterfish; they didn't seem to know what to do with the bones.

Once much of the research was complete, it was time to take the next step: bringing in the chef.

From bait to plate

The cookbook was not Ahmed's first collaboration with Eating with the Ecosystem. Ahmed, an instructor at Johnson and Wales University (JWU), first met Schumann several years ago when he owned a restaurant in Bristol. "Every Saturday I used to

Chef Rizwan Ahmed, with Kate Masury, serves up slipper limpet chowder from *Simmering the Sea*.

go to this farm stand and pick up produce and local ingredients for my restaurant, Hourglass Brasserie," he said. "Sarah had a sign out saying she was looking for chefs to collaborate on a dinner series featuring underutilized seafood. I thought, 'What a great idea!' I invited her to my restaurant and she was very pleased. We already had a lot of that sort of fish on the menu like skate, scup, and periwinkles, and we really clicked right there. She asked if I would like to start the series off, and we had the first dinner event there. We had Sarah speak, I spoke, and we had others. I served a five-course meal, and as we served, we talked about the environment, how we chose the best species, so it was a good event. It caught on, and restaurants around the state began to host similar evenings."

Ahmed shares an anecdote that might represent much of the philosophy behind the book: convincing the public that there are more delicious fish in the sea than just the typical seafood counter favorites. "When I first moved to Bristol, I went with my wife for a walk in Independence Park. There was a fisherman out there who caught a skate. He took out a bat and hit it a few times, cut it up, and put some on his hook. I asked, 'What are you doing?' and he said, 'This is no good. It's a garbage fish, so I'm using it for bait.' I said, 'No, these are the kinds of fish I'm interested in using at my restaurant, so next time you catch any, bring them to my restaurant and I'll take them.' And guess what? The next time I opened my restaurant, he came in and sold some to me."

Refining recipes

Ahmed says it took about four or five months to develop the recipes, test, and refine them. Some alterations were made to make the recipes less intimidating. "As a chef in a fine restaurant, I learned that some of the recipes I sent to Kate were a little too 'cheffy'—I wasn't making the recipe for a home chef, so I needed to tone it down a little bit. It's understandable. I was still going to use the recipes from my restaurant, but I would cut down on the ingredients. I would also go out to the farmers' markets to be sure readers were able to obtain the recipe ingredients."

JWU granted Ahmed permission to use their kitchens in recipe development. He also chose four students to cook his recipes. "I had the recipes, I gave them to my students, and I said, 'You guys go and make these recipes, taste them, and from there, you tell me what they taste like.' I had it in my own head what they should taste like, but I wanted the guys to tell me what their experience was. Most came out well, but a few we had to tweak a little here and there."

In his home kitchen, Ahmed is cleaning up after offering a sampling that was both delicious and looked like it came from a fine dining magazine. Both he and Masury speak of the enthusiastic cooperation *Simmering* received from URI, JWU, restaurants, and their citizen scientists—and the fishing industry.

"Fishermen are always very supportive of getting people to try more of the species that they normally don't have a market for," Masury says. "It helps them make a living because then they can go out and catch any kind of species that are in the water, not just cod or lobster. At the same time, they're supporting the ecosystem because they're taking things that are more abundant."

Squid, Scup, and Skate

SIMMERING THE SEA sings the praises of under-loved ocean animals

Reviewed by **Hugh Markey**

Illustration by Léa Tirmant-Desoyen

IMAGINE THAT YOU ARE IN YOUR favorite seafood restaurant, hungrily awaiting the first course of the evening meal. The server arrives carrying a tray: "Who had the chowder with limpets? And the razor clam and fava bean salad?" What would your reaction be? Confusion? Horror? Or would you simply dive into the culinary adventure? The authors of *Simmering the Sea: Diversifying Cookery to Sustain Our Fisheries* are out to encourage people react to those and other dishes with delight.

The cookbook is a tangible manifestation of the mission statement of Eating with the Ecosystem, the nonprofit that uses a research-driven approach to support marine ecosystems. Here the reader will find not only delicious recipes created by Chef Rizwan Ahmed of Johnson and Wales University, but also fascinating information about the ecosystems from which the fish come, instructions in technique, and an assortment of wonderfully unconventional illustrations by Léa Tirmant-Desoyen. "We combine the science along with the fisheries information, so we can teach consumers how they can support our local fisheries," says Kate Masury, the program director of the organization and co-author of the cookbook.

The Eating with the Ecosystem website says that "to uphold biodiversity in the ocean, we must make diversity a cornerstone of our fishing and seafood eating processes." That diversity is why there are no recipes for tuna steaks or lobster in this cookbook; its *raison d'être* is to highlight the lesser known marine life, just as tasty as the old standbys. With any fishing boat arriving in port comes a mixture of life: tuna, cod, and lobster are often accompanied by dogfish, sea robin, and Jonah crab. The authors want to encourage readers to experiment with those less popular fish, rather than have them literally tossed overboard.

The novel choices in *Simmering* include some fish that (until now, hopefully) bear an undeserved reputation, said Ahmed: "A lot of the recipes [that give people pause] are very common on menus in Europe, such as periwinkles, which are quite popular in France. Yet sometimes even the name is wrong. Do you think dogfish sounds like an appetizing name? It doesn't. But it's delicious."

Ahmed adds that the visual element may sometimes work against acceptance. Those who may be willing to try the filet of an unusual fish such as a sea robin (called gurnard in France, where the fish is widely consumed) may be less inclined if they see the entire fish.

Masury agrees. "We would talk to people at farmers' markets, and they'd say, 'Oh yeah, I've caught sea robin.' Did you ever eat it? 'No, I thought it was poison.'"

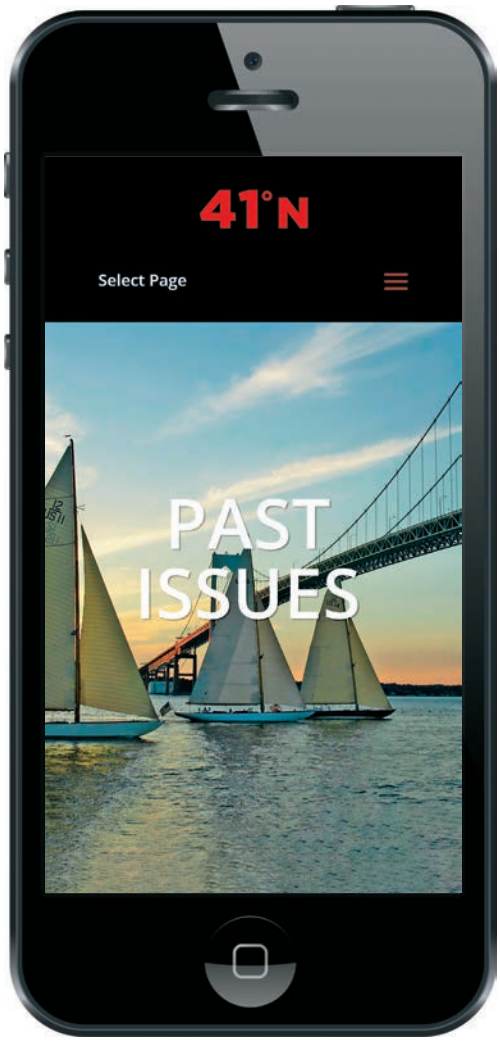
"We chose species from each part of the ecosystems, and by learning about these species, and cooking them and eating them, you're experiencing the ecosystems that they use," said Masury. In fact, the introduction says the book is "... a culinary travel guide to the marine ecosystems of the Northwest Atlantic and a 'who's who?' of the region's edible inhabitants." It is a journey that the reader will want to take; *Simmering the Sea* will serve as your informative and delicious guide to gustatory adventure.

SEA CHANGE

Visual artists Scott Lapham and Joan Wyand have collaborated again on “Sea Change,” a show incorporating photography, sculpture, and installation at Coastal Contemporary Gallery in Newport during the month of March. In April, a portion of ‘Sea Change’ will be displayed in the Middletown facility of Clean Ocean Access.

41° N
A PUBLICATION OF RHODE ISLAND SEA GRANT
& THE COASTAL INSTITUTE AT
THE UNIVERSITY OF RHODE ISLAND
A SEA GRANT INSTITUTION

NONPROFIT ORG.
U.S. POSTAGE
PAID
WAKEFIELD, RI
PERMIT NO. 19



41Nmagazine.org

BRING RHODE ISLAND'S OCEAN & COASTAL MAGAZINE WITH YOU WHEREVER YOU GO!