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41°N

ECONOMY

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41°N

EDITORIAL STAFF

Monica Allard Cox, Editor
Judith Swift
Alan Desbonnet
Meredith Haas

ART DIRECTOR
Ernesto Aparicio

PROOFREADER
Lesley Squillante

COVER
Photograph by Jesse Burke

ABOUT 41°N
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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) 874-6800. E-mail: 41N@gso.uri.edu

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GIVE & TAKE

IN THE BOOK *THE GIVING TREE* BY SHEL SILVERSTEIN, AN APPLE TREE gives the boy she loves a trunk and branches for climbing when he is young, then apples for selling when he gets older, then wood for building, and finally an old stump to rest on. If we were today to write a similar poem for Rhode Island, it might be The Giving Coast, about Narragansett Bay and the Atlantic Ocean, and the goods and services they provide to us. We expect the coast, unlike the apple tree of the story, to endlessly regenerate everything it brings forth.

In this issue of *41°N*, we look at the economics of the coast, and the price we can put—or not—on what it offers, from sand and seafood to intangibles such as ecosystem diversity and water views. And we examine how those things are changing—such as how warming waters are bringing new fish species further north—and how people and industries are adapting, such as how innovations are transforming the face of the marine trades.

Let us know what you think.

—MONICA ALLARD COX
Editor

Correction: In the previous issue of *41°N*, a photograph of Crescent Park in East Providence on page 7 "Oakland Beach: Building a New Reputation" was misidentified as Oakland Beach, Warwick.

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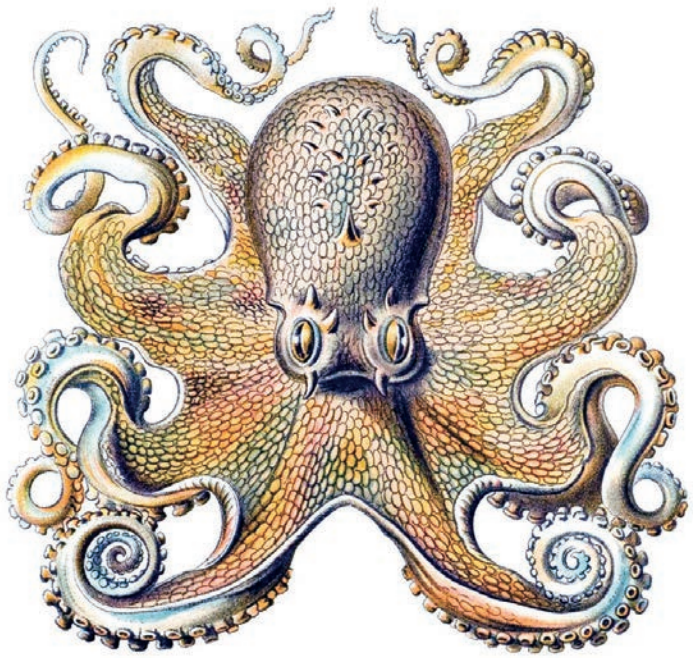

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Water View

THE PRICE OF PLACE

by **Ellen Liberman**

Photographs by **John Supancic**

OCEANFRONT. New construction designed with architectural grace & quality craftsmanship affording panoramic views of Pt. Judith Refuge and Block Island from every room. Sited on rare, gated 1.3-acre lot within walking distance of Roger Wheeler Beach. List price $2,990,000

The Multiple Listing Service (MLS) cannot do justice to 77 Stanton Avenue. The cedar-shingled, 3,464-square-foot, contemporary Victorian rises above the modest Capes that dominate the Sand Hill Cove neighborhood in Narragansett to meet the ultramarine of the Atlantic and the cerulean of the sky. Words fail to capture the restless shushing of the breakers and the salty tang delivered by the offshore breezes. To the north, a motley mantel of orange-blue-pink umbrellas shade the sunbathers on Roger Wheeler Beach. Due south, Block Island crests over the waterline. And the stony arms of the Point Judith breakwaters seem to draw the gaze forward into the endless blue.

Can one really put a price on that?

Realtors, tax assessors, scholars, insurers, hard-nosed home sellers, and dreamy homebuyers have certainly tried. Jim Houle, a Portsmouth-based appraiser since 1973, still remembers the very first rule of real estate he learned in his very first certification course:

"When it comes to dealing with waterfront property, you can forget every rule you ever learned," he recalled. "For the most part, in real estate appraisal work, you can cut through individual and subjective and personal responses by accumulating sufficient amounts of data, and it comes out to a fairly empirical conclusion. But, when you deal with waterfront property, it is so subjective and so individual and so very personal, there really is not an ability to distill it down to a single set of parameters that gives you a clean answer to the question: What is the value of a water view?"

This home on Stanton Avenue in Narragansett commands a view of Sand Hill Cove.

THE PREMIUM FOR THE BEST WATER VIEWS REACHED 100 PERCENT

The housing sector is a powerful economic engine, with residential investment and housing-related spending at its peak comprising up to 18 percent of the nation's gross domestic product. Real estate in proximity to the water shifts it into high gear. At the peak of the market in the 1980s and 1990s, real estate researchers determined that the premium for the best water views ranged from 60 to 100 percent, and 120 to 200 percent for waterfront. According to a more recent market analysis by the real estate company Zillow, the median value of waterfront properties compared to that of all homes rose from 64 percent in 1994 to 116 percent today.

Rhode Island is famously blessed with 384 miles of coastline. And, in early August, the MLS identified 3,948 properties with the word "water" in the description, ranging from a two-bedroom, 529-square-foot shoebox in Galilee for $89,000 to a $19 million mansion on Newport's Ocean Avenue. Determining the premium associated with the ability to install a dock, or step out onto a sandy beach, or even spy a scrap of waterscape from a third-floor window is as critical for municipal budgets as it is for individual wealth.

Earl D. Benson, a professor of finance at Western Washington University who has co-written several papers on the topic, says that developing mathematical models that can quantify the value of a water view by its quality is a more recent development in real estate research, but one that has interest beyond scholarly circles.

"It's a very big issue for people who have views that get destroyed and some cities even have ordinances that if there is something that harms someone's view, they have to be compensated," he says. "So it's really important to lots of segments of people—from city government to developers to homeowners to lawyers."

In practice, the market determines the current value of a water view. Realtors, who help home sellers set the price, say it is more art than science.

"You have to look at comparable properties. You also have to feel it in your gut, and have the experience to decipher what type of waterfront property it really is," says Melanie Delman, president of Lila Delman Real Estate International, which has been selling high-end waterfront property in Rhode Island since 1964. "How rare is it? Do you hear sounds? Do you see a sunset? What are the components that make it special?"

Municipal tax assessors take their cues from the data.

"I don't look at the water, I look at what someone else paid for that waterfront, and that's how I decide the value of the property," says Allan Booth, a tax assessor since 1984 who currently works for the city of Newport and the town of Narragansett. "The market tells an appraiser and an assessor what the values are in an area. Waterfront and waterview amenities certainly enhance the tax base."

Depending on how much coastline a municipality has in its portfolio and its share of the total tax base, the impact can range from a blip on the bottom line to the properties that carry the budget. Warwick, for example, has 40,822 parcels of stand-alone residential properties (excluding condominiums) representing $10.5 billion in assessed value. Waterfront and waterview homes are valued at $8.79 million—representing only 8.3 percent of the total. Further, the city's coastal properties represent each extreme in the range of values.

"When people think of Warwick, they think of malls and the airport, but the city actually has 39 miles of coastline—more coastline than most communities," says Warwick Mayor Scott Avedisian. "But, the same body of water separates the highest tax bill for a home on Warwick Neck to the lowest tax bill for a home in Oakland Beach."

For Charlestown, with a $2.36 billion tax base and very little commercial or industrial real estate, its water view is its wealth. Bisected by Route 1, the town's southern half has 22,000 acres encompassing Atlantic-facing sandy barrier beaches, bordered inland by Ninigret and Quonochontaug salt ponds; its wooded northern half comprises about 35,000 taxable acres. Yet with fewer parcels, the south side's total assessment is $1.56 billion, versus $814 million on the north side of Route 1. Not only is Charlestown's seaward land considerably more valuable, its occupants—retirees and second-homeowners—tend to use fewer town services, as their children went to school elsewhere, and their homes may be unoccupied in the winter.

While the town's entire tax base has tripled since 1993 due to the increase in residential land values, the south side of town makes a disproportionate contribution to the town revenues, says Tax Assessor Kenneth Swain.

"Without the waterfront, Charlestown would be like Hopkinton, because of the weight on residential versus commercial and industrial land," he says. "Our taxes would be significantly higher."

WATER, WATER EVERYWHERE. Views on all sides from this spacious contemporary. Sunset, bridge, and bay views. Open floor plan. Great room with gas stove and vaulted ceiling. Living and dining open to deck. Walk to bay. Mooring possible or marina nearby. List Price $535,000

Built in 1997, the two-bedroom, three-story at 1236 Anthony Road in Portsmouth's Common Fence Point literally sits between two different bodies of water. The neighborhood occupies Aquidneck Island's northernmost tip, a finger of land pointing to the upper reaches of Mount Hope Bay. From the stairway landing, you can look eastward over the Sakonnet River to Tiverton and Little Compton. Across the sweep of the back deck, sailboats make a lazy passage along the Bristol shoreline from the Mount Hope Bridge. Chris West, a real estate agent with Gustave White Sotheby's International Realty, waits patiently in the sauna of a late July afternoon for a buyer to be amazed by the 360 degrees of sea and sky.

Laurie McGowan, a Newport resident who traded the water view of her last home in Portsmouth's Black Point neighborhood for the convenience of an in-town rental, doesn't miss an opportunity to find a way back.

"The value of a water view for us—it's an escape from my husband's busy job. There's something so calming about the water, very peaceful—meditative," she says. But McGowan, who got her real estate license to sell her former home, wants the right house, in the right location, at the right price.

The current listing price of $535,000 is a step down from the original $595,000 list price and a steep drop from the $800,000 the current owners paid for it in 2004. Benson's most recent research on the value of water views, a 2013 analysis of 25 years of housing sales data for homes in Bellingham, Washington, showed that the premium for waterview properties fluctuates with the booms and busts of the entire real estate market.

West's experience has told her the same thing: "Even if you look in recent times—the market went crazy in '05, '06, '07, and then in '08 it just stopped and real estate went way, way down," she says. "We are just now getting back to those prices—but waterfront gets there first."

Nonetheless, 1236 Anthony has been a hard sell, with only one low-ball offer in five months on the market. Water views also come with liabilities, West acknowledges, and one of the biggest in recent years is the cost of flood insurance. Currently, about 5.5 million homes are covered by the National Flood Insurance

1236 Anthony Road has 360 degrees of water views.

Program, established in 1968 to give homeowners an opportunity to protect coastal properties, after the private market abandoned that segment of the business. The federal government has been heavily subsidizing flood insurance premiums for existing homes ever since, and flood insurance is a requirement for any mortgagee in a flood-prone area with a federally backed mortgage.

In 2012, after payouts from 2005 Hurricanes Katrina and Rita pushed the program $24 billion into the red, Congress passed the Biggert-Waters Flood Insurance Reform and Modernization Act, which increased insurance premiums 25 percent a year, until they reached full-risk rates for businesses, second homes, and properties with repetitive losses. The changes only affected about 20 percent of policy holders, but their rage was enough to force Congress to hastily pass a measure in 2014 to delay the premium increases.

The National Flood Insurance Program is due to be re-authorized in 2017, and the Federal Emergency Management Agency, which manages it, has been studying ways to balance its financial sustainability with affordability. Two reports recently issued by the National Academy of Sciences' Committee on the Affordability of National Flood Insurance Program Premiums attest to how difficult that will be. To keep policies affordable, the program must increase the number of purchasers, which are currently concentrated in Special Flood Hazard Areas in Louisiana, Texas, and Florida. Any program reforms would have to define affordability and determine who is eligible for assistance, and in what form.

"I think there's no way this program can thrive unless the affordability issue is addressed," says Howard Kunreuther, a public policy professor, co-director of the Risk Management and Decision Processes Center at the University of Pennsylvania's Wharton School, and a member of the committee. He has proposed that insurance premiums reflect risk, in a program that provides vouchers for those who implement cost-effective flood mitigation.

"If homeowners are required to do that and receive a loan to spread the mitigation cost over the life of the mortgage, it will reduce the homeowner's cost as well as the federal government's voucher expenditures. Everyone will be better off in the long run."

In the meantime, 1236 Anthony's liabilities have cast a pall over its panoramic views.

"I'm having a very difficult time selling the house," West says. "The taxes on top of the flood insurance are affecting how someone could afford a $535,000 house. The program only gives them $250,000 in flood insurance. With a $5,000 flood insurance and $7,300 in tax, that's another $1,000 a month on top of your mortgage and utilities to carry the house."

WATERVIEW COTTAGE. Fabulous unobstructed waterviews from most rooms. Balcony off master bedroom. Close to marina, bike path, and parks. Enjoy waterfront living year round. Subject to probate court approval. List price: $319,000

Hard to believe now, but there was a time when living on the water was considered a folly. A man who made his living fishing might require a house with a dock. Otherwise, many houses turned their backs on the views—no sliders, Palladian windows, or soaring towers to dominate Narragansett Bay. James Rhodes, who built Roselawn on Bellevue Avenue in 1854, was roundly chided by a friend for the recklessness of constructing a home so near to the ocean. He wrote: "I never thought you'd be such a damned fool and I expect to hear any day that you've been drowned." Assessor Allan Booth likes to tell the story of the Newport contractor who, 30 years ago, turned down a waterfront parcel in Jamestown from a customer in lieu of a $1,800 cash balance on a job. The land sold a couple of years ago for $1.8 million.

And yet, from the late 1800s on, Rhode Islanders were busy colonizing their shores. Hotels with dining halls and religious summer camps gave way to beach communities. Even if your summer cottage was just a "shore tent"—five rooms and a porch—you could still enjoy a Vanderbilt's view. Some of those properties still abide as trophy second or third vacation homes, but many simply became the suburbs. Barrington, with four rivers braided within the town borders, attracted developers, who, beginning in the 1850s, sliced some of the old farms and coast into truffle-thin plats to meet the demand for small houses.

The house at 37 Shore Drive was built in 1920, but the Bay Spring neighborhood began as a Victorian summer community. It crams in 1,500 square feet of living space on a 2,000 square-foot lot. Architecturally undistinguished, the house looks down-on-its-heels. But from the crudely constructed front porch, it commands a magnificent panorama of the Providence River, northward from Bullock's Cove, all the way down to the Newport Bridge.

"People make sacrifices to live near the water," says Realtor Ian Barnacle of Residential Properties. "A lot of houses on the water are smaller than people might want, and you have to edit your life to fit it. But, people buy the location above everything because you can change a house, but you can't change a spot."

But even the affordable spots are threatened. In East Providence, waterfront property owners revolted over assessments that leapt as high as 50 percent since the city's last revaluation in 2012. The City Council responded by voting to ask the General Assembly for authority to cap assessments at a maximum of 15 per-

From the porch of a modest home on Shore Drive in Barrington you can see the Newport Bridge.

cent over a previous year—a move that would force the city's other taxpayers to essentially subsidize property owners with more valuable real estate.

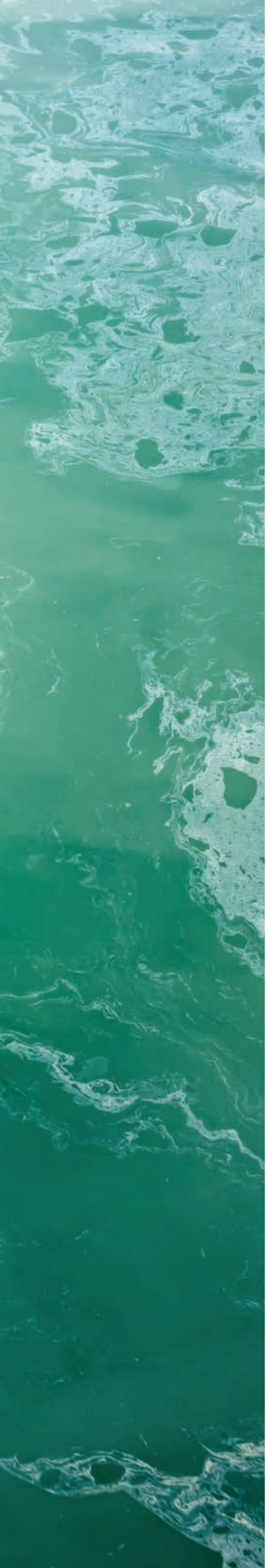
Houle expects the upward pressure on the value of a water view to continue. The demand was created by a confluence of sociological and economic influences in the late 19th and 20th centuries: access to the shore via trains, trolleys, and then automobiles; the emerging concept of a vacation; and the prosperity of the post-World War II era that gave a middle-class family the means to buy the available waterfront and water-view homes.

"A lot was changing by the 1980s; the supply was shrinking. You had the rising power of the Coastal Resources Management Council interested in further reducing the ability to use waterfront—requirements for set-backs and septic systems," he says. "As the supply got eaten up, the demand increased." In this century, climate change may reduce the supply even further.

"It will be economically unfeasible to keep bailing people out, and the regulators are going to have to force people back from the water."

And yet, we value our water views enough to keep pushing forward. Carey Bell pops out of the house next door to assess a stranger's interest in 37 Shore Drive. Fifteen years ago, she moved from her in-town home to the cozy confines of cottage living, cheek-by-jowl with an eclectic mix of neighbors. She enthused about the house's front row seat to a real working waterfront, with the constant parade of tankers headed for the Port of Providence.

"This is Barrington's most hidden treasure," she says. "I don't think you ever get tired of living on the water."



HOME VALUES AFFECTED BY NARRAGANSETT BAY WATER QUALITY

by **Tingting Liu, James Opaluch** and **Emi Uchida**

As water quality deteriorates, area real estate values may decline, according to our research on the impact of Narragansett Bay water quality on home prices in Rhode Island coastal municipalities.

The study, which looked at data from 1992 through 2013, evaluated water quality based on the amount of chlorophyll in the water, which can affect color and odor and, at high concentrations, can lead to algal blooms. The study compiled data on readings from 13 monitoring sites on Narragansett Bay and matched it to detailed data on housing transactions. It also controlled for other factors that are known to affect home prices.

As expected, we found a price premium for homes located within a mile of Narragansett Bay. The study found that poor water quality in the bay reduces the price of such homes, with the greatest impact on houses closest to the shoreline. The study also found that homebuyers are influenced most by extreme water quality problems such as algal blooms, odors, and fish kills.

The study also analyzed a scenario involving current efforts to reduce nitrogen in Narragansett Bay by requiring developments to be low-impact; upgrading independent sewage disposal systems; and reducing input from air pollution, livestock production, and agricultural fertilizer. Based on the scenario simulations, the study found that a 25 percent reduction in extreme chlorophyll concentration events would increase the aggregate value of homes in the study area by about $51 million over the study period.

TINGTING LIU is a postdoctoral fellow at the Environmental Protection Agency. JAMES OPALUCH and EMI UCHIDA are faculty in the University of Rhode Island College of the Environment and Life Sciences.

Extreme water quality problems can lower selling prices of nearby homes.

Rhode Island's resort economy

CENTURIES OF TOURISM TRANSFORM COASTAL TOWNS

by **Maury Klein**

Historical photographs courtesy of Rhode Island State Archives

THE OCEAN HAS ALWAYS DRIVEN THE RHODE ISLAND ECONOMY, WHETHER it be for fishing, commerce, recreation, or simply escaping the heat of summer. An economy strongly dependent on tourism is nothing new to Rhode Island. Summer people have fed it since the mid-19th century, lured by the sea, cooling winds, beguiling landscapes, and the pleasures to be found in different parts of the state. In the 19th century, city dwellers flocked to the shore seeking relief from the stifling heat of urban landscapes, while southerners fled not only their summer climate but the dreaded onset of fever season.

Transportation, or the lack of it, was the major factor in determining who went where when and for how long. The wealthy always had options for travel by land or sea. People of modest means could not venture very far from home, if they could go anywhere at all. At first, the sea offered the only convenient access to coastal or

The Watch Hill Lighthouse was a tourist attraction for 19th-century summer visitors to the area's hotels and cottages.

Postcards of the Ocean House, Westerly

island locations that evolved into resort towns. Later, train service combined with coastal steamers to reach some watering holes, and early in the 20th century, the automobile not only improved access but changed the basic rhythms of many Rhode Island resorts.

As islands, Newport, Jamestown, and Block Island could only be reached by boat. Early in its history, Newport ranked behind only Boston and Philadelphia as a port, but an island with no hinterland could not compete with fast-growing mainland cities as a shipping and trade center. However, in 1784, a small band of Carolina planters sailed to Newport seeking refuge from the summer heat and fever season. They rented farmhouses or stayed at boardinghouses. As more southerners flocked there, hotels went up: the Bellevue, Perry, Fillmore, and, in 1845, the most impressive of the lot, the Ocean House. Its opening, crowed one enthusiast, "reduced Saratoga to being a hotel, while Newport was a realm."

The rise of hotel society signaled an influx of northern visitors as well, especially from New York. It did not take the elite long to embrace the refreshing sea breezes and charming vistas of an island so near at hand. Some preferred not to rely on hotels but instead built their own "cottages," a quaint term given summer places of all sizes. Land was cheap enough at first. In 1845, farmland on Bellevue Avenue sold for 7 cents a foot; by 1874, the price had risen to $1 a foot. One parcel sold for $2,000 in 1846 and fetched $60,000 in 1880. This spectacular rise in value was but one sign of Newport's emergence as the social and fashion capital of America. As early as 1870, Henry James observed

Hotel life in Narragansett boomed in the late 19th century, but the advent of the automobile transformed the resort economy.

what made Newport superior. "The difference, in a word," he declared, "is the difference between a group of undiscriminating hotels and a series of organized homes."

Narragansett Pier underwent a similar pattern of growth. In 1848, Joseph Dulles of Philadelphia, grandfather of John Foster Dulles, U.S. Secretary of State under President Dwight Eisenhower, went there on business, liked what he saw, and engaged all the rooms of a local farmer for the coming season. He spread the word and was soon joined by a coterie of Philadelphia friends. The Pier offered not only charming scenery but the finest beach in the Northeast: a mile-long, curving shoreline with sparkling sand, a firm bottom, and a gentle undertow. By 1873, no fewer than 17 hotels had opened, followed by a cluster of bathhouses, restaurants, shops, stables, saloons, and other establishments. New Yorkers discovered the Pier, as did southerners, and families from Chicago, Cincinnati, St. Louis, and other Midwestern cities.

Throughout these decades, an increasing number of locals in every resort town came to depend on the summer people for their livelihood. Crops grown on Jamestown helped feed not only its residents but Newport visitors as well. While Newport emerged as the ultimate playground of the nouveau riche, Jamestown and Watch Hill catered to the quieter and less pretentious lifestyles of many wealthy families. Narragansett's atmosphere was spicier but divided, ranging from the sedate hotel crowd to a faster set that thrived on such pleasures as drinking, partying, and gambling. A certain class of business types gained

notoriety for spending Friday nights with their mistresses at the Pier before joining their families in Newport the next day.

Where cottage society came to dominate Newport, hotel life prevailed in Narragansett, even as more summer people began erecting cottages there. So, too, with Watch Hill and Jamestown. Watch Hill had eight hotels by 1887, but that year some Cincinnati investors bought an estate of 130 acres and turned it into lots for summer places. Jamestown had five hotels clustered near each other on the waterfront but also saw the rise of cottages. In all these resorts, it was common for families to pack up their trunks and move to their hotel or cottage for the entire summer.

Improved transportation eased their travels but eventually transformed the resorts as well. Some people reached the resorts by their own yacht; others relied on a growing fleet of steamers that ran regular excursions. The Narragansett Pier Railroad opened in 1876 from Kingston Station to the Pier, making it possible to reach that resort by rail. It ran six trains daily and eight on Sunday. Watch Hill could be reached by the Stonington or Norwich steamer line. One could take a morning train from New York, reach Stonington by noon, and get to Watch Hill by steamer in time for dinner.

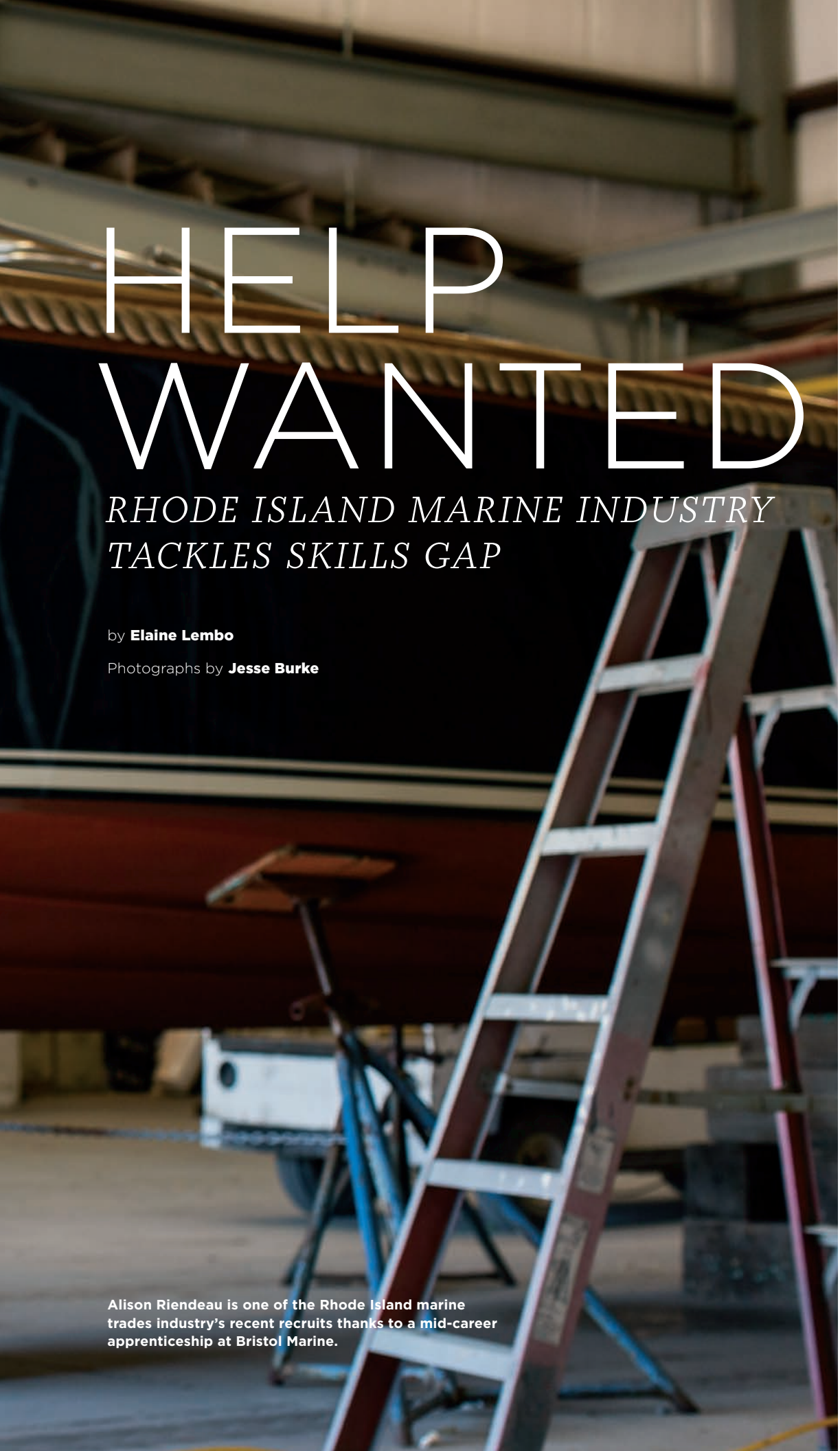
As early as the 1840s, excursion steamers brought hundreds of visitors to the resorts, especially Newport. On one memorable day in August 1901, steamers from Providence swamped Newport with nearly 4,000 visitors; in August 1883 one steamer, the *City of Worcester*, unloaded 2,500 excursionists in Newport, the largest number of any single ship. Most of these visitors were daytrippers who contributed little to the resort's economy. A reporter watching the 1901 throng come ashore noted sourly that "it seemed as if 3,999 came with their lunches."

The Sea View Railroad accelerated the arrival of daytrippers to Narragansett Pier. Completed in September 1900, it ran from the Pier to East Greenwich, where a connecting line moved passengers and freight to Providence. The railroad lasted only until 1920, when it was scrapped and sold for junk. By then the automobile had all but completed the transformation of the resorts by allowing daytrippers to flood the resorts, crippling the hotel industry and dooming the shops and restaurants dependent upon more liberal spenders. In every resort, cottagers gradually prevailed and created their own private enclaves of clubs and social institutions. Hotel life lingered longest in Narragansett but faded even there after the disastrous September 1900 fire that destroyed the Casino and the massive Rockingham Hotel.

Gradually, however, a new form of tourism geared to the automobile evolved to fill at least part of the economic gap and persists to this day with all its vagaries and uncertainties. At first a plaything of the rich, the motorcar enabled its owners to move about different locations rather than hunker down in one place for the summer. Once people of more modest means could afford cars, the flow of daytrippers increased sharply, changing not only the economy but the character of every resort. The golden age of resort life, geared almost entirely to the upper class, gave way to an economy that serviced crowds of people who came for the day or, at most, the week.

Top: **Watch Hill, Westerly**
Bottom: **Summer colony, Watch Hill**


BRISTOL MAR
STANLEY
PowerLock
12'



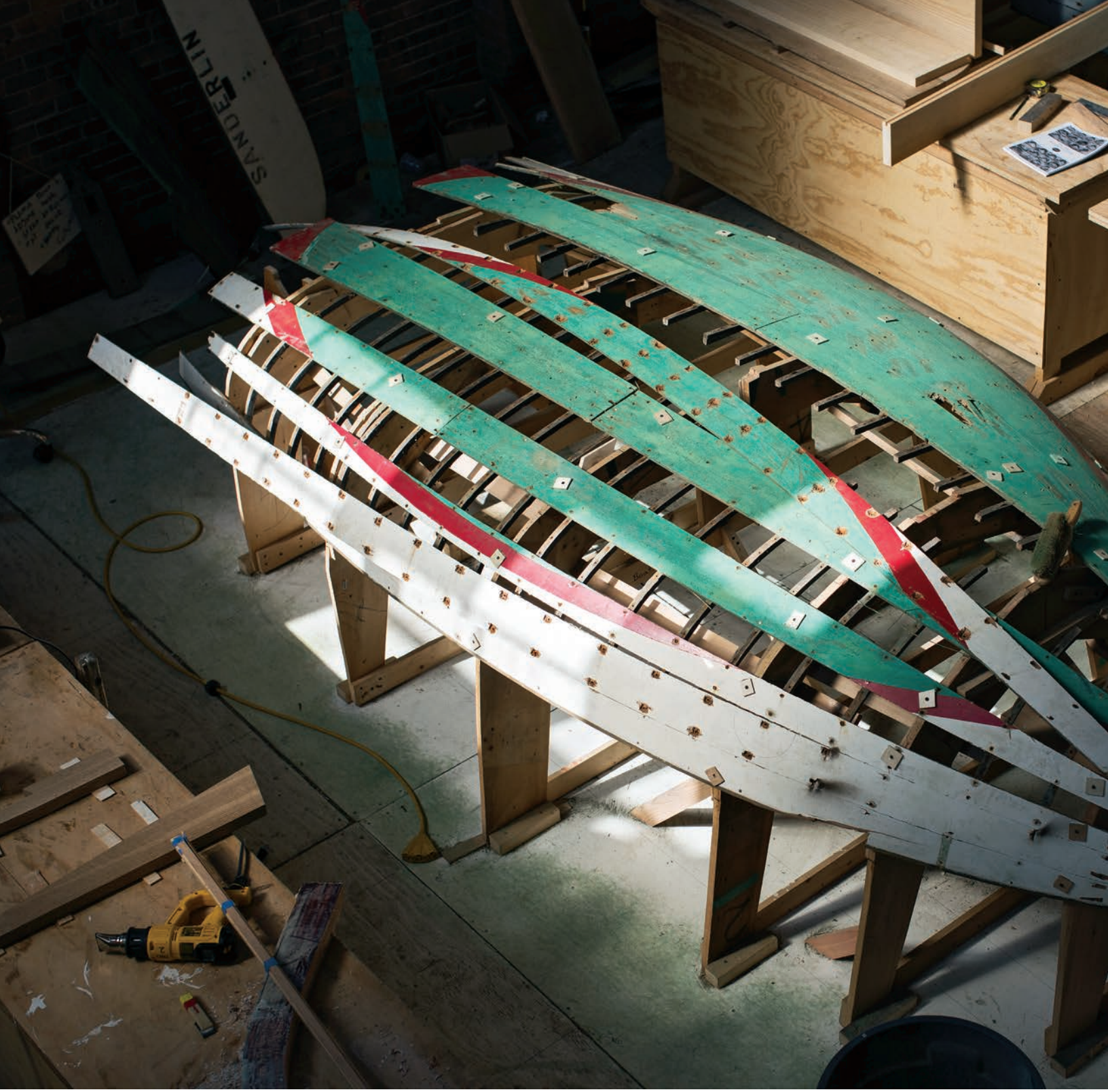
HELP WANTED

RHODE ISLAND MARINE INDUSTRY TACKLES SKILLS GAP

by **Elaine Lembo**

Photographs by **Jesse Burke**

Alison Riendeau is one of the Rhode Island marine trades industry's recent recruits thanks to a mid-career apprenticeship at Bristol Marine.



In a place with nearly 400 miles of coastline, a place whose nickname is the Ocean State, you'd think filling jobs in the marine trades industry would be a snap. Think again.

A hull undergoes repair at the International Yacht Restoration School in Newport.

IN RHODE ISLAND IN 2012, THE MARINE TRADES cluster—from boatyards to manufacturers—saw $1.5 billion in sales and provided 7,100 jobs, according to the state Department of Labor and Training. By 2020, it's predicted that the state's marine employers will need to fill more than 1,880 jobs, or 26 percent of the existing labor force.

Where those workers will come from, as fewer high school students choose to pursue employment in skilled trades, is a problem that a loosely organized group from Rhode Island's marine and educational sectors is committed to solving.

A 2015 survey found that 32 percent of U.S. employers responding reported difficulty filling jobs, largely in skilled trades, due to lack of available talent.

"The gap is universal across trades," despite the potential for high wages, says Ed Sherman, vice president and education director for the American Boat and Yacht Council, the national standards developer for recreational boating. "This is the first generation with access to everything electronic since birth. For most of these millennials, the extent that they've worked with their hands is their thumbs. That's the bottom line."

Wendy Mackie, Rhode Island Marine Trades Association (RIMTA) chief executive officer, says that when she started out in the marine industry, trying to recruit young people, many of them didn't even know what she was talking about. She would ask them: "'So who in here has ever considered a job in the marine trades?'" Someone would inevitably respond: "'I don't want to join the military!'"

Today, RIMTA offers a variety of high school and young adult apprenticeship programs that boast a high job placement rate for entry-level workers who range from teenagers to adults making career shifts.

Apprentices, Mackie says, are immersed in the environment and culture they will be working in and are trained by industry experts at the New England Institute of Technology (NEIT), the International Yacht Restoration School (IYRS), Bristol Marine, Pirate's Cove, or New England Boatworks, to name a few. "Whether it's shrink wrapping, painting, forklift driving, sail making, or vacuum infusion, the context in which all of this is delivered is through the employer."

The value of exposure to on-site experiences can't be overestimated, she adds. "A guy who works in a boatyard doesn't do just one thing. It's one of those career paths you need to see to understand, or to just do to understand."

In addition to working with RIMTA, many marine trades employers and organizations also conduct their own recruitment efforts and programs to raise visibility about potential jobs with student candidates. IYRS, for example, recently won a $75,000 state grant to

IYRS offers courses in composites technology as well as in wooden boatbuilding and restoration.


BRUTE

develop a traveling lab equipped with high-tech tools that will visit high schools and prisons, providing short-term, hands-on courses and building awareness about careers in 21st century manufacturing.

Part of that recruitment effort involves changing perceptions of what employment in a skilled trade entails and offers. No one appreciates this better than Steve Kitchin, vice president of the NEIT. Among its offerings is an associate degree in marine technology, with a curriculum that, like many, has seen extensive overhaul in its 40 years of existence, thanks to input from industry groups, trade associations, and employers.

"We've been sending a message to young people for 50 to 60 years about the best way to pursue their future," Kitchin says. "What got lost in the messaging about becoming a lawyer, nurse, doctor, accountant, or writer are the realities of the labor market. The trade careers of auto technician, heating technician, refrigeration technician require sophisticated levels of knowledge, too. I beg anyone to look under the hood of his car and say sophisticated knowledge isn't required. What's happened in auto has happened to marine. It requires technical knowledge that you're just not going to get from being a backyard mechanic."

And, he says, "Young people aren't getting access to the info they need to make informed decisions. The marine technology world is competing against very high messaging and is a small industry with small employers. They are not GM, Fidelity, Chrysler, United Health. And I don't know what marina you frequent, but if it's like the ones I know in Narragansett Bay,

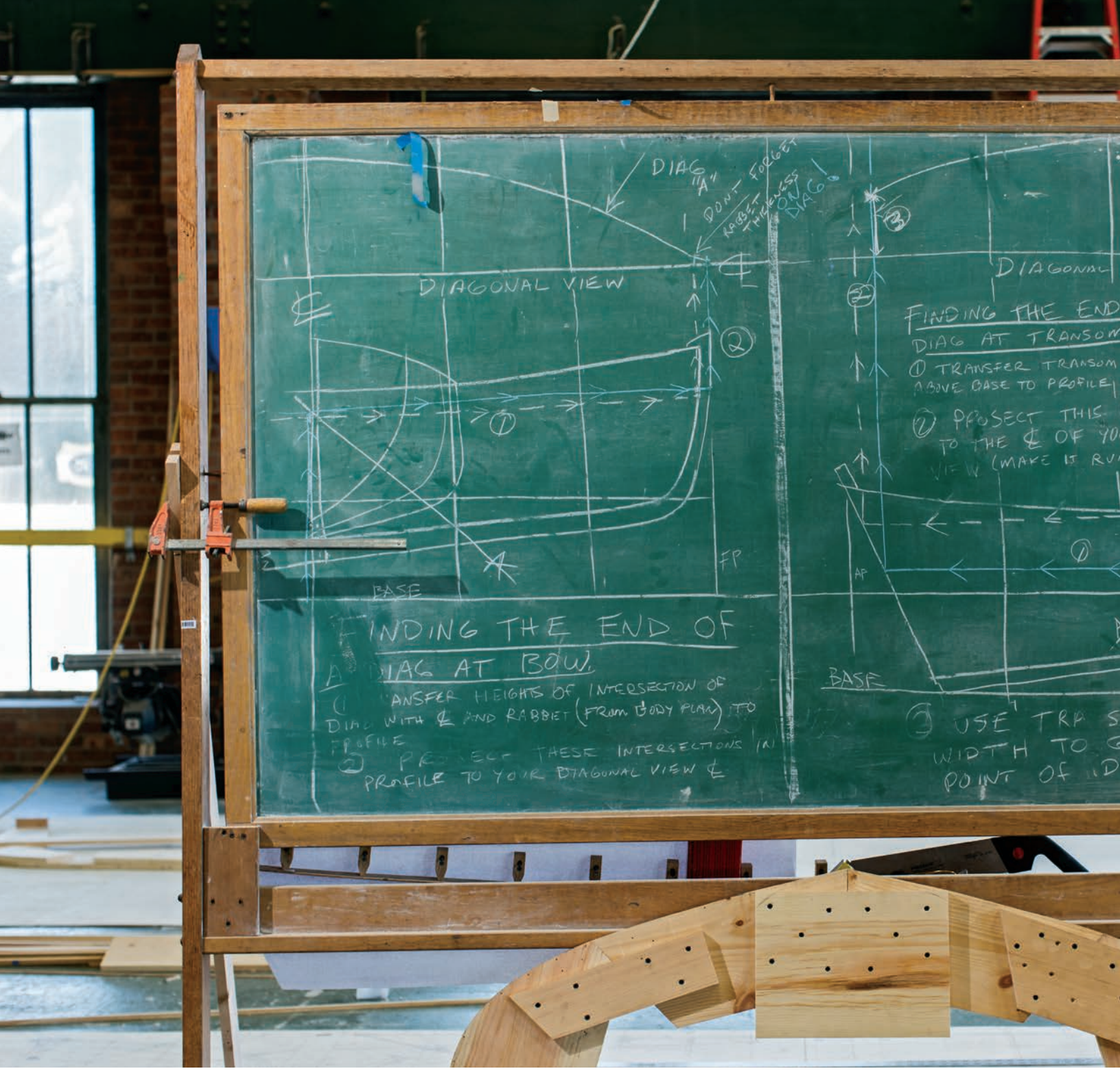
Left: **A wooden boat is under construction at IYRS.**
Above: **A look at some of the tools of the boatbuilder's trade.**

they are well hidden from the general populace. If you don't take a side street and go all the way to the end you wouldn't see these. You've got no experience and no message about these great careers."

To compensate, NEIT reaches out to the state's high schools, paying to transport students and feed them lunch onsite. "We encourage tours of all of our programs so high school kids get a real sense of what goes on here," he says. "We're on the journey and about halfway there. Between the Rhode Island Department of Labor and Training, industry, RIMTA and others, the partners are coming together and you can see the beginnings of a real pipeline for employers.

"As for the smaller employers who dominate the marine trades, they need to be part of the solution and spread the message that good jobs with good careers, good lifestyles, good compensation are available. It's a lot better than it was five years ago. And it will be much better five years from now."

An afternoon drive on a hot summer day to Goetz Composites, situated alongside dozens of other companies at the industrial park outside of historic Bristol village, is like a trip to a career fair. Help-wanted banners dot some of the lawns outside the white, rectangular buildings and plant facilities that stretch on for blocks. Manufacturing specialties here include aerospace, wind energy, transportation, marine, automotive, construction, and pipe and tank, among others.

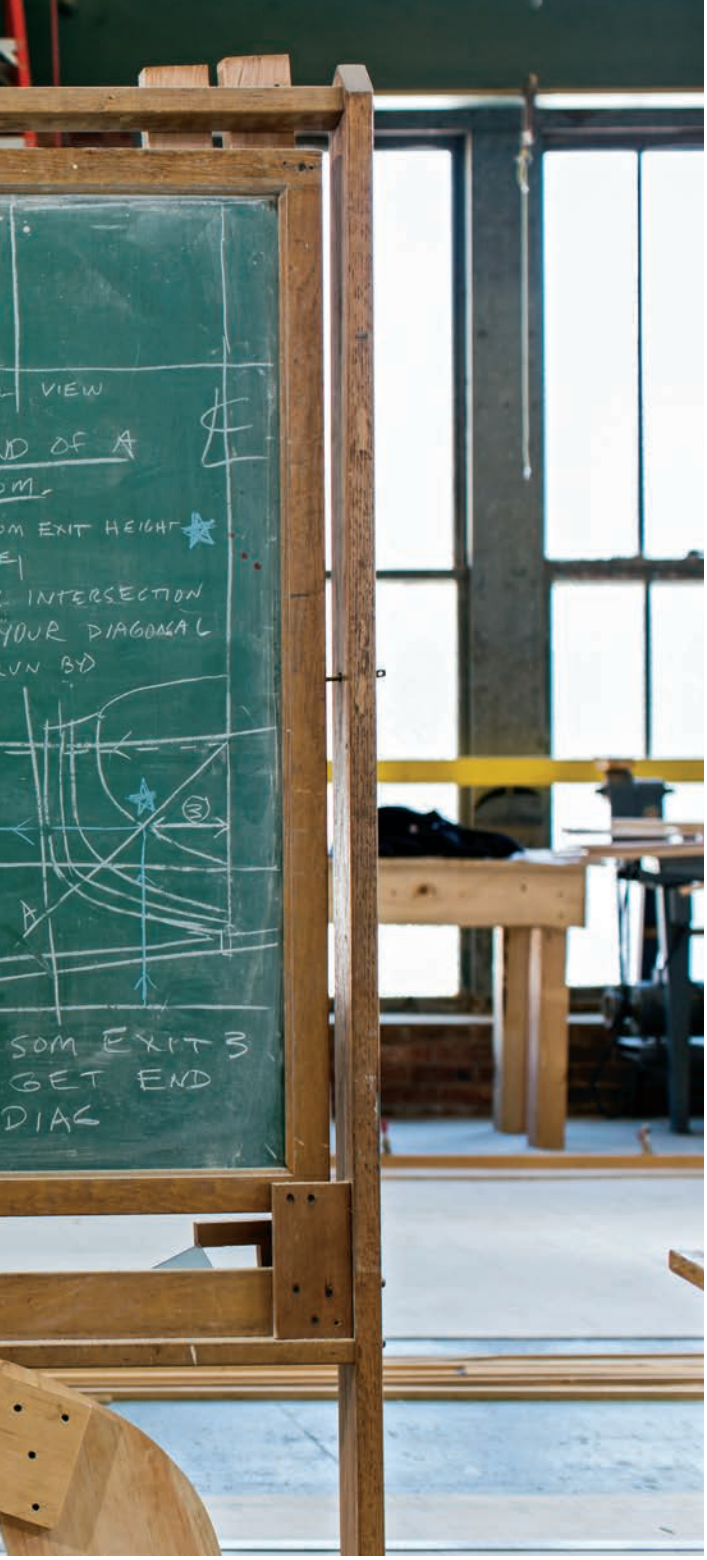


"The area we've chosen to focus on is composites, in terms of hull construction and structure, and integration of these systems," says Chase Hogoboom, Goetz president. "As a result of the complexity of these various components that go into a boat, the specialized skill for the composites technician is something that needs to be developed."

Goetz, a longtime RIMTA partner, participates in the apprenticeship program because it's affected by labor shortages.

"If you want to hire a nurse you just put in an ad for a nurse," explains Peggy Clay, Goetz human resources coordinator. "You can't really place an ad for a composites technician and get that same caliber. There are almost no people who can just walk in the door and start doing the job of composites technician."

Hogoboom echoes the perspective of Steve Kitchin about this unique dilemma. "Traditionally, boat builders were jacks of all trades," he says. "The industry has become much more specialized. Systems have



The chalkboard shows the challenge of rendering a three-dimensional design in a two-dimensional space.

become much more complicated and sophisticated. Electrical controls, propulsion systems—all have evolved and become extremely complex and require their own expertise.

Not all of the 20 technicians on the floor, who range in age from 20 to 65, come from a marine background or straight out of high school.

"Not all of them are boaters or know about boats," adds Hogoboom. He says the RIMTA apprenticeship program "gives us an opportunity to expose candidates to a possible career and get them excited." When those candidates are hired, "we experience a lower turnover rate. They've already been exposed to the type of work they're going to be doing, and although they don't have experience … they're more prepared mentally and emotionally."

One example is Alison Riendeau, who works at Rhode Island-based Bristol Marine's branch in Somerset, Massachusetts, along the Taunton River.

Riendeau, a single mother of two, was born and raised in Barrington and had worked as an English tutor, a jujitsu instructor, and in tax sales of foreclosed houses.

In a career quandary, she was seeing a counselor. "I'm thinking," she says on a break during this reporter's visit to the Bristol Marine plant, "I'm 35, sort of in the middle of my career. Do I go back to college? By chance I heard about [the program]. It was immensely appealing because of its hands-on nature. I'm not afraid to get dirty.

"[It] gave us an idea of what we want, and we could dabble in things, whether it was shrink wrapping, welding, driving a forklift," she says. "Bristol Marine was in my top three. I job-shadowed for a week and was hired before I was done."

"I like varnish, learning the formulas, tinkering. I like doing repairs and making something out of nothing. I'm definitely learning a little more every day. It takes patience on the part of my bosses and they're willing to teach me," she says, "The things I could do at the end of the program I never before thought I could do."

Her children, now 10 and 15, have given her the thumbs-up on the new gig, and at the company Christmas party at DeWolfe Tavern, like other new employees, she was given a street sign, "Riendeau Way," which hangs above her workstation in the carpentry department.

That sense of belonging is part of what Riendeau likes about her new career.

"We get some incredible boats in here," she says. "I get to do different stuff every day. These guys are like my family. I also think the best part is coming to work every day and actually liking it. It's an excellent balance of good work and good laughs."

Before she goes back to work, she shares a few more insights gained in the last year.

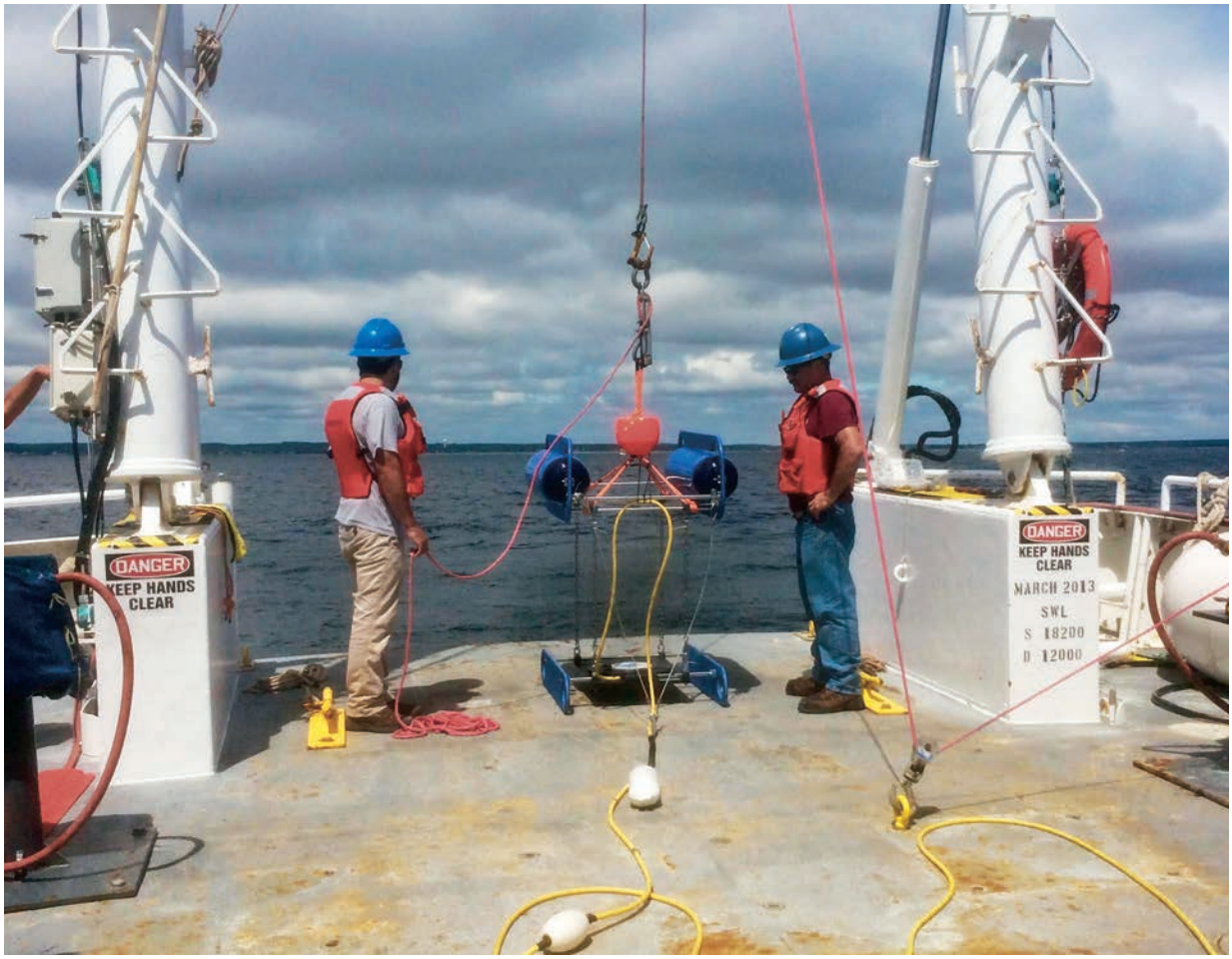
"If you show up, are on time, and have a good attitude, your chance of succeeding is great," she says. "Attitude is 90 percent of it. Skills can always be taught and learned. If someone is enthusiastic, the rest can be taught."

SAND MINE

LOOKING FOR BEACH NOURISHMENT FROM OFFSHORE SAND DEPOSITS

by **Meredith Haas**

Aerial photograph by **John Supancic**



Researchers prepare to deploy a seismic "bubble gun" to survey the sand and gravel deposits on the sea floor. This tool uses a low-frequency signal that can penetrate through coarse sand and gravel to produce high-resolution images of seafloor sediments. This method helps locate pockets of sand and determine their volume.

Since the frequency emitted from the bubble gun has the potential to disturb marine mammals, there is always an observer aboard to make sure there are no animals in the area.

After Superstorm Sandy in 2012, bulldozers, trucks, dredges, and barges were put to use hauling sand from every available source to restore beaches that protected waterfront properties and infrastructure, as well as critical habitats along the Atlantic coast. While Rhode Island was spared the worst as the storm turned toward New Jersey, the 5-foot storm surge and 15-foot waves still caused some hefty damage to exposed areas —primarily in Westerly, where the badly damaged Misquamicut State Beach was replenished in 2014 with more than 84,000 cubic yards of sand trucked in from an inland quarry in Charlestown. It was one the most extensive beach restoration efforts in Rhode Island and it most likely won't be the last one.

Rhode Island, however, is running out of sand and gravel options for similar large-scale projects in the future, says Grover Fugate, director of Rhode Island's Coastal Resources Management Council (CRMC). He explains that the state has moved to evaluate offshore sand resources as an option for beach restoration because while inland resources may be abundant, "a vast majority of sand and gravel assets are tied up in areas

that are either land trusts or state parks, which are unlikely to be tapped," he says.

Inland sources of sand can also be costly for large-scale beach replenishment efforts because each truck holds only a limited amount of sand, adds Jeffrey Waldner, an oceanographer with the Bureau of Ocean Energy Management's (BOEM) Marine Minerals Program, the federal agency charged with managing offshore development and mineral resources. The replenishment at Misquamicut alone required approximately 3,000 truckloads at a cost to the federal government of $3.1 million through Sandy relief funds. And inland sources of sand are sold at higher construction rates for a variety of uses beyond beach nourishment.

These problems affect not only Rhode Island, but all states along the Atlantic. In 2014, Rhode Island was one 13 states to sign a cooperative agreement with BOEM to map and identify offshore sand resources that could potentially be used for beach restoration projects. If enough sand deposits are identified and can be extracted (which is dependent on whether such a process would be harmful to the environment and/or conflict with other users of the area, such as fishermen) the costs for beach restoration could be significantly less. Dredging vessels, for example, can carry 2,500 to 5,000 times more cubic yards of sand than one truckload, and their use avoids the additional costs of damage to roadways from heavy construction vehicles carting sand along them.

"Offshore sand has a high upfront cost of $3 (million) to $5 million for mobilizing dredges, but it is cheaper long term," says Waldner. "When projects get big, all fingers point offshore. It's more economical."

Significantly more economical, according to researchers working with BOEM and CRMC to determine how much viable sand is in the federal waters adjacent to Rhode Island and how much sand the southern shore would need to be sustained.

"If you wanted to replenish 20 kilometers of shoreline (to the extent Misquamicut was), from Napatree to Point Judith, taking out the undeveloped stretches, you're adding about 1.3 million cubic meters of sand," says Bryan Oakley, a geoscientist at Eastern Connecticut State University, explaining that to replenish Rhode Island's southern coast at this level would cost about $60 million if using inland sand resources. "It would probably be around $25 million based on estimates on what it cost to get [offshore] sand in New Jersey."

But these numbers, according to Oakley, reflect estimates for the lower-end scenario regarding sand volume and costs, and do not account for the frequency of replenishment needed to keep pace with rising seas and erosion. Oakley notes that about 35 percent of the sand that was trucked in for Misquamicut has already been swept away over the course of two years without any major storms.

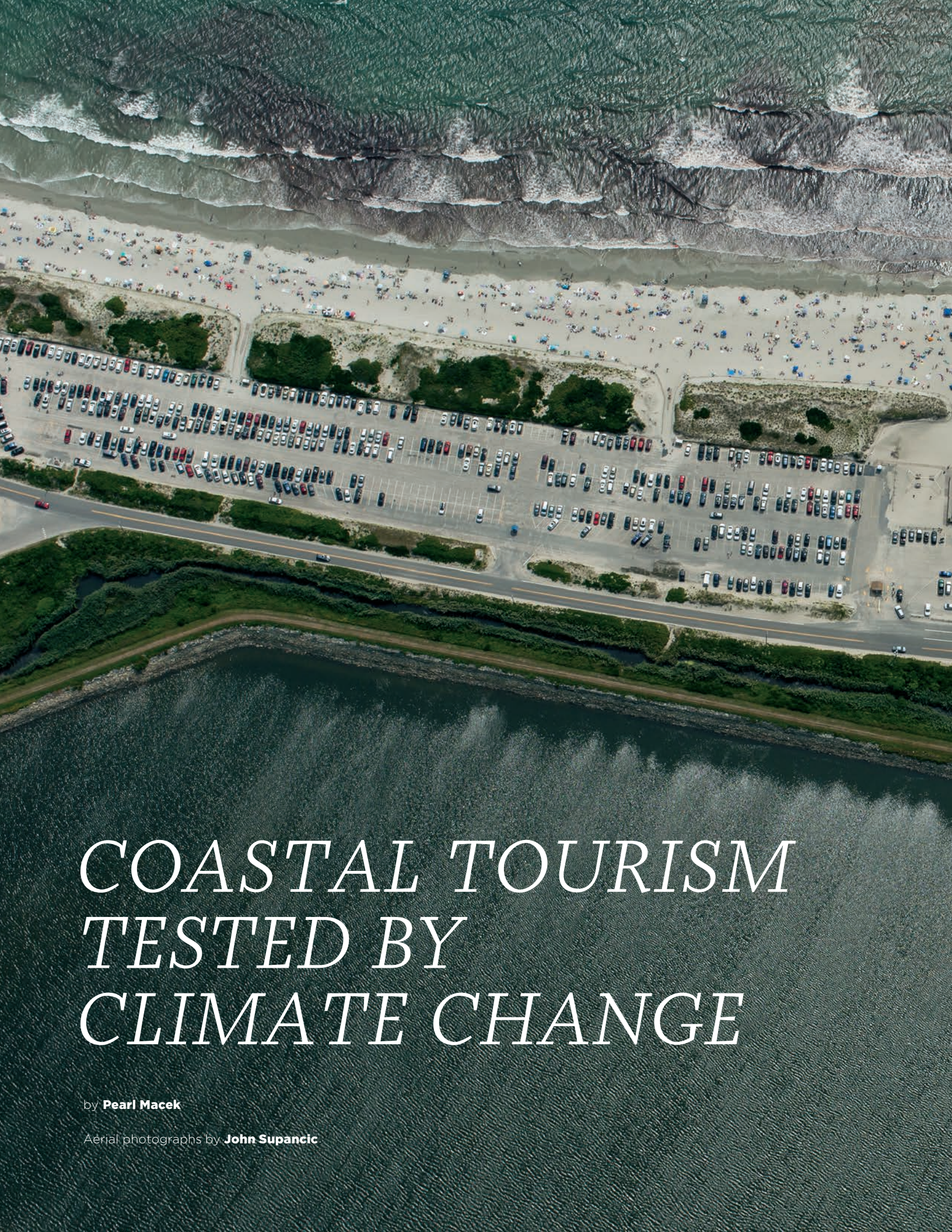
> "THE WORST TIME TO BE MAKING A DECISION IS RIGHT AFTER THE STORM"

"Replenishment doesn't work everywhere and, in most cases, doesn't work for very long," he says. "Sand wants to be where the sand wants to be, and the response of the shoreline is to move landward as storm surge pushes sand from the beach back onto the dunes, marsh, or whatever is behind it."

Despite the drawbacks, replenishment is the single most popular approach to deal with erosion because it's one of the few that are permitted, unlike hard structures, such as seawalls, Oakley says. But is there enough sand offshore for Rhode Island to potentially use if another Sandy, or worse, rolls around? According to geological oceanographer John King of the University of Rhode Island Graduate School of Oceanography, there is.

"We found a huge amount of sand out there that straddles the state line … It's probably enough sand for beach replenishment for quite a long time," says King, describing a deltaic deposit holding about 290 million cubic yards of sand 10 to 15 meters thick and several miles wide that formed from a river delta that used to dump into a glacial lake off the coast nearly 21,000 years ago. "If you compare the numbers, we are looking at 10 times the necessary sand for beach restoration [in Rhode Island] for the next decade."

This information will help the state to create an inventory of offshore sand and gravel assets to prepare for the next storm. "The worst time to be making a decision is right after the storm," says Fugate, explaining that there are multiple factors that need to be considered before extracting sand offshore, which shouldn't be done as a reaction to a disaster but as a response from a well-thought out plan. Now that the extent of the sand resource has been determined, Fugate says, "we move into the discussion phase about what the impacts are, who is affected, and should we be doing this?"



COASTAL TOURISM TESTED BY CLIMATE CHANGE

by **Pearl Macek**

Aerial photographs by **John Supancic**

Easton's Beach, Newport

VISIT MISQUAMICUT STATE BEACH IN WESTERLY or Easton's Beach in Newport on any sunny day in June, July, or August, and it is an ocular overload. From beachgoers toting umbrellas to coolers to beach chairs, the beaches are a flurry of colorful activity in the summer. It is no surprise that state and municipal beaches are an important revenue stream for the state and its coastal towns. According to Robert Paquette, chief of Rhode Island's Department of Environmental Management (DEM) Division of Parks and Recreation, between May 7 and Labor Day of 2015, beachgoers paid $3.83 million to park at state beaches, an increase of 1.5 percent from the previous year.

While the state had been seeing an increase from year to year in revenues from beach parking, Paquette says, in 2016 the fees were rolled back to the 2011 rates and attendance subsequently increased 35 percent over 2015. Paquette explains that attracting visitors to Rhode Island's beaches can increase patronage of nearby shops and restaurants. "I see (state beaches) being more important as a place to generate the economy, not the place to look for the revenue," he says.

And it has helped that the water in Narragansett Bay is healthier than it has been in years. This means fewer algae blooms and beach closures. Findings of a study published last year, which was funded by the National Oceanic and Atmospheric Administration (NOAA) and led by Candace Oviatt, a professor at the University of Rhode Island (URI) Graduate School of Oceanography (GSO), showed that nutrient levels in the bay are half of what they were in the 1990s.

Jennifer McCann, the director of the U.S. Coastal Programs at the Coastal Resources Center (CRC) at URI GSO and extension director for Rhode Island Sea Grant, says the health of the bay is "directly linked to our economy." McCann cites a report concluding that while employment in the private sector declined overall in the state between 2008 and 2013, employment in the marine trades industry grew by 1 percent and annual coastal tourism expenditures increased from $1.8 billion to $1.92 billion in that same timeframe. "The value of the bay is key. We need to make it a priority," she says.

IT WAS VERY CLEAR THERE WAS A TREMENDOUS AMOUNT OF ASSETS AT RISK

While these numbers are encouraging, the health of coastal tourism is at the mercy of some incredibly powerful forces. "Our biggest threat is the hurricanes," says Paquette about the beaches along Rhode Island's coastline. The U.S. Army Corps of Engineers spent $3.1 million restoring Misquamicut State Beach, which "got totally destroyed" after Superstorm Sandy.

Of course, storms threaten tourism at more than just the state's beaches.

Rep. Lauren Carson represents the city of Newport and lives in the Point neighborhood, which is prone to flooding during unusually high tides as well as during storms. In 2015, Carson headed up a commission that looked into the economic impact of sea level rise and coastal flooding. The group focused on three case studies: the Providence Port, the Newport waterfront, and the South County marine and tourism industries.

"I recognized that it was a huge topic. Certainly not something that 15 volunteers could achieve in seven or eight meetings. But I thought that we could at least begin to shine a spotlight on another aspect of flooding and sea rise that hasn't really come into bloom yet," Carson says.

The commission's recommendations, published in May 2016, included the creation of a flood audit program that would incentivize property and business owners to ensure that their homes and establishments are able to withstand flooding as well as educate members of planning commissions and zoning boards about the risks of flooding and sea level rise.

When Carson looked at the economic impact and vulnerabilities of the marine and tourism industries, she realized there was a lot at stake. "The aggregate numbers for the maritime industries, the aggregate numbers for the tourism industry, it was very clear that there was a tremendous amount of assets at risk," Carson says.

One of those businesses preparing for climate change is the Newport Shipyard, whose general manager and dock master Eli Dana says they have seen a steady increase in business over the years. "Last year we had a very good year, and this year is significantly better than that," he said. Newport Shipyard can dock approximately 30 boats over 100 feet and between 20 and 30 under 100 feet in length. Dana said that the political and social instability in Europe as well as the

The state acquired the area that is now East Matunuck State Beach in South Kingstown after the hurricane of 1938 and other storms destroyed private structures that had been built there.

Roger Wheeler State Beach in Narragansett has been owned by the state since the Revolutionary War, but a bath house and parking area were only added in 1955.

increased awareness of Rhode Island as a boating destination, thanks to events like the Volvo Ocean Race stop at Fort Adams in 2015 (which contributed $47.7 million to the state's economy), has led to a steady increase in business. "These folks are capable of going all over the world, so it's nice when they come spend a lot of time with us," he says.

"Whenever we do projects, we try to take into account that storms are getting worse," says Dana, adding that the shipyard may replace docks this winter and will likely build taller pilings to accommodate higher water levels caused by storm surge and higher tides.

These concerns about sea level rise and flooding are familiar to Evan Smith, CEO and president of Discover Newport. "I think it's an important conversation to have because [Newport is] not alone in this—just about every community that is within a certain geographic distance of the coastline is going to face these challenges in decades to come."

Smith says that there is one pressing concern for business and homeowners that will only get worse: the cost of flood insurance. "The cost of insurance has actually forced some people out of business, and I think as it continues it is going to be extremely detrimental to people who operate a business on or near the water.

And so, in the next couple years, I anticipate that rates in the coastal flood zone are only going to go up, and that is really going to impact small businesses' ability to actually make a profit," he says.

Rhode Island's recreational fishing industry is also seeing some climate-related changes. According to a NOAA report, recreational anglers contributed $300 million to the state's economy in 2014. "It's something that I wouldn't want my wife to hear, but it's a lot of dollars per pound for recreational fishermen. It's over $100 that we put into the economy for every pound of fish that we harvest," says Rich Hittinger, first vice president of the Rhode Island Saltwater Anglers Association (RISAA). "So we look at it as recreational fishing is a big economic boost for the state and the region." RISAA has over 5,000 members, and Hittinger sees a steady stream of fishing enthusiasts coming to Rhode Island, mostly from New York, New Jersey, and Connecticut. "More than half of the people that fish in Rhode Island are from out of state," Hittinger says.

Hittinger says that while the fishing is good, he and other fisherman have noticed a difference in what they catch. Where they used to catch summer flounder, "we get a tremendous amount of black sea bass, and black sea bass used to be much more common off of New Jersey and Maryland," he says, "and now we have a much bigger population in Rhode Island waters than they have down in that area."

Whether this increase in black sea bass is entirely due to warmer waters, Hittinger is unsure, as he says all fish populations naturally increase and decrease in a cyclical manner, but he does believe increasing temperatures have some effect.

Hittinger says that it is "unfortunate" that recreational fishermen are allowed to catch just three black sea bass per person, per day, according to DEM's catch restrictions.

Although Hittinger says he fully supports catch limits and protecting local fish populations, he says catch regulations are often "out of sync" with population shifts, and that there should be a "sense of urgency" in keeping these regulations up to date.

Hittinger says that by allowing more black sea bass to be caught, perhaps more anglers would be interested in buying permits to fish.

Jason McNamee, DEM's chief of marine resource management, agrees that the increase in black sea bass in the waters off Massachusetts and Rhode Island is dramatic. "Over the past couple of years we've seen some of our highest abundance estimates for black sea bass," he says. However, he adds, black sea bass are managed by the Mid-Atlantic Fishery Management Council, and due to a problem with the official stock assessment that was done for the species, the council could not accept the assessment and therefore

RECREATIONAL FISHING IS A BIG ECONOMIC BOOST FOR THE STATE AND THE REGION

"they default to this really conservative management structure."

"Hopefully we'll have—fingers crossed—an approved stock assessment that would be in play for 2017 management," McNamee says.

"From the DEM standpoint we've made this a really high priority ... we keep working at it because it's frustrating for us as well. There's a lot to complain about there."

Gaining a better understanding of what recreational anglers are catching is one of the goals of the Rhode Island Party and Charter Boat Association (RIPCBA), whose president, Rick Bellavance, says that "the charter boat industry is a great thing for the state," but more needs to be done to monitor boats' catch. "We don't have a very good handle on what we take out of the water," he says.

In 2014 and 2015, RIPCBA partnered with the state of Rhode Island in a pilot program that developed an electronic catch measurement system which, according to Bellavance, is now being used on charter boats up and down the Eastern Seaboard. Bellavance said that he uses the system, which is basically an app on a tablet, not only because it is much easier than filling out paperwork after every charter but because it also provides useful data that can hopefully be used in the future to preserve fishing grounds.

While Rhode Island's marine and coast-related tourism industries make significant contributions to the state's economy, there is still work to be done in order to ensure that they are fortified against the effects of climate change and environmental damage, and are able to adapt. But Jennifer McCann says that Rhode Islanders are observing changes in their natural environment and supporting a variety of local and state efforts, such as Carson's, that are identifying at-risk areas and planning strategies to address vulnerabilities. "The whole state has been recognized as a leader in climate resiliency," says McCann. "We're moving in the right direction."

Newport's waterfront is a major economic driver for the city, and businesses are planning for rising water levels and other climate change impacts.

Narragansett Bay Watershed

THE VALUE OF AN ECOSYSTEM

by **Elizabeth C. Smith** and **Emi Uchida**

OUR NATURAL SYSTEMS PROVIDE MYRIAD GOODS and services, but we often don't think about exactly how valuable those goods and services are to our economy and society.

We instinctively recognize cleaner water to play in, better fishing, and less flooding as contributions to well-being. Yet one challenge embedded in valuing the benefits from our natural systems is putting a price on these benefits—while some benefits are market based (for instance, the economic contribution from fisheries), other non-market benefits are more difficult to monetize because they aren't bought in a store and don't have a clear price (such as the habitat protection from wetlands). When we don't understand the values of the benefits of natural systems, we give them a de facto value of zero because we simply leave them out of the equation.

Rhode Island is a small state if evaluated by square miles or population, yet not if measured by natural assets. One perfect illustration is the Narragansett Bay watershed, a vibrant ecological system that provides many benefits to the surrounding communities and their residents and visitors alike. Ecologists and economists frequently use the term "ecosystem services" to refer to the benefits that natural systems provide; this definition, at its core, links the underlying ecological processes of nature with economic and social well-being. These benefits include provision of food (fish and shellfish), protection of coastal areas from natural hazards, regulation of waste and improved water quality, habitat for countless species, and a place for recreation and relaxation. Some of these benefits are easier to capture than others. For instance, according to the National Oceanic and Atmospheric Administration, saltwater recreational fishing contributes $300 million to the state's economy. Other non-market benefits are harder to value and require further study to understand the implications of management decisions.

UNDERSTAND THE BENEFITS OF NATURAL SYSTEMS

At the same time, estuaries (like other natural systems) around the country face ongoing stressors—namely increased populations, associated development pressure, and complications from a changing climate. Community well-being is directly tied to the health of natural systems, and a feedback loop exists where increased pressure on these natural systems may decrease the very thing that communities value in the first place. We've witnessed these phenomena up and down the East Coast as excess nutrients, such as nitrogen from wastewater, have wreaked havoc on our coastal systems, decreasing home values and collapsing once-thriving fisheries from Cape Cod to Long Island. This calls for thoughtful decision making and policy that account for economic trade-offs. For example, when policymakers recognize that economic gains from additional coastal development may be offset by economic losses from decreased fishery revenues, they may choose to limit or prohibit that development or require compensation for fishermen.

It is important for us to understand these impacts in Rhode Island. There are a number of large-scale and national studies that evaluate the importance of ecosystem services, but it is important to undertake ongoing local research. For instance, when pur-

chasing a house, buyers look at comparable homes with similar characteristics in the same neighborhood that would influence the offer price. If you are looking to buy a home in Rhode Island, you are unlikely to look at a comparably sized home in Cape Cod or around the Chesapeake Bay to determine a reasonable offer price. Characteristics of the geography and surrounding communities matter. National averages provide useful information to highlight trends; however, nothing substitutes for local numbers when making local decisions and choosing investments.

Given the importance of ecosystem services to economic and social well-being, we need to understand the values of our natural systems and integrate them into local decisions and policies.

To that end, a new study has been launched by an interdisciplinary team of researchers at the University of Rhode Island and Clark and Stanford universities to provide new information for decision makers to enhance their ability to take into account the value of a wide range of benefits from the Narragansett Bay watershed and its neighboring estuaries.

The study has three specific objectives: to identify and quantify the economic impacts of the Narragansett Bay watershed and their importance to sustained economic development; to estimate the value of ecosystem services that the bay and its watershed provide using an economic framework and methods; and to simulate the impact of future policy scenarios on ecosystem benefits and services and present recommendations of effective investments to maintain and enhance those benefits.

In 2015, the Office of Management and Budget directed federal agencies to "include ecosystem services into planning and decision making." This new study, along with the work of Rhode Island researchers and decision makers who have extensively studied the Narragansett Bay watershed and its natural systems, may well provide data to federal agencies whose work and regulations impact the bay. These experts may "communicate up" to those agencies about the importance of protecting this vital resource and improving its future health and that of the municipalities and economy that rely on it.

THE SHUCKIN' TRUCK
From Farm to Fender

by **Carol McCarthy**

Photographs by **Angel Tucker**

On a blazing July night at Narragansett Town Beach, The Shuckin' Truck stands out among the wheeled vendors selling pizza, hot dogs, and vegan treats—and not only because of its striking mural of Point Judith Lighthouse.

Within minutes of rolling in, the mobile purveyor of fresh seafood boasts a quick-moving line of barefoot, sunburned customers that is several deep. "Number 11," calls the young woman at the serving window, handing over lobster tacos with diced mango and avocado dressing. Seated on sandy blankets, in lawn chairs, or the back of pickup trucks, customers devour the locally sourced selections.

Dave Roebuck, owner of the Salt Pond Oyster Company on Point Judith Pond, opened the Shuckin' Truck in 2011 with the motto "from farm to fender," filling the fresh-from-the-oyster-bed niche in the food truck craze. "I had never seen one [a raw bar food truck] before," Roebuck says of his decision to plunge into the business.

Every Monday and Wednesday night during the summer, you will find Roebuck at the beach, shucking oysters and littlenecks nonstop at an ice-filled table alongside longtime employee Alvaro Badzan.

This night begins fortuitously. Not long into his shucking shift, Roebuck exclaims to his daughter Riley, age 7: "Look what I just found. A pearl. How cool is that? In five years I've found only two," he says, presenting the tiny gem to Riley, who soon loses it in the parking lot.

Dave Roebuck's Salt Pond Oyster Company provides oysters to his other business, the Shuckin' Truck.


fresh seafood • raw bar • to go
SHUCKINTRUCK
LOBSTER
SCALLOP
LOBSTER
FISH
Drinks - Water,

No matter. The true treasure here is the shellfish, which is as fresh as you can get. Roebuck harvested the oysters he is shucking that very morning, hoisting them onto his aluminum barge from their beds on the pond bottom.

As soon as the truck arrives, regular customers stream over. "Every week, a dozen little necks," Roebuck says as a familiar face arrives at the raw bar. The littlenecks come from another shellfish farmer's bounty on Point Judith Pond, the long body of water at the mouth of Narragansett Bay that divides the villages of Galilee in Narragansett and Jerusalem in South Kingstown.

Wei Da of South Kingstown is another regular. His mom is visiting from China, and he brings her every week. "She loves the oysters. They are so fresh," he says. "You can't eat raw seafood in China because of the water [which is polluted]."

The eastern oysters Roebuck grows are brawny and briny, with 32 percent salinity. Eating one is like a savory dive in the ocean. He sells three-quarters of a million oysters a year to customers from Washington, D.C., to Montreal.

"Number 34," calls the server as customers scan the truck's chalkboard menus, which offer tacos—made with Northern Atlantic cod, lobster or scallops—littlenecks, and oysters.

Nearby, Roebuck's family—including wife, Kristin, three children, dad, uncle, mother-in-law, and brother—gathers in a circle of chairs for a Shuckin' Truck dinner. "I have a lot of family support," he says.

In fact, his brother Chris's boats supply the scallops he serves. Fishing and seafood run deep in Roebuck's blood. His dad and uncle are longtime fishermen who live next door to each other on a dock in Snug Harbor, where Roebuck grew up lobstering with his dad and later worked as a squid fisher-

man. He launched the Salt Pond Oyster Company in 2002 so he could work on the water and be home at night with his family.

Roebuck uses an upwelling system for oyster farming. His approach takes longer but allows him to offer oysters in three sizes to meet customers' demands. "I do free planting on the [pond] bottom. It gives them extra time to grow," he says. The smaller ones take two years; the larger ones—palm sized—take four. Roebuck harvests every week by bullrake, hauling 5,000 to 6,000 oysters each time, even in winter. He hasn't missed a week in years.

Raising these beauties requires constant labor. At 7:30 on a sparkling summer morning, Badzan is at the dockside nursery upwelling bins, using a hose to flush out oyster waste, an endless but necessary task. "They need to be cleaned, or they can almost suffocate," Roebuck says.

The bins hold 20 million baby oysters, which sit on screens along the bottom, feeding on plankton delivered by the tides. A paddle wheel flushes the water 24 hours a day. Over the course of a few months, the oysters will grow from 1 millimeter (about 1/32 of an inch) to an inch and a half, he says.

Roebuck then moves the oysters to racks holding screen-like bags—which keep out hungry crabs—at the Matunuck Oyster Farm. After more than a year, Roebuck transfers the oysters to the pond, where they grow freely on 22 acres he leases from the state of Rhode Island. This work keeps him and a handful of employees busy year round. "You have to sort them by size in the nursery or the big ones will hog the food. "The biggest challenge is getting a high percentage of the babies out of the upwellers [nursery]. It takes constant grading and cleaning," Roebuck says.

The food truck business has its own challenges: creating a menu, knowing how much food to bring, preparing it quickly, working long hours. On this July day, Roebuck was on the water at 7:30 a.m. and will work until 10:30 p.m.

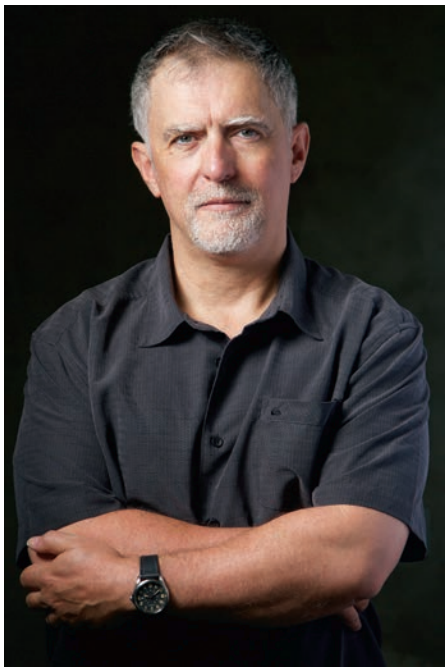
Well into the dinner rush at the beach, things move briskly. "Number 64," the server calls. Meanwhile, Roebuck restocks the raw bar and keeps shucking those sought-after gems from the sea.

Other Minds

THE OCTOPUS, THE SEA, AND THE DEEP ORIGINS OF CONSCIOUSNESS

by Peter Godfrey-Smith

Reviewed by **Hugh Markey**



Peter Godfrey-Smith

SEARCH YOUTUBE FOR TERMS LIKE octopus or cuttlefish—members of the class of cephalopods—and typical results fall into two categories. The first reflects the intelligence of the cephalopod ("Octopus Escapes Jar"), the second, its camouflage ("Cuttlefish: Tentacles in Disguise"). In *Other Minds: The Octopus, the Sea, and the Deep Origins of Consciousness*, Peter Godfrey-Smith examines these abilities as indicators of not only cleverness, but of actual consciousness. As he puts it, "Cephalopods are an island of mental complexity in the sea of invertebrate animals."

Godfrey-Smith is a professor of philosophy as well as the philosophy of science. For better or worse, *Other Minds* is more an exploration of the philosophy of consciousness than an examination of the workings of the cephalopod brain.

Other Minds is at its best when it examines the behaviors of cephalopods. Godfrey-Smith relates studies of captive creatures that very quickly learned to squirt water at the lights above their tanks, short circuiting them and relieving the octopus's sensitive eyes of the bright lights. He relates other behaviors: "In the same lab in New Zealand that had the 'lights-out' problem, an octopus took a dislike to one member of the lab staff, for no obvious reason, and whenever that person passed by on the walkway behind the tank she received a jet of half a gallon of water in the back of her neck."

Then there are those arms. Godfrey-Smith explains that most of the neurons in the octopus are found not in a central brain, but spread throughout the body, many of them in the arms. These seem to function at least partially independently, and are capable of tasting as well as feeling. Godfrey-Smith postulates that the complex system of neurons developed for controlling and coordinating that body, including arms that continue to function even after being severed, may allow other capacities—such as recognition of specific people—to arise as byproducts: "There is, it seems, a kind of mental surplus in the octopus."

Godfrey-Smith says cuttlefish, too, may have a surprising possibility of consciousness as evinced through their remarkable capacity for changing color. The chromatophores in one layer of their skin produce a limited array of colors, but there are also two types of cells that reflect and alter colors. The combinations of these three types produce the seemingly endless blends of camouflage so fascinating to see. "As a communication channel, the bandwidth of this system is extraordinary. You could say anything with it—if you had a way to encode the messages, and if anyone was listening."

Godfrey-Smith cautions that the rapid acceleration of fishing, pollution, and climate change indicates that the ocean's capacity for renewal is not endless. Though Smith's book raises more questions than it answers, he concludes by pointing out that none of those questions will ever be answered without better care for the world's oceans.

2,266

COMMERCIAL FISHING
AND
LANDING PERMITS ISSUED

1,566

NUMBER OF VESSELS COMMERCIALLY DECLARED

45,814,806.56

THE LANDING VALUE IN $ OF POINT JUDITH PORT

523

NOTHERN QUAHOG CLAM, NUMBER OF LICENSES

$ 75.7

RHODE ISLAND'S TOTAL LANDING VALUE IN MILLIONS

18,858,728.54

$ VALUE OF SQUID, THE MOST VALUABLE SPECIES LANDED

Data from 2015 courtesy of the Rhode Island Department of Environmental Management

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This photo, taken by John Supancic, shows Misquamicut Beach in Westerly, the cornerstone of the area's economy.