A SEAFOOD BUFFET
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) 874-6800. Fax: (401) 789-8340. 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.

Not a subscriber? You can get 41° N free. Sign up at seagrant.gso.uri.edu/41N (click the “subscribe” button) or call 874-6800.
The Seafood Issue

SUSTAINABLE AND LOCAL SEAFOOD
4 The art and science of sustainable seafood: Symposium explores collaboration among chefs, fishermen, and marine scientists
5 Talking seafood with Hemenway’s Executive Chef, Steve Long
6 Derek Wagner: In chef we trust
8 Fish becoming part of ‘local food’ movement
9 The next white meat?
10 The Local Catch connects kitchens, boats, and sub-sea habitats
12 Bring local seafood home: Ocean State Fresh
13 Farm Fresh Rhode Island adds seafood to its Market Mobile
14 The fishing industry in Newport, Rhode Island, 1930–1987

COOKING SEAFOOD
18 A seafood cooking lesson from Chef Normand Leclair
20 Cookbook offers [flavor]full story of scallops
21 The science behind seafood salad

DEFINING SUSTAINABLE SEAFOOD
22 What does ‘sustainable’ seafood mean?
23 Emerging market approaches to seafood sustainability
24 The spectrum of sustainable seafood

SEAFOOD HEALTH AND SAFETY
26 Seafood and health: Your questions answered
27 Mystery fish: Seafood mislabeling common, report finds

AQUACULTURE
28 Rhode Island shellfish aquaculture poised to expand
29 Science and society help determine how much shellfish aquaculture Rhode Island salt ponds can hold
30 Less tension, more growth: Reducing user conflicts over the expansion of shellfish aquaculture

RHODE ISLAND SEA GRANT
32 As sea levels rise, towns map future flood zones
35 Enhancing Newport Harbor Walk
36 Stuck in a gyre
38 Project offers guidance for communities planning renewable energy projects

WRITE US
We are interested in what you have to say. Please write to...
Letters, 41° N Editorial Office, Rhode Island Sea Grant, URI Bay Campus, Narragansett, RI 02852, or e-mail 41N@gso.uri.edu
... or complete the survey on page 39.

Visit 41° N on line at: seagrant.gso.uri.edu/41N
and on Facebook at: facebook.com/rhodeislandseagrant

Letter from the Editor
While putting this Seafood Issue of 41°N together, I had a conversation with contributor Sarah Schumann, who said that in thinking about writing for this issue, “It’s funny, I never thought of fish as something to eat—I always thought about them as something you catch to make money, or from a biological standpoint.” She added that Rich Cook, fisherman and owner of The Local Catch, has been asked by customers how best to prepare some of the variety of fish he sells... not exactly his area of expertise.

In another conversation, contributor Carrie Byron mentioned that her mother has a soy allergy and is unable to eat farm-raised fish fed soy diets—information that few markets have readily available.

Bringing people from different perspectives together to answer each other’s questions about seafood—from sustainability, science, and management to buying and selling, handling, preparation, and health—was the goal of the 2011 Ronald C. Baird Sea Grant Science Symposium. Titled “Developing the Rhode Island Seafood Knowledge Economy: Perspectives on Seafood Sustainability,” it brought together scientists, chefs, environmental managers, representatives of nonprofit organizations, and members of the fishing and aquaculture industries, among others, to discuss some of the myriad issues regarding seafood. This edition of the magazine was inspired by that symposium, and we hope you will enjoy the buffet of articles, recipes, oral histories, and more—all on the many aspects of seafood.

Changes to 41°N
Over the summer, we conducted a series of listening sessions to get feedback on 41°N. We received positive feedback about the design and layout of the magazine and its usefulness and interest to readers, but we also heard some areas we can improve... including making sure the font size is large enough to read easily, having a wider variety of contributors, and including more “human interest” stories. We’ve incorporated some of those suggestions into this issue, and you can look for more changes in 2012.

Sincerely,
Monica Allard Cox
Managing Editor
The art and science of sustainable seafood:
Symposium explores collaboration among chefs, fishermen, and marine scientists

James Griffin, Associate Provost, Johnson & Wales University

The 2011 Ronald C. Baird Sea Grant Science Symposium was a celebration of sustainable seafood that, for the first time, included hands-on sessions in commercial kitchens co-facilitated by seafood researchers, fishermen, and chefs.

The benefits of this interdisciplinary and active approach include the ability for participants to explore the science and sensory aesthetics (the art) of sustainable seafood while extending the dialog and research efforts related to edible seafood all the way to the end of the supply chain: the consumer or restaurant table. With Narragansett Bay and the surrounding coastal waters serving as a rich and diverse marine resource for the state, there is no better place for such a thorough exploration of seafood than Rhode Island. As I noted just after the symposium, from a culinary perspective, “Narragansett Bay is our Napa Valley” and we should, in a responsible and sustainable way, treat it as such.

Due to increased demand by chefs commercial sources for local seafood are increasing. Suppliers and Baird Symposium participants Rich and Ann Cook of Local Catch out of Point Judith partner with Farm Fresh Rhode Island to distribute local sustainable and underutilized seafood products to restaurants throughout the state and at local farmers markets. American Mussel Harvesters of Davisville, another Baird Symposium participant, offers the freshest locally farmed oysters, clams, and mussels in the region, attracting the attention of chefs and restaurateurs alike, including national luminaries such as Chef Thomas Keller.

Local chefs are marketing sustainable seafood as well. Chef Derek Wagner of Nick’s on Broadway in Providence offers diners a wonderful corn-crusted Point Judith bluefish with local tomatoes and shaved onion as a luncheon special. Wagner, a panelist who participated in the Baird Symposium, is a vocal advocate of locally sourced ingredients including seafood, and is masterful at creating dishes that highlight sustainable species such as bluefish, black bass, scallops, lobster, and summer flounder.

At Gracie’s Restaurant in Providence, Chef Matt Varga serves sea scallop crudo with Romesco sauce, fennel, and an elegant tiny garden herb salad. Another locally sourced favorite is butter-poached lobster, spinach cavatelli, chanterelles, baby vegetables, and brown butter hollandaise. Varga grows his own herbs and greens on a rooftop in downtown Providence and sources his seafood locally and sustainably.

The Baird Symposium provided chefs with insights into the science and technology behind farm-raised seafood, sustainable wild-caught fishing practices, and responsible management of marine ecosystems that professional experience and formal culinary programs rarely provide. In turn, the symposium allowed scientists, fishermen, and policy makers a rare hands-on opportunity to explore the sensory aspects of the seafood species they work so hard to protect. Together a deeper perspective on the art and science of sustainable seafood was achieved that made a lasting link from ocean to plate.

The Ronald C. Baird Sea Grant Science Symposium
The Ronald C. Baird Sea Grant Science Symposium is an internationally recognized annual event hosted by Rhode Island Sea Grant that provides a forum in which scientists, resource managers, and stakeholders come together to discuss the state of science on ocean and coastal issues vital to coastal communities, environments, and resources regionally, nationally, and across the globe.

In 2011, Rhode Island Sea Grant partnered with Johnson & Wales University to deliver a unique symposium: Developing the Rhode Island Seafood Knowledge Economy: Perspectives on Seafood Sustainability. This symposium brought together scientists, seafood businesses, fishermen, and chefs who discussed the science of sustainable seafood, economic aspects of sourcing seafood, consumer preferences, and health topics among other issues. The success of this symposium has led to Rhode Island Sea Grant to partner again with Johnson & Wales for another event, The Edible Ocean, to be held in 2012 at Johnson & Wales University’s culinary school in Providence. Check seagrant.gso.uri.edu for updates.

The 2012 Baird Symposium will focus on implementing marine spatial planning and address the key economic, ecological, and regulatory issues and questions that managers face in implementing effective plans. For more information, visit seagrant.gso.uri.edu/baird.
Eating locally grown or caught food has become an added value for restaurant patrons in Rhode Island and more consumers are curious as to where their food comes from and who is growing it or catching it. Steve Long, executive chef of Hemenway’s Restaurant in Providence and panelist member at the 2011 Ronald C. Baird Sea Grant Science Symposium on sustainable seafood, shares some insights about preparing local seafood for patrons, where he gets it, and what he finds customers are most interested in when it comes to their seafood.

When creating the menu at Hemenway’s do you take local seafood into account?

A: Absolutely. We buy from Local Catch in Point Judith pretty consistently, at least once a week. I tend to buy a lot of fluke from them, which sells well here. We also buy from Andrade’s Catch & Wholesale Shellfish in New Bedford, Windfall Shellfish in Bristol, as well as from the Walrus and Carpenter Oysters in Charlestown.

Is it more beneficial from a business standpoint to buy local?

A. The quality and shelf-life of the seafood I buy from Local Catch is exceptional because they sell what they get from the boats that day, so the quality is much higher. It can also be cheaper because you take out the middleman, which can add additional costs, and sometimes the product can be held when there’s no initial buyer and that can reduce the quality of the product. We do work with wholesalers in New England for popular items such as salmon, and they are very good.

You have to remember that buying local product also depends on the time of year and how you define “local.” Right now I can buy swordfish, tuna, and mahi-mahi locally until the winter. During the winter months I can get oysters, clams, scallops, and sometimes lobster locally.

Also, I don’t limit “local” to just Rhode Island. I also consider Massachusetts and Connecticut, if not all of New England, local. There are some parts of Massachusetts that are closer to Hemenway’s than some parts of Rhode Island. Rhode Island isn’t a big enough state to be able to meet all seafood demands.

What is the most popular seafood item at Hemenway’s and what is customer demand for local seafood?

...continued on next page
“I can envision eating anything.” — Chef and owner Derek Wagner on the possibility that menus at his popular Nick’s on Broadway restaurant may someday feature jellyfish.

If optimism, excitement, and an adventurous attitude are the ingredients for success, put your money on Derek Wagner to do quite well in this world.

The young owner and chef of Nick’s on Broadway in Providence has been a leader in seeking out fresh local produce and meats to serve his customers. Wagner has been the man in the vanguard in bringing seafood caught in the waters off of Rhode Island to his diners, as the first local restaurateur to sign on with the new Trace and Trust fishermen’s wholesale consortium.

Trace and Trust is an initiative created by a small band of local commercial fishermen that marries new technology to the everyday on-the-water business of catching fish, and makes a leap over the head of a middleman to bring the catch directly to the tables of some of Rhode Island’s most highly regarded restaurants. By texting about and even e-mailing pictures of what is being hauled on board during the day in real time, the Trace and Trust fishermen let local chefs on land such as Wagner know what could—and probably will—be on the menu that night. Trace and Trust will pack the selected catch in ice and deliver it right to the door of the expectant chef that very day. This innovative project has caught national attention, notably in an August article in the New York Times extolling its virtues.

“The alliance all started with a handshake at that table over there between a fisherman and a chef,” says Wagner, pointing out one of the settings in the cozy Nick’s dining room where the business trade between Trace and Trust and the restaurant began. He notes that the informality and smaller scale of operation is a positive factor in the business relationship, as it reduces the amount of administrative burdens that enter into the scenario, while allowing for the freedom many restaurants seek as they carve out a special niche for themselves.

“With this, our individual businesses can keep their identity—their sense of self. What might be good for you might not be good for everyone. For restaurants, it’s a patchwork quilt style of what works—different food, different venues, different service ... but we’re all brothers-in-arms” he says of the effort he and other chefs are making to bring locally sourced ingredients to their customers and to educate them about what they are eating.

...continued from page 5

A. The Poppasquash oysters from Windfall Shellfish are very popular, as is Point Judith flounder. The demand for local, I think, is only coming from a small fraction of our customer base and those customers tend to be a little more outspoken. The majority of our customers will come to us regardless, but serving “local” has an added value to all customers, which our wait staff tells us.

How successful is serving “underutilized” local seafood, such as scup or sea robin?

A. “Underutilized” species are a bit tricky to work with. I define “underutilized” as fish that’s high in abundance but not on many menus. It takes a lot more work to move these items because people aren’t looking for a fish they’ve never heard of. Customers usually have an idea of what they want to eat before they even walk in the door and aren’t likely to try something new.

As a chef, we need to be creative and have a good sales team behind what we’re offering. The wait staff samples everything and knows where the food is coming from so they can be informed to answer questions. Sometimes we’ll create verbal specials, or specials not on the menu, using fish such as tautog, which has gone over well. Sometimes we bring in skate from New Bedford or Local Catch. We don’t tend to get skate in the summer months because of increased air and water temperatures that increase the perishability of the product.
The link between local fishermen and their partners in the kitchen has allowed customers to learn more about what lives in the waters just miles away from their dinner tables. It also lets them enjoy new dishes featuring fish that many have never thought of putting in their mouths prior to being introduced to them at places such as Nick’s.

“I’ve served sea robin, skate wings, scup, and people try it!” Wagner says enthusiastically.

Knowledge and Education

Consumer knowledge and a willingness to try something new play a major role in the success of Nick’s.

A recent morning visit to Nick’s [pleasantly] shocked one of the diners when a daily breakfast special featured bluefish, hardly what the average American diner is used to starting the day off with.

“We’re putting the carrot out there, in the right atmosphere,” Wagner says of this type of dining derring-do. “You can create an appreciation that drives all else.”

Education is also an element of getting new culinary ideas and ingredients over with the public. A customer from the West Coast recently confronted Wagner over his having tuna on the menu, waving a Monterey Bay Aquarium folder at him that said tuna was over-exploited and shouldn’t be served in restaurants.

“I explained that it was local yellowfin tuna, which is OK, not bluefin. People read a little bit here and little bit there, and think they know. That’s the risk you run, that the real information is not getting out. We want to be responsible as stewards of the ocean. We want to help monitor [the health of fisheries] and know which ones are sustainable, not make them extinct.”

Wagner also learns from his friends at Trace and Trust, and finds it both fun and exciting. “Today I got a couple of e-mails from Steve Arnold [of Trace and Trust]. He told me there was a full moon effect on some fish, with higher tides, and that I shouldn’t expect that some species, like black bass, were going to be on the menu tonight. That blows my mind. But I can pass that information on to the customer. It’s the genuineness of it...the sharing of information, the serious involvement. It’s special.”

Changing Hearts

Wagner has also been successful in helping to market seafood as a major part of everyone’s cuisine.

“People have become conditioned to over-processed food,” he says. “Fish isn’t as sweet or salty as they are used to, it isn’t the same texture. But we’re driving seafood, pushing it. We have vegetarians who are now eating fish, and people who ate only meat eating fish. I recently did a six-course meal that included a fluke dish. There were a handful of people who didn’t eat fish, but said that it was so good!”

“People trust you—trust you to take them on that journey,” Wagner admitted. “You have to respect that. Be careful with it. And hold it in high regard.

“You have that one chance … promoting fish and changing hearts.”

Derek Wagner has been nominated for the James Beard Rising Star Award twice, and featured on TV’s Food Network several times.

Nick’s on Broadway has been named “One of the World’s Best Restaurants” by Fodor’s International Travel Guide for the third year in a row.

Nick’s on Broadway is located at 500 Broadway, Providence, RI 02909 (401) 421-0286.
Fish becoming part of ‘local food’ movement

Monica Allard Cox
Communications Manager
Rhode Island Sea Grant

On average, food travels 1,300 to 1,500 miles from the producer to your plate, which “is not good for the environment or the economy,” says Ken Ayars, chief of the R.I. Department of Environmental Management’s (DEM) Division of Agriculture, which both regulates and promotes local agriculture.

He explains that the price of food is tied in part to the price of fuel, expected to rise with future declines in availability of oil, which will make food—especially food that travels long distances to reach local grocery stores—more expensive. And all this transportation of food contributes to environmental threats such as global warming. Ayars adds that Rhode Island produces 1 percent of its own food, but has a growing vibrant local food economy. In regard to fisheries, however, “Much of what we produce we export; much of what we eat we import. We want to change that dynamic.”

DEM is partnering with a number of organizations in a comprehensive food assessment for the state that examines a variety of components, including producers, distribution, waste, and food deserts, as well as fisheries.

Why fisheries? Ayars says that DEM is encouraging local, sustainable food as key to Rhode Island’s “food system,” and that model is incomplete without local fisheries.

According to Ayars, the fishermen have expressed interest as well, as they have seen the success of local initiatives like the Rhody Fresh brand of milk produced by a collaborative of local dairy farms, a project supported by DEM.

As some fishermen are deciding to enter retail markets (as opposed to selling all of their catch to wholesalers), DEM is working with them to move through the regulation process and to raise grant funding for local seafood marketing. This year, the state legislature also created a Seafood Marketing Collaborative, with representatives and advisors from state agencies and organizations, to promote local seafood.

Ayars believes that the “entrepreneurial fishermen” he has met have the opportunity to replicate the grassroots success of efforts like Rhody Fresh and Farm Fresh Rhode Island, a nonprofit organization that markets local food.

“There is a phenomenal market in Rhode Island. There is plenty of room for farmers and fishermen to sell within the state and stay viable as businesses,” he says. ■
The scup, *Stenotomus chrysops*, is a great candidate for the post of “Rodney Dangerfield of The Fish World”—it gets no respect. From a historical perspective, the scup has often been viewed as a fish best used for bait. Those who did place a scup on the table for dinner were generally the down-trodden and poor, or newly arrived immigrants taking advantage of an abundant and familiar resource. Closely resembling European Sea Bream, a highly prized edible fish that often goes by the local name of Red Porgy along the Mediterranean, scup are often referred to here in New England as porgy or pogy. This moniker no doubt hearkens back to those days when European immigrants were the main purveyors of scup. Unlike its European relative, scup here in New England has not achieved such gastronomic acclaim, at least not yet.

James Griffin, Associate Provost at Johnson & Wales University in Providence, thinks differently about scup. Having grown up along the coast in Massachusetts, Griffin spent time fishing with his father, and inevitably scup came home as a dinner entrée. Griffin has introduced his own son to fishing along the coast, and to no surprise, a scup was the first fish his son caught on his own. Beyond the personal enchantment with scup, Griffin also knows of their gastronomic greatness.

With firm, flaky flesh and a sweet, mild fish flavor, scup is an all-star species at the table. Scaled and dressed, then breaded and deep-fried whole, they are delicious. Filleted carefully to be sure no bones come along in the flesh, then sautéed in browned butter or popped into the oven with wine and a bit of garlic, scup stands proud as a great New England fish.

And to better sweeten our fish stew, scup truly is a sustainable species. Once troubled by very low population levels due to over-fishing and high mortality as bycatch in other fisheries, scup populations have rebounded—due to strict management measures—faster than fisheries managers expected, and have achieved numbers higher than anticipated. In fact, this year the harvest season for scup will remain open until December 31st rather than closing in October because of an “unprecedented biomass,” according to fisheries managers.

So, if it’s sustainable, tasty, easy to catch, and downright plentiful, why isn’t scup to be found in the local fish market or on the menu in downtown restaurants? Could it be that scup is still considered a “low class” fish? Or could it be that people just don’t know what a great thing they’re missing out on? Griffin thinks it’s the latter.

“It’s the next white meat,” says Griffin with a smile on his face. That’s why he, in collaboration with others at Johnson & Wales, the University of Rhode Island, and Rhode Island Sea Grant, are working with chefs, seafood buyers, fishermen, and consumers, to spin up a new way of thinking about local, sustainable, seafood. So keep your eye on the menu, because you just might see scup there in the near future, especially in the restaurant of a Johnson & Wales graduate. Try it, and you’ll be rewarded with a savory treat that will not only taste great, but make you feel good about the pedigree of your meal.
The Local Catch connects kitchens, boats, and sub-sea habitats

Sarah Schumann
Assistant Director
The Local Catch

A fish can be many things.

In the sea, a fish can be a predator, a source of food for other species, a member of a school or a solitary wanderer, and a progenitor who releases millions of eggs or sperm into the water column in an ancient cycle of regeneration.

On the hook, in the net, or in the trap, a fish can be a vital source of income for commercial fishermen and their crews, a foundation of families, of coastal communities, and of the age-old tradition of obtaining sustenance from the seas.

On the plate, a fish can be a pleasure for the palate and a source of nourishment, a feature of meals both mundane and spectacular, a dish over which friendships, romances, and family connections are made and maintained.

In the public imagination in the Ocean State, these three roles of fish are tightly integrated. Rhode Islanders like to think that the fish they taste at local eateries or buy at local markets was swimming in local waters just days before and was landed by the fisherman who lives down the street.

But sadly, the reality is otherwise. Most fish caught by Rhode Island fishermen is shipped out of state, to places where people are willing to pay more for it. As a result, seafood products available for purchase locally tend to be imported from other parts of the globe, having suffered aging and deterioration en route. Frequently, they are treated with chemicals that prolong shelf life and increase their weight by causing them to soak up water. Ironically, many Rhode Islanders, despite living steps from the ocean, have never tasted fresh, local seafood.

Longtime Rhode Island fisherman Richard Cook wants to change that. Earlier this year, Cook formed a business called The Local Catch. Counterpoised against the layers of processors, dealers, brokers, and shippers that make up the global seafood supply network, The Local Catch shortens the seafood supply chain to a minimum by selling fresh-caught seafood direct to consumers.
Through this unique business model, Cook hopes to achieve two goals: helping fishermen attain higher profits for their catch, and making top-quality local seafood product available to the public. The Local Catch sells fish that Cook catches on his own boat, the 34’-foot F/V Sandra Lynn, as well as fish caught by Cook’s friends in Pt. Judith. Cook, his wife Ann, and their staff process it in a dockside facility in the Port of Galilee and deliver it in a refrigerated box truck to Rhode Island restaurants and retailers. Four days a week, they participate in local farm markets, marketing their catch direct to the public while educating local consumers about the species that underpin Rhode Island’s seafood industry. They have also teamed with Farm Fresh Rhode Island to offer local seafood through the Providence-based non-profit’s Market Mobile program, viable, and retraining chefs to be flexible in the face of seasonal and weather-based changes in the availability of seafood.

But despite the challenges involved in rerouting Rhode Island’s seafood supply chain to a more local orientation, Cook and his team see great potential for their business model. Since formally opening its doors in April, The Local Catch has sold fresh fish to dozens of area restaurants and introduced hundreds of farm market customers to the flavors found off our shores. Each of these sales represents more than a transaction—it is a personal bond and educational exchange between fishermen and the public.

For The Local Catch, each connection formed around local seafood represents a building block towards the socioeconomic and ecological sustainability of seafood. By encouraging Rhode Islanders to shrink their “seafood shed”—the area of ocean from which the seafood in their diets is obtained—Cook’s team aspires to lower the carbon footprint of seafood consumed in our state, bring consumption more in line with ecological carrying capacity, and inform local seafood consumers about the repercussions of seafood consumption on regional marine ecosystems.

Starting in 2012, the team will host a 12-month dinner series called “Dining from the Depths.” On one evening per month, a different Providence-area restaurant will showcase a spectrum of ocean-derived dishes, all obtained from a specific marine ecosystem (the location of this ecosystem will vary from month to month). The goal of this project is to expose diners to the relationship between the fish on the plate and the fish in the ecosystems found off our shores. The dinner series is an experiment in dining in balance with nature. Menus will be based on the relationships that form the basis of marine food webs and will promote many edible yet often overlooked regional species.

Through farm markets, restaurant sales, and projects like next year’s dinner series, The Local Catch is reuniting the three functions of a fish—animal, paycheck, and culinary delight—and linking up the Ocean State’s habitats, fishing boats, and kitchens. In the near future, the fledgling company hopes, the celebrated image of the salty New England fisherman, laden with bounty from the depths and proffering his harvest straight to local cooks, will no longer be a myth but the norm.

Sarah Schumann is a deckhand aboard the F/V Sandra Lynn and assistant director at The Local Catch.
During his last year of graduate school, Ross Pearsall realized the job he wanted didn’t exist. Not yet, anyway. Having initially entered the master’s program in marine affairs at the University of Rhode Island intending to specialize in shipping and ports, Pearsall developed an interest in sustainable seafood marketing after learning about a type of program called a community-supported fishery, the first of which was established in Maine. Similar to traditional agriculture co-ops, a community supported fishery program allows fishermen to sell some of their catch to participating members of the community, who receive subscription-based shares from the assortment of local seafood available. In other states, including Massachusetts and New Hampshire, community-supported fishery programs have proved quite popular and enjoyed considerable expansion in recent years.

A survey taken last year by the URI Sustainable Seafood Initiative sought to gauge consumer interest in purchasing local seafood products closer to the source, and found such a concept to be of tremendous appeal to respondents at farmer’s markets. Currently, relatively few vendors are licensed to sell seafood at Rhode Island farmer’s markets, and their offerings tend not to reflect the full array of diverse delicacies landed at Rhode Island ports. The resultant publication from the Sustainable Seafood Initiative survey called Pearsall’s attention to the growing demand largely unmet by existing local seafood vendors, and the potential for a community-supported fishery to thrive and increase popularity and profitability of Rhode Island fisheries. Thus, Ocean State Fresh was founded during the fall of 2010 as the first Rhode Island community-supported fishery, and began operations in February.

Ocean State Fresh offers several options for subscription packages, including full, half, and biweekly shares, as well as the option of fish delivered whole or filleted. All subscriptions run for 12 weeks, and each week customers receive a newsletter detailing the current catch and recipe suggestions. Smaller amounts of individual products may also be purchased a la carte, in addition to or in lieu of a subscription. Offerings change with the seasons, but are always fresh, which sharply distinguishes local product from supermarket versions of some of the same species, which have been frozen. During the fall, selections include the staples lobster, squid, cod, and shellfish, along with less mainstream fare such as monkfish, scup, and tautog (blackfish). Offering a larger, more inclusive variety of products in shares gives customers a chance to try something new, while supporting all participating Rhode Island fishermen and further expanding the market for distinctively Rhode Island products. Among the most well-received offerings, says Pearsall, are sea scallops and basses, though he also personally touts skate, which he describes as a hybrid of cod and bluefish in taste and texture.

There are a number of ways a community-supported fishery benefits both consumers and fishermen. Seafood often travels through a long line of processors, wholesalers, and distributors over a wide geographical range, and may require preservation treatments before ever reaching a retail location. Buying closer to the source and eliminating several entities along the distribution chain not only yields fresher, more traceable food, but can offer it near or at retail value to consumers while increasing fishermen’s profits considerably. In this way, fishermen also receive income earlier in the season than usual, which can help with the costs
Farm Fresh Rhode Island adds seafood to its Market Mobile

Zoe Gentes
Communications Intern
Rhode Island Sea Grant

In 2009, Farm Fresh Rhode Island—an organization that markets local agriculture—unveiled its Market Mobile delivery service, designed to more easily connect customers with local producers. The goals of this initiative include increasing sales and consumption of locally grown products, building a more efficient local food distribution system, and supporting local farms to supply the wholesale marketplace of schools, hospitals, grocers, and restaurants.

The system has been well-received in the community, says Hannah Mellion, coordinator of Market Mobile. The system has been well-received in the community, says Hannah Mellion, coordinator of Market Mobile. Each week, producers log onto the Market Mobile site and enter the foods they will be able to harvest this particular week, the quantity available, and the price. Consumers use the site to place their orders for specific items from specific vendors. The farms harvest and drop off the orders at a Farm Fresh warehouse, where staff and volunteers fill the trucks with the farms’ food, sorted by customer.

Originally, Market Mobile delivered produce, dairy, and meats. Then in April 2011, due to popular demand, the service made the jump to integrating local seafood into their services. The Local Catch, a Narragansett seafood processor and wholesaler, teamed up with the Market Mobile to create an effective system of fresh seafood transportation and delivery.

Mellion is pleased about the two companies working together, and what it means for the future of local buying and distribution. “Having fishermen who have the capacity to provide that service, have that direct contact with buyers, and have the same values as us was very important. We were really happy to have them come on board,” Mellion says, adding “Chefs are also excited to talk directly with the fishermen. Business that order seafood from Farm Fresh are already asking for more, such as a greater variety of seafood, which translates into not only potential for the partnership, but for greater recognition of local seafood as well.”

...continued from page 12...

of the repairs, maintenance, and fuel needed to make fishing trips. Additionally, the promise of a mutually agreeable fixed price for products protects fishermen from the dramatic price fluctuations that can sabotage profitability of an entire season and cause unrest within the fishing industry. Consumers can be assured of both quality and benefit to the local economy, while incorporating healthful seafood into their diets and expanding their culinary horizons.

Currently, Ocean State Fresh is based in Pearsall’s home, and products are distributed weekly at Newport’s Long Wharf from a refrigerated trailer. Despite its seemingly limited resources, Ocean State Fresh has proven very popular in its inaugural season, raising enough cash to make expansion possible. The next move will be to acquire a dedicated processing facility and a larger refrigerated vehicle, both goals that must have seemed lofty a year ago. Just as impressive, some might argue, is garnering a sponsorship by Narragansett Beer, another good indication that the Rhode Island brand is beginning to blossom.

Overall, it seems that community supported fisheries, especially in areas with a long history of fishing, are equipped to meet the challenges of economic recovery while respecting the culture of an old industry and the environment it depends on. This improved business model channels revenue more directly to individuals and communities, provides safe and wholesome food to an increasingly concerned public, and could be poised to take back a slice of the seafood industry from overseas producers by satiating more appetites at home.

Branding seafood

Even more economic benefits are possible through the creation of a strong brand image for Rhode Island seafood such as the one envisioned by Ocean State Fresh. The Louisiana Seafood Promotion and Marketing Board is an example of a successful seafood branding campaign which has formed a powerful alliance among the seafood-associated industries of Louisiana, including fishermen and aquaculturists, processors, restaurants and retailers, resource managers, and marketing professionals. As a result, foods such as crayfish, catfish, and even alligator are widely known as uniquely Louisianaan products associated with regional culture and cuisine, and every stage of production benefits from the prestige of this image. In this way, even products with a cheaper, imported equivalent like catfish gain a competitive edge over their foreign counterparts. Similarly, a recognizable hallmark whose reputation of quality and taste precedes it could increase an already piqued interest in Rhode Island seafoods. This is especially true outside New England, where perception alone could influence retailers and restaurants to choose Rhode Island over other regional commercial suppliers, and to advertise its origin as a selling point.
The fishing industry in Newport, Rhode Island 1930–1987

In 1987, with support from Rhode Island Sea Grant, the Newport Historical Society undertook a project to capture the experiences of local commercial fishermen dating back to the early 20th century. Excerpts of some of these oral histories, along with introductions from the manuscripts, are presented here.
Stephen Fougere

“My grandfather was a fisherman. His father was a whaler.” Stephen Fougere learned to become a fisherman from his father, a day dragger in Newport. Mr. Fougere left school at age 16 to go fishing and became captain of a fishing boat by age 18. He provides detailed information about the fishing industry in Newport from the 1930s to the [1980s]. He left the fishing industry in 1954 to work as the Rhode Island State Conservation Officer, a position he held for 30 years.

“A lot of the so-called ‘trash species’ of those days are delicacies today ... The monkfish, for example, is very popular today. We never saved or sold those. Hake is another. That was strictly a trash fish.”

“I can remember lobster being a nickel a pound and people not being able to sell them. I’d see hundreds of pounds carried up and down in Long Wharf, alongside the boats, and they couldn’t sell them.”

“Fishermen were kind of looked down on more so than they are today. It wasn’t that lucrative. People that liked fish were either Catholics or poor people ... If it was a high-priced restaurant, they wouldn’t sell fish; it was strictly steak.”

Kevin Tuttle

Kevin Tuttle worked extensively on offshore draggers since his graduation from the University of Rhode Island’s Fisheries School. His manuscript is filled with information about the work of fishing, life at sea, boats and equipment, safety, offshore fishing grounds, species sought by draggers, marketing, and fishing as a dangerous occupation. Mr. Tuttle has thoughtful insights concerning depletion and conservation and speaks at length about the relationship between fishermen, biologists, and government officials and how they affect the fishing industry.

“Hopefully, maybe the Food and Drug Administration or whatever agency governs the publicity of fish will do some good advertising for the more under-utilized species. People look at squid and they say ‘ugh’... It’s delicious. It’s got to be cooked right, that’s all.”

“Fishermen are kind of looked down on more so than they are today. It wasn’t that lucrative. People that liked fish were either Catholics or poor people ... If it was a high-priced restaurant, they wouldn’t sell fish; it was strictly steak.”

George Mendonsa

George Mendonsa was born in Newport, R.I., in 1923. His father came to Newport from Madeira, Portugal, in 1910 and supported his family by working as a trap fisherman. He passed on his knowledge and pride in his work to his son, George, who worked in the floating trap fishery in Rhode Island waters for his entire life.

“We can get fish down to North Carolina less than twenty-four hours after it stops swimming. Whereas, these boats that go offshore... Their fish could be ten days old before it gets to its destination.”

“There’s a lot of fish consumed here. The foreigners that come here, they’ve educated the Americans on lots of species. There’s lots of species that we used to throw away years ago that had no market value at all ... like monkfish.”

“Years ago, we were happy to see a few mackerel and we were kind of disgusted looking at scup because of the value. Now it’s the other way around. Now the scup is worth sky high and the mackerel is down. The market is completely reversed... A species does disappear and come back. The people that consumed mackerel all died off or something. It’s hard to get the people back onto it.”

Anthony Bucolo

In 1945, Anthony Bucolo’s father, a fish peddler, became part owner of Tallman and Mack Fish and Trap Company in Newport, RI. Anthony Bucolo’s association with Newport’s fishing industry began at that time.

In 1956, Mr. Bucolo started his own business, Anthony’s Seafood; in 1986, his business was sold. His operation played an extremely important role in Newport’s fishing industry. Mr. Bucolo’s business progressed from the handling of lobsters, to lobsters, fish, retail and wholesale, to the addition of a seafood restaurant. Mr. Bucolo also obtained his own boats that caught the fish and handled fish and lobster of numerous other incoming boats, many of whom were attracted to Newport by his reputation for fairness and honesty as a fish dealer.

“...there are some spots you go that you get your weight, you get treated fairly. Other spots, you don’t. Everybody takes an extra little bit of weight. They always do. In New Bedford, they have a scale set aside not only for the fish, but they have a man setting up the box with the ice in it. They’ve got the scale set. They know what the box weighs. The man’s supposed to shovel so many pounds of ice in it. Well, when the hurry’s on, the scale is not going to balance out all that quickly. He throws the ice. If it’s under, then the fish make up the difference ...”

Q: What were your main markets [before 1970]?

A: Up until about 1970... about ninety percent of our business was lobsters. They went to Boston and New York. We

...continued on next page
had two trucks on the road all the time, anywhere from here to Boston, to restaurants. Then, when we got into the heavy production with the draggers and we opened the market, it was more economical for us to just go to dealers ... We had customers and we'd deliver to them. As long as we had a truck going that way, we'd deliver. But most of the people picked them up. It was a good deal.

Q: How about your retail business: You opened that in 1970?

A: In 1970. Anywhere between 1975 and 1980, that really boomed ... By the early 1980s, we had more competition or other markets opening ... I don’t think they had to offer what we had to offer. And now you have several new [supermarkets] and things like that, who have a very nice display case. If you’re out in Middletown and you’re at Stop and Shop, why should you try to come down Thames Street and waste an hour and a half? And that’s what happens. The fish aren’t as fresh as ours. It probably doesn’t taste like ours. But, at the same token, you get used to it. You’re going to waste an hour and a half or you’re going to have something that you can get used to the taste of.

Q: What are the major differences between the chain markets’ fish and an operation like yours was?

A: With us, we had fresh fish available every day. A chain, usually, if they’re going to have a special, they will have it a week to ten days after they’ve purchased the fish. They have to be sure they have the fish in hand. They’ll tell you that it’s fresh caught every day. Well, the fish is fresh caught every day, but it’s not brought to market every day.

Q: Do you think people are becoming more willing to eat a lot of different kinds of fish that they didn’t really consider before?

A: That is a new trend ... I can remember one day when one of my boats came in and he looked at me. He said, “I’m getting more for junk fish than gold ...” There are a lot of people who like to try a lot of different things. [For example] squid. See, the Italians ate squid from Day One. I mean, we just love squid. The Spanish are big buyers; the Japanese got into eating the squid. It’s like anything else. Once there is an abundance, you can create a market. As long as that supply is there, the market will flourish.

**Raymond Palombo**

Raymond Palombo was one of the first lobstermen to realize lobster pots could be utilized successfully offshore on the continental shelf lobster grounds. Because of Newport’s close proximity to those grounds, its offshore lobster industry grew quickly during the 1970s. Mr. Palombo was part of that lucrative growing industry.
Palombo was involved in the fishing industry during all of his working life. He had extensive experience working in inshore and offshore fisheries outside of Boston. His manuscript is filled with descriptions of those fisheries as well as his deep concern about the depletion of most fish stocks. He was extremely knowledgeable about the reasons for depletion and said drastic measures must be taken to give fish stocks a chance to replenish themselves. Mr. Palombo’s stories about his occupation are interspersed with his rich and warm sense of humor and philosophy of life.

“I was naïve beyond anything you can imagine, because I had never dealt with dealers. I had always gone through a commission man, and he did all the dickering and everything. God knows what he was doing, too. I don’t know what he was getting for a kickback. They all played it so the first time I sold, I went up to this ... he was the buyer for Great Atlantic Fish, which was one of the big buyers of Boston. He, at this time, wanted flounder, so I gave him all my flounders. When he got through, he said, ‘Okay, Ray, what do I owe you?’ And to me it was a hodgepodge. People I didn’t know had taken fish from me. I was standing, and I was saying, ‘Oh gee, why didn’t I get a commission man?’ but you couldn’t. You had to do it on a board. This was a whole change. I looked at my slips and I added them up, and I says, ‘$3500.’ He says, ‘Ray, are you sure?’ And I says, ‘No, I guess I ain’t.’ ‘Oh,’ he says, ‘You know, it’s criminal. I don’t feel like taking candy away from a baby. You are so dumb it ain’t even funny.’”

“So by now he’s got me shaking. I says, ‘Well, all right, smart guy. What did I earn?’ He says, ‘$7000. I’m not supposed to tell you that. Ray, you know what my job is up here? My job is to steal my week’s pay every day ... [If I don’t tell you that] there’ll be somebody here worse than me doing it. It ain’t going to stop if I go. I’ll tell you once, but I’ll never tell you again. Remember what my job is.’”

“And he stayed [in his office] with me, oh, probably till eleven o’clock at night. And he’s telling me the different things that I had to watch. Well, I wrote them down, but it took me the longest while before reality took over. But I never forgot that guy.”
The first and most important step in preparing a delicious seafood dinner at home, says Chef Normand Leclair, happens before you even bring the fish home from the market.

“Try to find the best, freshest seafood. In Rhode Island we’re very lucky—we have some very reputable fish markets,” he says, but adds that customers shouldn’t be afraid to ask the attendant at the seafood counter, “Can I just smell this for a minute?”

Leclair, chef-owner of the Red Rooster Tavern in North Kingstown for over 40 years, held a cooking demonstration at the Narragansett Community Center in July, and prepared bluefish, a fish that some consider an acquired taste.

“Everyone liked the bluefish,” he says. For dark-fleshed fish, like bluefish, the key is finding a fish that is no more than one to two days old, he says, as dark fish “turn” quickly.

Once your fish is home, Leclair advises removing it from the fridge a half hour or so before cooking. The colder the fish, the longer it takes heat from the pan or oven to reach the inside—meaning that the outside of the fish will cook more rapidly than the inside, potentially drying it out.

The next step is to take care to not overcook the fish. In the case of fish such as tuna, “People are afraid to see it pink,” he says, “cook it until it just firms up to your fingers.” The time will vary depending on the thickness of the fish.

As for the recipe itself, Leclair says the best choice is one that you and your family will enjoy. To that end, his cookbook Culinary Expressions includes 25 recipes for salmon alone. At his restaurant, he says he always prepared a given fish special three ways—one very simply, perhaps with some lemon butter, another “a little more adventurous,” and a third with “an outrageous sauce.”

While he recommends adding some flavor to milder fish, “with a good, good fish, the simpler the better.” Asked about his own favorite fish, Leclair demurs. “Whatever’s fresh. It’s all good in its own way.”

Chef Normand Leclair travels throughout Rhode Island offering cooking lessons, demonstrations, and talks at libraries, schools, and nonprofit organizations. He has offered an annual seafood cooking demonstration at the Community Lecture Series sponsored by Rhode Island Sea Grant, the URI Cooperative Extension/Nutrition and Food Sciences Department, and the R.I. Coastal Resources Management Council.

Recipes from his book Culinary Expressions are reprinted here with permission.

To order, go to www.culinaryexpressionscookbook.com, or send a check for $19.50 to Culinary Expressions to Normand Leclair, Box 309, W. Kingston, RI 02892.
**Crumbed Cod (Scrod)**

Serves 2

1 lb. cod, skinned, checked for bones, cut into two servings
½ cup wine or fish stock [clam juice can also be used]
2 teaspoons fresh lemon juice
½ cup seasoned bread crumbs
dash of paprika
1 teaspoon butter

1. Select an ovenproof casserole dish large enough to contain the cod side by side.
2. Place skinned cod in casserole dish, skin side down. Add wine or fish stock. Top cod with lemon juice, spread crumbs on cod evenly, sprinkle with paprika and dot with butter.
3. Bake in a preheated 400°F oven for 20 minutes.
4. Remove cooked cod from casserole dish to heated plates with a spatula.

**Feta and Vegetable Cod**

Serves 2

1 lb. cod, skinned, checked for bones, cut into two servings
1 tablespoon olive oil
½ cup chopped onion
½ cup thinly sliced green bell pepper (cored, seeded)
1 garlic clove, minced
½ cup sliced mushrooms
1 cup canned diced tomato (or diced fresh tomato, seeds and skin removed)
¼ teaspoon dried oregano
¼ cup chopped fresh parsley
pinch of red pepper flakes
½ cup fish stock or water [clam juice can also be used]
½ cup crumbled feta cheese

1. Heat olive oil over medium heat in a skillet, sauté scallions for a minute, then stir in minced garlic, mushrooms, and sliced peppers. Cook for about 1 minute. Stir in diced tomato, oregano, parsley, and pepper flakes. Simmer for about 5 minutes over medium heat, stirring occasionally. Cool.
2. Select an ovenproof casserole dish large enough to contain the cod side by side.
3. Spread tomato sauce on and around cod and top with feta cheese.
4. Bake cod in a preheated 400°F oven for 20 minutes.
5. Remove cooked cod from casserole dish to heated plates with a spatula. Spoon the tomato sauce on and around cod.
Cookbook offers (flavor)full story of scallops – from research to recipes

Monica Allard Cox
Communications Manager
Rhode Island Sea Grant

Karin Tammi was a victim of her own success. Her project, along with municipal efforts, to restore bay scallops in the Westport River in the mid-1990s had taken an area that had not seen a scallop season in nine years to harvesting truckloads within three years. As a graduate student working on the Westport Bay Scallop Restoration Project, Tammi, along with her colleagues, ate a lot of scallops.

“We had so many scallop dinners, we got sick of the same recipes,” she says. The group started to collect a few new recipes to try, and Tammi’s mother Elaine offered to type them up, with the idea they could be collected into a little booklet for holiday gifts.

“Karin, you should write something about the biology of a scallop,” her mother suggested. They soon decided to include some photos, and a real cookbook was born. It was not, however, an instant success.

As members of the Women’s Fisheries Network the Tammis’ had Julia Child’s address, and she and her mother wrote to her about their cookbook idea. She replied, Tammi says, and that began a correspondence that lasted until Child’s death in 2004. Child encouraged them, saying, “It is wonderful that you are writing a cookbook devoted to [scallops] and I wish you great success with it.”

They shopped the manuscript off to numerous publishers, and collected a series of rejection letters.

Child sent the preface of the manuscript off to her editor, food icon Judith Jones at Knopf, without the authors’ knowledge. Jones replied, “The book sounds promising—a one-of-a-kind.” She went on to explain that Knopf generally moved away from publishing single ingredient cookbooks and was choosing manuscripts with a wider interest. But she also suggested, “In the meantime, it is important that you make your names known as the authorities of the subject and submit portions of the manuscript to food magazines.”

“We persisted, took their advice, and continued on,” Tammi says. In the meantime, they continued to test recipes and to develop the story of bay and sea scallops, their fisheries, and management. “I interviewed anyone who wanted to talk about scallops,” Tammi says. The book includes contributions from 20 professional chefs, home cooks, friends who were recipe testers, hatchery managers, and scallopers.

“Consumers will get an appreciation of the cultural heritage of the sea scallop industry as well as the bay scallop industry,” Tammi says, “but I wanted people to understand sustainable anything is going to be a challenge.” She says she wants people to appreciate how precious these local delicacies are: “We’ve got to treat these [scallops] like Champagne coming out of the Champagne region.”

“As we put this cookbook together,” Tammi says, “the sea scallop industry was in shutdown mode as were all the fisheries in the northeast. Over 10 years of developing this manuscript, sea scallops experienced resurgence due to strict regulations imposed on the fishery—now the stocks are doing very well.”

Efforts to restore the fishery involved measures including the development of a “kinder” dredge, and numerous vessel changes including the number of people allowed on a vessel, the number of days at sea vessels are allowed, and dredge modifications. Tammi says that the sea scallop fishery is the greatest wild-capture fishery remaining in the U.S. and one of the best managed sustainable fisheries in the world, and is undergoing review by the Marine Stewardship Council to be recognized as an eco-labeled sustainable seafood product.

Now, Tammi says, “the sustainable harvest of sea scallops out of New Bedford is between $200 million to as high as $350 million dollar range.”

Today, Tammi manages the Luther H. Blount Shellfish Hatchery at Roger Williams University. She and her mother, a retired teacher, are “enjoying the whole ride” of being new authors, including doing book signings and tastings throughout Rhode Island and Massachusetts. And they are considering a future project, perhaps a children’s book.

“There’s a lot of opportunity for other ideas to come along,” Tammi says, “the subject matter is not done.”

After all, what surprises some of their readers most, she says, is that this “is a mother–daughter cookbook. We did it over 15 years ... and we didn’t kill each other!”

Scallops: A New England Coastal Cookbook by Elaine Tammi and Karin Tammi, published by Pelican, is available from Barnes & Noble, Amazon.com, and local independent bookstores. More information about the book, the authors, and upcoming appearances, is on-line at scallopcookbook.com.
Karin’s Seared Scallops  
Serves 4

Parchment paper  
1 lb. sea scallops, trimmed, rinsed, patted dry, and left whole  
Sea salt and freshly ground pepper  
4 tbsp. clarified butter  
2 cloves garlic, chopped  
2 tbsp. Italian parsley  
1 lemon cut in wedges  
Large 12-in. searing pan or cast iron skillet  
Cinnamon (optional)  
Cumin (optional)

Place scallops on sheet of parchment paper.  
Sprinkle scallops with salt, pepper, and optional seasonings (if desired) on both sides to lightly coat.  
Heat large searing pan over medium-high heat about 1 minute.  
Add the clarified butter and swish to coat the bottom of the pan.  
Continue to heat until butter turns golden brown.  
Add scallops but do not crowd them.  
Cooking time may vary between 2 to 5 minutes per side, depending on size of scallops.  
Turn scallops with tongs one at a time. Turn only once, but caramelize on both sides, forming a nice crust.  
When scallops are seared, add parsley and garlic to pan.  
Watch carefully; do not burn garlic. You may use other herbs such as cilantro, chives, or basil according to your taste.

The science behind seafood salad

Liz Gamez  
Communications Intern  
Rhode Island Sea Grant

Whether strolling your grocer’s aisles or enjoying your California roll, chances are good you’ve encountered imitation crab meat before. But just what is it, anyway? Fish paste products known as surimi have a centuries-long history in Japan, and arrived in the West in the 1980s after the advent of industrial production technology in the early 1970s. Many types of surimi are enjoyed in Asia, but in the U.S. it is almost always found in the form of imitation seafood. Today, imitation crab, or “krab” as it is commonly known, is used in many dishes including seafood salad and stuffing, as well as sushi.

The development of modern production methods was intended to strengthen Japan’s fish industry and food security amidst declining catches as well as help ease the impacts of the oil and financial crises of the 1970s. These adversities inspired innovations in nutrition research and development to stretch production from seafood resources. Originally, the surimi industry relied heavily on inexpensive Alaskan pollock, but with pollock’s increased popularity as a fish unto itself (and as the McDonald’s Filet-o-Fish for that matter), the variety of species used has expanded and can include cod, tilapia, and even shark.

In the surimi-making process, lean white fish is minced, then rinsed repeatedly to remove odor, debris, and enzymes that can speed fish spoilage. The mince is then pulverized, pressed, and treated with a natural binder, then seasoned with sugar, salines, and flavorings such as crab extract. Often other ingredients are added to the mix to improve or customize texture, and can include egg, soy, and starch. Many products also include an antioxidant naturally found in crab, lobsters, and shrimp—called astaxanthin—for color. The surimi can then be molded into the desired shape, often taking the form of crab legs or lobster tails.

Unlike most processed meat products, the chemical additions made to surimi are mostly naturally derived, like the astaxanthin colorant. The binder that helps surimi hold texture is produced by fermentation of a harmless bacteria, and cryoprotectants that are added to frozen surimi products are mostly sugar (sucrose and sorbitol). This stands in contrast to beef- and pork-based processed foods, which may contain large amounts of preservatives like nitrates and have much higher fat and sodium contents.

It may be no Maryland blue crab, but surimi technology continues to improve and create increasingly convincing products, saving untold crustacean lives. Imitation crab has proven to be a key advancement in food processing technology, and has managed to please the complicated and fickle American seafood market. Just as importantly, it offers the advantages of a low price, conversion of food that otherwise might be wasted, conservation of wild crustacean fisheries, and a growing, profitable industry where there was none before.
What does ‘sustainable’ seafood mean?

Jeremy Collie
Professor of Oceanography
URI Graduate School of Oceanography

The term “sustainable” means different things to different people. In the context of U.S. marine fisheries, precise definitions can be found in the National Standards of the Sustainable Fisheries Act.

National Standard 1 requires fish stocks to be sustained by preventing overfishing while achieving optimum yield. Optimum yield is the amount of fish harvested that will provide the greatest overall benefit to the national economy, particularly with respect to food production and recreational opportunities, and taking into account the protection of marine ecosystems.

National Standard 8 relates to socio-economic sustainability, taking into account the importance of fishery resources to fishing communities, and provides for the sustained participation of those communities in fishing efforts. It seeks to minimize adverse impacts to those communities.

Besides the legal definitions of biological sustainability, there are additional components of sustainability related to the efficiency and carbon footprint of fisheries.

For example, safe and sustainable seafood is also part of the local foods movement. Locally caught seafood provides fresh products to consumers and restaurants, while minimizing carbon emissions and transportation costs. Locally caught seafood should be biologically sustainable, but the two concepts are not the same (see illustration on right).

Good examples of local and sustainable seafood in Rhode Island are summer flounder and farmed mussels. Wild Alaska salmon is managed sustainably, but the fisheries are located far from markets. A certain amount of Alaska salmon is taken in subsistence fisheries but economically viable commercial fisheries for Alaska salmon require transportation to markets.

Conversely, bluefin tuna is caught locally but there is concern about the sustainability of bluefin tuna stocks. Likewise there are conservation concerns about the sustainability of orange roughy, which is caught in the southern hemisphere and transported to markets in the north. While local, sustainable fisheries are desirable, geographic realities also require sustainably caught seafood to be transported from fishing grounds to consumer markets.
Emerging market approaches to seafood sustainability

Samuel Grimley
Sustainable Seafood Project Coordinator
Gulf of Maine Research Institute

The sustainable seafood movement has grown exponentially in recent years, with consumers becoming more concerned about the impacts of their seafood buying decisions. Simultaneously, many non-government organizations (NGOs) and academic institutions, as well as seafood harvesters, processors, and suppliers, are working to improve the sustainability of fishery resources while providing consumers with information on sustainable seafood. Because of the complexity in defining sustainability, it is often perceived as a moving target—only obtainable by continuously implementing practices that decrease negative impacts on the environment, such as overfishing or damage to seafloor habitats.

The marketplace has implemented a wide variety of approaches to reward and motivate sustainability in the seafood industry. Historically, boycott campaigns, such as the National Resources Defense Council’s 1998 “Give Swordfish a Break,” have been used to deter consumers from purchasing seafood from unsustainable sources. Some groups, such as Monterey Bay Aquarium and Blue Ocean Institute, offer wallet cards—or red, yellow, green lists—to aid consumers with seafood buying decisions.

While these approaches have brought needed attention to sustainability issues, recently developed alternative sustainability initiatives seek to differentiate among fisheries that may be more sustainable in one region, or to recognize fleets that are striving to curb bycatch or protect habitat.

An emerging trend—known as the Fishery Improvement Project or FIP—focuses on supporting fisheries as they improve harvesting practices. NGOs, such as Sustainable Fisheries Partnership and World Wildlife Fund, work directly with seafood buyers and retailers to develop and implement plans to improve the ecological sustainability of fisheries. Another example is the Gulf of Maine Research Institute’s Gulf of Maine Responsibly Harvested seafood branding program, which requires participants to make annual commitments that improve upon the sustainability of the seafood industry. These efforts give buyers sustainable options for sourcing from the fishery, while reducing economic damage to the fishing industry.

Sustainability is dynamic and complex. There is no single market approach that guarantees seafood sustainability, but the evolution of efforts that are proactive and multifaceted, while responding to the needs of local communities and cultures, holds great promise. ■
Interest in sustainable seafood is growing, but the term “sustainable” can be difficult to define succinctly and often consists of multiple elements. At one level, it has long been a national goal in the U.S. to have all domestically produced seafood be biologically sustainable. Under the 1996 reauthorization of the Magnuson-Stevens Act (also known as the Sustainable Fisheries Act), Congress increased emphasis on sustainable fishing. Then in 2006, Congress again acted to strengthen this emphasis by mandating that all regions of the country operate under scientifically determined catch limits designed to ensure that the use of these fishery resources is sustainable.

Related to this focus on biological sustainability have been efforts focused on creating marketing labels or wallet cards to guide consumers to purchases of “sustainable” seafood. The most widely known of the labeling efforts is that by the Marine Stewardship Council (MSC). While the MSC is recognized by many as having the most extensive criteria and evaluation process of available branding programs, some MSC assessments have received criticism for certifying certain fisheries not considered sustainable by alternative standards. The New England Aquarium and the Rhode Island Fishermen’s Alliance are examples of local groups that have developed regional sustainable seafood lists.

In addition to sustaining fish stocks, there is also the consideration of economic sustainability of the seafood industry itself. The saying “no fish, no fishery” captures the link between sustaining both the fish and their local marine environments, and local seafood harvesters is itself something to be nurtured and sustained. Local examples such as The Local Catch in Narragansett are similar in spirit to efforts in the U.K. (Southwest Handline Fishermen Association, Cornish Native Oysters). These niche-marketing efforts are dependent on consumers who have an affinity for supporting their local fishermen and markets. The inherent intimacy involved may prove difficult to sustain at the larger volumes needed to provide a protein source to a growing population. That is, the seafood industry has many scales of operation operating simultaneously and while small-scale approaches are not inherently in competition with the large-scale end of the spectrum, sustainability efforts for one scale may not be transferable to another scale. One local attempt to reach a larger market and greater revenues through the local food...
DEFINING SUSTAINABLE SEAFOOD

movement is the Trace and Trust effort, comprised of a group of vessels in Point Judith that sell directly to New England restaurants seeking locally harvested seafood.

In regards to management of fisheries resources, the trend to adopt management tools known as catch shares is regarded by some as a key step towards both biological and economic sustainability. Catch shares involve pre-assigning catch to fishing operations, who can then harvest their allocation or buy/sell/lease these assignments on an open market. If the overall catch is set and enforced at a biologically sustainable level, then sustainability should be attained. In addition, pre-assigning catch can permit more rational business planning and increase operating efficiency thus enhancing the sustainability of those operations holding shares. But catch shares are not without controversy and some question whether a system that concentrates benefits on a few can be considered sustainable from the perspective of sustaining a broader fishing community through generations.

Finally, in the world of post-peak oil production, it can be argued that no vision of seafood will be truly “sustainable” in the future without addressing the carbon footprint of seafood supply. While the local food movement mentioned above to some extent addresses the “food miles” component, the carbon consumed during the actual harvest, processing, and distribution of seafood has received less attention compared to other aspects of sustainability. Currently, collaborative efforts between fishermen and scientists in the New England region are focused on modifying fishing gear to increase fuel efficiency [NH Sea Grant, GMRI]. A more holistic approach known as life cycle assessment (LCA) involves evaluating ecological impacts, including carbon emissions, along the entire seafood supply chain. Of course, the biggest piece of “gear” is the fishing vessel hull design itself. Radical efforts to rethink the hull/carbon linkage have sprouted up domestically and abroad (Phil Bolger and Friends, James Wharram Designs, and others) but have yet to take hold.

Clearly sustainability in seafood extends beyond the biological elements, and also consists of a multitude of social, economic, and environmental dimensions. Despite the complexity of these individual elements, the sustainable seafood movement continues to grow and progress as these issues are explored and addressed.
Seafood and health:
Your questions answered

Lori Pivarnik
Coordinator, Nutrition and Food Sciences, Food Safety Outreach/Research Program, University of Rhode Island
Rhode Island Cooperative Extension and Sea Grant Extension Specialist

The USDA’s 2010 Dietary Guidelines, released earlier this year, for the first time recommend that Americans eat a variety of seafood, and more of it—at least 8 to 12 ounces (two servings) per week as part of a healthy diet. The MyPlate icon at USDA’s MyPlate.gov website illustrates the variety of seafood—fish, shellfish (e.g., oysters, clams) and crustaceans (e.g., shrimp, lobster)—that all consumers can choose from to help fulfill the protein requirement for a balanced diet.

Science has shown that seafood, high in the long-chain omega-3 fatty acids (DHA and EPA), has proven health benefits: reduction in the risk of heart disease, protection against sudden heart attack and death, and contribution to the brain, eye, and immune system development of infants and children. These omega-3 fatty acids are not the same as those that come from plants (e.g., flaxseed, walnuts). DHA and EPA provide far more health benefits, and are only found in seafood (particularly higher fat seafood, such as salmon and mackerel). Seafood is also low in calories, low in saturated fat, and is a great source of B-complex vitamins, vitamins A and D, and minerals such as zinc, iodine, iron, and selenium.

So why are Americans actually eating less seafood?

The latest seafood consumption data show that Americans are eating the lowest amount of seafood since 2002. There may be many reasons, including uncertainty about how to prepare and handle fish or how to choose quality product, or the price. However, one of the major reasons may be confusion due to some of the misleading or inaccurate information concerning the risks of seafood.

Overwhelmingly, science has shown that the benefits of eating seafood greatly outweigh the risks. For example, most consumers have heard of mercury and, perhaps, some other contaminants. For most people, the risk from mercury in fish and shellfish is not a health concern, while certain “at-risk” groups need to be aware that four or five species, of the over 300 species available in the market, are considered high in mercury and should be avoided. However, many people don’t know that the top commonly consumed seafoods in the U.S. are low in mercury and present little risk while offering numerous benefits. In fact, many times a pregnant or nursing mother has been told by her physician not to eat any seafood due to mercury contaminants and that seafood consumption would hurt her baby. And many times consumers have been told not to eat any aquacultured (farm-raised) seafood due to issues related to contaminants or chemical additives even though the information is wrong or misleading.

Meanwhile, sport fishermen and their families do not always understand that while their catch might be fresh, the inland waters where the fish were caught could contain far more contaminants than ocean waters, and all states have advisories about specific waters and the fish and shellfish that come from them.

Consumers can find answers to their questions about eating seafood at the newly launched website www.seafoodhealthfacts.org. This user-friendly, comprehensive site presents balanced information and contains downloadable brochures for healthcare professionals and consumers. The site includes information on seafood nutrition, the benefits of seafood consumption, seafood safety, risks associated with certain types of seafood, comparison of risks/benefits of seafood consumption, seafood supply in the U.S., and answers to commonly asked questions.
Mystery fish: Seafood mislabeling common, report finds

Julia Wyman
Staff Attorney, Marine Affairs Institute, Roger Williams University School of Law and Rhode Island Sea Grant Legal Program

When shoppers go to the grocery store or to a restaurant, they expect that the item they choose to purchase is the one they receive. However, that is not always the case with seafood, according to a new report that says over a third of fish marketed to consumers may be mislabeled.

A recent report by the conservation group Oceana, Bait and Switch: How Seafood Fraud Hurts Our Oceans, Our Wallets and Our Health, indicates that seafood mislabeling is a common occurrence; between 1988 and 1997, National Marine Fisheries Service (NMFS) data showed that approximately 37 percent of fish and 13 percent of shellfish and other seafood was mislabeled. Another review of labeling found misidentification on more than one-third of fish, while yet another report indicates that one-quarter of fish tested in the U.S. and Canada are mislabeled. What does this mislabeling mean for average consumers?

First, it means that they are likely paying for a more expensive fish than they are receiving. Pricier, sought-after fish like red snapper may be replaced with less-expensive tilapia. Consumers may believe they are purchasing wild salmon and be willing to pay a higher price for the fish, when in fact, they are purchasing farm-raised salmon.

Second, this mislabeling can lead to human health risks. Consumers who don’t know the species or origin of the fish they are purchasing may be exposed to contaminants, pathogens, and allergens that can cause issues such as food poisoning, neurological symptoms, and anaphylactic shock.

Third, it means that regulation of protected fish species may be circumvented. Mislabeling indicates there is not proper oversight and regulation of seafood inspection and labeling. In fact, according to the Government Accountability Office (GAO), while the majority of seafood in the United States is imported, only two percent of it is inspected. While much of the mislabeled fish are in fact of a more thriving species, inadequate inspection and oversight can raise risks of overfishing of more threatened species.

There are also great legal consequences to seafood mislabeling. The Lacey Act prohibits trade in wildlife, fish, and plants that have been illegally taken, transported, or sold. Civil and criminal penalties apply to those that violate the Lacey Act.

The increased focus on seafood mislabeling in the news and in the courts is an encouraging movement toward proper, effective seafood labeling. Moving forward, research on the current process of seafood labeling will be necessary to identify gaps in the current system and identify corrective measures, including law and policy changes, that can be taken to reduce seafood mislabeling.
Rhode Island shellfish aquaculture poised to expand

Barry A. Costa-Pierce
Director
Rhode Island Sea Grant

Rhode Island could see significant growth in its shellfish aquaculture industry at a time when demand is on the rise.

U.S. consumption of mussels is skyrocketing. Americans import about 42 million pounds a year, more than 10 times what we produce. Canada’s Prince Edward Island exports most of its mussels to the U.S., employing about 130 mussel farmers who farm approximately 11,000 acres and produce some 37 million pounds a year.

However, mussel farming in Rhode Island and southern New England could readily compete with that of Prince Edward Island, especially in terms of quality. Local waters are rich in the plankton and particles in the water (called detritus) that feed mussels and other shellfish. They are also warmer, so that mussels growing here take just 10 to 12 months from seed to market, a process that takes twice as long in Canadian waters.

Bill Silkes is president and owner of American Mussel Harvesters, a shellfish processing and marketing company, in North Kingstown, and owner of Salt Water Farms in the East Passage of Narragansett Bay off Aquidneck Island. Silkes is involved in a Sea Grant National Strategic Investment grant to expand mussel farming offshore. Silkes is working with a team of Rhode Island and Massachusetts fishermen, scientists, and staff from the University of Rhode Island, the Marine Biological Laboratory in Woods Hole, and the R.I. Coastal Resources Management Council on a mussel farming project in the waters off Newport, Block Island, and Massachusetts. He says that “farming mussels in Southern New England has the most immediate return on investment in terms of economic development” for creating significant employment and economic opportunities.

He adds that cultivation of seaweeds for “sea vegetables” is also an area of potential growth. “We have a number of chefs that say they are interested, and we have sent out 30 pounds of samples for feedback. What it means to me is there is a lot of interest in seaweed in the marketplace.”

Research shows that oyster cultivation as well could be increased substantially in Rhode Island. Former URI graduate student Carrie Byron (see article on page 29), found that the biomass of cultured oysters could be increased 625 times current levels for Narragansett Bay and 62 times in Rhode Island’s coastal lagoons (salt ponds) before the ecology of these ecosystems would be affected. For Narragansett Bay, such an expansion would translate to about 218 million pounds of farmed oysters each year, an amount that is about four times the total estimated annual harvest of fish in the Bay. Byron’s “socio-ecological carrying capacity” approach to aquaculture takes into consideration not only these figures and rigorous ecological modeling, but also a stakeholder process. With the efforts of these promising scientists and innovative businessman/farmers and others, Rhode Island has a great deal of opportunity for growth in sustainable aquaculture.
An ecosystem has a natural capacity to support a certain number of individuals in a population. For instance, a coastal lagoon, or salt pond, with its bottom habitat and the nutrients flowing through it, can be home to a given number of shellfish. Human activities such as fishing, farming, transportation, development, and recreation can impact that natural capacity.

These dynamics require a compromise between maintaining natural biological integrity of the ecosystem while at the same time utilizing or extracting resources needed by society. Rhode Island’s salt ponds are of particular concern due to their biological importance to many species as well as the high number of people using them.

One of the many uses of these salt ponds is shellfish aquaculture. A survey of users of R.I. salt ponds showed that 50 percent of respondents were ill-informed about aquaculture and 75 percent of respondents incorrectly believed it was illegal to fish or boat inside areas leased by aquaculture operations, which may contribute to feelings of exclusion from public-trust lands.

The R.I. Coastal Resources Management Council (CRMC), which regulates the ponds, recently undertook a project to combat feelings of exclusion and to determine acceptable levels of continued aquaculture growth. The CRMC Working Group on Aquaculture Regulations, a diverse stakeholder group, underwent a multi-year series of deliberations to verbally negotiate and scientifically calculate that optimum compromise between biological integrity and social equity. To arrive at this figure, stakeholders first had to decide how much change in the system they were willing to accept, if any at all. These changes included biological metrics, such as water quality or stability in the food web, as well as feelings of equity among users and across different uses of the system.

After determining acceptable levels of change, a carrying capacity value for aquaculture was calculated using ecosystem modeling. The resulting models suggest that the current levels of aquaculture are highly sustainable and could even increase 62 times in the salt ponds before causing any significant change to the biology of the ecosystem. Collaborations between scientists and stakeholders greatly improved the models as well as the stakeholders’ understanding of the science and acceptance of the results, thereby combating feelings of exclusion.

This relatively new approach to determining sustainability requires that societal values and perceptions are considered together with biological thresholds, and helps ensure that the management measures that come out of the process receive more widespread support.

For more information see:


Less tension, more growth: Reducing user conflicts over the expansion of shellfish aquaculture

Barry A. Costa-Pierce
Director
Rhode Island Sea Grant
Professor of Fisheries and Aquaculture
University of Rhode Island
As in many other crowded coastal areas, user conflicts over the use of Rhode Island’s coastal lagoons (salt ponds) for shellfish aquaculture have typically concerned two issues. The first is that when a shellfish farmer receives a lease from the state for acreage on the pond bottom, that area is no longer available for use by wild shellfish harvesters, though it can be fished by recreational fishermen using the water column. The second is that the leased area is perceived to be off limits to other uses, such as boating or diving.

However, a number of recent developments, including both technological advances as well as an improved understanding of shellfish aquaculture, are converging to help solve these conflicts.

For instance, shellfish growers have developed new submerged gear—such as racks and bags for off-bottom submerged farming of oysters, and upwellers for nursery stages of shellfish placed under floating docks. This makes their operations less obtrusive in the water, and makes it easier for other users to traverse the area. And scientific findings are showing that shellfish aquaculture, when well managed, can provide solid environmental benefits, such as improving water quality by filtering nutrients and particles from the water and providing habitat for fish and other marine life. Also, as more wild harvesters are diversifying by turning to aquaculture for some part of their livelihoods, traditional animosities between shellfishermen and shellfish growers are receding.

To further improve relations between local communities and aquaculture operators, the R.I. Coastal Resources Management Council has long convened a working group on aquaculture regulations that has recently looked at the “social carrying capacity” for aquaculture in comparison with the ecological carrying capacity—meaning that the shellfish production in an area can be limited not only by concerns over its impacts on the ecosystem, but also by societal factors—its social acceptability. This new combined socio-ecological approach to the development of shellfish aquaculture is described by Carrie Byron in her article on page 29.

Rhode Island is poised for major expansion in its shellfish aquaculture industry. Resolving user conflicts is key to managing this growth in a way that benefits the economy, the environment, and the communities around Rhode Island’s salt ponds.
Rhode Island Sea Grant Research and Outreach News

As sea levels rise, towns map future flood zones

Meredith Haas
Rhode Island Sea Grant Research Communications Specialist

Homes, community facilities, and public areas in Rhode Island coastal communities may be at risk for increased flooding, and some properties may end up underwater due to anticipated sea level rise in coming decades.

A 3- to 5-foot rise is anticipated for the state by 2100, according to the R.I. Coastal Resources Management Council (CRMC). This poses a high potential for increased flooding, damage of infrastructure and property, contamination of drinking water through salinization, as well as displacement of coastal residents.

"Sea level rise is happening now," said Pam Rubinoff, coastal management extension specialist for Rhode Island Sea Grant and the URI Coastal Resources Center (CRC) at a meeting sponsored by Save the Bay, Rhode Island Sea Grant, and CRC on the outcome of the first phase of a pilot project focused on mapping vulnerable assets, such as roads and residential homes, in response to projected sea level rise. "We don’t need to wait 50 years to see the impacts."

The anticipated changes in sea level will affect nearly 1 million residents and thousands of businesses in Rhode Island’s 21 coastal communities. The degree of impact, however, will vary in each community depending on elevation, geographic features, and development patterns. For example, shorefront areas at lower elevations that are highly developed, such as the port of Galilee, will see greater impacts from sea level rise than areas like Block Island that have a higher elevation and where development is set back further from the coastline.

Forecasting these changes is a complex and evolving science that has created much confusion around the seriousness of impacts and how and when to plan for them.

"There are still many uncertainties based on a variety of factors. These include the relation between air temperature and solar radiation and its effect on sea ice, expansion of the oceans, glacial melt, ocean current dynamics, and local land subsidence," said Rubinoff. "While these relationships are still being understood, we’ve been seeing acceleration in sea level rise over the past 20 years at our Newport tide gauge."

While it may be uncertain how fast sea level will rise, there is no uncertainty that coastal communities will experience adverse impacts.

Wickford Island?

In a year-long effort, Rhode Island resource managers, planners, and scientists have come together to develop high-resolution maps that show potential impacts of various sea level rise scenarios. These maps were created as part of a pilot project in North Kingstown to identify vulnerable assets, as well as impacts on coastal wetlands, which are important buffer zones protecting coastal areas. The town of North Kingstown provided data on local property and building values to quantify potential impacts.

Threats from increasing sea level rise have Rhode Island coastal communities looking at the future and planning for future challenges. Wickford is one community in North Kingstown at particular risk to sea level rise.

...continued on page 34
Sea level rise visualization for Wickford shows how a projected 3 feet of sea level rise (left) and 5 feet of sea level rise (middle) will combine with tides to cause flooding (right). Photos: Angela Wilson

Flooding at Wickford’s municipal parking lot. Photos: Teresa Crean (left) and Melissa Devine (right)
“We need to get policymakers to see the data and realize the reality of sea level rise,” said Jon Reiner, North Kingstown planning director. “People, unfortunately, need to see a few catastrophic events to make connections.”

The North Kingstown maps are available on Rhode Island Sea Grant’s website [see sea grant.gso.uri.edu/coast/slr_tools.html], along with similar maps for other towns. An important note to make is that the sea level rise scenarios indicated on the maps do not account for storm surges, which could increase sea level ranges from a foot to even 10 feet, as occurred in the 1938 hurricane.

“A spring high tide with a one foot increase in sea level will be at town hall,” said Reiner. “One basic issue we’ll face in North Kingstown, then, will be how to get to work every day.”

In addition to Quonset Point, “Wickford is particularly at risk,” said Reiner, explaining that sea level rise could potentially cut off Brown Street and the commercial waterfront on Main Street. “This is one of the denser areas, so the impacts will be much greater here. If we don’t plan now, Wickford will be cut off.”

Reiner further explained that identifying alternate transportation routes, especially for emergencies, is a top priority.

**Issues for Homeowners**

One factor that impacts residents right now is flood insurance rates. North Kingstown residents currently benefit from a five percent discount on National Flood Insurance Program premiums, which can be further reduced if homeowners increase their home’s freeboard, or elevate their homes above predicted flooding levels. While increasing freeboard elevation could be costly to homeowners initially, the long-term benefits include reduced risk of flooding and potential for a complete payback in reductions in flood insurance premiums.

“It’s hard to tell a homeowner that they may be in a flood zone and the potential costs involved,” said Gary Tedeschi, North Kingstown building and zoning official, explaining the benefits and challenges of building code changes that he thinks are necessary to adapt to sea level rise. “The problem is that sea level rise isn’t staring them in the face right now. The prospect of sea level rise 50 years down the road doesn’t greatly impact the older generations except those who want to pass their home on to their children.”

**Next Steps**

The next phase in the North Kingstown pilot project will be to refine the maps and implement adaptations by engaging town officials, staff, and residents to identify vulnerable assets, and prioritize areas in need of retrofit, capital improvement, and long-term management.

Adaptations include infrastructure improvement and integrating sea level rise into the town’s hazard mitigation and comprehensive plans, as well as building codes and zoning ordinances.

“It’s been a great partnership and very applicable to other towns,” said Reiner.
Enhancing Newport Harbor Walk

Sue Kennedy
Coastal Management Communications Specialist
URI Coastal Resources Center/Rhode Island Sea Grant

A community-based effort to improve the Newport Harbor Walk is progressing and is part of an overall effort to enhance the city’s waterfront economic and social assets.

“We keep giving the tours, and people keep coming—we know how important the harbor walk is to many people,” says Jim Perrier, president of Newport Friends of the Waterfront (FOW), a stewardship group.

The nearly 2-mile walk skirts the harbor and features a wealth of historical, cultural, and visual attractions. Yet several hundred years of urban development and environmental wear-and-tear have presented barriers to linking portions of the path, making it challenging at times for walkers to both find and use the harbor walk.

The city, FOW, and some local businesses, community groups, and citizens are working with the URI Coastal Resources Center/Rhode Island Sea Grant (CRC/RISG) to enhance the walk. The project is focused on developing a slate of cost-effective, practical, and visually appealing improvements for the walk, such as complementary signage or plantings.

Teresa Crean, a CRC/RISG coastal community planner, says the project speaks to the larger need to ensure that Newport’s waterfront remains economically, socially, and environmentally viable for decades to come.

“Through this project, we are building the community’s capacity to actively participate in making their waterfront a vibrant and diverse place for long-term benefit,” says Crean.

Besides the harbor walk effort, work is also underway to help Newport review its waterfront regulations so policy reflects the latest economic and climate change information. CRC/RISG is funded both by the federal government and the Prince Charitable Trusts to work with the city and the community to protect and enhance Aquidneck Island coastal resources.

To learn more about the harbor walk, visit http://seagrant.gso.uri.edu/ai/nh_main.html.

Several entities are working to expand public access to the shoreline in Newport.

King Park
Water circulation plays a critical role in transporting necessary nutrients and flushing out pollutants from coastal ecosystems much in the same way that a digestive tract works to keep a body healthy and functioning.

“Understanding water circulation and dynamics is like understanding the lifeblood of an ecosystem,” says Barry Costa-Pierce, director of Rhode Island Sea Grant. “It is the foundation of a healthy marine environment.”

For coastal ecosystems, estuaries play a critical role in water circulation between freshwater sources from rivers and saltwater sources in the ocean. Runoff from agricultural or urban activities and its effect on estuaries has been the focus of research efforts by Christopher Kincaid, a professor and researcher at URI’s Graduate School of Oceanography.

As Rhode Island’s largest and most prized estuary, Narragansett Bay and its water circulation patterns and driving forces, such as wind and tides, have been the basis of Kincaid’s research, which has examined water circulation from the mouth of Narragansett Bay all the way up to the Providence River.

Narragansett Bay has been described as a partially to well-mixed estuary with freshwater inputs from the Providence and Taunton rivers, but Kincaid’s most recent research efforts question whether water flowing in and out of Narragansett Bay does completely mix and flush in a uniform fashion as once thought. This hypothesis is based on the discovery of two large-scale gyres observed in Greenwich Bay and Edgewood shoal in Cranston, two subsystems of the Bay that experience chronic water quality problems. These gyres create a localized current system that retains water for longer periods of time than observed in the rest of the Bay. Poor water circulation resulting from these gyres appears to be related to conditions of extreme hypoxia, or low dissolved oxygen levels associated with massive fish kills such as the one observed in Greenwich Bay in 2003 when millions of dead fish, primarily juvenile menhaden, littered the shore.

“Narragansett Bay is known to be susceptible to severe low oxygen events and related fish kills,” said Kincaid in a presentation at Rhode Island Sea Grant’s research conference in March. “Past studies have indicated that hypoxia dynamics are dominated by aspects of circulation that control flushing rates.”

The biochemical processes for controlling oxygen levels are influenced by how efficiently water is circulated throughout the system. Narragansett Bay is dominated by two distinct north-south oriented passages referred to as the East and West Passages, which are long, linear channels connecting the broad, shallow regions of upper Narragansett Bay and Rhode Island Sound. These serve as conduits both for the flushing of nutrient-loaded waters of upper Narragansett Bay and the cooler, saltier, and less nutrient-loaded water from the sound.

In order to understand to the full extent the effects the gyres have on the general circulation pattern, acoustic current meters were used to produce detailed pictures of speed and direction of the flow of water in an area of the Bay. Colored dyes were used to trace source input (runoff from rivers or wastewater treatment facilities), dispersal, and accumulation. Resulting data served to create a more refined modeling system, known as the Regional Ocean Modeling System (ROMS), that allows researchers to view a system in three dimensions. Before, researchers used a more crude modeling method that could be described as looking at a pixilated and muddled picture.

Further research is underway to refine the ROMS modeling system in order to better understand the connections between water circulation, nutrient loading, and water quality throughout the Bay. Understanding these processes will help resources managers build more efficient strategies that will preserve the health of Narragansett Bay ecosystems.
Computer models are invaluable tools for investigating the dynamics of how water flows through coastal systems such as estuaries. Estuarine circulation is highly variable, depending on the interactions between the geology of the estuary itself and different environmental conditions, such as tides, river runoff, and atmospheric conditions such as wind. In situ (onsite) measurements, which are limited by the number of areas and amounts of time they can cover, are inadequate for obtaining detailed flow information. High-resolution computer models provide a level of detail that is unattainable from direct measurements.

The Kincaid lab has developed models for investigating Narragansett Bay using the Regional Ocean Modeling System (ROMS)—a three-dimensional hydrodynamic computer model that calculates currents and density structure. The model is widely used by the scientific community for a large range of coastal applications.

The FullBay Model of the ROMS used to study Narragansett Bay spans from the mouth of the Bay to Providence in the north. It encompasses Greenwich Bay, Mount Hope Bay, the Sakonnet River, and the East and West Passages.

Much has been learned from the FullBay Model output, for example identifying areas of inefficient flushing where water quality problems have persisted.

With further investigation, researchers using the FullBay Model hope to answer questions regarding how certain environmental conditions will impact flushing rates, and therefore, water quality.
Project offers guidance for communities planning renewable energy projects

Sue Kennedy
Coastal Management Communications Specialist
URI Coastal Resources Center/Rhode Island Sea Grant

A state effort to develop some solid guidelines for Rhode Island communities mulling entry into a relatively new arena—the siting of renewable energy facilities—is nearing its goal while it focuses thinking about solar, water, and wind projects.

The Rhode Island Renewable Energy Siting Partnership (RESP), under the auspices of the Rhode Island Office of Energy Resources (OER), is addressing issues of balance: how to incrementally lessen Rhode Island’s dependence on fossil fuels by strategically introducing renewable energy resources—while recognizing the need to protect critical social and environmental resources, and to foster a level playing field for effective and efficient government and private sector negotiations.

The goal of the RESP is to develop for the state a set of recommendations so municipalities have clear and science-based advice with which to make decisions about where to locate solar, water, and wind power structures. The state contracted the University of Rhode Island (URI) to conduct the work, from the scientific study to the community outreach to the drafting of the guidelines.

“We feel this guidance could be quite useful to the municipalities,” says Kevin Flynn, director of the Rhode Island Statewide Planning Program, which has been working closely with OER and the Rhode Island General Assembly to gather, evaluate, and organize renewable energy resources information for the state. “It’s a resource, but it’s up to the communities to decide if they want to use it or not.”

Beginning last October, scientists started the RESP work. They are collecting data from other places regarding how renewable energy resources facilities are created and monitored, and how they impact the human and natural environments around them. Researchers are also carrying out local experiments for homegrown information about such developments and effects.

The science is broad ranging and considers how energy structures would potentially interact with, impact, or be affected by weather, animal life—primarily birds and bats—and the lay of the land. It’s a lot for the public to think about and respond to, and that’s a primary interest for the state and URI.

RESP co-leaders Jennifer McCann, Rhode Island Sea Grant Extension director, and Marion Gold, director of the URI Cooperative Extension Education Center, say the project will bring forth the best scientific data to the public and will provide extensive opportunity for community dialogue and exploration of renewable energy resources issues.

McCann, who recently helped lead another large-scale state effort, the R.I. Ocean Special Area Management Plan (Ocean SAMP), which dealt in part with offshore renewable energy resources planning, has focused her team at the URI Coastal Resources Center/Rhode Island Sea Grant on addressing the RESP’s on-shore wind energy issues. Gold’s team, which has dedicated significant effort to exploring energy efficiency issues in Rhode Island, is addressing the solar and water-based renewable energy resources issues for the RESP.

As the science team brings forth the data, McCann and Gold are providing it to the public through a series of monthly stakeholder meetings. Participants—among them citizens, developers, energy advocates, wildlife proponents, and a wide range of state and local government staff and volunteer decision-makers—gather for the meetings, which are open to all. RESP staff have also brought members of the public on field trips to renewable energy projects, such as the Portsmouth Town Wind Turbine and the Thundermist hydroelectric plant in Woonsocket.

The RESP ends in March 2012, but project leaders say the resulting guidance is really just one more step to helping Rhode Island officials make wise choices when it comes to wind, solar, and water power opportunities.

“The goal is to help promote understanding among policy makers and the public regarding energy and its interaction with the economy and the environment,” says McCann.

“Additionally, the resulting analyses will compare Rhode Island energy performance to that of other states in the region and provide an accurate basis for future decision making,” adds Gold.

To learn more, visit the RESP at seagrant.gso.uri.edu/resp/index.html or join the list serve at RESP@listserv.uri.edu.
READER SURVEY

Please share your opinions of 41°N magazine. All respondents will be entered in a drawing for one of five $20 CVS gift cards.

How did you receive this issue of 41°N?

☐ On mailing list
☐ Friend/Colleague
☐ Picked up at event
☐ Other _______________________

Content

Are the articles

☐ too long  ☐ too short  ☐ just about right?

How much of the magazine do you usually read?

☐ a little  ☐ some  ☐ all, or most

What topics interest you the most? (select up to 3)

☐ Fish/Seafood
☐ Environmental/Coastal Health
☐ Climate Change
☐ New Research/Scientific Findings
☐ Economics of Coastal/Ocean Areas and Issues
☐ Coastal Recreation/Boating/Fishing
☐ Bay/Ocean Biology/Ecosystems
☐ Aquaculture/New Marine Businesses
☐ Social Science; Literature/Art
☐ Personal Histories/Profiles

Suggestions

Layout/Design

Do you like the current cover design?

☐ yes  ☐ somewhat  ☐ no

Do you like the graphics and layout?

☐ yes  ☐ somewhat  ☐ no

Suggestions

Contact Information (for prize drawing)

Name ____________________________

Address __________________________________________

E-mail ____________________________

Please mail in the postage-paid return envelope provided.
Oysters at Hemenway's Seafood Grill & Oyster Bar, Providence