shellfish interests...
paving a path for the future
Summer is here and waters are sparkling. That means it’s a perfect time to think about boating, swimming, clambakes, and shellfishing.

Shellfish have been part of our culture and tradition historically; they symbolize our connection to the estuaries and the sea. Did you know that the Eastern Oyster is our state shellfish?

Is there a New Englander who doesn’t recognize clams, oysters, scallops and mussels? —not in my acquaintance. In fact, many of us foodies treasure a special recipe for chowder that may have been passed down through the family. In mine, the bivalve gourmet delights are my husband’s clam chowder made with red potatoes (they don’t get mushy) and Great-Auntie Mamie’s oyster stuffing in the fall. I’m sure you have your own.

Fewer of us, perhaps, have thought about the opportunities for recreational harvesting in coastal towns, the people who are the lifeblood of commercial businesses, or the volunteers and managers who help keep these living resources thriving.

Whatever your particular interest in shellfish may be, we all have a stake in the future of these living resources. Thus, my colleagues and I here at Sea Grant have decided to devote this issue to the Connecticut Shellfish Initiative, an effort underway to plan for the future of shellfish and shellfishing in our state. You are invited to contribute your ideas.

We hope you enjoy this issue as much as the gentleman on our cover enjoyed digging clams!

Peg Van Patten

Peg Van Patten, editor

About our cover: Matt Radulski is delighted to be digging clams at a community event in Branford in 2012. Photographer Peter Otis (http://www.peterotisphotos.com) captured the moment.
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A Path Forward for Connecticut Shellfisheries and Shellfish Resources

Three decades ago, a plan was developed that identified top priorities for shellfish aquaculture in Connecticut. That plan was successful in generating enthusiasm and support for industry-related needs. The Connecticut Aquaculture Commission, established to draft the plan, included a diverse group of shellfishing interest groups who were passionate about promoting the growth of the industry comprised of clam and oyster harvesters.

Two notable initiatives that arose included the rehabilitation of the natural oyster beds which served as a seed source for the industry (shellfishermen harvest small seed from natural beds and transplant that seed on private cultivated beds), and the establishment of vocational education centers focused on aquaculture science and technology. The industry benefited greatly from the restoration of the beds and harvest numbers skyrocketed following the state’s investment in that resource. The plan also called for training opportunities for future workforce. Connecticut was one of the first states in the country to build high schools dedicated to aquaculture education. Today there are three schools, located in Bridgeport, New Haven, and Groton, that focus instruction on marine science and aquaculture. Several traditional and vocational-agriculture high schools offer aquaculture coursework as part of their curriculum. Having a written plan provided the justification for these and other projects, and crucial to its success was buy-in from both industry and government officials.

Thirty years later, many of the same industry needs are back on the table – clean water, a more streamlined permitting process, affordable shoreline access. New threats are also looming - pathogenic bacteria, climate change. These days, Connecticut shellfish interests extend beyond the industry. Recreational shellfishing is a popular activity for both residents and visitors. Thousands of harvest permits are sold each year in coastal towns from Greenwich to Stonington. Many towns rely on commercial producers to supply shellfish for their put-and-take harvest areas. There are also extensive natural populations of bivalve molluscan shellfish (various species of clams, oysters, scallops, mussels) in Long Island Sound – though how extensive we really don’t know. Worldwide bivalve populations are being impacted by pollution, overharvesting and a number of other perils, which has prompted concern about the status and health of our local resource. Shellfish are now being considered as potential tools to address coastal problems such as eutrophication of coastal waters and shoreline erosion. Scientists are investigating the ability of shellfish to remove excess nutrients, especially nitrogen, from Long Island Sound. Engineers are studying the ability of shellfish reefs to attenuate wave energy and protect vulnerable shoreline habitats and communities.

Not to be overshadowed are numerous opportunities for growth. Recognizing this fact, Connecticut Sea Grant, UConn Extension and NOAA Fisheries have partnered to facilitate the Connecticut Shellfish Initiative (CSI). The CSI is a public and stakeholder-driven endeavor that will result in a visionary plan for the future of Connecticut natural, recreational and commercial shellfish resources.

The Connecticut Shellfish Initiative is innovative in that it is broad in its reach – it includes all shellfish sectors and a diverse group of stakeholders. The initiative is supported by a steering committee comprised of individuals that represent those various interest groups. Just a few months ago we held public meetings to solicit input on the plan. We followed up with a statewide conference on shellfisheries topics highlighting the importance of our natural, recreational and commercial shellfish resources. The next step is to develop specific goals and actions – the justification we need to pave the path for the future of our shellfisheries and shellfish resources.

Learn more and get involved at: http://smp.uconn.edu.

Tessa Getchis is an Extension Educator with Connecticut Sea Grant and UConn Extension.
It's a beautiful day in late May. A solitary figure is wading off Calf Pasture Beach in Norwalk with a clam rake hoping to get the limit of cherrystones. A big horseshoe crab scuttles by on a mission. Approximately 1000 people every year are able to enjoy this pastime simply by buying a recreational clam permit from the town of Norwalk, allowing them access to this fresh seafood bounty. But these clams did not get within reach by accident—and there is no Clam Fairy as far as we know, at least not one with wings. The closest thing we have is Norm Bloom and his oyster boat captains. Three times a year each and every year, Norm Bloom and Son of Norwalk, Connecticut will transplant all-told 2000 bushels of clams from waters in Norwalk to the recreational beds where they can be reached from shore by recreational clammers. Norm provides the same service for the towns of Stamford and Westport as well. He has been doing this without fanfare since the mid-'90s. In all he provides more than 100 captain-hours every year to those three towns in efforts to keep their recreational shellfishing programs going.

Pete Johnson, chairman of the Norwalk Shellfish Commission, says he has a great relationship with all the area commercial operators but Norm is the only one who voluntarily offers this service.

“We don’t make a big deal about it; it’s just one of the things we can do to help out the guys who manage our resource.” Bloom explains. “Besides, if we announced when we do the transplanting, there would be cars lined up all along the shore roads for the easy pickings.” A great deal of planning has to go into these transplant operations, comments Bloom. “We have to coordinate when both the recreational and certified commercial beds are open and make sure that we put “clean” product in during those times.”

The Norwalk Shellfish Commission manages about 200 acres of natural shellfish beds, which include a number of recreational harvest areas. Among the recreational areas is Calf Pasture Beach, which is the only one accessible from shore. Most of the other non-recreational areas do not allow direct-to-market harvest by commercial shellfishers. In these areas the Norwalk Commission allows commercial operators to harvest for transplant in exchange for 10 percent of their take. The shellfish will be naturally depurated (cleansed for two weeks) after which they can be put on the recreational beds for harvest. These operators also pay lease fees to the Norwalk Commission, which allows the Commission to fund other activities. In all it is a perfect circle; providing the public access to high quality shellfish and allowing commercial operators to harvest and sell this bounty as well. Both activities boost economic activity and provide a huge amount of product to area seafood outlets and restaurants.

Norwalk offers a general recreational shellfish permit as both clams and oysters are available on their beds. Even commissions that don't receive commercial donations in product have to rely on commercial harvesters in one way or another. At the other end of the state, Don Murphy, a veteran of 29 years and chairman of the Stonington Shellfish Commission, buys his clams for stocking from Hillard Bloom and Company in Norwalk. The Stonington Commission manages three conditional recreational shellfishing areas and issues close to 1000 permits every year, generating $15,000. As with most shellfish commissions, their activities are self-funded, and do not rely on taxpayer dollars to sustain their programs. They also work with commercial operators to harvest clams in town.

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waters, transplanting some for recreational shellfishers, and allow a percentage to be sold by the commercial operator.

Murphy also works closely with members of the Noank Aquaculture Cooperative.

“We cooperate with commercial interests to improve recreational opportunities in Stonington. We have a terrific relationship with them,” Murphy says. The Commission relies on members’ boats, loading facilities and labor to accomplish their twice-yearly stocking. For the most part, such in-kind payment or remuneration offsets the cost of commercial license fees in town waters. Co-op members provide their landing/loading facilities as well as their boats to help the Stonington Commission stock its recreational areas. In all it comes to about 20,000 oysters per year. The Groton Shellfish Commission is the only commission in the state with a dedicated oyster program and separate permit sales for oysters.

“We sell about 1500 permits per year of which about 400 are specifically for the taking of oysters,” says Chairman Ed Martin. Groton also offers visitors the option of 1-day and 1-week permits opposed to seasonal only. Chairman Martin, a spry 84-year-old who has been a member of the Commission for the past 23 years, relates a great story of how the Groton Commission program got started. Back in 1994-95, when the Commission had no money to buy clams, Norm Bloom’s uncle and family patriarch, Hillard Bloom, donated clams for a period of four to five years to help the Groton program get on its feet. Chairman Martin said, “I visited him (Hillard Bloom) when he was very sick and close to passing many years later. I said, ‘you probably don’t remember me,’ at which point Mr. Bloom replied that in fact he did–of course he remembered me.” It was a touching moment that Chairman Martin relates with obvious emotion.

As with all these local shellfish programs, permit sales only scratch the surface of the larger economic impact of people coming to town for a limit of clams. Recreational shellfishers also spend money in shops and restaurants after a long day on the water. They buy equipment such as waders and clam rakes at local shops and marina facilities—and let’s not forget that statewide, town shellfish commission members volunteer their time at no public expense. Their work makes it possible for the thousands or permit purchasers across Connecticut’s shoreline to come away with a greater appreciation for the estuarine environment of Long Island Sound and maybe a limit of clams. It is doubtful that the average clammer will ever know the degree of effort required by the various parties to make sure that there are enough shellfish out there to catch. For them, there might just as well be a Clam Fairy—waving a magic wand over the state’s recreational shellfish beds.

Steve Plant is a commercial oyster farmer out of Noank, Connecticut.
New on the job and eager to prove my worth, I offered to spend the day working on his boat. Listening was considered a critical part of my new job as an extension agent, and I thought the best place to do that was out on the water. The night before the trip, I carefully planned what I’d need to be prepared. Foul weather gear, check. Boots, check. Gloves, check. Hat, sunglasses, lunchbox, pencil and paper…check, check, check and check.

When I arrived at the dock then next morning, the scruffy captain acknowledged me with a nod, said, “You’re late” and pointed toward the boat. I had arrived at 7:02 a.m.; New Haven traffic. There would be no more conversation about that. While I awaited orders, the captain reviewed his pre-departure checklist. Be mindful of the market, the weather, wind, sea conditions, inspect the controls and lines, check for leaks, measure the fuel and oil, start up the engine, fire up the electronics, start the coffee, and wait for the crew (who were supposed to show up at 6:30 a.m.). There was no paper list. This was, as I would learn, a mental process that he went through systematically, every day since he started his business.

I was assigned the job of staying out of the way until the crew arrived and lines were tossed to the dock. Once out on the shellfish grounds, I spent the rest of the day trying to keep up with the first mate who hoisted and emptied the dredge, sorted its contents and returned it to the water with lightning speed. I enjoyed every minute of it. Watching the clams being piled up on the culling table was to me like finding a treasure.

Aside from the captain occasionally shouting to me from the wheelhouse – “Stop talking.” “Sort faster!” or, “Put that camera down!” – there was little discussion. Nonetheless, at the end of the day, I’d call the trip a success. The boat was packed past the gunwales with neatly stacked mesh bags of clams destined for the market.

I wondered what the captain thought of the day, and my presence on the boat. I just thanked him and hoped that he’d invite me back someday so we could talk about shellfishing.

A few weeks later, to my surprise the phone rang and it was Larry Williams, the captain. “You can come back if you want,” he said, and nothing more. I packed up all my gear again, and this time I was early.

Perhaps he thought of me as less of a liability and more a help this time, because on this day he offered me a cup of coffee and slowly began to open up about the world of shellfishing. This was not anything I was going to learn in a classroom.

“One of the things I learned from early on was to be disciplined. In order for me to stay focused and be in the moment I had to get good rest and get up at 4:30 in the morning to begin the routine. It was a life choice, every morning, no matter what, year round for decades.” Williams said.

I would learn that from a young age, Williams was destined to work on the water. He told me of countless hours he spent exploring on the beach where he grew up in Milford. There, he enjoyed capturing and identifying what he called “creatures of the benthos” (an opportunity he wouldn’t afford me on the clam boat because I was supposed to be working).

Williams fished and later farmed the waters in adjacent towns. As a young man, he worked as a deckhand, and later a captain for some of the state’s largest seafood companies. In the eighties he started his own business, the Jessie D. shellfish company. While he spent time as a seed oysterman (these are individuals who harvest

continued on next page
As opposed to their wild harvest groundfishing counterparts, clam harvesters have a defined area to which they are confined to work. The state provides shellfishermen the opportunity to lease shellfish cultivation grounds in Long Island Sound. The majority of Connecticut’s clam producers (though not all) rely on seed from Mother Nature. Populations of adult clams, of which there are males and females, will in the summertime produce both sperm and eggs that are fertilized in the water column. Clams begin their lives as free-floating and microscopic zoo- (animal) plankton. After a couple of weeks of drifting in the currents, the clams will build their shells and eventually settle to and bury in the sediment. Connecticut has had commercially successful sets of quahogs for many years and this bounty has supported the livelihoods of many in the industry.

Shellfishermen target their clams using a hydraulic clam dredge that is dragged behind or beside the boat. The dredge slides along the sediment like a sled. It has short tines or “teeth” that probe into the sea bottom while a series of water jets contained by the manifold pump streams of water into the bottom. These jets fluidize the first couple of inches of the sediment so that the clams are brought to the surface and are then caught by the tines and scooped into the basket. Occasionally, something quite odd or valuable comes up in the dredge. Williams himself has happened upon old bottles, Native American artifacts such as clay pipes and arrowheads, rusted pistols, live ammunition from WWII, animal bones, coal, marble doorknobs, wallets, toys, and the list goes on. For someone like me with a degree in marine biology, hauling the dredge was sometimes like finding a gold mine. Although the dredge was designed for clams, sometimes the odd fish or invertebrate appeared in the pile.

Larry Williams as a boy spending his days at the beach

“*The Half Shell* was built in 1980 by myself and Don Whittle,” says Williams. “She was built and launched at Dock Road in Milford Harbor. Being 40 feet with a 15-foot beam, the *Half Shell* was a slow but steady boat that provided an enormous opportunity to learn and develop hydraulic clam dredging.” She was a gift, he adds, and only with the passage of time did he fully appreciate her value.

Another of his boats, the *Sara B.*, was named after his daughter, who is also named after one of Andrew Radel’s oyster boats. *Sara B.* was built in Maine in 1996. “My third boat, the *Raging Bull*, was acquired in 2006 in Portland Maine,” Williams says.

Commercial clam harvesting began in the seventies, and today is the largest segment of the state’s shellfishing industry. Williams and the other harvesters target the northern quahog, *Mercenaria mercenaria*, which is also known as the hard or round clam. Quahogs are marketed live, in shell, and by size with the smallest (a.k.a. littlenecks) being the most valuable in the market. Larger quahogs, sold as cherrystones, topnecks, and chowders are also harvested.
My favorite was the rat-tailed sea cucumber, an animal that I had never encountered when out digging for clams recreationally.

Once the clams were separated, the live animals were returned to the sea and the inorganic treasures were stashed away in the boat, the clams needed to be graded, counted, and placed in bags.

“Before commercial grading machines whatever we couldn’t sort through when the dredge came up, we’d put in baskets and sort in a lull between dredge tows,” Williams recalled. “It was tedious work.”

When he made the transition from being a subcontractor to running his own operation, he got his first mechanical clam grading machine. “At first, the machine was a nemesis of mine. It was the antithesis of instincts in terms of production. I looked at it as a choke point because it set the pace for harvesting. It changed the set flow of the operation. It also restricted the deck space. It necessitated another man to load the hopper and increased overhead costs.” But eventually, once the machine became part of the captain’s daily routine the grading machine was perhaps, like me, not seen as a liability.

Over the years, on the trips back to Milford Harbor, Williams told me countless stories of the old shellfishermen that worked the sea before him. He told me of their trials and tribulations, their risks they took and their successes. He attributes his early success to them. It was also his “faith in the lean years” and his willingness to adapt that got him through. Besides being a clam grower, he has also been a seed oyster harvester, a lobsterman, and today, aside from managing his clam operation, he designs dredges, grading machines and other equipment for shellfishing.

Unlike the old Cuban fisherman in Hemingway’s novel, Williams has been fortunate in his career making a living from the sea, as a shellfisherman. He’s made an honest living working in an often harsh environment. The legacy of this Old Man and the Sea will be the knowledge that he passed on to others, and the modesty with which he did it. He’s not that old, but he is destined to be one of the legends.

Tessa Getchis is a Sea Grant Extension educator specializing in aquaculture.
DJ King: a Once (and Maybe Future) Lobsterman Now Farms the Sea

by Nancy Balcom

Like many commercial fishermen in Connecticut and elsewhere, DJ King (aka Donald King) of Branford has had to reinvent himself several times over the last five decades or so. It wasn’t necessarily his choice, but his necessity.

A graduate of Clark University who studied economics and geography, King began lobstering and fishing on Long Island Sound in 1969 at the age of 10. Over the ensuing decades, his career path has also included earning a 50-ton captain’s license, captaining clam and oyster boats, farming oysters and bay scallops, and finally—so far—growing seaweed. He is the owner/operator of King Lobsters and Montowese Bay Oysters and an appointed member of the Connecticut Seafood Council.

When pots were wood and men were steel

King’s back and arms achingly remember the weight of heavily fouled wooden lobster pots—a time he says was “when pots were wood and men were steel.” Like other lobstermen, he switched from using wooden pots to wire traps, which stacked more easily and lasted longer. Lobstering was good in the Sound, particularly in the 1980s and 1990s. Around 1998, it hit its peak, when about 400 active Connecticut lobstermen fishing upwards of 125,000 pots landed nearly 4 million pounds of lobster. At that time, the 10 square mile area around Branford, where King lives and works, supported 24 full-time lobstermen fishing 27,000 pots. A great day’s catch exceeded 1,500 pounds of these tasty crustaceans.

Today, this same area barely supports three part-time lobstermen.

In 1999, the lobster resource in Long Island Sound suffered a disaster brought on by environmental conditions unfavorable to this crustacean, a disease previously unknown to affect lobsters, and—if you ask most lobstermen—the pesticides used to treat mosquitoes carrying West Nile Virus. The lobster population plummeted from an all-time high over the next few years, and then continued to decline over subsequent years. While some lobsters are still being landed in Connecticut—just over 241,000 pounds in 2012—there remains no recovery in sight. The number of active lobstermen in Connecticut followed a similar trajectory as the landings, as they first hoped for, then prayed for, and then pleaded for, a population recovery. It’s not the purpose of this article to get into the causes of the die-off, or the conservation measures, regulation changes and lawsuits that followed. Suffice to say, both the Long Island Sound lobster resource and the lobstermen who earned their livelihoods harvesting them have never been the same. In King’s words, both the lobsters and the lobstermen have become endangered species.

Diversification...or bust

Following the lobster die-off, King’s new mantra became diversification or bust. He wasn’t alone in this—it’s a common trait of fishermen who must ride out the highs and lows of fishery population cycles and the concomitant changes in management and conservation measures. However, not all Connecticut lobstermen were successful with diversification, and many left the lobster fishery and the water altogether. Others turned to other types of fishing, or conching—using wooden pots to catch the large sea snails (whelks) used for the dish, scungilli. Leasing oyster and clam beds became yet another avenue by which displaced lobstermen could remain working on the water.

Today, instead of lobster pots in the water, King has built a shellfish upweller at his home and is raising bay scallops and oysters on his leased grounds. Some of his idle lobster pots have been adapted to house the shellfish bags, keeping the
young oysters and scallops up in the water column, off the bottom where they might get silted, and away from predators.

“Scallops are much harder to grow than oysters,” says King. “Now I am trying to overwinter them in deeper water than I have in the past” so that more of them survive. He adds, “As for my oysters, I found one-inch oysters that survived out of the water for four hours at 7°F while inside the bags or cages. As the temperature drops, the bags and cages develop a layer of ice that becomes thicker until the cage becomes encased in ice and eventually a solid block of ice. This insulates the oysters from the severe cold.”

A quick glance at the deck of his boat, the F/V Kory Alexander, yields evidence of his diversification history. Wire lobster pots, wooden and wire conch pots, and gill nets are all stacked on the deck. More recently King added longlines to his complement of gear – for the growing of seaweed.

**Seaweed is the new local veggie in Connecticut**

In 2013, Bren Smith of Thimble Island Oyster Company in Branford harvested and sold the first permitted commercial harvest of the brown seaweed known as sugar kelp from Long Island Sound (see Wrack Lines 13(1) Spring/Summer 2013). Later that year, King became the second person to receive permits from the Connecticut Department of Agriculture, Bureau of Aquaculture, to raise seaweed or sea vegetables on longlines in Connecticut waters. He installed and seeded several longlines with sugar kelp with the assistance of researchers Charles Yarish and Jang Kim of UConn Stamford. The research, supported largely by Connecticut Sea Grant, led to the development of the technologies to culture several species of native seaweeds. King is anticipating his first harvest later this spring.

King also experimented with growing the red seaweed, *Gracilaria*, on longlines late last summer. In contrast to the kelp, which is a winter crop, *Gracilaria* is a summer crop—which offers seasonally-different options for individuals like Smith and King who are interested in growing seaweed for food. Connecticut Sea Grant, the Bureau of Aquaculture, Yarish, Kim, and others are working together to gather the data needed for the Bureau, and the Connecticut Departments of Consumer Protection and Public Health to approve longline harvest of *Gracilaria* for the sea vegetable market in the near future.

As King sees it, “The lobster may never flourish again in Long Island Sound; therefore it’s necessary to pursue other viable options. Sea farming may be our ticket to future success.” Fishermen like King will help determine that.
by Reed Whittemore

I go digging for clams once every two or three years
Just to keep my hand in (I usually cut it),
And I’m sure that whenever I do so I tell the
same story
Of how, at the age of four, I was trapped by the tide
As I clammed a sandbar. It’s no story at all,
But I tell it and tell it. It serves my small lust
To be thought of as someone who’s lived.
I’ve a war too to fall back on, and some years of flying,
As well as a high quota of drunken parties,
A wife and children; but somehow the clamming thing
Gives me an image of me that soothes my psyche
Like none of the louder events: me helpless,
Alone with my sandpail,
As fate in the form of soupy Long Island Sound
Comes stalking me.

I’ve a son now at that age.
He’s spoiled. He’s been sickly.
He’s handsome and bright, affectionate and demanding.
I think of the tides when I look at him.
I’d have him alone and sea-girt, poor little boy.

The self, what a brute it is. It wants, wants.
It will not let go of its even most fictional grandeur,
But must grope, grope down in the muck of its past
For some little squirting life and bring it up tenderly
To the lo and behold of death, that it may weep
And pass on the weeping, keep the thing going.

Son, when you clam,
Watch out for the tides and take care of yourself,
Yet no great care,
Lest you care too much and talk of the caring
And bore your best friends and inhibit your children and sicken
At last into opera on somebody’s sandbar. Son, when you clam,
Clam.
Digging it on the Connecticut Coast
by Nancy Balcom

There once was a clammer named Tess
Who had rake talents claimed as the best
Digging sand for the show
For clams hiding below
From dinner her ultimate quest

My colleague, Tessa, is an avid clammer. She grew up clamming with her father and is now instilling that same joy of shellfishing in her children. She finds it infinitely satisfying to squish her toes into the sand while dragging a rake across the bottom, listening for that telltale “scritch” sound. She’s not alone in her desire to bring home fresh clams for dinner – typically between 8,000 and 10,000 recreational shellfish permits are issued each year in Connecticut. That’s a lot of clammers – and harvested clams (not to mention mussels, oysters, and steamers)!

In Connecticut, recreational shellfishing is offered in 16 coastal communities with 15 local shellfish commissions managing the shellfish resources in town waters. According to Stephen Goldschmidt, Chair of the Guilford Shellfish Commission and Vice Chair of the Connecticut Sea Grant Extension Advisory Board, “Volunteer shellfish commissioners have a range of responsibilities. They set species harvest size and catch limits and enforce local regulations. They sell permits, stock clams and oysters on recreational beds and work to provide additional shellfishing opportunities. Commissioners ensure that the shellfishing waters are marked with open/closed signs, demarcation signs and buoys.”

“Then there’s water sampling, shellfish meat sampling, water sampling, and more water sampling…working with the State to classify the water quality of the shellfish grounds correctly to ensure public safety.” he adds. Recreational shellfishing enthusiasts, who benefit from the extensive effort put in by these commission members, can buy their permits and harvest hard clams, steamers, oysters, and mussels in these locally-regulated shellfishing areas.

What does it take to be a properly equipped recreational clammer? Well, shellfishing requires a local permit, a rake with tines spaced an inch or more apart, a basket to hold the catch, and a shellfish ring, slot or size gauge. Recreational shellfishers need to be familiar with local regulations and must call the local shellfish information hotline or check status signs to make sure it is legal and safe to shellfish in a particular area before venturing forth into the water for these succulent bivalve treasures.

For individuals drawn to the idea of harvesting their own fresh bivalves but unsure how to go about it, the answer can be found in locally sponsored “clam digs.” A number of local shellfish commissions sponsor these events in the spring and summer, enabling people to enjoy themselves while learning the ropes, and bringing home the key ingredient for a nice healthy shellfish meal.

“I think Madison was the first to sponsor community clam digs, starting about six or seven years ago,” says Steve Nikituk, Chair of the Madison Shellfish Commission. “These events are family friendly. About 25 to 50 percent of our participants come back year after year with their kids. We have a shellfishing area for

Guilford Shellfish Commission members Allyn Brown, Stephen Goldschmidt, and T.R. Brysh (Chairman) stock ready-to-be-caught hard clams into one of Guilford’s recreational shellfishing areas. Photo by Alison Varian.
adults, as well as a special shallow water area designed for small children. No experience is required – Commission members supply rakes and demonstrate clamping techniques for beginners. It’s a great way for people to get introduced to recreational shellfishing."

Nikituk continues, “About two weeks before the event, the Commission purchases 1000s of local clams from a commercial harvester and holds a ‘clam toss’ to seed the area designated for adult shellfishing. This gives the clams time to settle into the sand. We also have an ongoing oyster restoration effort on the Neck River. We buy oyster seed from a hatchery on Long Island and grow the oysters in cages in the River. Before the clam dig, we take some of these oysters and disperse them near shore so folks can harvest oysters as well as clams.”

Steve Straka, a former Madison Shellfish Commissioner, volunteers each year to oversee the kids’ area. Straka marks out the shallow area and distributes the clams on the day of the “dig” so they are easily accessible to the toes and fingers of the shellfishing kids. He keeps an eye on the little clammers while showing them how to find bivalve treasures. Those who find specially painted clams win an additional toy prize.

These special shellfishing events organized by shellfish commissions help promote Connecticut’s shellfish resources while encouraging both locals and out-of-towners to come out and enjoy the Sound. “Clam digs” are team efforts that involve local commission members, local departments of health and recreation, and local commercial shellfish harvesters. Held in shallow shellfishing areas classified as “Approved” or “Conditionally Approved” by the Connecticut Department of Agriculture/Bureau of Aquaculture, they are typically scheduled to fall a couple of hours before and after low tide (to avoid Reed Whitemore’s experience as a 4-year old – see page 12). Shellfish Commissioners typically work with local commercial shellfish harvesters to restock the areas before each event, so no one heads home disappointed. Day passes are sold to those who don’t hold a recreational shellfishing permit, with the hope that they will become seasonal permit holders in the future.

In Branford, the Shellfish Commission recently began partnering with the East Shore District Health Department to sponsor community clam digs. The digs are held in honor of former shellfish commissioners, William Davis and Joseph Dube. Initial financial support for the digs was provided in part by an Agriculture Viability grant from the Department of Agriculture. Connecticut Sea Grant, the Connecticut Department of Energy and Environmental Protection, the Connecticut Bathing Beach Monitoring Program, the Sound School in New Haven, the Connecticut Seafood Council and the Owenego Inn also contributed to the success of the digs by providing educational materials, assistance, or in the case of the Inn, serving as the host for the event.

“We had somewhere between 125 and 150 people participate, with 60 or more trying their hand at clamming at any one time,” said Lori Romick, a sanitarian with the East Shore District Health Department in Branford and Chair of the Connecticut Sea Grant Extension Advisory Board. “Participants were encouraged to hunt for specially marked green clams so they could claim a prize, such as a new clam rake or local seafood market gift card,” she added. “Once out of the water, they could sample a variety of shellfish. We had locally licensed caterers preparing and serving steamed clams, raw shucked clams and oysters, and two types of clam chowder.” Recipes and “how to shuck” guides were handed out while chefs demonstrated the fine art of opening clams and oysters safely and effectively. (Author’s take - The point is NOT to put the point of the shucking knife through one’s palm!)

The events in Branford also offered participants an array of educational materials about Long Island Sound, shellfish/seafood safety, non-point source pollution and water quality. As the ‘happy as a clam’ clammers headed home, they were given an insulated seafood bag and cold pack. “We wanted to promote seafood safety by providing the means for chilling the shellfish during the ride home,” said Romick. The bags were produced through a cooperative partnership among Sea Grant, the Bureau of Aquaculture, and the Seafood Council.

“It’s wonderful to have people come up to you at the end of the day to thank you and tell you that this is the best time they’ve had in years,” says Nikituk. “It makes it all worthwhile.”

Nancy Balcom is the associate director and extension program leader for Connecticut Sea Grant.
Native American and early colonial use

When the first European settlers came to Connecticut in the 17th century, they found local waters teeming with shellfish, especially oysters. In fact, the traditional New England clambake, featuring steamers and quahogs baked on a bed of seaweed, was already a custom of the native people. They spent the late summer and fall along the coast harvesting conch, soft shell clams, quahogs, bay scallops and oysters in large numbers, leaving sometimes enormous shell heaps called “middens.”

Not only did shellfish serve as a food source, but until 1792 they were also used by native people and Europeans as legal tender for commerce. Native Americans drilled the striking purplish-blue portion of northern quahog shells into tubular beads called “wampum”. The native name for round or hard clams—quahog (or quahaug)—and its Latin name Mercenaria mercenaria actually translates to “wages” or “money money”. Wampum was also used as decorative art for clothing and for communicating messages.

Colonists soon learned another virtue of shellfish, observing that native people often baked them in the fall. Settlers saw value in keeping them (mostly oysters) alive in cellars packed with moist sawdust or seaweed for the long, cold winters. Natives preferred to smoke quahogs on beach grass dried for winter use, but oysters caught in the fall would make it to March or April alive with little care. Stacking them “cup” side down so as to hold the liquor in moist sawdust became a skill. Oysters became an emergency food supply for the long, cold and often brutal New England winters. Little of the shellfish then likely made it to commercial shellfish routes; local supplies sustained the local populations and transportation routes were poor. However, by 1750, shellfish were loaded on smacks (small sailboats) and sent to New York City. New Haven, with its vast shellfish resources, became the epicenter for the Connecticut oyster trade. Before the turn of the century, the legislature provided coastal towns with the authority to regulate oyster harvests.

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continued on next page
Early cultivation

A growing Connecticut population and trade beyond the state soon resulted in the near exhaustion of natural oyster beds. The demand for oysters soon had settlers using agricultural approaches long known in Europe to farm them. English common law (1300s) had already established title to submerged lands for oyster culture; but there was no established legal entity in the colonies to title them out. So was no established legal entity in Europe to farm them. English agricultural approaches long known for oysters soon had settlers using natural oyster beds. The demand resulted in the near exhaustion of the sea floor.

As early as 1842 coastal landowners were allowed to close off creeks to create an “oyster pond” as long as none of the neighbors complained. Protection was then given to those who planted Southern seed oysters called bedding stock; millions of bushels were soon arriving in Connecticut from the Chesapeake Bay region to grow to legal or commercial size. This protection was only seasonal, not permanent like grazing livestock on a common meadow. Constant poaching of imported bedding stock was common, but most catches by this time had passed subsistence harvesting. Investment was then perceived as a crop—the first commercial enterprises we call aquaculture today.

Oystermen began with dugout canoes, a variety of sailboats (sharpies, sloops, etc.) and later turned to steam-powered vessels to transplant and harvest oysters. They utilized a variety of implements such as rakes, tongs and later dredges, to gather shellfish from the sea floor. Production during this time moved from the shallows to deep-water areas of Long Island Sound. Shoreside shucking facilities were established to facilitate packing and shipping minus the shells.

In 1855, Connecticut passed the “Two Acre Law,” which allowed towns to establish oyster committees appointed by the local selectmen. Such committees had two charges:

1. Delineate and protect natural beds, not to be granted; keep maps on file;
2. Allow up to 2 acres for private designation. If not opposed, a title/deed could be made available, be recorded in land records, and serve as permanent ownership protection of “planted” oysters.

In essence, individuals would be granted the title of underwater lands—up to two acres—but oystermen quickly found ways around this law and were able to aggregate the deeds of friends, family members, and others, amassing scores of acres of shellfish beds.

A decade later, the deeds became taxable as real estate. Unfortunately, lacking GPS at the time, battles over the location of deeded ground and disputes over town boundaries led to significant tension within the industry. A series of legislative acts attempting to address these challenges did little to help.

Peak production

In 1881, a new law established a State Shellfish Commission that was responsible for making sweeping changes to improve the management of the industry. The Commission created a state jurisdiction line; landward towns remained in control north of the line; the state had jurisdiction south of the line. This separation of jurisdiction continues today. The “Law of 1881” was also important for other reasons. It required the mapping of all existing and new shellfish deeds, and procedures for resolving the location of challenged private beds and natural beds.

During this time oyster sets in Long Island Sound greatly improved and were at record levels by the end of the century. By the late 1800s, about 50 oyster planters, harvesters and shippers operated out of the city of Norwalk alone. Many shellfish companies were established, including Talmadge Bros., in 1875. The Connecticut coast of Long Island Sound produced 15 million pounds of oysters in 1911. Hundreds of seed oystermen worked the natural beds. Shipbuilding, dredge and tong making, and other related industries thrived too.

Recreational shellfishing became popular as well as families from New York City fished into Connecticut shore towns to seek relief from heat and disease outbreaks. The 1889 Bureau of Labor Statistics report estimated that 2 to 3 thousand “summer” recreational harvesters, and likely more, frequented the shoreline to harvest shellfish.

The lean years

The oyster boom of the late nineteenth century was not destined to last long. Increasing pollution during the industrial era, public fear about oyster-borne diseases, major storms, unreliable sets of oyster seed, predators, and new taxes posed on shellfish beds all contributed to a downturn in production. The industry and harvest levels dwindled for decades. In 1929, Captain Frederick Lovejoy, an oysterman from East Norwalk, sued the city when shellfishing was banned due to pollution from untreated wastewater. Others followed, and improvements in water treatment began to be implemented. By the 1933 the ban was lifted there.

A group effort to promote shellfisheries

Improved water quality and shellfish sets, field research (a great deal of which was conducted in Connecticut at the National Marine Fisheries Service Milford Aquaculture Laboratory), extension and
government support led to renewed interest in shellfishing and aquaculture in the latter half of the century. Recreational shellfishing was established formally in the 1960s and 1970s. Municipal shellfish commissions were formed in many coastal towns to manage the resource.

In the 1980s, shellfish populations continued to grow as did interest in recreational shellfishing. The role and function of local shellfish commissions also increased dramatically. Commissions moved into aquaculture experiments, establishing spawner sanctuaries (as commercial operations did a century ago), and purchasing seed shellfish, all to enhance recreational shellfisheries while supporting commercial operations which had the equipment to harvest and relay shellfish for the public. Today, recreational shellfishers support commercial relays, increasing public access and education about shellfish as a natural renewable resource long a part of Connecticut’s shore history. The increase in awareness and appreciation of this resource has created public shellfish celebration days. Many individuals and families attend these shellfish days and learn about Connecticut’s rich shellfish heritage.

In the late 1980s Connecticut designated oysters as the state shellfish, an honor well deserved. It was a sign of what was to come. In 1999, Public Act 99-93 established aquaculture as a form of agriculture and designated the Department of Agriculture as the lead regulatory authority. This provided shellfish producers with many of the same rights as traditional land-based farmers, and put the responsibility of managing the shellfish resource in the hands of an agency meant to promote and protect it.

While the industry has seen up- and down-turns in production, it has persevered through the years. Connecticut shellfish are known round the world as a delectable, high quality and valuable product. Forty-five companies and more than 300 individuals are involved in the state’s shellfishing industry, and there is opportunity for growth. Here’s looking at the next 100 years of rich shellfish history in Connecticut.
The ribbed mussel, Geukensia demissa, may be a valuable tool in nutrient remediation. Their ability to filter large volumes of water, adaptability to a wide range of habitats, and low palatability make them uniquely suited for the task. Their use is especially relevant in waters closed or conditionally approved to shellfish harvest for human consumption. Photo by Mark Dixon NOAA/NMFS.
What do you think of when you hear the term “ecosystem services”?

We think the term was coined specifically to describe the benefits that shellfish, especially oysters, bring to coastal ecosystems. Come to think of it, the term “ecosystem engineers” also seems to have sprung from efforts to establish the importance of oysters and other shellfish in habitat creation in estuaries. To list and quantify fully the pivotal roles shellfish play in physical, chemical, and biological structuring of coastal ecosystems would require a very heavy volume, so here we just touch on the many reasons to value shellfish.

**Shellfish create habitat**
First, let’s talk about the “shell” in “shellfish.” Although lobsters, crabs, and even escargot qualify as “shellfish” on the menu, here we are referring to the bivalve mollusks, animals categorized by having an exoskeleton consisting of right and left valves with a hinge connecting them like a pocket watch. This group includes well-known (and delicious!) animals such as oysters, clams, scallops and mussels. The shell valves are built of chitin, protein, and calcium carbonate, in the form of the minerals aragonite and calcite. These “bones” of bivalves accumulate in life and persist on the seafloor after death. Accumulations of shells, as either “reefs” with vertical structure or “beds” flat on the bottom, often become the dominant hard surfaces in areas of the seafloor that have a lot of sedimentation of sand and silt. Shelled seafloor areas provide habitat for a host of attached invertebrates such as barnacles, bryozoans, and tunicates, and macroalgae that otherwise are limited by attachment opportunities. In turn, this community of shell-attached flora and fauna provides a place for young stages of fish to feed and hide from predators. Healthy shellfish populations thus provide a unique habitat supporting a diverse assemblage of hitchhikers and hangers-on.

**Bivalves provide stability**
Accumulations of shellfish and their shells also can stabilize sediments in several types of environments. Oyster reefs dissipate wave energy during storms. Oysters attached to the roots of mangrove trees reinforce the stabilizing strength of the roots, and ribbed mussels provide barriers to erosion in salt marshes. All of these physical habitat modifications serve human interests by protecting shorelines from erosion and storm damage, and shellfish provide this service while also contributing to biological diversity, unlike the bulkheading and shoreline-hardening approaches to which human engineers are limited.

**Shellfish form a link between the water column and seafloor environments**
Perhaps the most important engineering accomplished by bivalve shellfish in aquatic environments is largely invisible to us. Bivalves are suspension feeders; they filter the water around them and eat particles within the water such as phytoplankton and detritus. Bivalves are pivotal in the cycling of nutrients and energy between pelagic and benthic (that is, the water and the seafloor) compartments of the ecosystem. The term “pelagic-benthic coupling” has been coined to describe the capture of energy and nutrients contained within phytoplankton and detritus that is transferred to the benthic environment. The immediate result of phytoplankton filter-feeding activities is that water becomes clearer, allowing light to penetrate to greater depths where seaweed and seagrasses grow, extending their distributions. Indeed, some of the energy and nutrients are incorporated into the flesh and shell of the bivalves themselves, but most of the captured particles are deposited on
the sediment surface in the form of fecal and pseudo-fecal material. Deposit-feeding invertebrates, such as worms and amphipods—animals not known to be discriminating diners—depend upon bivalve feces and pseudo-feces as food sources. As these deposit-feeders themselves are prey for forage fish and young stages of game and commercial fish, this pelagic-benthic coupling is a critical link in the support network for fish and fisheries. Bacteria feast upon the feces and pseudo-feces that are not eaten by worms. Some of these bacteria turn protein nitrogen ultimately into nitrogen gas which is released to the atmosphere, thereby removing this overabundant nutrient from the ecosystem. And in a “turnabout is fair play” fashion, urea and ammonia released by bivalves and their biodeposits into the overlying water regenerates some nitrogen to sustain phytoplankton growth that is, in turn, eaten by shellfish downstream. In this respect, shellfish are said to cultivate their own phytoplankton food.

Wildlife depend on shellfish for food
When we think about shellfish as food, human diners need to get in line behind a long list of other predators. Coastal resident and migratory birds, horseshoe crabs, commercially important fish and crustacean shellfish such as crabs and lobsters all depend on bivalve molluscs as part of their natural diets. The wildlife that makes the shoreline a fascinating place to visit is sustained in large part by a constant supply of little clams, oysters, and mussels that never make it to our dinner plates.

People eat shellfish too!
To be sure, many of us enjoy the diversity of dietary delicacies provided by bivalve shellfish. Oysters, clams, mussels, and scallops prepared any number of ways are wholesome, healthy, and locally-produced foods, so many of us appreciate bivalve shellfish. Connecticut shellfishing alone generates $30 million in farm-gate sales each year, 300 workers statewide harvest and process more than 450,000 bushels of clams and 200,000 bushels of oysters annually. Connecticut’s shellfish industry is sustainable; more than 70,000 acres of shellfish farms are under cultivation in Connecticut waters.

Harvesting shellfish removes excess nutrients from our coastal environment
The term “eutrophication” refers to an excess of nutrients, especially nitrogen, in the coastal environment. While nitrogen itself is not harmful, and in fact is a building block of all life, too much nitrogen in our coastal waters can fuel the overgrowth of phytoplankton. Phytoplankton blooms can be a nuisance because the decaying phytoplankton can use up dissolved oxygen needed by marine organisms which may lead to fish kills. Excess nitrogen can come from a variety of sources on land and in our atmosphere, including wastewater treatment, suburban and agricultural fertilizers, and fossil fuel burning. Coastal states are using a variety of techniques to reduce nutrient inputs to our waterways, including improving wastewater treatment plant technology, planting rain gardens, and limiting fertilizer sales. Even so, excess nutrients remain a problem in many places around the country.

As we describe above, shellfish get their energy and nutrients from naturally-occurring phytoplankton and other particles suspended in seawater. They feed on the very phytoplankton whose blooms cause problems and incorporate the nitrogen they consume into their own tissues. When these shellfish are grown in a farm setting, their harvest removes the nitrogen contained within their tissues and shells from the environment. In this way, shellfish aquaculture increases the capacity of a marine ecosystem to process excess nutrients from land or air sources. The 450,000 bushels of clams and 200,000 bushels of oysters harvested from Connecticut waters annually are a measure of how much our local shellfish growers already are providing a valuable large-scale, nitrogen removal service on their farms.

These benefits of shellfish to coastal ecosystems and the services we value are recognized not only by scientists and naturalists, but also by all levels of government. In 2013, NOAA announced the National Shellfish Initiative, which has the simply stated the objective to increase shellfish in the nation’s waters. This national initiative has encouraged many of the state and local activities highlighted elsewhere in this issue. While not a “reason” to value shellfish, government support can remove barriers and allow us to profit, literally and figuratively, from the many values of shellfish.

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The strikingly-marked American Oystercatcher is found all along the Atlantic coast from New England to Florida as well as the Gulf coast. They are distinctly coastal birds, seldom found far from their preferred habitat of sand and shell beaches, rocky shorelines, marsh islands, mud flats and offshore gravel bars. In the 1800’s they became locally extinct in the northeast due to hunting and egg collecting, but with protection have now extended their range northward, reoccupying their historical range in New England. Oystercatchers move south in the winter spending the cold months in the southern states and the Gulf. Up to one third of the population may spend the winter in South Carolina alone.

These large, conspicuous water birds are uniquely marked by their black and white body and long, thick orange beak. Their loud, whistled “wheep!” can often be heard at a long distance before the bird comes into view.

In spite of the name, American Oystercatchers do not feed exclusively on oysters, but consume many species of shellfish and other marine invertebrates including clams, mussels, crabs and worms. They stalk the shellfish beds seeking a mollusk filtering water with its shell partially open. They then quickly hammer their bright orange, laterally-flattened bill between the shells of the unsuspecting bivalve, snipping the adductor muscles before the shells can close and feasting on the meat “on the half-shell”.

The nest of the Oystercatcher is a simple shallow scrape, lined with shells, pebbles or bits of tide wrack and disguised among the shells and pebbles where the two to four specked eggs blend perfectly with the gravel beach.

Oystercatchers are shy, sensitive birds, susceptible to human disturbance and loss of habitat due to degradation or development of our coastline and beaches. Storms and high tides can flood the nests, swamping the eggs and nestlings where the birds are forced to nest near the high tide line. There is much concern in Connecticut and throughout the northeast about the effect of sea level rise on the nesting habitat of these and other beach nesting birds.

Although offshore spoil islands have provided secure nesting habitat for Oystercatchers and other water birds all along the mid-Atlantic coastline, Connecticut has yet to adopt this practice.

Currently, the Connecticut Endangered Species Act lists this species as “Threatened.”

American Oystercatcher

Haematopus palliatus

by Milan Bull

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Clean Waters, Safe Shellfish

by Chris Sullivan and Kristin DeRosia-Banick

Everyone who consumes shellfish wants it to be safe and wholesome, which often depends on the quality of the water where they grow. Clean waters don’t happen by magic, however. The National Shellfish Sanitation Program (NSSP) is the federal/state cooperative program recognized by the U. S. Food and Drug Administration (FDA) and the Interstate Shellfish Sanitation Conference (ISSC) for the sanitary control of shellfish produced and sold for human consumption. The purpose of the NSSP is to promote and improve the sanitation of molluscan shellfish (including oysters, clams, mussels and scallops) moving in interstate commerce through federal/state cooperation and uniformity of State shellfish programs. In Connecticut, the Shellfish Sanitation Program is implemented by the Department of Agriculture Bureau of Aquaculture (DA/BA).

The Shellfish Growing Area Program identifies safe areas which provide Connecticut residents and commercial shellfish harvesters with a source of fresh and wholesome shellfish. This program provides water quality monitoring and pollution source assessment for coastal areas that include both municipal and state shellfish beds, which support recreational and commercial shellfishing activities. In order to insure that molluscan shellfish are safe for human consumption, all shellfish growing areas in the state must meet the requirements of the NSSP Guide for the Control of Molluscan Shellfish.

The basis of the Shellfish Growing Area Program is the shoreline sanitary survey, which is conducted every 12 years in each coastal town. The sanitary survey is the written evaluation report of all environmental factors, including actual and potential pollution sources, which have a bearing on water quality in a shellfish growing area. The sanitary survey includes the data and results of:
(a) A shoreline survey;
(b) A survey of the microbial quality of water and shellfish;
(c) An evaluation and analysis of the effect of any meteorological and hydrodynamic characteristics on the growing area, for example, river discharges or rainfall related water quality impacts;
(d) A determination of the appropriate growing area classification.

In support of the program, the Bureau performs year-round water and shellfish microbial monitoring to evaluate the suitability of coastal growing areas for shellfish production. The Bureau manages shellfish growing areas based on these data and on our assessment of the pollution sources impacting each growing area. The sanitary survey is periodically updated and annual evaluation reports assure that data is current and that conditions are unchanged. Water quality data and Twelve-Year, Triennial, and Annual evaluation reports are shared with the Connecticut Department of Energy and Environmental Protection (DEEP) for use in support of the Total Maximum Daily Load (TMDL) Program.

Stamford Sanitary Survey 2012: All major actual and potential sources of pollution that are identified during the course of the sanitary survey area must be located on a comprehensive map and evaluated to determine their impact on shellfish growing areas.
The Federal Clean Water Act (CWA) requires each state to monitor, assess and report on water quality. Waterbodies in Connecticut are compared to Connecticut Water Quality Standards for meeting designated uses. Shellfish harvesting is one of the uses for Connecticut marine waters. Connecticut DEEP breaks up marine waters into two groups. There are “SA” waters, which are suitable for direct human consumption. The second group is “SB” waters, which are available for commercial operations and require treatment prior to consumption. Waterbody segments in Long Island Sound are assigned as either SA or SB waters with accompanying goals. The current segment boundaries were created by DEEP in 2006 to improve assessment accuracy. Each segment was defined by distance from shoreline, location of swimming areas and other features.

Each waterbody has a water quality goal for recorded bacteria levels. The bacteria goal is more protective for SA waters than SB waters. The appropriate goal is applied to each piece in the Sound. When a waterbody is not meeting the goals of the Connecticut Water Quality Standards, a TMDL is developed to begin the process of repairing water quality.

Recent efforts by DEEP have developed multiple TMDL documents for shellfish uses along the Connecticut coastline. Each TMDL document uses the available data collected by DA/BA staff during their surveys. Bacteria values are calculated from the data and compared with the goals in the Water Quality Standards. When these calculations result in values larger than water quality goals, a reduction is required for the waterbody piece to be safe for use.

The TMDL documents for shellfishing include an overview of each waterbody piece and where the data was collected by DA/BA. A map of the inland areas highlights known potential sources of bacteria, such as available sewer lines and known waterfowl population issues.

Any available permitted discharge data, including stormwater results, is reviewed for additional sources. These reviews can help find problems in the watershed that are adding to bacteria concentrations and potentially closing or downgrading commercially and recreationally important shellfish beds in the Sound.

Having a review of potential sources and calculating bacteria reduction goals can help steer efforts to remedy issues affecting the Long Island Sound segments. Distribution of the TMDL generates awareness of bacteria issues and can affect individual choices that may impact water quality. For example, people who walk their dogs may more consistently clean up their waste. Homeowners with septic systems can do their part and keep them properly maintained and functioning to treat waste. In many watersheds it is these individual choices that lead to increases or decreases in pollutant concentrations in surface runoff.

Approval of the TMDL can add substances to the monitoring lists for permits in the affected waterbody. For example, a discharge permit on an impaired waterbody must sample for the substance that is causing the impairment. In shellfish TMDLs, this adds fecal coliform bacteria to the monitoring lists. DEEP staff can also guide municipalities to adjust their permit sampling locations in an effort to track down large sources of bacteria in stormwater entering Long Island Sound.

Having a TMDL for an impaired waterbody is the “first step to recovery.” These documents begin to pinpoint the sources of impairment and develop a plan to fix the problems. Municipalities, watershed groups, or other interested parties can apply for limited funding to help develop implementation plans in the affected watersheds. These plans become the next step in repairing water quality to meet the goals set in the Connecticut Water Quality Standards.

DA/BA staff partner with municipal Health Departments, Public Works Departments, and Conservation Departments as well as federal and state agencies such as the Environmental Protection Agency, the Food and Drug Administration, the Connecticut Departments of Public Health and Energy and Environmental Protection to investigate and correct pollution sources identified during the course of the sanitary survey. These critical interagency partnerships make thoughtful use of limited state resources through sharing of data and information.

So what’s the end result of these efforts? Improved water quality benefits wildlife, as well as stakeholder groups that rely on the health of Long Island Sound. For example, all Connecticut residents who enjoy recreation in Long Island Sound and its tributaries benefit from improved water quality conditions. Cleaner water improves opportunities for swimming, boating and fishing in Connecticut’s marine waters—and brings quality shellfish to the dinner plate.

Chris Sullivan is an environmental analyst in the Connecticut DEEP Bureau of Water Protection and Land Reuse.

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To learn more...

TMDL process: www.ct.gov/deep/tmdl
Aquaculture program: www.ctgrown.gov/aquaculture