

The Day

news

Jan. 4, 2025

Oyster farming a boon to health of Long Island Sound











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The Sixpenny Oyster farmers separate oysters by size by putting them through a tumbler, then bring them into a corner of Beebe Cove in Groton on Nov. 5, 2024. (Theresa Sullivan Barger, Special to The Day)

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Groton — Will Ceddia tips the laundry basket of small oysters into a spinning metal tumbler that separates the smaller oysters from the larger ones. Once they've been separated by size, he scoops these, a gallon at a time, into high-density polyethylene (HDPE) bags full of holes large enough to filter in water but small enough to keep the oysters from falling out. The rectangular bags are framed on their longer sides with floats so the oysters rest on the water's surface.

Once he and his business partner, Jason Hamilton, have completed this process with all the oysters, they load the netted plastic bags onto their flat boat, which has been tied to a dock on this early November day. Next, moving parallel to an Amtrak railroad line, they slowly drive their boat over to the inlet in

Beebe Cove in Noank, where they have a license to grow oysters. The cove is so shallow that only kayaks could navigate there during low tide.

As they approach the inlet, four black lines of floating bags anchored to the cove bottom come into view. Ceddia, dressed in yellow waterproof overalls, lies flat on his stomach on the boat's edge as Hamilton shakes out each bag to spread out the oysters. Hamilton then drops the bag into the water where Ceddia hooks it to the rope.

After attaching all the HDPE bags to the rope, they bring their boat to the waters near Ram Island, where they harvest mature oysters. These oysters have already been independently tested by state officials and found to be safe. The men pull the metal cages up onto their boat and quickly pluck out one oyster at a time, counting to fulfill the day's orders.

While the mature oysters stay in the cages, each one is filtering and purifying 50 gallons of water a day. When water temperatures dip below 50 degrees, the oysters go dormant.

"I'm trying to do my best for the community and the environment," said Ceddia, who got his passion for oyster farming after working as an oyster shucker. He was in college studying international business when he decided to apply to the University of Rhode Island's aquaculture and fisheries program. "That's where I learned about shellfish and all manner of aquaculture; they really focused on the sustainable ways to do it."

While oyster farmers like the Sixpenny Oyster Farm owners are making a living selling oysters and providing a sustainable source of protein, they're also helping to clean the water in Long Island Sound. It turns out, they're also providing a multi-million-dollar financial benefit.

Cleaning up the Sound

Scientists, working with economists, conducted a study in Long Island Sound that showed the oyster aquaculture industry in Connecticut provides \$8.5 million to \$23 million annually in nutrient reduction benefits, according to a federal National Oceanic and Atmospheric Administration (NOAA) study. And since the number of oyster farming operations in Long Island Sound is a fraction of what they could be, the researchers calculated that expanding oyster aquaculture in the Sound could remove excessive nutrients at a level comparable to investing \$470 million in traditional nutrient-reduction measures, such as wastewater treatment improvements and agricultural best management practices, the study said.

While oyster aquaculture is a boon to improving the health of Long Island Sound, it is just one piece of a multipart effort to address excessive nitrogen from wastewater treatment plants, septic systems, stormwater runoff and lawn fertilizers, said Julie Rose, a biologist with NOAA and one of the study's authors.

Nutrients like nitrogen are not inherently bad, she said. "If you have too much of a good thing, nitrogen encourages the growth of plants in the water."

Excessive nitrogen in the water leads to environmental problems as nitrogen fuels the growth of microscopic algae. If there's too much algae, that can produce large amounts of carbon dioxide and lead to a severe drop in oxygen levels in coastal waters. It can lower the pH of seawater, a process known as ocean acidification. In turn, severely depleted oxygen levels can harm wildlife, including inducing massive fish kills.

“What’s been really inspiring for me as a researcher is this combination of good, locally produced seafood, combined with the added environmental benefit that you don’t necessarily see with other types of food production,” she said.

Farmers don’t need to feed oysters, so there’s no food waste, said Tessa Getchis, senior extension educator, Connecticut Sea Grant & UConn Extension.

“Many of our estuary areas have excess nutrients from fertilizer and runoff,” she said. “When you have more farming activities, the more the better. Our natural shellfish beds are at a fraction of their natural levels.”

In the six years since Ceddia and Hamilton took over Sixpenny Oysters, they’ve noticed the eelgrass beds have expanded and spread in Beebe Cove. When oysters clean the water, it allows more sunlight to penetrate the water so eelgrass can thrive.

Eelgrass provides several important ecosystem functions, including foraging areas and shelter for young fish and invertebrates, food for migratory waterfowl and sea turtles and spawning surfaces for fish. Because eelgrass reduces the force of wave energy, eelgrass beds reduce coastal erosion.

Four-part approval process

While scientists and oyster farmers know that oysters clean the water and make it healthier for aquatic life and help with shoreline erosion, getting a permit to operate an aquaculture operation requires local, state and federal approval. Obtaining the necessary permits is a multi-year process, Getchis said. Regulators evaluate the impact on existing human uses, ferry boat crossings, commercial fishing, a mooring area and someone’s personal dock.

Some coastal residents don’t realize people have been farming oysters in Long Island Sound for more than two centuries underwater, “sight unseen,” and they worry that it will interfere with recreational boating and fishing and pollute the air with diesel fumes, Getchis said. For the most part, oyster farmers are proposing small-scale operations in containers.

A couple of large-scale projects that were proposed were not permitted. The projects lacked public engagement, she said, and “I think they left a bad taste in people’s mouth.”

Hamilton and Ceddia, like all oyster farmers, had to first get an aquaculture lease from the town where they wanted to run their operation, in this case, the Town of Groton. Their approval process took two years.

First, on the local level, they have to get approval from the town’s Shellfish Commission. This is where they may face opposition from local residents. Some people view aquaculture as a private use of public property, said Don Murphy, longtime chair of the Stonington Shellfish Commission. Some people don’t want to see an aquaculture operation from their waterfront property or in the waters where they bring their boat, he said. Most of the time, he said, they’re not interested in the ecological benefits of oyster farming.

Once farmers get a lease from the town, they apply to the state Department of Agriculture’s Bureau of Aquaculture for a license within the bureau’s designated areas where aquaculture is permitted.

Next, it's on to the state Department of Energy and Environmental Protection (DEEP), which evaluates noise, pollution and whether the proposed aquaculture operation is near a bird sanctuary and eelgrass.

If the DEEP determines the operation will not interfere with wildlife or cause pollution, the last step is to seek a permit from the U.S. Army Corps of Engineers, which makes sure the aquaculture operation won't inhibit boat navigation.

First generation farmers

Ceddia and Hamilton are the first in their families to become farmers. Like other forms of farming, it comes with risks, setbacks and constant challenges. They start by buying hundreds of thousands of seed oysters the size of a fingernail from another farmer. They scoop the seed oysters into the bags with tiny holes and as the oysters grow, they put them through tumblers, also with different-sized holes. They change bags with larger holes to accommodate the growth.

If left to grow like wild oysters, Ceddia said, the oysters will adhere to each other. They're going to be long, skinny, banana-shaped and covered in barnacles. "We have to go and handle the product, working the bags, getting rid of the seaweed," he said. "We put the oysters through the tumbler machines so they don't grow to look like bananas."

It takes 18 to 20 months for the oysters to reach maturity and be ready to harvest.

This summer, Sixpenny Oysters lost a lot of their seed oysters and had to buy more. A 30% loss of their product to predators or death can be expected, Hamilton said.

Once they reach maturity, they are put through a process called "depuration," where they are placed in open water that's passed state inspection for two weeks to purge any biological contaminants such as E coli. Samples are sent to DEEP for inspection, and once they are cleared, they can be sold. Oyster farmers have to watch the weather closely. If more than an inch of rain is forecast, they harvest as many oysters as they can sell before it rains. When there's more than 1.5 inches of rain within 24 hours, DEEP automatically prohibits oyster harvesting for a week.

This is because rapid, heavy rainfall can't be fully absorbed into the ground and as it washes over pavement, it picks up pollutants that flush into the Sound, Getchis said. After a week, the oysters have filtered out the E-coli that flows into Long Island Sound from stormwater runoff. The DEEP staff retests before reopening oyster beds.

"A farmed oyster in Connecticut is extremely safe to eat," Ceddia said.

Shellfish Recycling

"Connecticut is in the rare position of having some of the few self-sustaining populations of oyster beds in the world," Getchis said, and recycling shells to return them to the ocean is crucial. The shell recycling initiative was launched as part of a broader effort to restore the state's natural shellfish beds to preserve and enhance their economic, environmental and cultural contributions.

Up until a couple of years ago, all the shells from raw bars were thrown in the garbage in Connecticut. Oyster shells are a critical component of oyster reefs, said Zofia Baumann, an associate research professor in UConn's Department of Marine Sciences.

“We have opportunity to restore some of the oyster habitat from the recovery of oyster and clam shells from restaurants,” Baumann said. When mature oysters spawn, they’re in the larval stage for two to three weeks, then they want to settle down onto a hard surface; they prefer attaching themselves to clamshells or oyster shells, she said.

“If we harvest all the oysters and don’t put back the shell, we won’t have oysters anymore,” Baumann said. “Think of shells as an essential natural resource that we need to retain.”

The state legislature passed a bill in 2021 that designated the state Department of Agriculture to help facilitate shellfish recycling. This legislation helped kickstart restaurants’ shellfish recycling efforts, which keeps shells out of the waste stream and returns them to the water. After they’re collected, the shells are left outside in the sun for at least six months to be cured.

Collective Oyster Recycling and Restoration (CORR), a nonprofit organization, began recycling restaurants’ oyster shells in Fairfield County and has been making its way east, said Tim Macklin, co-founder.

“Since we started in July 2023 we have recovered/recycled over 450,000 pounds of shell. In May of 2024, we planted 125,000 pounds of shell in the state natural beds off Bridgeport and Stratford. In May-June of 2025, we will be planting over 350,000 pounds of shell back into Long Island Sound,” he said. The nonprofit has also donated an additional 81,000 pounds of shell to Leete’s Island Oysters for restoration work it is doing in Branford.

CORR is in over 40 restaurants and seafood businesses from Greenwich to Mystic, most in Fairfield and New Haven counties, Macklin said. Since it started at the Oyster Club in Mystic in September, CORR has recovered 4,700 pounds of shell from that restaurant. CORR is slowly expanding into Middlesex and New London counties, and it also recovered shells from the Niantic Bay Oyster Festival in September.

This August, the state Department of Agriculture and DEEP established a way for municipalities and nonprofits to set up shellfish recycling operations to include collecting, sorting and curing operations.

Sixpenny Oysters sells to the Oyster Club, and Will Ceddia still works there part-time as an oyster shucker.

“We knew what we were doing was a good thing for the environment. We’re super passionate about it,” Ceddia said. “It’s a keystone species. When something is going on with the oysters, they tell us a lot of what’s going on in the environment.”