

# Oysters turn man-made reefs into living ledges

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By Colin Nickerson, Globe Correspondent | November 3, 2008

WELLFLEET - What an oyster really needs is another oyster to cling to, and until a century or so ago the Atlantic Coast boasted the world's most spectacular shellfish embrace. Bays and estuaries from Canada's Maritime Provinces to Florida were thick with oyster reefs, some covering square miles.

But most of these living ledges were pillaged to satisfy the human appetite for the bivalve's succulent flesh. Others were poisoned by pollution, hacked out to clear boat channels, and even quarried for fertilizer and lime.

"Oyster reefs weren't so much harvested as they were strip-mined," said Rob Brumbaugh, a marine biologist with the Nature Conservancy.

Now, the first Massachusetts effort to rebuild an oyster reef is underway in Wellfleet Harbor, a project of the Nature Conservancy, Massachusetts Audubon Society, and the Town of Wellfleet. The National Oceanic and Atmospheric Administration is picking up much of the \$78,000 tab.

If successful, the artificial structure will allow oysters to flourish as nature intended, at least on the 2-acre project site. The goal is not to boost the numbers of oysters for eaters - plenty are cultivated on tidal farms - but to help restore labyrinths of shellfish capable of filtering and purifying huge amounts of water, broadening biodiversity, and forming natural breakwaters against shore erosion.

On a sparkling morning recently, wildlife biologist Bob Prescott waded through the tidal flat off Wellfleet's Lieutenant Island to inspect two 100-foot long stretches of "cultch" - substrate to which oysters will adhere, in this case 4-foot wide strips of crushed clam shell, reinforced by 300 mesh bags of shell - that were laid in June. They will serve as foundations for the nascent oyster colony. Both lie beneath 10 feet of water at high tide, although at low, the hump of one cultch strip breaks the water's surface.

Already, hundreds of wild oysters have seeded themselves onto the cultch and are slowly forming a reef. Oysters that were microscopic specks in June have grown into shellfish the size of a fingernail.

"We're building a three-dimensional habitat, full of nooks and crannies," Prescott said. "See those spots on the shells? Baby oysters." The shell was carried to the site by barge and raked into the cultch strips just in time to catch the early summer spawn from scattered wild oysters that still inhabit local waters. Clam shell was used because it was more readily available from processing plants, and oysters don't know the difference between crushed clam and crushed kin.

"This spot was home to natural oyster reef as recently as the 1970s, when it still held 1,000 bushels of oysters," said Prescott, director of Mass Audubon's Wellfleet Bay Wildlife Sanctuary. That's about 325,000 bivalves.

But the reef disappeared. Some blame the zealotry of oyster fishermen. Others say winter ice carried off the oysters.

"Since then, there's been nothing but bare bottom," Prescott said. "This project is part natural engineering - restoring a living reef to the harbor - and part pure science: Studying how an oyster reef works."

Come spring, biologists will add custom-made contraptions to the crushed shell in an escalated bid to entice free-floating oyster larvae to settle to the bottom, develop into spat - juvenile oysters that have assumed the shape and sedentary lifestyle of adults - and grow into a thick healthy crust of shellfish.

There will be Lego-like "oyster castles," made of interlocking hollow blocks of concrete. There will be 18-inch high "spat balls," conical forms with holes meant to provide secure shelter for spat.

Meanwhile, thousands of shucked shells from this year's Wellfleet Oyster Festival will be sewn into rough mats to be added to the burgeoning marine structure, serving

as beds for juvenile oysters.

"We're trying out different materials to find what works best," said Kate Killerlain Morrison, marine program director for the Nature Conservancy-Massachusetts.

Marine biologists hope the "castles" and other enticing rubble added to the reef before next year's spawn will one day form the base of a grand organism containing roughly 1,000 living oysters per square meter. Oysters will affix themselves to any hard surfaces, such as pilings or rocks, but do best when clumped with other oysters. Close proximity allows for more efficient reproduction, and for colonies to continually hoist themselves above sediments to better strain their diet of microscopic algae from the tides.

"They need to be gregarious to sustain themselves," said Brumbaugh, the Nature Conservancy biologist. "It's the evolutionary strategy that has worked over millions of years for oysters."

The Wellfleet project is one of several oyster reef restoration experiments up and down the Atlantic seaboard, with others in New Hampshire, New York, Virginia, North Carolina, and Florida.

Oysters are extraordinary purifiers of water - a single creature filters some 50 gallons a day through its gills - and the reefs helped support an abundance of other aquatic animals and plants, from crabs to eel grass.

Oyster farmers have a major stake in the health of wild stocks. Many count on natural spawn to increase their own bayside beds.

"It's all about biomass," said Bethany Walton, who runs a small Eastham oyster farm with her husband Bill.

"The more oysters we have releasing sperm and egg into the ecosystem, the healthier both the wild and farmed stocks are going to be. So this little Wellfleet project could blossom into a very big deal, oyster-wise," she said.

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