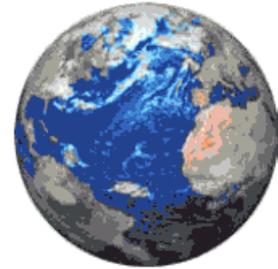


BLUE WATER GREEN BOAT



Long Island Lobsters Reveal Clues to Climate Change

Could sentinel monitoring help head off an environmental calamity?

By Kat Long, 11/17/2013

The first hint came in the summer of 1999 when lobstermen, expecting a bumper haul of crustaceans, instead started finding sick and dead lobsters in their traps. As the months wore on, the traps bore more dead specimens than live ones, and the catastrophe became clear.

“It was very sad to see the impact on the culture and economics of the Sound,” says Terry Backer, the Long Island Soundkeeper. As the head of Soundkeeper, Inc., the environmental watchdog group overseeing the fertile estuary between Connecticut and Long Island, this



second-generation former lobsterman understands the impact when he declares, “The lobsters are the harbingers of things that are askew in the Sound.”

Scientists at Stony Brook University studying the causes for the dying lobsters (formally known as *Homarus Americanus*) discovered that the yearly variation in August water temperature had become more extreme; 1999 was the warmest year to date. Lobsters fare best in water less than 68° F, but that year, the average reached 69.62° F.

“Lobsters were prospering until the increasing temperature of the water crossed the line from tolerable to intolerable,” explains Mark Tedesco, director of the U.S. Environmental Protection Agency’s (EPA)

Long Island Sound Office. “[Researchers] found that lobsters used more energy for respiration in warmer water, which meant that they ate more and grew faster. That can be a good thing, but if

the temperatures increased over the threshold of tolerance, they saw negative impacts in shell production, vulnerability to disease, and lack of reproduction.”

As the years passed, the crisis grew; the Sound’s lobster population continued to decrease for the next decade. In 2011, the total abundance was one-tenth of its pre-crash number. “Lobsters were booming, until they weren’t,” says Tedesco. “We didn’t see it coming.”

Today, researchers with the Long Island Sound Study (LISS) are looking closely at the mottled olive-orange crustaceans as part of a strategy called sentinel monitoring, a fairly new approach to evaluating the status of an environment based on the health of a certain species, known as a sentinel. Using data from the 1999 investigation and current observations, the researchers are working to head off future disasters. They’re watching lobsters not just for signs of population recovery, but also for something much bigger —whether and how climate change affects them.



Photos by Richard Howard

Obtaining lobster measurements involve using calipers to precisely measure the carapace length for each lobster. The lobster’s sex is determined and recorded along with other biological information.

Lobsters provide an ideal early-warning system for climate change. Lori Severino, spokesperson for the New York State Department of Environmental Conservation, a LISS partner, points out that both Connecticut and New York track lobster numbers in the Sound for commercial purposes. The lobsters populating our local waters live at the southern edge of their natural range, so they’re more susceptible to any changes in their habitat. As Tedesco of the EPA, another LISS partner, observes of the lobsters, “They have a demonstrated sensitivity to climate change. They’re really the canary in the coal mine.”

The sentinel-monitoring research team is keeping its eye on lobster abundance, and may even expand to monitor the population of larval lobsters, catch distribution between non-commercial and commercial trawls, and water temperature, along with detecting the presence of disease.

Expectations are that yearly warming water temperatures, a hallmark of climate change, will continue to stress the lobsters’ physiology. Long Island Sound lobsters rarely migrate, preferring to spend their whole lives on the pebbly bottom of the

estuary. However, a warmer habitat could “drive them out of the Sound and into northern, cooler waters,” says Severino.

Backer, the Soundkeeper, points to additional environmental stressors on lobsters. “We haven’t been able to put a finger on these pop-up illnesses — is it water temperature, pesticide run-off, pathogens? There are multiple pressures.” Hurricane Sandy was one such pressure, flattening dunes, flooding shoreline habitats, and allowing the discharge of toxic contaminants and agents

of disease into the water. The occurrence of more frequent and stronger storms could render the Long Island Sound uninhabitable for its iconic crustacean.

Perhaps there's a silver lining to the critical warning being sent by the lobsters. While the LISS sentinel monitoring program was tailored to Long Island Sound-specific issues, its researchers believe it can be useful in coastal ecosystems far beyond the Northeast U.S. "Climate change is occurring everywhere, and the strategy that was developed as part of this program could easily be adapted by resource managers around the country," Severino explains.

Along with research, action is needed. "One thing we can do is use less-toxic chemicals in the marine system," says Backer. "We have better options than [the insecticide] methoprene for killing mosquitoes that are not lethal to lobsters. It's not just higher water temperatures that are the culprit."



Lobster, striped bass, summer flounder, and spiny dogfish among the species collected during a Long Island Sound Trawl Survey conducted by the CT Department of Energy and Environmental Protection aboard the research vessel John Dempsey.

Tedesco says, "Climate change is sometimes spoken of as an abstract, far-in-the-future thing. But there is now evidence and measurements of warming. We see impacts of warming that may be positive, but overall, the outlook for lobsters is negative." Yet he notes that there may still be hope for local lobsters. "It's important for people to understand the impact of climate change. When people become aware of the issues and smarter consumers of information, they cause a ripple effect in their communities."