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NEW THREAT TO SOUND

How acidic water could imperil LI shellfish population

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WALSH PROBE TAKES A TURN

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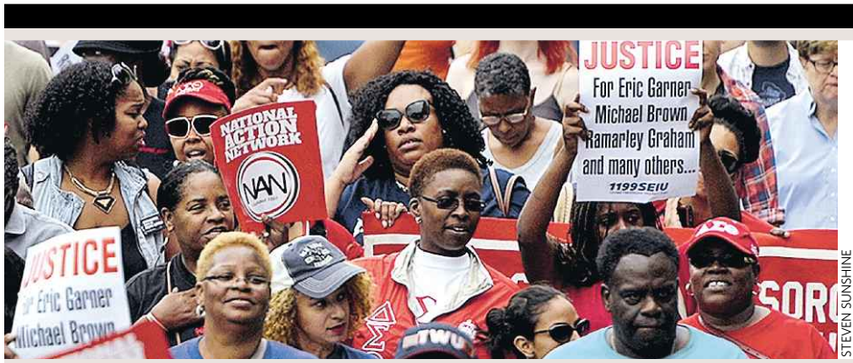

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'We will get justice'

Thousands march over NYC chokehold death A5

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SHELLFISH FACE RISK

Acidic water a new threat to oysters and clams in LI Sound

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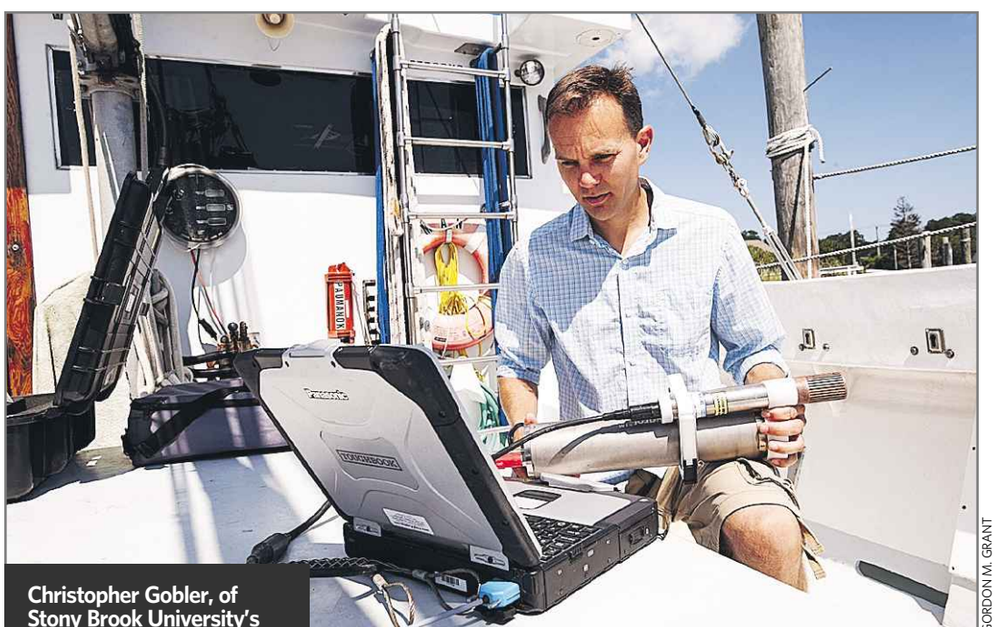

Christopher Gobler, of Stony Brook University's School of Marine and Atmospheric Sciences, conducts research in Southampton using a CTD device, which measures pH levels in depths of water.

GORDON M. GRANT

Long Island Sound, already choked with nitrogen, may also be becoming more acidic — a state that could threaten marine life.

Scientists are turning their attention to the phenomenon of ocean acidification — and its potential impact on the hard clams, oysters and other shellfish that make the Sound their home.

Acidic water could threaten Long Island's shellfish population during the most vulnerable stages of their lives — when they are beginning to form shells, said Christopher Gobler, a professor at Stony Brook University's School of Marine and Atmospheric Sciences who has been studying the issue.

"The very earliest stages of life for all the shellfish commercially important to Long Island are very sensitive to acidification," Gobler said. "We see high levels of mortality and very poor survival when acidification happens."

The Sound has been experiencing summer algal blooms, fed by high levels of nitrogen from wastewater and runoff from fertilizers. Those blooms are thought to feed a chemical process that ends in increased acidification, scientists say.

Effects on young shellfish

Water becomes acidic at the nexus of high levels of nitrogen and carbon dioxide, and low levels of oxygen — such as what has been occurring in the Sound in the summer.

High levels of nitrogen, largely emanating from sewage and septic systems, cause algal blooms to flourish with high summer temperatures, Gobler said.

When the algae die, sinking to the bottom of the Sound, bacteria come in to feed on the decaying mass.

The bacteria breathe, emitting carbon dioxide into the water — adding to the carbon dioxide from the atmosphere that already is absorbed by the ocean.

The carbon dioxide reacts with seawater to form carbonic acid. That compound, unstable in seawater, then breaks apart, releasing hydrogen ions that seek out and dissolve calcium carbonate — the very compound that larval shellfish use to build their shells as they grow in the summer months.

While adult shellfish seem to be able to survive acidic waters, it appears shellfish in their earliest, most vulnerable stages of life cannot, according to Gobler's research.

"What it looks like is the adults can handle it," he said. Even the smaller individuals can handle it. But these first-born new shellfish can't handle it."

Fin fish, too, appear to be sensitive to acidic waters, although it's too early to say for certain, he said.

"That's a new tip of the iceberg," Gobler said.

Research still developing

Research on ocean acidification is relatively new, and there has been no long-term monitoring of pH levels in the Long Island Sound, scientists say.

Gobler said the pH level of the ocean is normally about 8, or slightly basic. During times of acidification, the pH in Long Island Sound can drop to below 7, he said.

Dwight Gledhill, deputy di-

STEVE PFOST

Scientists are still studying if ocean acidification has affected New York's continuing decline in landings of scallops and fresh clams, shown above, harvested from Oyster Bay and Bayville waters.

rector of the ocean acidification program at the National Oceanic and Atmospheric Administration, said his agency has begun focusing on Long Island Sound.

"It's only just now starting to emerge on the radar," Gledhill said. "I think our expectation is that Long Island Sound has been undergoing significant changes."

What those changes will mean for sea life is still a mystery.

The state Department of Environmental Conservation is not "investigating or monitoring" ocean acidification in the Sound and said the phenomenon was not a public-health issue for shellfisheries.

"Although ocean acidification could pose a concern for shellfish in the future with the buildup of carbon dioxide in the oceans, it is not an immediate concern at this time and we are not aware that it has impacted shellfish resources in the Sound," spokeswoman Lori Severino said.

While shellfishing harvests in New York have declined over the decades — with landings of clams and scallops declining by 99 percent since 1980 — Gobler said it would be very difficult to say what role ocean acidification has played.

"Our feeling is over the last couple of decades, these numbers have declined and it would be interesting to know if it's associated with this pH question," said Bob Rheault, executive director of the East Coast Shellfish Growers Association. "It certainly would make sense, but it could be a dozen other things."

'Reaching a tipping point?'

Dianna Padilla, a professor at Stony Brook's Department of Ecology and Evolution who is also affiliated with the School of Marine and Atmospheric Sciences, said widespread oyster die-offs because of ocean acidification have been seen in other areas, such as in the Pacific Northwest. But those die-offs haven't occurred in the Sound.

"We still have clams, we still have oysters, we still have snails," she said. "They're still there. The question is, are they being stressed more and more and more? And are we reaching a tipping point?"

The Sound has always experienced fluctuations in pH levels, and the marine life in the area appears to have adapted to those fluctuations, Padilla said.

No one knows whether those fluctuations have increased over time — and if they have increased, what the effects will be, she said.

"This is one of the really scary things about ocean acidification — it's continuing to change," Padilla said. "So even if there isn't an immediate, horrible problem now, that doesn't mean we're not on the brink of a problem. And it doesn't mean everything's OK."

HOW SEA LIFE MAY BE IN DANGER

1 High levels of nitrogen in Long Island Sound, largely emanating from sewage and septic systems, cause algal blooms.

2 When the algae die, sinking to the bottom of the Sound, bacteria come in to feed on the decaying mass.

3 The bacteria breathe, emitting carbon dioxide into the water — adding to the carbon dioxide from the atmosphere that already is absorbed by the ocean.

4 The carbon dioxide breaks apart, releasing hydrogen ions that seek out and dissolve calcium carbonate — the very compound that larval shellfish use to build their shells.