

Living fossils of the wetlands



IN THE FIELD

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Soon after sunrise, life was stirring at the fringes of Shinnecock Bay on a recent morning. A pair of swans on a sandbar tended to their cygnets. A red fox vaulted silently through the back bay marsh.

But fur and feathers didn't interest a group of researchers, educators and students who trained eager eyes on sand at the water's edge. They had come in search of horseshoe crabs, the living fossils that come ashore each summer to spawn on protected beaches from Maine to the Gulf of Mexico.

Drawn by the full and new moons in June and July, females clamber ashore at high tide with the males, who are smaller, attached to their carapaces. Females hunker down in the sand after mating to lay their eggs — a single female lays as many as 80,000 in an evening.

Afterward, "you would find a relatively shallow depression," Dowling College professor John Tanacredi told the group as they wandered the shoreline. "Their tails leave marks in the sand."

Some become the next generation of horseshoe crabs, which are thought to live 20 to 25 years. But many are eaten by migratory shorebirds or used by commercial fishermen as bait for conch or eels. As adults, crabs are also useful to humans: Blood drawn from them is used in medical research to test the sterility of vaccines and medicines.

"They're really interesting," said Allyson Marchan, 16, a Sayville High School student who hoped to get some horseshoe crab DNA samples for a school science project.

Her classmate, Kathreen Mangaluz, was equally fascinated. Mangaluz, 17, remembers seeing them on the beach when she went jogging with her family. Now she's working on a project to see how horseshoe crabs



The underside, including the claws, of a horseshoe crab

captured offshore compare genetically with those she encounters at breeding spots.

More closely related to spiders than crabs, these armored arthropods have been around for some 400 million years. There are four species globally; the North American group is the most abundant. They outlasted the dinosaurs and predate our own comparatively brief stint here on Earth.

But local horseshoe crab populations may be falling off. A recent stock assessment by the Atlantic States Marine Fisheries Commission showed declines in recent decades in the New York and New England populations, although they appear to be on the rise in Delaware Bay and farther south.

That concerns Tanacredi. He has been counting horseshoe crabs on Long Island for nearly a decade through a network of volunteers who report breeding activity at dozens of beaches along the North and South shores. The survey mainly tracks which locations consistently lure amorous horseshoe crabs — Jones Beach is apparently a hot spot — and is less useful for population estimates, because data are not always consistently reported. Still, Tanacredi said, he has tracked a local decline of 10 to 15 percent.

Whatever the reason, no live horseshoe crabs turned up early that morning at Shinnecock Bay, a spot where they had been seen for the past six years during breeding season. Tanacredi said more horseshoe crabs would likely turn up this month; the

tracking effort will continue through the summer.

Disappointed, the Sayville High School students donned waders and followed teacher Maria Brown into the wetlands to search for more. They found two dead ones in the reeds.

"It was camouflaged really well," Brown said, holding up one with a barnacle-encrusted carapace. "Phew! It's dead. You can tell by the smell."

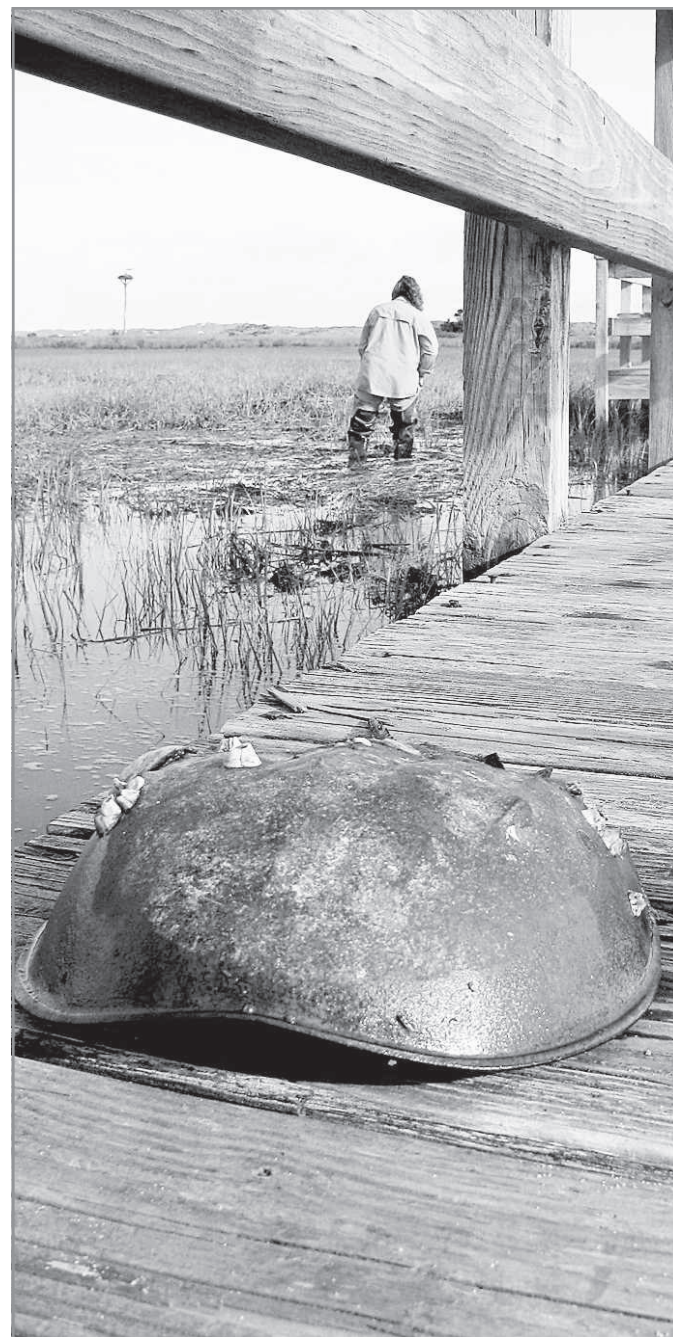
Eventually, a live male floated in on the tide. Brown clipped a section of one of his 10 legs to sample its DNA, then released him.

The Sayville group had better luck last weekend on the North Shore, at Short Beach in Smithtown. "An hour before high tide they just started coming up by the hundreds," Brown said.

To preserve the genetic diversity of Long Island horseshoe crabs, Tanacredi has been collecting eggs from different locations and rearing them in metal tanks at the college's waterfront lab. So far he has about 500 larvae and a handful of juveniles that are 4 to 5 years old; they'll mature sexually around age 10. A few tanks over are 20 or so other crabs harvested as adults. Eventually, he hopes to release thousands back into the Great South Bay.

"Just because there are large numbers of an organism doesn't necessarily mean they're going to survive," Tanacredi said.

"Pollution, harvesting, even natural environmental change could cause dramatic changes in the population over the lifetime of an animal."



In search of horseshoe crabs, Maria Brown, a teacher at Sayville High School, makes her way through the waters of Shinnecock Bay. Her students are researching the arthropods.



Brown holds up a dead horseshoe crab with a barnacle-encrusted carapace. It's one of two dead specimens the group found in the reeds during a visit to Shinnecock Bay in June.