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## Where One-Eyed Giants Sleep *Unraveling the Mysterious Lives of the Northernmost Horseshoe Crabs*

By Catherine Schmitt

January has arrived, and the beginning of winter has come to an end. With nothing but days and days of cold, snow and ice ahead, you might wish you were a Taunton Bay horseshoe crab, hunkered down in the mud beneath the frozen bay, protected from nor'east winds, sleeping until spring.

Here at their northernmost homestead just east of Maine's Mount Desert Island, horseshoe crabs have to be tough to survive. These are not the famous masses that congregate on Delaware Bay shores in a teeming frenzy of mating and egg-laying that attracts hundreds of thousands of shorebirds to gorge on the eggs and fuel their migration to the Arctic. Taunton Bay horseshoe crabs do not teem. They live a quiet, and until recently, a mysterious existence.

It wasn't until plans to replace the Route 1 bridge over Taunton Bay became public in 2000 that the crabs began receiving scientific attention. The old bridge was low enough to prevent most commercial shellfish draggers from entering the bay. With more and bigger boats having access to the bay's resources, concerned residents, led by Friends of Taunton Bay, forced a five-year moratorium on mussel dragging in the bay.

As part of the moratorium, the Department of Marine Resources (DMR) was required to assess the potential impacts of dragging on the bay's resources, and whether the moratorium should continue beyond its March 2005 expiration date. DMR used the requirement as an opportunity to conduct a broad ecological assessment of the bay, says Slade Moore of the DMR.

At the time of the moratorium, Friends of Taunton Bay and biologist Sue Schaller had been conducting surveys of breeding horseshoe crabs in the bay.

Horseshoe crabs have an interesting life cycle. They emerge from wintering areas in late April and early May, the actual moment depending on how warm the spring has been. They have a month before breeding to fatten up on mussels, clams and worms and avoid being eaten by bald eagles, crows, and seagulls or being dredged up by humans. When the spring moon is full, they clamor ashore in great piles, the males clinging to the females waiting for the chance to fertilize hundreds of tiny green eggs laid in the damp sand and mud. Then they eat some more, and by August are already moving to deeper waters in the bay.

"What we didn't know was what the crabs do when they're not up on shore in the shallow parts of the bay. We really don't know where they go after that," says Moore. Since the crabs are only near shore for a brief time, this knowledge gap is significant.

"How can we protect them if we don't know anything about them?" asks Steve Perrin, president of Friends of Taunton Bay. Perrin partnered with Moore and the DMR to track the horseshoe crabs year-round. With funding from Maine Sea Grant, the Sweetwater Trust, and the Norcross Wildlife Foundation, Moore and Perrin fitted 26 crabs with sonic transmitters in 2003.

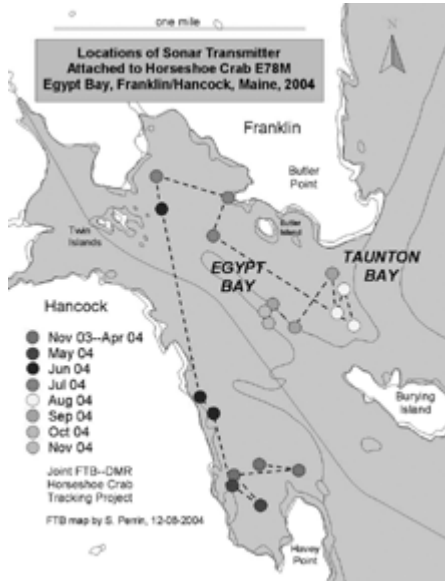
They followed them throughout the summer and fall, and found out that the horseshoe crabs were wintering in the bay, within a mile of where they were outfitted with the tracking devices. This was a surprise, since southern populations migrate to the continental shelf for the winter, and the first

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Transmitters epoxied to horseshoe crab shells allow researchers to track the crabs' annual migrations. This northernmost population of horseshoe crabs has a much more circumscribed range than their Mid-Atlantic cousins.



indication that the Taunton Bay horseshoe crabs were more unique than first thought.

Taunton Bay is the northernmost documented population of horseshoe crabs, whose range extends discontinuously along the coast from the Yucatan peninsula to Maine. And the evidence is mounting, based on data from federal research, that the Taunton Bay crabs may be a distinct population.

I joined Perrin on a cold November day for the second-to-last horseshoe crab survey of 2004, before freezing water temperatures would send the horseshoe crabs into hibernation. Schoodic Mountain wore a bright cap of the season's first snow, and we had the bay to ourselves, save for a few ducks bobbing on steely green waves in the distance.

We didn't actually see the crabs, but picked up their radio signals and estimated and recorded locations with a GPS. Perrin's detailed, penciled notes were added to those he keeps organized in binders.

Perrin has taken an indirect route to this place. He was studying physics at MIT when he decided he didn't want to be a physicist, and instead became broadly educated in the humanities. He worked as a professional photographer. He taught photography. He wrote books. Then he got tired of adding more words to the words that were already out there that never seem to make any difference. He co-founded Friends of Taunton Bay in 1990 and became president in 2001. The only way he could deal with the pain of seeing what poor stewards humans have been of the earth, he says, was to get active, to physically place himself in the bay, which he calls his spiritual home. He grew up exploring the bay, and spent two years living alone on an island in the bay, which he chronicled in words and photographs in *Back to Basics*. "Taunton Bay is the region of the Earth I know most about through direct experience," he says, "In a very real and personal sense, the bay is alive in me. I can't separate who I am from where I live."

And where he lives is this place with an unusual population of horseshoe crabs. We putter around in Egypt Bay, trying to pick up a signal. The horseshoes are slowing down; when temperatures dip below 13 degrees Celsius, they become sluggish and inactive, and hibernate from November to April.

"They hunker down for six whole months, below the ice, in the mud. It's unbelievable that they can do that," says Perrin. Their schedules are different from their southern relatives, too. Most horseshoe crabs are more active at night. But in Taunton Bay they seem to be more keyed in to the tides than the changing daylight, says Perrin.

The horseshoe crab, *Limulus polyphemus*, is not a crab at all but more closely related to scorpions and spiders. The second part of the name is Greek for "one-eyed-giant," and refers to the simple eyes on the front of the shell. A hard, knife-like tail extends from the back of the horseshoe crab, which the crab uses to right itself after being flipped over by waves or curious humans. They don't bite or sting. Empty shells on beaches are leftovers from molting.

Horseshoe crabs are cool for several reasons. For one, they save lives: a protein in their blood is used to test for bacterial toxins during medical operations. Second, they are old. Descendants of the trilobites we know from fossils, they have been around for over 400 million years and are considered "living fossils." They survived what the dinosaurs could not. Continents collided, ice ages came and went, and the horseshoe crabs kept on keepin' on, and they're still here. They must be fairly resistant to whatever nature or technology can throw at them.

But the Taunton Bay horseshoes are a small, isolated, breeding group teetering at the edge of their range. "The prevailing wisdom in conservation circles is that when an organism is at the geographical extent of its range, it may be more vulnerable to anything that would cause their population to

decrease sharply,” says Moore. “Dragging might be an issue and might affect the ability of the population to sustain itself.”

Moore and Perrin are analyzing the two years of data from the tracking study. The DMR is now drafting a bill to extend the moratorium for another five years. When the bill is introduced this winter the horseshoe crabs will be sleeping soundly. And by the time legislators begin battling it out in Augusta, the horseshoe crabs will be in the Taunton Bay shallows, basking in the thin spring sunlight, as they have for millions of years.

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