

# Wings & a prayer

## On Plum Island, scientists track a tiny sparrow in hopes of saving the marshes

The Plight of the Saltmarsh Sharp-Tailed Sparrow A team of researchers is painstakingly searching acres of wetlands along the New England coast this summer, the fifth in a row, for the secretive Saltmarsh Sharp-tailed Sparrow.

July 6, 2008

An elusive, palm-sized bird that spends its entire life in marshlands may help scientists unravel a mystery that, they say, could have profound implications for a lot of other creatures.

**Playing Tag** Researchers look for saltmarsh sharp-tailed sparrow nests at Parker River National Wildlife Refuge on Plum Island. They will monitor egg hatchings and capture birds to draw blood samples for testing and band them.

Donning hip-waders, a team of researchers is painstakingly searching acres of wetlands along the New England coast this summer, the fifth in a row, for the furtive saltmarsh sharp-tailed sparrow, which burrows into mounds of thick grasses to nest and feed, and communicates in a whisper-like call. The team has measured rising levels of mercury in the sparrows, with the largest amounts found in those at the Parker River National Wildlife Refuge on Plum Island.

Scientists aren't sure where the Plum Island contamination is coming from, but they do know that other species around the country with high mercury levels, such as loons, produce fewer offspring. Roughly 95 percent of the world's saltmarsh sparrows breed in the Northeast, where mercury contamination is among the highest in the nation. Because the sparrows spend their lives in the marsh, essentially unable to escape the pollution, scientists believe the elevated amounts of mercury found in these tiny birds may be a harbinger for many other species that also depend on the wetlands.

"If they disappear, then most likely everything that uses the salt marsh will disappear with them," said Oksana Lane, a biologist with the BioDiversity Research Institute, a Maine-based nonprofit that is collaborating with federal scientists on the multiyear study.

Evidence already collected in the project suggests that fewer chicks survive from adult sparrows with higher levels of mercury in their blood.

Lane and researchers from the refuge gingerly waded into the Plum Island wetlands one day in June, methodically turning over countless whorls of grass in their hunt for sparrow nests.

"It's like searching for a needle in a living haystack," said Nancy Pau, a refuge wildlife biologist, as she delicately poked the ground, hoping her fingers would find nests before her feet did.

The team uncovered eight nests by lunchtime and recorded their locations using a global positioning system. They returned several times to monitor how many of the eggs hatched before the lunar high tide at the end of the month flooded the nests. While most songbirds lay their eggs and fledge their young on a 28-day schedule, the saltmarsh sparrows complete their cycle in about 20 days, an evolutionary adaptation by a species that is dependent on the tidal cycles of the marshland.

With rising ocean levels from global warming, a shrinking ribbon of marshland because of coastal development, and unknown sources of mercury contamination, researchers worry that the delicate natural balance maintaining the sparrows' habitat may be altered beyond repair.

"There are multiple stresses going on with this population, and we don't know at what point we come to a tipping point," said Alan Van Arsdale, a mercury specialist with the Environmental Protection Agency's regional laboratory in Chelmsford. Arsdale is measuring the mercury in spiders and various bugs in the marshes, so researchers can track the source of contamination up the sparrow's food chain.

Mercury can damage developing brains of fetuses and children, and is believed to cause a variety of behavioral and physiological problems in wildlife. The naturally occurring element is emitted from coal-fired power plants and trash incinerators and later falls into lakes, ponds, and rivers, where bacteria break it down into its toxic form, which is then ingested by fish, fowl, insects, and other wildlife.

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While scientists don't know the precise source or sources of the marshland contamination on Plum Island, they say some of it likely was washed down the Merrimack River years ago from industrial facilities that are now closed. Marshes and estuaries are nature's sponges, absorbing and filtering out pollution as rivers empty into oceans. The Merrimack and Parker rivers flow into the refuge.

"It could be the mercury that was deposited years ago is still cycling in the environment," Van Arsdale said. "It doesn't go away."

Over the past four years, the team of researchers has observed a buildup of mercury in the sparrows as they summer on Plum Island, feeding among the vegetation and laying their eggs. Then the levels decrease when the birds fly south for the winter. Come summer the levels rise again, especially among the sparrows on Plum Island.

To track the cycles, the team attaches tiny identification bands to the legs of more than 100 birds, locating them in the marshes several times over the summer (the birds tend to return to the same sites each year) to take blood and feather samples that measure the rising amounts of mercury in their systems.

Using vials hardly bigger than toothpicks, researchers gently draw blood from each bird, then weigh and measure it before releasing it back to the vast marshland. The birds hop and dart low to the ground, quickly disappearing in the grasses.

Van Arsdale said the team will need to repeat the process for several more years to confirm the preliminary finding. Pinpointing the sources of Plum Island's unusually high contamination levels, he said, will be more complex.

But the 2006 deluge on Mother's Day weekend, which created widespread flooding along the Merrimack River, provided intriguing clues. Mercury levels in Plum Island's sparrows spiked in the aftermath. Reproduction data showed fewer chicks that season, compared with last year.

"It could be a coincidence, but it kind of raises flags that we want to study," said Pau, the lead wildlife biologist at the refuge. "The more we study, the more concerned we get."

Their mission, she said, can be frustrating at times.

"When you learn about science in school, you think you do research to answer a problem," Pau said. "But sometimes, the more you look, the more you find questions."

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