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## A Bird Whose Life Depends on a Crab

By DEBORAH CRAMER

GLOUCESTER, Mass. — HORSESHOE CRABS have been around for 475 million years, making them among earth's oldest animals. They emerge from waters along the Eastern Seaboard during the high tides of full and new moons each May and June to spawn and lay their eggs on sandy beaches. The world's largest population is concentrated in the Delaware Bay off the coasts of New Jersey and Delaware.

Arriving not far behind the crabs are thousands of small russet-colored shorebirds, known as red knots. They show up just in time to feast on the abundance of crab eggs before resuming their 9,300-mile journey from Tierra del Fuego to the Canadian Arctic. More than half of the red knots along the Western Atlantic flyway converge at this crucial springtime refueling stop, our own avian Serengeti.

But the number of horseshoe crabs has declined over the years. We'd been catching too many to use as bait to snag other sea creatures. That has meant trouble not only for red knots, whose numbers in the Delaware Bay have plummeted by 70 percent since the early 1980s, but for us.

Just as the red knots depend on crabs for food, we depend on them for their blood, which is exquisitely sensitive to bacterial toxins that can cause illness or death in humans. This has made a creature that survived the dinosaurs vital to modern medicine. The biomedical industry uses crab blood to create a clotting agent to test for bacterial contamination in an array of drugs and medical devices — from vaccines to intravenous medicines, heart stents and artificial hips.

The demand for these crabs has been a factor in the decline of the red knot, *Calidris canutus rufa*, whose numbers have dwindled to the point that the United States Fish and Wildlife Service recently proposed designating the bird as threatened, or likely to become in danger of extinction. If the red knot is so designated following the public comment period that ends on Friday, the government would develop a plan for the bird's recovery.

This could involve further protecting the crab, now used by commercial fishermen as bait for eel and whelk. The Atlantic States Marine Fisheries Commission, which regulates fishing along the coast, began restricting crab catches in 2000, and last year linked future harvest levels to recovery goals for the red knot.

Tougher action is required. The number of horseshoe crabs has stabilized in the Delaware Bay, but despite a moratorium imposed by New Jersey on crab harvesting by the bait industry, their population does not appear to be increasing. Meanwhile, since

2007, the number of crabs that die each year after being collected for their blood has exceeded the number recommended by the commission's management plan.

The biomedical industry catches crabs, extracts some of their blood and releases most of them back to the water. Many die as a result. Last year, the commission estimated that 15 percent, or 79,800, died — 40 percent more than its suggested threshold of 57,500 crabs. Recent studies suggest that the mortality from the biomedical catch could range from 20 to 30 percent. The industry says it is much lower.

Demand for horseshoe crab blood is only likely to increase as worldwide demand for medical devices and drugs continues to rise. The biomedical industry's catch has increased by 85 percent since 2004. Industry representatives have agreed to discuss with the commission how to reduce mortality.

Looking ahead, other threats also loom both for the red knot and horseshoe crab. The sea is becoming increasingly acidic as we pump more and more carbon dioxide into the atmosphere, and this is stunting the growth of tiny clams and mussels eaten by both crabs and shorebirds.

The red knot is the first bird proposed for inclusion on the endangered species list whose troubles are primarily a result of climate change. Erosion and storm surges are likely to become more intense as the climate warms and the seas rise, threatening the beaches where crabs spawn and shorebirds feed. Last year, Hurricane Sandy wiped out 70 percent of the Delaware Bay's best horseshoe crab spawning beaches, requiring restoration.

Biologists also worry that changes in the climate could affect the red knot's Arctic breeding grounds and also result in "asynchronies" or mismatches in the timing of the bird's migratory cycle and the availability of food along its round-trip of more than 18,000 miles.

We need to address threats to the red knots before another storm or a bad spawning season for crabs pushes the birds closer to extinction. Regulators can begin by reducing horseshoe crab mortality in the biomedical industry. The rest of us can protect what is left of our coast by curbing development and insisting on aggressive reductions of greenhouse gas emissions. As seas rise and storms become more intense, we're not the only ones with something precious to lose.

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