

Climate Change Plays Unlucky for Horseshoe Crabs

By Zahra Hirji | Tue Aug 31, 2010 07:41 PM ET



Horseshoe crab populations are declining across the entire East Coast, from Maine to Florida, and are triggering a domino-effect among the larger animals that prey on them. Already, researchers are observing marked decreases in shore bird populations, especially the red knot bird and loggerhead sea turtles, two species that commonly feast on the crabs.

Human activity, from overfishing to population booms along shorelines, have been blamed for recent drops in the number of American horseshoe crab (*Limulus polyphemus*). A new study in the journal *Molecular Biology* suggests that climate change may also play a significant role.

Tim King, of the U.S. Geological Survey, and colleagues evaluated historical crab population trends and found a convincing correlation between historical climate change events and past declines in the species.

Horseshoe crabs, sometimes referred to as a living fossil, are some of the oldest creatures on Earth. These ancient arthropods evolved before humans and the dinosaurs; in fact, they have changed very little in the past 400 million years. Found around the world from Asia to the Americas, part of their resilience comes from their genetic diversity.

But as King and his team discovered, the current genetic diversity among American horseshoe crabs is surprisingly low -- a bad sign for an already threatened species.

Using the genetics of today's crab communities, the researchers pieced together historical population sizes. If a population was started by a few individuals, this causes a genetic bottleneck and results in a population with low genetic variation. This low diversity becomes apparent when a species' numbers start declining.

Scientists suspect that rising sea levels and temperatures since the last Ice Age likely washed away huge swaths of the crabs' habitat, separating them among newly isolated regions, and setting up these communities to bottleneck.

The low genetic variation observed in the crabs feeds a vicious cycle seen [across the animal kingdom](#): low genetic diversity hurts a species' ability to adapt to environmental changes, which then often results in a population decline that further decreases genetic diversity.

King still believes human activities, such as the harvesting of horseshoe crabs as bait for American eel and whelk fisheries, play a major role in the recent crab declines, but he wants to raise awareness about climate change's potential influence.

Saving the [horseshoe crab is essential to protecting the entire coastal water environment](#), King and others believe. The animals' hard shells house many small creatures like crustaceans and insects, in addition to being a primary food source for large migratory birds and reptiles.

Image: [Greg Breese, U.S. Fish and Wildlife Service](#)
