Counting Solution Holes for Key Deer

By Phil Kloer

Key deer are dependent on freshwater in a setting where freshwater can be scarce – the Florida Keys, the only place where the federally endangered deer live.

At National Key Deer Refuge, freshwater collects in small ponds that form in limestone. These ponds are known as solution holes, but are they plentiful enough, and fresh enough, to support the petite deer?

That question is being addressed by two Student Conservation Association interns in a project funded by the American Recovery and Reinvestment Act. Kristie Killam and Joshua Albritton are splitting a $50,000 contract to study the refuge's resource holes this year.

Specifically, they are re-inventorying about 270 solution holes on or near the refuge. They are comparing what they find with data from the last time the solution holes were sampled in the 1980s. They hope to determine if the holes have changed measurably in terms of salinity, biodiversity, wildlife usage and even their very existence.

"These holes haven't been thoroughly inventoried for more than 20 years," says refuge manager Anne Morkill. "So, Kristie and Joshua are doing a biological assessment of as many as they can." Last time, the solution holes were hand-drawn on maps. This time, the interns are using a Global Positioning System (GPS) device to mark the holes' precise locations and entering the data into a Geographic Information System (GIS).

"The way these holes work," Morkill says, "is that the Miami oolite limestone on top is less porous than the coral-like Key Largo limestone found elsewhere in the Keys, so rainwater is captured in pond-like formations. But because the elevations are low – an average of less than three feet above sea level – storm surges and rising sea levels are bringing more saltwater into these basins."

Visiting Personally

Killam has taken the lead on the project for the summer while Albritton returns to the University of Tennessee to pursue graduate coursework in ecology and evolutionary biology. Killam's seven years of experience as a wildlife biologist in Florida, three years as an environmental consultant in Maryland and 13 years as a public high school science teacher make her a wildlife veteran. As part of her transition back into a natural resources management career, she visits roughly half a dozen solution holes a day. Some are as small as six inches in diameter; others as large as several meters wide.

Key deer habitat is the focus of a Student Conservation Association project funded by the American Recovery and Reinvestment Act at National Key Deer Refuge, FL. (USFWS)

By comparing salinity and biological data, the study may help determine if climate change is affecting the solution holes and, thus, Key deer on the fragmented, 9,200-acre refuge, which is intersected by private lands with homes and by roads.

It's too early to draw conclusions, but, says Killam, preliminary findings indicate that, "in areas that have been developed, there has been quite a loss in the number of solution holes that can be used by wildlife. Some are even fenced inside people's yards."

In many ways, the study is also an informal census of wildlife that frequent the solution holes: alligators, turtles, leopard frogs, blue wing teal, egrets and ibises, racoons, dragonflies and damselflies. Since the project started, Killam says, it has blossomed beyond the Key deer into a broader look at endangered species (particularly marsh rabbits), invasive plants (Australia pine and Brazilian pepper plants) and invasive wildlife (green iguanas and fire ants).

But the refuge's namesake and the salinity of the solution holes remain the primary focuses. "Anything below 15 parts per thousand is drinkable," Albritton says, referring to salinity measurement, "and anything above that, the Key deer are going to avoid that hole."

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