Study Shows Big Game Hunters, Not Climate Change, Killed Off Sloths

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Prehistoric big game hunters and not the last ice age are the likely culprits in the extinction of giant ground sloths and other North American great mammals such as mammoths, mastodons and saber-toothed tigers, says a University of Florida researcher.

Determining whether the first arrival of humans or the warm-up of the American continent at the end of the last Ice Age was responsible for the demise of prehistoric sloths has puzzled scientists because both events occurred at the same time, about 11,000 years ago. But by using radiocarbon to date fossils from Cuba and Hispaniola, where humans appeared later than on the North American continent, long after the last Ice Age occurred, UF ornithologist David Steadman was able to separate the two events.

He and his colleagues found the last record of West Indian ground sloths coincided with the arrival of humans 4,400 years ago. The results are published in a Proceedings of the National Academy of Sciences paper this week.

“If climate were the major factor driving the extinction of ground sloths, you would expect the extinctions to occur at about the same time on both the islands and the continent since climate change is a global event,” Steadman said.

Gary Haynes, anthropology professor at the University of Nevada, Reno, said Steadman’s study “clearly shows that ground sloth extinctions in the

New World didn't happen after serious changes in climate or vegetation – and that the first appearance of humans must have been the decisive factor."

The fossil record shows the people who arrived in North America were making sophisticated tools out of stone, bone and ivory, Steadman said. These "big-game hunters" had a traumatic effect on the animals living there, he said.

More than three-fourths of the large species of mammals that roamed the North American landscape became extinct within a few thousand years, which, besides ground sloths, included mammoths, mastodons, saber-toothed tigers and giant bears, Steadman said.

"It was as dramatic as the extinction of the dinosaurs 65 million years ago," he said.

By understanding when, and to some extent how, ground sloths became extinct, scientists may be able to determine the biological potential of an area for restoration if human contact could be eliminated, such as in a national forest, a national park or an island, Steadman said.

"I'm not a Steven Spielberg type in that I don't believe that DNA would bring these things back," he said. "But in lieu of Jurassic Park, I think we can come up with sound ideas using the nearest living relatives. For example, we might want to consider taking living tree sloths and introducing them to protected forested areas on Cuba or Hispaniola."

While the largest of the prehistoric ground sloths grew to the size of a modern elephant and fed on bushes and the leaves of lower branches of trees, today's only surviving descendants are several small tree sloths whose range extends from southern Mexico to southern Brazil, he said.

Such an experiment might be similar to the one that involved restoring bison, once native to Florida, to Paynes Prairie Preserve State Park near Gainesville, Steadman said. “With the work we’re doing, especially on islands, to reconstruct which kinds of plants and animals -- particularly birds and mammals -- used to live there, we can open up possibilities for restoring parts of these islands to something near their original condition,” he said.

The only reason the living species of sloths survive is that they live high up in trees, where their green-algae-colored fur camouflages them, Steadman said. “God save the sloth that comes down to the ground because usually somebody is there to kill it,” he said.

For the study, Steadman sent samples from the large collection of ground sloth skeletons at the Florida Museum of Natural History on the UF campus, to Paul Martin, a professor emeritus of geosciences at the University of Arizona, for radiocarbon dating.

Steadman said he was not surprised to find that humans were more significant than changes in climate because most species of plants and animals can adjust to changes in temperature. However, the transition between the glacial and inter-glacial period, which resulted in shifts in habitat and the ranges of plants, may have made animal species more vulnerable than they otherwise would have been, he said.

“This is the first time it’s been demonstrated for West Indian ground sloths, and West Indian ground sloths are sort of the poster child of big extinct West Indian mammals,” he said. “I think this will go a long way to finally put to rest this whole idea that large extinct animals from the West Indies died out in the Ice Age during the Pleistocene Epoch.”

Source: University of Florida