Researchers try to understand consequences of declining populations of large-bodied mammals

November 3 2015

More than 70 species of large-bodied mammals weighing more than 600 kg were lost in the late-Pleistocene extinction.

Researchers at the University of New Mexico, in a collaboration with other scientists, have demonstrated that the extinction of mammoths, mastodons, camels and other large-bodied mammals in the Americas

some 13,000 years ago changed the way that ecosystems were structured.

The study, released recently as part of a special feature in the journal *Ecography*, is the first to quantitatively explore the structure of mammal communities after the terminal Pleistocene megafauna extinction.

Led by Felisa Smith from the University of New Mexico, the research team included Seth Newsome, also a professor in the biology department, two graduate students: Catalina Tomé and Emma Elliott-Smith, Kathleen Lyons, a scientist from the Smithsonian, and Tom Stafford, a professor from Aarhus University.

To document what happened to mammal communities after the late-Pleistocene extinction of some 70 species of large-bodied mammal – all species greater than 600kg were lost, researchers examined fossils from an unusually well resolved site, Hall's Cave, in the Edward's Plateau of Texas. They compared the structure and composition of the mammal community over time as well as associations, or diassociations, between species.

"We found significant differences between extinct mammals and modern ones." said Felisa Smith, the lead author on the paper, "Extinct mammals were twice as likely to form strong species pairs than modern ones. For example, the most voracious predator of the time – the short-faced bear- was found more often than expected with mastodons, camels and giant sloths, suggesting that it preyed upon them. This type of strong predator-prey relationship was not seen with any of the modern predators at the site."

The goal of the research was to understand not what caused the extinction, which has been hotly debated by scientists for decades, but rather to understand how surviving animals responded.

Hall’s Cave in the Edward’s Plateau of Texas.

"We don't care who or what caused the extinction" said Newsome "but rather in what this event can tell us about how ecosystems respond to the loss of large-bodied animals. Certainly, our results strongly suggest that modern mammal communities are less cohesive than they were in the past." Added Tomé, a graduate student and co-author on the study "This is important because it suggests modern ecosystems might be less resilient to environmental changes".

The researchers found a fundamental shift in the mammal composition of the community, with grazers being replaced by frugivores/granivores

at around 15,000 years ago; today the only large-bodied grazer remaining is the bison. Both the climate and vegetation shifts and the extinction of megafauna were implicated in the changes in the structure of the community.

"Scientists have argued about the cause of the extinction for a long time" said Elliott Smith "but we really should be paying attention to how the removal of hundreds of millions of animals the size of bulldozers changed North America." Estimates suggest that perhaps as much as half a billion mammals were extirpated at this time. "The mammal assemblage of North America was more diverse than that of modern Africa" added Lyons. "It would have been something to see."

The results give clues about the role of large-bodied animals on ecosystems. This is important because most large-bodied animals around the globe today are in peril. Understanding the consequences of the loss of their 'ecological function' can help us develop mitigation and conservation strategies.

Provided by University of New Mexico

Citation: Researchers try to understand consequences of declining populations of large-bodied mammals (2015, November 3) retrieved 27 April 2024 from https://phys.org/news/2015-11-consequences-declining-populations-large-bodied-mammals.html