SMART NEWS

Mammoth and Horse DNA Left in Freezer Rewrite Ice Age Extinctions

New research reveals the ancient animals survived some 8,000 years later than previously thought

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Frozen DNA evidence trapped in soil suggests that mammoth and wild horse populations petered out slowly, instead of vanishing quickly. Leonello Calvetti via Getty Images

Frozen soil samples collected around a decade ago are rewriting our understanding of iconic Ice Age animals like the woolly mammoth. The soil samples were pulled from Canada's permafrost in the early 2010s, but no work on them had been published until recently. A new analysis of the DNA samples reveals that woolly mammoths, wild horses and steppe bison were around as recently as 5,000 years ago—some 8,000 years later than previously thought, according to a study published this week in *Nature Communications*.

Most DNA samples are taken from materials like bone or hair, but soils also contain also genetic residue that animals leave behind as they move through an environment, according to *Gizmodo*'s Isaac Schultz. The soil samples sat in a freezer untested for years until Tyler Murchie, an archaeologist specializing in ancient DNA at McMaster University, decided to reinvestigate them.

"I found them in the freezers while looking for a new project during my PhD," Murchie, lead author of the new paper, tells *Gizmodo*. "One of my responsibilities at the ancient DNA center is freezer maintenance, so I had a good idea of what cool stuff might be in there waiting for someone to study."

The research team was eager to understand how and why large North American species like mammoths and bison survived for thousands of years before they vanished. During the Pleistocene-Holocene transition roughly 11,000 to 14,000 years ago, the climate went through rapid changes that led to the extinction of many Ice Age species like mastodons and saber-toothed cats. Based on previous research, scientists suspected two factors were driving extinctions: a loss of food due to a warming climate or overhunting by humans. It's a question scientists have "been grappling with for some 270 years," says Murchie to *Gizmodo*. In the new paper, Murchie's team presents a DNA record of the plant and animal community dating back 30,000 years.

"Just from gathering tiny flecks of dirt—in this case between about 0.5 and 1 gram, which is very little sediment—we can reconstruct the whole ecosystem with a variety of animals that existed in the area," Murchie says to Sebastian Leck for CBC News.

Scientists reconstructed the ancient ecosystem using radiocarbon dating of plant material trapped in the soil in combination with microscopic genomic sequences from animal species. Their results showed something unexpected: Large mammals like mammoths and horses were already on the decline before the climate warmed. Murchie and his colleagues found evidence of woolly mammoth and North American horse DNA as recently as 5,000 years ago, which means the animals held out until the mid-Holocene.

ime to sample DNA trapped from the permafrost, as human-caused climate change is melting t melts, DNA trapped in the frozen earth breaks down and stored carbon is released into the e planet.

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nalist based in Brooklyn. Her work has also appeared in *Audubon* magazine, *National Geographic* and others.

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