White Sands

National Park Service
U.S. Department of the Interior
White Sands National Monument

The Pleistocene Trackways of White Sands National Monument

Have you ever wondered what this area, the Tularosa Basin, looked like 30,000 years ago? Was it a desert like today—or was it perhaps lush with lots of plants and animals?

Our present day desert was once a verdant land teeming with prehistoric plants and animals. The climate during the Pleistocene epoch was much wetter and cooler than today. Rain and snowmelt filled a 1,600 square mile lake called Lake Otero. This lake was larger than great lakes Erie and Ontario combined! Clues of this past oasis are found in the ephemeral trackways left behind by the Pleistocene giants that once called the Tularosa Basin home. Scientists are studying these trackways to gain a better understanding of this ancient ecosystem and the mighty mammals that ruled the day.

Scan for an in-depth explanation of the geologic story of White Sands and the Tularosa Basin.

First Discoveries

In 1932, Ellis Wright, a government trapper, found large tracks on the west side of the White Sands. He thought that he had discovered the tracks of a giant human! Each track was approximately 22 x 10 inches, the size of a rectangular place mat. Subsequent investigators thought that the tracks were indeed human because the print was perfect and even the instep was clearly marked.

It was not until 1981 that further investigation of the tracks identified them as mammoth, giant camel, and an undetermined mammal. During a tour by the New Mexico Archaeological Council in June of 1984, a large mammoth molar fragment was observed in a small gully within 800 feet of one of the mammoth tracksites. Unfortunately, there is no record that the fossil was ever recovered.

What Does the Future Hold?

Tracks found in the monument are preserved in gypsum layers and are quite fragile. Once exposed from beneath the sand, the tracks weather rapidly. Many of the recently found tracks have already eroded and disappeared. Because they breakdown so quickly, monument staff is working with experts to develop a strategy for conservation and monitoring of the tracks. Their scientific significance underscores the need for continuing research into these incredible and rapidly vanishing natural wonders.

Weathering of exposed mammoth tracks

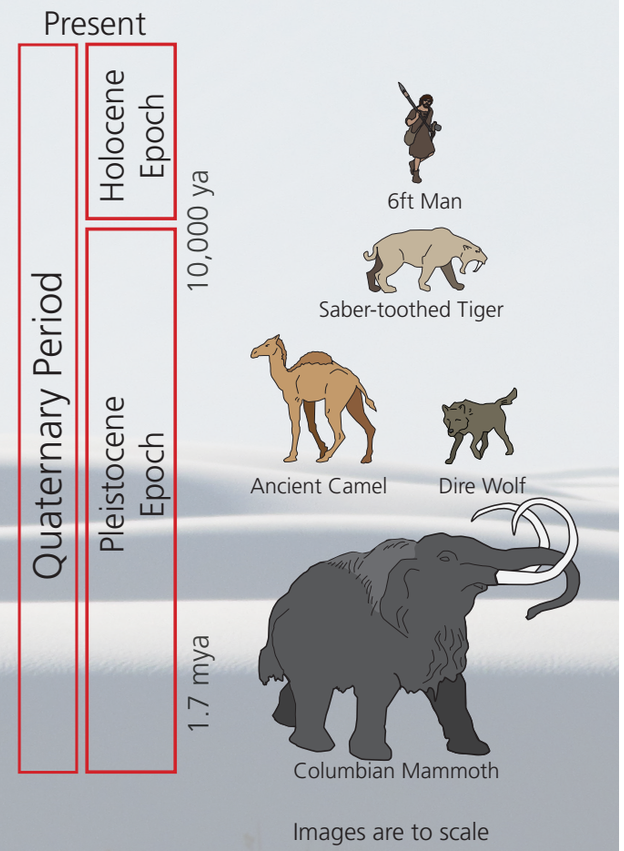
What We Are Learning Now

In 2001, tracksites in the monument were re-examined. Tweny-five mammoth tracks and 64 camel footprints from the late Pleistocene epoch were discovered. Additional trackways were also discovered on the southern shore of Lake Lucero. There were hundreds of them, all of which were nearly east-west in orientation. Unfortunately, the tracks were poorly preserved in the soft gypsum. Their age was determined to be about 30,000 years old by carbon dating the seeds and other plant matter embedded in the track itself. These tracks pre-date the arrival of humans in the area by about 20,000 years.

Since 2007, researchers and monument staff have discovered even more fossilized tracks within the monument. They may represent the largest concentration of Pleistocene trackways in the United States. They appear to be primarily from mammoths, camels, dire wolves, and saber-toothed tigers. While most of them pre-date humans in the area, a few recently discovered sets of fossil tracks appear to be associated with archaeological artifacts. This suggests the possible co-existence of humans and mammoths in the basin. The majority of the fossil tracks suggest that the ancient animals traveled to and along the shorelines of Lake Otero and across the surrounding wetlands during the late Pleistocene.

Pleistocene Epoch Happenings

A lot was going on during the late Pleistocene. It was during this period that our earliest human ancestors appeared and gradually evolved into *Homo sapiens*. By this time, the continents had moved into their modern positions and one of the last major Ice Ages shaped the land through dozens of interglacial and glacial periods. In North America, glaciers advanced and retreated, sometimes extending all the way down into New Mexico. Large mammals (megafauna) were plentiful and the climate dramatically shifted, changing from cool and moist to hot and arid.



Images are to scale

Columbian Mammoth

6ft Man

Ancient Camel

Mammoths
Mammuthus primigenius
Mammuthus columbi

Mammoth species in North America included the Wooly mammoth (*Mammuthus Primigenius*) and Columbian mammoth (*Mammuthus columbi*). Tracks from both species have been found in White Sands but the majority are from the Columbian mammoth.

Both mammoths were herbivores, eating mostly grass but grazing on other types of plants as well. Like today's elephants, they ate 600 pounds of food and drank 40 gallons of water daily. In fact, they spent 16–18 hours a day either feeding or moving toward a source of food or water.

Like modern elephants, mammoths used their tusks to dig and collect food and to intimidate and fight off predators and rivals. Their tusks began to form at birth and grew throughout their lifetime, gaining a new layer each year. Like tree rings, changes in tusk growth rate generally reflect changes in the animal's nutritional condition.

Camels
Camelops hesternus

The ancient western camel evolved rapidly between 33mya and 12mya, finally developing into *Camelops hesternus*. Originating in North America, *camelops* probably looked like a large dromedary, a modern-day one-hump camel. It went extinct around 11,000 years ago, probably due to pressures such as increased hunting and global climate change.

Weighing in at around 1,764 pounds, *camelops* would have dwarfed its modern cousin, which weighs around 1,433 pounds. Its limbs were also longer and its estimated shoulder height was seven feet. Like modern camels, it was an opportunistic herbivore that would eat any vegetation it could reach. Although modern camels are known for being able to survive for long periods without water, it is unknown whether *camelops* was able to do the same.

Saber-Toothed "Tiger"
Similodon fatalis

Known for its large canines, one species of saber-toothed tiger, *Smilodon fatalis*, stalked the Tularosa Basin until about 10,000 years ago. Unlike its colloquial name suggests, it was not related to any modern feline species. It was, however, larger and had a more robust build than modern "big cats" such as tigers, lions, leopards, and cougars.

As frightening as its canine teeth may look, *Smilodon*'s bite was relatively weak. The larger teeth reduced the space available for jaw muscles, reducing bite pressure. Biting down too hard on a prey animal could result in the breakage of one of its canines.

Smilodon's bob-tail suggests that did not chase down prey like lions or tigers whose long tails help them maintain balance while running. Instead, they were more likely opportunistic hunters, hiding in tall grasses and ambushing prey animals. Its diet would have included prehistoric deer, bison, and an occasional mammoth.

Dire Wolf
Canis dirus

Looking very much the modern-day gray wolf, the dire wolf hunted the grasslands of the basin until around 10,000 years ago. Similarities between the two species, however, stop at appearances.

The dire wolf was much heavier and had powerful bone-crushing jaws and teeth. Its legs were shorter and its shoulder blades more massive than the modern gray wolf. Weighing between 125 and 175 pounds, it was about the size of an English Mastiff—one of the biggest and heaviest dogs recognized by the American Kennel Association.

The dire wolf's rear teeth were adapted for tearing, not chewing. This suggests that it did not chew its meal but tore off large chunks of flesh and swallowed them whole. They were not picky eaters so any animal available was on the menu. Larger animals like bison could also be taken down by hunting in packs of 30 wolves or more.

Saber-toothed Tiger

6ft Man

Dire Wolf

Images are to scale

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