

What Happened to the Megafauna?

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Introduction



Modern bison are relatives of the ancient herds that once roamed North America. Grant Keddie photograph.

The large animals that roamed North America near the end of the Ice Age—mammoths, mastodons, horses and camels, among others—are called megafauna. Why did these animals become extinct? Scientists have debated this for years, but answers are beginning to emerge.

New research shows that the reasons are more complex than was previously thought. Both human hunting and climate change played a role.

For a 800-year stretch between 11,700 and 10,900 years ago, the open parkland near Victoria, BC provided habitat for herds of bison. A subsequent cold period saw their disappearance from Vancouver Island.

Expanding and Shrinking

Before the appearance of humans in the northern landscape, ecosystems were generally stable for long periods of time. The last major ice age, the Pleistocene (2.6 million to 11,700 years ago), was a time of sudden, repeated climate change. Animal populations could retreat to refugia—regions where the climate was more consistent—during harsh times and return to more favourable habitats later. During cold periods, when the sea level was as much as 150 metres lower, the Beringian continent—a landmass that spanned the region of the Bering Strait, including what is now Siberia and Alaska—was as wide as the Canadian prairies.

The evidence for shrinking environments is visible in the reduction of genetic diversity in large animals such as mammoths, mastodons and bison. Grass-loving animals of the far north were displaced with the expansion of boreal forests during warm periods. Boreal forest-dwelling mastodons disappeared from large parts of the north 70,000 years ago as colder climates advanced and open-tundra environments returned. By the time humans appeared on the scene, mastodons only lived far to the south.

Often animal populations nearly disappeared before subpopulations made a comeback. This pattern of population reduction and expansion happened even faster during rapid warming periods, when the habitat shrank faster than at the beginning of cold periods. The appearance of humans in a region may have destabilized the pattern by restricting the movements of animal populations.

Human Interference

Humans probably interrupted the ability of megafauna subgroups to connect with each other. If humans lived in the same resource-rich areas as the animals, or if they concentrated around the animals' migration routes, this would be especially likely. The concentration of large game animals in smaller regions would have made them more susceptible to predation.

Some mammal species that ranged across Beringia became extinct on one continent but not the other with the rise of sea level at the end of the Pleistocene. Examples include the horse (*Equus caballus*) and the Saiga antelope (*Saiga tatarica*), which survived only on the western side of the Bering Strait, in what is now Eurasia.

Humans coexisted with megafauna for several thousand years in the part of eastern Beringia that is now Alaska and the Yukon. During this time mammoths and horses disappeared, but muskox, bison and caribou survived.

Farther south, where humans were more numerous, large animals were faced with both rapid environmental change and even greater predation. In the American Southwest, mammoths experienced a warm, dry climate, which would have made their seasonal movements more predictable—and more vulnerable. Large-scale predation of mammoths and mastodons is often associated with a group of people who existed for a short time around 13,200–12,900 years ago. We call these people the Clovis culture, and we can recognize them in the archaeological record by their distinctive spear points. Other cultures before and after the Clovis culture also hunted mammoths, but our knowledge of these cultures is still developing.

When the Ice Age ended and the Holocene began, around 11,700 years ago, there were far fewer species of megafauna in North America and Eurasia. By this time the Woolly mammoth (*Mammuthus primigenius*) had become extinct in many parts of North America and the Eurasian continent. The last mammoth survivors lived on Wrangle Island, northwest of the Bering Strait, and disappeared only 3,700 years ago—around the same time as the first human occupation of the island.