

New Theory For Megafaunal Extinction

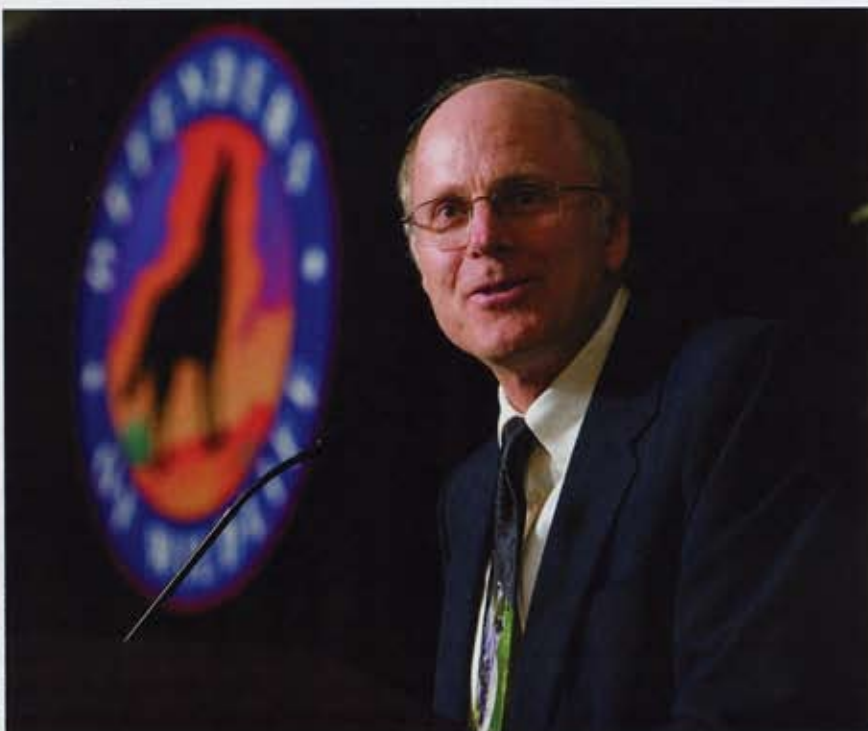
Humans threw a delicate system out of balance.

A recent study published in the journal *Bioscience* brings together a variety of data to suggest that newly arrived humans tipped the delicate balance that existed in North America between carnivores and herbivores, resulting in the mass extinction of large mammals about 10,000 years ago.

Scientists have long debated the cause of the late Pleistocene extinctions when some two-thirds of North America's large mammals went extinct, the two most popular theories pinning the extinctions on declines in food due to climate change and overhunting by humans. However, analyses of mammoth tusk growth rates, and other evidence suggest that the large herbivores such as mammoths were not suffering from food shortages between 10,000 and 15,000 years ago. "In debating the role of humans in the late Pleistocene megafaunal extinctions, the problem is that they didn't really have the greatest technology for killing off these animals," said Blaire Van Valkenburgh, professor of ecology and evolutionary biology at UCLA and co-author of the study. "But they didn't have to, they just tipped the balance that existed."

Rather than humans hunting the animals to extinction, William Ripple, the study's lead author, and Van Valkenburgh propose that by hunting various types of carnivores and herbivores, humans disrupted a delicate balance, triggering a collapse in the large herbivores and, ultimately, the carnivores that preyed upon them.

The researchers compared dental samples of modern and Pleistocene carnivores and found that the latter's teeth were heavily worn and fractured, suggesting that, presumably due to intense



William Ripple gives an acceptance speech after receiving an award for his research concerning large predators, herbivores, and plants.

competition for food, they consumed much of the carcass, including bones. Humans survived by varying their diets and protecting themselves by using fire, weapons, and living in groups.

Ripple, a professor of Forest Ecosystems and Society at Oregon State University, has been examining so called trophic cascades in Yellowstone National Park, where the elimination of wolves resulted in an explosion of the elk population, in turn causing widespread overgrazing, damage to stream ecosystems, and disruptions to other animal and plant life. Following the re-introduction of wolves to the park, these processes have begun to reverse themselves.

"We think the evidence shows that

major ecosystem disruptions resulting in these domino effects can be caused by subtracting or adding a major predator," said Ripple. "In the case of the woolly mammoths and saber-toothed cats, the problems may have begun by adding a predator, in this case humans."

Ripple and Van Valkenburgh have applied for a National Science Foundation grant to examine dental conditions of fossil animals from the late Pleistocene and to further study modern predator-prey systems in Yellowstone and Isle Royale National Park in Lake Superior, focusing on dental conditions of modern carnivores and their predator-limited prey as analogs for late Pleistocene conditions.

—Tamara Stewart