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Letter to Editor

Climate Change *vs.* Overhunting

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LETTER TO EDITOR

Dear Editor,

A new study suggests that the extinction of North America's largest mammals wasn't driven by overhunting by rapidly expanding human populations following their entrance into America. Instead, the findings, supported a replacement statistical modelling approach, suggest that populations of huge mammals fluctuated in response to global climate change, with drastic decreases of temperatures around 13,000 years ago initiating the decline and extinction of those massive creatures. Still, humans may are involved in additional complex and indirect ways than simple models of overhunting suggest [1].

Since the 1960's, it's been hypothesized that, as human populations grew and expanded across the continents, the arrival of specialised "big-game" hunters within Americas some 14,000 year ago rapidly drove many huge mammals to extinction. The massive animals didn't possess the acceptable anti-predator behaviours to affect a completely unique, highly social, tool-wielding predator, which made them particularly easy to hunt. Consistent with proponents of this "overkill hypothesis," humans took full advantage of the easy-to-hunt prey, devastating the animal populations and carelessly driving the enormous creatures to extinction. Not everyone agrees with this concept, however. Many scientists have argued that there's insufficient archaeological evidence to support the thought that mega fauna hunting was persistent or widespread enough to cause extinctions. Instead, significant climatic and ecological changes may are responsible.

Around the time of the extinctions (between 15,000 and 12,000 years ago), there have been two major climatic changes. The primary was a period of abrupt warming that began around 14,700 years ago, and therefore the second was a chilly snap around 12,900 years ago during which the hemisphere returned to near-glacial conditions. One or both of those important temperature swings, and their ecological ramifications, are implicated within the mega fauna extinctions.

"A common approach has been to undertake to work out the timing of mega fauna extinctions and to ascertain how they align with human arrival within the Americas or some climatic event," says Mathew Stewart [2], co-lead author of the study. "However, extinction may be a process meaning that it unfolds over some span of your time then to know what caused the demise of North America's mega fauna, it's crucial that we understand how their populations fluctuated within the initiate to extinction. Without those long-term patterns, all we will see are rough coincidences."

To test these conflicting hypotheses, the authors used a replacement statistical approach developed by W. Christopher Carleton. Estimating population sizes of prehistoric hunter gatherer groups and long-extinct animals can't be done by counting heads or hooves. Instead, archaeologists and palaeontologists use the radiocarbon record as a proxy for past population sizes. The rationale being that the more animals and humans present during a landscape, the more datable carbon is left behind after they're gone, which is then reflected within the archaeological and fossil records. Unlike established approaches, the new method better accounts for uncertainty in fossil dates [3]. The major problem with the previous approach is that it blends the uncertainty related to radiocarbon dates with the method scientists try to spot. "As a result, you'll find yourself seeing trends within the data that do not really exist, making this method rather unsuitable for capturing changes in past population levels. Using simulation studies where we all know what the important patterns within the data are, we've been ready to show that the new method doesn't have equivalent problems. As a result, our method is in a position to try to a way better job capturing through- time changes in population levels using the radiocarbon record," explains Carleton. The authors applied this new approach to the question of the Late Quaternary North American megafauna extinctions. In contrast to previous studies, the new findings show that megafauna populations fluctuated in response to global climate change.

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