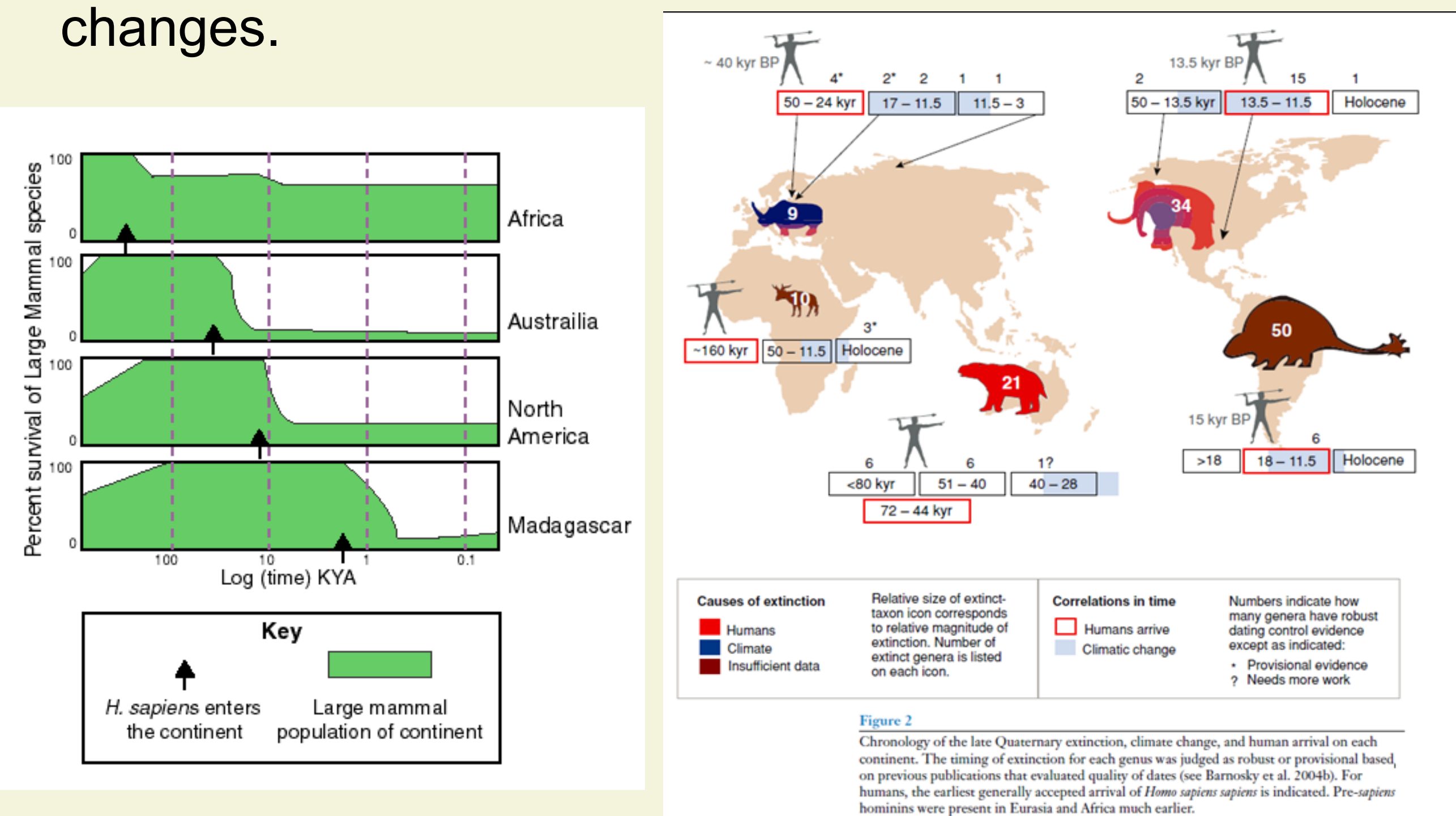


Mitch Torkelson (Biology) | Henry Zink (Sustainability)

## The Overkill Hypothesis

Paul Martin argues that animals had no previous experience with humans, and introducing them allowed them to become super-predators for megafauna. This caused rippling effects through ecosystems such as trophic cascades.

1. Extinctions were sudden, within the span of a few thousand years
2. Extinctions consistently followed directly after the introduction of humans.
3. The biggest losses were to large terrestrial mammals. Almost none were marine species. This showed hunting preference by humans
4. Megafauna only survived in Africa, which is the location where humans and megafauna coevolved.
5. The extinctions were not caused by displacement of animals from their niches by competing exotic species, since the ecological niches remained unfilled after the extinctions.
6. There are massive hunting sites filled with animal remains from hunting, although they are rare. Martin likens the invasion of humans to the "blitzkrieg" emphasizing the speed and ferocity.
7. Many of the extinct species had survived previous climatic changes.

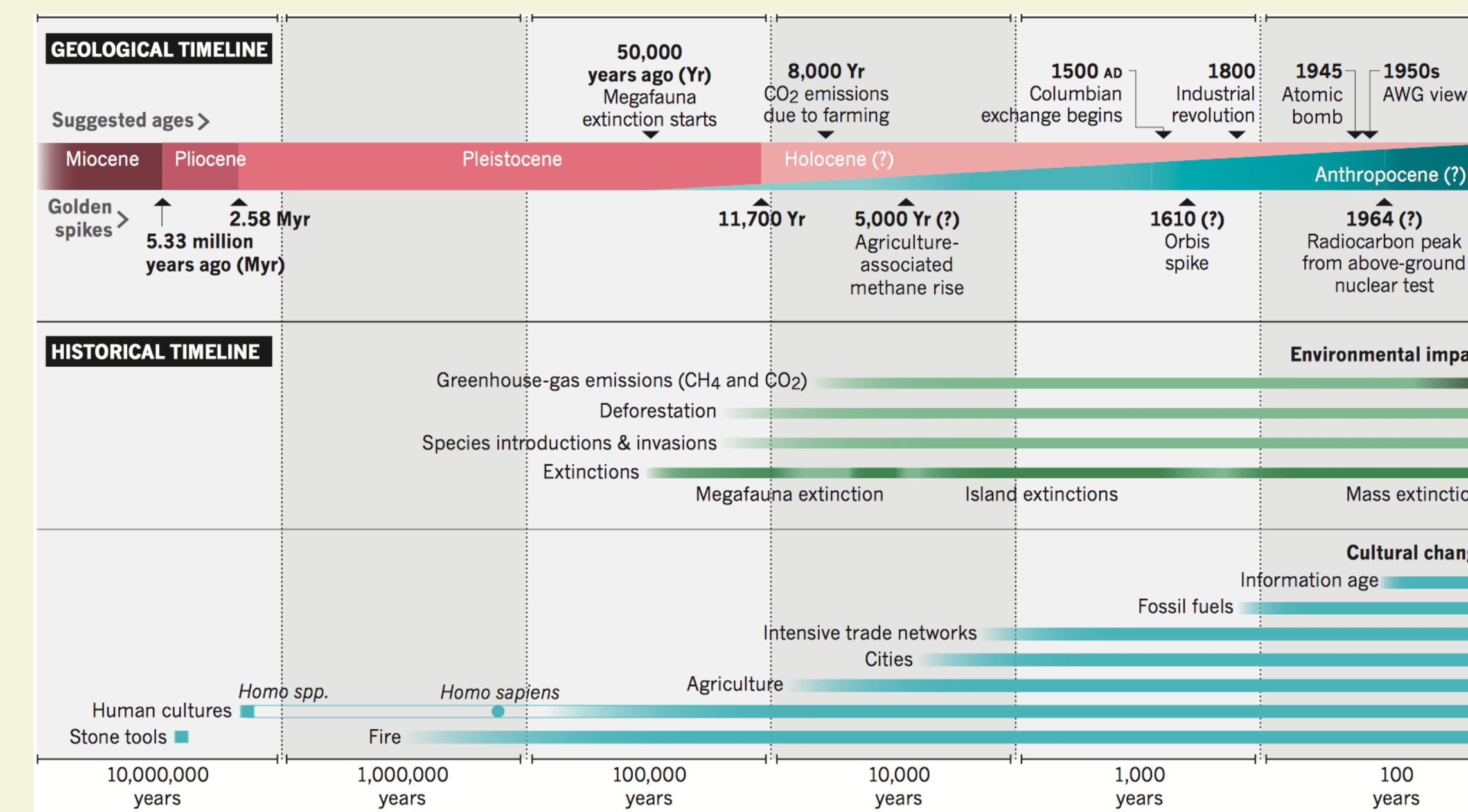


Martin's hypothesis has caught the attention of some skeptics who disagree for a few particular reasons:

1. There are too few kill sites. If humans had truly been a part of a blitzkrieg there would be more mammalian remains
2. Megafauna extinctions were happening around the world, many of which took place without humans.
3. Most archeological experts of the Pleistocene reject his hypothesis for being too much of an inference and not enough evidence.

## Abstract

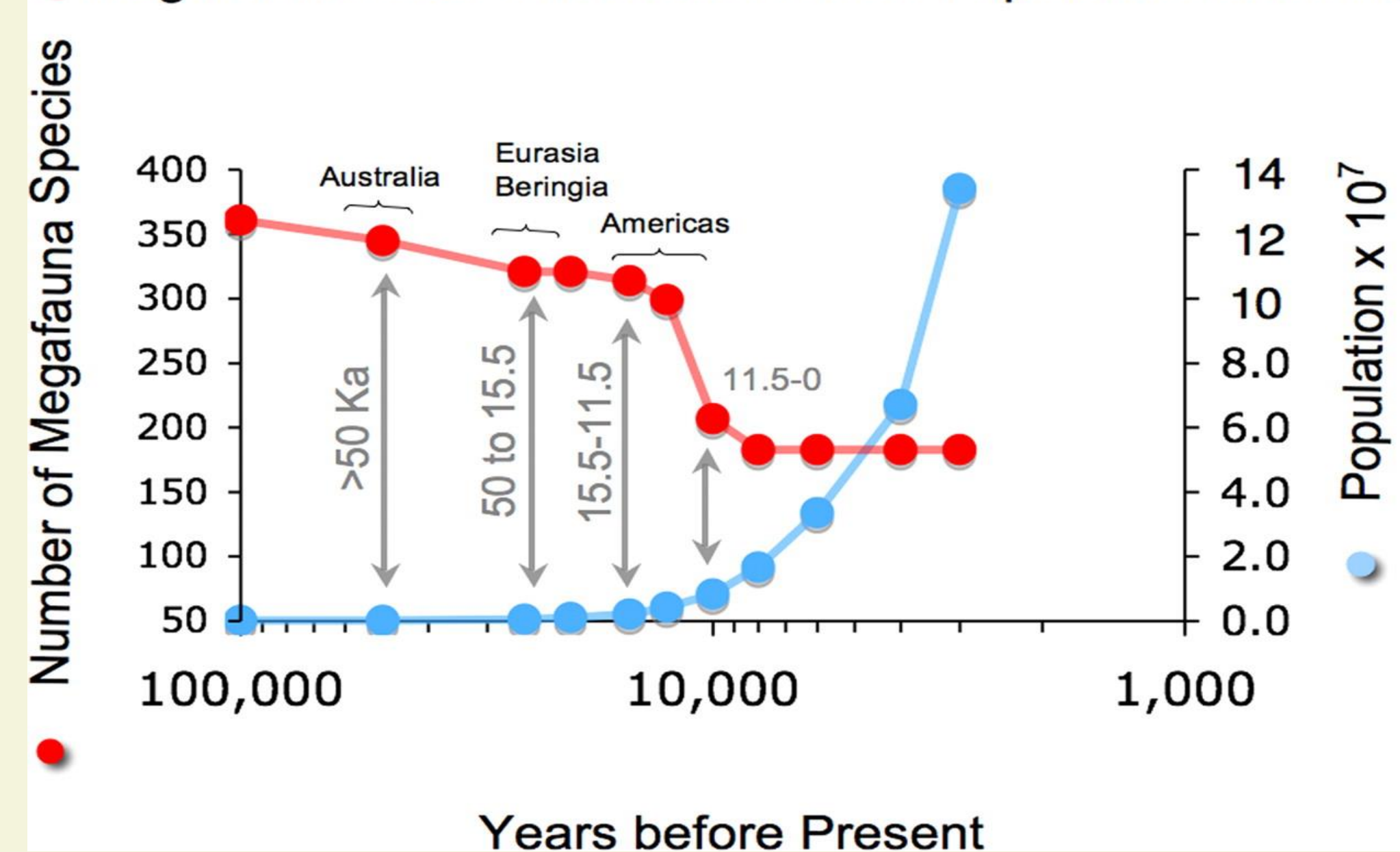
Arrowheads used by Paleo-Indians link to Lithic tools and hunting strategies as well as the Megafauna Extinction. Man's drive toward mastery of nature throughout this extinction has charged debates of its significance to the Anthropocene. Could it be the first golden spike? Paul Martin argues so in his Overkill Hypothesis, faces heavy pushback by environmentalists. Our goal is to give a clear overview of each side of the debate.



## Megafauna Extinction

Archeological records tell us that Asia natives crossed over the Bering land bridge that connected Canada to Russia 11,000 years ago. These people became known as the Paleo-Indians. Upon their arrival to North America, massive extinctions of land animals over 100 lbs. began to occur, including the woolly mammoth and saber-toothed tiger. Ultimately, 34 mammalian species would go extinct during this time.

● Megafauna Loss vs. Global Human Population Growth



## Environmental Hypothesis

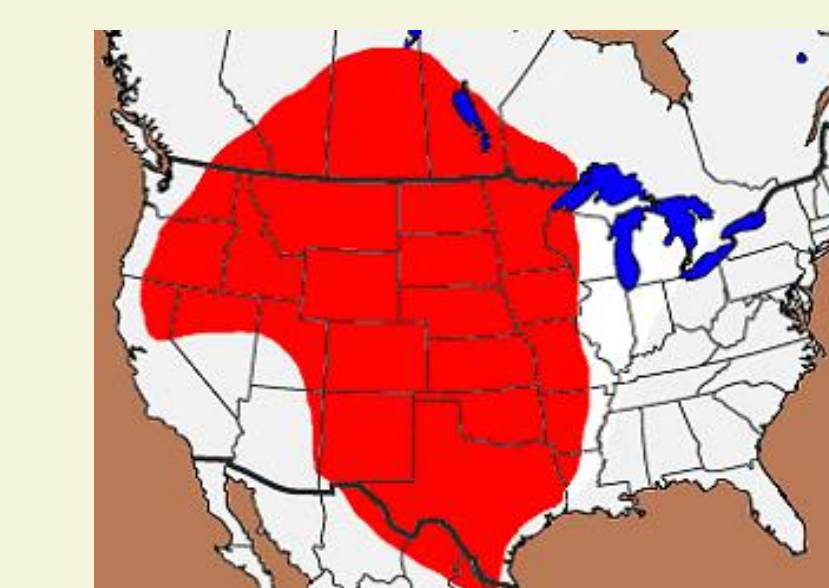
A particularly strong alternative hypothesis credits the ecological effects of climate change for having caused mass megafauna extinctions.

1. Habitat Loss: areas with adequate conditions for megafauna to live disappeared or fragmented.
2. Mosaic-Nutrient: reduced growing season and plant diversity reduced carrying capacities for megafauna.
3. Co-evolutionary disequilibrium: extremely rapid glacial-interglacial transition reorganized floras, disrupting ecosystems of coevolved systems.
4. Self-organized instability: extinctions resulted in small perturbations that were amplified into a catastrophe by multicomponent ecosystems.

## The Arrowheads

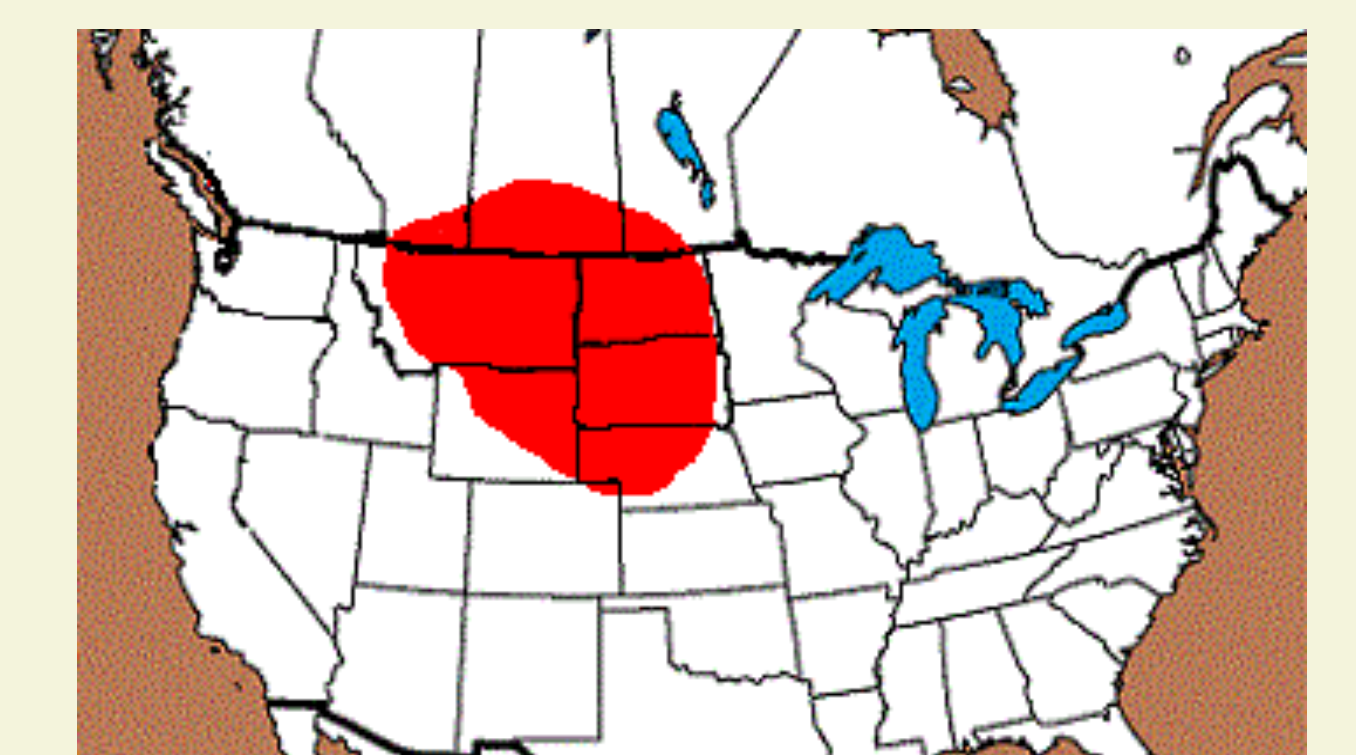
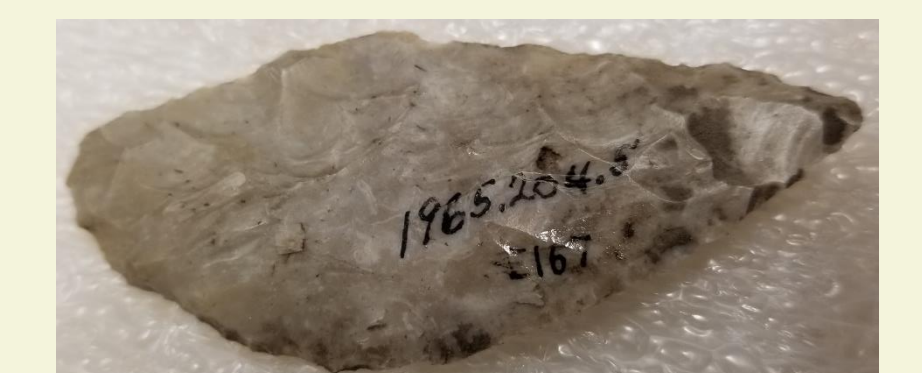
### Cut Bank Jaw-Notched

Easily identifiable by its small U-shaped side notches and straight edges. Made of flint ridge stone. This arrowhead is used for weaponry such as arrows and spears.



### Cody Knife

Easily identifiable by its weak shoulders and asymmetrical diagonal appearance. Made of Clovis stone. Possible uses include arrows, spears, or cooking.



## Sources

Barnosky, Anthony D. "Megafauna Biomass Tradeoff as a Driver of Quaternary and Future Extinctions." PNAS. August 12, 2008. Accessed April 06, 2018. [http://www.pnas.org/content/105/Supplement\\_1/11543](http://www.pnas.org/content/105/Supplement_1/11543).

Doughty, Christopher E., Adam Wolf, and Christopher B. Field. "Biophysical Feedbacks between the Pleistocene Megafauna Extinction and Climate: The First Human-induced Global Warming?" *Geophysical Research Letters* 37, no. 15 (2010). doi:10.1029/2010gl043985.

Ellis, Erle, Mark Maslin, Nicole Boivin, and Andrew Bauer. "Involve Social Scientists in Defining the Anthropocene." *Nature* 540, no. 7632 (2016): 192-93. doi:10.1038/540192a.

Koch, Paul, and Anthony Barnosky. "Late Quaternary Extinctions: State of the Debate." *Annual Reviews*. 2006. Accessed March 28, 2018.

"Projectile Point Identification Guide." Projectile Point Identification Guide. Accessed March 28, 2018. <http://www.projectilepoints.net/>.

Sundberg, Adam. "Firestick Ecology & Megafaunal Extinctions." Prezi.com. September 05, 2017. Accessed April 06, 2018.