



Extinction: Who's at fault

It's a raging debate. What's the greatest cause of extinction on Earth - humans or our climate? Associate Professor Rod Wells looks at the cause and effect of our diminishing biodiversity.

THE ebb and flow of life and death has been with us since life first appeared on the planet. Extinction has been as much a part of evolution as the appearance of new species.

And the causes of these extinctions appear to be many and varied.

Palaeontologists (scientists who study ancient life) speak of background extinction to differentiate the general evolutionary process from that of extinction through catastrophe.

For example, the evolution of the dinosaurs involved considerable species replacement (background extinction). This was a slow process, often caused by one species not being as well adapted to survive cyclic changes in the Earth's environment as others about it.

But the apparently sudden extinction of most dinosaurs at the end of the Cretaceous period was catastrophic, probably the result of an asteroid.

It is against the vast backdrop of history that we must judge the Earth's present situation.

We also must understand where the Earth is in its ongoing cycle of fire and ice. We now live in an ice-age - a period with polar ice-caps - that has lasted almost two million years.

Throughout this time, expansion and contraction of the great northern hemisphere ice sheets has resulted in falls and rises in sea level as water is taken up then released by glaciers.

The world is now in an interglacial phase of an ice-age. The last great glacial period (LGM) reached its peak about 18,000 to 20,000 years ago.

The penultimate glacial maximum occurred about 140,000 years ago.

Indeed, we now know that during the past 700,000 years the Earth has cycled through ever-deepening periods of low temperature and glacial aridity at approximately 100,000-year intervals.

As sea levels fall, new land bridges are exposed and, in the lead-up to the last glacial maximum, these bridges allowed humans to fan out across the globe.

By the end of this glacial period, about 10,000 years ago, temperature and sea level had returned to something approaching the present. But by then many of the world's largest ice-age mammals, the megafauna, were extinct.

What was the cause of this extinction?

We can see from the fossil record that the megafauna had survived previous glacial periods. So what was different this time?

The presence of humans.

Interestingly, the one place where large numbers of megafauna survived was where they had known mankind the longest: Africa.

Was it the naivete of the non-African megafauna facing this new human predator that led to their demise?

Like the Dodo, did they simply fail to recognise these strange new creatures as a threat? Scientists can still not agree.

Perhaps the last glacial phase was more extreme than the previous one. Perhaps the cumulative impact of this and previous glacial phases changed the pattern of vegetation. Perhaps a combination of climate and human hunting - or perhaps even disease - spelt their downfall.

○ Associate Professor Wells works in Flinders University's School of Biological Sciences.