



BY ANTHONY D. BARNOSKY

Halfway There

I'M A PALEONTOLOGIST, so when I think of extinction, I think big. The Big 5, to be exact. The Big 5 refers to five — and only five — extremely unusual times in the past 550 million years. Times when at least 75 percent of Earth's species went extinct in a geological instant. That's what people really mean when they say the words "mass extinction." Think about that. Five times, 550 million years. That works out to something that big happening, on average, only once every hundred million years or so. The last time it happened was when the dinosaurs went extinct — and that was the least dramatic of the Big 5, in terms of loss of species.

Now it looks to be happening again. People are talking about the 6th Mass Extinction. This one is different, because one species — us — is causing it. We're changing the world in four major ways. First, we turn places other species need to live into parking lots and farms — that's called habitat fragmentation. Second, there are lots of us — nearly seven billion, promising to grow to at least nine billion by 2050, and who knows after that. We need to eat, and we like our comforts, which means we take away resources that previously were available to support other species. It's a zero-sum game, the more we use, the less there is for other species. Third, we intentionally and inadvertently move species all over the globe — so-called invasive species, which often end up wiping out the natives. And fourth is global warming, caused by our insatiable appetite for fossil fuels. Yes, the Earth has been warmer before. But many species alive today — in fact, nearly all of the species of mammals, birds, reptiles, and amphibians — have never experienced temperatures they will see in the next couple of centuries. Nor have they seen the climate change as fast as it is changing now.

In short, species are ill equipped to adapt to the ways we humans have changed the planet, and they are succumbing. The numbers indicate we're moving fast towards the mass extinction benchmark exemplified by the Big 5, that is, at least 75 percent species loss. Here's what we know. Mammals: already up to 42 percent too low, compared to what was usual for millions of years before humans came on the scene, and another 21 percent of species endangered. Amphibians: up to 43 percent of species now endangered. Reptiles: 28 percent endangered. Birds: at least hundreds, maybe thousands of species gone already, at least 12 percent endangered. And that's just for species we have a reasonable handle on. Many, many more are going extinct even before we know they exist. The math is pretty simple. We're not at the 6th Mass Extinction yet, but the accumulating statistics suggest we could be halfway there in short order, at which point it would be very difficult, if not impossible, to arrest.

The good news is that we are not there yet. To keep the Big 5 from becoming the Big 6, we must apply human ingenuity towards keeping endangered species alive, and devise global conservation strategies that recognize the unique place in history that Earth's species, including us, occupy now. ▼

JAPANESE ENDANGERED SPECIES (above):

1. The Iriomote mountain cat, a "living fossil," was declared a Living National Treasure in 1977; less than 100 individuals are believed to exist today on the Okinawan island of Iriomote.
2. Japanese crane or *suzuko tsuru*: an estimated 1500 individuals exist in the wild.
3. The Amami rabbit only remains on two small islands, increasingly threatened by domestic animals.
4. The last wild Japanese crested ibis, or *toki*, in Japan died in 2003. The Sado Japanese Crested Ibis Preservation Center on Sado Island has a captive breeding program (supported by China) that aims to return 60 birds to the wild by 2015.



According to the International Union for Conservation of Nature (IUCN):

- 80 percent of all mangrove forests in India and SE Asia have been lost over the past 60 years.
- 75 percent of genetic diversity of agricultural crops has been lost.
- 75 percent of the world's fisheries are over-exploited.
- One-third of reef-building corals around the world are threatened with extinction.
- 17,291 species out of 47,677 assessed so far are threatened with extinction. Most threatened are amphibians.
- 23 percent of plant species and 12 percent of bird species are threatened with extinction.