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Humans on Verge of Causing 6th Great Mass Extinction

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Are humans causing a mass extinction on the magnitude of the one that killed the dinosaurs?

The answer is yes, according to a new analysis — but we still have some time to stop it.

Mass extinctions include events in which 75 percent of the species on Earth disappear within a geologically short time period, usually on the order of a few hundred thousand to a couple million years. It's happened only five times before in the past 540 million years of multicellular life on Earth. (The last great extinction occurred 65 million years ago, when the dinosaurs were wiped out.) At current rates of extinction, the study found, Earth will enter its sixth mass extinction within the next 300 to 2,000 years.

"It's bittersweet, because we're showing that we have this crisis," study co-author Elizabeth Ferrer, a graduate student in biology at the University of California, Berkeley, told LiveScience. "But we still have time to fix this."

Others aren't so optimistic that humans will actually do anything to stop the looming disaster, saying that politics is successfully working against saving species and the planet.

The 6th extinction

Species go extinct all the time, said Anthony Barnosky, the curator of the Museum of Paleontology at UC Berkeley and another co-author of the paper, which appears in today's (March 2) issue of the journal Nature. But new species also evolve constantly, meaning that biodiversity usually stays constant. Mass extinctions happen when that balance goes out of whack. Suddenly, extinctions far outpace the genesis of new species, and the old rules for species survival go out the window. [Read: Mass Extinction Threat: Earth on Verge of Huge Reset Button?]

"If the fossil record tells us one thing, it's that when we kick over into a mass extinction regime, results are extreme, they're irreversible and they're unpredictable," David Jablonski, a

paleontologist at the University of Chicago who was not involved in the study, told LiveScience. "Factors that promote success and survival during normal times seem to melt away."

Everyone knows that we now lose many species a year, Barnosky said. "The question is, 'Is the pace of extinction we're seeing today over these short time intervals usual or unusual?'"

Answering the question requires stitching together two types of data: that from the fossil record and that collected by conservation biologists in the modern era. They don't always match up well. For example, Barnosky said, fossils tell us lots about the history of clams, snails and other invertebrates. But in the modern world, biologists have only assessed the extinction risk for 3 percent of known species of such invertebrates. That makes comparisons tough.

The fossil record also presents a blurrier history than today's yearly records of species counts. Sparse examples of a species may be distributed across millions of years of fossil history, the researchers wrote, while modern surveys provide dense samples over short periods of time. And even the best source of modern data — the International Union for the Conservation of Nature Red List of threatened and endangered species — has catalogued the conservation status of less than 2.7 percent of the 1.9 million named species out there.

Coming crisis

The researchers worked to combine these two sources of data, Ferrer said, taking a conservative approach to filling in gaps and estimating future directions. They found that the overall rate of extinction is, in fact, between three to 80 times higher than non-mass extinction rates. Most likely, species are going extinct three to 12 times faster than would be expected if there were no crisis, Ferrer said.

That gives Earth between three and 22 centuries to reach the point of mass extinction if nothing is done to stop the problem. (The wide range is a factor of the uncertainty in the data and different rates of extinction found in various species.) The good news, Barnosky said, is that the total loss so far is not devastating. In the last 200 years, the researchers found, only 1 to 2 percent of all species have gone extinct.

The strongest evidence for comparison between modern and ancient times comes from vertebrate animals, Barnosky said, which means there is still work to do collecting better data for more robust comparisons with better invertebrate data. But, he said, the research "shows absolutely without a doubt that we do have this major problem."

Back from the brink?

The culprits for the biodiversity loss include climate change, habitat loss, pollution and overfishing, the researchers wrote.

"Most of the mechanisms that are occurring today, most of them are caused by us," Ferrer said.

So can we fix it? Yes, there's time to cut dependence on fossil fuels, alleviate climate change and commit to conservation of habitat, the study scientists say. The more pressing question is, will we?

Barnosky and Ferrer both say they're optimistic that people will pull together to solve the problem once they understand the magnitude of the looming disaster. Jablonski puts himself into the "guardedly optimistic category."

"I think a lot of the problems probably have a lot more to do with politics than with science," Jablonski said.

That's where Paul Ehrlich, the president of the Center for Conservation Biology at Stanford University and author of "The Population Bomb" (Sierra Club-Ballantine, 1968), sees little hope.

"Everything we're doing in Washington [D.C.] today is working in the wrong direction," Ehrlich, who was not involved in the research, told LiveScience. "There isn't a single powerful person in the world who is really talking about what the situation is … It's hard to be cheery when you don't see the slightest sign of any real attention being paid."

Other researchers take an upbeat view.

"If we have a business-as-usual scenario, it is pretty grim, but it isn't yet written," Stuart Pimm, a professor of conservation ecology at Duke University who was not involved in the research, told LiveScience in a phone interview from Chile, where he was doing fieldwork.

In 2010, Pimm said, the United Nations declared the International Year of Biodiversity. According to a UN statement, the 193 countries involved agreed to protect 17 percent of Earth's terrestrial ecosystems and 10 percent of marine and coastal areas. Some types of ecosystems still lag behind, Pimm said, but there is reason for hope.

"I hope that this will alert people to the fact that we are living in geologically unprecedented times," Pimm said. "Only five times in Earth's history has life been as threatened as it is now."

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