**6th Mass Extinction CER**

After having had some time with your groups to learn about the 5 mass extinctions that have taken place in Earth’s history, it is now time for you to look at life today. Using what you already know about mass extinction and the articles below, you are going to make a claim about whether or not humans have begun a 6th mass extinction. Be sure to pull specific evidence from both the texts below and what you learned during the Mass Extinction Mini-Lesson.

**Are humans are responsible for a 6th mass extinction?**

Claim:

I believe that….

Evidence:

The evidence that backs up my claim is….

Reasoning:

The reason my evidence backs up my claim is….

[**Mass extinctions don’t come out of the blue — and we’re seeing some of the signs today**](https://www.zmescience.com/science/mass-extinction-signs-8235254/?utm_source=ZME+Science+Newsletter&utm_campaign=2573a21655-RSS_EMAIL_CAMPAIGN&utm_medium=email&utm_term=0_3b5aad2288-2573a21655-242696289&goal=0_3b5aad2288-2573a21655-242696289)

LAST UPDATED ON MARCH 29TH, 2018 AT 6:55 PM BY [**ALEXANDRU MICU**](https://www.zmescience.com/author/alexandrumicu/)

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An incoming mass extinction isn’t as hard to spot as we’d believed, new research suggests.

Paleobiologists from the Friedrich-Alexander-Universität Erlangen-Nürnberg (FAU) say that the build-up to the largest mass extinction event ever recorded was a lot less inconspicuous than anyone assumed. Armed with this knowledge, they also make a worrying remark: some of the tell-tale signs are unfolding today.

Mass extinctions are like really deep economic crises, but for life — which is why such events are also referred to as ‘biotic crises’. They’re rare, dramatic events, reaping life with terrifying efficiency: the ‘tamest’ mass extinctions cull around 70% to 75% of all species. The largest such event we know of, the Permian-Triassic extinction event, claimed an estimated 83% of all genera and 90% to 96% of all species. Such is their effect that geologists actually [use these events as separators](https://www.zmescience.com/science/news-science/mass-extinctions-sixth-next-0432423/) between whole geological eras.

**Draw of the curtain**

Needless to say, such events completely alter the course of evolution, usually on a planetary scale. The Permian-Triassic event made the rise of the dinosaurs possible, and a subsequent mass extinction 65 million years ago threw them off their throne — allowing mammals, and ultimately humans, to move in. There have been five such events that we know of so far.

Given their sheer ability to stir things up — especially for the dominant species (used to be dinosaurs, now it’s us) — mass extinction events are certainly something we’d want to avoid. Thus making the fact that a sixth one[is likely incoming](https://www.zmescience.com/ecology/environmental-issues/sixth-massive-extinction-646754/) a very, very scary prospect. However, a new paper suggests that our view of how these events unfold don’t necessarily correspond to reality.

It’s widely believed that they start relatively abruptly and unfold quickly (in geological terms); most estimates of the Cretaceous-Paleogene extinction, the one with the meteorite that wiped out the dinosaurs, pin its duration around the 60,000-year mark.

The new paper, published by researchers from Germany and Iran, suggests that this crisis unfolded over a longer period of time. Led by Prof. Dr. Wolfgang Kießling, Chair for Palaeoenvironmental Research at FAU, the team examined fossils from largely unresearched geological profiles in Iran. According to their findings, the first indicators of a mass extinction became apparent as early as 700,000 years prior to the event itself — several species of ammonoids disappeared around that time, and the remaining species became increasingly smaller and less complex closer to the extinction event.

“There is much evidence of severe global warming, ocean acidification and a lack of oxygen [today],” says Kießling. “What separates us from the events of the past is the extent of these phenomena. For example, today’s increase in temperature is significantly lower than 250 million years ago”.

The team further reports that some of the processes they observed towards the end of the Permian Period (close to the extinction event) can also be seen today. Most notably, they point to the “increased rate of extinction in all habitats” that can be linked directly to human activity “such as the destruction of habitat, over-fishing, and pollution”. Another worrying sign is the “dwarfing” of ocean species, which they note is “clearly attributed to climate change”.

“We should take these signs very seriously,” he adds.

And I daresay he’s right.

[Sixth mass extinction: The era of 'biological annihilation'](https://www.cnn.com/2017/07/11/world/sutter-mass-extinction-ceballos-study/index.html)

**By**[**John D. Sutter**](https://www.cnn.com/profiles/john-d-sutter)**, CNN**

Updated 6:29 AM ET, Tue July 11, 2017

**(CNN)**Many scientists say it's abundantly clear that Earth is entering its sixth mass-extinction event, meaning three-quarters of all species could disappear in the coming centuries.

That's terrifying, especially since humans are contributing to this shift.

But that's not even the full picture of the "biological annihilation" people are inflicting on the natural world, according to [a study published Monday](http://www.pnas.org/content/early/2017/07/05/1704949114) in the Proceedings of the National Academy of Sciences. Gerardo Ceballos, an ecology professor at the Universidad Nacional Autónoma de México, and his co-authors, including well-known Stanford University biologist Paul Ehrlich, cite striking new evidence that populations of species we thought were common are suffering in unseen ways.

"What is at stake is really the state of humanity," Ceballos told CNN.

[Listening for the amphibian apocalypse](https://www.cnn.com/2016/12/11/world/vanishing-sutter-amphibian-extinction/index.html)

Their key findings: Nearly one-third of the 27,600 land-based mammal, bird, amphibian and reptile species studied are shrinking in terms of their numbers and territorial range. The researchers called that an "extremely high degree of population decay."

The scientists also looked at a well-studied group of 177 mammal species and found that all of them had lost at least 30% of their territory between 1900 and 2015; more than 40% of those species "experienced severe population declines," meaning they lost at least 80% of their geographic range during that time.

Looking at the extinction crisis not only in terms of species that are on the brink but also those whose populations and ranges are shrinking helps show that "Earth's sixth mass extinction is more severe" than previously thought, the authors write. They say a major extinction event is "ongoing."

"It's the most comprehensive study of this sort to date that I'm aware of," said Anthony Barnosky, executive director of the Jasper Ridge Biological Preserve at Stanford University, who was not involved in the study. Its value, Barnosky said, is that it makes visible a phenomenon typically unseen by scientists and the public: that even populations of relatively common species are crashing.

"We've got this stuff going on that we can't really see because we're not constantly counting numbers of individuals," he said. "But when you realize that we've wiped out 50% of the Earth's wildlife in the last 40 years, it doesn't take complicated math to figure out that, if we keep cutting by half every 40 years, pretty soon there's going to be nothing left."

[We have 20 years -- at the very most -- to prevent mass extinction](https://www.cnn.com/2016/10/27/opinions/sutter-wwf-sixth-extinction/index.html)

Stuart Pimm, chair of conservation ecology at Duke University in North Carolina, summed up the the concept this way: "When I look out over the woods that constitute my view from my window here, I know we no longer have wolves or panthers or black bears wandering around. We have eliminated a lot of species from a lot of areas. So we no longer have a functional set of species across large parts of the planet."

This is an important point to emphasize, Pimm said. But the new paper's analysis risks overstating the degree to which extinction events already are occurring, he said, and the research methodology does not have the level of granularity needed to be particularly useful for conservationists.

"What good mapping does is to tell you where you need to act," Pimm said. "The value of the Ceballos paper is a sense of the problem. But given there's a problem, what the bloody hell are we going to do about it?"

Often, scientists who study crisis in the natural world focus on species that are at high and short-term risk for extinction. These plants and animals tend to be odd and unfamiliar, often restricted to one island or forest. You probably didn't notice, for example, that the Catarina pupfish, native to Mexico, went extinct in 2014, according to the paper. Or that a bat called the Christmas Island pipistrelle is thought to have vanished in 2009.

[Climate confusion is back, and it's dangerous](https://www.cnn.com/2017/05/01/politics/sutter-epa-nyt-doubt-climate-change/index.html)

Meanwhile, as this research shows, entire populationsof other plants and animals are crashing, even if they're not yet on the brink of extinction. Some of these are well-known.

Consider the African elephant. "On the one hand, you can say, 'All right, we still have around 400,000 elephants in Africa, and that seems like a really big number,' " Barnosky said. "But then, if you step back, that's cut by more than half of what their populations were in the early part of last century. There were well over 1 million elephants (then).

"And if you look at what's happened in the last decade, we have been culling their numbers so fast that if we kept up with that pace, there would be no more wild elephants in Africa in 20 years."

Twenty years. No more African elephants. Think about that.

Barn swallows and jaguars are two other examples, according to Ceballos, the lead author of the paper. Both are somewhat common in terms of their total numbers, he said, but their decline is troubling in some places.

Such population crashes can, of course, lead to inevitable extinctions. And currently, scientists say that species are going extinct at roughly 100 times what would be considered normal -- perhaps considerably more.

[Packing up because of climate change](https://www.cnn.com/2016/02/25/opinions/sutter-miami-climate-change/index.html)

There has been[some dispute lately](https://www.theatlantic.com/science/archive/2017/06/the-ends-of-the-world/529545/)about whether the Earth's sixth mass extinction event already has begun or is simply on the horizon, but there is little disagreement among scientists that humans are driving an unprecedented ecological crisis.

And the causes are well-known. People are burning fossil fuels, [contributing to climate change](http://cnn.com/2degrees). They're chopping down forests and other habitat for agriculture, to the point [37% of Earth's land surface now is farmland or pasture](http://data.worldbank.org/indicator/AG.LND.AGRI.ZS?end=2013&start=1961&view=chart), according to the World Bank. The global population of people continues to rise, along with our thirst for land and consumption. And finally, but not exclusively, poachers are driving numbers of [elephants](http://www.cnn.com/2016/12/11/world/vanishing-mckenzie-botswana-elephants/index.html), [pangolins](http://www.cnn.com/interactive/2014/04/opinion/sutter-change-the-list-pangolin-trafficking/), rhinos, [giraffes](http://www.cnn.com/2016/12/08/world/sutter-giraffe-extinction/index.html) and other creatures with body parts valuable on the black market to worryingly low levels.

All of this is contributing to a rapid decline in wild creatures, both on land and in the ocean.

Ceballos' paper highlights the urgency of this crisis -- and the need for change.

"The good news is, we still have time," he said. "These results show it is time to act. The window of opportunity is small, but we can still do something to save species and populations."

Otherwise, "biological annihilation" continues.

[Humans have killed 60% of all animals since 1970](https://www.zmescience.com/science/humans-kill-animals-31102018/?utm_source=ZME+Science+Newsletter&utm_campaign=92289c83da-RSS_EMAIL_CAMPAIGN&utm_medium=email&utm_term=0_3b5aad2288-92289c83da-242696289&goal=0_3b5aad2288-92289c83da-242696289)

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A sobering report concludes that mankind has driven a worldwide massacre of all life forms. Directly or indirectly, we’ve wiped out more than half of all living animals since 1970 — here are the main takeaways.

A new WWF report based on the work of 59 scientists shows that increasing pressure from human population is disrupting virtually all environments on the planet, annihilating ecosystems and threatening all types of creatures.

“We are sleepwalking towards the edge of a cliff” said Mike Barrett, executive director of science and conservation at [WWF](https://www.theguardian.com/environment/wwf). “If there was a 60% decline in the human population, that would be equivalent to emptying North America, South America, Africa, Europe, China and Oceania. That is the scale of what we have done.”

The [*Living Planet Report 2018*](http://www.panda.org/lpr/), WWF’s comprehensive study of the health of the planet, serves as a grim reminder of the pressure we exert on nature. The main finding is that the population of vertebrates (which are what we typically consider ‘animals’) have, on average, declined by 60% in just over 40 years; that’s a rate of decline of 13.6% per decade.

It’s not all bad news, though — there are several examples of successful conservation efforts. [Tiger numbers in India](https://www.zmescience.com/ecology/animals-ecology/tigers-conservation-india-21012015/) have gone up, the river dolphins in the Amazon are finally being [studied and protected](https://www.worldwildlife.org/stories/tagging-river-dolphins-for-the-first-time-wwf-and-partners-boost-conservation-efforts-in-the-amazon), and in Ethiopia, public awareness has led to a stabilization of the [Ethiopian Wolf habitat](https://www.theguardian.com/environment/gallery/2018/may/22/12-conservation-success-stories-in-pictures). There is a ton of evidence that conservation [funding works](https://www.zmescience.com/ecology/environmental-issues/now-proof-conservation-funding-works/) and that science, and a that proper understanding of the science and the environmental situation can [pave the way](https://www.zmescience.com/ecology/animals-ecology/science-wildlife-conservation-21042017/) for successful conservation initiatives. Yet overall, the planetary-wide view gives a lot of reason for concern.

South and Central America have seen an 89% drop in vertebrate populations, largely driven by [the felling of vast](https://www.theguardian.com/environment/2018/oct/30/humanity-wiped-out-animals-since-1970-major-report-finds?CMP=share_btn_fb&fbclid=IwAR3wRUOPJQJFAwfVHM4ffhohG8DxpADRQegYT4TDpK38yRkUv-4vQHWoWfE) areas of wildlife-rich forest. But it’s not like those areas alone have to account for this — for instance, much of the cleared areas is used to grow soy, which is exported largely to Europe and the US.

“It is a classic example of where the disappearance is the result of our own consumption, because the deforestation is being driven by ever expanding agriculture producing soy, which is being exported to countries including the UK to feed pigs and chickens,” he said.

The biggest cause of wildlife loss is the destruction of natural habitats — typically, to create farmland. Killing for food is the second most prevalent cause — with over 300 mammal species being [eaten into extinction](https://www.theguardian.com/environment/2016/oct/19/worlds-mammals-being-eaten-into-extinction-report-warns). The oceans aren’t doing much better either: the vast majority of fish [stocks are overfished](https://www.zmescience.com/science/news-science/tuna-mackerel-overfishing-16092015/), and many populations are already [starting to collapse](https://www.zmescience.com/ecology/environmental-issues/mediterranean-fish-stocks-almost-completely-collapsed/).

Chemical and plastic pollution are also major aspects, and global trade creates a perfect gateway for invasive species and diseases to spread.

Because the problem is so complex, there’s no simple, straightforward, and unique solution — no silver bullet. We need a systemic change to address all these issues, and many more. It won’t be easy, but if we don’t do it, we will fail, too.

**Save the animals? No, let’s save ourselves**

The fact that we are destroying ecosystems is not new by any stretch. It’s been discussed for decades, and while some action has been taken, mankind is still accentuating its impact rather than reducing it. But researchers stress that even if we don’t care about saving animals and ecosystems, we should still do so — because our skin is also on the line.

This *Living Planet Report* joins an ever-increasing number of research and policy papers building the case that our planet’s natural systems are fundamental to our society. We depend on pollinators for agriculture, we depend on trees for stabilizing soils, and we depend on a myriad of animals which offer countless environmental services. If they fall, it could take a while, but eventually, we will fall too.

The report urges policymakers to understand how pressing the situation is and to take immediate action.

“Yet, the future of millions of species on Earth seems not to have captured the imagination or attention of the world’s leaders enough to catalyse the change necessary. We need to radically escalate the political relevance of nature and galvanize a cohesive movement across state and non-state actors to drive change, to ensure that public and private decision-makers understand that business as usual is not an option.”

It remains to be seen whether the right people will heed this warning, or if we will continue “business as usual.” In a way, the choice belongs to all of us, because we all elect people to develop policies, but it’s easy to see why so many people feel completely powerless in the face of such a gargantuan problem.

The report ends with a call for an international agreement — something in the lines of the Paris Agreement, perhaps — to curb the rate of biodiversity loss. The WWF considers the next two years as crucial if we want to achieve this goal.

“The evidence becomes stronger every day that humanity’s survival depends on our natural systems, yet we continue to destroy the health of nature at an alarming rate. It’s clear that efforts to stem the loss of biodiversity have not worked and business as usual will amount to, at best, a continued, managed decline. That’s why we, along with conservation and science colleagues around the world, are calling for the most ambitious international agreement yet – a new global deal for nature and people – to bend the curve of
biodiversity loss.”