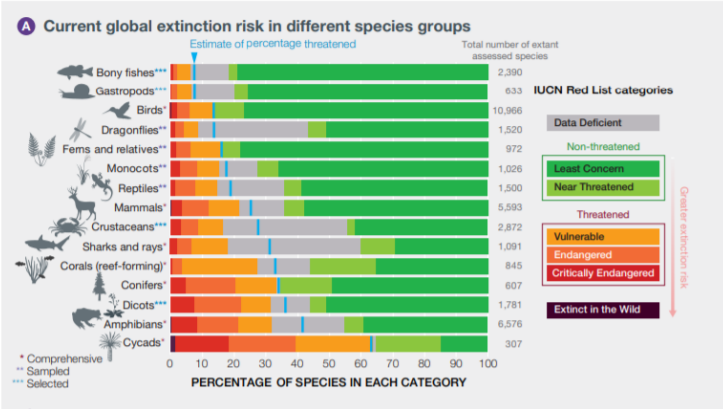
10 Losing Biodiversity

The sixth mass extinction, also called the Holocene extinction or the Anthropocene extinction, is an ongoing extinction event of species resulting from human activity. Definitions of the period when man's activities have resulted in the extinction of other species vary, with some going back 200,000 years when man evolved, some to the beginning of the Industrial Revolution in the 19th century, and others to as recently as the mid 20th century. These extinctions cover numerous families of plants and animals, including mammals, birds, amphibians, reptiles and arthropods.

Causes of species extinction can be the result of a number of factors and sometimes a combination. These can include: overharvesting or overhunting of fish or wild animals and plants for food; overgrazing; pollution from pesticides, fertilisers and leachates; habitat destruction; introduction of invasive species (such as new predators and food competitors); diseases; human population growth putting pressure on space; collection of species for zoos and museums; killing of animals for trophies and supposed medicinal properties.

The current extinction rate of species is estimated to be 100 to 1,000 times higher than natural background rates. The *Global Assessment Report on Biodiversity and Ecosystem Services* published by IPBES in 2019 estimates that roughly one million species of plants and animals face extinction caused by anthropogenic impacts.



There are more than 120,000 species on The IUCN Red List, with more than 32,000 species threatened with extinction, including 41% of amphibians, 34% of conifers, 33% of reef building corals, 26% of mammals and 14% of birds.

Since many highly biodiverse habitats, such as coral reefs and rainforests, remain only partially characterised, many extinctions are thought to be undocumented since some members of these complex ecosystems remain unidentified at the time of their extinction.

Plant species.

Scientists at the Royal Botanic Gardens, Kew, and Stockholm University reported in 2019 that 571 plant species had disappeared in the past two and a half centuries, a number that is more than twice the number of birds, mammals and amphibians recorded as extinct. Plant extinctions can lead to a whole cascade of extinctions in other organisms that rely on them - for instance, insects that use plants for food and for laying their eggs.

Lost plants include the Chile sandalwood, which was exploited for essential oils and cut to extinction for its aromatic wood. The biggest losses are on islands and in the tropics, which are home to highly valued timber trees and tend to be particularly rich in plant diversity.

Birds recently declared extinct

The Po'ouli from Hawaii was declared extinct in 2018. Their extinction was considered to be due to invasion by alien species, their habitat was destroyed by feral pigs and they were hunted by mongooses.

Cryptic Treehunter was only formally described in 2014 but was last seen in 2007 and is considered extinct; similarly the **Alagoas Foliage-gleaner** from Brazils rainforest was also declared extinct in 2018. Both

birds were endemic to small regions of the rainforest and this became eroded through deforestation for sugar plantations. With the forest divided into small sections, habitat was lost and competition with other species increased.

Spix's Macaw, a blue parrot found in Brazil, was declared extinct in the wild in 2018 due to the creation of a dam, through trapping and deforestation, but an estimated 60 to 80 still live in captivity.

Mammals recently declared extinct or critically endangered

The Vaquita is the world's rarest marine mammal and was only discovered in 1958. With some thirty left they are on the edge of extinction. These small porpoise are often caught and drowned in gillnets used by illegal fishing operations in marine protected areas within Mexico's Gulf of California.

Northern White Rhino were reduced to two females following the death of Sudan, the last remaining male, which died at the age of 45 in March 2018. The extinction of the Northern White Rhino was considered to be due to extensive poaching for their horns as well as loss of habitat.

The West African Black Rhinos were declared extinct in 2011, with the last one sighted in 2006. Their extinction was largely due to habitat loss and big-game hunters who killing them for sport.

Javan and Sumatran Rhinos are critically endangered. A subspecies of the Javan rhino was declared extinct in Vietnam in 2011. A small population of the Javan rhino is clinging on on the Indonesian island of Java.

Two subspecies of Giraffe were listed as Critically Endangered by the International Union for Conservation of Nature (IUCN) Red List of Threatened Species in 2018 for the first time. Giraffe numbers have plummeted by 40% in the past three decades, and less than 100,000 remain today. Habitat loss through expanding agriculture, human-wildlife conflict, civil unrest and poaching for their meat, pelts and tails are among the reasons for the decline. Subspecies in East, Central and West Africa are faring particularly poorly, with the Kordofan and Nubian giraffes having respectively 2,000 and 2,645 individuals remaining.

Pinta Island Tortoises used to be abundant in the Galapagos Islands but were almost wiped out by sailors and pirates who hunted them in the 1800s and 1900s. After the hunting ceased, new animals introduced to the area overgrazed the lands until the tortoises lost their natural habitats. The species was considered to be extinct until a single male was discovered on the island in 1971. Efforts were made to mate the male, named Lonesome George, with other species, but no viable eggs resulted. Lonesome George died on 24 June 2012, and the species was believed to have become extinct with his death.

Diseases and invasive species

Batrachochytrium dendrobatidis (Bd) is a primitive type of fungus first described in 1999 that infects the skin of amphibians. *Bd* appears capable of infecting most of the world's approximately 6,000 amphibian species and many of those species develop the disease chytridiomycosis that is linked to devastating population declines and species extinctions. Since its discovery, *Bd* has been found in wild and captive amphibian populations on every amphibian-inhabited continent. It is actively spreading in South, Central and western North America, as well as the Caribbean, Australia and Europe.

It appears that *Bd* was newly introduced to these locations and then caused the population declines. Although its exact origin has not yet been determined, it has become clear that global trade in amphibians for food, for use as laboratory animals, or for use as pets or display animals is responsible. New international shipping regulations are now in place.

The Cane Toad, also known as the **giant neotropical toad** or marine toad, is the largest terrestrial true toad native to South and mainland Central America, but which has been introduced to various islands throughout Oceania and the Caribbean, as well as Northern Australia. It has poison glands, and the tadpoles are highly toxic to most animals if ingested. Its toxic skin can kill many animals, both wild and domesticated, and cane toads are particularly dangerous to dogs.

Because of its voracious appetite, the cane toad has been introduced to many regions of the Pacific and the Caribbean islands as a method of agricultural pest control. The cane toad is now considered a pest and an invasive species in many of its introduced regions. In Australia, the **Northern Quoll** have become an endangered species due to the introduction of the cane toad.

Extinction of Arthropods

Arthropods - invertebrates including insects, that have external skeletons - are declining at an alarming rate. While the Tropics harbour the majority of arthropod species, little is known about trends in their abundance.

As of September 2016, the International Union for Conservation of Nature (IUCN) lists 81 extinct species, 86 possibly extinct species, and two extinct in the wild species of arthropod.

A comparison of arthropod biomass in Puerto Rico's Luquillo rainforest carried out in 2018 compared with a similar study during the 1970s found that biomass had fallen 10 to 60 times. The study showed a synchronous decline in the lizards, frogs and birds that eat arthropods. Over the past 30 years, forest temperatures had risen 2.0°C indicating that climate warming is probably the driving force behind the collapse of the rainforest's food web.

Oceans

Increasingly warmer and more acidic oceans will result in damage to coral reefs and loss of shell fish. The shells of some are already dissolving in the more acidic seawater. While some organisms may thrive under the more acidic conditions, others will struggle to adapt and may even go extinct.

Does this matter?

Extinction is a natural consequence of Darwinian evolution and, like changes in climate, normally progresses over timescales measured in millions of years. Life on Earth has survived five previous rapid mass extinctions, the most recent triggering the expansion and diversification of mammalian species to replace those that succumbed to the causative asteroid impact and enabled our own evolution. A common feature of all five is that the re-establishment of stable, diversified communities takes tens of thousands, even millions, of years and the resulting communities were radically different from their predecessors and in largely unpredictable ways as evolution only had survivors to act upon.

By destabilising virtually every ecosystem, not only may we exterminate entire Species, Genera and possibly Families of unknown future 'value' to us but we could reduce overall global variability. This time, unlike during previous extinctions, we have redistributed species around the globe and 'cross contaminated' nearly every previously isolated ecosystem.

The resulting disruption of previously stable communities inevitably removes constraints from both potentially 'harmful' as well as 'beneficial' species. Either may expand until a new environmental factor limits populations: this applies to our pets and domesticated livestock, non-native species (such as the Indian Pythons in Florida Everglades) and the next coronavirus strain that, for the present, may be benignly infecting indigenous host species in undisturbed forests that we are about to or are already disrupting.

In summary, we have no idea what the consequences of our actions will be other than that we will be fortunate to emerge unscathed. We are no less vulnerable to the resulting chaos than the Vaquita in the Gulf of California.