

# Species Extinction

## FACTS

- ✓ 15,589 species are known to be threatened with extinction.
- ✓ 1.9 million species have been described out of an estimated 5-30 million species that exist.
- ✓ In the last 500 years, human activity has forced 844 species to extinction (or extinction in the wild).
- ✓ One in every four mammals and one in every eight birds is facing a high risk of extinction in the near future.
- ✓ One in three amphibians and almost half of all tortoises and freshwater turtles are threatened.
- ✓ The current species extinction rate is estimated to exceed the natural or 'background' rate by 100 to a 1,000 times.
- ✓ Of the 129 recorded bird extinctions, 103 are known to have occurred since 1800, indicating an extinction rate 50 times that of the background rate.
- ✓ The total number of threatened animal species has increased from 5,205 to 7,266 since 1996.
- ✓ Habitat loss and degradation affect 86% of all threatened birds, 86% of mammals, and 88% of threatened amphibians.
- ✓ All 21 species of albatross are now under threat globally, compared to only 3 in 1996, as a result of long-line fishing. By-catch threatens 83 species of bird.

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## A NATURAL - AND UNNATURAL - PROCESS

The world is, and always has been, in a state of flux. Even the land beneath our feet is constantly on the move. Over hundreds of millions of years, continents have broken apart, oceans appeared, mountains formed and worn inexorably away.

These processes continue, barely discernible over a single human life-time. With geological change come changes in living things: species, populations, and whole lineages disappear, and new ones emerge.

**The entire basis of organic evolution is underpinned by the appearance of some species and the disappearance of others; extinction is therefore a natural process.**

According to the fossil record, no species has yet proved immortal; as few as 2-4% of the species that have ever lived are believed to survive today. The remainder are extinct, the vast majority having disappeared long before the arrival of humans.

## EXTINCTIONS AND HUMANS

Extinctions caused by humans are generally considered to be a recent, modern phenomenon. However, humanity's first significant contribution to the rate of global extinction may have occurred during the past 100,000 years, when North and South America and Australia lost 74 to 86% of the genera of "megafauna" - mammals greater than 44 kg.

In Australia, where the earliest human remains are dated to approximately 64,000 years, the great majority of the 22 identified genera of large land animals disappeared between 30,000 and 60,000 years ago.

In the Americas, almost 80% of large-bodied genera became extinct. Extraordinary creatures, such as sabre-toothed cats, mammoths, giant armoured glyptodonts and giant ground-sloths, all disappeared some time between 11,000 and 13,000 years ago, coinciding with the dates of the first clear evidence of a human presence there.

Island megafaunas - like giant birds known as moas in New Zealand, the dodo on Mauritius, giant lemurs and the extraordinary elephantbird in Madagascar, or large rodents and ground-sloths in the Caribbean - survived until much more recently than the continental faunas. All seem to have disappeared within a few hundred years after the arrival of humans - in the case of the moas within the last 300 years.

## THE "SIXTH WAVE"

The rapid loss of species that we are witnessing today is estimated by some experts to be between 100 and 1,000 times higher than the "background" or expected natural extinction rate (this is a highly conservative estimate: some studies estimate current extinction rates as 1,000-11,000 times background rates). Unlike the mass-extinction events of geological history, the current extinction phenomenon is one for which a single species - ours - appears to be almost wholly responsible. Such a deteriorating situation is being referred to as "the sixth extinction crisis", after the five known extinction waves in the Ordovician, Devonian, Permian, Triassic and Cretaceous Periods.

The frequently asked question of "how many species have gone extinct in the last 100 years" is difficult to answer because of problems in recording contemporary extinction events. Decline and eventual extinction may take place over many years, or even centuries in the case of very long-lived organisms like some of the large mammal and tree species.

The final stages of extinction are seldom observed except those caused by extreme events such as the excessive hunting of the passenger pigeon (*Ectopistes migratorius*) or the mass extinction of native snails in French Polynesia and Hawaii following the introduction of the predatory snail (*Euglandina rosea*) to Pacific Islands. Since 1500 AD, 844 extinctions have been recorded.

## The IUCN Red List

With the dedication and contribution of the Species Survival Commission (SSC) experts, IUCN has, for over 50 years, been assessing the conservation status of species on a global scale in order to highlight those threatened with extinction, and therefore promote their conservation.

Today the *IUCN Red List*, as the most authoritative and comprehensive status assessment of global biodiversity, is guiding conservation efforts at all scales from local to international.

The IUCN Red List Categories and Criteria are an objective system for classifying species according to their risk of global extinction. There are nine categories: Extinct, Extinct in the Wild, Critically Endangered, Endangered, Vulnerable, Near Threatened, Least Concern, Data Deficient, and Not Evaluated.

## Back from the Dead

A species is classified as Extinct when "exhaustive surveys in known and/or expected habitat, at appropriate times, (diurnal, seasonal, annual) throughout its historic range have failed to record an individual. Surveys should be over a time frame appropriate to the taxon's life cycle and life form."

Fortunately, a species being pronounced Extinct is not always the last word.

The **New Zealand storm petrel** (*Oceanites maorianus*) was presumed extinct due to the lack of records since specimens were collected in the 1800s but it was rediscovered in 2003 with two separate observations followed by further sightings in 2004.

The **Fernandina rice rat** (*Nesoryzomys fernandinae*) from the Galapagos Islands, known only by skeletal fragments found in owl pellets, was listed as Extinct in 1996 - again prematurely. In the late 1990s it was rediscovered. The species is now listed as Vulnerable - a welcome boost in status.

The **Lord Howe Island stick-insect** (*Dryococelus australis*) was thought to have become Extinct around 1920 after the introduction of rats to Lord Howe Island. However, in 2001 the species was rediscovered on Balls Pyramid, a rocky outcrop 23km from the Island.

The **Vietnamese warty pig** (*Sus bucculentus*) was listed as Extinct in 1996. In 1997 the species was reported to exist based on the discovery of a fresh skull.

## PROFILES IN RED

The *2004 IUCN Red List of Threatened Species* tells us that the global extinction crisis is as bad, or worse, than we believed.

**A total of 15,589 species of plants and animals are known to face a high risk of extinction in the near future, in almost all cases as a result of human activities. This includes 32% (one in three) of amphibian species, 24% (one in four) of mammal species, 12% (one in eight) of bird species, 25% (one in four) of conifers and 52% of cycads (an ancient group of plants).**

Indonesia, India, Brazil and China are among the countries with the most threatened mammals and birds, while plant species are declining rapidly in South and Central America, Central and West Africa, and Southeast Asia.

**The IUCN Red List highlights the plight of a range of animals and plants, from the Pemba flying fox to the King Pilly pine.**

**Aders duiker** (*Cephalophus adersi*). This antelope which occurs in Kenya and Tanzania moved from Endangered to Critically Endangered since 2003 because of substantial population declines caused by declining habitat and illegal hunting.

**The state of the world's threatened bird species is worse than ever. Since 1994 the number of bird species threatened with global extinction has risen to 12%. Of the new total, 1,175 (99%) are at risk of extinction from human activities.**

**Sao Tome free-tailed bat** (*Chaerephon tomensis*). This bat has moved up the threatened scale from Vulnerable to Critically Endangered. It is known to occur in only two sites, despite extensive searches. Its coastal forest and savanna habitats are being destroyed through tourism and agricultural development.

**The number of threatened reptiles increased from 253 in 1996 to 304 in 2004. The number of Critically Endangered species has increased from 41 to 64 and Endangered from 59 to 79 species.**

**St Helena olive** (*Nesiota elliptica*). Listed in 2003 as Extinct in the Wild, this symbolic species is now Extinct. The last known tree surviving in the wild died in 1994 and the only known plant still in cultivation died in November 2003. No other live material (plants, seeds or tissues) remain in local or international collections.

**A total of 8,321 threatened plants are listed. This is around 2% of the world's described plants, but as only approximately 4% of the world's described plants have been evaluated, the true percentage of threatened plant species is much higher.**

**Giant Hispaniolan galliwasp** (*Celestus warreni*). Moving from Near Threatened to Critically Endangered, this lizard is thought to have declined by at least 80% over the last 20 years. It is threatened by habitat loss, especially deforestation for agricultural activities (planting crops and creating pastures). The galliwasp is also killed by local people who mistakenly consider it to be venomous. Galliwasp are also killed by dogs, cats and mongooses.

## A CATEGORICAL THREAT

**Almost all the factors that have led to the extinction of species in the modern era continue to operate, many with ever-increasing intensity. While these factors vary in intensity and relative importance in the three major biomes (the land, inland waters and the seas), certain common threads emerge.**

Major threats to ecosystems and biological diversity (biodiversity) are:

- Habitat loss and fragmentation
- Over exploitation (extraction, hunting, fishing etc.)
- Pollution
- Invasions of alien species (e.g. cats and rats on Ascension island)
- Global climate change (changes in migratory species patterns, coral bleaching, etc.)

## Planetary Invaders

Green crabs, zebra mussels, the African tulip tree and the brown tree snake are just a few of the ecological offenders named invasive alien species. Biological invasion by alien species, second only to habitat loss as a threat to biodiversity, severely disrupts freshwater and marine ecosystems, tropical, boreal and temperate forests, urban areas, islands, grasslands and deserts. This in turn impacts global and local economies. Introductions of alien species can happen deliberately or unintentionally, for example, by organisms "hitch-hiking" in containers, ships, cars or soil.

IUCN is part of the Global Invasive Species Programme (GISP), which brings several IUCN programmes and partners together to formulate and carry out work to counter the invasive species problem. This initiative recognizes that working cooperatively is the only way to respond to this multifaceted issue. The IUCN/SSC Invasive Species Specialist Group ([www.issg.org](http://www.issg.org)) maintains a global database of invasive species and has produced a booklet *100 of the World's Worst Invasive Species* as an awareness raising tool.

## QUOTES

*"What is the origin of the softest shawls on earth? What are the ingredients in Far Eastern medicines, and are they linked to the shocking statistics in the Red List of Threatened Species? We develop our beautiful planet in such a way that we brush aside the species... that we risk creating a wasteland, where our aspirations will ultimately wither and die,"* - Her Majesty Queen Noor of Jordan, Patron of IUCN.

*"Even if we act immediately, the world is doomed to lose many of its animal and plant species and this in turn will reduce the ability of ecosystems to deliver vital services to human populations. The Red List gives all of us a practical tool for raising awareness of the biodiversity crisis and for forging new partnerships within the international community."* - Achim Steiner, IUCN Director General.

*"Every time we lose a species we break a life chain which has evolved over 3.5 billion years,"* - Jeffrey McNeely, IUCN Chief Scientist.

**Habitat Loss and Degradation** is the most pervasive threat to birds, mammals and amphibians, affecting 86% of all threatened birds, 86% of the threatened mammals assessed and 88% of the threatened amphibians.

**Exploitation**, including hunting, collecting, fisheries and fisheries by-catch, and the impacts of trade in species and species' parts, constitutes a major threat for birds (30% of threatened birds), mammals (33% of threatened mammals), amphibians (6% of threatened amphibians), reptiles and marine fishes.

**Alien Invasive Species** are a significant threat, affecting 326 (30%) of all threatened birds, and 212 threatened amphibian species (11%). The commonest cause of extinction of bird species since 1800, especially those on islands, is the introduction of alien invasive species such as the black rat.

## WHY SHOULD WE CARE?

Living organisms keep the planet habitable. Plants and bacteria carry out photosynthesis, which produces oxygen. Trees absorb carbon dioxide, which can help in the fight against global warming.

**The monetary value of goods and services provided by natural ecosystems (including gas regulation, waste treatment, and nutrient recycling) is estimated to amount to some 33 trillion dollars per year - nearly twice the global production resulting from human activities.**

Many species are of immense value to humans as sources of food, medicines, fuel and building materials. Between 10,000 and 20,000 plant species are used in medicines worldwide.

Currently about 100 million metric tons of aquatic organisms, including fishes, molluscs, and crustaceans, are taken from the wild every year and represent a vital contribution to world food security.

Meat from wild animals (wild meat) forms a critical contribution to food sources and livelihoods in many areas particularly in countries with high levels of poverty and food insecurity. A huge range of species are involved including monkeys, tapirs, antelopes, pigs, pheasants, turtles and snakes.

The diversity of nature helps meet the recreational, emotional, cultural, spiritual and aesthetic needs of people.

## CAN EXTINCTION BE STOPPED?

It takes huge efforts at all levels, from individual to global, to halt species extinction, a constant input and analysis of data on species, their habitats and threats. The tools in the conservation arsenal are many and varied and include:

- Effective management and restoration of habitats and ecosystems (including establishment of protected areas and protected area networks)
- Enforcement of key agreements such as the Convention on Biological Diversity, Convention on Migratory Species, Convention on International Trade in Endangered Species of Wild Fauna and Flora.
- Creating incentives and finance for conservation
- Equitable sharing of costs and benefits
- Assessment of biodiversity and related social and economic factors
- Captive breeding and reintroduction, including seed banks
- Conservation information management and communication
- Limiting the use of pesticides, herbicides and other chemical pollutants
- Training and technical capacity-building.

## IUCN'S RESPONSE

One of the key roles of IUCN's Species Programme is to provide the tools and knowledge needed for conservation action, through Action Plans, policy guidelines and checklists, to name a few.

**IUCN helps to identify global conservation priorities by producing assessments like the IUCN Red List of Threatened Species, which serves as a gauge of biodiversity loss.**

The IUCN/SSC Species Information Service (SIS) is being developed to provide access to high-quality, up-to-date species information for users across the world.

## IUCN CONTACTS

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## A WEB OF EXPERTISE

With its network of 8,000 volunteer experts, the IUCN Species Survival Commission represents the world's most complete source of scientific and management expertise on species. Over 120 Specialist Groups, based on their area of expertise, involve scientists from 179 countries, working for species conservation across the planet.

Created in 1948, IUCN – The World Conservation Union brings together 78 States, 114 government agencies, over 800 NGOs, and some 10,000 scientists and experts from 181 countries in a unique worldwide partnership. IUCN's mission is to influence, encourage and assist societies throughout the world to conserve the integrity and diversity of nature and to ensure that any use of natural resources is equitable and ecologically sustainable.

IUCN is the world's largest environmental knowledge network and has helped over 75 countries prepare and implement national conservation and biodiversity strategies. IUCN is a multicultural, multilingual organization with 1000 staff located in 42 countries. Its headquarters are in Gland, Switzerland.

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## IUCN facilitates resolutions to conservation challenges, using its science-based approach and technical expertise.

IUCN advises the government Parties to international treaties, such as the Convention on Biological Diversity, and the Convention on Migratory Species to help ensure that decisions are informed by the best available information about biodiversity. It provides scientifically-based analyses of proposals to change the way trade in plant and animal species is regulated within the terms of the Convention on International Trade in Endangered Species (CITES).

## IUCN leverages conservation action through partnerships with conservation organizations, government agencies and others. Thanks to the IUCN/SSC Action Plans and other conservation measures they have inspired, there have been some notable success stories.

Several species have moved down the threat categories or been removed from the Red List altogether. Examples include the Chinese crested ibis, Mauritius kestrel, Hawaiian goose, white rhino, and short-tailed albatross.

## BIODIVERSITY GLOSSARY

**Biological diversity** - "biodiversity" means the variability among living organisms from all sources including, *inter alia*, terrestrial, marine and other aquatic ecosystems and the ecological complexes of which they are part; this includes diversity within species, between species and of ecosystems.

**Biome:** major ecological community, a division of the world's vegetation that corresponds to a particular climate and is characterized by certain types of plants and animals, for example, tropical rain forest or desert.

**Ecosystem:** a dynamic complex of plant, animal and micro-organism communities and their non-living environment interacting as a functional unit.

**Endemic:** restricted to a particular area: used to describe a species or organism that is confined to a particular geographical region, for example, an island or river basin.

**Genus, Genera pl.:** set of closely related species: a category in the taxonomic classification of related organisms, comprising one or more species. Similar genera are grouped into families.

**Habitat:** the place or type of site where an organism or population naturally occurs.

**Invasive alien species:** are those that occur outside their natural range and threaten the existence of native plants and animals.

**Taxon:** category of organisms, any of the groups to which organisms are assigned according to the principles of taxonomy, including subspecies, species, genus, family, order, class, and phylum.

## TO LEARN MORE

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