Species Extinction – The Facts

FACTS

- 16,928 plant and animal species are known to be threatened with extinction. This may be a gross underestimate because less than 3% of the world's 1.9 million described species have been assessed for the IUCN Red List of Threatened Species.
- Only 1.9 million species have been described out of an estimated 13-14 million species that exist.
- In the last 500 years, human activity is known to have forced 869 species to extinction (or extinction in the wild).
- One in four mammals and one in eight birds face 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 be between 1,000 and 10,000 times higher than the natural or 'background' rate.
- The total number of known threatened animal species has increased from 5,205 to 8,462 since 1996.

A NATURAL - AND UNNATURAL – PROCESS

The world is, and always has been, in a state of flux. Over hundreds of millions of years, continents have broken apart, oceans appeared, mountains formed and worn away. With geological change come changes in living things: species, populations, and whole lineages disappear, and new ones emerge.

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.

But the rapid loss of species we are seeing today is estimated by experts to be between 1000 and 10,000 times higher than the "background" or expected natural extinction rate (a highly conservative estimate). 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. This is often referred to as "the sixth extinction crisis", after the five known extinction waves in geological history.

The number of species known to be threatened with extinction has topped 16,928. Their ranks include familiar species like the Polar Bear, Hippopotamus, sharks, freshwater fish and Mediterranean flowers. Marine species are proving to be just as much at risk as their land-based counterparts.

WHY DOES EXTINCTION MATTER?

Biodiversity - the variety of species and their habitats - plays an important role in ecosystem function and in the many services ecosystems provide. These include nutrient and water cycling, soil formation and retention, resistance against invasive species, plant pollination, climate regulation, and pest and pollution control. Escalating biodiversity loss has widespread implications for both human and environmental security.

The monetary value of goods and services provided by ecosystems is estimated to amount to some 33 trillion dollars per year – nearly twice the global production resulting from human activities. An estimated 50,000-70,000 plant species are used in traditional and modern medicine worldwide. About 100 million metric tons of aquatic organisms, including fish, molluscs and crustaceans are taken from the wild every year and represent a vital contribution to world food security. Meat from wild animals forms a critical contribution to food sources and livelihoods in many 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.

MORE FACTS

- Habitat loss and degradation affect 89% of all threatened birds, 83% of mammals, and 91% of threatened plants.
- All 22 species of albatross are under threat as a result of long-line fishing.
- A total of 8,457 threatened plants are listed. This is around 2% of the world's described plants. As only approximately 4% of the world's described plants have been evaluated, the true percentage of threatened plant species is much higher.
- Indonesia, India, Brazil and China are among the countries with the most threatened mammals and birds.
- 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.

WHAT ARE THE THREATS?

Major threats to biodiversity are:

- Habitat destruction and degradation
- Over-exploitation (extraction, hunting, fishing etc.)
- Pollution
- Disease
- Invasions of alien species (e.g. cats and rats on islands)
- Global climate change (changes in migratory species, coral bleaching)

Threats vary both within and between species groups. Although habitat destruction is universally the most dominant threat, over-exploitation (harvesting, trade etc.) is a major threat to mammals, affecting 33% of threatened species. For birds, over-exploitation and invasive alien species both affect about 30% of threatened species. Of the amphibians, 29% of species are affected by pollution (including climate change) and 17% by disease (particularly chytridiomycosis). The interaction between disease and extreme climatic events (drought) is the leading theory behind widespread amphibian declines.

Threats in marine and freshwater systems are poorly understood but it appears that over-exploitation is presently the greatest threat to marine species, followed by habitat loss. Incidental death in fisheries affects seabirds, marine mammals, and others. Habitat loss is likely to be the most severe threat to freshwater species followed by pollution and invasive species.

Threats to species change over time. Invasive alien species were historically the greatest threat to birds, followed by over-exploitation and habitat loss. Today, habitat loss has emerged as the dominant threat to birds, followed by invasive species and over-exploitation. This order may change again if predictions of global warming are correct.

Invasion by alien species, second only to habitat loss as a threat to biodiversity, severely disrupts freshwater and marine ecosystems, tropical forests, urban areas, islands, grasslands and deserts. Green Crabs, Zebra Mussels, the African Tulip Tree and the Brown Tree Snake are among the ecological offenders that also affect global and local economies. Introductions of alien species can happen deliberately or unintentionally, for example, by organisms "hitchhiking" in containers, ships, cars or soil.

There are many examples of the effects of climate change on species from around the world, which taken together, provide compelling evidence that climate change will be catastrophic for many species.

WHERE ARE THE THREATENED SPECIES?

Most threatened species occur in the tropics, especially on mountains and on islands. Most threatened birds, mammals, and amphibians are located in Central and South America; Africa south of the Sahara; and tropical South and Southeast Asia. These realms contain the tropical and subtropical moist broadleaf forests that are believed to harbour the majority of the earth's living terrestrial and freshwater species. Therefore, the patterns shown for mammals, birds and amphibians are likely to represent most terrestrial taxonomic groups.

Extinctions are becoming increasingly common on continents. While the vast majority of extinctions since 1500 AD have occurred on oceanic islands, continental extinctions are now as common as island extinctions. Roughly 50% of extinctions over the past 20 years occurred on continents.

People and threatened species are often concentrated in the same areas. This is especially true in much of Asia, in particular southeast China, the Western Ghats of India, the Himalayas, Sri Lanka, Java (Indonesia), the Philippines and parts of Japan, and in parts of Africa (especially the Albertine Rift in Central Africa and the Ethiopian Highlands).

The number of threatened species is likely to rapidly increase in regions where human population growth rates are high. Future conflicts between the needs of threatened species and rapidly increasing human populations are predicted to occur in Cameroon, Colombia, Ecuador, India, Madagascar, Malaysia, Peru, Philippines, Tanzania, and Venezuela.

THE IUCN RED LIST OF THREATENED SPECIES™

The IUCN Red List is the most authoritative and comprehensive status assessment of global biodiversity and guides conservation efforts at all levels around the world.

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.

A species is classified as **Threatened** if it falls into the categories Critically Endangered, Endangered, or Vulnerable. An explanation of the categories is available at this website:

http://www.iucnredlist.org/static/categories_criteria

Too big to be published as a book, the IUCN Red List is available online at:

www.iucnredlist.org

CAN EXTINCTION BE STOPPED?

Species can be, and many already have been, saved from extinction (see 'SUCCESS STORIES' below). Globally threatened species frequently require a combination of conservation responses to save them. These responses encompass research, species-specific actions, site and habitat based interventions, policy responses and communication and education. It is much more effective and economical to protect habitat in the first place than to try to restore it after it has been destroyed or to reintroduce a species.

The tools in the conservation arsenal are many and varied. They include:

- Effective management and restoration of habitats and ecosystems (including establishment of protected areas and protected area networks)
- Limiting the use of pesticides, herbicides and other chemical pollutants
- 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 of conservation
- Assessment of biodiversity and the social and economic factors affecting it
- Captive breeding and reintroduction, including seed banks
- Conservation information management and communication
- Training and technical capacity-building.

Ongoing monitoring of conservation action is needed to gauge how effective it has been, and how it can be best targeted. Information on the needs of species must also be continually updated.

Widely recognized as the most authoritative assessment of the global status of plants and animals, the IUCN Red List of Threatened Species provides an accurate measure of progress, or lack of it, in achieving the globally agreed target to significantly reduce the current rate of biodiversity loss by 2010.

The Red List is a versatile conservation tool. It can provide information on the conservation status of individual species; guide the listing of individual species in national or international legislation; aid in conservation planning, priority-setting and recovery planning; and support educational programmes.

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.

Following large recoveries in many European countries, the numbers of White-tailed Eagles (*Haliaeetus albicilla*) doubled in the 1990s and the species has been downlisted from Near Threatened to Least Concern. Enforcement of legislation to protect the species, and measures to address threats from habitat changes and pollution contributed to the recovery.

The 300 kg Mekong Catfish (*Pangasianodon gigas*) of South-east Asia is one of the largest freshwater fish in the world and was listed as Critically Endangered in 2003. Adopted as one of four flagship species by the Mekong Wetlands Biodiversity and Sustainable Use Programme, it is the focus of regional co-operation on fisheries management issues and conservation activities.

Swift action since the dramatic 97% population crash of the Indian Vulture (*Gyps indicus*), listed as Critically Endangered in 2002, means that the future for this and related species is more secure. The veterinary drug that unintentionally poisoned them is now banned in India. A promising substitute has been found and captive breeding assurance colonies will be used for a re-introduction programme.

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TO LEARN MORE

The IUCN Red List of Threatened Species™:

www.iucnredlist.org

Species Survival Commission and Species Programme:

www.iucn.org/species

SSC Specialist Groups:

http://www.iucn.org/about/work/programmes/species/about_ssc/specialist_groups

IUCN'S RESPONSE TO THE EXTINCTION CRISIS

Working closely together, the IUCN Species Programme and the Species Survival Commssion (SSC) - a global network of 7,500 experts - provide the tools and knowledge needed for conservation action, through Action Plans, policy guidelines and checklists, among others.

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 and helps target conservation action.

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

IUCN is part of the Global Invasive Species Programme (GISP) which brings several IUCN programmes and partners together to counter the invasive species problem. This initiative recognizes that working cooperatively is the only way to respond to this multifaceted problem.

The IUCN Invasive Species Specialist Group (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. 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 plant and animal species are regulated within the terms of the Convention on International Trade in Endangered Species (CITES).

IUCN promotes 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 many notable success stories.

GLOSSARY

Biological diversity - "biodiversity" means the diversity of life on Earth, including 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 grouped in 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 species, genus, family, order, class, and phylum.