

The 2004 IUCN Red List of Threatened Species. A Global Species Assessment

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Introduction

The global community has recognized that the loss of biodiversity must be stemmed. In 2002, the World Summit on Sustainable Development re-affirmed the commitment of Parties to the Convention on Biological Diversity (CBD) to reduce the rate of biodiversity loss by 2010. Achieving this goal (itself only the first step towards halting, and eventually reversing, biodiversity loss) will require concerted and well-focused action, not just by Governments but also by a very wide range of organizations and individuals (Oteng-Yeboah, this Congress).

As the world begins to respond to the current crisis of biodiversity loss, information on the overall status of biodiversity, the rate it is being lost, where it is being lost, and the causes of decline, is essential in order to design and implement effective conservation strategies and to communicate the scope and severity of the problem. The ability to monitor changes in the status of biodiversity is also essential for measuring our success or failure in halting biodiversity loss. However, providing this information is a large and complex task and requires multiple measures to assess the status and trends of the many aspects of biodiversity. For example, different measures may be necessary to assess genes, populations, species, and ecosystems.

The *IUCN Red List of Threatened Species*[™], hereafter referred to as the *IUCN Red List*, is one approach for assessing and monitoring the status of biodiversity and one which provides a key tool for monitoring progress towards the achievement of the 2010 goal. IUCN has been producing lists of threatened species since the 1960s. In the past, Red Lists were produced primarily to highlight specific species that were believed to be threatened with extinction and therefore in need of conservation attention. However, in recent years, the mandate of the *IUCN Red List* has been expanded, to identify large-scale patterns and trends in the status of species. To achieve this mandate, a Red List Consortium was formed in 2000 to support the compilation and production of the *IUCN Red List*. The Red List Consortium comprises IUCN – The World Conservation Union (in particular the Species Survival Commission), BirdLife International, Conservation International (in particular the Center for Applied Biodiversity Science), and

NatureServe. Together these organizations provide the world's largest knowledge base on the global status of species.

The 2004 *IUCN Red List* provides objective information on the threat status of more than 38,000 species (see www.iucnredlist.org). An analysis of the 2004 Red List information is presented in *The Global Species Assessment* (Baillie *et al.* 2004), a publication that was launched at this Congress on the 17th of November 2004. The *Global Species Assessment* (GSA) provides an insight into the status and trends of the world's species. Specifically, the GSA highlights trends in the status of threatened species; taxonomic groups that are at the greatest risk of extinction; recent documented extinctions; regions of the world where threatened species tend to be found; the threats that are driving species towards extinction; the social and economic context in which extinctions are taking place; and the conservation responses that are available. The GSA helps to inform several crucial questions:

- How much progress are we making in achieving the 2010 target?
- What are the most pressing conservation needs — which taxa are in trouble, where and why?
- What are the most urgent research needs — where are the most significant gaps in our knowledge?
- What responses are in place, and which ones might still be needed?

The *IUCN Red List* is intended to be policy-relevant and useful for informing conservation planning and priority setting processes. However, it is not intended to be prescriptive. Biodiversity conservation is far too complex for the *IUCN Red List* to be taken as the last word on what and where to conserve. Rather, the *IUCN Red List* provides information that can assist real-world decision-making when set in the wider context of society, economics and ecology. With this caveat in mind, what is the 2004 *Global Species Assessment* telling us?

How is the state of biodiversity changing?

To measure whether or not we are succeeding in reducing the rate of biodiversity loss a series of indicators are needed that are representative across the full spectrum of biodiversity, easy to interpret by decision makers, and realistic to produce over time. Within this context, IUCN has developed a Red List Index that charts the net changes to the threat status of particular groups over time.

For the first time, the GSA presents Red List Indices for two completely assessed groups, birds and amphibians. For birds, the Red List Index shows that their overall threat status (projected extinction risk) has deteriorated steadily between 1988 and 2004. A preliminary Red List Index for amphibians shows a similar rate of decline, from 1980 to 2004, although with a steeper rate of deterioration in the status of the species at highest extinction risk. Underlying data draw attention especially to threats from forest loss and longline fisheries (birds) and disease, climate change and exploitation (amphibians) (See http://www.iucn.org/themes/ssc/red_list_2004/main_EN.htm).

For most other groups, it is not yet possible to assess trends in status as data are lacking. An exception is for the Cycads (Cycadopsida, N=288 species). Within this group, population trends show that 79.6% (207 species) are declining, 20.4% (53 species) are stable and none are considered to be increasing. There is also a growing body of evidence pointing to a serious deterioration in the conservation status of both freshwater and marine species, but species from these systems are still poorly assessed in the *IUCN Red List*.

In February 2004, the Parties to the Convention on Biological Diversity agreed to test and develop a specific set of indicators for assessing progress towards the 2010 biodiversity target. 'Change in status of threatened species' is one of these indicators. The Red List Index presented here measures this change and is being considered for adoption by the Convention. An increasing projected risk of extinction implies an increase in the rate of biodiversity loss. The data from birds, amphibians and cycads suggest that we are not yet on track to meet the 2010 target of reducing the rate of loss.

Which species are in trouble?

For only four major taxonomic groups have we assessed the status of at least 90% of the species. The *IUCN Red List* shows that that 12% of birds, 23% of mammals, 32% of amphibians and 34% of gymnosperms are globally threatened. Threatened species in these groups total 4,475 (29%) of the 15,589 threatened species on the *IUCN Red List*. Percentages of threat for most other taxonomic groups cannot be stated because too few species in each have been evaluated against the Red List Criteria.

Among **mammals**, the percentage of threatened species has decreased since the 2000 *IUCN Red List* analysis. However, this is due to changes in taxonomy and knowledge, not improvements in conservation status. There are significantly more threatened species than expected among the orders Artiodactyla (deer, antelope, cattle, sheep, goats, etc.), Carnivora (cats, dogs, weasels, bears, etc.), Primates, Perissodactyla (equids, rhinos and tapirs), and

Sirenia (dugongs and manatees). The last two of these taxa have few species, so extinctions could cause a disproportionate loss of evolutionary novelty.

The fourth assessment of the status of all the world's **birds** reveals substantial deterioration of status among Indomalayan forest species and seabirds. Particularly high proportions of threatened species are found among albatrosses, petrels, shearwaters, penguins, cranes, rails, parrots, pheasants, and pigeons.

The GSA outlines the very serious situation facing **amphibians** globally, which may be indicative of the state of freshwater species as a whole. The situation may be even graver than the numbers suggest, since too little is known about 23% of amphibian species to make a threat assessment. Several families of amphibians appear to be disproportionately threatened, in particular the Hynobiidae (Asian salamanders), Plethodontidae (lungless salamanders), Astylosternidae (Cameroonian stream frogs), Bufonidae (true toads), Rhacophoridae (Asian tree frogs), Leptodactylidae (typical Neotropical frogs), Leiopelmatidae (New Zealand frogs), Nasikabatrachidae (Indian burrowing frog), Rhinodermatidae (Darwin's frogs), and Sooglossidae (Seychelles frogs). Both members of the Rheobatrachidae (gastric-brooding frogs), are now Extinct, representing the loss of an entire vertebrate family.

Although **reptiles** have not been a major focus of Red List assessment activity to date, the rapidly deteriorating status of tortoises and freshwater turtles in Southeast Asia has resulted in many important changes in the listings of these species.

Fishes also have not yet been a major focus of Red List assessments. However, regional assessments show high threat levels among freshwater fish; 27% of 1,085 species assessed in East Africa and 20% of 801 species assessed in North America are threatened. There are few assessments for marine fish but preliminary analysis of the chondrichthyan fishes (sharks, rays and chimaeras) shows that 18% of the 373 species so far assessed (about a third of the total) are threatened.

No **invertebrate** groups have yet been assessed comprehensively, and only a tiny proportion (below 0.3%) of the total species have been evaluated. Regional analyses show levels of threat varying widely, from 7% of 294 East African dragonflies to 54% of 1,975 North American snails.

Although 8,321 threatened species of **plants** appear on the 2004 *IUCN Red List*, the number evaluated against the Red List Criteria represents only about 4% of the total number of species.

Full evaluations have been done for conifers, with 25% of 618 species threatened, and cycads, with a very high 52% of 288 species threatened. The overall proportion of threatened species for plants as a whole remains unknown, but regional assessments and sampling analyses suggest a figure of approximately 20%.

We have already lost many species. On the 2004 *IUCN Red List*, 844 species are listed as Extinct or Extinct in the Wild. A further 122 amphibians and 18 birds are considered Critically Endangered (Possibly Extinct). Extinction rates based on known and possible extinctions of birds, mammals and amphibians over the last 100 years indicates that current extinction rates are 100 to 1,000 times natural (background) extinction rates. Historically, most recorded extinctions have occurred on islands, especially within Oceania, but mainland species represent 48% of the 27 extinctions documented within the last 20 years. For most groups, the number of extinctions is likely to be seriously under-recorded.

Where is the threat of extinction greatest?

Geopolitical units

Countries with the most threatened and threatened endemic species lie mainly in the continental tropics, while those with the highest proportion of threatened endemics are mainly tropical island nations. Nearly all countries have at least some national responsibility for threatened species, but some particularly stand out: Australia, Brazil, China, Indonesia, and Mexico have particularly large numbers of threatened species. Colombia, India, Malaysia, Myanmar, New Caledonia, Papua New Guinea, the Philippines, South Africa, and the United States have high numbers of threatened endemics for at least one taxonomic group. Madagascar, São Tomé and Príncipe, and the Seychelles have particularly high proportions of threatened species across multiple taxa.

The distribution of threatened species shows a complex relationship with human population density, population growth, and economic wealth. Areas with high human population densities and few threatened species are mainly in the higher latitudes. There are few areas that have low human population densities and high numbers of threatened species. Countries with relatively low population densities, but high rates of population growth and many threatened species (mainly in Africa) represent opportunities to plan for conservation as part of sustainable development. Many of the countries with the most threatened species have relatively low Gross National Incomes per capita, highlighting the need to view biodiversity conservation as a global responsibility.

Ecological systems

The seven taxa for which we have relatively complete datasets include many more terrestrial than freshwater or (especially) marine species, and so probably do not provide a clear picture of the relative degree of threat across ecological systems. Among mammals, freshwater species are more threatened than marine or terrestrial ones. Among amphibians, species associated with flowing water are significantly more threatened than those living in still water. Among birds and turtles, the marine species are the most threatened. For chondrichthyan fishes (sharks, rays and chimaeras), the freshwater species currently appear to be proportionately more threatened than the marine species; but as only a third of the species have been assessed so far, these results may change.

Areas of species richness

The greatest numbers of threatened species, for mammals, birds and amphibians, occur in the tropical continents - in the Neotropical, Afrotropical, and Indomalayan realms. This is related, in part, to the enormous importance of tropical and subtropical moist broadleaf forest. For all three taxa, this is by far the richest biome for numbers of threatened species and threatened endemic species.

Oceania, while having low richness of threatened species, has remarkably high proportionate threat, evidence of the vulnerability of oceanic island biodiversity. Threatened marine mammals concentrate in the northern Pacific Ocean and threatened seabirds, chondrichthyan fishes and seahorses (the latter two not comprehensively assessed) in the eastern Indian Ocean and southwest and west-central Pacific.

Although forests are the most important habitat type for both threatened birds and amphibians, grassland and shrubland habitats also hold high numbers of threatened species. For amphibians, inland wetland habitats are exceptionally important. The importance of artificial habitats for both birds and amphibians is also evident.

Mammals, birds, turtles and amphibians all show concentrations of threatened species in centres of endemism in southern Brazil, Madagascar, the Western Ghats of India, the eastern Himalayas, central China, mainland Southeast Asia, Sumatra, Borneo, and the Philippines. Threatened mammals, birds and amphibians are also concentrated in the Andes, West Africa, Cameroon, the Albertine Rift of Central Africa, the Eastern Arc Mountains of Tanzania, and Sri Lanka. For birds, the map shows the importance of oceanic islands, while turtles concentrate in the Amazon, the eastern and southwestern United States, and Asia Minor. While threatened mammals are

relatively widespread, threatened amphibians are highly restricted geographically, clustering strongly in certain areas, and are particularly concentrated in the area from southern Mexico southwards to northern Peru, and on the Caribbean islands.

What are the main pressures?

Habitat destruction and degradation are by far the most important immediate threat(s) to birds, mammals and amphibians, impacting between 85 and 90% of threatened species in all three groups. Other significant threats to birds include over-exploitation (30% of threatened species) and invasive alien species (30%, overall, but affecting 67% of threatened bird species on oceanic islands). Mammals are more susceptible to over-exploitation than either birds or amphibians, with at least 33% of species affected. Amphibians are impacted by a broad array of significant threats, notably pollution (including climate change, 29% of threatened species), disease (17%), invasive alien species (11%), human disturbance (mainly fire, 11%), natural disasters (8%), and over-exploitation (6%) (See http://www.iucn.org/themes/ssc/red_list_2004/main_EN.htm).

Incidental mortality through longline fishing is now a major cause of increased mortality for albatrosses and other seabirds. As a result, all 21 species of albatrosses are now listed as globally threatened or Near Threatened. This is a side effect of the increased pressure of fisheries in general, a very significant cause of threat for many marine species (although many are yet to be evaluated). Though comprehensive data are lacking, over-exploitation for wild meat appears to be an increasing source of threat for many vertebrate species, especially mammals.

Very often, threats act together in a synergistic way and therefore need to be dealt with collectively. For example, climate change is likely to have many direct effects on species, some of which are already detectable. However, it is also hastening the spread of invasive alien species, including new diseases, and in many places is likely to exacerbate human pressures on natural habitats.

It is difficult to address these immediate threats without tackling their underlying causes — which include some of the world's most intractable social and economic problems.

What are the most urgent research needs?

The 2004 *Global Species Assessment* demonstrates how little we still know about the world's biodiversity. Regarding Red List assessments, there are major gaps in the marine and freshwater systems, among plants, and even among terrestrial vertebrates such as reptiles.

Efforts to fill these gaps are already under way. A Global Reptile Assessment is beginning this year. The IUCN Freshwater Biodiversity Assessment Programme is continuing its work and will be coordinating evaluations in new regions. A number of initiatives are underway for fish and invertebrates, often involving IUCN SSC Specialist Groups. Further concentrated efforts are needed. The world's botanists face a particular challenge in achieving Target 2 of the Global Strategy for Plant Conservation - 'A preliminary assessment of the conservation status of all known plant species' by 2010.

Even within groups that have been assessed comprehensively, many species remain Data Deficient — including 1,294 amphibians, 380 mammals, and even 78 birds. These species are important targets for further research. Among species known to be threatened, nearly all amphibians and birds (95% and 92%) still require baseline information on their population numbers and range.

However, the fact that we have many gaps in our knowledge should not be an excuse for inaction. The 2004 *IUCN Red List* already provides much clear information to help guide conservation planning and priority setting. And the 15,589 threatened species on the list require urgent conservation attention if they are not to slip further towards extinction.

What responses are in place?

Conservation measures are being taken for many species all over the world, ranging from species-specific actions to broad changes in national, regional or global policy. We are only just beginning to measure these responses in relation to individual threatened species. Information on birds suggests that, encouragingly, at least some action is underway for 67% of threatened species, but that, less encouragingly, these actions have only benefited 24% of species so far.

Many case studies show that well-focused species-centred actions can succeed in reducing threat and improving status. There are also many examples of constructive policy responses, some of which begin to address the underlying causes of threat. The *IUCN Red List* can be used to provide guidance to many of these, including international agreements such as the Convention

on International Trade in Endangered Species of Wild Fauna and Flora (CITES) and the Convention on the Conservation of Migratory Species of Wild Animals (CMS).

The *IUCN Red List* can also be used to identify gaps in responses at the site scale, for example through the key biodiversity areas process and the Alliance for Zero Extinction. These analyses can be used, in turn, to target effort and investment on the ground.

Conservation action works. The 2004 *Global Species Assessment* shows that we need much more of it, and need to focus it better using the constantly improving information at our disposal. That means more resources, and resources better applied.

Summary of the main findings

- The Red List Indices show that the status of birds and amphibians continues to deteriorate.
- The limited information available for other taxonomic groups indicates that declines may be widespread.
- The 2004 *IUCN Red List* contains 15,589 species threatened with extinction.
- Among major species groups, the percentage of threatened species ranges between 12% and 52%.
- The first complete assessment of amphibians reveals that they are likely to be the most threatened vertebrates.
- Threatened species are not distributed randomly across orders and families.
- There are major gaps in our knowledge of the status of threatened species.
- As we learn more about the status of species, the world's list of extinctions continues to increase.
- Recent extinction rates far exceed the rates of extinction in the fossil record.
- Extinctions are becoming increasingly common on continents.
- Most threatened species occur in the tropics, especially on mountains and on islands.
- The uneven distribution of threatened species means that a number of countries have a disproportionate number of species at risk of extinction.
- Patterns of distribution of threatened species are relatively congruent between taxonomic groups analysed.
- People and threatened species are often concentrated in the same areas.

- The number of threatened species is likely to increase rapidly in regions where human population growth rates are high.
- Countries that currently have low human population density but a high population growth rate could be opportunistic places for pre-emptive conservation initiatives.
- Countries that have the most threatened species tend to be those that are least able to invest significant resources into conservation.
- Habitat destruction and associated degradation and fragmentation are the greatest threats to assessed terrestrial species.
- Threat processes vary both within and between taxonomic groups.
- Threat processes are dynamic and change over time.
- The *IUCN Red List* information can be used in many different ways as a conservation tool.
- Globally threatened species frequently require a combination of conservation responses to ensure their continued survival.
- Species can be, and many already have been, saved from extinction.
- The majority of threatened species require substantially greater action to improve their status.

Reference

Baillie, J.E., Hilton-Taylor, C. and Stuart, S.N. (eds) 2004. *IUCN Red List of Threatened Species. A Global Species Assessment*. IUCN, Gland, Switzerland and Cambridge, UK. [Available online at: www.iucn/].