

Life in the balance?

Gregory Dimijian/SPL

Much of our planet's biodiversity appears to be teetering on the brink of a man-made extinction crisis. Scientists have suggested that, unless urgent action is taken now, many species will disappear in the next 50 years. This article looks at some of the issues involved.

The main reasons for this crisis are well documented. The world's tropical forests are disappearing at an alarming rate, both due to logging for the timber trade (much of it illegal) and to land conversion to agriculture. Vast tracts of lowland forest have been converted to banana, oil palm or pineapple plantations. Large areas of the Amazon Basin are currently being converted to soya cultivation or pasture for cattle ranching.

What is not always appreciated is that many of the world's temperate forests face a similar threat. Increased logging is taking place in the far east of Russia, for example, and clear felling is continuing along stretches of the northwestern coast of North America.

The potentially harmful effects of global warming are of increasing concern. As average temperatures rise, habitats may change and become unsuitable for their resident plants and animals. To survive, many need to **migrate** to more suitable areas, but **habitat fragmentation** means that such species may literally have nowhere else to go.

The island of Mauritius is a tropical paradise. Most visitors do not realise that only around 1% of its original forest remains. The lush green forest canopy is largely made up of introduced exotic species – guava and privet. Invasion by exotic species is an increasing menace to natural populations. Of course, Mauritius was once home to the dodo, tragically extinct within less than 100 years of its discovery in 1598.

Sadly, examples of illegal and unsustainable hunting of animals for local trade and consumption, as well as for the international market, are easy to find. In China there is an illegal market in snow leopard skins and bones. The bones are used in traditional medicines, as are the gall bladders of bears. In parts of Africa where there is a shortage of protein, there is a thriving bush meat trade, including such wild animals as chimpanzees.

GCSE key words

Human impact on the environment
Deforestation
Global warming

Habitat

fragmentation: after clearing the natural vegetation in an area, small fragments of the original landscape are sometimes allowed to remain. Unfortunately, the number of species able to survive in such small parcels of land declines rapidly.

Plant migration: unlike animals, plants have to remain rooted to the spot. Plant populations can, however, migrate over time through seed dispersal.

Figure 1 Mauritius and Madagascar are islands in the Indian Ocean



● To learn more about Orchid Conservation International go to its website (www.orchidconservation.org).



Box 1 Case study: a Kew expedition to Madagascar

During our 11-hour drive to the Ranamofana National Preserve it was easy to believe that only 10% of Madagascar's natural forest remains. For most of the journey the countryside was a mosaic of rice paddies encircled by bare hillsides with their characteristic red soils which, from the air, can be seen bleeding into the surrounding Indian Ocean.

The lush humid forest of Ranamofana boasts a total of 20 lemur species, each living in a slightly different ecological niche. The highlight was finding the rare golden bamboo lemur. Only 100 individuals remain in the wild, 20 of which are currently protected, at Ranamofana.

In contrast, the Itremo Plateau was hot and dry. We were looking for plants of an endangered orchid, *Angraecum longicalcar*, which grows in full sun on marble outcrops. We soon discovered that the total population had declined to no more than 25 plants. The local herdsmen routinely burn the grassland, to stimulate the formation of fresh green shoots for their herds of zebu cattle. Alarmingly, part of the population of orchids had recently been accidentally burned. In addition, some of the remaining plants had been removed by collectors, and one of the outcrops was being mined for its marble. Truly, this is an orchid species on the edge.

Why should we care?

There are various reasons why we should be concerned. The first is an economic argument. Illegal logging threatens the livelihoods of many local communities that depend on forest resources for employment and income. Trees bind the soil together and, particularly on steep slopes, prevent it being washed away by rainfall.

Plants and animals are important sources of food, fibres and, potentially, undiscovered medicines.

At the heart of the matter is the fact that we depend on other species for our continued existence on this planet. They are part of the fabric of life, and food chains and food webs may begin to unravel as key organisms are removed.

Ultimately, after millions of years of evolution and coexistence, many people would argue that it is morally wrong to cause the extinction of plants and animals.

What is being done?

All of the above can make pretty depressing reading, but fortunately there appear to be an increasing number of people who care enough to be doing something, and more and more people are willing to pay to see wildlife in its natural habitat. The Central American country of Costa Rica, for example, derives more income from ecotourism than any other source. Here are just a few examples of the sorts of conservation activities and projects that are taking place around the world.

Mauritius kestrel

In situ conservation involves conservation of plants and animals in their natural habitats. The Mauritius kestrel declined to just four wild individuals, but captive breeding and subsequent reintroduction has saved this beautiful bird from extinction.

African elephants

One of the successes of the conservation community has been the international agreement banning trade in ivory and its products, thereby halting the lucrative market for poached tusks, and the catastrophic decline in African elephant populations.

Box 2 Case study: cloud forests of Costa Rica

Cloud forests are among the richest habitats on Earth. Constantly bathed in rain and mist, the branches of the trees are draped in a dense carpet of orchids, bromeliads and ferns. As global temperatures rise so the cloud base moves up the mountain sides, and those plants and animals migrate up the mountains along with the changing conditions. Those that required the special conditions at the tops of the mountains have nowhere left to go.

A lady's slipper orchid



Malkoim Warrington/SPL

Lady's slipper orchid

It is not only plants and animals in exotic places that are at risk. In Britain our native lady's slipper orchid declined to one individual plant remaining in a secret location somewhere in Yorkshire, after the plants had been dug up by collectors. Artificial pollinations were carried out by staff at the Royal Botanic Gardens, Kew, the seeds germinated in the micropropagation unit, and a healthy population of seedlings was once again established in its natural habitat.

Sustainable development

Ex situ conservation is conservation of material outside its natural habitat.

The key phrase in the vocabulary of today's conservationists is **sustainable development**. In Mexico many orchid species are used in religious festivals to decorate the altars. Not only are the flowers removed from the wild, but also sections of the plants, as this means that the flowers will remain fresh for a longer time. This leads to a decline in natural populations.

Projects are now being set up to store seed of these orchids for the future in germ banks, and laboratories are being established to raise orchids from seed for subsequent cultivation by the local people. The Millennium Seed Bank Project at Kew aims to conserve seeds representing 10% of the world's flora by 2010, concentrating particularly on semi-arid areas, where most people live on land on which agriculture is marginal.

Philip Seaton taught biology for more than 30 years. He now works full time in orchid conservation. He is secretary to the Orchid Specialist Group of the IUCN/SSC, the World Conservation Union, and Orchid Conservation International, a Registered Charity.

The natural vegetation of much of Britain is woodland, but most forests were cleared for agriculture thousands of years ago.

- The beautiful blue Brazilian parrot, **Spix's macaw**, was declared extinct in the wild in December 2000. In contrast, after an absence of more than 60 years, the **ivory-billed woodpecker** has recently been sighted in the ancient cypress swamps of Arkansas, USA. To learn more about both birds go to www.arkive.org/species

- To find out more about the Millennium Seed Bank Project visit the Kew website on www.kew.org.uk and click on Wakehurst Place.