





HOW ARE PEOPLE AFFECTING BIODIVERSITY?



THE MAJOR THREATS TO BIODIVERSITY AND THE ROLE OF PEOPLE

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Every day we are faced with choices. As individuals we must decide what to eat, what to wear, how to get to school, and so on. Schools, businesses, governments and other groups also make choices. Some of these choices impact **biodiversity**, the variety of life on Earth. Sometimes our choices have positive impacts, for instance when we decide to use biodiversity sustainably or to protect it better. Increasingly, however, many of our actions are having negative consequences for biodiversity. In fact, human activities are the main cause of biodiversity loss.



The negative impacts of our actions have become so great that we are losing biodiversity more quickly now than at any other time in Earth's recent history. Scientists have assessed more than 47 000 **species** and found that 36 percent of these are threatened with **extinction**, the state whereby no live individuals of a species remain. In addition, extinction rates are estimated to be between 50 and 500 times higher than those observed from fossil records or the so-called "**background rate**". When species which are possibly extinct are included in these estimates, the current rate of species loss increases to between 100 and 1 000 times larger than the background rate!

The current rate of biodiversity loss has led many to suggest that the Earth is currently experiencing a sixth major extinction event, one greater than that which resulted in the extinction of the dinosaurs. However, unlike past extinction events, which were caused by natural disasters and planetary changes, this one is being driven by human actions.



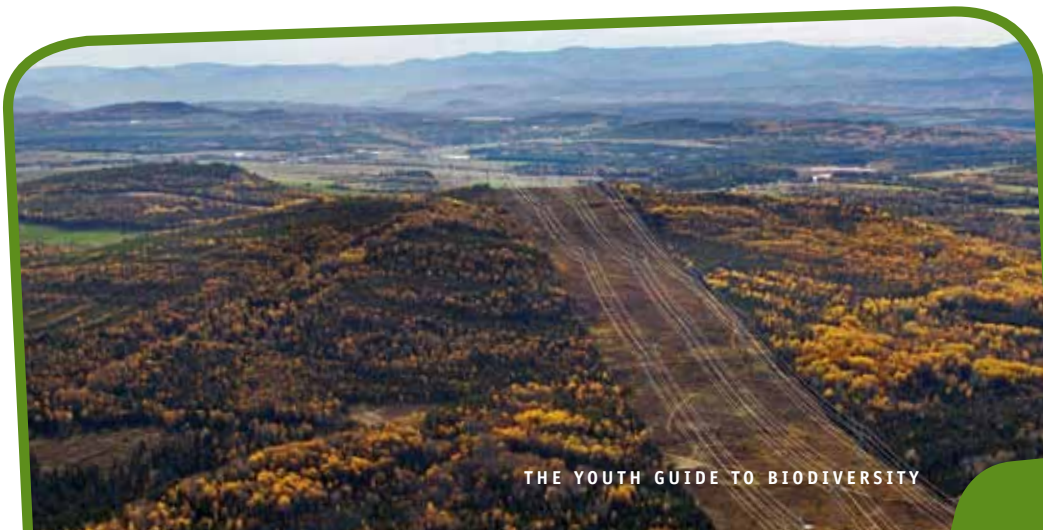
THE MAIN THREATS TO BIODIVERSITY

There are five main causes of biodiversity loss:

- 1 **habitat loss**
- 2 **climate change**
- 3 **overexploitation**
- 4 **invasive alien species**
- 5 **pollution.**

Each of these causes, or “**direct drivers**”, puts tremendous pressure on biodiversity and often they occur at the same time in the same **ecosystem** or environment.

1 **Habitat loss** occurs when natural environments are transformed or modified to serve human needs. It is the most significant cause of biodiversity loss globally. Common types of habitat loss include cutting down forests for timber and opening up land for agriculture, draining wetlands to make way for new development projects, or damming rivers to make more water available for agriculture and cities. Habitat loss can also cause **fragmentation**, which occurs when parts of a **habitat** (the local environment in which an organism is usually found) become separated from one another because of changes in a landscape, such as the construction of roads. Fragmentation makes it difficult for species to move within a habitat, and poses a major challenge for species requiring large tracts of land such as the African forest elephants living in the Congo basin. Though some habitat loss is necessary to meet human needs, when natural habitats are changed or modified with little concern for biodiversity the results can be very negative.



POWER LINES CUT THROUGH THE BOREAL FOREST IN QUEBEC, CANADA. APPROXIMATELY 35 PERCENT OF QUEBEC'S BOREAL FOREST HAS BEEN AFFECTED BY HUMANS THROUGH HYDROELECTRIC POWER, FORESTRY, MINING, HUNTING, FISHING AND RECREATIONAL ACTIVITIES.
© Allen McInnis/Boreal Communications

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Climate change, which is caused by a build-up of greenhouse gases such as carbon dioxide in the Earth's atmosphere, is a growing threat to biodiversity. Climate change alters the climate patterns and ecosystems in which species have evolved and on which they depend. By changing the temperature and rain patterns species have become accustomed to, climate change is changing the traditional ranges of species. This forces species to either move in order to find favourable conditions in which to live, or to adapt to their new climate. While some species may be able to keep up with the changes created by climate change, others will be unable to do so. Biodiversity in the polar regions (see box: "Arctic Sea Ice and Biodiversity") and mountain ranges is especially vulnerable to climate change.

3

Overexploitation, or **unsustainable use**, happens when biodiversity is removed faster than it can be replenished and, over the long term, can result in the extinction of species. For example:

- the once-plentiful cod fishery off the coast of Newfoundland, Canada has all but disappeared because of overfishing;
- freshwater snakes in Cambodia are declining from hunting pressure;
- *Encephalartos brevifoliolatus*, a cycad, is now extinct in the wild after being overharvested for use in horticulture;
- Overexploitation, especially when combined with destructive harvesting practices, is a major cause of biodiversity loss in certain ecosystems.



4

Invasive alien species (IAS), or species that have spread outside of their natural habitat and threaten biodiversity in their new area, are a major cause of biodiversity loss. These species are harmful to native biodiversity in a number of ways, for example as predators, parasites, **vectors** (or carriers) of disease or direct competitors for habitat and food.

In many cases invasive alien species do not have any predators in their new environment, so their population size is often not controlled (see box: “The Troublesome Toad”). Some IAS thrive in degraded systems and can thus work in conjunction with or augment other environmental stressors. IAS may also cause economic or environmental damage, or adversely affect human health.

The introduction of invasive alien species can be either intentional, as with the introduction of new crop or livestock species, or accidental such as when species are introduced through **ballast** water or by stowing away in cargo containers. Some of the main vectors (carriers) for IAS are trade, transport, travel or tourism, which have all increased hugely in recent years.



FELLING OF TREES IS A MAJOR ECOSYSTEM DISTURBANCE AFFECTING NUMEROUS SPECIES.
© FAO/L.Taylor

ANIMALS ARE VARIOUSLY AFFECTED BY DIFFERENT TYPES OF POLLUTION. OIL SPILLS CAN DEVASTATE FISH, SEA TURTLE AND MARINE BIRD POPULATIONS.

BROWN PELICANS CAPTURED AT GRAND ISLE, LOUISIANA, USA, WAIT TO BE CLEANED.

© International Bird Rescue Research Centre

SOME ANIMALS, SUCH AS THIS HERMIT CRAB IN THAILAND, MAKE THE BEST OF A BAD SITUATION AND USE TRASH ON THE BEACH AS A MAKESHIFT HOME.

© Alex Marttunen (age 12)



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The final driver of biodiversity loss is **pollution**. Pollution, in particular from nutrients, such as nitrogen and phosphorus, is a growing threat on both land and in aquatic ecosystems. While the large-scale use of fertilisers has allowed for the increased production of food, it has also caused severe environmental damage, such as **eutrophication** (see box below).

EUTROPHICATION

In eutrophic water bodies, such as lakes and ponds, the concentration of chemical nutrients is so high that algae and plankton begin to grow rapidly. As these plants

grow and decay, the water quality and the amount of oxygen in the water decline. These conditions make it difficult for many species to survive. The excess nutrients

that cause this situation mostly come from fertilisers, erosion of soil containing nutrients, sewage, atmospheric nitrogen deposition and other sources.

EUTROPHICATION IS CAUSED BY TOO MANY NUTRIENTS IN THE WATER.
© F. Lamiot



THE TROUBLESOME TOAD

Saadia Iqbal, Youthink!

It all started with some beetles that were destroying sugarcane crops in Australia. A type of toad called the cane toad was brought in from Hawaii, with the hope that they would eat the beetles and solve the problem. Well, the toads left the beetles alone, but ate practically everything else, becoming full-fledged pests in their own right.

Now they are running amok, preying on small animals and poisoning larger ones that dare to try eating them. Scientists are still trying to figure out what to do.

Source: australianmuseum.net.au/Cane-Toad



CANE TOAD.
© H. Ehmann/Australian Museum

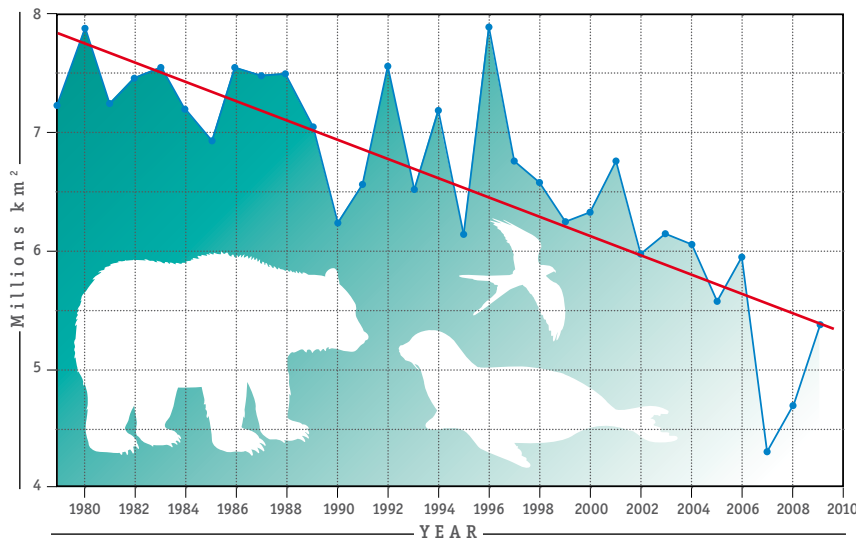
ARCTIC SEA ICE AND BIODIVERSITY

In the Arctic, ice is the platform for life. Many groups of species are adapted to life on top of or under ice. Many animals use sea ice as a refuge from predators or as a platform

for hunting. Ringed seals need certain ice conditions in the spring for reproduction, while polar bears travel and hunt on the ice. Algae even grow on the underside of ice floating on

the ocean. Ice is also the surface for transportation and is the foundation of the cultural heritage of the native Inuit people.

The pattern of annual thawing and refreezing of sea ice in the Arctic Ocean has changed dramatically in the first years of the twenty-first century. The extent of floating sea ice, measured every September, has declined steadily since 1980 (shown by the red trend line). Not only is the ice shrinking, but it is also much thinner.



Adapted from: Global Biodiversity Outlook 3, 2010

CONCLUSION

Though biodiversity loss is occurring at a rapid rate, examples from all over the world show that people are beginning to make choices and take actions that benefit biodiversity. However, we need more action if further biodiversity loss is to be averted. It's important to carefully consider the choices you make and their impacts, and to encourage other groups such as businesses and governments to do the same. The rest of this guide will help inform you about issues to consider, steps you can take and examples of positive action for biodiversity.

LEARN MORE

- :: Global Biodiversity Outlook 3: gbo3.cbd.int
- :: Global Environment Outlook 4: www.unep.org/geo/geo4/media
- :: Invasive alien species:
www.cbd.int/iyb/doc/prints/factsheets/iyb-cbd-factsheet-ias-en.pdf ,
www.cbd.int/doc/bioday/2009/idb-2009-childrens-booklet-en.pdf and
australianmuseum.net.au/Cane-Toad
- :: Climate change:
www.cbd.int/doc/bioday/2007/ibd-2007-booklet-01-en.pdf