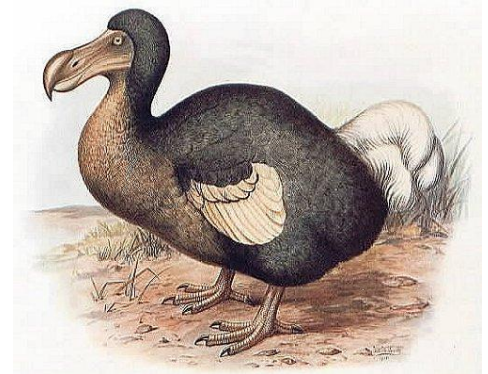
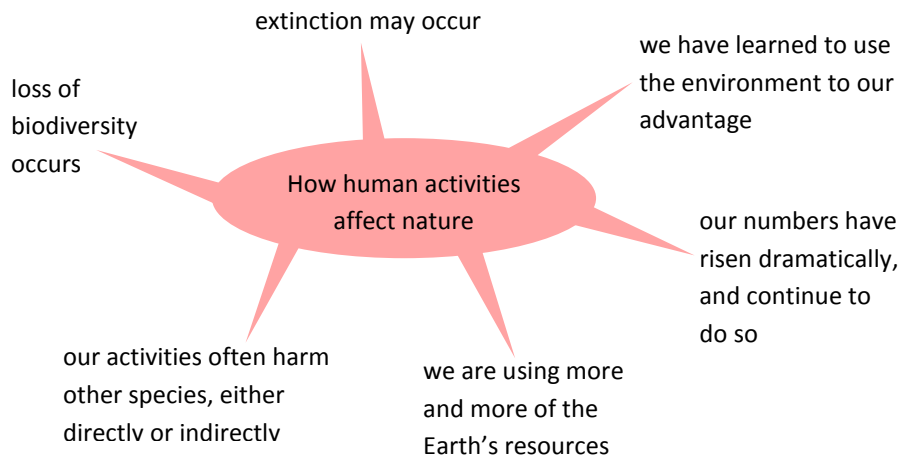




CONSERVATION

The importance of preserving biodiversity and conservation in situ and ex situ

Several thousand years ago when us humans were all troglodytes, we had very little impact on the environment and on natural processes. However, as society developed, we had more and more of said type of impact, and nowadays we are always hearing about the large effect we have on our own planet:



▲ The dodo is just one of many animals which are now extinct

The term **extinction** is heard of widely in today's world. Extinction occurs when the last living member of a species dies, and therefore the species ceases to exist. Humans started to spread widely over the Earth about 100,000 years ago. Since then, the rate of extinction has risen dramatically. Some scientists believe that increasing human activity caused the extinction of animals such as the giant sloth and the mammoths around 10,000 to 14,000 years ago, animals which were hunted for food.

The extinction of just one single species reduces *biodiversity*. There is such a wide variety of human activities that reduce biodiversity and cause extinction, and also many human actions cause habitats to be lost. These include:

- hunting for food, and over-harvesting
- killing for protection (e.g. attempting to kill insects which are vectors of disease, such as mosquitoes, or trying to remove the threat of a predator)
- pollution
- killing to remove competitors to our food (e.g. the use of pesticides to kill insects and fungi)
- habitat destruction, such as deforestation or clearing for development or agriculture

The importance of biodiversity

Genetic diversity is important because it allows a species to evolve. Without some genetic diversity, plant and animal species would not be able to adapt in order to survive to changes in the environment.

Modern agriculture uses **monoculture** and **selective breeding**. This reduces the variation and genetic diversity of domesticated plants and animals. It also leads to the extinction of some varieties within a species – this is called **genetic erosion**.

Climate change and biodiversity

Any species which has lost its genetic variation is going to be unable to evolve, as it won't be able to successfully adapt to changes in the environment brought along with climate change. The only alternative will be for them to move.

Climate change will inevitably result in the destruction of habitats, e.g. the loss of sea ice (icebergs). Other effects of climate change include the spread of disease (such as malaria-carrying mosquitoes now surviving in South-Eastern Europe), changing patterns of agriculture (e.g. crops no longer being suited to the environment) and genetic erosion.

Conservation in situ

The term **conservation in situ** means attempting to protect the natural environment via means of minimising human impact on the environment. There are several ways in which conservation in situ can arise:

Legislation

It is possible to pass legislations preventing development projects and human activities such as logging, hunting and clearing land for development and agriculture, although legislation will be isolated to one small area, or at least specific to a single country

Conservation parks

It is often possible to stop unacceptable human activities by establishing regions such as national parks and natur reserves which do not permit such activities. The obvious advantages of conservation parks are that various speci remain protected from human action and they permanently protect biodiversity, however conflict may arise wher protected animals come out of the reserve and raid crops, or if people violate the rules and hunt/log anyway

Repopulation

Where biodiversity has been lost, it is possible to rebuild it. There are many examples of sites where recreated wildlife habitats have been made to work. In the UK, the number of bitterns and otters are increasing in new reed beds. Conifer crops are being cleared for wildlife habitat recovery and large areas of grazing land are being helpe to revert to traditional meadow grassland

Conservation ex situ

Nowadays, zoos play a fundamental role in **conservation ex situ**. They concentrate on breeding endangered species. These breeding programs increase the numbers of an endangered species, which means there is a lower likelihood of the species becoming extinct.

It is not just animals being protected though, also plant species. One major type of conservation ex situ is a **seed bank**. This is a collection of seed samples. The one your course recommends you know about is the **Kew Millennium Seed Bank Project** in Sussex. It has the aim of one day holding seed samples of every known species of plant. Its aim by the end of this year (2010) is to have obtained samples of 10% of all plant life currently discovered, including many endangered species.

The seeds are regularly checked to see if they are still *viable* using frequent **germination** tests. This is because there is no point storing seeds for generations which will not survive. The seeds, however, are kept at freezing temperatures in dry conditions, because for every 1% decrease in moisture, their lifespan doubles, as does it with a 5°C drop in temperature.

International cooperation

- **CITES (Convention on International Trade in Endangered Species)** is a bill which means most endangered species (live or dead) cannot be traded or have artefacts sold; although some slightly-less endangered species are allowed to be traded, but under tight regulations (for these species, a licence must be owned to trade)
- **Rio Convention on Biodiversity** is a more positive convention which sets an agreement on positive cooperation between countries in research and conservation activities (scientists can take samples from other countries, and resources stored in one country – such as the Sussex seed bank – can be accessed by researchers from other countries) – although a weakness of this convention is that countries can slip through the regulations by trading deliberately from non-participating countries
- **environmental impact assessments (EIA)** are detailed surveys and a required component of the Convention on Biodiversity which must be carried out before all major developments to assess how it will affect the local wildlife, and if necessary modifications to the development plans might need to be made to mitigate any negative effects – sometimes the requirement may be to move the project to a different location, and sometimes the development application may be rejected altogether