

Conservation

NATURE RESERVES AND *IN SITU* CONSERVATION

The best place to conserve a species is in its own habitat. This is called *in situ* conservation. Many terrestrial and marine nature reserves have been established for this purpose. *In situ* conservation has several advantages.

- Species remain adapted to their habitats.
- Greater genetic diversity can be conserved.
- Animals maintain natural behaviour patterns.
- Species interact with each other, helping to conserve the whole ecosystem.

Despite these advantages, *in situ* conservation is not always enough to ensure the survival of a species.

- Some species become so rare that it is not safe to leave them unprotected in the wild.
- Sometimes destruction of a natural habitat makes it essential to remove threatened species from it.

In these situations *ex situ* measures are needed.

EX SITU CONSERVATION

1. **Captive breeding** – some or all members of a species are caught and moved to a zoo, where they are encouraged to breed. When numbers are high enough, some are returned to the wild to re-establish a natural population. An example of a species helped by captive breeding is the Hawaiian kestrel.

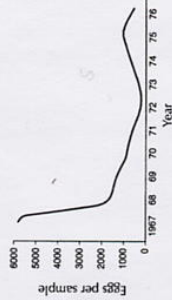
2. **Botanic gardens** – sites where many different species of plants are cultivated, either in greenhouses or in the open. One of the largest, Royal Botanic Gardens of Kew has more than 50,000 of the world's 250,000 known species in its collection.

3. **Seed banks** – seeds are kept in cold storage at -10°C to -20°C. Seeds of most species remain viable for more than a hundred years in these conditions. Other species that are not as long lasting can be germinated and grown to produce replacement seed before viability is lost. The Kew Millennium Seed Bank will eventually hold seed of 25,000 endangered species.

CONSERVATION OF FISH

Wild populations of fish are an important food source for many human populations. If a population is overexploited and the numbers of adult fish fall below a critical level, spawning fails. The disastrous collapse in the Peruvian anchoveta fishery is an example of this. Industrial scale exploitation of the anchoveta began in 1940 and grew at a rapid rate until 1973, when the annual catch dropped from 12 million tonnes to zero. The fall in anchoveta egg production in the years preceding the population crash is shown below. An El Niño event was partly responsible, but over-fishing was also a major factor. The anchoveta is a key species in its ecosystem. Many predators rely on it for food, including bonitos, cormorants, gannets and pelicans and populations of all of these species were greatly reduced.

Graph showing a collapse in anchoveta egg production



International measures are needed to promote fish conservation because most fish live in international waters, where ships from any country can catch fish. Various measures would help.

- Monitoring of stocks and of reproduction rates.
- Quotas for catches of species with low stocks.
- Moratoria on catching endangered species.
- Minimum net sizes, so that immature fish are not caught.
- Banning of drift nets, which catch many different species of fish indiscriminately.

Some of these measures have been used already in parts of the world, with limited success. Enforcement is very difficult and relies on a level of international trust and co-operation that is not always seen.

MANAGEMENT OF NATURE RESERVES

Nature reserves often need active intervention – this is called management.

- Alien species must be eliminated, especially alien species of predator and invasive plants.
- Areas that have been degraded by human activities must be restored.
- Special measures may be needed to help encourage threatened species, supplementary feeding or clearing vegetation, for example.
- Exploitation by humans must be controlled, for example the hunting of animals for bushmeat.

INTERNATIONAL ORGANIZATIONS AND CONSERVATION

Wildlife does not recognize frontiers between countries, so international co-operation over conservation is vital. Both voluntary and governmental agencies have important roles.

WWF – an example of a voluntary organization

The World Wildlife Fund is the largest privately supported conservation organization in the world, with millions of members and over 10,000 conservation projects so far undertaken. WWF is involved in political lobbying, monitoring of endangered species and establishing nature reserves. It also tries to involve local populations in conservation projects.

CITES – an example of a governmental organization

The Convention on International Trade in Endangered Species is the largest conservation convention, with over 100 member states. It regulates trade in threatened wild plant and animal species. Every 2 years there is a review of the species that are listed in two appendices to the convention. Trade in species listed in Appendix I is banned. Trade in species listed in Appendix II is only allowed with a licensing system that allows the trade to be monitored. The African elephant and the Alice tree of South America are examples of species listed in Appendix I. Listing of the African elephant in 1989 stopped the rapid fall in numbers caused by poaching.