

CONSERVATION



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In situ

Ex situ

In situ:

- Conservation of species in their natural habitat
- E.g. natural parks, nature reserves

Ex situ:

- Conserving species in isolation of their natural habitat
- E.g. zoos, botanical gardens, seed banks

In situ conservation

Setting up wild life reserves is not just a matter of building a fence around an area and letting it grow “wild”

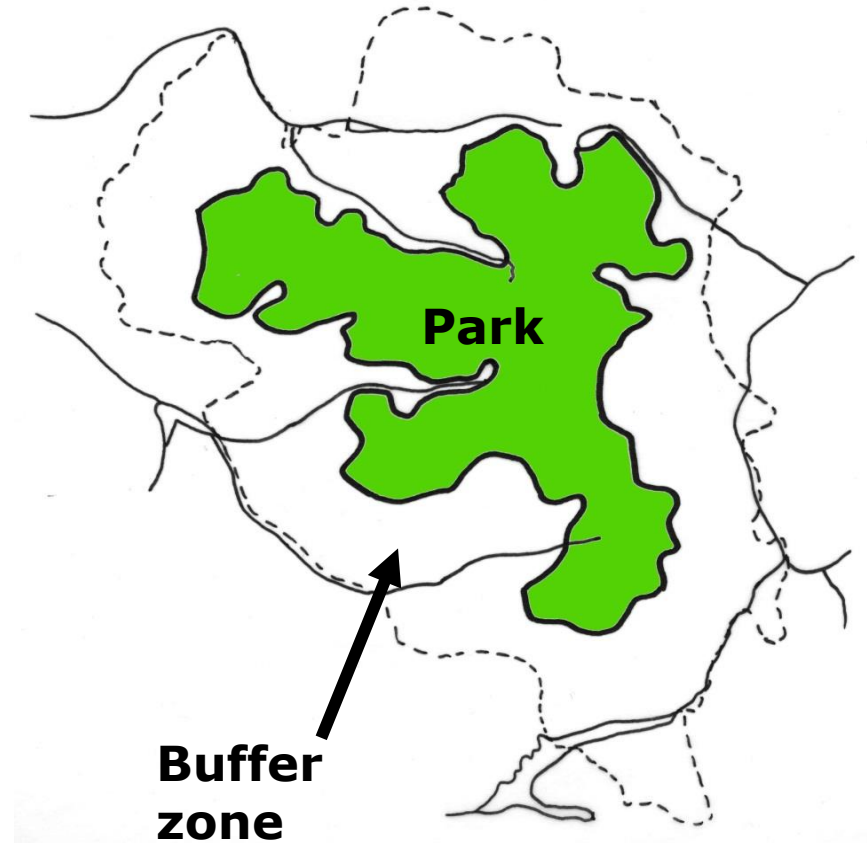


Without grazing animals heathlands which contain a number of rare species will revert to woodland

Nature Reserves and National Parks

- ❑ First the area that is suitable for the creation of a reserve has to be identified and delimited
- ❑ This requires surveys to collect data on key species
- ❑ Property may have to be expropriated
- ❑ A legal framework may need to be set up to control human activities in the area and in its immediate surroundings
- ❑ Policing the area may also be necessary

Les Ecrins National Park, France



Nature reserves and national parks

- ❑ If part of the area has been degraded due to bad land use it may need restoring
- ❑ Alien species that have penetrated the area may need excluding or eliminating
- ❑ Constant management will be needed to maintain the habitat of the species being conserved
- ❑ This may mean arresting natural succession



The advantages of *in situ* conservation

- ❑ The species will have all the resources that it is adapted too
- ❑ The species will continue to evolve in their environment
- ❑ The species have more space
- ❑ Bigger breeding populations can be kept
- ❑ It is cheaper to keep an organism in its natural habitat



However there are problems

- ❑ It is difficult to control illegal exploitation (e.g. poaching)
- ❑ The environment may need restoring and alien species are difficult to control



Ex situ conservation Captive breeding

- ❑ The Hawaiian goose was practically extinct in the wild
- ❑ 12 birds were taken into captivity
- ❑ A population of 9000 was released back into the wild
- ❑ The experiment failed because the original cause rats had not been eliminated.
- ❑ The rats eat the eggs and the nestlings of the geese



Pere David's deer success or failure?

- ❑ Pere David's deer was a native species of China
- ❑ In 1865 18 were taken into zoological collections
- ❑ Meanwhile it became extinct in the wild
- ❑ By 1981 there were 994 individuals scattered through zoological collections



Ex situ conservation

- ❑ Captive breeding of endangered species is **a last resort**
- ❑ These species have already reached the point where their populations would not recover in the wild
- ❑ It works well for **species that are easily bred in captivity** but more specialised animals are difficult to keep (aye aye)
- ❑ Isolated in captivity **they do not evolve** with their environment

Zoos: The land of the living dead?

- ❑ They have a very small gene pool in which to mix their genes
- ❑ **Inbreeding** is a serious problem
- ❑ Zoos and parks try to solve this by **exchanging specimens** or by artificial insemination where it is possible
- ❑ ***In vitro* fertilisation** and fostering by a closely related species has even been tried
(Indian Guar – large species of cattle - cloned)
- ❑ Even if it is possible to restore a population in captivity **the natural habitat may have disappeared** in the wild
- ❑ Species that rely on this much help are often considered to be **“the living dead”**

Botanical gardens

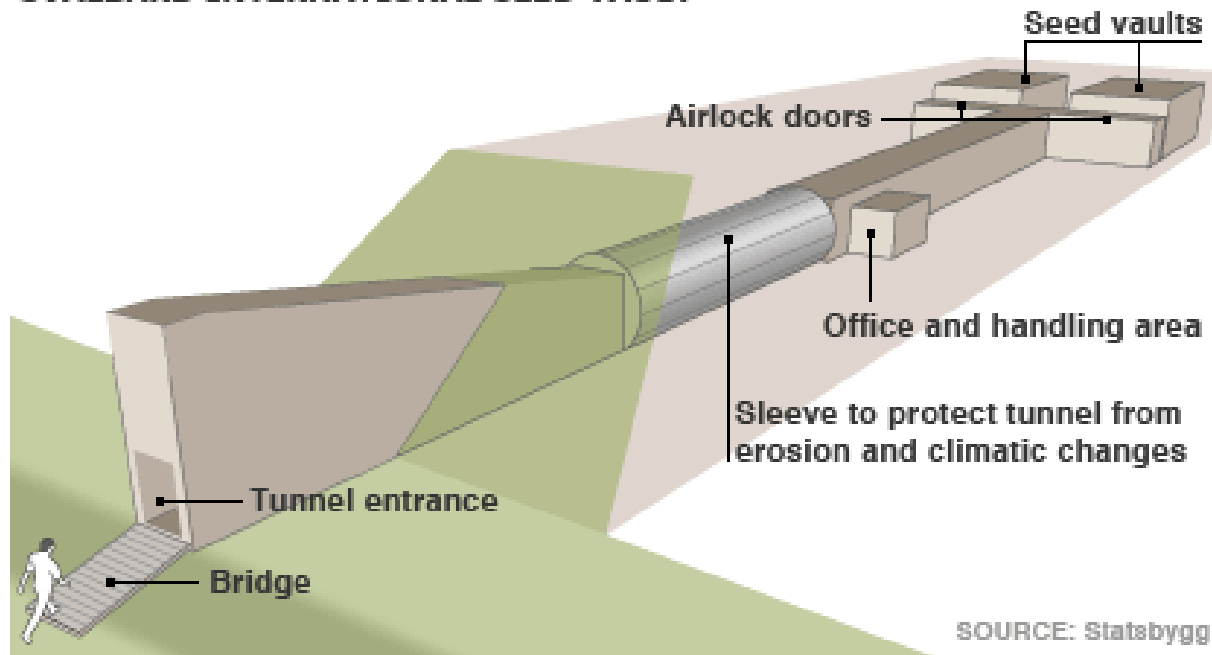
- ❑ Botanical gardens show the same problems as captive breeding of animals
- ❑ Originally the role of botanical gardens was economic, pharmaceutical and aesthetic
- ❑ Their range of species collected was limited
- ❑ The distribution of botanical gardens reflects the distribution of colonial powers
- ❑ Most are found in Europe and North America
- ❑ But plant diversity is greatest in the tropics

Seed banks

- ❑ Seeds can be maintained for decades or even centuries if the conditions are controlled
- ❑ <5% humidity and -20°C
- ❑ Not all species are suited to this treatment
- ❑ Seeds need to be regularly germinated to renew stock or the seeds will eventually lose their viability
- ❑ Seed banks are at risk from power failure, natural disasters and war
- ❑ Duplicate stocks can be maintained
- ❑ Seeds kept in seed banks do not evolve with changes in the environment

The doomsday vault - Spitzbergen

SVALBARD INTERNATIONAL SEED VAULT



International agencies

- ❑ **CITES**
(The Convention in International Trade in Endangered Species)
- ❑ Set up in 1988 to control and encourage the **sustainable exploitation** of species
- ❑ The CITES conferences determine the status of a species and whether or not its exploitation requires regulation
- ❑ Species are placed into different appendices depending on their status

