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Does Conservation have to mean Preservation?

Around the World, conservation is the buzzword. We are conserving species, landscapes, heritage sites and resources. This Factsheet considers what we mean by conservation and how it differs from preservation.

Conservation means that landscapes, ecosystems or organisms are actively managed in order to enhance, protect or restore them to a previous state. Preservation, though part of conservation, involves the protection of the natural environment, but with minimal human intervention, allowing it to evolve naturally. In some cases a strategy of preservation may result in an unwanted change.

Conservation of Landscapes

The main method of conserving landscapes is by designating areas as National Parks. National Parks were created by the National Parks and Access to the Countryside Act 1949, which now cover 12 areas in England and Wales Loch Lomond and the Trossachs in Scotland.

These areas, however, are not 'natural' landscapes: they result from hundreds of years of agricultural practice and will only retain their unique characteristics if these practices continued. Farmers are encouraged to maintain the practices that contribute to the landscape, e.g. maintain hedgerows and drystone walls.

The **Environmental Stewardship Schemes** pay farmers to maintain landscape features and National Parks also provide grants. The Lakeland Herdwick Direct scheme, for example, helps to support local hill farmers, maintain traditional farming practices and ensure that this native sheep breed survives.

Recent changes to the Common Agricultural Policy (CAP) may cause problems in National Parks.

Farmers no longer have to keep livestock in order to gain financial support which will create problems for upland areas of the Lake District which are the product of sheep grazing. Without management, the loss of sheep will change the appearance of the landscape as **secondary succession** will result in the growth of shrubs and eventual reversion to oak woodland.

The conservation of landscapes therefore involves considerable management to maintain a stage of succession. The 'do-nothing' approach would result in a changed landscape.

Management of Invasive Species

Conservation also means restoring landscapes and habitats that have been invaded by alien species such as rhododendron, Japanese Knotweed and Giant Hogweed. If left alone, these species have the ability to smother native species and destroy ecosystems.

Case Study – Rhododendron Eradication for Juniper conservation in Snowdonia

Rhododendron is a Victorian import from the Mediterranean, brought over for gardens. Once ***rhododendron porticum*** *is established, it is extremely difficult to eradicate. It invades by seed and vegetatively, producing roots from branches that grow horizontally. It has been shown to reduce the numbers of earthworms, birds and plants and the regenerative capacity of a site, leading to a reduction in local biodiversity. Physical access to a site can be reduced by the density and size of mature bushes, and management costs then rise as the bushes need to be treated prior to other activities being carried out. Established bushes then act as a seed source for further invasions in adjacent areas, eradicating ground cover plants and interfering with the process of natural regeneration of trees.*

There are already several hundred hectares of solid Rhododendron cover in the Snowdonia National Park. In Cwm Bychan and Mynydd Sygyn, this has threatened native juniper species. In an eradication programme in 2004, over 1,000 volunteers took part in a weekend of rhododendron cutting. The National Parks Authority have to maintain a programme of monitoring and clearance, currently costing around £300,000 per year.

Alien species such as this often find a sanctuary in derelict and abandoned gardens and their seeds are easily dispersed to re-populate cleared areas. If the roots are not completely removed they will regrow.

The removal of the largest plants is vital - mature bushes can produce up to a million seeds a season, continually re-invading surrounding habitats.

Injecting herbicide directly into the stems of large rhododendron results in their death within six months. The dead material can then be removed; the application of the herbicide is more precise than in traditional methods, thus less is used, which saves money.

Rhododendrons are a problem across Wales, Scotland and Ireland, anywhere where acid soils are found and management is vital if native species are to be conserved.

Conservation of Specie's Habitats

Habitat conservation is integral to conserving species. Many habitats have been lost in the past as **intensification** of farming involved draining wetlands and ploughing up heathlands. As subsidies that encouraged intensification have been removed, many of these unique habitats have been restored, often with EU funding.

Case Study – Reedbed restoration for bitterns

The RSPB have undertaken a programme of reedbed restoration in order to increase the number of breeding bitterns. Reedbeds have a high conservation value because they are home to a diversity of species, including invertebrates, moths, water voles and birds. The RSPB programme has included:

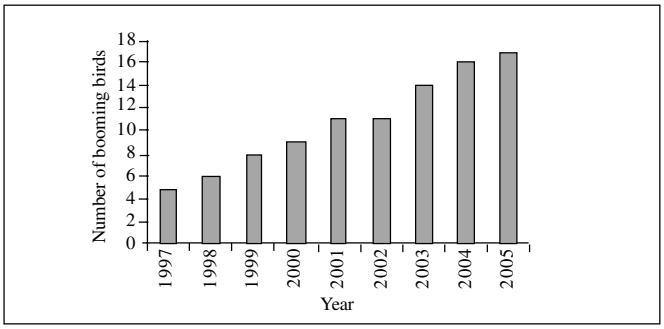
- *the creation of open water areas and ditches*
- *bed-lowering to make deeper waters*
- *scrub and sediment removal*
- *the creation of new reedbeds*

The aim in many areas is to restore the reeds to an earlier stage of succession. The strategy will then be to maintain this.

Bed-lowering involves considerable work to increase the area of wet reedbed, but the landscape soon recovers. At Minsmere reserve in Suffolk, bed-lowering was followed by the introduction of reedbeds , which flourished.

However a management problem for newly created reedbeds is the lack of fish and eel populations that bitterns and other birds rely on. Water control structures that maintain water levels often create a barrier for migrating young and so where necessary mature fish and eels have to be artificially introduced to establish a sustainable population.

Number of booming bitterns on RSPB reserves



The work done by the RSBP on their reserves has been successful in conserving bitterns and their numbers have steadily risen, producing a large percentage of the UK's chicks.

This is another example where conservation requires considerable human intervention.

Management of a National Nature Reserve

Meadows are an example of active management because mowing is often required to encourage the growth of plant species. North Meadow on the banks of the Thames near Cricklade in Wiltshire is home to the rare **snake's head fritillary**. As well as being designated a **NNR**, it is also a **Special Area of Conservation (SAC)** and a **SSSI.**

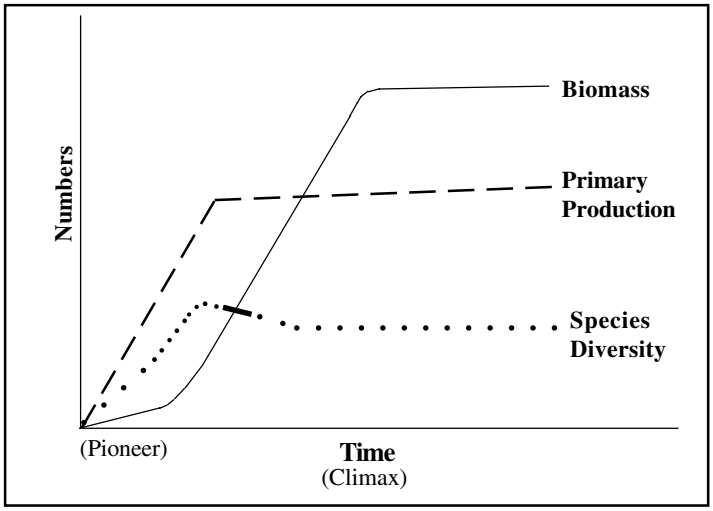
The meadow supports a wide variety of wildflowers, including marsh orchids, over 20 species of grasses, insects such as moths, beetles and blue damselflies, and several species of birds. Many meadows like this have now been lost through intensive agriculture or gravel extraction.

Local people have managed this meadow for centuries and they still do, in partnership with **Natural England**. The meadow is flooded during the winter months, which is a vital part of the life-cycle of the plants. In spring a hay crop is grown and harvested after the flowers have seeded. The meadow is then used to graze livestock for six months before being 'rested' ready for the next hay season. These practices are vital to the conservation of the wildflowers of the meadow.

Conservation of Dune ecosystems: Oxwich Bay

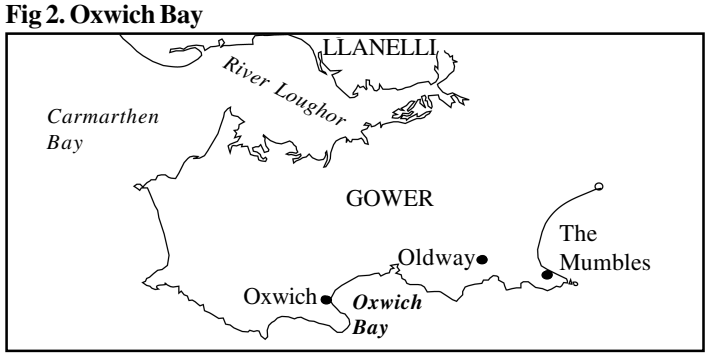
Much conservation involves maintaining succession at a sub-seral stage. Diversity is at its greatest at lower stages of succession and reduces towards climatic climax, when a few species dominate (Fig1).

Fig 1. Changes in vegetation during succession



In order to maintain species diversity, succession has to be arrested and the ecosystem managed. This is the case at Oxwich Bay on the Gower Peninsular where there is an extensive dune system.

Fig 2. Oxwich Bay



The area is a **National Nature Reserve** and in high demand for field studies. There are a variety of species including sea-stock, small blue butterfiy and Ceparo's groundhopper. Visitor access for non-damaging activities is encouraged because trampling has maintained small open areas and short turf. However, another more intrusive form of management is the 'controlled disaster' where a JCB scrapes off the top layers to reveal bare sand. Primary succession then takes place and the slacks (the hollows between the dunes) are rejuvenated and a diversity of dune vegetation begins to develop.

The dunes also have to be managed for invasive species, in this case, bracken. This was initially done by ripping up the bracken with a 'bush-hog flail', but the bracken litter resulted in a nutrient-rich sand that encouraged the growth of non-dune species. So, complete removal is now the preferred method. Scrub, mainly birch, sallow and alder, also has to be dealt with and this is achieved in a more natural way using wild goats to graze on them. These are kept within an enclosure of electric netting and fed over winter with hay and goat mix.

Table 1. Annual costs of using goats to manage the scrub (£, prices as at 2000)

Goats	Netting	Battery (netting)	Shelter	Feed	Vets Bills	Dip	Husbandry	Total
Free	24.00	90.00	250.00	69.00	50.00	5.00	20 man days	>488.00

The goats are moved around as they reduce the scrub in each area. It only takes three years of browsing to reduce quite dense scrub to struggling bushes.

When is preservation and minimal human intervention best?

Sometimes doing nothing is the best option. Where this happens most is with the protection of wilderness areas. National Parks outside the UK tend to be for the protection of wilderness areas. Other than minimal management of honey-pot areas, with pathways, visitor amenities etc, intervention in the rest of the park is minimal.

Yosemite National Park

Yosemite was one of the first National Parks established in the world, covering 12,000 square miles. 95% is designated as wilderness, meaning that only 5% is managed. In comparison to UK National Parks, the aims of the Yosemite management plan are to:

- Restore altered ecosystems as nearly as possible to conditions they would be in today had natural ecological processes not been disturbed
- Protect threatened and endangered plant and animal species and reintroduce, where practical, those species eliminated from the natural ecosystems
- Identify and perpetuate natural processes in park ecosystems
- Permit only those levels and types of use that are compatible with the preservation or protection of the scenic resources

Natural succession is to be allowed. Farming, commercial forestry or quarrying are not allowed in the park.

Land management is achieved by zoning, with four 'natural sub-zones', each having differing levels of management.

Table 2. Zone management

Zone	Management
Wilderness Subzone	Number of visitors limited. Natural systems permitted to follow their course.
Environmental Protection Subzone	Dedicated to scientific research. Nomanagement that might interfere with this
Outstanding Natural Feature Subzone	Maximum protection for outstanding features
Natural Environment Subzone	Roads, picnicking areas, and trailheads are allowed, but development will be minimal.

However, even in the wilderness, invasive plant removal is undertaken because these are not natural to the area and can displace native plants and wildlife. The worst invaders are:

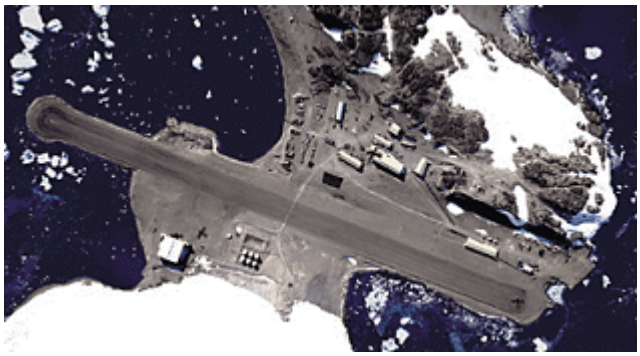
- Yellow star thistle (*Centaurea solstitialis*)
- Himalayan blackberry (*Rubus discolour*)
- Spotted knapweed (*Centaurea maculosa*)
- Perennial pepperweed (*Lepidium latifolium*)

Geographical Positioning System technology is used to map populations and then crews move in and hand –pull, or remove weeds using mechanical means, natural weedkillers, or predatory insects.

Antarctica

Antarctica is a unique ecosystem and vital to the scientific studies of, for e.g. ozone depletion and climate change. It is protected under the **Antarctic Treaty.** Over time however, regulations have increased so that all plants and animals in Antarctica are now protected and there are measures to prevent pollution of this pristine environment.

- No bird or mammal may be caught or killed without a permit, which are only granted for scientific reasons
- Nothing that could introduce non-native species is allowed, e.g. growing compost or soil
- Killing of seals is absolutely prohibited
- Commercial fishing is strictly controlled to conserve marine life
- The discharge at sea of all toxic and noxious chemicals and non-biodegradable waste is prohibited
- Mining is prohibited



The only permanent structures of any size in Antarctica are scientific research stations. There are currently 49 stations with between one and two thousand scientists and support staff. The largest UK research station is Rothera, with up to 120 people in summer and 20 in winter. There are strict regimes to manage waste and complete clean ups of abandoned stations. Every human activity on the continent is carefully assessed, though the concern is that with increasing tourism there will be a gradual cumulative impact.

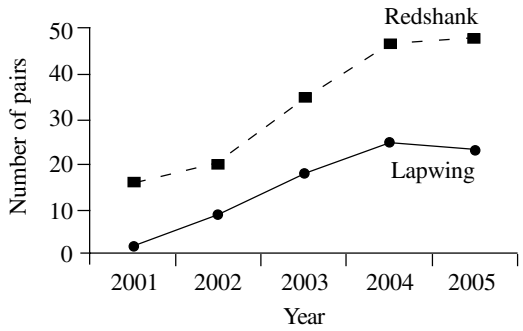
Why is there conservation rather than preservation in the UK?

The United Kingdom is a small island and densely populated. Most of the land is in use for settlements, agriculture, forestry, industry etc. This means there are few examples of unique ecosystems and so those we do have need careful management to maintain them and prevent them developing naturally and so being lost. Some argue that this is artificial because succession is a natural process and we should not prevent this. In Britain however, much of what we wish to conserve is man-made anyway.

Even in vast regions such as Antarctica, human impact is a threat and some management and control is required.

Sample questions

1. The graph shows the number of two bird species found on reedbeds at a RSPB reserve.



   Suggest two management techniques that could be used to conserve the lapwing population. (2 marks)

2. Explain what is meant by the term *secondary succession* (2 marks)

3. Management of dunes often aims to stop climatic climax vegetation developing. Explain why. (1 mark)

4. Why are invasive alien species routinely removed from ecosystems? (2 marks)

5. Suggest three ways in which human activity may cause extinction of species (3 marks)

Answers

1. Preventing pollution of food/water sources; controlling predators; improving food sources; improving extending nesting sites;

2. Change in community over time; where the existing community has been disrupted/not from a bare surface.

3. Increased diversity at lower stages/lower diversity at climax stages.

4. Can out-compete native species/crowd out native species/not support native wildlife/do not look natural.

5. Introduction of predators/competition; pollution of water sources/food sources; damage to habitats by farming/industry/building; hunting/e.g. collecting/pet trade.

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