

Learning objectives

- Describe what is meant by conservation.
- Explain how managing succession can help to conserve habitats.

Specification reference: 3.7.4



▲ **Figure 1** Moorland is an example of the conservation of a habitat by managing succession. Burning of heather and grazing by sheep has prevented shrubs and trees from developing

Summary questions

Fenland is an area of waterlogged marsh and peat land. It supports a rich and unique community of plants and animals. If left alone, reeds initially dominate and the area gradually dries out as dead vegetation accumulates. Grasses, shrubs and trees in turn replace the fenland species.

- 1 Identify reasons for conserving habitats such as fenland.
- 2 Suggest practical measures that may be taken to prevent succession by grasses, shrubs, and trees in fenland.

What is conservation?

Conservation is the management of the Earth's natural resources by humans in such a way that maximum use of them can be made in the future. This involves active intervention by humans to maintain **ecosystems** and **biodiversity**. It is therefore a dynamic process that entails careful management of existing resources and reclamation of those already damaged by human activities. The main reasons for conservation are:

- **personal** to maintain our planet and therefore our life support system.
- **ethical**. Other species have occupied the Earth far longer than we have and should be allowed to coexist with us. Respect for living things is preferable to disregard for them.
- **economic**. Living organisms contain a gigantic pool of genes with the capacity to make millions of substances, many of which may prove valuable in the future. Long-term productivity is greater if ecosystems are maintained in their natural balanced state.
- **cultural and aesthetic**. Habitats and organisms enrich our lives. Their variety adds interest to everyday life and inspires writers, poets, artists, composers, and others who entertain and fulfill us.

Conserving habitats by managing succession

We saw in Topic 19.6 that any **climax community** has undergone a series of successional changes to reach its current state. Many of the species that existed in the earlier stages are no longer present as part of the climax community. This is because their habitats have disappeared as a result of succession, or species have been out-competed by other species or they have been taken over for human activities. One way of conserving these habitats, and hence the species they contain, is by managing succession in a way that prevents a change to the next stage.

One example is the moorland that exists over much of the higher ground in the UK. The burning of heather and grazing by sheep has prevented this land from reaching its climax community. The burning and grazing destroy the young tree saplings and so prevent the natural succession into deciduous woodland.

Around 4000 years ago, much of lowland UK was a climax community of oak woodland, but most of this forest was cleared to allow grazing and cultivation. The many heaths and grasslands that we now refer to as natural are the result of this clearance and subsequent grazing by animals. An example is chalk downland which was cleared of forest and where sheep and rabbits now eat any new saplings preventing these saplings from developing into full grown trees.

If the factor that is preventing further succession is removed, then the ecosystem develops naturally into its climatic climax (secondary succession). For example, if grasslands are no longer grazed or mowed, or if farmland is abandoned, shrubs initially take over, followed by deciduous woodland. Sand dunes can be managed to prevent succession to woodland leaving wet areas where species like natterjack toads can thrive.

Conflicting interests

One challenging conservation issue in the UK is the conflict between the conservation of hen harriers and the commercial hunting of red grouse. One scientific survey investigated the effect of predation by hen harriers on the breeding success of red grouse on managed moorland in Scotland. Some of the results included:

- On moorland where hen harriers were present there were, on average, 17% fewer young grouse than on moorlands without hen harriers.
- Over a three-year period grouse nests were intensively observed during the six weeks following the hatching of chicks. In this period, predation by harriers accounted for 91% of grouse chick losses.
- Prey remains found around harrier nests were examined. Of the 300 items identified, 32% were grouse chicks.

- 1 \sqrt{x} Calculate how many of the items of prey identified around harrier nests were grouse chicks.
- 2 Harriers also feed on voles and meadow pipits. Explain how a rise in the population of these organisms might affect the population of grouse.

Moorland is considered one of the most attractive landscapes in the UK. Many of the national parks are made up of moorland and are visited by millions of people each year. To rear grouse, moorland has to be carefully managed. Controlled grazing by sheep and the periodic burning of vegetation are used to maintain low-growing plant populations of heather, bilberry, and crowberry that grouse feed on and nest within. The money to support this management comes largely from charges made to those who shoot grouse.

- 3 Explain what might happen to moorland if sheep-grazing and burning of the vegetation ceased.

The population of grouse in the UK is in decline due mainly to disease. Currently there are around 250 000 breeding pairs. The hen harrier was persecuted to such an extent that, by 1900, it was only found on a few Scottish islands. It recolonised the UK mainland in the 1970s and there are now around 750 breeding pairs. Both harriers and grouse normally produce one clutch of eggs each year. Hen harriers are protected by law and it is illegal to kill them, collect their eggs or destroy their nests. Conservationists want to retain this protection so that the population of hen harriers can increase. Grouse managers want to be allowed to control hen harrier populations to prevent them threatening the declining grouse populations.

- 4 Outline the arguments for and against continued protection of hen harrier populations.

To try to help resolve this conflict, scientists are currently conducting experiments to test whether hen harrier populations can be increased at the same time as reducing their negative impact on grouse populations. The information can then be used to inform decisions about how best to conserve grouse, harriers and moorland habitats.

The experiment will be carried out in two large areas where harriers are currently rare. Within these areas, the results of two strategies on the size of harrier and grouse populations will be measured:

- Killing hen harrier chicks, or moving them to a different location, when the harrier population size reaches an agreed ceiling.
- Providing alternative sources of food for hen harriers.



▲ **Figure 2** Hen harrier



▲ **Figure 3** Red grouse

- 5 In each of the following, suggest a reason why:
 - a The experiment will take at least five years to produce any findings.
 - b An independent body, acceptable to both conservation groups and grouse managers will be needed to oversee the experiment.
 - c The sites chosen for the experiment are ones where harriers can be expected to colonise relatively quickly.
 - d Each experimental area will contain a number of different moorland sites managed by different individuals.
 - e Some people are concerned about the long-term implications of a suspension, however temporary, to the legal protection of harriers that would be required during the experiment.
- 6 Explain how scientific experiments such as this one help to inform decision-making.