

Farmland

Scotland's farmland is highly varied and contains a wide range of habitats for wildlife. However, populations of some birds and insects are in decline. Intensive land management is the main challenge to farmland wildlife.

Summary

Key messages

- Farmland and low-lying habitats consist of arable and grassland fields, crofting land, horticultural areas and lowland heaths and unimproved grasslands.
- The wildlife found in this ecosystem is highly influenced by changes in land use and land-management practices, such as the very recent losses of set-aside land and applications of herbicides and pesticides.
- Around two-thirds of habitats and species have been assessed as being in either recovering or favourable condition, with the remaining third in unfavourable condition.
- Of 61 farmland bird species, nine have declined massively between 1995 and 2011, with some now so scarce that they have almost disappeared.

State and trend

State: Moderate - high agreement, medium evidence

Trend: Stable/declining - high agreement, medium evidence

There is an explanation of the diagram and further information on how we carried out the assessments on the [summary pages](#).

- Farmlands are highly diverse, with a range of habitats and varying conditions.
- Assessments are of the current "average condition"; some areas are in a worse condition, and others are in a better one. Equally, the condition of some aspects of farmland wildlife is declining, while others are improving.
- Making any overall assessment is necessarily a simplification.
- We have taken account of the scale of any damage to the environment in these assessments; impacts can be locally damaging, but may have little effect on a national scale.
- We have stated how confident we are in the assessments based on the level of agreement between the specialists involved, and the quality and quantity of the supporting evidence.



Overview

Farmland and lowland ecosystems are made up of a wide range of habitats, including [arable and horticultural fields](#), often with hedgerows or stone dykes as boundaries, [crofting land](#), [lowland heaths](#), [woodlands](#), [traditional orchards](#), [wood pasture](#) and a [range of grasslands](#) (including [machair](#)). Many of these habitats have been heavily altered by agriculture through intensive management and decades of intensive cattle and sheep grazing on pasture land. These habitats are widespread in the Central Belt and in much of southern and eastern Scotland, but they are also found on the coastal fringes and in alluvial valley bottoms in the northern and western Highlands. Some pockets of lowland croft land are home to rare birds like [corncrakes and choughs](#). Other common habitats in the lowlands include [wetlands](#) and [woodlands](#).

Lowlands and farmland support a diversity of wildlife, but this has been altered by land management over centuries, particularly in recent decades. The abundance of particular species of birds is a good indicator of biodiversity in the lowlands because their presence or absence can reflect changes in the quality of the habitat and its food supply. Across Scotland, 39 habitats have been identified as amongst the most threatened, and are designated as [priority habitats](#). Several of these are in the lowlands, notably lowland heath, neutral grasslands and fen meadows.

According to the [Countryside Survey Report for Scotland 2007](#), nearly a quarter of Scotland's land area was in arable, horticultural or improved grassland habitats. These habitats occur predominantly in the lowlands, where they occupy 58% of the land area. Farming on the most fertile lowland soils can be as intensive as anywhere in the UK.

Broadly, there are four farmland landscape habitats in Scotland.

Arable fields and horticulture

These are the most intensively managed areas, with regular inputs of fertilisers and pesticides. Scotland's arable crop farming is dominated by cereals and, in some areas, potatoes. The horticultural sector is dominated by the production of soft fruit, which is now mainly produced in polytunnels as a way of controlling the environment so the cropping season can be extended. Very few orchards with fruit trees are still in operation, although there is interest in reviving them.

Field margins and hedgerows

[Hedges](#) are an integral part of our landscape and these field boundaries provide an essential habitat and refuge for farmland wildlife. [Mistle thrush](#) and [wood warbler](#), [butterflies](#), such as the peacock and meadow brown, [bats](#) and [hedgehogs](#) all use the shelter and food supplies afforded by hedges. They also act as wildlife corridors, helping animals to move through open farmland while staying under cover.

The uncultivated edges of enclosed fields are often referred to as [field margins](#) or 'conservation headlands'. These areas receive little in the way of fertilisers and pesticides and can act as refuges for wildlife. Insects in particular thrive in these areas, providing food for birds and animals. They may also help pollinate crops and prey upon crop pests.

Grasslands

The vast majority of agricultural grassland in rural Scotland has been improved over many years through drainage, fertilisers and re-seeding using the best grass species from livestock grazing and harvesting winter forage.

Unimproved areas of grassland are rare in the lowlands, as most areas have been improved for agriculture to encourage the grass species that are most suitable for livestock to eat.

Applying fertiliser to encourage the fastest growing grasses results in the smaller, slower-growing species being crowded out by the grass. In contrast, unimproved lowland grasslands are usually full of flowers, rushes, sedges, mosses and the great variety of wildlife that is squeezed out of improved grassland. Many colourful flowering plants grow here, such as purple thyme and knapweed, and they support insects that feed on their nectar and pollen. This abundance of insects, including bumblebees and butterflies, attracts birds such as [yellowhammers](#), nesting in nearby hedges, and [skylarks](#), which nest on the ground in open fields.

Scotland also has a rare coastal grassland, called [machair](#), which has developed on shell-sand soils. It is restricted to the Hebrides, the north-west coast and the northern Isles, and outside Scotland it is only found in small areas of north-west Ireland. Centuries of low-intensity livestock farming in these areas, using seaweed rather than chemicals as fertiliser, have created grasslands rich in flowers. The displays of summer wild flowers can be visually stunning, and the habitat supports a wide range of insects and birds. Machair provides a refuge for species that were once widespread in the arable farms of the Scottish lowlands, such as the corncrake and the [great yellow bumblebee](#).

Lowland heath

Below an altitude of 300 metres, and dominated by heather, other dwarf shrubs and gorse, lowland heaths add colour and texture to the landscape. Over centuries activities like grazing have prevented woodland from growing, with many woodlands gradually removed as they were cleared for farming. Lowland heaths were once much more common across Scotland, but many have been changed into grassland as a result of intensive agriculture.

More than 5,000 invertebrate species are found in Britain's heathland, alongside a diversity of other wildlife, ranging from [juniper](#) to nesting [stonechat](#).

Other common habitats in Scotland's lowland and farmland include [woodlands](#) and [wetlands](#).

Benefits of farmland ecosystems

The [UK National Ecosystem Assessment](#), published in 2011, provides an overview of a range of consequences of a change in biodiversity.

Lowland and farmland has shifted towards intensive use for food production – for people as well as livestock. However, this has resulted in a change in biodiversity that could have major implications for food production. As fields have become larger and the use of agricultural chemicals has increased, evidence points to a potentially serious decline in populations of [pollinators](#), such as [bees](#). As these are essential for crop production, a decline could affect how much we are able to grow and our ability to feed Scotland's population from food grown in Scotland.

Farmland and lowland has cultural benefits as well. It can define many visitors' perceptions of the environmental quality of places away from towns and cities. Lowland heaths, hay meadows and machair are often described as cultural landscapes – reflecting the distinctive nature of the consequences of how these areas are managed. If these habitats were lost, it would have a negative effect on our culture.

As one of the most visible and visited landscapes in Scotland, the changing nature of the farmland and lowland ecosystem may be seen by many as indicative of changes in Scotland as a whole.

State

[Between 1998 and 2007](#), the land area used for arable farming and horticulture declined by 13%, whereas improved grassland expanded by 9%. The length of linear features (hedges, walls, fences, etc.) decreased by nearly 8%. Over the same period the total length of hedges and lines of trees decreased by 5%, and the length of managed hedgerows decreased by 7%. At present, Scotland has about 46,000 kilometres (km) of hedgerows – roughly equivalent to the circumference of the Earth.

Neutral grassland, which has only minimal fertiliser added, covered almost 6% of Scotland in 2007; this is the same area as was recorded in 1998. Unimproved grassland, which has not been re-seeded or fertilised, is now rare in the lowlands. Here, many species of orchids and globeflowers are found in abundance. The species in these grasslands require a moderate level of grazing – enough to ensure the meadow does not become overgrown, but not so much as to prevent wild flowers from seeding. Many grassland plants need small, open spaces to germinate, whereas many invertebrates need tussocks for shelter, so the best grasslands for wildlife contain short and long patches – a variety of micro-habitats for a variety of species.

To measure the condition of habitats and species in protected areas, such as [Special Areas of Conservation](#) (SACs) and [Sites of Special Scientific Interest](#) (SSSIs), assessments are carried out of the 'notified features' – such as named species or habitat types.

Of 160 of these assessments for the lowlands in 2010, 68% were in a recovering or favourable condition. The main reasons for poor condition were over-grazing, invasive species and land management. Figure 1 shows the condition of notified features in lowland and farmland protected areas in 2010.

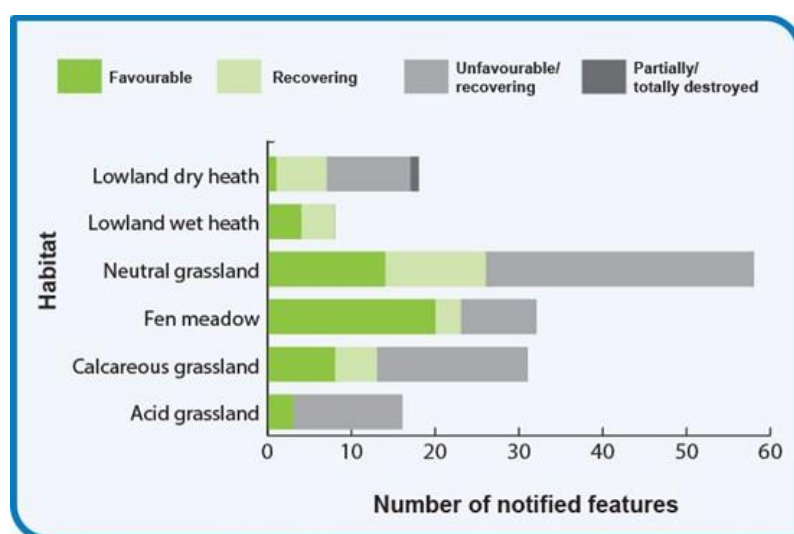


Figure 1: Condition of notified features in lowland and farmland protected areas in 2010

Source: SNH – 30 September 2010, including recovery under remedial action as in the [National Indicator](#)

Note: some of these habitats are described in other parts of Scotland's Environment website – such as fens, under [Wetlands](#)

Changes in a number of broad habitats and priority species across the wider countryside, as well as protected areas, of Scotland are monitored under the [Biodiversity Action Reporting System](#) (BARS). The farmland and lowland habitats include lowland meadows, arable field margins and orchards, and the 108 lowland species include butterflies, moths, birds, flowers, and mosses and lichens. BARS provides details of changes occurring over time.

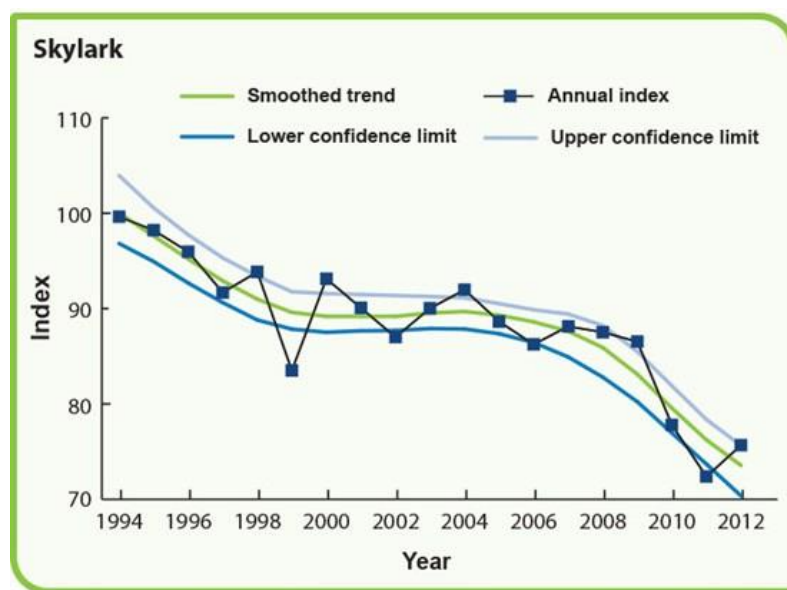
Wildlife indicators are also used to determine trends. The smoothed long-term (1979-2010) [butterfly population trend](#) for all species was classed as stable. However, butterfly species that are restricted to specific and often isolated habitats (known as specialists) declined to 51% of their 1979 populations, although this decline may have levelled off since 2000. [Moth numbers](#) among 185 of the more common species fluctuated between 1975 and 2004. There is emerging evidence from the [Rothamsted insect survey](#) of long-term declines in common moth species in Britain.

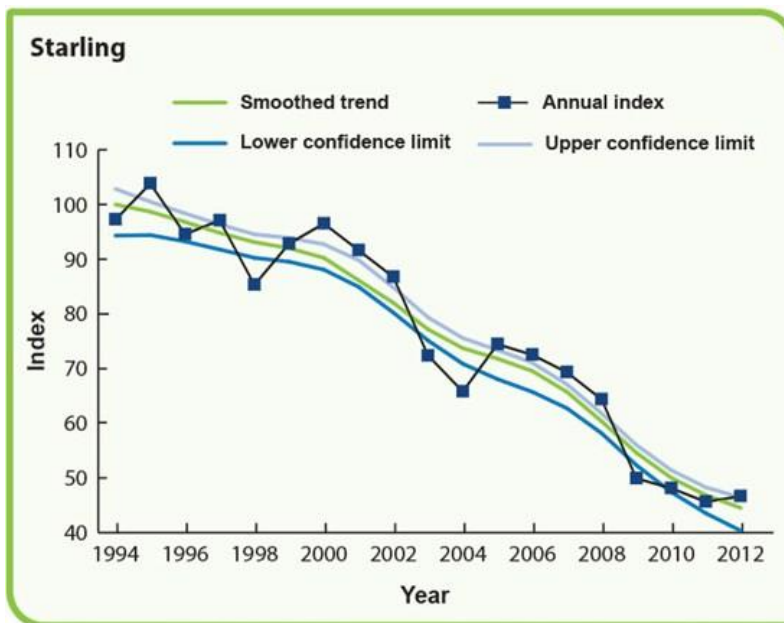
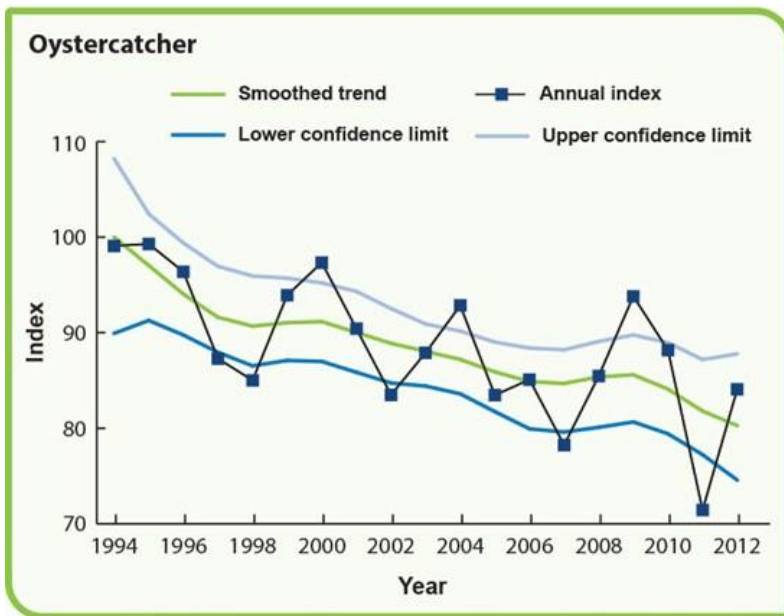
The [abundance of terrestrial breeding birds indicator](#) shows the trends for 65 breeding bird species in Scotland between 1994 and 2011, based on data obtained from sampling 300 plots in the Breeding Bird Survey (BBS) and a number of other targeted surveys.

Three main terrestrial habitats are represented: farmland, woodland and upland. Although useful for common birds, this indicator is based on a relatively small sample size, so some threatened farmland species, such as grey partridge, tree sparrow and corn bunting, are now too scarce to measure reliably through the BBS.

For 2012, the [BBS](#) provides a clearer picture of trends in wildlife condition by providing information on trends for individual species. Of the 61 species for which trends specific to Scotland can be calculated, nine declined significantly between 1995 and 2011: kestrel (-57%); oystercatcher (-30%); lapwing (-56%); swift (-57%); rook (-34%); skylark (-19%) starling (-40%); and meadow pipit (-29%).

Graphs showing trends for some of the key farmland species between 1995 and 2012 are shown in Figure 2.





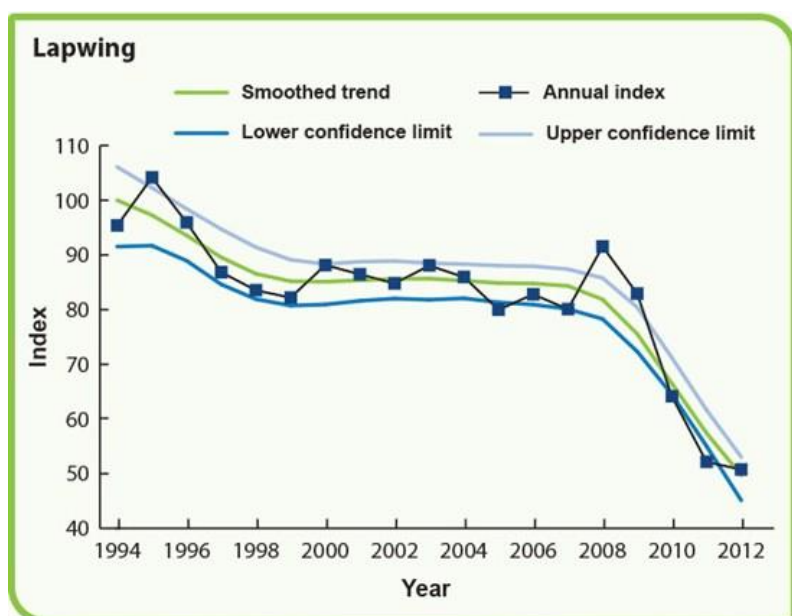


Figure 2: Breeding birds survey population trends for four farmland bird species in Scotland: skylark, oystercatcher, starling and lapwing (source: [BTO/JNCC/RSPB Breeding Bird Survey](#))

Long-term monitoring and research has identified the main reasons why populations of these birds have declined so severely. These are shown in Table 1.

Table 1: Summary of main agricultural causes of population change for some farmland bird species

Source: RSPB Scotland

Species	Main causes of population change on lowland farms
Grey partridge	Decline caused by pesticides, which affect the survival of chicks by reducing insect populations, and changing hedgerow and field margin management, which reduces habitat for nesting.
Corncrake	Long-term decline caused mainly by early and repeated cutting of forage grasses, destroying nests and young. Conservation measures to delay cutting and provide cover throughout the breeding season have led to population recovery in the core range in Scotland.
Lapwing	Declines caused by the reduction of nesting opportunities and nest success as a result of grassland intensification, loss of spring cropping, and the timing and frequency of agricultural operations in remaining spring-sown fields. High densities of generalist predators (crows and foxes) may limit the effectiveness of interventions to preserve habitats.

Skylark	Decline caused by loss of nesting and foraging opportunities in dense, autumn-sown crops, coupled with high rates of nest loss in intensive grass silage systems.
Chough	Causes of long-term population fluctuations are not fully understood, but intensifying or abandoning grazing management of coastal grasslands may have contributed to declines by reducing the availability of soil invertebrates, which, in turn, affects survival, especially of birds in their first year.
Corn bunting	A decline of mainland populations has been caused by herbicide use, efficient harvesting, and loss of spring cropping reducing the availability of weedy, grain-rich over-winter stubbles, as well as the effects of more intensively managed arable and grassland on insects that chicks rely on for food. These effects are compounded by the impacts of earlier cereal harvesting and repeated silage cutting on nests. On the Western Isles, where cereal sowings are exceptionally late and agrochemical inputs very limited, corn buntings nest very successfully in dune grassland. Here declines are being driven by early harvesting and baling cereals as arable silage, which removes the over-winter grain source.

Pressures affecting farmland wildlife

Land management

The future pressures on farmland wildlife are expected to be associated with continuing intensive farming practices.

For arable habitats, the main pressures include:

- use of agro-chemicals (pesticides and inorganic fertilisers), which reduces the abundance and diversity of a wide range of arable plants and insects that birds and other species depend on;
- autumn-sown cereal varieties, which reduce or eliminate the winter and spring fallow period and the availability of stubble seeds for seed-eating birds, as well as nesting opportunities for birds that nest on the ground, like skylarks and lapwings;
- the widespread introduction of 'new' arable crops for fodder and fuel.

For grassland habitats, the main pressures include:

- cultivation and conversion to arable production;
- re-seeding with a limited mix of vigorous fodder grass species (which can out-compete more wildlife-friendly species), and increasing use of inorganic fertilisers – such improved grasslands can support far fewer plants and insects;
- higher stocking rates on grazed grasslands, which reduces the ability of plants to seed and increases the destruction of the nests of ground-nesting birds;
- a switch from hay-making to silage conservation, involving earlier and more frequent cutting.

In addition, the loss and neglect of non-farmed features, such as hedgerows, trees, gorse and scrub and ponds in farmland, has gone hand in hand with agricultural improvement and contributed to a decline in biodiversity by reducing the diversity of habitats. While agri-environment funding has helped to stem the loss of hedgerows in recent years – and reverse them in some cases, through replanting – the lack of appropriate management of such habitats more widely is a continuing problem.

For all lowland habitats there are considerable concerns about the [state of pollinators](#), and the possible role of neonicotinoid pesticides.

Globally, according to the [Millennium Ecosystem Assessment](#), land use change is expected to continue to be the main reason for loss of biodiversity. Agriculture is the main reason for changes in land use, and it is the main source of nitrogen, phosphorus and other nutrients that enter the farmland and lowland ecosystem. Agriculture is expanding and intensifying because of the increasing demand for food, which, in turn, is influenced by the increasing population and increasing consumption.

Climate change

The projections for climate change in Scotland suggest that although the growing season may lengthen, this could be accompanied by increases in seasonal rainfall, which limits access to land and increases the possibility of pests and pathogens surviving over winter. Wetter soils in some areas of the west and north may result in low-lying parts of fields being converted permanently to wildlife habitats.

In the east a drier climate may extend the potential for cultivation and put pressure on field-margin habitats, which are currently valuable for wildlife. In addition, there is the possibility of wetland habitats shrinking as the amount of rainfall decreases and for wildfires to become a more common threat to wildlife in the Scottish lowlands.

What is being done

Policy and legislation

The [2020 Challenge for Scotland's Biodiversity](#), published in 2013, sets out ambitious proposals for restoring nature and broadening the benefits derived from it. This includes the lowlands of Scotland.

Because agriculture is the dominant land use in the lowlands, the legislation associated with the European Commission Common Agricultural Policy is very important for improving the condition of wildlife. This legislation is periodically reviewed to reflect changing policy priorities. The Common Agricultural Policy (CAP) reform has, over many decades, put more emphasis on support payments for farmers who contribute to environmental conservation.

Designations have been used to protect special wildlife in the lowlands. These protected areas are monitored under the site condition monitoring (SCM) programme under the European Commission Habitats Directive. This involves assessing the areas' notified features every 6 to 24 years, depending on how sensitive and vulnerable the features are.

Sustainable land management and practical conservation

With public and private financial support, land managers are doing a huge amount of wildlife conservation work. Most projects are undertaken by farming businesses, but there are also very active not-for-profit and public sector organisations. These are often the land managers who have the resources to undertake the most ambitious habitat-restoration projects.

Land managers in the lowlands can apply for financial assistance when undertaking wildlife conservation projects. The major source of funding comes from [Scotland's Rural Development Programme](#) (SRDP). A new SRDP is planned for 2014 and there has been extensive [consultation](#) on the content of the programme.

Organic farming

Organic farming is actively [encouraged in Scotland](#). This is a relatively new form of farming (though in the 19th century and earlier a lot of farming was organic, with few inputs of chemicals). It is still too early to judge the relative importance of organic farming for wildlife.

Vast areas of land still do have chemicals applied (and are therefore not organically farmed). Arable crops cover around 530,000 hectares (ha), outdoor vegetable crops 15,000 ha, fodder crops 9,000 ha, and grasslands cover 4.5 million ha, and the majority of these areas (more than 90% of crop areas) are treated with pesticides. Researchers are still determining the impacts of fungicides, herbicides, insecticides and rodenticides on the food chain, and the results need to be compared with organically farmed areas.