TECHNICAL NOTE TN674 (Revised) / May 2025

Farm Advisory Service

Biodiversity audit habitat identification help sheet

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Introduction

Ensuring natural habitats are protected and restored is crucial in achieving Scotland's future biodiversity targets. With 75% of Scotland's land being used for agriculture, the farming sector plays a vital role in conserving wildlife. Mapping farmland habitats helps land managers better understand the habitats on their farm and the condition that these habitats are in. This can help you prioritise management actions that will benefit the environment and that are in line with the direction of business travel. Additionally, knowing where habitats are can help prioritise the creation of new habitats. For example, through targeting areas that connect two isolated habitats, or placing habitats that provide these different resources next to each other to ensure that a target species has all the resources it requires.

With biodiversity audits required as part of the Whole Farm Plan in which all farms will have to comply by, being able to identify the different habitat categories listed in the biodiversity audit, will allow farmers to be better able to begin conducting their own. This document provides a brief description of each biodiversity audit habitat type, along with photographs of what these habitats could look like, and some pictures of specific iconic plants that are easy to notice and can indicate what habitat you are looking at.

Grasslands

Semi-improved grasslands

Semi-improved grasslands have undergone previous improvement, such as drainage, inorganic fertilisers, lime, or reseeding in the past. Unimproved grasslands that have undergone a low level of agricultural improvement often fall into this category and improved grasslands that are under low management intensity (i.e. low levels or grazing or mowing, and little or no inorganic fertilisers fertilisers) typically revert to semi-improved grasslands over time.

Semi-improved grasslands are botanically richer than improved grasslands, but often fail to meet the richness of unimproved grasslands. The cover of agricultural grasses such as ryegrass, timothy alongside white clover will be less than 30% of the field. Flowering plants can include buttercups, clovers, plantain, yarrow and mouse-eared chickweed with grasses including crested dog's tail, sweet vernal grass and cock's foot.

Semi-improved grassland

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Unimproved grasslands

Unimproved grasslands can have a high diversity of wildflowers and grasses. They are becoming increasingly rare and are one of the UK's most valuable habitats. Where once more than 7.5 million acres of the UK was wildflower meadows, twice the area of Northern Ireland, in the last century 97% of these have been lost and the small pockets that are remaining are threatened by development. Unimproved grasslands range from upland acidic grasslands to lowland hay meadows and can vary considerably in their quality. They often support unique communities of wildflowers, which are particularly vulnerable to inorganic fertilisers, scrub encroachment.

Where these habitats still exist, they provide food and shelter to support thriving populations of insects, birds, bats, amphibians and small mammals. Alongside this, they sequester carbon, promote healthy soil biota, improve water infiltration preventing flooding, and lock up harmful pollutants.

Unimproved grasslands can be identified through the type of species present alongside the number present in a square meter. This number varies across Scotland, with altitude, climate and underlying soil properties. In upland grasslands, six species per m^2 could be considered species rich, while lowland hay meadows can have in excess of 25 species per m^2. Each grassland type is characterised by specific species (indicator species). Unimproved upland grasslands are included later in the report as upland grasslands. Below are some species likely to be found in lower altitude unimproved grasslands.

Yarrow

Orchid

Knapweed

Bird's-foot Trefoil

Selfheal

Yellow rattle

Rush pasture

Rush pastures are grasslands that are dominated by soft rush, with mostly semi-improved grassland pasture around and between the stands of rushes. The rushes can be scattered or in dense stands, and their dominance can limit other plant species. Rush pastures can provide excellent habitat for wading birds, with the rushes providing cover and the more open wet grassland areas providing ideal foraging conditions.

Soft rush

Soft rush (close up)

Wetland habitats

Wetlands

The importance of wetlands lies within their ability to trap a high volume of water, which reduces the risk of flooding. Wetlands provide unique habitats that a vast range of species depend on including a range of specialist plants, amphibians and many semi-aquatic insects such as dragonflies and mayflies. Wetland habitats are often hotspots for invertebrates, due to their abundance and diversity of plant species and the presence of standing water. This in turn makes them important for insectivorous birds such swallows, house martins and fly catchers as well as all UK bat species which catch insects on the wing. Declining wading birds such as curlew, oystercatcher and snipe also utilise the soft, muddy habitats that wetlands support to probe for invertebrates.

Within the whole farm plan guidance, Wetlands are described as areas that are too wet for livestock such as swamp, reedbeds and marsh. Within these areas, the water table will be close to, if not on, the surface of the soil during winter, and for some habitats year-round. This can result in a range of habitat types depending on soil type and water source. Habitats that can be categorised as wetlands include Reedbeds, where reeds dominate, often found at the edge of water bodies and streams. Fens, were ground water feeds peat soils often in shallow valleys and loch basins. Marshes, where taller plants dominate on very wet mineral soil. Wetlands are different from bog habitats, as bogs are fed solely by rainwater, and have an abundance of peat making species such as sphagnum moss and harestail cotton grass.

Bullrush

Common reed

Meadowsweet

Reed Canary Grass

Wet / Marshy grassland

Within the Whole Farm Plan, the definition for Wet / Marshy grasslands differs from Wetlands as they are defined as wet or marshy ground that is specifically used for grazing. Within Wet / Marshy grasslands you can find mostly tussocky grasses, alongside a variety of flowering plants, sedges and rushes. Typical plants include marsh thistle and ragged robin with the delicate pale pink flowers of Cuckooflower, also known as Lady's-smock, common in spring. Where the habitat is species poor and dominated by soft rush the habitat should be categorised as Rush Pasture (see above) rather than Wet / Marshy grassland.

Marsh Thistle

Top Flowering Rush

Tufted hair grass

Cuckooflower

Ragged robin

Woodland habitats

Conifer plantations

Conifer plantations are areas that are dominated by conifer trees, excluding Scotland's native Scots pine. This includes commercially planted stands of conifers, as well as areas where these conifer species have spread naturally and now dominate the vegetation. Conifer plantations are characterised by densely planted trees that are often planted in rows to aid harvest. Unlike deciduous trees, conifers have a very distinct triangular shape and keep their needles year-round. Typically little light penetrates to the ground level and ground flora is lacking, instead replaced by a carpet of pine needles.

Sitka spruce

Sitka spruce

Natural woodland

Natural woodlands are dominated by broadleaved also known as deciduous trees (i.e. species with leaves and seeds/fruit rather than needles and pinecones). As Scots pine is native to the UK, woodlands dominated by this species are also categorised as natural woodlands, reflecting their higher biodiversity value. Broadleaves trees include native species such as birch, oak, ash, hazel, elder and rowan with alder and willow common in wetter areas and non-native species including sycamore and beech. Both newly planted native woodlands and semi-natural woodlands are included in this habitat category, as are woodlands along watercourses (known as riparian woodlands).

Well managed, mature, native woodlands will have different layers of vegetation, tall mature trees, younger trees, a well-developed shrub layer (e.g. holly and brambles) with mosses, ferns and wildflowers at ground level. In spring, natural woodlands often come alive with bluebells, primroses, and the smell of wild garlic filling the air. Both lying and standing deadwood provide extremely valuable resources, bats and birds such as woodpeckers will roost in the cavities and some insects and fungi rely solely on deadwood.

Natural woodland in background, rush pasture in foreground

Hazel with its characteristic multi-stemmed structure

Scots Pine: Needles are longer than non-native conifers and the canopy tends to be more rounded

Silver birch

Ash

Rowan

Sessile oak

Beech

Sycamore

Mixed woodland

For the Whole Farm Plan's Biodiversity Audit, Mixed woodlands are categorised are those that are comprised of a mix of both deciduous trees/Scot's pine and non-native conifers like larch and spruce. There can therefore be overlap with the tree species present in natural woodlands and conifer plantations. What distinguishes the two habitats is the proportion of nonnative conifers to broadleaved trees (or Scots pine). A conifer plantation with 20% broadleaved (or Scots pine) or a natural woodland with over 20% non-native conifers should be categorised as mixed woodland. Mixed woodlands, if managed appropriately, can provide similar benefits to biodiversity as natural woodlands, however, they often lack the specialist woodland flora and fungi that is present in natural woodlands. This includes newly planted woodlands that are planted with a mix of both non-native conifers and broadleaved tree species.

Mixed woodland in the background, improved grassland in the foreground

Wood pasture

Wood pasture is a term given to an area which contains too many trees to be described as grassland, but too few trees to be described as grassland. This can include areas of agroforestry, orchards, and ancient wood pasture. You can often find these habitats in estates, where mature trees are scattered amongst grazed grassland, where grazing prevents younger tree saplings from forming and creating a woodland. Ancient wood pastures are part of our heritage, shaping our landscape and indicating the presence of old estates or carriageways.

The open nature of wood pasture allows sun to penetrate to ground level and a diversity of plant species can develop, particularly in areas that have not been ploughed or fertilised. Ancient wood pastures are a priority habitat for nature conservation with century old veteran trees providing crevices for bats, rot-holes and deadwood hosting a variety of fungi and invertebrates.

Scrub

Scrub is characterised by areas dominated by small trees, shrubs, and bushes. Scrub habitats are dominated by native 'scrub' species, woody species that have multiple trunks and grow to a much lower height than trees. Native scrub species include willows, juniper, broom, hawthorn, hazel, elder, gorse and blackthorn. The species present will strongly depend on a variety of factors including soil type, altitude, and location. For example, in upland situations juniper and montane will may be found while in more coastal areas you will come across gorse and broom. Scrub habitats are often a natural halfway point between grassland and woodland and if left unmanaged or grazed they will eventually form woodlands.

Scrub can often look messy, consisting of a variety of different woody plants of different ages, however, it is this diversity that makes scrub a valuable habitat for wildlife. Many species provide important forage for pollinators with some being

particularly important early in the season (e.g. willow, hawthorn and blackthorn). Additionally, scrub provides shelter and nesting sites for birds, and berries during the autumn and winter.

Scrub can be scattered or form dense clumps. For the Biodiversity audit focus on mapping denser stands, with scattered scrub mapped as the underlying habitat (e.g. unimproved grassland). Additionally, due to the invasive nature of rhododendron areas dominated with this species should be recorded using Invasive Non-Native species marker.

Scrub along banking

Scrub in the background, improved grassland in the Foreground

Hawthorn bush

Hawthorn flowers – abundance flowers in May

Gorse bush (commonly known as whins)

Gorse flowers

Broom bush similar to gorse but not spikey

Broom flowers

Blackthorn

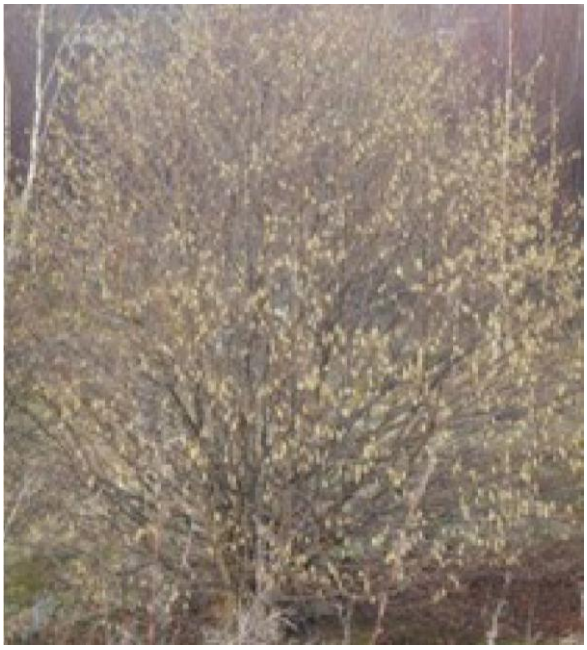
Elder

Goat willow catkins

Goat willow leaf

White willow scrub

White willow leaf



Hazel scrub

Hazel leaf

Juniper scrub

Juniper needles

Coastal habitats

Saltmarsh

Saltmarshes occur where salty tidal water meets land in sheltered conditions, allowing the sea to deposit fine sediments that build up over time allowing plants to grow. Confined to the coasts of Scotland, the plants that grow there are usually highly specialised, evolved to withstand high salt levels and periodic submersion in water. The sheltered conditions that allow these habitats to form, are also the reason they are so sensitive, small disturbances can result in lasting impacts to these habitats. These specific conditions mean that saltmarshes support unique communities of plants and invertebrates.

While not only providing a home to some of Scotland's most specialist plants, fungi and animals, they also provide a wide range of other ecosystem services to society. These include carbon sequestration, with salt marshes sequestering 19 tonnes of CO_2 per hectare each year, and tidal defence with the vegetation in these habitats reducing the impact of more extreme weather events which could increase with climate change.

Saltmarshes can be identified at different stages of their 'succession', where they go from mudflats of sediment deposits to low marsh, mid marsh and upper marsh. Each of these stages supports different communities of plants. Plants to look out for include sea thrift, sea aster, scurvy grass, marsh pennywort, sea arrow grass and glassworts.

Sea aster

Danish scurvy grass

Marsh pennywort

Sea arrow grass

Sea thrift

Glasswort

Sand dunes

Sand dunes include coastal sand hills, ridges and dunes slacks. Sand dunes in Scotland are dynamic habitats, which can be found along a stage of progression, going from sparse grass within the sand, to denser grass and scrub as a fixed habitat. At the early stages of these habitats, you would be likely to find marram grass, stabilising the sand, and over time more plants colonise these areas, until areas of dense scrub such as burnet rose and bramble, with grasses and wildflowers such as viper's bugloss, common centaury and birds foot trefoil.

These dune habitats are vital protecting our coastlines against erosion and reduce the risk of coastal flooding. Sand dunes are dynamic habitats that support a wide variety of highly specialised species of plants, invertebrates and birds.

Fixed sand dunes

Marram grass

Bird’s foot trefoil

Viper’s bugloss

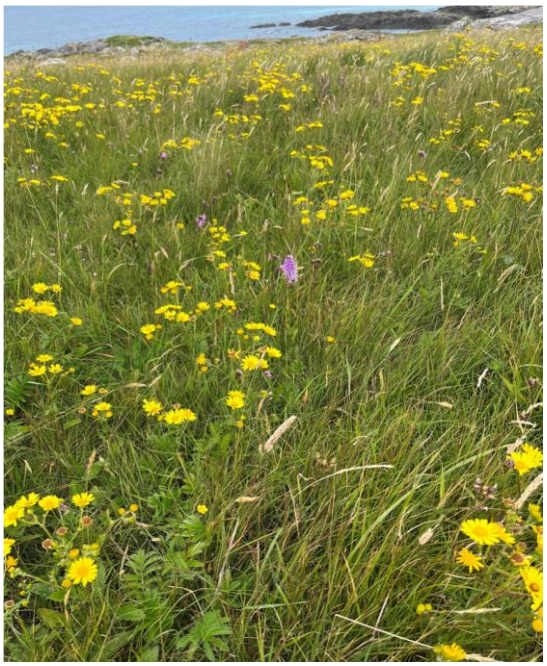
Common centaury

Machair

Machair is unique to the North-west of Scotland and Ireland and is recognised internationally as a habitat of high conservation value. Restricted to coastal regions, machair forms where sands loaded with shell fragments blow inland, and the cool wet oceanic climes support the vegetation. The habitat consists of a rich diversity of grasses and wildflowers typically maintained by conservation grazing, haymaking or cropping. The biodiversity audit therefore categorises machair as either grazed machair or cropped machair depending on management.

The soil and climate required for machair to develop, alongside the sympathetic agricultural management gives rise to a rich diversity of grass and wildflowers. This diversity provides food and shelter for a wide variety of invertebrates, including many rare species such as the great yellow bumblebee and corncrake. Furthermore, the extensively managed swards provides ideal conditions for ground nesting birds such as lapwing, oystercatcher, and curlew.

The plant species that grow on machair depend on the dampness of the soil, but wildflowers will widely follow those found in species-rich grasslands. This could include yarrow, oxeye daisy, selfheal, red bartsia, devil’s-bit scabious, knapweed, orchids and yellow flag iris. Machair can be recognised from its unique assemblages of plants, in grasslands adjacent the sea where the soil is made up of fine sandylike shell materials.



Machair showing the high floral diversity of this habitat

Coastal heath

An herb-rich form of heathland that occurs in exposed locations where the vegetation is strongly influenced by salt spray. The species in this area have evolved to cope with the high salt levels and include spring squill, sea plantain, thrift, and sheep's bit scabious. You will often find heather and other dwarf shrubs in this area which are stunted due to harsh conditions.

Coastal heaths provide similar ecosystem services to sand dunes, helping to protect our coastlines from storm surges and erosion. Due to their harsh conditions, these habitats often support a rare and unusual array of plants, which in turn can support rare insects, reptiles and birds.

Coastal heath habitat, showing mosaic of grassland and scrub in foreground, and heath in background

Sea thrift

Bell heather

Ling heather

Upland habitats

Upland mixed habitats

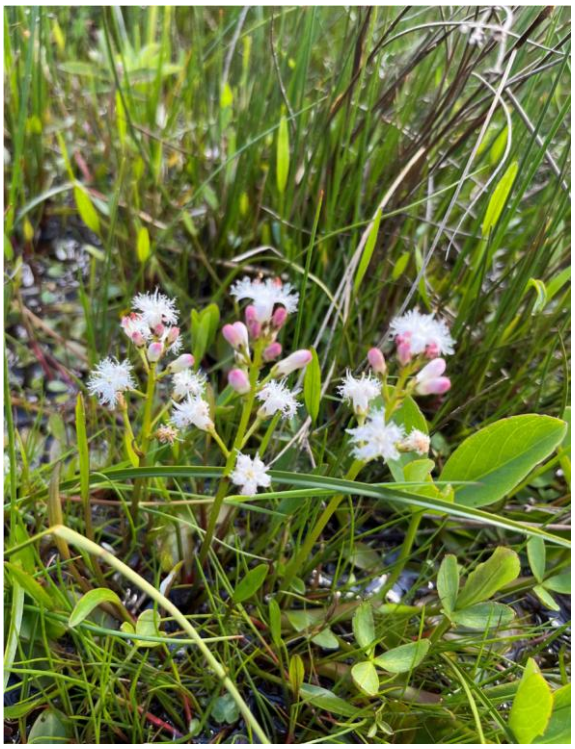
This habitat is used to map large areas that comprise of a mosaic of different upland habitats such as bog, heathland and upland grassland. This habitat category recognises the difficulty in mapping upland habitat mosaics that consist of small areas of different habitats that merge into each other. Whole Farm Plan guidance states that where obvious and distinct habitat patches are apparent that these should be mapped separately. Additionally, any area of peatland bigger than 0.5 ha should be pulled out and mapped separately as peatland habitat.

Peatlands

Bogs are habitat that occur on gently sloping land with damp to very wet peaty soils that are at least 50 cm depth. In Scotland, the two bogs we have are raised bogs and blanket bogs. Lowland raised bogs are gentle domes of deep peat that have built up over time in previously water filled basins, whereas blanket bogs have built up in poor draining land to form an almost blanket like cover of peat. Peat bogs cover around 23% of Scotland's land, with the majority of these being blanket bogs.

With bogs covering so much land in Scotland, the benefits they provide society can be seen across the whole country. One of their greatest benefits is the enormous amount of carbon they store underground in their peat. Scottish peatlands store around 1.6 billion tonnes of carbon this is equal to around 140 years worth of Scotland yearly emissions, and 25 times more carbon stored in entire UK's woodlands, grasslands, saltmarshes and every other vegetation combined. When damaged through drainage, extraction or over grazing, these bogs begin to release carbon. With 80% of Scotland's peatlands damaged, it is important that they are identified so effort can be made to restore them and lock this carbon in. Alongside this, they offer valuable habitat for many of Scotland's iconic biodiversity, as well as flood prevention.

Bogs can be identified by the presence of peat building species such as sphagnum mosses and hare's tail cotton-grass. Other species that can occur less sparsely include cross-leaved heath, deer grass and purple moor grass. Ling heather and bell heather can also be present, but as these species prefer drier conditions, they will be sparser than heathland habitat.



Bog bean

Bog rosemary

Cotton grass

Cranberry

Bog asphodel flower

Bog asphodel

Sphagnum mosses

Upland grassland

Often referred to as rough grazing above the hill dyke (occasionally also found at sea level in the north and west of Scotland). Unlike the more productive in-bye these often-expansive grasslands haven't been ploughed or reseeded and can include hay meadows and permanent pastures on upland farms. In some instances, this upland grassland will include areas that may have been regularly limed or fertilised.

The plants found in these habitats are generally hardy grasses, sedges, mosses and wildflowers adapted to the harsh conditions of the Scottish uplands. Identifying this habitat takes into account its location and altitude. Common species you could find in these habitats could include grasses such as matt grass and sweet vernal grass with wildflowers including tormentil, heath bedstraw, devil's-bit scabious, eyebrights, blaeberry and crowberry.

These habitats are important for Scotland's upland biodiversity, with the plants found here supporting a variety of wildlife, including insects, birds (skylark, meadow pipit, curlews) and red deer. Appropriate grazing of these habitats stops scrub encroachment and maintains this open species-rich habitat.

Sweet vernal grass

Blaeberry

Crowberry

Matt grass

Tormentil

Eyebright

Devil's bit scabious

Heathland

Heathlands, our heather moorlands, are one of Scotland's most internationally important habitats and these iconic habitats attract visitors from across the globe. They consist of a mixture of dwarf shrubs, grasses and wildflowers. Upland heath is the most common heathland in Scotland covering approximately 31% of our land area. Its abundance across the country makes it a European stronghold for the habitat. Upland heath occurs where acidic mineral soil and shallow peat soils occur allowing for dwarf shrubs to dominate.

The diversity and abundance of flowering heathers and wildflowers provides a valuable food source for many of our pollinators, and the structural diversity of the shrubs, grasses and wildflowers provides a home for bird species like meadow pipit, curlew and skylark, as well as many reptiles like adders, slow worms and common lizards. Rich in insect life heathlands support many insectivorous birds. Often managed as grouse moorland, heathland contributes significantly to Scotland's rural economic (estimated to be worth approximate £7 million annually).

Healthy heathlands support a variety of specialist species that rarely occur else. Heathland can be easily identified from the bright purple flowers of ling heather, bell heather, blaeberry, cowberry and crowberry. Heathlands are at threat from both over grazing which can lead to their conversion to acid grasslands and under grazing which can result in scrub encroachment. To maintain their quality, heathlands require low levels of disturbance (e.g. conservation grazing or burning).

Overview of heath habitat

Bell heather

Cross leaved heath

Ling heather

Deergrass

Hedgerows

The hedgerow signifies the countryside to many people in Scotland. The line of shrubs and trees have a history of enclosing stock, but alongside their livestock enclosing abilities, their benefit to farmland wildlife cannot be overstated. Hedgerows provide linear habitat that connect wildlife through agricultural land, while also offering food and shelter to Scotland's beloved farmland species.

Hedgerows can offer varying levels of benefits to wildlife depending on their management and diversity of species. Having a diversity of native flowering species like blackthorn, rowan, hawthorn and dog rose offer a source of food for pollinators throughout the year. These shrubs then produce berries then provide a food source that extends into late autumn for birds like song thrush, yellowhammers and redwings. The bases of hedgerows provide shelter allow small mammals like hedgehogs, mice and voles to move through our countryside.

The roots and tall vegetation provides hibernation habitat for newts, lizards and snakes. Hedgerows form networks through the countryside helping bats and pollinators navigate, and barn owls are often seen hunting for small mammals along hedgerows.

Hedgerows are simple to identify, however the management and species composition of hedgerows can provide valuable information on how the habitat can be improved. Species-rich hedgerows are those with four or more woody species per 30 m of hedgerow. Usual species often include hawthorn, bramble, blackthorn, rowan, elder, dog rose, holly, hazel, oak and ash. A well-managed hedgerow is one that is trimmed every two-three year, in the winter, and is part of a cycle of hedgerow trimming where only a third of hedgerows on a farm are cut in year.

Alder

Ash

Beech

Dog rose

Elder

Hawthorn

Holly

Sycamore

Wych elm

Author

Harry Fisher, SAC Consulting

Plant photographs sourced from BSBI Lanarkshire Botany Network.

Habitat photos sourced from David Brown and Harry Fisher.

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