



Grassland & Farmland

Headlines

- Sheffield has over 7,528ha of grassland and arable land, over half of which is improved grassland. Unimproved grasslands – the most beneficial for wildlife – cover less than 10% of all grasslands and farmland.
- Less than 10% of grassland is covered by designated sites. A total of 46 Local Wildlife Sites (LWSs) featuring grassland habitats – covering 138ha – are in positive conservation management but these make up only 39% of LWS grassland. Most grassland within LWSs is amenity grassland, covered in the Urban chapter.
- Over 9,350ha of farmland is under agri-environment schemes which are working to improve grassland, field boundaries and arable land for a variety of outcomes such as increasing wildlife habitat and reducing the declines of farmland birds.
- Priority grassland sites are likely to be under represented and mapping is incomplete. More action is required to fully understand how much priority grassland lies within the district.
- The UK Biodiversity Indicator 'Birds of the wider countryside: Ca. farmland birds' shows that most specialist farmland birds are declining due to changes in agricultural practices. Four of the five most severe declines of breeding birds are farmland specialists.
- National and local conservation projects are working to better understand the flora and fauna of local grasslands in order to improve their protection.
- Current threats to farmland and grassland habitats include agricultural intensification, lack of protection, neglect and pressure from development and urbanisation.

Introduction

This chapter covers the grasslands and farmlands that make up the rural landscape of Sheffield with the exception of woodlands and moorlands. Wildlife-rich, unimproved grasslands provide resources for a range of wildlife, store carbon in the soil, filter pollutants, retain water to reduce flooding, help reduce soil erosion, store native plant seeds and are hotspots for pollinators¹. They also help produce quality pastoral produce such as beef and lamb¹. Sheffield's grassland sites are often the result of an interaction between human activity and the environment and are managed through activities such as mowing, burning or feeding livestock. The most botanically rich sites are often relicts of long-established grasslands from the historic rural landscape². Good quality grasslands contain diverse plant species, which support invertebrates, birds, fungi and lower plant communities and provide further conservation interest as part of a mosaic of habitats.

In the UK 75% of the landscape is classed as agricultural, with enclosed farmland (40%) incorporating grasslands, hedgerows, field margins, arable land, fallow land and other uncropped areas. These all have value for wildlife with appropriate management. Here, farmland is defined as arable land which is managed and modified for crop production and grazing. Arable land and field boundaries are important habitats for farmland birds and provide linkages to connect natural habitats. Uncropped, cultivated land provides key nesting habitats for ground nesting birds such as lapwing as well as open ground foraging opportunities for priority species including skylark, turtle dove and brown hare.

What grassland and farmland habitat types does Sheffield have?

Figure 1 shows the composition of Sheffield's grassland habitats. How these broad habitat types are distributed across the district is also mapped (Figure 2, opposite page). Amenity grasslands, such as parks, are primarily in developed areas and are covered in the Urban chapter.

Sheffield has a mosaic of grassland types that appear in distinct bands across the district (described below). These include improved grasslands – mostly managed for agricultural purposes and composed of fast-growing grasses – plus rough grasslands with low productivity. Unimproved neutral and unimproved acid grasslands are also present (see Appendix for definitions). These are primarily composed of vegetation on a range of lime-deficient soils. In addition, there are very small patches of calcareous grassland, and the flora that it supports, found on man-made substrate such as limestone chippings on railway sidings and road verges.

Sheffield's priority grasslands outside of the Peak District National Park (PDNP) are covered by the Sheffield Grassland Habitat Action Plan (HAP)².

Whilst much of Sheffield's agricultural land is pasture or grassland, there is a substantial area of arable land (1,318ha). This is defined by regular ploughing and is managed for crop production and horticulture. Some re-seeded ley grassland is also managed for silage production. This arable land mostly buffers pastoral lands within the central region but also forms a distinct pocket to the south-east.

Sites within the PDNP include both species-rich grasslands and semi-improved sites. An example of the former are sites adjacent to Burbage, owned by Sheffield City Council (SCC), which include a range of plants uncommon in Sheffield such as autumn gentian. The latter includes Hammonds Field, under the management of Sheffield & Rotherham Wildlife Trust (SRWT). Other sites are key sites for upland birds such as golden plover. The importance of these sites is recognised through their designations of Special Protection Area (SPA) and Site of Special Scientific Interest (SSSIs).

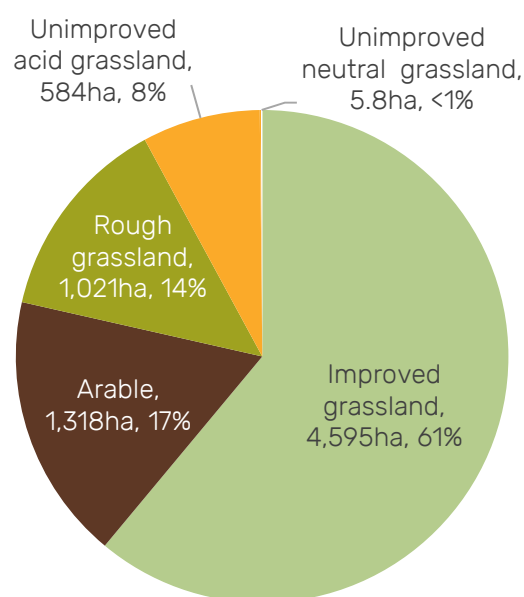
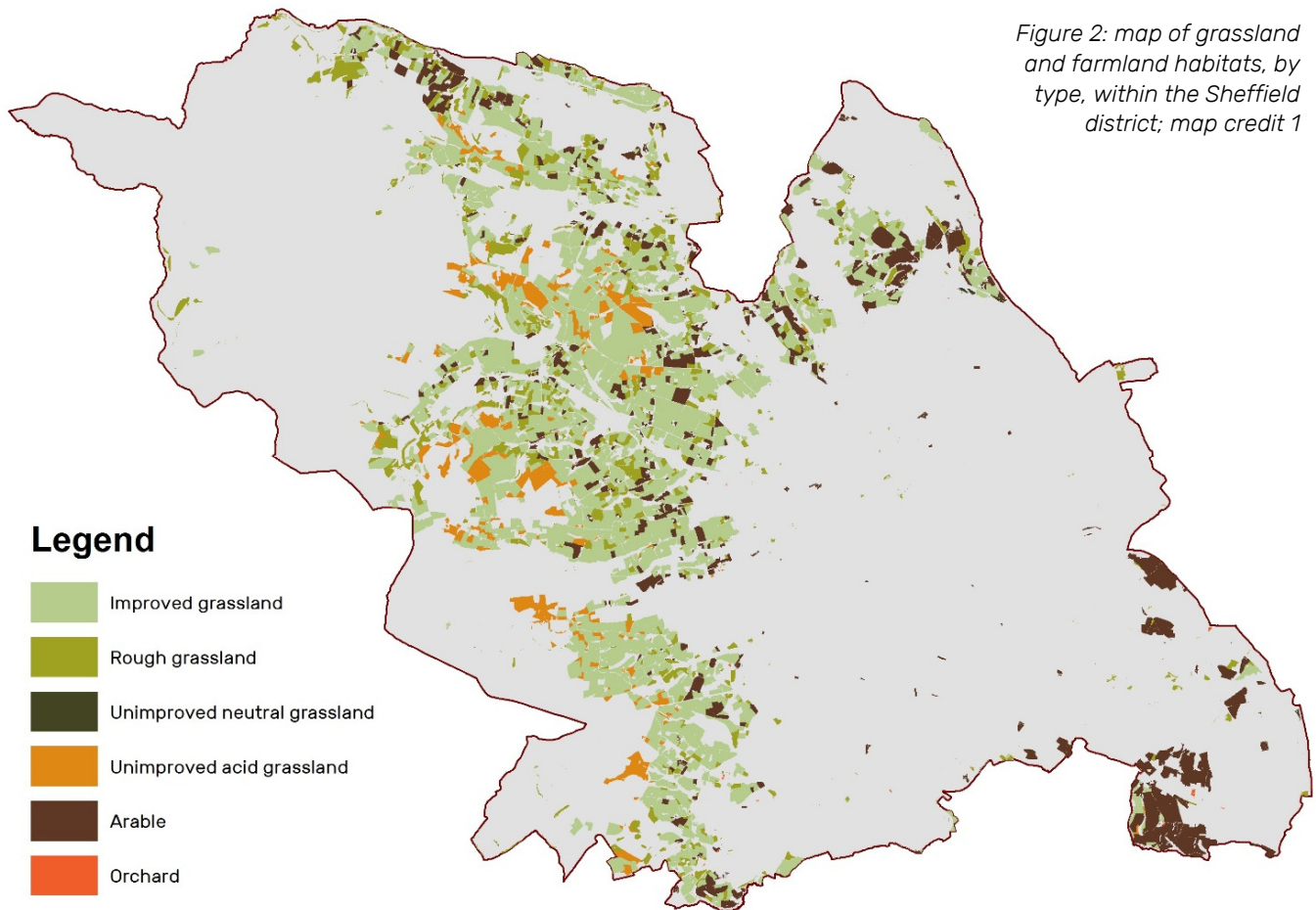


Figure 1: percentage and area coverage (hectares) of grassland and farmland habitats, including boundaries, e.g. hedgerows, within the Sheffield district

Figure 2: map of grassland and farmland habitats, by type, within the Sheffield district; map credit 1



National Character Areas (NCAs) relating to farmland and grassland

National Character Areas (NCAs: see Sheffield Overview chapter for map) have a key relevance to grasslands and arable land across the district, and their importance for wildlife, as they relate significantly to land use and how this has changed over time. Within the Dark Peak NCA, farmlands and associated grasslands are isolated at the moorland fringe and are dominated by acid and rough grasslands bounded by dry stone walls. Scattered enclosed fields on flatter land are commonly semi-improved or rarely support unimproved neutral grasslands.

The Yorkshire Southern Pennine Fringe (YSPF) NCA is characterised by small family farms dominated by livestock farming including dairy farming, for example, around Bradfield. Farming here has remained relatively constant with most changes being a shift in livestock grazing from lowland areas to less favourable areas³. Topography is varied with steep grassland slopes above wooded cloughs and reservoirs. Wildlife-rich habitats in these areas include acid grasslands on the steepest slopes with scattered dwarf shrubs and areas of heathland on the highest ground, wet grasslands and marshes where springs emerge between the gritstone and shales, and rare areas of species-rich or semi-improved hay meadows. Closer to farmsteads, grasslands are commonly (and extensively) improved, supporting productive agriculture including intensive grazing land and silage fields. Fields may be regularly ploughed and reseeded. Dry stone walls are the most prevalent field boundary with hedges localised on the lower ground.

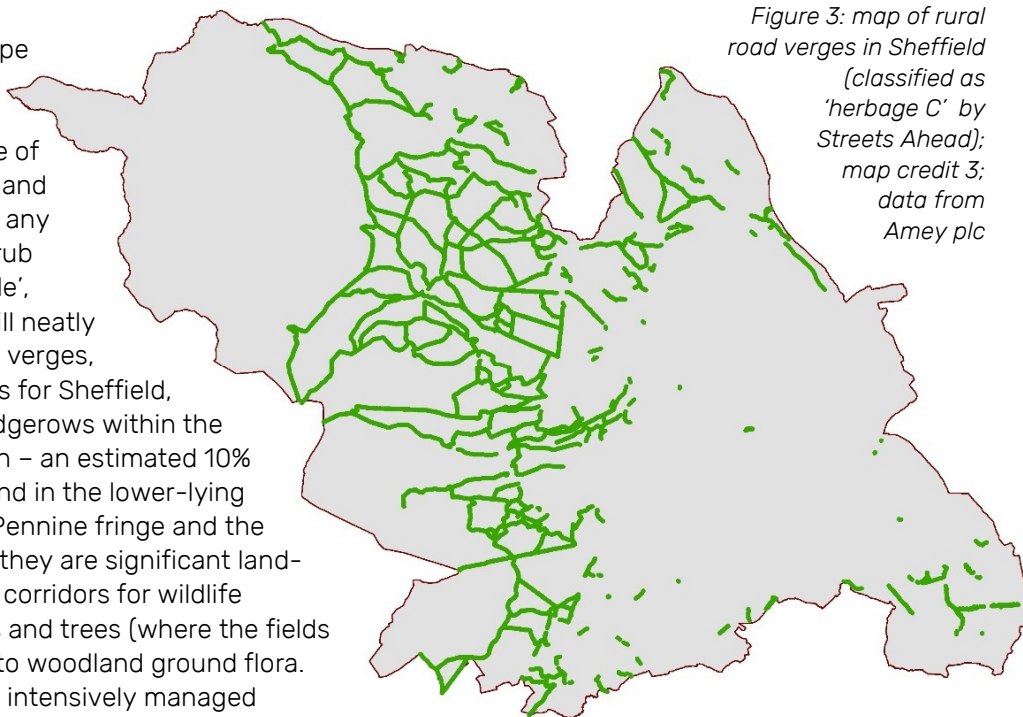
The Nottinghamshire, Derbyshire and Yorkshire Coalfield (NDYC) NCA supports a more mixed farmland including significant areas of arable land. Over half of this area (64%) is designated as Green Belt⁴. Farming here tends to be more intensive than in the YSPF NCA as a result of more productive soils and lower altitudes. Livestock farming has slowed since 2000 with lower stocking rates and a shift towards horse and pony grazing⁴. Grasslands here are mainly improved for agriculture, or at best, semi-improved. The rolling topography – particularly in the west – is characterised by the pattern of field boundary hedgerows. The size and pattern of fields and enclosed grasslands is varied, reflecting both how woodland was cleared in medieval times and how piecemeal medieval strip fields were enclosed. Further east many traditional boundaries have been lost as a result of agricultural intensification but this has improved slowly with agri-environment schemes focussed on hedgerow and dry stone wall management. In several areas farming now occupies the sites of former coal workings and wildlife-rich habitats are very rare. The conservation emphasis, through agri-environment support, is often on the maintenance of priority habitats plus the creation of field headlands (including those alongside ditches and remnant hedgerows) to benefit farmland birds and invertebrates.

Rural verges, hedgerows and field boundaries

Whilst the majority of grasslands are found within a farmland context as described above, the Sheffield area also includes many kilometres of rural road verges which are managed by cutting at least once a year. Very little data exists for these sites, and whilst it is expected that few are of high species diversity, they are likely to play a significant role as refuges for wildflowers and associated invertebrates. Many of these species are now unusual on the improved grasslands and arable fields which make up the majority of Sheffield's farmland, and thus these verges are a valuable habitat. They are also likely to perform a useful function in linking other grassland and semi-natural sites, acting as wildlife corridors. Figure 3 shows 48.3km of rural verges mapped across the district.

Hedgerows are an important feature of the farmed landscape in the Sheffield area. The UKBAP definition of a hedgerow is 'any boundary line of trees or shrubs over 20m long and less than 5m wide, and where any gaps between the trees or shrub species are less than 20m wide', although not all hedgerows will neatly fit this definition. As with road verges, little data for hedgerows exists for Sheffield, but there are 37,400km of hedgerows within the Yorkshire & the Humber region – an estimated 10% of the national resource⁵. Found in the lower-lying areas of the Yorkshire South Pennine fringe and the western parts of the coalfield they are significant landscape features and important corridors for wildlife supporting a variety of shrubs and trees (where the fields are lightly grazed) in addition to woodland ground flora. Locally, especially in the more intensively managed landscapes, there have been considerable losses of hedgerows⁴. In other areas, for example close to Totley, most hedgerows survive with only 16% of the network having been lost since 1876.

Figure 3: map of rural road verges in Sheffield (classified as 'herbage C' by Streets Ahead); map credit 3; data from Amey plc

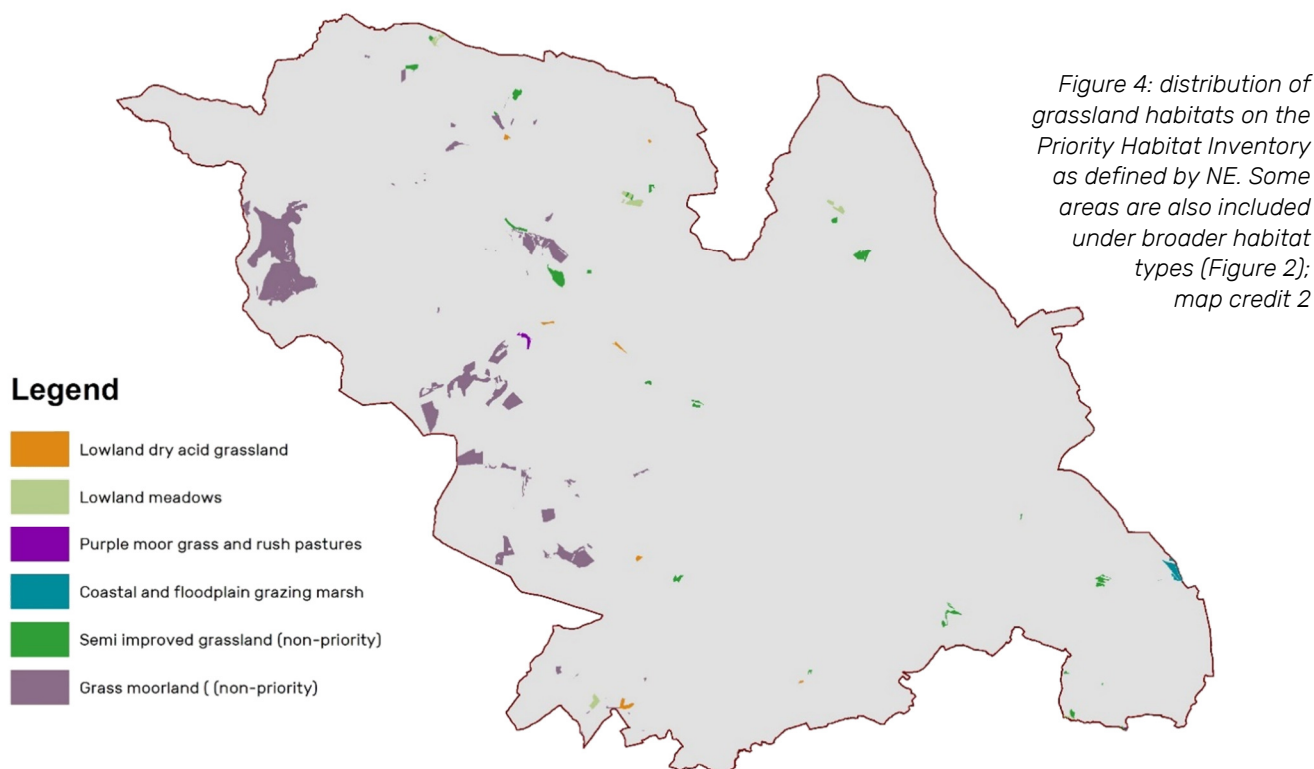


Dry stone walls are the predominant field boundaries in the more upland moorland fringes of the western areas of Sheffield within the Peak District and the South Yorkshire Pennine fringe. Local wildlife associated with dry stone walls include wheatear, little owl, various reptile and amphibian species, lichens and plants including ivy-leaved toadflax and crane's bills⁶. In addition the field edges often support plant species which have been lost from the core field areas as a result of intensive farming practices.



Priority Habitat Inventory: Grassland habitats

Sheffield has a number of Priority Habitat Inventory (PHI: Figure 4) grasslands as classified and mapped by Natural England (NE). These mapped areas are small (736.2ha) and lie mostly between the urbanised centre of Sheffield and the moorland fringe to the west with small areas also found to the east of the city.



Coastal and floodplain grazing marsh is pasture or grazed/cut meadow which is periodically flooded or has high water levels sustained by ponds or ditches. Species found include creeping buttercup, tufted hair grass, hard rush and common spike rush. Sheffield has only 12.9ha of this habitat, across the River Rother on the Sheffield-Rotherham boundary, mostly within the Woodhouse Washlands Nature Reserve managed by SRWT. This rare habitat covers only 215ha (<1%) of the NDYC NCA⁴.

Lowland dry acid grassland covers just 15.6ha of Sheffield. Nutrient-poor, free-draining soils are characterised by a range of plant species such as heath bedstraw, devil's bit scabious and sheep's sorrel plus grasses such as wavy hair grass and mat grass. It is often found in enclosed fields managed as pasture close to the moorland edge. Yorkshire and Humber has 17,704ha of lowland dry acid grassland - 34.3% of the national resource⁵. Within the NDYC and YSPF NCAs, lowland dry acid grassland covers a total of 490ha (<1%)^{3,4}.

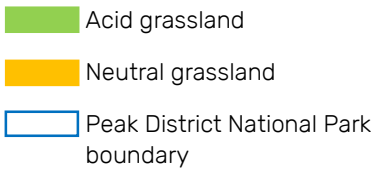
Lowland hay meadows cover 29.7ha of the Sheffield district. This neutral grassland type includes enclosed unimproved neutral grasslands with species such as common knapweed and grasses such as crested dog's tail, yorkshire fog, false oat grass and meadow foxtail. Many sites are managed as hay meadows whilst others are managed as pasture. Good examples of lowland hay meadows exist in fields near Burbage, Midhope Reservoir and Ecclesfield. Yorkshire and Humberside has 2,217ha of lowland meadow - 7.3% of the national resource⁵. Within the NDYC NCA and YSPF NCAs, lowland hay meadows cover a total of 539ha (<1%)^{3,4}.

Purple moor grass and rush pasture are wet grasslands with various rushes and grasses are found in the moorland fringe north of Sheffield. These grasslands, including species such as devil's bit scabious, lousewort and various sedges, are also of considerable value for invertebrates and wading birds including snipe and curlew.

Semi-improved grassland is not a priority habitat but is on the PHI. These are species-rich grasslands with conservation value. Approximately 75ha are scattered and fragmented around the district including Stocksbridge and High Bradfield. On the moorland fringe these sites provide key feeding sites for upland birds; their importance is recognised in the designation of the South Pennine Moors SPA. Together with a proportion of acid and neutral grasslands these sites are also important for grassland fungi.

Grass moorland is also not a priority habitat but is included on the PHI as it usually forms a rough mosaic of other priority habitats with both grassland and moorland characteristics. Such open mosaic habitats may be important for invertebrates and serve as important bird feeding grounds.

Additional priority and quality grassland habitats



NE's PHI is not an exhaustive inventory of identified priority habitats and other regions exist that are not mapped through NE's PHI. Additional areas of priority habitat are known by SCC Ecology Unit, the Peak District National Park Authority (PDNPA) and others through additional surveying. Those lying within the National Park, mapped by the PDNPA, are mapped in Figure 5 – note that there may be some overlap with small areas of habitat mapped by NE.

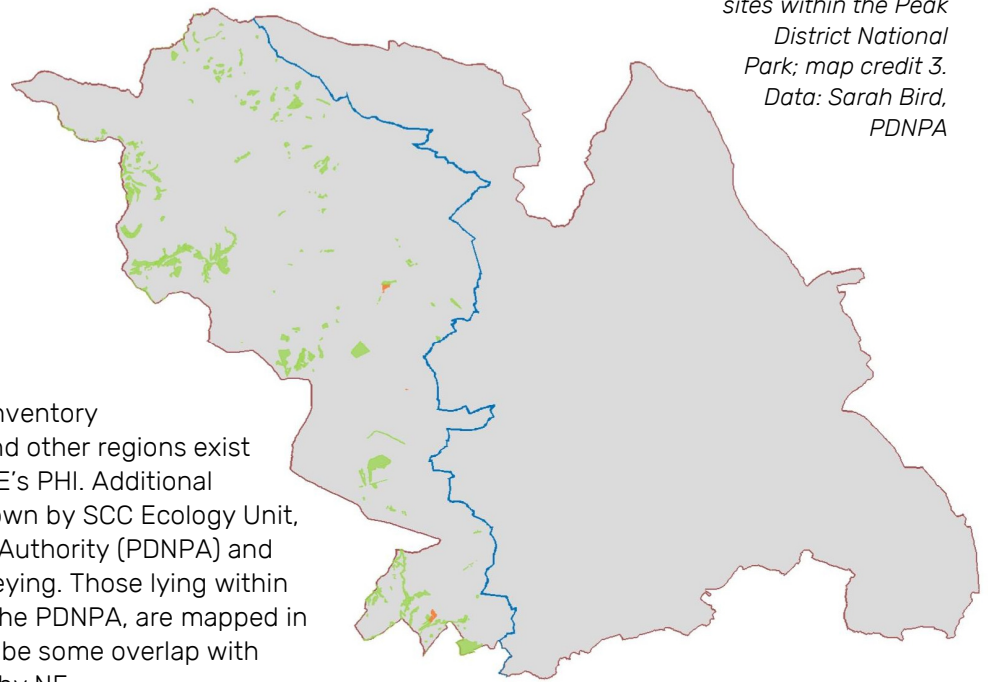
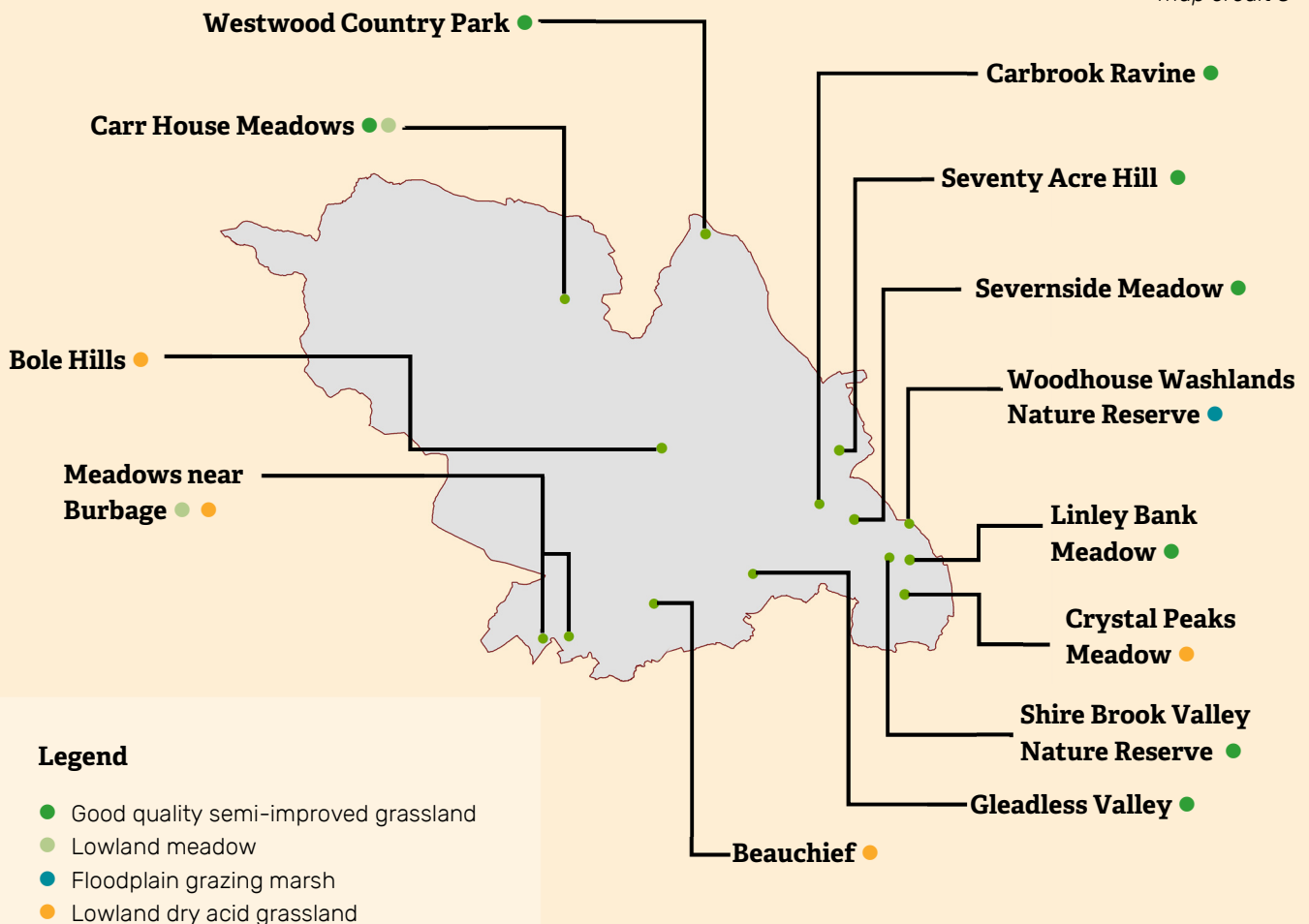


Figure 5: additional priority grassland sites within the Peak District National Park; map credit 3. Data: Sarah Bird, PDNPA

Important grassland sites

Figure 6: sites that feature key areas of important grassland habitat. Note that this map does not include privately owned important grassland sites; map credit 3



Case study: Cowslips and the hay meadows at Burbage

Julie Riley and Dr Rebekah Newman, Sheffield & Rotherham Wildlife Trust

Cowslip *Primula veris* used to be a common plant of traditional meadows and is closely associated with much English folklore and tradition including adorning garlands for May Day. An early flowering plant, it provides nectar to a variety of invertebrates. The loss of its habitat to the advancement of agriculture caused a serious decline in cowslip populations and now fields coloured bright yellow with the nodding heads of cowslip are a rare sight.

Cowslip is an unusual find in the Sheffield area. It occurs in well-drained calcareous and neutral grasslands, occurring in a generally herb-rich community in pastures and meadows. It was recorded as being common in pastures in 1889, and present around Crookesmoor, Fulwood, Hallam and Upperthorpe in 1911, but unrecorded in the years between 1918–1988, although present in adjoining Derbyshire⁷. Between 2001 and 2010 the South Yorkshire Plant Atlas lists it as present in 165 of 1665 km squares in South Yorkshire; within the Sheffield area it has been recorded in eleven 1km squares⁸.

One of the locations cowslip is present is in the flower-rich hay meadows near Burbage, part of the Eastern Peak District Moors SSSI. Here, cowslip is locally abundant within a low productivity grassland with a thin scatter of other species of interest including birdsfoot trefoil, oxeye daisy, meadow vetchling, eyebright, common spotted orchid, tormentil and yellow rattle. The meadows are secured into positive management with a late July/August cutting date, through a Higher Level Stewardship Scheme agreement. The meadows are owned by SCC and managed by the Eastern Moors Partnership. In 2017 seed from these meadows was hand harvested for use in a grassland restoration project within the Peak District.



Cowslips can also turn up on road verges and embankments where the grassland strip has withstood development and is well-drained – for example on a tiny verge along Abbeydale Road in the southwest part of the city. Cowslip can also be planted into urban meadow developments as plug planting – such as in the ‘Grey to Green’ development at West Bar in Sheffield city centre (see Urban chapter case study) – and appears in parks, for example in Meersbrook Park and Millhouses Park.

Cowslips © Guy Edwardes/2020VISION

Case study: Hedgerows in Totley. Friends of Gillfield Wood

The Friends of Gillfield Wood (FoGW) are carrying out a study of hedgerows in a small area just to the west of Totley. The survey began in late spring 2017 as part of a wider project funded by the Heritage Lottery Fund and facilitated and supported by the South Yorkshire Biodiversity Research Group. The aim is to map the distribution of ancient woodland indicator species within the hedgerows and the distribution and age class of the hedgerow trees (Figure 7). The work is being carried out solely by local volunteers who started with very little knowledge but have now acquired skills in fieldwork, data recording and mapping. The evidence collected, together with research into old field names, suggests that the hedgerows could be relicts of a formerly more widespread woodland. Now, they provide corridors through intensively managed farmland for many woodland species.

The project shows that only 16% of the total length of hedgerow in the area has been lost from this landscape since 1876. Surveys will continue in 2018 and the FoGW have produced a training package that could be used by other local people and groups to get involved in hedgerow recording.

Figure 7: Surveyed hedgerows close to Gillfield Wood. ‘Significant’ trees are shown as a red dot. Imagery and map data ©2018 Google.



Case study: Carr House Meadows waxcap grassland: Quadrat recording of abundance and diversity of fungi Steve Clements & Brian Mitchell, National Trust Longshaw Fungi & Lichen Survey Team

Waxcap grasslands are highly endangered in Europe, with the UK representing an important stronghold. Climate change means that grass grows longer, for a longer period, and poses a potential threat to these rare ecosystems. We suspect that waxcaps are decreasing but insufficient data has been collected to confirm this – fungi are generally under-recorded. Following Shelley Evans' English Nature study of UK grasslands in 2003⁹, much work has been done to locate important waxcap grasslands across the UK.

Typical grassland fungi surveys produce a species list and comments about the habitats, but offer little objective assessment of abundance. In this single visit study in 2015, we used 10m circular quadrats (quadrats may be any shape!) to carry out a very detailed and systematic study of the grassland fungi of the site. Fungi generally fruit in a circular pattern, and research by Dahlberg & Mueller in 2011 demonstrated that terrestrial fungi mycelia are generally separated by less than 10 metres¹⁰. Thirty-eight specimens were examined microscopically and peer review on social media confirmed difficult identifications.

The 246 quadrats produced 699 individual records of well over 100 species. We were able to count over 2,600 fruiting bodies of mushroom and toadstools, of which 590 were in a single field. In addition we recorded 11 'numerous', two 'abundant', two 'large troops' and two 'small clusters' of mushrooms or toadstools. Over 1,120 waxcaps comprising at least 14 species on a single visit establishes Carr House Farm as a waxcap grassland site of national importance. Seventeen finds of pink waxcaps produced 67 specimens.

Number of species found:
● 1 ● 2 ● 3 ● 4 ● 5 ● 6

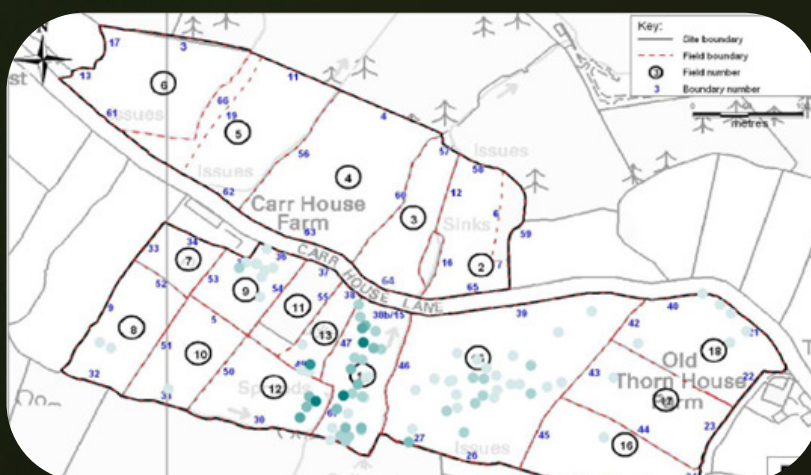


Figure 8: Number of waxcap species per quadrat examined at Carr House Fields (south) 4-6 November 2015; map credit 3

Mapping of species diversity and abundance per quadrat, as well as individual waxcap species maps, using DatMapR freeware (done by Adrian Middleton) provided detailed information to SRWT about the relationship of macrofungi to compartment characteristics (such as hay meadow vs. pasture). Quadrats were also used to assess the diversity and abundance of fungi in the site's small woodland and in the numerous hedgerows. Our study was a detailed 'snapshot' of the October fungi, which clearly demonstrated the site's mycological importance.



Status of grassland habitat within protected areas

Table 1: percentage of total grassland and farmland within the whole of the Sheffield district that is covered by designated sites

Total grassland & farmland covered by site designation	
Special Areas of Conservation	3.1%
Sites of Special Scientific Interest	3.8%
Local Nature Reserves	0.1%
Local Wildlife Sites	5.7%
All designated sites*	10%

Meadow by Greno Woods
© Helena Dolby

Sheffield's most species-rich and important grassland sites outside of the PDNP have been designated as Local Wildlife Sites (LWSs); some of these are shown earlier in this chapter in Figure 6. Again we have not included amenity grassland in this chapter as these are mostly sites of recreation, although they do have some conservation value for wildlife. All unimproved and semi-improved grasslands in the Sheffield planning area are a local conservation priority². However, only a small amount of grassland and farmland habitat (10%) is covered by designated sites (Table 1). Only 5.7% is covered by LWS designation and only 10% of all habitat across LWSs is grassland and farmland. Indeed, most sites covered by LWSs that are not woodland are amenity grassland sites such as parks and recreational areas (a total of 13.5%) which also have value for wildlife. This is in contrast to moorland habitats which are well covered by SSSI and SPA designation.

Sixty-two of Sheffield's 253 LWSs have grassland as the main habitat of interest, but other sites do feature large grassland patches. Of the 73 LWSs that contain grassland patches over 0.5ha, 45 are in positive conservation management; however, this only totals 138ha (39%) of the total LWS area (Figure 9). Whilst the Limb Valley, the largest grassland LWS, is in positive conservation management, eight out of the 11 sites with grassland patches over 10ha are not. This includes Dam Flask to Rowell Bridge, Whitwell Moor and Totley Moor. In addition, few grassland sites are covered by European designations and SSSIs and almost none by LNRs. These figures perhaps highlight the need to designate and positively manage more grassland sites within the Sheffield district.

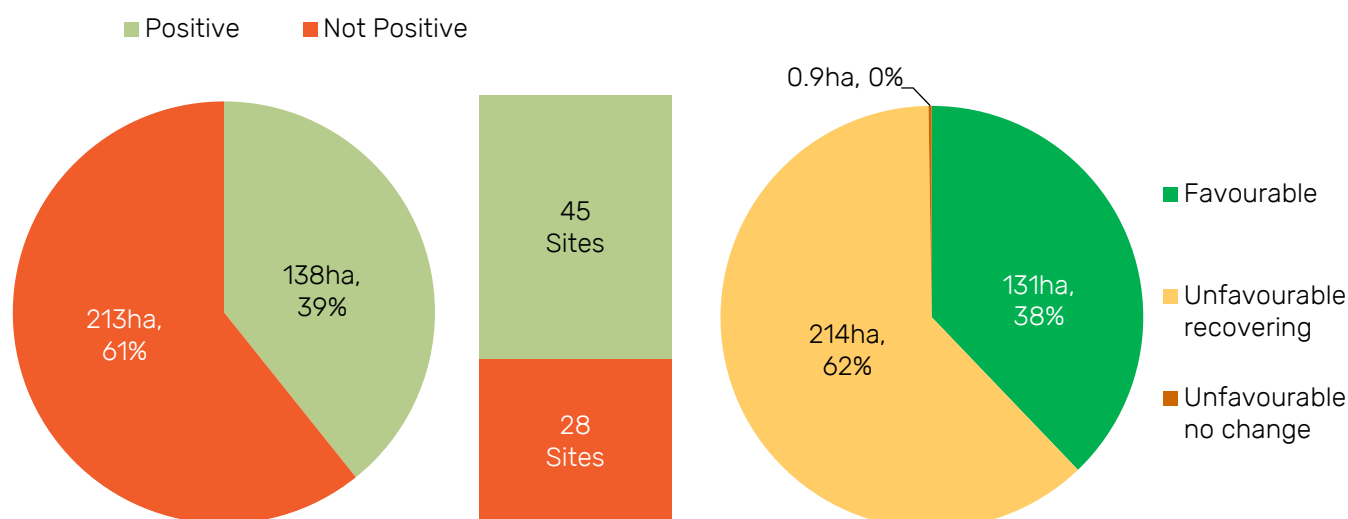


Figure 9: management status of grassland and farmland habitat within LWSs by proportion and area size (left) and condition of grassland and farmland sites within SSSI units (right). Only sites containing grassland patches larger than 0.5ha were considered to remove sites where these habitats are unlikely to inform the management plan.

Grassland and farmland species highlights



Ringlet on yellow rattle ©
Ross Hoddinott/2020VISION

Yellow rattle

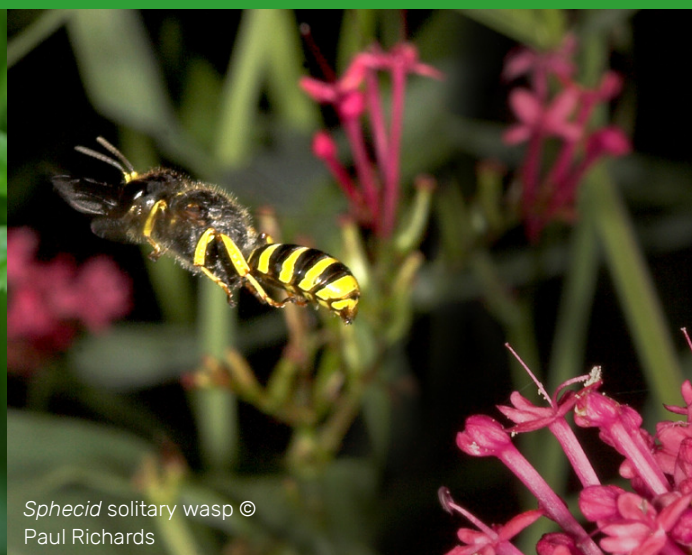
This hemi-parasitic annual plant of grassland utilises nutrient-poor grasslands including permanent pastures, hay meadows, rough grazing, roadside verges and marginal land. It underwent a marked decline in the 20th century linked to farming practices, particularly cutting hay meadows before mid-July¹¹. Now the situation appears to be improving, increasing from eight 1km squares in the 1988 Sheffield Flora Atlas to 35 1km squares in the 2011 South Yorkshire Plant Atlas^{7,8}.



Tormentil ©
Rudmer Zwerver/Saxifraga

Tormentil

A low-growing, creeping perennial, this plant provides a rich source of nectar for bees and butterflies. It is common with a stable population throughout the UK. Locally, it was noted in 82 1km squares within Sheffield in the 1988 Sheffield Flora Atlas and in 201 1km squares within Sheffield in the 2011 South Yorkshire Plant Atlas.



Sphecoid solitary wasp ©
Paul Richards

Invertebrates

Grassland habitats support huge communities of invertebrates that are vitally important in shaping grassland ecosystems. Lowland acid grassland is characterised by having clumps of vegetation and bare ground that allows many invertebrates to flourish, including ants, grasshoppers, butterflies and solitary bees and wasps¹². Heavily grazed grasslands tend to have low floral diversity and support fewer invertebrate species than less intensively managed land¹³. Carefully managed grassland can support a wide range of invertebrates, which in turn support small mammals such as shrews and bats, and birds such as song thrushes¹⁴.



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Arable weeds

Wildflowers associated with arable land – commonly known as arable weeds as they are often early colonisers of farmland – have become increasingly rare over the last 100 years in response to the increased efficiency of farming. This, coupled with the relatively low cover of arable land in the Sheffield area, has resulted in a complete lack of recent Sheffield records for species now considered rare or threatened in the UK, although a small proportion of these were known to occur in the past. Species include red hemp nettle, corncockle, corn marigold and corn chamomile.

Harvest mice

At only 5–7cm in size and weighing just 4–6g¹⁵ harvest mice, like our other small mammals, are not easy to spot. The best way to determine the presence of harvest mice is by finding their nests which are spherical, woven structures in tall and dense vegetation. Breeding nests are around the same size as a cricket ball and non-breeding nests are smaller, more flimsy and are not lined. Nest surveys should be done, by experts, outside of the breeding season so as not to cause disturbance.

Harvest mice are near the top of their range in South Yorkshire. There are 267 harvest mice records in the SBRC; consisting of 263 nests, four cat-kills and only one live sighting, all from the eastern side of Sheffield. Of all records (1991–2017), 231 are from the Beighton Marsh area, from where an annual count has been carried out since 2007 (except 2010 due to foot and mouth disease) by Sorby Natural History Society's harvest mouse 'flying squad', supported by SCC. Numbers have varied over the years, with a high of 29 nests found in 2009 and only two nests in the recent survey in 2017^{16, 17}

Harvest mice are a (NERC Act Section 41) Species of Principal Importance in England as they are believed to have become much scarcer in recent years. Conservation plans are required to reverse the decline.

Changes in habitat management and agricultural methods are thought to be the main cause for the loss of populations from certain areas, although there have been no reliable studies to quantify this change¹⁵.



Harvest mouse
© Rob Bates

Case study: Farmyard dung heap invertebrate communities

Paul Richards, Sheffield & Rotherham Wildlife Trust, Sorby Invertebrate Recorder

The moist, warm, detritus rich environment of a dung heap is a very inviting habitat for many invertebrates. Locally there are a number of species that are primarily only found in such habitats and to a lesser extent in compost heaps and around farmyards. Three such species include the lesser earwig, *Labia minor* and the woodlice *Porcellionides pruinosus* and *Porcellio dilatatus*. These three species have quite a scattered distribution and are considered to have been more widespread in the past due to greater reliance on horse-drawn transport^{18,19}. A recent increase in recreational horse-riding and growth in riding schools may be advantageous to such species. However a corresponding expansion in the use of antiparasitic drugs such as anthelmintics, macrocyclic lactones (e.g. Ivermectin, Doramectin etc), pyrethroids (e.g. Permethrin) and organophosphates (e.g. Dichlorvos) in livestock may in turn restrict the expansion of species due to medicinal residues impacting dung communities^{20,21,22}.

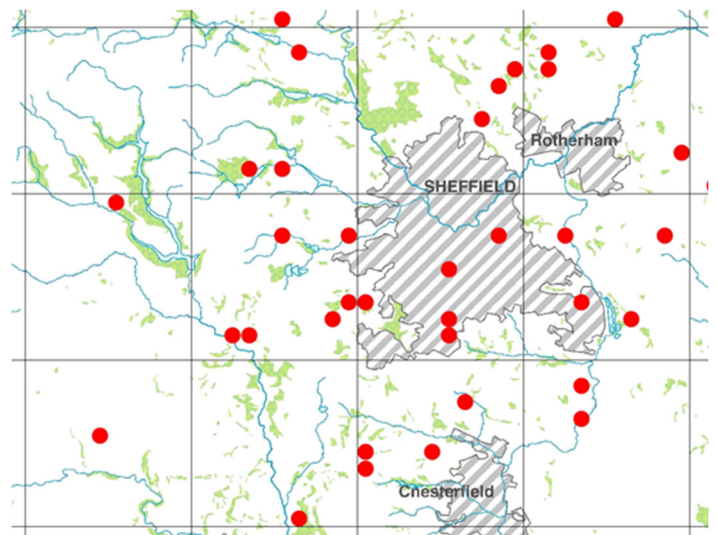


Figure 10: Combined records of the three dung heap associated species in the Sheffield area (*Labia minor*, *Porcellionides pruinosus* and *Porcellio dilatatus*, pictured below, left to right). Mapped using DatMapR. Images © Paul Richards.



Farmland bird species highlights

Skylark

Skylarks are a protected species under Section 41: Species of Principal Importance in England and are a 'Birds of Conservation Concern' red list species due to recent national population declines. Between 1970 and 2015, numbers have declined by 59% nationally²³ and in their natural preferred breeding site of arable fields, national numbers have declined by 75% between 1972–1996²⁴.

In Sheffield, the percentage of areas with skylarks has decreased by 13% between 1980–2008. Numbers of skylarks in migrating flocks have also declined significantly over this period²⁵. Their main routes of a connectivity corridor are concentrated to the west in and around the Peak District National Park, including areas of unimproved grassland, arable land and the moorland fringe²⁶. Some 2017 figures for skylark give the highest number of singing birds – double-figure counts on the Eastern Moors in April as part of the Eastern Moors survey²⁷, and 12+ over the 'plains' area at Orgreave/Waverley Lakes (in nearby Rotherham) on 4th May (reported by David Wood)²⁵.

Their preferred nesting and feeding habitat is arable cereal fields which provide 58.5% of their territories²⁸. Upland grasslands with moderate grass length, plus restored industrial wasteland and grassed-over colliery spoil such as the old Orgreave colliery site, now part of the Waverley development on the edge of Sheffield, just in to Rotherham, are also favoured²⁸. Declines in arable areas are linked to the move from spring-sown to autumn-sown cereals. This creates thicker crops at nesting time and causes difficulties in nesting and feeding, also resulting in no stubble for winter food. Nesting skylarks prefer tractor tracks as these have lower vegetation; however, this leaves them vulnerable to both tractors and predators^{28,29}.

Breeding density also increases with crop diversity so arable monoculture also affects success³⁰. In grasslands, the change from hay-making to silage-cutting means more regular and earlier grass cutting, reducing available nesting time between cuts. The RSPB is trialling the use of unsown patches within arable fields, away from tractor tracks and field margins, and has found this successful²⁹.



Skylark
© Stefan Johansson



Linnet © Terry Whittaker
/2020VISION

Barn owl

Barn owls are iconic countryside birds, living on a diet of small mammals, small birds and some larger mammals. They require rough grassland and field edges to hunt their prey, with a pair requiring 20–25km² of 'edge'³¹. They usually nest in holes in trees or in undisturbed buildings such as barns.

There are 3,000–5,000 breeding pairs resident in the UK with up to 25,000 birds overwintering³². The barn owl underwent a decline of 25–50% nationally up to the 1990s, but has since increased across the country by 464% (1995–2008), and is now green-listed. Data is patchy as the barn owl is largely nocturnal, so DEFRA does not include barn owl in the population decline figures for farmland birds as there are not enough data. Within the local Sheffield area, this species has declined more steeply than at the national level, with a greater than 60% decline in both occupancy and confirmed breeding²⁵.

Most breeding pairs in Sheffield are now found in farmland to the east and south of the area, with a scattering of pairs to the west. The decline between 1975–2008 in the wider Sheffield area is likely to be due to changes in and intensification of agricultural practices that have reduced suitable habitat for prey species. The loss of old barns and large hedgerow trees as nesting sites may also be a factor. The local population was estimated to be eight to 15 pairs in 2008²⁵.

The numbers of barn owls have started to increase, with the Sheffield Bird Study Group recording the species 129 times in 48 locations in 2015, and reporting nine breeding locations across their study area. A barn owl has been recorded at Blackburn Meadows Nature Reserve, and more recently, barn owls have been recorded around the Norton area of Sheffield³³.

Barn owl ©
Andy Rouse/2020VISION



Lapwing ©
Margaret Holland



Lapwing

Lapwings are a familiar bird of the open countryside and farmland, breeding on arable land, wet grassland, and moorland fringe habitats where the sward is short. However, they are declining in line with national trends. Within the Sheffield area, lapwing showed an 80% occupancy in 1975–80, compared to 63% occupied in 2003–08: a decline of 22%²⁵. This decline is largely associated with changing farming practices since the mid-20th century. The moorland edge and surrounding unimproved pastures are stable with broadly the same number of occupied 2km x 2km tetrads between surveys.

Ownership and Management

Whilst the majority of farmland is within private ownership, many important grassland sites are owned by local authorities and conservation organisations, including SCC and SRWT. Management is normally linked to a farming business or, on some grassland sites, particularly on the urban fringe, to horse ownership or a livery business.

Sheffield's most species-rich and important grassland sites, outside of the PDNP, are managed by SCC. Most have been designated as LWS which affords them a degree of protection through the local planning system (see Designated Sites chapter). Their ongoing management is recorded annually (see Figure 9). In addition, a small number of grassland sites are protected through the Dark Peak and Eastern Peak District Moors SSSIs, where conservation management is secured through agri-environment schemes (see page 100).

The Environmental Impact Assessment (Agriculture) Regulations are designed to protect grassland habitats and farmland landscapes that do not have legal protection and are vulnerable to changes in agricultural practices. However, there are significant issues regarding the effectiveness of the regulations, particularly in relation to grassland conservation. For example, in the last few years, two high quality grassland sites that fell below the two hectare threshold have been lost to ploughing in the Peak District National Park.

Liz Ballard, Chief Executive of SRWT, comments: *"With Brexit on the horizon, the future management and protection of grasslands is uncertain. Many priority sites have benefitted from funding to farmers who have applied for EU agri-environment scheme payments (delivered in the UK as Countryside Stewardship). Although the Government has committed to supporting Countryside Stewardship agreements until 2022, as farms come out of current schemes or look further ahead the future is far from clear. Current proposals outlined in the DEFRA 25-year Environment Plan suggest a new environmental land management scheme may be made available to farmers and land managers post-Brexit, but details regarding its operation and the level of funding available have not been confirmed. Whatever the outcome, this will have the most profound effect on the future of our local grasslands and the wildlife they support."*



Case study: Rickett Field Farm, Dungworth

A small number of high wildlife value sites persist within the Pennine fringe farmlands east of the Bradfield Moors despite modern farming pressures to intensify agricultural production. One of these is found at Rickett Field Farm, Dungworth, on a north facing slope above Dale Dyke Reservoir, where over 150 species have been recorded in a rich diversity of habitats including rush dominated marshes, small springs, dry and wet heathland, acid and neutral grassland, bracken, gorse and scrub trees. The marshes include species such as marsh pennywort, marsh valerian and common spotted orchid whilst the spring communities support bog pimpernel, marsh lousewort, butterwort, flea sedge, and bog pondweed. Cotton grasses, sphagnum and cross-leaved heath are found within the areas of wet heath. The site is also of value for a wide range of invertebrates and birds including snipe.

The site is managed within a Higher Level Stewardship (HLS) Scheme agreement (see page 100) which also protects a number of acid grassland sites on steep slopes in addition to the complex pattern of field boundaries – mainly dry stone walls. This situation contrasts with the scenario in the late 1980s and early 1990s when the farm first came to the attention of conservation organisations, as financial support from the government for drainage of the wetter sites on the farm was being considered. Since then the site has been managed within a Peak District National Park Authority conservation scheme agreement before being transferred into HLS.

Managing the landscape at Rickett Field Farm is central to the dairy and sheep farming enterprise and to the provision of self-catering and bed & breakfast accommodation. The Shepherd family have owned the land since 1963 buying it from the then owners at the Haychatter pub, formerly known as the Reservoir Inn.

UK Biodiversity Indicator Focus

Birds of the wider countryside: Ca. Farmland Birds

Sheffield features all 19 species included in the farmland bird indicator list – seven generalists and 12 specialists. Of the seven generalist species, (Figure 11; right), three (43%) had declined in occupancy between 1975–80 and 2003–08. Only two species (29%) showed increases, which were small (6.4% and 9.0% for greenfinch and jackdaw respectively). Worryingly, farmland specialists are not faring well; out of the 12 species, 10 (83%) showed a decline, with four species showing a decline of over 50%. Only two species (17%) showed an increase.

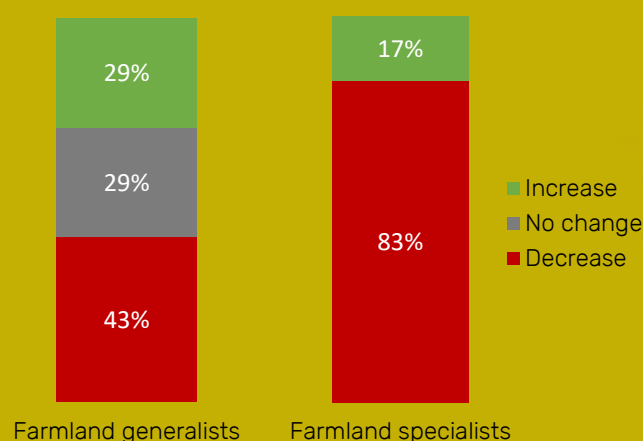


Figure 11: trends of farmland generalists and farmland specialists included as part of the UK biodiversity indicator C5: birds of the wider countryside, measured as a change in the number of tetrads occupied between 1975–80 and 2003–08²⁵.

All data © Sheffield Bird Study Group

Case Study: Farmland Birds, David Wood, Chair, Sheffield Bird Study Group

At a national level, the index of 12 specialist farmland species (corn bunting, goldfinch, grey partridge, lapwing, linnet, skylark, starling, stock dove, tree sparrow, turtle dove, whitethroat and yellowhammer) declined by 70% between 1970 and 2016³⁴. All of these were widespread breeding species in the Sheffield area, found in at least 23% of tetrads during the 1975–80 Breeding Atlas conducted by Sheffield Bird Study Group (SBSG).

Of the species undergoing the most significant declines of distribution or abundance – or both – in the second SBSG Breeding Atlas (2003–08), four of the five most severe declines in occupation corresponded to farmland specialists, namely corn bunting (96% decline), turtle dove (91%), yellow wagtail (83%), and tree sparrow (74%). These declines have continued since the 2003–08 atlas; turtle dove was not recorded anywhere in the SBSG recording area during 2012 or 2013, nor in 2015, and corn bunting was reported just twice during 2014, with no indication of a breeding attempt and no reports at all in 2015 or 2016. It is also worth noting that the other species in decline is twite (97% decline) which has also been affected by changes in (upland) agricultural practices.

The reasons behind drastic declines in farmland specialists are well documented as national agencies seek to understand and address the situation. Major contributory factors are the changes in farming practices over recent decades, notably: reductions in mixed farming, with a massive increase in rapeseed oil production; the move to sowing arable crops in autumn rather than spring; and increased silage production with attendant changes in grassland management. The drive towards ever greater crop productivity, and the associated use of pesticides and herbicides, has also reduced the availability of seed-producing ‘weeds’, as well as insects and invertebrates. Such factors are exacerbated by the loss of hedgerows, which further deprive farmland breeders of feeding opportunities and of nest sites. Reduced survival is the key factor affecting resident farmland breeders, although some (such as skylark and lapwing) are also suffering from changes in cropping regimes that result in a shortened breeding season as cereal fields are harvested earlier in the summer. All of these features affect specialist farmland species around Sheffield as much as they do at a national level and play a major part in their decline.

In Sheffield specifically, the amount of land that is primarily built-up has approximately doubled between 1970 and 2010 as new homes and other structures have been built on previously undeveloped plots of land in urban and suburban areas, together with more extensive redevelopment in other areas to the east and south-east of the city. The recent intensification of agricultural practices, which has proved catastrophic for a number of species both nationally and locally, is partly the result of increased demand for low-cost food. As such, future directions on this front are our shared responsibility.



UK Biodiversity Indicator Focus: B1a: Area of land in agri-environment schemes

Agri-environment schemes require farmers to implement environmentally beneficial management practices and to demonstrate good environmental practice on their farms, recently through the Environmental Stewardship scheme. The entry-level part of this scheme (ELS) promotes simple and effective environmental management across all types of farmland, whilst the higher-level or targeted version (HLS) promotes environmental management aimed to conserve wildlife, maintain and enhance landscape quality and character, protect the historic environment and natural resources, and promote public access and understanding of the countryside.

Not all agri-environment schemes are active in Sheffield. Figure 12 and Table 2 shows where several grassland-specific options have been adopted.

A total of 442ha of land falls under arable options (EE3, EF6, EJ11 and HF12) of which EJ11 ('maintenance of watercourse fencing') forms the majority of the area. This is concentrated on one site.

A further 85ha of land is also under four options designed to improve grasslands for farmland birds (Figure 13). This includes 30ha of HLS options to restore wet grasslands for breeding waders (HK11) and wintering waders and wildfowl (HK12), and 55ha to manage enclosed rough grazing (UL22) and upland grassland (UL23).

In addition, 7,914m of hedgerows fall under the scheme (Figure 13), including 3,303m under the HLS (HB11 and HB12; 'maintenance of hedges of very high environmental value').

Figure 12 (top right): ELS and HLS options for grassland, classed as low input (green), species rich (orange) and targeted features (yellow). Details are given in Table 2 below. Data: Joint Nature Conservation Committee (JNCC); map credit 3.

Figure 13 (bottom right): ELS and HLS options for arable land (green), hedgerows (orange) and birds (yellow). Details are given in the text above. Data: JNCC; map credit 3.

Table 2 (below): accompanying details for the ELS and HLS options for grassland shown in Figure 12, classed as low input (green), species-rich (orange) and targeted features (yellow). SDA = Severely Disadvantaged Areas. ML = moorland line. Data: JNCC.

Scheme option	Number of sites	Total area (ha)
EK3 Permanent grassland with very low inputs: outside SDA & ML	50	62.3
EK4 Manage rush pastures: outside SDA & ML	2	2.7
EL3 In-bye pasture & meadows with very low inputs: SDA land	143	336.8
EL4 Manage rush pastures: SDA land & ML parcels under 15ha	14	37.8
EL5 Enclosed rough grazing: SDA land & ML parcels under 15ha	27	109.9
Maintenance of species-rich, semi-natural grassland	27	50.0
Restoration of species-rich, semi-natural grassland	37	63.2
Maintenance of grassland for target features	42	154.9
Restoration of grassland for target features	56	102.5

Conservation in Action

Various local and national projects are working to both increase local knowledge and prevent declines of local grassland and arable habitats and species.

The National Plant Monitoring Scheme started in 2015, a joint venture between Botanical Society of Britain and Ireland, the Centre for Ecology and Hydrology, Plantlife and the Joint Nature Conservation Committee. The aim is to collect data to provide an annual indication of changes in plant abundance and diversity through transect and quadrat surveys within random 1km squares. The results will help inform the new Biodiversity Indicator 'Plants of the Wider Countryside', with data sets uploaded to the NBN gateway. Datasets for 2015 & 16 are available; the Sheffield area has one survey completed so far with more surveys to be completed and uploaded by volunteers. This will help to track plant trends in specific areas. There will not be sufficient data for statistical analysis of trends until 2020³⁵.

Highways England is undertaking a grassland feasibility study to enhance the wide rural road verges along the A616 Deepcar to Langsett/Flouch. It plans to enhance existing species-rich grassland strips and sow appropriate wildflower seeds on poorer quality grassland. Interesting plants such as dyers greenweed and common cudweed (both on the England Red Data List³⁶) are already present on verges in Sheffield; the project's aims are to: contribute additional species-rich grassland; increase the wildflower abundance and diversity to benefit pollinating invertebrates such as butterflies, bees and bumblebees; and provide connectivity for wildlife.

In January 2018, a new Nature Friendly Farming Network was launched, hoping to encourage British farmers to restore wildlife, reverse declines in soil quality and help manage the impact of climate change at the same time as growing affordable, healthy food. The Network has said that a post-Brexit policy framework should incorporate provisions for wildlife and public service in an attempt to change Britain's approach to agriculture³⁷.



Carbrook Ravine restoration meadow
© Julie Riley

Case study: The Restoration Meadow at Carbrook Ravine nature reserve

In 2015, SRWT successfully created a wildflower meadow on the old college playing fields at Carbrook Ravine nature reserve near Richmond. Stradbroke College (formerly Richmond College) closed in the 1990s and was subsequently demolished. Some of the site was redeveloped for housing, but the old playing fields were left unused for 20 years. As the playing fields adjoin the SRWT nature reserve at Carbrook Ravine, the Trust took the opportunity to transform the disused fields into a wildflower meadow extending this local oasis for wildlife.

After removing scrub and fly-tipping from the area, the fields were ploughed up in spring 2015 and sowed with a mixture of wildflower seeds. The seed mix was chosen to complement the existing hay meadows on the adjacent nature reserve and to provide food plants for bees, butterflies and other insects. The flowers sown include typical hay meadow plants such as ox-eye daisy, red clover, yarrow, wild carrot, salad burnet, yellow rattle and lady's bedstraw. In 2016 and 2017 green hay and yellow rattle was harvested by staff and volunteers and used on other nature reserves and trial sites.

SRWT is delighted with the success of this project, which has created a fabulous new area for wildlife and an eye-catching sight for local people. Many people living in urban Sheffield are not easily able to access the countryside. The creation of this meadow has brought wildlife right back to the local neighbourhood, allowing people to connect with local nature.

Threats to Grassland and Farmland

What is the threat?	What does it cause?		
	Grasslands	Arable	Field boundaries
Agricultural intensification and changes in management	Loss of species diversity through fertiliser and pesticide applications, early cutting for silage, over-grazing, compaction from heavy machinery etc. Loss of priority and semi-improved grassland habitats through re-seeding and conversion to arable land.	Loss of arable weeds through pesticide applications, reduction in field headlands. Reduction in spring-sown cereals which provide nesting habitat for farmland birds. Heavier crops resulting in loss of nesting habitat for farmland birds. Reduction in seed retained in fields over winter.	Reduction in extent and quality of associated ground flora. Reduction in quality of hedgerows through intensive trimming, removal of boundary trees, and grazing pressure. Removal of field boundaries, reducing habitat availability and removing wildlife corridors.
Neglect	Under-grazing leading to loss of species diversity Encroachment of scrub and bracken leading to a loss of habitat.	-	Degradation of the boundary which ultimately leads to its loss.
Inappropriate tree planting	Loss of habitat.	-	-
Intensive horse/pony grazing	Loss of species diversity through over-grazing and compaction.	-	Reduction in the quality of hedgerows through grazing pressure.
Urbanisation and development pressure	Loss of habitat. Inappropriate mowing, tidying, planting of non-native species leading to a reduction in species diversity and loss of habitat.	Loss of habitat.	-

All of these threats result in a loss of available habitat for birds, small mammals, amphibians, reptiles and invertebrates. They all also result in habitat fragmentation and a reduction in connectivity and available wildlife corridors. Knock-on effects include reduced opportunities for successful seed dispersal and a reduction in animal movements in response to changes in climate and other environmental pressures.

Recommendations

1. Develop targeted conservation plans for harvest mice, skylark and other farmland birds as key indicator species or local species in severe decline.
2. Continue to deliver conservation actions that support the return and expansion of the barn owl. This includes habitat improvement, raising awareness of rodenticide, improved monitoring and installation of barn owl boxes.
3. Promote the value of LWSs and unprotected, important grasslands to farmers, land managers, landowners, planners and developers.
4. Focus efforts on improving the overall condition of key grassland LWSs currently in poor condition or not in positive conservation management for wildlife.
5. Ensure all presently un-mapped areas of priority grassland habitat are mapped on the national Priority Habitat Inventory.
6. Develop the positive conservation management of rural road verges to act as corridors and linkages between fragmented grassland sites.
7. Identify opportunities to plant new hedgerows where appropriate and restore connecting dry stone walls.
8. Promote the value of local, non-designated but important grassland sites by encouraging Natural England to include them within the higher tier of Countryside Stewardship or bringing them in to the PDNPA's Conservation Scheme.
9. Actively promote and practically support farmers and landowners wishing to apply for mid-tier Countryside Stewardship and any appropriate replacement scheme after Brexit.
10. Encourage the creation of new hay meadows and the planting of 'arable weeds' and meadow species where appropriate, for example, cowslip and yellow rattle.
11. Further improve our knowledge of fungi at grassland sites and promote the mycological importance of key sites.
12. Raise awareness with land managers, landowners, farmers, grounds maintenance contractors and public bodies of the impact of inappropriate or over-grazing and excessive mowing or cutting, especially at the wrong time of year, on grasslands and the wildlife they support.



