



3.6 Arable, orchards and hedgerows

Enclosed farmland habitats cover 60% of England, and make up the typical 'English countryside' that has such a strong hold on the affections of people living in England and visitors from abroad. The two main components are cultivated crop land (arable) and grassland (meadows and pastures). These lowland habitats are divided up into a patchwork by field boundaries of hedgerows, walls and fences. Small orchards of apple, pear, plum and cherry trees are scattered through this patchwork, adding their particular character to the landscape. Grassland habitats are covered in more detail in Section 3.3. The biodiversity of the other habitats is covered below.

Arable agriculture changed hugely in the latter part of the 20th century. It is now based upon a very narrow range of crops. Land sown with cereals, mainly wheat and barley, comprises 67% of the arable area. Oil-seed rape is another major crop (16% of the arable land). Spring-sown crops are now much less common than autumn-sown crops, with the result that winter stubble fields are also less common. Spring-sown wheat and barley declined from 70% of the total in 1968 to less than 20% in 1998 (Buckwell & Armstrong-Brown 2004). Most of the intensively grown crops provide a uniform habitat of low value to wildlife. Habitats on arable land that are of more value for biodiversity include temporarily unused land known as set-aside, and margins of fields or areas within the fields that are deliberately managed for wildlife, for example sown wild bird food areas, fallow plots for nesting birds and wildflower strips.

The orchards of England can be divided into two groups according to the intensity of management for fruit production. Traditional orchards (the UK BAP priority habitat) are usually grazed by cattle or sheep and chemical pesticides and fertilisers are rarely used. The trees are long-lived and reach the veteran, gnarled stage, with hollows and decaying wood. The combination of fruit trees, the grassland on the floor and hedgerow boundaries or scrub mean that these orchards resemble miniature parklands or wood-pastures. In England, traditional orchards occur on a wide range of soil types, slopes and aspects in England. Intensively managed orchards are of less value for wildlife and are characterised by inputs of chemicals such as pesticides and inorganic fertilisers, frequent mowing of the orchard floor rather than grazing or cutting for hay, and the planting of short-lived, high-density, dwarf or bush fruit trees.

The green network of hedgerows, which is such a dominant feature of the English countryside, is highly valued as wildlife habitat, as an attractive part of our landscapes and for its links to England's culture, history and archaeology. Hedgerows composed mainly of native trees and shrubs are a priority habitat under the UK BAP. This includes both ancient hedgerows and more recent hedgerows planted during the time of the Enclosure Acts in the 18th and 19th centuries.

UK BAP priority arable, orchard and hedgerow habitats in England:

- Arable field margins
- Hedgerows
- Traditional orchards

Multiple values of traditional orchards

Biodiversity

Traditional orchards are hotspots for biodiversity as demonstrated by the study of three small orchards on the edge of the Wyre Forest by the Wyre Forest Study Group. In 2004, a grand total of 1,868 species of wild plants and animals was recorded from the orchards, including vascular plants, bryophytes, fungi, lichens, vertebrates and invertebrates. The orchards supported 56 nationally rare, nationally scarce or declining species, including two Red List birds and eight Amber List birds.

Source: Smart & Winnall (2006)

Community

Wilson's Orchard near Northampton is a 100-year-old apple orchard purchased by Persimmon Homes during their residential development of the surrounding area. The development company recognised the value of the orchard to the local community and generously conveyed it to South Court Environmental Ltd (SCE) in 2000. SCE is a worker's co-operative with the aims of conservation and enjoyment of the environment by the local community, and, together with 'The Apple Cause', as the friends of Wilson's Orchard are known, they manage the orchard. Community events such as Apple Day are well supported, as are other activities, including learning more about the wildlife in the orchard. SCE has started pruning old trees to re-invigorate fruit production and has planted new trees, including other fruit species such as pear, plum and quince. Apple juice is one of the community crops from the orchard, illustrating the part such orchards can play in promoting healthy eating.

Source: English Nature (2005)

Economy

Within the three counties of Herefordshire, Worcestershire and Gloucestershire, 24 small-scale producers rely on traditional orchard fruit to make around 0.29 million litres of cider and perry a year, estimated to contribute at least £0.5 million a year to the local economy. If the value of services provided by suppliers and tourism income from visitors attracted to the area is included, the estimate for the economic value of traditional orchards in the area could be in excess of £1.5 million a year.

Source: Natural England (unpublished data)

3.6.1 Importance of England's arable, orchard and hedgerow habitats

England has the bulk of the UK's farmland habitats, including around 97% of traditional orchards and about 69% of hedgerows. Farmland habitats are not included in Annex I to the EC Habitats Directive but Article 10 of the Directive requires member states to encourage the management of hedges (and other linear features) in their land use planning and development policies and, in particular, with a view to improving the ecological coherence of the Natura 2000 network. In addition, farmland habitats are important for several species listed in Annex II to the Directive, including greater horseshoe bat *Rhinolophus ferrumequinum* and great crested newt *Triturus cristatus*.

3.6.1.1 Arable, orchard and hedgerow species

The farmland habitat mosaic, including pasture, is important at a landscape scale for wide-ranging species that require a combination of habitats to successfully complete their life cycles.

Vascular plants

Over 150 plant species are characteristic of arable habitats, sharing the same ecological niche as the crops amongst which they grow (Still & Byfield 2007). Many are now regarded as ancient introductions (archaeophytes) into Britain, including rapidly declining species such as corn buttercup *Ranunculus arvensis*, shepherd's-needle *Scandix pecten-veneris*, spreading hedge-parsley *Torilis arvensis* and broad-fruited cornsalad *Valerianella rimosa*.

On arable land, 200 key sites have been identified for their importance for arable plants (Wilson & Byfield 2005). These sites are known as Important Arable Plant Areas (Figure 3.16). Seven sites are of European importance and a further 151 sites are listed as being of national importance. The richest areas for arable plants are in southern and eastern England, particularly where soils are light and chalky.

Lower plants

Arable land has a distinctive bryophyte flora, particularly associated with autumn and over wintering stubbles. At least 17 liverworts and hornworts and 76 mosses have been recorded in arable habitats, comprising 9% of the total British and Irish bryoflora (Porley 2000). Among bryophytes on the UK BAP priority list are several species associated with arable land, including the sausage beard-moss *Didymodon tomaculosus*, starry earth-moss *Ephemerum stellatum* and spreading-leaved beardless-moss *Weissia squarrosa* (Porley 2000).

Hedgerow trees

There are estimated to be over 1.6 million hedgerow trees in England of which more than a third are thought to be over 100 years old. Hedgerow trees are a traditional part of England's lowland landscapes and provide havens for many species of wildlife. Since the late 18th century England has witnessed the dramatic decline of these hedgerow trees. Intensive agricultural practice, Dutch elm disease and poor management have led to the removal of many hedges and their trees.

Over 200 lichen species have been recorded growing on elms *Ulmus* species in Britain. Old elms have a rough alkaline bark, which is particularly suitable for a species-rich lichen community to develop. This is

characterised by the brightly coloured leafy lichen *Xanthoria parietina*, along with grey and brown species belonging to the *Physcia* genus.

In many parts of central, southern and eastern England these species are joined by a number of elm specialists including three UK BAP priority species:

- Sap-groove lichen *Bacidia incompta*
- Orange-fruited elm-lichen *Caloplaca luteoalba*
- Clustered mini-jelly lichen *Collema fragrans*

Source: Edwards (2005)

Figure 3.16 Distribution of important arable plant areas in England

- European importance
- National importance
- County importance
- Regional boundary



Source: Plantlife International, 2008

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Invertebrates

Over 20 of the butterfly species found in lowland England breed in hedgerows, including the brown hairstreak *Thecla betulae*, a UK BAP priority species, which lays its eggs on blackthorn *Prunus spinosa* (Asher *et al.* 2001). The rare barberry carpet moth *Pareulype berberata*, another UK BAP priority species, also breeds in hedgerows. Hedgerow trees and the veteran trees in traditional orchards provide habitats for a whole range of insects and other invertebrates that rely on old and decaying wood. To date, 403 species specialising in wood-decay habitats have been recorded in traditional orchards, including 102 Red Data Book or nationally scarce species (Mountford & Strachan 2007). The noble chafer *Gnorimus nobilis* is a priority UK BAP beetle species that is almost entirely restricted to traditional orchards.

Mammals

The hazel dormouse *Muscardinus avellanarius* (a UK BAP priority species) nests and forages in hedgerows and uses them as dispersal corridors (Bright & MacPherson 2002). Greater horseshoe bats (listed in Annex II to the EC Habitats Directive) and other bat species use hedgerows as flyways for commuting to and from their roosts and as foraging routes (Entwistle *et al.* 2001).

Birds

Arable fields provide a range of plant and invertebrate food resources for many declining farmland birds, such as grey partridge *Perdix perdix*, corn bunting *Emberiza calandra*, turtle dove *Streptopelia turtur* and yellowhammer *Emberiza citrinella*, both in summer and winter (Vickery *et al.* 2002). Some crop types are important for birds, for example sugar beet fields are widely used by internationally important numbers of wintering pink-footed geese *Anser brachyrhynchus*, where the crop is traditionally grown close to the east coast. Hedgerows are important for many farmland and woodland birds, including 28 threatened species, such as bullfinch *Pyrrhula pyrrhula* and tree sparrow *Passer montanus* (Mountford & Strachan 2007).

UK BAP species of farmland landscapes

Most farmland birds and mammals need a range of habitats to survive.

Yellowhammer

The yellowhammer *Emberiza citrinella* nests in low hedges and grassy ditch margins and feeds its chicks on grasshoppers and other invertebrates found in these habitats and in semi-improved grasslands. In winter, the adult birds feed on the seeds of weeds found in crop stubbles.



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Greater horseshoe bat

Greater horseshoe bats *Rhinolophus ferrumequinum* range over several kilometres from their summer roosts in old buildings to hunt for insects. Their insect prey is especially abundant in landscapes that are mixtures of woodland, old orchard and permanent pasture, linked by 'flyways' formed by tall, bushy hedgerows and lines of trees.

Source: English Nature (2004b)



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3.6.2 Extent of habitat

The extent of the different arable, orchard, hedgerow and related habitats is given in Table 3.10. Of the three UK BAP habitats, arable field margins comprise around 60,000 ha of permanent grassland margins, 7,000 ha of cultivated margins, 9,000 ha of wild bird mix and 3,600 ha of flower margins for bumblebees and other insects (based on current management options under agri-environment schemes). Traditional orchards cover an estimated 24,600 ha, while about 84% of hedgerows are classed as BAP habitat (BRIG 2006b).

Orchards are dispersed throughout the lowlands of England (Figure 3.17) but there are concentrations, particularly in Kent, Herefordshire, Worcestershire, Cambridgeshire, Norfolk and Somerset. Most of the intensive orchards occur in these six counties (80%), while just over 50% of the traditional orchard area is within them (Mountford & Strachan 2007).

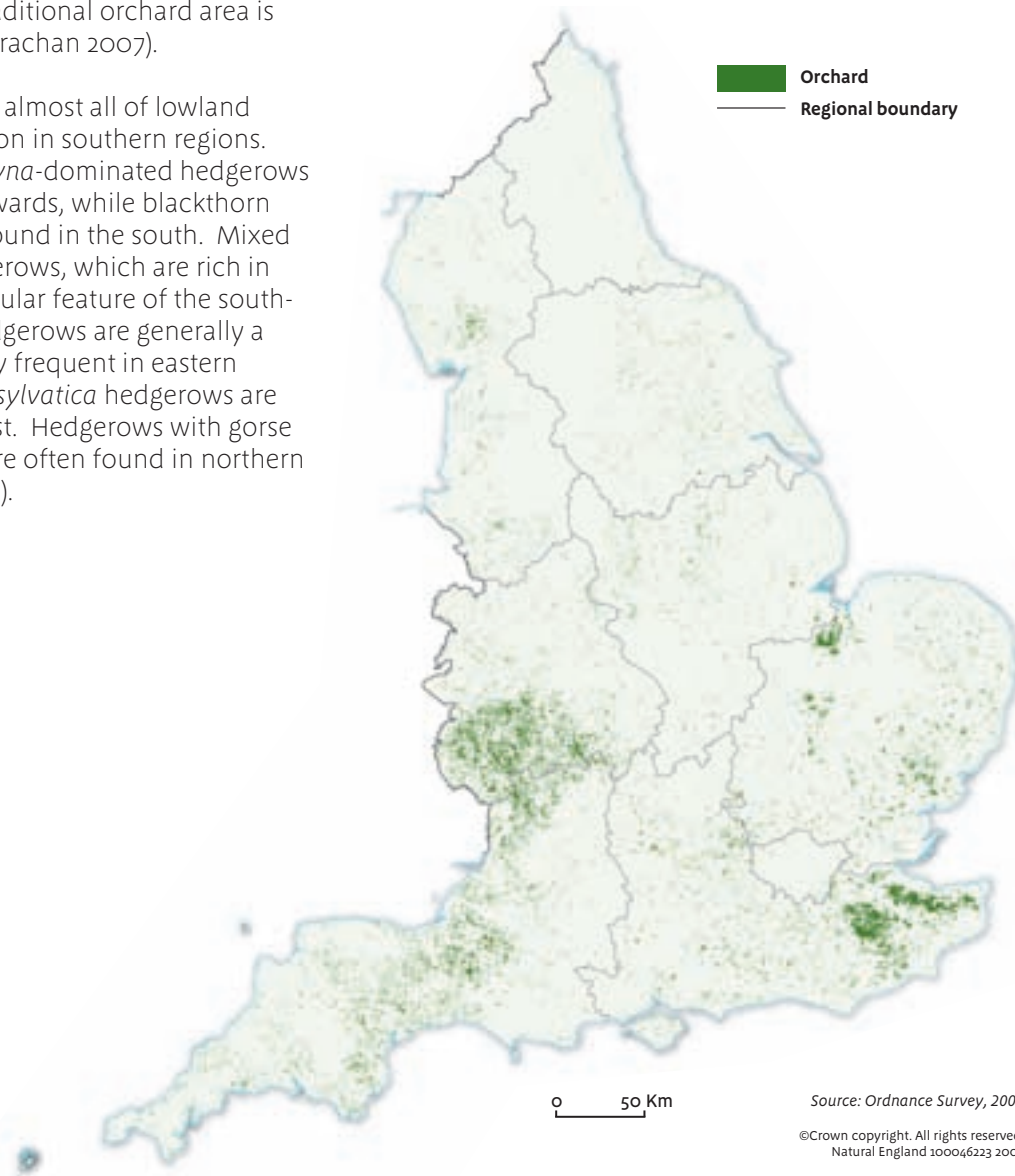
Hedgerows are found across almost all of lowland England but are most common in southern regions. Hawthorn *Crataegus monogyna*-dominated hedgerows increase in frequency northwards, while blackthorn hedgerows are more often found in the south. Mixed hazel *Corylus avellana* hedgerows, which are rich in trees and shrubs, are a particular feature of the south-west. Elm *Ulmus* species hedgerows are generally a southern type, and especially frequent in eastern England, while beech *Fagus sylvatica* hedgerows are commonest in the south-west. Hedgerows with gorse *Ulex* species are rare but more often found in northern England (Cummins *et al.* 1992).

Table 3.10 Farmland habitats in England

Habitat	England resource (ha or km)
Arable crops and temporary grass in crop rotations	3,709,000 ha
Fallow land and set aside	1,158,000 ha
Orchards	40,000 ha
Hedgerows	515,000 km
Walls	90,000 km
Fences	350,000 km
Boundary banks/grass strips	51,000 km

(Source: BTO, RSPB, JNCC, Defra, 2008)

Figure 3.17 Orchard extent in England



3.6.3 Protection

There are 14,066 ha of arable habitats within SSSIs, largely in one site, Breckland Farmland SSSI (most of which is also within Breckland SPA). This site supports breeding stone curlews *Burhinus oedicanus* in numbers of European importance. Nine SSSIs are notified for arable plants and a further 50 SSSIs support some arable plant interests (Pinches *et al.* unpublished). Statutory protection of traditional orchards is very limited. There are only two SSSIs in England containing the habitat, both notified for deadwood invertebrates. SSSI notification is not a significant protection measure for hedgerows. Important hedgerows are protected from removal by the Hedgerows Regulations 1997.

3.6.4 Condition

By area, 98% of SSSI arable land is in favourable or recovering condition. Of this, 97% (13,694 ha) is in favourable condition and 1% (149 ha) is recovering. There are currently no measures of condition of BAP arable field margins but criteria are being developed (Critchley *et al.* 2007).

Many traditional orchards are suffering from neglect and becoming overgrown by scrub. In Cambridgeshire and Peterborough in 2004 and 2005, over 30% of traditional orchards had unmanaged grassland and less than 50% had signs showing that trees were being managed (East of England Apples and Orchards Projects 2005).

Applying the condition assessment method developed by the UK Hedgerow Habitat Action Plan group to Countryside Survey 2000 data, only 22% of hedgerows in Great Britain are estimated to be in favourable condition (Defra 2007c).

3.6.4.1 Trends in arable, orchard and hedgerow species

There has been a catastrophic decline in the distribution of arable flowering plants during the last half century and they are now amongst the most threatened elements of our flora (Smith 1989; Rich & Woodruff 1996; Sutcliffe & Kay 2000; Wilson & King 2000; Preston *et al.* 2002b). Of the 30 vascular plant species that have shown the greatest relative declines across Britain, no fewer than 18 are characteristic of arable and other cultivated ground (Preston *et al.* 2002b). Seven species are extinct in arable habitats, including downy hemp-nettle *Galeopsis segetum*, and many others, such as the cornflower *Centaurea cyanus*, are rare. However, one of the extinct species, the interrupted brome *Bromus interruptus*, has recently been reintroduced to three sites. The arable bryophyte flora is less well known but also appears to be declining (Porley 2000).

Other plants have also suffered declines. The species richness of the herbaceous flora at the base of hedgerows declined between 1990 and 1998 (Haines-Young *et al.* 2000). Declines in plants on arable land and in hedgerows are related to the widespread use of herbicides and fertilisers, more efficient seed-cleaning techniques and loss of winter stubbles and summer fallow land.

Trends in farmland birds

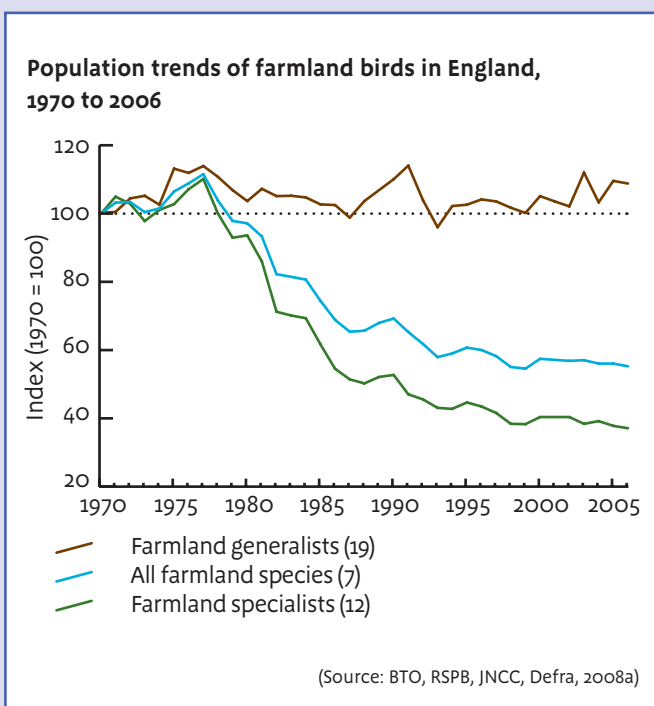
The populations of farmland birds in England declined by over a half between the late-1970s and late-1990s. Declines in England mostly affected farmland specialist species (those species that breed solely or mainly on farmland).

Of those species that have experienced major declines over the last three decades some, such as grey partridge *Perdix perdix*, turtle dove *Streptopelia turtur* and starling *Sturnus vulgaris*, continue to decrease. Tree sparrow *Passer montanus*, and perhaps reed bunting *Emberiza schoeniclus*, are the only declining species where the decreases have levelled out since the late 1990s.

Declines in farmland birds have been associated with changes in agricultural practices, including increased specialisation and mechanisation, switching to autumn sowing of cereals, intensification of grassland management, increased use of agro-chemicals, and loss of field margins and hedges.

The farmland bird index also includes trends for seven increasing farmland generalist species, including woodpigeon *Columba palumbus* and stock dove *C. oenas*, which may have benefited from changes such as increased area of oil-seed rape production.

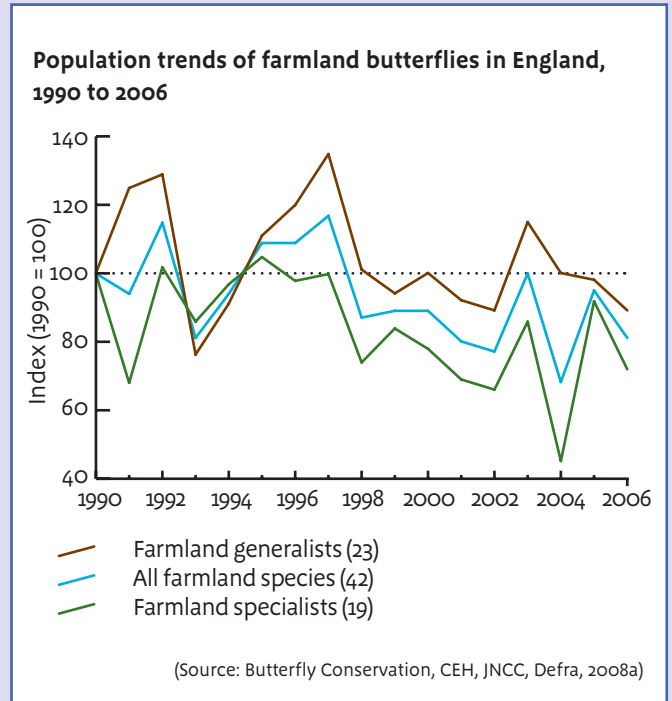
Source: Defra (2008a)



Trends in farmland butterflies

- Data from the UK Butterfly Monitoring Scheme shows that the abundance of butterflies on farmland sites (mostly semi-natural grasslands) has fallen by nearly a fifth over the last 17 years.
- In 2004, specialist species (low mobility species restricted to semi-natural habitats) declined to a low point of 45% of the 1990 baseline, but have since partially recovered to 28% below the baseline in 2006. Specialist species include Adonis blue *Lysandra bellargus*, Duke of Burgundy *Hamearis lucina*, heath fritillary *Melitaea athalia*, northern brown argus *Aricia artaxerxes* subspecies *salmacis*, and silver-studded blue *Plebejus argus*.
- Generalist species (mobile species that occur in a wide range of habitats) have fared better, with a relatively stable trend over the period. Species that have declined most are those associated with varied turf height that are sensitive to overgrazing. Generalist species include peacock *Inachis io*, purple hairstreak *Neozephyrus quercus* and comma *Polygonia c-album*.

Sources: Defra (2008a); Fox et al. (2006)



The Duke of Burgundy (pictured right) requires structurally diverse grassland, usually with a scatter of scrub or hedgerows. Numbers have declined by over 50% in the last ten years due to habitat fragmentation and lack of suitable management.



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3.6.4.2 BAP arable, orchard and hedgerow action plan threats

The main issues posing a threat to arable field margins are (BRIG 2006a):

- **Changes in agricultural management practice**, when arable land is lost to grassland in areas increasingly specialising in livestock production.
- **Agricultural intensification**, resulting in both loss of field margins of wildlife value when intensively cultivated arable areas are enlarged and damage from drift of herbicides and pesticides from in-field farming operations.

The main issues posing a threat to traditional orchards are (BRIG 2006a):

- **Changes in agricultural management practice**, including undergrazing of traditional orchards in areas specialising in arable production, leading to neglect and scrub invasion, and lack of new planting to replace trees at the end of their lives.
- **Agricultural intensification**, leading to further loss of traditional orchards to other agricultural uses.
- **Inappropriate development**, including housing, leading to loss of orchards.

The main issues posing a threat to hedgerows are (BRIG 2006a):

- **Changes in agricultural management practice**, notably neglect (no trimming and laying or coppicing) leading to the development of gaps and loss of connectivity in the hedgerow network. Gaps also appear through too frequent and badly timed trimming. Lack of replacement of hedgerow trees is a threat to the hedgerow tree population.
- **Agricultural intensification**, such as use of herbicides, pesticides and fertilisers close to the bases of hedgerows, resulting in a decline in plant species richness, and increased livestock numbers causing damage through browsing and trampling.