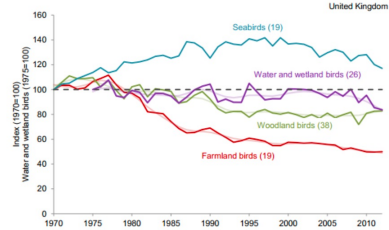


MODULE 2 – HABITAT AND SPECIES MANAGEMENT

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1



Breeding farmland birds, woodland birds, and seabirds, United Kingdom, 1970 to 2012
Source: British Trust for Ornithology, Defra, Joint Nature Conservation Committee, RSPB 2014

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2

2

Wildlife and Countryside Act 1981

Primary mechanism for wildlife protection in Britain.

Legislation covers four areas:

- Wildlife protection, including protection of wild birds, eggs & nests, protection of other animal & protection of plants
- Nature Conservation, Countryside & National Parks
- Public Rights of Way
- Miscellaneous provisions



Turtle Dove – Red List
Woodland edges, hedge rows
and open land with
scattered bushes

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3

3

Wildlife and Biodiversity Policy

Priority: Improve delivery of environmental outcomes from agricultural land management practices, whilst increasing food production

- Over 70% of England is farmed - agricultural land management practices - important influences on biodiversity & ecosystem services.
- Shapes landscapes contributes significantly to UK economy.
- Farmers & land managers play a vital role, not only as food suppliers, but also as the stewards of our countryside.
- Cooperation is crucial in achieving our ambitions for biodiversity.
- Potential tensions exist between improving the environment & increasing food production & this requires all interested parties to work together.

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4

Biodiversity net gain (BNG)

- Contributes to the recovery of nature while developing land.
- Leaves habitat for wildlife in a better state than before development.
- From Nov. 2023 in Town & Country Planning Act 1990, unless exempt.
- It will apply to small sites from April 2024.
- Maintained for 30 years
- Plus 10%
- Any planning application not including permitted. development

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5

5

Who it will affect

BNG will apply if you're a:

- land manager
- developer
- local planning authority (LPA)

If you're a land manager

You can get paid by selling biodiversity units.

You must be a land manager with:

- land in England
- consent to register land if you're not the landowner
- a legal agreement for the land you're registering



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6

6

Functions of Biodiversity

Biodiversity provides the following essential services to agriculture and the rural community.

- Pollination of crops - P
- Run-off Reduction - R
- Soil conditioning - S
- Erosion prevention - E
- Flood prevention - F
- Improving water quality - W
- Pest Control - PC
- Sustaining rural people's livelihoods
- Providing variety to allow adaptation to changing conditions
- Windbreak - WB

7

Functions of Biodiversity

Biodiversity provides the following essential services to agriculture and the rural community.

8

Section 41 of the Natural Environment and Rural Communities (NERC) Act 2006: habitats and species of principal importance in England

This spreadsheet contains 2 tables.

Topic of each table	Link to each worksheet
Worksheet 1: Section 41 habitats of principal importance in England	Habitats list
Worksheet 2: Section 41 species of principal importance in England	Species list

Notes about the species list

Species are ordered (sorted) alphabetically, initially by Taxon group (column A), and then by Taxon name (column B).

Taxon name (column B) and Common name (column C) are the names as used when the NERC Act 2006 came into force.

Current recommended scientific name (column D) is the name recommended in the UK Species Inventory (UKSI) as of July 2022. The UKSI is available online at <https://www.nhm.ac.uk/our-science/data/uk-species/index>

Recent synonym (column E in the species list) is an alternative scientific name that has been used since 2006.

National Biodiversity Network (NBN) Taxon Version Key for recommended name (column F in the species list) is a unique identifier for the species (associated with the recommended name in column D). The key can be used to search for the taxon at the NBN Atlas <https://nbnatlas.org/>

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Section 41 Habitat Filtered

Worksheet 1: Section 41 habitats of principal importance in England

You can search the list by selecting the arrow and column header (drop-down) arrow under each column heading.

Broad habitat	Habitat name
Acid Grassland	Lowland dry acid grassland
Arable and Horticultural	Arable field margins
Boundary and Linear Features	Hedgerows
Calcareous Grassland	Lowland calcareous grassland
Calcareous Grassland	Upland calcareous grassland
Improved Grassland	Coastal and floodplain grazing marsh
Neutral Grassland	Lowland meadows
Neutral Grassland	Upland hay meadows
Rivers and Streams	Rivers

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Section 41 Species Filtered

Worksheet 2: Section 41 species of principal importance in England

1. You can search the list by selecting the arrow and column header (drop-down) arrow under each column heading.

2. In Column E, there will be some empty cells because that taxon name has no recent synonym (other recognised scientific names).

Taxon group	Taxon name (as listed in 2006)	Common name (as listed in 2006)
Bird	<i>Anthus trivialis</i> subsp. <i>trivialis</i>	Song Sparrow
Bird	<i>Carduelis cannabina</i> subsp. <i>autodithona</i> <i>cannabina</i>	Linnet
Bird	<i>Emberiza calandra</i> subsp. <i>calandra</i>	Corn Bunting
Bird	<i>Emberiza citrinella</i>	Yellowhammer
Bird	<i>Emberiza hortulana</i>	Grey Partridge
Bird	<i>Streptopelia turtur</i>	Turtle Dove
Bird	<i>Vanellus vanellus</i>	Lapwing

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Section 41 habitats and species examples

Priority Habitats include:

- Ponds
- Arable Field Margins
- Hedgerows
- Traditional Orchards
- Upland Hay Meadows
- Coastal and Food plains
- Grazing Marsh

Priority Species include:

- Yellow hammer
- Reed Bunting
- Corn Bunting
- Grey Partridge (-87%)
- Lapwing (-58%)
- Skylark (-51%)
- Linnet
- Brown Hare
- Dormouse
- Greater Horseshoe Bat

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• The Birds of Conservation Concern 5 Red list

Grey partridge	Lapwing	Grasshopper warbler
Plumage *	Whimbrel	House martin *
Capercaillie	Curling	Wood warbler
Black grouse	Black-tailed godwit	Starling
Bewick's swan *	Ruff	Mistle thrush
White-fronted goose	Dunlin *	Fulmar
Long-tailed duck	Purple sandpiper *	Ring ouzel
Velvet scoter	Woodcock	Spotted flycatcher
Common scoter	Red-necked phalarope	Nightingale
Goldeneye *	Kittiwake	Whinchat
Smew *	Herring gull	House sparrow
Pochard	Roseate tern	Tree sparrow
Scup	Acidic skua	Tree pipit
Red-necked grebe	Puffin	Yellow wagtail
Stavonian grebe	Han harrier	Hawfinch
Turtle dove	Montagu's harrier *	Greenfinch *
Swift *	Lesser spotted woodpecker	Tit
Cuckoo	Merlin	Linnet
Comorant	Red-backed shrike	Redpoll
Leach's storm-petrel *	Marsh tit	Corn bunting
Balearic shearwater	Willow tit	Girl bunting
Shag	Skylark	Yellowhammer
Dotterel	Marsh warbler	
Ringed plover	Sav's warbler	

a - species on the Amber list previously, g - species on the Green list previously

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• The Birds of Conservation Concern 5 Amber list

Curlew	Common crane	Teal
Whooper swan	Oystercatcher	Osprey
Avocet	Avocet	Honey buzzard
Barnacle goose	Black-winged stilt **	Marsh harrier
Greylag goose	Grey plover	Sparrowhawk *
Fox goose	Red-throated plover	White-tailed eagle
Pink-footed goose	Turnstone	Kestrel
Fulmar	Red	Rock *
Red-throated merganser *	Culver sandpiper	Shorleek
Gadwall	Sanderling	Sedge warbler *
Garganey	Shrike	Yellow-throated warbler *
Gullin	Common sandpiper	Willow warbler
Goosander	Green sandpiper	Common whitethroat *
Widgeon	Spotted redshank	Dartford warbler
Mallard	Swamp sparrowhawk	Short-eared shearwater
Pintail	Red-throated	Wren *
Tail	Wood sandpiper	Dipper
Black-necked grebe	Black-headed gull	Song thrush *
Coot	Black-headed gull	Redwing
Woodcock *	Common gull	Partridge *
Nightingale	Lesser black-backed gull	Black redstart
Red-throated	Yellow-legged gull	Common redstart
Red-throated	Whinchat	Whinchat
Crane	Island gull	Dunlin
Black-throated diver	Common gull	Marbled gull
Great northern diver	Great black-backed gull	Water pipit
European storm-petrel	Little tern	Grey wagtail
Northern fulmar	Common tern	Bullfinch
Marsh shearwater	Acidic tern	Parrot crossbill
Scops owl	Sandwich tern	Scottish crossbill
Osprey	Great albat	Lapland bunting
Little bittern *	Black gull	Stone bunting
Cattle egret *	Redpoll	Red bunting
Great white egret **	Quail	
Shorebird	Shorebird	

* - species on the Red list previously, g - species on the Green list previously, n - not assessed previously

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Habitats and species of principal importance in England
List of priority habitats and species in England ('Section 41 habitats and species') for public bodies, landowners and funders to use for biodiversity conservation.

- Better habitats – restoration of 15% of degraded ecosystems
- Establish marine protected network
- Prevent manmade extinctions
- Engage people

Key Habitats:

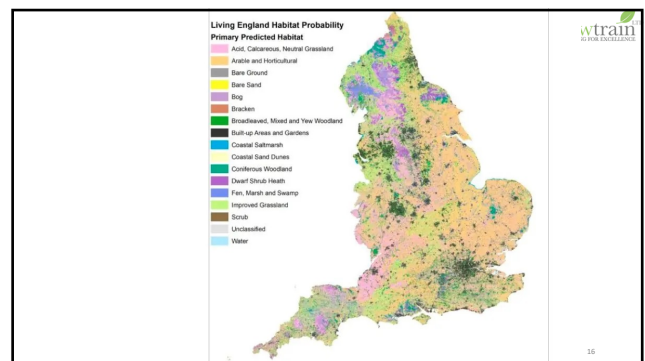
- Peatlands
- Waterways
- Hedgerows
- Meadows

Key Species:

- Lapwings
- Skylarks
- Yellow Hammer
- Grey Partridge

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Six Simple Steps for Managing Biodiversity on your Land

Monitoring

- Step 1 Identify habitats
- Step 2 Identify key species

Management

- Step 3 Manage farmland sympathetically
- Step 4 Be pro-active in your management of habitats

Enhancement

- Step 5 Enhance existing habitats and populations
- Step 6 Work with others

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Step 1 - Identify habitats

A habitat map can be the easiest way to do this and should include:

- Areas and sites on farm with statutory protection or designation.
- Areas and sites on farm where important species or populations are present.
- Lakes, ponds & watercourses.
- Semi-natural habitats (e.g. moorland, wetlands, lowland heath, species-rich grassland, broad-leaved woodland, forest etc.).
- Linear features (e.g. hedges, verges, fence lines, farm borders, field margins, walls, ditches, tracks etc.).
- Point features (e.g. in field trees, ponds etc.).
- Public rights of way.
- Archaeological or historical sites.

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Step 2 - Identify key species



- Identify four priority species to see growth, your conservation efforts around these.
- Ensure bees & other pollinators are monitored as well as soil biodiversity.
- Identify protected or priority species on land & any particular threats to these.
- Critical to monitor and track any invasive species on your farm
- Different species require different techniques for monitoring.
- Some species require a licence or specialist experience.
- Take photos, involve farm staff & local interest & biodiversity groups
- Link the species identified to your habitat map.
- Link information to wider initiatives such as Biodiversity Action Plans in your area.
- Conservation plans & around priority species will benefit further species.

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Step 3 - Manage farmland sympathetically



- Biodiversity affected by a wide range of factors.
- Changes to soil, water and air can have direct & indirect impacts on species.
- Manage these resources & minimise any negative impacts from agricultural activities.
- Reducing soil run-off from the land is important for water quality
- Soil particles can smother spawning grounds & hold phosphate and PPP.
- Sustainable soil management & good soil structure will reduce run-off & associated diffuse water pollution.
- Biodiversity provides a wealth of beneficial organisms.
- Use Integrated Pest Management techniques across farm to minimise chemical use.

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Step 3 - Manage farmland sympathetically



- Ensure appropriate and targeted application of narrow spectrum PPP
- Practices like min or zero tillage & returning OM to the soil feeds earthworms & other soils organisms.
- Rotations to include legumes plus giving some areas of farm over to flora and fauna.
- Avoid disturbing ground nesting birds when carrying out field operations by marking nests..
- Livestock & mixed farming systems has the potential to support varied & beneficial biodiversity.
- Manage grazing of sensitive habitats appropriately and include some fine leaved native grasses and legumes in your grassland.

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Step 4 – Be pro-active in management of habitats & species



- Biodiversity should be managed with outcomes – increase in species
- Have a 5 year action plan
- Get staff involved
- Know the species life cycle
- Follow best practice for margins, hedges & watercourses
- Ensure The Big Three are in place
- Manage invasive species – correctly identification
- Improve habitat – bat boxes – beetle banks – refuge for predators

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Step 5 - Enhance existing habitats and populations



- Improve existing habitats & ensure they fit with Landscape & Nature Conservation and Enhancement Plan
- Look at Innovative ways of managing & promoting biodiversity
- Aim for bigger, better & more connected habits
- Plan farm & inter farm connectivity with biodiversity
- Provide a biodiversity in habitat to improve ecosystems
- Look at micro habitats within field margins, hedges & ditches
- Set smart objectives to monitor biodiversity performance

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Step 6 - Work with others



- Working with others - max your understanding of the habitats and species.
- Conservation & biodiversity groups, neighbouring farmers & the local community.
- Staff are aware of Landscape & Nature Conservation & Enhancement Plan.
- Ensure advisers & contractors are aware of specific plans & overall aims.
- Farmers within catchment - improve water quality & health of biodiversity
- Local communities, host a farm walk, specialist experience
- Local schools, get them involved, aware, open farm sunday

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Habitat creation and management

- Even agriculturally improved grasslands, modifications can be made to improve the habitat for wildlife.
- Increasing plant diversity in productive swards results in a greater variation of sward structure, and this can be achieved by the inclusion of even just a couple of species other than ryegrass.
- Timothy, cocksfoot & red fescue generally suitable species.
- Adding legumes or herbs to sward can be more beneficial.

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Habitat creation and management

- Mechanical operations spreading, rolling, topping & harrowing can be particularly damaging to ground-nesting birds in the spring so, wherever possible, they should be timed before or after the breeding season in fields with breeding birds.
- Similarly, timing of mowing for silage is important.
- Early mowing, whether for hay or silage, can destroy eggs and chicks, so late mowing is preferable.
- Later mowing will also allow flowering, providing pollen and nectar sources for grassland invertebrates.

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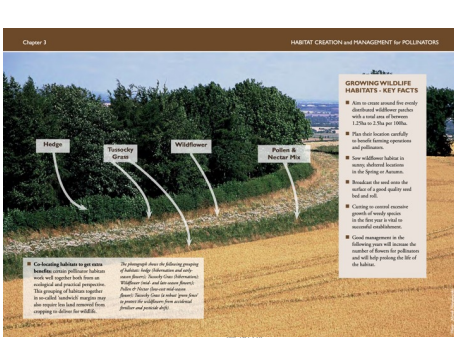


Habitat creation and management

- If some plants can be left to go to seed, this will provide food for birds late into the year, & even through the winter.
- Leaving uncut margins & corners in grass fields provides a refuge for wildlife from farm operations.
- Structural, tussocky areas are good habitat for voles and other small mammals, which are preyed upon by owls and kestrels.
- Invertebrates, including pollinators & other beneficial invertebrates, will also benefit from these uncut areas

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Habitat creation and management for pollinators

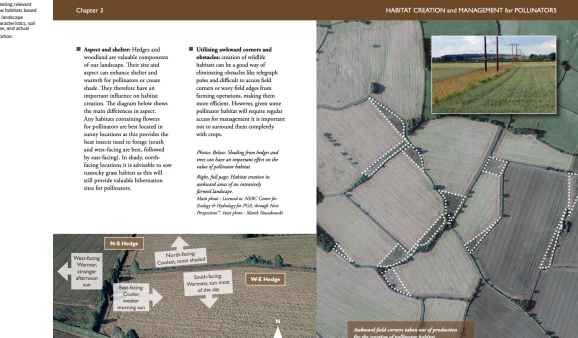
Chapter 3

GROWING WILDLIFE HABITATS - KEY FACTS

- Aim to create around five mostly different wildlife habitats with a total area of between 1.2ha to 2.5ha (10% of the farm).
- Place these habitats carefully in sunny, sheltered positions and pollinators.
- Some wildlife habitats are more sheltered locations in the spring or summer.
- Breakdown the seed into the soil of a good quality seed bed and soil.
- Creating a good seed bed will ensure the growth of many species in the long term and in seasonal conditions.
- Good management in the following years will ensure the number of flowers for pollinators and will help protect the life of the habitat.

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Habitat creation and management for pollinators

Chapter 3

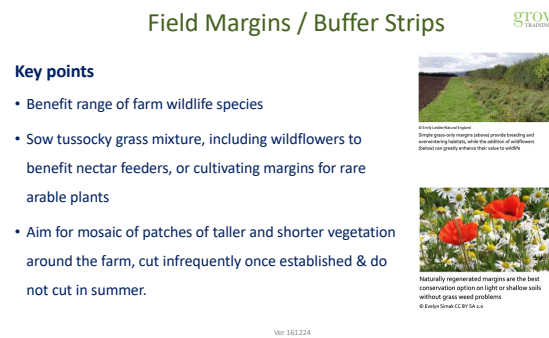
Aspect and shelter Hedges and woodlands are valuable components of our landscape. They are not only important for pollinators and other wildlife, but they also provide shelter and shelter from the sun and wind. They also provide shelter for pollinators and other wildlife.

Utilising reduced corners and sheltered areas These areas can be a good way of creating habitats for pollinators and other wildlife. They also provide shelter and shelter from the sun and wind. They also provide shelter for pollinators and other wildlife.

Planting Planting trees and shrubs can be a good way of creating habitats for pollinators and other wildlife. They also provide shelter and shelter from the sun and wind. They also provide shelter for pollinators and other wildlife.

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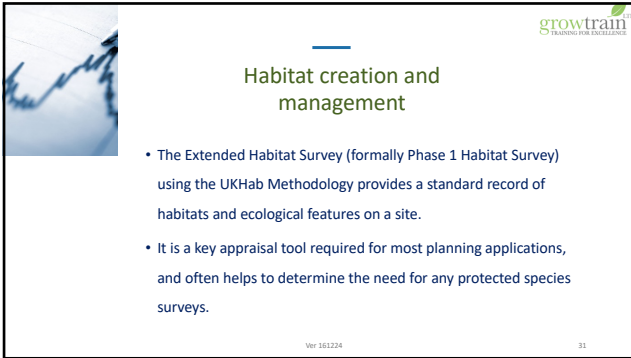
Field Margins / Buffer Strips

Key points

- Benefit range of farm wildlife species
- Sow tussocky grass mixture, including wildflowers to benefit nectar feeders, or cultivating margins for rare arable plants
- Aim for mosaic of patches of taller and shorter vegetation around the farm, cut infrequently once established & do not cut in summer.

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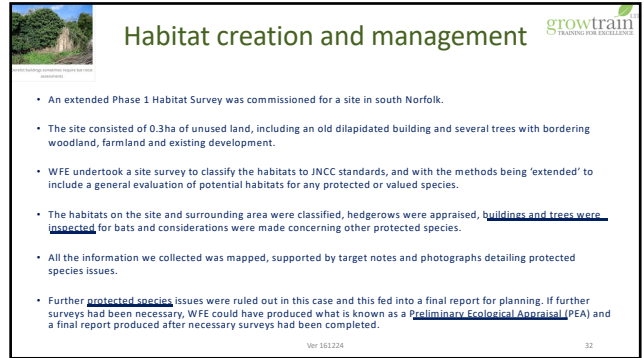


Habitat creation and management

- The Extended Habitat Survey (formally Phase 1 Habitat Survey) using the UKHab Methodology provides a standard record of habitats and ecological features on a site.
- It is a key appraisal tool required for most planning applications, and often helps to determine the need for any protected species surveys.

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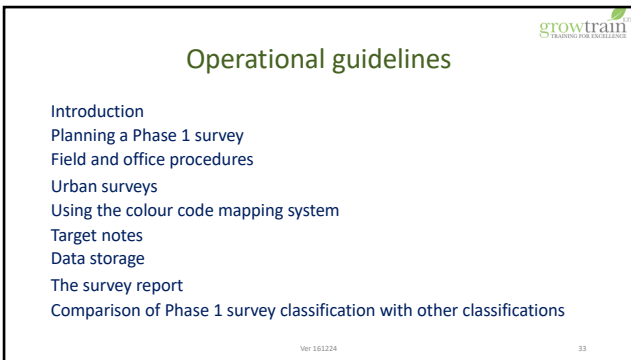


Habitat creation and management

- An extended Phase 1 Habitat Survey was commissioned for a site in south Norfolk.
- The site consisted of 0.3ha of unused land, including an old dilapidated building and several trees with bordering woodland, farmland and existing development.
- WFE undertook a site survey to classify the habitats to JNCC standards, and with the methods being 'extended' to include a general evaluation of potential habitats for any protected or valued species.
- The habitats on the site and surrounding area were classified, hedgerows were appraised, buildings and trees were inspected for bats and considerations were made concerning other protected species.
- All the information we collected was mapped, supported by target notes and photographs detailing protected species issues.
- Further protected species issues were ruled out in this case and this fed into a final report for planning. If further surveys had been necessary, WFE could have produced what is known as a Preliminary Ecological Appraisal (PEA) and a final report produced after necessary surveys had been completed.

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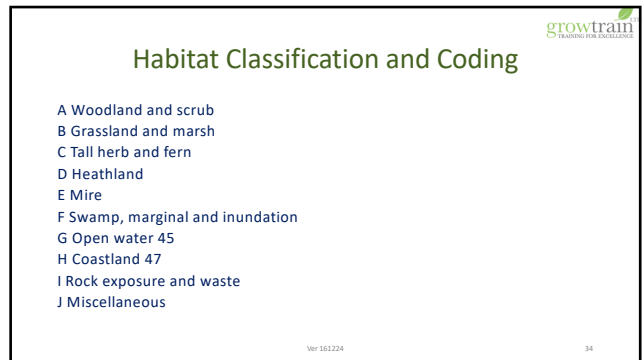


Operational guidelines

- Introduction
- Planning a Phase 1 survey
- Field and office procedures
- Urban surveys
- Using the colour code mapping system
- Target notes
- Data storage
- The survey report
- Comparison of Phase 1 survey classification with other classifications

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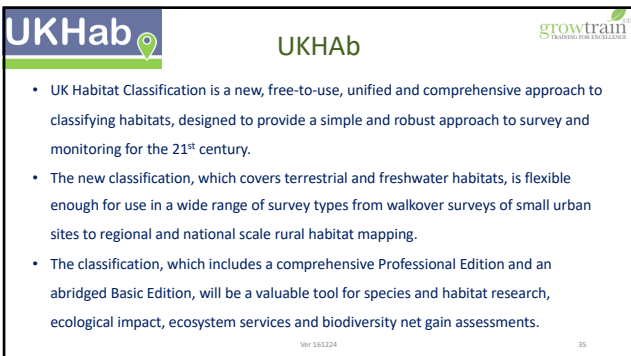


Habitat Classification and Coding

- A Woodland and scrub
- B Grassland and marsh
- C Tall herb and fern
- D Heathland
- E Mire
- F Swamp, marginal and inundation
- G Open water 45
- H Coastland 47
- I Rock exposure and waste
- J Miscellaneous

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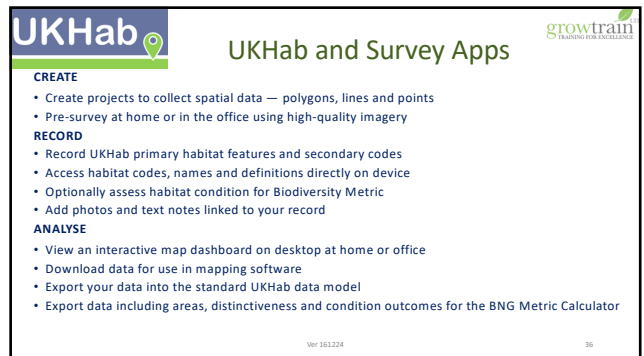


UKHab

- UK Habitat Classification is a new, free-to-use, unified and comprehensive approach to classifying habitats, designed to provide a simple and robust approach to survey and monitoring for the 21st century.
- The new classification, which covers terrestrial and freshwater habitats, is flexible enough for use in a wide range of survey types from walkover surveys of small urban sites to regional and national scale rural habitat mapping.
- The classification, which includes a comprehensive Professional Edition and an abridged Basic Edition, will be a valuable tool for species and habitat research, ecological impact, ecosystem services and biodiversity net gain assessments.

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UKHab and Survey Apps

- CREATE**
 - Create projects to collect spatial data — polygons, lines and points
 - Pre-survey at home or in the office using high-quality imagery
- RECORD**
 - Record UKHab primary habitat features and secondary codes
 - Access habitat codes, names and definitions directly on device
 - Optionally assess habitat condition for Biodiversity Metric
 - Add photos and text notes linked to your record
- ANALYSE**
 - View an interactive map dashboard on desktop at home or office
 - Download data for use in mapping software
 - Export your data into the standard UKHab data model
 - Export data including areas, distinctiveness and condition outcomes for the BNG Metric Calculator

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- Identify the main agri-environment options, for example pollen and nectar mix, wild bird seed mix, legume and herb rich swards, field corners, grass margins

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Hedgerows Trees

- Huge number of invertebrates available for birds (high protein for chicks) & bats
- Nesting hole for birds / small mammals
- Benefits will vary depending on the tree species – Oak / Conifer



A mature oak hedgerow tree
© Tree Council Image Bank, Hedgerisk

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The Complete Hedge

- Wide margins - strips or headlands
- Mature trees, shrub layer, base/bank, ditch
- Secure nesting, summer food (especially invertebrates) and winter food (especially berries and seeds) high protein and carbohydrates
- Vital habitat in farmed landscapes
- No one hedge can provide optimal requirements for all birds
- Can support a wide range of birds, including species that are *red-listed in the UK, such as grey partridge turtle dove, song thrush, tree sparrow, linnet, girl bunting & yellow hammer together with others like kestrel, rook and whitethroat make-up the 'Farmland Bird Indicator', used by Government to assess the success of its policies relating to farmland biodiversity.

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- Carbon sequestration
- Birds
- Shelter – nesting – predation avoidance
- Food – berries – seeds- nuts – fruit
- Beneficial and pollinator insects



A complete hedge
Photo: Rob Weston

- Key components for farm birds
- Mature Trees – Oak huge biodiversity
- Shrub layer
- Bank / Base A shaped
- Ditch
- Margin – buffer strips - headlands

- Planting mixed native species
- blackthorn – hawthorn – guelder rose hazel – rosa
- Linking landscape
- Cut– Jan/Feb - rotational 3 yr cycle providing winter food
- Height – varied 1.5 – 4m
- Rejuvenate – layering - coppicing
- Grey partridge 1.5m
- Turtle dove 4m +
- Song thrush 1.5m
- Tree sparrow
- Linnet
- Girl bunting
- Yellow hammer

Ref. The Complete Hedge Management Guide for Farmland Birds

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Boundary Features

Role of hedgerows:

- Among most important remaining areas of semi-natural habitat on lowland farmland.
- Many are ancient & of historical interest, & all hedgerows able to provide a host of resources for wildlife: food, shelter, nesting sites, refuge from farm operations and corridors across the landscape.
- A whole range of wildlife species, common as well as rare and declining, depend on hedgerows for their survival.

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Boundary Features

On going maintenance

- Hedgerows still lost but, over recent years, this has been due more to neglect or harmful management, particularly repeated annual cutting to the same height for many years, rather than grubbing out.
- Many remaining hedgerows are in poor condition.
- Main problems are excessive gaps, a structure that is too short or too thin (especially at the hedge base), or low fruit / berry production.
- Need to be rejuvenated through laying or coppicing, as well as cut on a rotation that allows growth and flowering,

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Benefits of Farm Hedgerows & Good Hedgerow Management

- Shelter & habitat for multiple species of mammals & insects
- Food for pollinators when in flower & seed and berries for birds in winter
- Corridor for wildlife to move around farm
- Contributes to biodiversity on farm
- Cut in Jan / Feb
- Only cut 1/3 of hedges each year
- Cut A shape
- Leave tussocky strip at base between hedge & crop or fence
- Larger hedges provide more nesting sites

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Hedgerows Management Summary



Tree hedges not more than once every three years to increase fruit supplies of bird hedges, hedges



Coppice hedges, probably due to being at same height for many years in low hedges, hedges

- Cut hedges on a rotation and do not cut more than once every three years
- Will allow growth and fruiting of hedge
- Aim for hedgerows of different heights around the farm
- Will provide a variety of suitable habitats for different birds and mammals

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Hedgerows Management Summary

- Lay or coppice hedges to rejuvenate them giving them a new lease of life
- Avoid repeated cutting to the same height
- Relaxing the cutting regime encourages a dense growth of healthy hedgerow stems



Heavily coppiced hedgerow
Laying a hedge in the old style in low hedges, hedges



Laying a hedge in the old style in low hedges, hedges

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Hedgerows Hedge Planting



Heavily flowered hedges provide nesting and pollen, and the berries provide food over winter
© Tom Hey, hedges

- Use mixture of native species, preferably those that are locally common
- Will provide the best food resources for wildlife, and fit best in the landscape
- Where possible, try to link areas of woodland, other hedges or semi-natural habitats
- Hedgerows can help wildlife move through the landscape from one patch of habitat to another

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Mixed native hedgerow –providing lots of variation of food for adult birds



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Hedge Components used by Farmland Birds

Mature/Emergent Trees	✓
Shrub Layer	✓
Bank/Base	✓
Ditch	✓
Margin	✓

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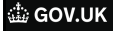
Endangered birds supported by hedges All Red List

- Grey Partridge
- Turtle Dove
- Song Thrush
- Tree Sparrow
- Linnet
- Cirl Bunting
- Yellow Hammer

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Hedge Regulations

Defra has said the following will be introduced:

2m buffer strip from the centre of hedgerows, with no cultivation or application of pesticides or fertilisers

Hedge cutting ban between:

1 March and 31 August to protect nesting birds.

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Importance of ditches

Wildlife
Water Management



High water quality benefits aquatic plants and invertebrates
© Peter Roworth/Natural England

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Ditch Structure



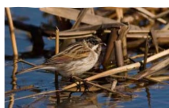
- Aim for a range of ditch bank profiles, steeper areas and shallower areas
 - *Species have different requirements*
 - Create some places where grazing animals can access ditches, but restricting access in others is also important
 - *Some cattle poaching can be very good for ditch wildlife, but water voles need dense bank vegetation and benefit from fenced areas*
 - Aim to have field margins and hedgerows next to ditches
 - *Provides a greater complexity of wildlife habitat and buffers the ditch*
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Ditch Management



recently cleared ditch with recovering vegetation
sally Shaw



- Clear ditches in autumn or winter on 3-5 yr rotation
 - *Will reduce disturbance to wildlife*
 - Clear on a little and often basis
 - *Leave areas from which species can re-colonise*
 - Leave some areas undisturbed at any one time
 - *Keep pesticides, fert. & other inputs away from ditches*
 - Water quality is crucial for wildlife
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CS Schemes in relationship to wildflowers & farm wildlife packages

- Encourage biodiversity of flowering plants to provide habitat & food for small mammals, beneficial insects & pollinators
 - Have 3 - 5% of land in management to encourage pollinators, farmland birds and other wildlife
 - Increases choice acceptance to schemes
 - Choice of 21 options which a few can be chosen
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Pollination - Key Facts

- Insect pollinators provide a valuable 'pollination service' for certain crops estimated to be worth £630 million annually to British agriculture.
- Bees visit flowers for nectar (sugar for flying) & pollen (protein for their young).
- Type of flower a bee visits is controlled by factors such as colour, shape, scent.
- Length of a bee's tongue determines the ability to gain flower access.
- Solitary bees transport dry pollen on their body, possibly making them more efficient pollinators than bumblebees and honeybees.

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Pollinators

- Small mammals sustaining ecosystem - produce natural resources by helping plants to reproduce
- Approx. 75% – 95% of all flowering plants need pollinators
- Without pollinators we would have food shortages
- Encourage pollinators enhancing habitats woodlands, flowering plants and hedgerows
- Reducing use of pesticides
- Field margins with wildflowers provide food and shelter

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Grassland

Five main types of semi-natural grassland in England:

- limestone (calcareous) grasslands,
- marshy grasslands
- acid grasslands
- lowland meadows and pastures
- upland hay meadows

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Chalk downland

- Chalk downland is often unsuitable for intensive agriculture nutrient- poor, shallow soil & difficult slopes.
- For this reason it has often survived uncultivated; however, its shallow soil structure makes it extremely fragile & easy to destroy.
- Decline of extensive grazing has meant that many areas of downland have reverted to scrub or other less rare habitat.
- Chalk downland needs to be managed carefully to safeguard unique flora and fauna.
- Ideal grazing regimes create varied turf structure with some short and some tall areas, with the precise level of grazing depending on the interests of the site.




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Acid grasslands

- Acid grasslands are less well known than lowland meadows or limestone grasslands.
- They tend to occur as mosaics with lowland heathland.
- The tussocky vegetation and bare ground that characterise lowland acid grassland allow a wide range of invertebrates to thrive including solitary wasps, butterflies and moths
- In some areas, such as Breckland, soil disturbance is an important part of conservation management to help these species thrive.

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Lowland hay meadows

- Lowland hay meadows that are rich in wildflowers are a rare and irreplaceable habitat.
- Closing fields off from grazing livestock allows broad-leaved plants to flower and seed, providing summer food for seed-eaters like linnets, and nectar & pollen for insects.
- The continuation of haymaking provides a greater diversity of wildflowers, habitats for insects and mammals, and food for birds.

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Managing grassland

- Managing grassland with low or very low inputs, soil erosion & run off from the farm can be reduced.
- Permanently grassed areas will slow down the flow of water on natural drainage pathways & reduce the channelling of runoff water, which can produce rills and gullies.
- Grassland managed or retained with little or no fertiliser has a greater value to wildlife, such as butterflies and bees, and will sustain a wider variety of plants.
- Permanent grassland is also an important historical feature demonstrating how farming has shaped our landscape over the centuries.

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Wet grassland

- Highly valuable habitat for range of plant and animal species.
- Important for wintering and breeding wildfowl and waders.
- Support a rich variety of other wildlife, including dragonflies and damselflies, water beetles, and wetland vegetation.
- Usually managed by grazing, mowing, or both, and timing of management, intensity and frequency, influence the habitat.
- Some species-rich wet grasslands, such as floodplain meadows, have been managed in the same way for hundreds of years, and care should be taken not to change this.

Wet grasslands are vital for birds such as waders
© Chris Lawrence / iStockphoto.comCattle grazing is often used to manage wet grasslands
© Peter Greenhouse / iStockphoto.com

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Grassland



Key principles behind different grazing regimes,

- extensive grazing – greater diversity of habitat conditions for flora and fauna
- mob grazing - all plants get nibbled, leads to greater diversity in plant species.
- differences between key livestock types and how they graze,
- Large herbivores such as cows can trample vegetation and take larger, less-specific bites when grazing, whereas smaller ruminants such as sheep are much more selective and less heavy footed
- impact they can have on sward structure composition
- different timings of grazing.

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Grassland



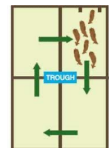
- potential benefits & impacts of livestock
- grassland management systems on soil health,
- soil structure and soil biology,
- the subsequent influence on water quality and carbon sequestration.
- different leys can influence soil health and livestock production.
- use of specific agri-environment options for grassland farming systems.

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Rotational Grazing



- Common approach to sustainable grazing.
- Involves the division of a large pasture into two or more smaller paddocks, and the grazing between them is in a planned sequence.
- The herd grazes in some paddocks, the other paddocks have a chance to rest and regenerate.
- Often, rotational grazing reduces to shifting animals from one paddock to another based on time schedules rather than in response to forage regrowth rates.

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Strip Grazing

- Involves a movable electric fence that helps guide and push cattle along a strip of land.
- Can make the forage last longer because you can make them graze what you want them to feed for a short period.
- Usually, no back fencing is in place for this type of grazing, so farmers will start in an area nearest to the water source to reduce waste.

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Continuous Grazing

- Animals have access to a particular land area without restrictions or interruptions throughout an entire year or just part of the grazing season.
- Mimics natural grazing, which is part of regenerative agriculture.
- All of the gates in the farm are open for all herds to eat forage as they please.
- This can encourage livestock only to eat the best forage possible, which is why this grazing method is often used for racehorses and dairy cows.

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Creep Grazing



- Works best if you have both smaller and larger livestock, like a herd of sheep or goats and cattle.
- It also works well for a mixture of younger and older livestock.
- The smaller and younger animals have access to a higher quality pasture utilizing a small creep gate.
- This especially helps younger animals supplement their mother's milk, reducing energy requirements for the mother cows.

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Forward Grazing

- Forward grazing involves two groups of livestock in one paddock, one group directly following the other.
- The first group usually consists of animals with higher nutritional requirements, like growing calves and animals with dietary needs.
- This allows the first group to forage more selectively.
- The second group follows the first and has lower nutritional requirements.
- They feed on any leftovers from the first group.

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Mob Grazing

- Method of ultra-high-density grazing that involves a large concentration of animals grazing a specific, small area for a short time.
- Animals moved between regions multiple times per day with more extended rest periods.
- Farmer allows the animals to graze the paddocks up to three times per year, and animals are forced to eat everything.

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Mixed Grazing

- Mixed or multi-species grazing, allows livestock of different species to graze together on the same pasture either as one herd or using the forward grazing method.
- Different types of livestock enjoy different types of forage.
- A way to control weeds and other undesirable plants that cattle or horses may not eat.
- Increases the utilization of the land.

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Grazing Sustainably

Know your land & livestock forage requirements & find a balance between the animals, soil and plants.

- Rotating pastures, allowing grazing areas to renew, building native grass populations and supplementing with feed.
- Find what works best for you, your livestock & your land to make it the most sustainable, efficient and productive.

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Grassland



grassland production systems:

- haymaking
- silage production
- benefit the environment
- potential environmental impacts can be minimised.

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Beetle Bank

- A raised ridge between 3 – 5m wide and 0.4m high
- Covered in dense tussocky cover – (Timothy, Cocks Foot)

Purpose:

- Provides nesting and foraging habitat for insects, bumble bees, small mammals, farmland birds

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How to create a Beetle bank



- September best month to establish grass sward which forms a beetle bank.
- Plough furrows that point towards each other from either side during cultivation of the field to create a raised bank of about 0.4 metres along the plough line.
- The headland at each end of the beetle bank can remain cropped.
- Ensure grass mix includes a high % of tussock-forming species.
- All species should be of native origin.
- Broadcast seed immediately after cultivation to get good establishment.
- 3 cuts may be necessary in first summer, when sward reaches 10 cm in height.
- This encourages grasses to tiller and helps control invasive annual weeds.
- Once established, only cut the grass strips in order to get the dead tussocks to regenerate.
- This is likely to be no more than once every three years.

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Species



- Habitat – Shelter – Nesting – Safety against predation
- hedges – banks – buffer zone – trees – uncropped sections – grass leys – hay meadows – marsh / wetlands – ditches - beetle banks
- Food Source – summer – winter – high protein for chicks –
- Seeds – fruit – nuts – insects – nectar rich flowers -

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Grey Partridge



- Tussocky field margins / verges / beetle banks
- Usually found in open farmland
- Chicks feed exclusively on insects
- Avoid use of insecticides to protect insect population

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Brown Hare

- Like wide open spaces
- Long grass and hedges for cover
- Eat young shoots such as grass
- March - April, boxing & chasing each other on open fields.
- Prefer mix of arable and grassland fields, some woodland, a mixture of vegetation height, and some large uniform fields.
- More common in eastern counties, and on arable farms.
- Number of funding options benefit hares

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Brown Hare Management Summary Arable



- A mix of crops such as wheat and beet, with some grass is good for hares. Overwintered stubbles are especially valuable.
Hares can find food and cover at different times of year.
- Beetle banks or strips of grass across arable fields are valuable, also taking field corners out of management
Provide extra cover for hares
- Plant game cover and wild bird seed crops
Helps provide food and cover for hares and other wildlife

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Brown Hare Management Summary Grassland

- Try to leave some areas uncut and/or ungrazed
Provides areas for leverets to hide
- When making silage, cut from the field centre outwards
Allows hares to escape the farm machinery

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Brown Hare Management Summary Landscape

- Hares thrive in mix of arable and grass fields and non-cropped areas such as small woodlands
Provides food and cover for hares throughout the year

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Dormouse




- Wide hedgerows, infrequently cut, will benefit small mammals
- Grassy field margins and ditches provide food and cover
- Hedgerows and margins linking areas of woodland are especially valuable
- Reducing pesticides within the crop, as in conservation headlands, helps small mammals

©Rak-Wolton, Hedgerink
The hazel dormouse (above) needs mature hedgerows and species-rich woodland for foraging and building nests (below)

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Water Voles & Otters




Key points

- Dependent on freshwater habitats such as rivers, streams and ditches
- Water vole conservation focuses on improving bankside habitats and controlling the non-native American mink
- Otters need high quality river environments

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Birds



- Wide hedgerows, infrequently cut, will benefit small mammals
- Grassy field margins & ditches provide food and cover
- Hedgerows & margins linking areas of woodland are especially valuable
- Reducing PPP in crop, in conservation headlands, helps small mammals
- Farmland birds are continuing to decline
- Need safe nesting habitat, summer food and winter food (provided by seed and insect-rich areas): these are often referred to as the 'big three' for farmland birds.
- Range of measures, supported by agri-environment scheme funding, can help provide these requirements

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Birds



Management summary

	Key habitats	Potential benefits
Non-cropped habitats and grassland	• Field margins • Hedgerows • Woodland and scrub	- Tussocky and wildflower-rich margins enhance invertebrate numbers and seed supplies - Provide fruit, seed and invertebrate food, shelter and nest sites - Coppiced woodland and woodland edge habitats are important for farmland birds
Cropped areas	• Grassland • Wetland features • Wild bird mixes • Overwinter stubbles • Conservation headlands • Skylark plots	- Where possible, manage to increase seed and invertebrate food - Rich sources of plant and invertebrate food - Provides food for seed and invertebrate feeding birds - Helps supply seed for birds over winter - Increases seed and invertebrate food - Creates accessible foraging areas for skylarks in winter cereals

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Lapwings

- Nest on bare ground with short vegetation
- Eat worms, snails, spiders.
- Chicks feed on small snails, insect larvae
- Like area of damp grassland



Wet grasslands are important for lapwing
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Skylarks

- Nest in arable crops - need bare areas to land
- Nest in vegetation 20 – 50cm high
- Chicks feed on insects & spiders
- Adults eat insects & spiders in summer & weeds & crop seeds

Include spring cereals in rotation:

- Create skylark plots
- Beetle Banks
- Weedy overwintered stubbles

What funding is available ?



Follow plots encourage skylarks
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Bats

Key points

- Have complex needs, & different species have different requirements
- Important habitats for bats are water, woodland, grassland & linear features such as treelines
- Protecting these habitats safeguards bat roosting, commuting and feeding areas



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Bats Management Summary Water Bodies

- Ponds, ditches, streams and rivers are all important

Many bats feed or rely on emergent aquatic invertebrates.

- Both shaded and open parts of ponds and rivers are valuable

Different bat species prefer to hunt in different ways

- Manage for a range of vegetation types

Will encourage abundant invertebrate prey



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Bats Management Summary Woodland

- Ancient woodland is especially important – keep old trees
- Provides roosting and foraging opportunities for many bats*
- Avoid clear-felling, coppice on long rotation where coppicing is traditional management
- Some rarer bats are predominantly woodland species*
- Rides, glades and clearings are valuable woodland features



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Bats Management Summary Grassland

- Cattle grazed pasture especially important
- Encourages a rich insect fauna for bats to feed on*
- Reduce inputs and vary vegetation height and structure; retain hedgerows



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Bats Management Summary

Treelines, hedgerow trees & tall hedges

- Retain treelines, protect hedgerow trees, allow hedges to grow tall
- Linear features are important for helping bats move through the landscape, and can be rich feeding areas*



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Approaches to cross taxa advice



See handout for details

Write a short answer on how you would advise a client on this

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Species Best practice for vermin control

IPM Hierarchy::

Know your pest

- Remove food source
- Remove Water
- Remove harbourage
- Block up access
- Encourage predation
- Live traps
- Snap traps
- Baiting – follow the CRRU – Qualification – Assurance Scheme

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Species

Identify a range of important non-native invasive species and demonstrate an understanding of the threats they pose and main management control methods for key examples.

- Box Tree Moth £15.4m
- Cockroaches £70
- Hymenoscyphus fraxineus £883.5m
- Japanese Knotweed £246.5m
- Varroa mite £22.5m
- Deer £63m
- Rabbits £260m
- Grey Squirrel £40.5m
- Rat and mice £84m

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Why commensal rodents need to be managed

- Damage – buildings – electrics - equipment
- Diseases – Leptospirosis (Wells disease) Rat Urine see handout
- Food spoilage / contamination - Salmonella
- Damage to crops
- Prevention of Damage by Pest Act 1949 see legislation
- Public Health Act 1936 and 1961
- Food Safety (General Food Hygiene) Regulation 2006
- Health & Safety at Work Act 1974

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Farmers' four options for rodent control:

- Membership of a stewardship-approved farm assurance scheme
- Do training, pass an exam, get your own proof of competence.
- Employ a qualified pest control contractor...CRRU Wildlife Aware qualified
- Use products permitted for 'amateur use' (max 300g units lower % ai)

• Permanent baiting 'just-in-case' is NOT allowed.

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CRRU Code
(Campaign for Responsible Rodenticide Use)

7 point code is:

- Always have a planned approach
- Always record quantity of bait used and where it is placed
- Always use enough baiting points
- Always collect and dispose of rodent bodies
- Never leave bait exposed to non-target animals and birds
- Never fail to inspect bait regularly
- Never leave bait down at the end of the treatment

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Wildlife Incident Investigation Scheme (WIIS)

- Plays a key role in investigating the effects of pesticides on animals and environment.
- Investigates around 150 cases /yr, over a third of these attributed to pesticides.
- In many cases, the pesticides have not been correctly used and may result in enforcement action, such as a criminal prosecution.
- In these cases, the team can provide expert witness statements.

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Wildlife Incident Investigation Scheme (WIIS)

➤ Badger	24
➤ Barn Owl	220
➤ Buzzard	196
➤ Cat	77
➤ Crow	26
➤ Dog	23
➤ Fox	100
➤ Peregrine	20
➤ Pigeon	21
➤ Red Kite	97

Birds of prey & owls

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