



Research Report No.638

**Review of the Sites of Special
Scientific Interest (SSSI) Selection
Guidelines for Breeding Bird Assemblages**

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1. BACKGROUND

The existing guidance specification for the selection of SSSIs for birds (NCC 1989) includes the quality of the breeding bird assemblages of different habitats occurring in Britain. This guidance was based, to some extent, on *Bird Habitats in Britain* (Fuller 1982) and, at that time, the BTO Register of Ornithological Sites. Bird populations, distribution and habitat preferences have changed greatly since 1989 and the current breeding bird assemblage guidance is no longer entirely suitable for SSSI selection. All elements of the guidance required reviewing and updating, including habitat definitions, component species and resulting 'threshold scores' for each habitat. The process for calculating 'threshold scores' for assessing the quality of the breeding bird assemblage within any particular habitat type is described in section 4.

In this document we update the breeding bird assemblage guidelines using the latest available information for all relevant bird species. The details include the most recent estimates and information for Great Britain on population size, distribution and habitat requirements. All data sources and methods used to update the guidelines are described. Tables are produced for each habitat showing the component species, amended species rank scores based on their current population size and the suggested overall threshold scores required for individual site designation. Entirely new guidelines are created for breeding bird assemblages of lowland farmland (arable, grassland and mixed) and upland in-bye (e.g. rough pastures, pastures and meadows) and Welsh fridd habitats which tend to be mosaics of bracken, grassland and scrub.

2. RATIONALE

The following approach was used in preparing the revised assemblages and threshold scores:

Habitats were defined as closely as possible, including reference to relevant National Vegetation Classification (NVC) communities where appropriate. Species for each habitat were selected on the basis of their current distribution from the most recent national bird atlas work, and based on known habitat preferences. The latest national population estimates (Musgrove et al 2013), were used to rank each species and list those which score 1-6 according to the order of magnitude of their population size (method outlined in section 4 below). The threshold score for each assemblage was re-calculated to provide an index value (referred to subsequently as 'threshold scores') by which sites would be designated if achieving that score or above, for the assemblage of birds recorded there. The method used was the same as that used in 1989, for consistency (section 4). That said, a number of scores for assemblages calculated in 1989 did not tally exactly with the method described below and there was no indication of the rationale used to modify their values. The new scores for 2012 are therefore generally higher than the old scores, even where the assemblage of species was not changed. The method was applied to the original habitat bird assemblages with new species added or omitted according to their current range distributions and habitat preferences. The process was applied also to new assemblages compiled for lowland farmland, in-bye and scrubland habitats. The scrub assemblage required a closer definition relative to the original generic category, to assess its suitability for sub-categorisation in designating SSSIs. Also, the species list for scrub required significant modification.

3. DEFINING HABITATS

The original suite of habitats selected for inclusion in the guidance specification is summarised below. Revision or amendments were made to each of the habitat categories to reflect up-to-date knowledge of the status, distribution and habitat preference of the bird species involved. In some cases, this has meant new species being added to the assemblages and in other cases, species being removed. In all, 14 assemblage categories were defined and compiled. Within the definitions, reference to the National Vegetation Classification (NVC) is given where appropriate. It is recognised that bird species distributions or bird assemblages do not readily 'map' onto the NVC system. Nevertheless, it was desirable that cross-reference was made to the NVC where possible, to assist habitat category definition.

The habitat categories are defined as follows:

Sand-dunes, saltmarshes and shingle (this should include birds breeding on sandy and shingle beaches and spits and also coastal scrub, such as sea buckthorn or elder).

Lowland damp grasslands: including coastal grazing marshes.

Lowland Fen without open water: generally relates to Phragmites swamp, reedbed and tall herb and relatively base-rich fen or wetlands (NVC types S4, S24, S25, S26). Note that where in combination with open water it is better to use the following lowland open water habitat instead. Typically below 300m altitude.

Lowland open water and their margins: includes reservoirs, gravel pits, natural lakes, pools and other relatively base-rich open water bodies; should include species associated with marginal reedbed and wetland scrub/trees.

Northern wetlands: largely relevant to low lying land in Scotland generally below 300m with lochs and lochans and, where appropriate, associated rivers, including flows, the Hebrides and coastal wetlands. Relatively base-poor wetlands including open mire, flows, with scattered pools, as well as larger water bodies.

Upland moorland with waterbodies: largely relevant to Scotland This category was formerly known as 'Upland moorland and grassland with water bodies' but largely refers to the complex and variable, unenclosed moorland, grassland and blanket bog where waterbodies can intergrade into the habitat mosaic; environments generally above 300m.

Upland moorland without waterbodies: unenclosed land including dwarf shrub heath, wet heath, blanket mires, scrub, grassland and bracken, generally above 300m.

Montane grassland and heaths: largely relevant to Scotland, on the higher altitude hill and mountain tops (NVC, H13, H14, H15, H17, H19, H20).

Lowland heath: largely relevant to southern England and Midlands, at least 10% cover heather, generally less than 300m altitude (NVC H1-6, H8, H9, H10, H12, M16). The category includes heathland scrub (e.g., gorse, broom and birch).

Woodland: all woodland types including willow carr, alder, birch (not on heath), ash-oak woods, beech, mixed woods with some conifers and pine forest/plantation (not on heath) (NVC W1-18).

Includes the Scottish Caledonian pine woodland with a relatively distinctive bird fauna and for which a separate threshold score is calculated.

Scrub: a transitional component of woodland covering a very wide variety of contexts and compositional and structural forms. Open scrubland can support different bird species to dense thicket and the plant species composition of scrub can also influence the bird species assemblages in a broadly definable way (Fuller 2012). Fuller (2012: Appendix E5.1) identifies the following seven categories of 'shrubland' (including scrub) with distinctive bird assemblages:

- Northern upland scrub: principally birch and/or juniper and heather relatively poor in birds.
- Western upland scrub: upland margins in Wales & S-W England, mainly with gorse, heather and bracken.
- Lowland heathland scrub: gorse and heather mixtures.
- Lowland hawthorn scrub: hawthorn dominated, typified by high densities of warblers, plus finches and buntings.
- Lowland blackthorn scrub: dense blackthorn may support higher densities of thicket species such as Nightingale and Lesser Whitethroat but otherwise similar to lowland hawthorn.
- Wet scrub: (willow, elder) may support Sedge and Cetti's Warbler and Reed Bunting.
- Coastal dune scrub: mainly buckthorn, hawthorn and elder with warblers and finches

In this document, we combine the lowland hawthorn and blackthorn dominated definitions into a single generic lowland category (similar to NVC categories W21 and W22 combined), where the composition of the species found will tend to reflect variation in structure rather than shrub-species composition. In addition, scrub is also a component of other habitat mosaics affected by the context in which it grows. Thus, coastal dune scrub (Fuller 2012) is covered under the 'Sand dunes, saltmarshes and shingle' habitat category. Wetland scrub (Fuller 2012), is covered by the 'Lowland waters and their margins' category. Birds associated with heathland scrub are covered under the 'Lowland heathland' assemblage category.

'Ffridd' refers to a variable mosaic of scrub, grassland, heathland and bracken. Ffridd is treated as a separate category to other forms of scrub, since it is a well-recognised element of the Welsh marginal uplands, which does not fit well with any other assemblage categories.

Farmland assemblages:

Lowland farmland: refers to arable and grass fields, hedgerows and other non-farmed habitats (eg ponds and ditches) that in many areas is a predominant form of land use. The assemblage therefore includes in-field species, using crops, fallows & grassland, and field boundary species, using field margins, ditches, hedgerows and mature trees within hedgerows. For farm woodlands *per se* it is better to refer to the 'woodland' assemblage.

'In-bye land': refers to marginal-upland farmland, mainly of enclosed rush-dominated, grass and/or arable fields that may include areas of improved or unimproved grassland. Uncultivated field corners and field margins, such as water margins and hedgerows, within this area are included as 'in-bye'. Fields are bounded by walls and fences and, less frequently, by dykes or hedges, and used to provide for winter feed such as hay, silage or oats, or sheep and cattle grazing.

4. CREATING SPECIES ASSEMBLAGES AND CALCULATING HABITAT THRESHOLD SCORES

Breeding bird assemblage guidelines.

The lists of birds of different habitats presented below is based on Bird habitats in Britain (Fuller 1982) with updates added from current knowledge of the species' abundances via the Avian Population Estimates Panel (APEP 2012) and distributions (2007-2011 National Bird Atlas). Each species assigned to a particular habitat will be strongly characteristic of the habitat though not necessarily restricted to it. All species are given an index of abundance from 0 to 6, which refers to the total number of breeding pairs in Britain, as follows:

- 0 >1 million
- 1 100,000 - 1,000,000
- 2 10,000 - 100,000
- 3 1,000 - 10,000
- 4 100 - 1000
- 5 10 - 100
- 6 1-10

Where the population of a species falls on the border of two classes, an intermediate value may be given (e.g. 2.5). The species list for each habitat is made up as follows. All species characteristic of the habitat and with indices of abundance of 4 to 6 (i.e. with a total British population less than 1,000 pairs) are included. Also included are more abundant species which are either primarily associated with this habitat or are associated with more than one habitat, some of which are particularly threatened by habitat change (e.g. drainage of wetlands or loss of heath or scrub). All species of index 0 (i.e. with more than 1 million pairs) are omitted from the assemblage lists.

The index value for a site is calculated by summing the indices of abundance for species breeding in it. A species may be included if it has been recorded as probably breeding in a majority of recent years for which information is available. Species regularly using a site for essential activities (such as feeding) while breeding may be included even if they nest outside the site. Species which rarely or never breed in a habitat but which depend on it for foraging are indicated for each habitat category. To qualify, the index value for a site should exceed the threshold value given for the relevant habitat.

The threshold values were derived as follows. For each habitat, the theoretical maximum score which could be obtained for those species with indices of 1 to 4 was calculated. Those species with scores of 5 and 6 were excluded, as these species with British populations of less than 100 pairs are generally very restricted in geographical distribution. (In fact, this applies also to many species with an index of 3 or 4). Although species with indices of 5 and 6 are excluded in the calculation of threshold values, any such species must be included in the calculation of a site index, as few, if any, will be present at any one site and inclusion allows the required added importance to be given to the sites used by these rarer species. Even with these rare species included, it is most unlikely that the theoretical maximum score would be achieved at any site because species from all parts of Britain and all subdivisions of the general habitat category concerned are included in its calculation. For most habitats, a site reaching half the theoretical maximum as calculated above would be an especially good example of the breeding bird community. Thus, it is this *half-maximum value* which is the threshold given for each habitat, with the following exception. For woodland, *two-thirds of the theoretical maximum* is taken as the threshold: this is because of the exceptionally large number of mainly passerine species that are fairly widespread and numerous but nevertheless characteristic of woodland. The differences in distribution patterns shown by birds make the provision of national values difficult. For some habitats, different values are given for different parts of Britain to make

some allowance for this. Even if a single threshold level is given, this may allow for the absences of some species in some parts of the country. It is of course impracticable to make the very fine geographical divisions which biological purists might suggest. No list is provided for certain habitats (e.g. cliffs). In these cases, it is envisaged that other selection criteria (e.g., population size) will be more relevant.

5. BREEDING BIRD ASSEMBLAGES OF DIFFERENT HABITATS AND THEIR THRESHOLD SCORES

Sand dunes and saltmarsh

Species	Abundance 2012
Shelduck <i>Tadorna tadorna</i>	2
Eider <i>Somateria mollissima</i>	2
Red-breasted Merganser <i>Mergus serrator</i>	3
Montagu's Harrier <i>Circus pygargus</i>	5
Little Egret <i>Egretta garzetta</i>	3
Oystercatcher <i>Haematopus ostralegus</i>	1
Ringed Plover <i>Charadrius hiaticula</i>	3
Lapwing <i>Vanellus vanellus</i>	1
Dunlin <i>Calidris alpina</i>	3
Snipe <i>Gallinago gallinago</i>	2
Black-tailed Godwit <i>Limosa limosa</i>	5
Curlew <i>Numenius arquata</i>	2
Redshank <i>Tringa totanus</i>	2
Black-headed Gull <i>Chroicocephalus ridibundus</i>	1
Common Gull <i>Larus canus</i>	2
Little Tern <i>Sternula albifrons</i>	3
Sandwich Tern <i>Sterna sandvicensis</i>	2
Common Tern <i>Sterna hirundo</i>	3
Arctic Tern <i>Sterna paradisaea</i>	2
Roseate Tern <i>Sterna dougallii</i>	5
Cuckoo <i>Cuculus canorus</i>	2.5
Short-eared Owl <i>Asio flammeus</i>	3.5
Grasshopper Warbler <i>Locustella naevia</i>	2
Sedge Warbler <i>Acrocephalus schoenobaenus</i>	1
Stonechat <i>Saxicola rubicola</i>	2
Wheatear <i>Oenanthe oenanthe</i>	1
Rock Pipit <i>Anthus petrosus</i>	2
Linnet <i>Carduelis cannabina</i>	1
Reed Bunting <i>Emberiza schoeniclus</i>	1
Threshold score:	26

For this assemblage, Little Egret was added due to its rapid range expansion across the UK, especially England and South Wales but now also reaching southern Scotland in small numbers. The species forages extensively over saltmarshes though it does not breed there. From the original assemblage, Corncrake and Whinchat were removed, being largely considered a grassland species and not necessarily using coastal locations except perhaps on passage. Corn Bunting is also excluded as this habitat is very unlikely to be a primary habitat for this species.

Lowland damp grassland (including coastal grazing meadows and marsh)

Species	Abundance 2012
Mute Swan <i>Cygnus olor</i>	3
Shelduck <i>Tadorna tadorna</i>	2
Gadwall <i>Anas strepera</i>	3.5
Teal <i>Anas crecca</i>	3
Pintail <i>Anas acuta</i>	5
Garganey <i>Anas querquedula</i>	5
Shoveler <i>Anas clypeata</i>	4
Pochard <i>Aythya ferina</i>	4
Grey Heron <i>Ardea cinerea</i>	2
Little Egret <i>Egretta garzetta</i>	3
Marsh Harrier <i>Circus aeruginosus</i>	4
Corncrake <i>Crex crex</i>	3
Lapwing <i>Vanellus vanellus</i>	1
Ruff <i>Philomachus pugnax</i>	6
Snipe <i>Gallinago gallinago</i>	2
Black-tailed Godwit <i>Limosa limosa</i>	5
Curlew <i>Numenius arquata</i>	2
Redshank <i>Tringa totanus</i>	2
Cuckoo <i>Cuculus canorus</i>	2.5
Grasshopper Warbler <i>Locustella naevia</i>	2
Sedge Warbler <i>Acrocephalus schoenobaenus</i>	1
Yellow Wagtail <i>Motacilla flava</i>	2
Reed Bunting <i>Emberiza schoeniclus</i>	1
Threshold score:	23

For this assemblage, Little Egret was added due to its rapid range expansion across the UK, especially England and South Wales but now also reaching southern Scotland in small numbers. The species forages extensively over wetland habitats though it does not breed there. Grey Heron was added as it also frequents the habitat for foraging purposes only. Pochard was added, as this species may nest among the fringing vegetation of channels and ditches. From the original list, Quail, Short-eared Owl and Whinchat were removed as none of these species was considered to be dependent on lowland damp grassland for either breeding or foraging.

Lowland fen without open water (Includes reed-beds and relatively base rich fen typically below 300m altitude. Where this habitat occurs in combination with open water, use the lowland open water list)

Species	Abundance 2012
Gadwall <i>Anas strepera</i>	3.5
Teal <i>Anas crecca</i>	3
Garganey <i>Anas querquedula</i>	5
Shoveler <i>Anas clypeata</i>	4
Pochard <i>Aythya ferina</i>	4
Grey Heron <i>Ardea cinerea</i>	2
Bittern <i>Botaurus stellaris</i>	5
Little Grebe <i>Tachybaptus ruficollis</i>	3
Marsh Harrier <i>Circus aeruginosus</i>	4
Water Rail <i>Rallus aquaticus</i>	3
Spotted Crake <i>Porzana porzana</i>	5
Snipe <i>Gallinago gallinago</i>	2
Crane <i>Grus grus</i>	5
Cuckoo <i>Cuculus canorus</i>	2.5
Bearded Tit <i>Panurus biarmicus</i>	4
Cetti's Warbler <i>Cettia cetti</i>	3
Grasshopper Warbler <i>Locustella naevia</i>	2
Savi's Warbler <i>Locustella luscinioides</i>	6
Sedge Warbler <i>Acrocephalus schoenobaenus</i>	1
Marsh Warbler <i>Acrocephalus palustris</i>	6
Reed Warbler <i>Acrocephalus scirpaceus</i>	1
Reed Bunting <i>Emberiza schoeniclus</i>	1
Threshold score:	21

Montagu's Harrier and Whinchat were removed from the original list since neither species is now especially associated with fen habitat. Grey Heron was added as it frequents reed beds as a foraging habitat. Crane was added since it breeds in wetland mosaics and is re-establishing breeding populations across Britain. As confirmed breeding species, Savi's and Marsh Warbler are the only species restricted to S, SE England, E Anglia and the E. Midlands. Both are rare and neither species contributes to the threshold score. Cetti's Warbler's range now extends beyond the English Midlands, into northern England and north Wales, therefore the original south and eastern regional threshold has been removed and replaced with a single generic category for the whole of the UK.

Lowland open water and their margins (relatively base rich or calcareous fen or wetlands)

Species	Abundance 2012	NE & NW Scotland	Rest of Britain
Mute Swan <i>Cygnus olor</i>	3	*	*
Shelduck <i>Tadorna tadorna</i>	2	*	*
Gadwall <i>Anas strepera</i>	3.5	*	*
Teal <i>Anas crecca</i>	3	*	*
Pintail <i>Anas acuta</i>	5	*	*
Garganey <i>Anas querquedula</i>	5	*	*
Shoveler <i>Anas clypeata</i>	4	*	*
Pochard <i>Aythya farina</i>	4	*	*
Tufted Duck <i>Aythya fuligula</i>	4	*	*
Common Scoter <i>Melanitta nigra</i>	5	*	*
Red-breasted Merganser <i>Mergus serrator</i>	3	*	*
Bittern <i>Botaurus stellaris</i>	5		*
Little Egret <i>Egretta garzetta</i>	3		*
Grey Heron <i>Ardea cinerea</i>	2	*	*
Little Grebe <i>Tachybaptus ruficollis</i>	3	*	*
Great Crested Grebe <i>Podiceps cristatus</i>	3		*
Slavonian Grebe <i>Podiceps auritus</i>	5	*	
Black-necked Grebe <i>Podiceps nigricollis</i>	5		*
Marsh Harrier <i>Circus aeruginosus</i>	4	*	*
White-tailed Eagle <i>Haliaeetus albicilla</i>	5	*	
Osprey <i>Pandion haliaetus</i>	4	*	*
Water Rail <i>Rallus aquaticus</i>	3	*	*
Spotted Crake <i>Porzana porzana</i>	5	*	*
Crane <i>Grus grus</i>	5		*
Avocet <i>Recurvirostra avosetta</i>	3		*
Little Ringed Plover <i>Charadrius dubius</i>	3	*	*
Ringed Plover <i>Charadrius hiaticula</i>	3	*	*
Snipe <i>Gallinago gallinago</i>	2	*	*
Redshank <i>Tringa totanus</i>	2	*	*
Wood Sandpiper <i>Tringa glareola</i>	5	*	
Red-necked Phalarope <i>Phalaropus lobatus</i>	5	*	
Common Tern <i>Sterna hirundo</i>	3	*	*
Cuckoo <i>Cuculus canorus</i>	2.5	*	*
Kingfisher <i>Alcedo atthis</i>	3	*	*
Bearded Tit <i>Panurus biarmicus</i>	4	*	*
Willow Tit <i>Poecile montana</i>	2		*
Cetti's Warbler <i>Cettia cetti</i>	3		*
Grasshopper Warbler <i>Locustella naevia</i>	2	*	*
Savi's Warbler <i>Locustella luscinioides</i>	6		*
Sedge Warbler <i>Acrocephalus schoenobaenus</i>	1	*	*
Marsh Warbler <i>Acrocephalus palustris</i>	6		*
Reed Warbler <i>Acrocephalus scirpaceus</i>	1	*	*
Yellow Wagtail <i>Motacilla flava</i>	2		*
Grey Wagtail <i>Motacilla cinerea</i>	2	*	*
Reed Bunting <i>Emberiza schoeniclus</i>	1	*	*
Threshold score:		36	44

For this assemblage, Montagu's Harrier was removed, since it is not closely associated with this habitat category. Black Tern was removed since it no longer breeds in Britain. Little Egret was added due to its rapid range expansion across the UK, now reaching southern Scotland in small numbers and is dependent on a broad range of wetland habitats for food, though it does not breed there (as with Grey Heron). Crane was added since it breeds in wetland mosaics and is re-establishing breeding populations across Britain. Similarly Osprey and White-tailed Eagle were added as potentially feeding birds. Willow Tit was added since this species uses successional

marginal wetland habitats, especially in the south of its range. Little Ringed Plover has expanded its breeding range north into NE Scotland. So too has Reed Warbler, though breeding confirmation has not been established.

Northern wetlands (Relatively base-poor wetlands including open mire, flows, with scattered pools, as well as larger water bodies generally below 300 m of altitude).

Species	Abundance 2012	NE & NW Scotland	Rest of Britain
Greylag Goose <i>Anser anser</i>	2	*	*
Wigeon <i>Anas penelope</i>	3.5	*	*
Teal <i>Anas crecca</i>	3	*	*
Shoveler <i>Anas clypeata</i>	4	*	*
Tufted Duck <i>Aythya fuligula</i>	4	*	*
Common Scoter <i>Melanitta nigra</i> *	5	*	
Goldeneye <i>Bucephala clangula</i>	4	*	*
Red-breasted Merganser <i>Mergus serrator</i>	3	*	*
Goosander <i>Mergus merganser</i>	3	*	*
Red-throated Diver <i>Gavia stellata</i>	3	*	
Black-throated Diver <i>Gavia arctica</i>	4	*	
Grey Heron <i>Ardea cinerea</i>	2	*	*
Little Grebe <i>Tachybaptus ruficollis</i>	3	*	*
Slavonian Grebe <i>Podiceps auritus</i>	5	*	
Black-necked Grebe <i>Podiceps nigricollis</i>	5		*
White-tailed Eagle <i>Haliaeetus albicilla</i>	5	*	
Osprey <i>Pandion haliaetus</i>	4	*	*
Oystercatcher <i>Haematopus ostralegus</i>	1	*	*
Ringed Plover <i>Charadrius hiaticula</i>	3	*	*
Dunlin <i>Calidris alpina</i>	3	*	*
Snipe <i>Gallinago gallinago</i>	2	*	*
Curlew <i>Numenius arquata</i>	2	*	*
Common Sandpiper <i>Actitis hypoleucos</i>	2	*	*
Greenshank <i>Tringa nebularia</i>	2.5	*	
Wood Sandpiper <i>Tringa glareola</i>	5	*	
Redshank <i>Tringa totanus</i>	2	*	*
Common Tern <i>Sterna hirundo</i>	3	*	*
Dipper <i>Cinclus cinclus</i>	2.5	*	*
Grey Wagtail <i>Motacilla cinerea</i>	2	*	*
Threshold score		34	29

For this assemblage there is no longer any clear distinction between the north-western ('native resident') and the rapidly expanding, feral breeding populations of Greylag Goose, so this species is included in the 'Rest of Britain' too. Scaup was removed from the original list being a rare and irregular breeding bird within the UK. Osprey and White-tailed Eagle were added as potentially feeding birds over larger open waters and their margins. *Common Scoter also has an outlying breeding presence in Northern Ireland. Great crested Grebe has been removed from the original list as these habitats are very marginal for this species.

Upland moorland with wetlands (This category was formerly known as 'Upland moorland and grassland with water bodies' but largely refers to the complex and variable unenclosed, moorland, grassland and blanket bog where waterbodies can intergrade part of the habitat mosaic; environments generally above 300m).

Species	Abundance 2012	N & W Isles	NE & NW Scotland	Rest of Britain
Greylag Goose <i>Anser anser</i>	2	*	*	*
Wigeon <i>Anas penelope</i>	3.5	*	*	*
Teal <i>Anas crecca</i>	3	*	*	*
Common Scoter <i>Melanitta nigra</i>	5		*	
Goldeneye <i>Bucephala clangula</i>	4		*	*
Red-breasted Merganser <i>Mergus serrator</i>	3	*	*	*
Goosander <i>Mergus merganser</i>	3		*	*
Red Grouse <i>Lagopus lagopus</i>	1	*	*	*
Black Grouse <i>Tetrao tetrix</i>	3		*	*
Red-throated Diver <i>Gavia stellata</i>	3	*	*	
Black-throated Diver <i>Gavia arctica</i>	4	*	*	
Little Grebe <i>Tachybaptus ruficollis</i>	3	*	*	*
Slavonian Grebe <i>Podiceps auritus</i>	5		*	
Hen Harrier <i>Circus cyaneus</i>	4	*	*	*
Buzzard <i>Buteo buteo</i>	2	*	*	*
Golden Eagle <i>Aquila chrysaetos</i>	4	*	*	*
Osprey <i>Pandion haliaetus</i>	4		*	*
Merlin <i>Falco columbarius</i>	3	*	*	*
Peregrine Falcon <i>Falco peregrinus</i>	3	*	*	*
Oystercatcher <i>Haematopus ostralegus</i>	1	*	*	*
Ringed Plover <i>Charadrius hiaticula</i>	3	*	*	*
Golden Plover <i>Pluvialis apricaria</i>	2	*	*	*
Dunlin <i>Calidris alpina</i>	3	*	*	*
Snipe <i>Gallinago gallinago</i>	2	*	*	*
Whimbrel <i>Numenius phaeopus</i>	4	*	*	
Curlew <i>Numenius arquata</i>	2	*	*	*
Common Sandpiper <i>Actitis hypoleucos</i>	2	*	*	*
Greenshank <i>Tringa nebularia</i>	2.5	*	*	
Wood Sandpiper <i>Tringa glareola</i>	5		*	
Redshank <i>Tringa totanus</i>	2	*	*	*
Arctic Skua <i>Stercorarius parasiticus</i>	3	*	*	
Great Skua <i>Stercorarius skua</i>	3	*	*	
Common Gull <i>Larus canus</i>	2	*	*	
Short-eared Owl <i>Asio flammeus</i>	3.5	*	*	*
Cuckoo <i>Cuculus canorus</i>	2.5	*	*	*
Chough <i>Pyrrhocorax pyrrhocorax</i>	4			*
Raven <i>Corvus corax</i>	3	*	*	*
Dipper <i>Cinclus cinclus</i>	2.5	*	*	*
Ring Ouzel <i>Turdus torquatus</i>	3		*	*
Whinchat <i>Saxicola rubetra</i>	2	*	*	*
Stonechat <i>Saxicola rubicola</i>	2	*	*	*
Wheatear <i>Oenanthe oenanthe</i>	1	*	*	*
Grey Wagtail <i>Motacilla cinerea</i>	2	*	*	*
Twite <i>Carduelis flavirostris</i>	2.5	*	*	*
Threshold scores:		45	52	45

For this assemblage, Temminck's Stint was removed, since it is a rare and irregularly breeding bird in Britain. Pintail was removed from the lists being, at best, a sporadic breeding bird in this habitat. Red-necked Phalarope was removed being considered a northern but lowland breeding bird (see lowland open water habitat category). In this habitat category, the Northern and Western Isles are separated out from the rest of Scotland on the basis of supporting a slightly different bird fauna. For example, breeding Black Grouse, Osprey, Wood Sandpiper and number of other species (see above) were absent from the Northern and Western Isles as confirmed breeding species. Chough was

absent from NW & NE Scotland generally, only breeding as far north as Islay and Colonsay at the time of writing. Great Skua has increased its breeding range south along the west coast of mainland Scotland and the islands, to the north coast of Northern Ireland. Common Gull was added to the Scottish assemblages as some of the larger breeding colonies in Scotland nest on moorland mosaics.

There is no longer any clear distinction between the north-western ('native resident') and the expanding, feral breeding population of Greylag Goose, so this species is included in all categories.

Upland moorland without wetlands (unenclosed land including dwarf shrub heath, wet heath, blanket mires, scrub, grassland and bracken, generally above 300m).

Species	Abundance 2012	N & W Isles	NE & NW Scotland	Rest of Britain
Teal <i>Anas crecca</i>	3	*	*	*
Red Grouse <i>Lagopus lagopus</i>	1	*	*	*
Black Grouse <i>Tetrao tetrix</i>	3		*	*
Hen Harrier <i>Circus cyaneus</i>	4	*	*	*
Buzzard <i>Buteo buteo</i>	2	*	*	*
Golden Eagle <i>Aquila chrysaetos</i>	4	*	*	*
Merlin <i>Falco columbarius</i>	3	*	*	*
Peregrine Falcon <i>Falco peregrinus</i>	3	*	*	*
Golden Plover <i>Pluvialis apricaria</i>	2	*	*	*
Dunlin <i>Calidris alpina</i>	3	*	*	*
Snipe <i>Gallinago gallinago</i>	2	*	*	*
Whimbrel <i>Numenius phaeopus</i>	4	*	*	
Curlew <i>Numenius arquata</i>	2	*	*	*
Greenshank <i>Tringa nebularia</i>	2.5	*	*	
Wood Sandpiper <i>Tringa glareola</i>	5		*	
Redshank <i>Tringa totanus</i>	2	*	*	*
Common Gull <i>Larus canus</i>	2	*	*	
Arctic Skua <i>Stercorarius parasiticus</i>	3	*	*	
Great Skua <i>Stercorarius skua</i>	3	*	*	
Cuckoo <i>Cuculus canorus</i>	2.5	*	*	*
Short-eared Owl <i>Asio flammeus</i>	3.5	*	*	*
Chough <i>Pyrrhocorax pyrrhocorax</i>	4			*
Raven <i>Corvus corax</i>	3	*	*	*
Ring Ouzel <i>Turdus torquatus</i>	3		*	*
Whinchat <i>Saxicola rubetra</i>	2	*	*	*
Stonechat <i>Saxicola rubicola</i>	2	*	*	*
Wheatear <i>Oenanthe oenanthe</i>	1	*	*	*
Twite <i>Carduelis flavirostris</i>	2.5	*	*	*
Threshold score:		31	34	28

For this assemblage, Temminck's Stint was removed, since it is a rare and irregularly breeding bird in Britain. In this habitat category, the Northern and Western Isles are separated out from the rest of Scotland on the basis of supporting a slightly different bird fauna. For example, breeding Black Grouse, Osprey, Wood Sandpiper and number of other species (see above) were absent from the Northern and Western Isles as confirmed breeding species. Chough was absent from the Northern and Western Isles and NW & NE Scotland, at the time of writing (being no further north than Islay). Common Gull was added as some of the larger breeding colonies in Scotland occur on drier moorland mosaics. Great Skua has increased its breeding range south along the west coast of mainland Scotland and the islands, to the north coast of Northern Ireland.

Montane grassland and heaths

Species	Abundance 2012
Ptarmigan <i>Lagopus muta</i>	4
Buzzard <i>Buteo buteo</i>	2
Golden Eagle <i>Aquila chrysaetos</i>	4
Peregrine Falcon <i>Falco peregrinus</i>	3
Dotterel <i>Charadrius morinellus</i>	4
Golden Plover <i>Pluvialis apricaria</i>	2
Purple Sandpiper <i>Calidris maritima</i>	6
Dunlin <i>Calidris alpina</i>	3
Raven <i>Corvus corax</i>	3
Shore Lark <i>Eremophila alpestris</i>	6
Ring Ouzel <i>Turdus torquatus</i>	3
Lapland Bunting <i>Calcarius lapponicus</i>	4
Snow Bunting <i>Plectrophenax nivalis</i>	5
Threshold score:	16

For this assemblage, there was no change required from the original species composition.

Lowland heath (including Brecks grass heaths)

Species	Abundance 2012
Hobby <i>Falco subbuteo</i>	3
Stone-curlew <i>Burhinus oedicephalus</i>	4
Snipe <i>Gallinago gallinago</i>	2
Curlew <i>Numenius arquata</i>	2
Redshank <i>Tringa totanus</i>	2
Cuckoo <i>Cuculus canorus</i>	2.5
Long-eared Owl <i>Asio otus</i>	3
Nightjar <i>Caprimulgus europaeus</i>	3
Woodlark <i>Lullula arborea</i>	3
Dartford Warbler <i>Sylvia undata</i>	3
Grasshopper Warbler <i>Locustella naevia</i>	2
Stonechat <i>Saxicola rubicola</i>	2
Wheatear <i>Oenanthe oenanthe</i>	1
Tree Pipit <i>Anthus trivialis</i>	2
Linnet <i>Carduelis cannabina</i>	1
Threshold score:	17

For this assemblage, Red-backed Shrike was removed since it no longer breeds in the UK on a regular basis. Montagu's Harrier, Quail and Whinchat were removed as they rarely breed or forage on lowland heathland habitats. The assemblage includes heathland scrub, important for species such as Dartford Warbler and Stonechat.

Woodland

Species	Abundance 2012
Grey Heron <i>Ardea cinerea</i>	2
Little Egret <i>Egretta garzetta</i>	3
Honey-buzzard <i>Pernis apivorus</i>	5
Red Kite <i>Milvus milvus</i>	3
Goshawk <i>Accipiter gentilis</i>	4
Sparrowhawk <i>Accipiter nisus</i>	2
Buzzard <i>Buteo buteo</i>	2
Osprey <i>Pandion haliaetus</i>	4
Hobby <i>Falco subbuteo</i>	3
Black Grouse <i>Tetrao tetrix</i>	3
Capercaillie <i>Tetrao urogallus</i>	4
Woodcock <i>Scolopax rusticola</i>	2
Stock Dove <i>Columba oenas</i>	1
Cuckoo <i>Cuculus canorus</i>	2
Tawny Owl <i>Strix aluco</i>	2
Long-eared Owl <i>Asio otus</i>	3
Nightjar <i>Caprimulgus europaeus</i>	3
Wryneck <i>Jynx torquilla</i>	6
Green Woodpecker <i>Picus viridis</i>	2
Great Spotted Woodpecker <i>Dendrocopos major</i>	1
Lesser Spotted Woodpecker <i>Dendrocopos minor</i>	3
Jay <i>Garrulus glandarius</i>	1
Raven <i>Corvus corax</i>	3
Goldcrest <i>Regulus regulus</i>	1
Firecrest <i>Regulus ignicapilla</i>	4
Crested Tit <i>Lophophanes cristatus</i>	3
Coal Tit <i>Periparus ater</i>	1
Willow Tit <i>Poecile montana</i>	3
Marsh Tit <i>Poecile palustris</i>	2
Long-tailed Tit <i>Aegithalos caudatus</i>	1
Wood Warbler <i>Phylloscopus sibilatrix</i>	3
Garden Warbler <i>Sylvia borin</i>	1
Nuthatch <i>Sitta europaea</i>	1
Treecreeper <i>Certhia familiaris</i>	1
Fieldfare <i>Turdus pilaris</i>	6
Redwing <i>Turdus iliacus</i>	5.5
Spotted Flycatcher <i>Muscicapa striata</i>	2
Nightingale <i>Luscinia megarhynchos</i>	3
Pied Flycatcher <i>Ficedula hypoleuca</i>	2
Redstart <i>Phoenicurus phoenicurus</i>	1
Tree Pipit <i>Anthus trivialis</i>	2
Siskin <i>Carduelis spinus</i>	1
Lesser Redpoll <i>Carduelis cabaret</i>	1
Common Crossbill <i>Loxia curvirostra</i>	2
Scottish Crossbill <i>Loxia scotica</i>	3
Bullfinch <i>Pyrrhula pyrrhula</i>	1
Hawfinch <i>Coccothraustes coccothraustes</i>	4
Threshold score:	64

Breeding is suspected, if not necessarily confirmed, for Wryneck in Britain in most years, so this species is retained. Hoopoe and Serin, were removed since both species are only sporadic summer visitors to Britain with no confirmed breeding records within the last decade or two. Little Egrets may nest amongst Grey Herons so are also included.

Lowland scrub (Typically, *Crataegus monogyna* scrub and/or *Prunus spinosa* scrub dominated by woody species - includes NVC W21 & 22).

Species	Abundance 2012
Turtle Dove <i>Streptopelia turtur</i>	2
Cuckoo <i>Cuculus canorus</i>	2.5
Long-eared Owl <i>Asio otus</i>	3
Long-tailed Tit <i>Aegithalos caudatus</i>	1
Garden Warbler <i>Sylvia borin</i>	1
Lesser Whitethroat <i>Sylvia curruca</i>	2
Grasshopper Warbler <i>Locustella na</i>	2
Nightingale <i>Luscinia megarhynchos</i>	3
Linnet <i>Carduelis cannabina</i>	1
Bullfinch <i>Pyrrhula pyrrhula</i>	1
Yellowhammer <i>Emberiza citrinella</i>	1
Cirl Bunting <i>Emberiza cirlus</i>	4
Threshold score:	12

This assemblage includes thicket species (Nightingale and Lesser Whitethroat) and open, scattered scrub species (Whitethroat or Grasshopper Warbler). The assemblage corresponds mainly to those species that exhibit a strong relationship with the woody element of such mosaics, thus excluding species more representative of the field layer, such as Grey Partridge and Whinchat. Grasshopper Warbler falls somewhere between the two and so is retained. Red-backed Shrike was removed since it no longer breeds in the UK on a regular basis. Tree Pipit was removed from this assemblage as it rarely uses this habitat now. Tree Pipit does use scrub mosaics in the marginal uplands of Britain so is included in the ffridd habitat category. Similarly, Stonechat is mainly associated with upland scrub or lowland heathland scrub and is covered under those categories.

Ffridd (Valued as a diverse mosaic of grass and heathland with bracken, scrub (often hawthorn and gorse), scattered trees or rock exposures and may also include flushes, mires, streams and standing water, restricted in definition to Wales).

Species	Abundance 2012
Red Grouse <i>Lagopus lagopus</i>	1
Merlin <i>Falco columbarius</i>	3
Buzzard <i>Buteo buteo</i>	2
Short-eared Owl <i>Asio flammeus</i>	3.5
Snipe <i>Gallinago gallinago</i>	2
Curlew <i>Numenius arquata</i>	2
Cuckoo <i>Cuculus canorus</i>	2.5
Grasshopper Warbler <i>Locustella naevia</i>	2
Garden Warbler <i>Sylvia borin</i>	1
Ring Ouzel <i>Turdus torquatus</i>	3
Chough <i>Pyrrhocorax pyrrhocorax</i>	4
Raven <i>Corvus corax</i>	3
Tree Pipit <i>Anthus trivialis</i>	2
Pied Flycatcher <i>Ficedula hypoleuca</i>	2
Redstart <i>Phoenicurus phoenicurus</i>	1
Wheatear <i>Oenanthe oenanthe</i>	2
Whinchat <i>Saxicola rubetra</i>	2
Stonechat <i>Saxicola rubicola</i>	2
Linnet <i>Carduelis cannabina</i>	1
Lesser Redpoll <i>Carduelis carabet</i>	1
Reed Bunting <i>Emberiza schoeniclus</i>	1
Threshold score:	21

The species assemblage embraces the scrub elements (e.g., Linnet) and grass (e.g., Curlew), heathland (e.g. Red Grouse), bracken (e.g., Whinchat), elements of ffridd. Tree Pipit uses scrub mosaics in the marginal uplands of Britain, and, similarly, Stonechat. Short-eared Owl, Merlin and Ring Ouzel use ffridd mainly for feeding only as do Snipe and Curlew. Pied Flycatcher may occur in the more developed transition to woodland, with Redstart.

Lowland farmland

Species	Abundance 2012	S & E England	Rest of Britain
Grey Partridge <i>Perdix perdix</i>	2	*	*
Quail <i>Coturnix coturnix</i>	4	*	*
Marsh Harrier <i>Circus aeruginosus</i>	4	*	*
Montagu's Harrier <i>Circus pygargus</i>	5	*	*
Buzzard <i>Buteo buteo</i>	2	*	*
Kestrel <i>Falco tinnunculus</i>	2	*	*
Hobby <i>Falco subbuteo</i>	3	*	*
Corncrake <i>Crex crex</i>	3	*	*
Stone-curlew <i>Burhinus oedicnemus</i>	4	*	
Lapwing <i>Vanellus vanellus</i>	1	*	*
Curlew <i>Numenius arquata</i>	2	*	*
Crane <i>Grus grus</i>	5	*	*
Stock Dove <i>Columba oenas</i>	1	*	*
Turtle Dove <i>Streptopelia turtur</i>	2	*	*
Cuckoo <i>Cuculus canorus</i>	2.5	*	*
Barn Owl <i>Tyto alba</i>	3	*	*
Magpie <i>Pica pica</i>	1	*	*
Rook <i>Corvus frugilegus</i>	1	*	*
Swallow <i>Hirundo rustica</i>	1	*	*
Tree Sparrow <i>Passer montanus</i>	1	*	*
Yellow Wagtail <i>Motacilla flava</i>	2	*	*
Pied Wagtail <i>Motacilla alba</i>	1	*	*
Linnet <i>Carduelis cannabina</i>	1	*	*
Yellowhammer <i>Emberiza citrinella</i>	1	*	*
Cirl Bunting <i>Emberiza cirlus</i>	4	*	
Reed Bunting <i>Emberiza schoeniclus</i>	1	*	*
Corn Bunting <i>Emberiza calandra</i>	2	*	*
Threshold:		26	22

For lowland farmland, the assemblage of species represents the different habitat components of lowland farmland, with species dependent on in-field habitats (crops, fallows & grassland) and field boundary habitats (such as field margins, ditches, hedgerows and mature trees within hedgerows). It does not include woodland as such, since this habitat is covered under the 'woodland' assemblage. Most of the species, bar Stone-curlew and Cirl Bunting (S & E England), have a very wide distribution across Britain, though Turtle Dove has undergone a strong contraction of range from north-west Britain. Crane was included since it forages on farmland and may be dependent upon it. The species is re-establishing a small breeding population across Britain. The two harrier species (especially Montagu's Harrier) both frequently nest in crops and forage over open farmland.

In-bye land

Species	Abundance 2012
Black Grouse <i>Tetrao tetrix</i>	3
Grey Partridge <i>Perdix perdix</i>	2
Buzzard <i>Buteo buteo</i>	2
Kestrel <i>Falco tinnunculus</i>	2
Corncrake <i>Crex crex</i>	3
Lapwing <i>Vanellus vanellus</i>	1
Snipe <i>Gallinago gallinago</i>	2
Curlew <i>Numenius arquata</i>	2
Redshank <i>Tringa totanus</i>	2
Barn Owl <i>Tyto alba</i>	3
Cuckoo <i>Cuculus canorus</i>	2.5
Magpie <i>Pica pica</i>	1
Rook <i>Corvus frugilegus</i>	1
Dipper <i>Cinclus cinclus</i>	2.5
Wheatear <i>Oenanthe oenanthe</i>	2
Yellow Wagtail <i>Motacilla flava</i>	2
Grey Wagtail <i>Motacilla cinerea</i>	2
Linnet <i>Carduelis cannabina</i>	1
Twite <i>Carduelis flavirostris</i>	2.5
Threshold score	19

Generally, in-bye lies below the moorland wall. The in-bye assemblage represents the hay and pastoral grassland species and species associated with wet flushes (eg Snipe) and grassland/scrub transitional habitats such as Black Grouse and Linnet. Twite feeds on in-bye land. Stonechat and Whinchat are more likely to occur above the moorland wall and so are covered under those habitat categories.

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