ENGLISH NATURE

Key habitat attributes for birds and bird assemblages in England - Part 1

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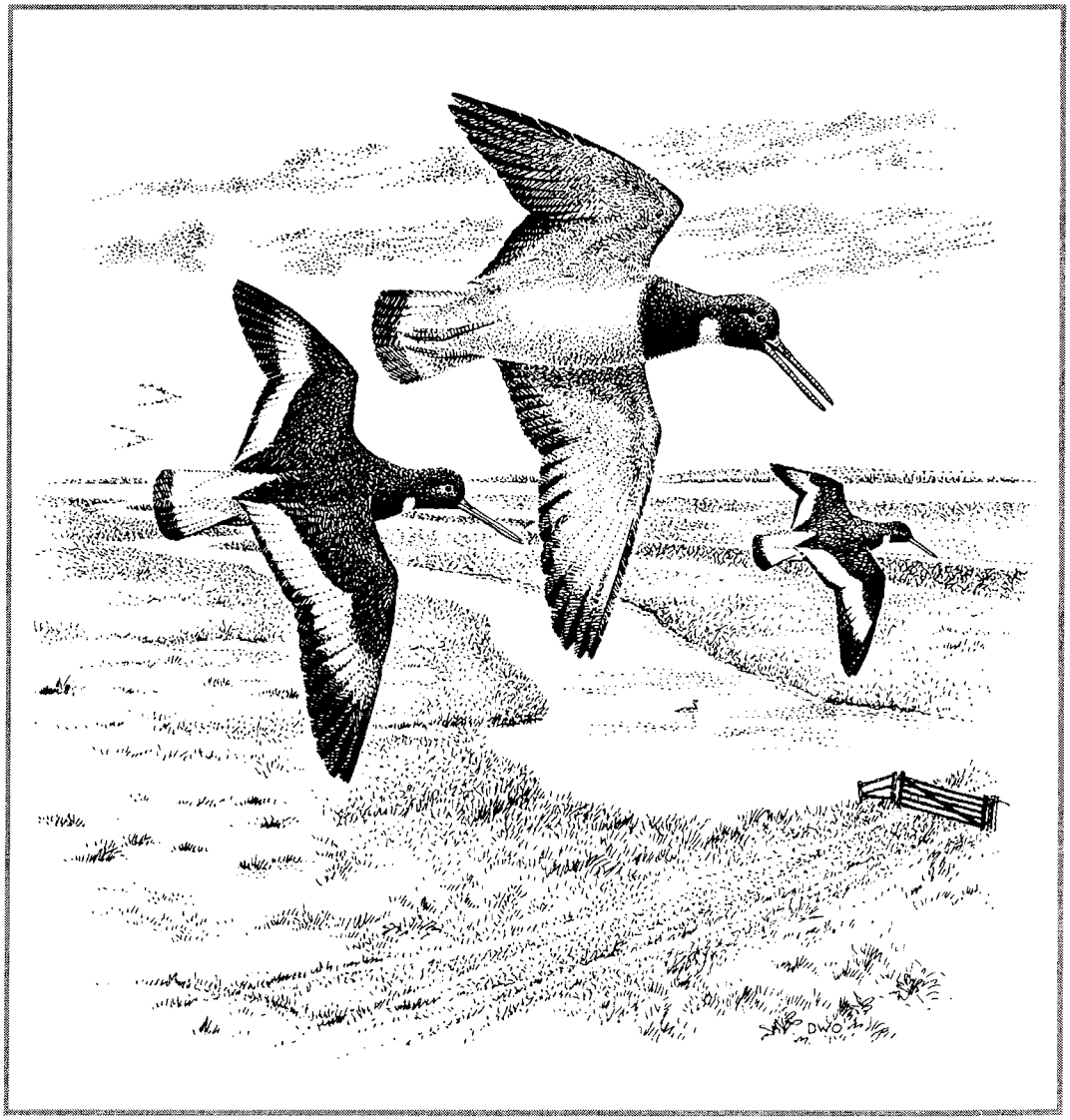

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English Nature Research Report

No. 359

Key habitat attributes for birds and bird assemblages in England

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CONTENTS

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1. Executive summary

This report is based on a time-limited literature search and focuses on key habitat requirements for all birds that occur regularly in England. We present species and species-assemblage tables containing habitat attribute statements for use in condition assessment on designated sites in England. 'Preferred states' are provided, describing the ideal condition of each attribute. Field monitoring targets that may be generically applied accompany these, allowing judgement of how the actual condition deviates from the ideal state. A summary of other habitat factors of particular importance for each species is also presented, including aspects such as habitat extent, predation and disturbance that are applicable to the majority of bird species in England.

The tables provide national standard guidance that will assist in maintaining or restoring favourable conditions for important birds on protected areas within England. The approach is discussed, gaps in research information are highlighted and guidance is provided for the interpretation and use of the tables by English Nature personnel. It is hoped that the tables will be expanded and improved in the future, using new research, expert opinion and field experience.

2. Background

The United Kingdom (UK) protects its most important wildlife sites through a process of formal designation based on assessments of relative importance. Sites of national significance may be designated as Sites of Special Scientific Interest (SSSIs) under The Wildlife and Countryside Act 1981 (HMSO 1981). Those of international significance may be designated under one of several instruments:

- Special Protection Areas (SPAs) under the EC Directive on the Conservation of Wild Birds (79/409/EEC; the 'Birds Directive');

- Special Areas of Conservation (SACs) under the EC Directive on the Conservation of Natural Habitats and of Wild Fauna and Flora (92/43/EEC; the 'Habitats Directive');

  or, with respect to wetlands only,

- Ramsar sites, under the Convention on Wetlands of International Importance Especially as Waterfowl Habitat (Stroud et al. 1990).

Designated sites must be monitored in order to ensure that they retain, as far as possible, the interests for which they were designated. Species monitoring allows the tracking of overall population sizes and patterns of distribution but provides only an indirect indication of habitat 'quality' on individual sites. What is needed, in addition, is a rigorous and routine assessment of the condition of key habitat components that together support the species of interest. Species and habitat monitoring are inextricably linked and thus estimating bird numbers is necessary when assessing the success of measures taken to maintain habitats.

'Common standards' have been agreed amongst the UK's statutory conservation agencies that provide a framework for monitoring designated sites in the UK, allowing for the setting of consistent conservation objectives and for condition assessments to be made on SSSIs, SPAs, SACs and Ramsar sites (JNCC 1998). Conservation objectives are themselves of critical importance. As well as driving standards for monitoring and reporting on sites, the definition of conservation objectives has extensive implications in UK site protection. This is because the

site's conservation objectives have legal definition and are the first point of reference for statutory advice under the Conservation (Natural Habitats, &c) Regulations 1994 (EN 1999).

A key component of the common standards approach is thus for 'features of interest' (the reasons for which sites were notified) on designated sites to be monitored and assessed against explicit conservation objectives. A single conservation objective will be defined for each interest feature on all sites. Where the condition of a feature is considered to meet a certain standard, and be stable or increasing, the condition is considered to be favourable. Common standards gives a consistent format for the definition of favourable condition, namely by first identifying the key attributes of a feature, eg. sward height or bare ground in grassland. Broad limits of acceptability (or 'generic targets') are then set to accommodate the natural variability for that attribute, such as 2-5% bare ground (EN 1999). Common standards must be observed when writing any conservation objectives. The objective will include the phrase "to maintain the habitat [name] in favourable condition" or "to restore habitat [name] to favourable condition", as applicable to each circumstance.

Features of interest are the feature(s) for which the site has been notified, designated or classified. They can be earth science features, habitats or species. Conservation objectives for species will be written in terms of maintaining in favourable condition the habitats that support the species for which the site is designated. For example, the objective for breeding avocet will be to maintain marsh and saline lagoons in favourable condition for that species. Similar objectives will be written for bird assemblages.

Based on current understanding of the species concerned, the selection of key attributes of features will define favourable condition. The selection of attributes, and the limits set for them (generic targets), should be at a level which, wherever possible, allows a repeatable assessment to be made in the field. This should be based on rapid visual assessments using consistent 'decision rules', eg. 'is there between 2-5% bare ground within the sward?' Further targets should be sufficiently broad to encompass temporal and most geographical variation, thus providing a national standard for favourable condition of the feature concerned. English Nature's Conservation Officers will usually perform the assessments although specialists from other organisations may also contribute where appropriate.

For SPAs, many Ramsar sites and SSSIs, features of interest are ornithological. Examples include an internationally important population of breeding avocets, a large heronry or a diverse woodland breeding bird assemblage. The objective of the current study is to describe the habitat conditions that are necessary to maintain (or restore) the favourable condition of ornithological interest features on statutorily designated sites. This has been undertaken by:

- comprehensively searching the published and unpublished literature for information on relevant habitat attributes for all birds occurring regularly in England;
- using scientifically-based information, where possible, to determine the preferred state of each attribute for each species;
- drafting generic targets, where possible, that allow a practical, in field, assessment of the condition of each habitat attribute in relation to the preferred state;
- using the species-based information, so generated, to provide attributes, preferred states and generic targets for a number of bird assemblages.

The study was progressed in two stages, looking at SPA and SSSI species respectively. Both stages are now complete and, in this final report, we provide national standard information for 210 bird species individually, for two bird assemblages associated with SPAs, and for 11 SSSI bird assemblages. In addition to this report, the included data are available in several database or spreadsheet formats.

3. Methodology

3.1 Selection of species and bird assemblages

The study was targeted to include the majority of bird species that occur regularly in England. This was determined with reference to the status information and distribution maps provided in '*The Wintering Atlas of Birds in Britain and Ireland*' (Lack 1986) and '*The New Atlas of Breeding Birds in Britain and Ireland*' (Gibbons et al. 1993). Feral and introduced species were excluded and a grand total of 210 species was addressed (see Annex 1).

The bird assemblages chosen included the 11 for breeding birds described in the '*Guidelines for the Selection of Biological SSSIs*' (NCC 1989) ('SSSI assemblages') plus two 'SPA assemblages', defined to include species occurring in at least nationally important concentrations on SPAs within England. The composition of these bird assemblages is shown in Annex 2.

3.2 Literature search

We conducted electronic and physical searches of the literature contained within the libraries of English Nature (Peterborough) and the Edward Grey Field Institute for Field Ornithology (Department of Zoology, Oxford University), and electronic searches of the British Library and Zoological Records. We searched on both English and scientific names for each bird species in turn and short-listed 'relevant' publications on the basis of title and, where available, abstract contents. Only the European literature was selected; material from elsewhere, eg North America was disregarded for this exercise. Full citation details for those documents retained were entered within Microsoft Excel® spreadsheets so that the bibliography could be easily sorted and updated. Approximately 1,200 citations were considered relevant to the study, 80% of which were accessed and read during the time available.

3.3 Species-specific attributes

We developed a Microsoft Access® database structure for the standard entry of habitat, attribute, preferred state and generic target information for each species. This allows easy future updating and dissemination of information to many users, and facilitates the generation of standard reports in many different formats. We extracted and entered relevant data directly into the database structure.

Our database content and structure went through several iterations, with improvements continually being made to achieve a standardized, user-friendly and practical content. Briefly, the species tables summarize the seasonal occurrence and broad habitat types used by each species and provide key attribute, preferred state and generic target information that are of *practical value* for condition monitoring on designated sites. Information that was considered useful and yet not directly relevant or impractical to use was not included in the species tables. This included, for example, attributes that pertain more to land outwith the current boundaries of designated areas (eg. use of networks of sites, the sea or agricultural crops etc.); or attributes that

could not be practically monitored or easily manipulated through management on site (eg. a preference for a certain invertebrate prey size or slope of beach etc.). Instead such information was retained, for reference, within a table of 'other factors of importance', allowing insights into the full range of factors that might be important on particular sites.

The format and content of the species tables is presented in detail in Annex 3.

3.4 Attributes for bird assemblages

The form of entry adopted for the database allows the easy production of species-by-habitat matrices, allowing the display of habitat attributes for bird assemblages. The habitat attributes associated with 13 bird assemblages were generated from the appropriate species tables. There are eleven 'SSSI assemblages' and 'SPA assemblages'.

A standard query was used to assemble the required information (species, habitat, habitat attribute, preferred state, monitoring target) for the species relevant to each assemblage in turn. These tables were then edited to combine, where possible, the attributes for individual species into species groups, where the information per species was identical or very similar. This resulted in a minimal loss of information for the species combined into species groups. However, the detail for all species individually is retained in the species-by-species tables and so is accessible there. The bird assemblage tables are presented individually and sorted first by habitat attribute and then by preferred state.

4. Results and Discussion

Individual species tables are presented in Annex 4. They contain 716 attribute statements in total, pertaining to either the breeding (summer) season, the non-breeding season or that are applicable year-round. The number of attributes defined per species varies from 1-9. The small number of breeding (summer) season attributes for some species (e.g. seabirds, gulls, some waterfowl) is generally indicative of a relatively poor research base on detailed habitat requirements plus, for seabirds, their selection of habitats that are largely outside management influence. The same is also true for the non-breeding season for some passage and wintering waders, gulls, birds of prey and some waterfowl. However, it is important to note that our study was time-limited, with less than one day allocated per species. The tables should therefore be regarded as 'first drafts', to be

expanded and refined on the basis of experience in using them and when other publications come to light. They are therefore not 'set in stone'. This said, only relatively few research publications contain precise, quantifiable information on habitat selection, despite this being such a fundamental aspect of ecology and conservation management. There is clearly a great need to encourage new research in this area and to collate and summarize the existing wisdom of species experts.

Taking all species and all seasons together, the attributes appearing most frequently in the tables were food availability (40.5% of entries), vegetation characteristics (28.1%) and landscape (10.6%), emphasising the importance of food, immediate vegetative cover and general landscape pattern for all birds. Attributes for artifical structures, nesting cavities, grazing animals, salinity, substrate and water area were used only infrequently in the database, reflecting the difficulty in determining preferred states and generic targets for these aspects of the birds' environment.

Preferred states were, on the whole, easy to describe for most habitat attributes. However, the drafting of generic targets for these preferred states was generally more difficult, and in this respect, a large proportion are incomplete (containing square brackets) or have been estimated. These require new information and, in the meantime, it may be best to maintain the current state of the attribute on a particular site (ie. to avoid deterioration) if this is thought to be favourable. In time, field measurements by research scientists and site managers will assist the development of targets that may then be adjusted in the light of future experience. In this way, Conservation Officers, researchers and field staff could make an important, on-going contribution towards improving the effectiveness of the national standard tables.

An overview of the current information gaps for the monitoring targets is revealing. Of particular note is the lack of research guidance on the average biomass of invertebrate prey that a species requires from an area for it to be favourable. Another significant gap relates to key guidance on the exact composition and configuration of mosaics of vegetation, for example short and long grassland swards or the ideal ratio of different types of vegetation. A further limitation is the lack of information on preferred wetland size. Clearly these are important topics for new research and synthesis of management experience.

Scrutiny of the 'other factors of importance' table, presented in Annex 5, indicates that a whole array of additional considerations will apply to many species. These include behavioural

interactions, especially amongst species; territory/home range sizes; habitat links; the use of crops; and hazards such as disturbance, predation, habitat loss, persecution, pollution etc. Conservation Officer's should therefore be aware of these additional factors in assessing whether designated sites are, overall, in a favourable condition for the range of species that depend on them.

With respect to the amount of habitat required by a species and the issue of habitat loss, the need for sufficient habitat is a generic attribute applicable to all species, both on and off designated sites. To avoid repetition it has not been included in each species table. The preferred state for each habitat should be the current area within the site, with a monitoring target of 'no decrease in extent of the habitat from this baseline' (with area figures given where known).

Similarly, ensuring adequate links between habitats and sites is almost universally applicable to bird species. Birds feeding on designated sites may seek roost sites elsewhere within or outwith the designated area (or *vice versa*), requiring managers to take a more holistic approach to management and ensure that adequate linkages are in place. Likewise, but albeit on a smaller scale, breeding birds often require distinct habitats in which to feed (when off-duty, for example), or may move their young to habitats away from the nest site, sometimes over relatively large distances. Here the duty for the manager and assessor of favourable condition is to ensure that such linkages are present and unimpeded. A site may not support a particular breeding or wintering species unless such habitat linkages are in place.

Also quite universally applicable to bird species are attributes of disturbance and predation. Again, to avoid repetition, they have not been included in all species tables. In this respect, a site may be in favourable condition for a certain species but this species may be absent or doing poorly if the levels of disturbance or predation are, in fact, unfavourable. In this respect we did not feel able to set national standards for disturbance or predation thresholds, partly on account of an inadequate understanding of the impacts and partly because the impacts would be extremely variable across sites. Instead we suggest that managers work towards a target of 'no significant displacement of birds (or reduced productivity for breeding birds) from an established baseline attributable to human disturbance' and 'no significant reduction in breeding success due to predation', for disturbance and predation respectively. For both there should be particular concern when unsustainable levels cause, for example, repeated nesting failure that may result in the reduction or loss of a population. The 'other factors of importance' table presented here should help in identifying species that are particularly vulnerable to disturbance or predation.

Attribute tables for 13 bird assemblages are presented in Annex 6. Obviously much of the forgoing discussion on the species tables applies to these also since they have been derived from information on the individual component species. These tables should also be considered provisional, and will be amended in the light of new research information and practical field experience.

Finally, whilst the tables provide the national standard and are broadly applicable to most situations there may be circumstances when site-specific attributes can be identified and targeted. This is recognized in English Nature's guidance on Common Standards (EN 1999) which indicates that further attributes may be added to the national standards, but only in agreement with English Nature's specialists. This need for consultation is aimed at retaining as much consistency in the approach to attribute monitoring as is possible without negating the need for flexibility when local conditions dictate.

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Annex 1: Species included

SPECIES	SCIENTIFIC NAME
Arctic skua	*Stercorarius parasiticus*
Arctic tern	*Sterna paradisaea*
Avocet	*Recurvirostra avosetta*
Bar-tailed godwit	*Limosa lapponica*
Barn owl	*Tyto alba*
Barnacle goose	*Branta leucopsis*
Bean goose	*Anser fabalis*
Bearded tit	*Panurus biarmicus*
Bewick's swan	*Cygnus columbianus*
Bittern	*Botaurus stellaris*
Black grouse	*Tetrao tetrix*
Black redstart	*Phoenicurus ochruros*
Black-headed gull	*Larus ridibundus*
Black-tailed godwit	*Limosa limosa*
Blackbird	*Turdus merula*
Blackcap	*Sylvia atricapilla*
Blue tit	*Parus caeruleus*
Brambling	*Fringilla monifringilla*
Brent goose	*Branta bernicla*
Bullfinch	*Pyrrhula pyrrhula*
Buzzard	*Buteo buteo*
Carrion crow	*Corvus corone*
Cetti's warbler	*Cettia cetti*
Chaffinch	*Fringilla coelebs*
Chiffchaff	*Phylloscopus collybita*
Cirl bunting	*Emberiza cirlus*
Coal tit	*Parus ater*
Common crossbill	*Loxia curvirostra*
Common gull	*Larus canus*
Common sandpiper	*Tringa hypoleucos*
Common scoter	*Melanitta nigra*
Common tern	*Sterna hirundo*
Coot	*Fulica atra*
Cormorant	*Phalacrocorax carbo*
Corn bunting	*Miliaria calandra*
Corncrake	*Crex crex*
Cuckoo	*Cuculus canorus*
Curlew	*Numenius arquata*
Dartford warbler	*Sylvia undata*
Dipper	*Cinclus cinclus*
Dotterel	*Charadrius morinellus*
Dunlin	*Calidris alpina*
Dunnock	*Prunella modularis*
Eider	*Somateria mollissima*
Fieldfare	*Turdus pilaris*
Firecrest	*Regulus ignicapillus*
Fulmar	*Fulmarus glacialis*

SPECIES	SCIENTIFIC NAME
Gadwall	*Anas strepera*
Gannet	*Morus bassanus*
Garden warbler	*Sylvia borin*
Garganey	*Anas querquedula*
Goldcrest	*Regulus regulus*
Golden eagle	*Aquila chrysaetos*
Golden oriole	*Oriolus oriolus*
Golden plover	*Pluvialis apricaria*
Goldeneye	*Bucephala clangula*
Goldfinch	*Carduelis carduelis*
Goosander	*Mergus merganser*
Goshawk	*Accipter gentilis*
Grasshopper warbler	*Locustella naevia*
Great black-backed gull	*Larus marinus*
Great crested grebe	*Podiceps cristatus*
Great northern diver	*Gavia immer*
Great skua	*Catharacta skua*
Great spotted woodpecker	*Dendrocopos major*
Great tit	*Parus major*
Green sandpiper	*Tringa ochropus*
Green woodpecker	*Picus viridis*
Greenfinch	*Carduelis chloris*
Greenshank	*Tringa nebularia*
Grey heron	*Ardea cinerea*
Grey partridge	*Perdix perdix*
Grey plover	*Pluvialis squatarola*
Grey wagtail	*Motacilla cinerea*
Greylag goose	*Anser anser*
Guillemot	*Uria aalge*
Hawfinch	*Coccothraustes coccothraustes*
Hen harrier	*Circus cyaneus*
Herring gull	*Larus argentatus*
Hobby	*Falco subbuteo*
Honey buzzard	*Pernis apivorus*
House martin	*Delichon urbica*
House sparrow	*Passer domesticus*
Jack snipe	*Lymnocryptes minimus*
Jackdaw	*Corvus monedula*
Jay	*Garrulus glandarius*
Kestrel	*Falco tinnunculus*
Kingfisher	*Alcedo atthis*
Kittiwake	*Rissa tridactyla*
Knot	*Calidris canutus*
Lapwing	*Vanellus vanellus*
Lesser black-backed gull	*Larus fuscus*
Lesser spotted woodpecker	*Dendrocopos minor*
Lesser whitethroat	*Sylvia curruca*

SPECIES	SCIENTIFIC NAME
Linnet	*Carduelis cannabina*
Little egret	*Egretta garzetta*
Little grebe	*Tachybaptus ruficollis*
Little gull	*Larus minutus*
Little owl	*Athene noctua*
Little ringed plover	*Charadrius dubius*
Little stint	*Calidris minuta*
Little tern	*Sterna albifrons*
Long-eared owl	*Asio otus*
Long-tailed duck	*Clangula hyemalis*
Long-tailed tit	*Aegithalos caudatus*
Magpie	*Pica pica*
Mallard	*Anas platyrhynchos*
Manx shearwater	*Puffinus puffinus*
Marsh harrier	*Circus aeruginosus*
Marsh tit	*Parus palustris*
Marsh warbler	*Acrocephalus palustris*
Meadow pipit	*Anthus pratensis*
Mediterranean gull	*Larus melanocephalus*
Merlin	*Falco columbarius*
Mistle thrush	*Turdus viscivorus*
Montagu's harrier	*Circus pygargus*
Moorhen	*Gallinula chloropus*
Mute swan	*Cygnus olor*
Nightingale	*Luscinia megarhynchos*
Nightjar	*Caprimulgus europaeus*
Nuthatch	*Sitta europaea*
Osprey	*Pandion haliaetus*
Oystercatcher	*Haematopus ostralegus*
Peregrine	*Falco peregrinus*
Pied flycatcher	*Ficedula hypoleuca*
Pied wagtail	*Motacilla alba*
Pink-footed goose	*Anser brachyrhynchus*
Pintail	*Anas acuta*
Pochard	*Aythya ferina*
Puffin	*Fraterula fratercula*
Purple sandpiper	*Calidris maritima*
Quail	*Coturnix coturnix*
Raven	*Corvus corax*
Razorbill	*Alca torda*
Red grouse	*Lagopus lagopus*
Red kite	*Milvus milvus*
Red-breasted merganser	*Mergus serrator*

SPECIES	SCIENTIFIC NAME
Red-legged partridge	*Alectoris rufa*
Red-necked phalarope	*Phalaropus lobatus*
Redpoll	*Carduelis flammea*
Redshank	*Tringa totanus*
Redstart	*Phoenicurus pheonicurus*
Redwing	*Turdus iliacus*
Reed bunting	*Emberiza schoeniclus*
Reed warbler	*Acrocephalus scirpaceus*
Ring ouzel	*Turdus torquatus*
Ringed plover	*Charadrius hiaticula*
Robin	*Erithacus rubecula*
Rock dove	*Columba livia*
Rock pipit	*Anthus petrosus*
Rook	*Corvus frugilegus*
Roseate tern	*Sterna dougallii*
Ruff	*Philomachus pugnax*
Sand martin	*Riparia riparia*
Sanderling	*Calidris alba*
Sandwich tern	*Sterna sandvicensis*
Savi's warbler	*Locustella luscinioides*
Scaup	*Aythya marila*
Sedge warbler	*Acrocephalus schoenobaenus*
Shag	*Phalacrocorax aristotelis*
Shelduck	*Tadorna tadorna*
Shorelark	*Eremophila alpestris*
Short-eared owl	*Asio flammeus*
Shoveler	*Anas clypeata*
Siskin	*Carduelis spinus*
Skylark	*Alauda arvensis*
Slavonian grebe	*Podiceps auritus*
Smew	*Mergus albellus*
Snipe	*Gallinago gallinago*
Snow bunting	*Plectrophenax nivalis*
Song thrush	*Turdus philomelos*
Sparrowhawk	*Accipiter nisus*
Spotted crake	*Porzana porzana*
Spotted flycatcher	*Muscicapa striata*
Spotted redshank	*Tringa erythropus*
Starling	*Sturnus vulgaris*
Stock dove	*Columba oenas*
Stone-curlew	*Burhinus oedicnemus*
Stonechat	*Saxicola torquata*
Storm petrel	*Hydrobates pelagicus*

SPECIES	SCIENTIFIC NAME
Swallow	*Hirundo rustica*
Swift	*Apus apus*
Tawny owl	*Strix aluco*
Teal	*Anas crecca*
Tree pipit	*Anthus trivialis*
Tree sparrow	*Passer montanus*
Treecreeper	*Certhia familiaris*
Tufted duck	*Aythya fuligula*
Turnstone	*Arenaria interpres*
Turtle dove	*Streptopelia turtur*
Twite	*Carduelis flavirostris*
Velvet scoter	*Melanitta fusca*
Water rail	*Rallus aquaticus*
Wheatear	*Oenanthe oenanthe*
Whimbrel	*Numenius phaeopus*
Whinchat	*Saxicola rubetra*
White-fronted goose	*Anser albifrons*
Whitethroat	*Sylvia communis*
Whooper swan	*Cygnus cygnus*
Wigeon	*Anas penelope*
Willow tit	*Parus montanus*
Willow warbler	*Phylloscopus trochilus*
Wood sandpiper	*Tringa glareola*
Wood warbler	*Phylloscopus sibilatrix*
Woodcock	*Scolopax rusticola*
Woodlark	*Lullula arborea*
Woodpigeon	*Columba palumbus*
Wren	*Troglodytes troglodytes*
Yellow wagtail	*Motacilla flava*
Yellowhammer	*Emberiza citrinella*

Annex 2: Component species of assemblages

	SPA assemblages		SSSI assemblages										
SPECIES	Coastal seabirds	Coastal marshes and mudflats	Sand dunes and saltmarshes	Lowland damp grasslands	Lowland fen without open water	Lowland open waters and their margins	Upland waters and their margins	Upland moorland and grassland with waterbodies	Upland moorland and grassland without waterbodies	Montane grasslands and heaths	Lowland heath	Scrub (excluding heath)	Woodland
arctic tern	*		*										
avocet		*				*							
barnacle goose		*											
bar-tailed godwit		*											
bearded tit					*	*							
bewick's swan		*											
bittern					*	*							
black grouse								*	*				*
blackcap												*	*
black-headed gull			*										
black-tailed godwit		*	*	*									
brent goose		*											
bullfinch													*
buzzard								*	*	*			*
cetti's warbler					*	*							
chiffchaff													*
cirl bunting												*	
coal tit													*
common crossbill													*
common sandpiper							*	*					
common scoter		*											
common tern	*		*			*	*						
corn bunting			*										
cuckoo			*	*	*	*					*		
curlew		*	*	*			*	*	*		*	*	*
dartford warbler											*		
dipper							*	*					

SPA assemblages	SSSI assemblages													
SPECIES	Coastal seabirds	Coastal marshes and mudflats	Sand dunes and saltmarshes	Lowland damp grasslands	Lowland fen without open water	Lowland open waters and their margins	Upland waters and their margins	Upland moorland and grassland with waterbodies	Upland moorland and grassland without waterbodies	Montane grasslands and heaths	Lowland heath	Scrub (excluding heath)	Woodland
dotterel										*			
dunlin		*	*				*	*	*	*			
eider		*	*										
fieldfare													*
firecrest													*
gadwall		*		*	*	*							
garden warbler												*	*
garganey				*	*	*							
goldcrest													*
golden eagle								*	*	*			
golden oriole													*
golden plover		*						*	*	*			
goldeneye		*					*	*					
goosander		*					*	*					
goshawk													*
grasshopper warbler			*	*	*	*					*	*	
great crested grebe		*				*	*						
great skua								*	*				
great spotted woodpecker													*
green woodpecker													*
grey heron						*	*						*
grey plover		*											
grey wagtail						*	*	*					
greylag goose		*					*	*					
guillemot	*												
hawfinch													*
hen harrier								*	*				
hobby											*		*
honey buzzard													*

SPA assemblages	SSSI assemblages													
SPECIES	Coastal seabirds	Coastal marshes and mudflats	Sand dunes and saltmarshes	Lowland damp grasslands	Lowland fen without open water	Lowland open waters and their margins	Upland waters and their margins	Upland moorland and grassland with waterbodies	Upland moorland and grassland without waterbodies	Montane grasslands and heaths	Lowland heath	Scrub (excluding heath)	Woodland
jay													*
kingfisher						*							
kittiwake	*												
knot		*											
lapwing		*	*	*									
lesser black-backed gull	*												
lesser spotted woodpecker													*
lesser whitethroat												*	
linnet			*								*	*	
little grebe		*			*	*	*	*					
little ringed plover						*							
little tern	*		*										
long-eared owl											*	*	*
long-tailed duck													*
marsh harrier				*	*	*							
marsh tit													*
marsh warbler					*	*							
merlin								*	*				
montagu's harrier			*		*	*					*		
mute swan		*		*		*							
nightingale												*	*
nightjar											*	*	*
nuthatch													*
osprey							*	*					*
oystercatcher		*	*				*						
peregrine								*	*	*			
pied flycatcher													*
pink-footed goose		*											
pintail		*		*		*		*					

SPA assemblages			SSSI assemblages										
SPECIES	Coastal seabirds	Coastal marshes and mudflats	Sand dunes and saltmarshes	Lowland damp grasslands	Lowland fen without open water	Lowland open waters and their margins	Upland waters and their margins	Upland moorland and grassland with waterbodies	Upland moorland and grassland without waterbodies	Montane grasslands and heaths	Lowland heath	Scrub (excluding heath)	Woodland
pochard		*			*	*							
puffin	*												
purple sandpiper		*											
quail				*							*		
raven								*	*	*			*
razorbill	*												
red grouse								*	*				
red kite													*
red-breasted merganser		*	*			*	*	*					
redpoll													*
redshank		*	*	*		*	*	*	*		*		
redstart													*
redwing													*
reed bunting			*	*	*	*							
reed warbler					*	*							
ring ouzel								*	*	*			
ringed plover		*	*			*	*						
rock/water pipit			*										
roseate tern	*		*										
ruff		*		*									
sanderling		*											
sandwich tern	*		*										
savi's warbler					*	*							
scaup		*											
sedge warbler			*	*	*	*							
shag	*												
shelduck		*	*	*		*							
shorelark										*			
short-eared owl			*	*				*	*				

SPA assemblages			SSSI assemblages										
SPECIES	Coastal seabirds	Coastal marshes and mudflats	Sand dunes and saltmarshes	Lowland damp grasslands	Lowland fen without open water	Lowland open waters and their margins	Upland waters and their margins	Upland moorland and grassland with waterbodies	Upland moorland and grassland without waterbodies	Montane grasslands and heaths	Lowland heath	Scrub (excluding heath)	Woodland
shoveler		*		*	*	*	*						
siskin													*
snipe			*	*	*	*	*	*	*		*		
snow bunting										*			
sparrowhawk													*
spotted crake					*	*							
spotted flycatcher													*
stock dove													*
stone curlew											*		
stonechat			*					*	*		*	*	
storm petrel	*												
tawny owl													*
teal		*		*	*	*	*	*	*				
tree pipit											*	*	*
treecreeper													*
tufted duck		*				*	*						
turnstone		*											
turtle dove												*	
twite								*	*				
water rail					*	*							
wheatear			*					*	*		*		
whimbrel								*	*				
whinchat			*	*	*			*	*		*	*	
white-fronted goose		*											
whitethroat												*	
whooper swan		*											
wigeon		*					*	*					
willow tit													*
wood warbler													*

SPA assemblages	SSSI assemblages												
SPECIES	Coastal seabirds	Coastal marshes and mudflats	Sand dunes and saltmarshes	Lowland damp grasslands	Lowland fen without open water	Lowland open waters and their margins	Upland waters and their margins	Upland moorland and grassland with waterbodies	Upland moorland and grassland without waterbodies	Montane grasslands and heaths	Lowland heath	Scrub (excluding heath)	Woodland
woodcock													*
woodlark											*		
wren													
yellow wagtail				*		*							

Annex 3: Table Format and Content

General

English and scientific names follow '*The Birds of the Western Palearctic - Concise Edition*' (Snow & Perrins 1998) and the order in which the tables are presented is alphabetical, by English name.

Seasonality

A summary of the pattern of seasonal occurrence *in England* is provided. 'Main occurrence' defines the period when the species is regular and generally common or abundant, with one of four standard terms used:

- Summer visitor - present as a breeding bird during the summer months;
- Winter visitor - present as a wintering bird during the autumn and winter months;
- Passage migrant - present on migration in the spring and/or autumn;
- Year-round - a resident species.

Note that summer or winter visitors or passage migrants may be present in other seasons also but only irregularly and in small numbers.

The months of 'main occurrence' are provided, using one of three standard terms:

- Breeding period - the time when most individuals have nests or dependent young;
- Summer season - the main period of occurrence for summer visitors and passage migrants (for resident birds a default period of April-September is used);
- Winter season - the main period of occurrence for winter visitors (for resident birds a default period of October-March is used).

Where a season is not applicable because the species is generally absent at that time, 'n/a' is shown.

The attributes of features within the main body of the species tables are either applicable to 'Year-round' or are given separately for the 'breeding (summer) season' and the 'non-breeding season'. The former includes the breeding period and summer season; the latter the winter season. The introduction of this split is to assist with the practical use of the tables by field staff engaged in either summer assessments or winter assessments, but not both.

Habitats

A brief description of the main habitat types used by each species in each season is provided in the header to each table. One of three standard terms is used:

- Breeding habitat - applicable to the breeding period and summer season for breeding birds including summer visitors and resident species;
- Passage habitat - applicable to passage migrants;
- Wintering habitat - applicable to wintering birds, including winter visitors and resident species.

Where the habitats used in different seasons are the same, this is indicated. Where a habitat description is not applicable for a particular season, because the species is generally absent at that time, 'n/a' is shown.

Since many of the key attributes of features, their preferred states and generic targets, are habitat specific, habitat categories have also been used within the main body of the species tables. The habitat categories used are those from the 'top tier' of Phase 1 Habitat Survey (JNCC 1993), or, alternatively, one of the following terms is adopted:

- Any habitat - where the attribute is applicable to all of the main habitats used by the species;
- Coastal waters - applicable to inshore marine waters;
- Non-intertidal - applicable to all of the main habitats except intertidal.

The main body of the species tables is sorted by habitat to assist with use in the field.

Habitat attribute

These describe a specific characteristic or property of the bird's environment. The following 13 standard terms are used:

- Artificial structures – requirement for buildings, telegraph poles etc.;
- Cavities – in trees, buildings, walls etc.;
- Connectivity - describing linkages between areas, eg. between roosting and feeding habitats;
- Food availability - type and condition of food items;
- Grazing animals - susceptibility to trampling (only when notable);
- Hydrology/flow -vertical and horizontal hydrology, flow rates etc;
- Landform - shape or form of land, waterbodies or other features at a within-site scale, eg. lake or ditch profiles;
- Landscape - shape or form of habitat areas, openness, topography etc. at a landscape scale, ie normally whole site or greater than site;
- Salinity;
- Substrate - type and condition of substrate(s);
- Vegetation characteristics – a complex attribute used to describe ideal species composition, cover/density, edge habitats, vegetation heights and mosaics;
- Water area - extent or configuration of open water;
- Water depth.

Attributes are provided alphabetically within habitat types in the main body of the species tables.

Preferred States and Monitoring Targets

A 'preferred state' and 'monitoring target' accompany each habitat attribute. The former describes the *ideal* condition of the habitat attribute for the species in question. The latter provides generic targets that allow practical, in field assessments of the condition of each habitat attribute in relation to the preferred state. Qualifiers are provided for the preferred states where the reason for the selection may not be clear, using the following standard terms: nesting;

colonial nesting; display; feeding; concealment; anti-predator; surprise attack; roosting; and communal roosting.

An indication of the future information required for the monitoring targets is presented in square brackets (eg. 'average biomass > [xxx]') in the hope that this information can be contributed by on site measurements, species experts or extracted from future research. Square brackets have also been used to separate information within the monitoring targets that is 'estimated' from that gleaned from the published literature (see further below).

Regarding food availability, prey sizes are given only where they may easily be influenced through management. For landscape attributes, the phrase 'effective field size' is used to indicate a preference for areas (not necessarily fields) of a certain size or for smaller areas with minimal boundary structures (i.e. walls, fences, low hedges) which birds may perceive as effectively larger.

Source and Task

The 'source' provides the authors and dates for the citations that support the statements made for each habitat attribute. This is usually related to information about conditions or targets and allows the user to locate key publications from the bibliography and refer to them for greater detail. Where '[estimated]' has been used, monitoring target information has been estimated on the basis of bird biology (eg. bill/neck size for ideal water depths), management experience or on the basis of expert opinion. The source of expert opinion is shown. We stress again that estimated information will be revised in the light of feedback from in field monitoring.

The 'task' column indicates whether the monitoring against generic targets can be carried out easily by English Nature's Conservation Officers ('EN COs') or would require the help of other specialists ('Specialist').

Annex 4: Species Tables

Arctic skua

Stercorarius parasiticus

Main Occurrence:	Summer visitor	*Breeding habitat:*	n/a
Breeding Period:	May-Jul	*Passage habitat:*	Pelagic
Summer Season:	Apr-Aug	*Wintering habitat:*	n/a
Winter Season:	n/a		

Year-round

Habitat	*Habitat Attribute*	*Preferred State*	*Monitoring Target*	*Citations*	*Task*
Coastland	Food availability	Abundance of marine fish, sea and land birds and land mammals	Average biomass > [xxx], including e.g. sandeels, sprats, small-medium sized birds - pipits to waders - and mammals - shrews to voles	Snow & Perrins 1998	Specialist

Arctic tern

Sterna paradisaea

Main Occurrence:	Summer visitor	*Breeding habitat:*	Coastal beaches, offshore islands, inland heaths, rough pasture and islets in lochs
Breeding Period:	May-Aug	*Passage habitat:*	n/a
Summer Season:	Mar-Sep	*Wintering habitat:*	n/a
Winter Season:	n/a		

Breeding (summer) season

Habitat	*Habitat Attribute*	*Preferred State*	*Monitoring Target*	*Citations*	*Task*
Any habitat	Vegetation characteristics	Mix of short vegetation/bare ground (nesting) and longer vegetation (concealment)	Short vegetation of <3cm, in patches not exceeding 100x30m, and [<50%] overall	Cramp et al. 1974; Avery & Cadbury 1990; [estimated, Just Ecology]	EN COs
Standing water	Landform	Frequent low, shallow-sloping islands affording maximum protection against flooding (colonial nesting)	Several low islands/spits [grading to <30cm above water level] or platforms	Swift 1982; [estimated, Just Ecology]	EN COs
Standing water	Connectivity	Undisturbed islands in fresh or brackish waters (nesting) very close to the sea (feeding)	Several suitable nesting areas [<2km] from the sea	[estimated, Just Ecology]	EN COs

Year-round

Habitat	*Habitat Attribute*	*Preferred State*	*Monitoring Target*	*Citations*	*Task*

Year-round

Habitat	*Habitat Attribute*	*Preferred State*	*Monitoring Target*	*Citations*	*Task*
Coastal waters	Food availability	Abundance of marine fish and crustaceans	Average biomass > [xxx], including e.g. sandeel and sprat of 5-8cm	Monaghan et al. 1989	Specialist

Avocet

Recurvirostra avosetta

Main Occurrence:	Year-round	*Breeding habitat:*	Coastal lagoons, pools or freshwater marsh
Breeding Period:	May-Jun	*Passage habitat:*	n/a
Summer Season:	Apr-Sep		
Winter Season:	Oct-Mar	*Wintering habitat:*	Estuaries, deltas and sheltered coasts

Breeding (summer) season

Habitat	*Habitat Attribute*	*Preferred State*	*Monitoring Target*	*Citations*	*Task*
Any habitat	Landform	Shallow-sloping ground adjacent to water (colonial nesting)	Sloping land, [grading to <30cm above water level], including or islands, spits or platforms	Hill 1988; Goutner 1986; [estimated, Just Ecology]	EN COs
Any habitat	Vegetation characteristics	Frequent patches of sparsely vegetated or bare ground (nesting)	Vegetation cover usually <10%, or 30-40% where many predators	Goutner 1986; [estimated, Just Ecology]	EN COs
Standing water	Water depth	Extensive shallow water (feeding)	3-5cm over [>50%] of water area	Cadbury et al. 1989; [estimated, Just Ecology]	EN COs
Standing water	Hydrology/flow	Stable water levels (nesting)	[<2cm] fluctuation	Cadbury et al. 1989; [estimated, Just Ecology]	EN COs

Breeding (summer) season

Habitat	Habitat Attribute	Preferred State	Monitoring Target	Citations	Task
Standing water	Salinity	Wetlands that are not too salty (feeding)	Fresh or brackish water: salinity <25%	Cadbury & Richards 1978; Hill et al. 1989	EN COs

Year-round

Habitat	Habitat Attribute	Preferred State	Monitoring Target	Citations	Task
Any habitat	Food availability	Abundance of marine or freshwater insects, crustaceans, molluscs, fish or worms	Average biomass > [xxx], including e.g. Gammarus, Corophium, flies, beetles, Neries, Hydrobia, Cardium, gobies	Cramp & Simmons 1983; Hill et al. 1989; Reay 1991; Moreira 1995b	Specialist

Bar-tailed godwit

Limosa lapponica

Main Occurrence:	Winter visitor
Breeding Period:	n/a
Summer Season:	n/a
Winter Season:	Aug-Apr

Breeding habitat:	n/a
Passage habitat:	n/a
Wintering habitat:	Estuaries and sandy beaches

Non-breeding season

Habitat	*Habitat Attribute*	*Preferred State*	*Monitoring Target*	*Citations*	*Task*
Any habitat	Landscape	Open terrain, relatively free of obstructions (anti-predator, feeding, roosting)	Areas with unrestricted views over [>200m] and an effective field size [>10ha]	[estimated, Just Ecology]	EN COs
Any habitat	Vegetation characteristics	Open, short vegetation or bare ground predominating (roosting)	Vegetation of [<10cm] throughout areas used for roosting	[estimated, Just Ecology]	EN COs
Intertidal	Food availability	Abundance of marine worms and molluscs	Average biomass > [xxx], including e.g. Arenicola, Nereis	Smith & Evans 1973, Goss-custard et al. 1991	Specialist

Barn owl

Tyto alba

Main Occurrence:	Year-round	***Breeding habitat:***	Agricultural habitats with open areas of permanent, rank, grassland, hedges, field margins and drainage ditches
Breeding Period:	Feb-Dec	***Passage habitat:***	n/a
Summer Season:	Apr-Sep		
Winter Season:	Oct-Mar	***Wintering habitat:***	[as breeding habitat], plus coastal marshes

Year-round

Habitat	*Habitat Attribute*	*Preferred State*	*Monitoring Target*	*Citations*	*Task*
Any habitat	Landscape	Open terrain (feeding) and accessible buildings (nesting, roosting)	Areas with unrestricted views over [>300m] and several undisturbed buildings	Gibbons et al. 1993; Snow & Perrins 1998; [estimated, Just Ecology]	EN COs
Any habitat	Artificial structures	Undisturbed buildings, permanently accessible, and with platforms or cavities (nesting, roosting)	Suitable buildings, especially old, stone barns with permanent access [locally frequent]	Ramsden 1998; [estimated, Just Ecology]	EN COs
Grassland -poor semi-improved	Food availability	Abundance of live mammals, birds, reptiles and amphibians	Average biomass > [xxx], including e.g. small mammals - voles, mice, shrews -and birds, frogs	Mikkola 1983; Cayford 1992; Snow & Perrins 1998	Specialist

Barnacle goose

Branta leucopsis

Main Occurrence:	Winter visitor	***Breeding habitat:***	[resident, naturalised birds not considered]
Breeding Period:	n/a	***Passage habitat:***	n/a
Summer Season:	n/a		
Winter Season:	Aug-May	***Wintering habitat:***	Saltmarsh, improved grassland and, sometimes, arable

Non-breeding season

Habitat	*Habitat Attribute*	*Preferred State*	*Monitoring Target*	*Citations*	*Task*
Any habitat	Landscape	Open areas, including large fields (feeding, anti-predator)	Areas with unrestricted views over [>500m] with an effective field size >4ha	Vickery & Gill 1999; [estimated, Just Ecology]	EN COs
Grassland - improved	Food availability	Abundance of soft-leaved and seed-bearing plants	[>25% cover] of one or more target species, e.g. Lolium perenne, Agrostis stolonifera, Juncus gerardii	Black 1997; [estimated, Just Ecology]	EN COs
Grassland - improved	Vegetation characteristics	Predominantly short grassland swards (feeding)	<10cm throughout areas used for feeding	Vickery & Gill 1999	EN COs
Saltmarsh	Food availability	Abundance of soft-leaved plants	[>25% cover] of one or more target species, e.g. Trifolium repens, Puccinellia maritima, Festuca rubra, Triglochin maritima	Black 1997; [estimated, Just Ecology]	EN COs

Bean goose

Anser fabalis

Main Occurrence:	Winter visitor	***Breeding habitat:***	n/a
Breeding Period:	n/a	***Passage habitat:***	n/a
Summer Season:	n/a	***Wintering habitat:***	Grassy wetlands, rough pasture, floodlands and crops
Winter Season:	Sep-Mar		

Non-breeding season

Habitat	*Habitat Attribute*	*Preferred State*	*Monitoring Target*	*Citations*	*Task*
Any habitat	Landscape	Open areas, including medium to large-sized fields (feeding, anti-predator)	Areas with unrestricted views over [200m] with an effective field size >5ha	Vickery & Gill 1999; [estimated, Just Ecology]	EN COs
Any habitat	Food availability	Abundance of rough and smooth meadow grasses and crops	[>25% cover] of one or more target species, e.g. Poa spp., potatoes, sugar-beat, wheat	Owen et al. 1986; Stroud et al. 1990a; Kirby et al. 1999; [estimated, Just Ecology]	EN COs
Any habitat	Vegetation characteristics	Predominantly short to medium grasslands (feeding)	<20cm throughout areas used for feeding	Vickery & Gill 1999	EN COs
Standing water	Water area	Small to medium open areas of water (roosting)	One or more freshwaters of 3-6ha	Allport 1989	EN COs

Bearded tit

Panurus biarmicus

Main Occurrence:	Year-round
Breeding Period:	Apr-Jul
Summer Season:	Apr-Sep
Winter Season:	Oct-Mar

Breeding habitat:	Large tracts of reeds and associated dense, tall, non-woody vegetation growing by fresh or brackish water or immediately adjoining marshes and swamps
Passage habitat:	n/a
Wintering habitat:	[as breeding habitat] plus damp, grassy areas

Breeding (summer) season

Habitat	*Habitat Attribute*	*Preferred State*	*Monitoring Target*	*Citations*	*Task*
Swamp, marginal and inundation	Food availability	Abundance of shrub-layer invertebrates	Average biomass > [xxx], including e.g. chironomids, midges, Wainscot moth larvae and pupae, snails, spiders	Bibby 1981; Gibbons et al. 1993; EN 1994f	Specialist

Non-breeding season

Habitat	*Habitat Attribute*	*Preferred State*	*Monitoring Target*	*Citations*	*Task*
Swamp, marginal and inundation	Food availability	Abundance of seed-bearing plants	[>25% cover] of one or more target species, e.g. Phragmities australis, Typha and Juncus spp., Urtica dioica, Chenopodium album, Epilobium hirsutum	Bibby & Lunn 1982; EN 1994f; [estimated, Just Ecology]	EN COs

Year-round

Habitat	*Habitat Attribute*	*Preferred State*	*Monitoring Target*	*Citations*	*Task*

Year-round

Habitat	Habitat Attribute	Preferred State	Monitoring Target	Citations	Task
Swamp, marginal and inundation	Landscape	Extensive reedbed (nesting, feeding)	Continuous reed over >20ha	Bibby & Lunn 1982	EN COs
Swamp, marginal and inundation	Vegetation characteristics	Mix of transitional, young and old reedbed, including drier areas with dense understory (nesting)	[x:y:z ratio] of transitional, young and old overall, and [locally frequent] dry patches	Bibby & Lunn 1982; EN 1994f; [estimated, Just Ecology]	EN COs

Bewick's swan

Cygnus columbianus

Main Occurrence:	Winter visitor	***Breeding habitat:***	n/a
Breeding Period:	n/a	***Passage habitat:***	n/a
Summer Season:	n/a	***Wintering habitat:***	Estuaries, lakes, rivers, arable and improved grassland
Winter Season:	Oct-Apr		

Non-breeding season

Habitat	*Habitat Attribute*	*Preferred State*	*Monitoring Target*	*Citations*	*Task*
Any habitat	Landscape	Open areas, including large fields (feeding, anti-predator)	Areas with unrestricted views over [>500m] with an effective field size >6ha	Rees 1990; [estimated, Just Ecology]	EN COs
Grassland - improved	Food availability	Abundance of soft-leaved plants	[>25% cover] of one or more target species, e.g. Lolium perenne, Glyceria fluitans, Phleum pratense, Rorippa amphibia, Alopecurus geniculatus	Beekman et al. 1991; Dirksen et al. 1991; Rees et al. 1997b; [estimated, Just Ecology]	EN COs
Grassland - improved	Hydrology/flow	Wet fields with many surface pools (feeding)	[25-50%] of the area soggy or flooded	Bowler 1996; [estimated, Just Ecology]	EN COs
Grassland - improved	Vegetation characteristics	Predominantly short grassland swards (feeding)	[<10cm] throughout areas used for feeding	Cramp & Simmons 1977; Rees 1990; Bowler 1997; [estimated, EC Rees]	EN COs

Non-breeding season

Habitat	Habitat Attribute	Preferred State	Monitoring Target	Citations	Task
Standing water	Food availability	Abundance of aquatic plants	[>25% cover] of one or more target species, e.g. Potomageton, Ceratophylum, Zannichellia, Myriophyllum, Chara spp.	Rees et al. 1997b; [estimated, Just Ecology]	EN COs
Standing water	Water depth	Shallow water (feeding)	<1m over [>50%] of water area	Owen et al. 1986; Newbold 1997; [estimated, Just Ecology]	EN COs
Standing water	Hydrology/flow	Fluctuating water levels, providing a succession of surface water areas (feeding)	Water levels fluctuating by [5-15%] per month	RSPB/EN/ITE 1997; [estimated, Just Ecology]	EN COs
Standing water	Water area	Large open areas of water (feeding, roosting)	One or more freshwaters of [>10ha]	Cramp & Simmons 1977; [estimated, Just Ecology]	EN COs

Bittern

Botaurus stellaris

Main Occurrence:	Year-round	***Breeding habitat:***	Reedbeds
Breeding Period:	Apr-Aug	***Passage habitat:***	n/a
Summer Season:	Apr-Sep	***Wintering habitat:***	Reedbeds, estuarine creeks, grazing marsh, streams etc.
Winter Season:	Oct-Mar		

Breeding (summer) season

Habitat	*Habitat Attribute*	*Preferred State*	*Monitoring Target*	*Citations*	*Task*
Swamp, marginal and inundation	Salinity	Freshwater wetlands (feeding)	Fresh water: salinity [<5%]	EN 1994a; [estimated, Just Ecology]	EN COs

Year-round

Habitat	*Habitat Attribute*	*Preferred State*	*Monitoring Target*	*Citations*	*Task*
Any habitat	Food availability	Abundance of fish and amphibians	Average biomass > [xxx], including e.g. eel, rudd, roach of 6-35cm, frogs, toads	Cramp & Simmons 1977; EN 1994a	Specialist
Standing water	Landform	Ditches predominantly with shallow margins and not too deep (feeding)	Most [>75% by area] ditches up to 2.5m deep, consisting of a deep central channel (>1.5m) and 1m deep/5m wide shallow margin on at least one side	Tyler 1994; [estimated, Just Ecology]	EN COs

Year-round

Habitat	Habitat Attribute	Preferred State	Monitoring Target	Citations	Task
Standing water	Water area	Large open areas of water (feeding)	Several freshwater pools of [>0.5ha], but <20% of reedbed area overall	Bibby & Lunn 1982; [estimated, Just Ecology]	EN COs
Swamp, marginal and inundation	Landscape	Large, unbroken expanse of emergent vegetation (nesting, feeding, concealment)	Continuous reed over >20ha	Tyler 1994; EN 1994a	EN COs
Swamp, marginal and inundation	Water depth	Shallow water within reeds, plus frequent deep pools and dykes (feeding)	Water throughout reedbed of 10-30cm, with pools and dykes 2-4m deep	Tyler 1994; [estimated, Just Ecology]	EN COs
Swamp, marginal and inundation	Vegetation characteristics	Pure reed stand with vigorous growth over whole area (nesting, concealment)	At least 30% reedbed uncut and remainder not more than 6 years old with no more than 20% cut in any year	Tyler 1994	EN COs

Black grouse

Tetrao tetrix

Main Occurrence:	Year-round	***Breeding habitat:***	Heathland and moor with mosaics of woodland, rough grassland and wet flushes
Breeding Period:	May-Jul	***Passage habitat:***	n/a
Summer Season:	Apr-Sep	***Wintering habitat:***	[as breeding habitat]
Winter Season:	Oct-Mar		

Breeding (summer) season

Habitat	*Habitat Attribute*	*Preferred State*	*Monitoring Target*	*Citations*	*Task*
Any habitat	Food availability	Abundance of ground-surface and shrub-layer invertebrates (feeding of young)	Average biomass >[xxx], including e.g. sawflies, caterpillars, spiders, beetles, harvestmen	Cayford & Hope-Jones 1989; Cadbury 1992; Cayford 1993	Specialist
Any habitat	Vegetation characteristics	Frequent patches of open ground with short vegetation, close to cover (display)	Several patches of >0.5ha containing vegetation of 5-20cm and <50m from cover	Cayford et al. 1989; Cayford 1993; EN 1994g; RSPB 1994; [estimated, Just Ecology]	EN COs

Year-round

Habitat	*Habitat Attribute*	*Preferred State*	*Monitoring Target*	*Citations*	*Task*
Any habitat	Food availability	Abundance of seed and fruit-bearing plants	[>50% cover] of one or more target species, e.g. larch, Scots pine, birch, juniper, rowan, hawthorn, Eriophorum vaginatum, Empetrum nigrum, Juncus squarrosus, Carex spp.	Cayford & Hope-Jones 1989; Cadbury 1992; Cayford 1993; [estimated, Just Ecology]	EN COs

Year-round

Habitat	Habitat Attribute	Preferred State	Monitoring Target	Citations	Task
Woodland and scrub	Landscape	Many small to large woodlands amidst open country (nesting, feeding)	Several woodlands of >1ha and representing [>50%] of the area overall	Cayford 1993; EN 1994g; RSPB 1994; [estimated, Just Ecology]	EN COs
Woodland and scrub	Vegetation characteristics	Mix of open, short vegetation (feeding) and taller grasses, scrub or woodland cover (nesting, feeding)	[>75%] of area with shrub, tall grass, understorey of >1m tall and remainder >0.5m tall	Cayford et al. 1989; Cayford 1993; EN 1994g; RSPB 1994; [estimated, Just Ecology]	EN COs

Black redstart

Phoenicurus ochruros

Main UK Occurrence:	Summer visitor
Breeding Period:	May-Jul
Summer Season:	Apr-Oct
Winter Season:	Oct-Mar

Breeding habitat:	Derelict industrial sites such as gasworks, railway sheds and power stations. Also modern industrial complexes and old houses in both rural and coastal settings
Passage habitat:	n/a
Wintering habitat:	[as breeding habitat]

Year-round

Habitat	Habitat Attribute	Preferred State	Monitoring Target	Citations	Task
Any habitat	Food availability	Abundance of ground-surface invertebrates	Average biomass > [xxx], including e.g. beetles, flies, ants, moths, caterpillars, millipedes, spiders	Witherby et al. 1938; Snow & Perrins 1998	Specialist

Black-headed gull

Larus ridibundus

Main Occurrence:	Year-round	*Breeding habitat:*	Saltmarshes, sand dunes, freshwater lakes, marshes, gravel pits, moorland etc.
Breeding Period:	Apr-Jun	*Passage habitat:*	n/a
Summer Season:	Apr-Sep		
Winter Season:	Oct-Mar	*Wintering habitat:*	Estuaries and coastal beaches, inland waters, rubbish dumps and farmland

Breeding (summer) season

Habitat	*Habitat Attribute*	*Preferred State*	*Monitoring Target*	*Citations*	*Task*
Any habitat	Vegetation characteristics	Predominantly short to medium swards (colonial nesting)	10-30cm throughout areas used for nesting	Cramp & Simmons 1983	EN COs

Year-round

Habitat	*Habitat Attribute*	*Preferred State*	*Monitoring Target*	*Citations*	*Task*
Any habitat	Food availability	Abundance of ground-surface and aquatic invertebrates and offal	Average biomass > [xxx], including e.g. earthworm, wireworm, leatherjacket, Neires, Arenicola, Hydrobia	Cramp et al. 1974; Cramp & Simmons 1983	Specialist