

# The UK SPA network: its scope and content





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## Volume 1: Rationale for the selection of sites

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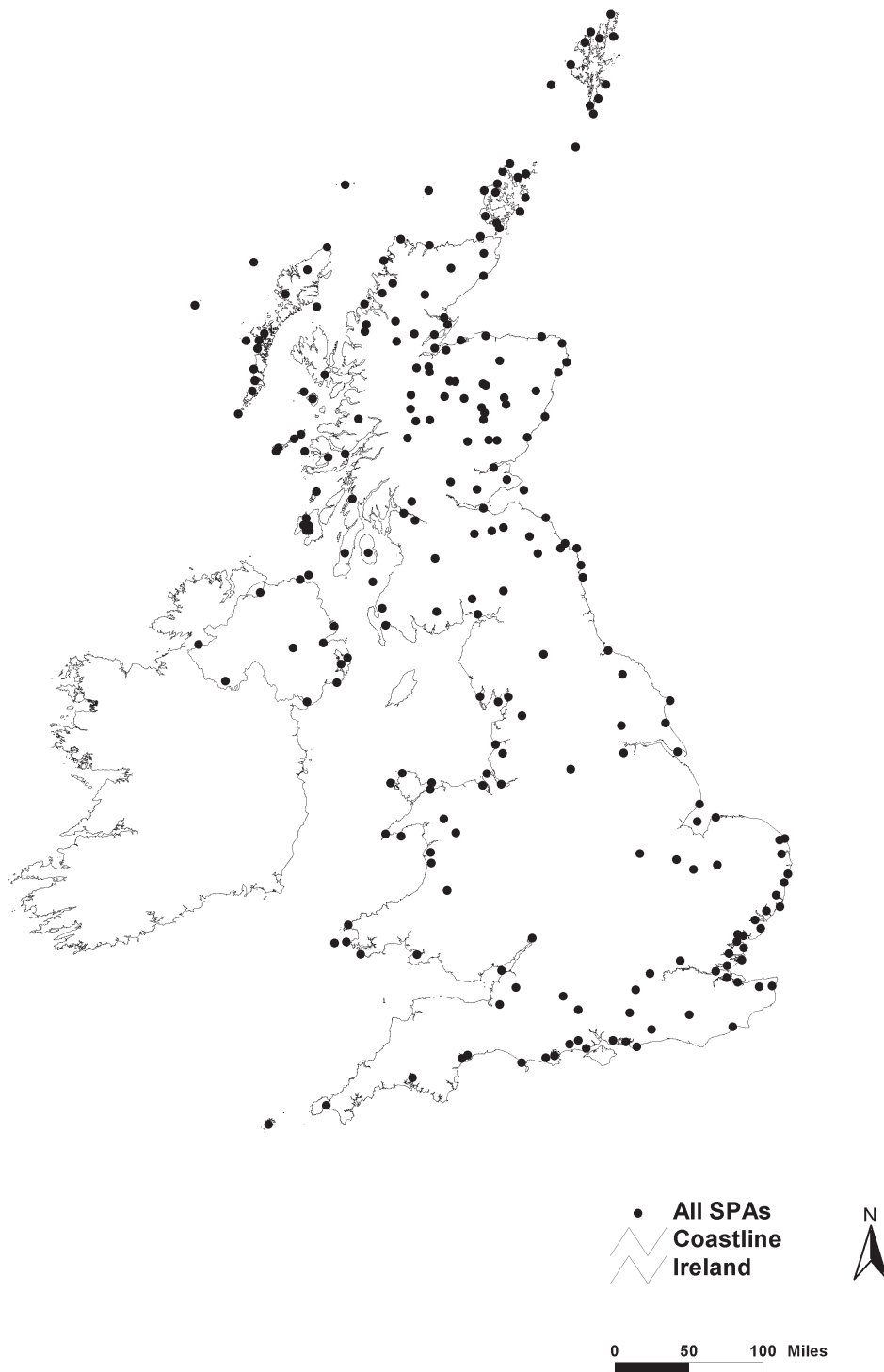


# Executive summary

- This report presents the UK network of Special Protection Areas (SPAs) identified to meet UK obligations under Article 4 of the European Union’s Directive on the conservation of wild birds (EC/79/409 as modified) (‘the Birds Directive’).
- The SPA network presented in this report is the result of a review undertaken by the UK Joint Nature Conservation Committee together with the Environment and Heritage Service of Northern Ireland, the Countryside Council for Wales, Scottish Natural Heritage and English Nature. The network of sites has been formally recommended to government by the Joint Committee.
- Publication of this review has been guided by a Steering Group comprising representatives of the statutory conservation agencies as well as the National Assembly for Wales, the Scottish Executive and the Department of the Environment, Transport and the Regions.
- This review updates the assessment of UK SPAs published in 1992. Since that time, there has been a range of new ornithological surveys undertaken throughout the UK, especially in the uplands and related to a number of species that were highlighted as being poorly represented in the national network proposed in the early 1990s. In view of new information and possible gaps, Government requested JNCC to review the UK SPA network with a view to recommending a definitive list of sites, identified against explicit selection guidelines.
- JNCC has derived guidelines for selecting SPAs, building on existing UK and international practice and precedent. In the absence of agreed European guidelines, there may be scope for their use elsewhere.
- The guidelines have been used to assess the conservation requirements of species listed in Annex I of the Birds Directive and/or migratory species regularly occurring in the UK, and to identify an appropriate suite of SPAs for each species. For Annex I species, assessments have been made at either national scale (Great Britain) or, in the case of Northern Ireland, in an all-Ireland context. For migratory species not listed on Annex I, assessments have been made at an international scale (*i.e.* the relevant biogeographic or flyway populations).
- The SPA suites for each species collectively form the UK SPA network – a contribution to the European Union’s Natura 2000 network – that comprises 243 sites. The network extends to c. 1,454,500 ha (see map below).
- Appendix 6 of this report presents accounts for 103 species for which SPAs have been selected. These accounts summarise the species’ conservation requirements in the different seasons in which they are present in the UK. They also outline the reasoning underlying the selection of each species’ SPA suite.
- Appendix 7 describes each site in the UK’s SPA network in a standard format indicating for which species the site has been selected, the features that are important for these species, and the proportion of national or international populations supported.
- The review has been based on best-available data for sites and populations from the first half of the 1990s. The data were the most current and comprehensive that were available at the commencement of the review. They thus provide a comparative assessment for a limited period, and a fixed baseline, even though more recent data have since become available.
- The UK is of major international importance for several groups of birds. These include: breeding seabirds, wintering and passage wildfowl and waders, birds of Britain’s distinctive uplands, and

birds of the Caledonian pine-forest. A high proportion – in some cases all – of the national and international populations of such species utilise the UK SPA network. In summer, the network holds over 4,946,000 breeding seabirds, whilst in winter it supports an average of over 2,186,000 non-breeding waterbirds. The habitat protection provided for these birds is a major contribution to their international conservation.

- Those species of greatest conservation concern (in the context of the Birds Directive) tend to have the highest proportions of their populations within the UK SPA network, as do those that have the smallest geographic ranges (in summer and winter), and those where the UK holds a high proportion of international numbers.
- SPAs are inappropriate for some UK bird species and thus for these, SPAs have not been selected. This report documents those populations which are broadly and/or sparsely dispersed or where are other reasons why site-protection measures under the Birds Directive are inappropriate, this report documents these. The special protection measures for these species are instead provided by legal protection, together with a range of wider-countryside conservation policies and other initiatives.
- It has not been possible to identify a full SPA suite for a small number of species because of currently changing status or lack of data. Monitoring schemes are being developed to give feedback on changing population status of species within each SPA as well as at national level. This, together with an ever-increasing knowledge of conservation requirements, will allow the UK to modify the SPA network if essential.
- There are minor differences between the UK list of SPAs and BirdLife International’s Important Bird Areas inventory. This is unsurprising – indeed, it is to be expected – since different selection guidelines, criteria, and priorities have been used to identify the respective site networks. The UK SPA list more accurately reflects the obligations under the Birds Directive.
- The carefully selected SPA network is of large size, contains a wide variety of habitats and includes sites spread throughout the UK. The network is logically and scientifically derived, collectively robust, and will make an enduring contribution to the conservation of Britain’s birds.
- The SPA network presented here provides for the site-based requirements of Birds Directive Annex I and migratory species that regularly occur in the UK. It will enable the UK to meet fully its obligations under the Directive to conserve its internationally important bird fauna.



Map showing the UK network of Special Protection Areas. (For more detailed regional maps see Appendix 7.)





# 1 Introduction

This review represents the UK’s contribution to the Natura 2000 network for terrestrial Special Protection Areas. It draws on an extensive background of ornithological surveys undertaken over many years, and previous lists of important sites. It distils best available information concerning species’ conservation requirements as stated by Article 4 of the Directive as well as knowledge of internationally important sites for birds in the UK.

The carefully selected network resulting from this review is of large size, contains a wide variety of habitats and includes sites spread throughout the UK. It is logically and scientifically derived, collectively robust, and therefore able to make an enduring contribution to conserving Britain’s birds. We recognise, however, the need to be aware of and respond to major biological changes, in particular those consequent upon climate change, or to the availability of significant new data.

## 1.1 The ‘Birds Directive’ and Special Protection Areas

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In 1979, the European Community adopted the Council Directive on the Conservation of Wild Birds (79/409/EEC). This Directive (see Appendix 2) is usually referred to as the Birds Directive. It provides for the protection, management and control of naturally occurring wild birds within the European Union through a range of mechanisms. One of the key provisions is the establishment of an internationally co-ordinated network of protected areas.

Article 4 of the Birds Directive requires Member States to identify and classify in particular, the most suitable territories in size and number for rare or vulnerable species<sup>1</sup> listed in Annex I (Article 4.1), and for regularly occurring migratory species (Article 4.2). Member States are also required to pay particular attention to the protection of wetlands, especially wetlands of international importance. These sites have become known throughout the Member States as Special Protection Areas (SPAs). Within SPAs, Member States are obliged to take necessary steps to avoid deterioration of natural habitats and disturbance of the species, where this disturbance would be significant having regard to the objectives of the Directive.

The Directive envisages that the classification of SPAs by all Member States will result in a European network of protected sites. This SPA network, together with Special Areas of Conservation under the Habitats Directive, is known as ‘Natura 2000’.

## 1.2 The UK avifauna – features of outstanding international importance

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The UK’s geographic position – a north temperate island close to a major continental land-mass – results in its particular European importance for a number of groups of birds. Whilst many species or

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<sup>1</sup> The Directive lists some sub-species (e.g. Fair Isle Wren and Greenland White-fronted Goose) on Annex I. Throughout this review, reference to the term ‘species’ should be taken to include such sub-species unless specifically stated to the contrary.

populations occur in internationally important numbers, there are various groups of birds that are of outstanding importance.

- The UK is exceptionally important for many populations of breeding seabirds. Together with Ireland, the UK holds over half the relevant biogeographic (and in some cases, the world) populations of Manx Shearwater<sup>2</sup>, Storm Petrel, Gannet, Great Skua, Lesser Black-backed Gull and Puffin (Lloyd *et al.* 1991).
- Britain is the wintering area for many waterbirds (ducks, geese, swans, waders) breeding throughout Arctic and sub-Arctic areas. Birds visiting the UK come from as far afield as the central Canadian Arctic (110 °W) and central Siberia (110 °E). Most of these waterbirds nest at very low densities over extensive areas of the arctic but gather in winter in UK wetlands in dense aggregations. The UK thus has significant international responsibility for high proportions of total populations.
- For many other waterbirds, the UK is not their final destination but is a stepping-stone on their migratory flyways to ultimate winter destinations in Africa. For many waders – such as Ringed Plover, Black-tailed Godwit, Redshank, Sanderling, Dunlin and Knot – the coast of the UK is of crucial importance during the spring and autumn passage periods.
- The British uplands have a unique and characteristic bird community (Ratcliffe 1990, 1991; Brown & Bainbridge 1995). Species such as Golden Plover and Merlin probably nest at higher densities in the British uplands than anywhere else in Europe (Ratcliffe & Thompson 1988), whilst several Arctic breeding birds, such as Red-throated Diver, are at the southern edge of their breeding range.
- The ancient Caledonian pine-forests of the central Scottish Highlands contain Britain's only endemic bird species, the Scottish Crossbill.

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2 Taxonomy and scientific names used in this report follow the British Ornithologist's Union (BOU 1992, as annually updated) and are given in each species account (Appendix 6).





# 2 The identification of the UK's SPA network

## 2.1 Implementation of Article 4 by the UK

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The UK has had an active programme of SPA identification and classification since the Birds Directive came into force. The programme has evolved over time, with the progressive development of processes and procedures related to the identification of sites and their classification.

Progress has been hampered, however, by the absence of formally agreed criteria or selection guidelines at EU level. The accession of additional Member States has resulted in revision of the lists of species in the annexes to the Directive (Appendix 2). In the context of the current review, the revisions of 1985 and 1992 were significant, adding to Annex I several species that occurred in the UK.

In implementing Article 4, the UK has had regard to conservation measures taken by other European Union Member States. However, published data on the content of other national SPA networks are not easily available. This has limited the practical extent to which the selection of SPAs by the UK has been influenced by similar activity in other countries.

Throughout the implementation process, the UK government has periodically published lists of qualifying SPAs in *Hansard* and elsewhere<sup>1</sup>. The total number of sites has varied from one listing to another, with an underlying upward trend, reflecting progressively better survey information (see table). Simple comparison of site-lists can be very misleading however, since a number of small sites identified separately in early lists have since been subsumed in larger composite SPAs. These subsumed sites still exist as legal entities although they are not used for reporting purposes, as explained in Appendix 8. The true comparison is the area identified as qualifying for SPA status. This has increased significantly since the early 1980s and the SPA network now amounts to about 1,454,500 ha.

| Year | Coverage | No. of Sites |
|------|----------|--------------|
| 1987 | GB       | 192          |
| 1988 | GB       | 188          |
| 1991 | GB       | 218          |
| 1992 | UK       | 256          |
| 2001 | UK       | 243          |

In 1990, the Nature Conservancy Council (NCC) published its recommendations regarding the proposed network of SPAs in Great Britain (Stroud *et al.* 1990a). This summarised the biological rationale for a national network of SPAs, gave locations of sites identified at that time and provided an assessment of the proportions of populations that would be covered by the then proposed national network. It also highlighted a number of species that were then inadequately covered by the proposed

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<sup>1</sup> Nature Conservancy Council 1983; Commons Hansard 18 March 1985, col. 340; Commons Hansard 18 July 1985, cols. 241–244; Commons Hansard 11 May 1987, cols. 78–85; Commons Hansard 20 December 1988, cols. 187–191; Stroud *et al.* 1990a; Commons Hansard 11 July 1991, cols. 219–224; Pritchard *et al.* 1992; DoE 1994 (Planning Policy Guidance 9: Nature Conservation); Scottish Office Circular 6/1995.

network. For some of these, further survey and census information has since been undertaken in order to identify additional sites.

In 1989, BirdLife International published a European list of Important Bird Areas (IBAs) (a non-statutory listing maintained by BirdLife International – Grimmett & Jones 1989) which built on the earlier inventory of Osieck & Mörzer Bruyns (1981). For the UK, the list of IBAs was then effectively identical with the list of proposed Special Protection Areas identified by the NCC (Stroud *et al.* 1990a), as similar criteria had been used to draw up the two lists.

Details of each SPA proposed by the 1990 NCC review were published jointly by JNCC, the country agencies and RSPB in 1992 as the UK's Important Bird Areas (Pritchard *et al.* 1992). This site inventory was widely distributed to local government and other statutory bodies. It presented more detail on the sites identified in the 1989 European IBA inventory for the UK and the species for which they were important. (It did, however, include some species that were neither migratory nor listed on Annex I and thus were not relevant in the context of Article 4 of the Directive).

The Joint Working Party on Special Protection Areas and Ramsar sites (also acting as the UK's National Ramsar Committee) has routinely reviewed classification of SPAs and provided a valuable national forum that involves government departments, their agencies and non-governmental organisations. It has regularly discussed aspects of the UK's implementation of the Birds Directive.

In 1991, the Office of Public Works, Dublin, and the Department of the Environment for Northern Ireland asked JNCC to advise them with respect to the establishment of an all-Ireland network of SPAs. This review was published in 1993 and gave details of proposed sites and the proportion of all-Ireland populations that would be covered by the suggested network (Way *et al.* 1993).

Since 1992, there has been a range of new ornithological surveys undertaken throughout the UK, especially in the uplands and related to a number of species that were highlighted as being poorly represented in the national network proposed in the early 1990s. In view of new information and possible gaps, Government requested JNCC to review the UK SPA network with a view to recommending a definitive list of sites, identified against explicit selection guidelines.

After a period of consideration and consultation with non-governmental organisations represented on the UK Joint Working Party on SPAs and Ramsar sites, JNCC published the UK's SPA selection guidelines in 1999 (JNCC 1999). The background to the derivation of these guidelines is outlined in section 3.1 and the overall review presented in this document.

In March 2000, BirdLife International published a two-volume updated inventory of IBAs in Europe (Heath & Evans 2000). This again presents a list of IBAs for each European country including the UK. BirdLife International has recently developed uniform global criteria for IBA selection which differ from those previously used in the UK (Pritchard *et al.* 1992). Accordingly, the list of IBAs published by BirdLife in the current review (Heath & Evans 2000) is no longer identical to the UK SPA network presented here. Notwithstanding the minor differences, there is, however, a broad degree of similarity between the SPA and IBA lists for the UK. Indeed, data from the draft IBA inventory for the UK were used in preparatory work for this SPA review.

The minor differences between the IBA and SPA lists for the UK are unsurprising and to be expected since different selection guidelines, criteria, time-periods and priorities have been used to identify the respective site networks. In cases where there are significant differences between boundaries of IBAs and SPAs, the reasons for these differences are always clearly justified in the context of the requirements of the Birds Directive.

## 2.2 Geographical scope of this review

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This review presents the national network of SPAs in the terrestrial environment of England, Scotland, Wales and Northern Ireland. There has been a long tradition of cross-border co-operation between the Republic of Ireland and Northern Ireland regarding nature conservation matters. As often as possible, the biogeographic entity of the whole of Ireland is used as the context for conservation priority setting (*e.g.* Whilde *et al.* 1993). Indeed, the previous review of SPAs in Ireland was jointly commissioned by government departments in both the Republic and Northern Ireland (Way *et al.* 1993).

The Directive’s obligations cover all the territory of Member States and therefore include the marine environment. This review has considered terrestrial sites that extend partly into marine or intertidal areas, for example, in estuaries. It has not, however, considered the requirements of birds using the wholly offshore environment, and proposed marine SPAs are not presented here. The protection requirements of birds in the offshore marine environment (with respect to Article 4) are outside the scope of this review.

## 2.3 Data-handling issues

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The site and species data used in this review have come from a wide variety of sources. The overall aim was to obtain the best-available ‘snapshot’ of information about sites and species in the mid-1990s to enable the resulting site series to sit in a uniform context. Because of the periodic nature of national surveys, data for different groups of species have not always been derived from exactly the same years. Generally, however, data mostly relate to the five-year period 1991/92 to 1995/96, unless there have been compelling reasons to use earlier or later data. These were the most current data available at the commencement of the review.

At an early stage, definitive reference population sizes were agreed for relevant breeding, passage and wintering populations, and geographical scales (Great Britain, all-Ireland and international). The reference populations for each species – which were taken from published sources available at the commencement of the review – are set out in Appendix 4.

A large number of issues surrounding data sources, and qualifying species, arose during the production of this review. These are explained in more detail in Appendix 5.

## 2.4 Future monitoring

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Article 4 of the Birds Directive states that “*trends and variations in populations shall be taken into account as a background*” by Member States in the evaluation of their special conservation measures. This indicates the need for monitoring of species status at a variety of scales.

The UK has in place arguably the most comprehensive regime of bird monitoring in the world. Detailed monitoring is undertaken on many sites through schemes such as the Wetland Bird Survey and the Seabird Colony Register. This monitoring provides essential feedback on the performance and efficacy of the SPA network as a whole, as well as aiding managers of individual sites to assess the success of site management regimes. It will also enable the UK to be aware of major biological changes, in particular those consequent upon current changes of climate.



# 3 Selection guidelines for Special Protection Areas

## 3.1 Background to derivation

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The process of selecting SPAs in the UK has been hindered by the lack of agreed selection criteria formalised at a European scale. Selection guidelines for the UK have, therefore, been derived from knowledge of common international practice. The selection guidelines below – which are based on scientific criteria – were prepared to assist the selection of SPAs in the UK. They were published by JNCC in 1999 on behalf of the statutory agencies and government departments concerned.

In order to maintain conformity and common standards, the UK has had regard to the internationally agreed guidelines for the selection of wetlands of international importance under the Ramsar Convention. The SPA guidelines make explicit reference to a number of definitions and other principles relating to Ramsar site selection guidance<sup>1</sup>.

The selection guidelines were applied to available data in two stages (described in more detail in section 4):

- (1) the first stage identified areas likely to qualify for SPA status;
- (2) the second stage considered these areas further using one or more of the judgements in Stage 2 to select the most suitable areas in number and size for SPA classification.

Stage 1's fourth guideline allows consideration, using the Stage 2 judgements, to be given to cases where a species' population status, ecology or movement patterns may mean that an adequate number of areas cannot be identified from Stage 1's first three guidelines alone. The Stage 2 judgements were particularly important for selecting and determining the boundaries of SPAs for thinly dispersed and wide-ranging species.

In the application of Stage 2 judgements, preference was given to those areas that contributed significantly to the species' population viability both locally and as a whole. The protection of the populations in SPAs was considered alongside, and is complemented by other non-site-based special measures designed to maintain populations (section 6).

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<sup>1</sup> The most recent guidance for the selection of Ramsar sites, and revised criteria, was agreed at the seventh Conference of Parties in 1999 – Resolution C.7.11 (Ramsar Convention Bureau 2000).

## 3.2 The Guidelines

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### Stage 1

- (1) An area is used regularly by 1% or more of the Great Britain (or in Northern Ireland, the all-Ireland) population of a species listed in Annex I of the Birds Directive (79/409/EEC as amended) in any season.
- (2) An area is used regularly by 1% or more of the biogeographical population of a regularly occurring migratory species (other than those listed in Annex I) in any season.
- (3) An area is used regularly by over 20,000 waterfowl (waterfowl as defined by the Ramsar Convention) or 20,000 seabirds in any season.
- (4) An area which meets the requirements of one or more of the Stage 2 guidelines in any season, where the application of Stage 1 guidelines 1, 2 or 3 for a species does not identify an adequate suite of most suitable sites for the conservation of that species.

### Stage 2

- (1) *Population size and density*  
Areas holding or supporting more birds than others and/or holding or supporting birds at higher concentrations are favoured for selection.
- (2) *Species range*  
Areas selected for a given species provide as wide a geographic coverage across the species' range as possible.
- (3) *Breeding success*  
Areas of higher breeding success than others are favoured for selection.
- (4) *History of occupancy*  
Areas known to have a longer history of occupation or use by the relevant species are favoured for selection.
- (5) *Multi-species areas*  
Areas holding or supporting the larger number of qualifying species under Article 4 of the Directive are favoured for selection.
- (6) *Naturalness*  
Areas comprising natural or semi-natural habitats are favoured for selection over those which do not.
- (7) *Severe weather refuges*  
Areas used at least once a decade by significant proportions of the biogeographical population of a species in periods of severe weather in any season, and which are vital to the survival of a viable population, are favoured for selection.



# 4 Applying the SPA selection guidelines

The application of the selection guidelines has generated the list of SPAs set out in Appendix 7. The section below explains the methods and approach adopted in selecting the list of UK SPAs and their qualifying features. The species accounts in Appendix 6 summarise the reasons why the particular suite of SPAs has been selected for each species. They also include information about each species' population status, size and distribution, and population structure and trends.

Following the agreement of site selection guidelines, JNCC convened a series of inter-agency review workshops in January 1998, which assessed the suite of sites for each regularly occurring Annex I species, and each regularly occurring migratory species (see Appendix 5.1).

The requirements of each species were assessed against a 'decision-tree' (see Figure 4.1). For many species, the initial meetings highlighted the need for further work to identify additional possible sites, and/or add further qualifying species to existing sites. The process of reviewing species site requirements was substantially completed by June 1999.

## 4.1 Selection Stage 1.1

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### 4.1.1 'National' population estimates and thresholds

For Annex I species, 1% thresholds relate to national rather than international population numbers. 'National' populations have been defined separately for Great Britain and for all-Ireland as two separate biogeographic entities, reflecting a long-established approach (Way *et al.* 1993).

For Great Britain, thresholds were derived from breeding or non-breeding population estimates collated by Stone *et al.* (1997), except for Hen Harrier, Stone Curlew, Greenshank and Woodlark. The assessment of 483 pairs derived from the 1988 national survey of Hen Harriers (Sim *et al.* 1999, in press) was used as the most recent national context. For Stone Curlew, an unpublished national total for 1998 was used (English Nature unpublished), whilst for Greenshank, the total of 1,440 pairs derived from the 1997 national stratified sample survey (Hancock *et al.* 1997) was adopted. For Woodlark, the more recent population estimate of 1,500 pairs derived from the British Trust for Ornithology (BTO) national survey of 1997 (Wotton & Gillings 2000) was used.

For all-Ireland populations, thresholds for non-breeding waterfowl used by Way *et al.* (1993) were used, whilst for other species thresholds were calculated from all-Ireland population estimates made by Gibbons *et al.* (1993).

### 4.1.2 Minimum numbers for wintering waterbirds

The size of the national population of some wintering waterbirds is very small. This typically is the case for those species whose main range in the non-breeding season occurs either to the south (e.g. for Ruff and Greenshank) or east (e.g. Bean Goose and Smew) of the UK. For these species, 1% of national populations give small values, often amounting to just a few individuals. In an international context

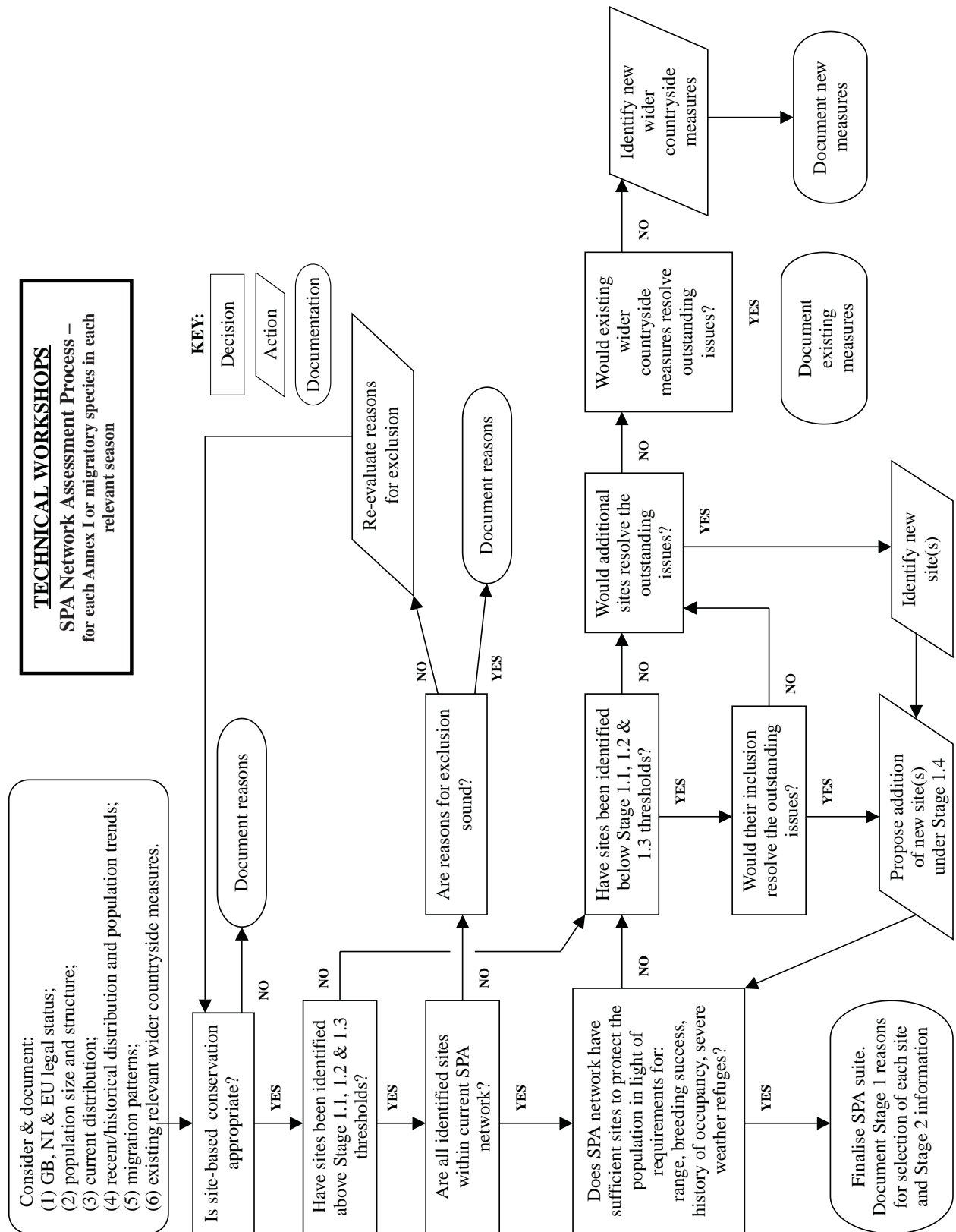


Figure 4.1



these very small numbers are not of major significance for sustaining viable biogeographical populations of these species.

With this in mind, it has been the statutory agencies' long-standing practice to require at least 50 individuals to be regularly present on a site before that area is considered for site selection (Salmon 1981). This has been the practice with regard to the selection of SSSIs and has also been adopted for this review of SPAs.

Note that the guideline has only been applied in the context of wintering waterbirds. It would not be appropriate for breeding birds where the rarest breeding populations of many species are characterised by just a few pairs. Nor would it be appropriate where the global population size is small (for example, a globally threatened species of waterbird such as Bittern). In such a case, it would be entirely appropriate to select a site based on small absolute numbers (as indeed, is urged by the Ramsar Convention's site selection guidance – Res. C.VII.11).

## 4.2 Selection Stage 1.2

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Whilst Guideline 1.1 selects the most important sites in the UK for Annex I species, Guideline 1.2 selects the most important sites at flyway scale. In this way, the number of UK sites selected under this guideline reflect the proportional responsibility the UK has for the species concerned. Significant numbers of sites have been selected for those species where the UK holds the major part of their international population (e.g. Pintail and many of the goose populations).

### 4.2.1 International population estimates and thresholds

For UK waterbirds, the recommended 1% thresholds published by Rose & Scott (1997) have been used, except for the following species.

For Red-breasted Merganser, Scott & Rose (1996) recommended the treatment of birds occurring in East Greenland, Iceland, Britain and Ireland as a separate biogeographical population. However, for reasons given in species account A6.42, the review has followed the earlier treatment of Rose & Scott (1994), which groups British Red-breasted Mergansers with others from north-west and central Europe, giving a 1% threshold of 1,250.

The British breeding population of Goosander is non-migratory, although these birds are joined in winter by others regularly migrating from Scandinavia (Boyd 1959; Owen *et al.* 1986). Accordingly, SPAs have been selected to cover aggregations in the non-breeding season, but not the breeding period.

For taxa other than waterbirds, there are fewer compiled data and no regular international summary of population sizes. For birds of prey, international totals for each species in European countries west of the Urals<sup>1</sup> were calculated from data in Hagemeijer & Blair (1997) and reported by the DETR/JNCC Raptor Working Group (2000 – Table 2.3).

## 4.3 Selection Stage 1.3

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### 4.3.1 Definition of important assemblage components

Guidelines 1.1 and 1.2 refer to numbers of a particular species at a site, whilst guideline 1.3 covers total numbers of *all* species within a defined assemblage at a site. All migratory and Annex I waterbirds within an assemblage are qualifying species. The main component species that characterise particular assemblages have been identified. To achieve this, 1% of national populations was used to provide basic guidance. In other words, at sites holding at least 20,000 waterbirds, species have been listed in this review where at least 1% of a national population is present within the assemblage.

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<sup>1</sup> The definition of Europe used in this context includes the islands of the Azores, Madeira and the Canaries, Russia east to the Urals, and the Caucasus, but excludes the whole of Turkey.



This approach, however, does not highlight the presence within internationally important assemblages of those species with very large national populations (and hence very large 1% national thresholds). This relates especially to Lapwing and more occasionally Wigeon, Dunlin, Knot and Oystercatcher. These species may rank as the primary or secondary component of a site's waterbird assemblage but despite many thousands being present, numbers are less than 1% of national populations. In order for species to qualify as a listed component of an assemblage, their numbers had to exceed 10% of the minimum qualifying assemblage of 20,000 individuals (*i.e.* at least 2,000 individuals). The same rules were adopted for assemblages of seabirds.

#### 4.3.2 Single species assemblages

For the purposes of SPA classification and this review, the presence of 20,000 or more individuals of a single species on a site was not considered to fulfil the definition of an 'assemblage'. For SPA classification purposes, assemblages have had to include more than one species within the relevant season. Thus, a site holding 28,000 individual breeding Black-headed Gulls alone (comprising only 0.8% of international population) would not be considered to fulfil guideline 1.3.

#### 4.3.3 Breeding seabirds

In the breeding season, 20,000 seabirds are taken as equating to 10,000 pairs (or other standard units such as apparently occupied nest sites/territories as appropriate for some species – Lloyd *et al.* 1991).

### 4.4 Selection Stage 1.4

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The Directive requires Member States to select the "*most suitable territories*" as sites for SPA classification. Initial selections were made using guidelines 1.1–1.3. Guideline 1.4 gives latitude for the exercise of scientific judgement where the application of guidelines 1.1–1.3 are considered to identify insufficient SPAs, and if site-based protection is an appropriate conservation response for the species, sites may be selected. Generally, this is through the addition of the species as a qualifying feature, following consideration of Stage 2 judgements, to SPAs classified for other species. If no such site within the existing network can be identified, and a robust case can be made, then a new, single-species site may be identified (as has occurred, for example, for Leach's Petrel and Cormorant).

Guideline 1.4 has been used to select SPA suites (in whole or in part) for the following species: Leach's Petrel, breeding Cormorant, Bean Goose, Pink-footed Goose, breeding Wigeon, Scaup, breeding Common Scoter, breeding and wintering Hen Harrier, breeding Merlin, breeding Peregrine, Corncrake, breeding and wintering Oystercatcher, breeding Golden Plover, breeding Ringed Plover, Sanderling, Purple Sandpiper, breeding Dunlin, breeding Black-tailed Godwit, breeding Whimbrel, breeding Redshank, breeding Greenshank, Little Tern and Arctic Skua.

### 4.5 Site boundaries

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The UK SPA network consists of 243 sites covering a wide variety of different habitats, ranging from offshore seabird stacks and cliffs, to estuaries and lowland heathland. It is beyond the scope of this report to deal comprehensively with the issue of determining boundaries for these SPAs because unique issues usually arise at each site. This section outlines the general principles underlying boundary determination.

In many cases, SPAs have been selected which are distinct in habitat and/or ornithological importance from the surroundings and have definable and recognisable character (*i.e.* the specific boundary is clearly identifiable 'on the ground'). They must also provide for the conservation requirements of the species in the season(s) and for the particular purposes for which they are classified. This process involves informed scientific judgement to define the most suitable territories (*i.e.* SPAs).

#### 4.5.1 Site boundaries and the SPA review

The application of the first stage of the SPA guidelines identifies broad areas of interest or potential ornithological importance. The application of the Stage 2 judgements, however, requires more precise locational information since this process involves between-site comparisons of numbers, densities and other attributes that depend on exact area assessments. Thus, Stage 2 is integrally linked with the determination of site boundaries for the qualifying species as outlined below.

#### 4.5.2 General principles

The first stage of boundary determination involves defining the extent of area required by the qualifying species concerned. These scientific judgements are made in the light of the ecological requirements of the relevant species that may be delivered by that particular site, and the extent to which the site can fulfil these requirements. This follows a rigorous assessment of best-available local information regarding distribution, abundance and movements of the qualifying species. It may also involve the commissioning of special surveys where the information base is weak.

Following this stage, every attempt is made to define a boundary that is identifiable on the ground and can be recognised by those responsible for the management of the site. This boundary will include the most suitable areas for the qualifying species identified in the first stage, but will relate to landscape features such as changes in habitat, field boundaries, rivers, roads *etc.*, and thus may be marginally more extensive.

Some SPAs consist of a cluster of smaller units sometimes separated from each other by significant distance. Where this occurs it is often for one or more of the following reasons:

- (1) where site elements are ecologically linked in their use by a common bird population (*e.g.* a group of alternative roost or feeding areas used by one population of waterbirds); and/or
- (2) where habitat was formerly geographically continuous before being separated by human activity (as for example heathland areas now fragmented).
- (3) where breeding birds are widely separated by the presence of habitats not directly contributing to their conservation, accordingly, these areas have been excluded in site definitions.

In cases where species' requirements are not met entirely by means of SPA classification, additional provision is achieved through other policies (for example agri-environment incentives to manage areas surrounding SPAs in an environmentally sensitive manner).

#### 4.5.3 Modifications to site boundaries

Over the period since the implementation of the Birds Directive, detailed knowledge both of UK bird species and of sites has grown. In the light of these improvements in understanding, it has sometimes been found necessary to extend the scope of some initial classifications (Appendix 8).

### 4.6 Stage 2 judgements

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The Stage 1 guidelines have been used to identify possible sites for SPA classification, whereas the Stage 2 judgements have been used to decide which are the most 'suitable' (in the sense of Article 4.1 of the Birds Directive). Those sites meeting several of the Stage 2 judgements have not necessarily been selected in preference to those meeting only one. This is because the factors operate independently as indicators of the various different kinds of importance that a site may have.

#### 4.6.1 Population size and density

Comparisons of population sizes have been undertaken on a simple numerical basis, for non-breeding waterbirds using five-year peak mean counts (where these were available). Different means of calculating densities were applied to different species as appropriate.

#### 4.6.2 Species range

In order to maintain range, SPAs have been selected to represent the extremities and the main centre(s) of the range, and principle occurrences in relevant regions of the UK.

Some species such as Pink-footed Goose and Icelandic Greylag Goose (species accounts A6.18 and A6.21) move across the country in the course of the non-breeding season and thus have a dynamic distribution. In such cases, the selection of sites has been undertaken on a regional basis to ensure that the main centres of occurrence are all represented within respective SPA suites.

#### 4.6.3 Breeding success

The role of one site in providing birds for other areas – *i.e.* its success as a source – is generally judged by absolute measures of productivity at the breeding site rather than evidence of its known contribution of birds, by dispersal, to other locations. Thus, recruitment to other areas is generally inferred from high productivity at the source rather than known occupation at the destination (information which is usually unavailable). Extremely limited data exist to apply this judgement, although it has been applied where appropriate to select sites for species such as Black-throated Diver, Slavonian Grebe and Golden Eagle where information on productivity at different sites exists.

#### 4.6.4 History of occupancy

Sites with a long history of occupancy are normally favourable to species. There are, however, some important exceptions to this. For example, some birds use successional habitats and favourable conditions may occur only for a limited number of years. In such situations, recently occupied sites can be especially important in ensuring the survival and reproduction of some birds. This Stage 2 judgement has, therefore, been applied with caution in the light of such ecological requirements.

At an early stage in the review, the Project Steering Group agreed to adopt the period of the first BTO Breeding Bird Atlas – 1968–1972 (Sharrock 1976) – as the baseline against which to assess history of occupancy. Any site occupied for the first time more recently than 1972 has not, therefore, been considered as having a long history of occupation in the context of this guideline.

Certain colonial nesting species, particularly terns, regularly move between different nesting sites from year to year. Thus, numbers at any one site can fluctuate from several hundred pairs to zero and back within the space of a few years (Sears & Avery 1993). Terns have, therefore, been retained as qualifying species on a number of sites where contemporary numbers are very low (below current qualification thresholds) but where there is a history of occupancy and/or where a site is known to be part of a large complex of nesting areas.

#### 4.6.5 Multi-species areas

The favouring of sites with larger numbers of qualifying species has regard for complementarity theory (Pressey *et al.* 1993; Pressey 1996; see Appendix 1), although this has not been formally applied in this review. Multi-species sites are important since the large number of species supported on such sites is typically an attribute of areas of high conservation importance. Generally, multi-species sites are large and often contain a diverse mosaic of high-quality habitats. Such areas provide a degree of ecological complexity that support many species at levels of international importance.

The distinctive ecology of some species means that they rarely occur together with other species at levels of European importance. For example, most SPAs selected for Black-throated Diver contain only that species at qualifying levels. This judgement has been applied carefully in order to avoid inappropriately 'downgrading' the status of some single-species sites, which may be of critical importance for a species in a way that a multiple-species site may not.

#### 4.6.6 Naturalness

As a general rule, sites having a low degree of naturalness (for example, urban and other industrialised landscapes) have not been selected for SPA classification. However, some 'less natural' sites, with large numbers of species or high species diversity, have been chosen as SPAs. This, typically, reflects appropriate management over long periods that has benefited the species concerned. Such areas include

low-intensity and small-scale arable areas (which can be of particular importance for species such as Corncrake and Stone Curlew) and some water storage reservoirs.

#### 4.6.7 Severe weather refuges

Severe weather in winter can result in the displacement of birds from their normal haunts to areas (usually in the south or west) which are subject to milder conditions. Some species readily move long distances to find more favourable areas at the onset of hard conditions, whilst others, for example Oystercatcher, tend to stay and 'gamble' that local food supplies will last for the duration of the cold (Meininger *et al.* 1991; Camphuysen *et al.* 1996).

Following several periods of severe cold weather in the 1980s, Ridgill & Fox (1990) reviewed cold weather movements of Mallard, Teal, Wigeon, Pintail, Shoveler, Pochard, Tufted Duck, Shelduck and Coot in western Europe. This highlighted the major importance of British west coast estuaries for those wildfowl and waders displaced in cold periods from eastern Britain and continental Europe. SPAs have been selected to reflect this. The 1990s were generally a period of milder winters and the analyses undertaken by Ridgill & Fox (1990) have yet to be made for other wildfowl or for wader species.

### 4.7 Species for which SPA suites will require future review

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There are a very small number of species that, for reasons outlined below, it has not yet been possible to identify full SPA suites. These will require further review. There are three main reasons for this:

- it is too early to assess 'most suitable' sites for species that are actively expanding in range and population size in the UK;
- lack of suitable data and information with which to assess important sites;
- the protection requirements of birds in the offshore marine environment are outside the scope of this review.

#### 4.7.1 Recent UK colonists

A number of species have colonised the UK in recent years, predominantly from mainland Europe. For example, Little Egret was a regular but rare vagrant in the UK until large influxes began in 1989. Since then, numbers have continued to increase and the species is found at wide-ranging sites along the coast of southern and south-eastern England (see species account A6.14). In 1996, it bred in the UK for the first time. The SPA suite for this species reflects the current size and distribution of the population in each season. Given the continuing expansion of the population size and range, however, a review of its SPA suite is likely to be required at a future date. The Rare Breeding Birds Panel and the Wetland Bird Survey will provide the necessary data for such a review.

#### 4.7.2 Re-establishing raptors

Both White-tailed Eagle and Red Kite are currently undergoing significant expansions in their UK populations and distribution arising from re-establishment schemes which commenced in the late 1980s (Evans *et al.* 1994). Within the UK, the Red Kite's current SPA provision maintains the native core population in Wales. A suite of SPAs for Red Kites may be appropriate in England and Scotland in the future, when populations in these countries have increased to such an extent that the 'most suitable' sites can be determined. Data from the Rare Birds Breeding Panel and the proposed decennial national survey of Red Kites (commencing in 2000) will provide the necessary data for such a review.

#### 4.7.3 Wintering gulls

The review discovered that for gull species, data were not available to undertake a comprehensive assessment of their distribution and need for SPA protection during the winter period. Data from the most recent (decennial) national gull roost survey undertaken by the BTO in 1993 are unpublished. The Wetland Bird Survey (WeBS) began collecting data on wintering gulls in 1993 (Cranswick *et al.*

1995) and when suitable data are available allowing regularity at key sites to be assessed, it is intended to review SPA suites for these species. In the light of this data inadequacy, JNCC will be working to further develop WeBS monitoring to better assess wintering gull numbers, and identify important sites in a national context.

#### 4.7.4 Wintering raptors in coastal areas

Information on the distribution and numbers of Hen Harriers and Merlins in winter, especially in coastal areas, is currently limited. Where information is available, this has been used to identify suites of SPAs for these species. JNCC and the country agencies will work to develop better monitoring of wintering raptors in the UK, at both site and national scales. It is possible that further sites of European importance for Hen Harrier and Merlin will be identified through this work.

#### 4.7.5 Passage waders and terns

The estuaries and rocky-shore coasts of the UK are important to waders not just during the winter period, but also during the autumn and spring migration periods. For some species, for example Sanderling and Ringed Plover, peak numbers recorded nationally occur in April-May or in August-October. Whilst WeBS collects data at some sites during these passage periods, they are not normally published annually and have only been systematically collected at most coastal sites since 1993 (Cranswick *et al.* 1995). The issues involved with interpretation of data during periods of high turnover (Frederiksen *et al.* 2001) and in situations where mixed populations (such as three populations of Dunlins) may be present, are also far from clear. Indeed, such situations may present intractable fieldwork problems. Where data relating to passage periods have been readily available, however, they have been used in this review.

The comprehensive database being developed by WeBS will allow much better interpretation of existing UK passage data for waterbirds (including Ringed Plover, Redshank, Curlew and Sanderling). It seems unlikely that new sites will be identified, but some species may be added as qualifying species to existing SPAs, where there is a large passage occurrence but limited overwintering.

Similar issues apply to terns on migration. Those breeding in northern parts of the UK use more southerly estuaries en route to wintering areas off the coasts of Africa. Knowledge of these autumn (and spring) movements is poor and the list of sites identified in this review is known to be incomplete. JNCC will review existing knowledge on important sites in the UK for waders and terns. The WeBS partnership is also actively taking steps to ensure that those sites of importance in any season of the year, and which are subject to monitoring, are clearly identified in annual published reports.

#### 4.7.6 Marine species

Whilst this review has considered terrestrial sites that extend into marine or intertidal areas for example, estuaries or inshore areas – it has not considered the requirements of birds using the wholly offshore environment. The site suites presented here may be incomplete and possible additional provision still needs to be determined in the marine environment. The protection requirements of birds in the offshore marine environment (with respect to Article 4 of the Birds Directive) will be considered in a separate review being co-ordinated by JNCC.

## 4.8 Species for which SPAs are inappropriate

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There are a number of species where site-based measures are not an appropriate protection mechanism, or it is simply not feasible to identify the 'most suitable sites'. Where this is the case, it has been stated in the relevant species accounts. Typically, these species fall into the following categories:

#### 4.8.1 Species that are broadly dispersed

Many migratory birds are broadly dispersed and do not occur in significant aggregations. Site-based measures under the Birds Directive are not, therefore, appropriate for their population conservation.

These include typical summer migrants, such as Swallow, House Martin, Chiffchaff and Willow Warbler, as well as winter migrants such as Redwing, Fieldfare, Lapland Bunting and Snow Bunting.

#### 4.8.2 Species that are sedentary year-round


The Bonn Convention on the Conservation of Migratory Species of Wild Animals defines migratory species as "*the entire population or any geographically separate part of the population of any species or lower taxon of wild animals, a significant proportion of whose members cyclically and predictably cross one or more national jurisdictional boundaries*". The BTO were asked to advise on the application of this definition to the UK avifauna and their findings are summarised in Appendix 3 (see also Appendix 5.1).

This review has highlighted the fact that certain resident or sedentary species in a UK context were listed as qualifying species on citations of SPAs designated some years ago. In view of the BTO work, the following sedentary species have now been removed as qualifying features from the citations for classified or proposed SPAs: Mute Swan, Black Guillemot, the native north Scottish population of Greylag Geese, Water Rail and Bearded Tit.

#### 4.8.3 Non-native species

There are no requirements under the Birds Directive to take site-based protective measures for non-native bird species.





# 5 The content of the SPA network

Suites of SPAs have been selected for Annex I and migratory species where this is an appropriate response to conservation needs. The degree to which these suites contain proportions of national populations within the network is assessed below.

Conservation science theory (e.g. Shafer 1990; Ramsar Resolution VII.11) and practice suggests that those species where highest proportions of species' populations should be located within a protected area network are those which:

- occur locally in high densities (congregatory species);
- occur, to a large extent, on natural or semi-natural habitats;
- show predictable occurrence at particular sites regularly between years (*i.e.* species that are not irregular or dispersive);
- have restricted national or international ranges; or
- have small national or international population sizes.

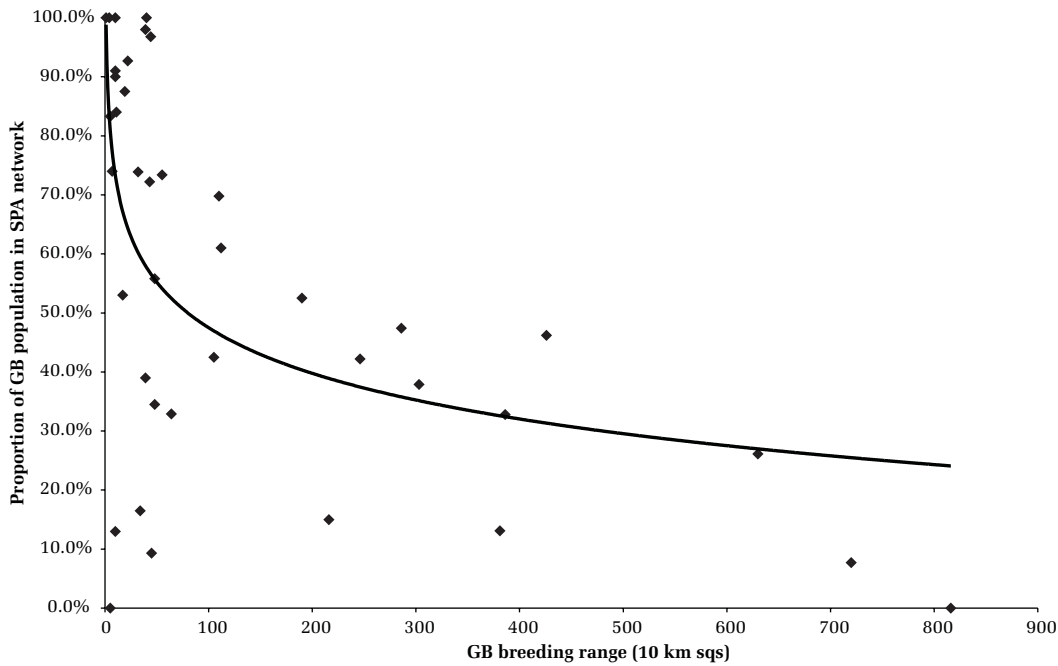
A series of analyses have been undertaken to test these presumptions against the results of this review of the UK SPA network.

## 5.1 Proportions of breeding populations within the UK's SPA network

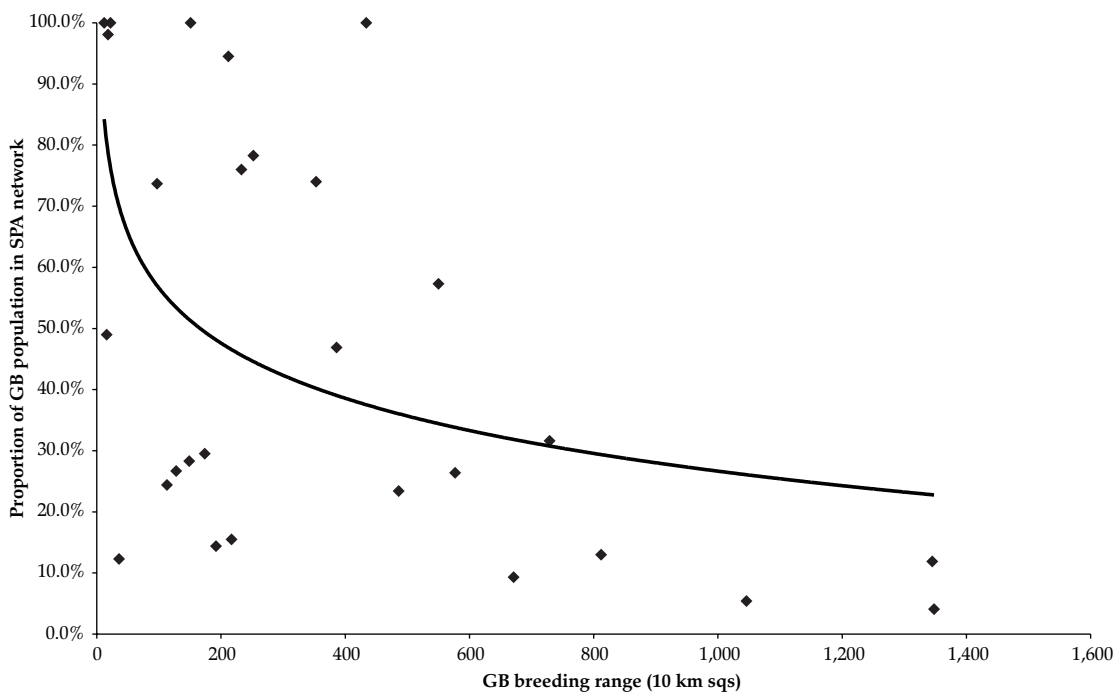
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Proportions of Great Britain populations in the SPA network have been related to the dispersion of these species indicated by the most recent BTO breeding bird atlas (Gibbons *et al.* 1993). Two analyses have been undertaken (Figures 5.1 and 5.2) because different selection thresholds have been adopted for Annex I species compared to other migratory species. The measure of range used was the number of 10 km grid squares in Britain with breeding evidence found in the period 1988–1991. It was not possible to undertake this analysis separately for Northern Ireland since the selection area (all-Ireland) is larger than the area within which SPAs have been selected in this exercise.

The results of this analysis show that there is a strong statistical relationship between both Annex I and breeding migratory species' ranges and the proportion of their British populations within SPA suites. Geographically more restricted birds (those occupying fewest 10 km squares) have increasingly higher proportions of their British breeding populations within SPAs. Indeed, for a number of rare species (e.g. Leach's Petrel, Wood Sandpiper, Fair Isle Wren) the whole UK population is contained within SPAs. Many of the colonially breeding seabirds have high percentages of their populations within SPAs, such as Manx Shearwater, Puffin and Lesser Black-backed Gull (all with about 100% population inclusion), Guillemot (92%), Roseate Tern (88%), Kittiwake (78%), Razorbill (76%), Great Skua (74%) and Sandwich Tern (72%). For most of these species breeding occurs at just a few locations (e.g. within just 18 10 km squares for Gannet and 22 for Manx Shearwater).



**Figure 5.1** Relationship between geographic range within Britain (occupancy of 10 km squares in 1988–1991 – from Gibbons *et al.* 1993) and proportion of British breeding populations contained within SPA suite within Britain for Annex I breeding species. [Logarithmic relationship:  $y = -0.1115\ln(x) + 0.9884$ ;  $R^2 = 0.3126$ ]



**Figure 5.2** Relationship between geographic range within Britain (occupancy of 10 km squares in 1988–1991 – from Gibbons *et al.* 1993) and proportion of British breeding populations contained within SPA suite within Britain for migratory, non-Annex I breeding species. (Migratory species with very large populations and for which no SPAs have been selected (section 6.106) are not plotted.) [Logarithmic relationship:  $y = -0.1302\ln(x) + 1.1658$ ;  $R^2 = 0.2503$ ]



Conversely, populations that are widely dispersed in the breeding season (e.g. Golden Plover, Ringed Plover, Redshank, Merlin and Peregrine) have lower proportional coverage within SPAs.

There are some rare species with low population coverage within SPAs which do not exhibit the parameters indicated above. For these species, site-based protection is not the most appropriate means of conserving viable populations. For example, Montagu's Harrier does not occur within the SPA network even though it has a very low population size. This is because the species occurs at low density, usually on managed farmland, and often in different locations in different years. The identification and classification of SPAs is not, therefore, the most appropriate means of conserving the population, and other measures have been put in place.

Another species that has low proportional occurrence is Red Kite. In the breeding season, this is a non-congregatory species that occurs at low densities. Thus, the identification and classification of sites for a significant proportion of the population is especially problematic. Again, other measures have been put in place to ensure the conservation of the population (see species account A.6.45).

## 5.2 Proportions of wintering totals within the UK's SPA network

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A similar analysis has been undertaken to assess the proportions of total numbers of wintering waterbirds in the SPA network. An index of dispersal in winter was taken as the total number of occupied 10 km grid-squares (or 'hectads') from the 1981/82–1983/84 BTO winter atlas (Lack 1986)<sup>1</sup>.

The broad pattern of occurrence within SPAs was similar for both Annex I species (Figure 5.3) and non-Annex I migratory species (Figure 5.4). Those birds with the most restricted distributions (e.g. Avocet, Bar-tailed Godwit, Grey Plover, Pintail and Shelduck) have higher proportions of British populations contained within the SPA network. In contrast, widely dispersed species, such as Mallard, Tufted Duck, Coot and Lapwing, are contained within SPAs to a lesser extent.

## 5.3 Proportions of international populations within the UK's SPA network

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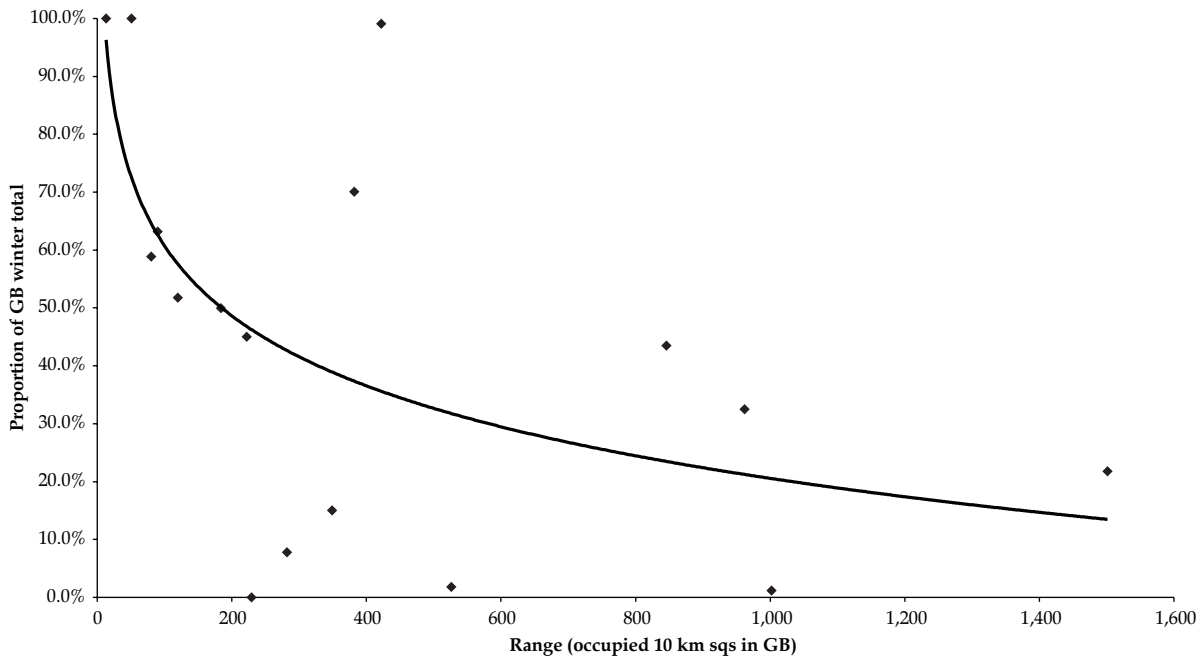
One basic tenet of international conservation is that countries have particular responsibility for those species or habitats that occur uniquely or in high proportions within their borders (e.g. Dunn *et al.* 1999). Thus, Article 3(2) of the Habitats Directive requires that, for any habitat or species, the national selection of Special Areas of Conservation (SACs) should be proportional to the degree to which that species or habitat is represented within the country concerned. Although the Birds Directive does not have a similar requirement, the degree to which this relationship exists within this review has been assessed (Figure 5.5).

The proportion of the international population of any species/sub-species that occurs within the UK (using data from Annex 4) has been related to the proportion of the UK population occurring within the SPA network (Annex 2). For both Annex I and for non-Annex I migratory species, there is a strong relationship. Those species (or sub-species) for which a large proportion of the international population occurs in the UK also have a high proportion of that population within the SPA network. Examples include Svalbard Barnacle Goose (100% within the UK, 100% within SPAs), Canadian Light-bellied Brent Goose (73% UK, 70% SPAs), Greenland Barnacle Goose (79% UK, 50% SPAs), Pintail (46% UK, 32% SPAs) and Dark-bellied Brent Goose (34% UK, 31% SPAs). Those species whose main population centres in winter lie away from the UK are represented within the network to a lesser extent.

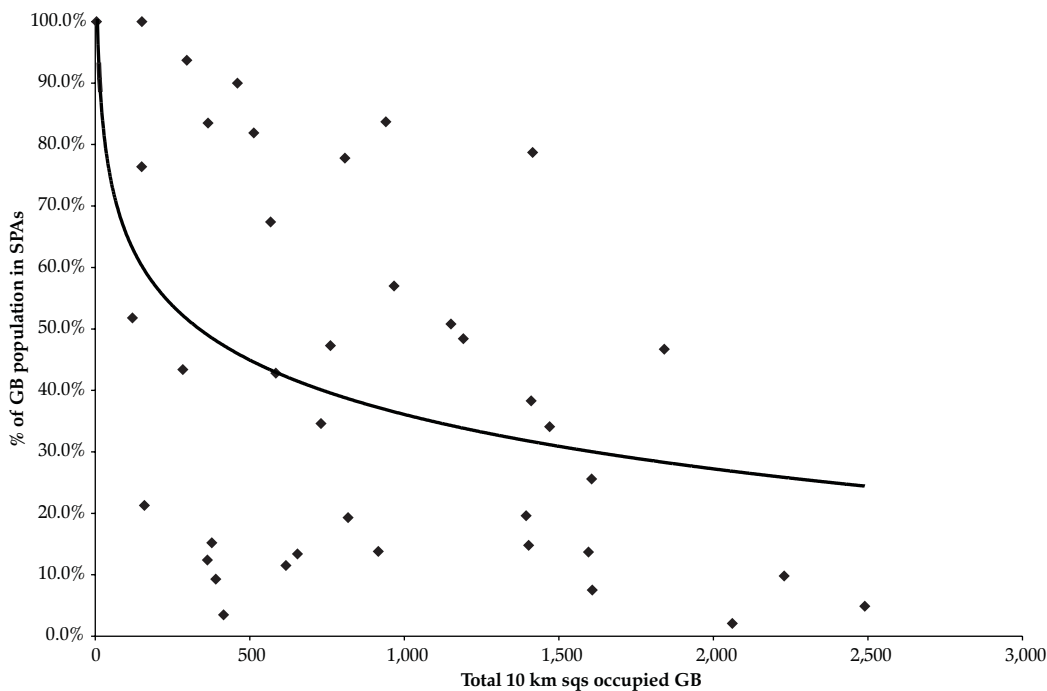
There are two notable exceptions to this relationship. In winter, the UK holds 96% of the international population of Turnstone and 60% of the population of Ringed Plovers, but only 14% and 14% of these

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1 Although the data from the winter atlas predates the data from the review by about a decade, there have been few significant changes in gross range by wintering waterbirds in the UK in this period. There have been some changes in population sizes, but overall distribution in the mid-1990s was similar to that in the mid-1980s.



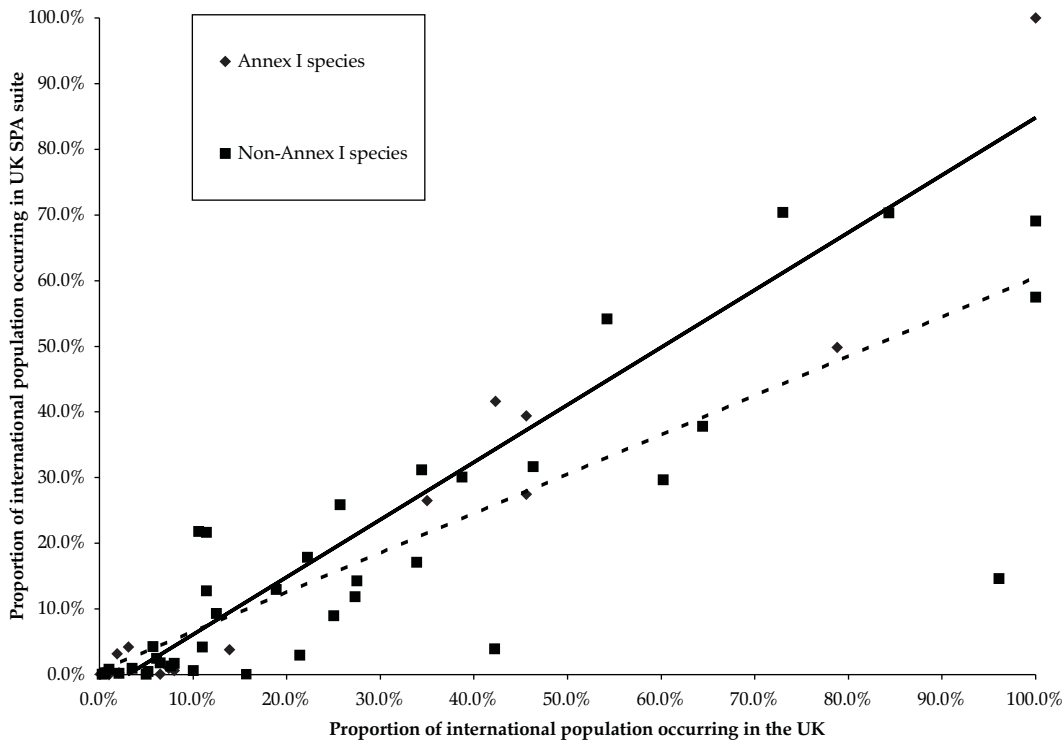
**Figure 5.3** Relationship between geographic range within Britain (occupancy of 10 km squares in 1981/82 – 1983/84 – from Lack 1986) and the proportion of winter total in Britain contained within SPA suite within Britain for Annex I wintering waterbirds. [Logarithmic relationship:  $y = -0.1744\ln(x) + 1.4104$ ;  $R^2 = 0.3818$ ]



**Figure 5.4** Relationship between geographic range within Britain (occupancy of 10 km squares in 1981/82 – 1983/84 – from Lack 1986) and the proportion of winter total in Britain contained within SPA suite within Britain for non-Annex I wintering waterbirds. [Logarithmic relationship:  $y = -0.1277\ln(x) + 1.2433$ ;  $R^2 = 0.2222$ ]

populations are contained within UK SPAs respectively. This is because both are birds of the open, non-estuarine shoreline, occurring widely around the coasts of Britain, often at low densities. Where notable concentrations occur, these have been selected as SPAs (see species accounts A6.77 and A6.59b), but elsewhere their wide occurrence in low densities has prevented the identification of key sites.

## The content of the SPA network



**Figure 5.5** Proportionate inclusion of international populations of wintering waterbirds within the UK SPA network related to the proportion of those populations that winter in the UK. [Linear relationship from Annex I species:  $y = 0.8743x - 0.0261$ ;  $R^2 = 0.9353$ . Linear relationship from migratory non-Annex I species:  $y = 0.6018x + 0.0044$ ;  $R^2 = 0.7029$ ]

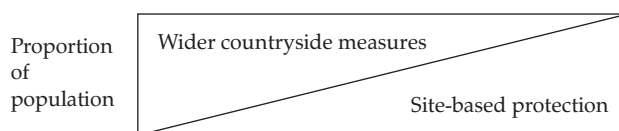
It is also notable in Figure 5.5 that the slope of the relationship is steeper for Annex I species than for non-Annex I migratory species. This implies that, on average, for any international population present in the UK, a higher proportion of that population will be contained within the SPA network if the species (or sub-species) is listed on Annex I.

The selection of SPAs by the UK does thus reflect the concept of proportionate international responsibility.

# 6 Wider countryside conservation measures

## 6.1 The necessary mix of conservation measures: protected sites and wider measures

In the face of increasing human pressure on the natural environment, there are strong biological grounds to establish national and international networks of protected areas. A mixture of site-based and wider policies is essential, however, to meet the conservation requirements of most species. The following diagram illustrates this point. Each species will occur in a different place along the horizontal axis, with a different ideal mix of site-related and wider countryside conservation measures.



Other than for a few highly gregarious species, or birds with very small populations, the protection of selected sites alone is normally inadequate to conserve populations in the long term. The appropriate management of areas outside protected sites is also required. For broadly dispersed migratory species (such as Skylark, Fieldfare, Redwing and Willow Warbler) appropriate conservation measures are undertaken through policies addressed at the ‘wider countryside’.

Bird populations within protected areas are frequently influenced by the consequences of land use in surrounding areas, and thus, protected sites are not closed units (Helle 1986; Janzen 1983; Schafer 1990). This highlights the need for taking a species-based approach to the provision of conservation needs, reviewing provision of both sites and complementary wider countryside needs. Section 4 explains how this has been undertaken in the UK in the context of this review.

## 6.2 Wider measures for birds in the UK

A variety of measures are in place for the conservation of birds away from protected sites. Some address specific needs of individual species and these are usually noted in the relevant species accounts.

Examples of such focused measures include:

- incentives for Corncrake-friendly farming in Scotland and Northern Ireland (species account A6.54);
- incentives for appropriate management of agricultural land for wintering geese in Scotland, especially Greenland Barnacle Goose on Islay, Orkney and the Solway Firth (A6.22), and for Greenland White-fronted Goose on Islay (A6.20);
- restoration, management and recreation of reed-swamps for Bitterns (A6.13);

**Table 6.1** National (UK) biodiversity action or management plans for birds

| Species              | Species status  |                      | UK Biodiversity Steering Group Action Plan |
|----------------------|-----------------|----------------------|--|
|                      | Annex I species | UK migratory species |  |
| Bittern              | ✓               | ✓                    | ✓  |
| Common Scoter        |                 | ✓ partial            | ✓  |
| Black Grouse         |                 |                      | ✓  |
| Capercaillie         | ✓               |                      | ✓  |
| Black Grouse         |                 |                      | ✓  |
| Grey Partridge       |                 |                      | ✓  |
| Corncrake            | ✓               | ✓                    | ✓  |
| Stone Curlew         | ✓               | ✓                    | ✓  |
| Red-necked Phalarope | ✓               | ✓                    | ✓  |
| Roseate Tern         | ✓               | ✓                    | ✓  |
| Turtle Dove          |                 | ✓                    | ✓  |
| Nightjar             | ✓               | ✓                    | ✓  |
| Wryneck              |                 | ✓                    | ✓  |
| Woodlark             | ✓               | ✓ partial            | ✓  |
| Skylark              |                 | ✓ partial            | ✓  |
| Song Thrush          |                 | ✓ partial            | ✓  |
| Aquatic Warbler      | ✓               | ✓                    | ✓  |
| Spotted Flycatcher   |                 | ✓                    | ✓  |
| Red-backed Shrike    | ✓               | ✓                    | ✓  |
| Tree Sparrow         |                 |                      | ✓  |
| Linnet               |                 | ✓ partial            | ✓  |
| Scottish Crossbill   | ✓               |                      | ✓  |
| Bullfinch            |                 |                      | ✓  |
| Cirl Bunting         |                 |                      | ✓  |
| Reed Bunting         |                 | ✓ partial            | ✓  |

- various measures to reverse the decline of Capercaillie in Scotland, in particular addressing the issue of mortality as a result of collisions with deer-fencing (A6.52);
- peatland management for wader populations and their habitat in the Isle of Lewis;
- measures to reduce Stone Curlew mortality from agricultural operations within their core range (A6.58); and
- the establishment of national Biodiversity Action Plans for many species (Table 6.1).

Additionally, there are a range of schemes operative in the UK which have direct positive benefits for the conservation of birds. They include:

- various agri-environment schemes such as Tir Gofal in Wales, the Countryside Premium Scheme in Scotland and Countryside Stewardship in England, as well as Environmentally Sensitive Areas located throughout the UK;

- schemes operated by the country conservation agencies to improve the quality of habitat management within SSSIs, such as the Wildlife Enhancement Scheme in England;
- implementation of Regional Indicative Forestry Strategies, and other measures (Stroud 1998), in Scotland to steer new afforestation away from areas of high nature conservation sensitivity;
- implementation of Water-table Management Plans to address the issue of hydrological management of key wetland protected sites (in the context of wider needs for water in surrounding areas). These plans directly benefit a range of breeding and wintering waterbirds through maintaining high-quality wetland habitats (see Bientema *et al.* 1996 for review);
- implementation of a range of Estuary Management Plans and related initiatives for major estuaries throughout the UK. These assist in reducing conflicting demands on estuaries and related coastal habitats through encouragement of joint planning between the various users and other stakeholder groups (including the many agencies and departments with statutory responsibilities in these areas);
- introduction of legislation in England<sup>1</sup> in 1999 to outlaw the use of toxic lead gunshot for shooting of wildfowl quarry species as well as on SSSIs notified for their importance for waterbirds. Public consultation on similar measures in Scotland is currently underway. Consultation on a draft Statutory Instrument and Regulatory Appraisal is expected to take place in Wales in spring 2001;
- annual monitoring of the severity of winter weather which may lead to the temporary cessation of shooting in order to reduce mortality of quarry and non-quarry waterbirds in periods of great energetic stress (J. Stroud 1992); and
- establishment of processes that will lead to the creation and restoration of a range of threatened habitats under the UK's Biodiversity Action Plan (Biodiversity Steering Group 1995).

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1 The Environmental Protection (Restriction on Use of Lead Shot) (England) Regulations 1999

# 7 Acknowledgements

The publication of this review is the conclusion of a major project, involving many organisations and individuals and undertaken over a protracted period – a consequence of its size and technical complexity. Initial work, commencing in 1993, focused on the derivation of selection guidelines for UK SPAs. These were published by JNCC in June 1999. Following on from this, work in 1998–2001 focused on the application of these guidelines to derive lists of qualifying sites and species (and completing the documentation presented here). We list below all those who have been involved in both phases of this activity (with apologies to anyone we have inadvertently omitted).

Work to derive site selection guidelines involved large numbers of individuals in the country agencies, organised as an Inter-Agency Working Group. Between 1993 and 1998, this involved: Michael Usher, Joyce Tait, Colin Galbraith, Mike Shepherd, Stephen Ward, Greg Mudge, Andy Douse and Nigel Buxton (for **SNH**); Malcolm Smith, Steve Parr and Peter Stuttard (for **CCW**), Keith Duff, John Finnie, Andy F. Brown, Pat Doody, Sue Collins, Alastair Burn, Dawn Isaac and Peter Clement (for **EN**), and Joe Furphy, Howard Platt and Richard Weyl (for the **Department of the Environment for Northern Ireland**); and Colin Galbraith, Alan Law, Mark Tasker and David Stroud. The later stages were guided by Roy Bunce, Graham Donald, Hilary Neal and Phil Lewis (**Department of the Environment**), Derek Beames, Jon Young and Richard Thomas (**Welsh Office**); and John Gilmour, John Davidson and John Miles (**Scottish Office**). This activity was lead by **JNCC** – principally by Colin Galbraith, with assistance from Alan Law, David Stroud, Roy Walker and Andy E. Brown.

Guidance through the site review (1998–2001) was provided by a Project Steering Group comprising: Phil Lewis, Hilary Neal, Nicola Donlon, John Miles, Jon Young, Peter Stuttard, Nigel Buxton, Peter Clement, Deryck Steer (chair 1998–1999), Ian McLean (chair 1999–2001), Steve Cook, Sarah Brocklehurst, David Stroud, Kathryn Farrell, Cameron Easton, Siân Whitehead, Trevor Salmon, Ian Bainbridge, Helen Baker, Ben Fraser and Christine Todd. Overall project management for JNCC was undertaken by Colin Galbraith (1993–1997), Andy E. Brown (1997–1998) and Ian McLean (1998–2001).

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Publication arrangements for JNCC were overseen by Trudi Harris. Tim Davis and Tim Jones of DJEnvironmental skilfully copy-edited the entire document. The cover was designed by Cottier Sidaway from a concept by Helen Baker. Cover photographs are as follows: Cairngorms SPA, Scottish Natural Heritage; Light-bellied Brent Geese, David Tipling/Windrush; The Wash SPA, Peter Wakely; Knot, Chris Gomersall; Chough, Chris Gomersall; Glannau Ynys Gybi / Holy Island Coast SPA, Peter Wakely; Strangford Lough SPA, Mike Hartwell; Scottish Crossbill, Mike Read.

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# Appendix 1

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## Glossary of terms used in this review

### **All-Ireland**

All-Ireland comprises the whole of Ireland (Northern Ireland and the Republic of Ireland) (section 2.2).

### **All-Ireland population**

The total population of a species occurring in the whole of Ireland (Northern Ireland and the Republic of Ireland). Standard 1% thresholds derived from all-Ireland population estimates are used for assessment purposes (section 4.2.1).

### **Area**

Areas to be classified as SPAs should:

- be distinct in habitat and/or ornithological importance from the surroundings and have definable and recognisable character;
- provide the conservation requirements of the species in the season(s) and for the particular purposes for which they are classified.

(see also ‘Use’ of areas)

### **Biogeographical population**

A group of birds which breed in a particular location (or group of locations), breed freely within the group, and rarely breed or exchange individuals with other groups. Standard 1% thresholds derived from biogeographical population estimates are used for assessment purposes (section 4.2.1).

### **Complementarity**

The extent to which protected areas, within a network of protected areas, complement one another in the features (species or habitats) they contain.

### **Country**

Country is taken to refer to either Scotland, Northern Ireland, Wales or England.

### **Density**

The number of individuals of a species per unit area. In practice, a range of methods is used to assess numbers in SPAs, for example, breeding pairs and singing males.

### **Great Britain**

Great Britain comprises Scotland, Wales and England, but excludes Channel Islands and the Isle of Man).



## Great Britain population

The total population of a species occurring in Scotland, Wales and England, but excluding the Channel Islands and the Isle of Man. Standard 1% thresholds derived from Great Britain population estimates are used for assessment purposes (section 4.2.1).

## Hectads

Ten-by-ten kilometre grid squares of the British and Irish national grids generally used as a framework for biological recording purposes.

## International population

This term is used synonymously to refer to the relevant biogeographical population of the species concerned. It does not refer to the total world population for which the terms 'global population' or 'global numbers' are used where they are relevant.

## Meta-population

A population of populations. A defined set of geographically separate populations with at least some exchange of individuals between the separate populations – in other words, systems of local populations connected by dispersing individuals.

## Migratory

Article I(1)(a) of the Bonn Convention defines a migratory species as "*the entire population or any geographically separate part of the population of any species or lower taxon of wild animals, a significant proportion of whose members cyclically and predictably cross one or more national jurisdictional boundaries*".

## National

National is taken here to refer to the United Kingdom.

## Natura 2000

The EU network of classified SPAs and Special Areas of Conservation (SACs) designated under Article 4 of the EU Habitats Directive (EEC/92/43). SACs are sites of European importance for habitats or species identified under the latter Directive.

## Population viability

Populations which contribute most to population viability locally and as a whole may show one or more of the following attributes:

- (1) a level of recruitment into the breeding population that equals or exceeds immigration and mortality (averaged over a suitable period of time); and/or
- (2) small-scale population fluctuations around a stable population size; and/or
- (3) an area supporting a population of a species which enables its geographic range to be maintained on a long-term basis.

Best-available scientific data will be used to make such assessments.

## Ramsar Convention

The informal name of the Convention on Wetlands of International Importance especially as Waterfowl Habitat (sometimes also known as the Convention on Wetlands). The Convention was adopted at a meeting of countries concerned with wetlands and waterfowl held in Ramsar, Iran in 1971 and was ratified by the UK in 1976.

## Regular

The Conference of the Contracting Parties to the Ramsar Convention has defined the term 'regularly' as used in the Ramsar site selection criteria. This definition applies also to the SPA guidelines. A wetland regularly supports a population of a given size if:

- (1) the requisite number of birds is known to have occurred in two-thirds of the seasons for which adequate data are available, the total number of seasons being not less than three; or
- (2) the mean of the maxima of those seasons in which the site is internationally important, taken over at least five years, amounts to the required level (means based on three or four years may be quoted in provisional assessments only).

In some instances, however, for example species occurring in very remote areas or which are particularly rare, areas may be considered suitable on the basis of fewer counts.

### **Seabirds**

In the context of the application of guideline 1.3, seabirds are defined as species within the families Procellariidae, Hydrobatidae, Sulidae, Phalacrocoracidae, Stercorariidae, Laridae and Alcidae.

### **Source**

Area/local population, within which fecundity exceeds the sum of mortality and immigration, and results in a net emigration of individuals.

### **Special Protection Area (SPA)**

An area classified under Article 4 of the Birds Directive.

### **SPA classification**

The process of formally notifying SPAs to the European Commission.

### **SPA network**

The total national (UK) network of all classified or proposed SPAs. It is the aggregate of many separate SPA suites.

### **SPA suite**

Refers to those classified or proposed SPAs selected under Article 4 of the Bird Directive to fulfil relevant site-protection requirements for one particular species, sub-species or population.

### **Special conservation measures**

Article 4.1 of the Birds Directive requires that “*special conservation measures*” are taken to conserve the habitat of species listed in Annex I of the Directive, to ensure their survival and reproduction in their area of distribution, in particular the classification of SPAs. Similar measures must be taken for regularly occurring migratory species, under Article 4.2.

### **Species range**

The limits of a species’ geographical distribution. Article 4 of the Birds Directive requires Member States to ensure the survival and reproduction of Annex I and regularly occurring migratory species “*in their area of distribution*”. Article I of the Habitats Directive necessitates that, amongst other considerations, the “*natural range of the species*” be maintained for a species’ status to be regarded as favourable.

### **United Kingdom**

The United Kingdom comprises England, Northern Ireland, Scotland and Wales (but excludes the Channel Isles and the Isle of Man).

### **‘Use’ of areas**

Article 4.2 of the Birds Directive requires special measures to be taken for migratory species at “*breeding, moulting and wintering areas and staging posts along their migration routes*”. The boundary of each SPA is so determined that it delimits an area which provides the conservation requirements of the species in the season(s) and for the particular purposes for which it is classified.

## **Waterbirds**

In the context of the application of guideline 1.3, waterbirds are defined as migratory species within the families Gaviidae, Podicipedidae, Phalacrocoracidae, Ardeidae, Threskiornithidae, Anatidae, Gruidae, Rallidae, Haematopodidae, Recurvirostridae, Burhinidae, Charadriidae, and Scolopacidae. The term waterfowl has the same meaning within the context of this review.



# Appendix 2

## Council Directive of 2 April 1979 on the conservation of wild birds (79/409/EEC)

COUNCIL DIRECTIVE  
of 2 April 1979  
**on the conservation of the wild birds**  
(79/409/EEC)

THE COUNCIL OF THE EUROPEAN  
COMMUNITIES,

Having regard to the Treaty establishing the European Economic Community, and in particular Article 235 thereof,

Having regard to the proposal from the Commission<sup>1</sup>,

Having regard to the opinion of the European Parliament<sup>2</sup>,

Having regard to the opinion of the Economic and Social Committee<sup>3</sup>,

Whereas the Council declaration of 22 November 1973 on the programme of action of the European Communities on the environment<sup>4</sup> calls for specific action to protect birds, supplemented by the resolution of the Council of the European Communities and of the representatives of the Governments of the Member States meeting within the Council of 17 May 1977 on the continuation and implementation of a European

Community policy and action programme on the environment<sup>5</sup>;

Whereas a large number of species of wild birds naturally occurring in the European territory of the Member States are declining in number, very rapidly in some cases; whereas this decline represents a serious threat to the conservation of the natural environment, particularly because of the biological balances threatened thereby;

Whereas the species of wild birds naturally occurring in the European territory of the Member States are mainly migratory species; whereas such species constitute a common heritage and whereas effective bird protection is typically a trans-frontier environment problem entailing common responsibilities;

Whereas the conditions of life for birds in Greenland are fundamentally different from those in the other regions of the European territory of the Member States on account of the general circumstances and in particular the climate, the low density of population and the exceptional size and geographical situation of the island;

Whereas therefore this Directive should not apply to Greenland;

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1 OJ No C 24, 1.2.1977, p.3; OJ No C 201, 23.8.1977, p.2

2 OJ No C 163, 11.7.1977, p.28

3 OJ No C 152, 29.6.1977, p.3

4 OJ No C 112, 20.12.1973, p.40

5 OJ No C 139, 13.6.1977, p.1

Whereas the conservation of the species of wild birds naturally occurring in the European territory of the Member States is necessary to attain, within the operation of the common market, of the Community's objectives regarding the improvement of living conditions, a harmonious development of economic activities throughout the Community and a continuous and balanced expansion, but the necessary specific powers to act have not been provided for in the Treaty;

Whereas the measures to be taken must apply to the various factors which may affect the numbers of birds, namely the repercussions of man's activities and in particular the destruction and pollution of their habitats, capture and killing by man and the trade resulting from such practices; whereas the stringency of such measures should be adapted to the particular situation of the various species within the framework of a conservation policy;

Whereas conservation is aimed at the long-term protection and management of natural resources as an integral part of the heritage of the peoples of Europe; whereas it makes it possible to control natural resources and governs their use on the basis of the measures necessary for the maintenance and adjustment of the natural balances between species as far as is reasonably possible;

Whereas the preservation, maintenance or restoration of a sufficient diversity and area of habitats is essential to the conservation of all species of birds; whereas certain species of birds should be the subject of special conservation measures concerning their habitats in order to ensure their survival and reproduction in their area of distribution; whereas such measures must also take account of migratory species and be coordinated with a view to setting up a coherent whole;

Whereas, in order to prevent commercial interests from exerting a possible harmful pressure on exploitation levels it is necessary to impose a general ban on marketing and to restrict all derogation to those species whose biological status so permits, account being taken of the specific conditions obtaining in the different regions;

Whereas, because of their high population level, geographical distribution and reproductive rate in the Community as a whole, certain species may be hunted, which constitutes acceptable exploitation; where certain limits are established and respected, such hunting must be compatible with maintenance of the population of these species at a satisfactory level;

Whereas the various means, devices or methods of large-scale or non-selective capture or killing and hunting with certain forms of transport must be banned because of the excessive pressure which

they exert or may exert on the numbers of the species concerned;

Whereas, because of the importance which may be attached to certain specific situations, provision should be made for the possibility of derogations on certain conditions and subject to monitoring by the Commission;

Whereas the conservation of birds and, in particular, migratory birds still presents problems which call for scientific research; whereas such research will also make it possible to assess the effectiveness of the measures taken;

Whereas care should be taken in consultation with the Commission to see that the introduction of any species of wild bird not naturally occurring in the European territory of the Member States does not cause harm to local flora and fauna;

Whereas the Commission will every three years prepare and transmit to the Member States a composite report based on information submitted by the Member States on the application of national provisions introduced pursuant to this Directive;

Whereas it is necessary to adapt certain Annexes rapidly in the light of technical and scientific progress; whereas, to facilitate the implementation of the measures needed for this purpose, provision should be made for a procedure establishing close cooperation between the Member States and the Commission in a Committee for Adaptation to Technical and Scientific Progress,

HAS ADOPTED THIS DIRECTIVE:

### *Article 1*

1. This Directive relates to the conservation of all species of naturally occurring birds in the wild state in the European territory of the Member States to which the Treaty applies. It covers the protection, management and control of these species and lays down rules for their exploitation.

2. It shall apply to birds, their eggs, nests and habitats.

3. This Directive shall not apply to Greenland.

### *Article 2*

Member States shall take the requisite measures to maintain the population of the species referred to in Article 1 at a level which corresponds in particular to ecological, scientific and cultural requirements, while taking



account of economic and recreational requirements, or to adapt the population of these species to that level.

### *Article 3*

1. In the light of the requirements referred to in Article 2, Member States shall take the requisite measures to preserve, maintain or re-establish a sufficient diversity and area of habitats for all the species of birds referred to in Article 1.

2. The preservation, maintenance and re-establishment of biotopes and habitats shall include primarily the following measures:

- (a) creation of protected areas;
- (b) upkeep and management in accordance with the ecological needs of habitats inside and outside the protected zones;
- (c) re-establishment of destroyed biotopes;
- (d) creation of biotopes.

### *Article 4*

1. The species mentioned in Annex I shall be the subject of special conservation measures concerning their habitat in order to ensure their survival and reproduction in their area of distribution.

In this connection, account shall be taken of:

- (a) species in danger of extinction;
- (b) species vulnerable to specific changes in their habitat;
- (c) species considered rare because of small populations or restricted local distribution;
- (d) other species requiring particular attention for reasons of the specific nature of their habitat.

Trends and variations in population levels shall be taken into account as a background for evaluations.

Member States shall classify in particular the most suitable territories in number and size as special protection areas for the conservation of these species, taking into account their protection requirements in the geographical sea and land area where this Directive applies.

2. Member States shall take similar measures for regularly occurring migratory species not listed in Annex I, bearing in mind their need for protection in the geographical sea and land area where this

Directive applies, as regards their breeding, moulting and wintering areas and staging posts along their migration routes. To this end, Member States shall pay particular attention to the protection of wetlands and particularly to wetlands of international importance.

3. Member States shall send the Commission all relevant information so that it may take appropriate initiatives with a view to the coordination necessary to ensure that the areas provided for in paragraphs 1 and 2 above form a coherent whole which meets the protection requirements of these species in the geographical sea and land area where this Directive applies.

4. In respect of the protection areas referred to in paragraphs 1 and 2 above, Member States shall take appropriate steps to avoid pollution or deterioration of habitats or any disturbances affecting the birds, in so far as these would be significant having regard to the objectives of this Article\*. Outside these protection areas, Member States shall also strive to avoid pollution or deterioration of habitats.

### *Article 5*

Without prejudice to Articles 7 and 9, Member States shall take the requisite measures to establish a general system of protection for all species of birds referred to in Article 1, prohibiting in particular:

- (a) deliberate killing or capture by any method;
- (b) deliberate destruction of, or damage to, their nests and eggs or removal of their nests;
- (c) taking their eggs in the wild and keeping these eggs even if empty;
- (d) deliberate disturbance of these birds particularly during the period of breeding and rearing, in so far as disturbance would be significant having regard to the objectives of this Directive;
- (e) keeping birds of species the hunting and capture of which is prohibited.

### *Article 6*

1. Without prejudice to the provisions of paragraphs 2 and 3, Member States shall

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\* Article 7 (Directive 92/43/EEC) Obligations arising under Article 6 (2), (3) and (4) of this Directive shall replace any obligations arising under the first sentence of Article 4 (4) of Directive 79/409/EEC in respect of areas classified pursuant to Article 4 (1) or similarly recognized under Article 4 (2) thereof, as from the date of implementation of this Directive or the date of classification or recognition by a Member State under Directive 79/409/EEC, where the

prohibit, for all the bird species referred to in Article 1, the sale, transport for sale, keeping for sale and the offering for sale of live or dead birds and of any readily recognizable parts or derivatives of such birds.

2. The activities referred to in paragraph 1 shall not be prohibited in respect of the species referred to in Annex III/1, provided that the birds have been legally killed or captured or otherwise legally acquired.

3. Member States may, for the species listed in Annex III/2, allow within their territory the activities referred to in paragraph 1, making provision for certain restrictions, provided the birds have been legally killed or captured or otherwise legally acquired.

Member States wishing to grant such authorization shall first of all consult the Commission with a view to examining jointly with the latter whether the marketing of specimens of such species would result or could reasonably be expected to result in the population levels, geographical distribution or reproductive rate of the species being endangered throughout the Community. Should this examination prove that the intended authorization will, in the view of the Commission, result in any one of the aforementioned species being thus endangered or in the possibility of their being thus endangered, the Commission shall forward a reasoned recommendation to the Member State concerned stating its opposition to the marketing of the species in question. Should the Commission consider that no such risk exists, it will inform the Member State concerned accordingly.

The Commission's recommendation shall be published in the *Official Journal of the European Communities*.

Member States granting authorization pursuant to this paragraph shall verify at regular intervals that the conditions governing the granting of such authorization continue to be fulfilled.

4. The Commission shall carry out studies on the biological status of the species listed in Annex III/3 and on the effects of marketing on such status.

It shall submit, at the latest four months before the time limit referred to in Article 18(1) of this Directive, a report and its proposals to the Committee referred to in Article 16, with a view to a decision on the entry of such species in Annex III/2. Pending this decision, the Member States may apply existing national rules to such species without prejudice to paragraph 3 hereof.

#### Article 7

1. Owing to their population level, geographical distribution and reproductive rate throughout the Community, the species listed in Annex II may be hunted under national legislation. Member States shall ensure that the hunting of these species does not jeopardize conservation efforts in their distribution area.

2. The species referred to in Annex II/1 may be hunted in the geographical sea and land area where this Directive applies.

3. The species referred to in Annex II/2 may be hunted only in the Member States in respect of which they are indicated.

4. Member States shall ensure that the practice of hunting, including falconry if practised, as carried on in accordance with the national measures in force, complies with the principles of wise use and ecologically balanced control of the species of birds concerned and that this practice is compatible as regards the population of these species, in particular migratory species, with the measures resulting from Article 2. They shall see in particular that the species to which hunting laws apply are not hunted during the rearing season nor during the various stages of reproduction. In the case of migratory species, they shall see in particular that the species to which hunting regulations apply are not hunted during their period of reproduction or during their return to their rearing grounds. Member States shall send the Commission all relevant information on the practical application of their hunting regulations.

#### Article 8

1. In respect of the hunting, capture or killing of birds under this Directive, Member States shall prohibit the use of all means, arrangements or methods used for the large-scale or non-selective capture or killing of birds or capable of causing the local disappearance of a species, in particular the use of those listed in Annex IV (a).

2. Moreover, Member States shall prohibit any hunting from the modes of transport and under the conditions mentioned in Annex IV(b).

#### Article 9

1. Member States may derogate from the provisions of Articles 5, 6, 7 and 8, where there is no other satisfactory solution, for the following reasons:

- (a) – in the interests of public health and safety,

- in the interests of air safety,
  - to prevent serious damage to crops, livestock, forests, fisheries and water,
  - for the protection of flora and fauna;
- (b) for the purposes of research and teaching, of re-population, of re-introduction and for the breeding necessary for these purposes;
- (c) to permit, under strictly supervised conditions and on a selective basis, the capture, keeping or other judicious use of certain birds in small numbers.

2. The derogations must specify:

- the species which are subject to the derogations,
- the means, arrangements or methods authorized for capture or killing,
- the conditions of risk and the circumstances of time and place under which such derogations may be granted,
- the authority empowered to declare that the required conditions obtain and to decide what means, arrangements or methods may be used, within what limits and by whom,
- the controls which will be carried out.

3. Each year the Member States shall send a report to the Commission on the implementation of this Article.

4. On the basis of the information available to it, and in particular the information communicated to it pursuant to paragraph 3, the Commission shall at all times ensure that the consequences of these derogations are not incompatible with this Directive. It shall take appropriate steps to this end.

#### *Article 10*

1. Member States shall encourage research and any work required as a basis for the protection, management and use of the population of all species of bird referred to in Article 1.

2. Particular attention shall be paid to research and work on the subjects listed in Annex V. Member States shall send the Commission any information required to enable it to take appropriate measures for the coordination of the research and work referred to in this Article.

#### *Article 11*

Member States shall see that any introduction of species of bird which do not occur naturally in the wild state in the European territory of the Member States does not prejudice the local flora and fauna.

In this connection they shall consult the Commission.

#### *Article 12*

1. Member States shall forward to the Commission every three years, starting from the date of expiry of the time limit referred to in Article 18 (1), a report on the implementation of national provisions taken thereunder.

2. The Commission shall prepare every three years a composite report based on the information referred to in paragraph 1. That part of the draft report covering the information supplied by a Member State shall be forwarded to the authorities of the Member State in question for verification. The final version of the report shall be forwarded to the Member States.

#### *Article 13*

Application of the measures taken pursuant to this Directive may not lead to deterioration in the present situation as regards the conservation of species of birds referred to in Article 1.

#### *Article 14*

Member States may introduce stricter protective measures than those provided for under this Directive.

#### *Article 15*

Such amendments as are necessary for adapting Annexes I and V to this Directive to technical and scientific progress and the amendments referred to in the second paragraph of Article 6 (4) shall be adopted in accordance with the procedure laid down in Article 17.

#### *Article 16*

1. For the purposes of the amendments referred to in Article 15 of this Directive, a Committee for the Adaptation to Technical and Scientific Progress (hereinafter called 'the Committee'), consisting of representatives of the Member States and chaired by a representative of the Commission, is hereby set up.

2. The Committee shall draw up its rules of procedure.

#### *Article 17*

1. Where the procedure laid down in this Article is to be followed, matters shall be referred to the Committee by its chairman, either on his own initiative or at the request of the representative of a Member State.

2. The Commission representative shall submit to the Committee a draft of the measures to be taken. The Committee shall deliver its opinion on the draft within a time limit set by the chairman having regard to the urgency of the matter. It shall act by a majority of 41 votes, the votes of the Member States being weighted as provided in Article 148 (2) of the Treaty. The chairman shall not vote.

3. (a) The Commission shall adopt the measures envisaged where they are in accordance with the opinion of the Committee.

(b) Where the measures envisaged are not in accordance with the opinion of the Committee or if no opinion is delivered, the Commission shall without delay submit a proposal to the Council concerning the measures to be adopted. The Council shall act by a qualified majority.

(c) If, within three months of the proposal being submitted to it, the Council has not acted, the proposed measures shall be adopted by the Commission.

#### *Article 18*

1. Member States shall bring into force the laws, regulations and administrative provisions

necessary to comply with this Directive within two years of its notification. They shall forthwith inform the Commission thereof.

2. Member States shall communicate to the Commission the texts of the main provisions of national law which they adopt in the field governed by this Directive.

#### *Article 19*

This Directive is addressed to the Member States.

Done at Luxembourg, 2 April 1979.

*For the Council*

*The President*

J. FRANÇOIS-PONCET

Full lists of those species occurring on the various annexes of the Directive, which are modified from time to time, can be found on the World Wide Web at:

<http://europa.eu.int/comm/environment/nature/legis.htm>

## Modifications to the Directive

The various changes to the Directive since 1979 are listed below, together with a brief summary of their purpose.

| Legal modification   | Purpose of modification   |
|--|---|
| Council Directive 79/409/EEC on the conservation of wild birds<br>( <i>OJ No L 103, 25 April 1979, p. 1</i> )  | Original text of the Directive  |
| Council resolution of 2 April 1979 concerning Directive 79/409/EEC on the conservation of wild birds<br>( <i>OJ No C 103, 25 April 1979, p. 6</i> )  | Statement of intent by both the Council of Ministers and the Commission relating to actions to be taken under the Directive   |
| Act concerning the conditions of accession and the adjustments to the Treaties – Accession of the Hellenic Republic<br>( <i>OJ No L 291, 19 November 1979, p. 112</i> )  |   |
| Council Directive (81/854/EEC) of 19 October 1981 adapting, consequent upon the accession of Greece, Directive 79/409/EEC on the conservation of wild birds<br>( <i>OJ No L 319, 7 November 1981, pp. 3–14</i> )                               | Added Greek vernacular names to the bird (sub-) species listed in Annexes I, II and III and indicated which species in Annex II/2 could be hunted in Greece   |
| Act concerning the conditions of accession and the adjustments to the Treaties – Accession of the Kingdom of Spain and the Portuguese Republic<br>( <i>OJ No L 302, 15 November 1985, p. 219</i> )   |   |
| Commission Directive (85/411/EEC) of 25 July 1985 amending Council Directive 79/409/EEC on the conservation of wild birds<br>( <i>OJ No L 233, 30 August 1988, pp. 33–41</i> )   | Modification of Directive following accession of Spain and Portugal as new Member States. Addition of further 70 species and sub-species to Annex I bringing total to 144 species and sub-species, <i>inter alia</i> , Merlin, Golden Plover, Hen Harrier |
| Council Directive 86/122/EEC of 8 April 1986 adapting, consequent upon the accession of Spain and Portugal, Directive 79/409/EEC on the conservation of wild birds<br>( <i>OJ No L 100, 16 April 1986, pp. 22–25</i> )                         | Addition of Spanish and Portuguese bird names in the new official languages   |
| Council Directive 90/656/EEC of 4 December 1990 on the transitional measures applicable in Germany with regard to certain Community provision relating to the protection of the environment<br>( <i>OJ No L 353, 17 December 1990, p. 59</i> ) | Article 5 of this Directive relates to the wild birds Directive   |
| Council Directive 91/244/EEC of 6 March 1991 amending Council Directive 79/409/EEC on the conservation of wild birds<br>( <i>OJ No L 115, 8 May 1991, p. 41</i> )  | Amended Annexes I and III of the Directive bringing the Annex I total to 175 species and sub-species  |
| Council Directive 92/43/EEC of 21 May 1992 on the conservation of natural habitats and of wild fauna and flora<br>( <i>OJ No L 206, 22 July 1992, pp. 7–50</i> )   | Modification of Article 4(4) of Birds Directive consequent upon Articles 6 & 7 of the Habitats Directive  |



| Legal modification   | Purpose of modification  |
|--|--|
| Council Directive of 8 June 1994 amending Annex II to Directive 79/409/EEC on the conservation of wild birds (92/24/EC)<br>( <i>OJ No L 164, 30 June 1994, p. 9–14</i> ) | Amended Annex II/2 of the Directive  |
| Act of accession of Austria, Finland and Sweden – Council Decision 95/1/EC<br>( <i>OJ No L 1, 1 January 1995, p. 1</i> )   | Modification of Directive following accession of new Member States. Amended Annex I (adding seven species, inter alia, Smew, Bar-tailed Godwit and Gyrfalcon), as well as Annexes II/2, Annex III/1 and Annex IV of the Directive as well as adding new bird names in new official languages |
| Commission Directive of 29 July 1997 Council Directive 79/409/EEC on the conservation of wild birds (97/49/EC)<br>( <i>OJ No L 223, 13 August 1997, p. 9</i> )           | Amendment of Annex I of the Directive by removal of <i>Phalacrocorax carbo sinensis</i>  |



# Appendix 3

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## Population coverage of UK migratory birds and Annex I species within SPA suites

This Appendix lists all regularly occurring migratory species of birds in the UK (and species listed in Annex I of the Directive where these are regularly occurring within the UK). All solely resident species have been excluded from these tables (unless the UK breeding population is tiny in comparison with the number of immigrants).

Partial migrants (*i.e.* UK breeding species where a significant, but lower, proportion of birds cross national boundaries) have been indicated in the comment field. Annex I species are indicated by the lightest level of shading. Where these are not also migratory, this is shown in the status column.

Summary of bird species occurring in the UK SPA network in breeding and non-breeding seasons. Medium shading indicates that, although the species/population is present in the UK during the relevant season, no corresponding SPAs have been selected for the reasons outlined in the text (section 6) (*i.e.* present but no SPAs). Black shading indicates that, for some migrants, the species does not regularly occur in the UK during the season concerned (*i.e.* not present thus no SPAs). Light shading indicates that the species/population is listed on Annex I.

| Name                     | Migratory status | Breeding season                       |                                    |                                    |   | Non-breeding season        |   |  |  |   |                            |
|--------------------------|------------------|---------------------------------------|------------------------------------|------------------------------------|---|----------------------------|---|--|--|---|----------------------------|
|                          |                  | Number of breeding sites in SPA suite | Total numbers in SPA suite (pairs) | % British (GB) breeding population | % all-Ireland breeding population in Northern Ireland | % international population | Number of non-breeding sites in SPA suite | Total numbers in SPA suite (individuals) | % British (GB) non-breeding population in Northern Ireland | % all-Ireland breeding population in Northern Ireland | % international population |
| Red-throated Diver       | Partial migrant  | 10                                    | 395                                | 42.2%                              |   | 5.6%                       | 1   | 88                                       | 1.8%   |   | 0.1%                       |
| Black-throated Diver     | Partial migrant  | 11                                    | 95                                 | 61%                                |   | 0.5%                       |   |  |  |   |                            |
| Great Northern Diver     |                  |                                       |                                    |                                    |   |                            |   |  |  |   |                            |
| Little Grebe             | Partial migrant  |                                       |                                    |                                    |   |                            |   |  |  |   |                            |
| Great Crested Grebe      | Partial migrant  | 1                                     | 500                                |                                    | 24.1%   | 1.0%                       | 10  | 828                                      | 14.8%  | 7.6%  | 0.2%                       |
| Red-necked Grebe         |                  |                                       |                                    |                                    |   |                            | 17  | 2,679                                    | 13.8%  | 43.2%   | 1.8%                       |
| Slavonian Grebe          | Partial migrant  | 6                                     | 37                                 | 53%                                |   | 0.6%                       | 3   | 31                                       | 7.8%   |   | 0.6%                       |
| Black-necked Grebe       | Partial migrant  |                                       |                                    |                                    |   |                            |   |  |  |   |                            |
| Fulmar                   | Partial migrant  | 25                                    | 310,279                            | 57.3%                              | 4.7%  | 4.1%                       |   |  |  |   |                            |
| Cory's Shearwater        |                  |                                       |                                    |                                    |   |                            |   |  |  |   |                            |
| Great Shearwater         |                  |                                       |                                    |                                    |   |                            |   |  |  |   |                            |
| Sooty Shearwater         |                  |                                       |                                    |                                    |   |                            |   |  |  |   |                            |
| Manx Shearwater          |                  | 4                                     | 219,898                            | 100%                               |   | 82.9%                      |   |  |  |   |                            |
| Mediterranean Shearwater |                  |                                       |                                    |                                    |   |                            |   |  |  |   |                            |
| Storm Petrel             |                  | 9                                     | 29,356                             | 34.5%                              |   | 11.4%                      |   |  |  |   |                            |
| Leach's Petrel           |                  | 6                                     | 55,000                             | 100%                               |   | 5.8%                       |   |  |  |   |                            |
| Gannet                   | Partial migrant  | 10                                    | 197,127                            | 98.1%                              |   | 75.0%                      |   |  |  |   |                            |
| Cormorant                | Partial migrant  | 7                                     | 2,316                              | 29.5%                              | 5.3%  | 5.6%                       | 32  | 4,986                                    | 34.1%  | 5.3%  | 4.2%                       |
| Shag                     | Partial migrant  | 13                                    | 17,584                             | 46.9%                              |   | 14.1%                      |   |  |  |   |                            |
| Bittern                  | Partial migrant  | 5                                     | 18                                 | 90%                                |   | 0.2%                       | 10  | 50                                       | 50%  |   | 0.2%                       |
| Little Egret             |                  |                                       |                                    |                                    |   |                            | 3   | 225                                      | 45%  |   | 0.2%                       |
| Grey Heron               | Partial migrant  |                                       |                                    |                                    |   |                            |   |  |  |   |                            |
| Purple Heron             |                  |                                       |                                    |                                    |   |                            |   |  |  |   |                            |
| White Stork              |                  |                                       |                                    |                                    |   |                            |   |  |  |   |                            |
| Spoonbill                |                  |                                       |                                    |                                    |   |                            |   |  |  |   |                            |
| Bewick's Swan            |                  |                                       |                                    |                                    |   |                            | 15  | 7,072                                    | 99.1%  | 5.4%  | 41.6%                      |

Population coverage of UK migratory birds and Annex I species within SPA suites

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| Name  | Migratory status | Breeding season                       |                                    |                                    |   | Non-breeding season        |   |  |                                    |   |                            |
|---|------------------|---------------------------------------|------------------------------------|------------------------------------|---|----------------------------|---|--|------------------------------------|---|----------------------------|
|   |                  | Number of breeding sites in SPA suite | Total numbers in SPA suite (pairs) | % British (GB) breeding population | % all-Ireland breeding population in Northern Ireland | % international population | Number of non-breeding sites in SPA suite | Total numbers in SPA suite (individuals) | % British (GB) breeding population | % all-Ireland breeding population in Northern Ireland | % international population |
| Whooper Swan  |                  |                                       |                                    |                                    |   |                            | 20  | 4,247                                    | 43.5%                              | 18.5%   | 26.5%                      |
| Bean Goose  |                  |                                       |                                    |                                    |   |                            | 1   | 207                                      | 51.8%                              |   | 0.3%                       |
| Pink-footed Goose                                     |                  |                                       |                                    |                                    |   |                            | 24  | 155,582                                  | 81.9%                              |   | 69.1%                      |
| European White-fronted Goose                          |                  |                                       |                                    |                                    |   |                            | 8   | 4,586                                    | 76.4%                              |   | 0.8%                       |
| Greenland White-fronted Goose                         |                  |                                       |                                    |                                    |   |                            | 12  | 8,243                                    | 58.9%                              |   | 27.5%                      |
| Greylag Goose (Iceland population)                    |                  |                                       |                                    |                                    |   |                            | 22  | 57,519                                   | 57.0%                              | 18.2%   | 57.5%                      |
| Snow Goose  | Partial migrant  |                                       |                                    |                                    |   |                            |   |  |                                    |   |                            |
| Barnacle Goose (Greenland population)                 |                  |                                       |                                    |                                    |   |                            | 11  | 19,115                                   | 63.2%                              |   | 49.8%                      |
| Barnacle Goose (Svalbard population)                  |                  |                                       |                                    |                                    |   |                            | 2   | 13,821                                   | 100%                               |   | 100%                       |
| Dark-bellied Brent Goose                              |                  |                                       |                                    |                                    |   |                            | 19  | 93,677                                   | 93.7%                              |   | 31.2%                      |
| Light-bellied Brent Goose (Svalbard population)       |                  |                                       |                                    |                                    |   |                            | 1   | 1,844                                    | 100%                               |   | 54.2%                      |
| Light-bellied Brent Goose (Canada/Ireland population) |                  |                                       |                                    |                                    |   |                            | 6   | 14,087                                   |                                    | 70.4%   | 70.4%                      |
| Shelduck  | Partial migrant  |                                       |                                    |                                    |   |                            | 32  | 65,472                                   | 83.7%                              | 38.0%   | 21.8%                      |
| Wigeon  | Partial migrant  | 2                                     | 80                                 | 27%                                |   |                            | 38  | 224,338                                  | 78.7%                              | 3.1%  | 17.9%                      |
| Gadwall   | Partial migrant  | 1                                     | 111                                | 14.4%                              |   | <0.1%                      | 18  | 3,580                                    | 42.8%                              | 25.9%   | 11.9%                      |
| Teal  | Partial migrant  |                                       |                                    |                                    |   | 1.1%                       | 30  | 68,433                                   | 46.7%                              | 4.8%  | 17.1%                      |
| Mallard   | Partial migrant  |                                       |                                    |                                    |   |                            | 14  | 29,137                                   | 4.9%                               | 9.5%  | 0.6%                       |
| Pintail   | Partial migrant  |                                       |                                    |                                    |   |                            | 25  | 19,021                                   | 67.4%                              | 2.4%  | 31.7%                      |
| Garganey  |                  |                                       |                                    |                                    |   |                            |   |  |                                    |   |                            |
| Shoveler  |                  | 1                                     | 155                                | 15.5%                              |   | 1.6%                       | 26  | 3,582                                    | 34.6%                              | 1.9%  | 9.0%                       |
| Red-crested Pochard                                   |                  |                                       |                                    |                                    |   |                            |   |  |                                    |   |                            |
| Pochard   | Partial migrant  |                                       |                                    |                                    |   |                            | 12  | 32,489                                   | 19.6%                              | 59.6%   | 9.3%                       |
| Ring-necked Duck                                      |                  |                                       |                                    |                                    |   |                            |   |  |                                    |   |                            |
| Ferruginous Duck                                      |                  |                                       |                                    |                                    |   |                            |   |  |                                    |   |                            |
| Tufted Duck   | Partial migrant  | 7                                     | 24,947                             | 7.5%                               |   |                            |   |  |                                    | 51.2%   | 2.5%                       |
| Scaup   |                  | 6                                     | 3,229                              | 15.2%                              |   |                            |   |  |                                    | 51.9%   | 1.0%                       |

| Name                   | Migratory status | Breeding season                                   |  |                                    |   | Non-breeding season        |   |  |  |   |                            |
|------------------------|------------------|---|--|------------------------------------|---|----------------------------|---|--|--|---|----------------------------|
|                        |                  | Number of breeding sites in species' UK SPA suite | Total numbers in species' UK SPA suite (pairs) | % British (GB) breeding population | % all-Ireland breeding population in Northern Ireland | % international population | Number of non-breeding sites in species' UK SPA suite | Total numbers in species' UK SPA suite (individuals) | % British (GB) non-breeding population | % all-Ireland breeding population in Northern Ireland | % international population |
| Eider                  | Partial migrant  |   |  |                                    |   |                            | 8   | 9,023  | 11.5%                                  | 18.3%   | 0.5%                       |
| Long-tailed Duck       |                  |   |  |                                    |   |                            |   |  |  |   |                            |
| Common Scoter          | Partial migrant  | 2   | 37   | 49%                                |   | <0.1%                      | 3   | 796  | 3.5%                                   |   | <0.1%                      |
| Surf Scoter            |                  |   |  |                                    |   |                            | 6   | 3,422  | 12.4%                                  |   | 0.2%                       |
| Velvet Scoter          |                  |   |  |                                    |   |                            |   |  |  |   |                            |
| Goldeneye              | Partial migrant  |   |  |                                    |   |                            | 4   | 639  | 21.3%                                  |   | <0.1%                      |
| Smew                   |                  |   |  |                                    |   |                            | 15  | 12,788   | 25.6%                                  | 76.7%   | 4.3%                       |
| Red-breasted Merganser | Partial migrant  |   |  |                                    |   |                            |   |  |  |   |                            |
| Goosander              | Partial migrant  |   |  |                                    |   |                            | 15  | 2,177  | 19.3%                                  | 12.2%   | 1.7%                       |
| Honey Buzzard          |                  | 1   | 2  | 13%                                |   | <0.1%                      | 2   | 75   | 0.8%                                   |   | <0.1%                      |
| Red Kite               | Partial migrant  | 1   | 15   | 9.3%                               |   | <0.1%                      |   |  |  |   |                            |
| White-tailed Eagle     | Not migratory    |   |  |                                    |   |                            |   |  |  |   |                            |
| Marsh Harrier          | Partial migrant  | 10  | 116  | 74%                                |   | 0.4%                       |   |  |  |   |                            |
| Hen Harrier            | Partial migrant  | 14  | 229  | 47.4%                              |   | 2.8%                       | 20  | 244  | 32.5%                                  |   | 1.0%                       |
| Montagu's Harrier      |                  |   |  |                                    |   |                            |   |  |  |   |                            |
| Goshawk                | Partial migrant  |   |  |                                    |   |                            |   |  |  |   |                            |
| Sparrowhawk            | Partial migrant  |   |  |                                    |   |                            |   |  |  |   |                            |
| Buzzard                | Partial migrant  |   |  |                                    |   |                            |   |  |  |   |                            |
| Rough-legged Buzzard   |                  |   |  |                                    |   |                            |   |  |  |   |                            |
| Golden Eagle           | Partial migrant  | 8   | 60   | 15%                                |   | 1.2%                       | Largely resident on breeding areas (Appendix 5.5.1)   |  |  |   |                            |
| Osprey                 |                  | 9   | 39   | 39%                                |   | 0.8%                       |   |  |  |   |                            |
| Kestrel                | Partial migrant  |   |  |                                    |   |                            |   |  |  |   |                            |
| Red-footed Falcon      |                  |   |  |                                    |   |                            |   |  |  |   |                            |
| Merlin                 | Partial migrant  | 14  | 426  | 32.8%                              |   | 4.2%                       | 1   | 15   | 1.2%                                   |   | <0.1%                      |
| Hobby                  |                  |   |  |                                    |   |                            |   |  |  |   |                            |
| Peregrine              | Partial migrant  | 10  | 109  | 8.8%                               | 1.9%  | 1.7%                       |   |  |  |   |                            |
| Capercaillie           | Not migratory    | 6   | 364  | 16.5%                              |   | <0.1%                      | Largely resident on breeding areas (Appendix 5.5.1)   |  |  |   |                            |
| Quail                  |                  |   |  |                                    |   |                            |   |  |  |   |                            |
| Water Rail             | Partial migrant  |   |  |                                    |   |                            |   |  |  |   |                            |
| Spotted Crane          |                  | 4   | 42   | 84%                                |   | <0.1%                      |   |  |  |   |                            |
| Corncrake              |                  | 10  | 204  | 42.5%                              |   | 0.2%                       |   |  |  |   |                            |



## Population coverage of UK migratory birds and Annex I species within SPA suites

| Name                     | Migratory status | Breeding season                                   |  |                                    |   | Non-breeding season        |   |  |  |   |                            |
|--------------------------|------------------|---|--|------------------------------------|---|----------------------------|---|--|--|---|----------------------------|
|                          |                  | Number of breeding sites in species' UK SPA suite | Total numbers in species' UK SPA suite (pairs) | % British (GB) breeding population | % all-Ireland breeding population in Northern Ireland | % international population | Number of non-breeding sites in species' UK SPA suite | Total numbers in species' UK SPA suite (individuals) | % British (GB) non-breeding population | % all-Ireland non-breeding population in Northern Ireland | % international population |
| Redshank                 | Partial migrant  | 4   | 1,660  | 5.4%                               |   | 2.8%                       | 36  | 56,739   | 48.4%                                  | 14.1%   | 37.8%                      |
| Greenshank               | Partial migrant  | 2   | 408  | 28.3%                              |   | 0.7%                       |   |  |  |   |                            |
| Green Sandpiper          |                  |   |  |                                    |   |                            |   |  |  |   |                            |
| Wood Sandpiper           |                  | 3   | 10   | 100%                               |   | <0.1%                      |   |  |  |   |                            |
| Common Sandpiper         |                  |   |  |                                    |   |                            |   |  |  |   |                            |
| Turnstone                |                  |   |  |                                    |   |                            |   |  |  |   |                            |
| Red-necked Phalarope     |                  | 1   | 30   | 83%                                |   | <0.1%                      | 13  | 10,200   | 13.4%                                  | 7.1%  | 14.6%                      |
| Grey Phalarope           |                  |   |  |                                    |   |                            |   |  |  |   |                            |
| Pomarine Skua            |                  |   |  |                                    |   |                            |   |  |  |   |                            |
| Arctic Skua              |                  | 7   | 780  | 24.4%                              |   | 2.6%                       |   |  |  |   |                            |
| Long-tailed Skua         |                  |   |  |                                    |   |                            |   |  |  |   |                            |
| Great Skua               |                  | 9   | 6,262  | 73.7%                              |   | 46.0%                      |   |  |  |   |                            |
| Mediterranean Gull       |                  | 5   | 23   | 74%                                |   | <0.1%                      |   |  |  |   |                            |
| Little Gull              |                  |   |  |                                    |   |                            |   |  |  |   |                            |
| Sabine's Gull            |                  |   |  |                                    |   |                            |   |  |  |   |                            |
| Black-headed Gull        | Partial migrant  | 4   | 48,582   | 9.3%                               | 61.3%   | 2.9%                       |   |  |  |   |                            |
| Ring-billed Gull         |                  |   |  |                                    |   |                            |   |  |  |   |                            |
| Common Gull              | Partial migrant  | 3   | 18,264   | 26.4%                              | 7.3%  | 14.7%                      |   |  |  |   |                            |
| Lesser Black-backed Gull | Partial migrant  | 10  | 88,633   | 100%                               | 11.6%   | 71.4%                      |   |  |  |   |                            |
| Herring Gull             | Partial migrant  | 12  | 54,650   | 31.6%                              | 9.0%  | 5.8%                       |   |  |  |   |                            |
| Iceland Gull             |                  |   |  |                                    |   |                            |   |  |  |   |                            |
| Glaucous Gull            |                  |   |  |                                    |   |                            |   |  |  |   |                            |
| Great Black-backed Gull  | Partial migrant  | 6   | 4,457  | 23.4%                              |   | 4.7%                       |   |  |  |   |                            |
| Kittiwake                | Partial migrant  | 33  | 390,597  | 78.3%                              | 13.6%   | 12.3%                      |   |  |  |   |                            |
| Sandwich Tern            |                  | 16  | 11,440   | 72.2%                              | 30.3%   | 8.7%                       |   |  |  |   |                            |
| Roseate Tern             |                  | 7   | 56   | 88%                                | 1%  | 3.2%                       |   |  |  |   |                            |
| Common Tern              |                  | 22  | 6,993  | 46.2%                              | 42.2%   | 3.6%                       |   |  |  |   |                            |
| Arctic Tern              |                  | 17  | 17,124   | 37.9%                              | 16.7%   | 1.9%                       |   |  |  |   |                            |
| Little Tern              |                  | 27  | 1,616  | 67.3%                              |   | 7.8%                       |   |  |  |   |                            |
| Black Tern               |                  |   |  |                                    |   |                            |   |  |  |   |                            |
| Guillemot                | Partial migrant  | 34  | 693,120  | 94.5%                              | 27.4%   | 30.8%                      |   |  |  |   |                            |

## Population coverage of UK migratory birds and Annex I species within SPA suites

Breeding seasonMigratory statusName \_\_\_\_\_

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Breeding seasonName  
Migratory status



# Appendix 4

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## Reference populations used in review

This Appendix summarises the standardised national (*i.e.* GB or all-Ireland) or biogeographic population figures used in this review. These data have been used to calculate proportions of Annex I or migratory species within SPAs. The proportion of such species' national or biogeographic population supported by the UK SPA network as a whole can therefore also be calculated. Usually only those species qualifying on at least one UK SPA are included.

Points regarding derivations:

- (1) Where figures have been taken directly from source, these are shown as originally cited.
- (2) Where population ranges have required the selection of a single population figure, the minimum has normally been taken.
- (3) Where such ranges are small, typically those in Stone *et al.* 1997, the minimum figure is shown exactly.
- (4) Where the range is large, typically in Rose & Scott 1997, the figure selected has additionally been rounded to produce a figure that can be more easily employed.
- (5) The rounding of large population figures follows the methodology given in Stone *et al.* 1997, *e.g.* 1,000–10,000 to the nearest 100, 10,000–100,000 to the nearest 1,000, 100,000–1,000,000 to the nearest 10,000, *etc.*
- (6) For a number non-Annex I migratory species, particularly ducks, breeding populations were derived by dividing the wintering figure by three, following Meininger *et al.* (1995) and Rose & Scott (1994,1997).
- (7) Breeding populations of Guillemot, Razorbill and Puffin have been converted from individual birds to breeding pairs, using the methodology used by Lloyd *et al.* (1991).
- (8) Biogeographical populations derived from data in Hagemeyer & Blair (1997) and defined here as 'European' exclude Turkey and European Russia.

F = individual females; M = calling males; P = pairs; I = individuals; A = individual adults

| Species/<br>population  | Season | GB<br>population<br>unit | GB<br>population<br>source      | GB<br>population<br>derivation    | All-Ireland<br>population<br>unit | All-Ireland<br>population<br>source | All-Ireland<br>population<br>derivation   | Bio-geographic<br>population<br>unit | Bio-<br>geographic<br>population<br>source | Bio-geographic<br>population<br>derivation              |
|-------------------------|--------|--------------------------|---------------------------------|-----------------------------------|-----------------------------------|-------------------------------------|---|--------------------------------------|--|---|
| Red-throated<br>Diver   | B      | 935                      | Gibbons <i>et al.</i> 1997      | 935–1,500<br>prs =<br>minimum     | <10                               | P                                   | Gibbons <i>et al.</i> 1997  | P                                    | 7,158 Europe                               | Hagemeyer 7,158–10,502 =<br>& Blair<br>minimum<br>1997  |
| Red-throated<br>Diver   | W      | 4,850                    | Danielsen<br><i>et al.</i> 1993 |                                   | 1,000                             | I                                   | Lack 1986   | I                                    | 75,000 Europe/<br>Greenland                | Rose &<br>Scott 1997                                    |
| Black-throated<br>Diver | B      | 155                      | Stone <i>et al.</i> 1997        | 155–189 prs<br>= minimum          |                                   |                                     |   | P                                    | 19,196 Europe                              | Hagemeyer 19,196–26,548 =<br>& Blair<br>minimum<br>1997 |
| Black-throated<br>Diver | W      | 700                      | Danielsen<br><i>et al.</i> 1993 |                                   |                                   |                                     |   | I                                    | 120,000 Europe/<br>W Siberia               | Rose &<br>Scott 1997                                    |
| Great Northern<br>Diver | W      | 3,000                    | Lack 1986                       |                                   | 1,000                             | I                                   | Lack 1986   | I                                    | 5,000 Europe<br>(wintering)                | Rose &<br>Scott 1997                                    |
| Little Grebe            | W      | 3,290                    | Kirby 1995                      |                                   | 5,000                             | I                                   | Sheppard<br>1993  | I                                    | 550,000 W<br>Palearctic                    | Rose &<br>Scott 1997                                    |
| Great Crested<br>Grebe  | B      | 4,000                    | Gibbons <i>et al.</i> 1993      | 8,000 adults<br>divided by<br>two | 2,074                             | P                                   | Gibbons <i>et al.</i> 1993  | P                                    | 50,000 NW<br>Europe                        | Rose &<br>Scott 1997                                    |
| Great Crested<br>Grebe  | P      |                          |                                 |                                   | 3,060                             | I                                   | Cranswick<br><i>et al.</i> 1997; September<br>all-Ireland<br>counts<br>1996b<br>1997/8<br>1995–1997 | I                                    | 150,000 NW<br>Europe                       | Rose &<br>Scott 1997                                    |
| Great Crested<br>Grebe  | W      | 9,800                    | Kirby 1995                      |                                   | 3,500                             | I                                   | Delany<br>1996b   | I                                    | 150,000 NW<br>Europe                       | Rose &<br>Scott 1997                                    |
| Slavonian Grebe         | B      | 70                       | Ogilvie <i>et al.</i> 1996      | 70–78 prs =<br>minimum            |                                   |                                     |   | P                                    | 6,058 Europe                               | Hagemeyer 6,058–9,268 =<br>& Blair<br>minimum<br>1997   |
| Slavonian Grebe         | P      | 400                      | Stone <i>et al.</i> 1997        | same as<br>winter                 |                                   |                                     |   | I                                    | 5,000 NW<br>Europe                         | Rose &<br>Scott 1997                                    |
| Slavonian Grebe         | W      | 400                      | Lack 1986                       |                                   | 30                                | I                                   | Lack 1986   | I                                    | 30–40 =<br>minimum<br>Europe               | Rose &<br>Scott 1997                                    |
| Black-necked<br>Grebe   | B      | 23                       | Ogilvie <i>et al.</i> 1996      | 23–48 prs =<br>minimum            |                                   |                                     |   | P                                    | 33,000 W<br>Palearctic                     | Rose &<br>Scott 1997                                    |
| Black-necked<br>Grebe   | W      | 120                      | Lack 1986                       |                                   |                                   |                                     |   | I                                    | 100,000 W<br>Palearctic                    | Rose &<br>Scott 1997                                    |
| Fulmar                  | B      | 539,000                  | Lloyd <i>et al.</i> 1991        |                                   | 31,300                            | P                                   | Lloyd <i>et al.</i> 1991  | P                                    | 7,540,000 N<br>Atlantic                    | Lloyd <i>et al.</i> 1991                                |

# Reference populations used in review

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| Species/<br>population | Season | GB<br>population<br>unit | GB<br>population<br>source | GB<br>population<br>derivation | All-Ireland<br>population<br>unit                           | All-Ireland<br>population<br>source | All-Ireland<br>population<br>derivation | Bio-geographic<br>population<br>name | Bio-<br>geographic<br>population<br>unit | Bio-<br>geographic<br>population<br>source | Bio-geographic<br>population derivation   |
|------------------------|--------|--------------------------|----------------------------|--------------------------------|---|-------------------------------------|---|--------------------------------------|--|--|---|
| Manx Shearwater        | B      | 220,000                  | P                          | Lloyd <i>et al.</i> 1991       | 220,000–250,000 prs = minimum                               | 30,000                              | P                                       | Gibbons <i>et al.</i> 1993           | 30,000–50,000 = minimum                  | 265,100 World                              | Lloyd <i>et al.</i> 1991 Excludes birds now regarded as <i>P. mauretanicus</i> and <i>P. yokoutan</i> |
| Storm Petrel           | B      | 85,000                   | P                          | Lloyd <i>et al.</i> 1991       | 20,000–150,000 inds = midpoint on JNCC Seabirds Team advice |                                     |   | 257,000 World                        | P  | Lloyd <i>et al.</i> 1991                   | 135,000–380,000 = midpoint  |
| Leach's Petrel         | B      | 55,000                   | P                          | Lloyd <i>et al.</i> 1991       | 10,000–100,000 inds = midpoint on JNCC Seabirds Team advice |                                     |   | 955,000 North Atlantic               | P  | Lloyd <i>et al.</i> 1991                   | 780,200–1,130,600 = midpoint  |
| Gannet                 | B      | 201,000                  | N                          | Stone <i>et al.</i> 1997       |   |                                     |   | 263,000 World                        | P  | Lloyd <i>et al.</i> 1991                   |   |
| Cormorant              | B      | 7,000                    | P                          | Lloyd <i>et al.</i> 1991       |   | 4,700                               | P                                       | Gibbons <i>et al.</i> 1993           | 41,200 total <i>P. c. carbo</i>          | Lloyd <i>et al.</i> 1991                   | Total population of <i>P. c. carbo</i>  |
| Cormorant              | W      | 13,200                   | I                          | Kirby 1995                     |   | 5,000                               | I                                       | Way <i>et al.</i> 1993               | 120,000 NW Europe                        | Rose & Scott 1997                          |   |
| Shag                   | B      | 37,500                   | P                          | Lloyd <i>et al.</i> 1991       |   | 8,800                               | P                                       | Gibbons <i>et al.</i> 1993           | 125,000 N Europe                         | Lloyd <i>et al.</i> 1991                   |   |
| Bittern                | B      | 20                       | M                          | Stone <i>et al.</i> 1997       |   |                                     |   | 10,044 Europe                        | M  | Hagemeijer & Blair 1997                    | 10,044–11,669 = minimum   |
| Bittern                | W      | 100                      | I                          | Lack 1986                      | 50–150 inds = midpoint on EN advice                         |                                     |   | 25,000 Europe                        | I  | Rose & Scott 1997                          | 25,000–100,000 inds = minimum   |
| Little Egret           | P      | 800                      | I                          | BTO <i>in litt.</i> 1999       |   |                                     |   | 125,000 W Mediterranean              | I  | Rose & Scott 1997                          | 100,000–150,000 = midpoint  |
| Little Egret           | W      | 500                      | I                          | BTO <i>in litt.</i> 1999       |   |                                     |   | 125,000 W Mediterranean              | I  | Rose & Scott 1997                          | 100,000–150,000 = midpoint  |
| Bewick's Swan          | W      | 7,200                    | I                          | Kirby 1995                     |   | 2,500                               | I                                       | Way <i>et al.</i> 1993               | 17,000 W Siberia/NW Europe               | Rose & Scott 1997                          |   |
| Whooper Swan           | P      | 5,600                    | I                          | Kirby 1995                     |   | 10,320                              | I                                       | Way <i>et al.</i> 1993               | 16,000 Iceland/UK/Ireland                | Rose & Scott 1997                          |   |
| Whooper Swan           | W      | 5,600                    | I                          | Kirby 1995                     |   | 10,320                              | I                                       | Way <i>et al.</i> 1993               | 16,000 Iceland/UK/Ireland                | Rose & Scott 1997                          |   |

| Species/<br>population               | Season | GB<br>population<br>unit | GB<br>population<br>source | GB<br>population<br>derivation | All-Ireland<br>population<br>unit | All-Ireland<br>population<br>source | All-Ireland<br>population<br>derivation | Bio-geographic<br>population<br>name   | Bio-<br>geographic<br>population<br>unit | Bio-<br>geographic<br>population<br>source | Bio-geographic<br>population derivation                    |
|--------------------------------------|--------|--------------------------|----------------------------|--------------------------------|-----------------------------------|-------------------------------------|---|--|--|--|--|
| Bean Goose                           | W      | 450                      | I                          | Batten <i>et al.</i> 1990      |                                   |                                     |   | 80,000 NE & NW Europe                  | I  | Rose & Scott 1997                          |  |
| Pink-footed Goose                    | W      | 192,000                  | I                          | Kirby 1995                     |                                   |                                     |   | 225,000 UK/Iceland/Greenland           | I  | Rose & Scott 1997                          |  |
| European White-fronted Goose         | W      | 6,100                    | I                          | Kirby 1995                     |                                   |                                     |   | 600,000 NW Siberia/NE & NW Europe      | I  | Rose & Scott 1997                          |  |
| Greenland White-fronted Goose        | W      | 13,700                   | I                          | Stroud 1992                    | 14,000                            | I                                   | Cranswick <i>et al.</i> 1999            | 30,000 total A. <i>a. flavirostris</i> | I  | Rose & Scott 1997                          | Total population of A. <i>a. flavirostris</i>              |
| Greylag Goose                        | W      | 100,000                  | I                          | Kirby 1995                     | 3,800                             | I                                   | Way <i>et al.</i> 1993                  | 100,000 Iceland/UK/Ireland             | I  | Rose & Scott 1997                          |  |
| Barnacle Goose (Greenland)           | W      | 31,009                   | I                          | Fox <i>et al.</i> 1990         | 7,500                             | I                                   | Cranswick <i>et al.</i> 1997            | 32,000 Greenland/Ireland/UK            | I  | Rose & Scott 1997                          |  |
| Barnacle Goose (Svalbard)            | W      | 17,450                   | I                          | Cranswick <i>et al.</i> 1997   |                                   |                                     |   | 12,000 Svalbard/UK                     | I  | Rose & Scott 1997                          |  |
| Dark-bellied Brent Goose             | W      | 103,300                  | I                          | Kirby 1995                     |                                   |                                     |   | 300,000 total B. <i>b. bernicla</i>    | I  | Rose & Scott 1997                          | Total population of B. <i>b. bernicla</i>                  |
| Light-bellied Brent Goose (Canada)   | W      |                          |                            |                                | 20,000                            | I                                   | Way <i>et al.</i> 1993                  | 20,000 Canada/Ireland                  | I  | Rose & Scott 1997                          |  |
| Light-bellied Brent Goose (Svalbard) | W      | 2,430                    | I                          | Cranswick <i>et al.</i> 1992   |                                   |                                     |   | 5,000 Svalbard/UK/Denmark              | I  | Rose & Scott 1997                          |  |
| Shelduck                             | B      | 10,600                   | P                          | Gibbons <i>et al.</i> 1993     | 1,100                             | P                                   | Gibbons <i>et al.</i> 1993              | 100,000 NW Europe                      | P  | Rose & Scott 1997                          | Winter figure divided by three                             |
| Shelduck                             | W      | 73,500                   | I                          | Kirby 1995                     | 7,000                             | I                                   | Way <i>et al.</i> 1993                  | 300,000 NW Europe                      | I  | Rose & Scott 1997                          |  |
| Wigeon                               | B      | 300                      | P                          | Gibbons <i>et al.</i> 1993     |                                   |                                     |   | 420,000 W Siberia/NW & NE Europe       | P  | Rose & Scott 1997                          | Winter figure divided by three & rounded to nearest 10,000 |
| Wigeon                               | W      | 277,800                  | I                          | Kirby 1995                     | 125,000                           | I                                   | Way <i>et al.</i> 1993                  | 1,250,000 W Siberia/NW & NE Europe     | I  | Rose & Scott 1997                          |  |
| Gadwall                              | B      | 770                      | P                          | Gibbons <i>et al.</i> 1993     | 30                                | P                                   | Gibbons <i>et al.</i> 1993              | 10,000 NW Europe                       | P  | Rose & Scott 1997                          | Winter figure divided by three                             |
| Gadwall                              | W      | 8,200                    | I                          | Kirby 1995                     | 600                               | I                                   | Way <i>et al.</i> 1993                  | 30,000 NW Europe                       | I  | Rose & Scott 1997                          |  |



# Reference populations used in review

| Species/<br>population | Season | GB<br>population | GB<br>population<br>unit | GB<br>population<br>source | GB<br>population<br>derivation                     | All-Ireland<br>population | All-Ireland<br>population<br>unit | All-Ireland<br>population<br>source | All-Ireland<br>population<br>derivation   | Bio-geographic<br>population<br>name     | Bio-<br>geographic<br>population<br>unit | Bio-<br>geographic<br>population<br>source | Bio-geographic<br>population derivation   |
|------------------------|--------|------------------|--------------------------|----------------------------|--|---------------------------|-----------------------------------|-------------------------------------|---|--|--|--|---|
| Teal                   | B      | 1,500            | P                        | Gibbons <i>et al.</i> 1993 | 1,500–2,600<br>prs =<br>minimum                    | 400                       | P                                 | Gibbons <i>et al.</i> 1993          | 400–675 =<br>minimum                      | 130,000 NW<br>Europe                     | P  | Rose &<br>Scott 1997                       | Winter figure divided<br>by three & rounded to<br>nearest 10,000                |
| Teal                   | W      | 135,800          | I                        | Kirby 1995                 |  | 65,000                    | I                                 | Cranswick<br><i>et al.</i> 1999     |   | 400,000 NW<br>Europe                     | I  | Rose &<br>Scott 1997                       |   |
| Mallard                | B      | 100,000          | P                        | Owen <i>et al.</i> 1986    | 100,000–<br>130,000 prs<br>= minimum               | 23,000                    | P                                 | Gibbons <i>et al.</i> 1993          | By extrap-<br>olation<br>from GB<br>total | 1,700,000 NW<br>Europe                   | P  | Rose &<br>Scott 1997                       | Winter figure divided<br>by three & rounded to<br>nearest 100,000               |
| Mallard                | W      | 500,000          | I                        | Owen <i>et al.</i> 1986    |  | 20,000                    | I                                 | Way <i>et al.</i> 1993              |   | 5,000,000 NW<br>Europe                   | I  | Rose &<br>Scott 1997                       |   |
| Pintail                | B      | 8                | P                        | Ogilvie <i>et al.</i> 1996 | 8–42 prs =<br>minimum                              | 1                         | P                                 | Gibbons <i>et al.</i> 1993          |   | 20,000 NW<br>Europe                      | P  | Rose &<br>Scott 1997                       | Winter figure divided<br>by three   |
| Pintail                | W      | 27,800           | I                        | Kirby 1995                 |  | 6,000                     | I                                 | Cranswick<br><i>et al.</i> 1999     |   | 60,000 NW<br>Europe                      | I  | Rose &<br>Scott 1997                       |   |
| Garganey               | B      | 15               | P                        | Ogilvie <i>et al.</i> 1996 | 15–125 prs =<br>minimum                            | 1                         | P                                 | Gibbons <i>et al.</i> 1993          |   | 670,000 W<br>Siberia/Europe/<br>W Africa | P  | Rose &<br>Scott 1997                       | Winter figure<br>(2,000,000) divided by<br>three & rounded to<br>nearest 10,000 |
| Shoveler               | B      | 1,000            | P                        | Gibbons <i>et al.</i> 1993 | 1,000–1,500<br>prs =<br>minimum                    | 100                       | P                                 | Gibbons <i>et al.</i> 1993          |   | 13,300 NW & C<br>Europe                  | P  | Rose &<br>Scott 1997                       | Winter figure divided<br>by three & rounded to<br>nearest 100                   |
| Shoveler               | W      | 10,000           | I                        | Kirby 1995                 |  | 6,500                     | I                                 | Way <i>et al.</i> 1993              |   | 40,000 NW & C<br>Europe                  | I  | Rose &<br>Scott 1997                       |   |
| Pochard                | B      | 251              | P                        | Ogilvie <i>et al.</i> 1996 | 251–406 prs<br>= minimum                           | 30                        | P                                 | Gibbons <i>et al.</i> 1993          |   | 120,000 NW &<br>NE Europe                | P  | Rose &<br>Scott 1997                       | Winter figure divided<br>by three & rounded to<br>nearest 10,000                |
| Pochard                | W      | 43,700           | I                        | Kirby 1995                 |  | 40,000                    | I                                 | Way <i>et al.</i> 1993              |   | 350,000 NW &<br>NE Europe                | I  | Rose &<br>Scott 1997                       |   |
| Tufted Duck            | W      | 60,600           | I                        | Kirby 1995                 |  | 40,000                    | I                                 | Way <i>et al.</i> 1993              |   | 1,000,000 NW<br>Europe                   | I  | Rose &<br>Scott 1997                       |   |
| Scaup                  | W      | 11,000           | I                        | Kirby <i>et al.</i> 1993   |  | 3,000                     | I                                 | Delany 1996b                        |   | 310,000 N & W<br>Europe                  | I  | Rose &<br>Scott 1997                       |   |
| Eider                  | B      | 31,000           | P                        | Gibbons <i>et al.</i> 1993 | 31,000–<br>32,000<br>females =<br>minimum<br>pairs | 600                       | P                                 | Gibbons <i>et al.</i> 1993          |   | 500,000 Europe                           | P  | Rose &<br>Scott 1997                       | Winter figure divided<br>by three   |

| Species/<br>population    | Season | GB<br>population | GB<br>population<br>unit | GB<br>population<br>source                          | GB<br>population<br>derivation  | All-Ireland<br>population<br>unit | All-Ireland<br>population<br>source | All-Ireland<br>population<br>derivation | Bio-geographic<br>population<br>unit | Bio-<br>geographic<br>population<br>source          | Bio-geographic<br>population derivation |  |
|---------------------------|--------|------------------|--------------------------|---|---|-----------------------------------|-------------------------------------|---|--------------------------------------|---|---|--|
| Eider                     | W      | 77,500           | I                        | Kirby <i>et al.</i><br>1993                         |   | 2,000                             | I                                   | Cranswick<br><i>et al.</i> 1999         | I                                    | 1,500,000 W<br>European S. m.<br>mollissima         | Derived<br>from Rose<br>& Scott<br>1997 | Combined totals of the<br>Britain and Ireland,<br>and Baltic, Denmark &<br>Netherlands wintering<br>groups 1,415,000–<br>1,775,000 |
| Long-tailed Duck          | W      | 23,500           | I                        | Kirby <i>et al.</i><br>1993                         |   | Unknown                           | I                                   | Delany<br>1996                          | I                                    | 150,000 Iceland/<br>Greenland                       | Rose &<br>Scott 1997                    |  |
| Common Scoter             | B      | 75               | F                        | Underhill<br><i>et al.</i> 1998                     |   | 95                                | F                                   | Underhill<br><i>et al.</i> 1998         | P                                    | 530,000 W<br>Siberia/N & W<br>Europe/NW<br>Africa   | Rose &<br>Scott 1997                    | Winter figure divided<br>by three & rounded to<br>nearest 10,000   |
| Common Scoter             | W      | 27,350           | I                        | Kirby <i>et al.</i><br>1993                         | Corrected<br>from<br>published<br>paper to<br>exclude Irish<br>totals | 4,000                             | I                                   | Cranswick<br><i>et al.</i> 1999         | I                                    | 1,600,000 W<br>Siberia/N & W<br>Europe/NW<br>Africa | Rose &<br>Scott 1997                    |  |
| Velvet Scoter             | W      | 3,000            | I                        | Kirby <i>et al.</i><br>1993                         |   |                                   |                                     |   | I                                    | 1,000,000 W<br>Siberia/N Europe                     | Rose &<br>Scott 1997                    |  |
| Goldeneye                 | B      | 83               | P                        | Ogilvie <i>et al.</i> 1996                          | 83–109 prs =<br>minimum   |                                   |                                     |   | P                                    | 100,000 NW & C<br>Europe                            | Rose &<br>Scott 1997                    | Winter figure divided<br>by three  |
| Goldeneye                 | W      | 17,000           | I                        | Kirby 1995  |   | 11,000                            | I                                   | Way <i>et al.</i><br>1993               | I                                    | 300,000 NW & C<br>Europe                            | Rose &<br>Scott 1997                    |  |
| Smew                      | W      | 250              | I                        | Lack 1986   |   | <10                               | I                                   | Delany<br>1996a,<br>1996b               | I                                    | 25,000 NW & C<br>Europe                             | Rose &<br>Scott 1997                    | 25,000–30,000 inds =<br>minimum  |
| Red-breasted<br>Merganser | W      | 10,000           | I                        | Kirby <i>et al.</i><br>1993                         |   | 2,000                             | I                                   | Cranswick<br><i>et al.</i> 1999         | I                                    | 125,000 NW & C<br>Europe                            | Rose &<br>Scott 1997                    |  |
| Goosander                 | W      | 8,900            | I                        | Kirby 1995  |   |                                   |                                     |   | I                                    | 200,000 NW & C<br>Europe                            | Rose &<br>Scott 1997                    |  |
| Honey Buzzard             | B      | 16               | P                        | DETR/<br>JNCC<br>Raptor<br>Working<br>Group<br>1998 |   |                                   |                                     |   | P                                    | 41,200 Europe                                       | Hagemeijer<br>& Blair<br>1997           | 41,200–48,677 =<br>minimum   |
| Red Kite                  | B      | 161              | P                        | DETR/<br>JNCC<br>Raptor<br>Working<br>Group<br>1998 |   |                                   |                                     |   | P                                    | 17,394 Europe                                       | Hagemeijer<br>& Blair<br>1997           | 17,394–28,185 =<br>minimum   |

# Reference populations used in review

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| Species/<br>population | Season | GB<br>population<br>unit | GB<br>population<br>source | GB<br>population<br>derivation                      | All-Ireland<br>population<br>unit | All-Ireland<br>population<br>source | All-Ireland<br>population<br>derivation | Bio-geographic<br>population<br>unit | Bio-geographic<br>population<br>source | Bio-geographic<br>population<br>derivation |
|------------------------|--------|--------------------------|----------------------------|---|-----------------------------------|-------------------------------------|---|--------------------------------------|--|--|
| Red Kite               | W      | 1,320                    | I                          | CCW<br>unpub-<br>lished                             | 1998                              |                                     | 52,182 Europe                           | I                                    | Hagemeijer Breeding<br>& Blair<br>1997 | Breeding<br>population × 3                 |
| Marsh Harrier          | B      | 157                      | F                          | Stone <i>et al.</i><br>1997                         | 157–160 prs<br>= minimum          |                                     | 25,955 Europe                           | P                                    | Hagemeijer<br>& Blair<br>1997          | 25,955–34,675 =<br>minimum                 |
| Hen Harrier            | B      | 483                      | P                          | RSPB<br>unpub-<br>lished                            | 1998                              | 180                                 | 8,332 Europe                            | P                                    | Hagemeijer<br>& Blair<br>1997          | 8,332–10,840 =<br>minimum                  |
| Hen Harrier            | W      | 750                      | I                          | Lack 1986   |                                   | 540                                 | 24,996 Europe                           | I                                    | Hagemeijer Breeding<br>& Blair<br>1997 | Breeding<br>population × 3                 |
| Montagu's<br>Harrier   | B      | 11                       | P                          | DETR/<br>JNCC<br>Raptor<br>Working<br>Group<br>1998 | 11–21 =<br>minimum                |                                     | 6,976 Europe                            | P                                    | Hagemeijer<br>& Blair<br>1997          | 6,976–9,610 =<br>minimum                   |
| Golden Eagle           | B      | 400                      | P                          | DETR/<br>JNCC<br>Raptor<br>Working<br>Group<br>1998 | 400–450 =<br>minimum              |                                     | 5,239 Europe                            | P                                    | Hagemeijer<br>& Blair<br>1997          | 5,239–5,616 =<br>minimum                   |
| Osprey                 | B      | 99                       | P                          | Stone <i>et al.</i><br>1997                         |                                   |                                     | 4,732 Europe                            | P                                    | Hagemeijer<br>& Blair<br>1997          | 4,732–5,249 =<br>minimum                   |
| Merlin                 | B      | 1,300                    | P                          | Rebecca &<br>Bainbridge<br>1998                     |                                   | 110                                 | 10,200 Europe                           | P                                    | Hagemeijer<br>& Blair<br>1997          | 10,166–16,612 =<br>minimum                 |
| Merlin                 | W      | 1,300                    | I                          | Stroud <i>et al.</i><br>1990                        | 1,500–2,500<br>= minimum          | 416                                 | 30,600 Europe                           | I                                    | From<br>Hagemeijer<br>& Blair<br>1997  | Breeding estimate × 3                      |
| Hobby                  | B      | 500                      | P                          | Gibbons <i>et al.</i><br>1993                       | 500–900 prs<br>= minimum          |                                     | 20,000 Europe                           | P                                    | Hagemeijer<br>& Blair<br>1997          | 19,720–22,799 =<br>rounded minimum         |

| Species/<br>population | Season | GB<br>population | GB<br>population<br>unit | GB<br>population<br>source                          | GB<br>population<br>derivation           | All-Ireland<br>population<br>unit | All-Ireland<br>population<br>source | All-Ireland<br>population<br>derivation | Bio-geographic<br>population<br>unit                  | Bio-geographic<br>population<br>source | Bio-geographic<br>population<br>derivation                       |
|------------------------|--------|------------------|--------------------------|---|--|-----------------------------------|-------------------------------------|---|---|--|--|
| Peregrine              | B      | 1,167            | P                        | DETR/<br>JNCC<br>Raptor<br>Working<br>Group<br>2000 |  | 365                               | P                                   | Gibbons <i>et al.</i> 1993              | 5,633 Europe  | Hagemeijer & Blair 1997                | 5,633–6,075 =<br>minimum   |
| Capercaillie           | B      | 2,200            | IA                       | Catt <i>et al.</i> 1994                             |  |                                   |                                     |   | 209,500 Europe  | Hagemeijer & Blair 1997                | 209,405–296,085 =<br>rounded minimum                             |
| Quail                  | B      | 515              | M                        | Ogilvie <i>et al.</i> 1998                          | Total of<br>probable &<br>possible pairs | <20                               | M                                   | Gibbons <i>et al.</i> 1993              | 640,000 Europe  | Hagemeijer & Blair 1997                | 641,525–876,497 =<br>rounded minimum                             |
| Water Rail             | B      | 450              | P                        | Gibbons <i>et al.</i> 1993                          | 450–900 =<br>minimum                     | 850                               | P                                   | Gibbons <i>et al.</i> 1993              | 129,994 Europe  | Hagemeijer & Blair 1997                | 129,994–239,718 =<br>minimum                                     |
| Water Rail             | W      | Unknown          | I                        |   |  | Unknown                           | I                                   |   | 550,000 Europe  | Rose & Scott 1997                      | 100,000–1,000,000 =<br>midpoint                                  |
| Spotted Crane          | B      | 50               | M                        | JNCC<br>unpub-<br>lished                            |  |                                   |                                     |   | 48,800 Europe   | Hagemeijer & Blair 1997                | 48,786–67,083 =<br>rounded minimum                               |
| Corncrake              | B      | 480              | M                        | Green 1995  |  | 174                               | M                                   | Green <i>et al.</i> 1997a               | 87,500 Europe   | Hagemeijer & Blair 1997                | 87,470–96,920 =<br>rounded minimum                               |
| Coot                   | W      | 114,100          | I                        | Kirby 1995  |  | 25,000                            | I                                   | Cranswick <i>et al.</i> 1999            | 1,500,000 NW Europe                                   | Rose & Scott 1997                      |  |
| Oystercatcher          | B      | 33,000           | P                        | Piersma 1986  | 33,000 prs =<br>minimum                  | 3,000                             | P                                   | Piersma 1986                            | 290,000 Europe/<br>W Africa                           | Rose & Scott 1997                      | Winter figure divided<br>by three & rounded to<br>nearest 10,000 |
| Oystercatcher          | W      | 359,000          | I                        | Cayford & Waters 1996                               |  | 50,000                            | I                                   | Cranswick <i>et al.</i> 1999            | 874,000 Europe/<br>W Africa (East<br>Atlantic Flyway) | Rose & Scott 1997                      |  |
| Black-winged<br>Stilt  | B      | 1                | P                        | Batten <i>et al.</i> 1990                           |  |                                   |                                     |   | 15,400 Europe   | Hagemeijer & Blair 1997                | 15,382–16,750 =<br>rounded minimum                               |
| Avocet                 | B      | 592              | P                        | Ogilvie <i>et al.</i> 1996                          | 592–654 =<br>minimum                     |                                   |                                     |   | 26,800 Europe   | Hagemeijer & Blair 1997                | 26,762–29,436 =<br>minimum                                       |
| Avocet                 | P      | 1,700            | I                        | Stone <i>et al.</i> 1997                            |  |                                   |                                     |   | 67,000 Europe/<br>NW Africa                           | Rose & Scott 1997                      |  |
| Avocet                 | W      | 1,270            | I                        | Cayford & Waters 1996                               |  |                                   |                                     |   | 67,000 Europe/<br>NW Africa                           | Rose & Scott 1997                      |  |

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| Species/<br>population | Season | GB<br>population<br>unit | GB<br>population<br>source | GB<br>population<br>derivation                               | All-Ireland<br>population<br>unit | All-Ireland<br>population<br>source | All-Ireland<br>population<br>derivation | Bio-geographic<br>population<br>unit | Bio-<br>geographic<br>population<br>source | Bio-geographic<br>population<br>derivation  |
|------------------------|--------|--------------------------|----------------------------|--|-----------------------------------|-------------------------------------|---|--------------------------------------|--|---|
| Stone Curlew           | B      | 188                      | P                          | English<br>Nature<br>unpub-<br>lished                        | 1998 count                        |                                     |   | P                                    | 32,690 Europe                              | Hagemeijer 32,690–45,704 =<br>& Blair<br>minimum<br>1997                                  |
| Ringed Plover          | B      | 8,500                    | P                          | Prater<br>1989   |                                   | 1,250                               | P                                       | I                                    | 16,000 Europe/<br>NW Africa                | Rose &<br>Scott 1997<br>Winter figure divided<br>by three & rounded to<br>nearest 1,000   |
| Ringed Plover          | P      | 30,000                   | I                          | Stone <i>et al.</i><br>1997                                  | Unknown                           |                                     |   | I                                    | 47,500 Europe/<br>NW Africa                | Rose &<br>Scott 1997<br>As from winter figure   |
| Ringed Plover          | W      | 28,600                   | I                          | Cayford &<br>Waters<br>1996                                  | 12,500                            | I                                   |   | I                                    | 47,500 Europe/<br>NW Africa                | Rose &<br>Scott 1997  |
| Dotterel               | B      | 840                      | P                          | Galbraith<br><i>et al.</i> 1993                              | 840–950 =<br>minimum              |                                     |   | P                                    | 17,922 Europe                              | Hagemeijer 17,922–39,136 =<br>& Blair<br>minimum<br>1997                                  |
| Golden Plover          | B      | 22,600                   | P                          | Gibbons <i>et al.</i><br>1993                                | 400                               | P                                   |   | P                                    | 474,900 Europe                             | Hagemeijer 474,920–621,757 =<br>& Blair<br>minimum<br>1997                                |
| Golden Plover          | W      | 250,000                  | I                          | Cayford &<br>Waters<br>1996                                  | 200,000                           | I                                   |   | I                                    | >200,000<br>inds =<br>minimum              | Rose &<br>Scott 1997  |
| Grey Plover            | W      | 43,200                   | I                          | Cayford &<br>Waters<br>1996                                  | 4,000                             | I                                   |   | I                                    | 168,000 East<br>Atlantic                   | Rose &<br>Scott 1997  |
| Lapwing                | B      | 190,000                  | P                          | Shrubbs &<br>Lack 1991; 240,000 =<br>Thom<br>minimum<br>1986 | 21,500                            | P                                   |   | P                                    | 2,300,000<br>Europe/ West<br>Africa        | Rose &<br>Scott 1997<br>Winter figure divided<br>by three & rounded to<br>nearest 100,000 |
| Lapwing                | W      | 1,500,000                | I                          | Cayford &<br>Waters<br>1996                                  | 250,000                           | I                                   |   | I                                    | 7,000,000<br>Europe/West<br>Africa         | Rose &<br>Scott 1997  |
| Knot                   | W      | 291,000                  | I                          | Cayford &<br>Waters<br>1996                                  | 37,500                            | I                                   |   | I                                    | 345,000 W<br>Europe/Canada                 | Rose &<br>Scott 1997<br>Total population of<br><i>C. c. islandica</i>                     |
| Sanderling             | P      | 30,000                   | P                          | Cranswick<br><i>et al.</i> 1997                              | Unknown                           |                                     |   | I                                    | 123,000 East<br>Atlantic                   | Rose &<br>Scott 1997  |
| Sanderling             | W      | 23,200                   | I                          | Cayford &<br>Waters<br>1996                                  | 3,500                             | I                                   |   | I                                    | 123,000 East<br>Atlantic                   | Rose &<br>Scott 1997  |
| Purple<br>Sandpiper    | B      | 2                        | P                          | Ogilvie <i>et al.</i><br>1996                                |                                   |                                     |   | P                                    | 17,000 East<br>Atlantic                    | Rose &<br>Scott 1997<br>Winter figure divided<br>by three & rounded to<br>nearest 1,000   |

| Species/<br>population                            | Season | GB<br>population<br>unit | GB<br>population<br>source | GB<br>population<br>derivation          | All-Ireland<br>population<br>unit                          | All-Ireland<br>population<br>source | All-Ireland<br>population<br>derivation | Bio-geographic<br>population<br>unit                        | Bio-<br>geographic<br>population<br>unit | Bio-geographic<br>population derivation   |
|---|--------|--------------------------|----------------------------|---|--|-------------------------------------|---|---|--|---|
| Purple<br>Sandpiper                               | W      | 21,300                   | I                          | Cayford &<br>Waters<br>1996             | 1,000  | I                                   | Cranswick<br><i>et al.</i> 1999         | 50,500 East<br>Atlantic                                     | I  | Rose &<br>Scott 1997  |
| Dunlin  | B      | 9,150                    | P                          | Reed 1985;<br>Stroud <i>et al.</i> 1987 | 9,150–9,900<br>prs =<br>minimum =<br><i>C. a. schinzii</i> | P                                   | Hutch-<br>inson 1989<br><i>schinzii</i> | 11,000 temperate<br>European <i>C. a. schinzii</i>          | P  | Stroud <i>et al.</i> 1990<br>Temperate European<br>figure (11,158 prs)<br>extrapolated from<br>British breeding popn<br>figures & rounded to<br>nearest 1,000 |
| Dunlin  | W      | 532,000                  | I                          | Cayford &<br>Waters<br>1996             | 125,000  | I                                   | Cranswick<br><i>et al.</i> 1999         | 1,373,000<br>Northern<br>Siberia/ Europe/<br>Western Africa | I  | Rose &<br>Scott 1997  |
| Ruff  | B      | 11                       | N                          | Ogilvie <i>et al.</i> 1996              | 2–24 =<br>midpoint on<br>JNCC advice                       |                                     |   | 105,700 Europe  | P  | Hagemeijer<br>& Blair<br>1997<br>105,655–139,209 =<br>rounded minimum   |
| Ruff  | P      | 1,100                    | I                          | Stone <i>et al.</i> 1997                |  |                                     |   | 1,000,000 West<br>Africa                                    | I  | Rose &<br>Scott 1997<br>>1,000,000 =<br>minimum   |
| Ruff  | W      | 700                      | I                          | Cayford &<br>Waters<br>1996             | <20  | I                                   | Delany<br>1996                          | 1,000,000 West<br>Africa                                    | I  | Rose &<br>Scott 1997<br>>1,000,000 =<br>minimum   |
| Snipe ( <i>G. g. gallinago</i> )                  | B      | 55,000                   | P                          | Gibbons <i>et al.</i> 1993              | 10,000   | P                                   | Piersma<br>1986                         | 862,000 Europe<br>minimum<br>estimate                       | P  | Hagemeijer<br>& Blair<br>1997<br>861,593–990,503 =<br>rounded minimum   |
| Snipe ( <i>G. g. faeroensis</i> )                 | B      | 6,900                    | P                          | BTO <i>in litt.</i> 2001                |  |                                     |   | 250,000 total <i>G. g. faeroensis</i>                       | P  | Rose &<br>Scott 1997<br>750,000 divided by<br>three Total population<br>of <i>G. g. faeroensis</i>  |
| Snipe   | W      | 100,000                  | I                          | Cayford &<br>Waters<br>1996             | >100,000 =<br>minimum                                      | Unknown                             |   | 2,000,000<br>Europe/ West<br>Africa                         | I  | Rose &<br>Scott 1997<br>>2,000,000 =<br>minimum   |
| Black-tailed<br>Godwit ( <i>L. l. limosa</i> )    | B      | 34                       | P                          | Ogilvie <i>et al.</i> 1996              | 34–41 pairs<br>= minimum                                   |                                     |   | 120,000 W<br>Africa/W Europe                                | P  | Rose &<br>Scott 1997<br>350,000 divided by<br>three & rounded to<br>nearest 10,000  |
| Black-tailed<br>Godwit ( <i>L. l. islandica</i> ) | B      | ?                        | P                          |   |  | P                                   | Gibbons <i>et al.</i> 1993              | 5,000 Iceland   | P  | Hagemeijer<br>& Blair<br>1997<br>5,000–15,000 =<br>minimum  |
| Black-tailed<br>Godwit ( <i>L. l. islandica</i> ) | W      | 7,410                    | I                          | Cayford &<br>Waters<br>1996             |  | I                                   | Cranswick<br><i>et al.</i> 1999         | 65,000 Iceland/<br>UK/Ireland                               | I  | Rose &<br>Scott 1997  |
| Bar-tailed<br>Godwit                              | W      | 52,500                   | I                          | Cayford &<br>Waters<br>1996             |  | I                                   | Way <i>et al.</i> 1993                  | 115,000 W<br>Palearctic<br>16,000–<br>20,000 =<br>minimum   | I  | Rose &<br>Scott 1997  |



Reference populations used in review

| Species/<br>population | Season | GB<br>population<br>unit | GB<br>population<br>source | GB<br>population<br>derivation | All-Ireland<br>population<br>unit | All-Ireland<br>population<br>source | All-Ireland<br>population<br>derivation | Bio-geographic<br>population<br>name  | Bio-<br>geographic<br>population<br>unit | Bio-<br>geographic<br>population<br>source | Bio-geographic<br>population derivation                                    |
|------------------------|--------|--------------------------|----------------------------|--------------------------------|-----------------------------------|-------------------------------------|---|---------------------------------------|--|--|--|
| Whimbrel               | B      | 530                      | P                          | Dore & Ellis 1994              |                                   |                                     |   | 220,000 Europe/<br>W Africa           | P  | Rose & Scott 1997                          | Winter figure divided by three & rounded to nearest 10,000                 |
| Whimbrel               | P      | 5,000                    | I                          | Cranswick <i>et al.</i> 1997   | Unknown                           |                                     |   | 650,000 Europe/<br>W Africa           | I  | Rose & Scott 1997                          | 600,000–700,000 = midpoint   |
| Whimbrel               | W      | <15                      | I                          | Lack 1986                      | <15                               | I                                   | Lack 1986                               | 650,000 Europe/<br>W Africa           | I  | Rose & Scott 1997                          | 600,000–700,000 = midpoint   |
| Curlew                 | B      | 33,000                   | P                          | Piersma 1986                   | 33,000–38,000<br>prs = minimum    | 12,000                              | P                                       | Reed 1985                             | P  | Rose & Scott 1997                          | Winter figure divided by three & rounded                                   |
| Curlew                 | W      | 115,000                  | I                          | Cayford & Waters 1996          | 87,500                            | I                                   | Cranswick <i>et al.</i> 1999            | 348,000 Europe                        | I  | Rose & Scott 1997                          |  |
| Spotted Redshank       | W      | 120                      | I                          | Cayford & Waters 1996          |                                   |                                     |   | 75,000 Europe/W Africa                | I  | Rose & Scott 1997                          | 75,000–150,000 inds = minimum  |
| Redshank               | B      | 30,600                   | P                          | Piersma 1986                   | 30,600–33,600<br>prs = minimum    | 4,400                               | P                                       | Gibbons <i>et al.</i> 1993            | 4,400–5,000 = minimum                    | Rose & Scott 1997                          | Winter figure divided by three<br>Total population of <i>T. t. totanus</i> |
| Redshank               | P      | 120,000                  | I                          | Cranswick <i>et al.</i> 1997   | Unknown                           |                                     |   | 177,000 total<br><i>T. t. totanus</i> | I  | Rose & Scott 1997                          | Wintering figure used<br>Total population of <i>T. t. totanus</i>          |
| Redshank               | W      | 114,000                  | I                          | Cayford & Waters 1996          | 24,500                            | I                                   | Way <i>et al.</i> 1993                  | 177,000 total<br><i>T. t. totanus</i> | I  | Rose & Scott 1997                          | Total population of <i>T. t. totanus</i>                                   |
| Greenshank             | B      | 1,440                    | P                          | Hancock <i>et al.</i> 1997     |                                   |                                     |   | 57,600 Europe                         | P  | Hagemeijer & Blair 1997                    | 57,612–83,189 = rounded minimum  |
| Greenshank             | W      | 380                      | I                          | Cayford & Waters 1996          | 900                               | I                                   | Cranswick <i>et al.</i> 1999            | 550,000 Europe/<br>W Africa           | I  | Rose & Scott 1997                          | 100,000–1,000,000 = midpoint   |
| Wood Sandpiper         | B      | 10                       | P                          | SNH unpublished                |                                   |                                     |   | 298,800 Europe                        | P  | Hagemeijer & Blair 1997                    | 298,842–412,474 = rounded minimum  |
| Turnstone              | W      | 64,400                   | I                          | Cayford & Waters 1996          | 22,500                            | I                                   | Cranswick <i>et al.</i> 1999            | 67,000 Europe (wintering)             | I  | Rose & Scott 1997                          |  |
| Red-necked Phalarope   | B      | 36                       | M                          | Stone <i>et al.</i> 1997       |                                   |                                     |   | 65,500 Europe                         | P  | Hagemeijer & Blair 1997                    | 65,536–94,391 = rounded minimum  |

| Species/<br>population   | Season | GB<br>population<br>unit | GB<br>population<br>source | GB<br>population<br>derivation | All-Ireland<br>population<br>unit | All-Ireland<br>population<br>source | All-Ireland<br>population<br>derivation | Bio-geographic<br>population<br>name                     | Bio-<br>geographic<br>population<br>unit | Bio-<br>geographic<br>population<br>source | Bio-geographic<br>population derivation  |
|--------------------------|--------|--------------------------|----------------------------|--------------------------------|-----------------------------------|-------------------------------------|---|--|--|--|--|
| Arctic Skua              | B      | 3,200                    | P                          | Walsh <i>et al.</i> 1995       | Territories equated to pairs      |                                     |   | 30,000 NE Atlantic                                       | P  | Lloyd <i>et al.</i> 1991                   | 20,000–40,000 = midpoint   |
| Great Skua               | B      | 8,500                    | P                          | Walsh <i>et al.</i> 1995       | Territories equated to pairs      |                                     |   | 13,600 World   | P  | Lloyd <i>et al.</i> 1991                   |  |
| Mediterranean Gull       | B      | 31                       | P                          | Ogilvie <i>et al.</i> 1996     | 31–45 pairs = minimum             |                                     |   | 184,000 Europe   | P  | Hagemeijer & Blair 1997                    | 183,925–339,963 = rounded minimum  |
| Black-headed Gull        | B      | 167,000                  | P                          | Lloyd <i>et al.</i> 1991       |                                   | 53,800                              | P                                       | 1,650,000 World  | P  | Lloyd <i>et al.</i> 1991                   |  |
| Black-headed Gull        | W      | 1,900,000                | I                          | Stone <i>et al.</i> 1997       |                                   | 1,100,000                           | I                                       | 5,000,000 NW Europe                                      | I  | Rose & Scott 1997                          | Minimum  |
| Common Gull              | B      | 68,000                   | P                          | Lloyd <i>et al.</i> 1991       |                                   | 3,600                               | P                                       | 124,000 NW & C Europe/Atlantic/Mediterranean             | P  | Lloyd <i>et al.</i> 1991                   |  |
| Common Gull              | W      | 900,000                  | I                          | Stone <i>et al.</i> 1997       |                                   | 67,500                              | I                                       | 1,600,000 NW & C Europe/Atlantic/Med.                    | I  | Rose & Scott 1997                          |  |
| Lesser Black-backed Gull | B      | 83,000                   | P                          | Lloyd <i>et al.</i> 1991       |                                   | 5,200                               | P                                       | 124,000 total <i>L. f. graellsii</i>                     | P  | Lloyd <i>et al.</i> 1991                   | Total population of <i>L. f. graellsii</i>   |
| Lesser Black-backed Gull | W      | 500,000                  | I                          | Stone <i>et al.</i> 1997       |                                   | 70,000                              | I                                       | 400,000  | I  | Rose & Scott 1997                          | 400,000–500,000 = minimum; total population of <i>L. f. graellsii</i>                          |
| Herring Gull             | B      | 160,000                  | P                          | Lloyd <i>et al.</i> 1991       |                                   | 44,700                              | P                                       | 940,000 NW European & Iceland/W Europe                   | P  | Lloyd <i>et al.</i> 1991                   | Includes both <i>L. a. argentatus</i> and <i>L. a. argentus</i>                                |
| Great Black-backed Gull  | B      | 19,000                   | P                          | Lloyd <i>et al.</i> 1991       |                                   | 4,500                               | P                                       | 95,546 Europe  | P  | Hagemeijer & Blair 1997                    | 95,546–121,233 = minimum   |
| Kittiwake                | B      | 490,000                  | P                          | Lloyd <i>et al.</i> 1991       |                                   | 50,200                              | P                                       | 3,170,000 North Atlantic = total <i>R. t. tridactyla</i> | P  | Lloyd <i>et al.</i> 1991                   | Calculated using mid-points of ranges presented<br>Total population of <i>R. t. tridactyla</i> |

# Reference populations used in review

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| Species/<br>population | Season | GB<br>population<br>unit | GB<br>population<br>source | GB<br>population<br>derivation | All-Ireland<br>population<br>unit | All-Ireland<br>population<br>source | All-Ireland<br>population<br>derivation                     | Bio-geographic<br>population<br>unit | Bio-geographic<br>population<br>source          | Bio-geographic<br>population<br>derivation  |
|------------------------|--------|--------------------------|----------------------------|--------------------------------|-----------------------------------|-------------------------------------|---|--------------------------------------|---|---|
| Sandwich Tern          | B      | 14,000                   | P                          | Lloyd <i>et al.</i><br>1991    | P                                 | Gibbons <i>et al.</i> 1993          | 132,000 Europe  | P                                    | Hagemeijer<br>& Blair<br>1997                   |   |
| Sandwich Tern          | P      | 42,000                   | I                          | JNCC<br>unpub-<br>lished       | I                                 | Gibbons <i>et al.</i> 1993          | 396,000 Europe  | I                                    | Derived<br>from Hage-<br>meijer &<br>Blair 1997 | Breeding population × 3   |
| Roseate Tern           | B      | 64                       | P                          | Stone <i>et al.</i><br>1997    | P                                 | Gibbons <i>et al.</i> 1993          | >400 =<br>minimum<br>estimate                               | P                                    | Lloyd <i>et al.</i><br>1991                     |   |
| Common Tern            | B      | 12,300                   | P                          | Gibbons <i>et al.</i> 1993     | P                                 | Gibbons <i>et al.</i> 1993          | 195,105 Europe  | P                                    | Hagemeijer<br>& Blair<br>1997                   | 195,105–227,250 =<br>minimum  |
| Arctic Tern            | B      | 44,000                   | P                          | Gibbons <i>et al.</i> 1993     | P                                 | Gibbons <i>et al.</i> 1993          | 900,000 Europe/<br>North Atlantic                           | P                                    | Lloyd <i>et al.</i><br>1991                     |   |
| Little Tern            | B      | 2,400                    | P                          | Lloyd <i>et al.</i><br>1991    | P                                 | Gibbons <i>et al.</i> 1993          | 20,643 Europe   | P                                    | Hagemeijer<br>& Blair<br>1997                   | 20,643–22,799 =<br>minimum  |
| Guillemot              | B      | 703,500                  | P                          | Lloyd <i>et al.</i> 1991       | P                                 | Gibbons <i>et al.</i> 1993          | 2,250,000 North<br>Atlantic                                 | P                                    | Lloyd <i>et al.</i> 1991                        | Conversion of 0.67<br>used between Appar-<br>ently Occupied Sites<br>and individual birds   |
| Razorbill              | B      | 99,160                   | P                          | Lloyd <i>et al.</i> 1991       | P                                 | Gibbons <i>et al.</i> 1993          | 575,000 total<br><i>Alca torda</i><br><i>islandica</i>      | P                                    | Lloyd <i>et al.</i> 1991                        | Total population of<br><i>Alca torda islandica</i><br>Conversion of 0.67<br>used between Appar-<br>ently Occupied Sites<br>and individual birds<br>Midpoints of national<br>ranges used |
| Puffin                 | B      | 449,000                  | P                          | Lloyd <i>et al.</i> 1991       | P                                 | Gibbons <i>et al.</i> 1993          | 901,000 total<br><i>Fratercula</i><br><i>arctica grabae</i> | P                                    | Lloyd <i>et al.</i> 1991                        | Total population of<br><i>Fratercula arctica</i><br><i>grabae</i><br>Conversion of 0.5 used<br>between Apparently<br>Occupied Sites and<br>individual birds                             |
| Short-eared Owl        | B      | 1,000                    | P                          | Gibbons <i>et al.</i> 1993     |                                   |                                     | 13,400 Europe   | P                                    | Hagemeijer<br>& Blair<br>1997                   | 13,376–26,265 =<br>rounded minimum  |
| Nightjar               | B      | 3,400                    | M                          | Morris <i>et al.</i> 1994      |                                   |                                     | 224,000 Europe  | M                                    | Hagemeijer<br>& Blair<br>1997                   | 223,921–264,419 =<br>rounded minimum  |

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|------------------------|--------|------------------|--------------------------|----------------------------|--------------------------------|-----------------------------------|-------------------------------------|---|--------------------------------------|--|--|--|
| Kingfisher             | B      | 3,300            | P                        | Gibbons <i>et al.</i> 1993 | 3,300–5,500 = minimum          | 1,300                             | P                                   | Gibbons <i>et al.</i> 1993              | 47,302 Europe                        | P  | Hagemeijer & Blair 1997                    | 47,302–66,752 = minimum  |
| Woodlark               | B      | 1,500            | P                        | Wotton & Gillings 2000     |                                |                                   |                                     |   | 1,050,000 Europe                     | P  | Hagemeijer & Blair 1997                    | 1,050,376–2,239,048 = rounded minimum                          |
| Aquatic Warbler        | P      | 67               | I                        | EN unpub-lished            | Count 1997                     |                                   |                                     |   | 11,220 World population              | I  | Tucker & Heath 1994                        | Breeding range minimum (3,740) × 3 = 11,220 inds               |
| Dartford Warbler       | B      | 1,600            | P                        | Gibbons & Wotton 1996      | 1,600–1,890 = minimum          |                                   |                                     |   | 2,026,000 Europe                     | P  | Hagemeijer & Blair 1997                    | 2,025,456–3,635,791 = rounded minimum                          |
| Chough                 | B      | 340              | P                        | Bignal <i>et al.</i> 1997  |                                | 906                               | P                                   | Berrow <i>et al.</i> 1993               | 12,265 Europe                        | P  | Hagemeijer & Blair 1997                    | 12,265–17,370 = minimum  |
| Chough                 | W      | 689              | I                        | Bignal <i>et al.</i> 1997  |                                | 2,633                             | I                                   | Berrow <i>et al.</i> 1993               | 36,800 Europe                        | I  | Derived from Hage-meijer & Blair 1997      | Breeding range minimum (12,265) × 3 = 36,795 inds then rounded |
| Snow Bunting           | B      | 70               | P                        | Stone <i>et al.</i> 1997   | 70–100 = minimum               |                                   |                                     |   | 220,000 Europe                       | P  | Hagemeijer & Blair 1997                    | 223,986–634,300 prs = rounded minimum                          |
| Fair Isle Wren         | B      | 37               | M                        | SNH unpub-lished           | Count 1997                     |                                   |                                     |   | 37 World                             | M  | SNH unpub-lished                           | Count 1997   |
| Scottish Crossbill     | B      | 300              | P                        | Stone <i>et al.</i> 1997   | 300–1,250 = minimum            |                                   |                                     |   | 300 World                            | P  | Stone <i>et al.</i> 1997                   | 300–1250 prs = minimum   |