An Atlas of Wader Populations in Africa and Western Eurasia

Wetlands International and International Wader Study Group

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Wetlands International is a non-profit, non-governmental organisation whose governing Board is derived from representatives of member governments, international organisations and wetland specialists. As the world's leading wetlands conservation organisation, Wetlands International operates in over 100 countries worldwide. Partnership is a key principle and as such Wetlands International has strong links to other international conservation agencies, national and local NGOs, foundations, government agencies, development agencies and private sector groups. Wetlands International and its predecessor organisation the International Waterfowl and Wetlands Research Bureau (IWRB) were closely involved in the development and implementation of both the Ramsar Convention on Wetlands and the African-Eurasian Migratory Waterbird Agreement (AEWA) under the Convention on Migratory Species.

The International Wader Study Group (WSG) is an international association of amateurs and professionals from all parts of the world interested in Charadrii (waders or shorebirds). Membership of the WSG is currently 650 worldwide. The interests of the group have diversified from its original focus on ringing and migration-related studies to embrace all aspects of wader biology. The WSG's aims are to: maintain contact between both amateurs and professionals studying waders; help organise co-operative studies; and provide a vehicle for the exchange of information on waders and their biology. The WSG has drawn on its wide-ranging network of wader experts to help prepare this Atlas as part of its role in acting as Wetlands International's Wader Specialist Group

Nick Davidson

Evolution and Authorship of the Wader Atlas

This book has been produced in four phases over a period of ten years and the 90 species accounts were written by 25 people. A first Consultation Draft covering 39 species and edited by **David Stroud** and **Nick Davidson** (Phase 1) was produced in 1999. About 100 people commented on this draft, and these comments have been invaluable in the compilation of subsequent drafts. Phase 2 consisted of a second draft which included an additional 19 species and was prepared in 2000-2001, but the funding for completion of the Atlas was lost in the bankruptcy of the Africa-Europe-Middle East office of Wetlands International in 2001-2002. Much of the material in these early drafts of the Wader Atlas was included in a publication edited on behalf of the International Wader Study Group by **David Stroud** *et al.* (Phase 3) and titled *Status of migratory wader populations in Africa and Western Eurasia in the 1990s* which was published on the Wader Study Group website in 2004 as number 15 in the International Wader Studies series.

In 2003, through the generosity of the Flemish Ministry of the Community and the AEWA Secretariat, capacity became available at Wetlands International for completion of the Atlas. A planning meeting involving **David Stroud, Ward Hagemeijer, Rodney West** and **Simon Delany** mapped the way forward, and the current draft of the Atlas came together, as other commitments allowed, between 2004 and 2008. The level of funding did not match the scale of the task, however, and (as was the case with earlier phases) a great deal of work was done by authors working in their own time. In this period we undertook an extended literature review and compiled a new database of records starting with data from the International Waterbird Census (IWC) and BirdLife International's World Bird databases, with the addition of data from hundreds of published and unpublished sources. The final 32 species accounts were drafted (making 90 in total), accounts from the earlier drafts were comprehensively re-written, expanded and updated and all maps and tables were re-compiled from scratch.

A final Consultation Draft was prepared between 2004 and 2007 and circulated for expert review in 2008. Suggested additions and amendments were received from over 100 experts and final editing was completed in 2008. This work was coordinated by **Simon Delany**, who also took a lead in compiling all the maps and tables, wrote first drafts of over 20 species accounts and did much of the final editing and updating. Most of the writing and extensive re-writing of species accounts for the final Consultation Draft was done by **Derek Scott** (who had also written first drafts for 15 species) for "Eurasian" breeding species and **Tim Dodman** for species breeding in sub-Saharan Africa, with final editing and updating by **Simon Delany.** Technical support, particularly with data and map compilation, was provided throughout by **Toon Helmink** and for the earlier drafts by **Lieuwe Haanstra,** and **Stephan Flink** provided invaluable technical assistance in the final stages.

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Additional authors and the species accounts to which they contributed were **Gerard Boere** (Slender-billed Curlew), **Torgrim Breiehagen**, (Little Stint, Temminck's Stint), **Nick Davidson** (Common Ringed Plover, Slender-billed Curlew, Red Knot, Purple Sandpiper), **Bruno Ens** (Eurasian Oystercatcher), **Olivier Girard** (Ruff), **Simon Gillings** (Northern Lapwing), **Murray Grant** (Whimbrel), **Tom van der Have** (Broad-billed Sandpiper), **Hermann Hötker** (Pied Avocet), **Jacques van Impe** (Grey Plover), **Guido Keijl** (Sociable Lapwing), **Pertti Koskimies** (Spotted Redshank), **Peter Meininger** (Kentish Plover), **Renato Neves** (Black-winged Stilt), **Umberto Gallo Orsi** (Slender-billed Curlew), **Theunis Piersma** (Red Knot), **Hans-Ulrich Rösner** (Dunlin), **Rui Rufino** (Black-winged Stilt), **Gregor Scheiffarth** (Bar-tailed Godwit), **Cor Smit** (Eurasian Oystercatcher), **David Stroud** (Cream-coloured Courser, Black-winged Pratincole, Madagascar Pratincole, Brown-chested Lapwing) and **Andy Wilson** (Northern Lapwing).

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Preface

Migratory waders or shorebirds travel some of the greatest distances of all migratory birds, traversing hemispheres and travelling between the latitudinal extremes of continents. Waders lead lives of great energetic stress which are easily disrupted by human activities. As this book was being finished, a satellite-tracked Bar-tailed Godwit proved for the first time that these birds habitually fly non-stop across the Pacific Ocean from Alaska to New Zealand, an 11,000 km non-stop flight that takes eight days. Ensuring the survival of these wonders of nature requires the conservation of networks of sites where they can breed, where they can accumulate fat and protein to fuel their incredible migrations, and where they can thrive outside the breeding season.

Those who study these birds are similarly widely dispersed, from specialists in Arctic areas studying breeding ecology of tundra waders, to those studying waders in temperate and tropical areas, to ornithologists whose objects of study are the waterbirds of wetlands of the tropical arid zones. This volume aims to summarise our currently available “best knowledge” of the movements, numbers and distribution of waders in Africa and Western Eurasia (the region covered by the African-Eurasian Migratory Waterbird Agreement, AEWA) by bringing together international expertise concerning all stages of the life cycles of these fascinating and important birds.

The baseline data and information that are needed to conserve any species include: how many individuals exist (population estimates), whether these numbers are increasing, stable or decreasing (population trends), and where the species chooses to spend different stages of its life cycle (key sites). This book aims to compile these data and information for the use of organisations and individuals involved in the conservation of waders and their mainly wetland habitats. It is hoped that the information presented will also be of interest to academic ornithologists, ecologists, naturalists and birdwatchers.

The information contained in this Atlas will be of particular value in the national and international implementation of both the African-Eurasian Migratory Waterbird Agreement (AEWA) and the Ramsar Convention on Wetlands. In particular, the Atlas aims to identify, using the best available information, key sites for each wader population, the conservation and wise use of which need to be promoted in order to assure the long-term conservation status of these species.

This volume includes accounts relating to all 90 species of wader that occur regularly in Africa, South-west and Central Asia and Europe.

The Editors
December 2008

Rodney West

1. Introduction

This book is a companion to the *Atlas of Anatidae Populations in Africa and Western Eurasia* (Scott & Rose 1996) and it has the same overall aim of supporting the conservation of waterbirds and the networks of wetland sites needed for their survival in the region covered by the African-Eurasian Migratory Waterbird Agreement (AEWA). Preparing such a review for waders (known in North America as shorebirds) is more ambitious than for Anatidae (ducks, geese and swans) for a number of reasons. There are more species of wader than Anatidae in the region considered (90 species divided into 230 biogeographic populations versus 61 species divided into 166 such populations). Many wader species are among the longest-distance migrants, and many have very extensive, even near-global distributions, involving migration between Arctic breeding grounds and tropical and temperate non-breeding areas deep in the Southern Hemisphere.
The scale and frequency of waterbird counting in many countries at the southern extreme of the ranges of many wader populations, especially in Africa and the Middle East, although growing steadily, do not yet allow comprehensive analysis of numbers and distribution of waders. Waders are, on average, considerably smaller than Anatidae, making the use of techniques such as colour-ringing and the deployment of devices such as satellite transmitters possible and effective for only the largest species. They also have lower ring-recovery rates because of their smaller size and their lower attractiveness (with notable exceptions) as quarry for hunters. These factors mean that the study of numbers, distribution and movements of waders is generally less advanced than for Anatidae, and separation of species into "biogeographic populations" and identification of migration routes and a suite of "key sites" for each is more difficult compared with better-known and less migratory Anatidae species, which have, on average, smaller geographic ranges of distribution.

It was possible to produce a comprehensive Atlas for Anatidae based largely on a single data source, namely the International Waterbird Census (IWC) which was designed in the 1960s with the specific purpose of providing a baseline for the conservation of Anatidae. The IWC involves a single count of each site in January every year, with an additional count in July in sub-Saharan Africa. Species additional to Anatidae were only included in the IWC from the 1980s onward, and waders have only been routinely counted in many countries since the 1980s or 1990s. The timing of counts for the IWC means that the methodology misses many sites important as staging areas on postnuptial and prenuptial migration of Palearctic waders. To provide as good a picture as possible, it has therefore been necessary to supplement the IWC data with data and information from a great many additional sources. It is hoped that the more challenging and complex subject matter and the necessity for more extensive research and compilation have resulted in an even more complete and authoritative source of information than the Anatidae Atlas.

Aims of the Wader Atlas

The Atlas presents a detailed summary of what is known about numbers, distribution, movements and important sites for 90 species of wader in Africa, South-west and Central Asia and Europe. One of the main purposes of presenting these data and information is to provide a basis for the conservation of waders and their habitats in the region. It is important to divide species having an extensive geographical distribution into separate populations so that conservation action can be focussed on biologically meaningful and geographically distinct networks of sites for each species. For waterbirds, these regions, known as "biogeographic populations", are listed in the publication *Waterbird Population Estimates – fourth edition* (*WPE4*) (Wetlands International 2006) but until now there has been a need to define the precise limits of each population. Addressing this need is one of the principal aims of this book.

The 90 species of wader occurring in the AEWA region are divided into 149 subspecies, most of which are well-known and widely accepted, and 230 less well-known "biogeographic populations". As well as presenting the geographic ranges of all these forms on maps, another important aim has been the identification of "key sites". These are defined as sites where 1% or more of a biogeographic population has been counted at least once since 1990. Altogether, 59 of the 90 species have been recorded in such numbers in at least one site, and 876 key sites have been identified in 85 countries. These key sites are listed by country on pages 424 - 488, and the key sites for each population are also listed in the species accounts and presented on the maps.

The concept of biogeographic populations, and of using a 1% threshold to identify internationally important sites for these populations, has been used by the Ramsar Convention on Wetlands and other international conservation instruments such as the EC Birds Directive for many years. The existence of these principles assumes the existence of waterbird counting schemes to form the basis of estimates of overall numbers and to allow the assessment of the relative importance of individual sites. The International Waterbird Census (IWC), coordinated by Wetlands International and its predecessor organisation IWRB since 1967, provides an excellent starting point for estimating the populations of many waterbird species, and for assessing the importance of sites. Having established a baseline, IWC now provides a means of monitoring changes in numbers of waterbirds and in the sites that they use. IWC data are limited to the month of January, however, and outside Northern and Western Europe, the number of sites that are counted regularly, although increasing steadily, still provide incomplete coverage.

In this book, the best available information for each wader species in the AEWA region has been used to:

- define the principal migration strategies;
- based on these, to delineate "units" of population which are best treated as separate units for conservation purposes;
- provide the current best estimate of population size and status (even if only provisional);
- provide a brief summary of habitat and ecology;
- identify all sites which are known to have supported 1% or more of particular populations (key sites);
- indicate the protection status of key sites, including both national protection status (e.g. National Park, Wildlife Refuge) and international designations (e.g. Ramsar Site).

2. Methods

Regional scope

The regional scope of this Atlas is based on the Western Eurasian/African bird migration systems, the territorial limits being set by the limits of those populations which spend the whole or a part of their annual cycle within Western Eurasia and/or Africa. Thus, the regional coverage closely follows that of the Agreement on the Conservation of African-Eurasian Migratory Waterbirds (AEWA) under the Convention on Migratory Species (Bonn Convention).

For the purposes of this Atlas, Western Eurasia is defined as the region extending from the extreme eastern part of the Canadian Archipelago and Greenland in the west through the continent of Europe, including its offshore islands, to the Urals in the east; Western and Central Siberia east to the region of the Lena River delta (longitude 130°E); the Central Asian Republics of Kazakhstan, Uzbekistan and Turkmenistan; and South-west Asia from Asia Minor through the Middle East, east to Iran and the Arabian Sea. Africa is taken to include all its offshore islands south to Kerguelen at about 50° south and including St Helena, Ascension and the Tristan group. Afghanistan and the Central Asian Republics of Kyrgyzstan and Tajikistan are not included.

Taxonomic scope, treatment and nomenclature

The species and populations of waders included in this Atlas are listed in Table 1. Only species and populations which occur regularly in Western Eurasia and Africa are included. Thus species and populations which occur in the region only as rare vagrants or stragglers from other regions have been excluded. One species, Pectoral Sandpiper, which breeds in the extreme north-west of the region, has not been included because its presence is marginal and it migrates out of the region to Australia and South America outside the breeding season.

The taxonomic treatment at species level follows the Handbook of the Birds of the World (del Hoyo *et al.* 1996) which itself is largely based on the treatment of Morony, Bock & Farrand (1975). Information on subspecies has been derived from a number of sources, the principal references being Cramp and Simmons (1983), Engelmoer & Roselaar (1998), Hayman *et al.* (1986), del Hoyo *et al.* (1996), Johnsgard (1981), Peters (1934), Urban *et al.* (1986) and Vaurie (1965). English names largely follow del Hoyo *et al.* (1996).

Population estimates

Unless otherwise stated, the population estimates presented in this Atlas follow those given in the fourth edition of *Waterbird Population Estimates* (Wetlands International 2006), many of which are, in turn, taken from the review of wader population sizes by the Wader Study Group (Stroud *et al.* 2004). All population estimates and the 1% thresholds derived from them are given in Table 1. In many cases, estimates of total population size are based on the population in January. Where this is not possible, for example, because the population is widely dispersed in regions with poor census coverage, in some cases it has been possible to derive the total population size from an estimate of the breeding population. In these cases, the number of individuals in the population is calculated as three times the number of breeding pairs, a formula proposed by Meininger *et al.* (1995) and since widely adopted.

For many of the populations of waders considered in this Atlas, however, no precise estimation of population size is available. In these cases, provisional criteria for site selection have been developed on the basis of a "provisional numerical criterion". This has been derived from a consideration of the minimum number of birds known to exist (from the IWC and any other available counts and estimates) and an upper limit to the population size (derived from knowledge of the range of the species, maximum concentrations at important sites, miscellaneous national estimates of numbers, etc.) The provisional numerical criterion has been set at 1% of the upper end of this range. Thus, for example, the numerical criterion for a population estimated at between 100,000 and 1,000,000 would be 1% of 1,000,000 which, gives a 1% threshold of 10,000.

Population trends

Table 1 provides information on population trends, which is also included in the species accounts. For many wader populations occurring in Europe and North Africa, the overall trend in numbers since the 1980s, at least in parts of their range, is well documented. The data are sufficiently comprehensive in Northern and Western Europe to permit the monitoring of population trends from year to year. Analyses of population trends require high-quality data to be consistently collected from a large sample of representative sites. In some parts of the AEWA region, particularly in parts of Africa and the Middle East, data of sufficient quality are not yet available for a sufficiently long time period to allow reliable analysis of population trends. Trends for these populations have been estimated using available waterbird count data as well as published assessments (e.g. careful comparison of Smit & Piersma 1989 with Stroud *et al.* 2004).

With relatively few years of census data being available for many of the wetlands in South-west Asia and Africa south of the Sahara, it is not yet possible to determine detailed long-term trends in the populations of most species in these regions. However, a considerable amount of ornithological exploration and research has been carried out in Africa since the 19th Century, and much of this has provided reliable information on the abundance of species at local level. Much of the information presented on numbers and trends for African species and populations was derived from assessment of this type of information.

Selection of key sites

Numerical criteria have been used to identify the key sites plotted on the species maps and listed in Annex 1.

i. The 1% criterion

The tool used throughout this Atlas for the selection of key sites for populations of waders is the 1% criterion developed as part of a larger set of criteria for the identification of wetlands of international importance for designation under Article 2 of the Ramsar Convention. These criteria were adopted by the Fourth Conference of the Contracting Parties in Montreux, Switzerland, in June 1990, and most recently reviewed by the Tenth Conference of Contracting Parties (Korea, 2008).

Within this larger set of criteria, the 1% criterion is Criterion 6 (Ramsar Resolution VII.11). This states that "A wetland should be considered internationally important if it regularly upports 1% of the individuals in a population of one species or subspecies of waterbird". This 1% threshold is applicable throughout the range of that population and at any time of the year.

The concept of the 1% criterion and its effectiveness in the identification of key sites for migratory Anatidae in the Palearctic was thoroughly discussed by Atkinson-Willes (1976) and Atkinson Willes *et al.* (1982). Atkinson-Willes (1976) examined the effect of using different numerical criteria to identify sites of international importance for waterbirds, and concluded that the 1% threshold offered much the best compromise. Criteria set at lower levels would select too many sites for some species to be manageable, while higher levels would exclude a large number of species that do not concentrate in high numbers at a few major resorts. As this criterion has now become widely accepted as a tried and tested tool for the identification of sites of special importance for the conservation of species of waterbirds, no further justification of its use is needed here.

The Conference of the Contracting Parties to the Ramsar Convention in Montreux in 1990, formulated a series of guidelines for application of the Ramsar criteria. One of these guidelines states that "The specific criteria based on waterfowl[1] numbers will apply to wetlands of varying size in different Contracting Parties. While it is impossible to give precise guidance on the size of an area in which these numbers may occur, wetlands identified as being of international importance under Criterion 3 [now Criterion 6] should form an ecological unit, and may thus be made up of one big area or a group of smaller wetlands". The application of the Ramsar criteria has also been discussed by Stroud *et al.* (1990), Rose and Scott (1994) and Meininger *et al.* (1995).

For proper application of criterion 6 (and criterion 5 – see below), it is essential that the term "regularly" be defined. Atkinson-Willes *et al.* (1982) recommended that "regularly" be defined as follows (and this is followed in the guidance in Ramsar Resolution VII.11):

"A wetland regularly supports a population of a given 'size' if:

i) the requisite number of birds is known to have occurred in at least three-quarters of the seasons for which adequate data are available, the total number of seasons being not less than three; or.

ii) the mean of the seasonal 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)."

Atkinson-Willes *et al.* (1982) recommended that the records on which the assessment is based should not be more than ten years old, unless they belong to a continuing series or are confirmed by recent data; the months to which they refer are immaterial.

Where a population exceeds two million birds, its 1% threshold will be 20,000 or greater. Here Criterion 5 (Ramsar Resolution VII.11) applies: "A wetland should be considered internationally important if it regularly supports 20,000 or more waterbirds." This means that populations which exceed two million individuals all have 1% thresholds of 20,000. In practice this applies to rather few wader populations in the AEWA region, notably Northern Lapwing *Vanellus vanellus*, Common Snipe *Gallinago Gallinago* and Eurasian Woodcock *Scolopax rusticola* – but these latter two species are dispersed at all times of year and the key site approach is of limited value in their conservation.

[1] *The word "waterfowl" is synonymous with the word "waterbird" in Ramsar usage*

ii. Interpretation of the 1% criterion used in this Atlas

For this Atlas, a simpler, less strict interpretation of the 1% threshold is used because of the variable quality and frequency of count data for waders that are available. Any site that has exceeded the 1% threshold of a population since 1990 has been selected as a key site. A few sites in countries such as Iraq, for which post 1990 data are not yet available, have also been included on the basis of older data. It is possible to calculate five-year mean counts for waders in only about 15 countries in Europe, and even in these, there are big differences in the intensity of count coverage, with a few countries undertaking monthly counts while others only organise one count per year. Beyond these core European countries, waterbird count coverage is usually annual at a selection of sites, but many sites, including many of the most important, are only counted occasionally. The logistical complexity of coordinating reliable census work at many of the largest and most important sites, particularly in Africa and South-west Asia, limits the frequency with which counts can be undertaken.

The primary data source, the IWC, is largely restricted to the month of January, plus July in sub-Saharan Africa, and concentrations of waders present at sites in other seasons are not included. This is a major omission, and to compensate, data from many other sources have been included. The Important Bird Areas (IBA) data generously provided by BirdLife International are the source of much of the key site data for waders in the breeding and migration seasons. The IBA data have a different purpose from the IWC data, and for each site, a single, maximum total (or a range) is given for the number of breeding pairs and/or number of individuals, as appropriate. These data do not lend themselves to calculation of mean counts. Similarly, a lot of data from a wide variety of literature have been included in the assessment of key sites, and the best comparison of these with the other data is obtained if maximum totals are used. The result is a suite of key sites based on the highest count at each site since 1990, but mean counts, where available, are also presented in the key sites tables.

iii Criteria for globally threatened species

The Ramsar criteria also include a criterion (Criterion 2) relating specifically to rare, vulnerable or endangered species or subspecies of plants and animals. Criterion 2 states that "A wetland should be considered internationally important if it supports vulnerable, endangered, or critically endangered species or threatened ecological communities." Guidelines on implementing this criterion state that: "Notwithstanding the small numbers of individuals that may be involved, or poor quality of quantitative data or information that may sometimes be available, particular consideration should be given to listing wetlands that support globally threatened species at any stage of their life cycle using Criterion 2 or 3", so linking the selection of sites for globally threatened species to the use of the 1% criterion. Since such species in general have very small populations, 1% thresholds will be very small. In the case of perhaps the most globally threatened of all migratory wader species, Slender-billed Curlew *Numenius tenuirostris*, covered in this Atlas, this threshold is now set at one bird.

iv Turnover at staging sites

In its guidelines for application of Criteria 5 and 6, Ramasr Resolution VII.11 states that "consideration may also be given to turnover of waterfowl at migration periods, so that a cumulative total is reached, if such data are available". This indicates that a site may qualify as being of international importance for a species or population if the total number of birds using that site during the course of a spring or autumn migration regularly exceeds the 1% threshold of the population in question. While considerable interest has been expressed in the application of this criterion, no clear guidelines have yet been provided for its application. Methods required to estimate turnover at sites are laborious and are beyond the scope of most waterbird counting schemes. The application of the 1% criterion to the peak count during the migration period should identify most sites which are being used to a significant extent by 1% or more of the population in question, but the number of sites which are missed because of turnover of birds during migration is not easy to assess.

v. Hard weather and drought refuges

Some sites may act as important refuges during years with extreme weather conditions. Under normal conditions, these sites may hold only small numbers of birds, but in certain years, very large numbers of birds may be present. Although these sites may not qualify as wetlands of international importance on the basis of the Ramsar numerical criteria, they can be of vital importance for some species in some years. For example, there are major movements of European waterbirds in response to severe winter weather in North-west Europe (Ridgill & Fox 1990).

The importance of protecting sites which serve as refuges for waterbirds during periods of unusually severe weather (either cold or drought) has often been stressed (e.g. Ramsar Resolution VII.11). The Ramsar Contracting Parties, in highlighting the importance of these refuges, have also stressed the need for the careful interpretation of supporting data: "In establishing long-term 'use' of a site by birds, natural variability in population levels should be considered especially in relation to the ecological needs of the populations present. Thus in some situations (e.g.,sites of importance as drought or cold weather refuges or temporary wetlands in semi-arid or arid areas – which may be quite variable in extent between years), the simple arithmetical average number of birds using a site over several years may not adequately reflect the true ecological importance of the site. In these instances, a site may be of crucial importance at certain times ('ecological bottlenecks'), but hold lesser numbers at other times. In such situations, there is a need for interpretation of data from an appropriate time period in order to ensure that the importance of sites is accurately assessed" (Ramsar Resolution VII.11).

To ensure that adequate attention is given to cold weather refuges, it is recommended that the 1% criterion be extended to apply to those sites which hold over 1% of a population of a species during unusually severe winters. Criteria for establishing the severity of a winter are discussed by Ridgill & Fox (1990), but without further research their definition is hard to apply. It may be difficult to know whether a winter count was undertaken within the period of harsh weather displacement and whether all species were affected. There is also no possibility for assessing drought movements easily, as rainfall is often local and unrecorded. It is partly because of these uncertainties that all sites that have ever supported more than 1% of a population are identified as "key sites" and plotted and listed in this Atlas.

vi. Key sites for breeding birds

The 1% criterion is applicable year round, and applies equally to sites which hold the requisite number of individuals throughout the life cycle of a population. Thus, any site which holds 1% of a population during the breeding season is included in the Atlas, irrespective of whether these birds are breeding adults or non-breeding birds. Obviously in the case of species which are almost entirely sedentary, a site which holds over 1% of the population at any time of the year is likely to be internationally important as a breeding area. However, many migratory species of waders, especially those breeding in temperate and northern latitudes, are widely dispersed during the breeding season, nesting at low density over vast areas. Breeding densities may vary considerably from one area to another, depending on the availability of suitable habitat, but over vast tracts of the breeding range, few if any clearly delineated "sites" will hold a sufficiently high density to account for over 1% of the total breeding population. In such circumstances, the conservation of the species can seldom be achieved through the establishment of reserves alone, since this would require the creation of enormous reserves to protect a significant proportion of the population. Effective conservation will be dependent on the implementation of ecologically sound land-use practices over large areas of the species' range as part of an overall land-use strategy.

For many wader species, the 1% criterion and the whole concept of "site protection" are of limited usefulness during the breeding season. Areas of exceptionally high density of breeding birds may be identified, e.g. in the case of some of the high Arctic breeding waders which nest semi-colonially, or species with specialised habitat requirements such as Crab Plover *Dromas ardeola*. At more southerly latitudes, and especially in arid regions, wetland systems are often very large, relatively isolated from other comparable systems, and often extremely productive. Thus in some parts of South-west Asia and Africa, the principal wetlands are sufficiently large to support in excess of 1% of a population of one or more species during the breeding season. Even here, however, a large proportion of the population may move to small, seasonal wetlands to breed, and will thus not be covered by the 1% criterion approach. This is particularly the case with many of the "rains migrants" in Africa.

There is one other major problem with the use of 1% thresholds to identify key breeding areas for waders at northern latitudes. This arises from the fact that many of the population estimates for the more widespread species (e.g. Curlew Sandpiper *Calidris ferruginea*) are based primarily on passage and wintering populations that do not relate specifically to any one particular breeding area. Because of the extent of the overlap between flyways on their breeding grounds, it can be difficult to decide which 1% threshold applies.

In view of these difficulties, no attempt has been made to identify sites of international importance for breeding waders on the basis of the 1% criterion unless (a) the breeding population in question is sedentary or clearly belongs to one and only one of the passage/wintering populations; and (b) the site in question is clearly definable (e.g. a single wetland ecosystem with precise limits, an existing protected area, or an ecological unit which would be manageable as a protected area). Sites which are considered to be key breeding areas for a species simply because of the presence of unusually high densities of breeding birds have only been included if the number of birds present is known to exceed the 1% threshold of the appropriate population.

3. Identification of population limits

Summary of "populations" used in this Atlas

The "biogeographic populations" which are treated as separate units in this Atlas are listed in Table 1. Several types of "population" have been recognised by the Ramsar Convention based on Scott & Rose (1996) and elaborated by Delany & Scott (2006):

- The entire population of a monotypic species.
- The entire population of a recognised subspecies.
- A discrete migratory population of a species or Subspecies, i.e. a population which rarely if ever mixes with other populations of the same species or subspecies.
- That "population" of birds which spends the non-breeding part of its life cycle in a relatively discrete portion of Western Eurasia and/or Africa (e.g. Western Europe, the Black Sea/Mediterranean region, South-west Asia, West Africa, Eastern Africa and Southern Africa). In many cases, these "populations" may mix extensively with other populations on the breeding grounds, or may mix with sedentary populations of the same species during the migration seasons and/or on the wintering grounds. The birds wintering in two or more adjacent regions have often been grouped together into a single larger region, when it seems likely that they belong to the same "population" (e.g. Western Europe and West Africa, or South-west Asia and Eastern and Southern Africa).
- That "population" of birds which spends the breeding season in a particular discrete portion of Western Eurasia and/or Africa (e.g. Europe, Western Asia, Madagascar). In many cases, there may be a considerable amount of overlap between two adjacent populations during the migration seasons and on the non-breeding (wintering) grounds.
- A regional group of sedentary, nomadic or dispersive birds with an apparently rather contiguous distribution and no major gaps between breeding units sufficient to prohibit interchange of individuals during their normal nomadic wanderings and/or post-breeding dispersal.

Table 1: Wader populations in Africa and Western Eurasia with 2008 population estimates and trends.

- *For interpretation of estimate and trend codes, see pages 30.*
- *For Globally Threatened species, IUCN threat status is given in the Species column. Near Threatened species are given in **green**, Vulnerable, Endangered and Critically Endangered species are given in **red**.*

Species	Subspecies / Population	Estimate	Trend	1% level
Rostratula benghalensis **Greater Painted Snipe**	Lower Nile	A	-	100
	Sub-Saharan Africa	C	-	1,000
	Madagascar	A	-	100
	SW Cape, South Africa	A	DEC	100
Dromas ardeola **Crab Plover**	NW Indian Ocean	60,000-80,000	STA?	700
Haematopus meadewaldoi **Canarian Black Oystercatcher Extinct**	Canary Islands	0	EXT	-
Haematopus moquini **African Black Oystercatcher Near Threatened**	Southern Africa	6,000	INC	60
Haematopus ostralegus **Eurasian Oystercatcher**	***ostralegus***	1,020,000	DEC	10,200
	longipes	100,000-200,000	DEC?	1,500
Himantopus himantopus **Black-winged Stilt**	***himantopus,*** W & SW Europe, W Africa	71,000-82,000	STA	770
	himantopus, Central & E Europe, E Mediterranean (bre)	40,000-60,000	STA?	500
	himantopus, SW Asia (non-bre)	30,000-70,000	-	500
	himantopus, Sub-Saharan Africa	100,000-200,000	-	1,500
	himantopus, Madagascar	5,000-10,000	-	75
	himantopus (meridionalis)	15,000-30,000	INC	230
Recurvirostra avosetta **Pied Avocet**	Western Europe (bre)	73,000	STA	730
	Mediterranean & SE Europe (bre)	47,000	STA/DEC?	470
	SW Asia (bre)	B	STA?	250
	E Africa	C	-	1,000

Species	Subspecies / Population	Estimate	Trend	1% level
Pied Avocet *(continued)*	Southern Africa	15,000-25,000	INC?	200
Burhinus oedicnemus	***oedicnemus,*** W Europe (bre)	110,000-170,000	DEC	1,400
Stone Curlew,	***oedicnemus,*** E Europe (bre)	12,000-36,000	DEC	240
Eurasian Thick-Knee	***distinctus***	900-1,200	DEC	11
	insularum	700-4,700	DEC?	30
	saharae	B/C	-	1,000
	harterti	-	-	-
Burhinus senegalensis	***senegalensis***	C	-	1,000
Senegal Thick-Knee	***(inornatus)***	C	-	1,000
Burhinus vermiculatus	***vermiculatus***	C	-	1,000
Water Dikkop,	***buettikoferi***	A/B	-	250
Water Thick-Knee				
Burhinus capensis	***capensis***	40,000-80,000	INC?	600
Spotted Dikkop	***maculosus***	B/C	-	1,000
	damarensis	5,000-10,000	-	75
	dodsoni	B	-	250
Burhinus (Esacus) recurvirostris **Great Thick-Knee, Great Stone Plover**	SW, S & SE Asia	A/B	-	250
Pluvianus aegyptius	***aegyptius,*** West Africa	20,000-50,000	STA	350
Egyptian Plover	***aegyptius,*** East Africa	A/B	DEC	250
	(angolae)	A	-	100
Cursorius cursor	***cursor***	-	-	-
Cream-coloured Courser	***bogulubovi***	-	-	-
	exsul	150-350	DEC?	3
	(bannermani)	2,000	DEC	20
Cursorius somalensis	***somalensis***	C	-	1,000
Somali Courser	***littoralis***	C	-	1,000
Cursorius rufus	***rufus***	A	DEC	100
Burchell's Courser	***rufus (theresae)***	B	STA	250
Cursorius temminckii	***temminckii,*** W Africa	B/C	-	1,000
Temminck's Courser	***temminckii,*** E Africa	C/D	-	-
	ruvanensis	25,000-80,000	-	525
	aridus	A/B	-	250
Rhinoptilus africanus	***africanus***	-	STA	-
Double-banded Courser	***granti***	-	STA	-
	traylori	-	STA	-
	bisignatus	-	-	-
	sharpei	-	STA	-
	gracilis	B	-	250
	raffertyi	-	-	-
	hartingi	-	-	-
Rhinoptilus cinctus	***cinctus***	C/D	-	-
Three-banded Courser	***emini***	B	-	250
	seebohmi	5,000-10,000	-	75
Rhinoptilus chalcopterus	***chalcopterus***	C	-	1,000
Bronze-winged Courser	***chalcopterus (albofasciatus)***	10,000-30,000	-	200
Glareola pratincola	***pratincola,*** W Mediterranean (bre)	18,000-19,500	DEC	190
Collared Pratincole	***pratincola,*** Black Sea, E Mediterranean (bre)	16,000- 32,000	DEC	240

Species	Subspecies / Population	Estimate	Trend	1% level
Collared Pratincole *(continued)*	***pratincola,*** SW Asia (bre)	B/C	-	1,000
	pratincola (limbata)	B/C		1,000
	fuelleborni (boweni)	B	-	250
	fuelleborni (erlangeri)	A/B	-	250
	***fuelleborni* (including former *riparia*)**	100,000- 300,000	-	2,000
Glareola nordmanni **Black-winged Pratincole Near Threatened**	E Europe -Central Asia	152,000-190,000	DEC	1,700
Glareola ocularis **Madagascar Pratincole Vulnerable**	Madagascar	5,000-10,000	DEC	75
Glareola nuchalis **Rock Pratincole**	***nuchalis***	C	-	1,000
	liberiae	100,000-300,000	-	2,000
Glareola cinerea **Grey Pratincole**	***cinerea***	B	-	250
	colorata	A	-	100
Vanellus vanellus **Northern Lapwing**	Europe & West Asia (bre)	5,500,000-9,500,000	DEC	20,000
Vanellus crassirostris **Long-toed Lapwing**	***crassirostris,*** E & C Africa	C	-	1,000
	crassirostris, Lake Chad Basin	<5,000	-	50
	leucopterus, W Angola	A	-	100
	leucopterus	25,000-50,000	-	380
Vanellus armatus **Blacksmith Lapwing**	S & E Africa	D	INC	10,000
Vanellus spinosus **Spur-winged Lapwing**	Africa	100,000-700,000	INC	4,000
	SE Europe, Asia Minor	C	INC	1,000
Vanellus tectus **Black-headed Lapwing**	***tectus***	25,000-200,000	-	2,000
	latifrons	A/B	-	250
Vanellus albiceps **White-headed Lapwing**	W & C Africa	30,000-70,000	STA?	500
	Tanzania	6,000-8,000	-	70
	SE Africa	20,000-50,000	STA	350
Vanellus lugubris **Lesser Black-winged Lapwing, Senegal Plover**	Equatorial, E & SE Africa	20,000-50,000	-	350
	West Africa	5,000-20,000	-	130
Vanellus melanopterus **Greater Black-winged Lapwing**	***melanopterus,*** Ethiopia	10,000-50,000	-	300
	minor, Kenya, Tanzania	A	DEC?	100
	minor, Southern Africa	2,000-3,000	DEC	25
Vanellus coronatus **Crowned Lapwing**	***coronatus,*** Eastern & Southern Africa	400,000-900,000	-	6,500
	coronatus, C Africa	A/B	-	250
	xerophilus	30-50,000	INC ?	400
	demissus	B/C	-	1,000
Vanellus senegallus **African Wattled Lapwing**	***senegallus***	25,000-60,000	-	450
	lateralis (solitaneus)	B/C	-	1,000
	lateralis	C	STA	1,000
	major	5,000-15,000	-	100
Vanellus melanocephalus **Spot-breasted Lapwing**	Ethiopia	A	-	100

Species	Subspecies / Population	Estimate	Trend	1% level
Vanellus superciliosus **Brown-chested Lapwing**	W, C & E Africa	A/B	-	250
Vanellus indicus **Red-wattled Lapwing**	***aigneri***	**-**	**-**	**-**
Vanellus gregarius **Sociable Lapwing** **Critically Endangered**	SW Asia & NE Africa (non-bre) S Asia (non-bre)	3,200-11,000 200	DEC DEC	70 2
Vanellus leucurus **White-tailed Lapwing**	SW Asia, NE Africa (non-bre) S Asia (non-bre)	B B/C	DEC? INC?	250 1,000
Pluvialis apricaria **Eurasian Golden Plover**	***altifrons,*** Iceland & Faeroes (bre) ***altifrons,*** N Europe, ***extreme*** W Siberia (bre) ***altifrons,*** W & N-Central Siberia (bre) ***apricaria***	930,000 500,000-1,000,000 - 140,000-210,000	INC? INC? - DEC	9,300 7,500 - 1,750
Pluvialis fulva **Pacific Golden Plover**	SW & S Asia, NE Africa (non-bre)	50,000-100,000		750
Pluvialis squatarola **Grey Plover**	***squatarola,*** E Atlantic (non-bre) ***squatarola,*** SW Asia, E & S Africa (non-bre)	250,000 90,000	DEC -	2,500 900
Charadrius hiaticula **Common Ringed Plover**	***hiaticula*** ***(psammodroma)*** ***tundrae***	73,000 240,000-330,000 D	DEC? DEC -	730 2,850 10,000
Charadrius dubius **Little Ringed Plover**	***curonicus,*** W & C Europe, NW Africa (bre) ***curonicus,*** E Europe, W Asia (bre)	200,000-300,000 -	STA? -	2,500 -
Charadrius thoracicus **Black-banded Plover, Madagascar Plover** **Vulnerable**	Madagascar	3,100	DEC	31
Charadrius pecuarius **Kittlitz's Plover**	***pecuarius,*** E, C & S Africa ***pecuarius,***West Africa ***pecuarius,*** Madagascar ***pecuarius (allenbyi)***	100,000-400,000 20,000-50,000 10,000-20,000 1,000-5,000	- - - -	2,500 350 150 30
Charadrius sanctaehelenae **St. Helena Plover** **Critically Endangered**	Saint Helena	200-220	DEC	2
Charadrius tricollaris **Three-banded Plover**	***tricollaris,*** E & S Africa ***tricollaris,*** Lake Chad ***bifrontatus***	70,000-130,000 A 10,000-30,000	INC? - -	1,000 100 200
Charadrius forbesi **Forbes's Plover**	Sub-Saharan Africa	10,000-50,000	-	300
Charadrius marginatus **White-fronted Plover**	***marginatus*** ***tenellus,*** Madagascar ***tenellus,*** coastal E Africa ***mechowi/tenellus,*** Inland E & C Africa ***mechowi,*** W coast Africa Angola-Cameroon ***mechowi,*** W Africa ***arenaceus*** SE African coast ***arenaceus*** SW African coast	10,000 5,000-15,000 15,000-25,000 10,000-15,000 3,500 10,000-15,000 8,000-12,000 10,000	- - - - - - - -	100 100 200 130 35 130 100 100

Species	Subspecies / Population	Estimate	Trend	1% level
Charadrius alexandrinus **Kentish Plover**	***alexandrinus,*** E Atlantic, W Mediterranean	62,000-70,000	DEC	660
	alexandrinus, Black Sea, E Mediterranean	32,000-49,000	DEC	410
	alexandrinus, SW Asia	C	-	1,000
Charadrius pallidus **Chestnut-banded Plover**	***pallidus***	11,000–16,000	STA	140
	venustus	6,500	STA	65
Charadrius mongolus **Lesser Sandplover, Mongolian Plover**	***pamirensis***	100,000-150,000	-	1,250
Greater Sandplover ***Charadrius leschenaultii***	***columbinus***	A	-	100
	crassirostris	C	-	1,000
	leschenaultii, E Africa (non-bre)	25,000-50,000	-	380
Charadrius asiaticus **Caspian Plover**	Central Asia (bre)	40,000-55,000	DEC?	480
Eudromias morinellus **Eurasian Dotterel**	Europe (bre)	40,000-120,000	STA/DEC?	800
	Asia (bre)	B/C	-	1,000
Scolopax rusticola **Eurasian Woodcock**	Europe (Bre)	10,000,000- 25,000,000	STA	20,000
	W Asia (bre)	-	-	-
	Azores	-	-	-
	Madeira	-	-	-
	Canary Islands	3,000-7,000	-	50
Lymnocryptes minimus **Jack Snipe**	Europe (bre)	E	STA	-
	W Siberia (bre)	-	-	-
Gallinago stenura **Pintail Snipe**	S, SW Asia, E Africa (non-bre)	C/D	-	-
Gallinago nigripennis **African Snipe**	***nigripennis***	B	-	250
	aequatoralis	B/C	-	1,000
	angolensis	B/C	-	1,000
Gallinago macrodactyla **Madagascar Snipe** **Near Threatened**	Madagascar	A	DEC?	100
Gallinago media **Great Snipe** **Near Threatened**	Scandinavia (bre)	18,000-51,000	STA	350
	W Siberia, NE Europe (bre)	D	DEC?	10,000
Gallinago gallinago **Common Snipe**	***gallinago,*** Europe (bre)	>2,500,000	DEC/STA	20,000
	gallinago, W Siberia (bre)	E	-	-
	faeroeensis	570,000	STA?	5,700
Limosa limosa **Black-tailed Godwit** **Near Threatened**	***limosa,*** W Europe (bre)	160,000-180,000	DEC	1,700
	limosa, E Europe (bre)	90,000-165,000	DEC	1,300
	limosa, W Asia (bre)	C	-	1,000
	islandica	47,000	INC	470
Limosa lapponica **Bar-tailed Godwit**	***lapponica***	120,000	STA	1,200
	taymyrensis, W, SW Africa (non-bre)	600,000	DEC?	6,000
	taymyrensis, E Africa, SW, S Asia (non-bre)	100,000-150,000	-	1,300
Numenius phaeopus **Whimbrel**	***islandicus***	600,000-750,000	STA	6,800
	phaeopus, NE Europe (bre)	190,000-340,000	STA?	2,700
	phaeopus, W Siberia (bre)	D	-	10,000
	alboaxillaris	A	DEC	100

Species	Subspecies / Population	Estimate	Trend	1% level
Numenius tenuirostris **Slender-billed Curlew** **Critically Endangered**	Mediterranean basin (non-bre)	<50	DEC	1
Numenius arquata **Eurasian Curlew** **Near Threatened**	***arquata***	700,000-1,000,000	DEC	8,500
	orientalis, SW Asia, E Africa (non-bre)	C	DEC?	1,000
	suschkini	-	DEC	-
Tringa erythropus **Spotted Redshank**	Europe (bre)	60,000-120,000	STA?	900
	W Siberia (bre)	B/C	-	1,000
Tringa totanus **Common Redshank**	***robusta***	150,000-400,000	INC?	2,800
	britannica	95,000-135,000	DEC	1,200
	totanus, N Europe (bre)	200,000-300,000	STA	2,500
	totanus, C&E Europe (bre)	570,000-870,000	DEC	7,200
	ussuriensis,SW Asia & E Africa (non-bre)	D	-	10,000
Tringa stagnatilis **Marsh Sandpiper**	C & NE Europe (bre)	14,000-40,000	DEC?	270
	SE Europe & W Asia (bre)	50,000-100,000	DEC?	750
Tringa nebularia **Common Greenshank**	NW Europe (bre)	190,000-270,000	STA	2,300
	NE Europe, W Asia (bre)	D	-	10,000
Tringa ochropus **Green Sandpiper**	Europe (bre)	1,000,000-2,400,000	STA	17,000
	W Asia (bre)	D/E	-	-
Tringa glareola **Wood Sandpiper**	NW Europe (bre)	900,000-1,200,000	STA	10,500
	NE Europe, W Siberia (bre)	>2,000,000	STA?	20,000
Xenus cinereus **Terek Sandpiper**	SW Asia, E Africa (non-bre)	D	STA?	10,000
Actitis hypoleucos **Common Sandpiper**	N, W & C Europe (bre)	1,500,000-2,000,000	DEC?	17,500
	E Europe, W Asia (bre)	E	-	STA?
Arenaria interpres **Ruddy Turnstone**	***interpres,*** NE Canada, Greenland (bre)	100,000-200,000	DEC	1,500
	interpres, Fennoscandia, NW Russia (bre)	45,000-120,000	DEC?	830
	interpres, SW Asia, E & S Africa (non-bre)	100,000		1,000
Calidris tenuirostris **Great Knot**	SW & W S Asia (non-bre)	2,000-5,000	-	35
Calidris canutus **Red Knot**	***canutus***	400,000	DEC?	3,400
	islandica	450,000	DEC	4,500
Calidris alba **Sanderling**	E Atlantic (non-bre)	120,000	STA/INC?	1,200
	SW Asia, E & S Africa (non-bre)	150,000	STA?	1,500
Calidris minuta **Little Stint**	Europe & West Africa (non-bre)	300,000	STA?	3,000
	SW Asia, E & S Africa (non-bre)	1,000,000	-	10,000
Calidris temminckii **Temminck's Stint**	Europe, W Africa (non-bre)	30,000-55,000	DEC?	430
	SW Asia, E Africa (non-bre)	D/E	STA?	
Calidris ferruginea **Curlew Sandpiper**	W Africa (non-bre)	1,000,000	INC	10,000
	E & S Africa (non-bre)	400,000	STA	4,000
Calidris maritima **Purple Sandpiper**	***maritima,*** NE Canada & NE Grenland (bre)	20,000-30,000	DEC ?	250
	maritima, N Europe & W Siberia (bre)	50,000-100,000	STA	750

Species	Subspecies / Population	Estimate	Trend	1% level
Purple Sandpiper *(continued)*	***maritima,*** West Greenland	30,000-60,000	-	450
	littoralis	90.000	-	900
Calidris alpina **Dunlin**	***alpina***	1,330,000	STA	13,300
	centralis	500,000	-	5,000
	schinzii, Baltic (bre)	3,300-4,100	DEC	40
	schinzii, Britain & Ireland (bre)	23,000-26,000	DEC	250
	schinzii, Iceland (bre)	940,000-960,000	STA	9,500
	arctica	21,000-45,000	STA?	330
Limicola falcinellus **Broad-billed Sandpiper**	***falcinellus***	61,000-64,000	DEC	630
Philomachus pugnax **Ruff**	W Africa (non-bre)	1,000,000-1,500,000	DEC	12,500
	S Asia, E & S Africa	E	-	20,000
Phalaropus lobatus **Red-necked Phalarope, Northern Phalarope**	NW Eurasia (bre)	E	-	20,000
Phalaropus fulicarius **Grey Phalarope, Red Phalarope**	Canada, Greenland, Iceland (bre)	1,000,000	DEC	10,000

Discussion of "biogeographic populations"

The concept of "biogeographic populations" was elaborated in some detail by Atkinson-Willes *et al.* (1982). In its simplest form, a population comprises a discrete entity with a clearly defined "flyway" linking the breeding grounds of the population to the moulting grounds, and encompassing the range occupied during and between post- and pre-nuptial migrations. In some cases, the unit will comprise the entire population of a species or subspecies, as in the Slender-billed Curlew *Numenius tenuirostris*, the Icelandic breeding population of Black-tailed Godwit *Limosa limosa islandica* and the nominate race of Red Knot *Calidris canutus canutus*. (Note that in North America, the term "flyway" is used in a rather different manner to refer to an administrative unit for the management of waterfowl populations).

A number of other species and subspecies are known, from ringing and migration studies, to have two or more distinct populations which seldom if ever mix at any stage in their annual cycles, and which should therefore be treated separately. Western Eurasia and Africa provide several examples of these discrete units, for example, the separate Atlantic and Pacific populations of the Grey Phalarope *Phalaropus fulicarius*.

Such a division of species into discrete population units is, however, often impossible, especially among the common and widespread species. For many species of waders that have been the subject of intensive ringing studies, it is clear that no such biogeographically discrete populations exist. Thus in many species of wader with a wide breeding range in Europe and Asia, there is no clear-cut relationship between the various breeding and wintering grounds; the birds wintering in any given area are likely to include individuals from several of the main breeding grounds, and similarly birds from the same breeding areas may often occur in a number of widely separated winter quarters. In many Arctic-nesting species, there is considerable mixing across wide longitudinal ranges, and clear dividing lines seldom exist. Additional methods of sub-dividing populations into convenient units are therefore needed. Population boundaries dividing species having an extensive geographical distribution into separate populations are needed so that conservation action can be focussed on biologically meaningful and geographically distinct networks of sites for each species.

In support of the these "population boundaries", there is considerable evidence, mostly from ringing studies, that most of the widespread waders breeding in Western Eurasia follow a south-westerly course from their breeding grounds to their winter quarters. In species with a relatively continuous breeding range across northern Eurasia and a relatively continuous wintering range across southern Eurasia (to Africa, India and South-east Asia), there is a strong tendency for birds breeding in the west to winter in the west, and birds breeding in the east to winter in the east. In many species of waders, ring recoveries have demonstrated that the majority of birds breeding in Europe (including Scandinavia) winter from Western Europe south in varying degrees to the Iberian Peninsula, Mediterranean Basin and West Africa. The majority of birds breeding in Western Siberia generally migrate south-west through the Caspian region to the Middle East, and Eastern and Southern Africa.

It is more difficult to generalise about the Afrotropical species, which generally have diverse migratory strategies that are less well understood (Dodman & Diagana 2007). Species which make use of the many large sites in Africa where water levels vary with the seasonal rains synchronise their breeding with times of optimum water level and may time post- and pre-nuptial migrations accordingly. Species such as lapwings and coursers which breed in extensive acacia-savannah, semi-desert and deciduous woodland habitats, time their breeding to coincide with optimum variations in these habitats. These variations are usually seasonal, in response to the regular alternation of wet and dry seasons brought about by the annual north-south movement of the Inter Tropical Convergence Zone. It is known that many species of waders are "rains migrants", moving away from the equator during the rainy season to breed in seasonal wetlands to the north or south, and retreating back to the humid equatorial zone during the dry season. However, the extent of these movements, the degree of isolation between the northern populations and southern populations (which breed at different times of the year), and the extent to which these mix with or form part of the sedentary populations which may remain year-round in the humid equatorial zone, are often poorly known. Basic survey work is still, therefore, a high priority, especially in Central and Eastern Africa (Dodman 1997). Some Palearctic migrants, after arrival in Africa, undertake intra-African migrations during their stay in response to these seasonal environmental changes. African species also undertake large-scale movements in response to unpredictable events such as fires, or flooding of ephemeral wetlands in arid and semi-arid areas. For a small number of species such as the Pied Avocet *Recurvirostra avosetta* and Collared Pratincole *Glareola pratincola*, Afrotropical populations are joined in the northern winter by large numbers of migrants from populations which breed in Europe and Asia.

Atkinson-Willes *et al.* (1982) discussed some of the challenges arising from this rather pragmatic approach to the selection of geographical units of population. The main problem arises in cases where a species is abundant in one region, but scarce and at the edge of its range in the next. If the populations in the two regions are treated separately, the 1% criterion will place undue emphasis on sites in the less important region. A solution is to combine the two regions, or to amend the boundary between them, so that the marginal overspill is included in the main population. However, it is important to distinguish between small relict populations, which are genetically and geographically isolated from all other populations of the species, and those that comprise no more than a minor extension of the usual distribution. The former should be treated separately, the latter as part of the main population.

Another problem arises where the number of individuals wintering in a region is very much smaller than the number passing through on migration. It has been suggested that two 1% thresholds should be adopted in this situation, one based on the number occurring on passage, for use in autumn and spring, the other on the number remaining in winter. Atkinson-Willes *et al.* (1982) regarded this as an unnecessary complication, and recommended that the small winter remnant be lumped with the main population with which it is associated; the same 1% threshold should then be used throughout.

Meininger *et al.* (1995) have suggested that when two or more populations use a site during the course of a year, the 1% threshold used at a particular time of year should be the 1% threshold of that population which is most abundant at that time of year. When it is unclear which population dominates, the highest level should be applied.

4. From populations to flyways: an essential concept in the conservation of migratory Species

Migratory waders, like other migratory waterbirds, migrate between breeding and staging areas along generally consistent routes, and for conservation purposes these can be broadly grouped into “flyways”. A flyway has been defined by Boere & Stroud (2006) as “the entire range of a migratory bird species (or groups of related species or distinct populations of a single species) through which it moves on an annual basis from the breeding grounds to non-breeding areas, including intermediate resting and feeding places as well as the area within which the birds migrate”. These authors go on to refine this definition by saying that flyways can be considered at three different scales, firstly: **single species migration systems**, which are exactly equivalent to the biogeographic populations mapped in this Atlas. The second scale at which flyways are defined is termed a **multi-species flyway,** defined as “…many overlapping migration systems of individual waterbird populations and species, each of which has different habitat preferences and migration strategies”. From knowledge of these migration systems, it is possible to group the migration routes used by waterbirds into broad flyways, each of which is used by many species, often is a similar way, during their annual migrations. Research into the migrations of many wader species, for example, indicates that the migrations of waders can broadly be grouped into eight such flyways: the East Atlantic Flyway, the Mediterranean/Black Sea Flyway, the West Asia/East Africa Flyway, the Central Asian Flyway, the East Asia/Australasia Flyway and three flyways in the Americas. (Figure 1). The third scale at which flyways can be considered, according to Stroud & Boere (2006), is as **Global regions for waterbird conservation management** also known as Political Flyways. These are “global regions containing species with similar migration systems that are the subject (actual or potential) of shared international conservation activity”. Thus the Agreement Area for the AEWA considered by this Atlas is the ”global region” that includes the migration systems of all migratory waterbirds occurring in Africa and Western Eurasia.

Waders occurring on the eastern seaboard of the Atlantic Ocean in Western Europe, and in North and West Africa, use the East Atlantic Flyway (Figure 1). Birds using this flyway breed over a large area of the Arctic, boreal and temperate Northern Hemisphere from Canada in the west, to Central Siberia in the east. Many subspecies and biogeographic populations using this flyway overwinter on the estuaries and open coasts of Western Europe. Others pass through this region during spring and autumn to reach overwintering sites in West Africa, some reaching as far south as South Africa (Piersma *et al.* 1987; Smit & Piersma 1989). Two other flyways within the African-Eurasian region are less well known than that of the East Atlantic coast. The Black-Sea/ Mediterranean Flyway joins Arctic and boreal breeding areas with final destinations in the Mediterranean Basin and West Africa (Figure 1; Kube *et al.* 1998; Summers *et al.* 1987; van der Have 1988), whilst the West Asian/East African Flyway links West and Central Siberia with the Caspian Sea, the Middle East (especially the Gulf Region) and Eastern and Southern Africa (Summers *et al.* 1987). The waders of the latter flyway are particularly poorly known.

No attempt has yet been made to define (or name) broad intra-African wader flyways, due to the general lack of precise information on seasonal movements of African wader populations within the continent. Some African waders do have clearly defined migratory movements, however. It might also be necessary to treat the flyway definition provided by Boere & Stroud (2006) with a bit more flexibility when considering intra-African movements. For instance, there are some regular movements that are not necessarily “annual” due to the vagaries of the rains. Some areas are only important for breeding every few years, for example when good rains turn ephemeral wetlands into areas of high productivity.

5. Previous reviews of wader populations in Western Eurasia and Africa and sources used to compile the Wader Atlas

One of the principal functions of this Atlas is to draw together data and information relevant to knowledge of numbers and distribution of waders. Over 1000 published and unpublished sources were used and these are presented in full on pages 488 - 522 The sources show a bias towards books, papers and reports published in English, and it is recognised and regretted that it has not been possible to represent more

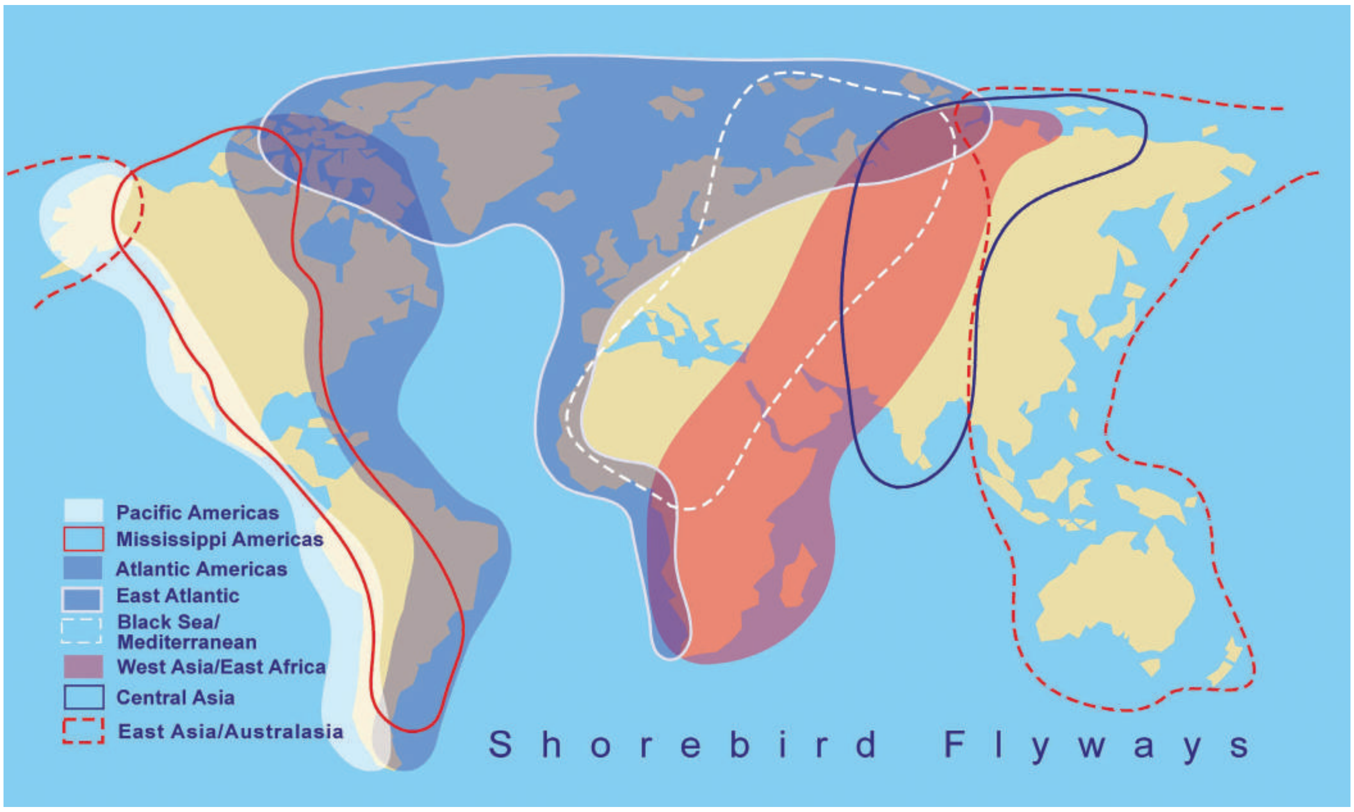


Figure 1. Wader flyways worldwide (after Wader Study Group 1992). Three multi-species flyways, the East Atlantic Flyway, the Mediterranean/Black Sea Flyway and the West Asia/Africa flyway, are included in the African-Eurasian Migratory Waterbird Agreement (AEWA) area.

fully the work of ornithologists working in other languages, particularly Russian, but also French, Spanish, German and a host of other languages. The sources are referred to extensively in the species texts and tables, and a summary is given here of the most important sources used. The starting point for most of the species accounts were the standard handbooks. Most important among these were Glutz von Blotzheim et al. (1975, 1977), Cramp & Simmons (1983), Urban *et al.* (1986), del Hoyo *et al.* (1996) and Snow & Perrins (1998).

1970-1990

The modern study of wader numbers, distribution and movements in Europe was established in 1970 with the formation of the Wader Study Group and the publication of the first issue of the Wader Study Group Bulletin under the editorship of Tony Prater. The International Waterbird Census (IWC), coordinated by the predecessor organisation to Wetlands International, the International Waterfowl Research Bureau (IWRB), had begun three years earlier in 1967.
In its early years, census work concentrated on obtaining standardised "midwinter" counts of Anatidae (ducks, geese and swans). There were, nevertheless, sufficient data available in the 1970s for the first review of the distribution of coastal waders in Europe and North Africa to be published, in the proceedings of an IWRB Conference (Prater 1976). Wader counting began in earnest in most European countries in the 1980s, and expeditions to many countries in West and North Africa, as well as Kenya, Turkey and Greece, were coordinated by the Dutch foundation WIWO (*Werkgroep Internationaal Wad-en-Watervogelonderzoek)* which was established in 1980 (e.g. Altenburg *et al.* (1982), Kersten *et al.* (1983), Van Dijk *et al.* (1986), van der Have *et al.* (1989)).

Two major reviews of wader populations in the region were published in IWRB Conference proceedings in the late 1980s. Summers *et al.* (1987) compiled the first comprehensive review of wader migration systems in Southern and Eastern Africa and Western Asia. Smit & Piersma (1989) published a similarly comprehensive account of wader populations in the East Atlantic Flyway. These major syntheses of the two principal flyways in what later became the AEWA region drew together data on waders by means of full reviews of the available literature, count data and ring recovery data. By the late 1980s, a baseline of knowledge of wader populations in the Palearctic – African migration systems had thus been established.

1990-2008

The African Waterbird Census (AfWC), which was started in 1991 with counts in 17 countries in sub-Saharan Africa, greatly extended the geographical range of the IWC. By 2006, counts had taken place in all but four countries of sub-Saharan Africa, and the results were summarised in a series of reports: Perennou (1991, 1992), Taylor (1993), Taylor & Rose (1994), Dodman & Taylor (1995, 1996), Dodman *et al.* (1997, 1999), Dodman & Diagana (2003), Diagana & Dodman (2008). Counts in South-west and Central Asia were included in the Asian Waterbird Census from 1987 onward, but after 1994, for logistical reasons, counts in these countries were included in the Western Palearctic census. Reports on the Western Palearctic census included summaries of counts of waders for the first time in 1995 (Rose 1995), and subsequent reports showed that regular counts of waders had become well-established in the region in the 1990s (Delany *et al.* 1999, Gilissen *et al.* 2002, reports on the Wetlands International website). Despite this progress, the complex logistics required to count some of the largest and most important sites in Africa, South-west Asia and Eastern Europe prevented annual coverage by counts, and these gaps continued to be filled on an occasional basis, often through expeditions organised by WIWO: e.g. van der Have *et al.* (1992), Meininger & Atta (1994), Green *et al.* (1994), Salvig *et al.* (1994), Keijl *et al.* (1998), van der Winden *et al.* (2001), Bos *et al.* (2001), Hagemeijer *et al.* (2004).

Numbers of waders in the AEWA region outside the restricted seasons covered by the IWC are available through BirdLife International's Important Bird Areas (IBA) programme. The

IBA programme started in Europe in the 1980s as a joint programme of ICBP (predecessor organisation to BirdLife International) and IWRB (predecessor organisation to Wetlands International) (Grimmett & Jones 1989, Heath & Evans 2000). IBA identification continued in the Middle East and Africa in the 1990s (Evans 1994, Fishpool & Evans 2001).This work involved full cooperation between ICBP/Birdlife and IWRB/Wetlands International, and a high proportion of wetland IBAs have been identified on the basis of IWC data. IBA data are compiled at infrequent intervals but they have the big advantage of including data from all seasons. For this reason, the World Bird database and its published summaries have been invaluable sources of data for this Atlas.

A number of published atlases have provided an important source of information for this one. In 1997, the EBCC Atlas of European Breeding Birds was published (Hagemeijer & Blair 1997), followed later in the same year by the Atlas of Southern African Birds (Harrison *et al.* 1997). Atlases of ring recovery data have also been invaluable; Viksne & Michelson (1985) plotted recoveries of birds ringed in Eastern Europe and Northern Asia, while national atlases of ring recoveries have been published for the UK (Wernham *et al.* 2002), Greenland (Lyngs *et al.* 2003), Norway (Bakken *et al.* 2003) and Denmark (Bønløkke *et al.* 2006). The Italian national migration Atlas (Spina & Volponi 2008) was published too late for data for most species to be included here. Veen *et al.* (2005) published a summary of ring recovery data from south-west Siberia, and this included recovery data for a number of wader species. Of many atlases at national level, several summarise bird distribution in African countries that are otherwise poorly covered, including Sudan (Nikolaus 1987), Kenya (Lewis & Pomeroy 1989), South Africa (Underhill *et al.* 1999), Uganda (Carswell *et al.* 2005) and Tanzania (Baker & Baker 2005, 2007).

Of the many scientific journals which have provided source material for this Atlas, the *Wader Study Group Bulletin*, published in 117 volumes, three times per year, between 1970 and 2008, is the most important. As well as the *Bulletin*, the group has published 17 volumes in an occasional series *International Wader Studies.* Numbers 1 (Piersma 1986) and 14 (Thorup 2006) in this series were reviews of numbers of breeding waders in Europe and are important sources for estimating populations of species which are not well covered by routine counts (particularly species that have a dispersed distribution and/or skulking habits). Number 7 (Meltofte *et al.* 1994) provided the first comprehensive overview of numbers and distribution of waterbirds in the Wadden Sea, the largest and most important intertidal area in Europe and the most important single “site” for waders in this Atlas. *International Wader Studies* Number 10, the famous “Odessa Proceedings” (Hötker *et al.* 1998) included 54 papers and 22 abstracts on waders in Eastern Europe and north Asia, and is the biggest single source of information on waders in the countries of the former Soviet Union included in this Atlas. Finally, Number 15 (Stroud *et al.* 2004) was a comprehensive review of the status of migratory wader populations in Africa and Western Eurasia in the 1990s. This review, which appeared only in electronic format on the website of the Wader Study Group, included much of the material now published in this Atlas and is the source of population estimates and trends for nearly all the migratory waders in the region under consideration.

The 1990s saw major developments in compiling estimates of waterbird populations. Stimulated by the need of the Ramsar Convention on Wetlands for a definitive, up-to-date basis for the 1% criterion, IWRB published the first edition of *Waterfowl Population Estimates* in 1994 (Rose & Scott 1994), followed by a second edition in 1997. The third edition, now titled *Waterbird Population Estimates* (Wetlands International 2002) was very comprehensively expanded and updated, a process which continued in the fourth edition (*WPE4*) published in 2006. Key sources for African wader population sizes and status during this process were Dodman (2002) and Dodman (2006), finally updated as Dodman (in press, 2009).

6. Gaps in information and limitations on data quality

There remain many gaps in our knowledge of the status, distribution and movements of wader species in Western Eurasia and Africa. Parts of the region, especially in Africa and South-west Asia, have been very incompletely surveyed. Figure 2 shows the sites from which waterbird count data were available for this Atlas, but it should be remembered that much additional information on numbers and movements, but not including precise count data, is available in the literature.

The geographical gaps in coverage in Africa and South-west Asia apparent in Figure 2 are less extensive than at first they might appear because there are few potentially important sites for waders in the very extensive Sahara-Arabian desert complex north of the equator, or the Kalahari-Namib complex to the south. Similarly, the equatorial forest belt of the Congo basin, although probably important as a whole for some wader species, is not thought to include many sites where very large congregations occur. The most data-deficient sites and regions include the Sudd, a 350 km long wetland complex on the Nile River in southern Sudan, which partial surveys in the early 1980s showed to be one of the most important wetlands for birds in Africa. The Niger delta in Nigeria, and adjacent mangrove areas in Cameroon, form another large tropical wetland complex where only very limited waterbird counts have been undertaken. Countries that have little published information available about their waterbirds, and where recent surveys are non-existent or very limited include Angola, the Central African Republic, Democratic Republic of Congo, Equatorial Guinea, northern Mozambique, Somalia and Yemen.

Difficulties in conducting surveys at some very large and complex sites, especially some of the vast and remote intertidal areas and floodplains in Africa, limit the quality of count data that are available. The Banc d’Arguin in Mauritania is a National Park 12,000 sq km in extent which includes 500 sq.km of intertidal mudflats. In the region covered by this Atlas, only the Wadden Sea holds higher numbers of waders. The site is very large and very remote, and despite annual scientific expeditions in recent years, the counts of Palearctic migrant waterbirds have been more or less complete on only six occasions between 1979 and 2001. Obtaining a comprehensive count of waders at the Banc d’Arguin takes approximately 120 man-days, and expeditions have usually accomplished this over a period of three to four weeks. Counting 2.5 million waterbirds (nearly all of them waders) of over 40 species occurring in mixed flocks often tens of thousands strong over a period of weeks is very challenging, and errors in the final totals are unavoidable. Almost 100% of the Dunlin *Calidris alpina* that breed in Iceland (*schinzii*) and Greenland (*arctica*) winter at the Banc d’Arguin, and the population estimate of Icelandic *schinzii* is completely dependent on the quality of counts at this one site. An estimated two-thirds (66%) of the East Atlantic flyway population of *taymyrensis* Bar-tailed Godwit *Limosa lapponica* winter at the Banc d’Arguin, as do 60% of the nominate subspecies of Red Knot *Calidris canutus*, and the quality of the estimates of these populations is also strongly limited by the challenges of counting this site. The Banc d'Arguin is a special and unique case, but similar difficulties exist on a smaller scale at sites such as the Bijagos Archipelago in Guinea-Bissau, Barr al Hikman in Oman and the Sivash in Ukraine. Aerial surveys have been successfully used, especially at sites such as the Inner Niger Delta and Lake Chad in West Africa, but this method poses its own challenges, particularly as small waders are usually impossible to identify from the air.

Even in some of parts of Europe, there remains a need for basic survey work. More information is required on the densities of breeding species of waders in the tundra and taiga zones of Northern Europe and Asia, to enable the identification of more areas with high densities of dispersed species. There are also still large gaps in knowledge of the moulting areas of some species in Northern Europe.

Despite the considerable amount of bird ringing which has been carried out in parts of Western Eurasia and Africa, knowledge of the migration patterns of many species and populations of waders remains incomplete. This is particularly the case with many Afrotropical species, the movements of which are still poorly understood. This could be partly remedied by more comprehensive analysis of existing ringing data, since much of the information derived from the recoveries of ringed birds has not yet been analysed and remains difficult of access. There is also a need for more ringing programmes, and for making information available about the significance of recovered bird rings. Public awareness campaigns could improve the effectiveness of ringing programmes by increasing ring recovery rates.

7. Key Sites

Key sites and the establishment of networks of protected areas

The continued survival of many migratory species of waders in Western Eurasia and Africa is dependent on the protection and conservation of a network of wetland sites which are of critical importance as breeding, moulting, staging or wintering areas. In many parts of the region, some types of natural wetland ecosystems have now all but disappeared outside of protected areas. This is particularly the case with reed-bed ecosystems and natural flood meadows in parts of Western Europe, and spring-fed marshes and shallow freshwater lakes in parts of North Africa and South-west Asia. It seems likely that within the next two to three decades, many species of waders in Western Eurasia and Africa will, at certain times of the year, have become almost confined to protected areas where they can find adequate natural foods, secure nesting and roosting sites, and freedom from persecution. This is already the case in some countries, as for example for breeding Black-tailed Godwit *Limosa limosa* and Ruff *Philomachus pugnax* in the UK.

Various migration strategies can be observed among the waders. During the course of their migrations, most long-distance migrants need to break their journey, often at several points, to renew their fat and protein reserves. Three principal strategies for this have been identified among Arctic-nesting waders, "hopping", "skipping" and "jumping", where birds break their flight into short, medium-length or long journeys (Piersma 1987). The presence of suitable staging areas with abundant food resources is thus of crucial importance. Some species use only a very small number of sites, probably because of their highly specialised feeding and habitat requirements. These sites may be extremely important, as it seems that in many cases no other suitable staging areas are available. Thus, the loss or degradation of even one of these sites could have serious consequences for the population concerned.

The final staging area during the spring migration can be of crucial importance, especially for species breeding in the high Arctic (Schekkerman *et al.* 2003, Meltofte *et al.* 2007)). When these birds arrive on the tundra, feeding conditions may be poor, and the extra energy reserves obtained at the last staging area may prove vital in helping them to overcome this initial unfavourable period. At some staging sites the turnover rate may be very high, and thus the total number of birds using the site during the course of a migration season may be much higher than the number of birds present at any one time.

The period of moult, especially wing moult, is a critical time in the annual cycle of waders. Food requirements are high because of increased energy demand for thermo-regulation and feather growth. There is also an increased risk of predation because of decreased manoeuvrability in flight. It is therefore likely that many species will have special habitat requirements during the moulting period, related to feeding conditions and safety from predators. In a number of species of waders, large numbers of birds concentrate at a few favoured localities for the wing moult. At this time, the birds are extremely vulnerable to disturbance, over-exploitation and man-made catastrophes. Thus, sites with large concentrations of moulting waders have an added importance.

Whether or not migratory populations of waders will thrive will depend on the effectiveness of the protected area networks in providing a "green route" from breeding grounds to wintering areas via a chain of protected wetlands which can serve as moulting and staging areas. The concept that countries should work together to conserve areas that are important for the same populations of migratory species but at different times of the year is fundamental to the Agreement on the Conservation of African-Eurasian Migratory Waterbirds (AEWA). Thus, the establishment of an adequate network of protected areas to ensure the survival of migratory populations of waterbirds is a basic requirement of this Agreement. Range States should work together with international conservation bodies and funding agencies to provide funds for the acquisition and protection of critical wetland areas, to prepare and implement management plans for these wetland reserves, and to restore degraded wetlands to their natural condition whenever possible.

Ideally, all wetlands of international importance for species of waders should be safeguarded. In some cases, because of the fragility of the ecosystem or its high importance for threatened species, strict protection may be necessary in the form of a nature reserve or wildlife sanctuary. Designation under the Ramsar Convention might also provide an effective level of protection, and would ensure that the site receives the international attention that it deserves. Designation under the Ramsar Convention does not preclude the use of wetland resources at these sites. In many countries in Africa and South-west Asia, the best arguments for wetland conservation relate to the high economic values of wetlands and the potential for sustainable exploitation of their natural resources that may include the migratory waterbirds.

There are a large number of wetland reserves in Western Eurasia and Africa, although the protection offered is variable in its scope and effectiveness in different countries. The effectiveness of these reserves in protecting a coherent network of breeding, staging and wintering areas for the region's waders has never been assessed, although such an assessment has been undertaken at national level in the UK (Jackson *et al.* 2004) and probably in some other European countries. One of the aims of the present Atlas has been to determine the extent to which the various populations of waders in Western Eurasia and Africa are protected within existing reserves, and thereby to assist in the identification of priorities for the establishment of further reserves.

Count coverage

Figure 2 maps all the sites from which some count data were available for this Atlas, and which could therefore be considered in the identification of key sites. A majority of these are sites covered by the International Waterbird Census (IWC) and Important Bird Area (IBA) programmes, but the maps also include all sites from which count data have been extracted in a wide variety of published and unpublished sources.

Coverage of sites for the Atlas is rather complete for much of Northern, Western and Central Europe, with the reduced density of sites in Eastern Europe and much of Fenno-Scandia being due to winter freezing, which excludes sites from IWC surveys because they take place in January. Most of the data for wader populations breeding or staging at sites in these regions which are frozen in January originated from the World Bird database and various published sources. In remote parts of Eastern Europe, most of Western and Central Siberia and Central and South-west Asia, breeding and staging sites for waders have been incompletely surveyed, and many key sites important at these stages of the life cycle probably remain unidentified. Central and South-west Asia have been well covered by the IWC in winter and the IBA programme has been active in this region in recent years, with Central Asia in particular having benefited from work in relation to the developing Central Asian Flyway initiative and IBA programme. Many sites in South-west Asia have not been counted in recent years, and in this region in the early years of the 21st century, only Iran, Israel and Jordan have coordinated an extensive census every year.

Count coverage has been less comprehensive in Africa but most of the important sites and countries have been included in surveys in recent years. Tunisia, Algeria and Morocco are now fully included in IWC surveys, and Libya, for which data are not yet included in the Atlas, has been counted since 2005. All these countries obtain good coverage of coastal sites, but have difficulty counting the very remote inland sites. Egypt is the most incompletely covered country in North Africa and has only been extensively surveyed by occasional expeditions. The Sahara desert has little suitable habitat for waders away from the coast and there are few sites suitable for waterbirds in this huge region. A notable exception is the Banc d'Arguin on the north coast of Mauritania, which is one of the most important sites for waders in the world. The Sahel zone south of the Sahara includes many crucial sites for waders in Mauritania, Senegal, Gambia, Mali, Burkina Faso, Nigeria, Niger and Chad, and aerial surveys of the extensive floodplains have been conducted as well as ground-based counts of many sites. Obtaining consistent coverage is problematic in this region because of the very variable extent of flooding in different years.

Further east, coverage in Sudan has been patchy, and the Sudd, a 350 km long swamp along the River Nile in the south of the country has still not been extensively surveyed. In Eastern Africa there remain many gaps in coverage of the waterbird counts, but the most important sites, especially those in the Rift Valley lakes and on the coast, have been included in surveys. Eastern Ethiopia and the whole of Somalia form a very extensive gap in coverage by waterbird counts. Apart from coastal sites, there has been little coverage in the forest belt of the Gulf of Guinea and the Congo Basin, but large concentrations of waders do not normally occur in these habitats and only a few species with dispersed distributions are found here in any numbers. The mangroves along the coast of Nigeria have not been surveyed and may hold high numbers of waders in the northern winter. Coverage of the waterbird counts in Southern Africa has been extensive, with the biggest gaps in coverage having been in Angola and northern Mozambique. Several extremely extensive floodplain and pan systems such as Kafue Flats in Zambia, and the Etosha, Okavango and Makgadikgadi systems in Namibia and Botswana are impossible to cover consistently or frequently, and their full importance for waterbirds has probably yet to be recognised. Several of Africa's oceanic islands have been surveyed for waders. Much of the necessary baseline survey work has thus been done in Africa, and the need now (as in much of South-west and Central Asia) is for more consistent and standardised counts on a more frequent and regular basis.

Key sites for waders in the AEWA region

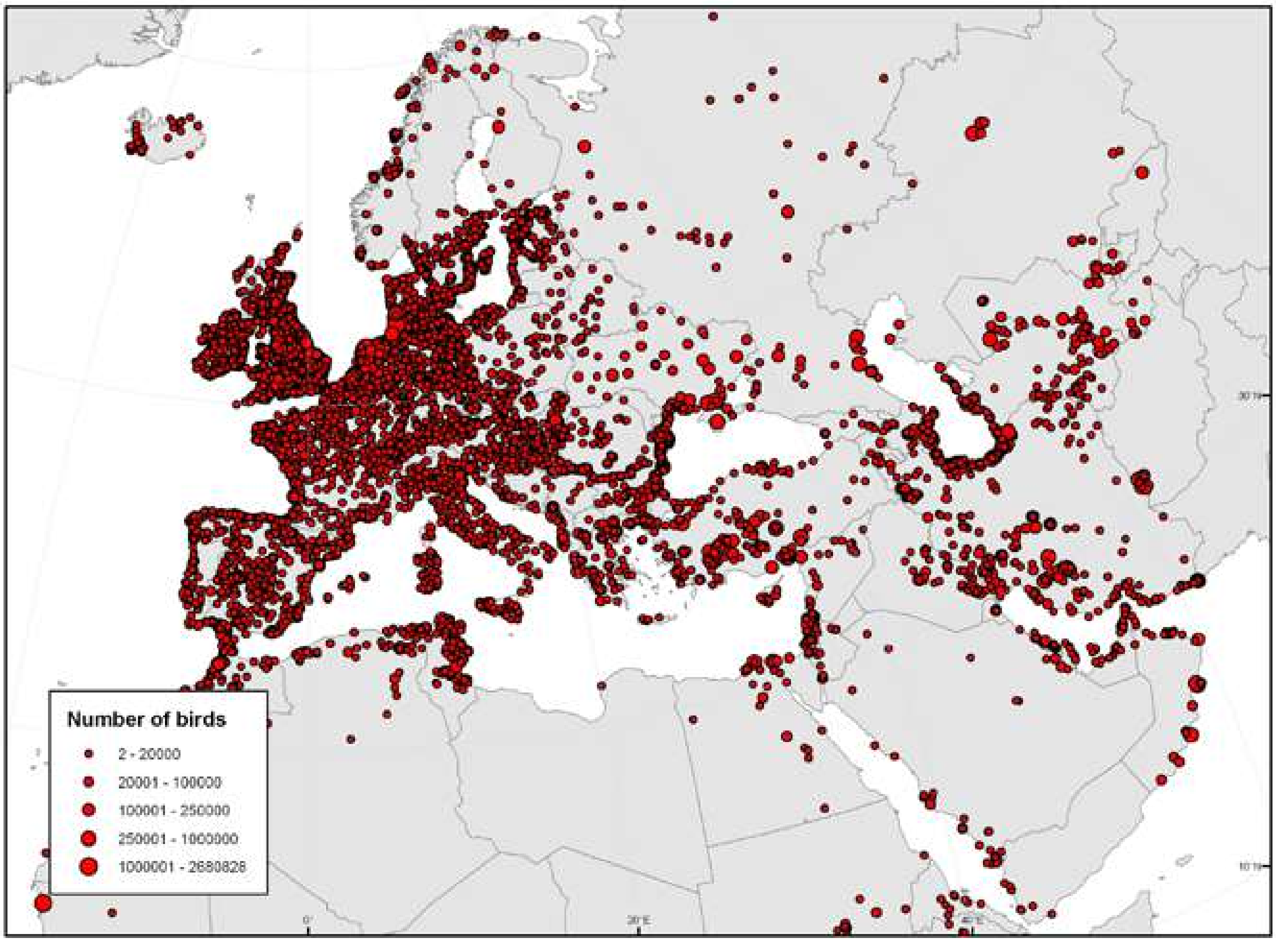
Figure 3 maps all sites that qualify as key sites because one or more populations of waders have been recorded in numbers exceeding 1% of the population estimate. The sites are also listed in **Annex 1** with details of the species found there. The 68 sites at which more than five species have been recorded in internationally important numbers are also listed in Table 2, and the 112 sites where the maximum counts of waders total more than 40,000 are listed in Table 3.

Key sites on the East Atlantic Flyway

Figure 3 shows that the highest density of key sites for waders in the AEWA region is found in the East Atlantic Flyway on the western seaboard of Europe, stretching from the Wadden Sea of Denmark, Germany and The Netherlands, through the delta of the Rhine, Meuse and Scheldt and along the coast of Belgium to the numerous estuaries around the shores of the UK, Ireland, and northern and western France. The East Atlantic Flyway continues through Iberia with important sites in the estuaries of Portugal, and a cluster of sites along the Gulf of Cádiz and south into Morocco. Further high densities of key sites on the East Atlantic Flyway are found on the coast of West Africa in Mauritania, Senegal, Gambia, Guinea-Bissau and Guinea, between the Banc d'Arguin and the Bijagos Archipelago key sites. Further high densities of key sites on this flyway are found in the coastal lagoons of Ghana and estuaries of Gabon and along the coasts of Namibia and western and southern South Africa.

Over half of the sites that have recorded more than five wader species in internationally important numbers (Table 2) are on the East Atlantic Flyway in Europe. The Danish-German-Dutch Wadden Sea is the most important of these, and because it is divided into four "sites" for the purposes of analysis, its position as the most important site for waders in the AEWA region is not immediately apparent in the tables. If the Wadden Sea is taken as a whole, 17 wader species have been recorded in numbers exceeding their 1% threshold. The Dutch and German (Schleswig Holstein) sections have each recorded 16 species at this level, but in Schleswig Holstein, compared with The Netherlands, an additional species, Curlew Sandpiper *Calidris ferruginea* replaces Black-tailed Godwit *Limosa limosa* on the list of internationally important species. Similarly, if the total number of birds recorded in the four sections of the Wadden Sea are summed, the site emerges as holding nearly twice as many waders as the next most important site, the Banc d'Arguin in Mauritania (Table 3).

Many more sites on the East Atlantic flyway have held



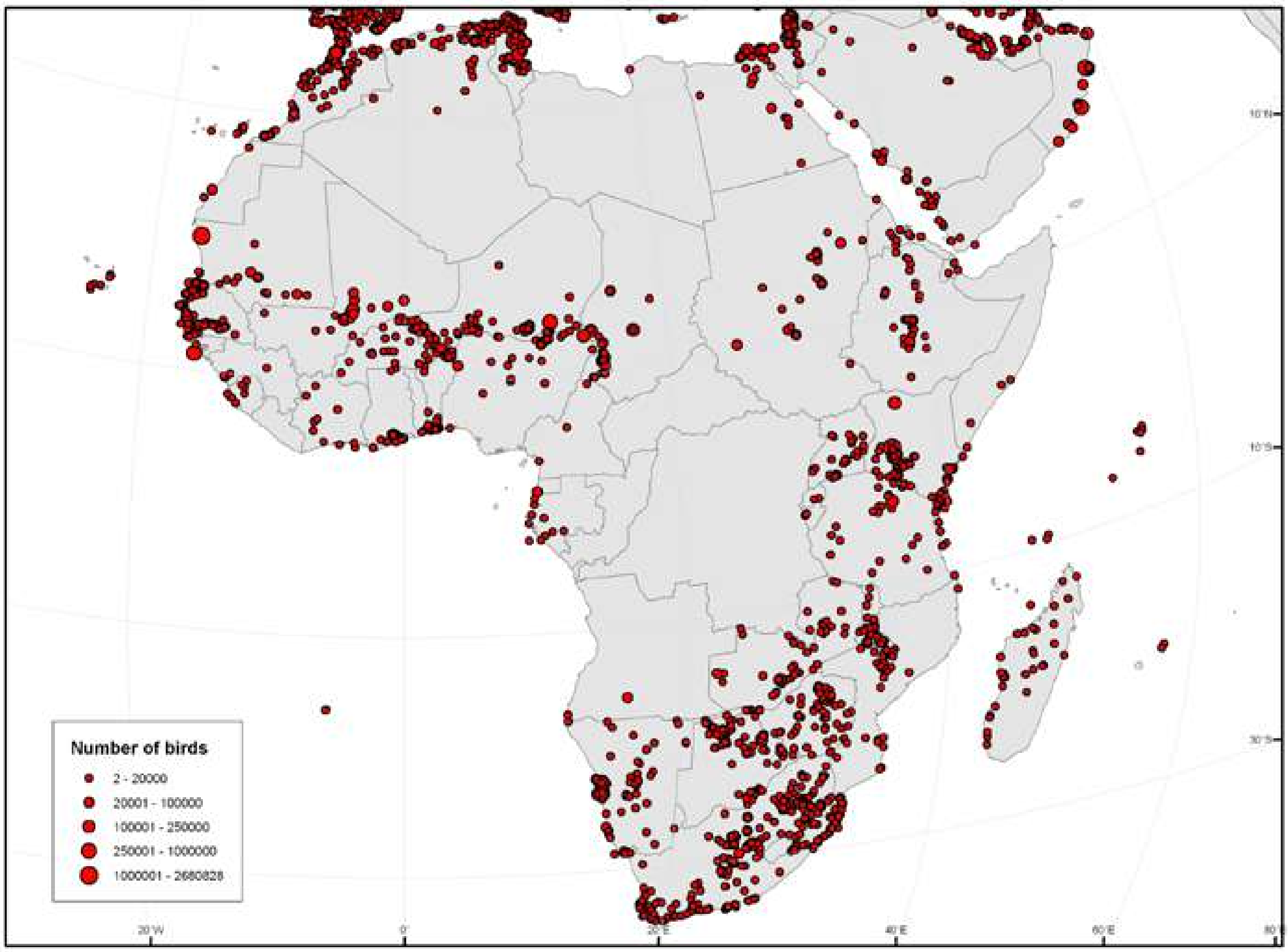
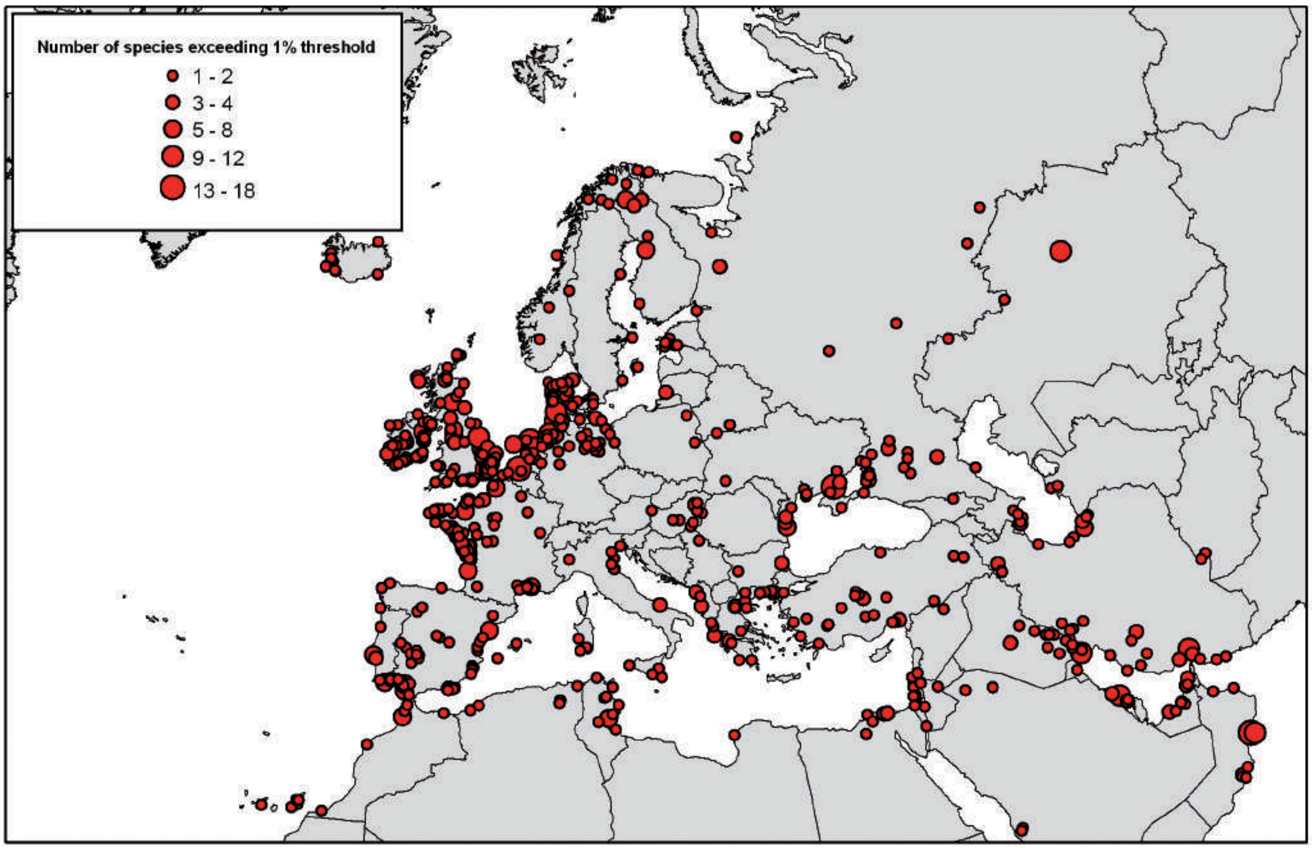


Figure 2. Sites from which count data were available for this Atlas



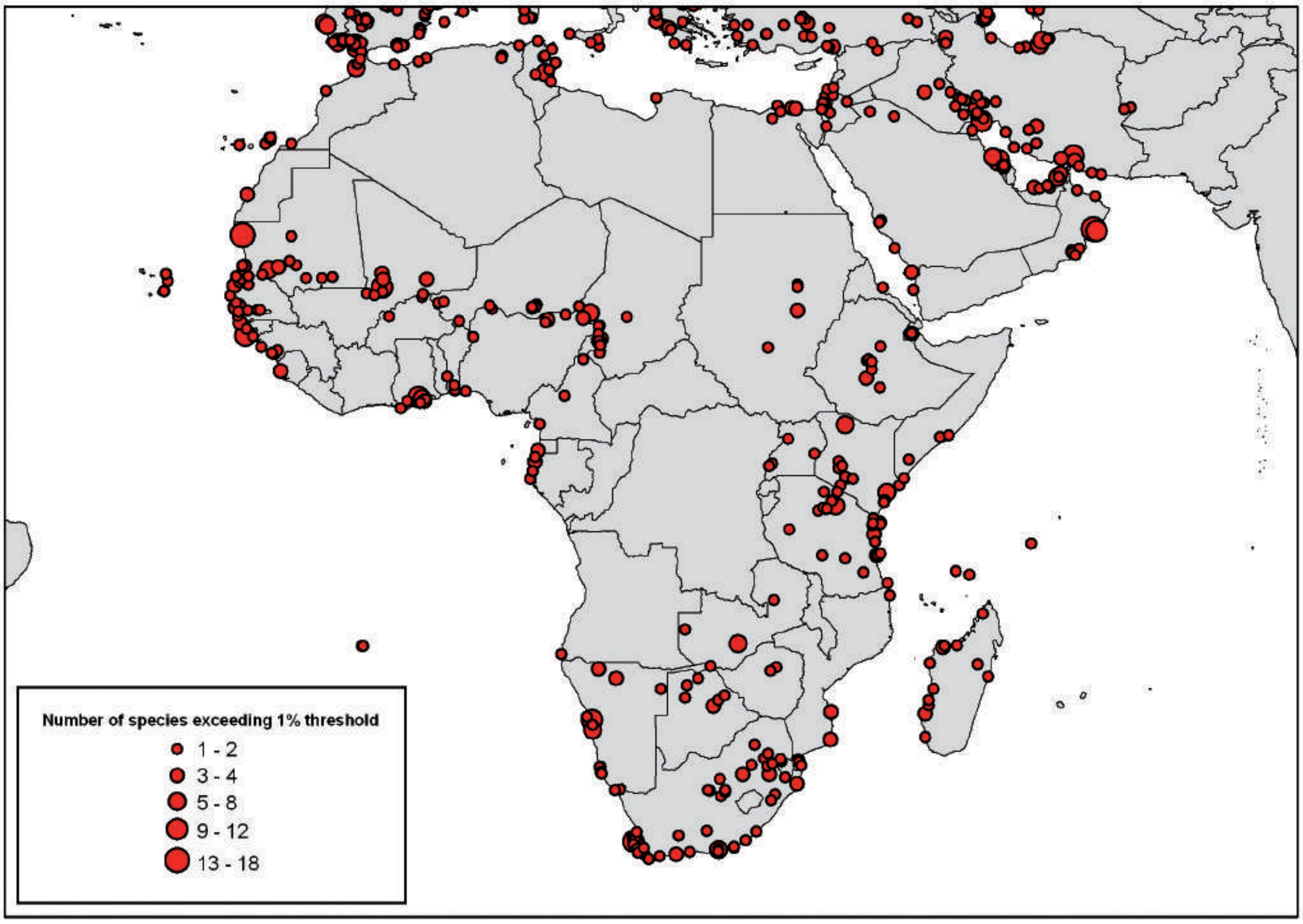


Figure 3. Key sites for Waders in the AEWA region

five or more wader species in internationally important numbers. Two sites in boreal northern Finland are important breeding areas for waders, holding five or six species in numbers exceeding 1% thresholds, and a third site, Oulu region wetlands, holds huge numbers of seven species on migration. The importance of the Wadden Sea has been outlined, and less than 100 km to its south in The Netherlands, the delta of the Rhine, Meuse and Scheldt rivers forms another site of outstanding importance where 16 species have been recorded in internationally important numbers and peak counts add up to more than half a million waders. In the UK, 13 estuaries have held more than five wader species in internationally important numbers, as have two in Ireland and nine in France. The most important of these are all on the English North Sea coast where The Wash, the Thames Estuary and the Humber Estuary held 11, 10 and nine species, respectively, in these numbers. Further south, the estuaries of Faro, Tejo and Sado in Portugal, Spain's Coto Doñana and Cádiz Bay and Merja Zerga in Morocco have all recorded five or more species in numbers exceeding their 1% thresholds.

Nine sites in Africa complete the list of key sites for waders on the East Atlantic Flyway where five or more species have been recorded in numbers exceeding the 1% level for international importance. Of these, The Banc d'Arguin in Mauritania and Bijagos Archipelago in Guinea-Bissau hold the most species (15 and 12 respectively) and the highest numbers of waders. In Ghana, the Keta Lagoon complex, with 10 internationally important wader species and the Saloum National Park in Senegal with eight are also extremely important. The southern limits of the East Atlantic Flyway are marked by two neighbouring sites in Namibia, Walvis Bay and Sandwich Harbour, and two sites in South Africa, West Coast National Park and Zwartkops River Estuary.

Key sites on the Black Sea/Mediterranean Flyway

The Black Sea/Mediterranean Flyway includes fewer key sites at lower density than the East Atlantic Flyway (Figure 3). Sites on the east coast of Spain are included in the Black Sea/Mediterranean Flyway, as are clusters of sites in southern France, Italy and Tunisia. In the East Mediterranean, there are important groups of key sites in Greece, Turkey, Israel and Egypt. Further north are the Sivash and the Danube Delta complexes, sites of outstanding importance on the north and west shores of the Black Sea respectively, and a cluster of sites in Hungary important as staging sites for a few wader species on migration. The wetlands of the Sahel zone in West Africa are the final destination of large numbers of birds in the Black Sea/ Mediterranean Flyway, forming a chain of key sites stretching from Mauritania to Chad.

Table 2 shows that counts of five or more wader species have exceeded 1% thresholds at 12 sites in this flyway. The Sivash on the Black Sea is one of the world's most important sites for waders, and in the region covered by this Atlas only Barr Al Hikman in Oman has recorded a higher diversity of wader species in internationally important numbers, and only the Wadden Sea and the Banc d'Arguin regularly record higher numbers of waders overall (Table 3). Like the Sivash, the Danube Delta and adjacent Razim-Sinoie lagoon complex in Romania are most important for waders during the migration seasons. Further south and west on the Mediterranean coast, the Camargue in France, Lucios de Veta La Palma and Ebro Delta in Spain and Gulf of Gabès in Tunisia have all recorded between six and eight wader species in internationally important numbers. Three sites in Africa complete the list of sites on the Black Sea/ Mediterranean flyway that have held more than five species of wader in internationally important numbers: Lac d'Aleg in Mauritania, the Inner Niger Delta in Mali, and Djoudj National Park in Senegal.

Key sites on the West Asia/East Africa Flyway

The West Asia/East Africa Flyway overlaps with the Black Sea/Mediterranean Flyway in the Black Sea region and a cluster of important staging sites for waders in southern Russia north of the Caucasus is also shared between these two flyways. Figure 3 shows that there are a number of key sites for waders in this flyway. Key sites on the Caspian coasts of Azerbaijan and Iran are most important as staging areas, while further south a number of key sites grouped around the Persian Gulf and inland in the Iraqi marshlands are important both as staging areas and wintering areas. Barr al Hikman on the south-east coast of the Arabian Peninsula in Oman has recorded counts of 18 species exceeding the 1% threshold for international importance, making it the most important single site for waders in the entire AEWA region in terms of the number of species for which it is internationally important. It should be mentioned that at Barr al Hikman, Pied Avocet has only been recorded in numbers exceeding the 1% threshold on one occasion, and the Critically Endangered Slender-billed Curlew is included on the basis of records as long ago as 1990, so that 16 species are nowadays recorded regularly in internationally important numbers. In East Africa, key sites for waders are mostly grouped along the Great Rift Valley of Ethiopia, Kenya and Tanzania, and on the coasts of the latter two countries. In Southern Africa, many key sites for waders are at inland floodplain and pan complexes. There are eight key sites for waders on the west coast of Madagascar but the coasts of Mozambique and South Africa appear to include rather few key sites for waders, although the coast of Mozambique has not been fully surveyed.

The West Asia/East Africa Flyway supports 11 sites where counts of five or more wader species have exceeded 1% thresholds (Table 2). At the top of the list, with 18 species is Barr Al Hikman in Oman. This site benefits from extensive, high quality habitats in a relatively undisturbed and very remote location, and is at about the same latitude as another extremely important site for waders during the boreal winter that is comparable in many ways, the Banc d'Arguin in Mauritania. The site is likely to hold even higher numbers of waders during the migration seasons, but comprehensive counts in these seasons have not yet been organised. The full importance of Barr Al Hikman as a site for waders is so far unrecognised and the site is not included in the five sites in Oman which enjoy international recognition under the World Heritage Convention or the six sites with various national designations as protected areas. Oman is not a signatory to either the Ramsar Convention or AEWA.

A total of nine further sites on the West Asia/East Africa Flyway have held five or more wader species in internationally important numbers. These include Masirah Island, adjacent to Barr al Hikman in Oman. On the Persian Gulf coast, four sites have recorded five or more wader species in numbers exceeding the 1% thresholds: the Shadegan Marshes complex in Iran, Tarut Bay and Sabkhat al-Fasl in Saudi Arabia and Khor Dubai in UAE. Miankaleh Peninsula on the Caspian coast of Iran is internationally important for six species of wader. Four sites in Africa complete the list of sites on the West Asia/East Africa flyway that have held more than five species of wader in internationally important numbers: Lake Turkana and Lake Manyara in the Rift Valley of Kenya and Tanzania respectively, the Tana River Delta on the coast of Kenya, and

Table 2 Sites holding the highest numbers of wader species in internationally important numbers

Country	Site name	Number species exceeding 1% Threshold
Oman	Barr Al Hikman	18
Ukraine	The Sivash, Sea of Azov	17
Germany	Wadden Sea - Schleswig-Holstein	16
Netherlands	Rhine-Maas-Schelde Delta	16
Netherlands	Wadden Sea - The Netherlands	16
Mauritania	Banc d'Arguin	15
Germany	Wadden Sea - Lower Saxony	14
Denmark	Wadden Sea - Denmark	12
Guinea-Bissau	Bijagos Archipelago	12
Kazakhstan	Tengiz-Korgalzhyn Lakes	11
U.K.	The Wash	11
U.K.	Thames Estuary	11
Ghana	Keta Lagoon complex	10
Saudi Arabia	Tarut Bay	10
Mali	Inner Niger Delta	9
Namibia	Walvis Bay Ramsar Site	9
Oman	Masirah Island	9
U.K.	Humber Estuary	9
Namibia	Sandwich Harbour	8
Portugal	Ria De Faro	8
Senegal	Parc National du Delta du Saloum	8
Spain	Lucios De Beta La Palma-Isla Mayor (Se)	8
Spain	Parque Nacional de Doñana	8
U.K.	Morecambe Bay	8
U.K.	Ribble Estuary	8
Finland	Oulu Region Wetlands	7
France	Bassin d'Arcachon et Banc d'Arguin	7
France	Ile de Re	7
France	Résèrve Naturelle de Moeze (Charente-Seudre)	7
Iran	Shadegan Marshes, Khor-al Amaya and Khor Musa	7
Morocco	Merja Zerga: Kenitra	7
Portugal	Estuário Do Tejo	7
Senegal	Parc National des Oiseaux de Djoudj	7
South Africa	West Coast National Park	7
Spain	Cádiz Bay	7
Spain	Delta Del Ebro	7
Tunisia	Gulf of Gabès	7
U.K.	Blackwater Estuary	7
Zambia	Kafue Flats	7
Finland	Lemmenjoki-Hammastunturi-Pulju	6
France	Baie de Bourgneuf et Noirmoutier	6
France	Baie du Mont Saint Michel	6
France	Camargue	6
France	Littoral Picard	6
Iran	Miankaleh Peninsula & Gorgan Bay	6
Ireland	Dundalk Bay	6
Ireland	Shannon and Fergus Estuary	6
Kenya	Lake Turkana	6
Mauritania	Lac d'Aleg	6
Romania	Danube delta	6
Romania	Razim-Sinoie Lagoons	6
Tanzania	Lake Manyara National Park	6
U.K.	Dee Estuary	6
U.K.	Forth Estuary	6
Finland	Saariselkä and Koilliskaira	5
France	Baie de l'Aiguillon et Pointe d'Arçay	5
France	Golfe du Morbihan	5
France	Marais Poitevin et Baie de l'Aiguillon	5
Kenya	Tana River Delta	5
Portugal	Estuário Do Sado	5
Saudi Arabia	Sabkhat al-Fasl Lagoons	5
South Africa	Zwartkops River Estuary	5
U.A.E.	Khor Dubai	5
U.K.	Medway Estuary	5
U.K.	North Norfolk Coast	5
U.K.	Solway Estuary	5
U.K.	Stour Estuary	5

Kafue Flats in Zambia.

Four of the sites listed in Table 3 are of very high importance for one species, Red-necked Phalarope *Phalaropus lobatus*, which gathers in enormous concentrations on migration and at sea. These sites are Tengiz Lake in Kazakhstan, where up to 600,000 have been counted on migration, the Manych–Gudilo lakes in Russia, Lake Maharlu in Iran, and the Arabian Sea off Oman, where over a million have been recorded during the northern winter.

8. Future developments

Existing waterbird counting and ringing programmes have achieved a great deal and continue to improve, but there is a need for more thorough and complete analyses of existing datasets and for collection of more detailed data at more sites. The population dynamics of waders are sensitive to factors operating in all parts of their annual cycle and geographic range. An understanding of the underlying demographic processes is essential if we want to understand what causes population change. There is a need to develop and implement methods for systematic measurement of demographic parameters – recruitment, survival, emigration and immigration – in wader populations. Changes at one site cannot be viewed in isolation, but need to be considered at the scale of entire flyways, which will make it necessary to analyse population responses at multiple sites and in different species in a coherent way. Population-scale monitoring of populations will allow shifts in distribution to be distinguished from changes in numbers. Monitoring at the scale of populations will also allow a more comprehensive network of sites used by each species for breeding, staging, moulting and surviving the non-breeding season to be identified. Modern methods including satellite telemetry, genetic and stable isotope techniques will play a part in producing more detailed, precise and accurate analyses of wader populations.

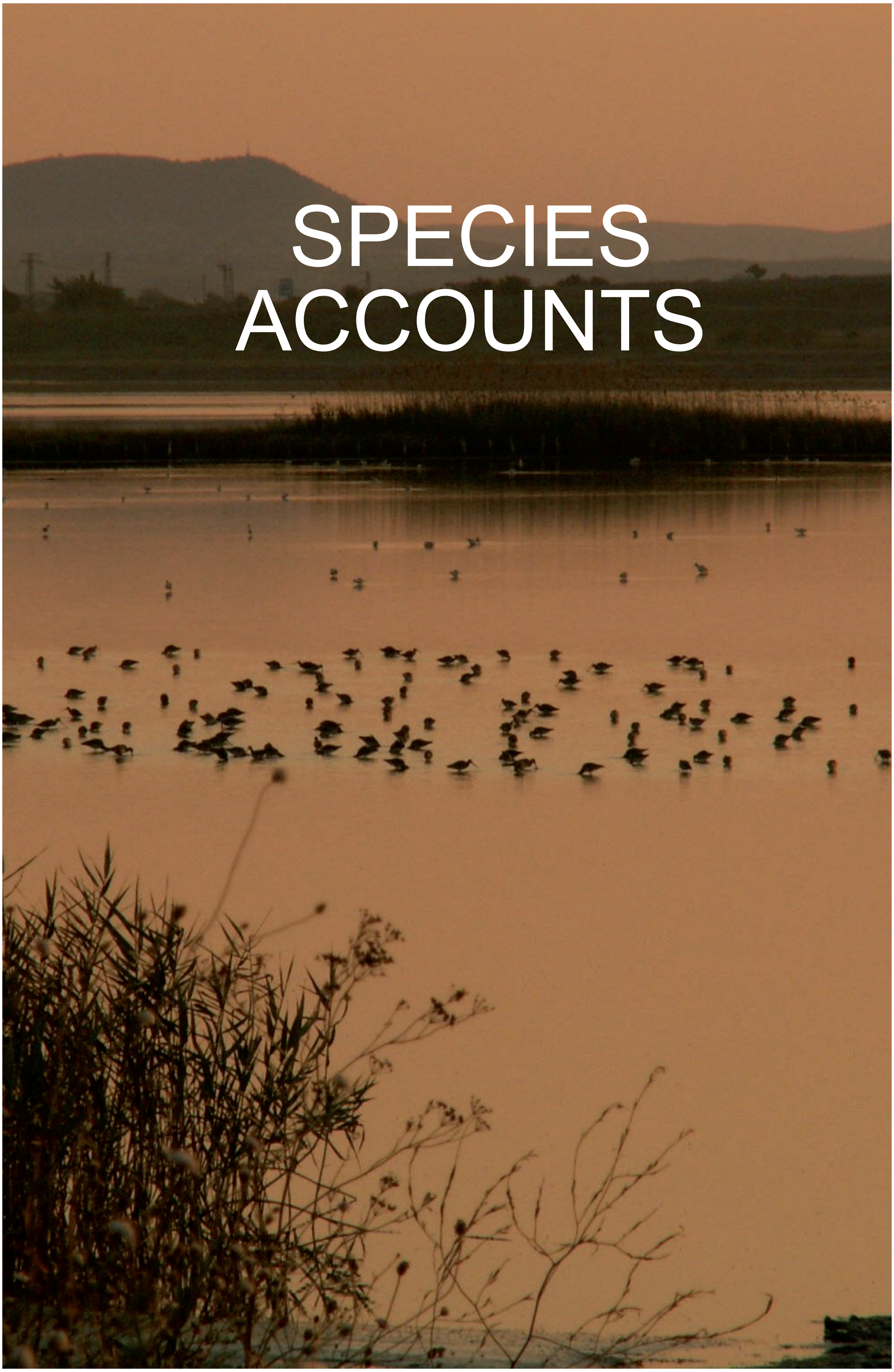
The great strength of the flyway approach to waterbird conservation is the promotion and support of networks of linkages between sites, species, and the ecological interactions that support them. Networks connect these biogeographic phenomena to people, through those whose livelihoods depend on the sites in the networks, and organisations pursuing the goals of conservation and sustainable management of sites and species. Livelihood support and sustainable development benefit local people and also habitat protection, for example through development of sustainable fisheries, grazing and regulated hunting. The inclusion of large numbers of countries in flyway agreements such as AEWA ensures that affluent countries are able to support nature conservation and sustainable development in developing and transition countries.

Table 3 Sites where more than 40,000 waders have been recorded

Totals were compiled for purposes of comparison only. They include the maximum count of each species at the site, regardless of season or year, and therefore generally over-estimate the number of waders to be found at the site at any one time.

Country	Site name	nBirds
Mauritania	Banc d'Arguin	2,358,322
Netherlands	Wadden Sea - The Netherlands	1,445,024
Germany	Wadden Sea - Schleswig-Holstein	1,298,533
Oman	Arabian Sea off Oman	1,000,000
Ukraine	The Sivash, Azov Sea	912,438
Kazakhstan	Tengiz-Korgalzhyn Lakes	906,677
Germany	Wadden Sea - Lower Saxony	790,807
Guinea-Bissau	Bijagos Archipelago	691,500
Senegal	Parc National des Oiseaux de Djoudj	546,436
Netherlands	Rhine-Maas-Schelde Delta	507,771
Denmark	Wadden Sea - Denmark	448,590
Oman	Barr Al Hikman	391,723
U.K.	The Wash	381,251
Mali	Inner Niger Delta	355,326
U.K.	Morecambe Bay	303,748
Chad/ Cameroon/ Nigeria/Niger	Lake Chad	262,457
Hungary	Hortobagy	241,000
Morocco	Merja Zerga: Kenitra	228,263
U.K.	Ribble Estuary	222,666
Senegal	Ndiael	217,159
Russia	Veselovsky Rice Field	215,000
Netherlands	Friesland Province	214,075
Tunisia	Gulf of Gabès	210,023
U.K.	Humber Estuary	200,279
U.K.	Thames Estuary	197,138
U.K.	Lindisfarne	191,627
Russia	Suskanski Nature Reserve	180,000
France	Marais Poitevin et Baie de l'Aiguillon	153,177
Tanzania	Lake Manyara National Park	143,830
Kenya	Lake Turkana	142,630
Spain	Lucios De Beta La Palma-Isla Mayor	142,065
Namibia	Walvis Bay Ramsar Site	140,396
Zambia	Kafue Flats	135,450
France	Bassin d'Arcachon et Banc d'Arguin	133,171
Russia	Zaonezh'ye	124,803
Finland	Oulu Region Wetlands	118,000
Portugal	Estuário Do Tejo	110,449
France	Baie du Mont Saint Michel	105,869
Germany	Lower Rhine	101,310
Iran	Lake Maharlu	100,000
Zambia	Liuwa Plains National Park	100,000
Kazakhstan	Tengiz - Korgalzhin lakes	99,751
Namibia	Sandwich Harbour	99,740
U.K.	Solway Estuary	98,732
Denmark	North-western Kattegat	98,216
France	Camargue	96,577
U.K.	Alt Estuary	94,298
Netherlands	Noord Holland Province	93,884
Senegal	Parc National du Delta du Saloum	91,686
U.K.	Dee Estuary	91,420
U.K.	Mersey Estuary	90,936
Romania	Danube delta	89,875
Finland	Lemmenjoki-Hammastunturi-Pulju	87,183
Ireland	Dundalk Bay	82,456
U.K.	North Norfolk Coast	81,923
Nigeria	Hadejia-Nguru	81,383
France	Résèrve Naturelle de Moeze (Charente-Seudre)	77,630
Romania	Razim-Sinoie Lagoons	75,227
U.K.	Somerset Levels	74,241
France	Etangs de la Brenne	73,027
Ireland	Shannon and Fergus Estuary	72,544
Portugal	Estuário Do Sado	71,245
Ghana	Keta Lagoon complex	70,907
France	Ile d'Oléron, marais de Brouage-Saint-Agnant	67,579
Morocco	Baie D'Ad Dakhla	67,385
Bulgaria	Bourgas Bay	66,845
Norway	Inner part of Porsanger fjord	65,500
U.K.	Strangford Lough	65,333
U.K.	Blackwater Estuary	64,946
U.K.	Medway Estuary	64,434
Spain	Parque Nacional de Doñana	62,347
France	Baie de l'Aiguillon et Pointe d'Arçay	61,523
Mali	Timisobo--Képagou	61,000
Netherlands	Groningen Province	59,565
Spain	Delta Del Ebro	59,493
U.K.	Severn Estuary	58,962
U.K.	Swale Estuary	58,626
U.K.	Forth Estuary	57,477
France	Littoral Picard	57,234
France	Côtes Nord et Ouest de l'Ile d'Oleron	54,332
Portugal	Ria De Faro	53,813
Nigeria	Niger: Gaya-Kainji dam	52,016
U.K.	Burry Inlet	51,116
France	Baie des Veys	50,391
France	Confluent des vallées de la Meuse et de la Chiers	50,000
Russia	Burukshunskiye limans	50,000
Russia	Manych-Gudilo lakes	50,000
Ireland	Wexford Harbour and Slobs	49,706
Guinea-Bissau	Rio Mansôa and Gêba estuary	49,500
Iran	Lake Uromiyeh	49,413
France	Estuaire Seine	48,412
U.K.	Breydon Water and Berney Marshes	48,382
Egypt	Lake Manzala	48,166
U.K.	Stour Estuary	48,073
U.K.	Chichester Harbour	48,042
Ireland	Cork Harbour	47,763
U.K.	Langstone Harbour	47,643
Sierra Leone	Yawri Bay	47,137
Ethiopia	Lake Abijatta	46,753
Finland	Saariselkä and Koilliskaira	46,650
Chad	Bas-Chari	46,507
Lithuania	Nemunas river delta	46,500
Spain	Marisma De Hinojos	46,490
U.K.	Moray Basin, Firths and Bays	45,540
France	Baie de Bourgneuf et Noirmoutier	44,990
France	Golfe du Morbihan	42,540
U.K.	Duddon Estuary	42,294
Italy	Laguna Di Venezia	42,124
Italy	Laguna Di Grado E Marano	41,196

SPECIES ACCOUNTS



Nicky Petkov


Boris Belchev

Species Accounts, Maps and Tables

Species accounts

The species accounts include information under the following headings:

Geographical variation and distribution: A brief description of the recognised subspecies and world range of the species, with special emphasis on its distribution within Western Eurasia and Africa.

Movements: Information on the movements of the species in Western Eurasia and Africa, summarised from ringing and migration studies. This information has been taken from the existing published literature, and no attempt has been made to undertake new analyses of ringing results.

Population limits: A description of the “biogeographic populations” into which the species is divided for the purposes of conservation, with justification as far as possible on the basis of known distribution and movements of the species. In many cases, it is accepted that these “populations” overlap extensively with other populations of the species, and are of limited biological usefulness. Justification then rests on the desirability of dividing the individuals in a species or subspecies into geographical units that are of a manageable size for practical conservation purposes, as discussed above.

Population size: An estimate of population size for each of the “populations” identified in the previous section, together with an estimated population trend and the 1% threshold used for identification of key sites for each population. Two types of estimates are presented: those that are considered to be sufficiently reliable to be used in the identification of Ramsar Sites based on the 1% criterion, and those that are not. The latter, usually given in the form of a very broad range, are presented as “best guesses” of population size, and are used to derive a “provisional numerical criterion” for the identification of key sites for this Atlas. Conservative 1% thresholds based on the upper end of presented ranges are given for these provisional estimates. 1% thresholds of populations expressed as more precise ranges are usually derived from the midpoint of the range. The codes used for estimates given in the form of a very broad range are as follows:

A = <10,000 individuals;
B = 10,000-25,000 individuals;
C = 25,000-100,000 individuals;
D = 100,000-1,000,000 individuals;
E = >1,000,000 individuals.

The following abbreviations are used to identify estimated population trends:

INC – Increasing;
STA – Stable;
DEC – Decreasing;
EXT – Extinct.

Conservation status: Discussion of information on trends in the population or populations. For many of the wader populations occurring in Europe and North Africa, trends in numbers over the past twenty years have been well documented. However, in much of South-west Asia and Africa south of the Sahara, only a few years of census data are available. In sub-Saharan Africa, in particular, the existing data on many species and populations are not yet sufficiently consistent to permit precise statements concerning population trends during recent years. In these cases, the remarks on trends have been based on information in the published literature and comments received from Wetland International’s network of contacts active in the region. For most species, this section consists of only one or two paragraphs describing population trends, with appropriate references. However, in the case of globally threatened species and species with small populations which are declining rapidly, some attention is given to threats to the population and possible causes of any decline.

Habitat and ecology: A brief note on habitat preferences, social behaviour, moult, timing of the migrations, and any special features, such as unusual feeding habits, which might be of important in the design and management of a suitable network of reserves.

Network of key sites: A brief appraisal of the value and completeness of the key sites listed, and a summary of the major gaps in coverage.

Protection status of key sites: A summary of the protection status of the key sites listed, and a review of the major gaps in protection.

Maps

For each species, a map is given showing the geographical limits of the populations as identified in the text. Population boundaries are shown as solid lines when they delineate populations that are considered to be discrete or almost so, and dotted lines when they delineate regional assemblages of birds that regularly exchange individuals with adjacent assemblages ("default" populations). Dotted lines are also used when there is a high degree of uncertainty as to where the best dividing line between two adjacent assemblages might be. Thus dotted lines are often used to delineate the main breeding ranges of Palearctic waders when there is known to be a considerable degree of overlap between different "populations" on their breeding grounds. The population limits as shown on the maps indicate the main range of the population in question, and do not necessarily indicate the total range of all the individuals in that population. For clarity, populations of each species are identified by boundary lines in different colours, and the 1% threshold used to identify key sites for each population is given in the key

All key sites are plotted as red dots scaled according to the size of the maximum count of the species at the site. Dot size has been chosen for maximum clarity and the key should be used to identify the number of birds represented by each dot. All known key sites so far identified and selected on the basis of a 1% threshold or a provisional numerical criterion are plotted on the maps. Many of the maps also show a second class of site called "Important IWC counts". These sites are represented by orange dots, again scaled according to the key of the map. These have been shown for any population for which fewer than 25 key sites have been identified, to give an impression of sites which are important for the population, even though counts have not exceeded the 1% threshold. A map which includes no, or very few dots, is indicative of a species which is dispersed at all times of the year, and which tends not to congregate in large numbers at particular sites. Many wader species have dispersed distributions and these species benefit less from site-based conservation measures than the many species which have congregatory habits, at least at certain seasons in their life-cycles. Many of the seven courser and 12 lapwing species which mainly occur in savannah, semi-desert and deciduous woodland habitats in Africa make little or no use of wetlands and hardly feature in waterbird counts.

The maps also show the breeding range and the non-breeding range of each species by means of shaded polygons. Yellow shading represents the breeding range, blue shading the non-breeding range, and green shading (yellow and blue together) indicates regions where a breeding species is thought to be present all year. This information has been derived from a wide range of published sources. Occasional instances where the range of occurrence extends beyond the plotted population boundaries indicate areas of distribution where the population is only an infrequent visitor.

More than one in three of the species considered in the Atlas have populations which breed in the Arctic tundra and boreal zones of Russia and migrate to temperate and tropical regions of Eurasia and Africa outside the breeding season. It is only possible to survey small samples of the vast tracts of wilderness preferred by these species during the breeding season, and maps of breeding ranges in Russia should be regarded as preliminary. Poor access to publications in the Russian language has made this problem worse, and the tendency of some species to occupy different breeding areas in different years is a further complicating factor.

Tables

Full details of the key sites so far identified are listed at the end of each species text. The key site tables in the species accounts give details of country, site name, geographic coordinates and season of the count, followed by the maximum count (the total which qualifies the site as a key site) and the season and the year when the maximum count was recorded. The season listed in the key sites tables is the season when the maximum count was made, and it should be borne in mind that at most sites birds are present in other seasons as well

The tables also list the average count, if this is available, and give a basis for the average. The basis for the average is usually given as the range of years from which the average was taken (e.g. 1998-2005) followed in brackets by the number of years included in the average calculation (e.g. (5)). The preferred basis for average counts is always the most recent five years for which data are available, but at many sites data are only available for two to four years. Finally, the tables list the source of the data presented and the population(s) of the species which use the site.

Key sites are also listed in a separate section at the end of the Atlas (Annex 1). This section repeats the key site data by country rather than by species. For each site, there is a list of all species and biogeographic populations which have been recorded in internationally important numbers (i.e. those which exceed 1% thresholds), with maximum and average counts at the site and source of the data.

List of abbreviations

ABBO Arbeitsgemeinschaft Berlin-Brandenburger Ornithologen
ABC African Bird Club
AEWA African-Eurasian Migratory Waterbird Agreement
AfWC African Waterbird Census of Wetlands International
BTO British Trust for Ornithology
BfN Bundesamt fűr Naturschutz
CWSS Common Wadden Sea Secretariat
DOEI Department of the Environment of Iran
DRC Democratic Republic of Congo
GCHC Grupo de Conservación de Humedales Costeros, Cádiz, Andalucía
GEF Global Environment Facility of the United Nations Environment Programme
GIC Grupo de Investigación en Biología de la Conservación, Área de Zoología, Universidad de Extremadura
IBA Important Bird Area of BirdLife International
INBO Research Institute for Nature and Forest, Flanders, Belgium
INC The former Institute for Nature Conservation (Belgium)
IWC International Waterbird Census of Wetlands International
IWRB The former International Waterfowl & Wetlands Research Bureau
LPO Ligue pour la Protection des Oiseaux (France)
NERI National Environment Research Institute (Denmark)
NP National Park
PERSGA Regional Organization for Conservation of Environment of the Red Sea and Gulf of Aden
RWS Rijkswaterstaat
RIKZ Rijks Instituut voor Kust en Zee
SOVON Vogelonderzoek Nederland
TMAP Trilateral Monitoring and Assessment Programme (Wadden Sea)
UAE United Arab Emirates
UK United Kingdom of Great Britain and Northern Ireland
WBDB The World Birds Database of BirdLife International
WIWO Werkgroep Internationaal Wad-en-Watervogelonderzoek
WPE The Wetlands International Publication *Waterbird Population Estimates*
WPE3 & **WPE4** The 3rd and 4th editions of the Wetlands International Publication *Waterbird Population Estimates*
ZICOMA Zones d'importance pour la conservation des oiseaux de Madagascar

Bernard Hanus

Greater Painted Snipe

Rostratula benghalensis

Geographical variation and distribution

The Greater Painted Snipe has a wide range in Africa, southern and eastern Asia and Australia. Two subspecies are widely recognised: the nominate race in Africa, Madagascar and Asia, and *australis* in Australia *(del Hoyo 1996).* However, Lane & Rogers (2000) present compelling evidence that *australis* is in fact a distinct and endangered species.

Within the region covered by this Atlas, the Greater Painted Snipe occurs regularly only in Africa and Madagascar. North of the Sahara, there is a small resident population in the marshes and other wetland areas of northern Egypt, specifically the Nile Delta, Wadi El Natrun and the Faiyum district, including Lake Qarun. There are occasional sightings further south along the Nile in Egypt (Miles 1998), but no records from northern Sudan. South of the Sahara it is widespread, occurring in tropical and subtropical wetlands and other habitats during rainy seasons. It is largely absent from the tropical forest blocks of West and Central Africa, and from the semi-arid regions of the Horn of Africa (Somalia and Djibouti) and south-western Africa (coastal Namibia and the western Cape to the Karoo and Kalahari). The population in the south-western Cape of South Africa appears to be quite geographically isolated. In Madagascar, it is patchily distributed in suitable habitat, although it is rather scarce in the south (Morris & Hawkins 1998). The species has bred in Israel, where it is an occasional winter visitor, and has been recorded as a vagrant in Iran, Oman and Yemen (Misonne, 1976, Porter *et al. 1996).*

Movements

Apart from the resident populations of the lower Nile, the south-western Cape and Madagascar, the Greater Painted Snipe is a partial intra-African rains migrant and nomad across most of its range in Africa. Most movements are in direct response to the state of wetlands, for which rain is the principal controlling factor. Birds probably move out of Zimbabwe during the wettest part of the summer, after December, whilst peak occurrence further west and south is in December-February (Navarro 1997). This includes the Eastern Cape of South Africa, where it is a scarce austral summer visitor (Hockey *et al.* 2005). In Nigeria, it probably moves gradually northwards after the rains, staying in northern wetlands until marshy habitats there dry up, whilst in Chad it moves into the Sahel zone during the wet season in July, remaining until November (Urban *et al.* 1986). In the Inner Niger Delta in Mali, it generally appears at the end of the hot dry season, with 22 birds recorded in June 1999 from two of the delta lakes, and no records at all between July 1998 and February 1999 (Van der Kamp & Diallo 1999). There is evidence from coastal Tanzania to suggest that it regularly migrates to temporary wetlands to breed (Baker 1996). The Greater Painted Snipe will not inhabit completely inundated wetlands, so rising flood levels will tend to force birds to seek alternative sites.

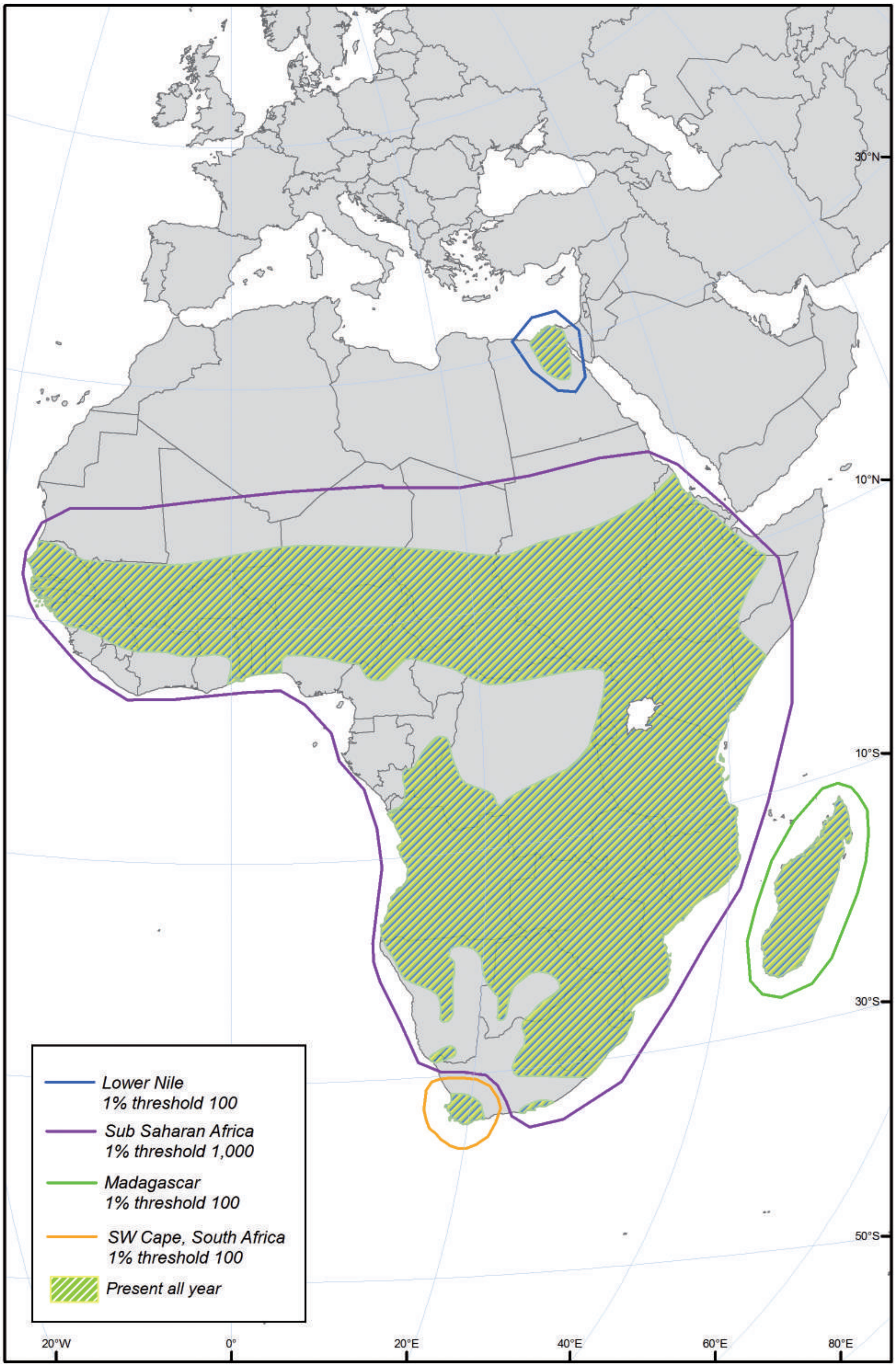
Across most parts of the range, places with suitable habitat change continuously with the passage of the dry and wet seasons. Sites are abandoned rapidly once they become either flooded or too dry. Likewise, the Greater Painted Snipe may exploit isolated ephemeral wetlands in dry areas in years of unusually high rainfall. This occurred in Botswana in the very wet summer of 1999/2000, when the species was reported from temporary pools in the central and western Kalahari desert (Tyler 2001).

Population limits

Dodman (in press 2009) identifies four populations, one large population occurring widely in sub-Saharan Africa, and three much smaller populations in the lower Nile, Madagascar and south-western Cape, for which geographical isolation is strongly suspected. These areas are:

Greater Painted Snipe

Rostratula benghalensis



1) The lower Nile in Egypt. This is an apparently discrete resident population, limited to the Nile Delta and other wetlands of the lower Nile. Presumably this population is a relict, isolated by relatively recent agricultural and water management developments along the lower Nile River rendering much of the lower Nile unsuitable for the species.
2) Sahelian Africa from Senegal to Somalia, south through East Africa to Southern Africa. The principal population limits are the Sahara to the north and the tropical forest blocks of West and Central Africa, whilst records are only very scanty in the semi-arid zones of the Horn of Africa and western Southern Africa.
3) Madagascar, where it is patchily distributed throughout east, west and north Madagascar but apparently absent from the drier south (Langrand 1990).
4) South-western Cape Province, South Africa. This population is geographically isolated from the larger population by about 1,000km (Hockey & Douie 1995); potentially recruitment from the latter may occur, given the nomadic nature of this population, e.g. in years of good rainfall.

Population size

1. Lower Nile, northern Eygpt

Population estimate	1% threshold	Population trend
A (<10,000)	100	Unknown

The Greater Painted Snipe is a fairly common breeding resident in parts of the Nile Delta and lower Nile Valley, Wadi el Natrun, the Faiyum and Suez Canal area, also occurring locally upriver in Egypt in very small numbers (Goodman & Meininger 1989). Dodman (in press 2009) proposes a population estimate of A, based on its limited distribution.

2. Sub-Saharan Africa

Population estimate	1% threshold	Population trend
C (25,000-100,00)	1,000	Unknown

Fishpool & Evans (2001) gave a very rough estimate of C/D for all birds in Africa. Population sizes at individual sites fluctuate quite widely (e.g. Barnes 2000). The species is largely under-recorded in counts of the African Waterbird Census due to its skulking behaviour, although often tens of birds are counted in certain countries, e.g. 21 in Cameroon and 18 in South Africa in January 1999, 50 in Senegal and 15 in Eritrea in January 2000, 42 in Namibia in July 2000 and 44 in Côte d'Ivoire in January 2001 (Dodman & Diagana 2003). Baker (*in litt*. 2008) considers there to be more than 100 regularly in the Dar es Salaam area of Tanzania.

Considering the relatively low numbers recorded at even well-documented sites, and the fact that it does not appear to be congregatory in Africa's extensive floodplains, Dodman (in press 2009) proposed a population estimate of C.

3. Madagascar

Population estimate	1% threshold	Population trend
A (<10,000)	100	Unknown

The Greater Painted Snipe has a patchy distribution in Madagascar. Dodman (in press 2009) provides a population estimate of A.

4. South-western Cape, South Africa

Population estimate	1% threshold	Population trend
A (<10,000)	100	Declining

The Heuningnes River and Estuary System IBA supports some 50-60 birds (Barnes 1998b). This sedentary population has decreased dramatically due to the direct and indirect effects of urbanisation, and may well be on the verge of extinction (Hockey & Douie 1995). Dodman (in press 2009) gave a poulation estimate of A, although the actual number may be considerably lower than the upper limit of this range.

Conservation status

The Greater Painted Snipe is generally rather uncommon throughout much of its range, largely attributable to the specialist nature of its habitat, although it is also easily overlooked. It is not globally threatened, although it is considered Near Threatened in South Africa, Lesotho and Swaziland (Barnes 2000, BirdLife International 2000). The rather isolated and declining population in the south-western Cape Province of South Africa may be threatened with local extinction, although the present distribution in South Africa remains basically unchanged, albeit with local site extinctions (Navarro 1997, Barnes 2000). The largest potential threat to the species in South Africa is the gradual loss of wetlands resulting in fragmentation and isolation, a process that is suspected to be taking place in the south-western Cape (Barnes 2000); increasing human pressure and disturbance at wetlands may also contribute. Continued drainage and development on the marshy areas of the Cape Flats, once an important stronghold for the south-western Cape population, are of particular concern (Hockey & Douie 1995).The population in the Nile Delta is also vulnerable, especially as wetlands in this area are threatened by pollution, drainage, land reclamation and landward migration of coastal sand barriers, whilst waterbird hunting is still widespread (Baha El Din 1999). In southern Somalia (where breeding has been recorded from May and November), two broods were recorded as being killed in a quelea spraying operation (Ash & Miskell 1998).

However, at many sites across its wide range, the species does not appear to be unduly threatened. In the Okavango Delta, Botswana, birds were recorded at the frequency of about one per 1-2 km along the Thamalakhane and Boteti Rivers in 2000/2001 (Tyler 2001). The Greater Painted Snipe may colonise suitable artificial wetlands, including sewage ponds and dams, and is able to locate widely dispersed ephemeral wetlands, so it is clearly able to adapt to changing environments. It is considered to be reasonably common in certain areas of Madagascar (Young 2003). It is recommended to monitor populations wherever possible, especially in the south-western Cape and the Nile Delta, where the species appears most at threat. Whilst it may not be possible to monitor numbers accurately, due to the species' skulking and crepuscular habits, it should at least be feasible to determine presence or absence at a selection of (suspected) key sites.

Habitat and ecology

The preferred habitat of the Greater Painted Snipe is wetlands composed of interspersed areas of open pools, soft muddy edges and dense emergent vegetation, such as marshes or thickets. The key habitat component is newly exposed mud adjacent to cover. Suitable wetlands occur in inland and coastal swamps, along slow flowing rivers and lake edges. The species may also occur in suitable artificial wetlands which have muddy edges and marginal vegetation, including sewage works, along dams and irrigation channels and in rice paddies, whilst it will also feed in damp agricultural lands adjacent to its normal habitats. In Senegal's Parc National des Oiseaux du Djoudj in the lower Senegal River, it is commonly seen on small islands under thickets close to the water's edge, and in the saline part of the Senegal River Delta, 124 birds were recorded in a 25 hectare wetland, under or on the branches of tamarisk (G.-N. Olivier *in litt.*) In Madagascar, it can be found in overgrown rice paddies (Morris & Hawkins 1998). In Zambia's Kafue Flats, it is regularly seen feeding at small hot springs on the edge of a woodland area, where muddy pools are fed by slow trickles of water through thick reeds; by contrast it is seen much less on the vast open floodplains of the Kafue River (T. Dodman, pers. obs.).

It is a crepuscular species, with most feeding activity taking place at dusk and dawn. It is omnivorous, feeding on both invertebrates (insects, crustaceans, worms and molluscs) and seeds. It feeds by probing into soft muddy substrates, both on exposed mud and mud covered by shallow water, where it catches molluscs and crustaceans by adopting a sweeping side-to-side motion of the head and bill (Urban *et al.* 1986). It is generally solitary or occurs in pairs or small groups. Small family groups (a male and the surviving young) may form after breeding. In parts of the range where only a few suitable wetlands remain in the dry season, it may gather in larger groups; flocks of up to 20 birds are recorded in West Africa in March-May, at the end of the dry season. There is an exceptional record of a flock of 100 birds in Senegal (Urban *et al.* 1986).

Greater Painted Snipes are polyandrous, with each female having two to four males. The pair bond lasts until the clutch has been completed, after which the female searches for a new mate. In parts of Southern Africa, the female might only find a single male, and technically be monogamous; however, nest-building, incubation, chick-brooding and chick-rearing duties are carried out almost exclusively by the male (e.g. Schmidt 1961), although there have been observations of participation of females in these activities in South-east Asia (del Hoyo *et al.* 1996). The typical clutch size is four eggs (range two to five); the incubation period is 18–19 days. The young are precocial, leaving the nest cup as soon as they are dry; the fledging period is unknown. The females defend a territory, which may be up to 200 m in diameter. The nests associated with this female are sometimes clustered within the territory, and may be as close as 4 m apart, but are more usually 15–50 m apart. The nest is a shallow cup, sparsely lined with leaves or other plant material. The nest is usually concealed in marsh vegetation. Sometimes the nest is placed on top of a small platform, built up of stems of marsh plants.

The timing of the breeding season across the African range is variable, but breeding tends to take place in the latter part of the wet season, or in the early part of the dry season.

Network of key sites

The Greater Painted Snipe does not congregate in large flocks, and is generally found at low densities even in favoured areas. No key sites can be identified on the basis of numerical criteria. However, a few sites may be identified that clearly hold reasonable numbers of the species in potentially vulnerable sub-populations. The Nile Delta and other lower Nile wetlands, including Lake Burullus Protected Area at the north of the delta, are particularly important, as they essentially support the only Greater Painted Snipe north of the Sahara in Africa. Likewise, wetlands of the south-western Cape, including Heuningnes River and Estuary System IBA and Rietvlei IBA, are important for the apparently dwindling and isolated population of this area. The Greater Painted Snipe is widespread in suitable habitat across much of Madagascar, and no particularly important sites stand out. However, the wetlands of mid-western Madagascar are likely to support reasonable numbers, including Lac Bemamba, a large complex of shallow lakes and marshes, whilst it is frequently encountered in wetlands of the High Plateau around Antananarivo and at Ambatolampy (Langrand 1990). In West Africa, the Parc National des Oiseaux du Djoudj in Senegal is certainly a favoured area for this species, as no doubt are other major wetlands of the Sahel Belt, such as Mali's Inner Niger Delta and Nigeria's Hadejia-Nguru Wetland Complex. In Southern Africa, the highest counts in the African Waterbird Census database are from the Bushmanland or Tsumkwe Pans in north-east Namibia.

Protection status of key sites

There are some protected areas within the Nile Delta, including the Ashtum El Gamil Protected Area of Lake Manzala (although this only includes a small area of the lake), and the Lake Burullus Protected Area and Ramsar Site (Baha El Din 1999). Just south of the delta, Lake Qarun Protected Area also supports Greater Painted Snipe. Whilst these sites are under various levels of protection, there are still significant threats to the integrity of their ecosystems, from factors such as continuing wetland loss, pollution and eutrophication, coastal development and waterbird catching at Burullus and Lake Manzala, and increasing salinity and unregulated tourism at Qarun (Baha El Din 1999). The Heuningnes River and Estuary System IBA is partially protected and a Ramsar site (Barnes 1998b).

Tim Dodman & Les Underhill

Nik Zurosky

Crab Plover *Dromas ardeola*

Geographical variation and distribution

The Crab Plover is a monotypic species, and no geographical variation has been reported. It is known to breed only in the Persian Gulf, Gulf of Oman, Gulf of Aden and southern Red Sea, but probably also breeds in western India, the Laccadives and Maldives. It is a colonial breeder, and fewer than 20 colonies were known until the early 2000s, mostly in Iran, Oman, Saudi Arabia, the United Arab Emirates and Yemen. In 2002-2004, 30 colonies were discovered in the Dahlak and Howakil Archipelagos of the Central Eritrean coast (De Marchi *et al.* 2006). The species is known to have bred in Iraq and Kuwait in the early part of the twentieth century (Cramp & Simmons 1983), and may still do so. In Africa, it is known to breed only in the above-mentioned sites in Eritrea, on islets off northern Somalia, and in the Suakim Archipelago in Sudan (Urban 1986, Dodman 1997, Dodman 2002). Outside the breeding season, the Crab Plover disperses along coasts to Pakistan, India and Sri Lanka (less commonly to Bangladesh and South-east Asia), and south in Eastern Africa to Mozambique and Madagascar. South of the Zambezi River Delta it occurs regularly in the Bazaruto Archipelago and less frequently as far south as Inhaca Island Mozambique, but it is essentially a vagrant on the South African coast. It is a scarce but locally common non-breeding visitor to the southern Red Sea coast of Egypt, mainly between October and late May, and occasionally straggles to the Nile Delta (Goodman & Meininger 1989). It has occurred as a vagrant on the Mediterranean coasts of Turkey, Syria and Israel. The non-breeding range also includes oceanic islands, and the species is regular on some isolated island groups including the Laccadives, Maldives, Chagos, Andaman Islands, Nicobar Islands and most islands in the western Indian Ocean south to the Iles Eparses, Comoros and Seychelles. In East Africa, there is an inland record at Lake Magadi in Kenya (Short *et al.* 1990).

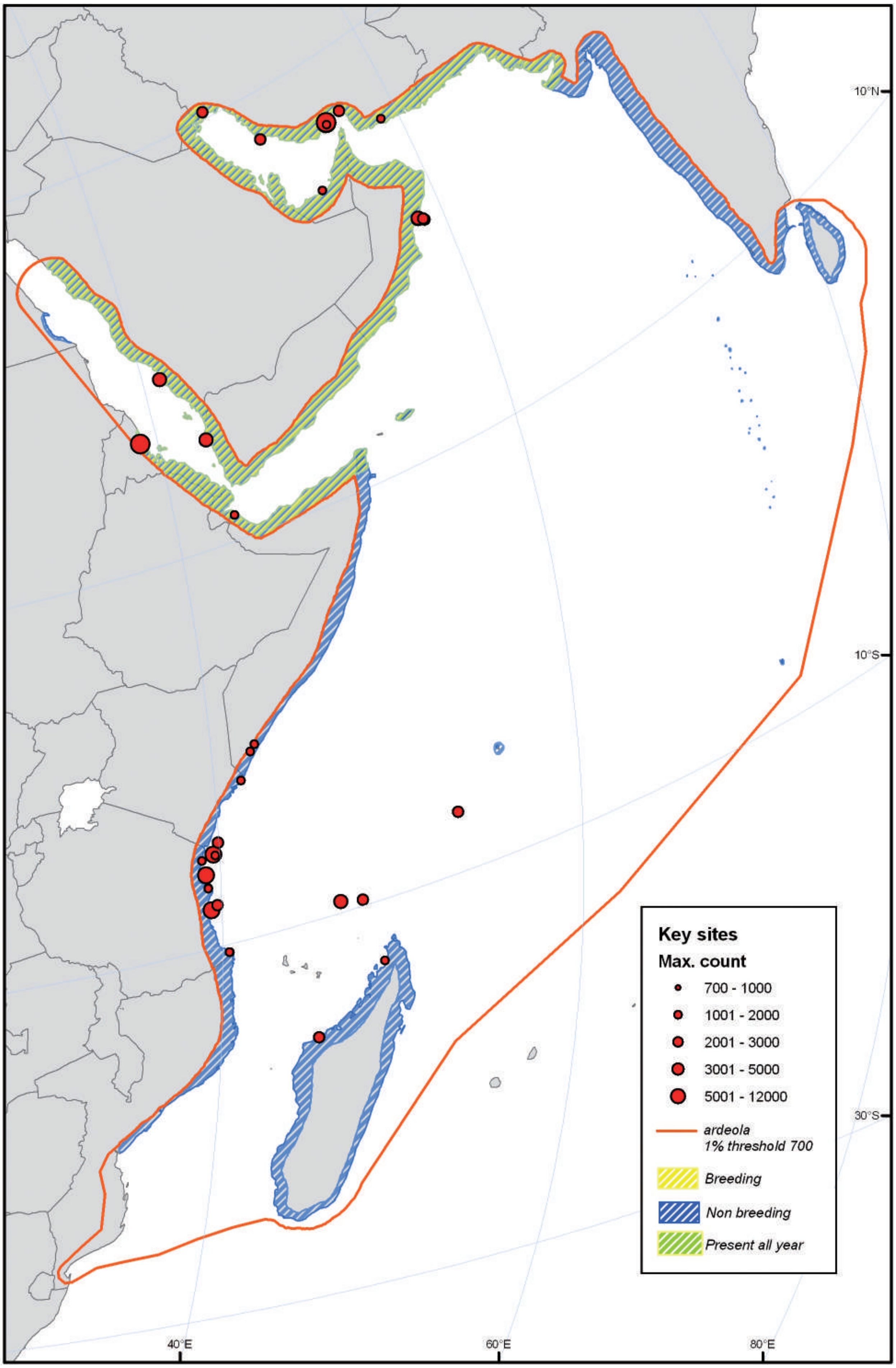
Movements

The Crab Plover is partially migratory, with many birds undertaking long-distance movements, including considerable trans-equatorial migrations, but the full extent of the movements is obscured by uncertainty of the breeding range. Many birds remain within the breeding range throughout the year, but the bulk of the population apparently shifts southwards or eastwards in August-November after breeding, and returns to the breeding grounds in March or April. Thus the species is largely absent from the southern portions of its African range and from areas east of the breeding range (except northern Sri Lanka) during the breeding season. Many adults and juveniles move out of the Persian Gulf in August. These birds are thought to move eastwards along the Makran coast to non-breeding areas in India, or southwards round the Arabian coast to non-breeding areas in Oman and possibly East Africa. Small numbers of birds have been recorded moving east along the Pakistan coast in autumn, presumably on their way to the important wintering areas in the Gulf of Kutch in Gujarat, as few birds winter in Pakistan (Roberts 1991). The highest counts in Pakistan in recent decades have been 70 in September 1984 and 30 in November 1967 (Roberts 1991). However, many birds remain in the Persian Gulf throughout the winter. The species is present throughout the year in Kuwait, where it probably still breeds, but numbers reach their highest levels in autumn and winter. In the United Arab Emirates, many of the birds breeding on Abu al Abyadh are thought to spend the non-breeding season only about 250 km away at Khor al Beidah, where as many as 550 are present from August to February (del Hoyo *et al. 1986, Richardson 1990).* Of the 5,000-6,000 pairs found nesting on the central coasts of Eritrea in 2002-2004, 4,800-6,500 individuals were recorded as remaining to spend the winter (De Marchi *et al.* 2006).

Some 95% of all Crab Plover records in Somalia are from March-November, when there is a large offshore passage along the east coast, often not readily visible as the birds fly close to the sea; 65% of the records are of birds on passage

Crab Plover

Dromas ardeola



from March to June, with approximately equal numbers flying both north and south, while 30% of the records are from July to November, with all birds flying south (Ash & Miskell 1998). There are high counts from the south coast of Somalia from September and October, and presumed migrants heard calling over coastal towns at night, with others accompanying Whimbrel *Numenius phaeopus* flying north (Ash & Miskell 1998). Southward passage at the Kenya coast starts in August, whist northward passage starts in March, and by April 60% of remaining birds are juveniles and immatures (Milligan 1979). Main Crab Plover arrival at Aldabra starts in November, most departing by May (Pistorius & Taylor 2008b).

The Crab Plover is probably only a passage migrant and non-breeding visitor to southern Arabia, but has been recorded in all months of the year in Yemen. A few non-breeding birds are present all summer in Aden, but there is an influx in mid-August peaking at 300 in September and early October (Cramp & Simmons 1983), suggesting a movement out of the Red Sea towards non-breeding areas in Eastern Africa, where the species is common from September to April. Small numbers of non-breeders remain on the wintering grounds in Eastern Africa and Aldabra throughout the northern summer.

Population limits

Perennou *et al.* (1994) recognised only a single population of Crab Plovers comprising the whole of the species, and this treatment has been adopted in all four editions of Waterbird Population Estimates and by Stroud *et al.* (2004). It seems likely that the birds breeding in the Persian Gulf migrate mainly east or south-east to non-breeding areas in eastern Arabia and the Indian subcontinent, while birds breeding in the Red Sea and Horn of Africa migrate mainly south to non-breeding areas in Eastern Africa and Madagascar, but in the absence of any ringing recoveries to support such flyway differentiation, a single world population is retained.

Population size

1. North-west Indian Ocean (the entire population of the species)

Population estimate	1% threshold	Population trend
60,000-80,000	700	Possibly stable

In Iran, the breeding population was estimated at a minimum of 1,500 pairs in the 1970s (Scott 1995). The great majority of these were at a single site (Ummal Korm Island) on the central Gulf coast. This remains the most important site, and numbers may have increased, with an average of 2,700 pairs having been recorded between 2004 and 2008 (H. Amini *in litt.)* There are thought to be at least 300 breeding pairs in the United Arab Emirates (at a single site) and 85 pairs in Oman (del Hoyo *et al.* 1996). Peak numbers on the southern Red Sea coast of Egypt have included 180 at Shalatein in late March 1983, and 110 at the same locality in early April 1985 (Goodman & Meininger 1989). There were some 1,000 breeding pairs on the Ceebaad and Sacaada Diin islands off northern Somalia in the first half of the nineteenth century (Archer & Goodman 1937), but no recent information is available from these islands. Recent estimates from the Red Sea include 1,060 pairs in Yemen (including 680 pairs at Kamaran Island), 1,100-1,500 pairs in Saudi Arabia, and 333-550 pairs on Mohammed Gol and in the Suakim Archipelago in Sudan (PERSGA/GEF 2003). About one quarter of the estimated world population, 5,000-6,000 pairs, nests in 30 colonies in the Dahlak (or Dehalak) and Howakil Archipelagos of Central Eritrea and it is likely that more colonies remain to be discovered in the southern Red Sea area (De Marchi *et al.* 2006).

It is probably easier to estimate the population of this species on the basis of non-breeding data, as the underground nesting colonies of this unusual wader are difficult to find, especially along the remote and little-visited coastlines, islands and archipelagos of the Red Sea. Dodman (2002) concluded that overall there were at least 35,000 non-breeding birds in Africa south of the Red Sea and on associated islands (comprising over 5,000 in Somalia, over 3,000 in Kenya, about 15,000 in Tanzania, over 1,000 in Mozambique, over 6,000 in the Seychelles and over 5,000 in Madagascar and all other islands). The species is abundant on the coast of Tanzania between September and April (Urban *et al.* 1986); 6,059 were counted by the African Waterbird Census in January 1998, including over 4,200 on Zanzibar (Dodman *et al.* 1999, Geene 2001). Some 3,000 were recorded on the Msangamkuu / Msimbati flats in extreme south-eastern Tanzania in January 1968 (Britton 1980), and more recently, a total of 3,402 was recorded in the Rufiji Delta in 2000 (Baker & Baker 2005). In Kenya, over 800 were at Kiwayuu Island in the Lamu Archipelago in November 1996 (Nasirwa 1998), whilst up to 800 have also been recorded at Mida Creek (Seys *et al.* 1995). The largest congregations of Crab Plover in Madagascar occur in the Ambavanankarana wetlands on the north-west coast, where as many as 900 have been recorded (ZICOMA 2001). Recent high counts for the whole of Madagascar have included 1,349 in January 1999 and 1,880 in January 2001 (Dodman & Diagana 2003). Reviewing recent counts in the Seychelles, Dodman (2002) concluded that at least 6,000 Crab Plovers spend a good part of the non-breeding season in these islands, including up to 2,800 on Aldabra (peaking in January to April), 2,000 inside the lagoon on Cosmoledo, and some 1,500 at St. François Atoll in the Alphonse Group. Recent surveys on Aldabra recorded an appreciably higher total, 3,800 individuals (Pistorius & Taylor 2008a).

To these birds can be added the substantial number of birds that remain within the Red Sea during the non-breeding season.The most important non-breeding site in this region is the Dehalak archipelago and adjacent coasts in Eritrea, where 4,800-6,500 were recorded wintering in 2002-2004 (De Marchi et al. 2006). A total of 352 was recorded on the mudflats around Djibouti City in February 2001 (Welsh et al. 2001).

The number of Crab Plovers spending the non-breeding period in the Asian part of the range would appear to be far fewer than in Africa. During the ten-year period 1990-1999, the maximum national totals reported by IWC in South-west Asia were 1,626 in Iran (1997), 611 in Kuwait (1994), 3,690 in Oman (1990), 2,185 in Saudi Arabia (1992), 861 in the United Arab Emirates (1994) and two in Yemen (1997) (Rose 1995, Delany *et al*. 1999, Gilissen *et al.* 2002). During the 12-year period 1990-2001, the total midwinter counts of Crab Plovers in South Asia varied from as few as one to 967. The highest national totals were 22 in Pakistan (1996), 966 in India (1995), 27 in Sri Lanka (1999) and one in Bangladesh (1995) (Lopez & Mundkur, 1997, Li & Mundkur 2004). In this same period, there was only one record of a single bird in South-east Asia (in Malaysia in January 1990). A wintering population of 2,500-5,000 birds was located in the Gulf of Kutch Marine National Park in Gujarat, India, in 1984 (Roberts 1991), and this population has since been estimated at a minimum of 6,000 birds (Perennou 1994). Elsewhere in India, however, numbers appear to be relatively small. Midwinter counts have included up to 163 in Tamil Nadu (1991), 57 in Orissa (1995) and five in Kerala (1991). These midwinter counts, in combination with

Table 4. Key sites for Crab Plover. Sites where 1% or more of a population has been recorded
Key sites in South Asia (Pakistan, India, Sri Lanka) are not included because they are outside the region considered by this Atlas.

Country	Site	Lat.	Long.	Season	Max total	Year max	Average total	Basis for average	Source
Eritrea	Dahlak & Howakil islands and adjacent coast	15.50	40.00	Breeding	15,000-18,000 5000-6000 prs	2002-2004			De Marchi *et al.* 2006
Iran	Ghabre Nakhoda Island	30.30	48.90	Breeding	900 300 pairs	2007			H. Amini *in litt.* 2008
Iran	Khor Musa	30.33	48.82	January	1037	2005	519	2004-05 (2)	DOEI / WIWO
Iran	Khouran Straits	26.93	55.7	January	3644	2007	2762	2004-07 (3)	DOEI / WIWO
Iran	Rud-i-Shur, Rud-i-Shirin & Rud-i-Minab Deltas	27.08	56.75	January	1327	2005	844	2004-07 (3)	DOEI / WIWO
Iran	Ummal Korm & Nakhilu Islands	27.83	51.50	Breeding	9723 3241 pairs	2007	8163 (2721 prs)	2004-08 (5)	H. Amini *in litt.* 2008
Kenya	Kiunga Marine National Reserve	-1.83	41.43	Non-breeding	800	1996			WBDB
Kenya	Mida Creek	-4.63	39.97	Non-breeding	1043	2000			AfWC database
Madagascar	Ambavanankarana	-13.12	48.77	July-August	902	1999			AfWC database
Madagascar	Baie de Baly	-16.07	45.28	July-August	1411	2001			AfWC database
Oman	Barr al Hikman	20.63	58.47	January	6900	2008	1043	1991-01(5)	IWC database R. Klaasen & J. de Fouw *in litt*
Oman	Masirah Island	20.50	58.75	Non-breeding	1352	1995	955	1994-01(5)	IWC database
Saudi Arabia	Red Sea Shore: Jeddah To Jizan	19.00	41.00	Winter	2353	1995	1149	1992-96 (4)	IWC database
Seychelles	Aldabra	-09.43	46.37	Non-breeding	3000 -3800	2007			Pistorius & Taylor 2008
Seychelles	Cosmoledo Atoll	-09.70	47.57	Non-breeding	2000				WBDB
Seychelles	St Francois Atoll, Alphonse Group	-07.00	53.00	January	1500	2001			T Dodman
Somalia	Saacada Din Island	11.26	43.28	Breeding	>1000				Ash & Miskell 1998
Somalia	Coastline south of Kismayo	-00.21	42.33	Non-breeding	>1000				Ash & Miskell 1998
Somalia	Istanbul	-00.50	42.06	Non-breeding	>1000				Ash & Miskell 1998
Tanzania	Dar es Salaam coast	-6.83	39.32	Non-breeding	700	1995			WBDB
Tanzania	Koeni river Mouth + Beach	-5.35	39.05	Non-breeding	750	1995			AfWC database
Tanzania	Mafia Island	-7.83	39.78	Non-breeding	1887	1988			WBDB
Tanzania	Mnazi Bay	-10.42	40.37	Non-breeding	750	1995			WBDB
Tanzania	Pemba Island	-5.17	39.67	January	4250	1998			Geene, 2001
Tanzania	Rufiji Delta	-8.00	39.45	Non-breeding	3402	2000			WBDB
Tanzania	Tanga South	-5.25	39.77	Non-breeding	750	1995			WBDB
Tanzania	Zanzibar Island	-6.13	39.23	January	4258	1998			Geene, 2001
UAE	Abu al Abyadh island	24.18	53.75	Breeding	840	1992			Evans, 1994
Yemen	Kamaran Island	15.33	42.67	Breeding	2040 680 Pairs				PERSGA/GEF 2003

estimates of 6,000 in the Gulf of Kutch and 500 in the rest of India, suggest that there are at least 15,500 birds wintering in Asia. Given the incomplete coverage of many parts of the wintering range, especially the south and west coasts of the Arabian Peninsula, it is possible that the total population could be double this figure.

Dodman (2002) concluded that the earlier estimate of 43,000 for the total population (from Perennou *et al.* 1994) was a considerable underestimate, and gave a revised figure of 60,000-80,000, comprising 40,000-50,000 in Africa and 20,000-30,000 in Asia. This estimate was adopted by Stroud *et al.* (2004) and in WPE3 and WPE4.

Conservation status

The overall status of the population is uncertain. The decreasing trend given by Perennou *et al.* (1994) was based on reports of a decrease in the numbers of birds wintering in some areas in South Asia, and may not be applicable to the bulk of the population further west. Del Hoyo *et al.* (1996) concluded that there was no evidence of any change in numbers in recent years, and Stroud *et al.* (2004) gave the overall trend as possibly stable. Pistorius & Taylor (2008a) recorded an increase in the number of birds wintering on Aldabra between 2000 and 2007, from 2,800 to 3,000-3,800 birds, and reported that numbers were also increasing in other parts of the Seychelles. No specific threats are known, partly because the species inhabits relatively isolated areas. Exploitation of colonies by humans can pose a problem on a local scale (Cramp & Simmons 1983, Urban *et al.* 1986), and the introduction of potential predators to breeding islands could have devastating effects (del Hoyo *et al.* 1996). De Marchi et al. (2006) concluded that Black Rats on breeding islands in the Dahlak archipelago did not threaten Crab Plovers, though increasing collection of eggs by fishermen could pose a long-term threat. Domestic cats caused desertion of the breeding colony on Marain in the Farasan Islands of Saudi Arabia (Newton & Al Suhaibani 1996). However, the most serious threat to the species is likely to be the extensive pollution of shorelines with oil and resulting destruction of the birds' food supplies. It is possible that the species suffered badly because of massive oil slicks in the Persian Gulf during the Gulf War in early 1991.

Habitat and ecology

The Crab Plover is a bird of the subtropical and tropical Indian Ocean shorelines, rarely occurring more than a kilometre from the sea. It occurs on sandy coastlines and islands, inter-tidal sand flats and mudflats, estuaries, lagoons and coral reefs, and also occasionally on rocky coasts and in mangroves. In and around the Arabian Peninsula, the breeding season begins in April and ends in June or July, with the first young seen in May and June (del Hoyo *et al.* 1996). In the Persian Gulf, fresh eggs have been found in the last week of April, and chicks are present in mid-June (Cramp & Simmons 1983). In Somalia, egg-laying takes place in May-June (Urban *et al.* 1986). The Crab Plover nests in dense colonies on sandy islands or extensive coastal sand dunes. It lays a single white egg (rarely two) in a chamber at the end of a tunnel 1.5-2.5 metres in length. The tunnels are excavated by the birds themselves, and may honeycomb very large areas extending up to one kilometre from the sea. The chick is nidicolous, relying on food carried in by the adults. Activity at the colonies is largely crepuscular and nocturnal. Even when fledged, the chick is highly dependent on the adults for food, with food-begging behaviour persisting well into winter (Hayman *et al.* 1986). The tunnel-nesting habit, pure white egg and nidicolous young are unique amongst waders. The species may have a communal breeding system, since groups of up to ten birds have been seen attending a burrow (Cramp & Simmons 1983). The Crab Plover, as its name implies, feeds almost exclusively on crabs, which are hunted in the inter-tidal zone with a stealthy, plover-like action. However, it will also take other crustaceans, some molluscs, marine worms and other invertebrates (Urban *et al.* 1986). The species has also been observed catching mudskippers *Periopthalmus sp.* (Roberts 1991). It usually forages singly or in small groups of up to about 20 individuals, but gathers in large flocks, sometimes of several hundred birds, at communal high-tide roosts. A roost on Bhaidar Island in the Gulf of Kutch held up to 1,200 birds (Roberts 1991). Birds commonly migrate in family parties of two adults and one juvenile. The fact that young birds remain dependent on their parents for some months after breeding and continue to beg for food even as late as December has given rise to erroneous reports of breeding. The adults undertake a complete post-nuptial moult between June and December, and a partial pre-nuptial moult in January-March (Cramp & Simmons 1983).

Network of key sites

The Crab Plover usually breeds in quite large colonies on small islands, and outside the breeding season, often congregates in large numbers at favoured feeding areas and high-tide roosts. It is therefore a species which can benefit greatly from the key site approach, as at all times of the year, a high proportion of the population is concentrated at a relatively small number of sites. In the region covered by this Atlas, 29 sites have now been identified as holding over 1% of the population, at least occasionally. The six sites that hold internationally important numbers of breeding birds (two in Iran and one each in Eritrea, Somalia, Yemen and the United Arab Emirates) account for about 13,500 pairs, or about half of the total breeding population, and it is clear that many of the important breeding sites, especially in the Red Sea and Somalia, remain to be discovered. The other 23 key sites are all non-breeding areas. In total, these account for a high proportion of the estimated population. One other key site has been located farther east in Asia. This site, the Gulf of Kutch in Gujarat, India, regularly supports a wintering population of about 6,000 birds (Perennou *et al.* 1994).

Protection status of key sites

Many of the key sites for the Crab Plover are in protected areas, while others are on remote coastlines and offshore islands and probably little disturbed. In Iran, the key breeding site on Ummal Korm Island is situated within the Monde Protected Area, while the main wintering area in the Khouran Straits was designated as a Ramsar site (100,000 ha) in 1975 and is partly protected in the Hara Protected Area and Biosphere Reserve (85,686 ha). Key sites in Oman, Saudi Arabia and Yemen are unprotected, but the breeding colony on Abu al Abyadh Island in the United Arab Emirates is fully protected in a private reserve (Scott 1995). In Eritrea, A protected area centred on the Buri Peninsula, south of Massawa, has been proposed, and this would safeguard at least seven colonies of Crab Plovers, given that the area includes the Buri Peninsula and most of the Howakil Bay (De Marchi *et al.* 2006). In Madagascar, Baie de Baly is protected in a National Park (69,350 ha), but the Ambavanankarana wetlands are unprotected and under threat from intensive cutting of mangroves in some areas (Fishpool & Evans 2001). Islands in the Kiunga Marine National Reserve and Biosphere Reserve in Kenya are well protected by virtue of their isolation, while Mida Creek is also well protected in a National Park, National Reserve, Forest Reserve and Biosphere Reserve. Mafia Island in Tanzania is a Marine Park and the Gulf of Kutch in India is protected in a National Park.

Derek Scott , Tim Dodman & Simon Delany

Canarian Black Oystercatcher

Haematopus meadewaldoi

The Canarian Black Oystercatcher is an extinct species which occurred in the eastern Canary Islands on the coasts of Fuerteventura, Lanzarote and La Graciosa, and the offshore islets of Montaña Clara, Lobos, Alegranza and Roque del Este. It has not always been treated as a separate species, but it differs from African Black Oystercatcher in its shorter winglength and more pronounced white base to the primaries (Hayman *et al.* 1986.) Its egg was also smaller than those of *H. moquinii* (Walters *et al.* 2007). It was last collected in 1913 on La Graciosia, but local fishermen reported it on Alegranza until about 1940 (Clarke 2006). Expeditions in 1956/57, 1970, 1985 and 1986 failed to find any trace of the bird. There have been two unsubstantiated records from Tenerife since 1965, and the identity of three black oystercatchers seen on the coast of Senegal in 1970 and 1975 has not been resolved (del Hoyo *et al.* 1996). There is also a record from Madeira (Clarke 2006). Its extinction was probably caused by over-harvesting of inter-tidal invertebrates, human disturbance, and commensal rats and cats (Hockey 1987).

Canarian Black Oystercatcher

Haematopus meadewaldoi

Simon Delany

Peter Scoones

African Black Oystercatcher

Haematopus moquini

Geographical variation and distribution

The African Black Oystercatcher is a monotypic species endemic to coastal Southern Africa, where it occurs from southern Angola to Mozambique, with a central area of distribution from mid-Namibia to the Eastern Cape of South Africa. Extreme records are as far north as Lobito, Angola, on the west coast and Inhaca Island, Mozambique, on the east (Martin 1997, Barnes 2000), whilst other records of black oystercatchers from as far as Senegal (see Canarian Black Oystercatcher), Gabon and Eritrea require confirmation (Urban *et al.* 1986). The regular breeding range stretches from Luderitz, Namibia, to Marzeppa Bay, Eastern Cape, South Africa, although relatively few birds breed between Luderitz and the Olifants River, Western Cape. Breeding has occasionally been recorded farther north in Namibia, between Walvis Bay and Swakopmund, and at Möwe Bay. The species shows no geographical variation across its range.

Movements

Adults are largely sedentary, though there are regular local movements, especially during the breeding season, when they generally move away from rocky shores to breeding sites on sandy beaches and islands (Hockey 1983). There is also some local movement away from exposed coastlines during the winter months, when storm conditions render feeding difficult (Underhill *et al.* 1999). Of 35 recoveries of birds ringed as adults, 91% were found within 4 km of the ringing site. In contrast, young birds move large distances soon after fledging, and many move beyond the limits of the breeding range to nursery areas for the first years of their lives, especially between central Namibia and southern Angola and eastwards to KwaZulu-Natal and southern Mozambique (Underhill *et al.* 1999).

Population limits

There is a single population centred along the coastline of Namibia and South Africa, with extensions to Angola and Mozambique, especially by dispersive juveniles.

Population size

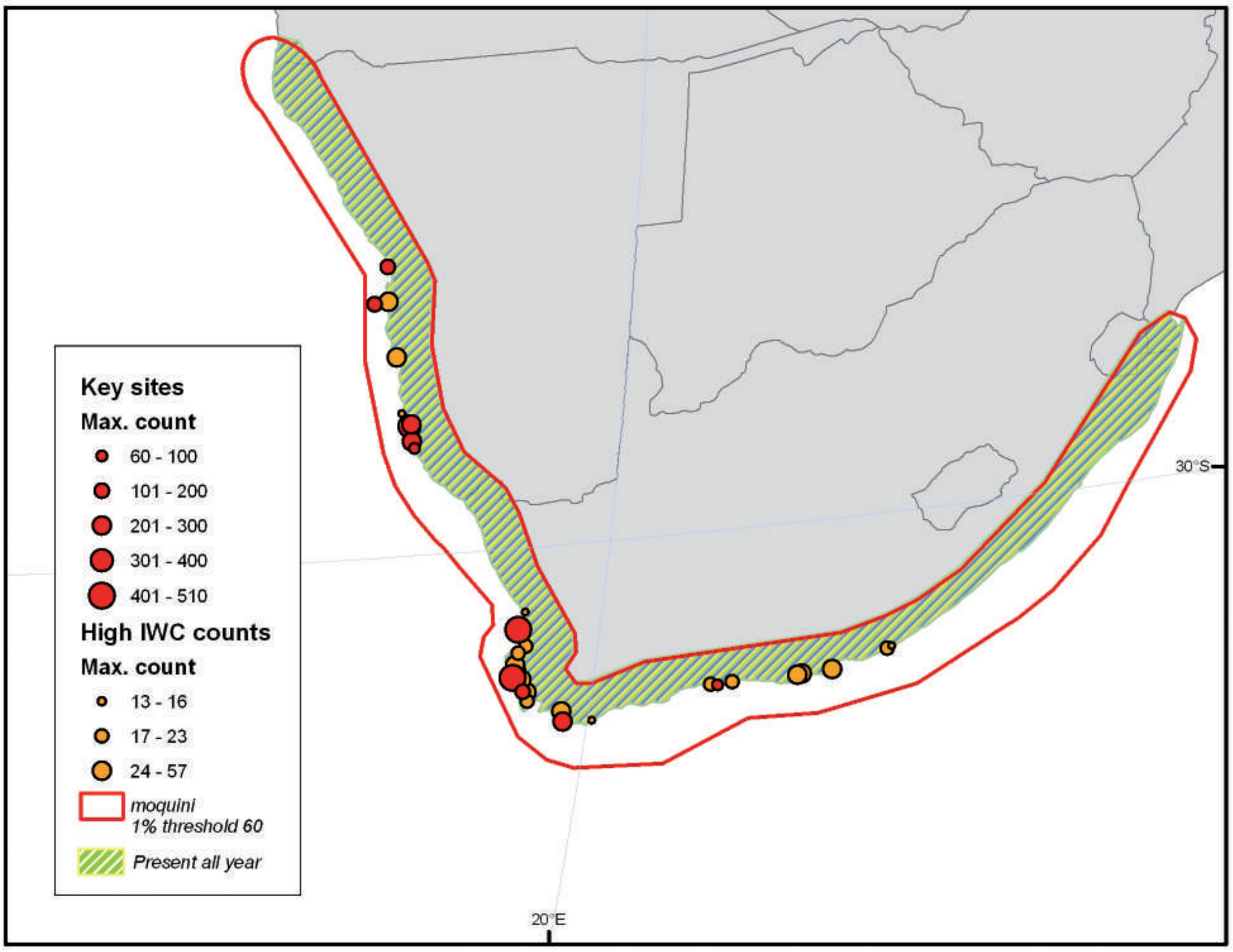
1. Southern Africa (the entire population of the species)

Population estimate	1% threshold	Population trend
6,000	60	Increasing

The total population size was estimated to be c. 4,800 birds in the early 1980s, with about half in the Western Cape of South Africa, a quarter of which were on offshore islands. Since then, there appear to have been increases in Namibia, from where there have been counts of up to 1,100 birds (R. Simmons *in litt.* in Dodman 2002). Numbers at protected islands off the west coast of South Africa have increased since the mid-1980s (e.g. at Robben Island from 40 in 1977 to 181 in 2002) and at certain mainland coastline sections, with increases along a 27-km section of coastline in the Eastern Cape from 70 in 1979, to 94 in 1983, to 212 in 1994, and to 310 in 2001 (Du Toit *et al.* 2002). Lower levels of human disturbance now prevail on most offshore islands than in the era of guano-scraping which ended soon after the 1980s, so it is likely that breeding productivity on these islands has increased. Increases are also due in part to invasion of the coastline by the alien Mediterranean Mussel *Mytilus galloprovincialis*, contributing to an increase in food supply and breeding success (Hockey & Van Erkom Schurink 1992). Dodman (2002) provided a population estimate of 5,000-6,000, noting that this could probably be improved by a specific survey of this species. More recently, Hockey *et al.* (2005) give the population as probably >6,000, based on unpublished data of the Oystercatcher Conservation Programme.

African Black Oystercatcher

Haematopus moquini



Conservation status

The species is classified as Near Threatened under IUCN Criteria (Barnes 2000, BirdLife International 2004b). Although the population is increasing, it is still small and subject to a variety of threats, especially during the breeding season, which coincides with the peak in human recreational activities at coastal sites on the mainland. Off-road vehicles can be particularly damaging as they can wreck the oystercatchers' beach breeding habitat, run over nests and kill chicks hiding in vehicle tracks (Barnes 2000). The banning of these vehicles from South African beaches has contributed to a recovery in numbers in recent years (Williams *et al.* 2004). In addition, eggs overheat in the sun during periods of prolonged disturbance from people fishing, swimming or picnicking, whilst terrestrial predators, such as mongoose, may take eggs and chicks (Barnes 2000). Breeding success is generally much higher at offshore islands, where the main threat is predation of eggs and chicks by Kelp Gulls *Larus dominicanus* (Hockey 1983). It is most likely that the offshore islands are vital for maintaining the population. A former threat on these islands came from disturbance caused by the collection of guano, but this was phased out in South Africa during the 1980s, and is infrequent in Namibia. Most islands are now either fully protected nature reserves (South Africa) or at least partly protected and more sensitively managed than in the past (Namibia). Other threats include the potential introduction of mammalian predators to offshore islands and paralytic shellfish poisoning (Martin 1997). Harmful algal blooms can also lead to severe local mortality, whilst this species is also susceptible to avian cholera (Hockey *et al.* 2005).

Habitat and ecology

The African Black Oystercatcher occurs along rocky and sandy shorelines, and in estuaries. The preferred habitat is coastline in which rocky and sandy sections are in close proximity. These shores provide the best feeding habitat; the African Black Oystercatcher is a mollusc specialist. The density of breeding pairs along favoured sections of mainland coastline seldom exceeds one pair per kilometre. Black Oystercatchers occasionally visit other wetland habitats near the coast, mainly using them as roosts, often when there are unfavourable weather conditions on the shoreline. The greatest densities of oystercatchers occur on offshore islands; many of these islands have seabird colonies, and guano from the islands enriches the surrounding intertidal areas, resulting in rapid growth of molluscs.

Most egg-laying takes place from October to April, with December and January being the peak months. The most frequent clutch size is two; sometimes one or rarely three eggs are laid. The incubation period averages 32 days (range 27–39 days), and fledging period is about 40 days. Both parents incubate eggs and care for chicks. Breeding success on the offshore islands is 0.3–0.6 young per pair per year, although it is far lower on the mainland (Urban *et al.* 1986), where there are numerous threats.

Network of key sites

The most important sites for this species are the offshore islands of Namibia and the Western and Eastern Cape Provinces in South Africa. Several islands regularly support more than the 1% threshold of 55 birds. The offshore islands of the Western Cape, South Africa, represent the main set of key sites for this species. There are some 150-170 breeding pairs at islands of the West Coast National Park: Jutten (43 ha), Malgas (18 ha), Marcus (17 ha) and Schaapen (29 ha). At other islands of South Africa, there are 100 breeding pairs at Dassen Island (273 ha), with counts of up to 436 birds, 20-35 breeding pairs at Robben Island (574 ha) and 27-67 breeding pairs at Dyer Island (20 ha). In Namibia, there are 5-10 breeding pairs at each of the three islands in Luderitz Bay: Halifax (3 ha), Penguin (36 ha) and Seal (44 ha). These islands also regularly support about 200 non-breeding birds, probably mainly young birds from South African offshore islands. On Possession Island (80 ha), there are about 66 breeding pairs, and regularly some 200-300 birds.

The coastline of continental Africa also has a number of key sites, notably Luderitz Bay, Mile 4 Saltworks near Swakopmund and Walvis Bay in Namibia, and West Coast National Park and Knysyna Lagoon and in South Africa. In addition to these key sites, non-breeding birds, especially juveniles, disperse quite widely along the seaboard, when the total numbers present at sites below the 1% threshold may well exceed numbers present at the key sites.

Protection status of key sites

All breeding offshore islands of South Africa, both in the Western Cape and Eastern Cape, are fully protected nature reserves, except for Robben Island, which is controlled by the Robben Island Museum, although the coastline of this island is effectively managed as a reserve. The Namibian offshore islands fall under the control of the Ministry of Fisheries and Marine Resources (not the Ministry of Environment and Tourism) and thus do not have a fully protected status, although they are generally sensitively managed for breeding birds. On the mainland, disturbance of breeding birds in recreational areas could be reduced through education and awareness programmes. The destruction of eggs and chicks is seldom deliberate, and is mostly done inadvertently through ignorance. The sign-posting of nests and marking off an area around them is generally effective in reducing disturbance to breeding birds. Although Walvis Bay is a Ramsar Site, it does not yet have an official protected area status (Simmons *et al.* 1998).

Table 5. Key sites for African Black Oystercatcher. Sites where 1% or more of a population has been recorded

Country	Site	Lat.	Long.	Season total	Max max	Year total	Average for average	Basis	Source
Namibia	Lüderitz Bay islands	-26.62	15.12	Non-breeding	400	2000			WBDB
Namibia	Mile 4 (Swakopmund) Saltworks	-23.42	14.17	July-August	115	1998	41	1992-98 (3)	AfWC database
Namibia	Possession Island	-27.02	15.2	All year	300		250		WBDB
Namibia	Luderitz Coast: Total	-26.58	15.17	Non-breeding	270	1997	124	1992-97 (3)	AfWC database
Namibia	Pomona Island	-27.20	15.27	Non-breeding	60	1996			AfWC database
Namibia	Walvis Bay Ramsar Site	-22.50	14.42	Non-breeding	167	1996	89	1992-98 (5)	AfWC database
South Africa	Knysna Lagoon	-34.05	23.03	Non-breeding	74	1999	55	1997-01 (5)	AfWC database
South Africa	West Coast National Park	-32.15	18.08	Breeding	510 150-170 pr	-			WBDB
South Africa	Dassen Island	-33.42	18.08	All year	436	-	330		WBDB
South Africa	Robben Island	-33.82	18.37	All year	181	-			WBDB
South Africa	Dyer Island	-34.68	19.42	All year	160	-			WBDB

Les Underhill & Tim Dodman

György Szimuly

Eurasian Oystercatcher

Haematopus ostralegus

Geographical variation and distribution

Four subspecies are recognised, of which only two - the nominate form and *H. o. longipes* - occur within Western Eurasia and Africa. *H. o. osculans* breeds in Kamchatka, Korea, and north-eastern and eastern China, and winters in Japan, Korea and eastern China south to Taiwan. *H. o. finschi* is confined to New Zealand, and is often treated as a separate species, the South Island Oystercatcher *Haematopus finschi* (e.g. in Waterbird Population Estimates). Birds breeding in Iceland and the Faeroes are sometimes considered as a separate subspecies (*malacophaga*), as are the British and Irish birds (*occidentalis*) (Wetlands International 2000).

The Eurasian Oystercatcher has an extensive breeding range in temperate and sub-arctic Europe and Asia. The nominate form breeds commonly in Western and Northern Europe as far north as Iceland, northern Norway, Finland and the area around the White Sea. This subspecies is primarily coastal and is especially common around the North Sea, but many birds breed inland, especially in Scotland, The Netherlands and Poland. Small, scattered breeding populations of nominate *ostralegus* occur along the north coast of the Mediterranean Sea as far east as Greece and Aegean Turkey (Valle & Scarton 1998), and the few birds breeding in Romania and Bulgaria probably also belong to this form. All nominate *ostralegus* move to the coast in winter. A few thousand remain in Iceland throughout the winter, but the majority move to estuaries in Ireland, the United Kingdom and the continental European coast from Denmark south to France. Smaller numbers winter in Spain, Portugal and West Africa as far south as Guinea-Bissau, with a few birds reaching Ghana.

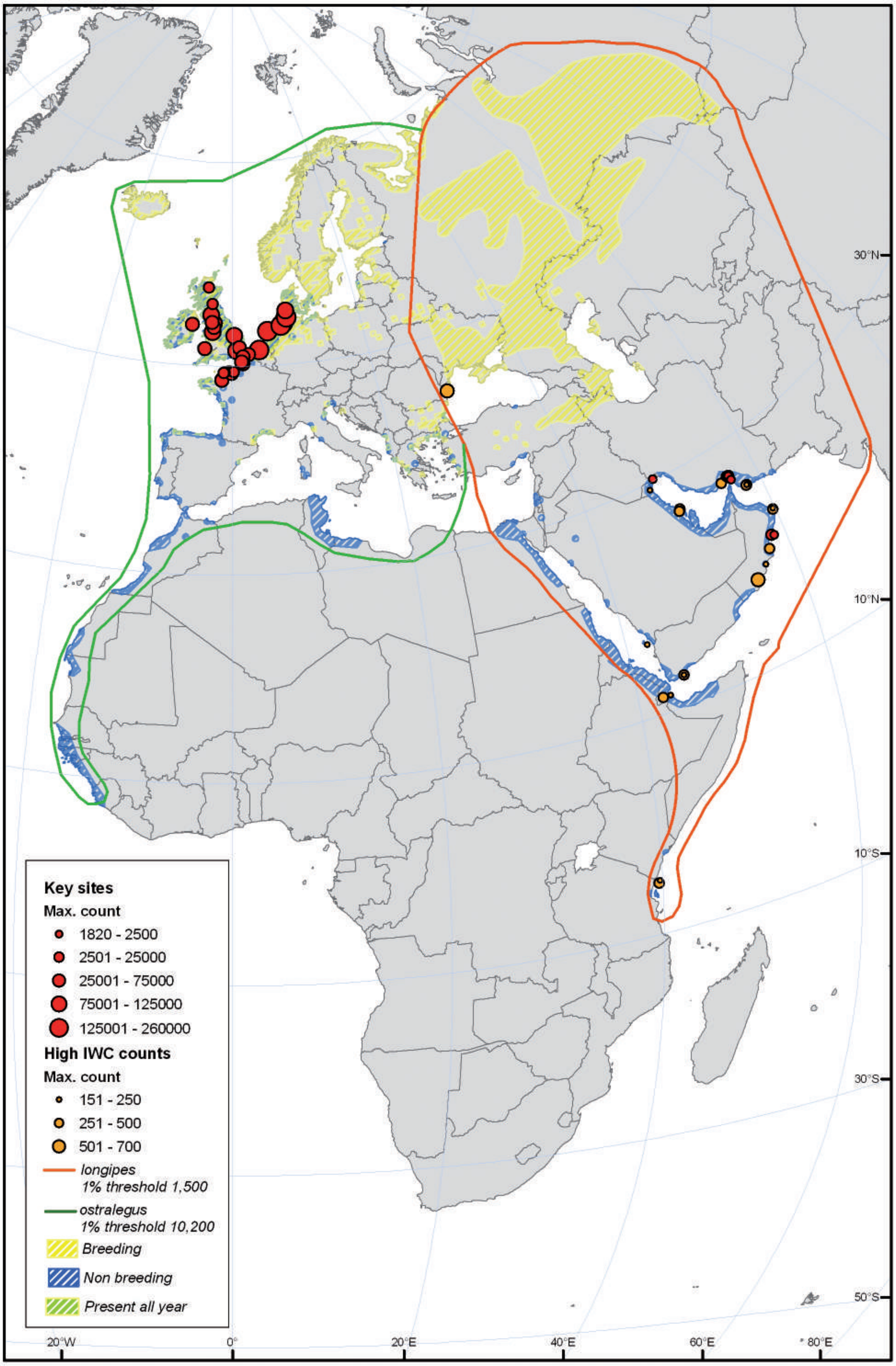
H. o. longipes breeds in rather small numbers along rivers, freshwater lakes and saline lakes in Ukraine, eastern European Russia, Western Siberia and the Central Asian Republics south to the northern Black Sea, Caspian Sea, Aral Sea and Lake Balkhash. The small number of birds breeding in eastern Turkey and north-western Iran presumably belong to this form. It winters along the coasts of North-east Africa (commonly south to Tanzania), the Arabian Peninsula and the Persian Gulf east to north-western India. Small numbers of birds also winter along the south coast of the Caspian Sea in Iran (Scott 1995). Small numbers regularly reach the coast of southern Mozambique (Parker 1999), and a few birds, believed to be *longipes*, occasionally migrate as far south as South Africa (Hockey 1997).

Movements

The Eurasian Oystercatcher is migratory, although many individuals of the nominate race move only a short distance (a few hundred kilometres) between their breeding grounds and their wintering grounds, while some individuals along the coast can be considered sedentary. Such “sedentary” birds do not defend a breeding territory all year round, but roost and feed only tens of kilometres away in winter, and may occasionally pay a short visit to their breeding territory. The approximately 20,000 birds that winter along the coast of West Africa (most notably the coast of Senegal, the Banc d’Arguin and the Bijagos Archipelago) probably breed around the White Sea, a one-way migration of 7,000 km. This area is also used for wintering by birds which breed in Italy (Hagemeijer *et al.* 2004). Especially in The Netherlands and Scotland, Oystercatchers may breed inland, and such inland breeding birds typically move to the coast in winter. Many adult birds probably migrate in a single flight from the breeding area to the wintering area and then stay there all winter. However, during cold winters, the more northerly mudflats freeze over, causing a sizeable number of birds to move further south. Typically, around 200,000 Oystercatchers winter in the Dutch Wadden Sea. During severe winters, up to 100,000 of these birds may depart. No more than about 40,000 of these find a place in the Dutch Delta area (Camphuysen *et al.* 1996). The other birds move to the coast of the North Sea and further south to estuaries in France,

Eurasian Oystercatcher

Haematopus ostralegus



where many are shot (Hulscher 1989, Hulscher *et al.* 1996, Triplet & Debacker 1987). The choice is difficult, because many of the birds that gamble that their energy reserves will suffice to carry them through the difficult period and stay, subsequently die of starvation (Hulscher 1989, Camphuysen *et al.* 1996). Individual Oystercatchers tend to return to the same wintering site year after year (Hulscher *et al.* 1996).

The breeding and non-breeding ranges of *longipes* are fully disjunct. Birds leave the Russian breeding areas from July onwards, although passage birds have been noted in the Black Sea region as late as October. Spring migration on the Black Sea, in Dagestan and in the southern Urals peaks at the end of March and in early April. European Russian birds arrive on their breeding grounds from mid-April to mid-May (Glutz von Blotzheim *et al.* 1975). In the Persian Gulf area (Bahrain and United Arab Emirates), wintering birds arrive from mid-July onwards. Spring migration starts in February and March, and the last birds leave these wintering grounds by the end of April (Hirschfeld 1994, Keijl *et al.* 1998). The form *longipes* winters in small flocks, generally of less than 40 birds (Meinertzhagen 1954, Bundy *et al.* 1989), although concentrations of several hundred birds are not unusual on the south-east coast of Iran (D.A. Scott pers. obs.). It is believed to be faithful to its wintering areas (del Hoyo *et al.* 1996). Summering (non-breeding) birds occur in the Red Sea area (Glutz von Blotzheim *et al.* 1975).

Population limits

Waterbird Population Estimates recognises only two populations of the Eurasian Oystercatcher in Western Eurasia and Africa, namely the populations of the two widely recognised subspecies:

1) *H. o. ostralegus* (including "*malacophaga*" and "*occidentalis*"), breeding mainly in Northern and Western Europe, and wintering in Western Europe and south to West Africa (to Guinea-Bissau);
2) *H. o. longipes* breeding in Western Siberia, the Black Sea, north-western Iran and the Central Asian Republics, and wintering in North-east Africa and the Middle East.

This treatment, following Smit & Piersma (1989) and supported by Stroud *et al.* (2004), is adopted here. However, it has been suggested that there may be two or more discrete populations of nominate *ostralegus*. Hulscher *et al.* (1996) recognised two populations, divided by the North Sea:

1) an Atlantic population, comprising birds which breed in Iceland, Faeroes, Great Britain and Ireland;
2) a continental population, comprising birds which breed on the continent and mostly winter on the continent (although birds ringed in Norway are regularly recovered in the Wash in eastern England and around the Irish Sea).

Wetlands International (2000) identified five relatively discrete *ostralegus* populations:

1) birds breeding in Iceland, Faeroes, northern and western Britain, Ireland and north-western France, and wintering on the coasts of Ireland, Britain and France "*malacophaga*" and "*occidentalis*");
2) birds breeding in Norway and wintering in the North Sea area;
3) birds breeding in the Baltic and north-western Russia, and wintering in the Wadden Sea;
4) birds breeding in southern Britain, Ireland, the Low Countries and France, and wintering on the Atlantic coast of Europe south to Iberia and Morocco (less commonly to Mauritania and Guinea-Bissau);
5) birds breeding in the Mediterranean and wintering mainly on the North African coast, and as far south as Mauritania.

It seems rather unlikely that birds wintering along the West African coast would breed in the Low Countries, where birds occupy their territories in late February, since birds on the Banc d'Arguin in Mauritania are still preparing for their northward migration at this time. The peak of departure of these birds from the Banc d'Arguin is in the last week of March (Swennen 1990). It seems more likely that the birds wintering on the Banc d'Arguin and in the Bijagos Archipelago of Guinea-Bissau breed in the far north, e.g. around the White Sea, where the birds do not arrive until May (Bianci 1967.). Thus, the birds in group 3 above probably winter in West Africa, while the birds in group 4 do not. At present, it is not known if this White Sea – West Africa population is sufficiently distinct from the others to warrant treatment as a separate unit for conservation purposes. Meltofte (1993) demonstrated that a majority of birds staging in the Danish Wadden Sea in spring and autumn originated from Finland and north-west Russia, and R.H.D. Lambeck (*in litt.*) has shown that at least some juvenile and immature White Sea Oystercatchers winter in western France This population is certainly unusual in making long-distance migrations, almost certainly depending on one or more stopover sites to reach the breeding area from the wintering area and vice versa.

As there is extensive overlap of all other breeding populations in Western Europe during the migration seasons, and as the status of the hypothetical White Sea – West Africa population is not clear, it would seem appropriate to continue to treat all breeding populations of nominate *ostralegus* as a single population for population assessment purposes.

Population size

1. *ostralegus*

Population estimate	1% threshold	Population trend
1,020,000	10,200	Decreasing

The most recent estimate of 1,020,000 birds, based on midwinter counts in the 1990s, is considered to be a reliable estimate, as nearly all of the important sites were well covered (Stroud *et al.* 2004). This population estimate is a 17% increase over the 874,000 given by Rose & Scott (1997). Dodman (2002) estimated that about 25,000 are regular non-breeding visitors to the coast of West Africa. According to Cayford & Waters (1996), the numbers wintering in Britain increased by 28% from 279,500 to 359,000 between 1981-85 and 1988-92. Thus, the increase of the British wintering population accounted for more than half of the 146,000 increase in the total population between the 1980s and 1990s. Goss-Custard *et al.* (1995) estimated the European breeding population at 214,000-291,000 pairs, and Hulscher (1997) came to a very similar estimate of 230,000-290,000 pairs. More recently, Thorup (2006) has given a European total of 301,000-369,000 pairs, equating to approximately 904,000-1,107,000 individuals, while the national estimates in BirdLife International (2004a) indicate a total of 275,000-375,000 pairs, or 825,000-1,125,000 individuals. The mid-points of these two ranges (1,005,000 and 975,000, respectively) agree well with the population estimate from midwinter counts (1,020,000). At present, populations are almost certainly considerably lower than 1,020,000, as drastic declines have occurred since around 1990 in the populations wintering in the international Wadden Sea (Blew *et al.* 2007) and in the Dutch Delta area (Strucker *et al.* 2007).

2. *longipes*

Population estimate	1% threshold	Population trend
100,000-200,000	1,500	Probably decreasing

Winter counts from the 1990s, as given by Stroud *et al.* (2004), totalled only 15,200 birds, but this was considered to be an underestimate because of incomplete count coverage in some parts of the Middle Eastern and East African wintering range. Large numbers of birds are known to winter in Oman and Iran. Up to 10,000 have been recorded at Barr Al Hikman in Oman (Scott 1995), and 9,000-12,000 were found wintering in south-eastern Iran in the 1970s (Summers *et al.* 1987). Large numbers of birds may also occur on the Baluchestan coast of Pakistan, but this stretch of coastline has never been fully surveyed. Up to 50 were recorded wintering on the south coast of the Caspian Sea in Iran in the early 1970s (Scott 1995), and there is a record of 60 at the head of the Persian Gulf in Iraq in the 1960s (Scott & Carp 1982). Oystercatchers are regularly recorded in small numbers in Eritrea, and 436 were counted in Tanzania in January 1998, mostly from Zanzibar and Pemba Islands (Dodman *et al.* 1999).

The estimated breeding populations in European countries within the range of *longipes* amount to 4,490-10,700 pairs (Thorup 2006). This equates to about 13,500-32,000 individuals. To these can be added 30,000-55,000 pairs (or about 90,000-165,000 individuals) estimated to breed in the Yamal region of Russia (Tertitsky 1999), whilst some allowance has to be made for birds breeding further east, since the range extends beyond the Urals to the Ob River (Cramp & Simmons 1983). Stroud (2004) proposed a rough estimate of 100,000-200,000 based on these figures, and this was the estimate adopted in *WPE3* and *WPE4*. However, Stroud *et al.* (2004) noted that the winter totals did not even closely approach the population estimate, suggesting either major underestimation on the wintering grounds, or overestimation of Russian breeding totals, or a combination of both factors.

Conservation status

Although still relatively numerous, the nominate subspecies now appears to be in decline after a long period of increase in the last three decades of the twentieth century. Increases were reported in the 1980s and 1990s in the large breeding populations in The Netherlands, Norway and the United Kingdom, and also in the smaller populations in Belgium, Denmark, the Faeroes, Finland, France, Germany, Latvia, Poland and Spain (Hulscher 1997, Snow & Perrins 1998). The breeding population of the Dutch-German-Danish Wadden Sea increased from 37,156 pairs in 1991 to 45,995 in 1996 (Rasmussen *et al.* 2000). At the same time, increases were reported in nearly all parts of the European wintering range. However, the numbers breeding in The Netherlands have been decreasing since 1990 (Stroud *et al.* 2004, BirdLife International 2004a), while the numbers wintering there declined by 6% from 307,300 in the 1980s (Smit & Piersma 1989) to 290,000 in the 1990s (Stroud *et al.* 2004). In the Dutch Wadden Sea, the number of wintering birds fell from 266,000 in the 1980s to 177,000 in the late 1990s (Rappoldt & Ens 2004). Most recent evaluations from 2000 and later suggest that numbers in The Netherlands have fallen even further. A likely major cause of this decline is the disappearance of the intertidal mussel beds in the Dutch Wadden Sea (Smit *et al.* 1998; Rappoldt *et al.* 2003; Ens 2006), due to overfishing in a period without spatfall at the end of the 1980s (Beukema & Cadée 1996; Ens *et al.* 2004). In addition, cockle fishery also had a negative impact on the carrying capacity of the Dutch Wadden Sea for Oystercatchers (Rappoldt *et al.* 2003). This has led to increased mortality during winter, especially among juvenile individuals (Nève & van Noordwijk 1997). In the Oosterschelde, the decline is due to continuing erosion of tidal flats (a delayed effect of the storm surge barrier), movement of littoral culture plots of mussels to subtidal areas and cockle fishery (Bult *et al.* 2000; Rappoldt *et al.* 2006). Food shortages, very probably also related to shell-fishing, have also occurred at the Wash in England (Atkinson *et al.* 2000). An increase in the number of birds wintering at a number of sites on the Atlantic coast of France (Baie de Somme, Baie des Veys and Seine Estuary) has been recorded in recent years, despite a decrease in the density of cockles (Triplet *et al.* 1999, Triplet & Mahéo 2000, Deceuninck & Mahéo 2000). These may be birds shifting their winter distribution as a result of food shortages caused by the significant ecological disruption in the Dutch Wadden Sea (Piersma *et al.* 2001). An analysis of population trends of wintering waterbirds in North-west Europe (Ireland, UK, France, Belgium, The Netherlands and Germany combined) based on IWC data estimated that between 1989 and 2002 there was an overall decrease in numbers of 1.4% per annum (Delany *et al.* 2007). Meltofte *et al.* (2006) demonstrated that numbers of oystercatchers migrating past Blåvandshuk, Denmark remained relatively stable from 1964 until 1996, after which they decreased steadily and significantly until 2005, suggesting that the Norwegian breeding population may also be decreasing substantially.

Little is known of the status of the population of *longipes* breeding in Eastern Europe and Western Asia. Based on historical information, the size of the breeding area has decreased since the beginning of the twentieth century (Rogacheva 1992), and some decreases have recently been reported in the populations in European Russia and Ukraine (Belik 1998a, BirdLife International 2004a). Trends in the population further east are unknown. Overall, *longipes* Oystercatchers may have decreased in numbers, but due to the incomplete coverage of the wintering population, this decrease cannot be quantified.

Habitat and ecology

In winter, Eurasian Oystercatchers aggregate on inter-tidal mudflats along the coast and take primarily shellfish, especially large cockles and mussels. Their principal morphological and behavioural trick is to open the shells with their strong bill by either hammering or stabbing, so that they can swallow the flesh without the shell. Other prey, such as ragworms, are occasionally taken, especially by juveniles, which lack the social status and feeding skills to feed profitably on large cockles and mussels in the middle of winter (Ens & Cayford 1996). Individual Oystercatchers may also feed on earthworms in wet fields in winter, but only when they seem to have difficulty meeting their energy demands during low tide (Caldow *et al.* 1999). In summer, many Eurasian Oystercatchers breed inland in fields, feeding their chicks with earthworms and tipulids (Cramp & Simmons 1983). Oystercatchers transport only one prey item at a time to theirchicks, and this restricts their breeding sites to a small fringe of saltmarsh or man-made dikes bordering the inter-tidal mudflats (Ens *et al.* 1992). At the same time, it allows them to breed along rocky coasts, where the adults, but not the chicks, are able to collect food in the inter-tidal zone. Eurasian Oystercatchers are long-lived birds (annual survival usually exceeds 95%) and do not return to the breeding areas until three years old, and then take one or more years to acquire a breeding territory (Ens *et al.* 1996).

Table 6. Key sites for Eurasian Oystercatcher. Sites where 1% or more of a population has been recorded

Country	Site	Lat.	Long.	Season	Max total	Year max	Average total	Basis for average	Source	Population(s) at site
Denmark	Wadden Sea	55.16	8.58	Non-breeding	39836	2000	25889	1999-02 (4)	NERI, Denmark, 2005	*ostralegus*
France	Baie de l'Orne	49.30	-0.16	Hard weather refuge	19500	1997			R Mahéo, LPO et al. 2005	*ostralegus*
France	Baie des Veys	49.40	-1.14	Non-breeding	11500	1997	3887	1999-04 (5)	R Mahéo, LPO et al. 2005	*ostralegus*
France	Baie du Mont Saint Michel	48.67	-1.51	Hard weather refuge	21100	1997	7851	1999-04 (5)	R Mahéo, LPO et al. 2005	*ostralegus*
France	Littoral du Pas-de-Calais	50.39	1.34	Non-breeding	13044	1997	2363	1999-04 (5)	R Mahéo, LPO et al. 2005	*ostralegus*
France	Littoral Dunkerquois	51.08	2.35	Non-breeding	13400	1997	142	1999-04 (5)	R Mahéo, LPO et al. 2005	*ostralegus*
France	Littoral Picard	50.23	1.50	Non-breeding	13500	1998	8622	1999-04 (5)	R Mahéo, LPO et al. 2005	*ostralegus*
Germany	Wadden Sea - Lower Saxony	54.00	8.00	Autumn	193218	1992	102803	1997-01 (5)	J . Blew, CWSS, 2005	*ostralegus*
Germany	Wadden Sea - Schleswig-Holstein	54.50	8.50	Autumn	130834	1994	93075	1997-01 (5)	J . Blew, CWSS, 2005	*ostralegus*
Iran	Rud-i-Gaz and Rud-i-Hara Deltas	26.67	56.83	Non-breeding	2000	1975			Evans, 1994	*longipes*
Iran	Rud-i-Shur, Rud-i-Shirin and Rud-i-Minab Deltas	27.08	56.75	Non-breeding	2180	2007	1522	2004-2007 (3)	DOEI / WIWO	*longipes*
Iran	Shadegan Marshes, Khor-al Amaya and Khor Musa	30.17	48.67	Non-breeding	1820	1974			Evans, 1994	*longipes*
Ireland	Dundalk Bay	53.95	-6.33	Non-breeding	14696	2000	10668	1999-04 (5)	BirdWatch Ireland 2005	*ostralegus*
Netherlands	Rhine-Maas -Schelde Delta	51.50	4.00		110574	1995	51156	1999-03 (5)	RWS WD RIKZ 2005	*ostralegus*
Netherlands	Wadden Sea	53.30	5.38	Winter	236804	1996	183661	1999-03 (5)	SOVON, 2005	*ostralegus*
Oman	Barr Al Hikman	20.63	58.47	Non-breeding	10700	1991	1038	1993-01 (5)	IWC database	*longipes*
Oman	Masirah Island	20.50	58.75	Non-breeding	2094	1995	1285	1994-01 (5)	IWC database	*longipes*
U.K.	Burry Inlet	51.64	-4.17	Winter	17867	1999-03	14578	1999-03 (5)	BTO, UK, 2005	*ostralegus*
U.K	Dee Estuary	53.27	-3.10	Autumn	26713	1999-03	21898	1999-03 (5)	BTO, UK, 2005	*ostralegus*
U.K.	Forth Estuary	56.00	-3.27	Autumn	10498	1999-03	8317	1999-03 (5)	BTO, UK, 2005	*ostralegus*
U.K.	Moray Basin, Firths and Bays	57.60	-4.00	Non-breeding	11100	1995			WBDB	*ostralegus*
U.K.	Morecambe Bay	54.12	-2.93	Autumn	72653	1999-03	52761	1999-03 (5)	BTO, UK, 2005	*ostralegus*
U.K.	Ribble Estuary	53.72	-2.92	Autumn	23881	1999-03	14018	1999-03 (5)	BTO, UK, 2005	*ostralegus*
U.K.	Solway Estuary	54.92	-3.40	Autumn	52765	1999-03	44267	1999-03 (5)	BTO, UK, 2005	*ostralegus*
U.K.	Thames Estuary	51.48	0.57	Winter	25958	1999-03	19265	1999-03 (5)	BTO, UK, 2005	*ostralegus*
U.K.	The Wash	52.93	0.30	Autumn	28765	1999-03	18562	1999-03 (5)	BTO, UK, 2005	*ostralegus*

H. o. longipes breeds on riverine sandbars and occasionally on pebble spits (Rogacheva 1992) or in marsh vegetation. It has also been reported locally breeding on bare cereal fields at large distances from rivers or lakes (Glutz von Blotzheim *et al.* 1975). On the breeding grounds, this subspecies feeds on bivalves, snails, worms, insects and small fish, which may be captured by swimming and diving (Grote in Glutz von Blotzheim *et al.* 1975). It winters on coastal mudflats and sandy and rocky shores.

Network of key sites

In winter, the great majority of nominate *ostralegus* occur at a small number of key sites: the Danish, German and Dutch Wadden Sea, the Dutch Delta area, nine sites in the U.K. (The Wash, Thames Estuary, Solway Estuary, Morecambe Bay, Ribble Estuary, Dee Estuary, Burry Inlet, Moray Basin and Forth Estuary), and Dundalk Bay in Ireland. Together, these 13 sites on average hold about 730,000 birds or 72% of the total population of nominate *ostralegus* during the winter months. Other sites, such as the Baie de l'Orne and Baie de Mont St Michel in France, which may be relatively unimportant in most years, assume great importance as hard weather refuges during cold winters. The Wadden Sea may also be an important staging area in autumn and spring for birds from the White Sea migrating to and from West Africa (Meltofte *et al.* 1994).

In the U.K., Eurasian Oystercatchers are common at many estuaries, three of which regularly support between 2% and 5% of the flyway population: the Solway Estuary, Morecambe Bay and the Dee Estuary. A further seven sites hold over 1% of the flyway population. On the continent, the Wadden Sea is by far the most important area. Some 375,400 Eurasian Oystercatchers were counted here in January 1995 (Delany *et al.* 1999), as compared with a peak count in the 1980s of 445,800, adjusted to 593,200 after compensation for areas that were not counted. The decrease at the Dutch Wadden Sea continued into the 2000s, and the five year mean of annual peak counts for the Dutch Wadden Sea between 1999 and 2003 was 184,000 (SOVON data). The next most important area is the Dutch Delta area with approximately 80,000 birds (January means 1996-1998; Berrevoets *et al.* 2000). In France, the Baie de Mont St Michel on occasion holds more than 20,000 birds, with an average of 10,000 in mid-January 1993-1999, or up to 25% of the total in France (Deceuninck & Mahéo 2000).

Five important wintering sites have been identified for *H. o. longipes*: three sites on the south coast of Iran and two in Oman. One of the latter, Barr al Hikman, is particularly important for this subspecies, at times holding over 10,000 birds, i.e. about 5-10% of the estimated population. During the migration seasons, *longipes* uses coastal wetlands in the eastern Mediterranean (Greece, Meininger 1990; Turkey, Kivit *et al.* 1994), Black Sea (van der Have *et al.* 1993), Caspian Sea and Red Sea as staging areas, but only sporadic quantitative data are available.

Protection status of key sites

All three key wintering sites for *longipes* in southern Iran were designated as Ramsar sites in 1975, and the tidal mudflats of Khor-al Amaya and Khor Musa are protected within Shadegan Wildlife Refuge (296,000 ha) established in 1972. The two wintering sites in Oman are unprotected.

Bruno Ens, Cor Smit & Simon Delany

Steffen Foerster

Black-winged Stilt

Himantopus himantopus

Geographical variation and distribution

The Black-winged Stilt is often regarded as a polytypic cosmopolitan species comprising at least five subspecies, but many authors now give full specific status to the forms occurring in North, Central and northern South America (*mexicanus*), southern South America (*melanurus*), Hawaii (*knudseni*) and Australasia (*leucocephalus*). The breeding range of nominate *himantopus* extends from The Netherlands, France and Iberia south through sub-Saharan Africa to the Cape and Madagascar, and east through Central Asia to north-central China, the Indian subcontinent and South-east Asia (Tourenq *et al.* 1995, del Hoyo *et al.* 1996). Birds in Madagascar have completely white heads, and thus seem to be morphologically distinct from Black-winged Stilts occurring on the mainland of Africa (F. Hawkins *in litt.* in Dodman 2002). The birds breeding in Southern Africa (considered by some as *meridionalis*) and Sri Lanka (*ceylonensis*) are also often recognised as separate forms. The form *meridonalis* was described in 1963, the original separation based on shorter wing and longer tail than the nominate, then by lack of black on the head, nape or neck of breeding males, although this varies clinally in Africa, the amount of black increasing northwards, and various authorities do not recognise this form (Hockey *et al.* 2005).

Birds breeding at northern latitudes migrate to winter quarters in the Sahelian region, the Middle East and Southern Asia. Many of the birds breeding in Africa north of the Sahara are thought to be mainly sedentary, at least in North-west Africa (Rufino & Neves 1995). In sub-Saharan Africa, the species is nomadic or partially migratory, and is absent only in regions where forest cover is very dense (Urban *et al.* 1986) and in very arid areas of the Horn of Africa. A small breeding population has recently become established in the Cape Verde Islands, where it was first reported in the 1960s (Hazevoet 1995), but the species is absent from islands in the Gulf of Guinea (Christy & Vande Weghe 1999). In Madagascar, it is non-migratory, occurring principally in the western wetlands, whilst it is sparsely distributed in the east and south (Dodman 2002) and absent from the high plateau (Morris & Hawkins 1998).

Movements

In Western Eurasia, the species' migratory behaviour varies from being fully migratory to being sedentary, depending on the latitude of the breeding grounds. Birds from southern latitudes are becoming increasingly more sedentary, as shown by changes in range and numbers of overwintering birds in South-west Europe (Rufino & Neves 1995). Migratory birds seem to move south or south-west in autumn. Return migration might take a slightly more easterly route.

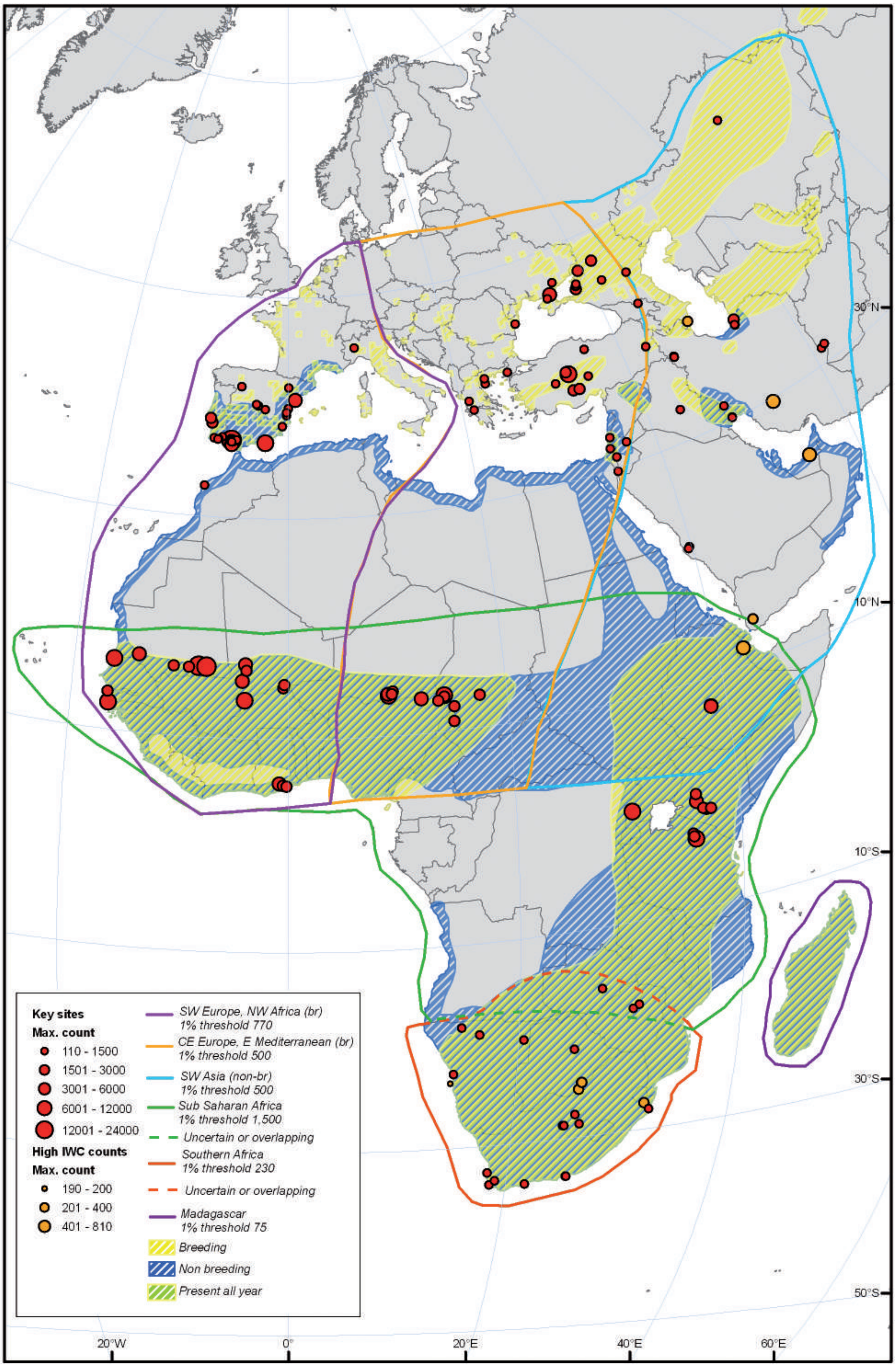
The species is considered nomadic (Cramp & Simmons 1983, Harrison *et al.* 1997), and this is supported by the few ring recoveries of European breeding birds. Birds fledged in France have been found breeding in Portugal; birds from Portugal, in north-west Italy. Within Iberia, there is evidence for birds breeding well away from the place where they were hatched. Some birds are, nevertheless, site-faithful between winters (Yésou *et al.* 1995).

Departure of birds on autumn migration starts as early as late July in South-west Europe, failed breeders dispersing even earlier than this. Some juveniles can leave their breeding grounds soon after they have fledged, as shown by colour-marked sightings in Iberia, or they may stay with their parents on the breeding grounds throughout the winter.

Snow & Perrins (1998) mention autumn concentrations of Black-winged Stilts in the southern Caspian Sea from mid-August to October, possibly of birds moulting before migration. In Western Europe, birds start moulting in July, but those that migrate seem not to complete their moult before leaving, suggesting that either they are able to migrate while moulting or that they suspend moult before departing (Cramp &

Black-winged Stilt

Himantopus himantopus



Simmons 1983). Most North African birds migrate southward after breeding (Urban *et al.* 1986), whilst the region does not support large numbers of birds from northern latitudes in winter, which mostly pass though on a broad front migration. However, there is an increasing number of birds wintering in Mediterranean wetlands of Algeria and Tunisia (Isenmann & Moali 2000, Isenmann *et al.* 2005), whilst winter numbers in Morocco are very variable, depending on the amount of autumn-winter rains and resulting areas of flood waters (Thévenot *et al.* 2003). The species has recently extended its breeding range to the Canary Islands, where a small breeding population (15-20 pairs) has been established on Lanzarote since 1996, with subsequent irregular breeding on other islands. It is also an uncommon but regular passage migrant throughout the archipelago (Martín & Lorenzo 2001, Lorenzo & Barone 2007).

In the Cape Verde Islands, breeding takes place on the island of Sal between mid-March and July, and there is some movement, probably of non-breeding birds, to other islands (Hazevoet 1995). In coastal Senegal, breeding occurs during a similar period. Breeding also occurs at coastal lagoons in Ghana, with breeding activity noted in May (Bannerman 1953). Dispersal of resident West African birds is most likely after breeding, during the main rainy season, probably to a wide range of permanent and ephemeral wetlands in the Sahel belt which are seasonally very productive habitats.

Six hundred Black-winged Stilts were recorded in the Inner Niger Delta in June 1999, and these were largely immature birds (Van der Kamp & Diallo 1999), presumably from breeding sites elsewhere, possibly Ghana. In East Africa, the Black-winged Stilt breeds in small numbers at several sites in the Rift Valley (Britton 1980), and is a widespread breeder at coastal wetlands in Tanzania (Baker 1996). It is present throughout the year in southern Somalia (Ash & Miskell 1998). Overall, it is probably largely resident within Eastern Africa, performing local, possibly nomadic, movements across a wide network of wetlands throughout the year. Throughout the range of the sub-Saharan population, it appears that breeding generally occurs before the onset of the main rains, with dispersal and generally local and partially nomadic movements occurring afterwards, particularly to exploit ephemeral wetlands.

Underhill *et al.* (1999) reported that in Southern Africa, coastal birds are probably locally nomadic, whilst inland birds are rains migrants, moving widely according to patterns of rainfall. Passage has apparently been reported through Zimbabwe, probably of birds from higher rainfall areas to the north. In Zambia, Benson *et al.* (1971) reported Black-winged Stilts to be far more numerous during the dry season than during the wet, leaving during the period of peak flooding (Tree 1997) and probably moving southwards through Botswana and Zimbabwe. However, Dowsett *et al.* (2008) concluded that there was no significant pattern to the stilt's status in Zambia, with records in all months. Concentrations at wetlands are generally higher when water levels are falling or low.

Population limits

Six populations are recognised in Western Eurasia and Africa. Three of these breed in the Palearctic and migrate along south-west to north-east trajectories. The other three populations occur in sub-Saharan Africa and Madagascar, and are sedentary, nomadic or partially migratory. The six populations are as follows:

1) birds breeding in Western Europe, largely in the western Mediterranean, and North-west Africa, and wintering in South-west Europe and West Africa;
2) birds breeding in Central and Eastern Europe (and probably Egypt) and wintering through the eastern Mediterranean and into Central Africa;
3) birds breeding in West-central Asia and wintering in South-west Asia and North-east Africa;
4) birds breeding in sub-Saharan Africa (excluding Southern Africa),
5) Birds breeding in Madagascar;
6) birds breeding in Southern Africa, probably south of the miombo woodland block of northern Zambia (sometimes considered as the form "*meridionalis*").

Population size

1. *himantopus* South-west Europe & North-west Africa (breeding)

Population estimate	1% threshold	Population trend
71,000-82,000	770	Stable

The average number of birds counted by the IWC in the region during the 1990s was about 25,000 (Stroud *et al.* 2004), but this is known to be incomplete, although it is a significant increase on the total of 6,000 given by Smit & Piersma (1989): an indication of the overall improved count coverage since the 1980s. Compilations based on all published data have accounted for 26,000-40,000 (Rufino & Neves 1995), but the true population size clearly exceeds the upper limit of this estimate. Estimates of breeding populations in countries within the range of this population total 23,662-27,242 pairs, which equate to approximately 71,000-82,000 post-breeding individuals (data from Thorup 2006). Included in this total are an estimated 400-500 pairs breeding in Tunisia in the 1970s (Cramp & Simmons 1983), although the number breeding in Tunisia may be many more than this, varying from one year to another but probably increasing overall (Isenmann *et al.* 2005). Stroud *et al.* (2004) adopted 71,000-82,000 as their population estimate, but considered it to be a minimum assessment since the compilation excluded birds breeding in Morocco, where sometimes thousands may breed (Cramp & Simmons 1983), Thévenot *et al.* (2003) providing details of widespread breeding sites. There are smaller breeding populations in Algeria (Isenmann & Moali (2000) and the Canary Islands (Lorenzo & Barone 2007). A 1% threshold of 770 was derived from the mid-point of the population range. The estimate of Stroud *et al.* (2004) was adopted in *WPE3* and *WPE4*, although national estimates from BirdLife International (2004a) suggest a slightly smaller population in Western Europe (19,000-26,600 pairs).

2. *himantopus* Central & Eastern Europe, East Mediterranean (breeding)

Population estimate	1% threshold	Population trend
40,000-60,000	500	Possibly stable

Stroud *et al.* (2004) used breeding estimates from Thorup (2006) and included an estimate of 165-240 pairs from Israel (from Cramp & Simmons 1983) to give a total of 7,658-14,631 pairs, i.e. approximately 23,000-44,000 post-breeding individuals. These authors assigned only those birds breeding in central-west Russia (40-145 pairs) to this population; birds breeding in central-east, south and south-east Russia were assigned to the South-west Asian population. National estimates from BirdLife International (2004a) give a somewhat higher total of 12,525-20,490 pairs, excluding Russia. Adding 40-145 pairs in central-west Russia and 165-240 pairs in Israel to this total gives a revised estimate of 12,730-20,875 pairs, or about 38,000-62,500 individuals. This new estimate, rounded to 40,000-60,000, was adopted in *WPE4*, with a 1%

threshold of 500 set at the mid-point of the range. Turkey holds a significant part of the population with 9,000-12,000 breeding pairs (BirdLife International 2004a).

Midwinter counts in the 1990s revealed only 1,834 birds in the region (Stroud *et al.* 2004), and confirm that important wintering grounds in sub-Saharan regions may not yet have been counted.

3. ***himantopus*** South-west Asia (breeding)

Population estimate	1% threshold	Population trend
30,000-70,000	500	Unknown

Winter counts and estimates provide some data on wintering numbers in South-west Asia, with an average total of 18,600 birds (Stroud *et al.* 2004), but coverage of important wintering areas in Iraq and North-east Africa has been incomplete. Breeding data are limited, and it is therefore not possible to gain an independent impression of the completeness of the winter data. However, breeding estimates from central-east, south and south-east Russia (in Thorup 2006), Armenia and Azerbaijan (in BirdLife International 2004a), and Iran (in Scott 1995) amount to 6,797-18,248 pairs, i.e. about 20,000-55,000 post-breeding individuals. Given that this total includes neither the whole range in Russia, nor the other breeding areas in Kazakhstan, Turkmenistan and Uzbekistan, it is clear that the estimate of 20,000-50,000 individuals made by Stroud *et al.* (2004) is too low. A higher estimate of 30,000-70,000 was therefore adopted in *WPE4*, with a 1% threshold of 500 set at the mid-point of the range.

4. ***himantopus*** Sub-Saharan African

Population estimate	1% threshold	Population trend
100,000-200,000	1,500[1]	Unknown

[1] *WPE4 gives the 1% threshold as 10,000 in error.*

It is difficult to base a population estimate on January AfWC counts, as at this time of year there are birds in Africa from this population, two breeding populations from Europe and one from South-west Asia, whilst the northern limit of the Southern African population ("*meridionalis")* is not at all clear. Only a few countries in West and Eastern Africa regularly carry out AfWC counts in July, when most birds from the three European/Asian breeding populations are presumably absent from Africa. In this month, both Ghana and Kenya regularly hold reasonable numbers of stilts, e.g. 3,953 at the Keta Lagoon complex in Ghana in July-August 1999, and over 3,000 in the Densu Delta and Sakumo Lagoon in Ghana and 1,558 at Mwea-Tibera Rice Scheme in Kenya in July-August 2000 (AfWC database). Baker (1996) suggests that Tanzania supports a population of 30,000-40,000 birds.

As a crude approximation, Stroud *et al.* (2004) gave an estimate for this population as within the range 100,000-1,000,000 birds, although this was largely based on extrapolations and comparisons with the population in Southern Africa. Dodman (2002) felt that the estimate given by Stroud *et al.* (2004) provided a good minimum figure of 100,000, but considered the upper limit of 1,000,000 to be an overestimate. He suggested that there were likely to be fewer than 50,000 birds resident in West Africa, fewer than 100,000 in Eastern Africa and fewer than 50,000 in Central and south-central Africa. This gives a maximum of 200,000. He therefore proposed a new population estimate of 100,000-200,000, and recommended the use of a mid-point 1% threshold of 1,500. This new estimate was adopted in *WPE4*, although the former 1% threshold of 10,000 was inadvertently retained.

5. ***himantopus*** Madagascar

Population estimate	1% threshold	Population trend
5,000-10,000	75	Unknown

F. Hawkins (*in litt.* in Dodman 2002) suggested that a reasonable estimate might be 5,000-10,000 based on distribution: the species is common in the west, where there are several fairly large centres with probably several hundred pairs, whilst it is sparse in the east and south of the island. Numbers recorded in the AfWC are generally very low, presumably indicating a rather low-density and wide distribution across the extensive wetlands of western Madagascar. A total of 521 was recorded in Madagascar in January 1998 (Dodman *et al.* 1999). The estimate of 5,000-10,000 was adopted by Stroud *et al.* (2004) and *WPE3*, and retained in *WPE4*, with a 1% threshold of 75 based on the mid-point of the range.

6. ***himantopus (meridionalis)*** **Southern Africa**

Population estimate	1% threshold	Population trend
15,000-30,000	230	Increasing

Underhill *et al.* (1999) estimated there to be 15,000-30,000 Black-winged Stilts resident in Southern Africa (south of the Zambezi and Cunene Rivers). The maximum July count of the AfWC for the sub-region is 9,430 birds in July 2000 (including 469 birds in Zambia, possibly north of the supposed Southern Africa population limit), with a notable 5,600 at Walvis Bay, Namibia (Dodman & Diagana 2003). A total of 3,809 was recorded in South Africa in July 2000 (Dodman & Diagana 2003). In Botswana, there appear to be far fewer birds in the large northern wetlands, such as the Okavango Delta, compared to wetlands in the south-east, many of which are artificial (Tyler 2001). Stroud *et al.* (2004) proposed a provisional 1% threshold of 230 based on the mid-point of the population range, but noted the low precision of the population estimate from which it was derived. However, recent counts from the AfWC lend good support to this population estimate. The population has been steadily increasing since the early 1900s, mainly due to the expansion of artificial wetlands, with colonisation as a breeding species in Namibia in the 1950s, major increases in South Africa's Western Cape in the 1950s-1960s and increases in Zimbabwe's central plateau since the 1970s (Hockey *et al.* 2005).

Conservation status

In Western Eurasia, the breeding population seems to be stable or even increasing, if the estimates made in recent years accurately reflect population changes. For example, a moderate increase was reported in France between 1984 and 1996 (Deceuninck 2001). BirdLife International (2004a) gives the overall trend in Europe as fluctuating, with stable or fluctuating breeding populations in most countries, some increases in Italy, Romania, Russia, Spain and Ukraine, and decreases only in Albania, Armenia and Turkey. Locally, the replacement of salt-pans with fish-farms and the drainage of temporary wetlands have had a negative effect on breeding numbers, but it is not known what impact this has had at the population level.

Tree (1997) refers to an increase in range and numbers in Southern Africa as a result of the creation of artificial wetlands. Elsewhere in Africa, there is no reason for concern for the overall conservation status of this cosmopolitan and widespread species, which seems to adapt well to change, being a common denizen of a range of artificial wetlands, from rice fields to sewage works, farm dams, large reservoirs and oxidation ponds. Recent expansions of the breeding range to eastern islands of the Canaries and Cape Verde are noteworthy.

Habitat and ecology

An opportunistic species, the Black-winged Stilt breeds in a wide variety of habitat types, both natural and man-made (Tinarelli 1992b, Snow & Perrins 1998). Historically, ephemeral and temporary wetlands must have been used, but today, as a result of human activities, a great variety of man-made wetlands have also become available to the species, such as salt-pans, sewage treatment plants, sugar factory ponds, farm ponds and rice fields. Its opportunistic feeding behaviour allows it to benefit from temporary food sources, such as earthworms emerging from rice fields at the beginning of flooding.

Breeding occurs in small, loose colonies of five to 50 pairs, occasionally more. Solitary breeding is not uncommon. In temperate latitudes breeding takes place in spring, whereas in tropical regions the species usually breeds after the rainy season. The numbers of breeding birds at particular sites may fluctuate greatly from one year to the next, possibly influenced by either: (a) nomadic and opportunistic behaviour where habitat conditions are unstable, thus resulting in significant regional variations in numbers; or (b) winter habitat conditions of the European-breeding populations, notably water levels, since Tinarelli (1992a) recorded a relationship between the numbers of Black-winged Stilts breeding in Italy and the numbers wintering on the Inner Niger Delta in Mali.

Network of key sites

In the Cape Verde Islands, all Black-winged Stilts breed at the Pedra de Lume salt-pans on the island of Sal, which is a key site for this relatively new sub-population. Elsewhere in West Africa, several of Ghana's coastal wetlands can be considered as key sites for this population, notably the Keta Lagoon complex, the Densu Delta (which includes the Panbros salt-pans) and Sakumo Lagoon. It is likely that some wetlands in Senegal merit consideration as key sites, but data on numbers present between May and August (when birds of Palearctic origin are absent) are lacking. In Eastern Africa, the Mwea Irrigation Scheme of central Kenya held over 1,500 birds in July 1999. Regular breeding sites, such as Lake Magadi, and a network of coastal wetlands are also important for maintenance of the population.

There are several key sites in Southern Africa, notably Walvis Bay and Bushmanland Pan in Namibia, Plantfontein Pans and Kamfers Dam in South Africa, the Kafue Flats in southern Zambia, and Lakes Manyame and Chivero in Zimbabwe.

Protection status of key sites

There is no protection at the Pedra de Lune salt-pans in the Cape Verde Islands. The key sites in the coastal wetlands of Ghana are all Ramsar sites. The main threat at Keta, Dansu Delta and Sakumo is escalating urbanisation, with unauthorised and largely uncontrolled housing developments (Ntiamoa-Baidu *et al.* 2001). Several of the breeding sites for Black-winged Stilts within the Rift Valley in East Africa enjoy some form of protected status, whilst some are managed for conservation. In Southern Africa, Walvis Bay and the Kafue Flats are Ramsar sites, the former having some partial protection, whilst the latter is largely under National Park or Game Management Area status. Lakes Manyame and Chivero are fully protected recreational parks. In Madagascar, Lake Tsimanampesotse is a National Park and Ramsar site.

Table 7. Key sites for Black-winged Stilt. Sites where 1% or more of a population has been recorded

Country	Site	Lat.	Long.	Season	Max total	Year max	Average total	Basis for average	Source	Population(s) at site
Botswana	Rysana Pan	-21.25	25.07	Non-breeding	467	1994	319	1991-96 (5)	AfWC database	Southern Africa
Burkina Faso	Béli River	14.97	-0.42	Non-breeding	1741	1990s			WBDB	*himantopus*, Sub-Saharan Africa + W & SW Europe, W Africa
Burkina Faso	Mare d'Oursi	14.67	-0.50	Pre-breeding migration	2680	1998			AfWC-database	*himantopus*, Sub-Saharan Africa + W & SW Europe, W Africa
Cameroon	Parc National de Waza Logone	10.83	15.00	Non-breeding	2300	2000			P Scholte *in litt.*	*himantopus*, Sub-Saharan Africa + C & E Europe, E Med
Chad	Bas-Chari	12.17	15.12	February	2561	1999			B Trolliet, unpublished data	*himantopus*, Sub-Saharan Africa + C & E Europe, E Med
Chad	Lake Chad	13.28	14.26	January	9701	2008			B Trolliet, unpublished data	*himantopus*, Sub-Saharan Africa + C & E Europe, E Mediterranean
Chad	Lake Fitri	12.95	17.50	January	2272	2007			B Trolliet, unpublished data	*himantopus*, Sub-Saharan Africa + C & E Europe, E Mediterranean

Country	Site	Lat.	Long.	Season	Max total	Year max	Average total	Basis for average	Source	Population(s) at site
Gambia	Tanbi wetland complex	13.42	-16.62	Non-breeding	2000	1990s			WBDB	*himantopus*, Sub-Saharan Africa + W Europe, W Africa
Ghana	Keta Lagoon complex	5.92	-0.83	Non-breeding	3953	1999			AfWC-database	*himantopus*, Sub-Saharan Africa + W Europe, W Africa
Ghana	Sakumo Lagoon	5.67	-0.17	July-August	1638	2000			AfWC-database	*himantopus*, Sub-Saharan Africa + W Europe, W Africa
Ghana	Songhor Lagoon	5.75	-0.50	Non-breeding	1900	1998			AfWC-database	*himantopus*, Sub-Saharan Africa + W Europe, W Africa
Greece	Agios Mamas marsh	40.23	23.33	Breeding	900	1996			WBDB	CE Europe, E Mediterranean
Greece	Amvrakikos Wetlands	39.00	21.00	Breeding	1080	1996			WBDB	CE Europe, E Mediterranean
Greece	Kalogria lagoon and Lamia marshes	38.17	21.37	Breeding	810	1994			WBDB	CE Europe, E Mediterranean
Greece	Lakes Volvi-Langada	40.68	23.37	Migration	600	1995			WBDB	CE Europe, E Mediterranean
Iran	Gomishan Marshes & Turkoman Steppes	37.25	53.92	Non-breeding	1700	1992			Evans, 1994	SW Asia
Iran	Hamidieh (Omidiyeh) plains	31.33	48.33	Non-breeding	650	1992			Evans, 1994	SW Asia
Iran	Hamoun-i Sabari & Hamoun-i Hirmand	31.17	61.17	April	790	1972			Evans, 1994	SW Asia
Iran	Lake Kobi	36.95	45.50	August	600	1972			Evans, 1994	SW Asia
Iran	Miankaleh Peninsula & Gorgan Bay	36.83	53.75	April	938	1973			Evans, 1994	SW Asia
Iran	Shadegan Marshes, Khor-al Amaya & Khor Musa	30.17	48.67	Wintering	800	1972			Evans, 1994	SW Asia
Iran	Shur Gol, Yadegarlu & Dorgeh Sang	37.02	45.52	August	1500	1972			Evans, 1994	SW Asia
Iran	South end of Hamoun-i Puzak	31.33	61.75	October	650	1975			Evans, 1994	SW Asia
Iraq	Bahr Al Milh	32.67	43.67	Migration	500	1979			Evans, 1994	SW Asia
Israel	Judean Foothills	31.75	34.92	Migration	750	1991			IWC database	CE Europe, E Mediterranean
Israel	Northern Arava Valley	30.88	35.32	Migration	500	1980-89			IWC database	CE Europe, E Mediterranean
Israel	Southern Arava Valley & Elat Mountains	29.67	35.00	Migration	500	1980-89			IWC database	CE Europe, E Mediterranean
Israel	Valley Of Yesreel	32.67	35.25	Winter	1101	1991	124	1996-00 (5)	WBDB	CE Europe, E Mediterranean
Italy	Vercelli rice-fields	45.20	8.27	Breeding	990	1995			WBDB	SW Europe, NW Africa
Jordan	Azraq Oasis	31.83	36.83	Breeding	1395	1992			WBDB	CE Europe, E Mediterranean
Kazakhstan	Tengiz-Korgalzhyn Lakes	50.50	69.40	Post-breeding	575	1999	559	1999-04 (6)	Schielzeth *et al.* in prep.	SW Asia
Kenya	Dandora Oxidation Ponds	-1.25	36.92	Non-breeding	1558	2000			AfWC-database	*himantopus*, Sub-Saharan Africa
Kenya	Lake Bogoria	0.25	36.12	Non-breeding	1934	1997			AfWC-database	*himantopus*, Sub-Saharan Africa
Kenya	Lake Nakuru National Park	-0.37	36.08	Non-breeding	3121	1991			AfWC-database	*himantopus*, Sub-Saharan Africa
Kenya	Manguo Floodplain	-1.10	36.65	Non-breeding	1558	2000			AfWC-database	*himantopus*, Sub-Saharan Africa
Kenya	Mwea-Tibera Rice Scheme	-1.30	37.37	July-August	1550	1999			AfWC-database	*himantopus*, Sub-Saharan Africa
Mali	Inner Niger Delta Total	13.50	-4.00	January	12200	2006	11600	2006-08 (3)	O. Girard *in litt.*	*himantopus*, Sub-Saharan Africa + W & SW Europe, W Africa

Country	Site	Lat.	Long.	Season	Max total	Year max	Average total	Basis for average	Source	Population(s) at site
Mali	Lac Faguibine	16.75	-4.00	Non-breeding	3060	1990s			WBDB	*himantopus*, Sub-Saharan Africa + W & SW Europe, W Africa
Mali	Lac Horo	16.22	-3.92	January	2230	2008			O. Girard *in litt.*	*himantopus*, Sub-Saharan Africa + W & SW Europe, W Africa
Mauritania	Lac d'Aleg	17.08	-13.98	Non-breeding	4280	2001			AfWC-database	*himantopus*, Sub-Saharan Africa + W & SW Europe, W Africa
Mauritania	Gâat Mahmoûdé	16.45	-8.38	Non-breeding	13200	2001	10350	2000-01 (2)	AfWC database	Sub-Saharan Africa + SW Europe, NW Africa
Mauritania	Sawana--Oum Lellé	16.33	-9.28	Non-breeding	2135	>1989			WBDB	*himantopus*, Sub-Saharan Africa + W & SW Europe, W Africa
Mauritania	Tamourt Sawana	16.33	-10.70	Non-breeding	2135	2000			AfWC-database	*himantopus*, Sub-Saharan Africa + W & SW Europe, W Africa
Morocco	Lagune De Sidi Moussa Oualidia: El Jadida	-32.78	-8.95	Non-breeding	919	1995	651	1991-95 (5)	IWC database	SW Europe, NW Africa
Namibia	Bushmanland Pan	-19.75	20.50	July-August	946	1991	327	1991-00 (3)	AfWC database	Southern Africa
Namibia	Etosha National Park	-18.80	16.57	Non-breeding	319	1997	147	1993-98 (5)	AfWC database	Southern Africa
Namibia	Oponono Lake and Oshitunto	-18.00	15.00	July-August	307	1999	212	1999-00 (2)	AfWC database	Southern Africa
Namibia	Walvis Bay Ramsar Site	-22.50	14.42	July-August	768	1997-05	262	1997-05 (9)	Wearne & Underhill 2005	Southern Africa
Niger	Atchi	13.80	9.47	Non-breeding	2500	2000			AfWC-database	*himantopus*, Sub-Saharan Africa + C & E Europe, E Mediterranean
Niger	Chiya	13.80	9.15	Non-breeding	4300	2000			AfWC-database	*himantopus*, Sub-Saharan Africa + C & E Europe, E Mediterranean
Niger	complexe des Retraits du Lac Tchad	16.00	16.00	Pre-breeding migration	7720	2001			AfWC-database	*himantopus*, Sub-Saharan Africa + C & E Europe, E Mediterranean
Niger	Falke (Taouna)	13.68	9.17	Non-breeding	6027	2001			AfWC-database	*himantopus*, Sub-Saharan Africa + C & E Europe, E Mediterranean
Niger	Lassouri + Karandi	14.02	9.57	Pre-breeding migration	2717	2001			AfWC-database	*himantopus*, Sub-Saharan Africa + C & E Europe, E Mediterranean
Niger	Tam	13.13	12.13	Pre-breeding migration	4300	2001			AfWC-database	*himantopus*, Sub-Saharan Africa + C & E Europe, E Mediterranean
Nigeria	Lake Chad - Nigerian part	12.83	13.67	Non-breeding	1826	2000			AfWC-database	*himantopus*, Sub-Saharan Africa + C & E Europe, E Mediterranean
Portugal	Castro Marim	37.22	-7.43	Breeding	1200	1996			WBDB	SW Europe, NW Africa
Portugal	Estuário Do Sado	38.45	-8.72	Breeding	2400	1996			WBDB	SW Europe, NW Africa
Portugal	Estuário Do Tejo	38.82	-8.92	Breeding	2250	1996			WBDB	SW Europe, NW Africa

Country	Site	Lat.	Long.	Season	Max total	Year max	Average total	Basis for average	Source	Population(s) at site
Portugal	Pera marsh	37.10	-8.33	Resident	900	2001			WBDB	W Europe, NW Africa
Portugal	Ria De Faro	37.00	-7.92	Non-breeding	884	1997	539	1997-01 (5)	IWC database	SW Europe, NW Africa
Romania	Razim-Sinoie Lagoons	44.67	29.00	May	500	1996			C. Sudfeldt *in litt.*, Schmitz *et al.* 2001	CE Europe, E Mediterranean
Russia	Akhtari Lagoons	46.00	38.25	Breeding	1050	1995			Krivenko 1998, per V. Belik	CE Europe, E Mediterranean
Russia	Bejsug Lagoons	46.17	38.38	Breeding	750	1995			Mischenko 1999, per V. Belik	CE Europe, E Mediterranean
Russia	Bolshovskaja flood-plain	47.50	41.67	Breeding	2100	1979			V. Belik unpublished	CE Europe, E Mediterranean
Russia	Dadynskiye lake	45.27	45.07	Breeding	600	1996			WBDB	SW Asia
Russia	Delta of the River Don	47.17	39.42	Migration	3000	1997			WBDB	CE Europe, E Mediterranean
Russia	Eastern coast of the Sea of Azov	45.77	38.08	Breeding	2640	1995			WBDB	CE Europe, E Mediterranean
Russia	Ptich'je Lake	42.42	44.50	Breeding	600	1984			Khoklov *et al.* 1986,	SW Asia per V. Belik
Russia	Salt-lakes in the Primorsko-Akhtarsk area	46.00	38.17	Breeding	1290	1989			WBDB	CE Europe, E Mediterranean
Russia	Solonoe Lake	45.58	41.70	Breeding	750	1979			Khoklov 1987, per V. Belik	CE Europe, E Mediterranean
Saudi Arabia	Makkah Waste-water Stream	21.28	39.68	Non-breeding	980	1992			Evans, 1994	SW Asia
Saudi Arabia	Mecca By-Pass Pool (Makkah)	21.42	39.83	Non-breeding	980	1993	373	1993-96 (4)	IWC database	SW Asia
Senegal	Casamance delta	12.43	-16.48	December	6500-7000	1985-87			R Mahéo *in litt* to P. Yésou	*himantopus*, Sub-Saharan Africa + W & SW Europe, W Africa
Senegal	Parc National des Oiseaux de Djoudj	16.42	-16.25	Non-breeding	10001	1992			AfWC database	Sub-Sahara + SW Europe, NW Africa
South Africa	Berg 3: Hotel Mudflats and Estuary	-32.78	18.18	July-August	472	1998	358	1996-00 (5)	AfWC database	Southern Africa
South Africa	Bloemhof Dam	-27.68	25.67	July-August	355	1993	47	1995-00 (5)	AfWC database	Southern Africa
South Africa	Kamfers Dam	-28.67	24.77	Pre-breeding migration	774	2000	474	2000-01 (2)	AfWC database	Southern Africa
South Africa	Lake St Lucia	-28.07	32.45	July-August	383	1992	68	1996-00 (5)	AfWC database	Southern Africa
South Africa	Paarl Bird Sanctuary	-33.68	18.97	July-August	376	1999	238	1995-00 (5)	AfWC database	Southern Africa
South Africa	Platfontein Pans	-28.65	24.62	Pre-breeding migration	874	2000	162	1997-00 (2)	AfWC database	Southern Africa
South Africa	Rondevlei Nature Reserve	-34.07	18.50	Non-breeding	407	1997	345	1997-01 (5)	AfWC database	Southern Africa
South Africa	Sunnyside Pan	-28.65	26.13	Non-breeding	320	1999			AfWC database	Southern Africa
South Africa	Voelvlei	-34.27	21.82	Non-breeding	250	1997	180	1994-97 (2)	AfWC database	Southern Africa
South Africa	Zwartkops River Estuary	-33.87	25.63	Non-breeding	369	2001	185	1995-01 (5)	AfWC database	Southern Africa
Spain	Albufera de Valencia	39.33	-0.25	Breeding	1026	1996			WBDB	SW Europe, NW Africa
Spain	Cádiz Bay	36.58	-6.33	Breeding	2184 728 prs	1991			F. Hortas *in litt.*	SW Europe, NW Africa
Spain	Cinca river rice fields and steppe area	41.83	0.05	Breeding	1050	1996			WBDB	SW Europe, NW Africa
Spain	Cortados del Jarama	40.17	-3.52	Migration	1500	1996			WBDB	SW Europe, NW Africa
Spain	Dehesa De Abajo (Se)	40.30	-3.75	Non-breeding	1200	1998	422	1998-03 (5)	IWC database	SW Europe, NW Africa
Spain	Del Palacio A La Algaida (H)	36.80	-2.60	Winter	9100	2001	2007		1998-03 (5)	IWC database SW Europe, NW Africa
Spain	Delta Del Ebro	40.70	0.80	Pre-breeding migration	5000	1992			IWC database	SW Europe, NW Africa

Country	Site	Lat.	Long.	Season	Max total	Year max	Average total	Basis for average	Source	Population(s) at site
Spain	El Hito	39.87	-2.68	Breeding	858	1997			WBDB	SW Europe, NW Africa
Spain	El Moro marshes	39.58	-0.25	Breeding	900	1996			WBDB	SW Europe, NW Africa
Spain	Laguna de Zarracatín (SE)	37.02	-5.80	Non-breeding	1021	1997	347	1990-98 (3)	IWC database	SW Europe, NW Africa
Spain	Lucios De Beta La Palma-Isla Mayor (Se)	36.93	-6.24	Winter	2062	2000	999	1996-03 (5)	IWC database	SW Europe, NW Africa
Spain	Lucios Del Caballero Y Del Puntal (H)	36.96	-6.43	Winter	1260	2001	631	1999-01 (2)	IWC database	SW Europe, NW Africa
Spain	Parque Nacional de Doñana	36.99	-6.37	Non-breeding	13256	2001	3489	1997-01 (5)	IWC database	SW Europe, NW Africa
Spain	Parque Natural De El Hondo	38.33	-0.70	Breeding	993	1995			WBDB	SW Europe, NW Africa
Spain	River Mijares mouth	39.95	-0.02	Resident	1185	1993			WBDB	SW Europe, NW Africa
Spain	Salinas De Bonanza (Ca) (Hidalgo)	36.82	-6.34	Winter	900	1998	400	1994-01 (5)	IWC database	SW Europe, NW Africa
Spain	Villafáfila	41.83	-5.58	Breeding	1371	1996			WBDB	SW Europe, NW Africa
Tanzania	Lake Manyara National Park	-3.67	35.83	Non-breeding	8367	>1989			WBDB	*himantopus*, Sub-Saharan Africa
Tanzania	Lake Masek	-3.17	35.58	Non-breeding	2613	1995			AfWC-database	*himantopus*, Sub-Saharan Africa
Turkey	Aksehir & Eber lakes	38.60	31.30	Breeding	933	1995			WBDB	CE Europe, E Mediterranean
Turkey	Çol lake & Çalikdüzü	39.30	32.90	Breeding	3000	1998			WBDB	CE Europe, E Mediterranean
Turkey	Eregli marshes	37.53	33.75	Breeding	1800	1986			WBDB	CE Europe, E Mediterranean
Turkey	Hotamis marshes	37.58	33.05	Breeding	2850	1985			WBDB	CE Europe, E Mediterranean
Turkey	Kizilirmak Delta	40.67	35.97	Breeding	825 250-300 prs	1992			Hustings & van Dijk 1994	CE Europe, E. Mediterranean
Turkey	Kulu lake	39.08	33.15	Breeding	12000	1986			WBDB	CE Europe, E Mediterranean
Turkey	Meric delta	40.77	26.23	Breeding	1050	1994			WBDB	CE Europe, E Mediterranean
Turkey	Sodalìgöl	38.82	42.98	Breeding	1320	1996			WBDB	CE Europe, E Mediterranean
Turkey	Sultansazligi	38.33	35.27	Breeding	1170	1994			WBDB	CE Europe, E Mediterranean
Uganda Reserve	Kyambura Game	0.05	30.25	Non-breeding	8090	1998			AfWC-database	*himantopus*, Sub-Saharan Africa
Ukraine	Ajgul & Karleut lakes	45.92	34.07	Breeding	1050	1999			WBDB	CE Europe, E Mediterranean
Ukraine	Lake near Magazinka village	45.92	34.07	Breeding	1050	1997			WBDB	CE Europe, E Mediterranean
Ukraine	Molochna river valley	47.08	35.50	Breeding	600	1997			WBDB	CE Europe, E Mediterranean
Ukraine	The Sivash, Azov Sea	46.17	34.58	August	5200	1998			Chernichko *et al.* 2001	CE Europe, E Mediterranean
Zambia	Kafue Flats	-15.75	27.27	July-August	735	1993	313	1993-97 (5)	AfWC database	Southern Africa
Zimbabwe	Lakes Manyame & Chivero	-17.83	30.62	July-August	632	1995	285	1993-95 (3)	AfWC database	Southern Africa
Zimbabwe	Whitehead Ponds	-18.13	30.12	July-August	470	1993	246	1993-97 (2)	AfWC database	

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Pied Avocet

Recurvirostra avosetta

Geographical variation and distribution

The Pied Avocet is a monotypic species, and the only geographical variation reported is some clinal increase in size from Western Europe east across Asia (del Hoyo *et al.* 1996). Southern African birds are quite distinct from European birds in having bright red eyes from about a year old (Tree 1992); this is also a feature of birds from East Africa (Tree *in litt.* 2008). The breeding range includes Southern and Eastern Africa, Western and Southern Europe and Central Asia between 35° and 50°N (Snow & Perrins 1998), and there are isolated breeding sites in North-west Africa and South-west Asia. The breeding distribution is very patchy throughout the whole range of the species (Cramp & Simmons 1983). Outside the breeding season, Pied Avocets occur on the coasts of Western Europe south of 52°N, on African coasts, in parts of Southern, Eastern and Western Africa, and on parts of the South Asian coastline (Cramp & Simmons 1983, del Hoyo *et al.* 1996).

Movements

The Southern African population is partly resident or moves nomadically, mainly in response to rains, according to the availability of suitable ephemeral wetlands (Tree 1997). Birds of the Eastern Africa population are also largely resident, mainly within the Rift Valley, with local movements in response to rain. Britton (1980) suggested that a southern origin is likely for non-breeding flocks in Kenya and Tanzania between June and August. Birds breeding in Southern Europe and North-west Africa may also be resident, but mostly migrate relatively short distances. All other populations are migratory. Pied Avocets breeding in Western Europe winter mainly on the Atlantic coast between southern Britain and northern France, and West Africa, possibly as far south as Guinea Conakry (Altenburg & Van der Kamp 1988). Pied Avocets breeding in South-east Europe winter mainly on the coast of the central and eastern Mediterranean, and may penetrate into inland Africa. The origins of the birds wintering in West Africa are not yet completely unravelled. Ringing results show that at least some West European individuals winter there (Blomert *et al.* 1990), but low percentages of colour-ringed avocets in all wetlands of Senegal (H. Hötker unpubl. obs.) suggest an influx also from other populations.

Pied Avocets breeding in Western and Central Asia move south or south-west to winter in the Middle East, North-east Africa (probably south to Ethiopia and Sudan), Pakistan and western India. There are marked increases at Lake Turkana and Lake Baringo in northern Kenya between October and May, suggesting the presence of non-breeding migrants (Lewis & Pomeroy 1989). East-central Asian birds winter on the coasts of southern China.

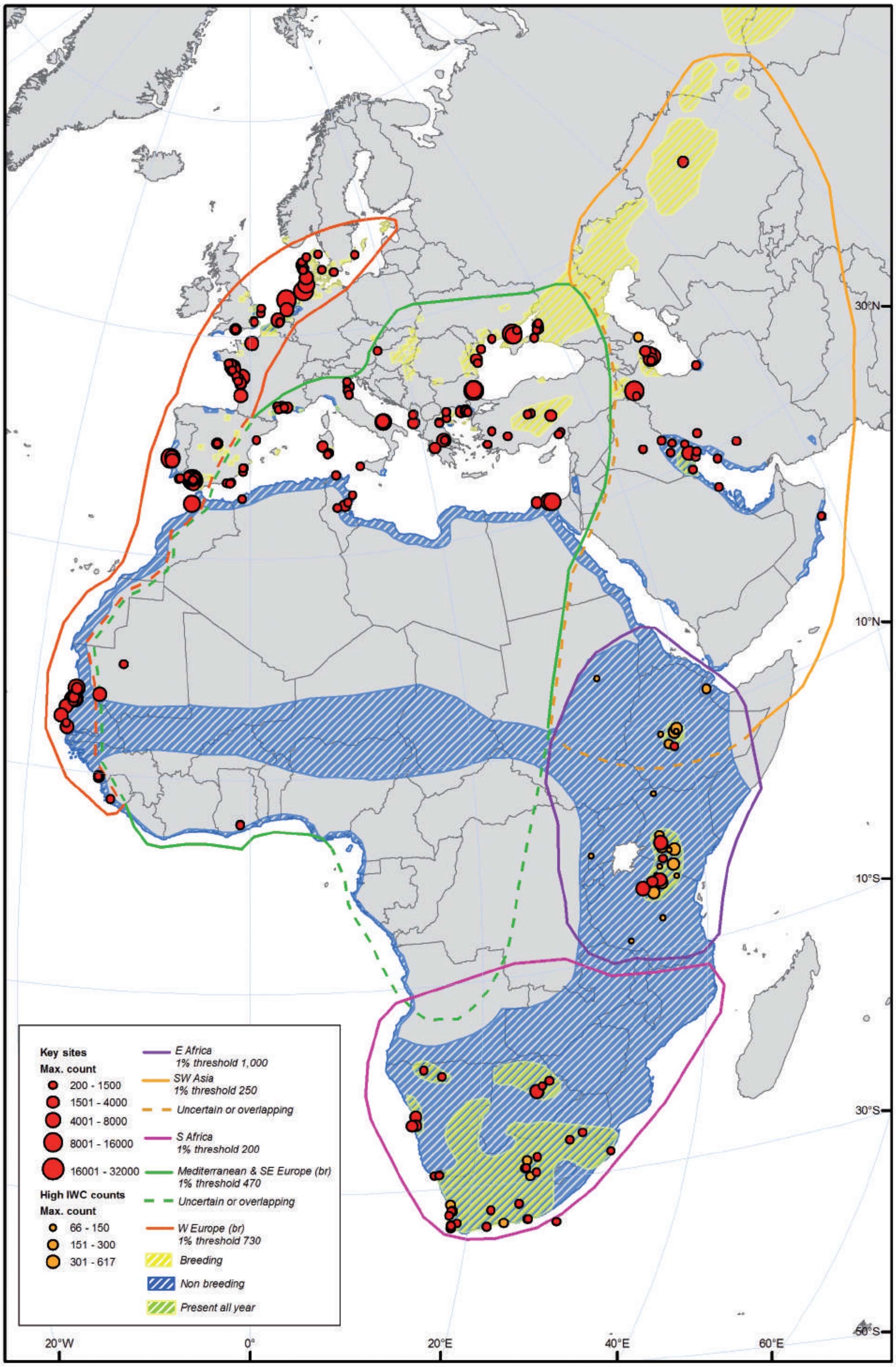
After the breeding season, many birds congregate in big flocks for their postnuptial moult. Movements to moulting sites can occur in directions differing from the direction of migration to the winter quarters (Dietrich & Hötker 1991). The most important moulting sites for West European avocets are the Jadebusen (Germany: up to 22,000), the island of Rømø (Denmark), the Dollard (Dutch/German border), and the Frisian coast and Ijsselmeer (The Netherlands) (Glutz von Blotzheim *et al.* 1977, Dietrich & Hötker 1991, Meltofte *et al.* 1994). Important moulting sites in South-east Europe include Lake Antonov in Bulgaria (Kube *et al.* 1998).

A fairly high degree of site fidelity has been demonstrated in the winter quarters (Hötker 1998). However, Pied Avocets often move considerable distances between their place of birth and first breeding site, or between breeding sites in consecutive years (H. Hötker unpubl. obs.).

Population limits

Breeding Pied Avocets disperse over long distances and there is considerable interchange between populations. The

Pied Avocet
Recurvirostra avosetta



population limits listed here should therefore be regarded as a chiefly descriptive means of separating flyway populations for conservation purposes. Five main populations can be identified within Western Eurasia and Africa:

1) birds breeding on the coasts of Western Europe and locally in North-west Africa;
2) birds breeding around the Mediterranean Sea and in South-east Europe;
3) birds breeding in South-west Asia (Caspian region, Kazakhstan and Iran);
4) birds breeding in Eastern Africa (Ethiopia, Kenya and Tanzania);
5) birds breeding in Southern Africa (Namibia, Botswana and South Africa).

This separation of populations, based on improved knowledge of movements of populations, differs from Rose & Scott (1997), who defined only four populations in the region. These authors recognised only a single population in sub-Saharan Africa and grouped the birds breeding in the western Mediterranean with the birds breeding elsewhere in Western Europe (following Smit & Piersma 1989).

The Southern and Eastern African populations have been separated because no interchange between these two populations is suspected (Tree 1997), although no northern limit was ascribed for birds in Southern Africa. This population is likely to extend into western and southern Zambia, where breeding has also taken place (Benson *et al.* 1971). Birds breeding in the western Mediterranean have now been excluded from the Western European population (contra Smit & Piersma 1989, Wetlands International 2000) because ringing results have shown little exchange between Mediterranean and Atlantic colonies, but have revealed a significant exchange of individuals between different Atlantic colonies. Moreover, birds breeding on the Mediterranean coast seem only rarely to reach the Atlantic coast in winter.

The limits of the South-west Asian population are poorly understood and require more research.

Population size

1.Western Europe (breeding)

Population estimate	1% threshold	Population trend
73,000	730	Stable

Midwinter counts and estimates of Pied Avocets in the 1990s from the wintering range of this population on the Atlantic coast of Europe and Africa south to Morocco, Mauritania, Senegal, Gambia and Guinea total 72,580 birds, and this figure was used by Stroud *et al.* (2004) in their revised population estimate, adopted in *WPE3* and *WPE4*. Included in this estimate were 22,500 birds wintering south of the Sahara whose breeding origins are uncertain. A total of 15,000 of the 17,700 Pied Avocets wintering in France are counted in western France (Deceuninck & Mahéo 2000), and these birds were included in this population. The remaining 2,700 French birds were assigned to the Mediterranean population. The estimate of 16,000 used for Guinea by Stroud *et al.* (2004) is based on extrapolations of counts in coastal wetlands from actual counts of some 3,300 birds (Altenburg & Van der Kamp 1985).

The breeding populations of Portugal, Spain, the Atlantic coast of France, the U.K., Belgium, The Netherlands, Germany, Denmark, Sweden, Norway, Lithuania and Estonia totalled about 28,700-32,000 breeding pairs in the mid-1990s (data from Thorup 2006). The core breeding area is the Dutch-German-Danish Wadden Sea, where 10,617 pairs were counted in 1996, a decrease from 11,990 in 1991 (Rasmussen *et al.* 2000). Aspects of Pied Avocet demographics (delayed maturity, low productivity) suggest that a factor of 2.5x rather than 3x is more appropriate to estimate the total number of birds in a population from the number of breeding pairs. Using a factor of 2.5x, the breeding population of 28,700-32,000 pairs equates to about 71,750-80,000 individuals. The mid-point of this range, 75,875, is only a little more than the estimate of 72,580 from assessments outside the breeding season. Van der Winden *et al.* (2007) counted 1,023 Pied Avocets in Yawri Bay, Sierra Leone in January-February 2005, estimating the total population for Sierra Leone as 1,000-1,100. The breeding origin of these birds is not known, but is most likely to be in Western Europe.

2. Mediterranean & South-east Europe (breeding)

Population estimate	1% threshold	Population trend
47,000	470	Stable or decreasing

The total of 47,100 derived from 1990s midwinter counts and estimates from Stroud *et al.* (2004) does not include birds wintering on the Mediterranean coast of Spain. It also does not take into account that part of the West African wintering population which is probably of Mediterranean or Black Sea origin. Kube *et al.* (1998) estimated the population to contain 35,000-55,000 birds, excluding the (small) French Mediterranean population. Assuming that the South-east European population has declined in recent years (based on evidence from breeding surveys), 47,000 seems to be a realistic estimate. In Egypt, the only comprehensive counts are 9,000 at Lake Manzala, 9,000 at El Malaha, Bur Fuad, and 3,000 at Lake Burullus Ramsar site (all in January 1990: Meininger & Atta 1994).

Collation of national breeding totals for the relevant countries from Thorup (2003) gives 10,392-16,699 pairs, equating to 25,980-41,748 individuals (using a conversion factor of 2.5x – see above). National estimates from BirdLife International (2004a) give a total of 36,300-49,220 pairs for the European breeding population excluding Armenia, Azerbaijan and Russia (assigned to the South-west Asian population). This estimate agrees closely with the figures in Thorup (2003), which give a total of 39,000-48,700 pairs for the Western Europe and Mediterranean & South-east Europe populations combined.

3. South-west Asia (breeding)

Population estimate	1% threshold	Population trend
B (10,000 -25,000)	Provisionally 250	Possibly stable

The 1990s midwinter counts and estimates provide a total of 16,491 birds in this population, with the majority (10,688) wintering in Ethiopia and the remainder (5,803) in the Middle East (Stroud *et al.* 2004). However, the origin of the Ethiopian birds is unclear, and there may be some overlap here with birds from the Eastern African population, as Pied Avocets have been recorded breeding in Ethiopia (Urban *et al.* 1986). The midwinter counts in South-west Asia in 1994 yielded a total of 10,600 Pied Avocets, mainly in Iran (Rose 1995), while 13,600 were recorded on passage at Lake Uromiyeh in north-western Iran in August 1973 (Scott 1995). In the absence of more detailed information, the rough estimate of B (10,000-25,000 birds) in *WPE2* was retained in subsequent editions of *WPE* and by Stroud *et al.* (2004). However, recent estimates from extreme South-east Europe (Caspian drainage) include 500-5,000 pairs in Azerbaijan, 20-80 pairs in Armenia and 1,100-2,700 pairs in Russia (BirdLife International 2004a), while 2,000-2,500 pairs were found breeding in Iran in the 1970s (Scott 1995). These figures, which exclude any birds breeding in the Central Asian Republics, indicate a minimum of 3,620-10,280 pairs (10,900-30,800 individuals), and suggest that the estimate of 10,000-25,000 may be too low.

4. Eastern Africa

Population estimate	1% threshold	Population trend
C (25,000-100,000)	Provisionally 1,000	Unknown

January counts and estimates in the 1990s give a total of 18,085 birds in Eastern Africa (African Waterbird Census reports). Stroud *et al.* (2004) considered this to be an underestimate since count coverage was limited, and referred to an observation of 45,000 individuals in Kenya mentioned by Hayman *et al.* (1986). Stroud *et al.* (2004) therefore proposed a rough estimate of C (25,000-100,000), and this was adopted in *WPE3* and *WPE4*. However, it may be unsafe to base the population size on counts made in January, when there are almost certainly birds of Palearctic origin present in the sub-region. This is supported by an observation of a bird flying north with a flock of Whimbrel *Numenius phaeopus* in April (Ash & Miskell 1998). Baker (1996) suggests that large flocks in the Rift Valley in January are likely to be breeding elsewhere, and estimates a non-breeding population of 12,000-15,000 birds. The Pied Avocet breeds in northern Tanzania during January (when most count data are obtained), and yet flocks of 4,956 at Lake Magadi and 2,000 birds at Lake Eyasi in northern Tanzania in January 1995 were recorded in areas that were not suitable as breeding habitat. However, laying dates vary between the different climatic regions of Eastern Africa (Urban *et al.* 1986), so it is hard to assign non-breeding flocks in January to any specific population. Although coverage of the AfWC counts in July is not as wide as that in January, numbers are significantly lower in July. Thus the Eastern Africa population may be lower than previously supposed. Improved and more widespread monitoring, especially during July (when the possibility of counting birds of Palearctic origin can be discounted) would help in developing a better population estimate.

5. Southern Africa

Population estimate	1% threshold	Population trend
15,000- 25,000	200	Possibly increasing

At times there are high counts from northern Botswana, such as 3,580 at Rysana Pan in the Makgadikgadi system in August 2000 (Tyler 2001). Kalejta-Summers *et al.* (2001) estimated 7,600 from South African coastal wetlands. Elsewhere on the coast there are often aggregations of more than 1,000 at Walvis Bay, Namibia, with total counts at times of more than 3,000 for Namibia (AfWC database), whilst there may only be around 200 along the coast of Mozambique (Parker 1999). Tree (1997) estimated a population of 10,000-20,000 birds in Southern Africa. Stroud *et al.* (2004) gave an estimate of 19,300 individuals based on "best-guess" estimates for the relevant countries, and this estimate was adopted in *WPE3* and *WPE4*. However, Dodman (2002) suggested that it would be more appropriate to present a range, as the size of this population is not as well known as this figure implies. Further, the figures used per country tend to reflect maximum counts, which may be misleading given that these birds make regional movements. Hockey *et al.* (2005) and Dodman (in press 2009) followed Tree's (1997) estimate,which has also been adopted here. The population has increased significantly in range and number since the early 1900s, and may still be on the increase. Tree (*in litt.* 2008) recommends a revised range estimate of 15,000 – 25,000, which is followed here.

Conservation status

In Western Europe, the population declined severely during the nineteenth century and the species became extinct in the U.K. and Sweden (Glutz von Blotzheim *et al.* 1977). Probable reasons for the decline were increased disturbance of colonies by hunting and egg-collecting and a cooling of climate in Western Europe. Since the 1920s, and particularly since 1940, populations have been increasing throughout North-west Europe. In the Wadden Sea, the core breeding area of the population (supporting 13,000 of the 25,000 pairs), the increase stopped around 1990 and the number has remained stable or declined slightly since then. In other regions, increases remain evident (e.g. in France), and dramatic increases have been recorded at some colonies. BirdLife International (2004a) reported recent increases in Belgium, France and Spain, and a decrease only in Denmark. Possible reasons for the upward trend during the twentieth century include: better protection from hunting (both in breeding and non-breeding sites); cessation of egg-collecting; an improving food supply via eutrophication (van Impe 1985, Beukema & Cadée 1986); creation of new breeding habitat as an indirect consequence of coastal engineering (Meininger *et al.* 1998); new nature reserves and protected sites (mostly on the Atlantic coast in France; Deceuninck & Mahéo 1998a); deliberate habitat management (Cadbury *et al.* 1989); and climatic warming.

At least some of the breeding populations in the Mediterranean and South-east Europe followed the trends of the West European populations and declined in the nineteenth century before recovering in the middle of the twentieth century (Tinarelli & Baccetti 1989, Nankinov 1989). In recent years, populations have been stable in parts of the range of this population, e.g. in Italy (Tinarelli & Baccetti 1989) and in southern Russia (Belik 1998a), whilst in other regions declines have been reported (Kinda 1998, Rudenko & Rybachuk 1998), mostly due to habitat destruction (Goutner & Jerrentrup 1987). BirdLife International (2004a) reports an increase in Italy, and decreases in Albania, Bulgaria and Turkey.

In Southern Africa, the size of the Pied Avocet population increased during the twentieth century because more permanent artificial wetlands became available as breeding and resting sites (Tree 1997). The conservation status of the Eastern African and South-west Asian populations is largely unknown. In Eastern Africa, there is a wide range of breeding and feeding habitats within the Rift Valley, many of them falling within protected areas, and there is no current reason for conservation concern about the population.

Habitat and ecology

Most Pied Avocets breed in colonies that, in rare cases, may be as large as several hundred pairs. Single nests are less common. Nesting takes place on small islands, on beaches, on saltmarshes or on arable land (Glutz von Blotzheim *et al.* 1977). After hatching, families can travel up to several kilometres to reach suitable feeding sites for the chicks, e.g. open mudflats or shallow ponds. In large parts of the range, Pied Avocets breed in ephemeral wetlands such as saline lakes and pans filled by irregular rainfall. In some countries, notably in Southern Europe, artificial wetlands (salt pans, reservoirs and fishponds) are the most important breeding habitats. In North-west Europe, breeding is almost completely confined to coastal habitats, in particular saltmarshes.

Outside the breeding season, the species tends to occur in very large concentrations at only a few wetlands, mostly in coastal habitats, notably inter-tidal mudflats and coastal lagoons. Salt pans, fishponds and shallow lakes may also hold large numbers of birds in some regions.

Network of key sites

Most of the key sites for the Western European population have now been identified. There is some uncertainty about the significance of sites in West Africa for West European birds, as noted above. The preference of Pied Avocets for particular sites, however, may change quickly as the example of the Dollard in the German-Dutch Wadden Sea shows. The Dollard was the most important autumn staging site for West European birds in the 1970s (up to 20,000), but has now lost its significance in favour of other sites.

Most of the key sites for the Mediterranean and South-east European population and the African populations are probably known, but the less comprehensive coverage of the waterbird counts in these regions makes it likely that some important sites have been missed. In Eastern Africa, several Rift Valley lakes, such as Lake Elementeita and Lake Magadi in Kenya, as well as a large number of ephemeral wetlands and small pools, are used for breeding. The use of ephemeral wetlands for breeding in the African and Asiatic parts of the range means that sites important ni some years may be abandoned in others. A wide range of sites surpass the 1% threshold for the Southern Africa population, notably the Makgadikgadi system, especially Rysana Pan, in Botswana (Tyler 2001), Sandwich Harbour and Walvis Bay in Namibia, and Bloemhof Dam, Lake St Lucia, Nqweba Dam, Orange River Estuary, Platfontein Pans and Rondevlei Nature Reserve in South Africa (AfWC database).
The relatively few key sites for the South-west Asian population probably reflect incomplete coverage in this region. Outstanding sites include Lake Tengiz in Kazakhstan, Kyzyl-Agach Bay, Kura River Estuary and Shirvan Reservation Lakes in Azerbaijan, and Lake Uromiyeh and Naseri Marsh in Iran. Barr al Hikman in Oman normally holds low numbers, but qualifies as a key site on the basis of a count of 1400 in 1997.

Protection status of key sites

Most of the key sites of the West European population have at least some protection. Shellfishing seems to be the principal cause of disturbance in France (Le Dréan *et al.* 2007) and loss of habitat due to harbour developments, particularly at the Seine and Loire estuaries has also adversely affected this species in France (Mahéo *et al.* 2007). Disturbance from hunting is still a problem at some French and Portuguese sites, and small-scale habitat loss (land reclamation in estuaries, transformation of salt pans into fish farms) occurs at many. Pollution of water and sediments is likely to be a problem in some estuaries.

For other populations, especially those in the Mediterranean, South-east Europe and South-west Asia, the large majority of key sites are not well protected. Habitat deterioration, hunting and disturbance by humans seem to affect many of these (del Hoyo *et al.* 1996).

Many of the sites important for the population in Eastern Africa, especially for breeding, enjoy some form of protected status. Lake Magadi, a regular breeding site in Kenya, is not protected, although the lake faces no obvious conservation problems at present (Bennun & Njoroge 1999). In Southern Africa, Sandwich Harbour in Namibia is fully protected (Simmons *et al.* 1998), as is Rondevlei Nature Reserve in South Africa. The Makgadikgadi Pans in Botswana are partially protected, with the most important area for avocets under National Park status (Tyler & Bishop 1998), as are Lake St Lucia and Mkuze Swamps in South Africa (Johnson *et al.* 1998).

Table 8. Key sites for Pied Avocet. Sites where 1% or more of a population has been recorded
Note: This species is well known for inconsistent and opportunistic usage of sites

Country	Site	Lat.	Long.	Season	Max total	Year max	Average total	Basis for average	Source	Population(s) at site
Albania	Karavasta Complex	40.92	19.48	Non-breeding	1763	1993	299	1999-04 (5)	IWC database	Mediterranean & SE Europe
Albania	Patok (Complexe De Patoku)	41.60	19.57	Non-breeding	1034	1993	172	1995-04 (5)	IWC database	Mediterranean & SE Europe
Algeria	Sebkha d'Oran	35.37	-0.80	Non-breeding	1250	1979			WBDB	Mediterranean & SE Europe
Austria	Lake Neusiedl/ & Seewinkel	47.75	16.83	Breeding	750 239 prs +165 juv	2007			J Laber *in litt.*	Mediterranean SE Europe
Azerbaijan	Big Kyzyl-Agach Bay	39.17	49.00	Non-breeding	4250	1997	3326	1996-97 (2)	IWC database	SW Asia
Azerbaijan	Hagygabul Gyolu (Hadgegabol Lake)	40.00	48.92	Non-breeding	3000	1996			IWC database	SW Asia
Azerbaijan	Kirov Bay	39.08	48.95	Post-breeding migration	300	1985			Shubin, 1998	SW Asia
Azerbaijan	Kura River Estuary	39.33	49.33	Non-breeding	9730	1997			IWC database	SW Asia
Azerbaijan	Shirvan Reservation Lakes	39.67	49.17	Non-breeding	6000	1997	3035	1996-97 (2)	IWC database	SW Asia
Belgium	Harbour area Antwerpen Linkeroever	51.28	4.23	Breeding	939	2001	609	1999-03 (5)	INC, Belgium 2005	E Atlantic
Belgium	Zeeschelde Estuary	51.33	4.25	Non Breeding	1106	1995	500	2001-05 (5)	INC, Belgium 2005	E Atlantic

Country	Site	Lat.	Long.	Season	Max total	Year max	Average total	Basis for average	Source	Population(s) at site
Botswana	Makgadikgadi Pans	-20.75	25.50	July	335	1993			S Tyler *in litt.*	S Africa
Botswana	Nata Delta	-20.33	26.08	July-August	335	1993	169	1991-93 (2)	AfWC database	S Africa
Botswana	Rysana Pan	-21.25	25.07	Non-breeding	5094	2000	1710	1994-01 (3)	AfWC database	S Africa
Bulgaria	Atanasovo lake	42.57	27.48	Migration	7570	1997			WBDB	Mediterranean & SE Europe
Bulgaria	Bourgas Bay	42.50	27.47	Post-breeding migration	20000	1995			Kube *et al.* 1998	Mediterranean & SE Europe
Denmark	Bøvling Fjord	56.40	8.15	Autumn	2545	1999			H Meltofte *in litt.*	W Europe
Denmark	Eastern part of Vejlerne	57.05	9.00	Breeding	840	1994			WBDB	W Europe
Denmark	Harboøre Tange	56.65	8.17	Autumn	1062	1990			H Meltofte *in litt.*	W Europe
Denmark	Northwestern Kattegat	57.20	11.00	Breeding	1554	1996			WBDB	W Europe
Denmark	Ringkøbing Fjord	56.00	8.25	Breeding	2010	1998			WBDB	W Europe
Denmark	Saltbæk Vig	55.75	11.17	Breeding	1500	1998			WBDB	W Europe
Denmark	Tipperne	55.88	8.24	Autumn	1437	1999			H Meltofte *in litt.*	W Europe
Denmark	Wadden Sea - Denmark	55.16	8.58	Autumn	5671	2001	3652	1999-02 (4)	NERI, Denmark, 2005	W Europe
Egypt	El Malaha. Bur Fuad	31.22	32.32	Non-breeding	8910	1990	4920	1980-90 (2)	IWC database	Mediterranean & SE Europe
Egypt	Lake Burullus	31.50	30.75	Non-breeding	2949	1990	1478	1990-94 (2)	IWC database	Mediterranean & SE Europe
Egypt	Lake Manzala	31.27	32.03	Non-breeding	9491	1990	3795	1979-90 (3)	IWC database	Mediterranean & SE Europe
Ethiopia	Lake Abijatta	7.55	38.52	Non-breeding	1471	1993	231	1997-01 (5)	AfWC database	E Africa
France	Baie de Bourgneuf et Noirmoutier	47.04	-2.12	Non-breeding	3102	2000	2441	1999-04 (5)	R Mahéo, LPO. *et al* 2005	W Europe
France	Baie de l'Aiguillon et Pointe d'Arçay	46.32	-1.17	Non-breeding	8288	2004	4508	1999-04 (5)	R Mahéo, LPO *et al.* 2005	W Europe
France	Baie de Vilaine	47.47	-2.51	Non-breeding	2147	2002	1639	1999-04 (5)	R Mahéo, LPO *et al.* 2005	W Europe
France	Bassin d'Arcachon et Banc d'Arguin	44.67	-1.12	Migration	5550	2003			R Mahéo, LPO *et al.* 2005	W Europe
France	Camargue	43.52	4.60	Non-breeding	1944	1995	1030	1999-04 (5)	R Mahéo, LPO *et al.* 2005	Mediterranean & SE Europe
France	Nature Reserve Moëze et Ile d'Oleron	45.97	-1.47	Non-breeding	902	1992	439	1990-03 (5)	IWC database	W Europe
France	Estuaire Seine	49.43	0.30	Migration	5000	1997			R Mahéo, LPO *et al.* 2005	W Europe
France	Etangs de Thau et de Bagnas	43.37	3.52	Non-breeding	1424	1992	19	1999-04 (5)	R Mahéo, LPO *et al.* 2005	Mediterranean & SE Europe
France	Etangs Montpellierains	43.57	3.89	Non-breeding	1611	2003	1065	1999-04 (5)	R Mahéo, LPO *et al.* 2005	Mediterranean & SE Europe
France	Golfe du Morbihan	47.56	-2.79	Non-breeding	1294	2000	1052	1999-04 (5)	R Mahéo, LPO *et al.* 2005	W Europe
France	Ile de Re	46.22	-1.50	Non-breeding	1835	1995	754	1999-04 (5)	R Mahéo, LPO *et al.* 2005	W Europe
France	Lac du Salagou	43.67	3.33	Non-breeding	1424	1992	561	1988-92 (5)	R Mahéo, LPO *et al.* 2005	Mediterranean & SE Europe
France	Loire Aval	47.27	-2.18	Non-breeding	2590	1997	846	1999-04 (5)	R Mahéo, LPO *et al.* 2005	W Europe
France	Marais d'Olonne	46.52	-1.79	Non-breeding	1224	1998	154	1999-04 (5)	R Mahéo, LPO *et al.* 2005	W Europe
France	Marais poitevin et baie de l'Aiguillon	46.33	-1.00	Non-breeding	1500	2003			WBDB	W Europe
France	Marais salants de Noirmoutier	46.98	-2.27	Breeding	765	1991			WBDB	W Europe
France	Petite Camargue laguno-marine	43.52	4.27	Breeding	1200	1991			WBDB	Mediterranean & SE Europe
France	Presqu'île Guérandaise dont Traicts du Croisic	47.29	-2.51	Non-breeding	2750	2001	1841	1999-04 (5)	R Mahéo, LPO *et al.* 2005	W Europe
France	Résèrve Naturelle de Moeze (Charente-Seudre)	45.83	-1.14	Non-breeding	1815	1997	698	1999-04 (5)	R Mahéo, LPO *et al.* 2005	W Europe
Germany	Einswarder & Tegeler Plate	53.52	8.52	Autumn	2100				Melter & Schreiber 2000	W Europe
Germany	Ems valley Leern to Emde	53.32	7.33	Autumn	1053				Melter & Schreiber 2000	W Europe
Germany	Krummhörn-Westermarsch	53.48	7.07	Autumn	3500				Melter & Schreiber 2000	W Europe

Country	Site	Lat.	Long.	Season	Max total	Year max	Average total	Basis for average	Source	Population(s) at site
Germany	Rheiderland	53.23	7.32	Autumn	2200				Melter & Schreiber 2000	W Europe
Germany	Wadden Sea - Lower Saxony	54.00	8.00	Autumn	30392	1994	12594	1997-01 (5)	J.Blew, K *in litt.* TMAP	W Europe
Germany	NP Lower Saxony Wadden Sea Schleswig-Holstein	- 54.50	8.50	Breeding	>10000		8000		J.Blew, CWSS, 2005	W Europe
Germany	West Pomerania coast	54.43	12.90	Moult	2600	1992	1943	1992-04	Dierschke & Helbigl in press.	W Europe
Ghana	Keta Lagoon complex	5.92	-0.83	July-August	1144	2000			AfWC database	Mediterranean & SE Europe
Greece	Alyki Kitrous	40.42	22.38	Non-breeding	670	1989	82	1994-99 (5)	IWC database	Mediterranean & SE Europe
Greece	Arogi Lagoon (Karatza)	40.93	25.85	Non-breeding	958	1998	456	1997-01 (5)	IWC database	Mediterranean & SE Europe
Greece	Axios, Loudias & Aliakmon Deltas	40.48	22.40	Non-breeding	1237	1997	636	1996-00 (5)	IWC database	Mediterranean & SE Europe
Greece	Evros Delta	40.77	26.05	Non-breeding	900	1990	446	1997-01 (5)	IWC database	Mediterranean & SE Europe
Greece	Kerkini	41.22	23.52	Non-breeding	1070	1999	512	1996-00 (5)	IWC database	Mediterranean & SE Europe
Greece	Lake Mitrikou (Ismarida)	40.97	25.28	Non-breeding	2500	1996			WBDB	Mediterranean & SE Europe
Greece	Lakes Volvi-Langada	40.68	23.37	Migration	1150	1995			WBDB	Mediterranean & SE Europe
Greece	Messolonghi Lagoon	38.33	21.22	Non-breeding	1540	2001	772	1997-01 (5)	IWC database	Mediterranean & SE Europe
Greece	Ptelea Lagoon (Karakatsali) / Elos	40.93	25.85	Non-breeding	2285	1989	501	1997-01 (5)	IWC database	Mediterranean & SE Europe
Greece	Spercheios Delta (Lamia)	38.83	22.40	Non-breeding	3500	1989	1116	1993-98 (5)	IWC database	Mediterranean & SE Europe
Guinea	Kobayah	9.67	-13.50	Non-breeding	2205	1988			AfWC database	W Europe
Guinea	Vasières de Sonfonia	9.67	-13.56	Non-breeding	1482	1999	826	1999-00 (2)	AfWC database	W Europe
Iran	Bandar Mahshahr Saltworks (Mahshahr Saltworks)	30.54	40.97	January	304	2007	221	2004-07 (3)	DOEI / WIWO	SW Asia
Iran	Gomishan marshes & Turkoman Steppes	37.25	53.92	January	641	2004	330	2004-07 (3)	DOEI / WIWO	SW Asia
Iran	Hamidieh (Omidiyeh) Plains	31.52	48.18	January	1131	2005	799	2004-05 (2)	DOEI / WIWO	SW Asia
Iran	Harm Lake	28.17	53.5	January	412	2005	137	2004-07 (3)	DOEI / WIWO	SW Asia
Iran	Hilleh River Delta	29.19	50.78	Wintering	300	1975			Evans, 1994	SW Asia
Iran	Hoveyzeh Marshes	31.29	47.95	January	683	2007	252	2004-07 (3)	DOEI / WIWO	SW Asia
Iran	Izeh and Sheikho Lakes	31.87	49.90	Wintering	400	1992			Evans, 1994	SW Asia
Iran	Lake Bakhtegan, Lake Tashk & Kamjan Marshes	29.67	53.50	August	1000	1970s			Evans, 1994	SW Asia
Iran	Lake Uromiyeh	37.50	45.50	August	13600	1973			Scott, 1995	SW Asia
Iran	Miankaleh Peninsula & Gorgan Bay	36.83	53.45	January	622	2007	540	2004-07 (3)	DOEI / WIWO	SW Asia
Iran	Mirza Koochak Khan Farm	30.88	48.28	January	423	2005	280	2004-05 (2)	DOEI / WIWO	SW Asia
Iran	Naseri Marsh	30.67	48.17	January	3412	2004	1141	2004-07 (3)	DOEI / WIWO	SW Asia
Iran	Sar Bandar Saltworks, Gulf Coast	30.53	48.97	January	450	2004	236	2004-07 (3)	DOEI / WIWO	SW Asia
Iran	Seheyn Basin Susangerd	31.52	48.18	January	467	2004			Hornman & Van Diek 2004	SW Asia
Iran	Shadegan Marshes, Khor-al Amaya & Khor Musa	30.17	48.67	Wintering	883	1970s			Evans, 1994	SW Asia
Iran	Shur Gol, Yadegarlu & Dorgeh Sangi	37.02	45.52	July	500	1971			Evans, 1994	SW Asia
Iraq	Bahr Al Milh	32.67	43.67	January	300	1979			Evans, 1994	SW Asia
Iraq	Haur Al Haushiya	32.08	46.90	January	500	1979			Evans, 1994	SW Asia
Iraq	Haur Al Suwayqiyah	32.70	45.92	January	373	1975			WBDB	SW Asia
Iraq	Haur Uwainah	31.42	46.33	January	380	1979			Evans, 1994	SW Asia
Italy	Cagliari wetlands	39.18	9.15	Resident	1500	1995			WBDB	Mediterranean & SE Europe

Country	Site	Lat.	Long.	Season	Max total	Year max	Average total	Basis for average	Source	Population(s) at site
Italy	Cervia saltpans	44.25	12.35	Breeding	720	1994			WBDB	Mediterranean & SE Europe
Italy	Delta Del Po - Parte Veneta	44.97	12.43	Winter	2458	2003	971	1999-03 (5)	IWC database	Mediterranean & SE Europe
Italy	Laguna Di Venezia	45.40	12.32	Winter	980	2003	641	1999-03 (5)	IWC database	Mediterranean & SE Europe
Italy	Manfredonia	41.48	15.90	Non-breeding	4770	1995	945	1999-03 (5)	IWC database	Mediterranean & SE Europe
Italy	Oristano wetlands & Cape San Marco	39.87	8.48	Non-breeding	2400	1995			WBDB	Mediterranean & SE Europe
Italy	Palmas - Sant'Antioco (Palmas Gulf wetlands)	39.08	8.93	Resident	600	1996			WBDB	Mediterranean & SE Europe
Italy	Salina Di Cervia	44.27	12.32	Non-breeding	522	2001	350	1998-02 (5)	IWC database	Mediterranean & SE Europe
Italy	Stagno Di Cagliari	39.25	9.03	Winter	768	2002	518	1999-03 (5)	IWC database	Mediterranean & SE Europe
Italy	Stagnone di Marsala & Trapani saltpans	37.78	12.50	Breeding	600	1996			WBDB	Mediterranean & SE Europe
Italy	Valli Di Comacchio E Vene Di Bellocchio	44.60	12.18	Non-breeding migration	567	1999	234	1999-03 (5)	IWC database	Mediterranean & SE Europe
Kazakhstan	Tengiz - Korgalzhin lakes	50.50	69.40	Post-breeding	2770	1999	2904	1999-04 (6)	Schielzeth *et al.* in prep.	SW Asia
Kenya	Lake Elmenteita	-0.42	36.20	Non-breeding	4186	1997	1622	1996-00 (5)	WBDB	E Africa
Kenya	Lake Magadi	-1.87	36.28	Non-breeding	1236	1998	751	1996-00 (5)	AfWC database	E Africa
Kuwait	Sulaibikhat Bay	29.33	47.83	Non-breeding	260	2000	92	1990-00 (4)	IWC database	SW Asia
Mauritania	Aftout es Sâheli	17.37	-16.13	Non-breeding	1650	2000			WBDB	W Europe
Mauritania	Bell Ndiaoul et Khurumbum	20.00	-12.00	Non-breeding	800	1972	184	1973-97 (5)	AfWC database	Mediterranean & SE Europe
Mauritania	Chott Boul	16.57	-16.43	Non-breeding	5650	2001			WBDB	W Europe
Mauritania	Diawling National Park	16.22	-16.38	Non-breeding	2200	1974			WBDB	W Europe
Mauritania	Entre Keur Massene	16.55	-16.34	Non-breeding	2056	1999			AfWC database	W Europe
Mauritania	Lac d'Aleg et Diawling	17.08	-13.98	Non-breeding	5200	2001			AfWC database	Mediterranean & SE Europe
Mauritania	Rosso Total	16.50	-16.18	Non-breeding	5650	2001	1388	1997-01 (5)	AfWC database	W Europe
Mauritania	Trarza. Aftout Es Saheli	17.42	-16.25	Non-breeding	9900	2001	5377	1987-01 (5)	AfWC database	W Europe
Morocco	Merja Zerga: Kenitra	34.80	-6.30	Winter	6945	1991	4407	1991-95 (5)	IWC database	W Europe
Namibia	Etosha National Park	-18.80	16.57	Non-breeding	355	1998	113	1992-98 (4)	AfWC database	S Africa
Namibia	Oponono Lake & Oshituntо	-18.00	15.00	July-August	616	1999	318	1999-00 (2)	AfWC database	S Africa
Namibia	Orange river: Total	-28.58	16.87	Non-breeding	374	1998	203	1994-98 (3)	AfWC database	S Africa
Namibia	Sandwich Harbour	-23.38	14.48	July-August	1569	1998	590	1992-00 (5)	AfWC database	S Africa
Namibia	Walvis Bay Ramsar Site	-22.50	14.42	July-August	4102	1997-05	1592	1997-05 (9)	Wearne & Underhill 2005	S Africa
Netherlands	Oostvaardersplassen	52.43	5.35	Non-breeding	4281	1990			WBDB	W Europe
Netherlands	Rhine-Maas-Schelde Delta	51.50	4.00	Winter	3198	2000	1990	1999-03 (5)	RWS WD RIKZ 2005	W Europe
Netherlands	Wadden Sea - Netherlands	53.30	5.38	Autumn	17573	1990	11039	1999-03 (5)	SOVON, The Netherlands, 2005	W Europe
Oman	Barr Al Hikman	20.63	58.47	Non-breeding	1400	1997	725	1997-01 (2)	IWC database	SW Asia
Portugal	Estuário Do Sado	38.53	-8.83	Non-breeding	5855	1996	2480	1997-02 (5)	IWC database	W Europe
Portugal	Estuário Do Tejo	38.75	-9.08	Non-breeding	13661	1989	4642	1996-01 (5)	IWC database	W Europe
Portugal	Ria De Faro	37.00	-7.92	Non-breeding	827	1997	529	1997-01 (5)	IWC database	W Europe
Romania	Danube delta	45.00	29.00	Post-breeding migration	3000	1995			Kube *et al.* 1998	Mediterranean & SE Europe
Romania	Razim-Sinoie Lagoons	44.67	29.00	March	1500	1995			C. Sudfeldt *in litt.*, Schmitz *et al.*2001	Mediterranean & SE Europe
Russia	Bejsug Lagoons	46.17	38.38	Breeding	750	1995			Mischenko 1999, per V. Belik	Mediterranean & SE Europe
Russia	Eastern coast of the Sea of Azov	45.77	38.08	Breeding	2010	1995			WBDB	Mediterranean & SE Europe
Russia	Kiziltash lakes	45.12	37.05	Breeding	900	1995			Krivenko 1998, per V. Belik	Mediterranean & SE Europe
Russia	Kuban river delta	45.70	37.75	Breeding	1260	1995			Krivenko 1998, per V. Belik	Mediterranean & SE Europe

Country	Site	Lat.	Long.	Season	Max total	Year max	Average total	Basis for average	Source	Population(s) at site
Russia	Salt-lakes in the Primorsko -Akhtarsk area	46.00	38.17	Breeding	1650	1989			WBDB	Mediterranean & SE Europe
Saudi Arabia	Sabkhat al-Fasl Lagoons	27.00	49.67	Non-breeding	665	1996	425	1992-96 (4)	IWC database	SW Asia
Senegal	Joal Fadiout	14.17	-16.83	Non-breeding	1200	1998	875	1997-98 (2)	AfWC database	W Europe
Senegal	Lac Wouye (Malika)	14.80	-17.37	Non-breeding	3200	1975	857	1972-97 (5)	AfWC database	W Europe
Senegal	Lagunes de St.Louis	15.67	-17.00	Non-breeding	3634	2000	1749	1997-01 (5)	AfWC database	W Europe
Senegal	Parc National des Oiseaux de Djoudj	16.42	-16.25	Non-breeding	1755	1998	772	1997-01 (5)	AfWC database	W Europe
Senegal	Parc National du Delta du Saloum	13.83	-16.75	Non-breeding	3788	1999	1914	1987-99 (4)	AfWC database	W Europe
Senegal	Senegal river delta	16.33	-16.48	January	6608	2000			Triplet & Yésou 1998, P. Yésou	W Europe
Sierra Leone	Yawri Bay	08.20	-13.02	January-February	1023	2005			van der Winden *et al.* 2007	W Europe
South Africa	Berg 3: Hotel Mudflats & Estuary	-32.78	18.18	September	533	2005	119	1996-00 (5)	A.J. Tree *in litt.* AfWC database	S Africa
South Africa	Bloemhof Dam	-27.68	25.67	February	836	2004	196	1992-98 (4)	AfWC database	S Africa
South Africa	Chatty SaltPans	-34.00	25.50	January	490	1996			A.J. Tree *in litt.*	S Africa
South Africa	Deelpan	-29.17	25.75	Non-breeding	231	2001			AfWC database	S Africa
South Africa	De Hoop Vlei	34.43	20.38	November	207	2004			A.J. Tree *in litt.*	S Africa
South Africa	Kamfers Dam	-28.67	24.77	Pre-breeding migration	307	2000	202	2000-01 (2)	AfWC database	S Africa
South Africa	Kanhym Pan 1	-25.83	29.52	Non-breeding	368	2001			AfWC database	S Africa
South Africa	Lake St Lucia	-28.07	32.45	May	3400	2007	101	1996-00 (5)	A.J. Tree *in litt.* AfWC database	S Africa
South Africa	Leeu Gamka Dam	-32.60	22.02	Non-breeding	214	1999	66	1998-01 (4)	AfWC database	S Africa
South Africa	Nqweba Dam	-32.22	24.53	Non-breeding	500	2001			AfWC database	S Africa
South Africa	Orange River Estuary	-28.63	16.45	August	890	2001	237	1999-01 (3)	.	S Africa
South Africa	Platfontein Pans	-28.65	24.62	Non-breeding	530	1997			AfWC database	S Africa
South Africa	Redhouse Saltpans	-33.83	25.58	January	248	2004			A.J. Tree *in litt.*	S Africa
South Africa	Paarl Bird Sanctuary	-33.68	18.97	December	218	1997			A.J. Tree *in litt.*	S Africa
South Africa	Rietvlei Wetland Reserve - Dolphin Beach	-33.83	18.47	January	669	1993	60	1994-01 (4)	A.J. Tree *in litt* AfWC database	S Africa
South Africa	Rondevlei Nature Reserve	-34.07	18.50	Non-breeding	1401	1998	803	1997-01 (5)	AfWC database	S Africa
South Africa	Stan Madden Bird Sanct.	-26.40	28.47	Non-breeding	200	1994			AfWC database	S Africa
South Africa	Strandfontein Sewage Works	-34.00	25.50	February	1700	2001			A.J. Tree *in litt.*	S Africa
South Africa	Verloren Vlei	-32.32	18.38	February	1250	2006			A.J. Tree *in litt.* AfWC database	S Africa
South Africa	Voelvlei	-34.27	21.82	January	600	1993	118	1993-97 (4)	A.J. Tree *in litt* AfWC database	S Africa
South Africa	West Coast National Park (Langebaan Lagoon)	-33.08	18.10	July	521	2003			A.J. Tree *in litt.*	S Africa
South Africa	Zandvlei - Upper Estuary	-34.10	18.47	Non-breeding	440	2000	95	1994-01 (5)	AfWC database	S Africa
South Africa	Zwartkops River Estuary	-33.87	25.63	July-August	247	1996	131	1995-99 (5)	AfWC database	S Africa
Spain	Cabo de Gata	36.83	-2.08	Resident	579	1996			WBDB	Mediterranean & SE Europe
Spain	Cádiz Bay	36.53	-6.27	Winter	2738	1996	1921	1996-01 (5)	IWC database	W Europe
Spain	Canal De Guadaira	40.30	-3.75	Non-breeding	2650	1991			IWC database	W Europe
Spain	Caño Del Guadiamar Pnd (H)	36.97	-6.36	Winter	1100	2000			IWC database	W Europe
Spain	Colonia De La Isleta De Puebla (Se)	40.30	-3.75	Non-breeding	2600	1992	735	1994-01 (5)	IWC database	W Europe
Spain	De La Algaida A Hato Villa (H)	36.80	-2.60	Winter	840	1998	324	1990-03 (5)	IWC database	Mediterranean & SE Europe
Spain	Dehesa De Abajo (Se)	40.30	-3.75	Non-breeding	1200	2000	416	1995-01 (5)	IWC database	W Europe
Spain	Delta Del Ebro	40.70	0.80	Non-breeding	1405	1997	883	1997-03 (5)	IWC database	Mediterranean & SE Europe
Spain	La Corta De Los Olivillos. Río Guadalquivir	37.18	-6.09	Winter	1200	2003			IWC database	W Europe
Spain	Lucio Del Membrillo (H)	36.87	-6.38	Winter	2236	2000	805	1998-00 (3)	IWC database	W Europe
Spain	Lucios de Veta La Palma -Isla Mayor (Se)	36.93	-6.24	Winter	11883	2003	7178	1998-03 (5)	IWC database	W Europe
Spain	Marisma De Hinojos (H)	36.98	-6.38	Winter	1350	1990			IWC database	W Europe
Spain	Marismas Del Odiel	37.26	-6.96	Non-breeding	1374	1992	481	1991-03 (5)	IWC database	W Europe
Spain	Odiel and Tinto marshes & Huelva coastal lagoons	37.25	-6.83	Migration	1550	1996			WBDB	W Europe

Country	Site	Lat.	Long.	Season	Max total	Year max	Average total	Basis for average	Source	Population(s) at site
Spain	Par. Nacional de Doñana	36.99	-6.37	Non-breeding	3688	2000	1167	1997-01 (5)	IWC database	W Europe
Spain	Par. Natural De El Hondo	38.16	-0.76	Winter	727	2003	391	1995-03 (5)	IWC database	Mediterranean & SE Europe
Spain	Salina San Federico	40.30	-3.75	Non-breeding	786	1993	394	1993-94 (2)	IWC database	W Europe
Spain	Salinas Cabo De Gata (Al)	36.75	-2.22	Winter	522	1999	295	1998-03 (5)	IWC database	Mediterranean & SE Europe
Spain	Salinas De Bonanza (Hidalgo) (Ca)	36.82	-6.34	Winter	1450	1991	275	1994-01 (5)	IWC database	W Europe
Spain	Salinas De Bonanza (Portugueses) (Ca)	36.88	-6.33	Winter	1243	2000	284	1995-01 (5)	IWC database	W Europe
Spain	Salinas De San Pedro Del Pinatar (Mu)	37.81	-0.77	Non-breeding	1403	1991	21	1994-03 (5)	IWC database	Mediterranean & SE Europe
Spain	Salinas De Santa Pola (A)	38.16	-0.64	Non-breeding	1412	1994	412	1997-03 (5)	IWC database	Mediterranean & SE Europe
Sweden	Coastal areas/Öland Is.	56.67	16.75	Breeding	900	1988			WBDB	W Europe
Sweden	Falsterbo-Bay of Foteviken	55.42	12.92	Breeding	900	1996			WBDB	W Europe
Tanzania	Lake Eyasi	-3.67	35.17	Non-breeding	2002	1995			WBDB	E Africa
Tanzania	Lake Kitangire	-4.10	34.30	Non-breeding	4000	1995			WBDB	E Africa
Tanzania	Lake Manyara N. Park	-3.67	35.83	Non-breeding	4940	1995			WBDB	E Africa
Tunisia	Bahiret El Bibene	35.25	11.25	Winter	900	1993			IWC database	Mediterranean & SE Europe
Tunisia	Gulf of Gabès	34.40	10.32	February	2625	1984			Van Dijk *et al.* 1986	Mediterranean & SE Europe
Tunisia	Lac Ichkeul	37.17	9.67	Winter	662	1992	341	1992-97 (2)	IWC database	Mediterranean & SE Europe
Tunisia	Saline De Thyna	34.65	10.68	Winter	627	1993	511	1990-93 (3)	IWC database	Mediterranean & SE Europe
Tunisia	Sebkha Sidi Mansour	34.23	9.50	Winter	600	1992			IWC database	Mediterranean & SE Europe
Turkey	Akyatan Golu	36.58	35.32	Non-breeding	601	1993	197	1990-99 (5)	IWC database	Mediterranean & SE Europe
Turkey	Beylemi Golu ; Calti [Drained]	37.77	29.68	Non-breeding	647	1999			IWC database	Mediterranean & SE Europe
Turkey	Büyük Menderes delta	37.57	27.20	Non-breeding	1000	1989			WBDB	Mediterranean & SE Europe
Turkey	Kulu lake	39.08	33.15	Non-breeding	1000	1987			WBDB	Mediterranean & SE Europe
Turkey	Marmara Golu	38.58	28.10	Non-breeding	1402	1992			IWC database	Mediterranean & SE Europe
Turkey	Samsam lake	39.10	32.75	Migration	616	1995			WBDB	Mediterranean & SE Europe
Turkey	Sultansazligi	38.33	35.27	Non-breeding	2115	1994			WBDB	Mediterranean & SE Europe
Turkey	Yumurtalik Lagoons (Yapi+Omerg)	36.68	35.65	Non-breeding	1217	1999	390	1990-99 (5)	IWC database	Mediterranean & SE Europe
Ukraine	Molochnyj Liman	46.32	35.32	Breeding	750	1992			WBDB	Mediterranean & SE Europe
Ukraine	Shagany-Alibej-Burnas lake-system	45.78	30.00	Migration	1300	1992			WBDB	Mediterranean & SE Europe
Ukraine	The Sivash, Azov Sea	46.17	34.58	August	25000	1998			Chernichko *et al.* 2001	Mediterranean & SE Europe
Ukraine	Yagorlyts'ka & Tendrivs'ka Bays	46.33	31.83	Breeding	750	1992			WBDB	Mediterranean & SE Europe
U.K.	Alde Complex	52.15	1.53	Winter	1330	2000	1135	1999-03 (5)	BTO, UK, 2005	W Europe
U.K.	Breydon Water & Berney Marshes	52.59	1.66	Autumn	1069	1999-03	770	1999-03 (5)	BTO, UK, 2005	W Europe
U.K.	Medway Estuary	51.40	0.65	Winter	860	1999-03	560	1999-03 (5)	BTO, UK, 2005	W Europe
U.K.	Poole Harbour	50.69	-2.00	Winter	1893	1999-03)	1341	1999-03 (5)	BTO, UK, 2005	W Europe
U.K.	Thames Estuary	51.48	0.57	Winter	1447	1999-03	855	1999-03 (5)	BTO, UK, 2005 IWC database	W Europe

Jan van de Kam

Stone Curlew (Eurasian Thick-knee)

Burhinus oedicnemus

Geographical variation and distribution

Stone Curlew taxonomy is complex, with five forms occurring in Europe, North Africa and Western Asia. The nominate race occurs in Western and Southern Europe east to Ukraine and the Caucasus; *distinctus* in the central and western Canary Islands; *insularum* in the eastern Canary Islands; *saharae* in North Africa (as far south as the Banc d'Arguin in Mauritania) and the eastern Mediterranean from Greece and Turkey through the Levant to Iraq and south-western Iran; and *harterti* from the Volga River east through Transcaspia and Turkestan to Central Asia, and south through central Iran to Pakistan and north-western India (Cramp & Simmons 1983, del Hoyo *et al.* 1996). *B. o. distinctus* occurs on the islands of La Palma, La Gomera, El Hierro, Tenerife and Gran Canaria, while *B. o. insularum* breeds on Fuerteventura, Lobos, Lanzarote, La Graciosa and Alegranza (Cramp & Simmons 1983, Clarke 2006). A sixth subspecies, *indicus*, occurs in India and Sri Lanka east to South-east Asia. *B. o. saharae* is paler, more rufescent, less streaked and smaller than the nominate (Urban *et al.* 1986). Both *oedicnemus* and *saharae* cross into Sahelian Africa from Senegal to Somalia, occurring regularly as far south as the Rift Valley in Kenya.

Between a quarter and a half of the global breeding population of Stone Curlew occurs in Europe (*Wetlands International* 2006). Northern populations are migratory, whereas birds occurring in more southerly, tropical and sub-tropical areas are sedentary.

Movements

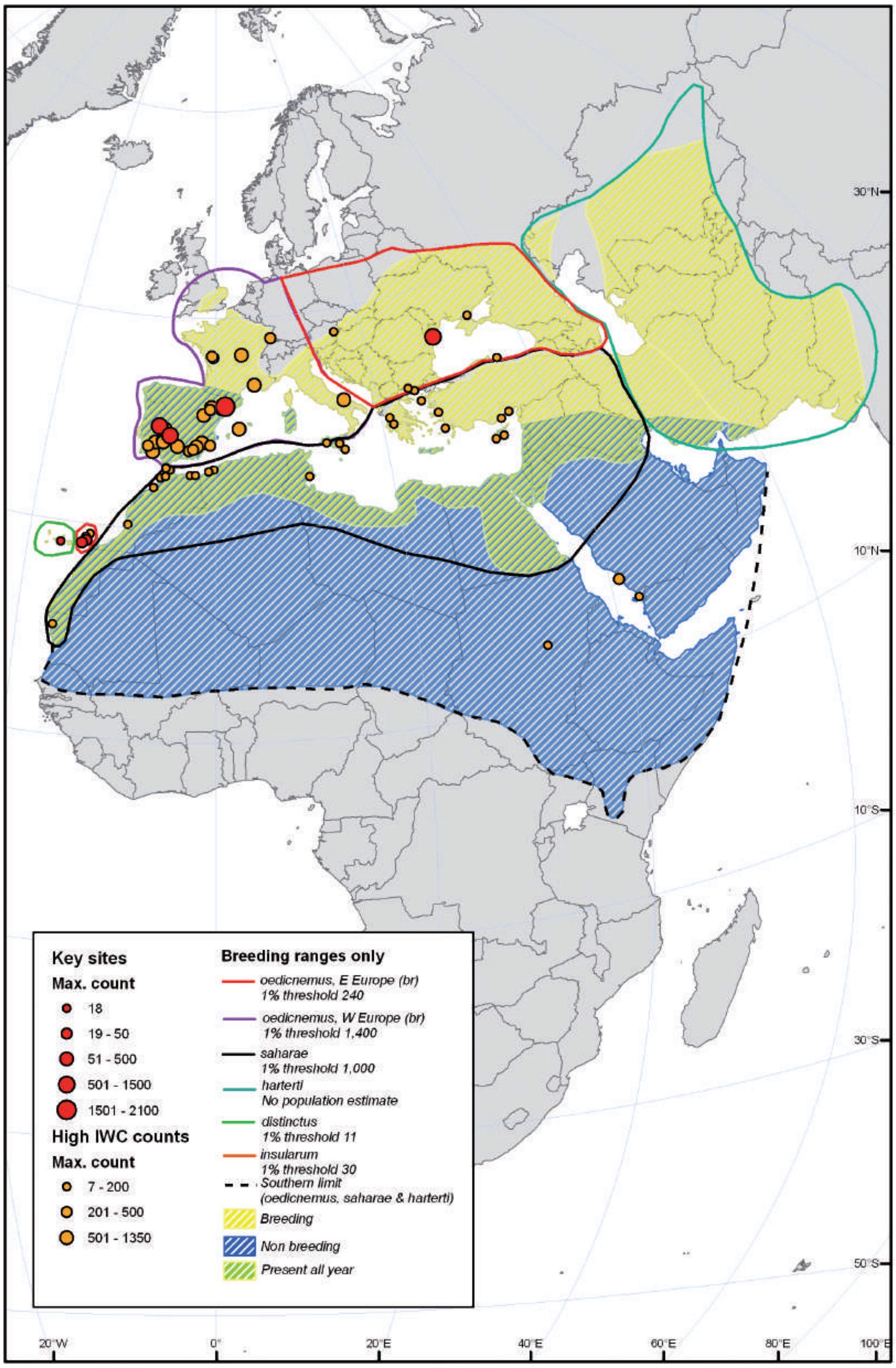
Nominate *oedicnemus* is generally migratory in the temperate and cool latitudes of Europe. Autumn passage is prolonged, beginning in the second half of August, with many birds remaining in or near the breeding areas until October and a few even into November. Stone Curlews still occasionally winter in southern England, and small numbers may have done so regularly during periods of climatic amelioration early in the twentieth century (e.g. 1920-1930s). A few birds winter in south-western France, with considerable numbers wintering in Southern Europe. The Iberian population is considered resident, but most birds breeding in the Bouches du Rhône (southern France) are believed to be migratory.

An analysis of recoveries of birds ringed in southern and eastern England shows that they migrate through western France to winter in Spain, Portugal, Algeria and Morocco (Green *et al.* 1997). This analysis also indicated that young birds return rapidly to England in their second calendar year. Recoveries of birds ringed in The Netherlands and northern France indicate that birds move south-south-west or south-west from the breeding grounds to winter in Iberia and North-west Africa (Cramp & Simmons 1983). Many European birds winter in North Africa and the northern sub-Saharan region, with migration across the Mediterranean and Sahara believed to be on a wide front. Some birds cross the Red Sea and Sinai to reach winter quarters in Eritrea (Cramp & Simmons 1983, Urban *et al.* 1986). The winter distribution south of the Sahara is unclear, and cannot be related to particular breeding areas. One recovery in Sierra Leone of an English ringed first-year bird, however, may indicate that a high proportion of this age class moves into Africa (Green *et al.* 1997). Spring departure from the winter quarters occurs mainly in March, with passage continuing into April in Morocco. British breeding areas are invariably reoccupied during the second half of March, with arrivals continuing until April. The breeding grounds in Eastern Europe are reoccupied in the first half of April, but not until early May in the north (Snow & Perrins 1998).

Movements undertaken by the North African and Middle Eastern populations (*saharae*) are little known. Birds are present all year round over much of the North African range, but are absent from high plateaux from October to March when groups occur on the coastal plain. The latter may,

Stone Curlew (Eurasian Thick-knee)

Burhinus oedicnemus



however, include European immigrants. Evidence that the North African population may be partially migratory comes from movements detected along the Atlantic coast, and the presence of some *saharae* among the birds wintering in Senegal (Cramp & Simmons 1983). Most of Morocco's breeding population of *saharae* is sedentary; they gather in flocks and disperse within the breeding area, but some migrate along the Atlantic coast and probably winter in Sahelian West Africa (Thévenot *et al.* 2003). Migrant *saharae* have also been recorded in Sudan, Eritrea, northern Somalia and northern Kenya. The origin of these birds in North-east Africa is unknown, and it may be they come from Western Asian breeding areas. In Turkey, the Stone Curlew is essentially a summer visitor, present from late March to mid-October. Elsewhere, in the Near East and Middle East, birds are resident but not necessarily sedentary (Cramp & Simmons 1983).

In Eastern Africa, Stone Curlew is a scarce but regular visitor from October to March, occurring south down the Rift Valley to the Tanzania border (Lewis & Pomeroy 1989); some birds belong to *oedicnemus*. The nominate race is also is an occasional visitor to northern Uganda, but may be regular in small numbers (Pomeroy *et al.* 2005).

The Western Asian population (*harterti*) is mainly migratory, but the movements are poorly understood. In Turkmenistan and southern Kazakhstan, emigration occurs from early September to early October, with the main spring passage in April, although the first migrants appear in mid March (Wassink & Oreel 2007). Some birds may be sedentary in the southern parts of the breeding range, but the birds breeding in the south Caspian region and central plateau of Iran are exclusively migratory, vacating their breeding areas in late September and early October, and returning in April (D.A. Scott unpubl. obs.). It seems most likely that these birds, along with migrants from further north, winter mainly in Iraq and the Arabian Peninsula. There is no evidence that birds from this population move into Pakistan or north-western India, where the resident birds make only local movements.

Neither form in the Canary Islands is known to migrate, although *insularum* undertakes inter-island movements, e.g. between Graciosa and Lanzarote (Cramp & Simmons 1983).

Population limits

Rose & Scott (1994) considered the nominate race to comprise western and eastern populations, and gave separate population status to each of the other five subspecies. This treatment was adopted in all subsequent editions of *Waterbird Population Estimates*. The extent of the western population of the nominate race is taken as those birds breeding west of a line from the Adriatic to Denmark.

Population size

1. *oedicnemus* Western Europe (breeding)

Population estimate	1% threshold	Population trend
110,000-170,000	1,400	Decreasing

There are significant populations in France and Iberia. National estimates collated by BirdLife International/EBCC (2000) and Thorup (2006) total 34,465-58,384 pairs and thus 103,400-175,100 individuals. Stroud *et al.* (2004) used these figures to give a population estimate of 100,000-180,000. National estimates given by BirdLife International (2004a) are slightly more precise, and total 37,000-55,400 pairs (equating to 111,000-166,200 individuals). This estimate, after rounding, was adopted as the new population estimate in *WPE4*.

2. *oedicnemus* Eastern Europe (breeding)

Population estimate	1% threshold	Population trend
12,000-36,000	240	Decreasing

Throughout the range of this population, breeding is now localised and discontinuous, with few countries holding large numbers. National estimates collated by Thorup (2006) total 8,475-16,995 pairs, and thus approximately 25,000-51,000 individuals. This was the estimate adopted by Stroud *et al.* (2004). However, national estimates collated by BirdLife International (2004a) give a total of only 3,980-11,970 pairs, largely because of the lower estimate for Russia (3,000-10,000 pairs, compared with 7,755-15,835 pairs in Thorup 2006). Using the data in BirdLife International (2004a), a revised estimate of 12,000-36,000 was adopted in *WPE4*, with a new 1% threshold of 240 set at the mid-point of the range.

3. *distinctus*

Population estimate	1% threshold	Population trend
900-1,200	11	Decreasing

Barone & Rodríguez (2004) have estimated the population at about 300-400 pairs, equating to 900-1,200 non-breeding individuals. These include 200 pairs on Gran Canaria, 50-60 pairs on Tenerife, <20 pairs on La Gomera, c. 100 pairs on El Hierro, and c. 12 pairs on La Palma.

4. *insularum*

Population estimate	1% threshold	Population trend
700-4,700	30	Probably decreasing

Lorenzo *et al.* (2004) have estimated the population at between 224 and 1,582 pairs, equating to about 700-4,700 non-breeding individuals. These include 76-548 pairs on Lanzarote and its associated small islands, and 148-1,034 pairs on Fueteventura and Lobos islands.

5. *saharae*

Population estimate	1% threshold	Population trend
B/C (10,000-100,000)	Provisionally 1000	Unknown

The total size of this population is not known, although BirdLife International (2004a) gives national totals for Turkey (3,000-6,000 pairs), Greece (300-500 pairs) and Cyprus (200-1,000 pairs). Dodman (2002) suggested that the population is most likely to fall within the range 10,000-100,000, and this estimate was adopted in *WPE3* and *WPE4*

6. *harterti*

Population estimate	1% threshold	Population trend
Unknown	Not established	Unknown

This population remains very poorly known.

Conservation status

The overall trend in Europe has been one of large decline, and the only country in which the numbers of Stone Curlews are increasing is the U.K., where there has been a slight increase in recent years following a long period of decline (BirdLife International/EBCC 2000, Thorup 2006, BirdLife International 2004a). There are also reports of increases in a number of regions following many years of decline in France (B. Trolliet *in litt.*), Declines in Western Europe began in the second half of the nineteenth century, but became more marked after the Second World War when the Stone Curlew disappeared from The Netherlands and western Germany. During 1970-1990, decreases became apparent almost throughout the entire European range, as suitable breeding habitat was lost through the intensification of arable farming and the replacement of dry grassland with intensively managed arable land (Lecomte & Voisin 1991, Suárez *et al.* 1997, Snow & Perrins 1998). In Britain, for example, there has been a significant loss of semi-natural habitats associated with changed farming practices (Stroud *et al.* 2001). In southern Russia west of the Caspian, the population now appears to be stable after a marked decline (Belik 1998). The breeding populations of *saharae* in Cyprus and Greece are thought to be stable (BirdLife International 2004a), but the trends elsewhere in the range of this subspecies are unknown.

Both of the breeding populations of Stone Curlews in the Canary Islands were reported to be declining by BirdLife

International/EBCC (2000). With a total population of only some 300-400 breeding pairs, the population of *distinctus* is particularly vulnerable. The main distribution of this form is in the southern parts of Gran Canaria and Tenerife, where the area of suitable habitat has been greatly reduced due to extension of farming and building developments (Thorup 2006). Barone & Rodríguez (2004) have recently reported a decline in the numbers of this population, especially on Tenerife, La Gomera and La Palma, and have identified the main threats as loss and fragmentation of habitat, human disturbance in the breeding and resting areas, hunting and road accidents. The form *insularum* remains common and widespread on Lanzarote and Fuerteventura, but numbers are thought to be decreasing as a result of loss and fragmentation of habitat, human disturbance, nest predation by mammals, grazing, hunting, road accidents and collision with power lines (Lorenzo *et al.* 2004).

Habitat and ecology

Unlike most other waders, the Stone Curlew is not closely associated with wetland habitats at any stage of its life-cycle. The breeding range extends across the middle and lower latitudes of Mediterranean, steppe, mild temperate and arid zones of mainly continental climate (Snow & Perrins 1998). Dry islands in the Atlantic and Mediterranean are also frequented. It is primarily a ground bird favouring at all seasons dry, unbroken terrain in areas with short or cropped vegetation interspersed with bare ground, sometimes in the neighbourhood of wetlands. A variety of suitable habitats is used, including lowland heathland, infertile or stony pasture, extensive sand dunes, saline or alkaline steppe, semi-desert and desert, stony plateaux, bare islets or tracts along rivers or by lakes and lagoons where there is a seasonal reduction in water levels (Snow & Perrins 1998). Adaptation to comparable artificial habitats has occurred, and birds will nest in those arable habitats where crops are short and open during the breeding season, e.g. maize, carrots, sugar beet and sunflowers, or where there is a succession of bare ploughed or fallow fields (Cramp & Simmons 1983, Green & Griffiths 1994).

Although pairs nest at well-spaced intervals, Stone Curlews are often gregarious, forming flocks in late summer, autumn and winter, and even meeting up for communal feeding and other display activity during the breeding season (Nipkow 1997, Snow & Perrins 1998). Stone Curlews are monogamous, with most pair establishment occurring shortly after arrival on the breeding grounds. Breeding densities in prime habitat, such as the Crau (in southern France), reach 1.5-3 pairs per sq.km dropping to 0.5-1.1 pairs per sq.km in arable habitats (Nipkow 1997). Nests are on bare ground or in short vegetation with egg-laying from early April to early July in Europe, and February to early June in the Canary Islands. Both parents share incubation and the care of young. Foraging is mainly crepuscular and nocturnal with a diet consisting of insects, crustaceans, molluscs, worms and also frogs and small rodents (Snow & Perrins 1998).

A complete post-nuptial moult starts between early April and mid-June (mostly early May) finishing four to five months later. Those adults still with many unmoulted primaries in late September suspend replacement until the following April or May. A restricted partial pre-nuptial moult, from March to May, is of uncertain extent and may actually be early post-nuptial moult. Juveniles undergo a partial moult, commencing soon after fledging and suspended by November. Retarded birds complete this moult in the spring (Cramp & Simmons 1983).

Network of key sites

The Stone Curlew is a bird of dry land, generally occurring at low densities over wide areas. Although it forms small flocks after the breeding season, these seldom exceed a few tens of birds, and large concentrations approaching the 1% thresholds of the continental populations have not been recorded. The Stone Curlew is not, therefore, a species for which the key sites approach is particularly effective, except for small populations with very restricted ranges. Only seven key sites have been identified, and all are breeding areas: two sites in the eastern Canaries for *insularum*, one site in the western Canaries for *distinctus*, three large sites on the Spanish mainland for the western population of *oedicnemus*, and one huge site in Romania for the eastern population of *oedicnemus*. The three sites in Spain, Brozas-Membrio plain (94,000 ha), La Serena grassland (109,800 ha) and Lerida steppes (62,500 ha), together hold about 1,600-1,700 breeding pairs, while the Danube Delta and Razim-Sinoe complex (442,000 ha) in Romania supports about 180 pairs.

Protection status of key sites

One of the two key sites in the eastern Canaries, Isthmus of Jandia, is partly protected in a National Park and Special Protection Area, and the site in the western Canaries, El Médano coast, is partly protected in a Natural Reserve, but none of the three sites on the Spanish mainland has any formal protection. The Danube Delta and Razim-Sinoe complex in Romania are well protected in 16 protected areas, a Biosphere Reserve (580,000 ha), a World Heritage Site and a Ramsar site. All seven sites have been identified as IBAs (Heath & Evans 2000).

Table 9. Key sites for Stone Curlew. Sites where 1% or more of a population has been recorded

Country	Site	Lat.	Long.	Season	Max total	Year max	Average total	Basis for average	Source	Population(s) at site
Romania	Danube Delta & Razim-Sinoe complex	45.30	29.20	Breeding	540	1996			WBDB	E Europe
Spain	Brozas-Membrío	39.67	-6.83	Resident	1500	1996			WBDB	W Europe
Spain	La Serena	38.83	-5.50	Resident	1500	1996			WBDB	W Europe
Spain	Lerida steppes	41.67	1.13	Breeding	2100	1995			WBDB	W Europe
Spain (Canary Is)	Cuchillete de Buenavista-gully of La Torre-Los Alares	28.40	-13.83	Resident	30	1990s			WBDB	*insularum*
Spain (Canary Is)	El Médano coast	28.03	-16.55	Resident	18	1993			WBDB	*distinctus*
Spain (Canary Is)	Isthmus of Jandía sandy plain	28.15	-14.27	Resident	30	1995			WBDB	*insularum*

Jeff Kirby

Niels Gilissen

Senegal Thick-knee
Burhinus senegalensis

Geographical variation and distribution

The Senegal Thick-knee is found only in Africa, where it occupies most river systems from the equator north to the Sahara, and eastwards from the Atlantic coast to Ethiopia and the Nile Valley. Two populations are recognised, *senegalensis* occupying the range from Senegambia east to Sudan, and a second population, recognised by some authors, e.g. Vaurie (1965) and Cramp & Simmons (1983), as *inornatus*, which is found in Eastern Africa and the Nile Valley. The two forms are poorly defined and geographical variation is slight and mostly clinal, with a wide range of intergradation in central Sahelian Africa (Cramp & Simmons 1983). Bannerman (1953) describes *inornatus* as a slightly greyer form than *senegalensis*; Urban *et al.* (1986) also mention a slightly shorter wing in *senegalensis*, but follow White (1965) in treating it as a monotypic species.

Movements

The Senegal Thick-knee is resident over much of its range, notably in Egypt, but in some areas, migration takes place in response to rains. It is an established rains migrant in north-east Democratic Republic of Congo, arriving in November and departing in April-May, whilst in Nigeria it makes local movements in response to changes in water level (Urban *et al.* 1986); numbers decrease in northern Nigeria during rainy season floods (Cramp & Simmons 1983). Numbers fluctuate in The Gambia (Barlow *et al.* 1997), whilst in Côte d'Ivoire it is generally present from November to April (Urban *et al.* 1986), before the rainy season, but more numerous in the Inner Niger Delta between April and June (Van der Kamp & Diallo 1999). It is a rare dry season visitor to Liberia (Gatter 1997). Breeding has been recorded right across the species' range in a wide variety of months and in both dry and wet seasons. Stronger migration patterns are perhaps associated with birds moving between the moist Sudan-Guinea Savannah biome and the drier Sahel biome to the north. Birds from coastal countries of the Gulf of Guinea and from northern Democratic Republic of Congo probably migrate northwards to the Sahel belt after breeding.

Population limits

Two populations have been identified:

1) *senegalensis*, occurring in West Africa south of the Sahara, eastwards probably to western Sudan.
2) *(inornatus),* occurring from the Nile Delta in Egypt, along the Nile Valley to northern Uganda and north-western Kenya, and east as far as the Ethiopian Highlands, which is the eastern limit of the Sahel biome.

There appears to be a wide overlap between the two populations, with *senegalensis* intergrading with "*inornatus"* in northern Cameroon, Chad, Central African Republic and north-eastern Democratic Republic of Congo (Cramp & Simmons 1983).

Population size

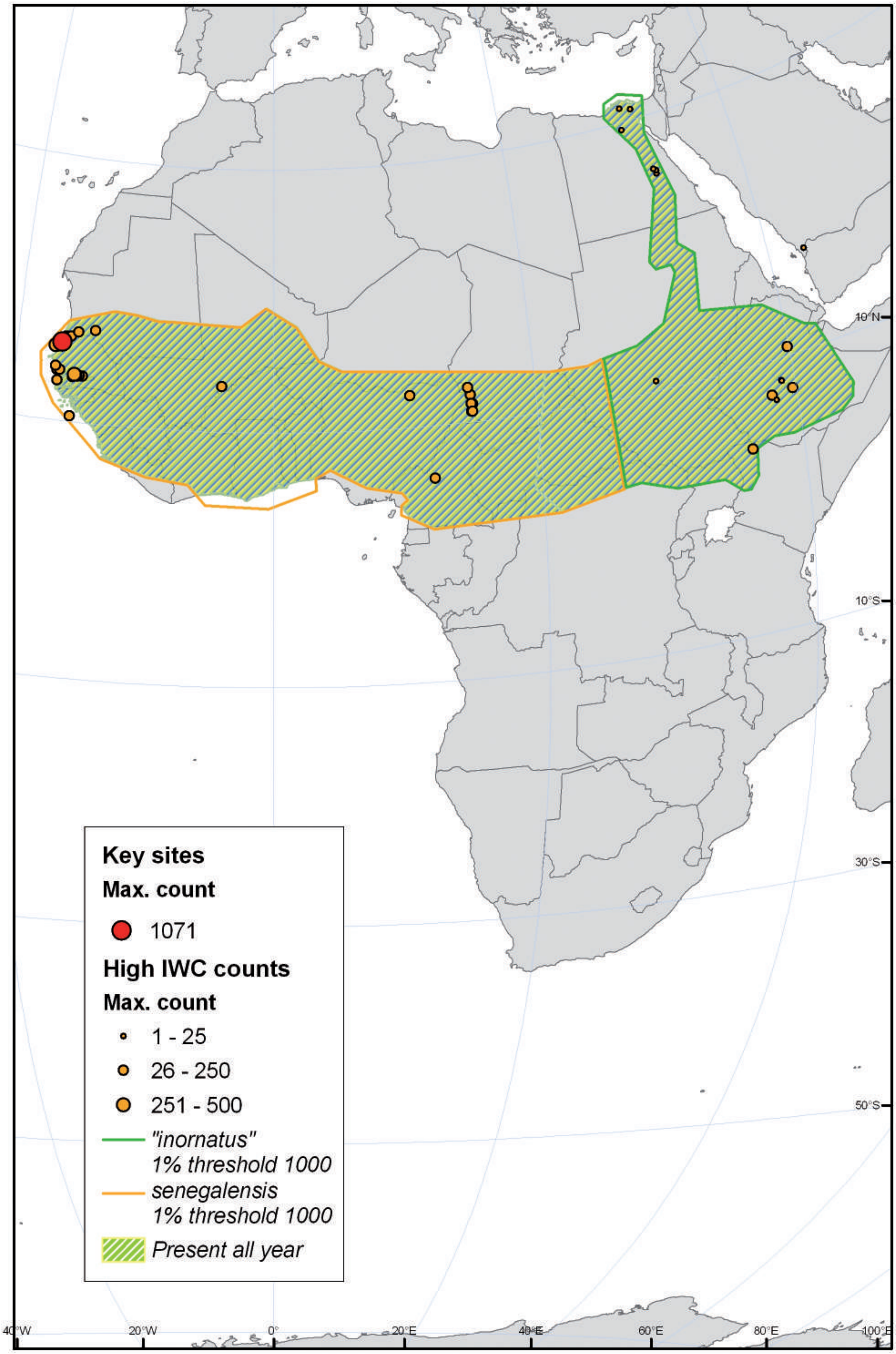
1. *senegalensis*

Population estimate	1% threshold	Population trend
C (25,000-100,000)	Provisionally 1,000	Unknown

This thick-knee is generally common from southern Mauritania to Chad, being more numerous in the Sahelian zone and absent from some forest blocks (Dodman 2002). Several hundred are usually recorded from West Africa in the January AfWC, e.g. 634 in January 1998 (Dodman *et al.* 1999), 709 in January 2001 (Dodman & Diagana 2003) and 849 in January 2003 (Diagana & Dodman 2006). Fishpool & Evans (2001) gave a population estimate of 10,000-

Senegal Thick-knee

Burhinus senegalensis



25,000, although this was not based on specific data. The geographical extent of the range and the availability of suitable habitat within that range suggested to Dodman (in press 2009) that a higher estimate was justified, but there are still insufficient data to allow greater precision. An estimate of C (25,000-100,000) has therefore been adopted for this Atlas.

2. *(inornatus)*

Population estimate	1% threshold	Population trend
C (25,000-100,000)	Provisonally 1,000	Unknown

This population is reasonably common along the Nile River and on the shores of Lake Turkana (Britton 1980) where it is at the south-east limit of its northern tropics breeding range (Lewis & Pomeroy 1989). It is a common resident associated with water throughout Sudan (Nikolaus 1987). A total of 144 was recorded in Ethiopia in the AfWC in January 1998 (Dodman *et al.* 1999). Fishpool & Evans (2001) gave a population estimate of 10,000-25,000, which, like the estimate for *senegalensis*, was not based on specific data. The estimate has been increased to C (25,000-100,000) for this Atlas, for the same reasons as for nominate *senegalensis*.

Conservation Status

The Senegal Thick-knee is not thought to be threatened. It is generally common in suitable habitat, and adaptable to human activity (Urban *et al.* 1986, del Hoyo *et al.* 1996). There are no causes for conservation concern at present for either population.

Habitat and ecology

The Senegal Thick-knee differs from the Stone Curlew *B. oedicnemus* in its avoidance of deserts and preference for the vicinity of water, especially river beds. It favours damp, muddy or sandy riversides and lakeshores, and occupies a wide variety of open, sparsely vegetated habitats, including savanna, woodland clearings, open orchards and gardens. However, it can also be found regularly away from water, and is a common bird of West African villages in the Sahel belt. It nests on flat-roofed buildings in Egypt, even in Cairo (Cramp & Simmons 1983) and in West Africa (Bannerman 1953). It is apparently monogamous, solitary or loosely colonial, and the same territory may be occupied for many years (Urban *et al.* 1986). It usually breeds before rains in areas with seasonal rainfall, when river levels are low (del Hoyo *et al.* 1996), nesting on bare ground in the open. It feeds on insects, crustaceans, snails, worms and other invertebrates as well as tadpoles, frogs and small rodents. It is mainly nocturnal or crepuscular, but can also be active during the day. It is often found in small flocks outside the breeding season (del Hoyo *et al.* 1996), and loose parties can often be seen resting under bushes or thickets fairly close to the banks of rivers or wetlands. This thick-knee is a familiar sight along river banks in the Inner Niger Delta. The Water Dikkop *B. vermiculatus* occupies similar habitats in Africa south of the equator, although it is even more closely associated with water.

Network of key sites

The Senegal Thick-knee generally occurs at rather low density along rivers and around large wetlands, and rarely occurs in large concentrations. Only one key site has been identified on the basis of the provisional 1% threshold, in West Africa; Lagunes de St Louis (including Langue de Barbarie) in the delta of the Senegal River in Senegal. Other large wetland complexes that are likely to support significant numbers of this thick-knee include the Inner Niger Delta in Mali, and Lake Chad.

Protection status of key sites

This species does not generally require protection of sites, as it adapts well to environmental change and habitat modification, and is regularly found on agricultural lands and within villages. It is most susceptible when breeding, although its cryptic coloration and behaviour make nest location quite hard for a fairly large wader nesting on open ground.

Table 10. Key sites for Senegal Thick-knee. Sites where 1% or more of a population has been recorded.

Country	Site	Lat.	Long.	Season total	Max max	Year total	Average for average	Basis	Source	Population(s) at site
Senegal	Langue du Barbarie P.N.	15.99	-16.52	Non-breeding	1071	1999	384	1997-01 (3)	AfWC database	*senegalensis*

Simon Delany & Tim Dodman

Nigel Blake

Water Dikkop (Water Thick-knee)

Burhinus vermiculatus

Geographical variation and distribution

This species is endemic to sub-Saharan Africa, where it is restricted to suitable waterside habitat. It never occurs far from water, and is thus absent from large tracts of dry countryside. Two subspecies are recognised: the nominate ranges from the Democratic Republic of Congo and Somalia southward to South Africa, and the form *buettikoferi* from Liberia to Gabon, where it is largely confined to the coastal zone. The nominate race is paler and greyer above than *buettikoferi* (Borrow & Demey 2001), whilst the latter has a larger culmen (Bannerman 1953).

Movements

The Water Dikkop is generally sedentary; there is one recovery of a bird at the site of ringing after an elapsed time of 19.5 years (Underhill *et al.* 1999). There are some local movements, especially during peak floods, when favoured sites become temporarily inundated. In parts of Zambia it is only present during high water levels, for example in Zambia's Copperbelt between January and March, so some local movements clearly occur (Dowsett *et al.* 2008). The fact that the species has not colonised new dams in semi-arid areas of western South Africa suggests that it does not generally perform nomadic movements in search of new feeding grounds.

Population limits

There are two subspecies:

1) *vermiculatus*, occurring in Eastern Africa from north-eastern Democratic Republic of Congo to southern Somalia, southwards to the Caprivi Strip and Mozambique, thence along the east coast of South Africa as far as the Cape; also skirting the southern edge of the Congo Basin, branching then to coastal Angola and up the lower-mid reaches of the Congo and Oubangui Rivers.
2) *buettikoferi*, occurring mainly in the coastal lowlands from Liberia to Gabon, but with colonisation up the lower reaches of most of the larger rivers, notably in Côte d'Ivoire. Hayman *et al.* (1986) ascribe birds of northern Uganda to this population, but this is not widely accepted.

Population size

1. *vermiculatus*

Population estimate	1% threshold	Population trend
C (25,000-100,000)	Provisionally 1000	Unknown

Fishpool & Evans (2001) gave a rough estimate of 25,000-100,000 for the species, of which this population forms the bulk. Underhill *et al.* (1999) estimated that there were at least 10,000 birds in Southern Africa (south of the Zambezi and Cunene Rivers).

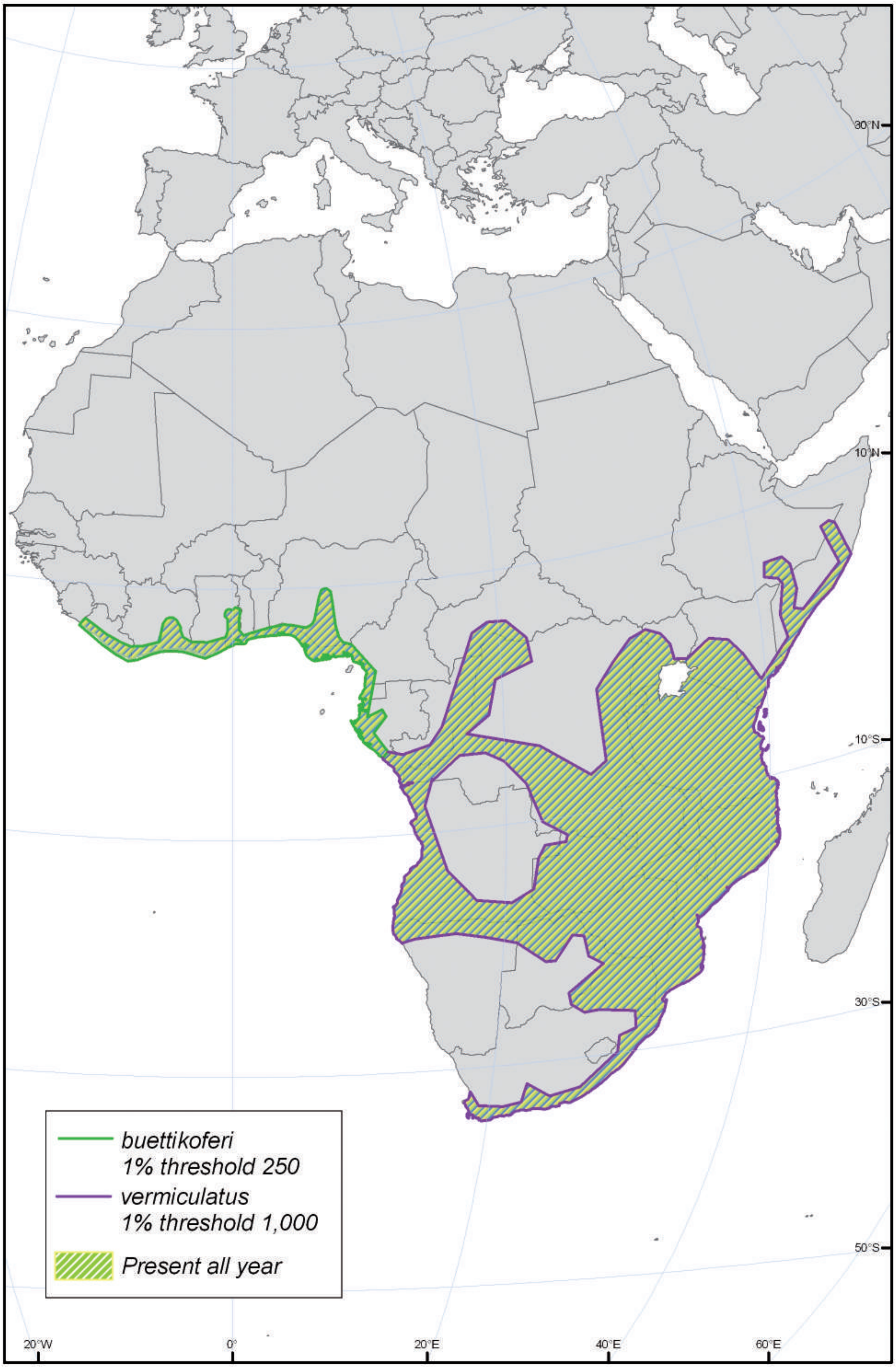
2. *buettikoferi*

Population estimate	1% threshold	Population trend
A/B (<25,000)	Provisonally 250	Unknown

Dodman (2002) suggested a provisional population estimate of A/B (<25,000) based on the rather patchy distribution and generally uncommon status. Gatter (1997) estimated that there were over 500 pairs along the Liberian coastline.

Water Dikkop (Water Thick-knee)

Burhinus vermiculatus



Conservation status

The species is not thought to be threatened. In Southern Africa, the population probably increased during the twentieth century, likely due to the construction of water impoundments (including small dams), although the overall range appears unchanged, and it has not been lured into otherwise arid areas by new dams (Maclean 1997). However, loss of habitat through the development of estuaries for recreational use and harbour development might be having a negative impact at the coast (Maclean 1997). Overall, there is no evidence of changing population status for either population, and no major threats are apparent.

Habitat and ecology

The Water Dikkop is the most water-dependent of all the thick-knees in Africa, and it is never found far from a permanent water source. Preferred habitats are large tropical river systems with sandbanks, estuaries fringed with mangroves, and the edges of lakes and pans. It is occasionally found on sheltered sandy shorelines, and sometimes on exposed rocks in rivers. It has adapted to artificial wetlands, such as dams. In Zambia, it is much more common on sandbanks of the Luangwa and Zambezi Rivers than in the floodplains of the Kafue River (Benson *et al.* 1971).

It usually occurs singly or in pairs, whilst groups of 20-30 birds are common outside the breeding season, especially by day, when it roosts along the edge of water bodies, usually in the shade of bushes or trees. It is generally more gregarious than other thick-knees. In West Africa, congregations may be found at river mouths. It is crepuscular and nocturnal, usually feeding less than one kilometre from water on insects, crustaceans and molluscs. The nest is a scrape on the ground, seldom more than 20 metres from water. The clutch size is two, and incubation takes about 24 days. In spite of its relative abundance in many places, this is a remarkably poorly studied species.

Network of key sites

The Water Dikkop occurs widely but at low density along rivers and in large wetland areas, and rarely congregates in large numbers. No key sites have been identified on the basis of the provisional 1% thresholds, and the key site approach is clearly inapplicable in the conservation of this species. Some extensive wetland systems doubtless support reasonable numbers of the nominate race, e.g. the Okavango Delta and the Luangwa Valley. The Liberian coastline is probably the most important area for *buettikoferi*.

Protection status of key sites

The Water Dikkop seems able to adapt to human presence, except where disturbance is severe. Specific site protection measures are not required for sustaining either population at present.

Tim Dodman & Les Underhill

Niels Gilissen

Spotted Dikkop

Burhinus capensis

Geographical variation and distribution

The Spotted Dikkop has a very wide distribution in sub-Saharan Africa, extending from the Western Cape, South Africa, northward as far as the Sahel zone and the Red Sea coastline, but avoiding the equatorial forests and other heavily wooded areas. It also occurs in the southern and eastern Arabian Peninsula. It is a polytypic species, and as many as eight subspecies have been described at various times, but only four are now generally recognised (Clancey 1980, Urban *et al.* 1986, del Hoyo *et al.* 1996). These are as follows

1) the nominate *capensis*, occurring in most of the southern part of the range;
2) *damarensis*, paler and greyer than *capensis* with less bold markings, occurring in the south-western arid zone;
3) *maculosus,* brighter and more tawny than *capensis*, occurring from Senegal eastwards to Ethiopia and parts of Somalia, and southward to Uganda and Kenya;
4) *dodsoni*, paler and more lightly marked than *maculosus*, occurring in Africa along the Red Sea from Eritrea eastwards, and in southern Arabia.

Movements

The Spotted Dikkop is generally sedentary. In Southern Africa, birds are known to emigrate from some high-rainfall regions during the wet season to drier areas, with birds that spend the dry season in Zimbabwe probably moving westward into the drier central Kalahari Basin in Botswana during the wet season (Underhill *et al.* 1999). The longest recorded movement of a ringed bird in inland South Africa is 169 km, whilst birds on the coast appear to be almost entirely sedentary; an adult ringed near Port Elizabeth, Eastern Cape, South Africa, was recovered only 4 km from the ringing place nearly 22 years after ringing (Underhill *et al.* 1999). However, some birds appear to move into coastal wetlands of the Eastern Cape duing the austral winter (Hockey *et al.* 2005). It is a partial intra-African migrant in West Africa, occurring in the open wooded savanna of northern Ghana in the dry season (November – February), also the non-breeding season (Grimes 1987). In neighbouring Togo, it avoids certain areas in the south of its range in the wetter months (Cheke & Walsh 1996).

Population limits

Four populations of Spotted Dikkop are recognised in *Waterbird Population Estimates*, corresponding to the four subspecies recognised by Urban *et al.* (1986):

1) *capensis*, from Southern Africa north to Angola in the west and Kenya in the east;
2) *damarensis*, in Namibia, western Botswana and south-western Angola;
3) *maculosus*, in the Sahel belt from Senegal to Somalia, northern Uganda and northern Kenya;
4) *dodsoni*, at the Red Sea coast from Eritrea to Somalia and in southern Arabia. In Eritrea, it is also found in the Dehalak Archipelago.

Population size

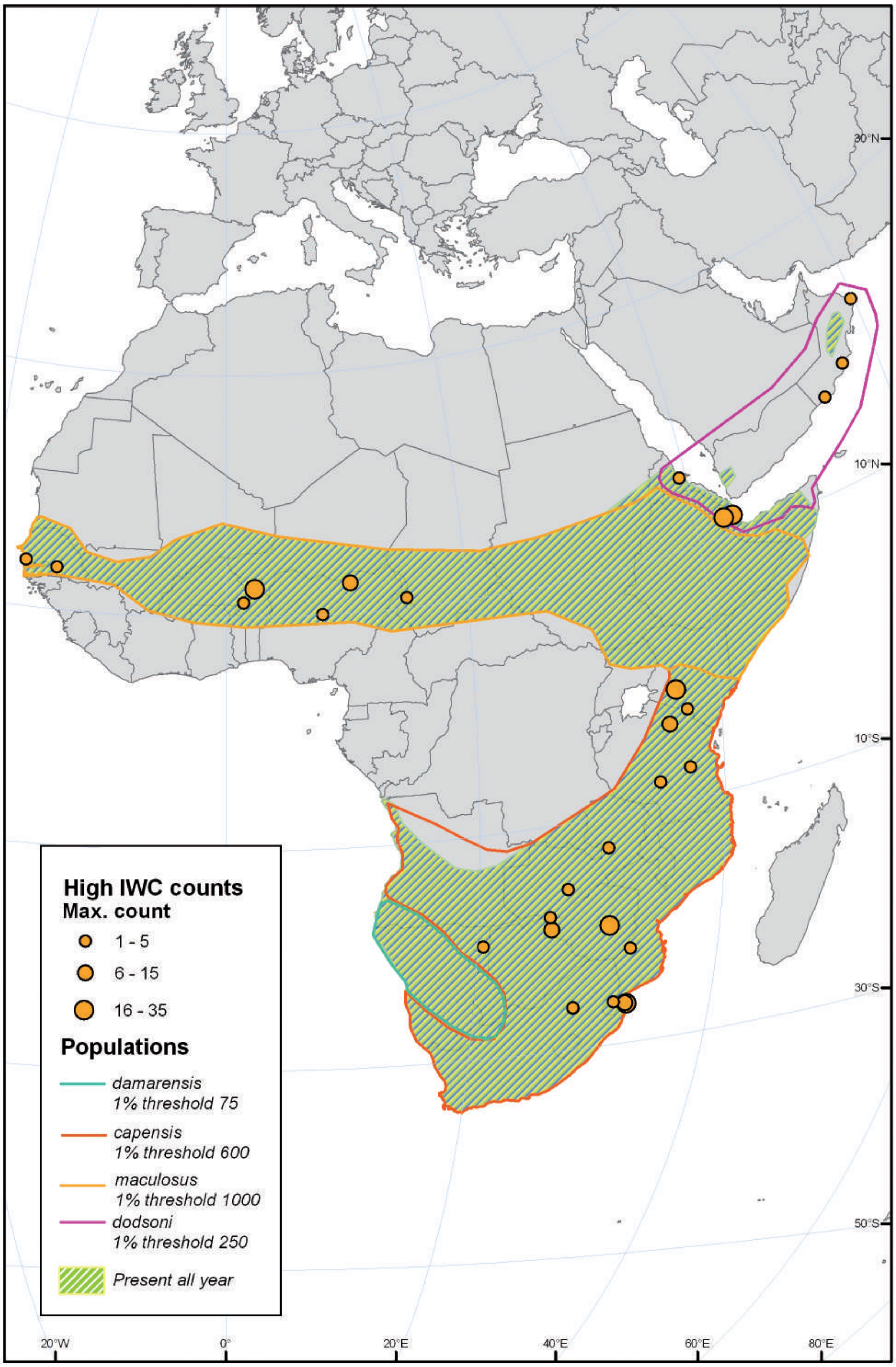
1. *capensis*

Population estimate	1% threshold	Population trend
40,000-80,000	600	Possibly increasing

The Spotted Dikkop is a common resident in suitable habitat throughout much of Southern Africa and in interior East Africa as far north as central Kenya. Underhill *et al.* (1999) considered that the total population in Southern Africa was over 50,000 birds, but noted that an accurate assessment

Spotted Dikkop

Burhinus capensis



was extremely difficult to achieve. Dodman (2002) considered that the population of this subspecies accounted for the bulk of the global population of *B. capensis*, and gave it a provisional estimate of 50,000-100,000. A rough estimate of C (25,000-100,000) was adopted in *WPE3* and *WPE4*. Tree (*in litt.* 2008) recommended a 1% threshold of 600, which was adopted by Dodman (in press 2009), along with a population estimate of 40,000 – 80,000. The population in Southern Africa is possibly increasing, because bush clearance appears to have helped it to extend its range and it adapts well to habitat modification, whilst it is no longer considered as a gamebird (Maclean 1997).

2. *maculosus*

Population estimate	1% threshold	Population trend
B/C (10,000-100,000)	Provisonally 1,000	Unknown

Borrow & Demey (2001) considered that this form is generally uncommon in West Africa, from southern Mauritania and Senegal east to Chad and north-eastern Central African Republic. It appears to be more numerous further east in its range, and is fairly common south of the Sahara in Sudan (Nikolaus 1987), and a common and widespread breeding resident in Somalia (Ash & Miskell 1998), though it is rather uncommon in Kenya (Lewis & Pomeroy 1989). Using the estimate of Fishpool & Evans (2001) of C for all four populations in Africa, Dodman (2002) gave a provisional estimate of 10,000-25,000, which was adopted in *WPE3*, but later revised to B/C, especially considering the extent of suitable habitat in Sudan Dodman (in press 2009).

3. *damarensis*

Population estimate	1% threshold	Population trend
5,000-10,000	75	Unknown

The range of this subspecies include some very arid areas where it is likely to have a low population density. It is largely absent from the drier parts of the Namib Desert (Hockey *et al.* 2005). Dodman (2002) proposed a provisional population estimate of <10,000, which was adopted in *WPE3* and *WPE4*. Tree (*in litt.* 2008) revised this to 5,000-10,000, indicating greater certainty that this population is uncommon, has low population densities and a very scattered distribution.

4. *dodsoni*

Population estimate	1% threshold	Population trend
B (10,000-25,000)	Provisonally 250	Unknown

In Africa, this population is restricted to the Red Sea coastal belt from eritrea to Somalia. It is frequent in the Dahlak Archipelago of Eritrea (Urban & Brown 1971). Its distribution is rather scattered in Arabia, with seemingly isolated populations in southern Yemen and Oman. Dodman (2002) proposed a provisional population estimate of 10,000-25,000, and this was adopted in *WPE3* and *WPE4*.

Fishpool & Evans (2001) give an estimate of 25,000-100,000 for all four populations combined. Dodman (in 2002) considered this to be an underestimate, given the wide distribution of the species and extensive availability of suitable habitat.

Conservation status

The Spotted Dikkop does not seem to be facing any serious threats across its wide range. It is most common in arid and semi-arid savanna and open woodland areas. The overall distribution probably changed little during the twentieth century. In Southern Africa, the clearing of bush and forest has undoubtedly helped it to extend its range into formerly unsuitable areas, whilst it is generally absent from areas with large numbers of livestock and people, such as occur in the Transkei, Eastern Cape, South Africa, and parts of Zimbabwe (Maclean 1997). However, it adapts well to light human modification of natural habitats, and may be found in a variety of modified environments. The Spotted Dikkop is unlikely to experience any widespread decrease in numbers in Southern Africa, especially as it does not seem to be widely regarded as a game-bird (Maclean 1997).

Habitat and ecology

The Spotted Dikkop is a bird of arid areas, semi-arid bush, savanna, open woodland and a variety of other generally open habitats, including modified environments such as cultivated and overgrazed land, large lawns, playing fields, parks, cemeteries and airfields. It favours open areas with sparse cover, a widespread habitat in Africa. In the Western Cape, South Africa, daytime roosts are frequently in scrubby areas just above the high tide mark on marine shorelines. It is mainly crepuscular and nocturnal, usually occurring singly or in pairs, especially while breeding. It is often encountered on tracks and roads at night. During the non-breeding season, daytime roosts sometimes consist of as many as 40-50 birds in a loose flock.

Over most of its range, it breeds towards the end of the dry season and near the beginning of the wet season, for example, April-July in Senegal (Barlow *et al.* 1997), mid-March to June in Somalia (Ash & Miskell 1998) and September to February in most areas of Southern Africa (Maclean 1997). The nest is a scrape; the clutch size is two eggs, rarely one or three. The incubation period is 24 days, and the fledging period is about 7-8 weeks. Both parents incubate and tend the chicks.

Network of key sites

No key sites have been identified. Like most other species of dikkop and thick-knee, the Spotted Dikkop is largely sedentary and occurs throughout its wide range at relatively low densities. It seems unlikely that there are any sites that regularly hold over 1% of the total population of any of the four subspecies, and the key site approach is inappropriate in the conservation of this species.

Les Underhill & Tim Dodman

Aditya Singh

Great Thick-knee

(Great Stone Plover)

Burhinus (Esacus) recurvirostris

Geographical variation and distribution

The range of this monotypic species extends from extreme south-eastern Iran through the Indian subcontinent and Sri Lanka to Indochina and southern China. In Western Eurasia, it is found only along the coast of south-eastern Iran from the region of Bandar Abbas and Qeshm Island to the Pakistan border.

Movements

The Great Thick-knee is mainly sedentary, but moves locally in response to changes in feeding conditions (Hayman *et al.* 1986). It is generally resident in Nepal's tarai (southern lowland plains), but also a winter visitor here, with the local population of the eastern tarai augmented from November to February (Inskipp & Inskipp 1985).

Population limits

All four editions of *Waterbird Population Estimates* recognise only one population comprising the entire range of the species.

Population size

1. South-west, South & South-east Asia
(the entire population of the species)

Population estimate	1% threshold	Population trend
A/B (<25,000)	Provisionally 250	Unknown

Little information is available on population size. This species is not well represented in waterbird counts, e.g. only 259 were counted in South Asia and 46 in South-east Asia in the IWC in 2001 (Li & Mundkur 2004). The estimate of A/B (<25,000) in *WPE4* is based on rough estimates of 2,000 individuals in India and 250-500 individuals in Sri Lanka (Wetlands International 2006). The total population in Iran was estimated at a minimum of 25 pairs in the 1970s (Scott 1995). In recent years, January counts in Iran have typically totalled between 30 and 50 individuals (Delany *et al.* 1999, Gilissen *et al.* 2002).

Conservation status

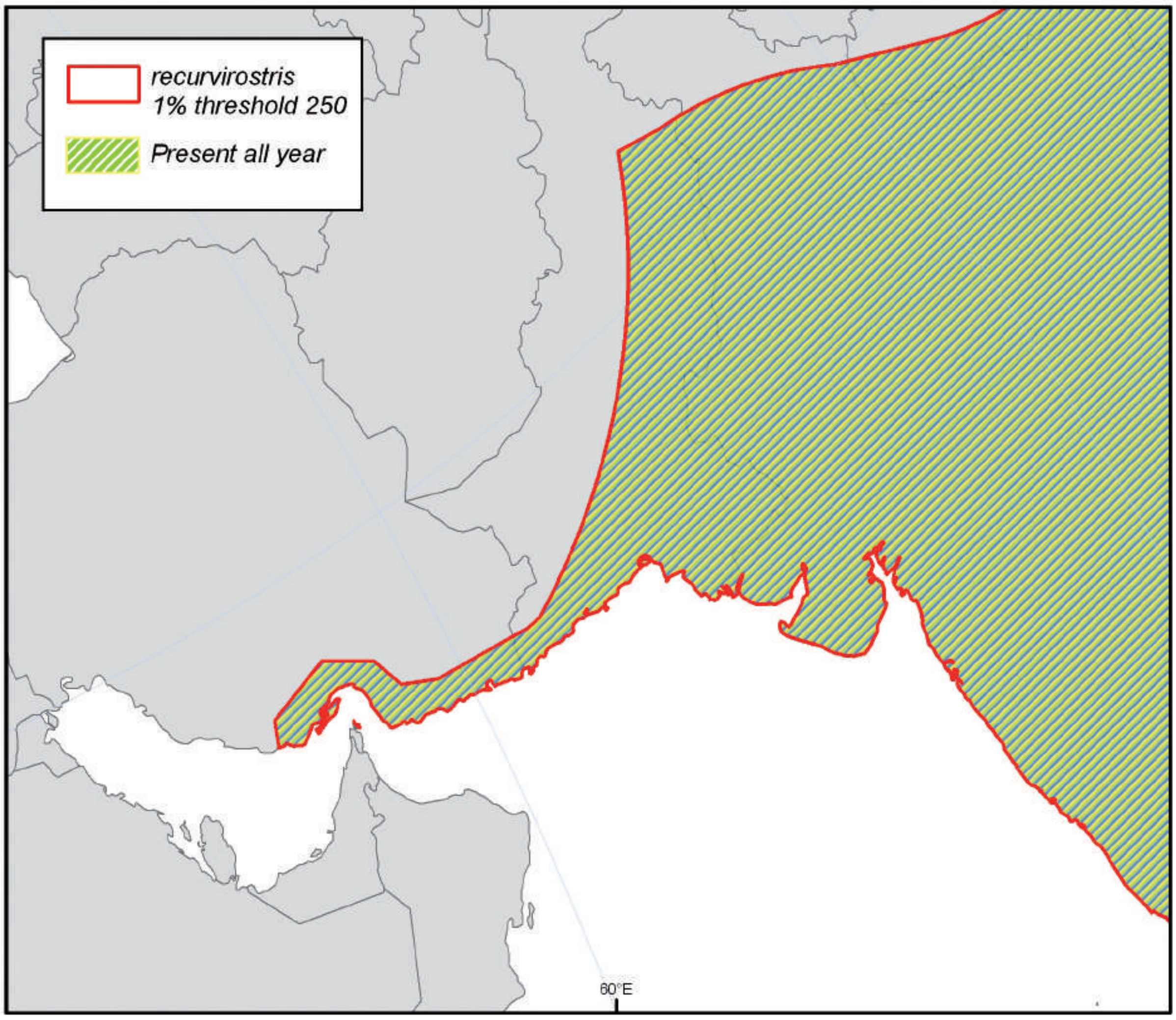
The Great Thick-knee is a rather poorly known species. It is reported to be fairly common in parts of its range in Southern Asia, but scarce and local in Pakistan, and possibly now extinct in Thailand (del Hoyo *et al.* 1996). Recent midwinter counts suggest that there has been little if any change in the distribution or abundance of this species in Iran since the 1970s. It is generally rather wary, and requires large, undisturbed areas for breeding (del Hoyo *et al.* 1996).

Habitat and ecology

In Iran, the Great Thick-knee is a bird of coastal beaches and inter-tidal mudflats, particularly in the vicinity of mangroves *Avicennia marina*. In the main South and South-east Asian parts of its range, it is found most often inland on large shingle banks along major river beds, or by extensive lowland lakes (Hayman *et al.* 1986). It is generally solitary or occurs in pairs, but small flocks are sometimes formed, especially after the breeding season. The breeding system is monogamous, and both sexes incubate and care for the chicks. It feeds mainly on crabs and other invertebrates, and often at night (del Hoyo *et al.* 1996).

Great Thick-knee (Great Stone Plover)

Burhinus (Esacus) recurvirostris



Network of key sites

No key sites have been identified. The Great Thick-knee is a sedentary species occurring at low densities throughout its wide range in Southern Asia. It seems unlikely that there are any sites that regularly hold over 1% of the total population, and the key site approach cannot play a major part in the conservation of this species.

Simon Delany & Derek Scott

Niels Gilissen

Egyptian Plover
Pluvianus aegyptius

Geographical variation and distribution

The Egyptian Plover is endemic to Africa, where it is most numerous in the Sahel belt. It is widely considered to be monotypic (e.g. Urban *et al.* 1986), although birds south of the equatorial forest of the Congo Basin ranging from northern Angola into western Democratic Republic of Congo were treated as a separate subspecies, *angolae*, by R. Meinertzhagen on the basis of their shorter wings (Bannerman 1953). It is distributed fairly widely in riverine habitats of West, Central and North-east Africa south of the Sahara, but became extinct in Egypt in the early twentieth century. In North-east Africa, it has a rather scattered distribution along the Nile and Omo Rivers and at a few other suitable rivers and lakes in Ethiopia, and extends south into north-western Uganda and north-eastern Democratic Republic of Congo. In West Africa, it only reaches the coast at river-mouths. Geographical variation is clinal.

Movements

The Egyptian Plover is a partial migrant, moving in response to changes in water level of rivers. In the Inner Niger Delta of Mali, it is generally absent during peak flood, when large areas of sandbanks, its preferred habitat, become submerged. In 1999, numbers rose steadily from December to June, as water levels receded (Van der Kamp & Diallo 1999). It is not a true rains migrant, as the real triggers for movement are changing water levels, and there is often a delay in peak floods, sometimes months after rains in the river headwaters. This is certainly the case for the Niger River. In Nigeria, it tends to leave southern rivers during the wet season between June and October, when it appears in peak numbers in the north of the country, making similar movements also in Chad, moving northwards to temporary wetlands in the Sahel zone (Urban *et al.* 1986). The main breeding season in Nigeria is in April-May, when river levels are low (Bannerman 1953). In Liberia, it is a rare dry season visitor (Gatter 1997). It is locally common in eastern divisions of The Gambia from June to February, with a population peak from September to December (Barlow *et al.* 1997). This may be due to birds leaving inundated river banks further upriver. In Senegal, it breeds in the dry season and is a rare wet season visitor to the lower Senegal Delta (Morel & Morel 1990); breeding in south-eastern Senegal has been recorded in February-March (Richards & Boswall 1985). Christy & Vande Weghe (1999) consider it to be a migrant across most of western Central Africa (Cameroon, Central African Republic, Equatorial Guinea, Congo and Democratic Republic of Congo). Most birds from Southern Sudan move north during the rainy season (Nikolaus 1989). Longer movements are also undertaken, and two birds ringed in Ethiopia were recovered in Sudan at distances of 588 km and 840 km respectively from the sites of ringing (Urban *et al.* 1986).

Population limits

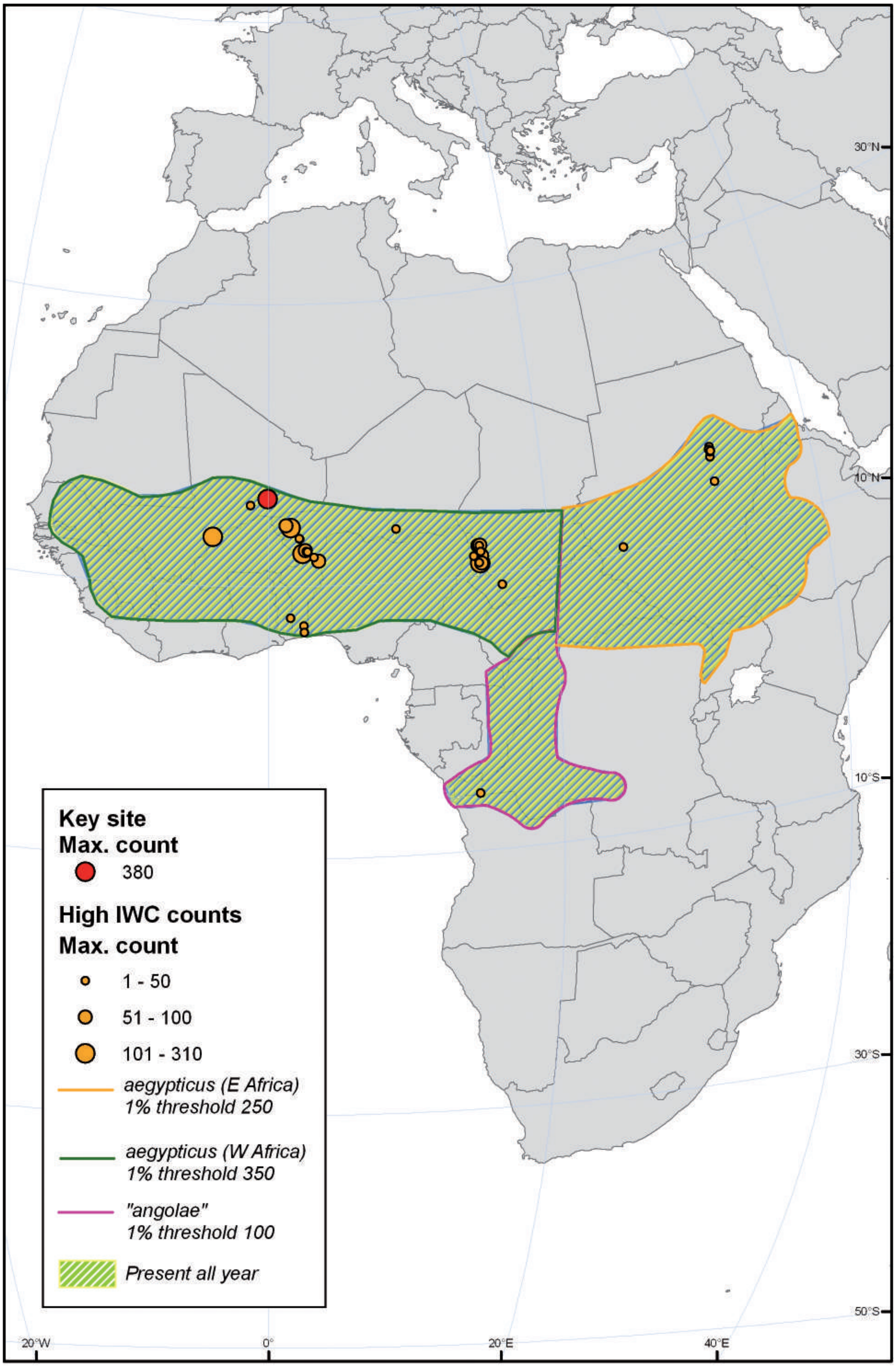
Three populations are recognised, with the split between the two Sahelian populations only recently proposed (Dodman 2002). The population *angolae*, occurring in northern Angola and the Democratic Republic of Congo, is not widely recognised as a separate subspecies (del Hoyo *et al.* 1996).

1) *aegyptius*, Western Africa from Senegal to Chad and the Central African Republic;

2) *aegyptius*, Nile Basin, from Sudan (north of Khartoum) and western Ethiopia to north-western Uganda and northern Democratic Republic of Congo;

3) (*angolae*), the Lower Congo basin, from northern Angola to the Kasai Basin of south-eastern Democratic Republic of Congo, and north along the Congo River to Ubangui.

Egyptian Plover
Pluvianus aegyptius



Population size

1. *aegyptius* Western Africa

Population estimate	1% threshold	Population trend
20,000-50,000	350	Stable

In the Inner Niger Delta, 246 were recorded at Lac Débo and Lac Walado Débo in August 1998 (Van der Kamp & Diallo 1999), so the whole delta is likely to support a few thousand birds. Brouwer & Mullié (2001) provide an average population estimate in Niger of 1,161, based on data from 1994-1997, suggesting that there may be around one pair per kilometre of the Niger River. Fishpool & Evans (2001) provide a population estimate of B (10,000-25,000) for *aegyptius* (both populations described here). Dodman (2002) considered this to be an underestimate, given the rather common and widespread nature of this species in suitable habitat in West Africa, and proposed the slightly higher population estimate of 20,000-50,000 adopted in *WPE3 and WPE4*.

2. *aegyptius* Eastern Africa

Population estimate	1% threshold	Population trend
A/B (<25,000)	Provisionally 250	Decrease

Dodman (2002) considered that this population was less numerous than the West African population, although parts of its range such as the Nile River in Sudan are not well known or monitored, and proposed a very preliminary population estimate of A/B (<25,000). This was based on the rather limited range and lower availability of suitable habitat compared to West Africa. In Sudan, it is common along rivers and lakes with sandbanks, and is largely absent from the extensive swamps of the Sudd and other similar habitats. This species has been observed at Murchison Falls National Park in Uganda at the extreme southern edge of its range, but sightings here are rare.

3. (*angolae*)

Population estimate	1% threshold	Population trend
A (<10,000)	Provisionally 100	Unknown

Fishpool & Evans (2001) provide a preliminary population estimate of <10,000, given the somewhat limited distribution of this form in comparison to other populations. It is an uncommon resident on sandbanks and open riverbanks of the Cuanza and Cuango rivers in Angola (Dean 2000). It is not known from the heavily forested section of the Congo River, and it is not common along the middle Congo River (Chapin 1939).

Conservation status

Habitat changes associated with the damming of rivers are probably the main threat to the Egyptian Plover throughout its wide range (del Hoyo *et al.* 1996). The abundance of the species varies with local conditions; in its preferred habitat it is generally common. In West Africa, it is a common denizen of sandy riverbanks in all main river systems, occupying most suitable stretches of river. It is most numerous in the Sahelian zone, where it can be found both in remote areas and in close proximity to villages. Numbers appear to be stable, and the species is only really threatened by potential modification of its specialist habitat, although eggs and chicks are susceptible to predation. Its tolerance to man is important in enabling it to live in quite heavily utilised stretches of river.

In Eastern Africa, however, the species has disappeared from parts of its former range, especially in the north, where it once extended as far north as Helwan, near Cairo in Egypt (Beaman & Madge 1998). This local extinction along the Egyptian Nile is no doubt due to development and canalisation of the Nile River, and in particular the construction of the Aswan dams. As there are still various proposals for further development of the Nile, the population along this river may well be in decline.

Habitat and ecology

The Egyptian Plover occupies the sandy banks, margins and islands of large rivers in lower, warm, dry latitudes, normally avoiding salt water and heavy forests. Outside the breeding season it may also occur at lakes and other fresh waters, which often brings it in close proximity to human settlements, where it can become extremely tame. It is generally found in pairs in the breeding season, and forms small flocks at other times of the year. It is monogamous and territorial, the usual territory being all or part of a sand, silt or gravel island in a river bed, which is defended aggressively by both birds. The species feeds on insects and other small invertebrates, and also seeds and particles of scavenged fish (Cramp & Simmons 1983). The contention that *Pluvianus* feeds in the gaping jaws of crocodiles was established by Herodotus in the year 459 BC and is widely believed, but reliable modern accounts of this behaviour are lacking (Urban *et al.* 1986).

Network of key sites

The Egyptian Plover generally occurs at low density in scattered pairs and small groups along large rivers, and rarely congregates in large numbers. Only one key site has been identified on the basis of the 1% thresholds, a stretch of the Niger River downstream of the Inner Niger Delta in Mali, where there was a count of 380 in 1978 and 391 in 2008. The Delta itself is likely to hold several thousand birds in the western population of *aegyptius*. Other important sites for this species include large wetland complexes and slow-moving stretches of river along the Senegal, Niger, Benue and Volta rivers in West Africa and along rivers of the Lake Chad Basin.

Protection status of key sites

There are several protected areas and/or Ramsar sites with good habitat for the Egyptian Plover, especially in West Africa, such as the Inner Niger Delta in Mali, the W Parc in Niger, Hadejia-Nguru wetlands in Nigeria and the Waza-Logone in northern Cameroon.

Table 11. Key sites for Egyptian Plover. Sites where 1% or more of a population has been recorded

Country	Site	Lat.	Long.	Season	Max total	Year max	Average total	Basis for average	Source	Population(s) at site
Mali	Fleuve Niger: Downstream From Inner Delta	16.25	-0.08	Non-breeding	391	2008			O.Girard *in litt.*	Western

Lee Johnson

Cream-coloured Courser

Cursorius cursor

Geographical variation and distribution

The Cream-coloured Courser has a discontinuous global distribution in North, North-east and Sahelian Africa, the Middle East and Pakistan, including the Canary and Cape Verde island groups in the Atlantic and Socotra off the Horn of Africa. Five or six subspecies are generally recognised. The two forms occurring in Eastern Africa, *littoralis* and *somalensis*, have been recognised as a separate species, the Somali Courser *C. somalensis* (Pearson & Ash 1996), and this treatment is adopted here. The form *bannermani* is weakly defined and often included within nominate *cursor* (e.g. by del Hoyo *et al.* 1996 and Thorup 2006).

Movements

In the Canary Islands, the Cream-coloured Courser is apparently resident, although there may be some inter-island movements, with recent records from Gran Canaria almost certainly relating to stragglers from other islands (Lorenzo 1994). There are apparently movements between the islands in Cape Verde in response to local conditions, and occurrence at regular sites is quite erratic (Hazevoet 1995); for instance, the courser is only irregular on some islands, such as São Vicente and São Nicolau, and it is rather erratic on Sal. Movements of continental forms are poorly known because they occupy inhospitable habitat and few have been ringed, but most appear to be migratory or dispersive. The Cream-coloured Courser is scarce or absent in most areas of North Africa in winter, when it is found mostly south of the Sahara. The main autumn movement across the Sahara occurs from mid-September to October, and the main spring migration, from March to May. Urban *et al.* (1986) mention a record of 1,000 birds in Tunisia in mid-March. In Tunisia, some birds move north after breeding (Isenmann *et al.* 2005), whilst in Algeria it also shows a reverse migration system, with spring migration towards the south and autumn migration towards the north in search of less arid areas (Isenmann & Moali 2000). Breeding populations in eastern Morocco are migratory, and in autumn there is a large movement of birds southwards, probably to winter in the Sahel (Thévenot *et al.* 2003). More northerly breeding birds to the east of the Mediterranean and in Iran are migratory, whilst those in sub-Saharan Africa are sedentary (del Hoyo *et al.* 1996). Birds in coastal Morocco and Libya also appear to be resident all year round, although the species is only present in the Algerian Sahara in winter and spring, when it breeds (Urban *et al.* 1986).

Population limits

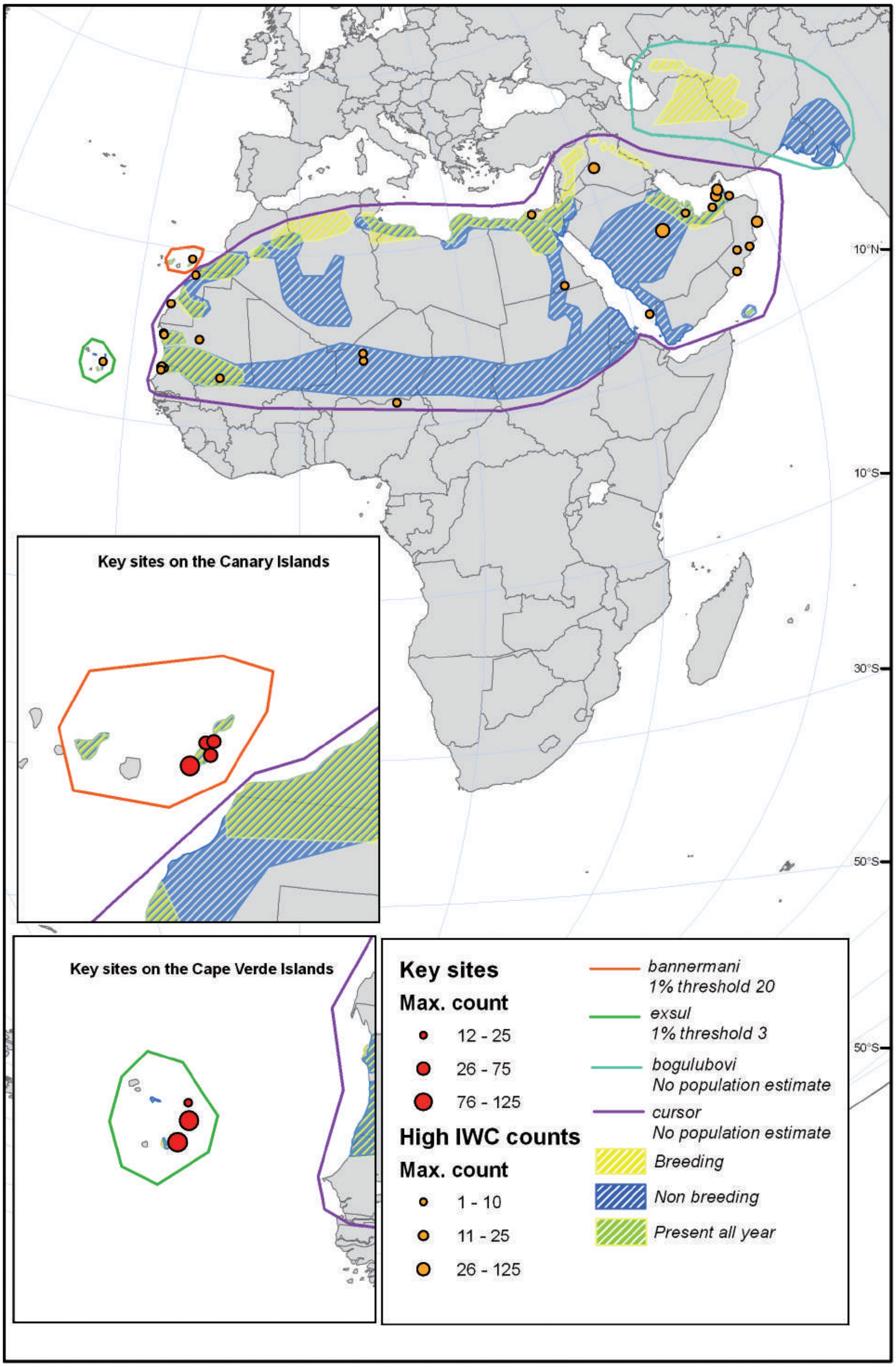
Four populations are recognised, corresponding to the four subspecies:

1) nominate *cursor*, breeding in North and Sahelian Africa, south-eastern Turkey, Syria, Iraq, south-western Iran, the Arabian Peninsula and Socotra, and wintering south to Sahelian Africa from Mauritania and Senegal eastwards to Eritrea and Saudi Arabia;
2) *bogolubovi*, breeding from central and eastern Iran and Turkmenistan to south-western Afghanistan, and wintering in southern Pakistan and north-western India;
3) *exsul*, restricted to the Cape Verde Islands, where it breeds on Boavista, Sal, Maio, Santiago and São Vicente, and has also been recorded (but not proved breeding) on Santo Antão, Santa Luzia, Raso and São Nicolau (Hazevoet 1992, 1995);
4) *bannermani*, restricted to the Canary Islands, where it breeds principally on Fuerteventura and Lanzarote (Thorup 2006).

This treatment differs from that adopted by Stroud *et al.* (2004) and the third edition of *Waterbird Population Estimates* in treating the two forms *littoralis* and *somalensis* as a separate species, the Somali Courser *C. somalensis*.

Cream-coloured Courser

Cursorius cursor



Population size

1. *cursor*

Population estimate	1% threshold	Population trend
Unknown	Not established	Unknown

There is no quantitative information on which to base a population estimate. The only recent records from the African Waterbird Census are of ten seen in southern Mauritania and the Lower Delta of the River Senegal in January 1998 (Dodman *et al.* 1999) and eight in 1996 (Dodman & Taylor 1996).

2. *bogolubovi*

Population estimate	1% threshold	Population trend
Unknown	Not established	Unknown

This form is poorly known and there is no quantitative information on which to base a population estimate.

3. *exsul*

Population estimate	1% threshold	Population trend
150-350	3	Possibly declining

There are reasonable numbers on Boavista and Maio, and each island may hold between 50 and 100 birds; smaller numbers occur on Santiago, Sal, São Nicolau and São Vicente, and the total for these islands may be some 100 birds (C. Hazevoet *in litt.* in Dodman 2002). These figures suggest a population of 200-300 individuals. Given the uncertainty, Dodman (2002) proposed a broader range of 150-350, and this was adopted in *WPE*4. As the courser is highly erratic in its occurrence, it is difficult to make a good population estimate unless simultaneous counts can be carried out on several islands.

4. *bannermani*

Population estimate	1% threshold	Population trend
2,000	20	Declining

The breeding population on the Canary Islands has been estimated at 2,000 individuals with a 90% confidence interval of 960 – 3,315 birds (Carrascal *et al.* 2006). A national survey found about 1,700 on Fuerteventura, 300 on Lanzarote and fewer than 10 on La Graciosa.

Conservation status

There is evidence of a marked decline in Syria during the twentieth century, and reduced vagrancy, e.g. in Central Europe, may indicate some decline in the population of nominate *cursor* (Snow & Perrins 1998). The very small populations of *bannermani* in the Canary Islands and *exsul* in the Cape Verde Islands are vulnerable and need to be closely monitored. In the Canary Islands, *bannermani* remains fairly widespread on Fuerteventura, but is very scarce and local on Lanzarote, and appears to have disappeared as a breeding species from Gran Canaria (Thorup 2006), although it has recently bred on Tenerife (Emmerson & Lorenzo 2004). Overall, the population is in decline, with a decrease of some 60-70% on Lanzarote between 1982 and 1993/95, and declines also noted on Fuerteventura, where it has disappeared from some areas due to transformation of the habitat (Emmerson & Lorenzo 2004). Other threats are off-road driving for recreation and military exercises (Lorenzo 1994).

In the Cape Verde Islands, the courser's habitat is generally stable, and Hazevoet (*in litt.* in Dodman 2002) expects that the population is also reasonably stable, although there have not been any specific attempts to monitor the population. There are, however, significant tourism developments in Cape Verde, especially on Boavista, one of the courser's strongholds, and the population on this island may well be in decline. It would certainly be wise to monitor the population in light of such developments and, as far as possible, to ensure that no tourism activities with likely negative environmental impacts are promoted, such as hunting or driving quad-bikes across sensitive areas. Recent government-led conservation initiatives and other conservation projects may help in ensuring that national biodiversity concerns are respected in such developments.

Habitat and ecology

The Cream-coloured Courser is found at low latitudes in arid semi-desert habitats. On islands, it makes use of low-lying, sandy or stony plains. In the Cape Verde Islands, it is usually found in pairs or family groups, occasionally in flocks of up to 25 (Hazevoet 1995), although in other areas, the birds are gregarious at all seasons. Throughout most of its range, it breeds from February to June on bare ground in the open, but the mating and territorial systems are not fully understood. It feeds mainly on insects and their larvae, singly, in pairs or in groups, running in short dashes to surprise and capture prey (Snow & Perrins 1998). The breeding season in the Cape Verde Islands is prolonged and irregular, from October to May (Hazevoet 1995).

Network of key sites

The Cream-coloured Courser is not a species for which the key site approach is appropriate, except in the case of small isolated populations that are confined to a few sites. In the Cape Verde Islands, the semi-arid plains of Boavista and Maio are particularly important for the species, and both support a significant part of the population. The arid plains in the south of Santiago and in the north near Tarrafal are also of importance. In the Canary Islands, five key sites have been identified on the island of Fuerteventura, and together these support some 95 breeding pairs.

Protection status of key sites

All four key sites for *bannermani* in the Canary Islands have been identified as IBAs (Heath & Evans 2000). One site, Corralejo plain, is entirely within a Natural Park and partly a Special Protection Area; three other sites are partly protected in Special Protection Areas, and two of these are partly protected as Natural Parks. Only one site, Cuchillete de Buenavista-La Torre-Los Alares, is completely unprotected.

The population of *exsul* in Cape Verde occurs at three key sites. There are already Conservation Areas under designation on Boavista and Maio and in the plains of south-west Santiago, whilst the Cape Verde National Biodiversity Strategy and Action Plan includes provisions for establishing Nature Parks on Boavista in the dunes of Sal Rei and the Rabil Lagoon and in the zone of Curral Velho and environs, and on Maio in the zone of Terras Salgadas.

Table 12. Key sites for Cream-coloured Courser. Sites where 1% or more of a population has been recorded

Country	Site	Lat.	Long.	Season	Max total	Year max	Average total	Basis for average	Source	Population(s) at site
Cape Verde islands	Boavista: Arid Plains	16.08	22.83	March	30	1997			Sargeant 1997	*exsul*
Cape Verde Islands	Maio: Arid Plains	15.22	23.17	All year	50-100	1990s			C. Hazevoet *in litt.* 2002	*exsul*
Cape Verde Islands	Sal: Arid Plains	16.72	22.97	March	11	1997			Sargeant 1997	*exsul*
Spain (Canary Is)	Cuchillete de Buenavista-gully of La Torre-Los Alares	28.40	-13.83	Resident	45	1994			WBDB	*bannermani*
Spain (Canary Is)	Isthmus of Jandía sandy plain	28.15	-14.27	Resident	120	1994			WBDB	*bannermani*
Spain (Canary Is)	Lajares sandy plain Cotillo-Ezquinzo	28.63	-13.97	Resident	60	1994			WBDB	*bannermani*
Spain (Canary Is)	Sandy plain of Corralejo	28.68	-13.80	Resident	45	1995			WBDB	*bannermani*

David Stroud, Simon Delany & Tim Dodman

Nik Borrow

Somali Courser

Cursorius somalensis

Geographical variation and distribution

The Somali Courser is endemic to the Horn of Africa, where there are two populations, the nominate race in the north of the species' range and *littoralis* in the south. The two forms differ slightly in colour: the upperparts of *somalensis* are pale tawny brown, while those of *littoralis* are slightly darker brown (Pearson & Ash 1996). The range of this courser extends from eastern Ethiopia, Djibouti and Somalia south to northern and eastern Kenya. When first described, the Somali Courser was treated as a subspecies of the Cream-coloured Courser *Cursorius cursor*, and this treatment was retained by Urban *et al.* (1986). However, Hayman *et al.* (1986) pointed out several differences between *cursor* and *somalensis*, and considered *somalensis* to be a subspecies of Burchell's Courser *Cursorius rufus*. Pearson & Ash (1996) researched its taxonomic position and concluded that *somalensis* should be treated as a separate species, endemic to Eastern Africa. This most recent taxonomic recommendation is adopted here. There is a clinal variation between the two subspecies, with intermediates occurring especially in eastern Somalia (Ash & Miskell 1998).

Movements

The Somali Courser is probably locally resident and a partial migrant. In Somalia, there is evidence of a northward movement of Somali Coursers in September and a southwards migration in April-May (Ash & Miskell 1998). In Kenya, *littoralis* occurs in the south of its range mainly between September and May (Britton 1980).

Population limits

Two populations are recognised:

1) *somalensis*, occurring from eastern Djibouti and north-eastern Ethiopia across northern Somalia (Somaliland) and south through Somalia and the Ogaden of Ethiopia to 3°N;

2) *littoralis*, occurring in southern Somalia from 3°N, northern Kenya as far west as south-eastern Sudan, and southwards through east-central Kenya to Tsavo.

The first two editions of *Waterbird Population Estimates* treated *littoralis* and *somalensis* as subspecies of Burchell's Courser *C. rufus*, while the third edition treated them as subspecies of the Cream-coloured Courser *C. cursor*. Dodman (2002) treated them as a separate species, the Somali Courser *C. somalensis*, following Pearson & Ash (1996), and this treatment was adopted in the fourth edition of *Waterbird Population Estimates*.

Population size

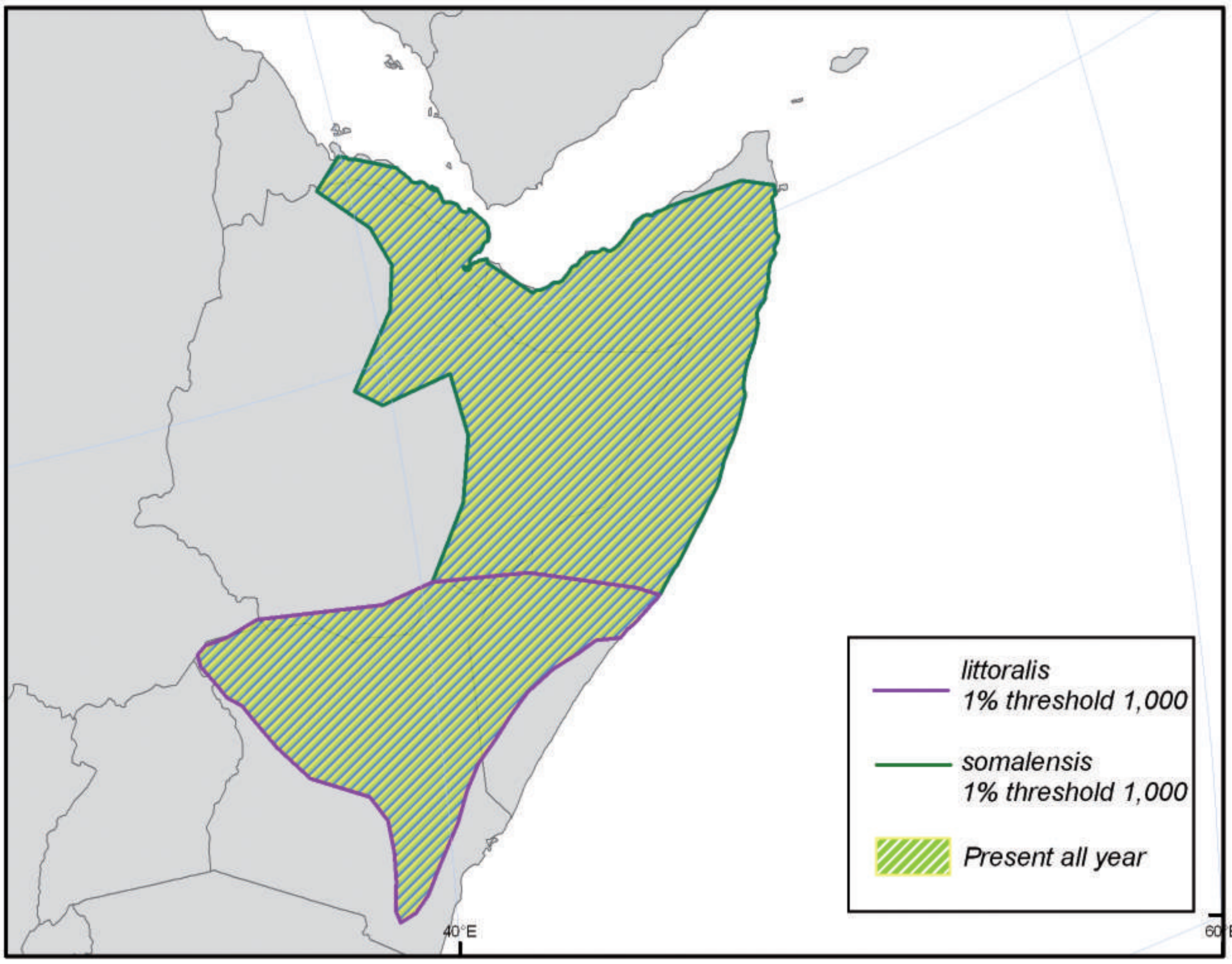
1. *somalensis*

Population estimate	1% threshold	Population trend
C (25,000-100,000)	Provisionally 1,000	Unknown

Using the Fishpool & Evans (2001) estimate for the total African population of *C. cursor* (including *somalensis* and *littoralis*) as a guide, Dodman (2002) provisionally estimated the population size of *somalensis* as being within the range 25,000-100,000. This estimate was adopted in *WPE4*.

Somali Courser

Cursorius somalensis



2. *littoralis*

Population estimate	1% threshold	Population trend
C (25,000-100,000)	Provisionally 1,000	Unknown

Fishpool & Evans (2001) estimated the total African population of *C. cursor* (including *somalensis* and *littoralis*) as within the range 100,000-1,000,000. On this basis, Dodman (2002) provisionally estimated the population size of *littoralis* as being within the range 25,000-100,000. This estimate was adopted in *WPE4*.

Conservation status

The Somali Courser is common and widespread throughout Somalia, though less common in the south, west of the Shebelle River (Ash & Miskell 1998). It is locally distributed in northern Kenya west to Turkana (Britton 1980). Its preferred habitats are widespread in the Horn of Africa, where population density is generally low, and there are no current reasons for conservation concern.

Habitat and ecology

The Somali Courser is found in desert, semi-desert, arid grassland and semi-arid bush in the coastal lowlands and up to 1,800 m a.s.l. on the open plateaux in Somaliland (Ash & Miskell 1998). In the north, *somalensis* breeds largely from April to June, whilst in the south, *littoralis* has two breeding seasons: April to mid-June and mid-November to December (Ash & Miskell 1998). The clutch size is two (Ash & Miskell 1998).

Network of key sites

No key sites have been identified for this courser, which is widespread within its range in the Horn of Africa.

Tim Dodman

Augusto Faustino

Burchell's Courser

Cursorius rufus

Geographical variation and distribution

Burchell's (or Rufous) Courser is endemic to Southern Africa, occurring across much of central and western South Africa, northwards through western Namibia and just into south-western Angola. This species is generally considered to be monotypic (e.g. Urban *et al.* 1986, Hockey *et al.* 2005) but birds in the western part of the range, from Bushmanland in South Africa to Angola, west of 21°E, are recognised by some authors as a separate subspecies, *theresae* (e.g. Maclean & Herremans 1997), described on the basis of being paler overall, with a purer blue nape and with a narrower dark band across the belly (Hockey *et al.* 2005). This division is adopted here at the population (but not sub-species) level. The range overlaps a little with that of Temminck's Courser *C. temminckii*, but Burchell's Courser occupies more arid areas.

Movements

Burchell's Courser is nomadic and probably a seasonal migrant in certain areas, such as the south-western Cape Province of South Africa, where it is a visitor during the austral winter (Hockey *et al.* 1989). Maclean & Herremans (1997) consider that it could be occasionally irruptive into the Kalahari of western Botswana; it probably was never resident here (Tree *in litt.* 2008). It is probably generally local, moving irregularly according to local conditions, whilst in most areas it appears to show nomadic tendencies.

Population limits

Two populations are recognised:

1) *rufus*, occurring on the inland plateau of South Africa, westwards to 21°E;
2) *rufus (theresae)*, occurring west of 21°E from south-western Botswana, Bushmanland and the southern Karoo in South Africa into southern Namibia, and northwards along the eastern edge of the Namib Desert as far as south-western Angola.

Population size

1. rufus

Population estimate	1% threshold	Population trend
A (<10,000)	Provisonally 100	Decreasing

Due to its uncommon and erratic status and widespread decreases in number and range, Dodman (in press 2009) proposed a provisional population estimate of A.

2. rufus (theresae)

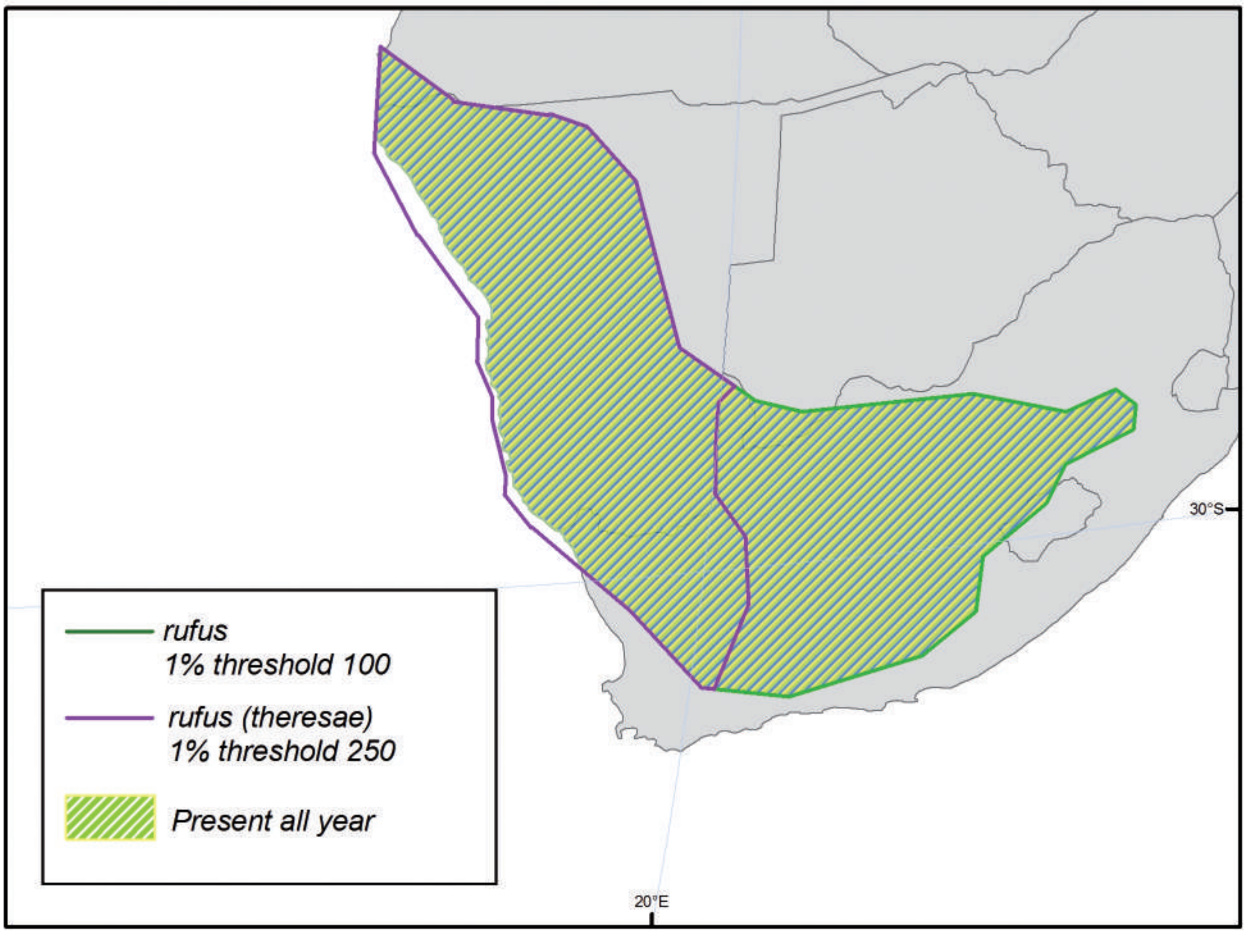
Population estimate	1% threshold	Population trend
B (10,000-25,000)	Provisionally 250	Stable

Fishpool & Evans (2001) have given a population estimate of D (100,000-1,000,000) for *C. rufus* (both populations). This is thought to be an over-estimate, considering the overall rather uncommon status of this bird in arid and semi-arid regions of Southern Africa, and Dodman (in press 2009) proposed a population estimate of B. This agrees well with an estimate of 10,000-30,000 proposed by Tree (*in litt.* 2008) for the entire species. There is no evidence for a decrease in this population (Hockey *et al.* 2005).

Conservation status

The status in southern Namibia appears to be healthy, but the range and abundance in South Africa have decreased considerably in recent years (Maclean & Herremans 1997). Assessment in Botswana is complicated by the possibility of high numbers in the mid-twentieth century (Smithers 1964) being due to irruptive behaviour not recorded since, but a considerable decline there cannot be ruled out. Described as

Burchell's Courser
Cursorius rufus



sparsely distributed but locally fairly common, it appears to have experienced a rapid decline in the southern part of its range (Maclean & Herremans 1997), which may warrant its consideration as a conservation priority. The reasons for the decline are not understood and merit further investigation, although agricultural intensification and the use of pesticides are likely to have played a role (Hockey *et al.* 2005).

Habitat and ecology

Burchell's Courser favours ploughed and heavily grazed stony veld, open, overgrazed or burnt grasslands, Karoo, stony or gravelly semi-desert, sandveld and bare saltpans (Maclean 1993). It is monogamous and a solitary nester, breeding in most months, but mainly in the dry season before the rains, between August and December (Maclean 1993). It is usually gregarious, occurring in groups of 5-15 (and occasionally up to 100 or more), sometimes in pairs, and feeds mainly on seeds and insects, especially Harvester Termites *Hodotermes mossambicus*, often foraging in quick runs (Maclean 1993).

Network of key sites

No key sites can be identified on the basis of numerical data. It is common in the extensive protected areas of Etosha National Park, the Skeleton Coast National Park and in and around the Namib-Naukluft National Park in Namibia (Simmons *et al.* 1998, Hockey *et al.* 2005), whilst the open plains of north-eastern Northern Cape Province in South Africa are likely to form a key stronghold for the declining eastern population.

Protection status of key sites

Etosha, The Skeleton Coast and Namib-Naukluft National Parks in Namibia are fully protected.

Tim Dodman & Simon Delany

Neil Gray

Temminck's Courser

Cursorius temminckii

Geographical variation and distribution

Temminck's Courser is widespread and locally common in sub-Saharan Africa, overlapping with the closely related Cream-coloured Courser *Cursorius cursor* in the northern part of its range and Burchell's Courser *C. rufus* in the south-west. It occurs across Sahelian West Africa and from Ethiopia through East Africa south to Angola, Namibia and South Africa. It is absent from tropical forest areas. Three subspecies have been recognised although they are poorly defined. The nominate form occurs widely across most of the range; *aridus* (formerly known as *damarensis*) occurs in Namibia, the Kalahari and Okavango, and *ruvaniensis* occurs east of *aridus* in Southern Africa (Maclean & Herremans 1997). These birds have a darker crown than the nominate, whilst the upper parts are a colder earthy brown (Clancey 1984). Birds in south-western Africa (*aridus/damarensis*) are paler than *temminckii* (Hayman *et al.* 1986), with the paler and greyer upper parts providing camouflage in saline habitats, and the breast buffish-pink (Hockey *et al.* 2008). There is still debate as to the status of the different races, and it may be that differences described above are more attributable to clinal variations.

Movements

Across much of its range, Temminck's Courser is nomadic, often undertaking short movements, especially in response to burning. Some birds appear to breed within days after savanna grasslands have burned (Urban *et al.* 1986). In West Africa, it is largely resident in the Sahel belt, with nomadic and seasonal movements in response to rainfall and burning of grasslands (Borrow & Demey 2001). It seems to breed opportunistically according to local conditions, with nests recorded in all months except September and October in Senegal (Morel & Morel 1990). This indicates that the species is largely resident in this, the westernmost part of its range. In Eastern Africa, it appears to be largely resident, but it certainly wanders, presumably in a nomadic fashion.

In Southern Africa, it appears to be a partial migrant into drier regions during the rainy season (Maclean & Herremans 1997). This pattern is true for Zambia, where it is largely a regional intra-African migrant, generally present from late April to November throughout the dry season; there is no evidence of entry of birds into Zambia from further north (Tree 1969, Benson *et al.* 1971). It is a breeding visitor on Zimbabwe's Mashonaland Plateau from late June to early December, whilst it is a nomadic resident in the drier parts of Matabeleland (Irwin 1981). Movements into arid regions of Namibia and Botswana may correspond with emigration of *ruvaniensis* from Zambia, Malawi and further north, whilst some authors consider that *temminckii* also extends into Southern Africa between March and July (Clancey 1984, Hockey *et al.* 2005). Other authors, however, refute this (e.g. Dowsett *et al.* 2008, Tree *in litt.* 2008).

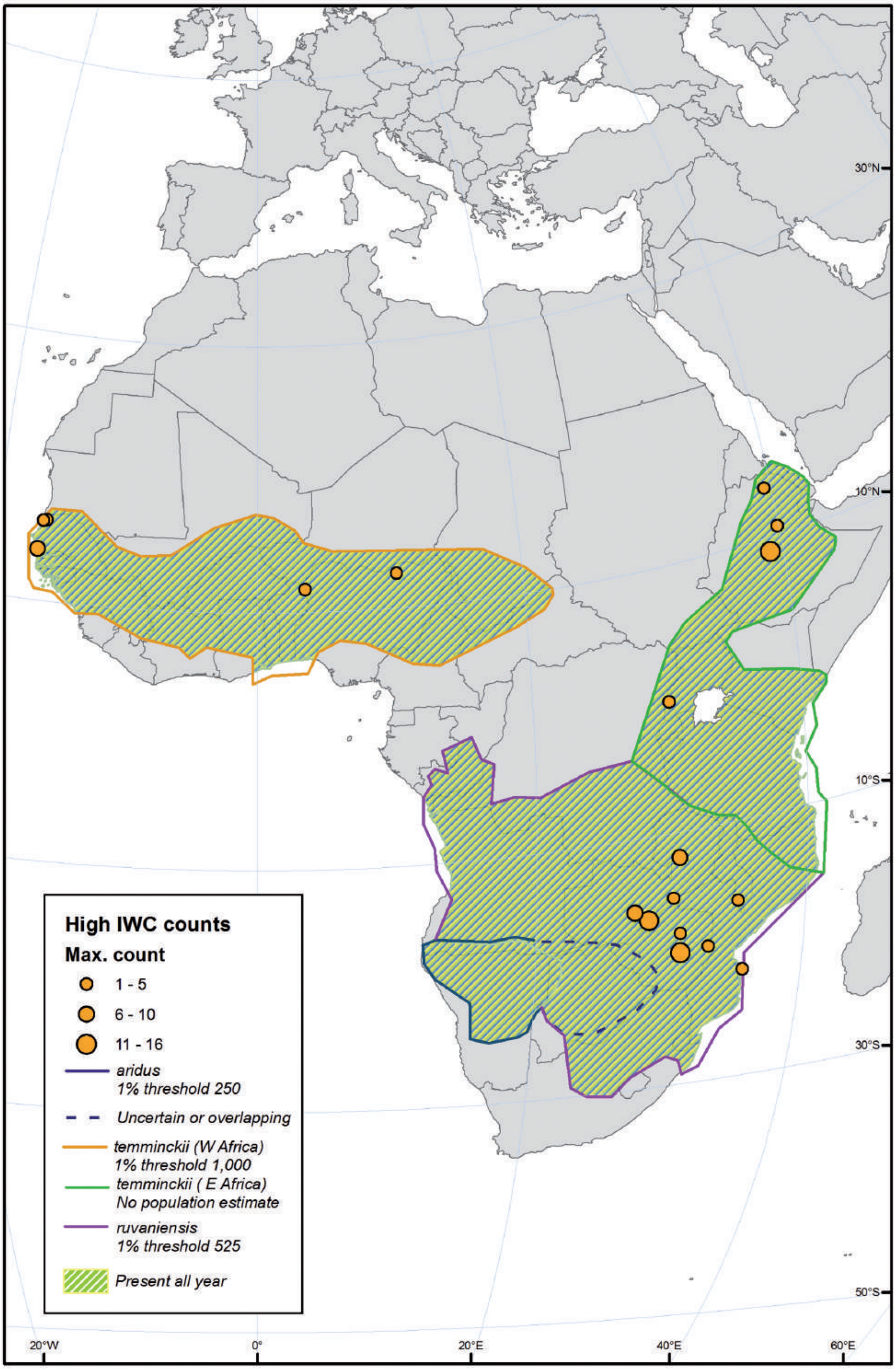
Population limits

Four populations are recognised:

1) *temminckii*, occurring in Sahelian West Africa from Senegal and southern Mauritania to Chad and Central African Republic, south to the coastal zone between Ghana and Nigeria;
2) *temminckii*, occurring in Eastern Africa, from Ethiopia through south-eastern Sudan and Uganda to Tanzania, and possibly further south seasonally;
3) *ruvaniensis*, occurring in southern Central Africa and eastern Southern Africa, from Mozambique and the Free State in South Africa north to Zambia and Democratic Republic of Congo (south of the forest) and through Angola to Congo;
4) *aridus* (formerly known as *damarensis*), occurring in the arid north-west of Southern Africa, in Namibia and in the

Temminck's Courser

Cursorius temminckii



Kalahari and Okavango regions of Botswana, seasonally extending further east.

The division of *temminckii* into two populations in West and Eastern Africa was proposed by Dodman (2002) and adopted in *WPE3*. The recognition of *ruvaniensis* as a separate population was proposed by Dodman (2002) and adopted in *WPE4*. However, definition of the limits of all four proposed populations is not clear, and may be subject to future change, as more information becomes available, especially from southern Central Africa. Hockey *et al.* (2005) present seasonally overlapping ranges of *temminckii* with *aridus* in south-west Zimbabwe and with *ruvaniensis* through Zimabwe and north-east South Africa. However, Dowsett *et al.* (2008) do not consider that *temminckii* occurs in Zambia from north of the equator.

Population size

1. *temminckii* West Africa

Population estimate	1% threshold	Population trend
B/C (10,000-100,000)	Provisionally 1,000	Unknown

This courser is generally uncommon in West Africa, and much less numerous than *temminckii* in East Africa. Dodman (2002) proposed a provisional population estimate of B/C (10,000-100,000), and this was adopted in *WPE3*.

2. *temminckii* East Africa

Population estimate	1% threshold	Population trend
(25,000-80,000)	Not established	Unknown

This is the commonest and most widespread courser in East Africa, and is regular as a migrant or wanderer up to 3,000 m a.s.l. (Britton 1980). Based on an estimate of D (100,000-1,000,000) for the total population of the species (Fishpool & Evans 2001), Dodman (2002) suggested a provisional population estimate of C/D (25,000-1,000,000) for this population in Eastern and Southern Africa.

3. *ruvaniensis*

Population estimate	1% threshold	Population trend
25,000-80,000	525	Unknown

In *WPE3*, this population was considered part of the East African population of *temminckii*, with a combined provisional population estimate of C/D. The estimate of C/D was retained for *ruvaniensis* in *WPE4*, although Dodman (2006) had suggested that an estimate of C (25,000-100,000) would be more appropriate, as Temminck's Courser is most likely to be more numerous in East Africa than in Southern Africa, where it is absent or scarce in several areas. Tree (*in litt.* 2008) considered that an upper limit of 1 million is far too high, as this bird is uncommon in Southern Africa, and suggested a range of 25,000-80,000, which is adopted here.

4. *aridus*

Population estimate	1% threshold	Population trend
A/B (<25,000)	Provisionally 250	Unknown

Dodman (2002) provided a provisional population estimate of A/B (<25,000) for this population, based on its limited distribution, and this was adopted in *WPE3*. It is absent from more arid parts if its range, notably the south Kalahari and the Namib Desert (Hockey *et al.* 2005).

Conservation status

There has been some range contraction in Southern Africa, e.g. from Eastern Cape Province, and conservation measures may be needed in this area. It appears to be sensitive to agricultural intensification, as well as factors such as grazing pressure, burning regimes and bush clearance (Maclean & Herremans 1997). Elsewhere across its range the numbers appear to be stable.

Habitat and ecology

Temminck's Courser favours dry or recently burnt short grass in open woodland, grassy plains, dry pans and bare or over-grazed veld, and may also be found at desert edges and in sand-dunes, whilst it is also common in suitable artificial habitats such as airfields. It prefers clearings in arid and semi-arid woodland to other habitats. The subspecies *aridus* in south-western Africa favours dry, muddy areas at the edges of saline pans (Clancey 1984). It is monogamous and a solitary nester, generally breeding in the dry season. It occurs in pairs or small flocks of sometimes up to 40 birds, and feeds mainly on insects, molluscs and seeds (Urban *et al.* 1986).

Network of key sites

No key sites have been identified for this widespread species that generally occurs at low density, although some of the large protected areas in western Botswana and Namibia, such as Etosha National Park, are no doubt of importance for *aridus*. There may be a need to identify important sites for integrated conservation measures in the south of its range, for instance in the Free State of South Africa, in order to prevent further range contraction.

Tim Dodman & Simon Delany

Nicolaas de Zalinge

Double-banded Courser

Rhinoptilus africanus

Geographical variation and distribution

This mainly nocturnal species is resident, occasionally nomadic and locally common in its discontinuous range in Eastern and Southern Africa.

A total of about eight subspecies are distributed across three separate geographic regions: *africanus, granti, traylori, bisignatus and sharpei* in Southern Africa, *gracilis* in Kenya and Tanzania, and *raffertyi* and *hartingi* in the Horn of Africa. However, some authors do not accept all of these races; for example Hockey *et al.* do not consider *bisignatus* to be a valid form. Further, the ranges ascribed to different populations also vary between authors, so that the information presented here should be treated as provisional only, and may be subject to future change. The main differences between subspecies are in plumage coloration: compared to *africanus, granti* has a darker mantle and is also more rufous*, sharpei* is paler, *traylori* is paler and greyer, *bisignatus* has more rufous above and a finely streaked throat and is smaller, *gracilis* is dark and greyish and is also smaller, similar to *raffertyi,* which has a darker greyish brown mantle, whilst *hartingi* has dorsal feathers with a cinnamon-rufous centre and cream border (Urban *et al.* 1986).

Movements

Urban *et al.* (1986) describe it as occasionally nomadic, adding that when vegetation becomes too dense after rain, birds move away to drier, more open areas. In Southern Africa it is highly nomadic, and numbers are greatest in the Transvaal and Kalahari during droughts (Maclean 1997). In Kenya and Tanzania it is largely resident in suitable habitat up to 1,800 m (Britton 1980), and it appears to be resident in the Horn of Africa.

Population limits

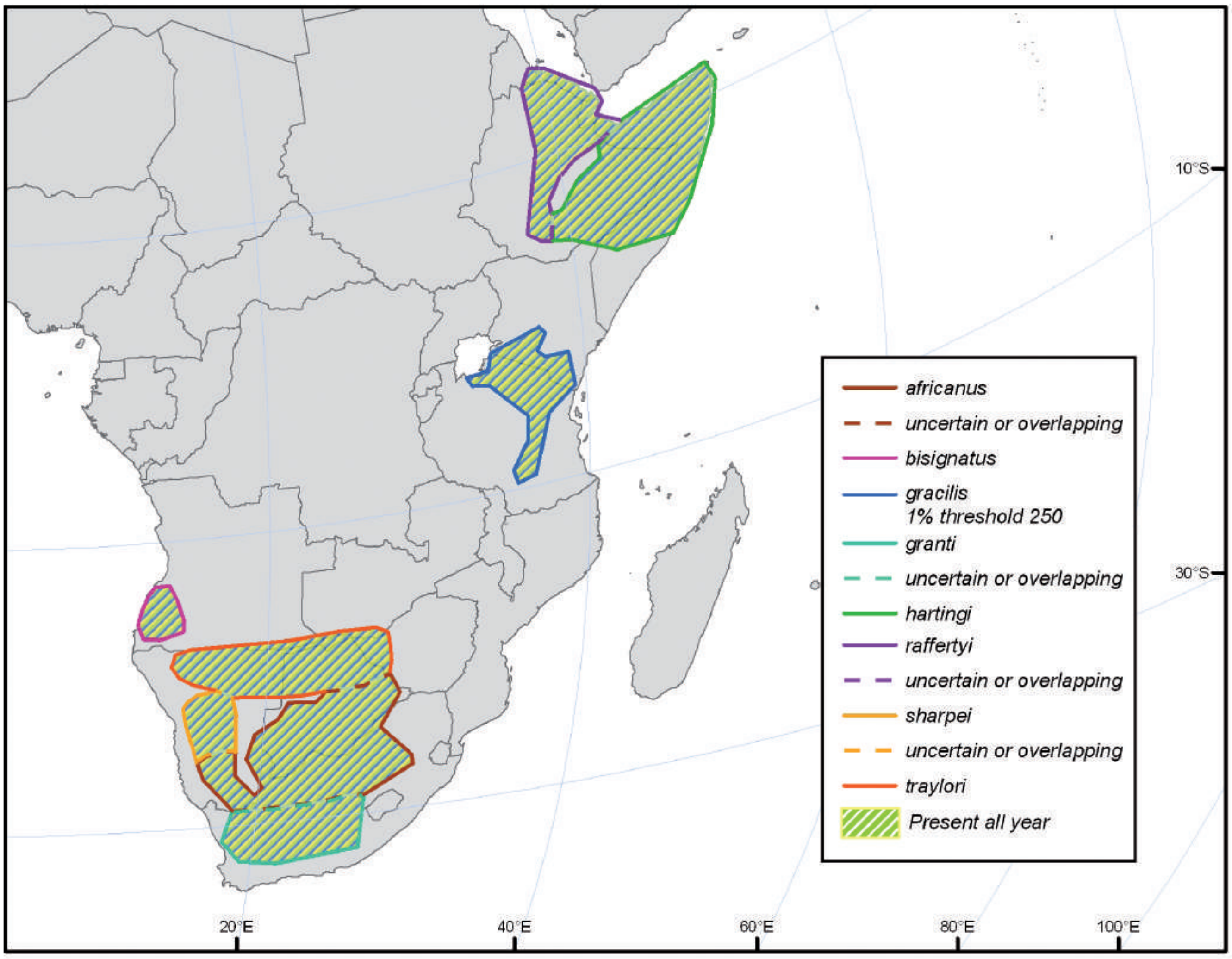
Eight populations are recognised, corresponding to the eight subspecies:

1) *africanus,* Southern Africa: south-western and central Kalahari, northern Cape Province of South Africa and southern Namibia;
2) *granti,* Southern Africa: western South Africa excluding the northern Cape;
3) *traylori,* Southern Africa: from Etosha, Namibia, to Makgadikgadi, Botswana
4) *bisignatus,* Southern Africa: south-western Angola;
5) *sharpei,* Southern Africa: Namibia, except for the Etosha region and the south of the country;
6) *gracilis,* East Africa: Kenya and Tanzania;
7) *raffertyi,* Horn of Africa: Ethiopia, excluding the Ogaden, Eritrea and Djibouti;
8) *hartingi*, Horn of Africa: Somalia and the Ogaden of eastern Ethiopia.

This treatment follows Urban *et al.* (1986), except that the birds in the Etosha depression in Namibia are considered to be *traylori* following Maclean (1997), rather than *sharpei*. However, Hockey *et al.* (2005) considered birds of north-west Namibia (including Etosha) to be *sharpei*, with *traylori* much further east in north-east Botswana and north-west Zimbabwe, and *bisignatus* subsumed into *sharpei*. Dean (2000) also considered *sharpei* to be in south-west Angola.

Double-banded Courser

Rhinoptilus africanus



Population size

1. *africanus*

Population estimate	1% threshold	Population trend
Unknown	Not established	Stable

2. *granti*

Population estimate	1% threshold	Population trend
Unknown	Not established	Stable

3. *traylori*

Population estimate	1% threshold	Population trend
Unknown	Not established	Stable

4. *bisignatus*

Population estimate	1% threshold	Population trend
Unknown	Not established	Unknown

5. *sharpei*

Population estimate	1% threshold	Population trend
Unknown	Not established	Stable

6. *gracilis*

Population estimate	1% threshold	Population trend
B (10,000-25,000)	Provisionally 250	Unknown

This courser is rather uncommon and local on open or sparsely vegetated plains up to 1,800m in Kenya (Lewis & Pomeroy 1989), usually occurring in pairs or small groups. Based on the limited geographical range in south-west Kenya and northern Tanzania and its expected rather low density, Dodman (2002) gave a provisional population estimate of B.

7. *raffertyi*

Population estimate	1% threshold	Population trend
Unknown	Not established	Unknown

8. *hartingi*

Population estimate	1% threshold	Population trend
Unknown	Not established	Unknown

Fishpool & Evans (2001) give a population estimate of D (100,000-1,000,000) for all populations combined. Dodman (2002) gave provisional estimates of C (25,000-100,000) for all Southern African populations combined and for both populations in the Horn of Africa combined.

Conservation status

The Double-banded Courser is usually fairly common in suitable habitat, though it is generally rather local in East Africa. Its distribution in Southern Africa appears not to have changed in historical times, where it remains fairly common and adapts well to stock-farming practices, and locally to crop farming (Maclean 1997). In the Horn of Africa, *hartingi* is most common in northern Somalia (Somaliland), but may be threatened in some areas by increased cultivation of grasslands (Ash & Miskell 1998).

Habitat and ecology

The Double-banded Courser inhabits flat, stony and gravelly desert and semi-desert plains, usually with a scattering of low shrubs, also firm, sandy soils, thorn scrub and dried out river beds in arid country (Urban *et al.* 1986). In Botswana and Namibia, it is apparently associated with mopane woodland, a generally flat biome with pans and floodplains (Maclean 1997), although it does not occur in Zimbabwe and southern Zambia, where this biome is also widespread. In Kenya and Tanzania, it is typically found in grassland and bushed grassland (Britton 1980), and in Somalia, it is characteristically found in large grassy plains and other open spaces (Ash & Miskell 1998).

The Double-banded Courser usually occurs singly or in pairs or small groups. It is monogamous and a solitary nester, usually breeding during the dry season. In Southern Africa, it will also breed in any month during drought periods (Maclean 1997). The female lays the single egg on bare ground; in Southern Africa, 60% of eggs are laid among antelope droppings for camouflage (Maclean 1985). It feeds mostly at night, mainly on insects, especially Harvester Termites *Hodotermes mossambicus* in Southern Africa (Urban *et al.* 1986).

Network of key sites

No key sites have been identified for this courser of large open plains.

Simon Delany & Tim Dodman

Nicolaas de Zalinge

Three-banded Courser
Rhinoptilus cinctus

Geographical variation and distribution

The Three-banded (or Heuglin's) Courser occurs in sub-Saharan Africa from Somalia south through Ethiopia, Kenya and central Tanzania to Zimbabwe and, much less regularly, along the Zambezi and Cunene Rivers into northern Namibia and southern Angola. Three subspecies are recognised. The nominate race in Eastern Africa is the smallest of the three, and has paler edges to the dorsal feathers than *seebohmi* in Southern Africa, whilst *emini* in East Africa is of intermediate size, with tawnier feather edges than *seebohmi* (Urban *et al.* 1986). Birds of the Luangwa Valley in eastern Zambia are smaller than other *seebohmi* further south (Benson *et al.* 1971).

Movements

The species is mainly sedentary, though local movements occur in Eastern Africa (Urban *et al.* 1986). It is a breeding resident in western Somalia (Ash & Miskell 1998), and is mainly resident in Kenya and Tanzania, although substantial movements seem to occur at times, indicated by large numbers in the Tsavo region of Kenya in March-April 1978 (Britton 1980). It appears to be largely resident in woodland in dry areas of Zambia in the Southern Province and the middle Zambezi and Luangwa valleys (Benson *et al.* 1971, Dowsett *et al.* 2008). It is generally sedentary in Zimbabwe at lower altitudes and widely in the drier south-west; local movements, which are probably dependent on intensity of local rainfall, have been attributed to the small highveld population (Irwin 1981, Tree *in litt.* 2008).There may be an influx at the southern edge of its range in the austral summer and an expansion southwards in wet years (Tree 1997).

Population limits

Three populations are recognised, comprising the three recognised subspecies:

1) *cinctus*, from south-eastern Sudan through Ethiopia to western Somalia (north and south of the Ogaden region of Ethiopia) and northern and eastern Kenya;
2) *emini*, from the eastern shore of Lake Victoria in south-western Kenya into Tanzania as far south (and east) as Ruaha National Park;
3) *seebohmi*, from Zambia into Zimbabwe and eastern Botswana, with limited occurrence in the Caprivi Strip and into northern Namibia and southern Angola.

Urban *et al.* (1986) consider that birds in northern Zambia belong to *emini*.

Population size

Fishpool & Evans (2001) gave a population estimate of D (100,000-1,000,000) for all populations combined.

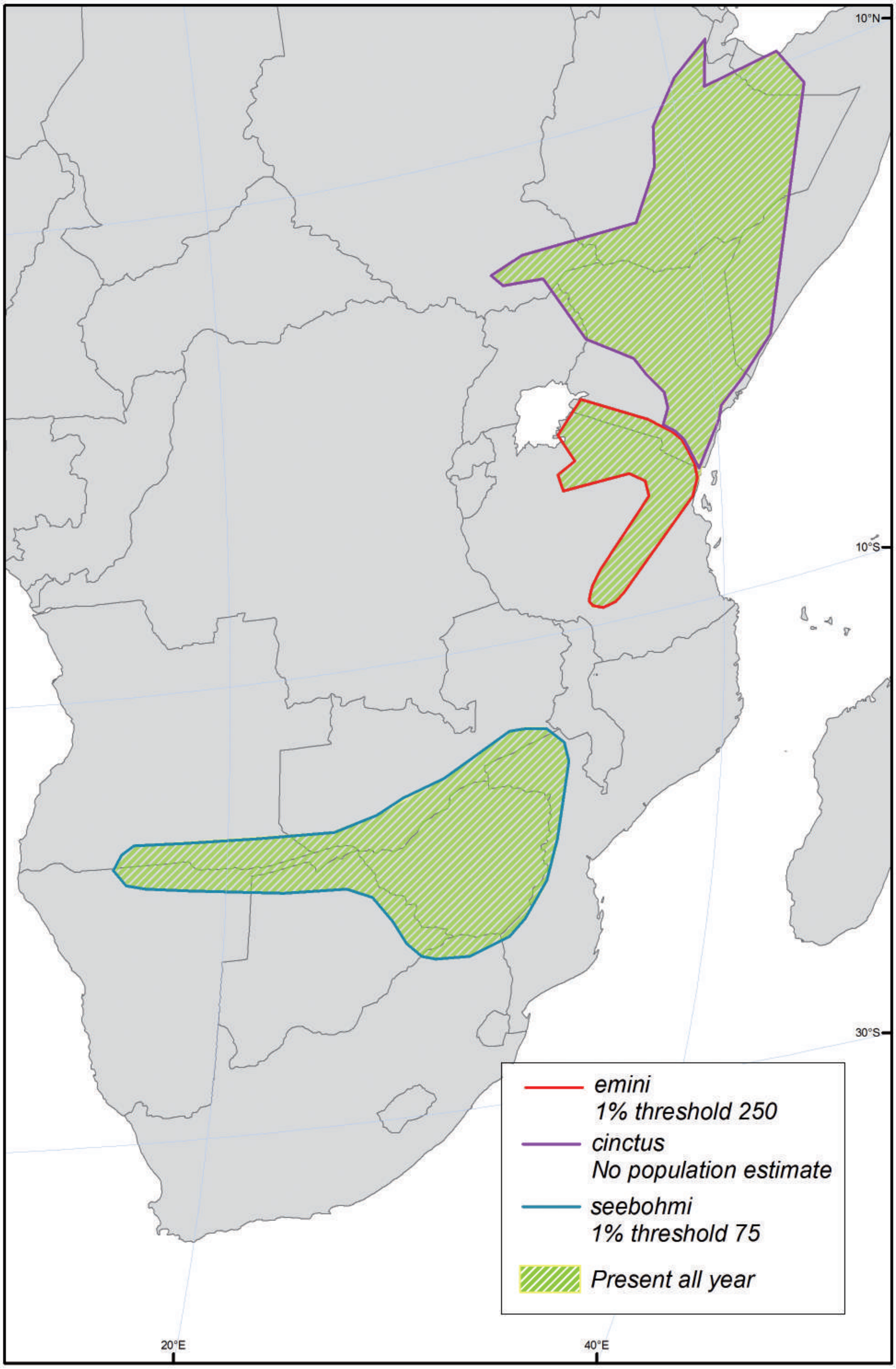
1. *cinctus*

Population estimate	1% threshold	Population trend
C/D (25,000-1,000,000)	Not established	Unknown

On the basis of the rough estimate by Fishpool & Evans (2001), Dodman (2002) proposed a provisional estimate of C/D, considering that birds of the nominate race were more numerous and widespread than the other two populations. This estimate was adopted in *WPE3* and *WPE4*. This courser is common in Somalia (Ash & Miskell 1998), but it is nowhere abundant here and never gathers in flocks (Archer & Godman 1937). It is frequent in grasslands and savannas in Ethiopia (Urban & Brown 1971). The top end of the current population estimate may well be too high, but further information is required before this can be refined.

Three-banded Courser

Rhinoptilus cinctus



2. *emini*

Population estimate	1% threshold	Population trend
B (10,000-25,000)	Provisionally 250	Unknown

On the basis of the rough estimate by Fishpool & Evans (2001), Dodman (2002) proposed a provisional estimate of B. Although fairly widespread, it is generally uncommon across its range.

3. *seebohmi*

Population estimate	1% threshold	Population trend
5,000-10,000	75	Unknown

On the basis of the rough estimate by Fishpool & Evans (2001), Dodman (2002) proposed a provisional estimate of A/B (<25,000). Tree (*in litt.* 2008) considers that this population is very localised and generally uncommon, and suggests that even a range of 5,000-10,000 birds may be too high. This figure is adopted as a new estimate; surveys would be useful to assess the current status of this relatively small population.

Conservation status

The Three-banded Courser is common in western Somalia, west of 46°E (Ash & Miskell 1998), and widespread and sometimes common in low rainfall areas of Kenya and Tanzania (Britton 1980). It is fairly common in mopane woodland and bordering the floodplains of the Kafue Flats in Zambia. It also prefers river valleys in Zimbabwe, where it is perhaps most common in the Sabi Valley (Maclean 1985). The historical distribution in Southern Africa is unlikely to have differed much from that found today, although destruction of acacia woodland on alluvial sands in south-eastern Zimbabwe may have caused local declines (Tree 1997, Ginn *et al.* 1989).

Habitat and ecology

In Somalia, this is a skulking species of acacia bushland, usually seen singly at night or in twos or threes (Ash & Miskell 1998); it also occurs in thorn scrub and sandy clearings in dry acacia scrub in Sudan. In Kenya and northern Tanzania, it favours bushland and bushy grassland in low rainfall areas, but also extends into miombo woodland (Britton 1980). In Zambia and Zimbabwe, it is found especially on alluvial soils with dry mopane or acacia woodland, both habitats with plentiful open areas. In the Zambezi Valley, it appears to prefer poorly developed or elephant-damaged mopane, although on the plateau it occurs locally in miombo woodland (Tree 1997).

It is mostly nocturnal and often seen in suitable habitat by night on tracks or roads. Throughout its range, it is usually seen singly or in pairs in the breeding season, otherwise in small groups of 5-6. It is a solitary nester, with probably monogamous breeding habits, the nest being placed under the shelter of a bush or tree (Urban *et al.* 1986). It nests in the dry season, and feeds chiefly on insects.

Network of key sites

No key sites have been identified for this courser which generally occurs at low density. In Zambia, the Kafue Flats and Luangwa Valley are important for the species, whilst in Zimbabwe the protected areas of the Zambezi Valley certainly provide excellent habitat, notably Mana Pools and Hwange National Parks.

Protection status of key sites

The sites mentioned above are protected or under game management programmes.

Tim Dodman & Simon Delany

Nik Borrow

Bronze-winged Courser
Rhinoptilus chalcopterus

Geographical variation and distribution

The Bronze-winged (or Violet-tipped) Courser is widespread but sparsely distributed over much of sub-Saharan Africa from Senegal to Ethiopia in the southern Sahel zone, and from western and southern Kenya southwards on a broad front to central Namibia, northern Botswana, Zimbabwe and Mozambique to KwaZulu Natal in South Africa.

Two subspecies have been described, the nominate form occurring in the northern part of the range, and *albofasciatus* in Tanzania and much of Southern Africa, although the latter is weakly defined and not widely recognised as a separate form (e.g. Urban *et al.* 1986, del Hoyo *et al.* 1996, Hockey *et al.* 2005). In this Atlas , it is recognised as a separate population, but not sub-species.

Movements

The Bronze-winged Courser shows the strongest migratory tendencies of any of the coursers in Africa. Although some birds appear to be resident and nomadic, others are clearly intra-African migrants, especially those reaching the northern and southern extremes of the range. In the northern tropics, northward movements away from the breeding grounds are often recorded between March and June, often with rains, and southward movements occur between October and December (Urban *et al.* 1986). It is a rainy season visitor to northern Senegal (Morel & Morel 1990), whilst there are records further south, in The Gambia, from all months of the year, peaking in late November to January (Barlow *et al.* 1997). Further east in Nigeria and Chad, it is a passage migrant to the north before the rains, moving south after the rains (Urban *et al.* 1986), although Christy & Vande Weghe (1999) consider it to be resident in Sahelian Cameroon but migratory in Central African Republic. Overall, the pattern of a northward movement before or during the rains seems to occur across the Sahel biome, but does not affect all birds.

In Central Africa south of the main forest block, it appears to be migratory (Christy & Vande Weghe 1999), and it is present in Katanga, in the Democratic Republic of Congo, from May to November. In Kenya, it is probably mainly a non-breeding visitor (Urban *et al.* 1986), whilst it is a presumed migrant in Tanzania, with fewer records in the dry season between August and November, although it is recorded in most months from well-watched sites (Baker & Baker 2005).

In Southern Africa, it appears that a resident population is supplemented by non-breeding birds from further north between November and May (Tree 1997). In Zambia, the Bronze-winged Courser occurs mainly in the dry season (May-November), with birds apparently arriving from both north and south (Urban *et al.* 1986) and with a considerable through passage until June (Benson *et al.* 1971). A bird ringed in April 1996 in KwaZulu-Natal (shortly prior to departure north) was recovered during the breeding season in eastern Zambia in October 1997 (Underhill *et al.* 1999). It is recorded throughout the year in Malawi at some sites, but it is at least partially migratory, with an influx of passage birds noted from May – July (Dowsett-Lemaire & Dowsett 2006).

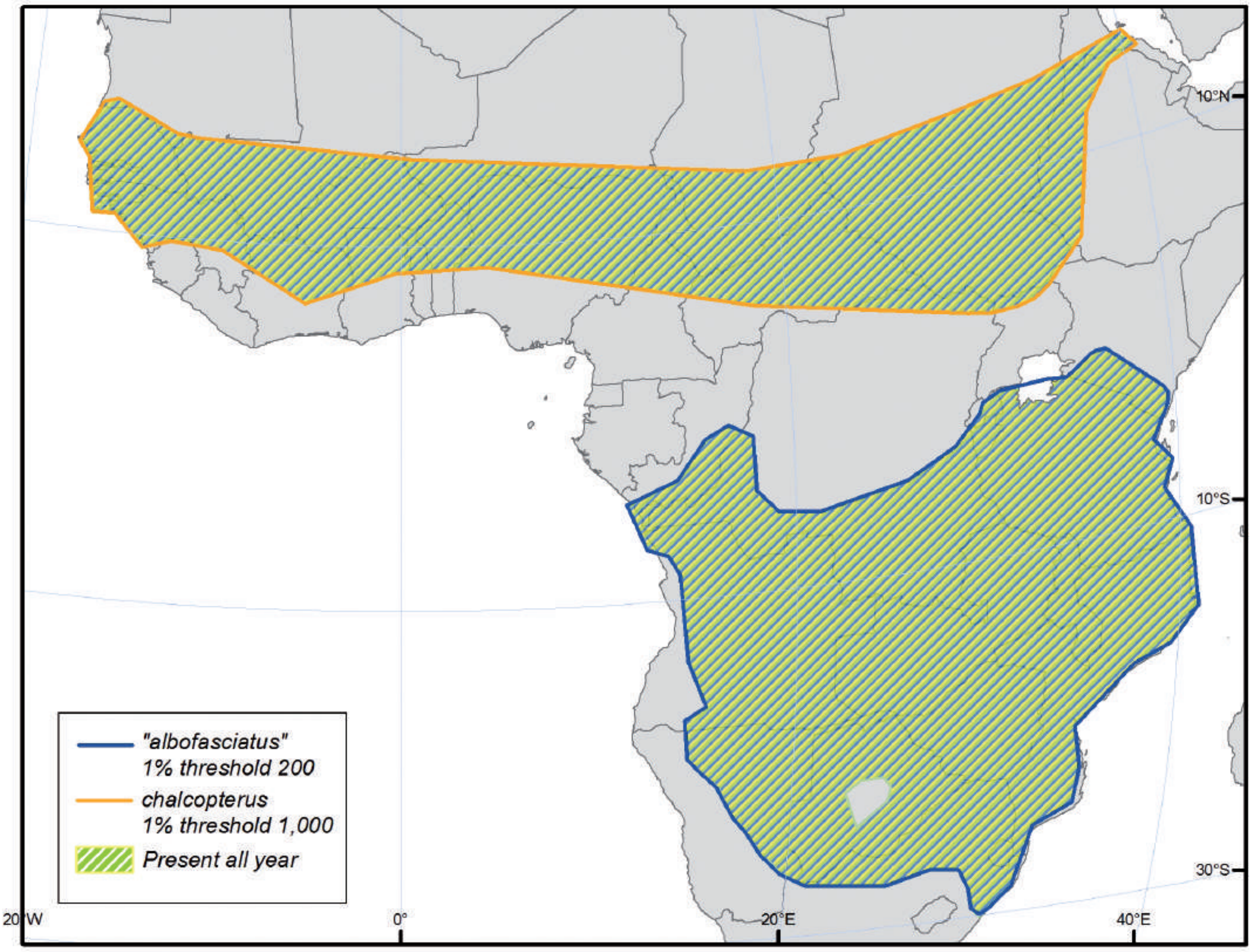
Population limits

Two populations are recognised:

1) *chalcopterus*, occurring in Sahelian Africa from Senegal east to southern Sudan and western Ethiopia;
2) *chalcopterus (albofasciatus)*, occurring from southern Kenya and Tanzania south and west through the Democratic Republic of Congo to eastern Angola and northern Namibia, through Zambia to northern Botswana, Zimbabwe and Mozambique and south to KwaZulu-Natal in South Africa.

Bronze-winged Courser

Rhinoptilus chalcopterus



Population size

Fishpool & Evans (2001) gave a population estimate of D (100,000-1,000,000) for both populations combined.

1. chalcopterus

Population estimate	1% threshold	Population trend
C (25,000-100,000)	Provisionall 1,000	Unknown

Dodman (2002) suggested a provisional estimate of C for the northern po, although a larger estimate of C/D was adopted in *WPE3* and *WPE4*. Given the recent low estimate for the southern population (see below), and its rather uncommon status in West Africa, the earlier estimate of C is followed here.

2. chalcopterus (albofasciatus)

Population estimate	1% threshold	Population trend
10,000 - 30,000	200	Unknown

Dodman (2002) suggested provisional estimates of C for this nothern population, which was adopted in *WPE3* and *WPE4*. Tree (*in litt.* 2008) however considers this to be too high, given its rather sparse distribution and the fact that much of its described range is given over to non-breeders, and proposes a population of 10,000-30,000 birds.

Conservation status

The Bronze-winged Courser is not considered to be threatened, although it is sensitive to human disturbance in farming areas, where it is a frequent nocturnal road casualty (del Hoyo *et al.* 1996), and woodland clearance is likely to have had an impact on breeding numbers in Southern Africa (Tree 1997). The widespread destruction of woodland is likely to affect Malawi's breeding population outside of protected areas (Dowsett-Lemaire & Dowsett 2006). There have been no records in Uganda since 1971 (Carswell *et al.* 2005).

Habitat and ecology

The Bronze-winged Courser is a nocturnal bird of dry woodlands. It inhabits a variety of dry woodland, acacia and other wooded savanna, bushveld and thorn scrub. In Southern Africa, it is most common in mopane woodland, although outside the breeding season it may be found in any open wooded habitat (Tree 1997). It feeds on invertebrates in open areas by night and rests in the shade by day. It is probably monogamous, and is a solitary nester on bare ground, laying 2-3 eggs (Urban *et al.* 1986).

Network of key sites

No key sites have been identified for this bird of open woodland, although some of the large nature protection areas such as the Kafue National Park in Zambia, Hwange in Zimbabwe, the Selous in Tanzania and the Ferlo in Senegal are likely to support relatively high numbers.

Protection status of key sites

This species certainly occurs in a range of protected areas across its distribution in Africa.

Tim Dodman & Simon Delany

György Szimuly

Collared Pratincole

Glareola pratincola

Geographical variation and distribution

The Collared (Common or Red-winged) Pratincole has an Afro-tropical and south-west Palearctic breeding distribution, with an isolated population in the southern Indus valley in Pakistan (Belik *et al.* 1997, Snow & Perrins 1998). In Western Eurasia, it has a range extending from Portugal to the Alakol region in eastern Kazakhstan (c. 81°E), breeding principally around the Mediterranean, Black, Caspian and Aral Seas. In Africa, the breeding populations are widespread but fragmented.

The species is polytypic with at least five subspecies described, all of which occur in Africa and Western Eurasia. However, most of the races described for Africa are nowadays usually treated as one sub-species. The nominate form *pratincola* breeds in Southern Europe, South-west Asia and North Africa, with a fourth breeding population in Sudan, Ethiopia, Somalia and southern Arabia, formerly treated as *limbata*; there are three other populations in Africa, all now treated as *fuelleborni*: (*boweni)* is found from Senegal to Chad; (*erlangeri)* in coastal southern Somalia and Kenya; and *fuelleborni* from eastern Democratic Republic of Congo and central Kenya to South Africa. Birds from the Okavango-Linyati-upper Zambezi floodplain system have been described as *riparia* (Maclean & Herremans 1997). Hockey *et al.* (2005) treat all African-breeding birds as *fuelleborni*, providing clear justification for subsuming *boweni, erlangeri* and *riparia* into this form. The putative race *limbata*, however, appears to be more closely aligned to *pratincola* (e.g. Archer & Godman 1937).

Almost the entire population of the nominate form winters in sub-Saharan Africa, although the small population breeding in Pakistan winters in India, exceptionally south to Sri Lanka (Cramp & Simmons 1983). West European and North-west African breeders winter mainly along the southern edge of the Sahara from Senegal and The Gambia to Nigeria. Breeders from South-east Europe, the Black Sea and Asia Minor winter mainly in the eastern Sahel zone. Birds originating from the Caspian region, Iran and Iraq winter mainly in North-east Africa south along the Nile Valley to Sudan and Ethiopia, possibly as far south as 5°N (Wetlands International 2000).

Movements

Within the Palearctic, Collared Pratincoles are migratory except for a very small number of birds in North Africa. Nearly all nominate *pratincola* populations winter in sub-Saharan Africa except for those breeding in Pakistan, some of which disperse south into India (Cramp & Simmons 1983). Few ringing recoveries and a scattering of observations indicate unbroken, high altitude flights into Africa (Snow & Perrins 1998). For example, while large numbers of birds use the Nile Valley route through Egypt, only a few have been recorded at Saharan oases. Sizeable wintering flocks have been recorded from Mali, Nigeria, Chad, northern Sudan and western Ethiopia. Palearctic birds, however, are not readily separable from African breeding birds, which also occur in some numbers in Sudan and the Sahelian zone. Because of the problem of separating forms, the southern limit of wintering nominate *pratincola* is not clear, although it probably does not extend south of about 5°N. Palearctic breeders have been identified from Lake Chad and various localities in Sudan (where they are present from October to March) and Ethiopia. In addition, a bird ringed as a chick in Spain was recovered in Senegal in March (Cramp & Simmons 1983). Records of large post-breeding flocks, e.g. from Algeria, Iraq, Greece and Turkey, indicate that some moult migration may occur, even though most adults moult within the breeding range. Autumn passage in the Mediterranean basin is mainly from late August to October. The return passage from African wintering areas begins in late March or April, with birds arriving in European breeding quarters mainly from April to mid-May (Snow & Perrins 1998).

In South-west Asia, autumn passage occurs on a broad front across Asia Minor, the Levant, Iran and northern Arabia, although records from southern Arabia may relate to Afro-tropical forms. Passage has been noted from August to mid-October in Eritrea and in September and October in Chad, although subspecific identification was indeterminate in these cases (Cramp & Simmons 1983). Spring passage has been noted in April in Eritrea and on the Red Sea coasts of Egypt and Saudi Arabia. Large-scale northwards movements were recorded at Juba in southern Sudan in early April 1983, with one large flock of 20,000 birds on the 3 April and over 20 flocks of 100-1,000 birds each over the next two days (Lambert 1985). Arrivals occur in April (sometimes late March) in Turkey, Palestine, Iraq, Iran and the southern CIS, although passage continues into mid-May in Cyprus and in Egypt. Migrants passing through the Gulf of Aqaba in June must be non-breeders (Cramp & Simmons 1983).

In Africa, most movements appear to be in response to rainfall patterns and/or changing water levels. In Senegal, Collared Pratincoles breed in colonies before and during the rains from May to July (Morel & Morel 1990), a pattern repeated in other Sahelian countries, with breeding recorded in Mali and Niger in April and May (Bannerman 1953). There is some post-breeding dispersal in West Africa, as adults depart Ghana after breeding in July, and juveniles in late August. Large concentrations build up around this time along parts of the Niger River when water levels are falling (Urban *et al.* 1986). However, it seems that falling water levels are not the triggers for this movement, as there were significantly higher concentrations recorded in lakes Debo and Walado-Debo in the Inner Niger Delta in August 1998 than between January and May 1999 (Van der Kamp & Diallo 1999); the main period of falling water level in the delta is between January and May (Wymenga *et al.* 2002). Lamarche (1980) noted high concentrations in Mali during September. Breeding takes place along the west coast of Liberia between April and June, whilst it is absent here between August and November (Gatter 1997). It would thus appear that *boweni* breeds in suitable habitats across West Africa (not governed by latitude; Bannerman 1953), dispersing afterwards to large Sahelian wetlands, where the birds congregate between July and September. Rising water levels along the Niger in October and November then presumably precipitate movement out of these areas, before the floodplains become inundated. Thus, birds breeding in the south of the range (e.g. in coastal Liberia and Ghana) are migratory, whilst those breeding further north within the Sahel are resident. All probably demonstrate some nomadic movements in pursuit of food, for instance following locust swarms or bush fires.

Birds of the Sahelian zone in Central Africa are probably breeding residents and local migrants (e.g. in northern Cameroon south to northern Democratic Republic of Congo), whilst no breeding apparently takes place in the forest block (Gabon, Congo, central Congo Basin). Records of Collared Pratincoles in north-western Somalia are all from August and September and presumably relate to passage migrants (Ash & Miskell 1998). These were considered by Archer & Godman (1937) to be African-breeding birds (population formerly considered as *limbata*),although this passage may also involve Palearctic-breeding birds. However, egg-laying is recorded from May for this population in Ethiopia (Urban *et al.* 1986), so this passage through north-western Somalia might represent a movement of birds from breeding grounds in Ethiopia to the Red Sea and southern Arabia.

In southern Somalia, Collared Pratincole is a breeding resident, with breeding taking place in June and July (Ash & Miskell 1998). In Kenya, Uganda and north-eastern Tanzania, *fuelleborni* is a rains breeder, with most egg-laying taking place between April and May, whilst elsewhere in Tanzania, the usual breeding habitat is dry mudflats left exposed after flood-plains have dried out, predominantly between June and September (Britton 1980). Collared Pratincoles were found breeding at three such sites in Tanzania in July 1995 (Baker 1996). In Zambia, most breeding takes place between August and October, and large flocks occur at major wetlands throughout the dry season from late April to November (Benson *et al.* 1971). As in other countries, the favoured breeding habitat on Zambia's Kafue Flats is the dry cracked mud of dry season floodplains. More recently, large non-breeding flocks have also been recorded on the Kafue Flats during the rains (e.g. Dodman & Taylor 1995), possibly representing changes in behaviour due to artificially controlled flooding regimes. In Botswana's Okavango region, the Collared Pratincole occurs mainly between floods from August to March, with increasing numbers to the west of the Okavango in May and June, and large migrant flocks further east along the Chobe River in June (Maclean & Herremans 1997). Breeding takes place in the Okavango and other wetlands of northern Botswana between August and October (Tyler 2001). There is thus a pattern of breeding pre-rains and pre-flood, with local migration out of major wetlands during flooding periods and presumably local nomadic movements in pursuit of food. Further south, this pratincole shows definite seasonal movements, being largely absent from KwaZulu-Natal between February and June (Maclean & Herremans 1997). Overall, it may be considered as partially nomadic in Southern Africa.

Population limits

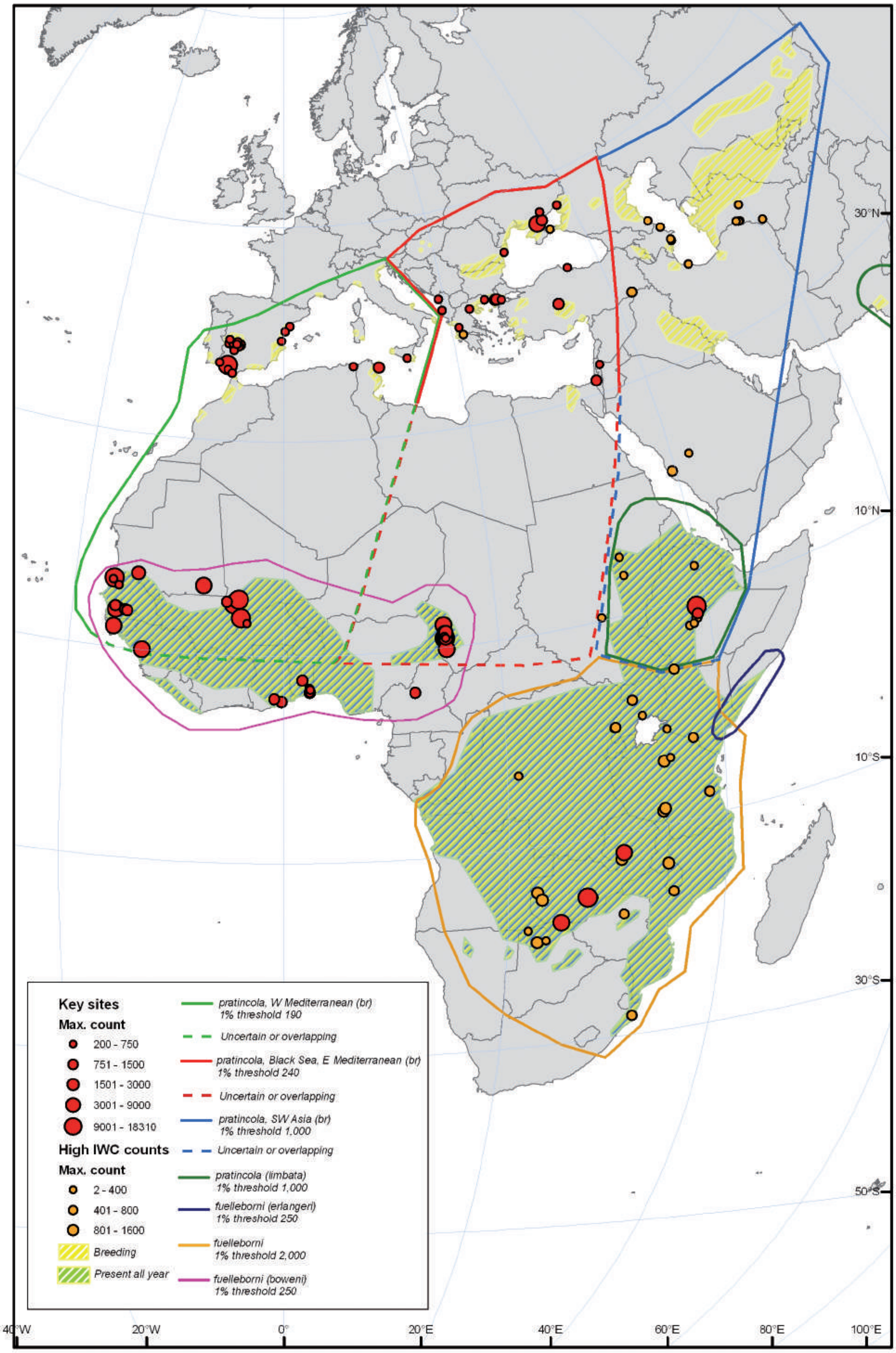
Waterbird Population Estimates recognises seven populations in Africa and Western Eurasia, including three relatively discrete migratory populations of nominate *pratincola*. These populations were adopted by Stroud *et al.* (2004). Whilst seven populations are also recognised here, they are all treated as either *pratincola* or *fuelleborni*; formerly-recognised sub-species are given in brackets:

1) *G. p. pratincola* breeding in the western Mediterranean;
2) *G. p. pratincola* breeding in the Black Sea and eastern Mediterranean;
3) *G. p. pratincola* breeding in South-west Asia;
4) *G. p. pratincola (limbata)* breeding in Sudan and Ethiopia and perhaps locally in southern Arabia;
5) *G. p. fuelleborni* (*boweni)* breeding in West Africa, in the Sahel zone from Senegal to the Central African Republic and also in some coastal areas;
6) *G. p. fuelleborni* (*erlangeri)* breeding mainly in coastal southern Somalia;
7) *G. p. fuelleborni* breeding in Eastern and Southern Africa, from Kenya and Tanzania through Zambia to Angola, the Caprivi, northern Botswana, northern Zimbabwe and south through Mozambique to coastal eastern South Africa.

The wintering ranges of Palearctic populations overlap with the ranges of Afro-tropical populations in the Sahel zone, and none of the forms concerned can be readily separated in the field.

Collared Pratincole

Glareola pratincola



Population size

1. *pratincola* South-west Europe (breeding)

Population estimate	1% threshold	Population trend
18,000-19,500	190	Decreasing

The breeding population in South-west Europe (Iberia, Italy and France) has been estimated at 5,083-5,346 pairs (Thorup 2006) and 4,994-5,871 pairs (BirdLife International 2004a). To these can be added fewer than 500 pairs in Tunisia, 200-300 pairs in Algeria and 200-300 pairs in Morocco (data from Snow & Perrins 1998, Wetlands International 2000). These figures suggest a population of about 6,000-6,500 pairs for the western Mediterranean, equating to a population of about 18,000-19,500 post-breeding individuals. This was the estimate proposed by Stroud *et al.* (2004) and adopted in *WPE3* and *WPE4*. Spain has the major proportion of this population (c. 75%), with 4,000-4,369 pairs estimated to be breeding in the National Park of Doñana in 1990 (Calvo *et al.* 1993), but a marked decrease in the 1990s to 2,300-2580 pairs in 1999 and 1,850 pairs in 2000 (Garcia *et al.* 2000). In view of this apparent decrease at the site which holds more than half the population, the Stable trend presented in Stroud *et al.* (2004) has been amended here to Decreasing.

2. *pratincola* Black Sea & East Mediterranean (breeding)

Population estimate	1% threshold	Population trend
16,000-32,000	240	Decreasing

National estimates collated by BirdLife International (2004a) for European countries within the range of this population total 4,285-9,525 pairs. This total includes a rough estimate of 3,000-6,000 pairs breeding in Turkey. To these can be added 1,000 pairs in Egypt, 50-100 pairs in Israel and 10 pairs in Jordan (Snow & Perrins 1998, Wetlands International 2000) to give a total population of about 5,345-10,635 pairs and thus about 16,000-32,000 individuals. This estimate, adopted in *WPE4*, was slightly higher than the earlier estimate of 16,000-31,000 proposed by Stroud *et al.* (2004) and adopted in *WPE3*.

3. *pratincola* South-west Asia (breeding)

Population estimate	1% threshold	Population trend
B/C (10,000-100,000)	Provisionally 1,000	Unknown

The South-west Asian population remains poorly known. There were 1,000-1,500 pairs breeding in Iran in the 1970s (Scott 1995), and flocks totalling 30,000 were seen moving north in south-eastern Sudan in April 1985 (Wetlands International 2000). Many of the European Russian birds breed in the Caspian basin and are best treated as belonging to this population rather than to the Black Sea/East Mediterranean population (Wetlands International 2000). The previous estimate for European Russia was 1,000-10,000 pairs (Dolz 1994), but this has recently been revised to just 320-1,250 pairs (Lebedeva 2000). Rose & Scott (1997) gave a rough estimate of B/C (10,000-100,000) for the population, and as no better information has become available, this crude figure has been retained.

4. *pratincola (limbata)*

Population estimate	1% threshold	Population trend
B/C (10,000-100,000)	Provisionally 1,000	Unknown

There are sites in Ethiopia where several thousand have been recorded, but most data are from January, when the presence of *pratincola* from the Palearctic is very possible. For example, 7,105 Collared Pratincoles were recorded at Shesher-Welella marshes in Ethiopia in March 2001 (Dodman & Diagana 2003). There are breeding records from Sudan (along the Nile) and Ethiopia. Using the Fishpool & Evans (2001) estimate of "low D" for all African populations, Dodman (2002) proposed a very provisional and rather broad estimate of B/C, and this was adopted in *WPE3* and retained in *WPE4*. There is ceetaily scope for improving the precision of this estimate.

5. *fuelleborni (boweni)*

Population estimate	1% threshold	Population trend
B (10,000-25,000)	Provisionally 250	Unknown

AfWC data from January counts are not very useful in developing an estimate for this population, as birds from Europe (*pratincola*) are also present in the Sahel at this time. Brouwer & Mullié (2001) gave an average population estimate for Niger of 698 birds, based on AfWC data from 1994-1997 (although most of the data came from January counts). A maximum of 18,310 was counted in the central part of the Inner Niger Delta complex in surveys conducted between 1998 and 2004 (Zwarts *et al.* 2005). In coastal Ghana, there have been July counts of 640 and 851 birds at Keta and Sakumo Lagoons, respectively (AfWC database). There is a record of a flock of 300 birds, mostly immatures, in The Gambia during the rainy season in mid-July (Barlow *et al.* 1997). Dodman (2002) concluded that, given the general paucity of records of large flocks outside the northern winter, when *pratincola* are present in the sub-region, the population appears to be fairly small, and proposed a provisional population estimate of B (10,000-25,000). This estimate was adopted in *WPE3* and retained in *WPE4*.

6. *fuelleborni (erlangeri)*

Population estimate	1% threshold	Population trend
A/B (<25,000)	Provisionally 250	Unknown

Dodman (2002) considered this population to be rather small, and proposed a provisional population estimate of A/B based on records from southern Somalia and coastal Kenya. This estimate was adopted in *WPE3* and retained in *WPE4*.

7. *fuelleborni* (including former *riparia*)

Population estimate	1% threshold	Population trend
100,000-300,000	2,000	Unknown

The Collared Pratincole is widespread and locally common in wetland and littoral habitats up to 1,800 m in East Africa (Britton 1980); in Tanzania, over 2,000 have been recorded at Tarangire National Park and 1,500 at each of Lake Kitangire and the Usangu Flats in 1995 (Baker & Baker 2005). Baker (1996) considered that 5,000-10,000 birds might be resident in Tanzania. In Zambia, it breeds on the Kafue Flats, where 17,070 were recorded in July 2000, and also in Liuwa Plain and the Barotse Floodplain in Western Province and at the Bangwuelu Swamps; over 1,000 have been recorded at each of these sites (Leonard 2005). Thousands were breeding at Lake Ngami in the Okavango Delta in Botswana in 1989 (Tyler 2001), with a peak of about 10,000 (mostly breeding birds) in November 1989 (Hockey *et al.* 2005). However, such concentrations are very erratic. Parker (1989 & 2005) estimated over 5,000 in southern Mozambique and 20,000 in Central Mozambique. Based on existing data and geographical range and taking account of large fluctuations in numbers recorded, Dodman (2002) proposed a provisional population estimate of 100,000-300,000. This was adopted in *WPE3* and retained in *WPE4*.

Conservation status

Large declines in range and numbers have been reported in Europe due to habitat loss, disturbance and the use of pesticides (Snow & Perrins 1998). Studies of the large Spanish population in the 1990s-2000s (Garcia et el. 2000, GIC 2007) show that most colonies declined in size overall (BirdLife International 2004a), but the small French, Italian and Portuguese populations are now thought to be stable or fluctuating. In Morocco, there has been some range extension in the last two decades, but nothing is known about trends in Algeria and Tunisia (Snow & Perrins 1998, Wetlands International 2000).

In the Black Sea and eastern Mediterranean region, there have been reports of large declines in Hungary and Ukraine, and smaller declines in Albania, Bulgaria and Greece (BirdLife International/EBCC 2000). For example, in the Ukrainian Danube delta, the population fell from 3,000 pairs in the 1960s to fewer than 100 pairs in the 1980s (Belik *et al.* 1997). The large breeding population in Turkey is now also thought to be declining (BirdLife International 2004a). However, BirdLife International (2004a) gives the recent trends in Bulgaria, Hungary, Macedonia, Romania, Serbia & Montenegro and Ukraine as stable or fluctuating. Trends for the relatively large Egyptian population (over 1,000 pairs; Goodman & Meininger 1989) are unknown, but a decrease has been reported from Israel, and the numbers breeding in Jordan fell dramatically after the draining of Azraq Oasis (Snow & Perrins 1998, Wetlands International 2000).

The status of the South-west Asian population is poorly known. However, the population breeding in European Russia is said to be declining (BirdLife International 2004a), and a review of the status of the Collared Pratincole in southern Russia in the 1990s concluded that without conservation action, this population would probably become extinct (Belik 1998a).

There are no indications of significant changes in numbers in the African populations, although monitoring these populations is difficult, especially in the Sahel zone, where January AfWC count data no doubt include birds from the Palearctic. One threat noted in Zambia was of nesting areas (with eggs and chicks) on floodplains of the Kafue Flats in Zambia becoming inundated by rising floods during artificially controlled flooding regimes (Tim Dodman pers. obs.). Some steps are currently being taken to ensure that future flooding patterns mimic the natural flood cycle. The breeding range of *fuelleborni* has contracted northward, probably due to urbanization and industrial development in South Africa, whilst declines have also been noted on the middle Zambezi Valley (Maclean & Herremans 1997).

Habitat and ecology

In the Palearctic, breeding occurs in the warm or very warm, dry lowlands of continental middle and lower latitudes, ranging from steppe to Mediterranean, semi-desert and tropical climatic zones (Snow & Perrins 1998). Within such areas, the birds require flat, firm, bare ground often with sand or gravel soils and free from any tall herbage, shrubs or trees or other obstruction such as rocks or gullies, normally near water (Cramp & Simmons 1983). Suitable habitat includes flood-lands which dry out at the appropriate moment to provide acceptable breeding ground, saline or alkaline steppe, or similar terrain where climate, soil or grazing pressure provide a check on vegetation (Snow & Perrins 1998). Studying nest-site selection in the province of Sevilla, Spain, Calvo & Alberto (1990) found that many colonies used fallow crop fields in addition to marshes. Immediately after breeding, birds move to moulting areas, using salt-pans, salt lakes, moist meadows, rice or fallow fields. Riversides, lagoons, coasts and farmland may be used during migration (Cramp & Simmons 1983). Dry season floodplains and other areas of bare ground are also favoured breeding habitats in Africa.

Collared Pratincoles are gregarious, breeding in discrete, scattered, loose colonies, and feeding in flocks, both during and outside the breeding season. Post-breeding flocks can be large, e.g. one of up to 5,000 adults and juveniles in Algeria in August (Snow & Perrins 1998) and one of over 17,000 in Zambia's Kafue Flats in July (Dodman & Diagana 2003). In Africa, non-breeding birds form small or large flocks of unstable composition, and are often nomadic in pursuit of insect swarms. Limited information on breeding behaviour suggests that the pair bond is seasonally monogamous with pair-formation of Palearctic migrants occurring in the winter quarters or early on spring migration. In Europe, egg-laying commences from late April or early May (Snow & Perrins 1998); 2-4 eggs are laid at 1-2 day intervals (Urban *et al.* 1986).

The post-nuptial moult of nominate *pratincola* (Palearctic populations) commences from early July to early August whilst in or near the breeding areas. Replacement of remiges and rectrices is suspended during migration until arrival in the winter quarters when, by December, the moult is completed. A partial prenuptial moult commences in late October, finishing from November on, with a few birds completing in late March. Juveniles undergo a complete moult starting in August or September, suspending during migration and completing in the winter quarters by late February (Cramp & Simmons 1983).

Network of key sites

In this species, the key site approach is quite effective as the birds nest in loose colonies and are gregarious at all times of the year. The West Mediterranean and Black Sea & East Mediterranean breeding populations are well represented in key sites, both on the breeding grounds and in their wintering areas in West Africa, but the South-west Asian breeding population is incompletely covered because of uncertainty in population size and the high provisional 1% threshold of 1,000 based on the top end of a broad range.

In West Africa, the Inner Niger Delta and coastal lagoons of Ghana are key sites for *fuelleborni* in this region and regularly support over 1% of the population. The Wagatera Swamp near Lake Tana in Ethiopia appears to be an important breeding site for *pratincola*, and may well be of international importance for this population. In Southern Africa, the extensive floodplains of Zambia are certainly key sites, notably the Kafue Flats, the Bangweulu Floodplain and the Barotse Floodplain. Lake Ngami in the Okavango Delta is also of international importance for Collared Pratincoles. The Caprivi Strip of Namibia also has some sites which support significant numbers, e.g. at Kalizo on the Zambezi River.

Protection status of key sites

Most sites mentioned above are either protected or under some form of integrated management; sites in Mali, Ghana, Botswana and Zambia are also Ramsar sites.

Table 13. Key sites for Collared Pratincole. Sites where 1% or more of a population has been recorded

Country	Site	Lat.	Long.	Season	Max total	Year max	Average total	Basis for average	Source	Population(s) at site
Albania	Karavasta Complex	40.88	19.42	Breeding	390	1996			WBDB	Black Sea, E Mediterranean
Algeria	Marais de Mekhada	36.75	8.03	Breeding	300	1984			WBDB	W Mediterranean
Benin	Lac Nokoue	6.47	2.38	Non-breeding	258	1996	98	1996-01 (3)	AfWC database	*boweni*
Benin	Oueme - So: NW Depression Valley	6.95	2.33	Non-breeding	350	1996			AfWC database	*boweni*
Benin	Riviere So	6.53	2.40	Non-breeding	925	1996	520	1996-01 (3)	AfWC database	*boweni*
Burkina Faso	Vallee du Sourou	13.00	-3.42	Non-breeding	300	1983			AfWC database	*boweni* + W Mediterranean
Cameroon	Depression Zilim	11.42	15.02	Non-breeding	1700	1993			AfWC database	*boweni* + Black Sea, E Mediterranean
Cameroon	Logone/Chari confluent (Fort-Foureau. Kousseri)	12.08	15.00	Non-breeding	3642	1999			AfWC database	*boweni* + Black Sea, E Mediterranean
Cameroon	Mare de Katoa	10.83	15.08	Non-breeding	250	1993			AfWC database	*boweni* + Black Sea, E Mediterranean
Cameroon	Parc National de Waza Logone	10.83	15.00	Non-breeding	7191	1998	5121	1996-98 (3)	AfWC database	*boweni* + Black Sea, E Mediterranean
Cameroon	Semry II Rizières: Maga. Pousse;	10.83	15.05	Non-breeding	5530	1999	1988	1993-01 (4)	AfWC database	*boweni* + Black Sea, E Mediterranean
Guirvidig										
Cameroon	Zoung	6.00	12.00	Non-breeding	500	2001			AfWC database	*boweni*
Chad	Lac de Tikem	9.80	15.10	Non-breeding	2700	1987			AfWC database	*boweni* + Black Sea, E Mediterranean
Chad	Plaines du Logone (Tchad)	11.37	15.13	Non-breeding	1150	2000			AfWC database	*boweni* + Black Sea, E Mediterranean
Ethiopia	Koka reservoir	8.33	39.00	Non-breeding	1000	1999			AfWC database	*limbata* + SW Asia
Ethiopia	Shesher & Welala Marshes	9.00	39.00	Non-breeding	7105	2001	1823	1997-01 (5)	AfWC database	*limbata* + SW Asia
Gambia	Bao Bolon Wetland Reserve	13.52	-15.83	Non-breeding	2500	1996			WBDB	*boweni* + W Mediterranean
Gambia	Dankunku Swamp	13.53	-14.73	Pre-breeding migration	800	1998			AfWC database	*boweni* + W Mediterranean
Gambia	Jakhaly Rice Fields	13.57	-14.97	Pre-breeding migration	862	1998			AfWC database	*boweni* + W Mediterranean
Gambia	Pinyai Swamp	13.53	-14.73	Pre-breeding migration	520	1998	520	1998	AfWC database	*boweni* + W Mediterranean
Ghana	Keta Lagoon complex	5.92	-0.83	July-August	640	1996	203	1996-01 (5)	AfWC database	*boweni*
Ghana	Sakumo Lagoon	5.67	-0.17	July-August	851	2000	380	1996-01 (5)	AfWC database	*boweni*
Greece	Amvrakikos Wetlands	39.00	21.00	Breeding	480	1996			WBDB	Black Sea, E Mediterranean
Greece	Axios, Loudias, & Aliakmon estuaries	40.50	22.72	Breeding	300	1996			WBDB	Black Sea, E Mediterranean
Greece	Evros delta Aliakmon estuaries	40.77	26.05	Breeding	750	1997			WBDB	Black Sea, E Mediterranean
Greece	Nestou delta & coastal lagoons	40.97	24.80	Breeding	300	1996			WBDB	Black Sea, E Mediterranean
Guinea	Plaine Rizicole de Koba	10.00	-13.15	Non-breeding	2420	2000	2360	1999-00 (2)	AfWC database	*boweni* + W Mediterranean
Guinea-Bissau	Rio Mansôa & Gêba estuary	11.92	-15.90	Non-breeding	2500	1983			WBDB	*boweni* + W Mediterranean
Israel	Northern Lower Jordan Valley	32.42	35.58	Migration	250	1991			WBDB	Black Sea, E Mediterranean
Israel	Western Negev	31.17	34.67	Migration	500	1991			WBDB	Black Sea, E Mediterranean
Italy	Biviere & Plain of Gela	37.02	14.33	Breeding	450	1997			WBDB	W Mediterranean

Country	Site	Lat.	Long.	Season total	Max max	Year total	Average	Basis for average	Source	Population(s) at site
Mali	Inner Niger Delta	13.50	-4.00	Non-breeding	18310	1998-04			Zwarts *et al.*	*boweni* + W Mediterranean
Mali	Plaine de Seri	14.98	-5.38	Non-breeding	650	1995			AfWC database	*boweni* + W Mediterranean
Mali	Séri	14.83	-4.67	Non-breeding	9000	1986			WBDB	*boweni* + W Mediterranean
Mauritania	Gâat Mahmoûdé	16.42	-7.63	Non-breeding	2457	2000			WBDB	*boweni* + W Mediterranean
Mauritania	Lac d'Aleg	17.08	-13.98	Non-breeding	1341	1996	612	1996-00 (4)	AfWC database	*boweni* + W Mediterranean
Montenegro	Ulcinj salina	41.92	19.30	Breeding	390 120-130 prs	2006			M. Schneider-Jacoby *in litt.*	Black Sea, E Mediterranean
Namibia	Zambezi river - Kalizo 10 Km	-17.75	24.83	July-August	2700	1999			AfWC database	fuellebomi
Romania	Razim-Sinoie Lagoons	44.67	29.00	May	270 90 prs	1996			C. Sudfeldt *in* Schmitz *et al.* 2001	Black Sea, E Mediterranean
Senegal	Lac de Guiers in Louga	15.80	-15.73	Non-breeding	204	1999			AfWC database	W Mediterranean
Senegal	Parc National des Oiseaux de Djoudj	16.42	-16.25	Non-breeding	1650	1994	206	1996-01 (5)	AfWC database	*boweni* + W Mediterranean
Senegal	Zic de Djeuss et environs	16.25	-16.30	Non-breeding	210	1998			AfWC database	W Mediterranean
Spain	Albufera de Valencia marshes	39.33	-0.25	Migration	200	1996			WBDB	W Mediterranean
Spain	Arroyo Conejo Reservoir	38.40	-5.80	Breeding			225	1997-07 (11)	GIC 2007	W Mediterranean
Spain	Delta Del Ebro	40.72	0.73	Breeding	297	1996			WBDB	W Mediterranean
Spain	Isla Cristina & Ayamonte marshes & Prado lagoon	37.22	-7.42	Breeding	300	1996			WBDB	W Mediterranean
Spain	La Janda	36.25	-5.85	Breeding	300	1996			WBDB	W Mediterranean
Spain	Lácara-Morante	39.00	-6.42	Breeding	210	1997			WBDB	W Mediterranean
Spain	Llanos de Cáceres	39.38	-6.37	Breeding			113	1997-07 (11)	GIC 2007	W Mediterranean
Spain	Parque Nacional de Doñana	37.00	-6.42	Resident	12000	1990			WBDB	W Mediterranean
Spain	Prat de Cabanes-Torreblanca	40.23	0.20	Breeding	270	1996			WBDB	W Mediterranean
Spain	Vegas Altas-La Serena	38.93	-5.22				563	1997-07 (11)	GIC 2007	W Mediterranean
Spain	VegasAltas - Orellana	38.98	-5.43				300	1997-07 (11)	GIC 2007	W Mediterranean
Spain	Vegas Altas-Cubilar	39.22	-5.45				120	1997-07 (11)	GIC 2007	W Mediterranean
Spain	Vegas Altas Rice Filelds		39.03	-5.93			188	1997-07 (11)	GIC 2007	W Mediterranean
Spain	Vegas Bajas-Alarge	38.75	-5.25				450	1997-07 (11)	GIC 2007	W Mediterranean
Spain	Vegas Bajas-Canchales	38.95	-5.52				120	1997-07 (11)	GIC 2007	W Mediterranean
Togo	Namgbéto Amont	7.70	1.72	Pre-breeding migration	842	1997			AfWC database	*boweni*
Tunisia	Lagune de Korba	36.47	10.93	Breeding	600	1990s			WBDB	W Mediterranean
Turkey	Kizilirmak delta	40.67	35.97	Breeding 65-115 prs	270	1992			Hustings & van Dijk 1994	Black Sea, E Mediterranean
Turkey	Meric delta	40.77	26.23	Breeding	600	1994			WBDB	Black Sea, E Mediterranean
Turkey	Saros bay	40.62	26.85	Breeding	300	1989			WBDB	Black Sea, E Mediterranean
Turkey	Tuz lake	38.75	33.38	Breeding	600	1998			WBDB	Black Sea, E Mediterranean
Ukraine	Kryva peninsula	47.08	38.12	Breeding	246	1999			WBDB	Black Sea, E Mediterranean
Ukraine	Molochna river valley	47.08	35.50	Breeding	240	1997			WBDB	Black Sea, E Mediterranean
Ukraine	Molochnyj Liman	46.32	35.32	Migration	600	1999			WBDB	Black Sea, E Mediterranean
Ukraine	The Sivash, Azov Sea	46.17	34.58	August	2700	1998			Chernichko *et al.* 2001	Black Sea, E Mediterranean
Zambia	Chikuni(Bangweulu Floodplain):Lukulu river	-11.92	30.42	July-August	3200	1993	1317	1993-96 (3)	AfWC database	*fuellebomi*
Zambia	Kafue Flats	-15.67	27.17	July	17,070	2000	7438	1994-98 (5)	AfWC database	*fuellebomi*

Chris Jones

Black-winged Pratincole
Glareola nordmanni

Geographical variation and distribution

The monotypic Black-winged Pratincole breeds from South-east Europe (Romania and Ukraine) east in the steppe zone across southern Russia and Kazakhstan to about 85ºE, and appears to migrate almost non-stop over western Arabia and the eastern Mediterranean to sub-Saharan Africa.

Movements

The Black-winged Pratincole is strongly migratory, with the entire population crossing the Middle East and eastern Mediterranean to spend the non-breeding season in Africa south of the Sahara. Birds are only rarely recorded on passage in South-west Asia and the Mediterranean, and it is assumed that most birds undertake the migration from their breeding grounds to Africa in a single non-stop flight. However, birds are commonly observed on migration in western East Africa, from Sudan and Ethiopia southwards, occasionally in very large flocks. Many birds probably follow the western Rift Valley, perhaps west and east of Lake Tanganyika, to western Zambia, from where there are historical reports of huge flocks, and then into eastern Namibia, Botswana and northern areas of South Africa (Dodman 2002). The species was an abundant passage migrant at Liuwa Plain National Park in western Zambia, where it has been recorded in the tens of thousands with some regularity; there is an estimate of hundreds of thousands of birds in this area in 1977 (Leonard 2001). Flocks of hundreds are probably annual on spring migration in western Uganda, with records of up to 500 from Kabalega Falls and Ruwenzori National Parks in April (Britton 1980). Black-winged Pratincoles are presumed to overfly the equatorial forests of Democratic Republic of Congo at a great height, although birds have been noted in ones and twos dropping into forest clearings in the eastern part of the country to rest (Bannerman 1953).

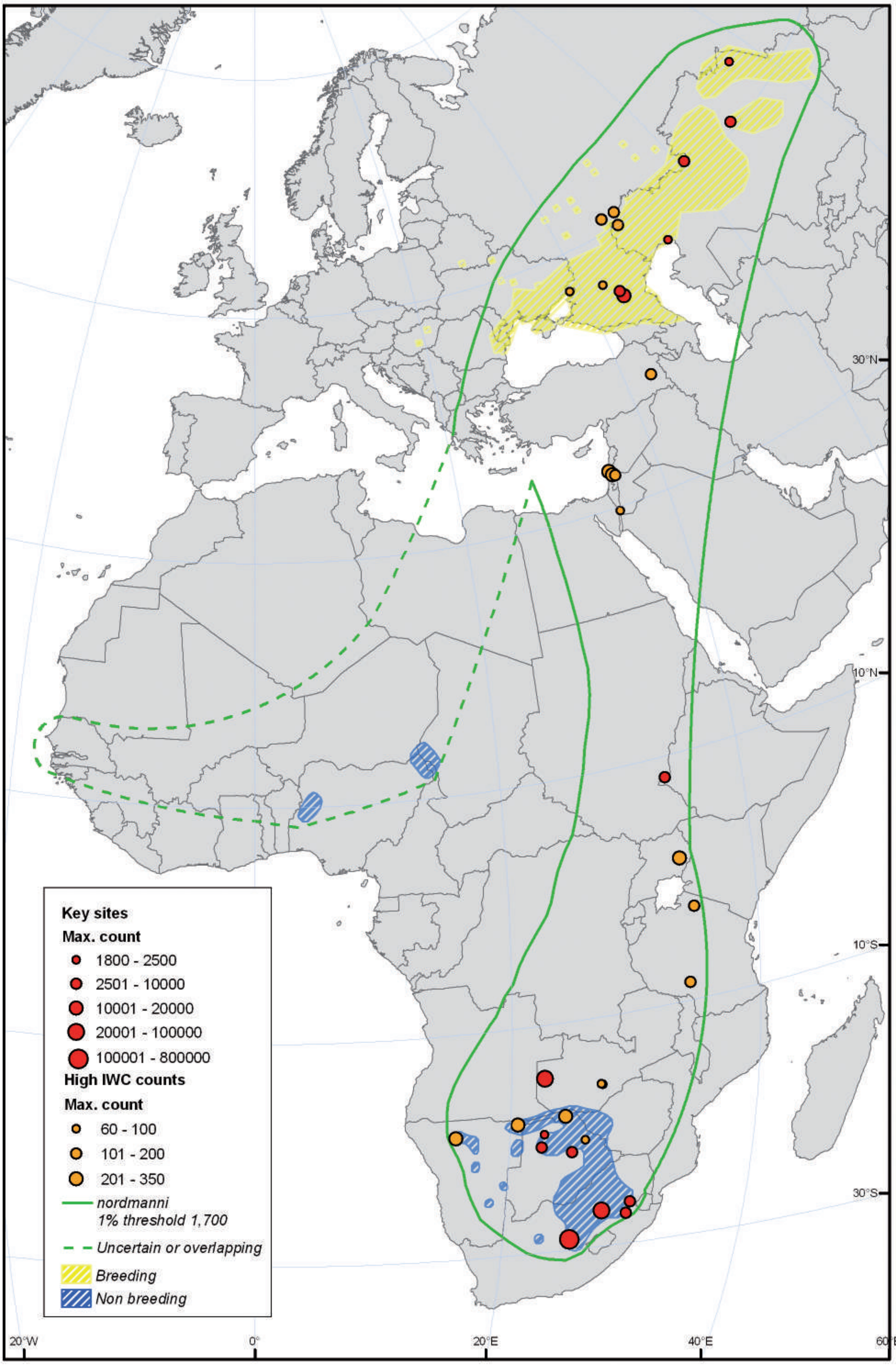
The bulk of the population spends the boreal winter in north-eastern Namibia, Botswana, southern Angola and South Africa. The main non-breeding area is on the highveld of the Orange Free State, southern Transvaal, western Natal, western Swaziland and the Northern Cape in South Africa (Maclean & Herremans 1997, Urban *et al.* 1986, Du Plessis 1995). Here, the species is highly nomadic, occurring where rains result in good conditions for its insect prey, especially locusts and winged termites.

A small number of birds apparently take a more westerly route to spend the non-breeding season in West Africa. There are a reasonable number of records from September to April at major lakes and rivers of the Sahel zone of West Africa from Mauritania to Chad, as well as widely scattered records of vagrants from across the region, especially in the Gulf of Guinea (Borrow & Demey 2001). There are old reports of flocks of 100-200 in Chad in December and 200 in Nigeria in December-April (Urban *et al.* 1986), and flocks of 5,000-15,000 have reputedly been observed in the Sahel zone of Mali in November/December (Lamarche 1980). However, there are no records of substantial numbers of birds in West Africa in recent years, and it may be that these West African birds represent a dwindling “sub-population” from the western extremity of the breeding range in South-east Europe (Dodman 2002). Archer & Godman (1937) described, at a time when the population was significantly higher, movements over Africa on a broad front towards Southern Africa, with birds passing through Cameroon and the Horn of Africa in September, arriving in South Africa in October.

Population limits

Only one population is recognised, comprising the entire population of the species.

Black-winged Pratincole
Glareola nordmanni



Population size

1. East Europe, West & Central Asia (breeding) (entire population of the species).

Population estimate	1% threshold	Population trend
152,000-190,000	1,700	Strong decrease

The Black-winged Pratincole was formerly an abundant species, with a report of possibly up to a million birds in Zambia in the 1970s (Aspinwall & Conant 1977) and post-breeding congregations of hundreds of thousands of bird in W Russia and Ukraine (Kessler 1858). A single congregation of at least 250,000 birds, but perhaps as many as 800,000, was seen in Orange Free State, South Africa, in December 1991 (Du Plessis 1995). A flock of 76,500 birds was present at Vaal Dam, South Africa, in 2006 (University of Cape Town 2006). In Botswana, there were counts of 2,000 (January 1991) and 5,200 (January 1993) at Rysana Pan in the Makgadikgadi system (Tyler 2001), while Penry & Tarboton (1990) reported a concentration of many thousands at Lake Ngami in 1989. Estimates of numbers on the breeding grounds in the mid-1990s revealed that there had been a very rapid decline in numbers. Belik & Tomkovich (1997) estimated the world population at only 15,000-45,000 breeding pairs of which some 6,000-11,000 pairs were in South-east Europe, while data collated by the Russian Bird Conservation Union for an International Action Plan seemed to indicate that by the turn of the century the total population had fallen to only 9,700-14,900 pairs (29,100-44,700 individuals, Belik & Lebedeva 2004). Most of these were in Russia (2,700-4,900 pairs) and Kazakhstan (7,000-10,000 pairs), and only very small numbers were found occasionally breeding in Hungary, Belarus, Romania, Ukraine, Bulgaria, Turkey, Armenia, Azerbaijan and Uzbekistan. The estimate of 29,000-45,000 was adopted by Stroud *et al.* (2004) and *WPE3*, and retained in *WPE4*, although it was noted by Stroud *et al.* that the largest single national total, that for Kazakhstan, was a "guesstimate" in need of confirmation. Surveys on the breeding grounds in Kazakhstan and Russia during the summer and autumn of 2006 found much larger numbers of Black-winged Pratincoles than expected, and resulted in a new higher estimate of 152,000-190,000 (Kamp *et al.* submitted).

Conservation status

The Black-winged Pratincole is one of several steppe-breeding species that appears to have undergone a rapid and widespread decline throughout most of its range since the 1850s. For this reason, it was listed as Near Threatened on the IUCN Red List (BirdLife International 2006).

The species has declined throughout its European breeding range since the 1970s, especially in Ukraine, where there was a precipitous decline in 20 years to extinction by 1990 (Belik & Tomkovich 1997, Belik & Lebedeva 2004). In southern European Russia, numbers increased following the irrigation of dry and desert steppe in the 1950s, and this increase continued until the mid-1980s, but since then, numbers have decreased (Belik 1994b, Belik & Tomkovich 1997). The breeding population to the east of the Volga (in Western Asia) was thought to be fairly stable (Belik 1994b), although recently there have been pronounced fluctuations in numbers, with some populations actually increasing (Belik & Lebedeva 2004). The primary causes of the range contraction and decline in numbers in Europe appear to be the cultivation of virgin steppes (Belik 1994b, Belik & Tomkovich 1997).

The species is also becoming increasingly scarce on its wintering grounds in South Africa, and no longer occurs in KwaZulu-Natal (Maclean & Herremans 1997, Barnes 2000). The present status of the species in West Africa is unclear; the fairly regular and widespread records in the past possibly indicate a much larger population than exists now, with birds migrating on a much broader front across Africa. The widespread chemical control of locusts, a major food for this species, is thought to have contributed to the declines (Du Plessis 1995). There are ongoing threats to some of the key wintering sites, especially in South Africa (see under "Protection status of key sites").

Habitat and ecology

The Black-winged Pratincole breeds entirely in the warm, continental steppe zone of South-west Asia and South-east Europe. It favours grassy meadows, saline vegetation and certain cultivated fields (flax, maize, millet, melon). In recent years, fallow and abandonend fields have been increasingly used.It also uses more open habitats such as salt flats, sand spits and islets with grassy mounds. Large breeding colonies are always near water. On the non-breeding grounds in Botswana, it favours damp ground or newly flooded grassland and ploughed areas (Tyler 2001). It feeds on large insects, in Africa forming large flocks hawking swarming species such as locusts. It also feeds on the ground. It nests colonially on the ground in the open, and a single clutch of three to four eggs is laid between April and May (Snow & Perrins 1998).

Network of key sites

Two sites in southern European Russia have been identified as key breeding areas: the Shalkar-Ega-Kara lake system near the Kazakhstan border, with up to 1,500 pairs (Kamp *et al.* submitted), and Dadynskie Lake in the Manych wetlands of Stavropolski region, with up to 1,800 pairs. Other very important breeding sites have recently been discovered in the Lake Tengiz region in central Kazakhstan, where 1,500 pairs were located in 2006 (Kamp *et al.* submitted). Important staging areas include the delta of the River Don on the Sea of Azov in Russia and Bulanik plain in eastern Turkey. An extremely important staging area has recently been discovered by the International Sociable Lapwing Research Project team in the Stavropol region of Russia, where a single flock of 20,000 was observed in September 2006 (Field *et al.* 2007). Key sites in Southern Africa include the Liuwa Plains in Zambia, the Okavango Delta (especially Lake Ngami) and Rysana Pan in Botswana, and Chrissie Pan. The Grassland Biosphere Reserve and sites in Free State, South Africa, are also extremely important for this species.

Protection status of key sites

The two key breeding sites in southern Russia are unprotected, as is the key staging area in eastern Turkey, but the delta of the River Don in Russia is partially protected in three protected areas (a "zapovednik" and two "zakaznik"). The Liuwa Plains National Park in Zambia is officially protected, although there is widespread encroachment and illegal hunting (Leonard 2001). Namibia's eastern Caprivi wetlands are partially protected; one of the major threats to the site is the high grazing pressure (Simmons *et al.* 1998). The Okavango Delta in Botswana is a Ramsar Site and is partially protected, although widely subject to local and international threats, from the side-effects of tsetse fly eradication campaigns to water-abstraction and canalisation issues; Makgadikgadi Pans are also partially protected

(Tyler & Bishop 1998). Of the two IBAs in South Africa that support significant numbers, the Chrissie Pans are unprotected and threatened by agricultural development and commercial afforestation (Barnes & Tarboton 1998a), whilst the Grassland Biosphere Reserve is partially protected, but severely threatened by grassland afforestation, wetland degradation and increased acid rain from local power-station sulphur emissions (Barnes & Tarboton 1998a).

Table 14. Key sites for Black-winged Pratincole. Sites where 1% or more of a population has been recorded

Country	Site	Lat.	Long.	Season	Max total	Year total	Average max	Basis for average	Source
Botswana	Lake Ngami	-20.50	22.62	Non- breeding	10000	1989			WBDB
Botswana	Okavango Delta	-19.42	22.75	Non- breeding	2000+	-			WBDB
Botswana	Rysana Pan	-21.25	25.07	Non- breeding	5200	1993	1816	1991-94 (3)	AfWC database
Ethiopia	Paro River	08.33	33.62	Non-breeding	5000	1973			Ash 1977
Kazakhstan	Caspian Sea shore near Atyrau	47.04	52.51	Breeding	1800 600 prs	2003			Kamp *et al.* submitted
Kazakhstan	Irtysh Basin, Pavlodar Oblast	53.06	76.18	Breeding	2350 785 prs	2007			Kamp *et al.* submitted
Kazakhstan	Tengiz-Korgalzhyn	50.50	69.40	Breeding	4500 1500 prs	2006			Kamp *et al.* submitted
Russia	Chagraiskoe reservoir Stavropol Region	45.05	44.2	September	20000	2006			Field *et al.* 2007
Russia	Manych wetlands, Stavropolski Krai	45.50	44.03	Breeding	5400 1800 prs	2006			Kamp *et al.* submitted
Russia	Shalkar-Ega-Kara lake system	50.92	60.83	Breeding	4500 1500 prs	2002			Kamp *et al.* submitted
South Africa	Chrissie Pan	-26.32	30.25	Non- breeding	5000	-			WBDB
South Africa	Grassland Biosphere Reserve	-27.25	30.02	Non- breeding	3000-5000	-			WBDB
South Africa	Vaal Dam	-26.76	27.95	Non-breeding	76500	2006			University of Cape Town 2006
South Africa	Oranje, Orange Free State	-29.03	25.58	Non-breeding	250000 800000	-	1991		du Plessis 1995
Zambia	Liuwa Plains National Park	-14.53	22.62	Non- breeding	100000	-			WBDB

David Stroud, Simon Delany & Tim Dodman

Per Smitterberg

Madagascar Pratincole
Glareola ocularis

Geographical variation and distribution

The Madagascar Pratincole breeds solely in Madagascar, but is absent from the extreme south-west. It occurs widely in Madagascar, breeding mainly in the east, although a few colonies have recently been found in the west (Morris & Hawkins 1998). The limits of the non-breeding range are coastal Somalia to 3°N (Ash & Miskell 1998) in the north, the Zambezi Delta in Mozambique in the south, and, historically, Lake Victoria in the west. The whole population migrates to the East African coast, usually arriving in Tanzania and, to a lesser extent, Mozambique north of the Zambezi River, thence moving north to Kenya and southern Somalia, where it remains in a narrow coastal strip, largely west of the coastal sand dunes. There are occasional historical records from further west inland, including as far west as Lake Victoria

Movements

The species usually breeds in eastern Madagascar from November to January, then moves across the central highlands of Madagascar, assembling in large post-breeding groups on western rivers (Hawkins & Goodman 2003). It then migrates to its non-breeding range on the East African coast, where it is present from March to September (Urban *et al.* 1986). It probably enters and leaves Africa from western Madagascar via Tanzania, thence moving northwards along the coast, but there are also erratic records inland, usually involving 1-6 birds, although there are historical records of concentrations of hundreds at Lake Victoria (Urban *et al.* 1986). It tends not to remain in coastal areas of Tanzania, where it only occurs on passage; there is a record of 2,000 birds in April 1982, as well as several records from September (Baker & Baker 2005), presumably on southern migration. The earliest recorded arrival date of 25 May in southern Somalia is about two months later than arrival times in coastal Kenya, and it may be that the birds moult in coastal Kenya before moving on to Somalia (Ash & Miskell 1998). It has been recorded on passage in the Comoros, with records from Mayotte always in October (Louette 2004), representing birds returning to Madagascar to breed.

Population limits

Only one population is recognised, the entire population of the species.

Population size

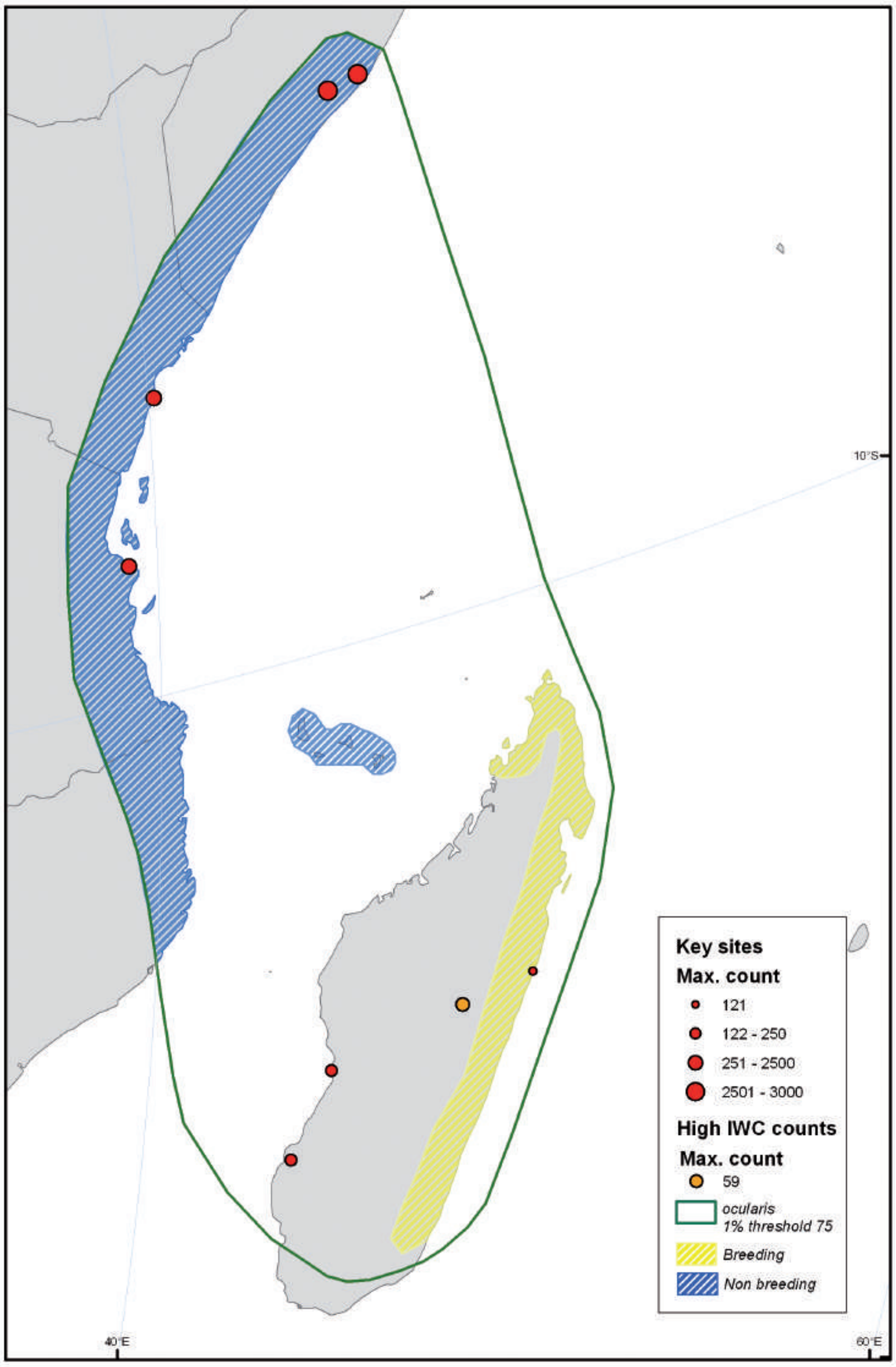
1. Madagascar (breeding)

Population estimate	1% threshold	Population trend
5,000-10,000	75	Decrease

Langrand (1990) reported the species to be fairly common in Madagascar, although flocks there seldom exceed 150 birds. Large non-breeding congregations occur at two sites in western Madagascar, the Tsiribihina River and the Mangoky Delta (Lac Ihotry), with 250 birds recorded from each site, whilst a post-breeding flock of 121 has been seen in the east at the North Pangalanes wetlands (ZICOMA 1999). There are several significant counts from the 1970s and 1980s in the non-breeding range, but there are few recent high counts. There are records of flocks of 3,000 from southern Somalia from May 1979 and July 1981 (del Hoyo *et al.* 1986), whilst in Kenya, there is a report of 9,000-10,000 in 1978 (Lewis & Pomeroy 1989) and, more recently, a record of up to 2,500 at the Sabaki River mouth (Bennun & Njoroge 1999). In Tanzania, 2,000 were recorded at the Dar es Salaam coast in 1982 (Baker & Baker 2001). F. Hawkins (*in litt.* in Dodman 2002) has suggested that the total population may now be as low as 2,000-10,000 birds, and Fishpool & Evans (2001) gave an estimate of A (<10,000). In reviewing more recent data, Dodman (2002) suggested non-breeding totals of some 2,500-5,000 in Somalia, 2,500-5,000 in Kenya and <5,000

Madagascar Pratincole

Glareola ocularis



in Tanzania and Mozambique, and proposed a new estimate of 5,000-10,000 (considering that passage totals in Tanzania and northern Mozambique should not be added to the totals for Kenya and Somalia). This estimate was adopted in *WPE3* and retained in *WPE4*.

Conservation Status

The Madagascar Pratincole appears to have suffered major declines in the last 20 years, and may still be in decline. These declines are probably linked to the widespread loss and degradation of wetland habitats in Madagascar in recent years, but further investigation is required. In view of the species' small population size and declining trend, it was listed by BirdLife International (2004b) as Globally Threatened on the IUCN Red List in the category Vulnerable. Clearly it is a species which should be closely monitored.

Habitat and ecology

In Eastern Africa, it is highly gregarious, frequenting exposed mudflats and sand dunes, and edges of lakes and rivers, often hawking for insects at dusk, sometimes over woodland (Urban *et al.* 1986). In Somalia, it is locally abundant in inland wetlands, grasslands, bushland and other open areas, and along the Juba and Shebelle rivers (Ash & Miskell 1998). In Madagascar, it breeds in loose colonies on rocky islets in rivers, saltmarsh and coastal rocky areas, and is also found in short grasslands and at lake edges (Morris & Hawkins 1998). Nesting has been observed in November (Langrand 1990).

Network of key sites

In Madagascar, breeding sites mainly in the east of the country are of particular importance, although colonies are often quite small and their importance is cumulative. One key site identified in the east is the North Pangalanes wetlands, and two sites on the west coast also support significant numbers, the Tsiribihina River and Mangoky Delta (Lake Ihotry) (ZICOMA 1999).A colony of 40 to 70 individuals was found 30 km in north of Maevatanana, NW Madagascar, in November 2005 (Zefania, S. and T. Székely, *in litt.*).Key sites during migration include the Tsiribihina River and Lake Ihotry.

There are several key sites along the East African coast which probably hold very substantial proportions of the population at certain times of the year. In Tanzania, the Dar es Salaam coast is a key site, with a past record of 2,000 birds in 1982. The most important site in Kenya is the Sabaki River mouth, where a count of 9,000-10,000 was reported in 1978 and up to 2,500 have been observed regularly in recent years. In southern Somalia, over 3,000 have been recorded on several occasions near Jowhar and Maxan (Ash & Miskell 1998). No key sites have been identified in Mozambique.

Protection status of key sites

In Madagascar, the North Pangalanes wetlands and wetlands of the Tsiribihina River and Delta are unprotected, whilst a part of the Mangoky Delta complex is partially protected as a Hunting Reserve (ZICOMA 1999 & 2001). The Dar es Salaam coast of Tanzania is an IBA, but is unprotected and subject to a range of threats, largely resulting from urban sprawl and unplanned developments, such as pollution and habitat degradation (Baker & Baker 2001). The Sabaki River mouth in Kenya is unprotected, and the estuary is heavily used and disturbed by people, although there is little direct harassment of birds (Bennun & Njoroge 1999). The key sites in Somalia are unprotected and are not far from the capital city, Mogadishu. These areas are subject to various threats, though some, such as the collection of firewood, may not be detrimental to the pratincole. In summary, none of the key breeding and non-breeding sites is adequately protected, which, given the Globally Threatened status of the species, gives considerable cause for concern.

Table 15. Key sites for Madagascar Pratincole. Sites where 1% or more of a population has been recorded

Country	Site	Lat.	Long.	Season	Max total	Year max	Average total	Basis for average	Source
Kenya	Sabaki river mouth	-3.17	40.13	Non-breeding	2500	1999			Bennun & Njoroge 1999
Madagascar	Lac Ihotry	-21.63	43.65	Non-breeding	250	1990s			ZICOMA 1999
Madagascar	North Pangalanes wetlands	-18.68	49.22	Non-breeding	121	1990s			WBDB
Madagascar	Tsiribihina delta & upper Tsiribihina river	-19.75	44.43	Non-breeding	250	1990s			ZICOMA 1999
Somalia	Near Jowhar	02.53	45.78	Non-breeding	3000	-			Ash & Miskell 1998
Somalia	Near War Maxan	2.4	45.02	Non-breeding	3000	-			Ash & Miskell 1998
Tanzania	Dar es Salaam coast	-6.83	39.32	Non-breeding	2000	1982			WBDB

Tim Dodman, David Stroud & Simon Delany

Tom Stephenson

Rock Pratincole
Glareola nuchalis

Geographical variation and distribution

The Rock Pratincole is a resident and intra-African migrant, ranging from coastal and Sahelian West Africa through Central Africa to Uganda and the Zambezi Basin as far as Mozambique. It also occurs along the Nile River in Sudan, where it is rare, and in Ethiopia, where it is more common. Otherwise it is poorly represented in Eastern Africa, and the status of birds in Ethiopia is in need of verification. There are also past reports of birds from Lake Chad. Two populations are recognised, comprising the two subspecies: the nominate (with a white collar), which occurs over much of the range, and *liberiae* (with a chestnut collar) in Western Africa. Intermediates occur in western Cameroon (Urban *et al.* 1986).

Movements

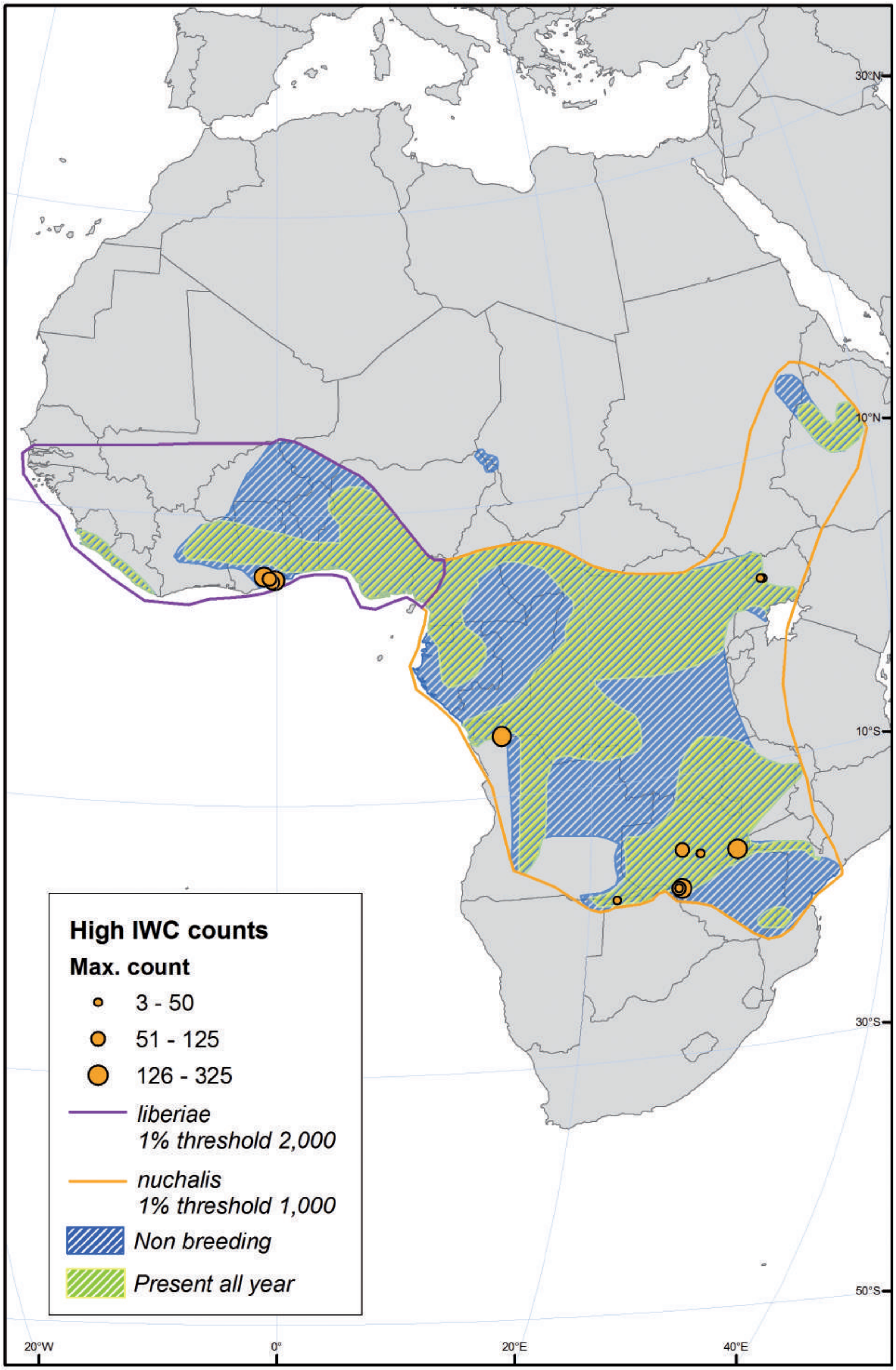
The Rock Pratincole is a locally common resident and intra-African migrant dependent on rocky areas in rivers and lakes. It undergoes seasonal movements related to changes in water level, leaving rivers during flood, though the full extent of the migrations is not known. In Zambia, nominate *nuchalis* is numerous only between July and January when rocks are exposed, with peak breeding occurring during the period of lowest water level in September, but as water levels rise there is an exodus from the country, and it is largely absent during peak floods from March to May (Benson *et al.* 1971). It arrives at breeding sites on the Zambezi River in July and August, usually departing during the peak rains around December (Tree 1997). Hundreds have been noted at Livingstone on the Zambezi in late October and November (Benson *et al.* 1971), presumably post-breeding aggregations. These birds must then move northwards after breeding, presumably into the Congo Basin. This species was noted on rocks in the Congo River in the Ituri Forest of north-eastern Democratic Republic of Congo in November (T. Dodman pers. obs.), whilst migrants from north-eastern Namibia have apparently been observed between January and July in eastern Democratic Republic of Congo (Urban *et al.* 1986). Birds breeding in the south of the range thus migrate northwards after breeding, probably into the Congo Basin and possibly further. Migrating *nuchalis* have been observed in October in the range of *liberiae* as far west as Togo (Cheke 1982) and Liberia (Gatter 1997).

In East Africa, *nuchalis* is apparently resident, breeding regularly on islets off the north shore of Lake Victoria in Uganda, and at other sites along the Nile and Semliki rivers in western Uganda, the Nzoia River in western Kenya and in the Selous of Tanzania (Britton 1980). There is a breeding record from the Malagarasi River in western Tanzania (Baker & Baker 2005). It is also resident (or largely resident) in Gabon and Congo (Christy & Vande Weghe 1999). At the Réserve de la Lopé in Gabon, it breeds on the Ogooué River during both dry seasons when river levels drop, with young observed in January and February and courtship displays in August (Christy & Clarke 1994).

In West Africa, *liberiae* is largely migratory. It arrives in Liberia in early October in groups of up to 300, and departs in May-June, with some movements down the coast between April and June; there are no records from Liberia during July to September (Gatter 1997). It is a regular migrant in Nigeria, occurring on the Niger River only between mid-March and September, and breeding there between April and June (Urban *et al.* 1986). The westernmost records are from the River Corubal in Guinea-Bissau (Dodman *et al.* 2004). Breeding in Liberia is in mid-November and December on upper rivers, whilst most clutches on lower rivers are in February-March (Gatter 1997). In northern Togo, breeding takes place between May and June/July (Cheke & Walsh 1996). One colony here completed breeding before the nest site was submerged in July, whilst a flock in late August, followed by two months absence, suggested some passage migration (Cheke 1982). The key factor controlling migration thus appears to be the availability of suitable breeding sites.

Rock Pratincole

Glareola nuchalis



There are marked variations in migratory cycles across the sub-region due to the varying water levels of suitable rivers, with birds breeding on upper rivers much earlier than those on lower stretches of the major rivers. Birds from Liberia probably migrate eastwards into the Niger Basin and Cameroon, and there are scattered records from many areas of southern Mali (Lamarche 1980).

Population limits

Two populations are recognised, corresponding to the two subspecies:

1) *nuchalis* (White-collared Pratincole): Central and Southern Africa, from central and eastern Cameroon, east to Uganda and western Kenya, south to Angola and Zambia to the Zambezi River, with extensions into Tanzania and with seemingly isolated areas in the Lake Chad Basin and the Blue Nile;
2) *liberiae* (Chestnut-collared Pratincole): West Africa, from Guinea-Bissau to western Cameroon, with the breeding population centred on Liberia.

Population size

1. *nuchalis*

Population estimate	1% threshold	Population trend
C (25,000-100,000)	Provisonally 1,000	Unknown

Fishpool & Evans (2001) gave a population estimate of B (10,000-25,000). Dodman (2002) considered this to be an underestimate, given the wide range and apparently common status of this species along a number of rivers, and the extent of potential habitat in the Congo Basin, especially along the upper reaches of rivers and other areas where rocks are regularly exposed. He therefore proposed a higher estimate of C (25,000-100,000), and this was adopted in *WPE3* and *WPE4*.

2. *liberiae*

Population estimate	1% threshold	Population trend
100,000-300,000	2,000	

High counts of *liberiae* in Liberia include 320 adults along a 10-km stretch of St. Paul River, 300 adults along a 10-km stretch of St. John River, and up to 420 non-breeding birds in Sinoe County (Gatter 1997). There is also a record of a non-breeding flock of 259 at Keta Lagoon in Ghana in July (Dodman & Diagana 2003), and 300 on the Pra River in the Central Region of Ghana in October (Helsens 1996). Fishpool & Evans (2001) gave an estimate of B (10,000-25,000), and this was supported by Dodman (2002) and adopted in *WPE3*. However, Gatter (1997) suggested that the (breeding) population in Liberia alone could be in excess of 100,000 birds, based on counts along 10-km stretches of several rivers. In light of this publication, a much higher estimate of D (100,000-1,000,000) was adopted in *WPE4*. Dodman (in press 2009) considers that Liberia probably holds at least half of the breeding population, and proposes a more conservative range of 100,000-300,000, with a 1% threshold of 2,000 birds.

Conservation Status

Neither population appears to be under threat. However, the building of large dams, such as the Kariba Dam on the Zambezi River, causes extensive loss of habitat, both through increased water levels and upstream silting. Similarly, the creation of Lake Volta in Ghana flooded many sites where the species was formerly common (Grimes, 1987). Further dam building in the Zambezi (and possibly elsewhere) will reduce the population further because all suitable habitat is apparently occupied, whilst silting due to other causes has also destroyed rocky habitats, for example in the south-eastern lowveld rivers of South Africa (Tree 1997).

Habitat and Ecology

The Rock Pratincole is found along rivers of all sizes from the tidal zone to the highlands, and less commonly also around lakes and lagoons. The species is monogamous and loosely colonial; in Liberia, colonies of 100-300 pairs have been recorded (Gatter 1997). The home range of one group of 180 birds in Gabon comprised a 4-km stretch of a large river bed, with the next group about 50 km distant (Urban *et al.* 1986). The species is gregarious, more strongly so outside the breeding season, and feeds by hawking for insects, especially flies, often at dawn and dusk, and often high above the forest canopy. The birds usually sit on exposed rocks when water levels are low, and, when water levels rise, will sometimes use overhanging branches as perches. Most nests are on small rocks in rivers and, to a lesser extent, in lakes. One to two eggs are laid, usually in a small depression or crack. Eggs are occasionally destroyed by flooding, and predation by Nile Monitors *Varanus niloticus* has been recorded (Urban *et al.* 1986).

Network of key sites

No key sites have been identified on the basis of numerical data for either population, but some information is provided for potential key sites. Favoured stretches of the Zambezi River may be of international importance for *nuchalis*, and there are likely to be other key sites in Gabon, Cameroon and Democratic Republic of Congo. Some 500-1,000 have been recorded along the Nile in Murchison Falls National Park in Uganda (Fishpool & Evans 2001). There are potential key sites in Liberia and Ghana, but count data are limited.

Protection status of key sites

In Liberia, only Sapo National Park appears to be functioning as a protected area at present. Keta Lagoon in Ghana is partially protected. There are areas of the Zambezi River that are protected, including islands above the Victoria Falls in Zambia and Zimbabwe which come under the protection of the Livingstone and Zambezi National Parks.

Tim Dodman & Simon Delany

Ian Nason

Grey Pratincole *Glareola cinerea*

Geographical variation and distribution

The Grey Pratincole is a resident and intra-African migrant on large rivers in West and Central Africa, occurring from the upper Niger River in Mali and, further south, from Ghana eastwards to Nigeria and Cameroon, thence south and east into the Central African Republic and Democratic Republic of Congo, as far as north-western Angola. Birds from the Upper Niger River in Mali have been described as a separate subspecies, *colorata*, but this form is not widely recognised; compared to the nominate race, it has a much wider nuchal collar, and the whole breast is strongly tinged with pale rufous (Bannerman 1953).

Movements

The Grey Pratincole breeds quite widely within its overall range, mostly along the major rivers, such as the Niger, Volta and Benue in West Africa and the lower Congo and Ogooué in Central Africa, east to the Ubangui, Shari and Kasai rivers in Democratic Republic of Congo. The timing of the breeding season is variable across this range, with breeding occurring when sandbanks are exposed. Post-breeding movements can then be observed throughout the region. For example, Grey Pratincoles from breeding areas on the Ogooué River occur on migration in the Réserve de la Lopé in Gabon (Christy & Clarke 1994). Birds move north along the Logone River to Lake Chad at the end of the rains (Urban *et al.* 1986), and when rivers are in flood in Nigeria, birds move to coastal areas or to inland waters, including reservoirs (Nason 1992). Thus movements away from the breeding sites occur both to the north and to the south. Grey Pratincoles also occur on sand-flats in coastal estuaries and the lower reaches of large rivers, such as the Sanaga River in Cameroon, where counts in 1999 revealed only eight birds in February and 48 in March, increasing to 276 in April (West *et al.* 2002). This suggests a gradual build-up of birds preparing to breed. Christy & Vande Weghe (1999) considered the species to be migratory in Cameroon, The Congo and Central African Republic, partially migratory in Democratic Republic of Congo, and resident in Gabon. Records of breeding in Equateur Province of Democratic Republic of Congo in February-March and July suggest that there are two breeding periods in this area (Demey *et al.* 2000).

The form *colorata* of the upper Niger River appears to be a local migrant, moving along the river as floods recede and as water levels rise. It occurs south of Koulikoro (the southern end of its normal range) in February (Lamarche 1980). Only three birds were recorded (in August) in the area of Lac Debo and Walado Debo in the southern sector of the Inner Niger Delta during regular surveys in 1998/1999 (Van der Kamp & Diallo 1999), whilst there was a count of 200 at the Bani River in January 1999 (Dodman & Diagana 2003). This suggests that the species is more widely distributed along the rivers of the delta and surrounding areas than in the delta itself.

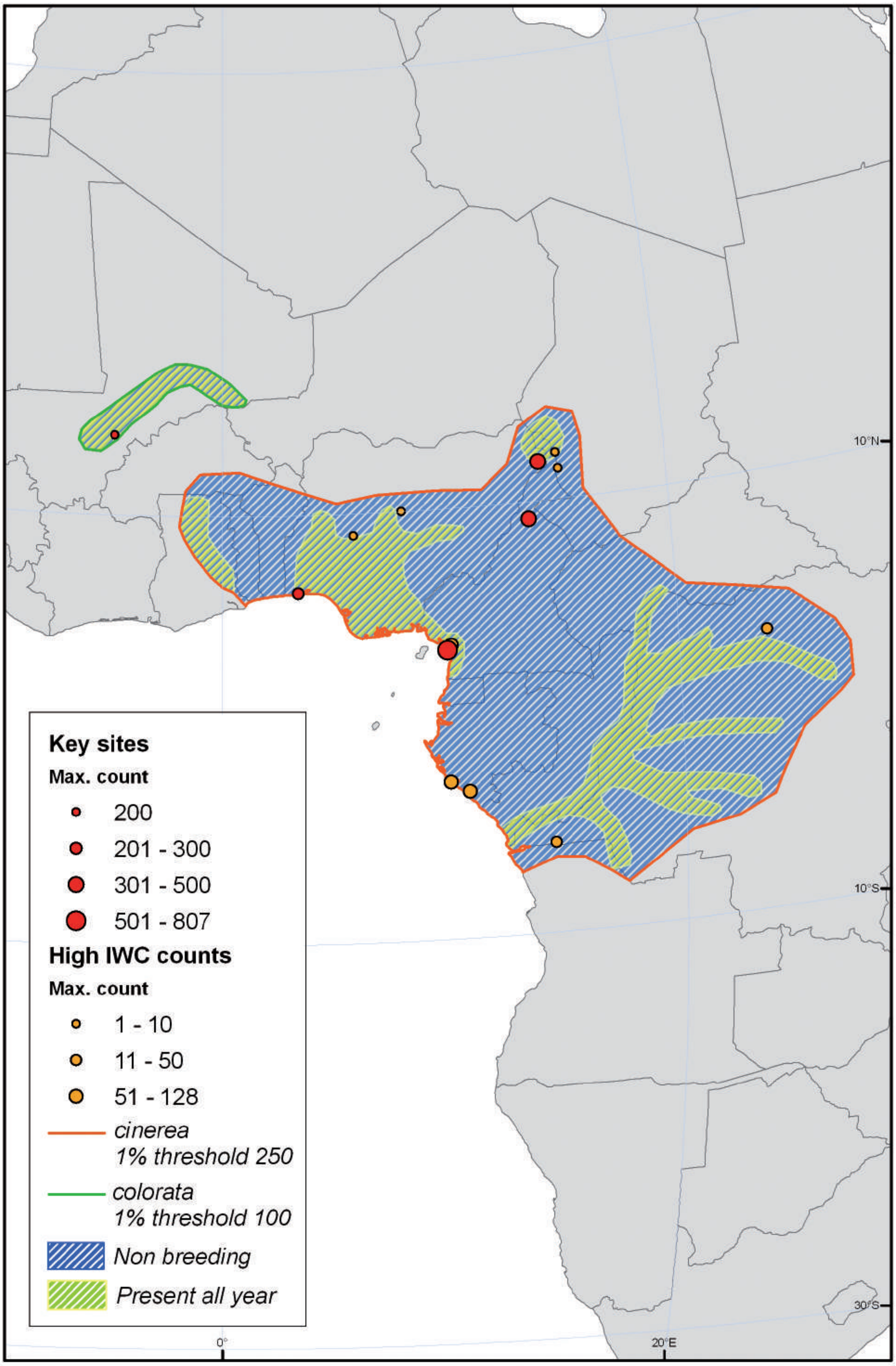
Population limits

Two populations are recognised, corresponding to the two subspecies:

1) *cinerea*, occurring in West & Central Africa, from Niger to Ghana, Cameroon, western Democratic Republic of Congo and north-western Angola;
2) *colorata*, occurring along the Upper Niger River in Mali, on sandbanks between Timbuktu (Tomboctou), Massian and Koulikoro.

Grey Pratincole

Glareola cinerea



Population size

1. *cinerea*

Population estimate	1% threshold	Population trend
B (10,000-25,000)	Provisonally 250	Unknown

Although this population occurs widely in the forest and savannah biomes in West and Central Africa from Niger and Benin to western Democratic Republic of Congo and north-western Angola, it is only locally common, and is apparently absent from many areas within this range, depending largely on the availability of broad rivers. It is rarely recorded in AfWC counts in West Africa, although coverage is limited over much of its range. The highest counts are on the Sanaga River in Cameroon, with 318 in February 1998 (West *et al.* 2002) and 807 in January-March 2007, when the total estimate for coastal Cameroon was between 800 and 1,200 (Van der Waarde 2007). There have been high counts of 500 at Lake Chad and 300 at Lagos in Nigeria (del Hoyo *et al.* 1996), and also a count of 150 on the lower Kaduna in central Nigeria, where it breeds (Ezealor 2002). Based on the available records, Dodman (2002) proposed a provisional population estimate of B, and this was adopted in *WPE3* and *WPE4*.

2. *colorata*

Population estimate	1% threshold	Population trend
A (<10,000)	Provisonally 100	Unknown

Considering the restricted range of this population and general paucity of records, especially of large flocks, Dodman (2002) proposed a provisional population estimate of A (<10,000), and thought that the actual number could well be under 5,000. This estimate was given erroneously as A/B (<25,000) in *WPE3*, but corrected to A (<10,000) in *WPE4*.

Fishpool & Evans (2001) gave an estimate of B (10,000-25,000) for the two populations combined.

Conservation Status

The Grey Pratincole is locally common in suitable habitat, but subject to human disturbance. It has not been recorded in Ghana since 1956, when the creation of Lake Volta removed much suitable habitat (Grimes 1987). Other dams in West Africa are also likely to have affected its distribution, and further dam construction poses a threat to the birds' specialised habitat. Drought conditions may increase the area of sandbanks in the main rivers, but may also reduce the number of sandy islets which offer breeding birds increased protection.

Habitat and Ecology

The Grey Pratincole favours sand bars and sandbanks in slow-flowing rivers and on lakeshores, at both inland and coastal sites. It may also be found in forested and open country and occasionally in mangroves (Urban *et al.* 1986). It is a gregarious bird and generally breeds in colonies, laying two eggs never more than 100 m from the water's edge (Bannerman 1953). It forages mainly on flying insects which it catches over water and riverbanks, lakeshores and estuaries, especially at dusk, and spends much of the day loafing on sand bars (Urban *et al.* 1986, Borrow & Demey 2001).

Network of key sites

For *cinerea*, the following key sites can be identified on the basis of existing data: Mare de Bounga and Sanaga River in Cameroon, sandbanks close to Lagos, Nigeria, and Lake Chad, Nigeria. Other key sites are likely to include the Ogooué Delta in coastal Gabon, the Niger Delta and Lower Kaduna-Middle Niger Floodplain in Nigeria, the Waza-Logone Floodplains in northern Cameroon, and some stretches of river in the Congo Basin. For *colorata*, only the Bani River in Mali can be identified as a key site on the basis of recent data, but any site supporting sizeable breeding colonies and non-breeding flocks is likely to be of importance.

Protection status of key sites

Much of the Sanaga Estuary lies within or near the Douala-Edea Wildlife Reserve. Natural areas within and around Lagos are few and far between, due to the march of urbanization, although some coastal areas remain protected, such as the Lekki Nature Reserve. Parts of Lake Chad are under some form of protection, such as Nigeria's Chad Basin National Park. The Ogooué Delta is unprotected, as is the Lower Kaduna – Middle Niger Floodplain.

Table 16. Key sites for Grey Pratincole. Sites where 1% or more of a population has been recorded

Country	Site	Lati.	Long.	Season	Max total	Year max	Source	Population(s) at site
Cameroon	Mare de Bounga (Wenu)	9.20	13.67	Non-breeding	320	1994	AfWC database	*cinerea*
Cameroon	Sanaga River	03.53	09.83	January	807	2007	van der Waarde 2007	*cinerea*
Mali	Bani River	13.63	05.63	January	200	1999	AfWC Database	*colorata*
Nigeria	Lake Chad	11.75	14.25	-	500	-	Del Hoyo *et al.* 1996	*cinerea*
Nigeria	Sandbanks nr Lagos	6.43	3.33	-	300	-	Del Hoyo *et al.*	*cinerea*

György Szimuly

Northern Lapwing

Vanellus vanellus

Geographical variation and distribution

The Northern Lapwing is a monotypic species restricted to the Palearctic region. It breeds from Britain and Ireland in the west (rarely Iceland) to Southern and Eastern Siberia in the east, and southwards from northern Fennoscandia at 70°N, decreasing to 65°N in European Russia. In Europe, the southern limit lies at about 40°N, with extensions into Spain. Further east, breeding occurs south to Turkey, north-western Iran, Kazakhstan, Mongolia and northern China (Cramp & Simmons 1983).

The winter range lies south and west of the 3°C isotherm, and the extent of the southern and western distribution is set by the relative severity of the winter weather. The wintering range includes Britain and Ireland, the Low Countries, Iberia, countries bordering the Mediterranean (including North Africa), the Middle East, South-west Asia, northern India and south-eastern China, extending into Burma, Taiwan, South Korea and Japan. Numbers reaching North Africa are annually variable, depending upon the severity of the winter in Europe (Cramp & Simmons 1983).

Movements

Northern Lapwings are resident in the south-west of the breeding range; elsewhere they are migratory, with strong weather-determined movements. Large numbers of recoveries are available from birds ringed in The Netherlands, Britain, Belgium and Sweden. Recoveries reported during the period December to February are strongly concentrated in Western and South-western Europe as well as in North-western Africa (Delany *et al.* 2006). The European population typically migrates south and west to winter along the Atlantic fringe and in countries bordering the Mediterranean. Birds displaced by severe weather usually remain in refuge areas until the onset of normal spring migration. Return migration routes are generally a reversal of autumn passage routes, although some Scandinavian and Central European breeders may return via a more easterly route. Western breeders winter along the western seaboard, Iberia and North Africa. Breeders from Finland, Hungary, the Czech Republic and Russia winter particularly in Italy and into North Africa (Imboden 1974).

Movements of the population breeding in West Asia were reported by Veen *et al.* (2005). They reported three cases of chicks ringed in South-western Siberia and recovered near the Caspian Sea in October, in western Syria in March and in western France in December. A total of 20 birds ringed in Western Europe (mostly in winter) were recovered in southwest Siberia. Most of these were thought to be South-west Siberian breeding birds which had wintered in Europe, but two, ringed as chicks in Europe, were recovered four years later probably breeding in South-west Siberia. This strongly suggests that some European born birds may subsequently breed as far away as South-west Siberia, 4,000-5,000 km to the east.

Post-nuptial migration starts in mid-summer, but the main migration period of birds in northern latitudes is mid-autumn. Consequently migration occurs in two waves, e.g. into Britain firstly in June and July and subsequently in September and October (Cramp & Simmons 1983). In Denmark, three waves of autumn migration have been identified, with birds from Northern and Eastern Europe passing through in June and July, the main wave of moulting birds (numbering 100,000-200,000) in August, and a third wave of birds which have moulted further to the east in October and November (Meltofte 1993). Southerly migration in the Middle East is perhaps slightly earlier than in Western Europe: in Israel, southerly movements span late August to the end of December, peaking between late October and late November (Shirihai 1996). In Israel, Northern Lapwings typically migrate on a broad front in small flocks (25-100), and major influxes occur during wet winters (Shirihai 1996). Adults undergo a complete post-breeding moult in late winter. Juveniles undergo a partial moult between September and December (Cramp & Simmons 1983).

In Western Europe, return migration begins in late January in southern wintering areas, later to the north. In the Middle East, spring migration commences in late January although the main passage occurs in late February and early March (Andrews 1995, Shirihai 1996). Northern Lapwings are therefore present on the southernmost wintering grounds for a little over two months between late November and late January.

Population limits

Although there are no discrete populations of the Northern Lapwing in Western Eurasia, two groups were recognised in the first two editions of *Waterbird Population Estimates*:

1) a large European population incorporating birds breeding in Europe and wintering in Western and Southern Europe, Asia Minor and North Africa;
2) a much smaller West Asian population incorporating birds breeding in Western Asia (Russia, Kazakhstan, Iran) and immediately adjacent parts of South-east Europe along the west Caspian coast, and wintering in South-west Asia.

The first of these populations was defined by its breeding range (Europe excluding the extreme south-east around the Caspian Sea), and was estimated at about seven million birds. The second population was defined by its wintering area (South-west Asia), and was thought to number less than a million birds (Rose & Scott 1994, 1997). Thorup (2006) followed this treatment, and recognised only a single population of Northern Lapwings in Europe (including Turkey). However, in their review of wader populations in Africa and Western Eurasia, Stroud *et al.* (2004) included birds breeding in eastern European Russia, Ukraine and Turkey (550,000-975,000 pairs) in their "West Asian (breeding)" population. They gave estimates of 2.8 to 4 million for the western "European" population and 1.6 - 2.9 million for the eastern "West Asian" population, and these estimates were adopted in *WPE3*. The wintering areas of the West Asian population were assumed to be in South-west Asia, but winter counts in South-west Asia can account for fewer than 25,000 birds – a tiny fraction of the numbers derived from breeding estimates. The most likely explanation for this discrepancy is that the large numbers of birds breeding in European Russia and Ukraine (and assigned to the West Asian population by Stroud *et al.* 2004) migrate south-west to winter in southern Europe and the Mediterranean basin, along with other European breeders.

As there seemed to be little justification for separating East European breeders from Central and Western European breeders, it was decided in *WPE4* to revert to the treatment adopted in *WPE1* and *WPE2*, i.e. to recognise a European breeding population and a West Asian breeding population separated by the Urals. Birds breeding in the Caspian drainage in south-eastern European Russia, Azerbaijan and Armenia were included in the West Asian population, while birds breeding in western and central Turkey were included in the European population. Growing evidence of the frequency of interchange between the populations, and of the scale at which West Asian birds winter in western Europe has led to a reappraisal of the population limits for this Atlas, and recognition of a single European and West Asian population.

Two other populations of Northern Lapwing are recognised by *Waterbird Population Estimates* in Asia: a population wintering in South Asia and a population wintering in East and South-east Asia.

Population size

1. Europe and West Asia (breeding)

Population estimate	1% threshold	Population trend
(5,500,000-9,500,000)	20,000	Decreasing

January counts from the 1990s give an estimated total of 985,000 for the European population, but the coverage of inland wintering areas was very incomplete (Stroud *et al.* 2004). A poorly known but large proportion of Northern Lapwings spends the winter away from coastal areas, often in non-wetland areas including agricultural land. This habit makes the Northern Lapwing a particularly difficult species to census because it is not tied to a restricted number of sites, unlike more coastal species. Consequently, there are few accurate national estimates of wintering populations. Trolliet & Aubry (2005) reported the results of a large-scale coordinated national census of Northern Lapwings and estimated that as many as 2.75 million birds wintered in the areas of France included in the census. The census was repeated in 2007 with more extensive coverage, and an estimated 3.5 million Lapwings were wintering in France in that year (B. Trolliet *in litt.*)

A better estimate of population size can be derived from estimates of breeding populations. National breeding estimates (largely, but not entirely from the 1990s) collated by Thorup (2006) amount to 1,500,000-2,400,000 pairs, and thus 4,500,000-7,200,000 individuals. National breeding estimates compiled by BirdLife International (2004a) give a somewhat higher estimate of 1,700,000-2,800,000 pairs. This latter estimate equates to about 5,100,000-8,400,000 individuals – the new estimate for the European breeding population adopted in *WPE4*.

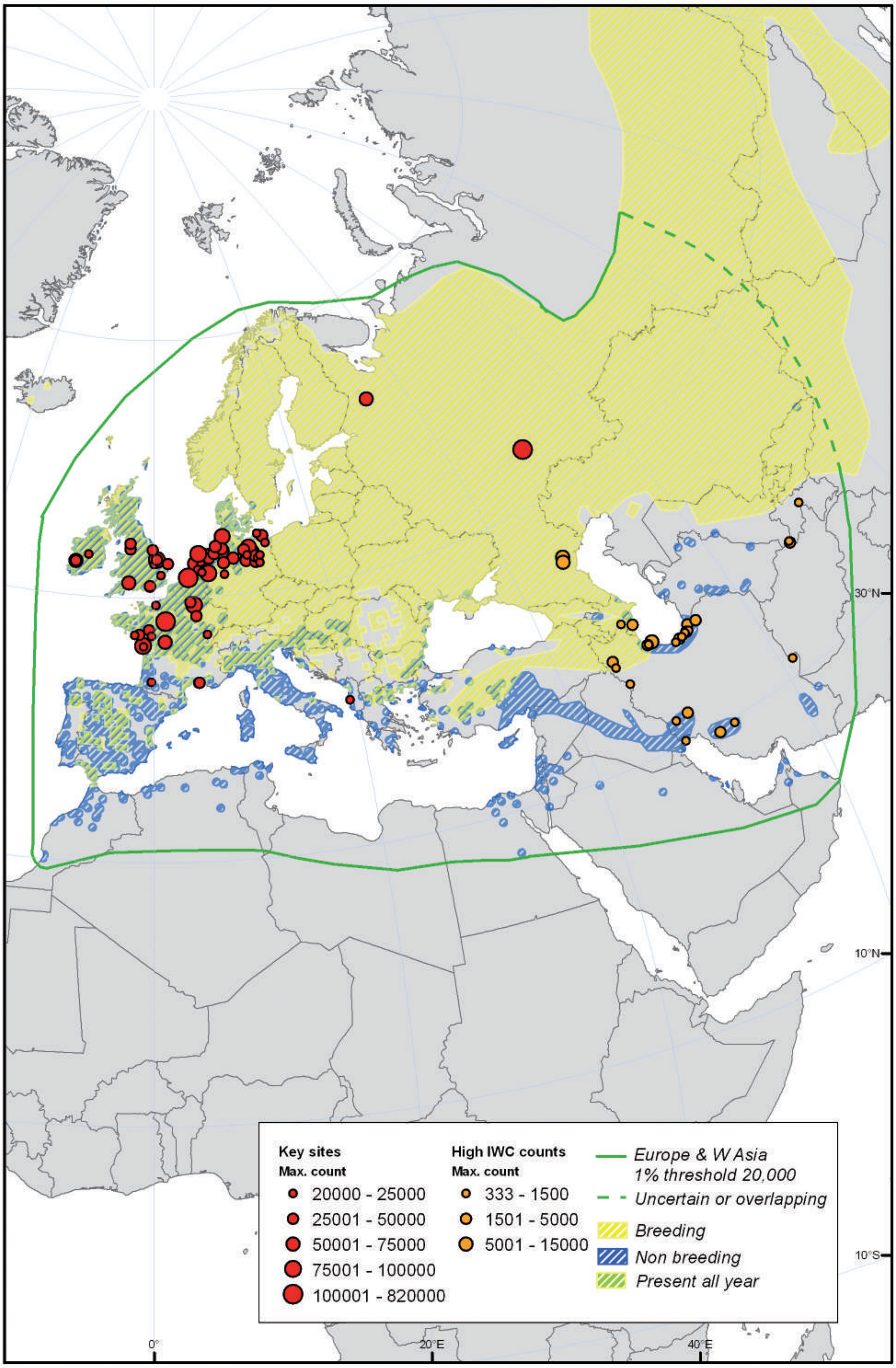
Little information is available on the size of the breeding population in Western Asia which was formerly considered to be separate. Some regional and national estimates include 13,000-35,250 pairs in south and south-east European Russia (Thorup 2006), 350-850 pairs in Armenia and 500-5,000 pairs in Azerbaijan (BirdLife International 2004a), and 500-1,000 pairs in Iran (Scott 1995). These figures equate to about 33,000-126,000 post-breeding individuals. To these should be added an unknown, but possibly large, number of birds from breeding areas in Western Siberia and the Central Asian Republics. Midwinter counts from the IWC database for countries in South-west Asia total only 21,100 birds (Stroud *et al.* 2004), but there are major gaps in coverage, especially in parts of the Caspian region where many of the birds in this population probably winter. The estimate for the new, combined European and west Asian population was derived by summing and rounding the estimates presented in WPE4.

Conservation status

There were range contractions and decreases in breeding numbers of between 20% and 50% in over half the countries of Europe between 1970 and 1990, due largely to intensification of farming (Pakkala *et al.* 1997). BirdLife International (2004a) reported recent decreases in 22 European countries, stable or fluctuating populations in nine countries, and increases only in Bulgaria, Italy, Moldova and Portugal. There was a 49% decrease in numbers breeding in England and Wales between 1987 and 1998 (Wilson *et al.* 2001). Numbers in Eastern Europe appear to be more stable

Northern Lapwing

Vanellus vanellus



than further west, but some studies have shown long-term declines there, e.g. in Estonia (Tuule *et al.* 2002). The advent of the Common Agricultural Policy in the new eastern states of the European Union will probably result in drainage of wetlands and intensification of agriculture and thus pose a major threat to breeding waders.

Recent work to establish a European population trend index for breeding birds has shown statistically significant declines for Northern Lapwings across Europe between 1978 and 1997 (van Strien *et al.* 2001). In Western Europe (U.K., The Netherlands, Denmark and western Germany), numbers fell significantly, mainly due to steep declines in the U.K. In Eastern Europe, numbers fell significantly in Finland and Latvia, but there was inadequate information on population changes in eastern Germany and Estonia (van Strien *et al.* 2001). Overall, however, there was population decline in Eastern Europe, although less steep than in Western Europe. These negative trends have been linked to intensification of European agriculture (Wilson *et al.* 2001, Beintema *et al.* 1995).

Recent increases in count totals in Britain have been related to a possible shift of birds from inland sites to the coast, perhaps in response to deteriorating habitat quality inland (Mason & Macdonald 1999), although Gillings (2003) concluded that it remains unclear whether these changes are due to redistribution, population increase or habitat shift.

Habitat and ecology

The Northern Lapwing is territorial, but can breed at high densities where suitable habitats occur. It breeds in a variety of open habitats, especially on farmland and grassland, but generally avoids steep slopes and areas of high altitude. Wet meadows and unimproved grassland provide the best breeding habitat and support the highest breeding densities. On arable farmland, the Northern Lapwing prefers fields of spring-sown crops for nesting, but young are often led to grasslands shortly after hatching. In winter, the majority is found in similar habitats, although exceptional concentrations exist in extensive shallow wetlands. Northern Lapwings are generally found in small numbers at estuarine sites, but the importance of saline habitats increases in cold weather when farmland and freshwater sites freeze. In southern parts of the wintering range, Northern Lapwings are tied to wetlands and irrigated agricultural areas, such areas being quickly vacated in periods of drought.

The Northern Lapwing is highly gregarious outside the breeding season, and is typically found in flocks of several hundred or more. Flocks of non-breeding adults or failed breeders start to build up as early as late May, to be joined by the first fledged juveniles and breeding adults shortly afterwards. Flocks build up in the wintering areas throughout the autumn, but remain mobile and quickly leave at the onset of freezing weather. In particularly cold winters there is a complete exodus from some wintering grounds.

Network of key sites

An adequate network of key sites for the Northern Lapwing should include coastal wetlands and inland areas, including both wetlands and terrestrial sites. The network should include sites of crucial importance on account of their sporadic use as cold weather refuges, in addition to sites used regularly in more "normal" winters. At present, large parts of the Northern Lapwing's winter range are not counted systematically, particularly inland areas, and especially non-wetland sites. For example, Cayford & Waters (1996) estimated that 85% of Britain's wintering lapwings occurred inland and as such were not covered by conventional monitoring programmes. Also the use of five-year peak means in the assessment of site importance may underestimate the importance of cold weather refuges because for the majority of the five-year period such sites may hold no or very few lapwings but remain of crucial long-term importance. In these respects, the existing key sites network for Northern Lapwing is both poorly known and inadequate.

In the main wintering areas in Western Europe, 46 sites had peak counts in excess of 20,000 during the period 1996-2004 (22 in Germany, 12 in France, eight in U.K., two in The Netherlands and two in Ireland), although of these, only six had mean counts in excess of 20,000 birds: Etangs de la Brenne in France, the Wadden Sea and Rhine-Maas-Schelde Delta in The Netherlands, and the Humber Estuary, Somerset Levels and The Wash in U.K. Also listed are one Departement in France (Eure et Loir) and seven Provincies in the Netherlands – administrative districts whose totals give an idea of the importance of some inland areas for this species. Only one site in South-east Europe has held over 20,000 birds in winter, the Karavasta wetland complex in Albania. The origins of these birds are unknown, but it is likely that many come from breeding areas in Western Asia. The Wadden Sea is the most consistently important site overall, and more than 100,000 and possibly as many as 350,000 Northern Lapwings stage and moult between September and November (Meltofte *et al.* 1994).

Two sites in European Russia have been identified as key staging areas during the autumn migration: Zaoenezh'ye in Karelia, where up to 70,000 were recorded on passage in the 1970s, and Suskanski Nature Reserve in south-east European Russia, where an estimated 180,000 were recorded on passage in 1996 (Heath & Evans 2000).

No key sites have been identified specifically for the formerly separate West Asian breeding population, and only one site in South-west Asia is known to have held over 10,000 lapwings in winter, namely Fereidoon Kenar Damgah in Iran, where a maximum count of 16,000 has been recorded.

Protection status of key sites

Most of the wetlands holding internationally important numbers of Northern Lapwings in Western Europe are at least partly protected within nationally protected areas, and many have been designated as Ramsar sites, Special Protection Areas or Special Areas for Conservation. Karavasta Lagoon (20,000 ha) in Albania has been designated as a Ramsar site and is partly protected within the Divjaka National Park. Zaonezh'ye in north-western Russia is partly protected in a "Zakaznik" of 50,000 ha, while the Suskanski Nature Reserve (40,500 ha) in south-eastern European Russia protects a large area of shallow water along the edge of Kuybyshev reservoir (Heath & Evans 2000).

Key sites in North-eastern Germany are only partially protected and the situation is typical of much of Western Europe. Mudflats used for roosting and bathing during the day are often protected, but feeding areas on surrounding agricultural field are not protected. The same holds true for important terrestrial daytime roosts. Such sites have been intensively disturbed by road construction and windfarm installations (several thousand turbines) during the last decade and several sites were given up in recent years (J. Kube *in litt.*).

Table 17. Key sites for Northern Lapwing. Sites where 1% or more of a population has been recorded

Country	Site	Lat.	Long.	Season	Max total	Year max	Average total	Basis for average	Source	Population(s) at site
Albania	Karavasta Complex	40.92	19.48	Non-breeding	21158	1997	6982	1996-01 (5)	IWC database	Europe
France	Barthes de l'Adour	43.60	-0.30	Migration	20000	2003			R Mahéo, LPO *et al.* 2005	Europe
France	Basses Vallées Angevines	47.56	-0.58	Migration	35000	2003			R Mahéo, LPO *et al.* 2005	Europe
France	Camargue	43.50	4.67	Non-breeding	43625	1994	296	1999-03 (5)	R Mahéo, LPO *et al.* 2005	Europe
France	Confluent des vallées de la Meuse et de la Chiers	49.63	4.13	Migration	25000	2000			R Mahéo, LPO *et al.* 2005	Europe
France	Estuaire Seine	49.44	0.19	Non-breeding	21348	1998	1323	1999-04 (5)	R Mahéo, LPO *et al.* 2005	Europe
France	Etangs dans region Argenton-Château	47.09	-0.31	Non-breeding	23700	2004	10775	1999-04 (5)	R Mahéo, LPO *et al.* 2005	Europe
France	Etangs de la Brenne	46.66	1.18	Non-breeding	71500	2001	20566	1999-04 (5)	R Mahéo, LPO *et al.* 2005	Europe
France	Eure et Loir Departement	48.20	1.25	January	817800	2007			B. Trolliet *in litt.*	Europe
France	Lac du Der-Chantecoq et étangs latéraux	48.55	4.70	Migration	30000	1997			WBDB	Europe
France	Loire Amont	47.20	-1.65	Non-breeding	29500	2000	11877	1999-04 (5)	R Mahéo, LPO *et al.* 2005	Europe
France	Marais poitevin et baie de l'Aiguillon	46.37	-1.20	Non-breeding	40550	1998	6060	1999-04 (5)	R Mahéo, LPO *et al.* 2005	Europe
France	Sud-Loire	47.17	-2.13	Non-breeding	21360	1996	4931	1999-04 (5)	R Mahéo, LPO *et al.* 2005	Europe
France	Vallée de la Saône de Corre à Broye	47.12	5.77	Migration	20000	1999			R Mahéo, LPO *et al.* 2005	Europe
Germany	Butjadingen	53.55	8.33	Autumn	28493				Melter & Schreiber 2000	Europe
Germany	Drömling	52.47	11.12	Spring	46300	1995			Seelig *et al.* 1996	Europe
Germany	Dümmer	52.50	8.33	Autumn	28748	1995			Melter & Schreiber2000	Europe
Germany	Elbe valley of Mecklenburg	53.32	11.02	Autumn	45000				BfN 2008	Europe
Germany	Fiener Bruch	52.32	12.22	Autumn	40000				ABBO 2003	Europe
Germany	Greifswalder Bodden	54.22	13.52	Spring & Autumn	36000	2000	20000	1994-04 (5)	J. Kube *in litt.*	Europe
Germany	Havelländisches Luch	52.58	12.54	Spring	20000				T. Ryslavy *in litt.*	Europe
Germany	Hellwegbörde	51.60	8.32	Autumn	>20000	2001			A .Hegemann *in litt.*	Europe
Germany	Jadebusen, inland	53.38	8.22	Autumn	58025				Melter & Schreiber 2000	Europe
Germany	Lakes Putzar & Galenbeck And surrounding lowlands	53.65	13.75	Spring	>21000	1999			Müller 2001	Europe
Germany	Landgraben & Dumme Lowlands	52.90	11.30	Autumn	21450				Melter & Schreiber 2000	Europe
Germany	Lewitz	53.47	11.63	Spring & Autumn	70000				Scheller *et al.* 2002	Europe
Germany	Lower Aller lowlands	52.77	9.57	Autumn	35000				Melter & Schreiber	Europe
Germany	Lower Elbe valley, Brandenburg	53.02	11.65	Spring	77000				ABBO 2003	Europe
Germany	Lower Havel & Dosse lowlands	52.75	12.27	Spring	>10000				Dornbusch, Fischer & Ryslavy *in litt*	Europe
Germany	Lower Rhine	51.77	6.40	Non-breeding	100000	1997			WBDB 2000	Europe
Germany	Plane-Niederung & Belziger Landschaftswiesen	52.21	12.69	Spring	>20000				T. Ryslavy *in litt*	Europe
Germany	Rheiderland	53.23	7.32	Autumn	>40000				Melter & Schreiber 2000	Europe
Germany	Rhin-Havelluch	52.79	12.87	Spring	>20000				T. Ryslavy *in litt*	Europe
Germany	Wadden Sea - Lower Saxony	54.00	8.00	Autumn	26640	2001	12714	1997-01 (5)	J . Blew, CWSS, 2005	Europe

Country	Site	Lat.	Long.	Season	Max total	Year max	Average total	Basis for average	Source	Population(s) at site
Germany	Wadden Sea - Schleswig-Holstein	54.50	8.50	Autumn	62700	1994	16773	1997-01 (5)	J . Blew, CWSS, 2005	Europe
Germany	Western Pomerania coast	54.43	12.90	Autumn	>20000				H.W. Nehls *in litt*	Europe
Ireland	Shannon & Fergus Estuary	52.60	-9.50	Non -breeding	52973	1995	12799	1997-01 (5)	IWC database	Europe
Ireland	Shannon Callows	53.17	-8.00	Non-breeding	23409	2000	11158	1998-04 (5)	BirdWatch Ireland 2005	Europe
Netherlands	Drenthe Province	52.90	6.62	Autumn	26929	2003			SOVON, The Netherlands, 2005	Europe
Netherlands	Flevoland Province	52.52	5.62	Autumn	22909	2003			SOVON, The Netherlands, 2005	Europe
Netherlands	Friesland Province	53.10	5.90	Autumn	84797	2003			SOVON, The Netherlands, 2005	Europe
Netherlands	Gelderland Province	52.10	5.92	Autumn	22181	2003			SOVON, The Netherlands, 2005	Europe
Netherlands	Groningen Province	53.22	6.73	Autumn	30971	2003			SOVON, The Netherlands, 2005	Europe
Netherlands	Noord Holland Province	52.58	4.88	Autumn	61585	2003			SOVON, The Netherlands, 2005	Europe
Netherlands	Rhine-Maas-Schelde Delta	51.50	4.00	Winter	110712	2000	52582	1999-03 (5)	RWS WD RIKZ 2005	Europe
Netherlands	Utrecht Province	52.10	5.22	Autumn	20143	2003			SOVON, The Netherlands, 2005	Europe
Netherlands	Wadden Sea	53.30	5.38	Winter	80044	2000	35622	1999-03 (5)	SOVON, The Netherlands, 2005	Europe
Russia	Suskanski Nature Reserve	53.75	49.25	Migration	180000	1996			WBDB	Europe
Russia	Zaonezh'ye	62.22	34.00	Migration	70000	1976			WBDB	Europe
U.K.	Arun Valley	50.90	-0.53	Non-breeding	29863	1995	1890	1997-02 (5)	IWC database	Europe
U.K.	Blackwater Estuary	51.72	0.80	Winter	20309	1999-03	11844	1999-03 (5)	BTO, UK, 2005	Europe
U.K.	Breydon Water & Berney Marshes	52.59	1.66	Winter	20500	1999-03	17860	1999-03 (5)	BTO, UK, 2005	Europe
U.K.	Humber Estuary	53.67	-0.17	Winter	39865	1999-03	27297	1999-03 (5)	BTO, UK, 2005	Europe
U.K.	Morecambe Bay	54.12	-2.93	Winter	20750	1999-03	16595	1999-03 (5)	BTO, UK, 2005	Europe
U.K	Nene Washes	52.58	-0.02	Winter	21016	1999-03	9859	1999-03 (5)	BTO, UK, 2005	Europe
U.K.	Somerset Levels	51.15	-2.98	Winter	50328	1999-03	32115	1999-03 (5)	BTO, UK, 2005	Europe
U.K.	The Wash	52.93	0.30	Winter	86129	1999-03	46775	1999-03 (5)	BTO, UK, 2005	Europe

Simon Gillings, Andy Wilson & Simon Delany

Tim Dodman

Long-toed Lapwing

Vanellus crassirostris

Geographical variation and distribution

The Long-toed Lapwing has a very patchy distribution from Lake Chad and the Sudd in Africa's Sahel belt south through Central and Eastern Africa to Angola, Botswana and KwaZulu-Natal in South Africa. Two subspecies are recognised: the nominate form in the northern part of the range and *leucopterus* in the south. The form *leucopterus* differs in having white secondaries and all but three outer primaries, as opposed to black in the nominate, whilst its wing is slightly shorter and tarsus longer (Urban *et al.* 1986, Hayman *et al.* 1986). Birds in southern Tanzania, Democratic Republic of Congo and northern Malawi have intermediate coloration in the wing; at one time these birds were assigned to the race *hybrida* (Urban *et al.* 1986).

The patchy distribution is partly attributable to its specialised habitat of marshlands with floating vegetation, although there are apparently suitable areas within its range where it is absent. In West Africa, it is largely restricted to the immediate vicinity of Lake Chad and the Chari-Logone Floodplains. However, there are also records from Pandam in central Nigeria (Elgood *et al.* 1994). It is common in southern Sudan, where it is confined to larger permanent water bodies with floating vegetation (Nikolaus 1987), and also occurs in extreme western Ethiopia. From here, the nominate form extends south through eastern Democratic Republic of Congo, Uganda and western Kenya into north-western Tanzania, Rwanda and Burundi. In Kenya, 85% of the range lies within areas with over 500 mm of rainfall (Lewis & Pomeroy 1989). There is an apparently isolated population of the form *leucopterus* in western Angola, where breeding has been recorded in Quiçama National Park (Dean 2000). In Southern Africa, *leucopterus* typically occurs in large wetland systems from eastern Angola, northern Botswana and the Caprivi Strip in Namibia along the Zambezi and through much of Zambia to Malawi. In the extreme south of its range, there are occasional records from KwaZulu-Natal, South Africa, and southern Mozambique (Ward & Herremans 1997, Parker 1999).

Movements

Long-toed Lapwings are largely sedentary, residing in favoured wetland habitats. However, they are also partial intra-African migrants, with evidence of fairly local migration, especially during periods of peak flooding in their favoured wetlands. In some areas, birds move when their wetland habitat dries up. In Rwanda's Akagera National Park, Long-toed Lapwings have been noted moving from permanent wetlands to flooded grassland as the grassland begins to dry out, while in Upemba National Park in south-eastern Democratic Republic of Congo, the species is only a migrant (Urban *et al.* 1986). It is apparently resident in Kenya, despite records of colonisation of new areas (Lewis & Pomeroy 1989). In Tanzania, some birds visit the coastal lowlands during periods of peak flooding in western wetlands, when the birds would not be breeding (Baker 1996). In northern Botswana, Long-toed Lapwings concentrate along permanent rivers in the dry season, and move out into ephemeral wetlands in the wet season (Ward & Herremans 1997).

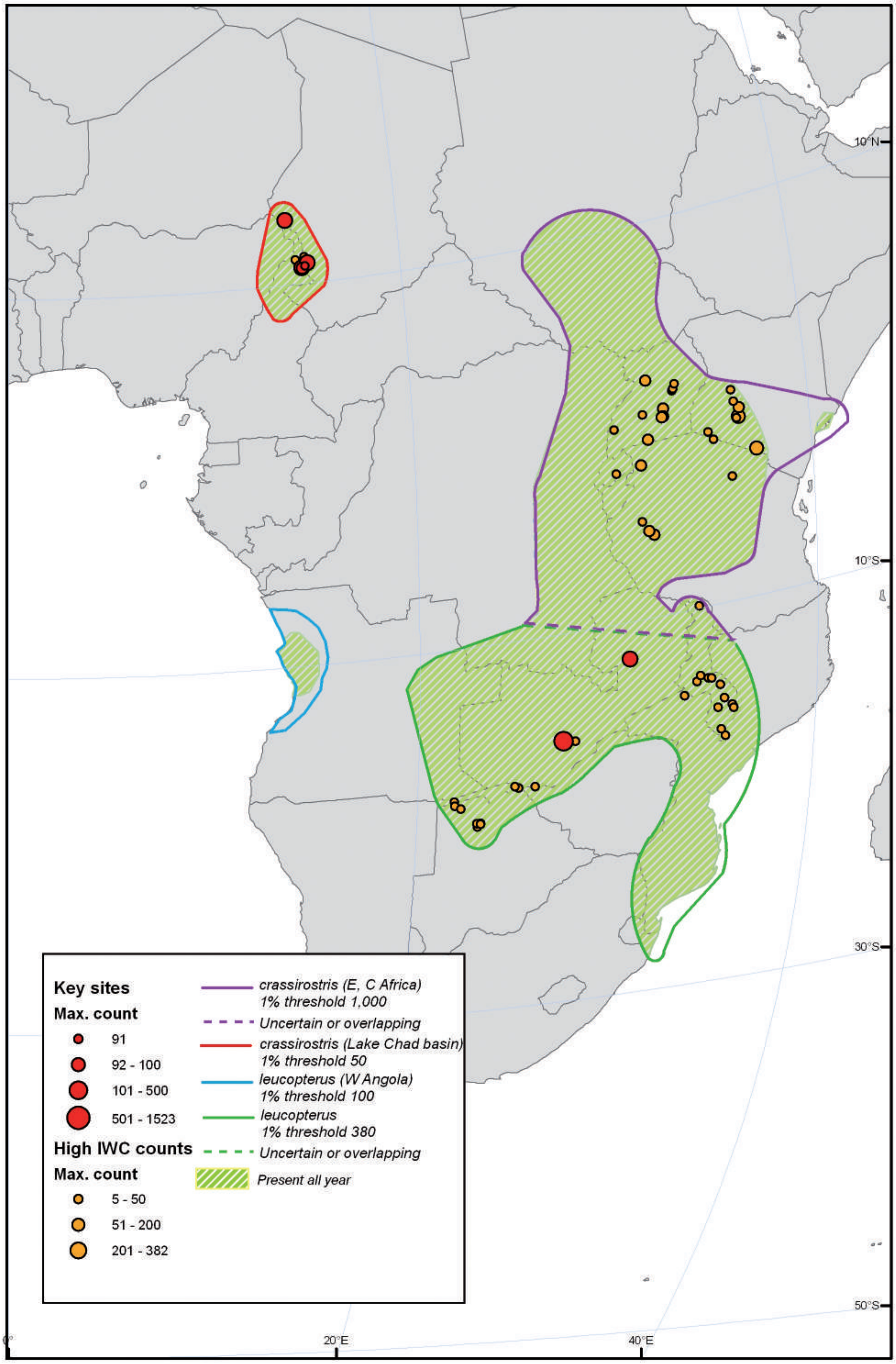
Population limits

Four populations are recognised:

1) *crassirostris*, Eastern & Central Africa: occurring in the northern part of the range from southern Sudan to northern Tanzania, northern Zambia and northern Malawi, including an apparently isolated sub-population at the Tana River in eastern Kenya;
2) *crassirostris*, Lake Chad Basin: occurring in the Lake Chad Basin and possibly also central Nigeria, where there have been isolated records;
3) *leucopterus*, Western Angola: confined to the coastal plains of Angola;
4) *leucopterus*, occurring in the southern part of the range,

Long-toed Lapwing

Vanellus crassirostris



from southern Democratic Republic of Congo and Zambia to South Africa.

The dividing line between the Eastern and Central African population of *crassirostris* and *leucopterus* is poorly defined as there is considerable intergradation between the two subspecies in southern Tanzania, south-eastern Democratic Republic of Congo and northern Malawi (Urban *et al.* 1986).

The birds of the form *leucopterus* occurring in western Angola were erroneously treated as part of the Eastern and Central African population of *crassirostris* in the first three editions of *Waterbird Population Estimates*, but are geographically isolated from all other populations, and were considered to merit treatment as a separate population of *leucopterus* in *WPE4.*

Population size

1. *crassirostris* Eastern & Central Africa

Population estimate	1% threshold	Population trend
C (25,000-100,000)	Provisionally 1,000	Unknown

There are presumably substantial numbers of Long-toed Lapwings in the Sudd swamps in southern Sudan. A total of 796 was recorded in East Africa during the AfWC in January 1995, including 556 in Tanzania (Dodman & Taylor 1995), while 360 were recorded in January 1998, including 269 in Uganda (Dodman *et al.* 1999). Dodman (2002) considered that there could well be tens of thousands (possibly 30,000) in southern Sudan, over 10,000 in Uganda, around 5,000-10,000 in Kenya, over 10,000 in Tanzania and over 10,000 in Democratic Republic of Congo, Rwanda and Burundi. He proposed a population estimate of C (25,000-100,000), and this was adopted in *WPE3* and *WPE4*.

2. *crassirostris* Lake Chad Basin

Population estimate	1% threshold	Population trend
<5,000	50	Unknown

Scholte *et al.* (1999) reported this species as uncommon in northern Cameroon during the years 1994-1997, with records from August to April. Their highest counts were 40 in January 1996 and 15 pairs in February 1995. According to Elgood *et al.* (1994), it is not uncommon on the southern shores of Lake Chad in Nigeria. In January 2001, 314 were recorded during the AfWC in Cameroon and Chad (Dodman & Diagana 2003). Presuming the population to be rather small, Dodman (2002) proposed a provisional population estimate of <5,000, and this was adopted in *WPE3* and *WPE4*.

3. *leucopterus* Western Angola

Population estimate	1% threshold	Population trend
A (<10,000)	Provisionally 1,000	Unknown

Little information is available for this recently recognised population centred on the Cuanza River. Considering its very restricted range and the limited extent of suitable habitat, Dodman (in press 2009) proposed an estimate of A (<10,000), and this was adopted in *WPE4*.

4. *leucopterus*

Population estimate	1% threshold	Population trend
25,000-50,000	380	Unknown

The stronghold of this population is in Zambia, where it is a common bird of swamps, marshes, dambos and other wetlands; there are several counts of over 1,000 individuals from the Kafue Flats (AfWC database). The average abundance along permanent rivers in northern Botswana was 1 bird per 12.4 km in the dry season (Ward & Herremans 1997). Dodman (2002) considered the population to be smaller than the Eastern African population, and proposed a provisional population estimate of 25,000-50,000. There are likely to be 10,000-20,000 in Zambia, fewer than 5,000 in Angola, fewer than 5,000 in Botswana and fewer than 10,000 in Zimbabwe, South Africa, Mozambique, Malawi and Namibia. However, these figures are very provisional estimates. Tree (*in litt.* 2008) considers there to be 5,000-10,000 in Botswana, Zimbabwe and Mozambique (with fewer than 200 in Zimbabwe), whilst the population in central Mozambique probably does not exceed 300 birds (Parker 2005).

Conservation status

Across most of its range, the Long-toed Lapwing does not currently appear to face significant threats, especially where it inhabits large swamp and floodplain complexes, such as the Kafue Flats in Zambia and the Sudd Swamps in Sudan. Range extensions in Kenya in recent decades and its occurrence at some artificial wetlands indicate that it is able to colonise new areas. However, expansion eastwards in Kenya may be due to drainage of western swamps (Zimmerman *et al.* 1996). The status of the small Lake Chad Basin population is not well known, and there is a need to identify breeding areas. The species expanded its range into Lake Kariba, Zambezi Valley, when the dam was invaded by Kariba Weed in the years following inundation, but numbers subsequently declined with the introduction of biological control of the weed (Ward & Herremans 1997). South of the Zambezi River, Ward & Herremans (1997) consider that its conservation status requires monitoring because of human and livestock pressure on its riverine habitat.

Habitat and ecology

The preferred habitat is floating vegetation in standing water in lakes, ponds and floodplains. With its long toes to distribute its weight, the Long-toed Lapwing runs on floating vegetation with the agility of a jacana. The main plant species used are water-lilies *Nymphaea*, although it also occurs on Kariba Weed *Salvinia molesta*, *Typha latifolia, Ludwigia, Cyperus, Pistia, Leersia, Oryza, Panicum repens, Vossia, Wolffia* and *Azolla*. In Sudan, clumps of “sudd” and other rotting vegetation are used. It also frequents the muddy edges of wetlands, inundated grasslands and flooded rice fields (Urban *et al.* 1986, del Hoyo *et al.* 1996).

It occurs in pairs or in small parties, with concentrations typically of a few tens of birds building up in the dry season as suitable habitat becomes scarce. It is monogamous and strongly territorial. The nests vary with the site: on floating aquatic plants, the birds build up a low platform, while on dry ground, they may make a scrape in soil or mud which they line with plant material. Nests are generally within 100 m of the water’s edge. The clutch size is two to four; the incubation period is about 30 days, and the young take about two months to fledge.

Network of key sites

No key sites can be identified in Eastern and Central Africa on the basis of the high provisional 1% threshold of 1,000. In Eastern Africa, one of the most important sites is the Sudd Swamps in southern Sudan, especially the area of Bahr-el-Ghazal. Other important sites include the larger wetlands of Uganda, such as parts of Lake Victoria, and the extensive wetlands of western Tanzania, such as Malagarasi-Moyowosi.

Key sites have been identified for the relatively small populations in the Lake Chad Basin, Katoa (south-west) on the Logone River in Chad and the area around Lake Maga, just across the border in Cameroon. The latter area falls within Lake Maga IBA. Quiçama National Park in north-western Angola is likely to be a key site for the small western Angolan population.

In Southern Africa, the most important sites are probably the Kafue Flats and Bangweulu Swamps in Zambia. Counts at both these sites surpass the current 1% threshold of 380. Other key sites are likely to include wetlands of western Zambia, the Okavango Delta and Chobe-Linyati area in Botswana, and the Eastern Caprivi wetlands in Namibia.

Protection status of key sites

Although some of the important sites are IBAs, the only ones with protected or partially-protected status are the Kafue Flats (Lochinvar and Blue Lagoon National Parks) in Zambia, Okavango Delta and Chobe-Linyati area in Botswana, and Quiçama National Park in Angola.

Table 18. Key sites for Long-toed Lapwing. Sites where 1% or more of a population has been recorded

Country	Site	Lat.	Long.	Season	Max total	Year max	Average total	Basis for average	Source	Population(s) at site
Cameroon	Lac Maga	10.80	14.98	January	218	2008			B Trolliet in litt.	*crassirostris* - L Chad Basin
Chad	Katoa Sud Ouest	10.90	15.13	January	91	2001			AfWC database	*crassirostris* - L Chad Basin
Chad	Lake Chad	13.28	14.26	January	429	2008			B Trolliet in litt.	*crassirostris* - L Chad Basin
Chad	Plaines du Logone	11.00	15.20	January	136	2008			B Trolliet in litt.	*crassirostris* - L Chad Basin
Zambia	Chikuni (Bangweulu Floodplain) Lukulu river	-11.92	30.42	Non-breeding	500	1991	142	1991-95 (5)	AfWC database	*leucopterus*
Zambia	Kafue Flats	-15.67	27.17	Non-breeding	1523	1994	901	1998-01 (3)	AfWC database	*leucopterus*

Tim Dodman & Les Underhill

Mark Anderson

Blacksmith Lapwing

Vanellus armatus

Geographical variation and distribution

The Blacksmith Lapwing (or Blacksmith Plover) is monotypic, with a fairly continuous distribution from South Africa north to northern Angola, southern Democratic Republic of Congo and Malawi, whilst it also occurs northwards through Tanzania to central Kenya. The entire population is considered as a single unit, and there are no obvious boundaries for which sub-division may be considered. The Blacksmith Lapwing and Spur-winged Lapwing *V. spinosus* are predominantly allopatric, with partially overlapping ranges in Kenya (Lewis & Pomeroy 1989) and northern Tanzania.

Movements

The Blacksmith Lapwing is a resident and partial migrant and nomad, which has expanded its range in some areas. It is largely resident across most of its range, but often displays local movements, for example in response to fluctuating water levels and dispersal after breeding. In the Democratic Republic of Congo, it makes considerable movements after the breeding season of May-October (Urban *et al.* 1986). Tree (1998) describes three types of movements in south-central Africa, especially Zimbabwe, with breeders becoming nomadic after breeding, influxes of birds from arid areas to the south and west during drought years, and influxes of birds from further north during rains, some on passage. In years of high rainfall, birds move southwards out of Zambia through Zimbabwe, whilst frequent but irregular movements in and out of Botswana have also been noted (Ward *et al.* 1997). The trigger for movement out of Zambia is likely to be the inundation of floodplain habitat (Tree 1969). Data from transects in Moremi Game Reserve in the Okavango Delta of Botswana indicated local movements as pans dried out, with numbers in January counts being some 20-30 times higher than in July counts (Tyler 2001). Count data from South Africa show peak numbers in the austral summer (middle of the dry season) in most regions (Taylor *et al.* 1999). Ringing studies in Southern Africa suggest that this species is also partially nomadic, as birds are seldom faithful to a particular site for more than a year (Ward *et al.* 1997, Underhill *et al.* 1999). Nomadic movements in Southern Africa probably occur over a broad front, as some birds have turned up as vagrants on islands south and east of Africa, including Europa (in the southern Mozambique Channel), Possession Island (in the Crozet Archipelago) and Prince Edward Island (Cooper & Underhill 2002).

In the northern part of its range, it is largely resident in the central highlands of Kenya above 1,000 m, although wanderers do occur, for example in the eastern lowlands (Lewis & Pomeroy 1989).

Population limits

Only one population is recognised, the entire population of the species.

Population size

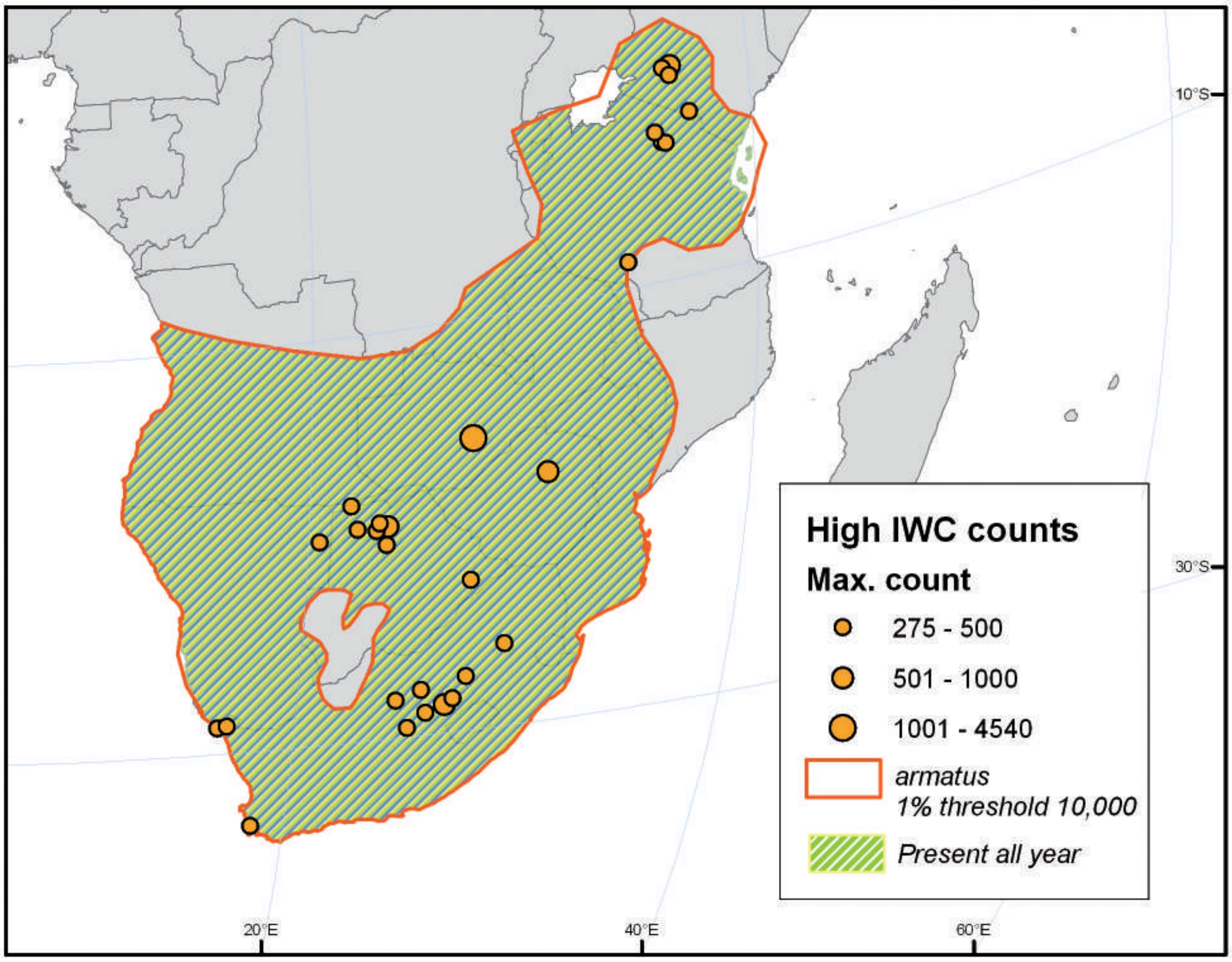
1. Southern & Eastern Africa (entire population of the species)

Population estimate	1% threshold	Population trend
D (100,000-1,000,000)	Provisionally 10,000	Increasing

The Blacksmith Lapwing is a regular feature of a wide variety of wetlands, both large and small, throughout Southern and Eastern Africa. It is widely recorded in AfWC counts from Kenya, Tanzania and Southern Africa. In January 2001, the total counted was 15,787, including national totals of 2,679 in Botswana, 6,585 in South Africa and 4,633 in Zambia (Dodman & Diagana 2003), although coverage was poor in East Africa. Nation-wide counts in Tanzania in January 1995 yielded a total of 2,965, and on the basis of these data,

Blacksmith Lapwing

Vanellus armatus



Baker (1996) produced a national estimate of 5,000-10,000. However, due to its widespread nature and adaptability, the Blacksmith Lapwing is widely under-recorded in AfWC counts. Fishpool & Evans (2001) gave a population estimate of D (100,000-1,000,000) for the African IBA Programme, and this was adopted by Dodman (2002), *WPE3* and *WPE4*.

Conservation status

The Blacksmith Lapwing is increasing in Southern Africa, where it readily exploits artificial wetlands such as farm dams and irrigation schemes (Ward *et al.* 1997). Across its range, it can also be found in urban areas, such as lawns and golf courses, and at temporary pools, and seems to be one of the more adaptable of the *Vanellus* plovers. Baker (1996) considered that counts in Tanzania in 1995 might indicate a population increase and range extension in the north-west.

Habitat and ecology

The Blacksmith Lapwing is a ubiquitous denizen of a wide range of moist habitats, occurring in most types of wetlands and grasslands, whilst it readily exploits artificial impoundments, and forages on lawns, airfields and cultivated lands. It also forages on muddy ground around the margins of wetlands or on dry ground nearby, and in ploughed land and where cattle grazing and dung are abundant (Urban *et al.* 1986). In Kenya, it is common on muddy shores and short grassy areas near water in the Rift Valley highlands and adjacent eastern plateau, invariably above 1,000 m altitude (Lewis & Pomeroy 1989). Its diet consists of both terrestrial and aquatic invertebrates. It usually occurs singly or in pairs or small groups, but larger groups may form outside the breeding season, and it may congregate at night-time roosts.

Breeding has been reported at all times of the year in Southern Africa, but mostly from July to November (Ward *et al.* 1997); breeding in Zambia occurs between May and October (Benson *et al.* 1971). It is monogamous and territorial, and its nest is usually no more than a shallow scrape in the ground. On average, three eggs are laid, with two broods per season (Urban *et al.* 1986).

Network of key sites

The Blacksmith Lapwing is widely dispersed throughout its range, occurring at a large number of wetland sites of varying sizes. Quite large concentrations can occur at permanent wetlands during the dry season, but it is doubtful if numbers ever exceed the provisional 1% threshold of 10,000, except perhaps in some large wetland complexes such as the Kafue Flats in Zambia.

Protection status of key sites

This lapwing occurs in a wide range of protected areas throughout its range.

Vincent Parker & Tim Dodman

Niels Gilissen

Spur-winged Lapwing
Vanellus spinosus

Geographical variation and distribution

The Spur-winged Lapwing is a monotypic species, occurring principally in the Sahel belt of Africa from Senegal and Mauritania in the west to coastal Sudan, Somalia and Kenya in the east. It also occurs northwards along the Nile to Egypt and into South-east Europe, Asia Minor and the Near East as far east as Iraq and extreme south-western Iran. Its usual southern limit is the Albertine Rift, but there are several records from further south, for instance in Malawi. Small numbers breed in Yemen and perhaps also along the Red Sea coast of Saudi Arabia. Hayman *et al.* (1986) noted that birds in Africa may be slightly shorter in the wing and tarsus than birds in the Mediterranean.

Movements

In Africa, the Spur-winged Lapwing is mainly sedentary, but it is also a partial and local intra-African migrant, moving largely in response to flooding and seeking out drier regions when suitable habitat becomes overgrown. In Mauritania and Chad, some birds move north into drier country during the rainy season (Urban *et al.* 1986), while in Mali, birds move out of the Inner Niger Delta when it becomes inundated (Van der Kamp & Diallo 1999). It also moves away from flooding rivers in northern Togo during the rains (Cheke & Walsh 1996), whilst it is resident along all types of lake and river shores in northern Nigeria (Elgood *et al.* 1994). In Kenya, there is evidence of wandering during the non-breeding season (Lewis & Pomeroy 1989), whilst it is resident throughout Ethiopia (Urban & Brown 1971). There is some evidence of range expansion in Tanzania, with records from the 1990s in areas where it was previously unrecorded, including two breeding records from Nyumba ya Mungu in December 1991 and 30 km north of Dar es Salaam in September 1992 (Baker 1996). Records further south in Malawi and Zambia suggest that there is a continuing range expansion southwards. Such movements may be partially nomadic, and indicate that this species is perhaps not as sedentary as previously thought.

Birds breeding north of 35ºN (i.e. in Greece, Turkey and Syria) are migratory, presumably wintering in the Levant and along the Nile, but possibly also in Iraq. Flocks along the Nile around Khartoum in Sudan during the northern winter are most probably of Palearctic origin (Nikolaus 1987). Birds recorded from parts of the Red Sea coast are possibly migrants on autumn passage from the Middle East to Africa via the Gulf of Aqaba and the Sinai coast (Urban *et al.* 1986). Records from north-western Somalia (Ash & Miskell 1998) may also relate to passage migrants. However, the birds breeding in Mesopotamian Iraq appear to be mainly sedentary (Mudhafar Salim *in litt.*).

Population limits

Two populations are recognised:
1) birds breeding in sub-Saharan Africa, from West Africa to the Horn of Africa and south-western Arabia, and south to Tanzania;
2) birds breeding in South-east Europe, Turkey, the Middle East and Egypt.

Population size

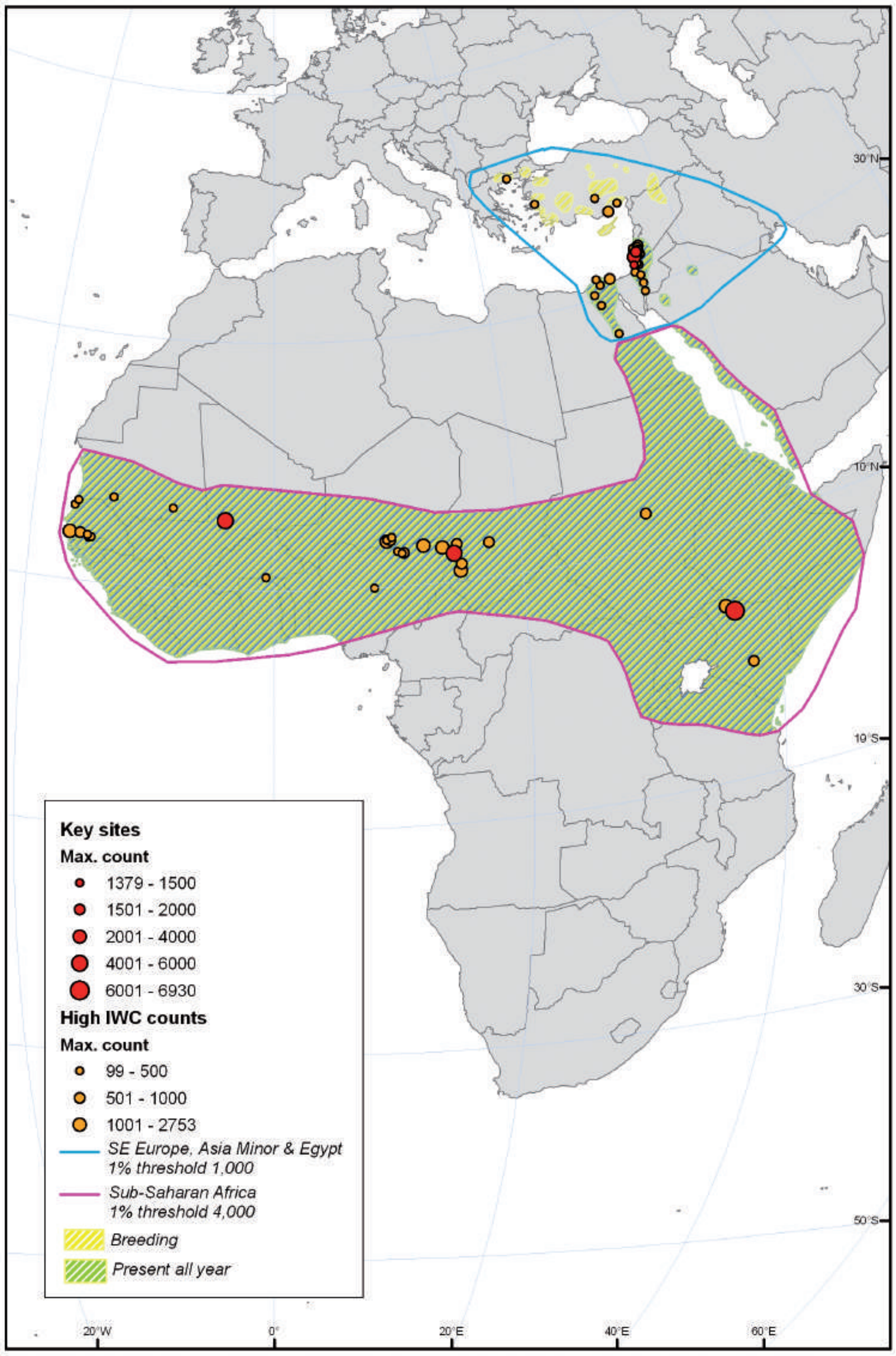
1. Sub-Saharan Africa

Population estimate	1% threshold	Population trend
100,000-700,000,	4,000	Increasing

In West Africa, the Spur-winged Lapwing is generally common in the Sahel zone, occurring in a wide range of wetlands. A total of 17,425 was recorded in the January 2001 AfWC from West and Central Africa, including 9,860 in Niger, whilst higher counts in other countries from other years include over 3,000 from northern Nigeria and over 2,500 from Chad in January 2000 and over 2,000 in both Mali and The

Spur-winged Lapwing

Vanellus spinosus



Gambia in January 1999 (Dodman & Diagana 2003). In West and Eastern Africa, this lapwing is often recorded in almost every participating country during the AfWC. Baker & Baker (2002) suggest there are now well over 1,000 in Tanzania. There was a count of close to 7,000 from Lake Turkana in northern Kenya in 1992.

Fishpool & Evans (2001) gave a population estimate of D (100,000-1,000,000). Given the wide distribution and regular occurrence at a range of wetland types, Dodman (2002) broadly supported this estimate, but considered the species to be less numerous than the Blacksmith Lapwing *V. armatus*, and proposed a slightly lower range of 100,000-700,000. This estimate was adopted in *WPE3* and retained in *WPE4*.

2. South-east Europe, Asia Minor & Egypt

Population estimate	1% threshold	Population trend
C (25,000-100,000)	Provisonally 1,000	Increasing

This population includes a mixture of migratory and sedentary birds. The total breeding population probably numbers between 10,000 and 20,000 pairs, comprising many thousands of pairs in Egypt, 1,000-1,500 pairs in Turkey, 5,000-10,000 pairs in Israel and probably fewer than 500 pairs elsewhere (data from Goodman & Meininger 1989, Snow & Perrins 1998 and BirdLife International 2004a). Between 5,000 and 15,000 birds are thought to spend the northern winter in Egypt (del Hoyo *et al.* 1996). Rose & Scott (1994) proposed a rough estimate of C (25,000-100,000) based on data from the BirdLife International/EBCC database (accessed in March 1994), Goodman & Meininger (1989) and Snow & Perrins (1998), and this estimate has been adopted in successive editions of *Waterbird Population Estimates*.

Conservation status

The Spur-winged Lapwing is not threatened in Africa, and indeed is expanding its range in some areas, notably through range extensions southwards in Eastern Africa. It occupies a wide range of wetland habitats and can adapt to artificial wetlands.

The population in South-east Europe, Asia Minor and Egypt is also thought to be increasing. The small breeding population in Greece (where the species was first noted in 1959) decreased from about 120-170 pairs in 1970 to 20-50 pairs in the late 1990s, mainly due to loss of wetland habitat, disturbance and predation (del Hoyo *et al.* 1996, Hagemeijer & Blair 1997, BirdLife International 2004a). However, numbers seem to have been relatively stable in recent years (BirdLife International 2004a). A recent decline has been reported in Turkey (BirdLife International 2004a), but increases have been reported in Egypt and Israel (Tucker & Heath 1994). In Israel, the dramatic increase from only 300 pairs in 1975 to 5,000-10,000 pairs in the 1980s (Snow & Perrins 1998) has been attributed to the considerable expansion of suitable habitat in the form of irrigated agricultural land, dams, fish-ponds and sewage works. A few pairs have bred in Cyprus since 1988 (20-60 pairs in recent years; BirdLife International 2004a). There has recently been a marked eastwards expansion of the range through the Mesopotamian Marshes of Iraq (Mudhafar Salim *in litt.*) to neighbouring south-western Iran, where small numbers have been recorded in winter since 2000 (IWC database) and breeding was first suspected in 2004 (R. Aye *in litt.*).

Habitat and ecology

The Spur-winged Lapwing occurs in a variety of wetland and grassland habitats, including bare ground by lakes and rivers, mudflats, sand flats, short-grass meadows, dry burnt grassland, rice fields and other cultivated areas, soda flats, sandy and gravel beaches and estuarine habitats. It rarely occurs far from water. It is monogamous, and nests singly or in loose colonies. It defends its breeding territory fiercely, vigorously driving out most other birds, especially waders. It occurs commonly in pairs and small groups, but will also congregate in sizeable flocks, especially at favoured sites. Loose groups of several hundred may be present at lakes in the Inner Niger Delta in Mali. It feeds principally on insects, especially beetles, although other items are also taken, such as crustaceans, molluscs, small lizards and grass seeds (Urban *et al.* 1986).

The nest is a shallow scrape, usually near water, and the clutch size is usually three or four eggs. Both parents participate in the incubation of 22–24 days. Young are precocial, leaving the nest as soon as they are dry, fledging at seven to eight weeks, and gaining independence soon thereafter, although some remain with their parents for several months (Urban *et al.* 1986).

Network of key sites

Three sites support over 1% of the sub-Saharan African population, namely Lake Turkana in northern Kenya, the shoreline of Lake Chad in Niger, and the Inner Niger Delta in Mali. However, there have been regular counts of between 2,000 and 4,000 birds at several other sites, and additional key sites are likely to include other sectors of Lake Chad and the Chari-Logone floodplains of northern Cameroon and western Chad. There was a count of over 1,500 from the Sine-Saloum Delta in Senegal (Schepers *et al.* 1998); this may be one of the most important coastal sites for the species.

Three key sites have been identified for the northern population, all in Israel where very large concentrations occur in winter. Two of the sites are on the coastal plain and the third is in the Yesreel Valley. The species is fairly common and widespread throughout the Nile Delta and along the Nile in Egypt, but concentrations of over 100 birds appear to be rare and no key sites can be identified here.

Protection status of key sites

Lake Turkana is a World Heritage Site; it is mainly unprotected, but two islands and about 13% of the shoreline are National Parks (Bennun & Njoroge 1999). The Inner Niger Delta in Mali is a Ramsar site, but this does not prevent potentially harmful activities such as bird hunting. The shoreline of Lake Chad in Niger is unprotected. However, this species certainly occurs widely in several National Parks and Ramsar sites in Sahelian Africa.

Table 19. Key sites for Spur-winged Lapwing. Sites where 1% or more of a population has been recorded

Country	Site	Lat.	Long.	Season	Max total	Year max	Average total	Basis for average	Source	Population(s) at site
Chad/ Cameroon/ Nigeria	Lake Chad Basin	13.28	14.26	January	7189	2008			B Trolliet *in litt.*	Sub-Saharan Africa
Israel	Central Coastal Plain	32.32	34.93	Winter	2033	1990	1326	1999-03 (5)	IWC database	SE Europe, Asia Minor & Egypt
Israel	Southern Coastal Plain	31.75	34.70	Winter	1379	1990	586	1996-00 (5)	IWC database	SE Europe, Asia Minor & Egypt
Israel	Valley Of Yesreel	32.67	35.25	Winter	1513	1991	592	1996-00 (5)	IWC database	SE Europe, Asia Minor & Egypt
Kenya	Lake Turkana	3.45	36.67	Non-breeding	6930	1992			WBDB	Subsaharan Africa
Mali	Inner Niger Delta	13.50	-4.00	Non-breeding	5732	1998-04			Zwarts *et al.* 2005	Subsaharan Africa
Niger	Complexe des Retraits du Lac Tchad	16.00	16.00	Pre-breeding migration	4095	2001			AfWC database	Subsaharan Africa

Les Underhill, Tim Dodman & Derek Scott

Ben van den Broek

Black-headed Lapwing
Vanellus tectus

Geographical variation and distribution

The Black-headed Lapwing (or Black-headed Plover) is endemic to Africa where it is resident and common across the Sahel zone from Senegambia and Mauritania east to the Red Sea coast, and south to northern Uganda, eastern Kenya and southern Somalia. Lewis & Pomery (1989) consider that its rather patchy distribution in Kenya, notably its sparsity in semi-arid plains south and south-east of the Central Highlands, may in part be due to the occurrence of the Crowned Lapwing *V. coronatus* in these areas. It is largely absent from highland areas of Eastern Africa. In West Africa, it is strictly a bird of the Sahel, and occurs almost exclusively between 11ºN and 18ºN. Sizeable concentrations have been recorded at the major Sahelian wetlands in Mali, Cameroon and Chad (AfWC database), although this bird is also found in very dry areas.

Two subspecies have been described: the nominate, which occurs over most of the species' range, and *latifrons*, which occurs in southern Somalia and eastern Kenya as far west as the Rift Valley. This race is differentiated from nominate *tectus* by its smaller size, shorter wing and a broader white band on the forehead (Urban *et al.* 1986).

Movements

The Black-headed Lapwing is mainly sedentary throughout most of its range. Some birds appear to move north during the rains in Mauritania, and some local movements have been noted in Mali and Nigeria (Urban *et al.* 1986). However, breeding has been recorded during the rainy season in Kaduna, Nigeria (Elgood *et al.* 1994), at the southern edge of the species' distribution, and it is therefore unlikely that there is widespread northward migration during the rains. In northern Togo, most records are in April-June, before the rainy season (Cheke & Walsh 1996). In Ethiopia, the Black-headed Lapwing is found mainly below 1,200 m, but groups wander to higher ground, from 1,500-2,000 m, in the Tacazze Valley and Tana Basin between November and May (Urban *et al.* 1986). In Kenya and Somalia, it is a breeding resident, and there is no evidence of regular migration. It has a wide distribution in Sudan, where it is also mainly resident, although it undertakes seasonal movements as well (Nikolaus 1987).

Population limits

Two populations are recognised, corresponding to the two subspecies:

1) *tectus*, occurring in the Sahel belt from Mauritania and Senegambia to the Rift Valley and north-eastern Somalia;
2) *latifrons*, occurring in southern Somalia and eastern Kenya, east of the Rift Valley.

Population size

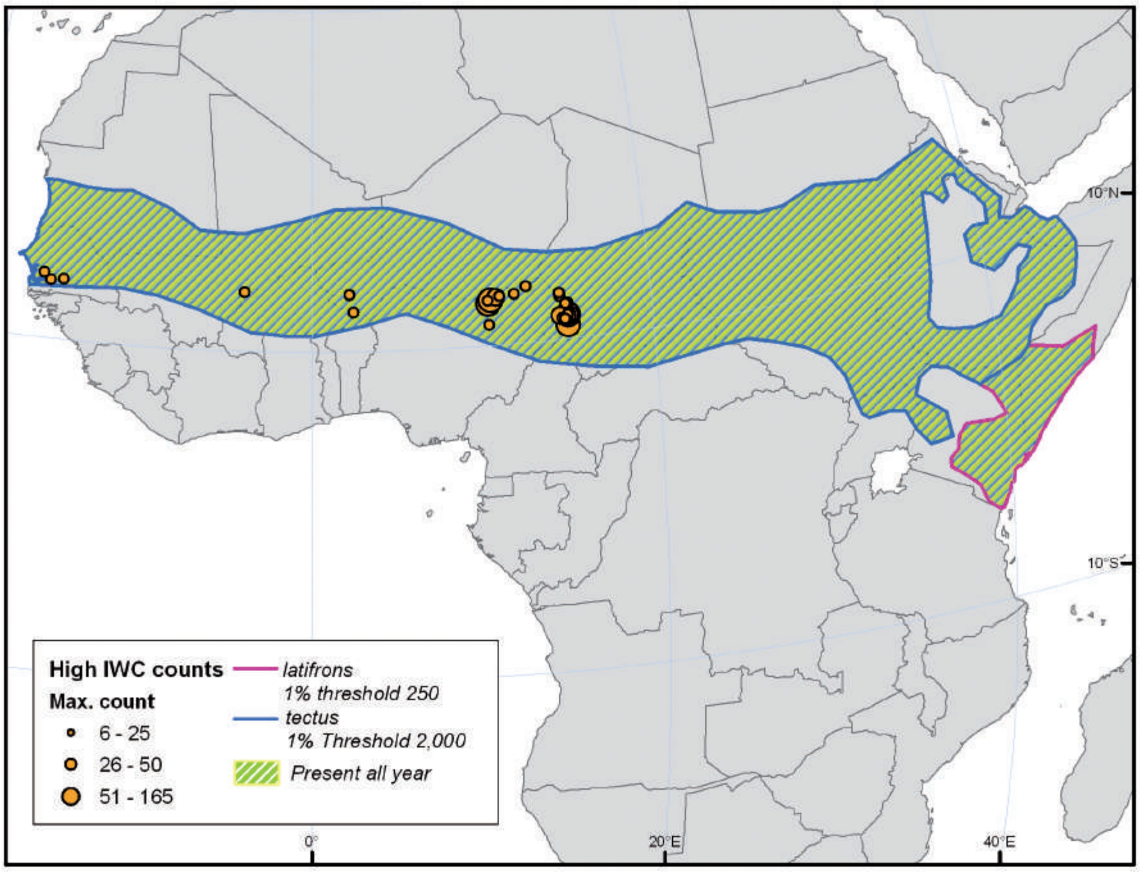
1. *tectus*

Population estimate	1% threshold	Population trend
(25,000-200,000)	2,000	Unknown

Fishpool & Evans (2001) gave a rough estimate of D (<1,000,000) for the species (both populations), while Brouwer & Mullié (2001) considered it to be rare in Niger, and suggested a lower estimate of C (25,000-100,000). Because the species is poorly known, Dodman (2002) proposed a broader range of 25,000-200,000, which has been adopted in this Atlas. As this lapwing is not a wetland bird, it is largely overlooked by the AfWC, which only provides an indication of its occurrence at wetland areas. High counts include 232 in the Inner Niger Delta (Mali) in January 2000, and 283 in northern Cameroon and 362 in Chad in January 2001 (Dodman & Diagana 2003).

Black-headed Lapwing

Vanellus tectus



2. *latifrons*

Population estimate	1% threshold	Population trend
A/B (25,000)	Provisionally 250	Unknown

Based on the somewhat limited range of *latifrons* in eastern Kenya and southern Somalia, Dodman (2002) proposed an estimate of A/B (<25,000), and this was adopted in *WPE3* and *WPE4*. Given that it is common and widespread in southern Somalia south of 5°N (Ash & Miskell 1998), the population is likely to be at the upper end of this range, and perhaps somewhat higher.

Conservation Status

The Black-headed Lapwing is not threatened, and is generally fairly common over much of its range. Population trends are unknown, but there does not appear to be any evidence of decline in either population. The species is widely tolerant of humans, and may breed close to buildings. Whilst this adaptability to man-made habitats is generally beneficial, trampling of nests by livestock and snaring at the nest have been recorded (Urban *et al.* 1986, del Hoyo *et al.* 1996). However, such incidents are local, and there do not currently appear to be any widespread threats to this species from humans.

Habitat and Ecology

This is a characteristic bird of the Sahel, adapted to its semi-arid regions, floodplains and open scrub, favouring dry grassy areas. It makes use of a variety of mainly grassland habitats within the Sahel, including dry ground, open desert with annual grass, grassy plains, bushy grassland and open areas in thorn scrub, as well as hard ground near rivers, ponds and waterholes, and areas around human habitation, such as airfields, playing fields, tilled ground and gardens (Urban *et al.* 1986). This broad ability to make use of almost any grassy areas of the Sahel presumably explains its largely sedentary lifestyle and general lack of movements. It is monogamous, breeding singly or in loose colonies in bare areas or short grass, and feeds on insects, including ant-lion larvae, and snails, mainly at night (Urban *et al.* 1986). In southern Somalia, some birds have been shown to be double-brooded, with egg-laying taking place in April, July and September (Ash & Miskell 1998).

Network of key sites

No key sites have been identified for this species which seldom congregates in large numbers. However, floodplains of the Lake Chad basin in Chad, Cameroon and Nigeria, for instance, no doubt support good numbers, as well as peripheral areas of the Inner Niger Delta of Mali and probably areas of central Sudan.

Protection status of key sites

Several sites where the lapwing occurs are under some form of protection in West and Eastern Africa, such as Waza-Logone National Park in northern Cameroon. The vast Tsavo East National Park in Kenya will support a reasonable population of *latifrons*, but the area is probably no more important for this form than large tracts of unprotected bush in southern Somalia.

Tim Dodman & Simon Delany

Ole Krogh

White-headed Lapwing

Vanellus albiceps

Geographical variation and distribution

This species, also known as the White-crowned Plover, is a monotypic riverine lapwing endemic to Africa, with three populations. In West and Central Africa, it occurs on all major river systems, from the Gambia River eastwards through the Sudan-Guinea Savanna and Guinea-Congo Forest biomes to south-western Sudan, thence throughout the whole Congo Basin south to northern Angola. It also occurs in Tanzania, mainly in the south-east, concentrated on the Ruaha-Rufiji-Kilombero-Luwegu river systems, although there is a possibly isolated population further west on the Ugalla River in western Tanzania (Baker 1996). A third population is concentrated on the Zambezi, Save and Limpopo river basins and along rivers of the Kruger National Park (Ward 1997), occurring from Zambia and Malawi to eastern Zimbabwe, the north-east Transvaal and Lowveld of South Africa and Mozambique. It has also been recorded from the Cuíto River in south-eastern Angola (Dean 2000).

Movements

In West Africa, the White-headed Lapwing undertakes seasonal movements to drier areas during the rainy season. It is absent from Côte d'Ivoire during August and September (Urban *et al.* 1986), and also from southern Nigeria from June to October, when it moves northward to Sokoto and Yankari National Park (Elgood *et al.* 1994). It is a breeding migrant in Liberia, where it is absent from June to October, returning in November as sandy islands are exposed by falling water levels in the country's many rivers (Gatter 1997). Further north, there are records from the Inner Niger Delta in June and August (Van der Kamp & Diallo 1999). It is a rare but regular wet season visitor to riverbanks and marshes of eastern Gambia from the Senegalese reaches of the Gambia River (Barlow *et al.* 1997), where it is present mainly from January to April (Morel & Morel 1990).

In the main forest block of the Congo Basin, it is largely a breeding resident (Christy & Vande Weghe 1999), although there are some local movements associated with river levels. It is most noticeable in the Lac Télé Likouala-aux-Herbes reserve, Congo, in April (Mokoko Ikonga 2003). It is considered resident in northern Angola, although there are no breeding records (Dean 2000).

Although essentially sedentary in Tanzania, it may retreat to higher ground near its favoured rivers during peak floods (Britton 1980).

In Southern Africa it is largely sedentary and movements are over short distances in response to drying up of rivers or, conversely, peak floods; in some instances in the dry season birds may remain in the vicinity of dry riverbeds (Underhill *et al.* 1999, Ward 1997).

Population limits

Three populations are recognised:

1) birds breeding in West and Central Africa, from Senegambia to south-western Sudan, the Congo Basin and northern Angola;
2) birds breeding in central and south-eastern Tanzania;
3) birds breeding in south-eastern Africa, from south-eastern Angola and Zambia to north-eastern South Africa and Mozambique.

White-headed Lapwing

Vanellus albiceps

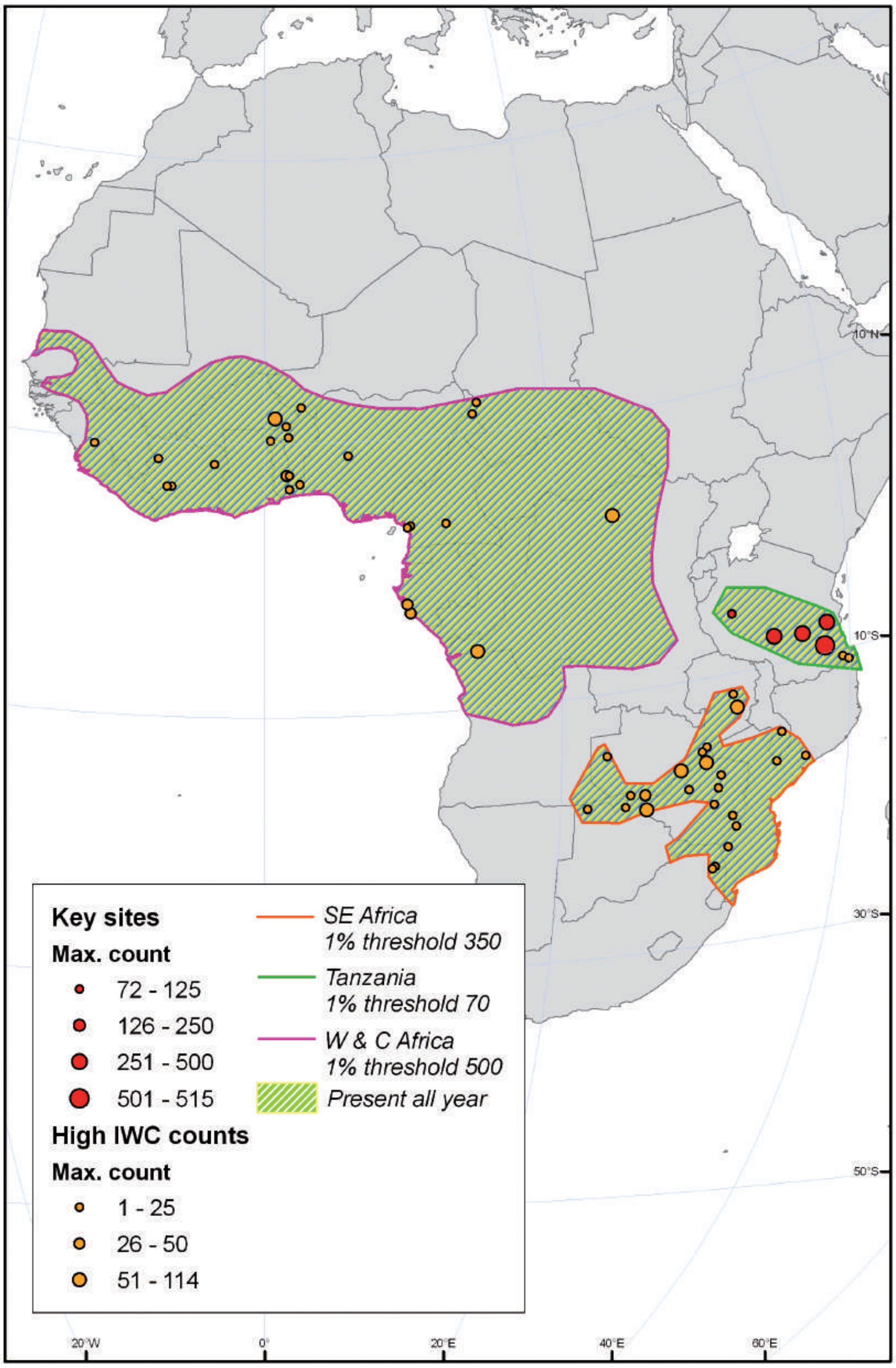


Table 20. Key sites for White-headed Lapwing. Sites where 1% or more of a population has been recorded

Country	Site	Lat.	Long.	Season	Max total	Year max	Average total	Basis for average	Source	Population(s) at site
Tanzania	Kilombero River System (140 Km)	-8.27	36.67	Non-breeding	476	1995			AfWC database	Tanzania
Tanzania	Ruaha National Park	-8.00	34.67	Non-breeding	500	1997			WBDB	Tanzania
Tanzania	Rufiji Delta	-7.87	38.42	Non-breeding	318	1995			AfWC database	Tanzania
Tanzania	Selous Game Reserve	-9.50	38.25	Non-breeding	515	1995			WBDB	Tanzania
Tanzania	Ugalla River: Total	-5.75	31.75	Non-breeding	72	1995			AfWC database	Tanzania

Population size

1. West & Central Africa

Population estimate	1% threshold	Population trend
30,000-70,000	500	Probably stable

Fishpool & Evans (2001) gave an estimate of B/C (10,000-100,000) for the total population of the species. Using this as a basis and considering the extensive habitat available especially in Central Africa, Dodman (2002) proposed a provisional estimate of 30,000-70,000 for the West and Central African population. Limited AfWC counts from southern Cameroon and Congo certainly suggest a fairly sizeable population, spread along various waterways of the Congo Basin, although it is only likely to be well represented in areas where sand is deposited. Despite a wide distribution in the Sahel belt from Senegambia across to south-western Sudan, population densities along such rivers as the Senegal and Niger are not high, in comparison to rivers in the forest belt. It is not a common bird in the Inner Niger Delta, although a group of 17 was found here in August 1998 (Van der Kamp & Diallo 1999). There were only four records in northern Cameroon between 1992 and 1994 (Scholte *et al.* 1999), but 95 were recorded in southern Cameroon in January 1998, with a few also from one site in Congo (Dodman *et al.* 1999). Up to 90 have been recorded in The Gambia (Barlow *et al.* 1997).

2. Tanzania

Population estimate	1% threshold	Population trend
6,000-8,000	70	Unknown

This sedentary population numbers around 6,000-8,000 birds, with estimates of <1,000 in the Ugalla River system, 500-1,000 in the Ruaha River and 5,000-6,000 in the Rufiji, Kilomero, Luwegu and Mbarangadu System (Baker 1996). A total of 1,126 was recorded during the AfWC in Tanzania in January 1995 (Baker 1996).

3. South-eastern Africa

Population estimate	1% threshold	Population trend
20,000-50,000	350	Stable

Dodman (2002) considered that there were likely to be over 20,000 north of and along the Zambezi, with Zambia supporting the bulk of the population, this being a ubiquitous plover of many stretches of rivers in the Zambezi Basin. He estimated the number south of the Zambezi as probably around 1,000 birds, and produced an estimate of 20,000-50,000 for the population as a whole. The breeding population in Kruger National Park, South Africa, was estimated at 90 pairs in the 1970s (Tarboton & Nel 1980) and 30-50 pairs in the 1990s (Barnes & Tarboton 1998). Parker (1999) gives an estimate of 100 birds for southern Mozambique.

Conservation status

The White-headed Lapwing is under no apparent threat throughout much of its range, and most populations are thought to be stable, except in south-eastern Africa (Dodman 2002). It is probably most threatened when breeding, as nests are in open areas along river courses, where the birds must share their habitat with large animals, crocodiles and people, and which may also be prone to flooding. In Liberia, many nests are destroyed by otters (Gatter 1997). However, this is a territorial species and is generally fairly successful at protecting its eggs and chicks.

There is some concern for its status in the southern part of the range in south-eastern Africa. Although considered common in Zambia (Benson *et al.* 1971), the White-headed Lapwing is listed as Near Threatened in South Africa due to its localised occurrence, disappearance from former breeding sites along the Limpopo and the threat of potential degradation of South Africa's large tropical river systems (Barnes 2000). It is scarce and locally threatened in nearby Sul do Save in southern Mozambique (Parker 1999). Increasing abstraction of water from the major rivers for agriculture and afforestation programmes threatens riverine habitats in these areas. The species has disappeared where dense human settlement on riverbanks has occurred, and predation by domestic dogs probably also affects breeding success.

Habitat and ecology

The White-headed Lapwing inhabits sandbanks along large tropical rivers or the margins of large lakes, and moves to other wetland habitats when these become unavailable due to flooding. It usually occurs in pairs or small groups. Breeding coincides with the dry season and occurs from December to May in West and Central Africa, July to November in Tanzania (Wiersma 1996), and July to November in Southern Africa (Ward 1997). It breeds close to the water's edge in sand or shingle, often on sandbanks and sandy islands in rivers.

Network of key sites

As this is not generally a species that congregates in large numbers, there are few sites that support significant numbers (i.e. more than 1% of the population). In West and Central Africa, some sites where it occurs in reasonable numbers include the Niokolo-Koba National Park in Senegal, the Sanaga River in Cameroon, the Lopé Reserve in Gabon, and the Conkouati National Park in Congo. Five sites meet the 1% threshold for the relatively small Tanzanian population, the Ugalla River, the Rufiji River system, Ruaha National Park, the Kilombero River and Selous Game Reserve, but these are mostly very large sites. In south-eastern Africa, sites likely to be of significance for the species include North and South Luangwa and Lower Zambezi National Parks in Zambia, and Mana Pools in Zimbabwe. The most important site in South Africa is the Kruger National Park (African Waterbird Census database).

Protection status of key sites

Most of the sites mentioned above are protected areas, although levels of protection vary. Parts of the Selous Game Reserve have been under some form of protection since 1905, and as well as being a Game Reserve, this huge site is also a World Heritage Site (Baker & Baker 2002). The four sites mentioned for Zambia and Zimbabwe are national parks, as also is the Kruger in South Africa

Tim Dodman & Vincent Parker

Hugh Chittenden

Lesser Black-winged Lapwing *Vanellus lugubris*

Geographical variation and distribution

This species, also known as the Senegal Plover, is monotypic, with two populations, one in West Africa and another in Central and Southern Africa. Both populations are very patchy in their distribution, no doubt reflecting the dispersed nature of this lapwing's preferred habitat of short open grasslands, especially recently burnt areas.

In West Africa, it occurs mainly in coastal savannas from Sierra Leone to south-western Nigeria, but it is also found north of the forest zone in southern Mali and Côte d'Ivoire. There are scattered records from northern Nigeria, and it has occurred rarely in Senegambia (Urban *et al.* 1986). The distribution is very patchy; in Liberia it only occurs in the west of the country in coastal savannas, and there are no records from the east, where the coastline gives way to forested habitats (Gatter 1997).

There is a break in the distribution between south-western Nigeria and Gabon, presumably because of the general absence of short grasslands in the coastal areas of the Niger Delta and Cameroon. This is considered as a dividing line between the western and eastern populations. The species occurs in the coastal savannas of Gabon and Congo to northern Angola, thence eastwards through the forest-savanna mosaic of Democratic Republic of Congo to East Africa. Here, it occurs in a broad swathe from western Democratic Republic of Congo through Kenya and Tanzania to the coast. It is also found on the outlying islands of Tanzania. In East Africa, the bulk of records are from the coastal lowlands, western Uganda, western Tanzania and the Lake Victoria Basin (Britton 1980). From here, it extends south through north-eastern Zambia, Malawi and Mozambique to eastern Swaziland and northern KwaZulu-Natal in South Africa (Urban *et al.* 1986, Ward 1997).

Movements

The Lesser Black-winged Lapwing is a resident and intra-African migrant, and probably at least partly nomadic in some areas. The main triggers for movement are likely to include local movements in pursuit of recently burnt grassland after brush fires, and, conversely, emigration from grasslands and savannas when the grass becomes too thick and long. Burnt ground with new grass growth may be particularly suitable for breeding (Urban *et al.* 1986). It is likely that some birds are present throughout the year in many parts of the range, but local movements to areas with shorter grass cover may confound evidence for migration.

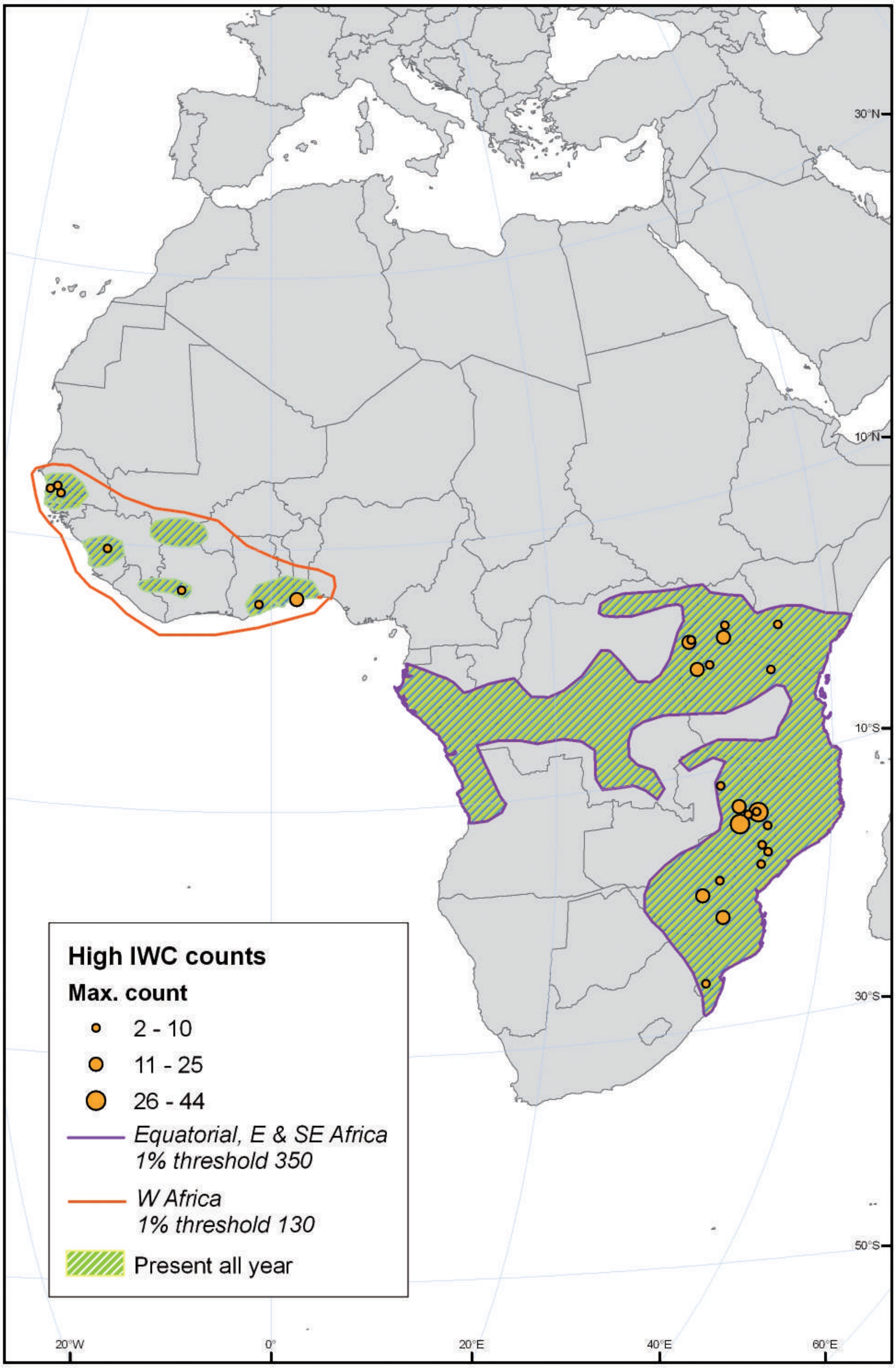
It is a breeding visitor to the western coastal savannas of Liberia, appearing in December (when there may be concentrations of up to 100 in some areas) and departing by May (Gatter 1997). It is migratory in Gabon, Congo and Democratic Republic of Congo (Christy & Vande Weghe 1999), and is observed in the Lopé Reserve in central Gabon in January/February and from June to November (Christy & Clarke 1994). In the Democratic Republic of Congo, large flocks have been reported migrating by night, northward in February to April and southward in April to October, suggesting movement between northern and southern edges of the main forest block (Urban *et al.* 1986).

In Kenya, it is a pronounced local and regular migrant, and is present in Tsavo East National Park from June to August, on the coast from April to July, and near Lake Victoria from November to June (Lewis & Pomeroy 1989). It occurs as a non-breeding visitor to the coastal plains and grassland of southern Somalia from April to July (Ash & Miskell 1998). Concentrations occur around Lake Victoria in September to May, and it occurs on the Tanzanian coast in June to August (Wiersma 1996). There are also some altitudinal migrations in East Africa.

In Southern Africa, there is evidence for partial movement from South Africa eastward into Mozambique in the austral

Lesser Black-winged Lapwing

Vanellus lugubris



winter (May to August) and the reverse in the austral summer (Ward 1997, Parker 1999). All records in Zimbabwe are in the dry season, from July to November (Urban *et al.* 1986), whilst records in Zambia are from April and and October (Dowsett *et al.* 2008). In Malawi it is resident but subject to much wandering (Dowsett-Lemaire & Dowsett 2006).

Population limits

Two populations are recognised:

1) birds occurring in Equatorial, East and South-eastern Africa, from Gabon to Kenya, south to Swaziland;
2) birds occurring in West Africa, predominantly in coastal savanna between Sierra Leone and Nigeria.

Population size

1. Equatorial, East and South-eastern Africa

Population estimate	1% threshold	Population trend
20,000-50,000	350	Unknown

There are relatively few AfWC records of this species, which does not tend to congregate at wetlands, and little information is available on population size. Schepers & Marteijn (1993) estimated some 300-350 along the coast of Gabon, but it also occurs widely inland as well, for instance, in several areas of the Lopé Reserve in central Gabon (Christy & Clarke 1994). It is locally common in parts of northern Angola (Dean 2000), and a flock of 35 was encountered in coastal savanna in Congo in April 2005 (T. Dodman pers. obs.). It is locally very common in the forest-savanna mosaic of Democratic Republic of Congo, and reasonably common in open grassy and bushed habitats in Kenya (Lewis & Pomeroy 1989). There are estimates of 2,000 in southern Mozambique, , over 1,000 in central Mozambique, and 50 in Swaziland (Parker 1999, Parker 2005, Parker 1994), but the species is said to be uncommon in Zambia and Malawi (Urban *et al.* 1986). Fishpool & Evans (2001) gave a very rough estimate of C/D (25,000-1,000,000) for the two populations combined, while V. Parker (*in litt* 2002) gave a more conservative estimate of 20,000-50,000 for this population. The latter estimate was adopted in *WPE3* and retained in *WPE4*.

2. West Africa

Population estimate	1% threshold	Population trend
5,000-20,000	130	Unknown

This lapwing is thinly and patchily distributed in West Africa. It has been described as common in Sierra Leone and Ghana (Wiersma 1996), and is not uncommon in the western coastal savannas of Liberia (Gatter 1997), but it is uncommon in Nigeria (Elgood *et al.* 1994) and southern Mali (Lamarche 1980), and rare in Senegambia. V. Parker (*in litt.* 2002) proposed a population estimate of 5,000-20,000, and this was adopted in *WPE3* and *WPE4*.

Conservation status

The Lesser Black-winged Lapwing is not globally threatened, but is probably in decline in parts of its range because of the loss of woodland savannas due to clearance for agriculture and deforestation for charcoal manufacture. It appears to be declining in Southern Africa (Ward 1997), and is listed as locally threatened in Swaziland (Parker 1994), where habitat loss has occurred through clearance of woodlands for agriculture. Declines have been documented in the Hluhluwe-Umfolozi complex in South Africa (Hockey & Douie 1995) and in the Lagos area of Nigeria (Elgood *et al.* 1994). The extent of the available habitat in the coastal savanna of Congo has declined because of afforestation with eucalyptus plantations.

Habitat and ecology

The Lesser Black-winged Lapwing is essentially a bird of open woodlands, savanna and short grasslands. It also occurs on ground cleared for cultivation, farmland, pastures and airfields, and beside large lakes and rivers (Urban *et al.* 1986). In East Africa it occurs at altitudes of up to 3,000 m, but in Southern Africa it is restricted to areas below 300 m. In almost all areas, its preferred habitat is burnt grassland, be it within woodlands, on agricultural land or in coastal savannas. It feeds on terrestrial invertebrates, presumably most successfully in burnt areas. It moves locally in search of recently burned ground and other areas of short grass cover, and is usually encountered in flocks of some 5 to 20 birds. Breeding has been reported from March to May in Sierra Leone, June to September in Gabon, August to November in East Africa, and mostly June to November in Southern Africa (Wiersma 1996, Ward 1997).

Network of key sites

No key sites have been identified for this widespread lapwing of savanna habitats. Some of the highest counts have come from coastal Gabon, where the lapwing occurs in a variety of habitats and often within the confines of villages (Schepers & Marteijn 1993). The Lopé Reserve in Gabon also appears to support reasonable numbers. In West Africa, the coastal savannas of western Liberia are probably of significance, including the area around Lake Piso and the Cape Mount peninsula. The complex of coastal Ramsar sites in Ghana and adjacent areas may also be of importance for this population.

Protection status of key sites

Although there are no key sites for this species, it no doubt occurs in a number of protected areas throughout its range.

Tim Dodman & Vincent Parker

Barry du Plessis

Greater Black-winged Lapwing *Vanellus melanopterus*

Geographical variation and distribution

Two subspecies of this lapwing, also known as the Black-winged Plover, have been described: the nominate form, *melanopterus*, from Ethiopia, and *minor*, occurring in two disjunct populations, one in the highlands of Kenya and northern Tanzania, and the other in eastern South Africa and Swaziland. Johnsgard (1981) and del Hoyo *et al.* (1996) assign birds in Kenya and Tanzania to the nominate form *melanopterus*, but most authors recognise this population as belonging to *minor* (Peters 1934, Britton 1980, Howard & Moore 1981, Urban *et al.* 1986, Hayman *et al.* 1986, Zimmerman *et al.* 1996, Wetlands International 2000). There are no obvious differences in the appearance of the two subspecies, but *minor* is somewhat smaller, with a shorter wing (Urban *et al.* 1986, Hayman *et al.* 1986).

The core range of *melanopterus* is in the highlands of Ethiopia, where it is a frequent to common resident of highland grasslands from 1,800-2,750 m (Urban & Brown 1971). It extends marginally into Eritrea and extreme north-western Somalia. In Kenya and northern Tanzania, *V. m. minor* is a bird of the high plateau (Britton 1980), where it is a common and gregarious lapwing of the grassland, occurring mainly above 1,500 m but locally down to 1,300 m (Lewis & Pomeroy 1989). In Southern Africa, this subspecies breeds from the eastern Transvaal and Swaziland through KwaZulu-Natal southwards along the coast to southern Cape Province (Ward 1997).

Movements

The Greater Black-winged Lapwing is a resident and local migrant. It is largely sedentary in Ethiopia. The few records in north-eastern Somalia (Ash & Miskell 1998) suggest that some movement occurs, perhaps to and from peripheral areas of its core range. It is a partial altitudinal migrant in Kenya, Tanzania and Southern Africa (Wiersma 1996). In Kenya, it is a resident in many areas, but at Mau Narok (2,700-3,000 m) in the central highlands, it is a migrant, appearing in January, breeding between March and June, and then congregating in flocks prior to departure in September (Lewis & Pomeroy 1989). Birds migrating from the western highlands of Kenya move down to the plains some 65 km to the south (Urban *et al.* 1986). In Southern Africa, birds at high altitude move seasonally to lower altitudes to escape harsh winter conditions. In Swaziland, birds occurring at altitudes from 1,000-1,300 m have been found to remain in the area during winter, moving locally to exploit areas of shortest grass cover (Parker 1994). Birds at similar altitudes in South Africa also moved locally, while birds from higher altitudes on the Drakensberg escarpment moved to lower altitudes to the east. In most of KwaZulu-Natal, this lapwing occurs at the coast for most of the year, only moving to higher altitudes to breed in the austral spring; in eastern Cape Province and Transkei, it is probably resident near the coast, with local movements in response to rainfall (Ward 1997). In the non-breeding season, it moves locally in large flocks in search of areas of shortest grass cover.

Population limits

Three populations are recognised:

1) *melanopterus,* occurring in the Ethiopian highlands, and also marginally in Eritrea and north-western Somalia;
2) *minor,* occurring on the highland plateau of Kenya and northern Tanzania;
3) *minor,* occurring in the eastern highlands of South Africa and Swaziland and along the coast of eastern South Africa.

Population size

1. *melanopterus*

Population estimate	1% threshold	Population trend
10,000-50,000	300	Unknown

V. Parker (*in litt.* 2002) proposed an estimate of 20,000-100,000 for this population, but Dodman (2002) considered this to be an overestimate and gave a lower figure of 10,000-50,000 which was adopted in *WPE3* and *WPE4*. Although the Greater Black-winged Lapwing is not a wetland bird, it is regularly recorded during the annual waterbird counts in Ethiopia, with a maximum national total of 457 in January 2000 (Dodman & Diagana 2003).

2. *minor* Kenya, Tanzania

Population estimate	1% threshold	Population trend
A (<10,000)	Provisionally 100	Possibly decreasing

V. Parker (*in litt.*) estimated the population at 1,000-5,000, but Dodman (2002) considered this to be an underestimate, given the presence of fairly regular non-breeding flocks at a number of different sites, and proposed an estimate of A (<10,000). This estimate, which was adopted in *WPE3* and *WPE4*, may still be too low. Urban *et al.* (1986) refer to post-breeding flocks of over 1,000, perhaps up to 10,000, assembling before migration in western Kenya. The bird is a common breeder on the Ardai and Athi plains at 1,300-1,500 m, and pre-migratory flocks of thousands have been recorded at Mau Narok in the central highlands of Kenya (Britton 1980, Lewis & Pomeroy 1989). Over 1,000 were recorded in the Serengeti National Park in May 1998 (Baker & Baker 2002).

3. *minor* Southern Africa

Population estimate	1% threshold	Population trend
2,000-3,000	25	decreasing

Parker (1994) gave an estimate of 200 birds for Swaziland, where flocks of over 50 may be seen on heavily grazed land outside the Malolotja Nature Reserve (Boycott & Parker 2003). Underhill *et al.* (1999) gave estimates of 400-600 for the coastal belt between Mossel Bay and East London, and considered the total population to lie within the range 2,000-3,000. Tree (*in litt.* 2008) gives figures of about 100 birds for Port Alfred and 200-300 for East London. The number of birds occurring in Important Bird Areas in Southern Africa is estimated at 1,500–3,500 (Barnes 1998).

Conservation status

The Greater Black-winged Lapwing is not globally threatened, but is listed as Near Threatened in South Africa and Swaziland, where much of its habitat will be lost in the coming years through proposed afforestation of the grassland biome in KwaZulu-Natal and Mpumalanga (Barnes 2000). Timber plantations have already replaced large proportions of the temperate grasslands in South Africa, causing a decline in this species. The species does not appear to be under threat in Ethiopia. However, Kenya's unique highland grasslands are vanishing rapidly (Bennun & Njoroge 1999), and the status of the Greater Black-winged Lapwing, along with other highland birds, is uncertain here.

Habitat and ecology

The Greater Black-winged Lapwing is a bird of temperate grasslands. It hunts terrestrial arthropods by sight and is therefore most common in grasslands with short grass cover, especially on the highland plateaux, although in Southern Africa it also occurs on short coastal flats. At lower elevations within its disjunct range, it prefers open plains, dry savanna and recently burnt ground, including areas frequented by game animals (Urban *et al.* 1986). It also exploits man-made habitats, including golf courses, racecourses and cultivated lands. When breeding, it occurs in loose aggregations, typically of five to ten pairs, often on recently burnt ground. In some areas, it overlaps with the Crowned Lapwing *Vanellus coronatus*, and the two species forage in mixed flocks, apparently without competition (Ward & Maclean 1988). Breeding occurs from April to August in Ethiopia, and in Kenya and Tanzania may occur at almost any time of year, usually in the dry season and when new grass is present after early showers (Urban *et al.* 1986). In Southern Africa, breeding is mostly from August to November (Ward 1997).

Network of key sites

Some highland sites with important grasslands that are likely to be of importance in Ethiopia include the Bale Mountains and the Simien Mountains National Parks. Wondafresh (2003) considers that Wagetera Swamp is an important site for this population.

The Serengeti National Park in Tanzania is a key site for this species outside the breeding season. Important breeding sites in Kenya which may qualify as key sites include the Mau Narok-Molo Grasslands, an extensive area of montane grassland on a high open plateau about 80 km long, and the Kinangop Grasslands of the Kinangop Plateau (Bennun & Njoroge 1999).

In Southern Africa, some important grassland areas with Greater Black-winged Lapwings include Steenkampsberg, Songimvelo Game Reserve, Amersfoort-Bethal-Carolina District, the Grassland Biosphere Reserve, Itala Game Reserve, Midmar Nature Reserve and the KwaZulu-Natal Mistbelt Grasslands in South Africa, as well as the Malolotja Nature Reserve in Swaziland (Barnes 1998). At the coast, key sites include the Alexandria Coastal Belt, Port Alfred and the East London area (Barnes 1998d, Tree *in litt.* 2008).

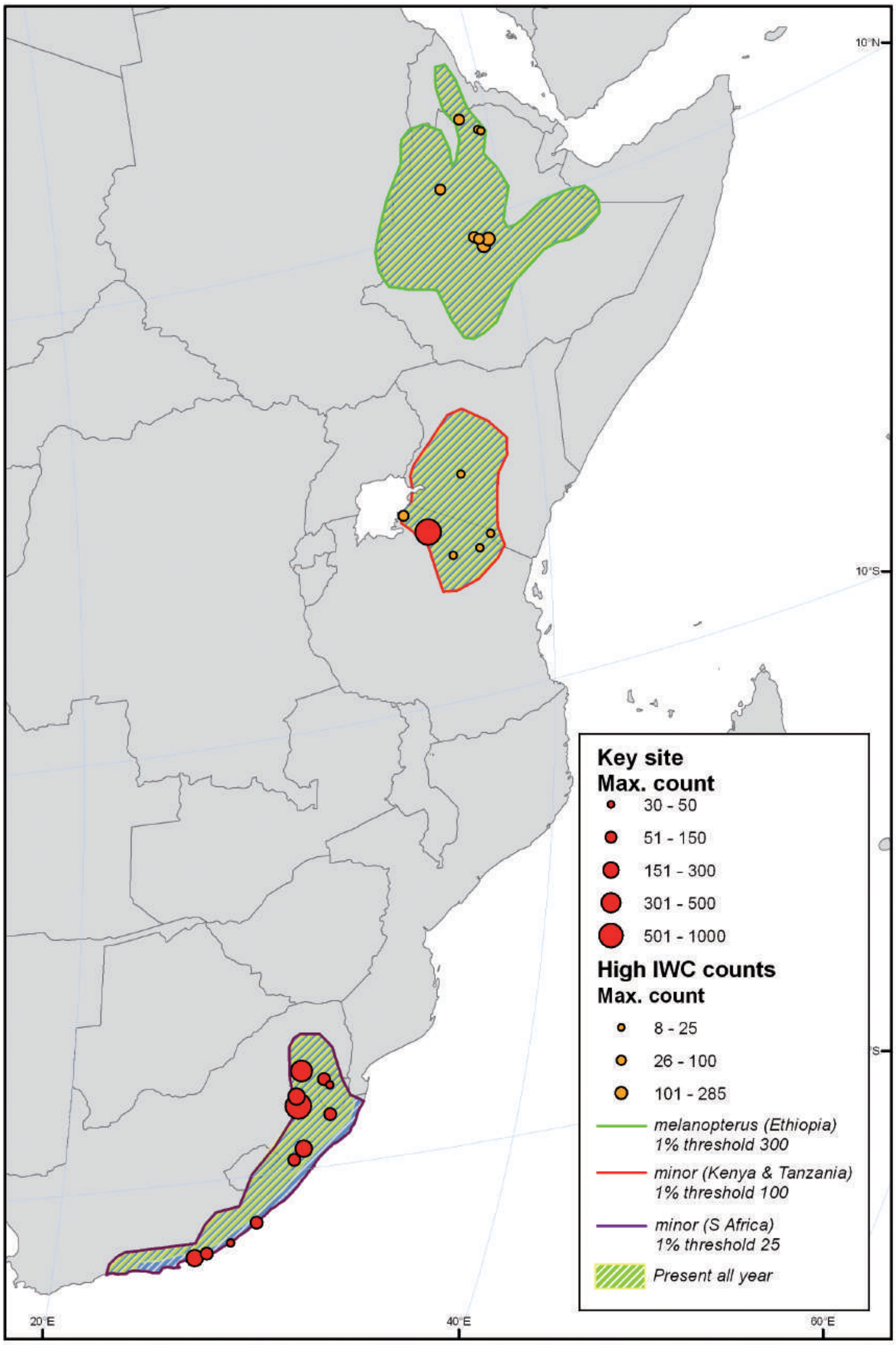
Protection status of key sites

The Greater Black-winged Lapwing certainly occurs in protected areas in Ethiopia, although the main threats to such areas, including the presence of people and their livestock, probably do not affect this species much.

Kenya's unique highland grasslands are not represented by any protected area in the country (Bennun & Njoroge 1999). The Mau Narok-Molo Grasslands and the Kinangop Grasslands are both unprotected IBAs, mainly on private land; in fact the Kinangop Grasslands are threatened by afforestation (which is resulting in a warmer, drier climate), drainage of wetlands, cultivation of crops and increased human habitation, whilst Mau-Narok faces similar threats (Bennun & Njoroge 1999). Around 50% of the original grassland of the Kinangop Plateau was cleared for agriculture between 1964 and 1996, and the plateau is now a mosaic of fragmented grassland remnants, eucalyptus plantations and agricultural fields (Lens *et al.* 2000). The Serengeti National Park is protected.

Greater Black-winged Lapwing

Vanellus melanopterus



In Southern Africa, Steenkampsberg is partially protected through the Verloren Valei Nature Reserve (5,500 ha), which is fully protected, although it only constitutes about 5% of the site; the east of the area is unprotected and threatened with afforestation (Barnes & Tarboton 1998). Songimvelo Game Reserve is fully protected and administered by the Mpumalanga Parks Board (Barnes & Tarboton 1998). Amersfoort-Bethal-Carolina District is unprotected, and consists of farmland with patches of grassland that are grazed by sheep interspersed amongst cultivated lands (Barnes & Tarboton 1998). Protected areas in the Grassland Biosphere Reserve include the Pongola Bush Reserve, Ncandu Forest Reserve and Zeekoeivlei Nature Reserve, whilst surrounding the core areas there is a buffer zone of privately-owned farm land in which 20,000 ha of Natural Heritage Sites have been registered in and around Wakkerstroom.

Itala Game Reserve and Midmar Nature Reserve are fully protected and managed by the KwaZulu-Natal Nature Conservation Service (Johnson *et al.* 1998). The Mistbelt Grasslands consists of a disconnected series of grassland patches on private farmland; it is unprotected and threatened with afforestation (Johnson *et al.* 1998). The Malolotja Nature Reserve in Swaziland is fully protected (Barnes 1998) although the lapwing is often outside the reserve in adjacent grazing areas.

Table 21. Key sites for Greater Black-winged Lapwing. Sites where 1% or more of a population has been recorded

Country	Site	Lat.	Long.	Season	Max total	Year max	Source	Population(s) at site
South Africa	Alexandria coastal belt	-33.70	26.90	Breeding	30-200	1990s	Barnes 1998d	*minor*, Southern Africa
South Africa	Amersfoort-Bethal- Carolina district	-26.50	29.83	Breeding	100-300	1990s	Barnes & Tarboten1998a	*minor*, Southern Africa
South Africa	Dwea & Cwebe Nature reserves	-32.27	28.88	Breeding	10-100	1990s	Johnson *et al.* 1998	*minor,* Southern Africa
South Africa	East London	-33.02	27.93	Breeding	200-300	1990s	Tree *in litt.* 2008	*minor,* Southern Africa
South Africa	Grassland Biosphere Reserve	-27.00	30.00	Breeding	500-1000	1990s	Barnes & Tarboten 1998a	*minor*, Southern Africa
South Africa	Itala Game Reserve	-27.50	31.42	Breeding	80-100	1990s	Johnson *et al.* 1998	*minor*, Southern Africa
South Africa	Kwazulu Natal Mistbelt Grasslands	-29.00	30.50	Breeding	100-300	1990s	Johnson *et al.* 1998	*minor*, Southern Africa
South Africa	Midmar Nature Reserve	-29.52	30.15	Breeding	80-100	1990s	Johnson *et al.* 1998	*minor*, Southern Africa.
South Africa	Port Alfred	-33.60	26.90	Breeding	100	1990s	Tree *in litt.* 2008	*minor,* Southern Africa
South Africa	Songimvelo Game Reserve	-25.92	31.00	Breeding	50-150	1990s	Barnes & Tarboten 1998a	*minor*, Southern Africa
South Africa	Steenkampsberg	-25.42	29.92	Breeding	200-500	1990s	Barnes & Tarboten 1998a	*minor*, Southern Africa
Swaziland	Malolotja	-26.10	31.08	Breeding	>50		Boycott & Parker 2003	*minor,* Southern Africa
Tanzania	Serengeti National Park	-2.42	34.83	Non-breeding	1000	1990s	WBDB	*minor,* Kenya, Tanzania

Vincent Parker & Tim Dodman

Nicolaas van Zalinge

Crowned Lapwing
Vanellus coronatus

Geographical variation and distribution

The Crowned Lapwing, also widely known as Crowned Plover, is polytypic, with three subspecies: the nominate form from Ethiopia to South Africa, *demissus* from Somalia, and *xerophilus* from south-western Africa, especially, Namibia. A fourth subspecies, *suspicax*, was described in Southern Africa by Clancey *et al.* (1991), but this was subsumed within the nominate form by Hockey *et al.* (2005). Hockey *et al.* (2005) accept *xerophilus* as a valid subspecies, as the described differences between *xerophilus* and the nominate form are sufficiently distinct, but they note that it may potentially represent only the extreme of a cline.

V. c. demissus occurs in northern Somalia (Somaliland) south to 4ºN, thence along the coastal belt and lower Shebelle River to 1ºN. It also occurs in the eastern part of the Ogaden in Ethiopia, but avoids the arid coastal zone of north-eastern Somalia (Ash & Miskell 1998). The nominate form occurs from southern Somalia, south and west of *demissus*, and Ethiopia south through East Africa to Zambia, Zimbabwe, Mozambique and South Africa. There is also a disjunct population of this form in the Albertine Rift, which is treated here as a discrete population. The core range of *xerophilus* is Namibia, extending east into western Botswana, and in South Africa north of the Orange River in the Northern Cape to western areas of North-west and Northern Provinces. The wide distribution of the Crowned Lapwing within Southern Africa based on atlas data (Ward 1997) indicates that there must be overlap between the nominate form and *xerophilus,* although Hockey *et al.* (2005) present a population boundary, which is followed here. North of the Zambezi and Cunene rivers, nominate *coronatus* occurs in Zambia and is present in eastern Angola (mainly in south-eastern Cuanda-Cubango as far west as eastern Cunene and, marginally, to eastern Huíla), whilst *xerophilus* occurs in south-western Angola (Huíla, Namibe, Cunene and western Cuando-Cubango) (W.R.J. Dean *in litt.*).

Within its wide range, the Crowned Lapwing is absent from some highland areas, such as parts of Lesotho and the central Ethiopian highlands. It is absent from much of Uganda and parts of Tanzania, Malawi and northern Zambia, presumably avoiding moist areas and extensive tracts of miombo woodland. It is also absent from the arid west coast of Namibia and the mesic east coast of Mozambique.

Compared to the nominate form, the brown feathers of the upperparts, wings and breast of *demissus* are paler and broadly tipped white, giving a sandy tone to the plumage (Urban *et al.* 1986), while *xerophilus* has more extensive white on the throat, which extends to the lower face, and the brown areas of its plumage are paler and greyer (Urban *et al.* 1986).

Movements

The Crowned Lapwing is believed to be mainly resident throughout its range, with local movements in search of areas of short grass cover, and particularly following grass fires (Wiersma 1996). However, it displays some fairly regular movements within parts of its range associated with annual changes in its habitat, linked to rainfall patterns.

The nominate form is resident in Ethiopia below 2,400 m (Urban & Brown 1971), resident in southern Somalia (Ash & Miskell 1998), and is considered resident in Kenya, although local movements do occur (Lewis & Pomeroy 1989). It is present in most months of the year in northern Tanzania (Baker & Baker 2005). In Zambia and Malawi, it is mainly a dry season visitor from April to November (Urban *et al.* 1986). This is illustrated by AfWC count totals for Zambia of 372 in July 1993, decreasing to 21 in January 1994 AfWC database). Birds may leave southern Zambia for Botswana in the wet season. In Southern Africa, there is some evidence for partial movement, with higher frequency of reporting from the mesic east in the dry season and from the xeric west in the late wet to early dry season (Ward 1997). However, it is resident and sedentary in most areas of Southern Africa, making local movements, especially seeking burnt or open areas when grass becomes too long (Hockey *et al.* 2005). Over a two-year period, Tree (*in litt.* 2008) found only *coronatus* in Ngamiland in western Botswana, and considered that many of these were migrants, presumably from Zambia and Zimbabwe.

In the Albertine Rift, *coronatus* is absent from its breeding grounds on the plains of the Ruzizi River in Burundi from December to March, and is also largely absent from Akagera in eastern Rwanda from January to May, with most breeding birds arriving in June and July during the main fire season (Urban *et al.* 1986). It is not clear where these breeding birds move to during the rains.

Xerophilus is generally resident, but occasionally irrupts eastwards into Zimbabwe in drought years (Hockey *et al.* 2005, Irwin 1981). *Demissus* is largely resident in Somalia, although seasonal changes in numbers indicate some movements (Ash & Miskell 1998).

Population limits

Four populations are recognised:

1) *coronatus*, in Eastern and Southern Africa from Ethiopia to South Africa;
2) *coronatus*, in the Albertine Rift (western Uganda, eastern Democratic Republic of Congo, Rwanda and Burundi);
3) *xerophilus*, in Southern Africa, from south-western Angola and Namibia, to Botswana and northern South Africa (Northern Cape to Northern Province);
4) *demissus*, in Somalia.

Population size

1. *coronatus* Eastern & Southern Africa

Population estimate	1% threshold	Population trend
400,000-900,000	6,500	Unknown

The Crowned Lapwing is common to abundant in Ethiopia (Urban & Brown 1971) and in central East Africa, but is largely absent from the Lake Victoria Basin and coastal plains (Britton 1980). N. Baker (*in litt.*) suggested that there might be some 200,000-250,000 in Tanzania alone, based largely on data from the Tanzania Bird Atlas (Baker & Baker 2005). It is common and widespread in parts of Zambia, and there are estimates of 2,000 for Swaziland and 4,000 for southern Mozambique (Parker 1994, Parker 1999). V. Parker (*in litt.*) estimated the total population in Southern Africa (including *xerophilus*) at 200,000-400,000. Based on these figures, Dodman (2002) produced an estimate of 400,000-900,000 for this population of *coronatus*, including up to 500,000 in East Africa, and this estimate was adopted in *WPE3* and *WPE4*. As this is not a wetland species, only small numbers are recorded by the AfWC.

2. *coronatus* Central Africa (Albertine Rift)

Population estimate	1% threshold	Population trend
A/B (<25,000)	Provisionally 250	Unknown

The extent of suitable habitat within the range of this population is fairly limited, and the total population is unlikely to be very large. Dodman (2002) gave a provisional estimate of A/B (<25,000) and this was adopted in *WPE3* and *WPE4*. It is possible that this population may not be discrete, although it is certainly resident in this area.

3. *xerophilus*

Population estimate	1% threshold	Population trend
30,000-50,000	400	Possibly increasing

The form *xerophilus* is generally common in appropriate habitat throughout its range. Dodman (2002) gave a provisional estimate of B/C (10,000-100,000). However, Tree (*in litt.* 2008) considers that *xerophilus* is not widespread across Botswana, which was previously assumed to form a core part of its range, and proposes the more refined population estimate given here.

4. *demissus*

Population estimate	1% threshold	Population trend
B/C (10,000-100,000)	Provisionally 1,000	Unknown

The Crowned Lapwing is a common and widespread breeding resident in much of Somalia (Ash & Miskell 1998). Dodman (2002) proposed a provisional estimate of B/C (10,000-100,000), and this was adopted in *WPE3* and *WPE4*.

Conservation status

The Crowned Lapwing has expanded its range in Southern Africa through exploitation of man-made habitats, although improved grazing practices, with lower stocking rates, may lower its abundance in some areas (Ward 1997). Elsewhere in Africa, it does not appear to be under any real threat.

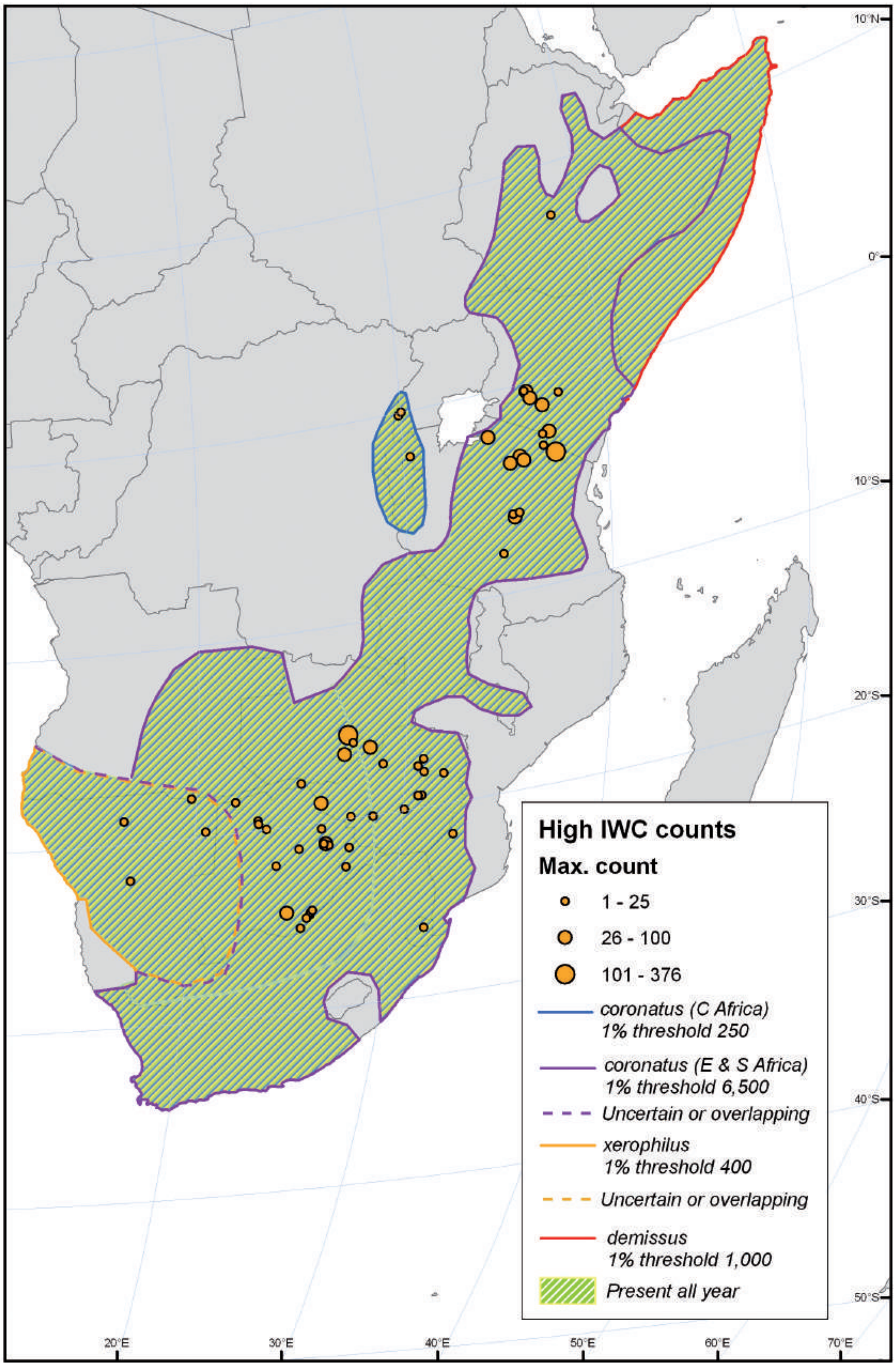
Habitat and ecology

The Crowned Lapwing hunts terrestrial arthropods purely by sight, and therefore requires open grasslands and savanna with short grass cover (with grass generally less than 6 cm in height). It is principally a bird of semi-arid grasslands and occurs only marginally in temperate and moist grasslands. It has adapted to man-made environments, and occurs commonly in parks, gardens, airfields and cultivated lands.

In its natural environment it is nomadic, searching out areas of shortest grass cover and following grass fires during the dry season. Exploitation of man-made environments has allowed it to become more sedentary. It occurs in pairs in the breeding season, and forms flocks in the non-breeding season which sometimes number over 100 birds. It overlaps with the Greater Black-winged Lapwing *V. melanopterus* in the east of its range in Southern Africa, and the two forage alongside each other apparently without competition (Ward & Maclean 1988). It is absent from the higher altitude parts of the Greater Black-winged Lapwing's range. It rarely occurs alongside the Lesser Black-winged Lapwing *V. lugubris*, which occupies more wooded habitats (*contra* Benson *et al.* 1971), and does not compete with the Blacksmith Lapwing *V. armatus*, which is confined to wetlands (*contra* Wiersma 1996). Intra-specific competition with the Black-headed Lapwing *V. tectus* may be a factor in its absence from much of south-eastern Kenya and southern Somalia (Lewis & Pomeroy 1989). It breeds at any time of the year throughout its range. In Southern Africa, the peak of nesting is from September to November (Ward 1997).

Crowned Lapwing

Vanellus coronatus



Network of key sites

The species is very widely dispersed and is not specifically associated with wetlands, although it is common in some floodplain areas. Although gregarious, large concentrations do not occur regularly at any particular site. Consequently, no sites have been identified that exceed the threshold levels.

Protection status of key sites

The Crowned Lapwing certainly occurs in many protected areas throughout its range. However, it is generally just as numerous outside of protected areas as within them, so long as appropriate habitat is available.

Tim Dodman & Vincent Parker


Francois Dreyer

African Wattled Lapwing
Vanellus senegallus

Geographical variation and distribution

The African Wattled Lapwing, also widely known as the Senegal Wattled Plover, occurs in sub-Saharan Africa, excluding the Congo Basin, the Indian Ocean coastline north of the Zambezi, and south-western Africa. Three subspecies are generally recognised: the nominate *senegallus* in the Sahel zone, *major* in Ethiopia, and *lateralis* in Southern Africa. Some authorities also recognise *solitaneus* as a separate subspecies in the Caprivi Strip and the Okavango Basin (Ward & Tree 1997), but this is not widely considered in more recent works, e.g. Hockey *et al.* (2005), and it is more usually included in *lateralis*.

V. s. senegallus has a black chin, and the tip of the bill is mainly yellow (Urban *et al.* 1986). It is essentially a bird of the lower plains and savannas. There is a west-east cline in size in the Sahel zone as far as Darfur in Sudan. Here, intermediate forms between *senegallus* and *major* occur, but birds further east are recognised as a larger highland form, *major* (Archer & Godman 1937). Apart from its larger size, *V.s. major* is very similar to *senegallus*. The wing length of *major* is consistently larger than in West African birds (Archer & Godman 1937). *V.s. lateralis*, however, shows some marked differences to *senegallus*, such as a white chin (with centre of throat black) and a much more extensive black tip to the bill, whilst it also has a blackish band on the belly, which is absent in *senegallus* and *major* (Urban *et al.* 1986).

Movements

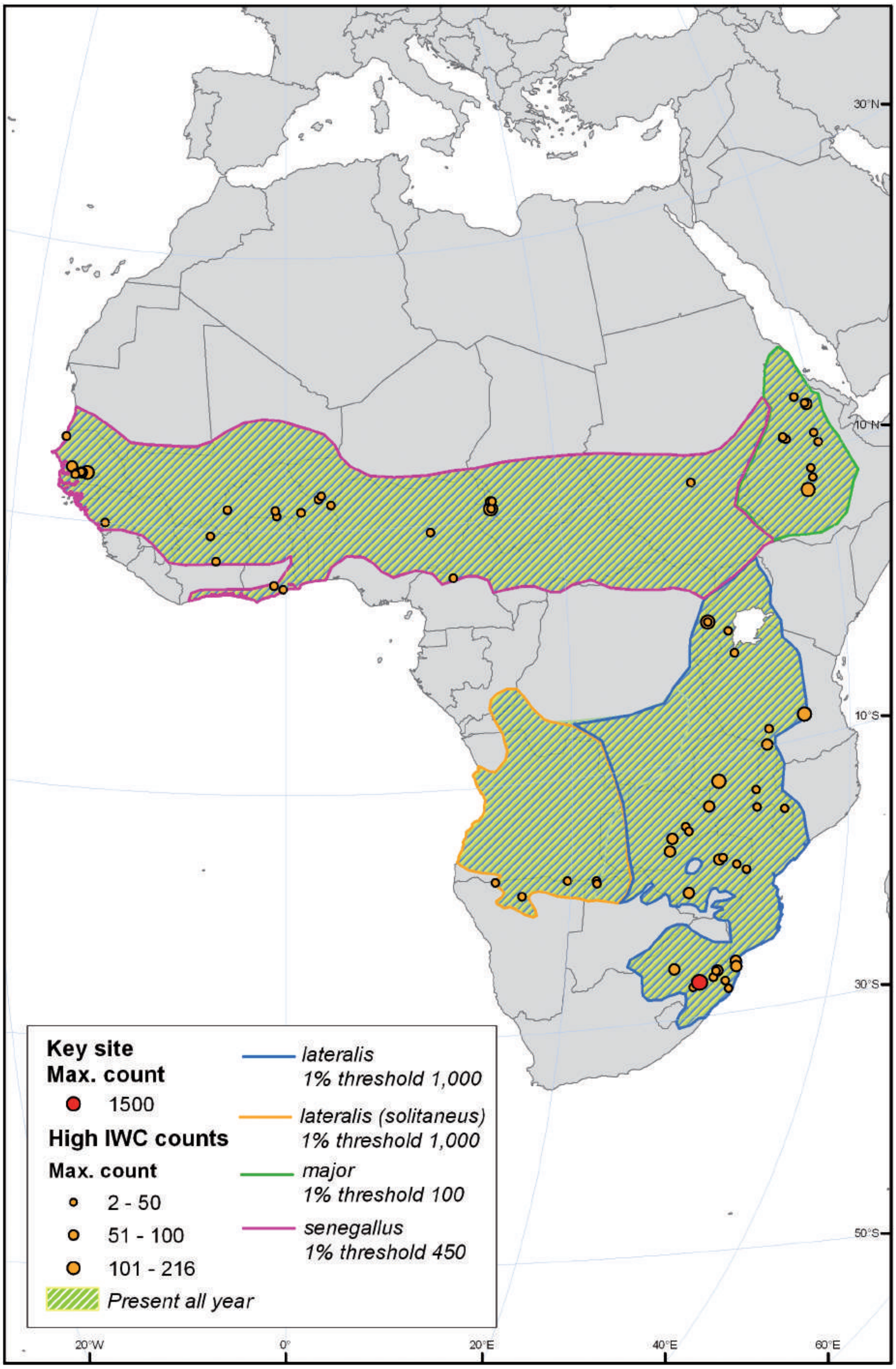
The African Wattled Lapwing is largely resident over most of its range, undertaking only local movements, primarily for breeding. However, in some areas it is partially migratory or nomadic. It is a breeding resident throughout The Gambia, where it generally breeds before or early in the rains (Barlow *et al.* 1997), and is probably resident in northern Cameroon (Scholte *et al.* 1999). However, there are some migratory and nomadic movements within West Africa, with birds generally moving north during the wet season in some areas. Such northward movements have been reported for the wet season in Mali and Chad (Wiersma 1996). It is an uncommon visitor to Liberia, with no definable pattern (Gatter 1997). It is resident in Ghana, with breeding recorded between April and July (Grimes 1987). Breeding in Côte d'Ivoire is recorded from December to April (Thiollay 1985); birds are present throughout the year in the mesic regions and only during December to April in the drier regions. It is largely resident in Nigeria, but occurs in the far north and the south only during the rainy season (Elgood *et al.* 1994). It breeds in the northern savannas of the Democratic Republic of Congo (Uelli and Ubangi regions) between February and March, but it is completely absent during the middle of the rainy season, when birds must migrate northwards, as they are unknown in the forest block to the south (Chapin 1939).

In the Ethiopian highlands, *major* is probably an altitudinal migrant. There are seasonal movements in Ethiopia (Archer & Godman 1937), and it has been reported around Addis Ababa only during July to October.

The birds occurring from Angola south to the Okavango and Caprivi ("*solitaneus*") appear to be largely resident, with no clear movements defined. Irregular movements in response to flooding have been reported from *lateralis* in East Africa and Zambia (Keith 1986). This form is generally local in the western plateau of Kenya, but small parties can wander to the eastern plateau, where it is most likely a non-breeding visitor (Lewis & Pomeroy 1989). In Southern Africa, *lateralis* appears to be a partial altitudinal migrant (Underhill *et al.* 1999); there is some evidence that birds at high altitudes in South Africa vacate their breeding grounds in the austral winter (April to August) (Taylor *et al.* 1999) and may move as far as Zimbabwe (Ward & Tree 1997). Numbers in southern Mozambique similarly peak from July to August (Parker 1999). In Zambia, birds are thought to move out of the

African Wattled Lapwing

Vanellus senegallus



country when their habitat is flooded, possibly to northern Botswana and northern Namibia (Ward & Tree 1997). Tree (*in litt.* 2008) noted regular movements southwards from Zambia's Kafue Basin as the rains became established. The breeding season in Southern Africa is from September to January (Ward & Tree 1997).

In summary, *senegallus* is a resident and partial rains migrant in West Africa, also showing irregular, nomadic tendencies; *major* is a partial altitudinal migrant in Ethiopia; "*solitaneus*" is largely resident in south-western Africa; and *lateralis* is resident across much of its range, but is a partial altitudinal migrant in some areas, and moves in response to rains in others.

Population limits

Four populations are recognised, three corresponding to the widely accepted subspecies, and a fourth to the weakly defined "*solitaneus*" in south-western Africa:

1) nominate *senegallus* in the Sahel zone, from south-western Mauritania, Senegambia and Liberia east to Sudan, north-eastern Democratic Republic of Congo and northern Uganda;
2) *major* from northern Eritrea to the Harar Plateau (in north-eastern Ethiopia), south through western and central Ethiopia to Lake Turkana;
3) *lateralis* from southern and eastern Democratic Republic of Congo, central Uganda and Kenya to Botswana and South Africa;
4) *lateralis* ("*solitaneus*") from Congo through Angola to the Okavango Basin and Caprivi Strip.

Population size

1. *senegallus*

Population estimate	1% threshold	Population trend
25,000-60,000	450	Unknown

In West Africa, this lapwing is widespread, but tends to avoid arid areas. It is common to locally abundant throughout The Gambia (Barlow *et al.* 1997) and common in northern Cameroon (Scholte *et al.* 1999). However, it is rather rare in the Inner Niger Delta, Mali, where Van der Kamp & Diallo (1999) report only singles or pairs south of the central area surveyed, although it is more frequently encountered in peripheral areas of the Delta (O. Girard *in litt.*). Brouwer & Mullié (2001) report it to be thinly spread in Niger, and suggest a total population estimate for the species of C or D (25,000-1,000,000). Nikolaus (1987) considered it to be fairly common in Sudan. However, the January counts do not reveal high numbers of this species: 375 were recorded in the AfWC in January 1998, including 348 in The Gambia, and 216 were also counted at Waza Logone in Cameroon (Dodman *et al.* 1999); 559 were recorded in West Africa in January 1999, including 302 in Ghana, and a further 144 were recorded in Cameroon and Chad (Dodman & Diagana 2003). V. Parker (*in litt.2002*) estimated the total population of *senegallus* at 20,000-100,000 individuals, and Scott (2002) recommended a population estimate of C (25,000-100,000). In considering the rather low counts and generally low density of this species across its range, Dodman (2002) revised the upper limit of this estimate down to 60,000, and this revised estimate of 25,000-60,000 was adopted in *WPE3* and *WPE4*.

2. *lateralis* (*solitaneus*)

Population estimate	1% threshold	Population trend
B/C (10,000-100,000)	Provisionally 1,000	Unknown

The African Wattled Lapwing is a common resident in Angola in dry, moist and marshy grassland and dambos, and is found across most of the country (Pinto 1983, Dean 2000). It is also a fairly common to common resident of the Okavango, Linyati and Chobe river systems in northern Botswana (Penry 1994). V. Parker (*in litt.* 2002.) gave an estimate for *solitaneus* and *lateralis* combined of 50,000-100,000 individuals, while Scott (2002) recommended a population estimate of C (25,000-100,000) for *solitaneus* alone. Because of the uncertainty, Dodman (2002) proposed a slightly broader range of B/C (10,000-100,000), and this was adopted in *WPE3* and *WPE4*.

3. *lateralis*

Population estimate	1% threshold	Population trend
C (25,000-100,000)	Provisionally 1,000	Stable

In East Africa, this population is widespread but local up to 2,200 m on damp, short grass by lakes, swamps and streams in Uganda (south of Masindi to Elgon), western Kenya and western Tanzania (Britton 1980). It is widespread and often common in the moister regions of Uganda, but it is not usually numerous, with flocks of 50 birds being exceptional (Carswell *et al.* 2005). Concentrations of up to 150 have been reported in Rwanda (Keith 1986). It is widely recorded in the main drainage basins of Tanzania (Baker & Baker 2005). The general picture is of a widespread but low-density species, evidenced by fairly low counts in AfWC surveys: 223 were recorded in Uganda during the January 1998 AfWC (Dodman *et al.* 1999), whilst 279 were recorded in nation-wide counts in Tanzania in January 1995 (Dodman & Taylor 1995). Further south, it is a common wetland bird in Zambia and Zimbabwe. Concentrations of over 50 are not uncommon on the Kafue Flats of Zambia. Some 476 were recorded in Southern Africa in the AfWC counts in July 1997, 337 in January 1998 (Dodman *et al.* 1998) and 456 in January 2001 (Dodman & Diagana 2003). Underhill *et al.* (1999) gave an estimate of 10,000-20,000 for the population in Southern Africa south of the Zambezi, while Parker (1999, 1994) produced estimates of 1,000 for southern Mozambique and 700 for Swaziland. Scott (2002) recommended a population estimate of C (25,000-100,000), and this was adopted in *WPE3* and *WPE4*.

4. *major*

Population estimate	1% threshold	Population trend
5,000-15,000	100	Unknown

The form *major* is widespread in Ethiopia, and described by Urban & Brown (1971) as frequent to uncommon in aquatic grasslands and savannas. It is most numerous in western and central Ethiopia, and also occurs in Eritrea. A total of 161 were counted in Ethiopia in January 2001 (Dodman & Diagana 2003). V. Parker (*in litt.* 2002) suggested a population estimate of 5,000-15,000, and this was adopted in *WPE3* and *WPE4*.

Conservation status

None of the four populations appears to be under threat. The species may be increasing in some areas due to exploitation of man-made habitats. There were no major changes in its distribution in Southern Africa during the twentieth century, and in some areas, it has adapted well to man-modified habitats (Ward & Tree 1997).

Habitat and ecology

The African Wattled Lapwing is primarily a bird of marshlands. It sometimes remains where marshes have dried up, and is also encountered in other dry-land habitats, including areas of short or recently burnt grass and cultivated lands. It usually occurs in pairs, but sometimes gathers in flocks that may exceed 100 birds. It feeds mostly on large insects and also aquatic invertebrates and plant seeds. Breeding seasons vary across its range, but usually seem to occur before the rains.

Network of key sites

The species is widely dispersed at a large number of wetlands, grasslands and other areas, and generally occurs at low population density. However, one key breeding site can be identified for *lateralis*, the Grassland Biosphere Reserve in Mpumalanga and Free State Provinces of South Africa, which has been found to support about 300-500 pairs.

Protection status of key sites

The Grassland Biosphere Reserve in South Africa is partially protected, but is severely threatened by grassland afforestation, wetland degradation and increased acid rain from local power-station sulphur emissions (Barnes & Tarboton 1998a).

Table 22. Key sites for African Wattled Lapwing. Sites where 1% or more of a population has been recorded

Country	Site	Lat.	Long.	Season	Max total	Year max	Average total	Basis for average	Source	Population(s) at site
South Africa	Grassland Biosphere Reserve	-27.25	30.02	Breeding	1500 300-500 pr				WBDB	*lateralis*

Tim Dodman & Vincent Parker

Vernon Lundy

Spot-breasted Lapwing
Vanellus melanocephalus

Geographical variation and distribution

The Spot-breasted Lapwing has a restricted distribution in the highlands of Ethiopia, where it is locally frequent to common. It occurs mainly above 3,000 m in the Simen Mountains and highlands north of Gondar south at least to Shoa District, and in highlands south-east of the Ethiopian Rift Valley in Arussi and Galla Districts (Urban & Brown 1971, Urban *et al.* 1986). The total range of the species is about 170,000 sq.km (BirdLife International 2004b).

Movements

The species is essentially resident within its highland habitat, but there are local seasonal movements, presumably in relation to rainfall and resulting feeding conditions within the upland grassland plains. North of Gondar (in the north-western part of the central highlands), a few birds are present all year, but large numbers appear in the rainy season (Olson 1976). It occurs at Berga Floodplain (75 km west of Addis Ababa) in large numbers as the plains dry out, and also at Sululta Plain when it dries out, especially between October and January (Ethiopian Wildlife & Natural History Society 2001).

Population limits

Only one population is recognised, the entire population of the species.

Population size

1. Ethiopia (entire population of the species)

Population estimate	1% threshold	Population trend
A (<10,000)	Provisionally 100	Unknown

Counts during IBA surveys in the 1990s included 136 in the Guassa area of Menz, 120 at Sululta Plain and 210 at Gudo Plain. Large numbers have been recorded at Berga Floodplain and over 50 pairs have been found breeding in the Bale Mountains National Park (Ethiopian Wildlife & Natural History Society 2001). Fishpool & Evans (2001) gave a population estimate of A (<10,000) based on advice from the Ethiopian Wildlife & Natural History Society, and this estimate was adopted in *WPE3* and *WPE4*.

Conservation Status

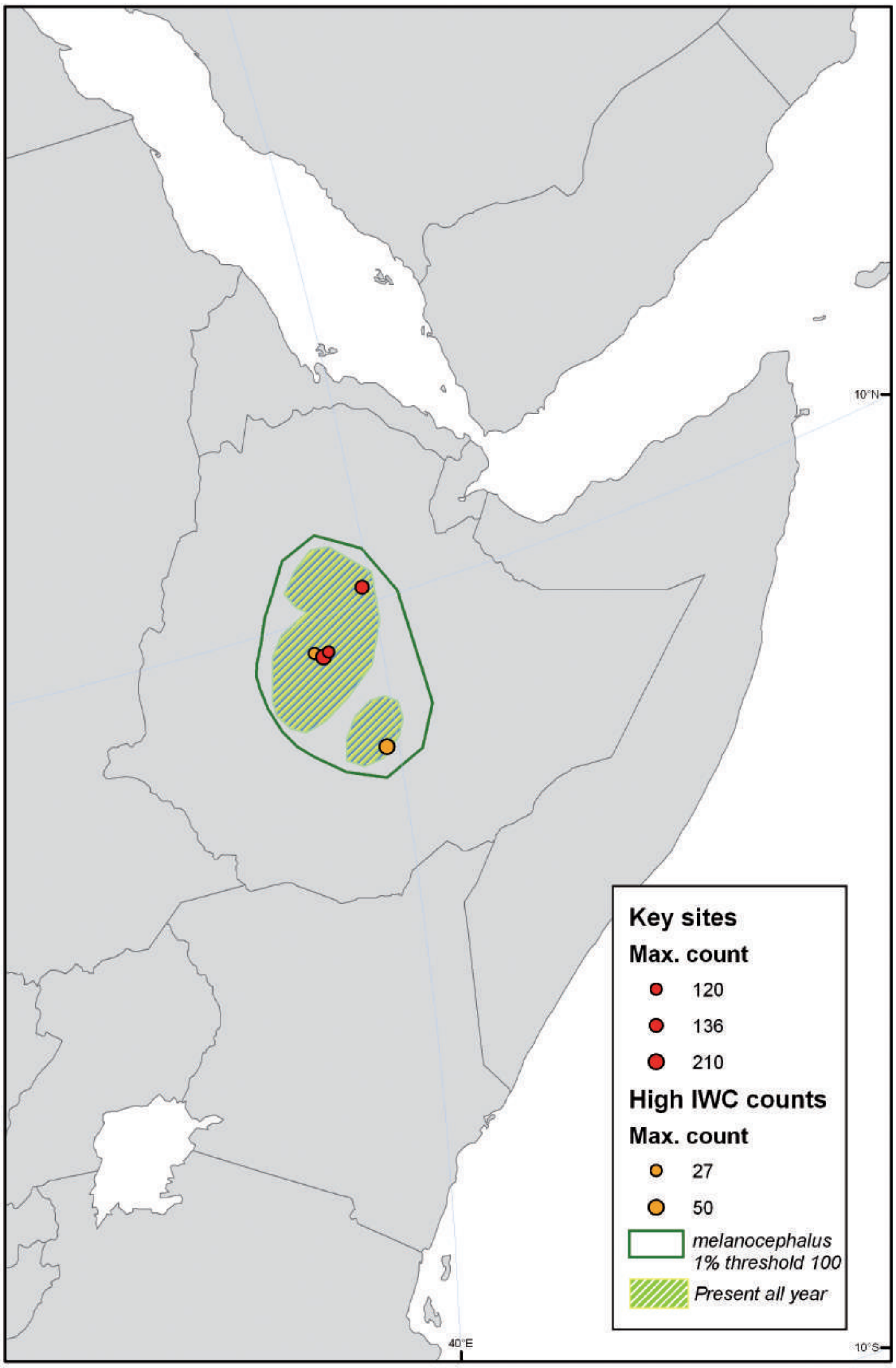
The Spot-breasted Lapwing is not considered to be threatened. However, its restricted range and small population do not allow for complacency, and it will be essential to monitor the species closely, especially as some areas of its upland habitat are used extensively by man. Most key sites are unprotected.

Habitat and Ecology

The Spot-breasted Lapwing inhabits highland grassland, moorlands with Giant Lobelia, Giant Heath, *Alchemilla* and tussock grass, marshes, streams and damp meadows at altitudes between 1,800 and 4,100 m. It often occurs on cattle pastures, and normally occurs in pairs or small parties, although outside the breeding season it is also found in large flocks (Urban *et al.* 1986). Breeding is reported for April in the Bale Mountains and August in Shoa District (Urban *et al.* 1986).

Spot-breasted Lapwing

Vanellus melanocephalus



Network of key sites

Four key sites have been identified for the Spot-breasted Lapwing: Bale Mountains National Park (a breeding area with over 50 pairs) and three non-breeding sites, the Guassa area of Menz, Sululta Plain and Gudo Plain. The Geech Plateau in Simen Mountains National Park and the Choke Mountains are thought to be important breeding areas, and good numbers of non-breeding birds have been reported on Berga Floodplain (Ethiopian Wildlife & Natural History Society 2001). All of these sites have been identified as IBAs (Fishpool & Evans 2001), and all apart from the Bale Mountains fall within the Central Ethiopian Highlands Endemic Bird Area, which has an area of 120,000 sq.km (Stattersfield *et al.* 1998).

Protection status of key sites

The Bale Mountains National Park was established in 1970 but not legally gazetted, and areas such as the Sanetti Plateau are heavily grazed and subject to other human pressures (Ethiopian Wildlife & Natural History Society 2001). The Guassa area of Menz, although not formally protected, has been under a successful traditional conservation system, but this appears to have broken down in recent years (Ethiopian Wildlife & Natural History Society 2001). Sululta Plain and Gudo Plain are unprotected, and are used mainly for grazing and harvesting of vegetation (Ethiopian Wildlife & Natural History Society 2001), although these activities probably do not affect the Spot-breasted Lapwing in any significant way. Simen Mountains National Park was gazetted in 1969, but was effectively robbed of this status in the 1980s by civil unrest and consequent widespread human activities; however, some rehabilitation is now underway (Ethiopian Wildlife & Natural History Society 2001). Berga Floodplain and the Choke Mountains are unprotected, and the latter is severely threatened by rapid agricultural expansion, overgrazing and soil erosion.

Table 23. Key sites for Spot-breasted Lapwing. Sites where 1% or more of a population has been recorded

Country	Site	Lat.	Long.	Season	Max total	Year max	Average total	Basis for average	Source
Ethiopia	Bale Mountains National Park	06.75	39.72	Breeding	150 50+ pr	1990s			WBDB
Ethiopia	Guassa area of Menz	10.37	39.8	Non-breeding	136	1990s			WBDB
Ethiopia	Gudo Plain	9.13	38.58	Non-breeding	210	1990s			WBDB
Ethiopia	Sululta Plain	09.20	38.72	Non-breeding	120	1990s			WBDB

Tim Dodman & Simon Delany

Ian Nason

Brown-chested Lapwing
Vanellus superciliosus

Geographical variation and distribution

The monotypic Brown-chested Lapwing is an intra-African migrant, breeding north of the equator from Nigeria to northern Democratic Republic of Congo, and migrating south-east after the breeding season to southern Democratic Republic of Congo, Rwanda, Burundi, south-western Uganda, south-western Kenya and western Tanzania. The limits to both the breeding and non-breeding ranges are poorly known, and del Hoyo *et al.* (1996) noted, that there is "considerable scope for extensive survey work and research."

Movements

The Brown-chested Lapwing is an intra-African and trans-equatorial migrant, the only species of lapwing with clearly defined intra-African migrations. It is present in its known and presumed breeding range from Nigeria to the Central African Republic and northern Democratic Republic of Congo in the dry season (late November to early June). At the onset of the rainy season, it migrates south-east across the forest block of the Congo Basin to savanna areas around the forest rim in eastern Central Africa, eastwards as far as western Tanzania, where it is an uncommon non-breeding visitor (Baker & Baker 2005). It spends the non-breeding season in this area, and moves back to its breeding grounds in November. Adults migrate through central and eastern Democratic Republic of Congo in November and December, presumably on their way to the breeding areas, and return again with immature birds in July and August (Chapin 1939, Urban *et al.* 1986).

Population limits

Only a single population is recognised, the entire population of the species.

Population size

1. West, Central & East Africa (the entire population of the species)

Population estimate	1% threshold	Population trend
A/B (<25,000)	Provisionally 250	Unknown

The species is generally uncommon to rare, although local concentrations have been recorded in a few areas in its non-breeding range (Urban *et al.* 1986). Parties of up to 30 have been recorded on short grassland, newly burnt ground and lake shores in the Western Rift Valley in Uganda, and there have been occasional, scattered records from Tanzania and western Kenya (Britton 1980). There is also a record of a concentration of 100 in Rwanda (Urban *et al.* 1986), but overall the status of this lapwing is not well known. Fishpool & Evans (2001) gave a population estimate of A/B (<25,000 individuals), and this was adopted in *WPE3* and *WPE4*.

Conservation Status

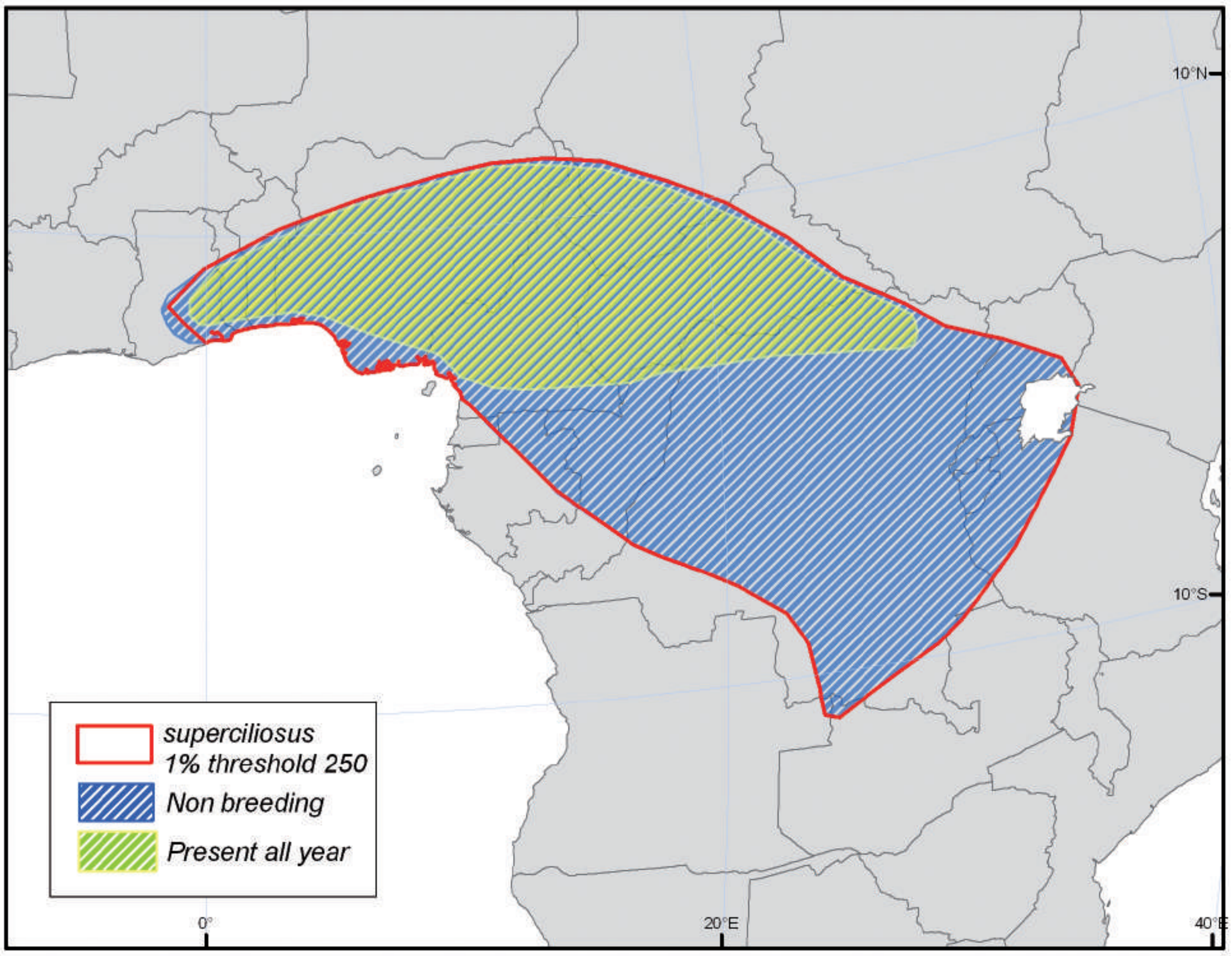
The status of the Brown-chested Lapwing is poorly known. It is generally uncommon to rare, with a rather low global population, and has a tendency to come into contact with human activities, especially in its breeding areas, where there is a potential for loss of habitat. It is possible, therefore, that the species has an unfavourable conservation status, and there is a strong need to investigate this more closely. The A.P. Leventis Ornithological Research Institute at Jos, Nigeria, could be well-placed to lead such research.

Habitat and ecology

The Brown-chested Lapwing inhabits grasslands, open bare areas by rivers and lakes, recently burned areas and cleared ground, including sports fields and lawns (Urban *et al.* 1986). Both grassy savanna and wooded savanna are used, and in Nigeria it inhabits "orchard bush". It has monogamous

Brown-chested Lapwing

Vanellus superciliosus



breeding habits, with recently burned ground preferred as the site for the nest and territory (Urban *et al.* 1986). It occurs in small flocks outside the breeding season.

Network of key sites

No key sites can be identified from AfWC data. However, it is likely that there are key sites for the species, notably at favoured breeding sites in Nigeria. One such site could be the Kagoro-Nindam Forest Reserves IBA in Kaduna region, central Nigeria, where nests of this lapwing were found in 1987 and 1997 (Ezealor 2002). Breeding has also been recorded in central regions of Nigeria at Onitsha and the Sanga River Forest Reserve (Elgood *et al.* 1994) and in south-eastern Ilorin Province (Clarke 1936).

Protection status of key sites

The potential key site at Kagoro-Nindam is subject to a number of threats, such as slash-and-burn agriculture, indiscriminate logging, poaching, livestock-grazing and forest fires (Ezealor 2002), although not all of these would have an impact on the Brown-chested Lapwing population.

David Stroud, Tim Dodman & Simon Delany

Jan Seveik

Red-wattled Lapwing
Vanellus indicus

Geographical variation and distribution

The Red-wattled Lapwing has a wide distribution in southern Asia from extreme south-eastern Turkey to Indochina. Four subspecies are generally recognised: the nominate form in eastern Pakistan, India, Nepal and Bangladesh; *lankae* in Sri Lanka; *atronuchalis* from north-eastern India and Myanmar to Malaysia and Vietnam; and *aigneri* in south-eastern Turkey, Iraq, southern and eastern Iran, southern Turkmenistan, eastern Arabia, Afghanistan and Pakistan east to the Indus. *V. i. aigneri* appears to be in the process of spreading up the Tigris Valley in south-eastern Turkey, where it was first discovered breeding in 1983 (Snow & Perrins 1998).

Movements

The Red-wattled Lapwing is mainly sedentary throughout most of its range, but subject to a certain amount of dispersal in response to rainfall or drought. The small numbers of birds breeding in southern Turkmenistan are migratory, probably wintering in Afghanistan or Pakistan and returning to Turkmenistan in the second half of April (Perennou *et al.* 1994, del Hoyo *et al.* 1996). In southern Iran, the Red-wattled Lapwing appears to be almost entirely sedentary, with many birds remaining on their breeding territories throughout the year, but locally there is some concentration of birds around wetlands during the winter months (D.A. Scott pers. obs.). In Kuwait, it is a rare winter visitor, with evidence of passage between October-November and February-March (Snow & Perrins 1998). In the United Arab Emirates, it is partly resident and partly dispersive, most appearing only during the breeding season from March to July (Richardson 1990a).

Population limits

Waterbird Population Estimates recognises four populations, corresponding to the populations of the four subspecies. Only one of these, *aigneri*, occurs in the area covered by this Atlas.

Population size

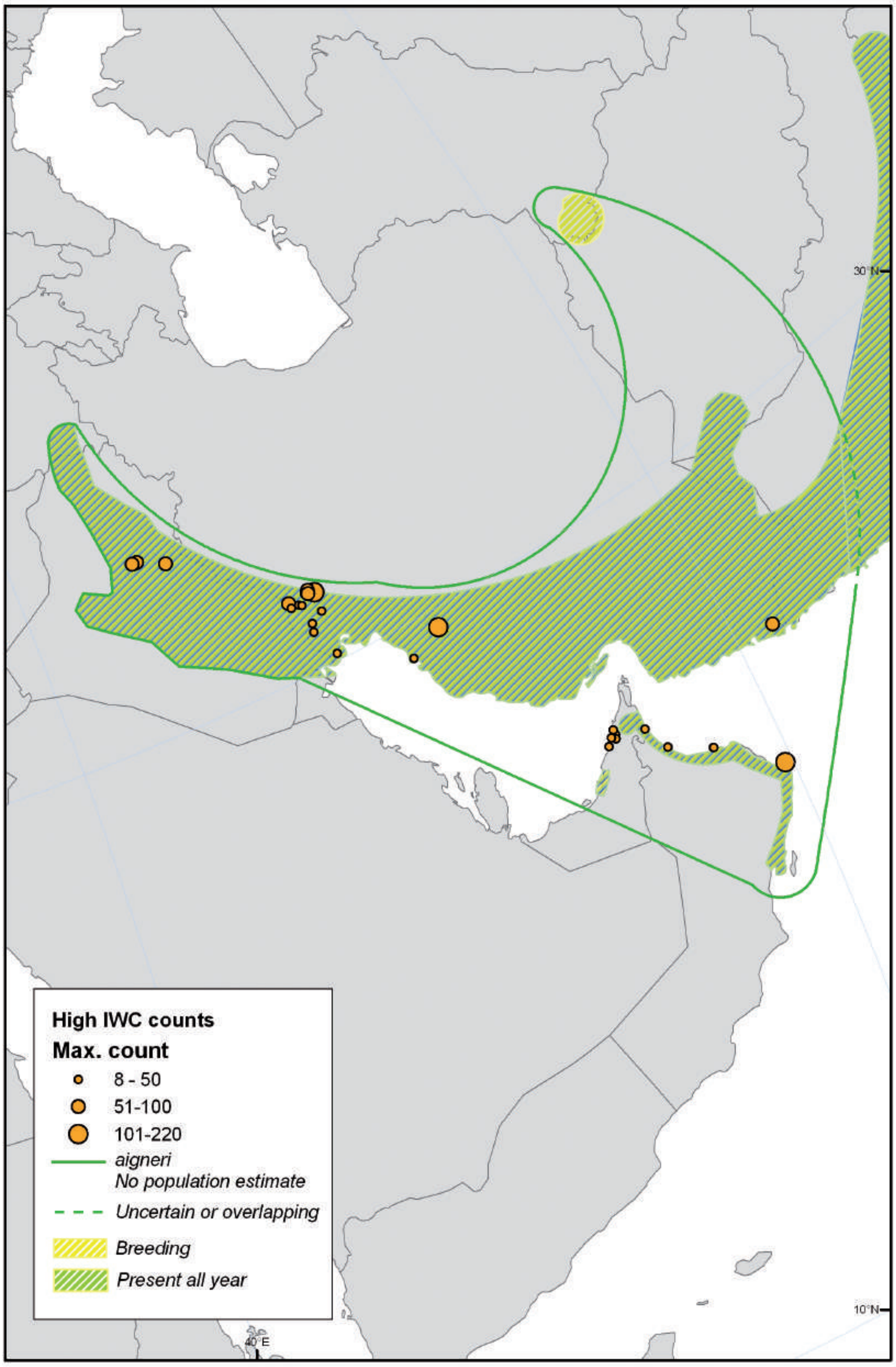
1. *aigneri*

Population estimate	1% threshold	Population trend
Unknown	Not established	Unknown

This population remains poorly known, and no attempt has been made to give an estimate of population size in *Waterbird Population Estimates*. As a widely dispersed species of semi-arid areas, often occurring far from wetlands and seldom congregating in any numbers, the Red-wattled Lapwing is poorly covered by the IWC, and no reliable estimation of population size is possible from the winter counts. Perennou *et al.* (1994) gave a very rough estimate of 25,000-1,000,000 for the South-west Asian population, although the IWC data at that time could account for only 5,150 birds. BirdLife International used 1% thresholds of 20 pairs and 50 individuals in the Middle East Important Bird Areas Project, implying populations of only 2,000 breeding pairs or 5,000 birds (Evans 1994). However, del Hoyo *et al.* (1996) suggested that South-west Asia held in the order of 100,000 birds. The highest national midwinter totals from within the range of *aigneri* since 1989 have included 1,826 in Pakistan (1999), 597 in Iran (1991), 87 in Oman (1995) and 82 in the United Arab Emirates (IWC Reports). Only single individuals were reported from Saudi Arabia and Qatar, and none was recorded during the few censuses in Bahrain, Kuwait and Yemen (IWC Reports). A maximum of 131 was recorded in four midwinter waterbird surveys in Iraq between 1968 and 1979 (Scott & Carp 1982), but none were recorded in seven midwinter waterbird censuses in Afghanistan between 1969 and 1976 (Perennou *et al.* 1994).

Red-wattled Lapwing

Vanellus indicus



Exceptionally high counts of 2,864 reported from Iran in 1996 (Delany *et al.* 1999) and 8,645 reported from Oman in 1999 (Gilissen *et al.* 2002) are now thought likely to be erroneous.

Conservation status

Little information is available. The Red-wattled Lapwing remains common and widespread in southern Iran, and may be benefiting from the rapid spread of irrigated agriculture into arid areas in recent decades, especially in Persian Baluchestan. A large part of the South-west Asian population occurs in and around the Mesopotamian Marshes in Iraq, where vast areas of wetland habitat were destroyed in the 1990s. It seems likely that the species suffered a major decline in numbers as a result of this habitat destruction, but with the re-flooding of the marshes that is currently taking place, some recovery in the population might be expected. Unfortunately, civil unrest and warfare have prevented any proper surveys in Iraq for over 25 years. The spread of the species into south-eastern Turkey may now have ceased, as the breeding population, estimated at 40-80 pairs in 2001, is now thought to be stable (BirdLife international 2004a).

Habitat and ecology

The Red-wattled Lapwing mostly inhabits open country inland, at altitudes up to 1,800 m, with access to fresh or brackish water, including jheels, tanks, mud banks, canals, rivers, ditches and puddles, especially in cultivated areas such as cornfields, ploughed land, fallows and large, irrigated gardens or nurseries. It commonly occurs around human habitation, and can survive well even in densely populated areas, provided there are areas of waste ground or abandoned cultivation, and some surface water in irrigation ditches or sewage outfalls. It is monogamous, solitary and territorial in the breeding season, and not highly gregarious at other times of the year. It nests on the ground, in the open, usually near water, and feeds, usually at night, on insects, especially beetles.

Network of key sites

No key sites have been identified. The Red-wattled Lapwing is a largely sedentary species occurring at relatively low densities throughout its wide range in South-west Asia. It seems unlikely that there are any sites that regularly hold over 1% of the total population, and the key site approach is inappropriate in the conservation of this species.

Simon Delany & Derek Scott

Leander Khil

Sociable Lapwing

Vanellus gregarius

Geographical variation and distribution

The Sociable Lapwing is a monotypic species, breeding in the grassland steppes of southern Russia and North Kazakhstan. Once far more widespread, the breeding population is now confined to the steppes between the Volga and Ural rivers (Serebryakov 1997). Most birds apparently migrate south-west to winter in North-east Africa (possibly mainly Sudan). Some birds migrate south to winter in Pakistan and North-west India. Very small numbers have been found wintering in the Middle East. Old records of birds wintering in Iraq have been discounted (Kasparek 1992). The species was formerly a regular winter visitor and passage migrant in Egypt, but there have been only fifteen sightings since 1950 (Goodman and Meininger 1989).

Movements

Sociable Lapwings leave their breeding grounds by August-September. Most birds apparently migrate south-west through the Central Asian Republics, Turkey and the Middle East to wintering grounds in North-east Africa, where they arrive from late October onwards. Much smaller numbers migrate south to Pakistan and North-west India (BirdLife International 2000, Wetlands International 2000).

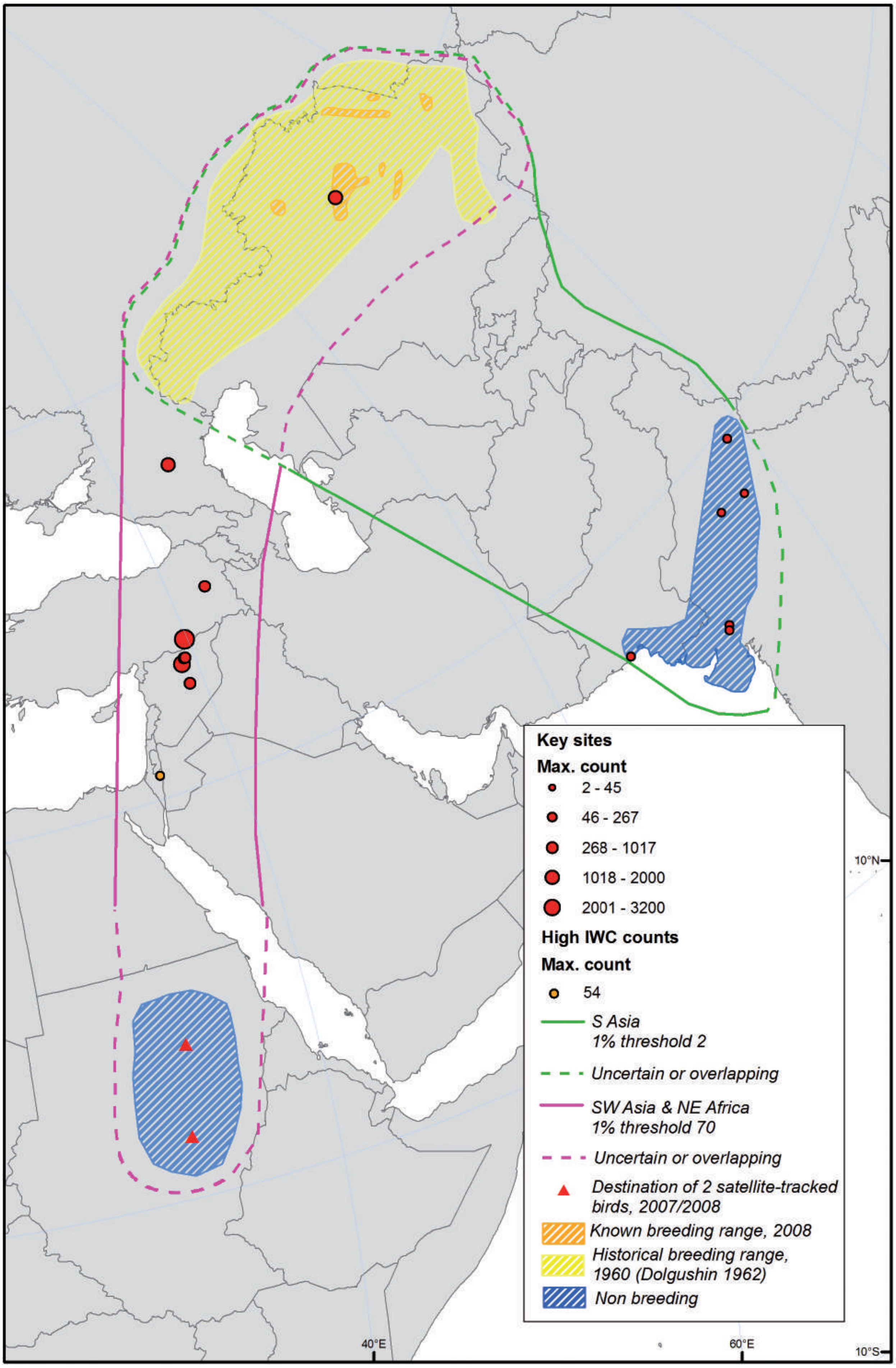
Two birds from the western wintering population were successfully satellite tagged in the autumn of 2007: http://www.birdlife.org/news/news/2008/02/sociable_lapwing_sudan.html). They left Korgalzhyn Lake in Kazakhstan on August 3 2007 and arrived near Viranşehir, Turkey, around October 8th. They left Turkey in late October, arriving in Sudan on November 3. Birds taking this route stage at wetlands on the steppes north of the Caucasus, with flocks of up to 700 in 2005 (J. Kamp *in litt.*) and up to 236 in the wetlands of the Kuma-Manych Depression, Stavropol Region, on 9 September 2006 (Field *et al.* 2007). Migrating flocks in autumn have also been observed in eastern Turkey, *e.g.* up to 155 individuals in Malazgirt and Bulanýk Plain in eastern Anatolia in October 2002 (Eken *et al.* 2006 *in* Bozdogan *et al.* 2007). A stunning 3,200 Sociable Lapwings were counted in the Ceylanpýnar area, South-east Turkey, on 13 October 2007 (RSPB press release cited in Hofland & Keijl 2008). These birds were found during searches for the satellite tagged individuals which had arrived in the area the previous week. Small flocks have been recorded on passage in Syria and Israel from September to November (Shirihai 1996, Murdoch & Serra 2006). Modest numbers of birds spend the winter in the western Negev in Israel: 19-54 annually, even up to 115 in 1984/85 (although this record was discarded by Shirihai (1996)), but not more than 25 have been counted there since 2000 (O. Hatzofe *in litt.*). The majority apparently continues on south to winter in northern Sudan and possibly in northern Eritrea. Records in Chad are now thought to be erroneous. An isolated record from Cameroon in 2005 may relate to a vagrant or to a wintering bird at the western extremity of the wintering range (J. Kamp *in litt.*) . Vagrants are also occasionally found in winter among Northern Lapwings in Europe, the Arabian Peninsula (United Arab Emirates and Oman) and the Persian Gulf coast of Iran (three birds in February 2006 and one in January 2007, Tohidifar & Zarei, 2007).

Birds using the eastern route spend the winter in Saurasthra and North Gujarat, West India, where 27 birds were found in 2006 and 45 in 2007 (Sharma *et. al*. and A. Demourari to J. Kamp *in litt*.).

Spring migration begins early, with birds leaving their wintering areas in Africa in February and March and occurring on passage in Israel and Syria from mid-February and in Turkey from early March onwards (Bozdogan *et al.* 2007, Hofland & Keijl 2008). Important spring staging areas were discovered in 2007 in northern Syria and eastern Turkey, where near-simultaneous counts in early March 2007 gave totals of about 2,000 and 1,017 birds, respectively (Bozdogan *et al.* 2007,

Sociable Lapwing

Vanellus gregarius



Hofland & Keijl 2008). A sighting of four birds in Gomishan wetland, North Iran, in April 1999 is one of the very few records giving insight in the spring migration phenology of birds belonging to the eastern population (Ghaemi 2006). The birds arrive back on their breeding grounds in mid-April to early May (Piersma and Wiersma 1996).

Both colour-ringing and satellite-telemetry have demonstrated that birds from as far east as 70ºE take the westerly route towards Africa (J. Kamp *in litt.*, http://www.birdlife.org/news/news/2008/02/sociable_lapwing_sudan.html). A bird ringed as a chick near Tengiz Lake in Kazakhstan (also at 70ºE) and recovered in the Seistan basin (61ºE) on the Iran/Afghanistan border in October of the same year (Argyle 1975) might well have been on its way to Pakistan/India or to North-east Africa.

Population limits

Two populations are recognised on the basis of separate wintering areas: a relatively large population migrating south-west from the breeding areas to winter in North-east Africa; and a much smaller population migrating south to winter in Pakistan and India. Until now, ringing recoveries or satellite-tagged birds have failed to demonstrate a divide between a western and eastern breeding population. The eastern population is outside the geographical area covered by this Atlas, but it has been included to allow complete coverage of the current known status this highly threatened species.

Population size

1. South-west Asia & North-east Africa (non-breeding)

Population estimate	1% threshold	Population trend
3,200-11,000	70	Strong decrease

The first two editions of *Waterbird Population Estimates* (*WPE*) gave an estimate of <10,000 individuals for this population. Assessments in 2000 and 2001 (Khrokov 2000, Khrokov & Buketov 2000, BirdLife International 2001) concluded that there were no more than 1,000 breeding pairs in the total range of the species. Data from the wintering range are sparse and until now not very useful for deriving estimates; the largest flock recorded historically from Africa was of 150 in Eritrea (Smith 1957). Despite reported declines (e.g. Nikolaus & Hamed 1984), it appears that the species was never common in Sudan, being cited as rare by Wedgwood Bowen (1926) and local and scarce by Cave & Macdonald (1955). On the other hand, it remains unclear how thorough censuses in the wintering areas have been in the past. Satellite-tagged birds have spent the winter in Sudan in 2007 and this appears to be the only wintering area of the western population currently known, apart from the very small number spending the winter in Israel. At an international workshop held in 2001 to produce an International Action Plan for the Sociable Lapwing, it was concluded that the total population of the species was only 171-516 pairs (Tomkovich & Lebedeva, 2002). This estimate, rounded to 200-600 pairs, equates to 600-1,800 individuals. Stroud *et al.* (2004) assigned 400-1,200 of these birds to the western population (following E.A. Lebedeva & P.S. Tomkovich *in litt.*), and this estimate was adopted in *WPE3* and *WPE4*. However, it is now evident that this was an underestimate. Surveys on the breeding grounds in Kazakhstan in 2006 found 376 pairs in 7% of the potentially suitable habitat over the entire breeding range and extrapolation resulted in a total breeding population estimate of 5,612 pairs (Sheldon *et al.* 2006). Given the uncertainty of the extrapolation, it seems safe to estimate the total world population to number between 3,200 (the size of the largest single flock seen on migration) and 11,000 birds (double the total extrapolated by Sheldon *et al.* 2006). The 1% threshold is set at 70 birds.

2. Southern Asia (non-breeding)

Population estimate	1% threshold	Population trend
200	2	Decrease

Perennou *et al.* (1994) considered that the small number of birds wintering in northern India and Pakistan might possibly constitute a discrete population and gave a provisional estimate of <10,000, although they considered that the total number was probably less than 1,000. The first two editions of *WPE* adopted the lower figure of 1,000. Stroud *et al.* (2004) revised the estimate on the basis of the International Action Plan (Tomkovich & Lebedeva, 2002), assigning 200-600 of the estimated total population of 600-1,800 individuals to the eastern population (following E.A. Lebedeva & P.S. Tomkovich *in litt.*). This estimate of 200-600 was adopted in *WPE3* and retained in *WPE4*. J. Kamp (*in litt.*) has suggested that the actual figure is unlikely to be much more than 200, with numbers after 2000 never exceeding 45 birds at a single site. Therefore, until more information is available from this end of the flyway, the population estimate is conservatively set at 200 birds.

Conservation status

The Sociable Lapwing is a globally threatened species. It was listed as Vulnerable on the IUCN Red List by BirdLife International (2000), but was subsequently reassessed as Critically Endangered (BirdLife International 2004b).

There was a marked contraction of the breeding range and decline in numbers throughout eastern Europe and parts of western Asia during the twentieth century, a decline that commenced in the 1970s or earlier (Nikolaus & Hamad 1984) and is apparently continuing. In his review of the species' status north of the Caspian, Shevchenko (1998), however, considered numbers to have been broadly stable until about the mid-1970s. In northern Kazakhstan, numbers fell by 40% between 1930 and 1960, and by a further 50% between 1960 and 1987 (Belik 1994c). In this region, the largest post-breeding flocks between 1970-2002 have numbered only some tens of birds (Piersma and Wiersma 1996). There has also been a major decline in the numbers observed on spring migration in the region between the Volga and Ural rivers, with only very small numbers now being seen each year (Shevchenko 1998). In the Saratov region of Russia, the species has not been observed breeding since 1989 (Piskunov & Belyachenko 1999). These declines have been attributed mainly to the conversion of grassy steppes into arable land and the consequent increase in grazing pressure on remaining grasslands (Belik 1994a, 1994c).

Shevchenko (1998), however, considered the causes of the decline to be more complex. Whilst loss of natural habitats since the 1960s will have negatively affected the population, he considers that the ultimate cause has been a marked increase in regional climatic aridity in recent decades. This has had the consequence of forcing birds from remaining natural habitats (which have now become unsuitable for breeding) to other (sub-optimal) grassland areas managed by man (riverside meadows and "limans"). In these areas, there is a greater risk of disturbance from humans. Such areas are also subject to excessive levels of grazing, leading to high levels of nest destruction as a consequence of trampling by cattle. Indeed, a marked shift in habitat selection was noted at the time of the first declines in the 1970s. This hypothesis suggests that climate change and habitat destruction have resulted in a forced move from optimal to sub-optimal habitats where levels of production have been low and mortality high. This has resulted in a rapid collapse of the population. Shevchenko (1998) noted that declines had also occurred in reserves ("zapovedniks" and "zakazniks") where there had been no habitat modification, which also pointed to wider climatic influences. Within the breeding range, the annual probability of drought conditions has increased from 5-8% to 20% over the last 40 years (Shevchenko 1998). Climate change is not, however, thought to have had a significant influence on the population in the Tengiz-Korgalzhyn area of Central Kazakhstan, where several hundred breeding birds have been found in recent years (Eichhorn & Heinicke 2000) and the same goes for northern Kazakhstan (Sheldon *et al.* 2006). The results of a recent study of two colonies in Kazakhstan suggest that nesting by Sociable Lapwings in areas where densities of grazing livestock are high leads to very low egg survival, and this may be the principal reason for the decline of the species in that area (Watson *et al.* 2006).

Sociable Lapwings are also severely threatened on migration: conversion of natural habitat into arable land is probably a largely underestimated factor. In Syria in early spring 2007 after a particularly wet winter, all *c*. 2,000 Sociable Lapwings observed were concentrated on just a few patches of grazed natural steppe, while no birds were observed on adjacent cultivated or fallow fields (Hofland and Keijl 2008). Moreover, hunting in the Middle East is a major threat: hunting is common practice in this region, and in the few areas frequented by the birds they tend to stay in close flocks, constituting an easy target.

There is no information on threats on the wintering grounds, but conversion of natural habitat and hunting may take their toll. The region of Sudan which was the destination of satellite tagged birds is remote and relatively undisturbed, but potential threats have not yet been investigated. Use of insecticides would be disastrous for this insectivore species. Even though work since 2005 has shown that earlier estimates were unduly pessimistic, this remains an extremely scarce and threatened species. All current information points to a strong decrease over the past decades and the Red List status of the species, although in need of review, is undoubtedly still justified.

Habitat and ecology

The Sociable Lapwing breeds on warm, semi-arid lowlands or low upland steppe, preferring dry inland terrain. The presence of water has often been stated as being important (*e.g.* Glutz von Blotzheim *et al.* 1975, Cramp and Simmons 1983, Piersma and Wiersma 1996), but the only recent observation of Sociable Lapwings near water was that of birds roosting in the Stavropol region. Interestingly, this period coincides with the flight feather moult (Hofland and Keijl 2008). In other seasons, the species is also found inland in dry waste areas, often near cultivation, ploughed fields and stubble fields (Snow & Perrins 1998). In the Middle East, it occurs in semi-deserts, steppes (Hofland and Keijl 2008) and bare or cultivated fields, including those with winter cereals (Porter *et al.* 1996). In Sudan, it was reported from the more arid regions well away from the river banks (Macleay 1960), whilst it has also been found in short grass savanna, highland grassland, *Panicum* steppe, burnt grassland, sandy wastes and coastal saltmarsh in Africa (Urban *et al.* 1986). It feeds almost exclusively on insects. It appears to be monogamous and is semi-colonial when breeding. One clutch is laid on the ground, in the open or in short vegetation, from mid-April in the south of the range to the second half of May in the north.

The birds form post-breeding flocks before departure from the breeding grounds from early August onwards (Snow & Perrins 1998). On the staging sites in spring, the birds stay in loose or rather tight feeding flocks of up to 1,200 birds (Hofland and Keijl 2008).

Network of key sites

The key sites for the western population have not been fully identified. Information for the eastern population is even more limited. Thus far, fourteen key sites have been identified (Table 26), eight of which belong to the western flyway. Syria seems especially important, with four sites. These sites however are all close together and may act as a single site. The area near Urim, western Negev, Israel (31.10N, 34.40 E), does not qualify as a key site, as this area has never held 70 or more Sociable Lapwings (but see under Movements). However, Sociable Lapwings are seen there virtually every year (Shirihai 1996), with 25 in 2000, 22 in 2003 and 9 in 2007 (O. Hatzofe *in litt.*). This site could be more important than the figures suggest: turn-over rate could be high and the site could act as a stepping-stone for migrating flocks in both spring and autumn. It is probably the northernmost regularly used wintering site of this species and is free of hunters.

Protection status of key sites

The southern side of the Chagraiskoje Reservoir, in South Russia, is a Regional Reserve of the Stavropol Region, the northern side is a Regional Reserve of the Kalmykia Region. Hunting is prohibited all year round, but fishing is allowed. Wardens are employed to ensure that laws are enforced. We have no information on the protection status of the Bulanik and Malazgirt steppe and Ceylanpýnar Key Biodiversity Area in Turkey. Ar Ruweira in Syria is a so-called rangeland reserve: it is meant to provide grazing for dromedaries, sheep and goats in times of drought. Hunting is officially orbidden throughout Syria. However, hunting with guns and falcons, for fun, food and medicinal cure, is common practice, both by Syrians and foreigners, the latter mainly from the Gulf States. Overgrazing in Syria is a great problem and the pristine steppe suffers from car traffic in places (Hofland and Keijl 2008). Four other - nearby - smaller steppe sites in Syria are unprotected. Vanod, Gujarat, India is a populated area and is unprotected. We have no information on the protection status of Tumeria Dam in India. The other sites in India and Pakistan are national parks.

Table 24. Key sites for Sociable Lapwing. Sites where 1% or more of a population has been recorded
The eastern population is outside the geographical area covered by this Atlas, but it has been included to allow complete coverage of the current known status this highly threatened species.

Country	Site	Lat.	Long.	Season	Max total	Year max	Source	Population(s) at site
Kazakhstan	Tengiz-Korgalzhyn Lakes	50.5	69.4	Breeding/ Post-breeding	787	2007	R. Sheldon & J. Kamp *in litt.*	NE Africa
Russia	Chagraiskoje Reservoir	45.30	44.25	September	1017	2005	Field *et al.* 2007	NE Africa
Turkey	Ceylanpýnar	36.51	40.03	October	3200	2007	RSPB, in Hofland & Keijl 2008	NE Africa
Turkey	Bulaniýk/Malazgirt	42.00	42.50	October	155	2002	in Bozdogan *et al.*	NE Africa
Syria	Al Fedha	35.02	39.04	February	113	2007	Hofland & Keijl 2008	NE Africa
Syria	Ar Ruweira	36.03	39.03	March	2000	2007	Hofland & Keijl 2008	NE Africa
Syria	Ar Ruweira	36.03	39.03	October	95	2008	D. Murdoch *et al. in litt.*	NE Africa
Syria	Al Aumair	36.26	39.39	February	192	2007	Hofland & Keijl 2008	NE Africa
Syria	Eiwa	36.27	39.29	February	267	2007	Hofland & Keijl 2008	NE Africa
Pakistan	Hingol National Park, Aghore	25.44	65.54	November	9	2006	Sociable Lapwing world database, J. Kamp *in litt*	Indian subcontinent
India	Little Rann of Kuch	23.32	71.83	November	27	2006	Sociable Lapwing world database, J. Kamp *in litt.*	Indian subcontinent
India	Vanod, Gujarat	23.49	72.00	November	45	2007	Sociable Lapwing world database, J. Kamp *in litt.*	Indian subcontinent
India	Keoladeo National Park (Bharatpur)	27.21	77.50	January	22	2004	Sociable Lapwing world database, J. Kamp *in litt.*	Indian subcontinent
India	Sariska Tiger Reserve	27.43	75.47	January	17	2001	IWC database	Indian subcontinent
India	Tumeria Dam	29.45	78.77	January	2	2002	IWC database	Indian subcontinent

Guido Keijl, Simon Delany Jeff Kirby, & Tim Dodman

Georges Olioso

White-tailed Lapwing
Vanellus leucurus

Geographical variation and distribution

The White-tailed Lapwing is a monotypic species, breeding in wetlands from central Iraq and the Caspian region east across Iran and the Central Asian Republics to about 70ºE. small numbers also breed in Europe in the Danube and Volga Deltas, It has two main centres of distribution: in the marshlands of Iraq and south-western Iran, and in the warm, temperate steppe zone of southern Kazakhstan, Turkmenistan and Uzbekistan. It is a scarce or irregular breeder further west in Azerbaijan, Armenia, Jordan, Syria, Turkey and Ukraine, and in the east in western Afghanistan and south-western Baluchestan Province, Pakistan (Cramp *et al.* 1983, Roberts 1991, Vaurie 1965). In recent years, it has also bred in the United Arab Emirates (Richardson & Aspinall 1998) and eastern Saudi Arabia (Snow & Perrins 1998).

The birds breeding in southern Iran and southern Iraq appear to be mainly sedentary, but there is some movement of birds out of breeding areas in south-central Iran, and the species is said to be a summer visitor to the northern parts of its breeding range in Iraq (Cramp *et al.* 1983). The birds breeding in the Central Asian Republics and north-central and north-eastern Iran are almost entirely migratory, although a few birds may overwinter in some years in south-western Turkmenistan (Cramp *et al.* 1983).

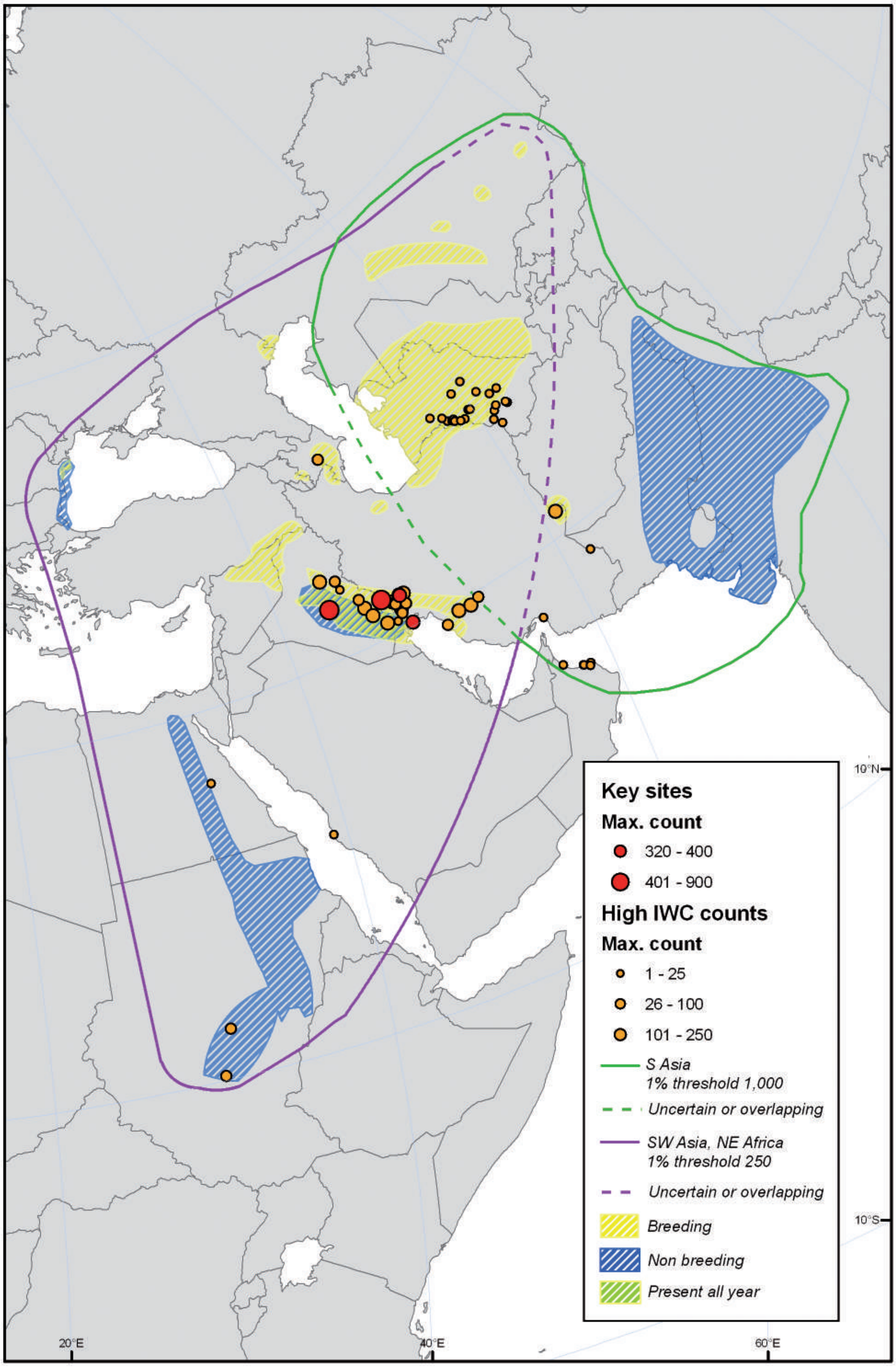
The White-tailed Lapwing is an uncommon passage migrant and winter visitor in Egypt, with small numbers of birds regularly being seen from Nile cruises throughout the winter. The largest concentration reported by Goodman & Meininger (1989) was only 12 birds, but Miles (1998) counted 62 between Nag Hamadi and Aswan, including a single flock of 30, and about 40 were recorded in March 2005 (African Bird Club 2005). It is an uncommon winter visitor to Sudan, both along the Red Sea coast and inland mainly along the Blue and White Niles (Nikolaus 1987). Elsewhere in Africa, the White-tailed Lapwing appears to be rare. Urban *et al.* (1986) refer to only two records from Lake Chad, and the only record from Ethiopia appears to be of a single bird recorded during the AfWC in January 1996 (Dodman & Taylor 1996). Small numbers winter along the south side of the Persian Gulf and in southern Afghanistan, but further east, it is a common winter visitor throughout the Indus Valley in Pakistan (Roberts 1991) and in north-western and north-central India, south to northern Maharashtra and east to central Orissa (Grimmett *et al.* 1999, Perennou *et al.* 1994, Roberts 1991).

Movements

As the bulk of the breeding population in Iran and Iraq appears to be sedentary, it has been assumed that the birds wintering in North-east Africa originate from the western part of the breeding range in the Central Asian Republics (Cramp *et al.* 1983, Hayman *et al.* 1986). Kasparek (1992) considered that broad-front migration occurred across Arabia, and suggested that the majority of birds seen there were birds *en route* from breeding areas in Central Asia to wintering areas in the Nile Valley in Sudan. Meadows (2000) reported spring passage of White-tailed Lapwings on the Red Sea coast of Saudi Arabia in February and March, and autumn passage extending from September to November. He also supposed that the birds were from breeding areas in Central Asia, as the timing of observed spring passage on the Red Sea coast accorded well with arrival dates on Central Asian breeding areas. However, there is very little evidence of any south-westerly movement of birds across Iran. There are very few records of birds on passage in the south Caspian region or north-western and western Iran, although the species breeds in some numbers in the south-east Caspian region and north-central Iran (D.A. Scott unpubl. obs). Small numbers of birds occur on passage in Israel and Egypt (Goodman & Meininger 1989), but the species is generally rather scarce on passage in the Arabian Peninsula (Jennings 1981). G. Nikolaus (in Summers *et al.* 1987) estimated the total wintering population in Sudan

White-tailed Lapwing

Vanellus leucurus



(the only regular wintering area in Africa) at 600-1,100 birds, including 500-1,000 inland and 100 along the Red Sea coast. Given the small numbers of birds involved, it is possible that the African wintering population is comprised almost entirely of birds from breeding areas to the west and south-west of the Caspian Sea and includes few, if any, birds from breeding areas east of the Caspian.

There is good evidence of a broad-front migration in a north-west to south-east direction across the eastern half of Iran, with the wetlands of the Seistan Basin on the Iran/Afghanistan border constituting a major staging area, at least in spring. Concentrations of over 100 White-tailed Lapwings were recorded in these wetlands (where relatively few birds breed) in March 1971 and March 1972 (D.A. Scott unpubl. obs). These are presumably birds migrating between breeding areas east of the Caspian and the Indian subcontinent. There is one ringing recovery that supports this: a bird ringed at Bharatpur in Rajasthan, northern India, in December 1970 was recovered in the following October in the Seistan Basin in Iran (Argyle 1975). Roberts (1991) also concluded that birds wintering in the Indus Valley entered Pakistan on a north-west to south-east direction from Afghanistan.

Population limits

Two populations are recognised on the basis of separate wintering areas:

1) a population wintering commonly in southern Iraq and southern Iran, in smaller numbers in North-east Africa, and sparingly in the Arabian Peninsula;
2) a population wintering mainly in Pakistan and north-western India.

Birds from the first population are believed to breed mainly in Iraq, southern Iran, Turkey and the west Caspian, while birds from the second population are believed to breed in north-eastern Iran and the Central Asian Republics. Further study is required to determine if, as previously supposed, some of the birds breeding in the Central Asian Republics migrate south-west to winter in South-west Asia and/or North-east Africa.

Population size

1. South-west Asia & North-east Africa (non-breeding)

Population estimate	1% threshold	Population trend
B (10,000-25,000)	Provisionally 250	Probably decreasing

Winter counts give a poor indication of numbers, as important wintering areas in Iraq and Sudan have not been covered. The species was said to be very common in the Euphrates marshes in Iraq (Cramp *et al.* 1983), but counts during four surveys of the wetlands of Iraq between 1968 and 1979 produced totals of only 145, 14, 95 and 595 (Scott & Carp 1982). Although these surveys covered only a few per cent of the total wetland area, it seems unlikely that the total population in Iraq could have exceeded a few tens of thousands at the very most. In the 1970s, the breeding population in Iran was estimated at 300-500 pairs and the wintering population at 1,200-1,600 birds (Summers *et al.* 1987, Scott 1995). The highest midwinter counts in Iran in recent years (830 in 1992 and 533 in 1995) suggest a similar total wintering population. There has been little coverage of wetlands in Sudan in the African Waterbird Census since its inception in 1990, and no White-tailed Lapwings have been recorded. Thus the only estimate available is that of 600-1,100 given in Summers *et al.* (1987). Very few winter elsewhere in Africa, and only tiny numbers have been recorded in Israel e.g. three in January 1993 and one in January 1997 (Rose, 1995, Delany *et al.* 1999, Gilissen *et al.* 2002). In recent years, the species seems to have become commoner in the Gulf States, and now overwinters on a regular basis, probably because of the great increase in availability of suitable habitat in the form of artificial wetlands (sewage lagoons, irrigation systems and ornamental ponds). Even so, the total number of birds wintering along the south coast of the Gulf and elsewhere in the Arabian Peninsula may not exceed 100 birds. The maximum midwinter counts in the years 1990 to 1999 were: Bahrain, 1 in 1990; Oman, 15 in 1996; Saudi Arabia, 18 in 1994; United Arab Emirates, 8 in 1995; and Yemen, 12 in 1997 (IWC reports, 1990-1999). An apparent increase in numbers has been particularly marked in the United Arab Emirates, where a concentration of 39 birds was recorded in January 2002 (C. Richardson pers. com.).

Perennou *et al.* (1994) gave a provisional estimate of 10,000-25,000 for this population, and this estimate was adopted in *WPE2*. Wetlands International (2000) suggested that this estimate might be too low, and proposed a broader range (10,000-100,000). However, it has since become apparent that there has been a massive loss of wetland habitat in Mesopotamia since the early 1980s. Taking this into consideration, Stroud *et al.* (2004) retained the original estimate of 10,000-25,000, and suggested that the actual total might be nearer the lower than the upper end of this range.

2. South Asia (non-breeding)

Population estimate	1% threshold	Population trend
B/C (10,000-100,000)	Provisionally 1,000	Possibly increasing

Little is known of numbers on the breeding grounds. Dement'ev & Gladkov (1951) described the species as abundant within its fairly restricted range in the Central Asian Republics. It is said to be a common breeding bird along the lower Amu-Darya River in Uzbekistan, where flocks of up to 100 have been recorded on spring passage (Cramp *et al.* 1983, Shernazarov & Turaev 1998).

Winter counts give a poor indication of numbers. The species is said to be quite common as a winter visitor throughout the Indus Valley in Pakistan (Roberts 1991), and it is a locally common winter visitor to north and north-western India (Grimmett *et al.* 1999). The maximum national midwinter totals between 1990 and 2001 were 856 in Pakistan in 1995 and 198 in India in 1992 (IWC Reports 1990-2001). Perennou *et al.* (1994) gave a rough estimate of 10,000-100,000, and this was adopted in all four editions of *Waterbird Population Estimates*. Stroud *et al.* (2004) supported this estimate, but thought that the actual total was likely to be towards the lower end of the range.

Conservation status

There is good reason to believe that the western population is in decline, and perhaps rapidly so, given the extent of the wetland destruction that has occurred in the Mesopotamian Marshes in Iraq in recent decades. There were originally some 15,000-20,000 sq.km of wetlands in Lower Mesopotamia (Scott 1995), but this area had already been reduced to about 9,000 sq.km by the late 1970s, when the last waterbird counts were carried out. Satellite imagery taken in 2000 revealed that massive drainage works in southern Iraq in the late 1980s and 1990s had destroyed all but 1,300 sq.km of wetlands by 2000, and most of this survived in a single system, the Hawr Al Hawizeh/Hawr Al Azim on the Iraq/Iran border (UNEP 2001). A more recent study, conducted by

UNEP, indicated that of the remnant wetlands surviving in 2000, one-third had disappeared by 2002 (UNEP 2003). As the wetlands of Mesopotamia constitute the core breeding and wintering area for the western population of White-tailed Lapwings, it is very likely that there has been a major decline in the population as a whole since the 1970s. Extensive re-flooding of the marshes has occurred since early 2003, and it may be that the population has now started to recover again.

Elsewhere, there has been some expansion in the breeding range of this population in the north and west beginning in the 1950s and 1960s, with breeding first reported in Azerbaijan in 1961-63, in Turkey in 1971 and in Syria in 1976 (Cramp *et al.* 1983). The expansion continued westwards to the Volga Delta and the Danube Delta, where 20 to 25 pairs bred in 2000 (Kiss & Szabó 2000). This expansion may have been related to a succession of drought years (Jackson 1997). The small populations in Azerbaijan (50-150 pairs) and European Russia (30-120 pairs) are still reported to be increasing, but the Turkish population (0-10 pairs) is now reported to be decreasing (BirdLife International 2004a).

While the western population has almost certainly been decreasing in recent decades, there is some evidence that the eastern population is increasing. The breeding range has expanded locally in Central Asia, and this is thought to be associated with a growth in human population and spread of irrigated agriculture (Tomkovich 1992a, Jackson 1997). The species began to breed on the north coast of the Caspian in Kazakhstan in the late 1970s, and there were reported to be some tens of pairs in the lower Volga and Ural deltas by the early 1990s (Snow & Perrins 1998). It was also found breeding for the first time in Pakistan in 1987 (del Hoyo *et al.* 1996, Roberts 1991).

Habitat and ecology

The White-tailed Lapwing breeds in the lowlands, river basins and plateaux of South-west Asia and extreme south-eastern Europe. It is a wetland species at all times of the year, favouring the margins of shallow, still or slow-flowing, fresh to brackish waters in areas with low plant growth (Cramp *et al.* 1983). In Africa, it occurs almost exclusively in the Nile Basin, where it prefers river banks, drainage ditches, ponds and marshes (Macleay 1960, Urban *et al.* 1986). It feeds on insects, especially beetles, on land and in shallow water. Where common, it often nests in loose colonies, but social pattern and behaviour have been little studied. One clutch is laid between late April and early May, on the ground, in the open, and usually near water (Snow & Perrins 1998).

Network of key sites

Only four keys sites have been identified: Hoor Al-azin marsh (626 birds in 2007); Horeh Bamdej (100 breeding pairs and up to 390 individuals in winter) and Shadegan Marshes (60 breeding pairs and up to 320 individuals in winter) in Iran, and Bahr Al Milh (300 breeding pairs and up to 100 birds in winter) in Iraq. However, the data from Iraq date back to the 1970s, and it is not known if this wetland area still survives.

Protection status of key sites

Only one of the three key sites is protected: Shadegan Marshes in Iran. This is a Wildlife Refuge and Ramsar site.

Table 25. Key sites for White-tailed Lapwing. Sites where 1% or more of a population has been recorded

Country	Site	Lat.	Long.	Season	Max total	Year max	Average	Basis for average	Source	Population(s) at site
Iran	Hoor Al-azim marsh	31.97	42.27	January	626	2007	322	2005-07 (2)	DOEI / WIWO	SW Asia
Iran	Horeh Bamdej	31.75	48.60	January	395	2005	206	2005-07 (3)	DOEI / WIWO	SW Asia
Iran	Shadegan Marshes, Khor-al Amaya & Khor Musa	30.17	48.67	Wintering	320	1975			Evans 1994	SW Asia
Iraq	Bahr Al Milh	32.67	43.67	Breeding	900	1975			Evans 1994	SW Asia

Derek Scott, Jeff Kirby, Simon Delany & Tim Dodman

Steve Race

Eurasian Golden Plover
Pluvialis apricaria

Geographical variation and distribution

The Eurasian Golden Plover is a Palearctic species, occurring mainly at higher latitudes in continental-arctic or arctic-alpine and boreal tundra conditions, but secondarily on temperate oceanic, unenclosed upland moors and peatlands (Snow & Perrins 1998). It breeds from Western Europe to north-central Siberia, and winters south to the Mediterranean basin and south Caspian region.

Two subspecies have been described on the basis of coloration. Peters (1934) assigned the northern, darker form to nominate *apricaria* and the southern, paler form to *oreophilos*. Vaurie (1965), Johnsgard (1981) and many later authors (e.g. del Hoyo *et al.* 1996) assign the northern form to *altifrons* and the southern form to nominate *apricaria*. However, many individuals exhibit intermediate characteristics, both forms may occur throughout the range of the species, and the proportion of each in any individual area changes markedly between years. Engelmoer & Roselaar (1998) could find no morphological differentiation between northern breeders from Iceland and northern Scandinavia, and southern breeders from southern Scandinavia, Britian and Ireland, and considered the species to be monotypic, as do many other authors, e.g. Cramp & Simmons (1983) and Hayman *et al.* (1986). Detailed studies within Norway suggest that the two forms are sufficiently well defined, both geographically and morphologically, to be regarded as valid subspecies, but only just (Byrkjedal & Thompson 1998). Results from elsewhere (e.g. Britain, southern Sweden and the east Baltic) lend support to the evidence for gradual, clinal variation, both altitudinal and latitudinal, and not subspecific separation. Clearly further studies are needed, but for the purposes of this Atlas, the existence of the two subspecies has been accepted.

P. a. altifrons breeds widely at high latitudes in Western Eurasia from Iceland and the Faeroes across northern Scandinavia east to about 125ºE in the north Siberian lowlands south of the Taymyr Peninsula (Snow & Perrins 1998). Within Russia, the range is expanding (Tomkovich 1992). It also breeds in small numbers in eastern Greenland (25-50 pairs) and Ellesmere Island in north-eastern Canada (Boertmann 1994, Crick 1997, Thorup 2006). Wintering occurs from the southern North Sea to the Iberian Peninsula and coastal North-west Africa, and across southern Europe, North Africa and Asia Minor to the south Caspian region (Urban *et al.* 1986, Byrkjedal & Thompson 1998).

P. a. apricaria breeds at more southerly latitudes in Britain, Ireland, Denmark, western Germany, southern Norway, southern Sweden and the Baltic States, and winters mainly in North-west Europe (Vaurie 1965, del Hoyo *et al.* 1996, Snow & Perrins 1998).

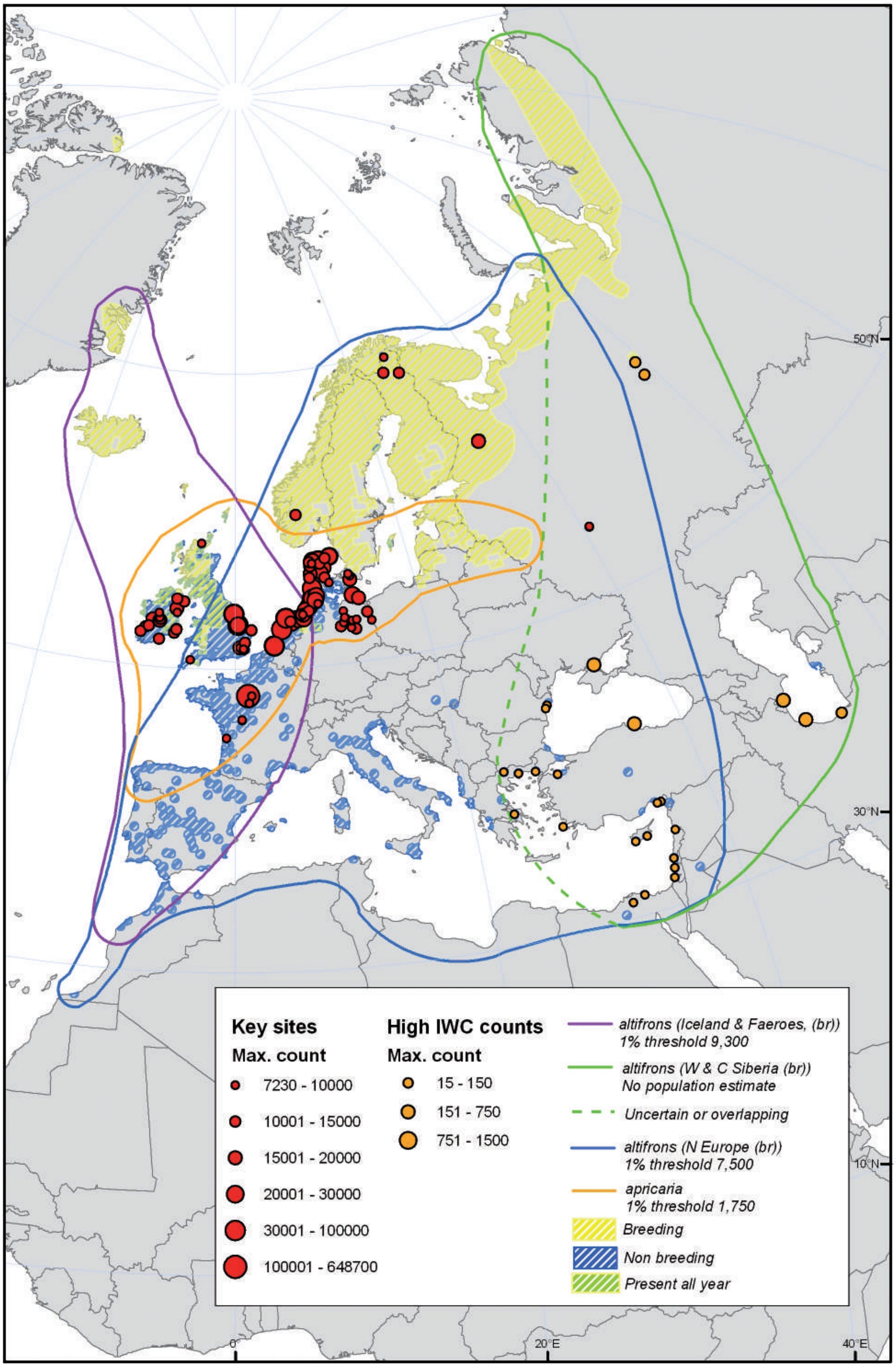
Movements

P. a. altifrons is highly migratory, wintering mostly at temperate latitudes, but sporadically at more southerly latitudes during cold winters. Icelandic breeders are thought to winter mainly in Ireland, but about 75% of birds overwintering in Britain are believed to be of Icelandic origin (Byrkjedal & Thompson 1998). Some also move to western France and Iberia (Cramp & Simmons 1983). These birds follow a "western Atlantic" route and return in spring along much the same pathway. Icelandic breeders leave Iceland from late September to early November, and arrive on the winter quarters shortly after (del Hoyo *et al.* 1996).

Scandinavian and northern European Russian *altifrons* move mainly to Western Europe and the western Mediterranean (Hayman *et al.* 1986). These birds follow either a "North Sea" route, travelling from the north through Denmark and The Netherlands, or an "east-west" route from north-eastern European Russia through Central Europe to Iberia. Ringing evidence, as presented in Byrkjedal & Thompson (1998),

Eurasian Golden Plover

Pluvialis apricaria



suggests that the Urals are a reasonable eastern demarcation of the population of *altifrons* wintering in Western Europe and North-west Africa (Thorup 2006).

Birds from the Taymyr region, forming the most easterly population, possibly journey across Western Siberia and Kazakhstan, and also south along the Yenisey River across the taiga towards the Caspian Sea (Piersma & Wiersma 1996). From there, many probably go westwards into the Black Sea region and eastern Mediterranean (Byrkjedal & Thompson 1998). The degree to which these birds from breeding areas east of the Urals mix with European breeders in wintering areas in southern Europe and North Africa remains unclear.

Adults from northern continental breeding populations of *altifrons* vacate the breeding quarters in August, with the females leaving first; juveniles migrate later, in late August to late September (Meltofte 1993). Birds arrive in southern wintering areas mainly in October to November. Adults moult *en route*, during August to November, especially in the region from Denmark to Schleswig-Holstein (Byrkjedal & Thompson 1998). The number of Eurasian Golden Plovers staging and moulting in Denmark has more than doubled since the species was protected from shooting in 1983, so that they now number in the order of 380,000 individuals (Rasmussen 2007). Northward passage begins in mid-February, and peaks in April and early May, with arrivals on the breeding grounds from late May to early June (del Hoyo *et al.* 1996, Byrkjedal & Thompson 1998). Spring migration occurs on a broad front over Europe, many *altifrons* returning via the same routes used in autumn. A larger proportion in spring than in autumn apparently flies over the Mediterranean basin to the south Russian plains (Byrkjedal & Thompson 1998), subsequently moving north to the European sub-arctic. Other birds pass through north-western Kazakhstan, probably on a narrower front, on their way north to the Siberian breeding grounds. Dutch ringing data suggest that the spring and autumn migrations follow similar routes, with birds showing a high degree of site fidelity (Arjo Bunskoeke, Jan Hulscher *et al. in litt.*).

In comparison with *altifrons*, *P. a. apricaria* is only a short-distance migrant, most birds wintering in lowland areas fairly close to their breeding grounds except during periods of severe weather (Hayman *et al.* 1986). The key site West-Rügen – Bock – Darß-Zingst Peninsulas (NE-Germany) is an important moulting area for adult *apricaria* from the Baltic. 2.000-3.000 individuals moult there annually (about 10 % of the regional breeding population), followed by several thousand *altifrons*, moulting the same wing feathers at the same place in September (Kube *et al.* 1994). British-ringed *apricaria* have been recovered almost entirely within Britain, with a few in south-western France and Portugal, and none in Ireland (Cramp & Simmons 1983). Should there be cold weather at any time between November and January, Britain plays host to birds moving from Denmark and The Netherlands (Jukema & Hulscher 1988). These, plus British and Irish birds, may then move south to France and Iberia should the cold conditions persist. Many move quickly back to areas vacated when mild conditions return (Kirby & Lack 1993). In Britain and Ireland, *apricaria* may reoccupy breeding sites as early as February if the weather permits. Here, most individuals abandon their breeding sites by late July.

The overall delineation between the flyways of *P. apricaria* may not in fact be so clear. For example, ringing recoveries in Morocco include birds from Belgium, Britain, Denmark, Finland, Iceland, The Netherlands and Norway (Thévenot *et al.* 2003), thus involving at least two populations and both subspecies. Furthermore, birds ringed in Italy as well as in Denmark have been recovered east of the Urals, indicating that birds from the easternmost breeding populations may penetrate well into Europe (Byrkjedal & Thompson 1998). It appears that all populations may mix - to an unknown degree - in Iberia, the Mediterranean and North Africa, especially when severe weather forces birds further to the south and west (Crick 1997).

Population limits

Four main groups can be identified on the basis of their breeding areas:

1) *altifrons* breeding in Iceland, the Faeroes and marginally also in Greenland and north-eastern Canada, and wintering mainly in Ireland and Britain, with smaller numbers in the Low Countries, France, Iberia and North-west Africa;
2) *altifrons* breeding from northern Norway east to the Ural Mountains (60ºE), and wintering mainly in western and southern continental Europe and North-west Africa (Morocco to Tunisia, south sparingly to Mauritania);
3) *altifrons* breeding in western and north-central Siberia from the Urals east to 125ºE, and wintering in the Caspian region and probably also Asia Minor and the eastern Mediterranean;
4) the more southerly *apricaria*, breeding in Britain, Ireland, southern Norway, southern Sweden, Denmark, Germany and the Baltic States, and wintering in North-west Europe.

Because of the extensive mixing of birds from populations 1, 2 and 4 on their wintering grounds, the first two editions of *Waterbird Population Estimates* treated all these birds as belonging to a single large "North-west European" population. Despite this extensive overlap, treatment of the "North-west European" birds as three separate populations would seem to be more appropriate on account of differences in plumage and population trends between northern (*altifrons*) and southern (*apricaria*) breeders, and in migration routes of the Icelandic/Faeroese and Scandinavian/Russian birds. Thorup (2006) and Stroud *et al.* (2004) recognised these three populations in Europe, and this treatment was adopted in *WPE3* and *WPE4*, which thus recognise four populations of Eurasian Golden Plover.

Population size

Population estimation based on winter census data is currently impractical given the extensive mixing amongst populations and considerable gaps in coverage for this species. The extensive use by this species of inland, non-wetland sites at this season is also problematical, and a high proportion are missed by waterbird counts. Breeding census data, albeit crude, provide some insights into likely population sizes.

1. *altifrons* Iceland & Faeroes (breeding)

Population estimate	1% threshold	Population trend
930,00	9,300	Probably increasing

A late 1980s estimate of the breeding *altifrons* population in Iceland was 200,000-300,000 pairs (Koskimies 1993), and from this Wetlands International (2000) estimated the population size to be 750,000 (i.e. three times the mid-point of Koskimies's estimate). More recently, Gudmundsson (2002) assessed the population at 310,000 pairs during 1999-2001. When the small numbers of birds breeding in the Faeroes and Greenland are taken into account, this indicates a population size of about 932,000 birds in winter. This estimate, rounded to 930,000, was adopted by Stroud *et al.* (2004) and *WPE3*, and retained in *WPE4*, although BirdLife International (2004a) give a more conservative estimate of 250,000-310,000 breeding pairs for Iceland. Kirby & Lack (1993) provided an estimate of approximately 600,000 for the number of birds wintering in Britain and Ireland as a whole. About 90% of these are considered to originate from Iceland. Trolliet & Aubry (2005) reported results of a large-scale coordinated national census of Golden Plovers and estimated that as many as 1.2 million birds wintered in the parts of France included in the census. Following a repeat census in January 2007, B Trolliet (*in litt.*) estimated the population wintering in France at 1.52 million. This total includes individuals from three populations.

2. *altifrons* Northern Europe (breeding)

Population estimate	1% threshold	Population trend
500,000-1,000,000	7,500	Probably increasing

The total European breeding population of *altifrons*, excluding birds breeding in Iceland and the Faeroes, is currently estimated at 217,000-362,000 pairs (data from Thorup 2006) or 158,000-358,000 (data from BirdLife International 2004a). Most occur in Norway (50,000-100,000), Finland (40,000-80,000), Sweden (50,000-90,000) and European Russia (24,000-95,000) (data from BirdLife International 2004a). These estimates suggest a total non-breeding population in the region of 500,000-1,000,000 individuals. This estimate was adopted in *WPE4* in place of the previous estimate of 645,000-954,000 from Stroud *et al.* (2004), who used somewhat different population limits, excluding birds breeding in northern European Russia, but including birds breeding in southern Norway, southern Sweden, the Baltic States, Belarus and west-central European Russia.

In 2003 an extensive, coordinated autumn count in North-west Europe provided the basis for a more accurate estimate for this population of close to 900.000 individuals (when southern *apricaria* is excluded)(Rasmussen & Gillings, 2008). This is higher than the average but within the range of previous population estimates based on breeding populations

3. *altifrons* West & North-central Siberia (breeding)

Population estimate	1% threshold	Population trend
Unkown	Not established	Unknown

Very little is known about this population of *altifrons*. Byrkjedal & Thompson (1998) estimated that there were between 584,000 and 1.4 million pairs breeding in European Russia and Siberia. Only 100,000 of these were thought to breed in European Russia (after Tucker & Heath 1994), suggesting that there were some 0.5-1.3 million pairs of *altifrons* in Siberia, equating to 1.5 to 3.9 million individuals in winter. This estimate is almost certainly too high, as Byrkjedal & Thompson (1998) derived their estimate on the basis of extrapolation from breeding densities in northern Europe. The estimate of 100,000 pairs that they used for European Russia is higher than the most recent estimates (10,900-55,800 pairs in Thorup 2006; 24,000-95,000 pairs in BirdLife International 2004a), and therefore any extrapolation from this figure would itself be too high. Furthermore, in a study of breeding Golden Plovers in northern Russia, Mischenko & Sukhanova (1998) found that a peat bog system of 55,300 sq.km in the Novgorod area, representing 13% of the area occupied by bogs and water bodies, held just 200-250 breeding pairs. Until better information becomes available, it is not possible to give any meaningful estimate for the size of this population.
The wintering grounds of the Western and Central Siberian breeders remain poorly known. Substantial numbers of birds were thought to winter in Azerbaijan, but recent midwinter counts indicate that only about 1,000 may do so (Stroud *et al.* 2004). Shubin (1998) noted that the species was rare on the west coast of the Caspian, and only about 500-1,000 birds reach the south Caspian littoral in Iran (Scott 1995). It is possible that most of the West Siberian breeders migrate south-west to join northern European breeders in southern Europe and North Africa, and that only a relatively small number of birds breeding at the eastern end of the range migrate to the Caspian region.

4. *apricaria*

Population estimate	1% threshold	Population trend
140,000-210,000	1,750	Decreasing

Stroud *et al.* (2004) gave an estimate of 69,000 individuals for this population, and this figure was adopted in *WPE3*. However, this estimate was confined to the birds breeding in Britain, Ireland, Denmark and Germany, and used an old estimate of 22,600 pairs for the British population based on an assessment in the 1980s (Stroud *et al.* 1987).

The most recent estimate of the British breeding population is 38,400-59,400 pairs (sources cited in Thorup 2006 and BirdLife International 2004a). To these can be added the small numbers of *apricaria* breeding in Ireland (200-400 pairs), Denmark (1-2 pairs), Germany (22 pairs), southern Norway (250 pairs), southern Sweden (3,800 pairs), Estonia (3,000-5,000 pairs), Latvia (350-450 pairs), Lithuania (40-50 pairs), Belarus (110-140 pairs) and adjacent areas of central-west European Russia (1,560-2,730 pairs) (data from Thorup 2006 BirdLife International 2004a and BirdLife Denmark *in litt.*), to give a total population of 47,736-71,247 breeding pairs, equating to 143,209-213,741 post-breeding individuals. This figure, rounded to 140,000-210,000, was adopted as the new population estimate in *WPE4*.

Conservation status

Widespread declines were reported during the twentieth century in numbers breeding on heather moors throughout northern Europe, linked to habitat loss and changes in management. By contrast, increases have generally occurred in European boreal forests as the land has gradually been cleared. There is no firm evidence for any population changes in the northern and alpine/montane populations of Fennoscandia and Russia. The little evidence that exists suggests that here the populations were relatively stable throughout the last century (for a full discussion, see Byrkjedal & Thompson 1998). The large populations of *altifrons* in northern Norway, and European Russia are thought to be stable (BirdLife International/EBCC 2000, BirdLife International 2004a). Some decrease has recently been reported in Sweden (BirdLife International 2004a), while in Finland, there has been an expansion in the breeding range and marked increase in numbers since the 1950s (Byrkjedal & Thompson 1998).

The Icelandic breeding population of *altifrons* is thought to be more or less stable, although there is no annual monitoring in Iceland and information on numbers and trends consists of little more than informed guesses (Byrkjedal & Thompson 1998). Annual counts of wintering birds in Britain and Ireland are made at a large number sites (e.g. Banks *et al.* 2006, Crowe 2005), but a disproportionate number of these sites are coastal, and the counts typically total about 320,000 birds in the two countries. This is clearly only a small proportion of the population and it is not clear how representative the changes in numbers counted are of actual population trends. Indeed, changes in numbers within and between years are very likely to be influenced by changing patterns of weather influencing wintering site selection (Kirby 1995). Increases in the count totals in Britain since the 1990s have been related to a possible shift of birds from inland sites to the coast, perhaps in response to deteriorating habitat quality inland (Mason & Macdonald 1999), although Gillings (2003) concluded that it remains unclear whether these changes are due to redistribution, population increase or habitat shift.

There is growing evidence that numbers of *altifrons* wintering in Europe are increasing. The number migrating through the Netherlands increased towards the end of the last century (Jukema & Hulscher 1997, Piersma *et al.* 2005). There also appears to have been a long-term increase in the wintering numbers in the Netherlands (Kleefstra & van Roomen 2005), the UK (Austin *et al.* 2008) and France (Trolliet *et al.* 2005). There was also an increase in annual survival of Golden Plovers staging in The Netherlands between the 1960s and 2000 (Piersma *et al.* 2005).

By contrast, there has been a long-term decline in breeding *apricaria* throughout its range, and this is apparently continuing. Previously extensive breeding populations in Denmark, Belgium, Luxembourg, Germany and Poland have gone extinct or are near extinction (Crick 1997), and the species last bred in The Netherlands in 1937 (Johnsgard 1981). These declines have been attributed to extensive afforestation of uplands, changed management of moorlands and an increase in sheep grazing (references in Crick 1997). Declines have also been reported from southern Sweden and southern Norway, but numbers in Estonia are thought to be more or less stable after an increase in the 1960s, while the small population in Latvia is increasing slightly (Crick 1997).

Since 1994, the numbers of Eurasian Golden Plovers in Britain and Ireland have been monitored through the Breeding Bird Survey. The results of this survey (Noble *et al.* 2001) indicate a 12% decline between 1994 and 2000. Although this is not statistically significant, it is in accord with other evidence suggesting widespread declines of the species in the British uplands in the 1980s and 1990s (Boobyer 1992, Parr 1994, Whitfield 1997, Hancock & Avery 1998; see also review in Byrkjedal & Thompson 1998).

The Eurasian Golden Plover is a popular quarry species on the wintering grounds. It is hunted extensively in France, but also in Italy, Spain and Portugal (Hagemeijer & Blair 1997). Smaller numbers of Dutch-ringed birds were recovered in the late twentieth century following changes in hunting legislation, particularly in the former Soviet Union, Denmark and Italy, which reduced hunting pressure considerably (A. Bunskoeke & J. Hulscher *in litt*.).

Habitat and ecology

The Eurasian Golden Plover breeds on swampy heaths with an abundance of sphagnum and heather, highland bogs and moors, barren heaths in high-latitude mountains, and low-lying marshes in moss tundra (Johnsgard 1981). Breeding densities tend to be related to the productivity of the land. Typical high population densities are about 10 pairs per square km; densities of 2-5 pairs per square km are more typical over many of the low-lying peatlands and mires in Northern Europe (references in Crick 1997). The birds feed primarily on permanent pastures and arable farmland in winter. Tidal mudflats, saltmarshes and the fringes of inland lakes are also used, mainly for resting, although foraging on tidal flats has increased in recent years (L.M. Rasmussen & K. Koffijberg *in litt*.). On passage, they occur mainly on pasture, stubble and ploughed fields. Birds forage both by day and by night, and return to favoured feeding and roosting sites within large tracts of open land (Byrkjedal & Thompson 1998). The species is strongly territorial during the breeding season, but can congregate in very large flocks on passage and in winter (Hayman *et al.* 1986).

Network of key sites

Maximum winter counts during the period 1995-2004 reveal that 23 sites, 12 in the United Kingdom and 11 in Ireland, have supported more than 9,300 Eurasian Golden Plovers in at least one winter (the 1% threshold for Icelandic and Faeroese *altifrons*). However, only six of these sites regularly support this number of birds: Blackwater Estuary, Breydon Water and Berney Marshes, the Humber Estuary and The Wash in the United Kingdom, and Ballymacoda and Little Brosna Callows in Ireland. Fifty important staging areas have been identified for the North European breeding population of *altifrons*, supporting over 7,500 birds on at least one occasion in recent years: two sites in European Russia, three in Sweden, 17 in Denmark and 28 in Germany. Much the most important of these are the Danish Wadden Sea (maximum of 44,000 on spring migration) and German Wadden Sea in Schleswig-Holstein (maximum of 43,000 in autumn). Further south, the Dutch Wadden Sea and Dutch Delta are key wintering areas for this population as also are several sites in western France, which also support a few *altifrons* from Iceland and the Faeroes. The importance of France for wintering Golden Plovers was documented by Trolliet & Aubry (2005) and a single Departement, Eure et Loir, held nearly 650,000 birds in 2007 (B. Trolliet *in litt.)* Identifying “sites” for these birds occurring inland is problematic.

The identification of key wintering sites for the small population of nominate *apricaria* is not possible because of the complete overlap with wintering *altifrons* both in Britain and Ireland and on the continent of Europe. However, one key breeding site has been identified for *apricaria* in the United Kingdom: the peatlands of Caithness and Sutherland, which supported an estimated 2,410 pairs in 1995 (Heath & Evans 2000). No key breeding sites have been identified for the population of *altifrons* breeding in Iceland and the Faeroes, but four breeding sites have been identified for the Northern European population, in Norway (Hardangervidda) and Finland (Kevo, Lemmenjoki-Hammastunturi-Pilju, and Saariselkä and Koilliskaira).

Protection status of key sites

Most of the wetlands holding internationally important numbers of Eurasian Golden Plovers in Western Europe are at least partly protected within nationally protected areas, and many have been designated internationally as Ramsar sites, Special Protection Areas or Special Areas for Conservation. The extensive use by this species of farmland for feeding and roosting means that a high proportion of the population spends much of its time in unprotected areas prone to many kinds of disturbance.

Table 26. Key sites for Eurasian Golden Plover. Sites where 1% or more of a population has been recorded

Country	Site	Lat.	Long.	Season	Max total	Year max	Average total	Basis for average	Source	Population(s) at site
Denmark	Agero	56.70	8.55	Spring	14000	1998			H Meltofte *in litt.*	*altifrons* N Europe + *apricaria*
Denmark	Alrø – Gylling Næs	55.84	10.12	Autumn	11880	1994			H Meltofte *in litt.*	*altifrons* N Europe + *apricaria*
Denmark	Aså-Gerå	57.10	10.40	Autumn	10500	1991			H Meltofte *in litt.*	*altifrons* N Europe + *apricaria*
Denmark	Dråby Vig & Buksør Odde	56.83	8.83	Migration	10000	1995			WBDB	*altifrons* N Europe + *apricaria*
Denmark	Eastern part of Vejlerne	57.05	9.00	Migration	18000	1994			WBDB	*altifrons* N Europe + *apricaria*
Denmark	Egholm	56.15	9.83	Autumn	17000	1992			H Meltofte *in litt.*	*altifrons* N Europe + *apricaria*
Denmark	Glomstrup Vig, Agerø, Munkholm and Katholm Odde, Lindholm, & Rotholme	56.67	8.58	Non-breeding	13500	1994			WBDB	*altifrons* N Europe + *apricaria*
Denmark	Northwestern Kattegat	57.20	11.00	Migration	28000	1994			Skov *et al.* 2000	*altifrons* N Europe + *apricaria*
Denmark	Odense Fjord	55.47	10.52	Migration	10000	1996			Skov *et al.* 2000	*altifrons* N Europe + *apricaria*
Denmark	Randers Fjord	56.48	10.22	Autumn	19000	1994-95	14500		H Meltofte *in litt.*	*altifrons* N Europe + *apricaria*
Denmark	Rosvang	56.15	8.53	Autumn	17000	1992			H Meltofte *in litt.*	*altifrons* N Europe + *apricaria*
Denmark	Sjørring Sø	56.95	8.57	Migration	12000	1993			WBDB	*altifrons* N Europe + *apricaria*
Denmark	Skjern Enge	55.90	8.40	Autumn	11880	1994			H Meltofte *in litt.*	*altifrons* N Europe + *apricaria*
Denmark	Ulvedybet	57.08	9.64	Autumn	20300	1989-98	11816		H Meltofte *in litt.*	*altifrons* N Europe + *apricaria*
Denmark	Vejlerne	57.02	9.01	Autumn	26600	1992			H Meltofte *in litt.*	*altifrons* N Europe + *apricaria*
Denmark	Voerså-Stensnæs	56.78	9.75	Autumn	15000	1997			H Meltofte *in litt.*	*altifrons* N Europe + *apricaria*
Denmark	Wadden Sea -	55.16	8.58	Pre-breeding migration	14322	1992-2002	6091		NERI, Denmark, 2005	*altifrons* N Europe + *apricaria*
Finland	Kevo	69.58	26.78	Breeding	9000	1996			WBDB	*altifrons* N Europe
Finland	Lemmenjoki-Hammastunturi-Pulju	68.58	25.50	Breeding	15000	1991			WBDB	*altifrons* N Europe
Finland	Saariselkä & Koilliskaira	68.25	28.00	Breeding	15000	1996			WBDB	*altifrons* N Europe
France	Estuaire de la Gironde : marais de la rive nord	45.43	-0.80	Migration	10000	1991			WBDB	Iceland, Faeroes + *altifrons* N Europe + *apricaria*
France	Eure et Loir Departement	48.20	1.25	January	648700	2007			B. Trolliet *in litt.*	Iceland, Faeroes + *altifrons* N Europe + *apricaria*
France	Petite Beauce	47.73	1.33	Migration	10000	2000			WBDB	Iceland, Faeroes + *altifrons* N Europe + *apricaria*
France	Plateau de Bellefonds	46.63	0.62	Migration	10000	1991			WBDB	Iceland, Faeroes + *altifrons* N Europe + *apricaria*
France	Vallée de la Conie et Beauce centrale	48.23	1.60	Migration	10000	1998			WBDB	Iceland, Faeroes + *altifrons* N Europe + *apricaria*
Germany	Aland-Elbe lowlands	52.96	11.80	Spring	10000				G. Dornbusch, S. Fischer *in litt.*	*apricara*, *altifrons* Iceland,N Europe
Germany	Butjadingen	53.55	8.33	Autumn	9292				Melter & Schreiber 2000	*apricaria*, *altifrons* N Europe, W Siberia
Germany	Drömling	52.47	11.12	Spring	12660	1998			Weber *et al.* 2003	*apricaria*, *altifrons* N Europe, W Siberia
Germany	Eiderstedt peninsula	54.37	8.78	Autumn	20192	2003			Jeromin 2003	*apricaria*, *altifrons* N Europe, W Siberia

Country	Site	Lat.	Long.	Season	Max total	Year max	Average total	Basis for average	Source	Population(s) at site
Germany	Elbe lowlands Jerichow	52.56	11.99	Spring	10000				G. Dombusch, S. Fischer *in litt.*	*apricaria*, *altifrons* N Europe, W Siberia
Germany	Engerhafer Meede	53.48	7.25	Autumn	10000				Melter & Schreiber 2000	*apricaria*, *altifrons* N Europe, W Siberia
Germany	Fiener Bruch	52.32	12.22	Spring	10000				G. Dombusch, S. Fischer *in litt.*	*apricaria*, *altifrons* N Europe, W Siberia
Germany	Greifswalder Bodden	54.22	13.52	Autumn	20000				Scheller *et al.* 2002	*apricaria*, *altifrons* N Europe, W Siberia
Geremany	Island of Fehmarn	54.48	11.13	Autumn	15000				Berndt *et al.* 2002	*apricaria*, *altifrons* N Europe, W Siberia
Germany	Krummhörn-Westermarsch	53.48	7.07	Autumn	14300				Melter & Schreiber 2000	*apricaria*, *altifrons* N Europe, W Siberia
Germany	Lewitz	53.47	11.63	Autumn	10000				Scheller *et al.* 2002	*apricaria*, *altifrons* N Europe, W Siberia
Germany	Lower Elbe valley, Brandenburg	53.02	11.65	Spring	7500				T. Ryslavy *in litt.*	*apricaria*, *altifrons* N Europe, W Siberia
Germany	Lower Havel & Dosse lowlands	52.75	12.27	Spring	>30000				Dombusch, Fischer & Ryslavy *in litt.*	*apricaria*, *altifrons* N Europe, W Siberia
Germany	Milde lowlands (Altmark)	52.69	11.49	Spring	10000				G. Dombusch & S. Fischer *in litt.*	*apricaria*, *altifrons* N Europe, W Siberia
Germany	Norden-Esens, inland	53.66	7.34	Autumn	8826				Melter & Schreiber 2000	*apricaria*, *altifrons* N Europe, W Siberia
Germany	Oderbruch	52.63	14.45	Spring	7500				T. Ryslavy *in litt.*	*apricaria*, *altifrons* N Europe, W Siberia
Germany	Ostfriesische Meere	53.43	7.30	Autumn	15900				Melter & Schreiber 2000	*apricaria*, *altifrons* N Europe, W Siberia
Germany	Plane-Niederung and Belziger Landschftswiesen	52.21	12.69	Spring	>10500				T. Ryslavy *in litt.*	*apricaria*, *altifrons* N Europe, W Siberia
Germany	Randow-Welse-Bruch	53.23	14.13	Autumn	14000				ABBO 2003	*apricaria*, *altifrons* N Europe, W Siberia
Germany	Rheiderland	53.23	7.32	Autumn	22600				Melter & Schreiber 2000	*apricaria*, *altifrons* N Europe, W Siberia
Germany	Rhin-Havelluch	52.79	12.87	Spring	7500				T. Ryslavy *in litt.*	*apricaria*, *altifrons* N Europe, W Siberia
Germany	Schleswig-Holstein coast: Brunsbüttel toEider mouth	54.13	9.04	Autumn	9334				Jeromin 2003	*apricaria*, *altifrons* N Europe, W Siberia
Germany	Schleswig-Holstein coast: Husum to Danish border	54.65	8.92	Autumn	28210				Jeromin 2003	*apricaria*, *altifrons* N Europe, W Siberia
Germany	Unteres Rhinluch	52.78	12.43	Spring	8000				ABBO 2003	*apricaria*, *altifrons* N Europe, W Siberia
Germany	Wadden Sea - Lower Saxony	54.00	8.00	Autumn	24363	2001	16670	1997-01 (5)	J . Blew, CWSS, 2005	*altifrons* N Europe + *apricaria*
Germany	Wadden Sea - Schleswig-Holstein	54.50	8.50	Autumn	43016	1992	19042	1997-01 (5)	J . Blew, CWSS, 2005	*altifrons* N Europe + *apricaria*
Germany	Western Pomerania coast	54.43	12.90	Autumn	30000				Scheller *et al.* 2002	*apricaria*, *altifrons* N Europe, W Siberia
Germany	Wittmund-Wangerland	53.69	7.95	Autumn	11448				Melter & Schreiber 2000	*apricaria*, *altifrons* N Europe, W Siberia
Ireland	Ballymacoda	51.84	-7.92	Non-breeding	12500	2001	10410	1999-04 (5)	BirdWatch Ireland 2005	Iceland, Faeroes + *apricaria*
Ireland	Boyne Estuary	53.68	-6.27	Non-breeding	10000	2002	6388	1999-04 (5)	BirdWatch Ireland 2005	Iceland, Faeroes + *apricaria*
Ireland	Cahore Marshes	52.56	-6.19	Non-breeding	10250	1996	3710	1999-04 (5)	BirdWatch Ireland 2005	Iceland, Faeroes + *apricaria*
Ireland	Dundalk Bay	53.95	-6.33	Non-breeding	15330	2004	8143	1999-04 (5)	BirdWatch Ireland 2005	Iceland, Faeroes + *apricaria*
Ireland	Little Brosna Callows	53.07	-8.03	Non-breeding	16330	2000	9321	1999-04 (5)	BirdWatch Ireland 2005	Iceland, Faeroes + *apricaria*
Ireland	Rahasane Turlough	53.13	-8.78	Non-breeding	16500	1997	5666	1999-04 (5)	BirdWatch Ireland 2005	Iceland, Faeroes + *apricaria*
Ireland Estuary	Shannon and Fergus	52.60	-9.50	Non-breeding	13627	1995	4812	1997-01 (5)	IWC database	Iceland, Faeroes + *apricaria*
Ireland	Shannon Callows	53.17	-8.00	Non-breeding	11200	2002	5803	1999-04 (5)	BirdWatch Ireland 2005	Iceland, Faeroes + *apricaria*

Country	Site	Lat.	Long.	Season	Max total	Year max	Average total	Basis for average	Source	Population(s) at site
Ireland	Southern Roscommon Lakes	53.58	-8.17	Non-breeding	10000	2000	6410	1999-04 (5)	BirdWatch Ireland 2005	Iceland, Faeroes + *apricaria*
Ireland	Tralee Bay, Lough Gill & Akeragh Lough	52.25	-9.92	Non-breeding	12000	2000	6652	1999-04 (5)	BirdWatch Ireland 2005	Iceland, Faeroes + *apricaria*
Ireland	Wexford Harbour & Slobs	52.32	-6.42	Non-breeding	13017	2003	7412	1999-04 (5)	BirdWatch Ireland 2005	Iceland, Faeroes + *apricaria*
Netherlands	Friesland Province	53.10	5.90	Autumn	70364	2003			SOVON, The Netherlands, 2005	Iceland, Faeroes + *altifrons* N Europe + *apricaria*
Netherlands	Groningen Province	53.22	6.73	Autumn	28594	2003			SOVON, The Netherlands ,2005	Iceland, Faeroes + *altifrons* N Europe + *apricaria*
Netherlands	Noord-Holland Province	52.58	4.88	Autumn	32299	2003			SOVON, The Netherlands, 2005	Iceland, Faeroes + *altifrons* N Europe + *apricaria*
Netherlands	Rhine-Maas-Schelde Delta	51.50	4.00	Winter	36264	2003	27687	1999-03 (5)	RWS WD RIKZ Iceland, 2005	Faeroes + *altifrons* N Europe + *apricaria*
Netherlands	Wadden Sea - The Netherlands	53.30	5.38	Winter	58908	2001	48462	1999-03 (5)	SOVON, The Netherlands,2005	Iceland, Faeroes + *altifrons* N Europe +*apricaria*
Norway	Hardangervidda	60.20	7.62	Breeding	15000	1999			WBDB	*altifrons* N Europe
Russia	Shilovo flood-plain 54.33 of Oka river	40.75		Migration	10000	1996			WBDB	*altifrons* N Europe +W&C Siberia
Russia	Zaonezh'ye	62.22	34.00	Migration	20000	1976			WBDB	*altifrons* N Europe
Sweden	Bay of Lommabukten	55.73	12.98	Migration	10000	1996			Skov *et al.* 2000	*altifrons* N Europe + *apricaria*
Sweden	Bay of Lundåkrabukten	55.87	12.83	Migration	10000	1996			Skov *et al.* 2000	*altifrons* N Europe + *apricaria*
Sweden	Foteviken-Lommabukten	55.50	12.92	Post-breeding migration	20000	1990-99	13500	1990-99	L Nilsson *in litt.*	*altifrons* N Europe + *apricaria*
U.K.	Blackwater Estuary	51.43	0.48	Winter	18826	1999-03	10981	1999-03 (5)	BTO, UK, 2005	Iceland, Faeroes + *altifrons* N Europe + *apricaria*
U.K.	Blyth Estuary	51.43	0.48	Winter	10000	1995-01	3663	1995-01 (5)	BTO, UK, 2005	Iceland, Faeroes + *altifrons* N Europe + *apricaria*
U.K.	Bodmin Moor	50.58	-4.58	Non-breeding	10000	1995			WBDB	Iceland, Faeroes + *altifrons* N Europe + *apricaria*
U.K.	Breydon Water and Berney Marshes	52.59	1.66	Winter	13280	1999-03	10689	1999-03 (5)	BTO, UK, 2005	Iceland, Faeroes + *altifrons* N Europe + *apricaria*
U.K.	Caithness&Sutherland Peatlands	58.37	-4.05	Breeding	7230 2410 prs	1995		1995	WBDB	*apricaria*
U.K.	Carmarthen Bay	51.43	0.48	Winter	9832	1999-03	3228	1999-03 (5)	BTO, UK, 2005	Iceland, Faeroes + *altifrons* N Europe + *apricaria*
U.K.	Humber Estuary	53.67	-0.17	Winter	50662	1999-03	37674	1999-03 (5)	BTO, UK, 2005	Iceland, Faeroes + *altifrons* N Europe + *apricaria*
U.K.	Loughs Neagh and Beg	54.61	-6.39	Non-breeding	10025	1992	2365	1999-03 (5)	BTO, UK, 2005	Iceland, Faeroes + *apricaria*
U.K.	Strangford Lough	54.45	-5.60	Non-breeding	14095	1997	4455	1999-03 (5)	BTO, UK, 2005	Iceland, Faeroes + *apricaria*
U.K.	Swale Estuary	51.35	0.83	Winter	13898	1999-03	7246	1999-03 (5)	BTO, UK, 2005	Iceland, Faeroes + *altifrons* N Europe
U.K.	Thames Estuary	51.4 8	0.57	Non-breeding	12500	1995			WBDB	Iceland, Faeroes + *altifrons* N Europe + *apricaria*
U.K.	The Wash	52.93	0.30	Winter	42761	1999-03	23103	1999-03 (5)	BTO, UK, 2005	Iceland, Faeroes + *altifrons* N Europe + *apricaria*


Jared Clarke

Pacific Golden Plover
Pluvialis fulva

Geographical variation and distribution

The monotypic Pacific Golden Plover breeds in northern Siberia from the Yamal Peninsula (at about 70ºE) eastwards to the Chukotsky Peninsula and Anadyr Basin, and in Alaska from Cape Lisburne to the Kuskokwim River. The southern limit of the breeding range lies along the northern edge of the forest taiga, and extends south in northern Kamchatka to 55ºN (Byrkjedal & Thompson 1998). The bird has an immense wintering range, mainly south of 20ºN, stretching from North-east Africa (sparingly) through the Arabian Peninsula, south-eastern Iran, the Indian subcontinent, southern China, South-east Asia, New Guinea, Australia and New Zealand to the South Pacific islands, Hawaiian Islands, and coastal California (sparingly). Much the largest numbers occur from the Bay of Bengal eastwards to the Pacific islands and eastern Australia.

Anecdotal evidence from hunters in The Netherlands in the first half of the twentieth century suggests that the species may have been a winter visitor to the northern Netherlands until about the 1950s, especially during periods of cold weather (Jukema *et al.* 2001, Jukema & Piersma 2002). It has been speculated that these birds originated from westerly breeding range extensions of the species in Western Siberia, but were exterminated by large-scale commercial trapping of Golden Plovers (Byrkjedal & Thompson 1998). Jukema *et al.* (2001) thus considered that birds formerly wintering in The Netherlands represented a now extinct biogeographical population of Pacific Golden Plover. Between 1800 and 2006, however, only 33 records have been accepted by the Dutch Rarities, Committee (van der Vliet *et al.* 2007) and the possible former existence of this population remains controversial.

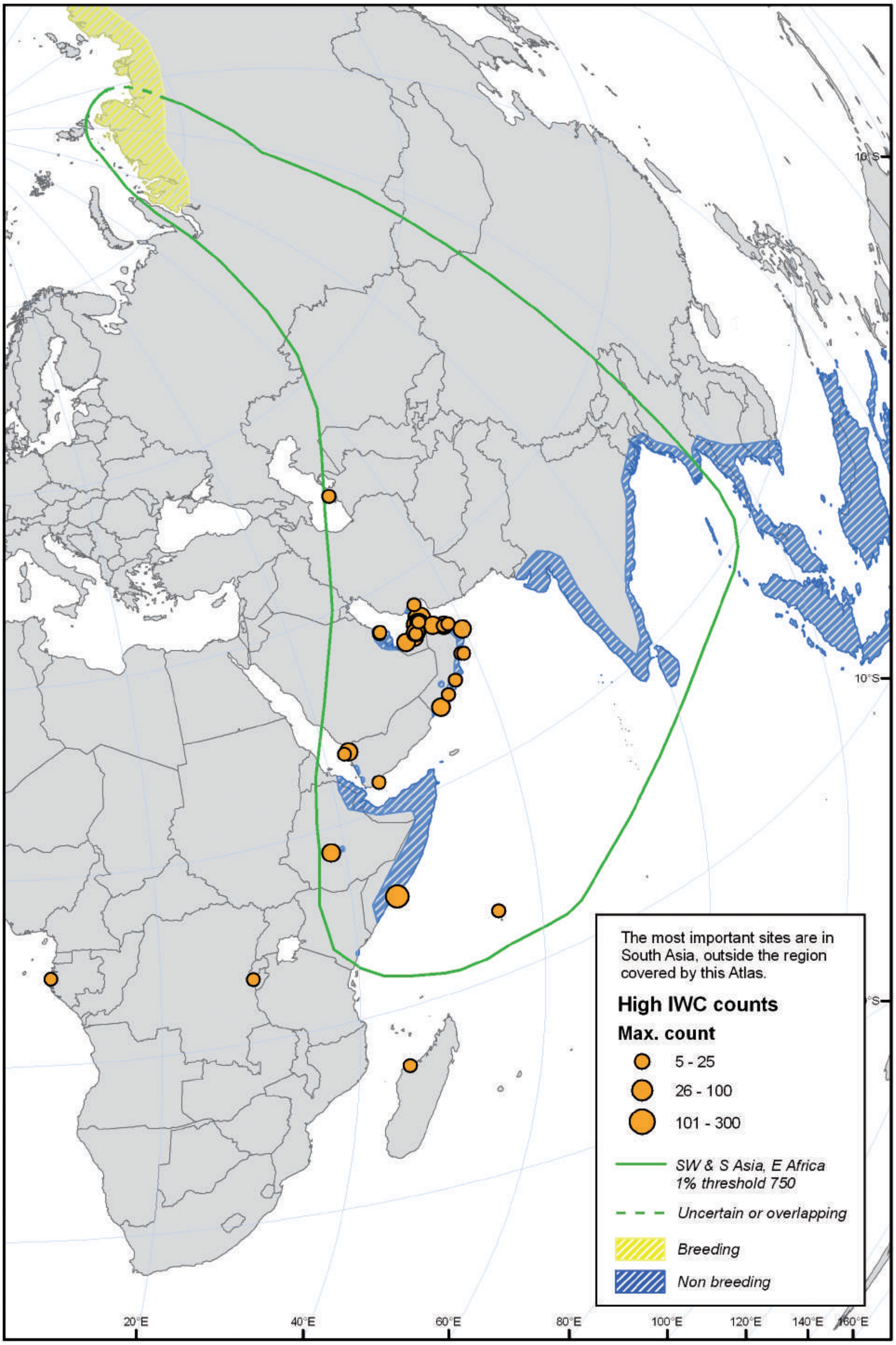
Movements

The Pacific Golden Plover is highly migratory. There are few ringing recoveries for this species, and the migration routes are poorly understood. Byrkjedal & Thompson (1998) have attempted to describe the main migration routes on the basis of collection dates of museum specimens and observations of birds on migration. Birds breeding in Alaska apparently migrate south through the Aleutians to the Hawaiian Islands, with smaller numbers continuing on to central and eastern Polynesia. North-east Asian breeders migrate south-east on a broad front across the taiga to the east Asian coast and follow this through South-east Asia to Melanesia and Australasia, or cross the western Pacific via Micronesia. West Siberian breeders apparently migrate in reasonably high numbers through eastern Kazakhstan on their way to wintering grounds along the Arabian Sea coast and Bay of Bengal. The birds wintering in South-west Asia and North-east Africa presumably reach these regions by overland passage across Western Siberia and Kazakhstan. Migrants have been recorded in the Volga Delta (Dement'ev & Gladkov 1951) and Iraq (Cramp & Simmons 1983). The species is recorded regularly on the west coast of the Kara Estuary in extreme north-eastern European Russia, and it is possible that there is a regular passage through this area (Snow & Perrins 1998).

The Pacific Golden Plover is a great wanderer, and has occurred in many regions of Europe and Africa, as well as Greenland (three records) and the north-eastern U.S.A. It has occurred as a vagrant in most countries in Europe, and also in Turkey, Jordan and Egypt, and is described as a very rare passage migrant in Israel and Kuwait. In recent years, it has been found to be a locally fairly common passage migrant and winter visitor in parts of the Arabian Peninsula, especially the United Arab Emirates and Oman. It is a regular winter visitor to the coast of Eritrea and Somalia, and occurs in small numbers on the Red Sea coast of Sudan and in coastal Kenya and Tanzania (Urban *et al.* 1986). At Jasiira Lagoon near Mogadishu, Somalia numbers build up to a peak in the third week of March, declining rapidly in the first and

Pacific Golden Plover

Pluvialis fulva



second weeks of April (Ash & Miskell 1998). It is also a regular winter visitor in small numbers to the Seychelles (Skerrett *et al.* 2001). Further south in Africa, it occurs only as a rare vagrant. There have been several records from the coast of Cape Province in South Africa (Hockey, 1997), and there has been one February record in coastal Mozambique (Nilsson & Shubin 1998). Schepers & Marteijn (1993) counted 26 on the coast of Gabon in January and February 1992, and estimated a total of 25-50 birds for the northern inter-tidal areas. It seems possible, therefore, that small numbers are regular on the Atlantic coast of Africa. Birds leave the breeding grounds in late July or early August, non-breeders leaving two to four weeks before breeders, and young birds leaving some weeks after the adults.

The first migrants reach their winter quarters in the Pacific islands, Arabian Peninsula and North-east Africa in August and early September (rarely in late July). Departure from the winter quarters begins in March and continues through to early May. In eastern Kazakhstan, the main passage is in late April. However, in northern Kazakhstan, peak numbers do not occur until mid- to late May, indicating that birds use Kazakhstan as a staging area before continuing on to the breeding grounds in Siberia (Byrkjedal & Thompson 1998). The tundra breeding grounds are re-occupied at the end of May and in the first half of June (Snow & Perrins 1998, Byrkjedal & Thompson 1998). Many, if not most, one-year old birds spend the boreal summer in their wintering range (Byrkjedal & Thompson 1998).

Population limits

No discrete populations are identifiable. Perennou *et al.* (1994) recognised two main wintering groups in Asia, a South & South-west Asia group and a South-east Asia & Australasia group, and this treatment has been adopted in *Waterbird Population Estimates*. As there is no evidence to suggest that the small number of birds reaching the Arabian Peninsula and North-east Africa have a different origin from those wintering in Pakistan and India, these birds are included within the South & South-west Asia group.

Population size

1. South-west & South Asia and North-east Africa (non-breeding)

Population estimate	1% threshold	Population trend
50,000-100,000	750	Unknown

Midwinter counts in South Asia and South-west Asia in the period 1987-91 accounted for only about 13,700 birds (Perennou *et al.* 1994), while during the period 1994-2001, the highest midwinter count in South Asia was only 11,746 in 1996 (Lopez & Mundkur 1997). However, as this species inhabits grasslands as well as coastal and riverine areas, a large proportion of the birds is missed by the IWC (Perennou *et al.* 1994). Rose & Scott (1997) thought that the population was in the range 25,000-100,000. Stroud *et al.* (2004) concluded that a rough estimate of 50,000-100,000 seemed reasonable, based on the meagre information available, and this estimate was adopted in *WPE3* and *WPE4*.

The total number of birds wintering in South-west Asia and North-east Africa is apparently small. The highest national totals in South-west Asia during the midwinter censuses of 1989-1999 inclusive were: Bahrain 13; Iran 18; Oman 141; Qatar 3; Saudi Arabia 37; United Arab Emirates 507; and Yemen 10 (Scott & Rose (1989), Perennou *et al.* (1990), Perennou & Mundkur (1991,1992), Mundkur & Taylor (1993), Rose (1995), Delany *et al.* (1999), Gilissen *et al.* (2002)). Counts in North-east Africa are even lower. Summers *et al.* (1987) gave figures of <10 for East Africa (mostly inland) and <20 for Sudan (mostly on the Red Sea coast). Urban *et al.* (1986) describe it as locally common between September and early May in coastal Eritrea and Somalia, and report a maximum count of 138 near Mogadishu in March. However, the only reports during the African Waterbird Censuses in 1993-2001 were counts of three and four individuals at Roche Caiman Bird Sanctuary in the Seychelles in January 1994 and January 1995, respectively, a single bird in Kenya in January 2000, and a count of 60 in Ethiopia in January 2001 (Dodman & Diagana 2003). These figures suggest that the total population wintering in South-west Asia and North-east Africa is no more than a few thousand birds.

Habitat and ecology

During the breeding season, the Pacific Golden Plover is mostly associated with the high Arctic tundra, where it favours dwarf shrub and lichen-moss tundra. Locally it extends into the low Arctic, where it also breeds in the alpine zone. The birds nest in June and July on well-drained tundra, often on hillsides, ridges or raised polygons. The species shows a high degree of site fidelity on the breeding grounds, and this is especially so for the males (del Hoyo *et al.* 1996). Outside the breeding season, the Pacific Golden Plover generally occurs on inter-tidal mudflats, sandy beaches and reefs, even on quite small oceanic islands, but extensive use is also made of short grasslands, such as airfields and golf courses, pastures, flooded fields and other open freshwater habitats close to the coast. It sometimes occurs in shallow tidal lagoons surrounded by mangroves. During the migration seasons, it also occurs inland on the shores of lakes and rivers (Hayman *et al.* 1986, Urban *et al.* 1986).

Conservation status

Nothing is known of trends in the numbers of birds wintering in South-west Asia and North-east Africa.

According to Byrkjedal & Thompson (1998), no general increases or decreases in population are known for the Pacific Golden Plover, although there are reports of substantial declines (up to around 70%) at some Australian wintering areas in the period 1986-1995. This species may be vulnerable to on-going coastal development in Australasia and to considerable habitat loss and hunting along the northern part of the East Asian-Australasian Flyway (Byrkjedal & Thompson 1998). However there would seem to be fewer pressures on the relatively small numbers of birds wintering in South-west Asia and North-east Africa.

Network of key sites

No key sites have been identified in Western Eurasia or Africa. The number of birds wintering in South-west Asia and North-east Africa (perhaps only a few thousand) represents no more than a few per cent of the total “flyway” population (at least 50,000-100,000). Thus it is unlikely that there are any sites in either region that exceed the 1% threshold (750). The highest single count during the Asian Waterbird Censuses in 1990-1997 was 300 at Khor Al Beidah in the United Arab Emirates in January 1994. The only other site to hold more than 100 birds was the Emirates Golf Course, also in the United Arab Emirates (104 in January 1994).

Derek Scott

Michael Schmitz

Grey Plover *Pluvialis squatarola*

Geographical variation and distribution

The Grey Plover (or Black-bellied Plover) is a holarctic wader breeding in the tundra zones of Eurasia and North America. Most authors consider it to be a monotypic species showing some clinal variation, but Engelmoer & Roselaar (1998) resurrected the form *cynasurae* for the relatively small birds breeding in northern Canada, and have described a new subspecies, *tomkovichi*, for the relatively long-winged and short-billed birds breeding on Wrangel Island. In Eurasia, the Grey Plover breeds from the Kanin Peninsula in the west to the Chukotsky Peninsula and Anadyr Gulf in the east. Several islands, e.g. Kolguyev, Beliy, Vaigach, L'akhovskiy and Wrangel, support important numbers (Stepanyan 1990). Outside the breeding season, Eurasian breeders occur widely along coasts south to South Africa, Sri Lanka and Australasia, while North American breeders occur widely along the temperate and tropical coasts of the Americas.

In Europe, the most important wintering areas are the southern North Sea coasts (including the Wadden Sea), British estuaries and the Atlantic coast of France. Wintering sites are more scattered in the Mediterranean basin, and numbers are generally fairly low except along the Tunisian coast (c. 9,500 birds; van Dijk *et al.* 1986). Along the Atlantic coast of Africa, there are important wintering areas in Morocco, Sierra Leone and especially Mauritania, Guinea-Bissau and Guinea. In the Middle East, there are important wintering areas in Oman and Saudi Arabia. In Eastern Africa, the coasts of Tanzania and Mozambique appear to hold particularly large numbers.

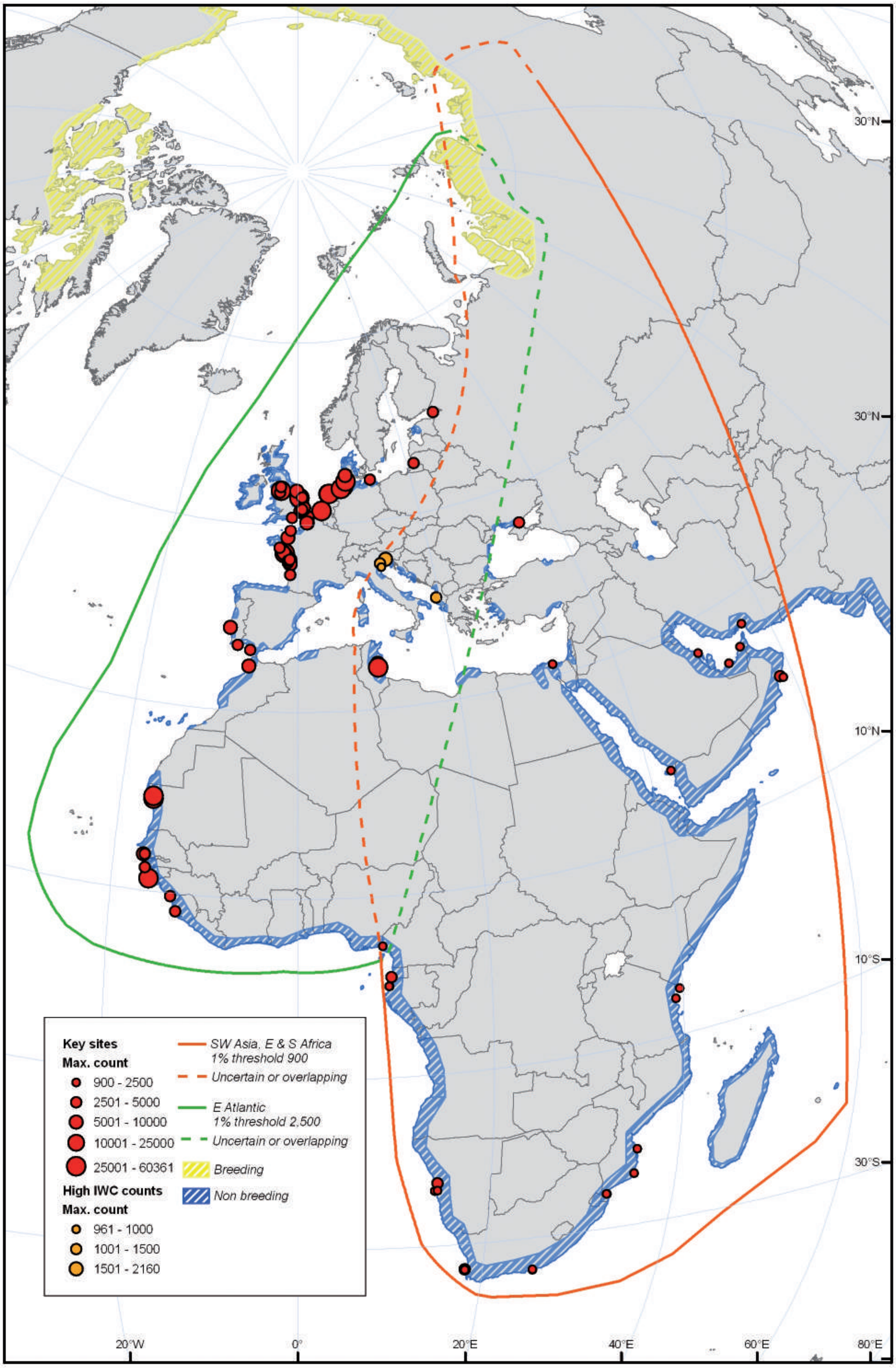
Movements

According to Mineyev (1994), there are five important autumn gathering places for the Grey Plover in the tundra of north-east European Russia which are visited by hundreds of migrants during the first half of August. Such gatherings are not apparent in the Yamal Peninsula (Danilov *et al.* 1984). In western Taymyr, at least as far east as 100°E, most birds migrate in a south-westerly direction in autumn, following the sea shore (Syroechkovski & Lappo 1994). These movements begin in July, and considerable numbers arrive in Denmark from mid-July onwards (Meltofte 1993). Although some birds begin to appear on their subtropical and tropical wintering grounds by August, the bulk of the birds seem to reach their destinations from November onwards. Birds from the westernmost part of the Siberian breeding range migrate through the Baltic and on to the Atlantic seaboard of Europe. Adults generally migrate before juveniles, which follow on a broader front (Cramp & Simmons 1983, Exo & Wahls 1996). These birds begin their main departure from North-west Africa in late April and, along with other birds wintering on the coasts of Western Europe, head for the Wadden Sea, where large numbers congregate between late April and mid/late May. As many as 140,000 birds have been counted in the Wadden Sea in mid-May (Prokosch 1988, Meltofte *et al.* 1994), with the German Wadden Sea in particular constituting an important staging area. From the Wadden Sea, the Grey Plovers continue north-east along the Baltic Sea to their Russian breeding grounds.

Birds from more easterly breeding populations seem to reach Kazakhstan, the Caspian Sea and Black Sea in non-stop flights in autumn. From there, the birds move westwards into the Mediterranean and also southwards along the East African coast, and to some extent along the Arabian and Somali peninsulas. Many of the birds reaching Southern Africa are thought to come from the Taymyr Peninsula, because breeding productivity is correlated with that of species such as the Curlew Sandpiper *Calidris ferruginea* that are known to breed there (Underhill 1997). Ringing recoveries show that the birds wintering in South Africa and Namibia follow a route through the Black Sea and eastern Mediterranean (Underhill 1997). In spring, birds taking the Mediterranean route and some birds from Eastern Africa head for staging areas in the Black and Caspian Seas. There is a diurnal migration along the Somali coastline in

Grey Plover

Pluvialis squatarola



April-May, with flights of up to 150 birds flying in V-formation at 75-150 m in height; passage is restricted to two hours in the afternoon, suggesting that direction and timing follow a schedule (Ash & Miskell 1998). Staging areas in Turkmenistan and Kazakhstan probably receive birds from Eastern Africa, as well as from wintering grounds in the Middle East.

There may be some mixing of birds from these two populations, especially on spring migration. Van Dijk *et al.* (1986) considered that about 90% of the birds passing through the Gulf of Gabès in Tunisia were from the eastern population (using the East Mediterranean Flyway), while the remainder were from the western population. This agrees with the conclusions of Grimes (1974), who thought that the birds wintering in Ghana followed a trans-Saharan route in spring, taking them into the East Mediterranean Flyway. Long-term counts in the Sivash area, Ukraine, indicate that Grey Plovers are up to seven times more numerous there during spring than during autumn (Chernichko *et al.* 1991). This may be an indication of a loop-migration in the Grey Plover.

The two populations may also mix during the autumn migration. Wymenga *et al.* (1990) have suggested that a large proportion of the birds wintering in Guinea-Bissau originate from breeding areas in Central and possibly also Eastern Siberia. There may be an autumn migration route through the Mediterranean, taking birds from north-western Kazakhstan and the Black Sea into the Mediterranean and onwards to Western Africa (Byrkjedal & Thompson 1998, M. Exo pers. com.).

In Western Europe, at the northern limit of its wintering range, the Grey Plover is sensitive to cold weather, and may undertake hard weather movements in severe winters. In mild winters, between 9,400 and 28,000 individuals are recorded in the Wadden Sea, while only a few thousand may remain in severe winters. Most birds leave the Danish and German portions of the Wadden Sea in cold winters, whereas numbers in the Dutch part may remain high (Meltofte *et al.* 1994).

Population limits

It is possible that there are at least three populations of Grey Plovers occurring on passage and in winter in Western Eurasia and Africa. Analyses of wing and bill frequency distributions from sites in both Europe and Africa have revealed the presence of three groups of birds: birds with short wings; birds with short bills and long wings; and birds with long bills and long wings (Engelmoer 1984, Prokosch 1988, Wymenga *et al.* 1990, Smit & Piersma 1989, 1994, Engelmoer & Roselaar 1998). Engelmoer (1984) argued that the short-winged birds, which make up about 10% of the birds turning up in North-west Europe, were from breeding areas in north-eastern Canada. The short-billed and long-winged birds (comprising 76%) were thought to be from Western Siberia, and the long-billed and long-winged birds (comprising 14%) from Central Siberia. As there had been no ringing recoveries linking breeding grounds in Canada with wintering areas in the East Atlantic, Smit & Piersma (1989) considered all birds wintering in Western Europe, the western part of the Mediterranean and Western Africa (including the Gulf of Guinea) as belonging to one population. In view of the uncertainties, and in the absence of any further evidence from ringing, this treatment was adopted in successive editions of *Waterbird Population Estimates*. Thus only two populations of the Grey Plover are currently recognised in Western Eurasia and Africa, both identified primarily on the basis of their distribution in the boreal winter:

1) birds wintering on the Atlantic coast of Western Europe, in the western Mediterranean and in Western Africa south to the Gulf of Guinea (as far as Nigeria); these are thought to breed mainly in Arctic Russia as far east as the Taymyr Peninsula (approximately 80-90°E);
2) birds migrating through the Black Sea and Caspian Sea, and wintering from the Persian Gulf and Arabian Peninsula south to South Africa and Madagascar (including the western coast of Southern Africa north to Cameroon); these are thought to breed mainly in Central and Eastern Siberia.

Engelmoer & Roselaar (1998) investigated the biometrics of Grey Plovers throughout their breeding range, and concluded that the species was polytypic with three subspecies:
- *P. s. squatarola* — breeding in the Palearctic and Alaska (but not on Wrangel Island);
- *P. s. cynosurae* — breeding in North Canada, east of the Mackenzie River; and
- *P. s. tomkovichi* — breeding on Wrangel Island.

Relating this taxonomy to previous considerations of population delimitation suggests the following population units should be adopted at a global scale:
- *P. s. squatarola* — birds breeding in the Western Palearctic from Kanin east to Taymyr, and wintering in the East Atlantic/Western Africa;
- *P. s. squatarola* — birds breeding in the Eastern Palearctic from Taymyr east to Chukotka, and wintering in South-west Asia and Eastern and Southern Africa;
- *P. s. squatarola* — birds breeding in western and northern Alaska, and wintering in the West Pacific;
- *P. s. cynosurae* — birds breeding in northern Canada and wintering in the West Atlantic; and
- *P. s. tomkovichi* — birds breeding on Wrangel Island (wintering area unknown).

The first two of these populations equate closely to the two populations recognised in *Waterbird Population Estimates* and retained here.

Population size

1. *squatarola* Eastern Atlantic (non-breeding)

Population estimate	1% threshold	Population trend
250,000	2,500	Decreasing

Stroud *et al.* (2004) gave a new population estimate of 247,000 based on counts and estimates from the 1990s. This figure represented a 47% increase on the previous estimate of 168,000 (Smit & Piersma 1989). However, it should be noted that some 36,900 of the new estimate came from six countries for which Smit & Piersma (1989) had no data (notably 28,000 in Guinea, 7,200 in Sierra Leone and 1,500 in Ghana). Had these numbers been available in the 1980s, Smit & Piersma's total would have been approximately 205,000 (Stroud *et al.* 2004).

2. *squatarola* South-west Asia, Eastern & Southern Africa (non-breeding)

Population estimate	1% threshold	Population trend
90,000	900	Unknown

Stroud *et al.* (2004) gave a new population estimate of 90,000 based on counts and estimates from the 1990s.

Although this was a substantial increase on the previous estimate of 50,000 (Perennou *et al.* 1994), it may still be an underestimate, since there is incomplete coverage for several countries in the Arabian Peninsula and Eastern Africa. Zwarts *et al.* (1991) found that of 260,000 waders on 200 sq.km of inter-tidal mudflats on the Gulf coast of Saudi Arabia, 7,000 (2.7%) were *P. squatarola*. Extrapolation from these data, which covered only 7% of the inter-tidal area in the Persian Gulf, might suggest that at least 60,000 Grey Plovers winter in the Persian Gulf alone. Ash & Miskell (1998) considered this to be a very common to abundant winter visitor and passage migrant to the Somali coastline.

Conservation status

There was a marked westward expansion in the breeding range in European Russia in the second half of the twentieth century (Mineyev & van Impe 1997), and the numbers wintering in North-west Europe increased substantially between the mid-1980s and mid-1990s (Stroud *et al.* 2004). However, surveys of the Banc d'Arguin in Mauritania in 1997 and 2000 found only 15,200 and 19,495, respectively, compared with 30,000 in 1980 (Zwarts *et al.* 1998, Hagemeijer *et al.* 2004), while van der Have *et al.* (1997) found a 25% decrease in the numbers wintering in the Gulf of Gabès in Tunisia between 1984 and 1994. This suggests that part of the increase in Western Europe may have been due to a northward shift in the distribution of wintering birds. More recently, a decrease has been recorded in North-west Europe and the West Mediterranean region between 1995 and 2002 (Delany *et al.* 2007), and it now appears that this population is in decline.

Very little information is available on trends in the South-west Asia/Eastern and Southern Africa wintering population. An increase was apparent in South Africa during the beginning of the twentieth century, but there is no evidence that this has continued in recent years (Underhill 1997). The increase in the population estimate given above is thus more likely to be a product of improved knowledge than of any real increase in population size.

The Grey Plover may be under some long-term threat both on the breeding grounds and in the winter quarters. In the former, the impact of the rapidly expanding oil and gas extraction activities, especially in north-eastern European Russia and on the Yamal Peninsula (Sagers 1994, Vitebsky 1990), is a topic for further research. In the Yamal Peninsula, severe weather may cause mass mortality (Evans & Pienkowski 1984, Davidson & Clark 1985). The damage and destruction of large parts of the winter habitat appears to be the most important negative factor at this season. At least 85% of British estuaries have lost at least some inter-tidal habitats through human activities (Davidson *et al.* 1992).

Habitat and ecology

In most of Eurasia, the southern limit of breeding follows that of the dwarf shrub tundra. However, in Western Siberia, breeding occurs in peat bogs in the region of the tree-line between tundra and taiga (Pokrovskaya 1999). In North America, the Grey Plover is almost totally confined to the lichen-moss zone (Byrkjedal & Thompson 1998). During migration and in winter, the highest densities are recorded on estuaries and lagoons. On the open coast, the Grey Plover prefers sheltered sandy beaches, shorelines composed of alternating rocky and sandy sections, or wave-cut rocky platforms backed by sandy beaches. On the mudflats of the Sivash area, Ukraine, brackish to hypersaline lagoons are preferred (Verkuil *et al.* 1993, Metzner & Nickel 1999). In the wooded steppe along the River Tobol in Western Siberia, migrating Grey Plovers regularly visit agricultural fields (Blinova & Blinov 1997).

While breeding, this "bold" species has an active anti-predator defence which affords protection to other species of waders as well (Larsen & Grundetjern 1997, Byrkjedal & Thompson 1998). Reproductive success, however, is largely dependent on a three-year predator/prey cycle (Potapov 1997, Ebbinge 1998). A high degree of site fidelity has been observed on the breeding grounds, and this is strongly dependent on climate and breeding density. Males are significantly more faithful to the same breeding territory than females. The return rate is much higher after a successful nesting season than after an unsuccessful one (Ryabitsev & Alekseeva 1998, Tomkovich & Soloviev 1994).

Some degree of site fidelity has also been demonstrated outside the breeding season. Individual marking has shown that some juvenile and approximately one third of the adult Grey Plovers visiting Teesmouth, north-east England, defended fixed feeding territories on inter-tidal mudflats for several months. This behaviour persisted over successive years after the first winter (Townshend *et al.* 1984, Townshend 1985). At Zwartkops Estuary, South Africa, about 65% of Grey Plovers defend feeding territories throughout the austral summer (Turpie 1995).

Network of key sites

A total of 64 key staging and wintering sites have been identified for the cosmopolitan Grey Plover, in 28 countries spread across the region. Forty three sites have been identified for the western population, spanning 18 countries from Russia and Lithuania along the Atlantic seaboard of Western Europe to Mauritania, Senegal, Guinea-Bissau and Guinea. All of these sites have held over 2,500 Grey Plovers at least once in recent years, and nine sites, the German Wadden Sea in Lower Saxony, German Wadden Sea in Schleswig-Holstein, Dutch Wadden Sea and Rhine-Maas-Schelde Delta in The Netherlands, Ribble Estuary and The Wash in the United Kingdom, Marais Breton in France, Banc d'Arguin in Mauritania, and Bijagos Archipelago in Guinea-Bissau, have held over 20,000. Key sites for the eastern population have been identified in Ukraine (1), Egypt (1), Saudi Arabia (2), Iran (1), United Arab Emirates (2), Oman (2), Tanzania (2), Mozambique (3), South Africa (3), Namibia (2) ,Gabon (2) and Cameroon (1). Counts in excess of 3,000 birds have been recorded at four of these sites: Sivash Gulf in Ukraine (maximum 5,000), Barr Al Hikman in Oman (3,300), Baie de Corisco in Gabon (3,900), and Langebaan Lagoon in South Africa (3,900). The Gulf of Gabès in Tunisia is also an extremely important site for the Grey Plover, supporting birds from both populations, especially during the spring migration when up to 16,000 birds have been recorded (van Dijk *et al.* 1986).

Protection status of key sites

Important autumn gathering places on the tundra in north-eastern Europe (Mineyev 1994) belong partly or wholly to the Nenetsky "Special Purpose" Reserve (400,000 ha), but the reserve is not totally protected from economic activity (Volkov & de Korte 1998).

Grey Plovers from the western population visit a chain of incompletely protected and unprotected estuaries in Western Europe and West Africa, which are subject to land-claim, industrial activities and human recreation. Intensive national legalisation as well as international agreements (reviewed in de Jong *et al.* 1993) now protect the habitats of the Wadden Sea. The very important Banc d'Arguin in Mauritania and Bijagos Archipelago in Guinea-Bissau have some protection. The first has been declared a National Park, but Gowthorpe *et al.* (1996) have documented over-exploitation of offshore fisheries resources and disturbance to the entire ecosystem. UNESCO has accepted the Bijagos Archipelago as a Biosphere Reserve. Monitoring of this site was strengthened in the 1990s by a co-operative programme between the Wadden Sea States and Guinea-Bissau (Salvig *et al.* 1997).

Key sites for the eastern population are less well protected. Land-claim has resulted in permanent destruction of many inter-tidal habitats along the Saudi Arabian Gulf coast to the detriment of waterbird populations (Evans & Keijl 1993b). Protected status has been accorded here to only a few sites, e.g. Khor Dubai and Merawah Island in the United Arab Emirates. In Saudi Arabia, some protection has been given to Jubail Lagoons. Tarut Bay, also in Saudi Arabia, has been proposed as a Special Nature Reserve, Biological Reserve and Resource Use Reserve. The establishment of this protected area is one of the most pressing wildlife conservation priorities along the Gulf coast (Evans & Keijl 1993a).

Table 27. Key sites for Grey Plover. Sites where 1% or more of a population has been recorded

Country	Site	Lat.	Long.	Season	Max total	Year max	Average total	Basis for average	Source	Population(s) at site
Cameroon	Ndian Basin	04.50	8.75	January-March	972	2007			Van der Waarde 2007	SW Asia, E & S Africa & E Atlantic
Denmark	Wadden Sea	55.16	8.58	Spring	5373	2003	2666	2000-04 (3)	NERI, Denmark, 2005	E Atlantic
Egypt	El Malaha. Bur Fuad	31.22	32.32	Non-breeding	1540	1990			IWC database	SW Asia, E & S Africa
France	Baie de Bourgneuf et Noirmoutier	47.04	-2.12	Non-breeding	6110	1997	2787	1999-04 (5)	R Mahéo, LPO *et al.* 2005	E Atlantic
France	Baie de l'Aiguillon	46.32	-1.17	Non-breeding	2555	2001	1912	1999-04 (5)	IWC database	E Atlantic
France	Baie des Veys et Pointe d'Arçay	49.40	-1.14	Non-breeding	3401	1997	1348	1999-04 (5)	IWC database	E Atlantic
France	Baie du Mont Saint Michel	48.67	-1.51	Non-breeding	7200	2001	4329	1999-04 (5)	IWC database	E Atlantic
France	Bassin d'Arcachon et Banc d'Arguin	44.67	-1.12	Migration	3000	1997			WBDB	E Atlantic
France	Côtes Nord et Ouest de l'Ile d'Oleron	45.97	-1.47	Non-breeding	3429	1992	486	1999-03 (5)	IWC database	E Atlantic
France	Golfe du Morbihan	47.56	-2.79	Wintering	2600	1998	2113	1999-03 (5)	R Mahéo, LPO *et al.* 2005	E Atlantic
France	Ile de Ré	46.22	-1.50	Non-breeding	2572	2000	1560	1999-04 (5)	IWC database	E Atlantic
France	Littoral Picard	50.23	1.50	Non-breeding	5053	1996	323	1999-04 (5)	IWC database	E Atlantic
France	Marais Breton	46.97	-2.00	Non-breeding	12532	2001	4180	2001-03 (3)	IWC database	E Atlantic
France	Résèrve Naturelle de Moeze (Charente-Seudre)	45.83	-1.14	Non-breeding	5943	2000	3320	1999-04 (5)	IWC database	E Atlantic
Gabon	Baie de Corisco	1.20	9.67	Feb-Mar	3900	1992			AfWC database	SW Asia, E & S Africa
Gabon	Estuaire du Gabon	0.21	9.42	Feb-Mar	1176	1992			AfWC database	SW Asia, E & S Africa
Germany	Wadden Sea - Lower Saxony	54.00	8.00	Spring	58036	1993	25679	1998-02 (5)	J . Blew, CWSS, 2005	E Atlantic
Germany	Wadden Sea - Schleswig-Holstein	54.50	8.50	Autumn	46812	1992	20458	1997-01 (5)	J . Blew, CWSS, 2005	E Atlantic
Germany	Western Pomerania Coast	54.43	12.90	Autumn	3200				Graumann 2007	E Atlantic
Guinea	Vasières de Sonfonia	9.67	-13.56	Non-breeding	2876	2000	2738	1999-00 (2)	AfWC database	E Atlantic
Guinea-Bissau	Bijagos Archipelago	11.30	-16.00	January	39100	1993	32600	1992-01 (3)	Dodman & Sá 2005	E Atlantic
Iran	Rud-i-Shur, Rud-i-Shirin & Rud-i-Minab Deltas	27.08	56.75	January	1130	2005	652	2004-07 (3)	DOEI / WIWO Svazas *et al.*1999	SW Asia, E & S Africa
Lithuania	Nemunas river delta	55.30	21.33	August	4500	1996				E Atlantic
Mauritania	Banc d'Arguin	20.12	-16.27	January	19500	2000	17660	1997-01 (3)	Hagemeijer *et al.* 2004	E Atlantic
Morocco	Merja Zerga: Kenitra	34.80	-6.30	Winter	5260	1990	2365	1990-95 (5)	IWC database	E Atlantic
Mozambique	Bay Inhambane	-24.18	35.38	July-August	2070	1999			AfWC database	SW Asia, E & S Africa

Country	Site	Lat.	Long.	Season total	Max max	Year total	Average for	Basis average	Source	Population(s) at site
Mozambique	Bazaruto, Benguera and Magarugue Is	-21.50	35.43	Non-breeding	2029	1997	1552	1996-98 (3)	Köhler & Köhler. *in litt*	SW Asia, E & S Africa
Mozambique	Inhaca Island	-26.00	32.62	No data	900	1995			Parker 1999	SW Asia, E & S Africa
Namibia	Sandwich Harbour	-23.38	14.48	July-August	1207	1999	394	1992-00 (5)	AfWC database	SW Asia, E & S Africa
Namibia	Walvis Bay Ramsar Site	-22.50	14.42	July-August	2598	1999	1061	1991-99 (4)	AfWC database	SW Asia, E & S Africa
Netherlands	Rhine-Maas-Schelde Delta	51.50	4.00	Autumn	13540	1995	9542	1999-03 (5)	RWS WD RIKZ 2005	E Atlantic
Netherlands	Wadden Sea	53.30	5.38	Spring	60361	2004	50411	1999-03 (5)	SOVON, The The Netherlands	E Atlantic
Oman	Barr Al Hikman	20.63	58.47	Non-breeding	3300	1997	1310	1993-01 (5)	IWC database	SW Asia, E & S Africa
Oman	Masirah Island	20.42	58.78	October	1600	1992			Evans, 1994	SW Asia, E & S Africa
Portugal	Estuário Do Tejo	38.75	-9.08	Non-breeding	6836	1989	2415	1996-01 (5)	IWC database	E Atlantic
Portugal	Ria De Faro	37.00	-7.92	Non-breeding	3028	1995	513	1997-01 (5)	IWC database	E Atlantic
Russia	Seskar Island	60.02	28.40	Migration	3000	1997	2500	1997	Skov *et al.* 2000	E Atlantic
Saudi Arabia	Jizan Beach	16.88	42.53	Non-breeding	2232	1992	653	1991-96 (5)	IWC database	SW Asia, E & S Africa
Saudi Arabia	Tarut Bay	26.67	50.17	Non-breeding	1708	1993	1102	1993-96 (3)	IWC database	SW Asia, E & S Africa
Senegal	Casamance delta	12.43	-16.48	December	4000	1985-87	3500	1985-87	R Mahéo *in litt* to P. Yésou	E Atlantic
Senegal	Parc National du Delta du Saloum	13.83	-16.75	Non-breeding	5539	1999	3185	1973-99 (4)	AfWC database	E Atlantic
Sierra Leone	Yawri Bay	8.20	-12.92	January-Feb	2684	2005			Van der Winden *et al.* 2007	E Atlantic
South Africa	Langebaan Beach	-33.13	18.07	Pre-breeding migration	1860	1998			AfWC database	SW Asia, E & S Africa
South Africa	West Coast National Park	-33.08	18.10	Non-breeding	3915	1999			AfWC database	SW Asia, E & S Africa
South Africa	Zwartkops River Estuary	-33.87	25.63	Non-breeding	914	1994			AfWC database	SW Asia, E & S Africa
Spain	Cádiz Bay	36.53	-6.27	Non-breeding	2624	1996	1227	1996-01 (5)	IWC database	E Atlantic
Tanzania	Pemba Island	-5.17	39.67	January	2150	1998			Geene, 2001	SW Asia, E & S Africa
Tanzania	Zanzibar Island	-6.13	39.23	January	2388	1998			Geene, 2001	SW Asia, E & S Africa
Tunisia	Gulf of Gabès	34.40	10.32	February	16790	1984			Van Dijk *et al.* 1986	E Atlantic + SW Asia, E & S Africa
Ukraine	The Sivash, Azov Sea	46.17	34.58	Spring	5000	1992			van der Winden *et al.* 1993	SW Asia, E & S Africa
U.A.E.	Khor Dubai	25.21	55.33	Non-breeding	1000	1992	394	1995-99 (5)	Evans, 1994	SW Asia, E & S Africa
U.A.E.	Merawah Island	24.33	53.25	Non-breeding	932	1995	587	1994-98 (4)	IWC database	SW Asia, E & S Africa
U.K.	Alt Estuary	53.52	-3.05	Spring	4890	1997-02	3214	1997-02 (5)	BTO, UK, 2005	E Atlantic
U.K.	Blackwater Estuary	51.72	0.80	Winter	4649	1999-03	2992	1999-03 (5)	BTO, UK, 2005	E Atlantic
U.K.	Chichester Harbour	50.80	-0.93	Winter	3180	1999-03	2144	1999-03 (5)	BTO, UK, 2005	E Atlantic
U.K.	Dengie Flats	51.68	0.93	Winter	7826	1999-03	4144	1999-03 (5)	BTO, UK, 2005	E Atlantic
U.K.	Hamford Water & the Naze	51.88	1.23	Winter	3267	1999-03	2494	1999-03 (5)	BTO, UK, 2005	E Atlantic
U.K.	Humber Estuary	53.67	-0.17	Spring	6135	1997-02	2742	1997-02 (5)	BTO, UK, 2005	E Atlantic
U.K.	Medway Estuary	51.40	0.65	Winter	3221	1999-03	1990	1999-03 (5)	BTO, UK, 2005	E Atlantic
U.K.	North Norfolk Coast	52.98	0.76	Autumn	2890	1999-03	2104	1999-03 (5)	BTO, UK, 2005	E Atlantic
U.K.	Ribble Estuary	53.72	-2.92	Spring	16395	1997-02	7922	1997-02 (5)	BTO, UK, 2005	E Atlantic
U.K.	Stour Estuary	51.93	1.15	Winter	3739	1999-03	3188	1999-03 (5)	BTO, UK, 2005	E Atlantic
U.K.	Thames Estuary	51.48	0.57	Winter	6923	1999-03	4939	1999-03 (5)	BTO, UK, 2005	E Atlantic
U.K.	The Wash	52.93	0.30	Spring	16112	1997-02	13514	1997-02 (5)	BTO, UK, 2005	E Atlantic

György Szimuly

Common Ringed Plover

Charadrius hiaticula

Geographical variation and distribution

The Common (or Great) Ringed Plover is an Arctic and northern temperate breeding wader. Its breeding range extends around much of the Arctic, from the east coast of Baffin Island and Greenland across northern Europe and the Russian tundra to the coasts of the Bering Sea in northern Chukotka. Throughout much of its range, it is essentially a high Arctic breeder, but its range extends to the temperate coasts of North-west Europe as well as a few inland areas of Europe. It winters in Western and Southern Europe, Africa and South-west Asia, and is absent from the Americas and Greenland outside the breeding season.

In Europe, some Common Ringed Plovers breed inland in Iceland and northern and central Scandinavia, as well as locally in Britain and Ireland. They also breed along some of the major river systems of Poland, Ukraine and Belarus. Elsewhere, the distribution is largely coastal with a wide distribution in the Baltic, in Denmark and along the coasts of the Wadden Sea.

Three subspecies are generally recognised:

(1) *hiaticula* — breeding in northern Europe from southern Scandinavia and the Baltic to Britain, Ireland and France, and including northern and eastern continental Europe; wintering in Europe and North-west Africa;

(2) *psammodroma* — breeding in north-eastern Canada, Greenland, Iceland, the Faeroes and Jan Mayen; wintering in Western and Southern Africa;

(3) *tundrae* — breeding in northern Europe and Asia from northern Scandinavia and Finland east across high Arctic areas of northern Russia to the Bering Strait; wintering in South-west Asia (to Pakistan) and Eastern and Southern Africa. The proportion of this subspecies that winters in West Africa remains to be determined.

Some authors consider *psammodroma* invalid, although Engelmoer & Roselaar (1998) concluded that it is a valid form, intermediate morphologically between the large *hiaticula* and the smaller *tundrae.*

The nominate sub-species and *psammodroma* winter mainly on the Atlantic coast of Western Europe and North-west Africa, with the range of *psammodroma* continuing south to Mauritania, Senegal and Gambia, although birds assigned to *psammodroma* (formerly *hiaticula*) have been recorded as far south as South Africa (Tree 1997). The high Arctic race *tundrae* appears to winter mainly in Eastern and Southern Africa and South-west Asia east to Pakistan, although many probably reach the eastern Mediterranean and some, perhaps many, apparently reach West Africa. Very few birds winter in Asia east of Pakistan.

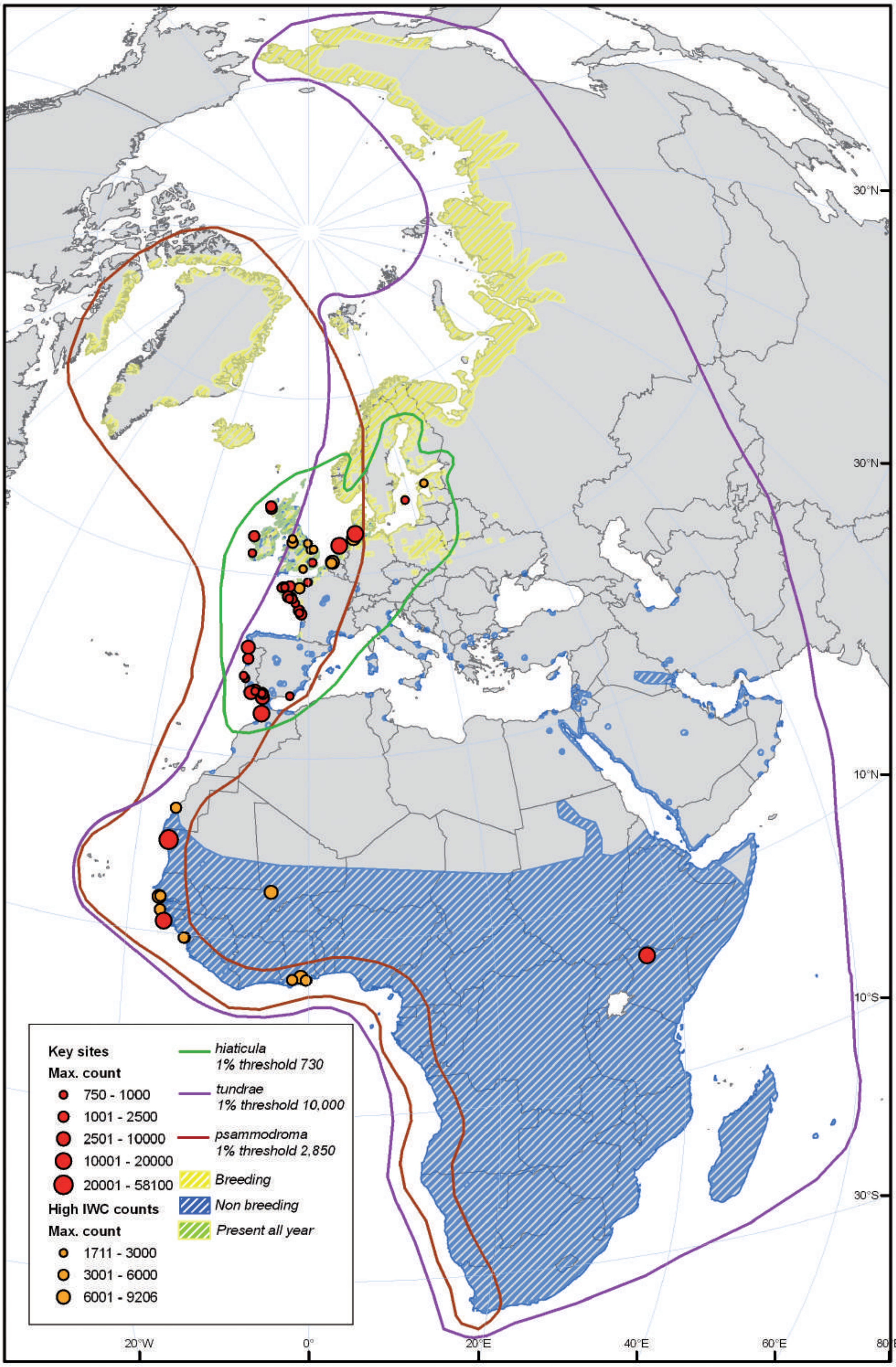
It is clear that there is a considerable amount of mixing between all of these populations. There is also some inter-gradation on the breeding grounds in Scandinavia between west European *hiaticula* and north European *tundrae*, with *hiaticula* breeding as far north as Trondheim in western Norway (Engelmoer & Roselaar 1998).

Movements

Populations of the nominate form and *psammodroma* show the phenomenon of “leap-frog” migration, with the northernmost breeding populations (*psammodroma* in north-eastern Canada and Greenland) wintering furthest south (mainly in West Africa), and the southernmost breeding populations (*hiaticula* in Ireland, Britain and Brittany) being almost sedentary. Some West European birds remain close to their breeding grounds throughout the year, although there is a tendency amongst British breeders for birds from southern and eastern breeding areas to move south-west to Brittany, Ireland and south-west England, and for birds

Common Ringed Plover

Charadrius hiaticula



from western and northern breeding areas to move south (Liley *et al.* 2002). Birds breeding in southern Scandinavia and the Baltic winter along the Atlantic coast from Britain and Ireland to West Africa. Most of the 149 foreign recoveries of birds ringed in Norway are from Britain and the west coast of continental Europe, although two birds ringed as young birds in extreme northern Norway (and presumably, therefore, *tundrae*) were recovered in Ghana (Bakken *et al.* 2003).

Nearctic breeders migrate across the North Atlantic to North-west Europe in a single flight or staging in Greenland and Iceland, before moving on to overwinter mainly in West Africa, with some probably moving as far south as South Africa. For birds breeding in Greenland, Britain is an important staging area in both autumn (14 ringing recoveries) and spring (5 recoveries concentrated on west coast estuaries bordering the Irish Sea) (Lyngs (2003). Icelandic breeders are also known to move through the U.K. and southern North Sea to overwinter mainly in France, Iberia, Morocco and West Africa.

Some *tundrae* (probably the western part of the population) pass through staging areas in Western Europe, but the majority probably move across Eurasia on a broad front towards wintering areas in Eastern and Southern Africa. Two birds ringed in South Africa have been recovered at staging areas in the Black Sea and south of Moscow, respectively, while a bird ringed on autumn passage in central Kazakhstan has been recovered in South Africa (Underhill *et al.* 1999). Meltofte (1993) considered West Africa to be the migratory destination of most European breeding *tundrae*; he reported a few thousand European *tundrae* staging in Denmark in spring (May-June) and autumn (August-September), and a small wave of Siberian *tundrae* passing through eastern Denmark during late August and September. Meissner (2007) analysed the biometrics of migrants through the Polish southern Baltic and concluded that a wave of nominate *hiaticula* passes through in July, followed by adult and then juvenile *tundrae* in August. Owing to the considerable overlap between populations during the moult and migration periods, precise patterns of movement and the use of staging sites by the different populations are poorly understood and require further research.

Population limits

Smit & Piersma (1989) identified two populations of Common Ringed Plovers in the East Atlantic Flyway: a population wintering in Western Europe, the western Mediterranean and North-west Africa, and comprising mainly birds breeding in Western Europe (including southern Scandinavia); and a population wintering mainly in West Africa, with smaller numbers reaching South Africa, and comprising birds breeding in north-eastern Canada, Greenland, Iceland, North-east Europe and Western Siberia. These two populations were adopted in the first two editions of *Waterbird Population Estimates*, along with a third population comprising the birds wintering in South-west Asia and Eastern and Southern Africa (following Perennou *et al.* 1994). Stroud *et al.* (2004) and Thorup (2006) also recognised three populations of Common Ringed Plovers, but these were defined as the populations of the three subspecies, as recognised by Engelmoer & Roselaar (1998), rather than on the basis of separate wintering areas. These three subspecies populations were adopted in *WPE3* and retained in *WPE4*. However, it must be acknowledged that although there is much similarity between the three wintering populations recognised in the first two editions of *Waterbird Population Estimates* and the winter distributions of the three subspecies recognised in the third and fourth editions, they are not the same. Considerable numbers of *tundrae* are believed to winter in West Africa, where they mix with *psammodroma*; some *psammodroma* are believed to reach Southern Africa, where they mix with *tundrae*, and some *psammodroma* most likely mix with nominate *hiaticula* in southern Europe and North-west Africa. Until the extent of this mixing can be ascertained, population estimates based on winter counts must be treated with some caution.

Population size

1. *hiaticula*

Population estimate	1% threshold	Population trend
73,000	730	Possibly decreasing

The population estimate of 73,000 given by Stroud *et al.* (2004) and first adopted in *WPE3* was based on the total of January counts from the wintering range (Europe and the western Mediterranean, including Algeria, Tunisia and Morocco north of 28ºN) in the 1990s. Fewer than 100 were counted in Libya in 2007 (Etayeb *et al.* 2007) and exlusion of this country from earlier estimates is unlikely to have had much effect on estimates. The total breeding population of *hiaticula* has been estimated from national breeding estimates collated by Thorup (2006). Together these total 24,700-31,200 pairs, which equate to 74,100-93,600 individuals. The mid-point of this range, 83,850, is broadly comparable with the estimate based on midwinter counts, given the sensitivity of this comparison to assumptions as to the ratio of *hiaticula/tundrae* breeding in Norway and Sweden, as well as the accuracy of some breeding estimates, some of which (e.g. U.K.) derive from the early 1980s. Chylarecki & Ojanen (1997) estimated the European breeding population of *C. hiaticula* at 84,000-116,000 pairs, but this estimate included both *hiaticula* and *tundrae*.

2. *psammodroma*

Population estimate	1% threshold	Population trend
240,000-330,000	2,850	Decreasing

Stroud *et al.* (2004) gave a population estimate of 190,000 based on the total number of wintering birds counted in West Africa in the 1990s (from Morocco south of 28ºN, south to Angola and including 50% of the South African total), and this estimate was adopted in *WPE3* and *WPE4*. It seems likely, however, that this estimate was too low. Dodman (2002) made some allowance for countries that had been poorly covered in the January censuses, and concluded that there could be at least 250,000 *psammodroma* in Africa during the northern winter, while Trolliet & Fouquet (2004) concluded that there were about 240,000 *psammodroma* wintering in West Africa alone. Estimates of breeding populations give an even higher figure. Meltofte (1985) estimated the high Arctic breeding population in Greenland and north-eastern Canada at 24,500 pairs. However, Meltofte (2001) has highlighted methodological issues that show that this was a significant underestimate, with the total in Greenland recently recalculated at 30,000-60,000 pairs. This, together with a further 500-1,000 breeding pairs in north-eastern Canada (Meltofte 1985) and 50,000 breeding pairs in Iceland and the Faeroes (Asbirk *et al.* 1997), suggests a total breeding population of 80,500-111,000 pairs – an estimate adopted by Thorup (2006). This would indicate a total non-breeding population of approximately 240,000-330,000 individuals, the estimate adopted in this Atlas.

3. *tundrae*

Population estimate	1% threshold	Population trend
D (100,000-1,000,000)	Provisionally 10,000	Unknown

The total numbers counted in Southern Africa (excluding 50% of the South African total), Eastern Africa and the Middle East in the 1990s amounted to only 62,672 individuals (Stroud *et al.* 2004). This is clearly a major underestimate. Estimates of the breeding populations in Northern Europe (a large proportion of the Norwegian and Swedish populations, together with significant parts of the populations of Finland and European Russia) amount to 48,210-91,100 pairs (Thorup 2006). This suggests a total non-breeding population of 145,000-273,000 individuals from the European breeding areas alone. To this must be added an unknown, but possibly very large, number of birds from breeding areas east of the Urals, given the vast extent of the breeding range across northern Siberia east to the Bering Sea (Engelmoer & Roselaar 1998). Thorup (2006) noted that only about one third of the breeding range of this subspecies lies within Europe, and considered that the proportion of the breeding population within Europe might be far less than this. He concluded that the total population of *tundrae* could be much larger that hitherto supposed. The estimate of 145,000-280,000 proposed by Stroud *et al.* (2004) and adopted in *WPE3* scarcely differs from the total derived from the European breeding population, and was obviously a considerable underestimate. Given the uncertainty, a much broader estimate of D (100,000-1,000,000) was adopted in *WPE4*.

Conservation status

The large European breeding population of Common Ringed Plover appears to have been more or less stable during the last decades of the twentieth century. There was an increase in inland breeding in some areas (e.g. in Britain and Germany), while at the same time, numbers breeding in some coastal areas declined (Chylareki & Ojanan 1997). Overall increases were reported in Britain and Germany, and decreases in Finland, Estonia and Poland, but the large breeding populations in Iceland, Sweden and Norway were thought to be stable (Chylareki & Ojanan 1997). Early 1990s totals from Western Europe and North Africa suggested that about 73,000 *hiaticula* were wintering in this region at that time, compared with only 47,500 in the 1980s, leading Stroud *et al.* (2004) to conclude that the population was increasing. It seems, however, that this population is now in decline (Wetlands International 2006). An analysis of population trends of waterbirds wintering in North-west Europe (Ireland, U.K., France, Belgium, The Netherlands and Germany combined) based on IWC data estimated that between 1989 and 2002 there was an overall decrease in numbers of 1.2% per annum (Delany *et al.* 2007). Numbers wintering in the U.K. have been decreasing steadily since the late 1980s (Banks *et al.* 2006) but in The Netherlands the trend is less clear, with a decrease in the southern Delta, but a steady increase in the Wadden Sea (van Roomen *et al.* 2006). Numbers wintering in France have also increased in recent years (Deceuninck 2005). Rehfisch *et al.* (2003) found that the number of Common Ringed Plovers wintering along non-estuarine coastlines in the U.K. had decreased by 15% (from 28,290 to 24,110) during the period 1984/85 to 1997/98, while Colhoun & Newton (2001) found a massive 62.5% decline in the much smaller numbers wintering on non-estuarine coasts in Ireland during the period 1987 to 1997/98.

The increase in the population estimate for *psammodroma* is an adjustment of former under-estimates, and should not be interpreted as representing a genuine increase in numbers.

The population of *psammodroma* wintering in West Africa is thought to be declining (Wetlands International 2006). Comprehensive surveys of the Banc d'Arguin in Mauritania in 1997, 2000 and 2001 gave counts of 58,000-60,000 individuals, a decrease of 40-42% on the 1980 total of 97,990 (Zwarts *et al.* 1998, Dodman & Diagana 2003, Hagemeijer *et al.* 2004). In the Bijagos Archipelago, Guinea Bissau, counts decreased on a similar scale, from 30,400 in 1987 to 16,000 in 2001 (Dodman and Sá 2005).

Nothing is known of trends in the population of *tundrae* wintering in South-west Asia and Eastern and Southern Africa.

Habitat and ecology

Northern populations breed on Arctic tundra while more southerly populations breed on coastal gravel and shingle banks, upper salt marshes and artificial habitats such as the shores of gravel pits and reservoirs. High densities of breeding birds have been reported in the machair (calcareous coastal grasslands) of the Scottish Outer Hebridean islands and western Ireland, while in northern Britain, shingle banks in rivers hold a high proportion of the population. Birds begin nesting in April in southern breeding areas, in June to mid-July in Iceland, and in June in northern Eurasia, Greenland and Arctic Canada. They nest either solitarily or in loose groups, with nests located 5-100 m apart (del Hoyo *et al.* 1996). On migration and in the wintering areas, the birds feed visually on small crustaceans, polychaete worms, isopods, amphipods, insects and millipedes, on sand and shingle shores, sandbanks and mudflats; also occasionally on salt marshes, short grassland, flooded fields and artificial shores (del Hoyo *et al.* 1996). They roost communally, close to the feeding sites, on bare ground and in low vegetation.

Network of key sites

The large size and extensive geographical range of the population of *tundrae* give it a high 1% level (10,000), resulting in few key sites being recognised for this population in Africa and none in South-west Asia. The considerable overlap of *tundrae* with other forms, and incomplete understanding of the extent to which populations mix, especially *tundrae* and *psammodroma* in West Africa, also results in rather few key sites being recognised in Africa. Thus, the only wetlands in Africa which qualify as key sites are Lake Turkana (Kenya), the Banc d'Arguin (Mauritania), the Bijagos Archipelago (Guinea Bissau) and Merja Zerga (Morocco).

In Europe, a majority of key sites qualify as a result of January counts of nominate *hiaticula*, which has a 1% threshold of 730. Most of these key sites are located on the western seaboard of Europe with five sites in Portugal, seven in western Spain and a cluster of 14 sites in north-western and western France. Two sites in western Ireland and one in Britain complete the suite of key sites which qualify on the basis of January counts. Two sites in the Western Isles of Scotland and one in Sweden qualify as key sites on the basis of numbers of breeding birds. The most important site in Europe, the Wadden Sea of Schleswig Holstein, Germany, qualifies as a key site on the basis of numbers present on spring migration, and the second most important site, the Dutch Wadden Sea is most important during autumn passage.

Table 28. Key sites for Common Ringed Plover. Sites where 1% or more of a population has been recorded

Country	Site	Lat.	Long.	Season	Max total	Year max	Average total	Basis for average	Source	Population(s) at site
France	Baie de Bourgneuf et Noirmoutier	47.04	-2.12	Non-breeding	978	1995	311	1999-04 (5)	IWC Database	*hiaticula + tundrae + psammodroma*
France	Baie de Guisseny	48.65	-4.52	Non-breeding	900	1992	254	1999-04 (5)	IWC Database	*hiaticula + tundrae + psammodroma*
France	Baie de l'Orne	49.30	-0.16	Hard weather refuge 1997	750	1997			IWC Database	*hiaticula + tundrae + psammodroma*
France	Baie de Morlaix + Penze	48.68	-3.87	Non-breeding	750	1989	526	1999-03 (5)	IWC Database	*hiaticula + tundrae + psammodroma*
France	Baie de Quiberon	47.49	-3.10	Non-breeding	911	2001	611	1999-04 (5)	IWC Database	*hiaticula + tundrae + psammodroma*
France	Baie de Vilaine	47.47	-2.51	Non-breeding	927	2004	713	1999-04 (5)	IWC Database	*hiaticula + tundrae + psammodroma*
France	Côtes Nord et Ouest de l'Ile d'Oleron	45.97	-1.47	Non-breeding	753	1994	243	1999-03 (5)	IWC Database	*hiaticula + tundrae + psammodroma*
France	Estuaires de Trieux. Jaudy et Anse de Paimpol	48.81	-3.12	Non-breeding	1365	1992	489	1999-04 (5)	IWC Database	*hiaticula + tundrae + psammodroma*
France	Golfe du Morbihan	47.56	-2.79	Non-breeding	1309	1994	815	1999-04 (5)	IWC Database	*hiaticula + tundrae + psammodroma*
France	Ile de Re	46.22	-1.50	Non-breeding	1711	2002	947	1999-04 (5)	IWC Database	*hiaticula + tundrae + psammodroma*
France	Littoral Plouescat-Roscoff	48.70	-4.15	Non-breeding	1053	1993	599	1999-04 (5)	IWC Database	*hiaticula + tundrae + psammodroma*
France	Littoral Roscoff/Santec	48.73	-3.98	Non-breeding	905	1998	641	1994-98	IWC Database	*hiaticula + tundrae + psammodroma*
France	Rade de Lorient	47.69	-3.36	Non-breeding	1202	1992	511	1999-04 (5)	IWC Database	*hiaticula + tundrae + psammodroma*
France	Résèrve Naturelle de Moeze (Charente-Seudre)	45.83	-1.14	Non-breeding	1307	2004	903	1999-04 (5)	IWC Database	*hiaticula + tundrae + psammodroma*
Germany	Wadden Sea - Schleswig-Holstein	54.50	8.50	Spring	14627	2002	10211	1998-02 (5)	J . Blew, CWSS, 2005	*tundrae + hiaticula + psammodroma*
Guinea-Bissau	Bijagos Archipelago	11.30	-16.00	January	33000	1994	25100	1992-2001 (3)	Dodman & Sa 2005	*tundrae + psammodroma*
Ireland	The Mullet, Broadhaven & Blacksod Bays	54.15	-10.00	Non-breeding	1069	2004	735	1999-04 (5)	BirdWatch Ireland 2005	*hiaticula + psammodroma*
Ireland	Tralee Bay, Lough Gill & Akeragh Lough	52.25	-9.92	Non-breeding	770	1999	344	1999-04 (5)	BirdWatch Ireland 2005	*hiaticula + psammodroma*
Kenya	Lake Turkana	3.45	36.67	Non-breeding	13600	1992			WBDB	*tundrae*
Mauritania	Banc d'Arguin	20.12	-16.27	January	58100	2000	58730	1997-01 (3)	Hagemeijer *et al.* 2004	*tundrae + psammodroma*
Morocco	Merja Zerga: Kenitra	34.80	-6.30	Winter	11500	1995	10214	1994-95 (2)	IWC database	*tundrae + psammodroma + hiaticula*
Netherlands	Wadden Sea - The Netherlands	53.30	5.38	Autumn	10830	2000	6983	1999-03 (5)	SOVON, The Netherlands, 2005	*tundrae + psammodroma + hiaticula*
Portugal	Estuário Do Minho	41.92	-8.83	Non-breeding	5280	2002	1091	1998-02 (5)	IWC Database	*hiaticula + tundrae + psammodroma*
Portugal	Estuário Do Sado	38.53	-8.83	Non-breeding	930	1998	439	1997-02 (5)	IWC Database	*hiaticula + tundrae + psammodroma*
Portugal	Estuário Do Tejo	38.75	-9.08	Non-breeding	887	1992	272	1996-01 (5)	IWC Database	*hiaticula + tundrae + psammodroma*
Portugal	Ria De Aveiro	40.67	-8.67	Non-breeding	1772	1992	1195	1992-96 (5)	IWC Database	*hiaticula + tundrae + psammodroma*
Portugal	Ria De Faro	37.00	-7.92	Non-breeding	4334	1995	1949	1997-01 (5)	IWC Database	*hiaticula + tundrae + psammodroma*
Spain	Cádiz Bay	36.53	-6.27	Non-breeding	2593	1996	1365	1996-01 (5)	IWC Database	*hiaticula + tundrae + psammodroma*
Spain	Coto Del Rey	37.03	-6.37	Non-breeding	1479	1996	741	1995-96 (2)	IWC Database	*hiaticula + tundrae + psammodroma*
Spain	Del Palacio A La Algaida (H)	36.80	-2.60	Non-breeding	982	2000			IWC Database	*hiaticula + tundrae + psammodroma*
Spain	Isla Cristina & Ayamonte	37.22	-7.42	Non-breeding	5000	1996			WBDB	*hiaticula + tundrae + psammodroma*
Spain	Lucios de Veta La Palma -Isla Mayor (Se)	36.93	-6.24	Non-breeding	1143	1996	330	1995-01 (5)	IWC Database	*hiaticula + tundrae + psammodroma*

Country	Site	Lat.	Long.	Season	Max total	Year max	Average total	Basis for average	Source	Population(s) at site
Spain	Marisma De Isla Cristina	37.19	-7.33	Non-breeding	798	2003	442	1994-03 (2)	IWC Database	*hiaticula* + *tundrae* + *psammodroma*
Spain	Parque Nacional de Doñana	36.99	-6.37	Non-breeding	993	2000	360	1993-00 (5)	IWC Database	*hiaticula* + *tundrae* + *psammodroma*
Sweden	Gotland Coast	57.40	18.95	Breeding	1000	1995			Skov *et al.* 2000	*hiaticula*
U.K.	North Uist Machair	57.58	-7.47	Breeding	1005 335 prs	1995			WBDB	*hiaticula*
U.K.	South Uist Machair	57.32	-7.33	Breeding	1395 465 prs	1995			WBDB	*hiaticula*
U.K.	Thames Estuary	51.48	0.57	Winter	954	1999-03	783	1999-03 (5)	BTO, UK, 2005	*hiaticula* + *tundrae* + *psammodroma*

Nick Davidson & Derek Scott

Niels Gilissen

Little Ringed Plover
Charadrius dubius

Geographical variation and distribution

The Little Ringed Plover has a broad breeding distribution across Europe and Asia, extending south to North Africa, the Indian sub-continent, Indochina, the Philippines and New Guinea. Three subspecies are generally recognised: the nominate race in the Philippines; *curonicus* in temperate regions of Eurasia and North Africa; and *jerdoni* in the Indian subcontinent and South-east Asia. The birds inhabiting New Guinea and the Bismarck Archipelago are sometimes assigned to the form *papuanus*. Only the form *curonicus* occurs in Western Eurasia and Africa. This breeds in temperate and Mediterranean areas, extending north to about 66ºN in the west of its range. Within Europe, the breeding distribution is rather discontinuous depending on the availability of suitable open-ground habitat, although the species breeds in all European countries except Ireland and Iceland (Geister 1997). In many countries, only a small proportion of the total numbers breeds in natural habitats, with disturbed areas of open ground being greatly favoured (Parrinder 1989).

In Western Eurasia and Africa, the Little Ringed Plover is almost entirely migratory, moving south after breeding to spend the boreal winter in the northern tropics of Africa south of the Sahara, generally between about 18ºN and the equator (Cramp & Simmons 1983). Here the birds typically occur at low densities with no major concentrations known. Stragglers have occurred as far south as Zambia. A few birds may be resident in southern breeding areas, e.g. in the Mediterranean basin (Cramp & Simmons 1983), and a small number of birds overwinter in the Arabian Peninsula, particularly in Oman, Saudi Arabia and Yemen (IWC Reports). However, the often repeated statement that the species winters commonly in the Middle East (e.g. in Thorup 2006) is unfounded. Only a few individuals have ever been found wintering in Iran, despite very good coverage of wetlands in the south. The only records during four midwinter surveys in Iraq in the 1960s and 1970s were of 12 individuals in January 1975 (Scott & Carp 1982), and none was recorded in three surveys in Syria in January and February 2004 (Murdoch *et al.* 2004). The highest midwinter count in the United Arab Emirates between 1995 and 1999 was only six individuals, and none was recorded in January 1996 and January 1998 (Delany *et al.* 1999, Gilissen *et al.* 2002).

Populations of *curonicus* breeding in Central and Eastern Asia migrate south to winter in the Indian Subcontinent and South-east Asia.

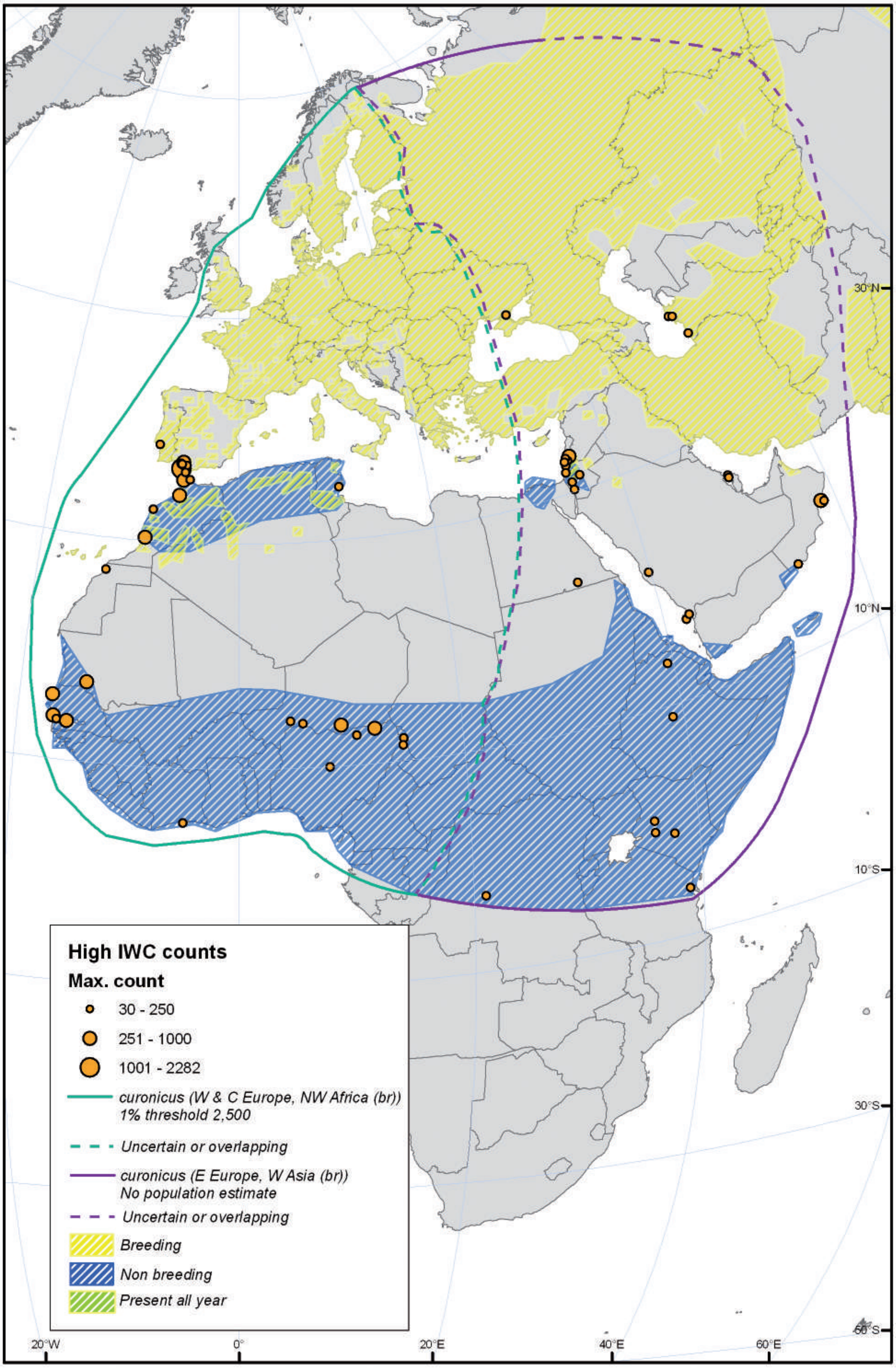
Movements

Western Palearctic birds are migratory over most of their range except in the extreme south, where a few birds may be resident. Dispersal from the breeding areas begins in late June to early July, with juveniles wandering in all directions. The main autumn passage in Europe extends from mid-July to September and peaks in August. Autumn departure from breeding areas in Britain starts in late July, and by the end of that month, some of these birds have already reached the south of France (Prater 2002). The first birds arrive on their Senegalese wintering grounds from late August. Records from the southernmost wintering areas, e.g. Tanzania, extend from the beginning of October to the end of March. The return movement from Africa commences in late February, and birds begin to arrive back on their breeding grounds in Western Europe in the second half of March. In northern Russia, however, birds do not arrive back on their breeding grounds until late May or early June (Snow & Perrins 1998).

Eleven recoveries of birds ringed in Fennoscandia indicate a mainly south-easterly autumn movement through Russia towards the Black Sea (Cramp & Simmons 1983). Exceptions include an August recovery in eastern Turkey, one (probably atypical) in January in Georgia, and another individual that moved south-west to Portugal. One bird ringed in the

Little Ringed Plover

Charadrius dubius



winter quarters in Kenya was subsequently recovered in Georgia in May, indicating the Caucasus to be *en route* from East Africa, the likely destination of birds originating from Fennoscandia. Recoveries of birds originating from Western Europe (Britain, the Low Countries and Germany) indicate a SSW-SSE movement in autumn (Cramp & Simmons 1983). The spread of autumn and spring recoveries of birds ringed in Britain, all of which are to the west of 10ºE, suggest that British breeders are likely to winter in the western Sahel region (Prater, 2002). Migrants avoid the Atlantic coast of Europe to reach the Mediterranean basin between Portugal/Morocco and Italy/Tunisia. The few recoveries from Iberia compared with a substantial number from France indicate a major overland route through France, with the Camargue being an important moulting and staging area. Birds then cross the western Mediterranean between eastern Spain and the Tyrrhenian Sea, making landfall in North-west Africa. Movement across the Sahara presumably occurs on a broad front, although there is only one recovery in the Sahara (a German bird found in southern Algeria) to support this (Cramp & Simmons 1983). Ringing recoveries from the winter quarters are few. They include five birds ringed in Britain and recovered in Ghana (Toms & Clark 1998)[1], one ringed in Germany and recovered in northern Nigeria, one ringed in Belgium and recovered in Senegal, and one ringed in Sweden and recovered in Libya. In addition, a bird ringed in Chad in November was recovered in Romania in August (Cramp & Simmons 1983, Urban *et al.* 1986).

Spring passage through the western Mediterranean is broadly the reverse of the autumn passage, with a similar concentration of recoveries in southern France (Cramp & Simmons 1983). The lack of recoveries from Iberia in spring, and the greater number of recoveries from Italy in spring than in autumn suggest a more easterly bias to the spring migration. Birds wintering as far west as Senegal may take a north-easterly route across the Sahara in spring, as has been shown by radar for coastal waders (Cramp & Simmons 1983).

Inter-seasonal movements are not very well known. A German study showed that first-time breeders moved on average 33.2 km from their natal areas, although 50% settled within 10 km. Older birds were more philopatric, settling on average 5.5 km from previous breeding sites. The temporary nature of nesting habitat, however, imposes a degree of dispersal between breeding seasons (Cramp & Simmons 1983).

Population limits

Waterbird Population Estimates recognises two populations of *curonicus* in Western Eurasia and Africa:

1) birds breeding in Europe (excluding European Russia) and North-west Africa, and wintering mainly in West Africa (Mauritania to Chad and northern Democratic Republic of Congo); and
2) birds breeding in European Russia and West and South-west Asia, and wintering sparingly in the Arabian Peninsula and commonly in North-east and Eastern Africa (south as far as northern Tanzania).

These two populations were adopted by Stroud *et al.* (2004) and are retained here. However, as Thorup (2006) has pointed out, linkages between breeding areas and wintering areas are poorly known, and there is evidence from ringing that some birds from Fennoscandia winter in Eastern Africa. He therefore prefers to treat all European and North African breeders as a single population.

[1] Prater (2002) mentions only one recovery of a British-ringed bird in sub-Saharan Africa – a bird recovered in Togo.

Population size

1. *curonicus* West & Central Europe and North-west Africa (breeding)

Population estimate	1% threshold	Population trend
200,000-300,000	2,500	Probably stable

National estimates of breeding populations in Europe (excluding European Russia and Turkey which are considered as part of the West and South-west Asian population below) indicate a total population of 63,350-94,820 pairs (data from Thorup 2006) or 67,000-103,000 pairs (data from BirdLife International 2004a). To these should be added the birds breeding in North Africa, although numbers here may be quite small, e.g. probably under 100 pairs in Tunisia (Snow & Perrins 1998). These figures suggest a total population of approximately 200,000-300,000 non-breeding individuals. This estimate was adopted in *WPE4.* Only a very small proportion of the population is counted in the winter quarters, e.g. only 1,165 were recorded in West Africa in January 1998 (Dodman *et al.* 1999), presumably because the species is widely dispersed in small numbers at small wetlands throughout the region.

2. *curonicus* Eastern Europe and Western Asia (breeding)

Population estimate	1% threshold	Population trend
Unknown	Not established	Unknown

The breeding population in European Russia and Turkey is estimated at 65,650-128,180 pairs (Thorup 2006) or 43,000-137,000 pairs (BirdLife International 2004a). A further 330-830 pairs breed in Armenia, and 500-1,000 pairs in Azerbaijan (BirdLife International 2004a). These estimate equate to about 130,000-420,000 individuals. To this must be added a very large number of birds breeding in West and South-west Asia (Cramp & Simmons 1983). Counts on wintering areas locate only a very small proportion of the population. The maximum midwinter count in North-east Africa during the period 1997-2001 was only 176 individuals (Dodman *et al.* 1997, Dodman *et al.* 1999, Dodman & Diagana 2003), while the maximum midwinter count in South-west Asia during the period 1995 to 1999 was only 66 individuals (Delany *et al.* 1999, Gilissen *et al.* 2002). Stroud *et al.* (2004) concluded that until better information became available, it was not possible even to guess at the size of this population.

Dodman (2002) considered the non-breeding population of Little Ringed Plovers in North-east Africa to be relatively low, when compared with other Palearctic visitors, whilst Fishpool & Evans (2001) provide a rough estimate of 10,000-100,000. However, it is likely that many more than 100,000 Little Ringed Plovers spend the boreal winter in North-east and Eastern Africa, which probably supports a substantial number of birds from Central Europe, as Thorup (2006) suggests. It is a complete mystery where the bulk of the large south-east European and West Asian population (possibly in excess of 500,000 birds) spends the northern winter.

Conservation status

European populations of the Little Ringed Plover declined in the late nineteenth and early twentieth centuries, probably because of climate change (Snow & Perrins 1998). The wet summers of this period decreased nest site availability through high water levels. Such water levels allowed the luxuriant growth of vegetation which is unfavourable for nesting. Starting in about the 1930s, a rapid expansion in numbers and range occurred, coinciding with the onset of a period of dry summers. This continued after the Second World War, when a huge increase in gravel extraction created an abundance of ideal breeding habitat. Later in the twentieth century, colonization of man-made habitats aided expansion into North-west Europe. In recent years, most populations have been relatively stable, although the increase appears to be continuing in some North-west European countries, while slight decreases have been reported in some Eastern European countries and Turkey (BirdLife International 2004a). Nothing is known of trends in the large West and South-west Asian breeding populations.

Habitat and ecology

The Little Ringed Plover breeds in the mild boreal, temperate, steppe and Mediterranean climatic zones of Western Eurasia. It avoids terrain subject to snow and ice, and is averse to cultivation, pastures, mountains, forests and tall and dense vegetation including the vegetated margins of inland wetlands (Snow & Perrins 1998). In Europe, it is mainly a lowland species breeding up to 600 m above sea level, although nests above 2,000 m have been recorded in Asia (Paludan 1959, in Cramp & Simmons 1983). The preferred breeding habitat includes open, bare or sparsely vegetated areas in the vicinity of shallow, standing or slow-flowing freshwater, although it will sometimes use saline pools inland and brackish estuaries and lagoons (Snow & Perrins 1998). It can penetrate far upstream where riverbanks, islets and dry beds provide suitable breeding habitat. As primarily a freshwater wader, it is found much less frequently on coasts than the Common Ringed Plover *C. hiaticula* (Snow & Perrins 1998), although breeding does occur at river mouths in Northern and Southern Europe (Geister 1997). Modern, industrial extraction and mining activities have created many temporarily or permanently suitable breeding habitats such as gravel pits, refuse dumps, sewage works and open-cast mining sites (Cramp & Simmons 1983). In some regions, such as Central Europe and the U.K., the majority of pairs use such artificially created sites with only 6% or less of the population breeding in natural habitats (Geister 1997). Breeding densities are influenced by the nature of the habitat. For example, a density of 1-2 pairs per ha was recorded at industrial sites in Ljubljana (Slovenia), with five pairs at one 0.5 ha location, whereas five pairs occupied 5 km of the River Sava in Slovenia, and 31 pairs bred along 60 km of the River Warta in Poland (Geister 1997).

The Little Ringed Plover is, as a rule, seasonally monogamous. Nests are solitary or in loose neighbourhood groups on bare ground or amongst low vegetation, rarely far from water (Snow & Perrins 1998). In Europe, egg-laying commences from early April. Both sexes share in incubation and care for the young (Cramp & Simmons 1983). Outside the breeding season, the Little Ringed Plover is not highly gregarious, being found mostly singly or in small groups. The diet consists chiefly of insects and other small invertebrates such as spiders obtained from, or just below, the surface, usually in wet areas, and also from shallow water (Snow & Perrins 1998).

The post-nuptial moult commences in June, often on the breeding grounds during incubation or before the young fledge. This moult, suspended for migration, resumes at staging posts and is completed in the winter quarters during December. The partial pre-nuptial moult, from January to May, is usually completed by early April. Juveniles undergo a partial moult from August to December (Cramp & Simmons 1983).

In Africa, this plover has a distinct preference for freshwater wetlands, including muddy and sandy shores of rivers and lakes, residual flood waters and short grassy areas near water, whilst it also occurs, less commonly, in coastal areas, including rainwater pools on salt flats bordering mangroves and estuaries (Urban *et al.* 2006).

Network of key sites

The Little Ringed Plover is a widely dispersed, inland wader at all times of the year, and rarely if ever congregates in large numbers at particular sites. No key sites can be identified, and the key site approach is clearly inappropriate in the conservation of this species.

Jeff Kirby & Derek Scott

Jacques Erard

Black-banded Plover (Madagascar Plover)

Charadrius thoracicus

Geographical variation and distribution

A close relative of the Kittlitz's Plover *C. pecuarius*, the entirely sedentary and monotypic Black-banded or Madagascar Plover is confined to south-western Madagascar. It occurs at or near sea level in a narrow strip along the west coast of Madagascar between Mahajanga and Tsimanampetsotsa (Morris & Hawkins 1998). The southern limit of its distribution has recently been identified as Fort-Dauphin (Long *et al.* 2008). There is significant geographic variation: breeding adults in the southern ecoregion (Morondava and further south) have longer wings and tarsi, and are heavier than those from the western ecoregion (Zefania *et al.* unpublished).

Movements

The Black-banded Plover is believed to be entirely sedentary, rarely moving far from the coastal strip, where it associates with other small plovers.

Population limits

Only one population is recognised, the entire population of the species.

Population size

1. Madagascar (entire population of the species)

Population estimate	1% threshold	Population trend
3,100	31	Decreasing

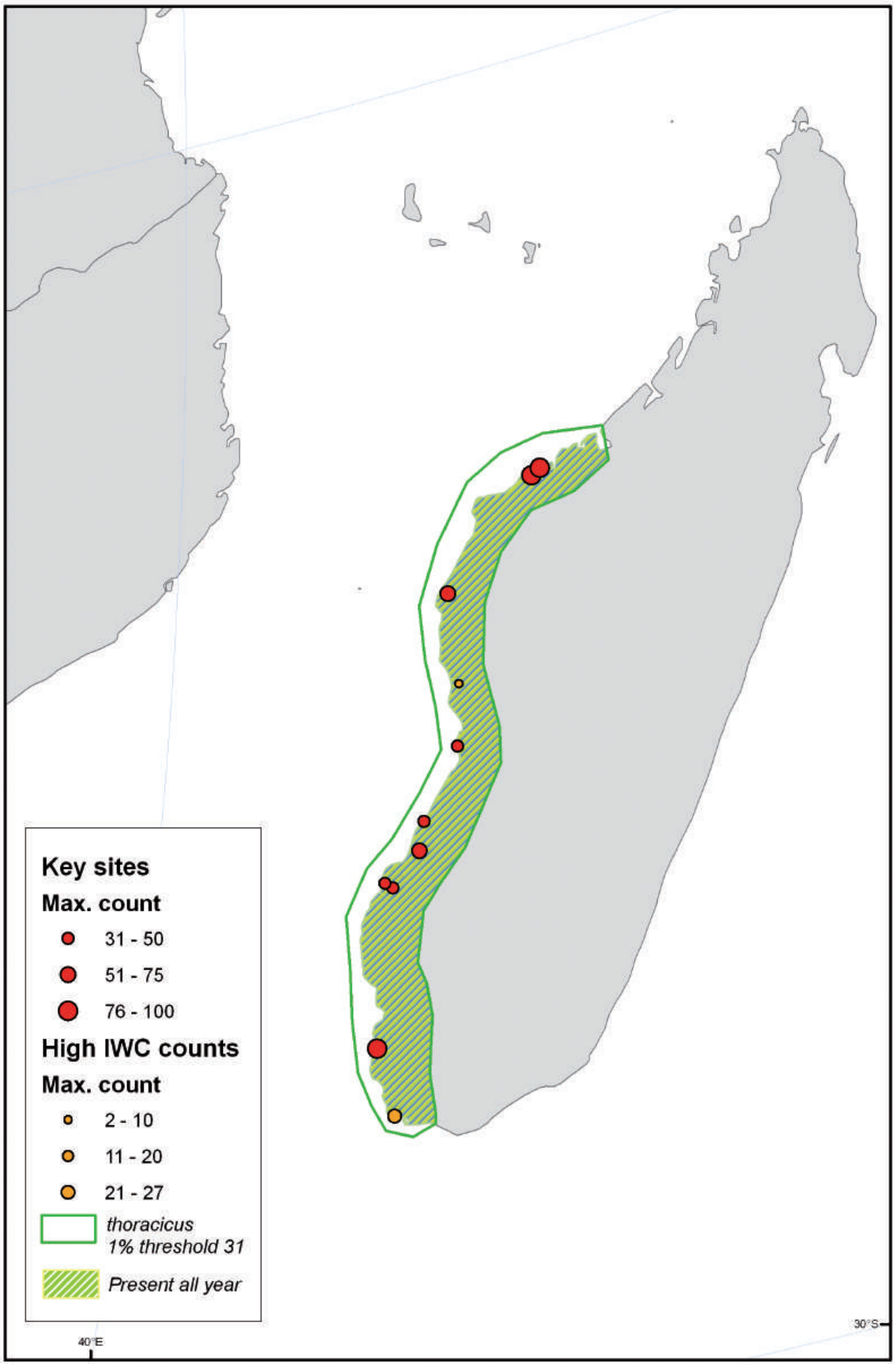
Long *et al.* (2008) used a habitat suitability model and mean density data to estimate a population of 3,100+/- 396 (2,704-3,496) individuals. In the absence of systematic survey data, *WPE4* adopted a conservative estimate of 750-3,100 based on F. Hawkins (*in litt.* 2002) and Zefania *et al.* (2005). High counts have included 92 in Baly Bay National Park, 61 at the Tambohorano wetlands, 46 in the Tsiribihina Delta, 46 in the Mangoky Delta (Lac Ihotry), 133 at Tsimanampetsotse and 25 at the south-western coastal wetlands (ZICOMA 2001). A total of 121 birds was recorded from ten wetlands in Greater Menabe in November 2004, and it is possible that significant populations remain undetected in this area (Young *et al.* 2005).

Conservation Status

In 2004, the globally threatened status of the Black-banded Plover on the IUCN Red List was upgraded from Near Threatened to Vulnerable because of its restricted distribution and small and declining population (BirdLife International 2004b). The main problem appears to be low nesting success, extremely low frequency of renesting and thus low overall productivity (Zefania *et al.* 2008). It may be locally vulnerable to egg collection, although human population density is generally low across much of its rather remote range (ZICOMA 1999). Modification of its wetland habitat on the west coast of Madagascar represents an increasing threat (BirdLife International 2006). Indeed, most coastal wetlands in western Madagascar are not protected, and general threats to wetlands include destruction of mangroves, uncontrolled burning of grassland and clearance for agriculture. The Black-banded Plover can also be considered

Black-banded Plover (Madagascar Plover)

Charadrius thoracicus



vulnerable to climatic pressures, such as cyclones and rising sea levels linked to global warming.

Habitat and Ecology

The preferred habitat of the Black-banded Plover is dry, grazed grassland on the coast, where it may occur together with other waders, such as Kittlitz's Plover *C. pecuarius*, White-fronted Plover *C. marginatus*, Common Ringed Plover *C. hiaticula* and Greater Sandplover *C. leschenaultii* (Langrand 1990), although it typically prefers drier areas than Kittlitz's Plover (Morris & Hawkins 1998). It often visits the margins of shallow, brackish marshes and ponds, and less often occurs on sandy beaches and sandy or muddy estuarine flats (Hayman *et al.* 1986, Langrand 1990). Nesting has been observed between August and April (Langrand 1990), the nest being a small scrape in dry grassland near the coast or a lake shoreline (Morris & Hawkins 1998). It is fairly common in Lac Ihotry region (in the south-western part of the known range) and at times it gathers into single-species roosts of up to 33 birds (Hayman *et al.* 1986).

Network of key sites

Nine key sites have been identified, a majority of which are IBAs of the West Malagasy Wetlands Endemic Bird Area: Lake Tsimanampetsotse Strict Nature Reserve; Lake Ihotry Hunting Reserve and Mangoky Delta complex (Lac Ihotry); the Tambohorano wetlands; wetlands of the Tsiribihina Delta and upper Tsiribihina River; and wetlands in the Kirindy-Mite area. Smaller numbers of Black-banded Plover occur in at least four other IBAs: Baly Bay National Park; Benamba wetland complex; Manambolomaty wetland complex and Tsimembo Classified Forest; and south-western coastal wetlands (ZICOMA 2001, Young *et al.* 2005).

Protection status of key sites

Only two of the key sites are known to have protected area status: Lake Tsimanampetsotse Strict Nature Reserve, which is also a Ramsar site (ZICOMA 2001), and wetlands in the Kirindy-Mite area, which are partly protected in Kirindy-South National Park. Wetlands in Baly Bay National Park are fully protected, while the four lakes within Manambolomaty wetland complex form a Ramsar site. The recent discovery of as many as 71 Black-banded Plovers nesting in and around Kirindy-South National Park is encouraging for the conservation of the species (Young *et al.* 2005).

Table 29. Key sites for Black-banded Plover. Sites where 1% or more of a population has been recorded

Country	Site	Latitude	Longitude	Season	Max total	Year max	Source
Madagascar	Baly Bay National Park	-16.07	45.28	All year	92	2003-05	Long *et al.* 2008
Madagascar	Belo sur Mer	-20.75	44.00	All year	40	2003-05	Long *et al.* 2008
Madagascar	Kirindy-Mite area	-21.17	44.00	Breeding	71	2000s	Young *et al.* 2005
Madagascar	Lac Ihotry	-21.63	43.65	Non-breeding	46	1990s	WBDB
Madagascar	Lac Tsimanampetsotse	-24.00	43.73	All year	133	2003-05	Long *et al.* 2008
Madagascar	Mangoky Delta	-21.42	43.57		46	1990s	ZICOMA 2001
Madagascar	Marambitsy Bay	-15.96	45.40	All year	86	2003-05	Long *et al.* 2008
Madagascar	Tambohorano wetlands	-17.47	44.10	Non-breeding	61	1990s	WBDB
Madagascar	Tsiribihina delta & upper Tsiribihina river	-19.75	44.43	Non-breeding	46	1990s	WBDB

Tim Dodman & Simon Delany

Niels Gilissen

Kittlitz's Plover

Charadrius pecuarius

Geographical variation and distribution

Kittlitz's Plover occurs widely in Africa from the Nile Valley in the north, across the length of the Sahel belt and south to the Cape, as well as in Madagascar. It is only absent from very arid areas, such as the Horn of Africa and Kalahari, and the main tropical forest belt. Equatorial populations are generally smaller in size than birds from more temperate regions to the north and the south (Hayman *et al.* 1986), and several subspecies have been proposed, including the following:

- *allenbyi,* described by Nicoll (1921) for birds occurring in Egypt from the Nile Delta south to Luxor.
- *isabellinus,* described by Clancey (1979) for birds occurring from Egypt to Democratic Republic of Congo and Kenya.
- *tephricolor,* described by Clancey (1971) based on a bird from a locality where it rarely, if ever, breeds (Hockey *et al.* 2005). Its presumed area of occurrence was in northern Namibia and northern Botswana. Tree (2001) reviewed individual and clinal variation in Southern Africa, and recommended that it be subsumed within *pecuarius*.

The birds breeding in Madagascar have also been considered as a separate subspecies (Hayman *et al.* 1986). However, variation between all populations is slight, overlapping and mainly clinal (del Hoyo *et al.* 1986), and none of the proposed subspecies is generally accepted. The species was recorded on the west coast of Madagascar between Boanamary in the north and Fort-Dauphin in the south between August 2003 and March 2004. (S. Zefania and T. Székely, *in litt.*)

Movements

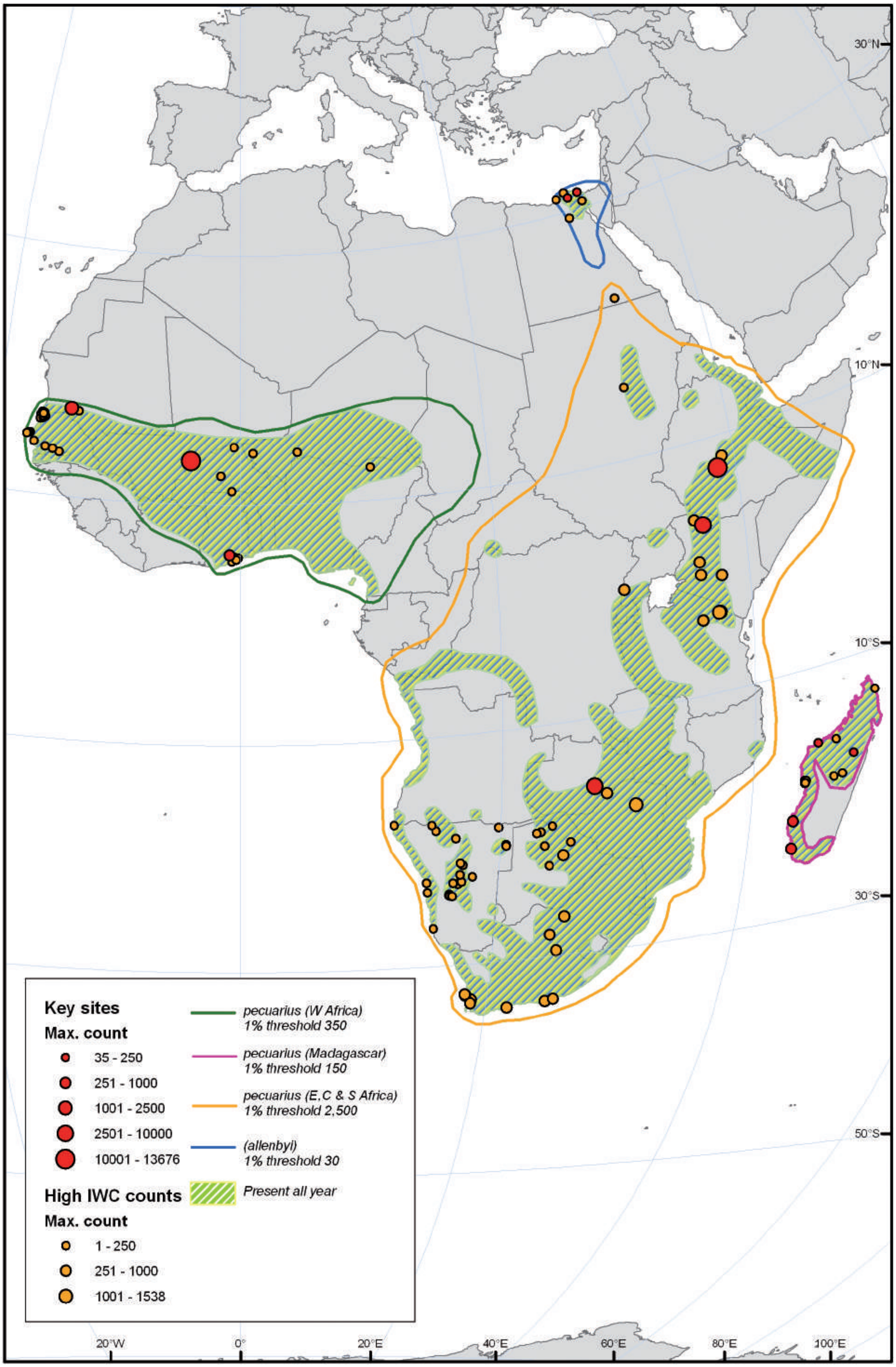
Kittlitz's Plover is largely sedentary across much of its range, but in some areas it is nomadic, migratory or a partial migrant. In several areas, there would appear to be a mixing of migratory and largely sedentary birds.

In West Africa, Kittlitz's Plover is partly resident and partly a local intra-African migrant, and there is no evidence of long-distance migration to or from other regions. There are no breeding records from The Gambia (Gore 1990), but it is seasonally frequent along the coast and lower estuary between October and April (Barlow *et al.* 1997). It is a dry season (December to April) visitor to Sierra Leone (Wiersma 1996). The main breeding season in northern Senegal is in the dry season between February and July (Morel & Morel 1990). It occurs across the Sahel belt, showing movements based on flooding cycles. It disappears from the Inner Niger Delta in Mali during the annual floods, where numbers increase as floods recede, peaking in May and June, with breeding activity observed at Debo in the central delta between March and June (van der Kamp & Diallo 1999). It is resident on the Ghana coast at suitable locations east of Accra, but its status in northern Ghana is not clear (Grimes 1987). Elgood *et al.* (1994) found no evidence of seasonal movement in Nigeria, where it is resident at suitable locations around the country. It is largely absent from the forest block; for instance there is only one record from Liberia (Gatter 1997).

There is a break in the distribution from western Nigeria across the forest block to eastern Democratic Republic of Congo. The species reappears on the west coast in Gabon, and thence occurs south along the coast and inland south of the main forest block. It is common in eastern Democratic Republic of Congo on lake shores (Chapin 1939). It appears to make some seasonal movements in Uganda; although apparently scarce at Entebbe at the north of Lake Victoria, past records here indicate that it was largely absent in December and January, with greatest numbers in July and

Kittlitz's Plover

Charadrius pecuarius



August (Carswell *et al.* 2005). Peak egg-laying is from April to August in Uganda (Carswell *et al.* 2005) and in southern Somalia (Ash & Miskell 1998). It also breeds at various locations in Kenya, mainly in the Rift Valley, where there are local movements due to changing water levels and some use of seasonal waterholes (Lewis & Pomeroy 1989). Further north in Sudan there is a marked increase during the northern winter, with breeding recorded from April and May (Nikolaus 1987). It is likely that numbers increase along the Upper Nile in Sudan as water levels gradually recede after the April-September rainy season. Breeding is reported from Ethiopia from March to June (Urban & Brown 1971). There is indirect evidence of migration in southern Somalia, where birds are seldom seen in the non-breeding season between October and April, except in occasional large flocks (Ash & Miskell 1998).

Further south, Kittlitz's Plover is widespread and common in Tanzania (Baker 1996), and locally common in Malawi, where it appears to be a partial migrant, most commonly reported from May to December, with breeding occurring mainly between May and October (Dowsett-Lemaire & Dowsett 2006). There are breeding records from southern Tanzania (south of 7°S) from between March and December (Baker & Baker 2005); on the southern shore of Lake Rukwa, breeding has been recorded from between April and August (Vesey-FitzGerald & Beesley 1960), although there is no recent data from this site. In Zimbabwe, it is largely migratory, with the majority of birds arriving to breed in April-May and departing again in December, although in years of poor rainfall many birds remain throughout the year (Irwin 1981). In Zambia, most birds leave for drier areas during the rainy season, although a few remain at favoured wetlands (Benson *et al.* 1971). Birds in the east of South Africa, Swaziland and southern Mozambique appear to be largely sedentary (Tree 1997, Parker 1994, Parker 1999). However, resident birds in the drier areas of south-western Africa are augmented by migrants from other areas, mainly between November and March. South African count data show austral summer peaks at some localities in the south-west and austral winter peaks in the north and central region (Taylor *et al.* 1999). Thus, birds from higher rainfall areas of Democratic Republic of Congo, Zambia, Zimbabwe and northern Botswana move south and west to Namibia, Botswana and South Africa from November to July, where they become nomadic (Hockey *et al.* 2005). Northbound migrants appear in Zimbabwe from March to August and on passage through Zambia in April (Tree 1997), whilst numbers in Botswana peak in April (Penry 1994). Underhill *et al.* (1999) predicted movements up to a scale of thousands of kilometres in Southern Africa, although the longest proven distance from ringing recoveries to date is of just 332 km within Zimbabwe.

In Madagascar, Kittlitz's Plover is a common resident in suitable habitat throughout the country, although most common in the east, south and west (Morris & Hawkins 1998). However, it is a seasonal visitor on the High Plateau (Langrand 1990), indicating that there are some regular, possibly altitudinal, movements. Hockey & Douie (1995) consider that the population in Madagascar represents relatively recent immigration from continental Africa, whilst the very similar Black-banded (or Madagascar) Plover *C. thoracicus* may have evolved from earlier Kittlitz's Plover stock.

In northern Egypt, Kittlitz's Plover is a scarce breeding resident in the Nile Delta and adjacent areas, as far south as Faiyum and Lake Qarun, and has been found breeding on the Nile in southern Egypt at Abu Simbel, Lake Nasser (Goodman & Meininger 1989, Miles 1998). It is a vagrant in Israel, Cyprus, Bahrain and the United Arab Emirates (Porter *et al.* 1996, O. Hatzofe *in litt*).

In summary, this species is migratory across much of its range, moving out of favoured wetlands and floodplains when they become submerged. In some areas, these movements are rather local, but in others, such as in Southern Africa, they can be quite extensive. It is also widely resident, and resident birds may often be joined by migrants from elsewhere.

Population limits

Four populations are recognised in the fourth edition of *Waterbird Population Estimates*:

1) a population in Eastern, Central and Southern Africa, from southern Egypt south along the Nile to eastern Democratic Republic of Congo and Tanzania, thence south across Southern Africa to the Cape;
2) a population in West Africa, from Senegal and Mauritania east to Chad;
3) a population in Madagascar;
4) a small, isolated population, formerly assigned to the subspecies *allenbyi*, breeding in northern Egypt from the upper Nile Valley (Faiyum, Lake Qarun) to the Nile Delta, with some non-breeding birds occurring in Israel.

The first three editions of *Waterbird Population Estimates* treated the birds occurring in northern Namibia and northern Botswana as a separate population under the name *tephricolor*, but this form has recently been subsumed within *pecuarius* (Tree 2001) and the population is no longer thought to be valid (Dodman in press 2009).

Population size

1. *pecuarius* Eastern, Central and Southern Africa

Population estimate	1% threshold	Population trend
100,000-400,000	2,500	Unknown

Baker (1996) provided an estimate of 10,000-20,000 for Tanzania. Underhill *et al.* (1999) provided a preliminary estimate of 50,000 for Southern Africa (south of the Cunene-Zambezi). Concentrations of 600-650 have been reported at several localities in the Western Cape of South Africa (Taylor *et al.* 1999), and over 1,000 birds have been counted at the Robert McIlwaine Recreational Park in Zimbabwe (Barnes 1998). There are high counts of 6,000 from Zambia's Kafue Flats and 10,968 from the Abijatta-Shalla lakes in Ethiopia (WBDB). Parker (1994, 1999) gives population estimates of 200 for Swaziland and 5,000 for southern Mozambique. Dodman (2002) compiled estimates from throughout the range and produced an overall estimate of 100,000-400,000 that was adopted in *WPE4*.

2. *pecuarius* West Africa

Population estimate	1% threshold	Population trend
20,000-50,000	350	Unknown

One of the highest counts from West Africa was of 11,834 in June 2000 in the region of Lac Debo and Walado Debo in the central area of the Inner Niger Delta in Mali (Diallo *et al.* 2002). There were also counts of over 1,000 from coastal lagoons in Ghana. Brouwer & Mullié (2001) estimated the Niger population at 875, based on AfWC data from 1994-1997. Dodman (2002) used AfWC data and other published counts to produce the current estimate of 20,000-50,000, adopted in *WPE3* and *WPE4*.

3. *pecuarius* Madagascar

Population estimate	1% threshold	Population trend
10,000-20,000	150	Unknown

Although Kittlitz's Plover is widespread in Madagascar, there have been few high counts. A total of 338 were recorded in the AfWC in July 1997, including 238 at Lac Ihotry in the west, and 167 were recorded in southern Madagascar in April 1998 (Dodman *et al.* 1999). Approximately 500-600 Kittlitz's Plovers were present At 30 sites on the west coast of Madagascar between Boanamary in the north and Fort-Dauphin in the south between August 2003 and March 2004. (S. Zefania and T. Székely, *in litt.*). The estimate of 10,000-20,000 was proposed during development of this atlas, and this was adopted in *WPE3* and *WPE4*.

4. *pecuarius* (*allenbyi*)

Population estimate	1% threshold	Population trend
1,000-5,000	30	Unknown

This species is a scarce breeding resident in northern Egypt. There are about 200 pairs breeding at Wadi el Natrun (Miles 1998), and other important breeding sites in the Nile Delta and in the Faiyum along Lake Qarun (Goodman & Meininger 1989). V. Parker (*in litt.* 2002) proposed an estimate of 1,000-5,000, and this was adopted in *WPE3* and *WPE4*.

Conservation status

Overall trends in the populations of Kittlitz's Plover are unknown. The species may be increasing over parts of its wide range, because it has been able to exploit man-made wetlands and other artificial habitats, e.g. the construction of dams in Southern Africa has enabled it to expand its range and increase its numbers substantially (Tree 1997). On the other hand, in some floodplain systems it is threatened by artificial flooding regimes imposed by barrages. Unseasonal flooding in Zambia's Kafue Flats has resulted in nests and eggs being submerged (T. Dodman unpubl. obs.).

Habitat and ecology

Kittlitz's Plover is found in a wide range of habitats, but its general preference is for the open dry mud of floodplains and shores. It occurs in areas with short grass cover or bare ground, usually around the margins of inland wetlands, but sometimes in dry-land habitats. It also occurs sporadically on the coast, for instance at lagoon edges and in some estuaries. It is largely absent from mangrove-fringed coastlines. In coastal Gabon, it is most numerous in areas with very short grass and bare sandy areas in the coastal savanna (Schepers & Marteijn 1993). It is generally encountered in pairs or small family groups during the breeding season, and in flocks when not breeding. It undertakes sporadic large-scale movements out of regions where its habitat has become flooded. The timing of the breeding season varies widely across its range, and seems to depend largely on the availability of suitable breeding habitat. Thus, breeding in semi-arid areas such as Namibia occurs more-or-less year round, while the breeding season is shorter in more humid zones, or in areas prone to flooding.

Network of key sites

Twelve sites have been identified that exceed the relevant 1% thresholds, spread amongst eight widely spaced countries. Key sites in Eastern Africa include the Abijatta-Shalla Lakes in Ethiopia and Lake Turkana in northern Kenya. Zambia's Kafue Flats is the only site in Southern Africa that meets the current 1% threshold, but several other sites also regularly support fairly high numbers, including the Robert McIlwaine Recreational Park and Lake Chivero in Zimbabwe, and the Lower Berg River wetlands and West Coast National Park (including Langebaan Lagoon) in South Africa. The main key site in West Africa is the Inner Niger Delta in Mali, notably the central zone of Debo and Walado-Debo, whilst Lac d'Aleg in Mauritania and Keta Lagoon in south-eastern Ghana are also important. Two of the identified key sites in Madagascar (Lac Ihotry and Baie de Baly) are on the west coast, whilst the third, Lac Alaotra, is inland. In Egypt, Lake Manzala is a key site in the Nile Delta, as is Wadi el Natrun, just to the west of the delta in the western desert.

Protection status of key sites

Abijatta-Shalla Lakes National Park is a protected area, but the lake is heavily used and threatened by various developments (Ethiopian Wildlife and Natural History Society 1996). Parts of Lake Turkana are protected, but direct human pressure on the lake is relatively low (Bennun & Njoroge 1999). Two core areas of the Kafue Flats are designated as National Parks, the rest as a Game Management Area. However, the main threat to Kittlitz's Plover here is from the regulated flooding regime of the Kafue Flats, which has resulted in nests being destroyed, whilst invasive plants are now also taking over the floodplain habitat (Leonard 2005). The Robert McIlwaine Recreational Park and West Coast National Park are fully protected, but the Lower Berg River wetlands are unprotected (Barnes 1998).

The Inner Niger Delta in Mali is a Ramsar site, although this does not prevent potentially harmful activities such as bird hunting. Keta Lagoon is also a Ramsar site, but generally unprotected and subject to various threats in this densely populated area, including pollution and erosion (Ntiamoa-Baidu *et al.* 2001). Lac d'Aleg in Mauritania is unprotected; the soils and vegetation around the lake are much affected by flood-recession agriculture, and unregulated hunting of waterbirds is an increasing problem (Fishpool & Evans 2001). Of the four sites in Madagascar, Baly Bay is a National Park, although subject to a number of threats, while Lac Ihotry and Lac Alaotra are unprotected (ZICOMA 1999). In Egypt, Lake Manzala is partially protected, but subject to a wide number of threats including pollution, while Wadi el Natrun is unprotected, with various threats impacting the main wetland habitats (Baha El Din 1999).

Table 30. Key sites for Kittlitz's Plover. Sites where 1% or more of a population has been recorded

Country	Site	Lat.	Long.	Season	Max total	Year max	Average total	Basis for average	Source	Population(s) at site
Egypt	Lake Manzala	31.27	32.03	Non-breeding	35	1990			IWC database	*"allenbyi"*
Egypt	Nile Delta Other Areas	31.00	31.00	Non-breeding	55	1990			IWC database	*"allenbyi"*
Ethiopia	Lake Abijatta	07.50	38.50	Non-breeding	10,968	-			WBDB	*pecuarius* E, C & S Africa
Ghana	Keta Lagoon complex	5.92	-0.83	July-August	725	1999	303	1997-01 (5)	AfWC database	*pecuarius* W Africa
Kenya	Lake Turkana	3.45	36.67	Non-breeding	8600	1992			WBDB	*pecuarius* E, C, S, Africa
Madagascar	Baie de Baly	-16.07	45.28	July-August	155	2001	82	1999-01 (2)	AfWC database	*pecuarius*
Madagascar	Lac Alaotra	-17.58	48.33	July-August	242	2000	95	1997-00 (3)	AfWC database	*pecuarius*
Madagascar	Lac Ihotry	-21.93	43.68	July-August	286	1997			AfWC database	*pecuarius*
Madagascar	Lac Tsimanampesotse	-24.12	43.80	Breeding	300	2003			Zefania & Székely *in litt.*	*pecuarius* Madagascar
Mali	Inner Niger Delta	13.50	-4.00	Non-breeding	13676	1998-04			Zwarts *et al.* 2005	*pecuarius* W Africa
Mauritania	Lac d'Aleg	17.08	-13.98	Non-breeding	1432	2001	381	1996-01 (4)	AfWC database	*pecuarius* W Africa
Zambia	Kafue Flats	-15.75	27.27	Non-breeding	6000	2000			WBDB	*pecuarius* ECS Africa

Tim Dodman & Vincent Parker

Mike Pienkowski

St Helena Plover (Wirebird) *Charadrius sanctaehelenae*

Geographical variation and distribution

The monotypic St Helena Plover (or Wirebird) forms a superspecies with Kittlitz's Plover *C. pecuarius*, but is a third larger in size, with a relatively longer sternum and tarsus, different primary feather formula and reduced tan coloration of the breast (del Hoyo *et al.* 1996, Rowlands *et al.* 1998). It occurs only on St Helena Island (15°58'S, 05°43'E) in the South Atlantic Ocean. St Helena lies 1,913 km west of Angola and 3,284 km east of south-eastern Brazil, while the nearest island is Ascension, 1,296 km to the north-west (Rowlands *et al.* 1998).

Movements

Adults are territorial and highly sedentary, remaining on their territories throughout the year, whilst young birds form small flocks which might allow an interchange of birds between sub-populations (Rowlands *et al.* 1998).

Population limits

Only one population is recognised, the entire population of the species.

Population size

1. Saint Helena (entire population of the species)

Population estimate	1% threshold	Population trend
200-220	2	Decline

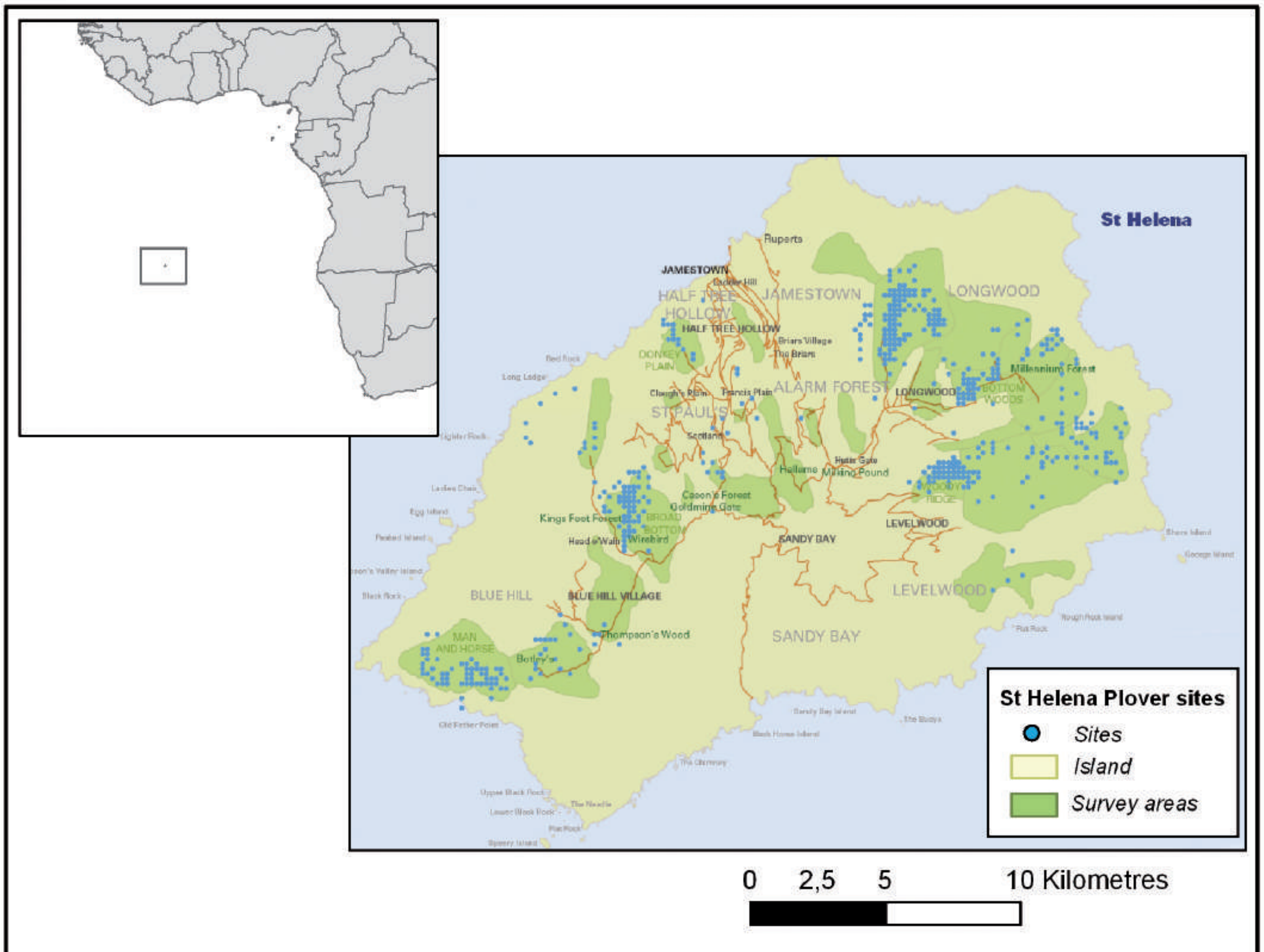
In 1957, this plover was apparently widespread across the island, and the population was estimated at just under 1,000 birds (Rowlands *et al.* 1998). In 1952, however, the population had been estimated at only 100 pairs (Haydock 1954). The lack of information about methods used to arrive at these estimates is problematic, but Pitman (1965) wrote that "Loveridge suggests the total population as something just under a thousand". The population may have declined in the 1970s, and was estimated at 450 adults in 1988-1989 (the first systematic survey) decreasing to 315 in 1993; it then increased to 335 in 1999 and stabilised between then and 2001, when it was believed to occur within a range of just 46 sq.km (McCulloch 1992, Rowlands 2001, BirdLife International 2008). Surveys in 2005-2006 found only 200-220 mature individuals (BirdLife International 2008) and this continuing decrease in numbers triggered an upgrade in the globally threatened status in 2008.

Conservation status

The St Helena Plover is a globally threatened species, whose status was updated on the IUCN Red List in 2008 from Vulnerable to Critically Endangered because its small population is decreasing rapidly within a very geographically restricted range of distribution (BirdLife International 2008). Numbers roughly halved between the late 1980s and 2006, and this decline has been attributed to a variety of factors (Rowlands *et al.* 1998, BirdLife International 2008): (1) the natural short grassland habitat being transformed by lower livestock density and reduced arable land-use; (2) scrub encroachment of its favoured open terrain habitat at one site; (3) invertebrate prey populations fluctuating widely in abundance; (4) feral cats *Felis catus*, introduced rodents and

St Helena Plover (Wirebird)

Charadrius sanctaehelenae



"The St Helena National Trust and St Helena Government Legal and Lands section are gratefully acknowledged for permission to use this map"

introduced Common Mynas *Acridotheres tristis* predating eggs and/or chicks; (5) off-road vehicles traversing breeding areas probably causing nest-destruction and disturbance; (6) housing development encroaching onto former breeding areas. Two major breeding areas were proposed as sites for an airport, but the plans have been delayed and the most important breeding site has been ruled out for this development (N McCulloch *in litt* 2003). The current proposal for the construction of the airport on Prosperous Bay Plain, its ancillary development and haul routes would eliminate an estimated 11-12 territories and is likely to indirectly impact a further 11-14 territories based on 2006 data. This represents approximately 44-50 adults, or over 20% of the world population. (McCulloch 2006). A report in mid 2008, under the headline "St Helena Airport Still on Schedule for 2012" stated that the Government of St Helena "are confident that a Design Build and Operate contract will be signed with some activity on the island by the end of this year" (http://www.sthelenaonline.com/). The project was, however, postponed again in December 2008, but the proposed airport undoubtedly remains a potentially serious threat in future.

Habitat and ecology

The St Helena Plover is found in suitable habitat throughout the island. Most birds live on drier pastures below 600 m, but they are also found, thinly scattered, in semi-desert areas (McCulloch 2004). About 80% of the population occurs in open pastureland with a mean vegetation height of less than 10 cm, a slope of less than 6%, an annual rainfall of 300-500 mm, and an altitude of about 300-450 m (McCulloch 1992). The best sites have large proportions of Kikuyu Grass *Pennisetum clandestinum* and broad-leaved weeds. The remainder of the population occurs at lower densities in the arid zone around the periphery of the island, where semi-desert conditions prevail (Rowlands *et al.* 1998).

The nest consists of a shallow depression in a patch of bare earth within areas of short grass. The clutch size is two; eggs are laid throughout the year, with a peak in October-February. Both sexes share in incubation. The incubation period is about 28 days, and the fledging period 4–5 weeks, with fledglings remaining with adults for up to a further three weeks. If eggs or chicks are lost, a replacement clutch is laid (Rowlands *et al.* 1998).

Network of key sites

Given that the 1% threshold is only two birds, all breeding sites can be considered as key sites. There are two IBAs in St Helena: the North-east St Helena IBA formerly supported up to 335 breeding adults, and the South-west St Helena IBA has supported up to 100 breeding adults (Rowlands 2001). Totals are now lower but data are not readily available at site level. These two sites together cover over 75% of the surface area of the island (c. 9,300 ha of the total 12,170 ha).

Protection status of key sites

The St Helena Plover is fully protected by law; in theory, therefore, the birds at all sites are protected. However, neither of the IBAs is protected, and the only protected site where the species occurs is the Old Joan Point National Forest (Rowlands *et al.* 1998). Because the most suitable breeding habitat is sheep-grazed pasture, protection of this species requires sensitive management by private landowners. Deadwood Plain is thought to support about 30% of the breeding population, and is therefore a priority area.

Table 31. Key sites for St Helena Plover. Sites where 1% or more of a population has been recorded

Country	Site	Lat.	Long.	Season	Max total	Year max	Source
St Helena	North-east St Helena	-15.98	-05.75	Breeding	335	2001	WBDB
St Helena	South-west St Helena	-15.95	-05.67	Breeding	100	2001	WBDB

Up-to-date totals, which are considerably lower, are not yet readily available at site level.

Les Underhill, Tim Dodman & Simon Delany

Nicolaas van Zalinge

Three-banded Plover
Charadrius tricollaris

Geographical variation and distribution

The Three-banded Plover is a polytypic plover of sub-Saharan Africa and Madagascar, occurring from Eritrea south to the Cape, but avoiding arid and semi-arid areas of the Horn of Africa and most of the Sahel belt as well as the tropical forest block. It also occurs sparingly in eastern West Africa, mainly in the Lake Chad basin. Two subspecies have been described: the nominate form from continental Africa, and *bifrontatus* from Madagascar. The form *bifrontatus* differs rather distinctly from *tricollaris*; amongst several plumage variations, it has a dark greyish face and neck (as opposed to brown), whilst it is also slightly larger in bill and tarsus measurements (Hayman *et al.* 1986). Clancey (1979) proposed the subspecies *pelodromus* for larger migratory birds in Southern Africa, but this is not generally accepted, although there do appear to be two different populations in the sub-region (Tree 2003). The Three-banded Plover is found throughout Madagascar, but is most common in suitable habitats in the west and north (Morris & Hawkins 1998). It forms a superspecies with Forbes's Plover *Charadrius forbesi*, which is larger and darker and without white on the forehead (Urban *et al.* 1986).

Movements

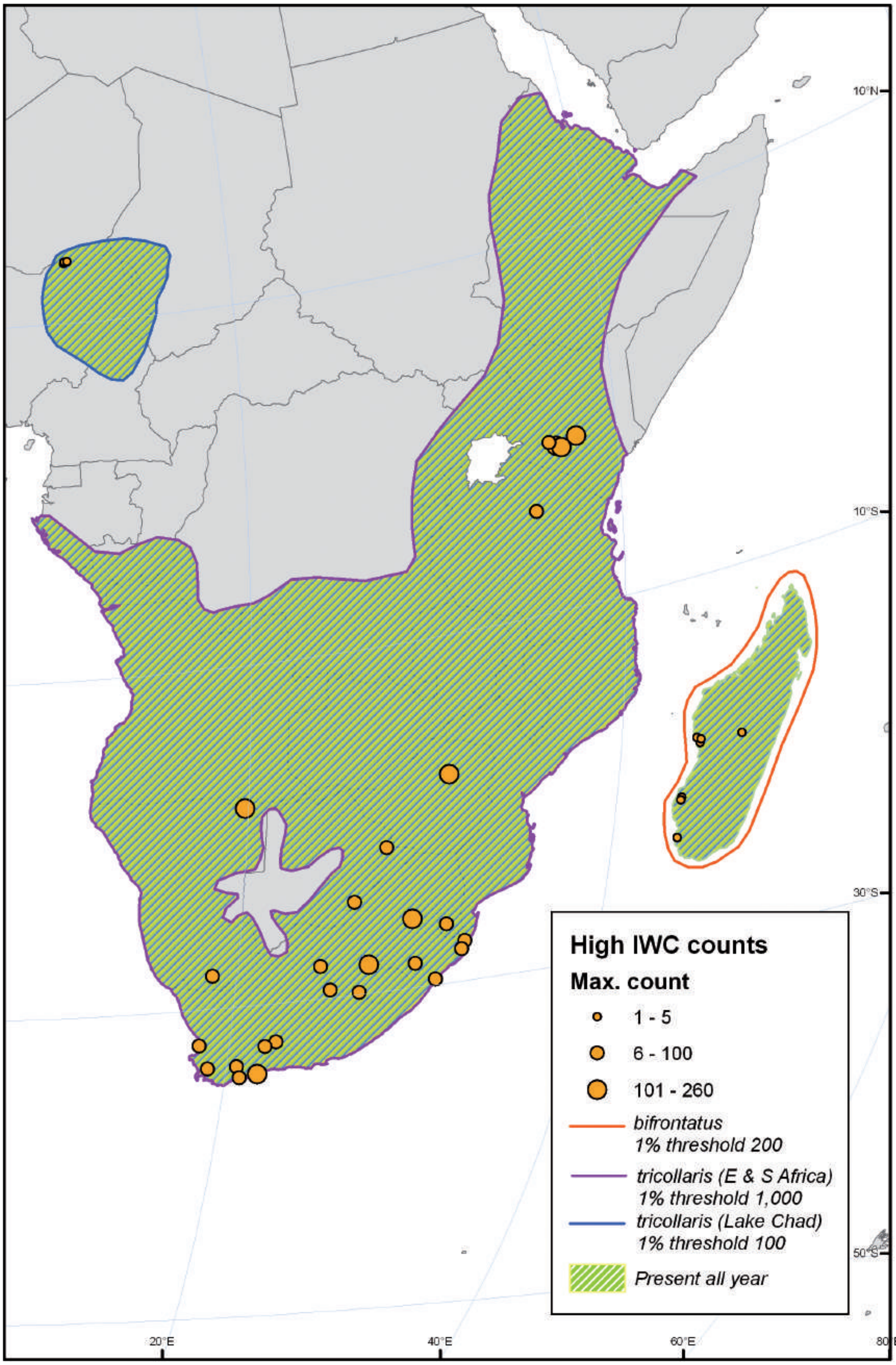
The Three-banded Plover is resident in parts of its range on the African continent and also a partial intra-African migrant, moving away from some areas during flooding or rains, but its movements are not well understood. It is resident in Madagascar.

In Southern Africa, there is widespread movement of birds in the period April to August, with peaks in Zambia in July and August, birds leaving Namibia by August and birds moving northwards through Zimbabwe between April and July (Tree 2003). Birds tend to move out of semi-arid areas during the dry season, when water is scarce, and out of moister regions during the wet season, when wetlands flood and water edges are thick with vegetation. There is evidence of some birds putting on fat in preparation for longer migrations, for instance on northward migration through Zimbabwe at the end of the wet season, when they must pass over large tracts of land and water unsuitable for landing and feeding (Tree 2003). Plovers move from the Karoo (xeric habitat in western South Africa) to the coast during the austral winter (Tree 1997). South African count data suggest increases in all regions during the austral winter (Taylor *et al.* 1999). It is likely that some birds from Angola and southern Democratic Republic of Congo move south during the rains. The longest recorded movements of ringed birds are of 265 km westward within Namibia and of 88 km within Zimbabwe (Underhill *et al.* 1999). Ringing studies have shown that although they may rarely be absent from an area, there is constant turnover throughout the year (Tree 2003). The widespread creation of artificial water bodies in Southern Africa has created suitable habitat year-round in some areas where it did not exist before. Around Gabarone in Botswana, the Three-banded Plover is a very common resident at such habitats (Tyler & Borello 1998). There may thus be two different populations in Southern Africa: a sedentary and partially nomadic population, also comprising short-distance migrants, and a migratory population, moving into the area from moister regions further north.

Dean (2000) considers the Three-banded Plover to be a common resident throughout Angola. From here, it extends north in the coastal savanna region of Congo and Gabon, with a record also from Likouala-aux-Herbes in eastern Congo (Mokoko Ikonga 2003). Christy & Vande Weghe (1999) consider it to be occasional in Congo and migratory in Gabon. It is absent from the forest block, but occurs on the lower Congo River and in eastern Democratic Republic of Congo (Chapin 1939). It is found throughout the year in south-western Uganda, where breeding has been recorded

Three-banded Plover

Charadrius tricollaris



between March and June (Carswell *et al.* 2005). It is recorded in most months of the year in various regions of Tanzania (Baker & Baker 2005), and year-round across Malawi but with at least some local movements (Dowsett-Lemaire & Dowsett 2006). There are also at least local movements in Kenya, as indicated by a ringing recovery between lakes Naivasha and Nakuru, whilst it is apparently absent from Lake Baringo between September and December, and most numerous on small dams near Nairobi from July to September and December to February after the rains (Lewis & Pomeroy 1989). Nikolaus (1987) considers that birds in eastern Sudan are probably non-breeding visitors from Ethiopia, where it is largely absent in May and June (Urban *et al.* 1986).

In West Africa, it is uncommon in central and northern Nigeria, northern Cameroon and western Chad, but its status here is far from clear. Elgood *et al.* (1994) thought that it was probably only a non-breeding dry season (August to February) visitor to Nigeria from Eastern Africa, but Borrow & Demey (2001) consider it to be a local resident in West Africa. Hall (1976) recorded it from oases in the extreme north-east of Nigeria in the dry season between August and February.

Population limits

Only two populations were recognised in the first two editions of *Waterbird Population Estimates*, corresponding to the two subspecies. However, Dodman (2002) proposed that the small number of nominate *tricollaris* occurring in West Africa should be treated as a discrete population, although it was not known if these birds belonged to an isolated population that remained in West Africa throughout the year or were a migratory population from breeding areas in Eastern Africa. This treatment was adopted in *WPE3* and *WPE4*, which thus recognise three populations:

1) *tricollaris*, in Eastern and Southern Africa, from Eritrea to South Africa, east and south of the main forest block and in coastal Congo and Gabon;
2) *tricollaris*, in West Africa, from central Nigeria north to Lake Chad and environs;
3) *bifrontatus,* in Madagascar.

Future results from ringing and other studies may reveal further discrete populations, perhaps with a partially migratory population in Central and Eastern Africa, a largely resident and partially nomadic population in Southern Africa, and a largely migratory population in central Southern Africa. This summary remains speculative until further evidence is established.

Population size

1. *tricollaris* Eastern and Southern Africa

Population estimate	1% threshold	Population trend
70,000-130,000	1,000	Possibly increasing

Underhill *et al.* (1999) give an estimate of 40,000-70,000 birds in Southern Africa, whilst Tree (1997) gives a somewhat lower estimate of 25,000-50,000. Other estimates in the region include 1,000 for Swaziland (Parker 1994) and over 5,000 for southern and central Mozambique (Parker 1999, Parker 2005). Densities are likely to be highest in South Africa, where it has expanded its (dry season) range and presumably increased in numbers in response to artificial impoundments. It has been described as common and widespread in Kenya, Tanzania and Zambia (Zimmerman *et al.* 1996, Benson *et al.* 1971), and as frequent in Ethiopia (Urban & Brown 1971), and it is fairly common in north-western Somalia (Ash & Miskell 1998). However, it generally occurs only in pairs or small flocks at suitable wetlands, and thus densities are generally low compared to some other waders in the region. Dodman (2002) proposed an estimate of 70,000-130,000, and this was adopted in *WPE3* and *WPE4*.

2. *tricollaris* Lake Chad

Population estimate	1% threshold	Population trend
A (<10,000)	Provisionally 100	Unknown

The Three-banded Plover is nowhere common in its limited range in West Africa. Dodman (2002) proposed a population estimate of A (<10,000), but thought that the actual population size was unlikely to exceed 5,000.

3. *bifrontatus*

Population estimate	1% threshold	Population trend
10,000-30,000	200	Unknown

An estimate of 10,000-30,000 is considered appropriate, assuming densities in Madagascar are similar to those in southern Central Africa. It has been described as common in the west and north of Madagascar (Langrand 1990).

Fishpool & Evans (2001) gave an estimate of 100,000 for the three populations combined.

Conservation status

The species does not appear to be under threat, and is increasing in Southern Africa as a consequence of its extensive exploitation of man-made wetlands.

Habitat and ecology

The Three-banded Plover inhabits most types of freshwater wetlands, wherever a small stretch of exposed shoreline occurs, but avoids extensive swamps and areas where vegetation is thick. It is uncommon at coastal lagoons and estuaries and rarely occurs on open beaches at the coast. It exploits most artificial impoundments. These small plovers are encountered singly, in pairs or in small flocks. The timing of the breeding season varies across its wide range. In Madagascar, nesting has been observed between July and September (Langrand 1990). Most breeding records in Eastern Africa and southern Central Africa are between April and October (Urban *et al.* 1986). In South Africa, most breeding occurs between July and December, with variations across the country and occasional exceptions (Hockey *et al.* 2005).

Network of key sites

The Three-banded Plover is a widely dispersed species, occurring at low densities at a large number of wetlands throughout its range. No large concentrations are known, and no sites have been identified that exceed the relevant threshold levels.

Tim Dodman & Vincent Parker

Ian Nason

Forbes's Plover

Charadrius forbesi

Geographical range and distribution

Forbes's Plover breeds from Ghana to northern Angola, south-western Sudan, western Tanzania and central Zambia (Colebrook-Robjent & Griffith 1996), and occurs as a non-breeding visitor west to Senegambia. It is monotypic.

Movements

This plover is not known to breed west of Ghana (del Hoyo *et al.* 1996), where breeding has been recorded from July-August (Grimes 1987). It is present in Côte d'Ivoire only from November to April (Urban *et al.* 1986). It is also a dry season migrant in Liberia, leaving the forest zone in April and possibly breeding on granite inselbergs, and gravel plains in the north-west of the country (Gatter 1997). In Togo, it is possibly a wet season visitor to northern savannas, where it may breed (Cheke & Walsh 1996). It is seasonally migratory in Nigeria, gathering into flocks in open habitats at the beginning of the dry season (September), and moving to rocky hillsides and inselbergs with the first rains in March to breed (Urban *et al.* 1986, Elgood *et al.* 1994).

In Central Africa, it is present year-round in Cameroon, Congo and Democratic Republic of Congo, and a breeding resident in Gabon, whilst it is considered to be a visiting migrant to Central African Republic (Christy & Vande Weghe 1999). It breeds in coastal Gabon in the dry season (June-September) (Schepers & Marteijn 1993), whilst inland in the Lopé Reserve it occurs between August and February (Christy & Clarke 1994). It is rather widespread in Democratic Republic of Congo, occurring both north and south of the forest block, but is nowhere common (Chapin 1939). Further north, it is uncommon and local in south-western Sudan, where birds observed in July and August showed signs of breeding (Nikolaus 1987). It is a vagrant to Uganda (Carswell *et al.* 2005), and there are just a handful of records in far western Tanzania, mostly between April and June (Baker & Baker 2005). It has also been recorded as a vagrant in Kenya (Hayman *et al.* 1986).

In the south of its range, it is presumed to be resident in central latitudes of Angola (Dean 2000). In Zambia, it is only found in the north of the country, where most records fall between April and December and breeding has been reported in October (Colebrook-Robjent & Griffith 1996). Benson *et al.* (1971) considered most movements in Zambia to be only of a local nature in response to flooding, but Aspinwall & Beel (1998) considered that it was mainly a dry season visitor across most of its range in northern Zambia, breeding at the Zambezi Rapids in the north-west corner of the country.

Overall, this plover would appear to be a relatively short-distance migrant across most of its range, moving from grassy plains and open areas in forest to rocky outcrops and gravel river-beds to breed in the rainy season.

Population limits

Only one population is recognised, the entire population of the species.

Population size

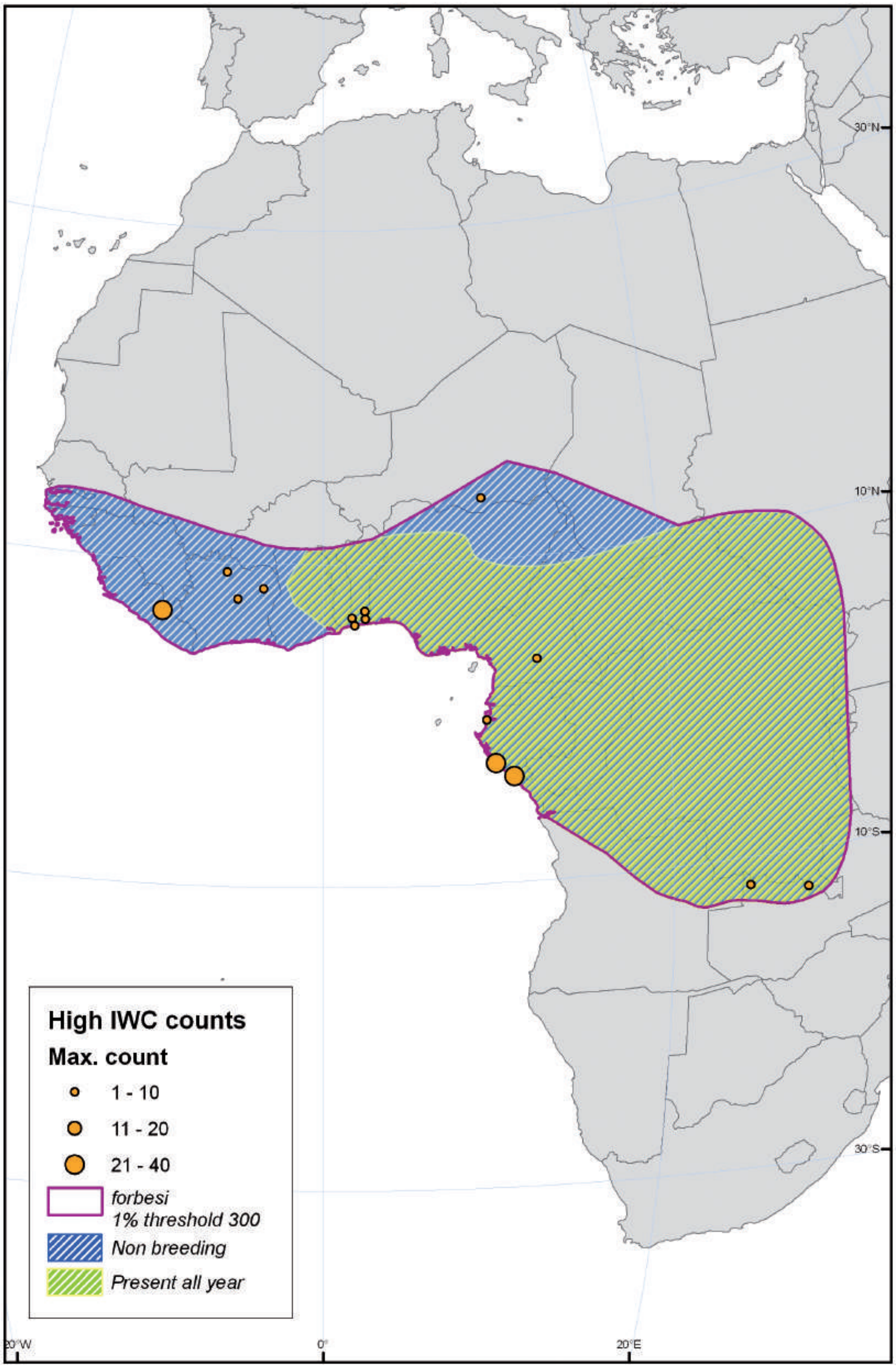
1. Sub-Saharan Africa

Population estimate	1% threshold	Population trend
10,000-50,000	300	Unknown

Fishpool & Evans (2001) suggested that the population was in the range B/C (10,000-100,000). This estimate was supported by Dodman (2002) and adopted in *WPE3* and *WPE4*. One of the highest counts reported in recent years was of 40 birds in northern central Liberia in March

Forbes's Plover

Charadrius forbesi



(Gatter 1997). There are very few records of this species during the AfWC, but this is not a bird that congregates at wetlands, being found more often on grassland and farmland, especially where burning has recently occurred. Tree (*in litt*. 2008) considers the upper limit of this estimate too high for such a sparsely distributed species, and proposed a new estimate of 10,000-50,000, which has been adopted here.

Conservation status

Forbes's Plover is nowhere very numerous and generally thinly scattered across its range. It is rare in the extremities of its range, in Senegambia in the west, in East Africa in the east, and in Zambia in the south. It certainly comes into contact with humans, because it is attracted to burnt areas and artificial grasslands, such as airfields and sports fields. It may even benefit from some human activities, such as slash-and-burn agriculture, with resulting creation of forest clearings. Its status, however, is generally unknown, and is worthy of further investigation.

Habitat and ecology

Forbes's Plover nests on top of granite outcrops among rocky hills and slopes, or in gravel stream beds, and in the non-breeding season it moves to open grassy plains, bare ground, recently burnt areas, open places in forest belts and muddy edges of lakes and rivers (Urban *et al.* 1986). It is a monogamous, solitary nester, and feeds on insects, small molluscs, crustaceans and worms (Urban *et al.* 1986).

Network of key sites

No key sites can be identified from AfWC data. This plover is not regularly encountered during waterbird surveys as it is not dependent on wetlands. It generally occurs at very low densities and it is doubtful if any sites ever support numbers approaching the 1% threshold. At its western limit, it occurs in Vendu-Tcham IBA in Guinea-Bissau (Dodman *et al.* 2004), and at its southern limit in six IBAs in Zambia (Leonard 2005).

Protection status of key sites

It occurs in a few protected areas across its range, such as Mole National Park in Ghana (Grimes 1987) and the Lopé Reserve in Gabon (Christy & Clarke 1994). However, this species does not really benefit from a site-protection approach across much of its range.

Tim Dodman, David Stroud & Simon Delany

Per Smitterberg

White-fronted Plover
Charadrius marginatus

Geographical variation and distribution

The White-fronted Plover is endemic to sub-Saharan Africa and Madagascar, occurring both on sandy coastlines and inland along large rivers and lake shores. Several subspecies have been described, but not all are widely recognised, and there is a lack of clarity concerning the subspecific status of birds in some regions. The nominate form occurs along the coast from the West Cape of South Africa northwards to southern Namibia, *arenaceus* from the south and east coasts of South Africa to southern Mozambique, and *mechowi* northwards from Angola along the coast and into West Africa. Birds inland from Zimbabwe and Botswana northward are widely considered as either *mechowi* or *tenellus*. Birds on the coast from central to northern Namibia are best considered as an *arenaceus* type until further taxonomic work is carried out (A.J. Tree *in litt.* 2006), this population presumably extending north into Angola. Dean (2000), however, considers that coastal birds in southern Angola belong to *marginatus*. The race *tenellus* occurs in Madagascar, where it has a mainly coastal distribution. Various authors, including Hayman *et al.* (1986), consider that all birds along the Indian Ocean coastline of Africa north of Natal in South Africa also belong to this form. Pakenham (1979) indicates that *tenellus* was collected on Zanzibar between February and April and recorded breeding there from May to July. Other proposed races are *hesperius* or *pallidus* (coastal West Africa, and lower Niger River east to Central Africa), *nigirius* or *russatus* (upper Niger River); and *pons* (south Somalia). These are generally included within *mechowi*.

Compared to the sandy-grey upperparts of the nominate race, *arenaceus* has warmer sandy-brown upperparts, with mantle feathers, scapulars and tertials edged a rusty cinnamon buff, whilst *mechowi* is tawnier and smaller than *arenaceus*, with legs and feet pale grey (Urban *et al.* 1986, Hockey *et al.* 2005, A.J. Tree *in litt.* 2006). The race *tenellus* often has a concentration of rufous on the sides of the lower neck and upper breast, a characteristic also shared to some degree with *nigirius/russatus* in West Africa (Bannerman 1953, Hayman *et al.* 1986). The collar in most races is pale rufous, but white in the nominate and in the proposed race *pons* of southern Somalia (Hayman *et al.* 1986).

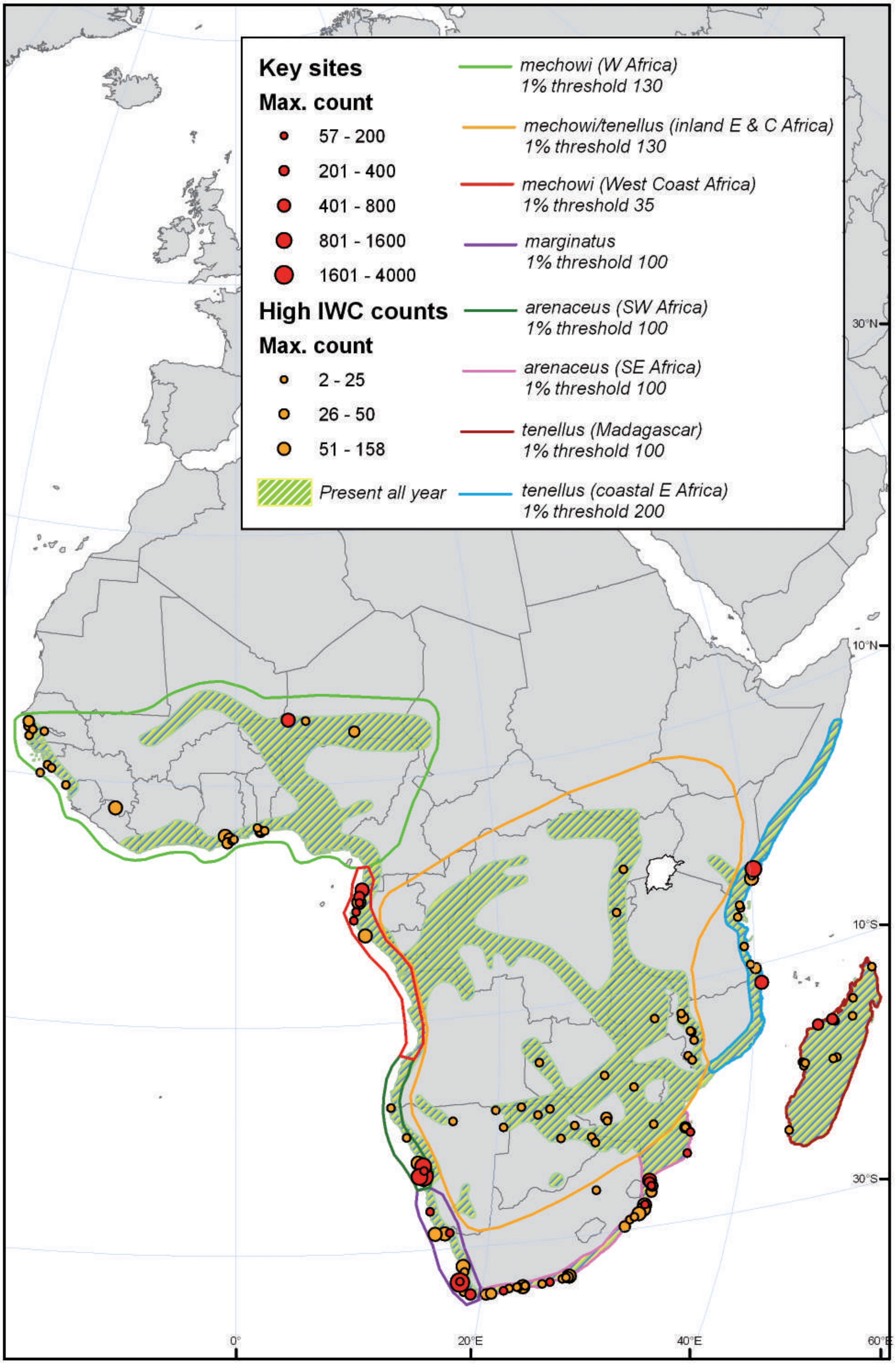
Movements

In Southern Africa, coastal populations are largely sedentary, although there are movements from exposed shores to more sheltered estuaries and bays during the stormy months of the austral winter (Tree 1997). Anderson (2006) describes it as resident in the Orange River estuary at the South Africa/Namibia border. Further north, Dean (2000) describes *marginatus* as resident along the coast of Angola north to about Cuanza Sul or 10°S, and *mechowi* as resident along the coast northwards, whilst both occur inland along the major rivers. The subspecific status of inland birds is unclear, with some authors ascribing them to *mechowi* (e.g. Urban *et al.* 1986 and Hockey *et al.* 2005) and others to *tenellus* (e.g. Benson *et al.* 1971, Britton 1980 and Dowsett-Lemaire & Dowsett 2006). This inland population is essentially migratory, moving seasonally in response to flooding of rivers and submergence of sandbanks in the late austral summer (January to April). After the rains, the large majority probably move to the east coast, although some birds remain inland throughout the year in times of drought (Tree 1997). However, count data from the east coast of South Africa do not show an increase in the austral winter (Taylor *et al.* 1999), and further count data from Mozambique are needed to confirm these movements. The race *mechowi* is found to be a sparse summer visitor (January to March) as far south as St Francis Bay (west of Port Elizabeth) on the southern coast of South Africa (Tree 2002). Ringing recoveries from South Africa show only very local movements, but ringing has only been carried out on the coast (Underhill *et al.* 1999).

Although it has been recorded in Zambia in every month

White-fronted Plover

Charadrius marginatus



of the year, the White-fronted Plover is usually absent during the high flood period between January and May, although some may take advantage of man-made wetlands (Leonard 1999). Birds gather outside the breeding season in Zimbabwe in small flocks, when the vast majority leave during the rains (Irwin 1981). In Malawi, it is probably resident on the shores of Lake Malawi, but with local movements elsewhere; all records near Lilongwe are between January and April (Dowsett-Lemaire & Dowsett 2006). Further north, birds at inland localities in Central Africa (race *mechowi/tenellus*), where fluctuations in water levels are less extreme, may be more sedentary, but some movements coastward have been reported (Urban *et al.* 1986). It is widely distributed in Democratic Republic of Congo, mainly restricted to islands and banks of large rivers and lakeshores, quite commonly from areas of the mid-Congo River at both high water in December and low water in March (Chapin 1939). Schouteden (1961) detailed records from the Equateur Province of Democratic Republic of Congo, where most records fell between October and April. Carswell *et al.* (2005) consider that the race *mechowi* is scarce in Uganda, where it occurs on sandy beaches of the larger lakes and rivers between November and May.

There are relatively few records from several inland localities in Tanzania, suggesting that the inland population is highly mobile, even transient, although records at the coast suggest it is resident there (Baker & Baker 2005). In Kenya, it only occurs regularly at Lake Turkana in the north-west and on or near the coast in the south-east; seasonal occurrences (June-July) at a dam on the Athi River near Voi suggest there are some regular movements (Lewis & Pomeroy 1989). There are no inland records from Somalia, where it occurs as a breeding resident on the coast, mostly south of 3°N (Ash & Miskell 1998).

On the west coast, Christy & Vande Weghe (1999) describe it as resident from Congo through Gabon and Equatorial Guinea to Cameroon, but as a migrant in the Central African Republic. However, the resident population in Gabon is strongly augmented by non-breeding migrants from October to April, and various plumage variations have been observed here (Christy & Clarke 1994). During extensive January waterbird surveys of coastal Cameroon in 1998 and 1999, West *et al.* (2002) found only one bird on the northern coast (on the Meme River), with none in the Estuaire du Cameroon nor from the coastline around Limbe, although it was regular along the Sanaga River further south. In surveys of coastal Cameroon in January 2007, it was only found along the Sanaga River and at the Sanaga River mouth (Van der Waarde 2007).

In Nigeria, it occurs on sandy shores, both coastal and inland, with seasonal movements suggesting regular migration in some areas, with birds possibly leaving the coast and Lake Chad to breed centrally, though not always in the same months (Elgood *et al.* 1994). It is a common resident of the Togo and Ghana coasts and coastal lagoons (Cheke & Walsh 1999, Grimes 1987). However, further west it is a rare but regular visitor to the coastal zone of Liberia, with records between August and February (Gatter 1997). Such records may be from low-density breeding birds on sandy banks further up Liberia's rivers or from neighbouring countries. Year-round counts from lakes Debo and Walado Debo in the Inner Niger Delta of Mali reveal an extreme fluctuation in numbers, with hardly any records at all for most months, but a count of nearly 800 birds in August 1998 on the beaches and sandbanks of Lac Debo (Van der Kamp & Diallo 1999). This would suggest that birds here are highly migratory, but it is not known if they are moving along the Niger River or if they travel as far as the coast. The White-fronted Plover appears to be a local resident in low numbers in coastal areas of southern Senegal, The Gambia and Guinea-Bissau, with breeding records from The Gambia in May, June and November (Morel & Morel 1990, Dodman *et al.* 2004, Barlow *et al.* 1999).

The race *tenellus* is resident along the entire coastline of Madagascar. However, the White-fronted Plover is an occasional visitor to Mayotte (or Maore), the easternmost of the Comoros island group (Louette 1988), so the possibility of connection between birds in Madagascar and on the east coast of continental Africa cannot be ruled out. The birds in Zanzibar and other coastal areas of eastern Africa may also belong to *tenellus*, but this requires further investigation.

Overall, the movements and status of the different forms of this plover are not entirely clear, and may well be subject to future revision. In summary, it would appear that there is a largely sedentary population of nominate *marginatus* along the west coast from the Cape of South Africa north to southern Namibia, and another largely sedentary coastal population occurring from southern Namibia to mid-Angola, treated here as *arenaceus*. A second largely sedentary population of *arenaceus* occurs along the east coast from the Cape of South Africa to southern or central Mozambique. Further north on both west and east coasts, there are two largely resident coastal populations, *mechowi* on the west coast from central Angola to central Cameroon, and *tenellus* on the east coast from northern Mozambique to southern Somalia. There is a largely migratory inland population extending from South Africa north to Central African Republic in the west and Ethiopia in the east, sometimes treated as *mechowi* and sometimes as *tenellus*; there is a resident and partially migratory population in West Africa, occurring along the coast from Senegal to Cameroon and at inland wetlands from Mali to Lake Chad, treated here as *mechowi*; and finally, there a resident population of *tenellus* in Madagascar.

Population limits

Eight populations of the White-fronted Plover are here recognised in sub-Saharan Africa and Madagascar:

1) *marginatus*, occurring on the south-west coast of Africa, from the Western Cape of South Africa north to south-central Namibia;
2) *tenellus,* occurring in Madagascar;
3) *tenellus*, occurring on the east coast of Africa, from northern Mozambique to southern Somalia (including *pons*);
4) *mechowi* or *tenellus*, occurring inland from northern South Africa to Democratic Republic of Congo and southern Central African Republic in the west and northern Kenya and the Ethiopian Rift Valley in the east; this population frequents the shores of tropical rivers and major lakes, and mingles with coastal populations outside the breeding season;
5) *mechowi,* occurring on the west coast from central Angola to the Sanaga River in Cameroon;
6) *mechowi*, occurring in West Africa, on the coast from Senegal to Cameroon and inland from the Inner Niger Delta to Lake Chad (including *hesperius*, *nigirius* and *spatzi*);
7) *arenaceus*, occurring on the south-east coast of Africa, from the eastern Cape of South Africa to southern Mozambique;
8) *arenaceus*, occurring on the south-west coast of Africa, from south-central Namibia to central Angola.

This treatment differs from that adopted in *WPE4* in several respects. It assigns the birds on the east coast of Africa to *tenellus* rather than *mechowi*; it recognises two populations of *arenaceus*, one on the east coast and one on the west coast, rather than a single population in two parts, and it gives separate treatment to the birds occurring on the west coast from Angola to Cameroon and assigns them to *mechowi*, rather than including them within an enlarged population of *arenaceus*.

Population size

1. *marginatus*

Population estimate	1% threshold	Population trend
10,000	100	Unknown

Summers *et al.* (1987) provided an estimate of >18,000 for the White-fronted Plovers occurring along the coastlines of Namibia and South Africa. V. Parker (*in litt.* 2002) considered that this estimate was conservative and suggested retention of this figure for *marginatus* alone. However, this assumed a distribution of *marginatus* from the West Cape north to central Angola, whilst a good proportion of birds within this range are now ascribed to *arenaceus*. There are 2,000-4,000 in West Coast National Park in South Africa (Barnes 1998). Dodman (in press 2009) provides a new estimate of 10,000 for this population, based on former estimates, recent count data and densities. The estimate of 18,000 for *marginatus* in *WPE3* and *WPE4* includes a large number of birds here assigned to *arenaceus*.

2. *tenellus* Madagascar

Population estimate	1% threshold	Population trend
5,000-15,000	100	Unknown

F. Hawkins (*in litt.* 2002) reported that this species is usually considerably commoner than the Black-banded Plover *C. thoracicus* in Madagascar, with larger groups and a wider ecological tolerance, and estimated the total population size at 5,000-15,000 individuals. This estimate was adopted in *WPE3* and *WPE4*. High counts have included over 300 at two sites in the north-west. Zefania & Székely (*in litt*. 2008) recorded 505 individuals along the west coast of Madagascar between Boanamary in the north and Fort-Dauphin in the south between August 2003 and November 2004.

3. *tenellus* Coastal Eastern Africa

Population estimate	1% threshold	Population trend
15,000-25,000	200	Unknown

There was a count of 500 birds at Sencara Island in the Quirimbas Archipelago of northern Mozambique in July 2003 (Bento in Diagana & Dodman 2007). Baker (1996) considered that there may well be some 5,000 birds along the coast of Tanzania. A high count of 1,070 was recorded at the Tana River delta on the Kenya coast in January 2004 (Bennun & Njoroge 1999), and the species has been described as common in Somalia (Ash & Miskell 1983). Dodman (2002) provided an estimate of 15,000-25,000 based on 5,000 on the Tanzania coast (although there may be additional birds on east-flowing rivers such as the Rufiji), some 5,000-7,500 on the Kenya coast and east-flowing rivers, perhaps 2,500-7,500 in southern Somalia, and some 2,500-5,000 in northern Mozambique. This estimate was adopted for this population in *WPE3* and *WPE4*, although the birds were assigned to *mechowi*.

4. *mechowi/tenellus* Inland East and Central Africa

Population estimate	1% threshold	Population trend
10,000-15,000	130	Unknown

Baker (1996) estimated that there may be some 3,000 birds at inland waters in Tanzania. It is scarce in Uganda (Carswell *et al.* 2005), whilst in the interior of Kenya it is only numerous at Lake Turkana in the north (Lewis & Pomeroy 1989). V. Parker (*in litt.* 2002) proposed an estimate of 10,000-15,000, taking into account the large number of potentially suitable localities inland, but noting that observed densities along rivers were lower than those at the coast. This estimate was adopted in *WPE3* and *WPE4*.

5. *mechowi* West coast of Africa, Angola to Cameroon

Population estimate	1% threshold	Population trend
3.500	35	Unknown

Dodman (in press 2009) provided an estimate of 3,500 for this resident coastal population, based on estimates for each country within the population's range. Population density appears to be generally low. In *WPE4*, these birds were included in a single enlarged population of *arenaceus*.

6. *mechowi* West Africa

Population estimate	1% threshold	Population trend
10,000-15,000	130	Unknown

The White-fronted Plover occurs only at low densities along the coast of West Africa, and co-ordinated counts along the coast from Mauritania to Sierra Leone in January 2006 yielded only 52 birds. Schepers *et al.* (1998) estimated that some 100 birds occur in the Sine Saloum Delta of Senegal. Densities also appear to be generally low inland; e.g. Brouwer & Mullié (2001) estimated just over 250 birds for the whole of Niger. However, there are occasional high concentrations at some large inland wetlands, as evidenced by a count of 800 in Mali's Inner Niger Delta (van der Kamp & Diallo 1999). V. Parker (*in litt.* 2002) proposed an estimate of 10,000-15,000, and this was adopted in *WPE3* and *WPE4*. Dodman (in press 2009) has recently reassessed this population, and considers the estimate of 10,000-15,000 to remain valid.

7. *arenaceus* South-eastern African coast

Population estimate	1% threshold	Population trend
8,000-12,000	100	Unknown

V. Parker (*in litt.* 2002) proposed an estimate of 8,000-12,000 for this population of *arenaceus*, and this estimate was adopted in *WPE3* and *WPE4*. Dodman (in press 2009) arrived at a figure of 10,000 based on densities along relative lengths of the coastline, taking into account lower densities on the east coast compared to the west (Summers *et al.* 1987), and an estimate of "probably over 2,000" for southern Mozambique (south of the Save River) (Parker 1999). Counts at most sites along the south-east coast between 1992 and 1997 were fewer than 100, with a maximum of 127 from St Lucia (Taylor *et al.* 1999). The highest single count was of 617 at Salinas de Matola in Mozambique (AfWC database).

8. *arenaceus* South-west African coast

Population estimate	1% threshold	Population trend
10,000	100	Unknown

Dodman (in press 2009) provided an estimate of 10,000 for this newly defined population, based on densities in coastal Namibia of 2.0-6.5 birds per kilometre given by Underhill & Whitelaw (1997), estimated lower densities in Angola, and known concentrations at Walvis Bay and Sandwich Harbour in Namibia. The maximum counts at Walvis Bay and Sandwich Harbour in the 1990s were 1,610 and 2,540, respectively (Simmons *et al.* 1998).

The combined estimates of 73,500-103,500 for the eight populations of this species agree reasonably well with the species estimate of c. 100,000 given by Fishpool & Evans (2001).

Conservation status

Trends in the eight populations are unknown, but the White-fronted Plover does not appear to be under serious threat. It shows tolerance for some human disturbance of its habitat. However, there are threats to nests from predation, floods, high tides and vehicles driving along beaches (Urban *et al.* 1986). Numbers of *mechowi* have been seriously affected on the Zambezi river by dam building and associated ecological changes that have occurred (Tree 1988). Global climate change may pose a long term threat, as some preferred coastal sites may be rendered unsuitable by rising sea levels, whilst sandy river habitat may be affected by changing rainfall and flood patterns.

Habitat and ecology

The White-fronted Plover is commonest on both exposed and sheltered sandy beaches along the coast, and less common on rocky shores and other coastal habitats. It also occurs on sandy beaches along river banks and islands of large tropical rivers, and around the margins of large lakes. It is usually encountered in pairs, and some birds defend territories throughout the year. Birds on exposed seashores roost communally, with roosts numbering up to 400 birds (Hockey & Douie 1995). Birds along riverbanks are forced to move when their habitat becomes submerged, and some move to the coast, where they intermingle with resident populations. They feed on small invertebrates. Breeding generally occurs from February to September in West Africa, from May to July in East Africa, and from March to October in Madagascar (Wiersma 1996, Langrand 1990). Breeding has been recorded throughout the year along the coasts of Southern Africa, but most records are between August and February, whilst in Zimbabwe the race *mechowi* breeds mostly from July to October (Tree 1997). Similarly, the White-fronted Plover breeds between July and October in Zambia and between August and October in Malawi (Benson *et al.* 1971, Dowsett-Lemaire & Dowsett 2006).

Network of key sites

Across much of its range, the White-fronted Plover only occurs at low densities, and therefore the key site approach to conservation does not work especially well for this species. However, there are a few clearly identifiable key sites. The most important site for *marginatus* is West Coast National Park in the Western Cape, South Africa, where there are an estimated 2,000-4,000 birds and 100-200 breeding pairs, mostly concentrated around Langebaan Lagoon. The Orange River Estuary on the Namibia/South Africa border and the Luderitz coastline in Namibia are also of importance for this population.

Two sites are of known importance for *tenellus* in Madagascar: Baly Bay and Bombetoka, both on the north-west coast, where there have been counts of over 300 birds (AfWC database). Along the eastern seaboard of Africa, key sites include the Quirimbas Archipelago in Mozambique and the Tana River Delta in Kenya. There are no count data in the AfWC database that meet the 1% criterion for *mechowi/tenellus* in inland East and Central Africa. One likely key site is Lake Turkana in Kenya. Five sites in coastal Gabon are important for the population of *mechowi* on the west coast of Africa: the Baie de Corsico, Baie de Cap Lopez, Baie de Mondah-Pointe Moka, Estuaire du Gabon and Barre de l'Arabe. Angola's Mussulo Lagoon is also of importance for this population. In West Africa, only Mali's Inner Niger Delta has been identified as a key site for *mechowi*.

Six sites in Mozambique have met the 1% criterion for the south-east African population of *arenaceus* on at least one occasion, but there is a paucity of records (few repeat counts). Of these, the Salinas de Matola is of greatest importance, followed by Maputo Beach, the Bazaruto Archipelago and Inhambane Bay. In South Africa, key sites include Botriviervlei estuary, Voelvlei, Sodwana Bay to Cape Vidal in the Greater St Lucia Wetland Park, and the Swartkops Estuary. In Namibia, two sites within close proximity of each other, Walvis Bay and Sandwich Harbour, support internationally important numbers of predominantly, *arenaceus.*

Protection status of key sites

Langebaan Lagoon is fully protected as part of the West Coast National Park. It is a Ramsar site and an IBA, although the site is nevertheless prone to a number of threats including impacts of urbanisation and recreational developments at the lagoon (Barnes 1998). The Orange River Estuary is not a formally protected site, although negotiations to set up a trans-frontier conservation area have been underway since the mid-1990s (Anderson 2006).

In Madagascar, Baly Bay is a National Park, but Bombetoka is unprotected (ZICOMA 1999). Rabariosa *et al.* (2006) mention shrimp aquaculture within Baly Bay National Park, and recommend continued waterbird monitoring to provide an early warning of any changes at this site. The Quirimbas Archipelago in northern Mozambique is a National Park. The Tana River Delta in Kenya is unprotected and subject to a number of complex threats; Lake Turkana is also largely unprotected, although direct pressure on the lake is rather low (Bennun & Njoroge 1999). The coastal sites in Gabon are unprotected, as is most of Mussulo Lagoon in Angola. The Inner Niger Delta in Mali is a Ramsar site, but not formally protected.

Of the key sites for *arenaceus* in southern Mozambique, only the Bazaruto Archipelago is a protected area. In South Africa, the Greater St Lucia Wetland Park is a Ramsar site and an IBA; although it is at present partially protected, administration of the site is in a state of flux (Johnson *et al.* 1998). The Swartkops Estuary is also partially protected (Barnes 1998). Walvis Bay is a Ramsar site, and receives some measure of protection, although there are threats in the area from various development plans. Sandwich Bay is a marine reserve within the Namib-Nakluft National Park, managed by the Namibian Ministry of Environment and Tourism (Simmons *et al.* 1998). Both Namibian sites are IBAs.

Table 32. Key sites for White-fronted Plover. Sites where 1% or more of a population has been recorded

Country	Site	Lat.	Long.	Season	Max total	Year max	Average total	Basis for average	Source	Population(s) at site
Gabon	Baie de Corisco	1.20	9.67	Feb-Mar	517	1992			Schepers & Marteijn 1993	*mechowi* coastal W Africa
Gabon	Barre de l'Arabe	-1.27	9.00	Feb-Mar	57	1992			AfWC database	*mechowi* coastal W Africa
Gabon	Baie de Mondah - Pointe Moka	0.65	9.45	July-August	400	2000	230	1998-00 (2)	AfWC database	*mechowi* coastal W Africa
Gabon	Baie du Cap Lopez	-0.59	9.20	February	167	1992			AfWC database	*mechowi* coastal W Africa
Gabon	Estuaire du Gabon	0.16	9.45	Feb-Mar	74	1992			AfWC database	*mechowi* coastal W Africa
Kenya	Tana River Delta	-2.50	40.33	Non-breeding	1070	1993			WBDB	*tenellus* coastal E Africa
Madagascar	Baie de Baly National Park	-16.05	45.33	Jul-Aug	313	1999	248	1999-01 (2)	AfWC database	*tenellus* Madagascar
Madagascar	Bombetoka Bay	-15.92	46.52	Jul-Aug	314	1999			AfWC database	*tenellus* Madagascar
Mali	Inner Niger Delta	13.50	-4.00	Non-breeding	791	1998-04			Zwarts *et al.* 2005	*mechowi* W Africa
Mozambique	Bay Inhambane	-24.18	35.38	July-August	130	1999			AfWC database	*arenaceus* SE Africa
Mozambique	Bazaruto, Benguérena & Magaruque Is	-22.47	35.48	July-August	157	1999			AfWC database	*arenaceus* SE Africa
Mozambique	Lake Xigunte	-26.48	32.80	Pre-breeding migration	104	1997			AfWC database	*arenaceus* SE Africa
Mozambique	Maputo beach	-26.17	32.58	Pre-breeding migration	216	1997			AfWC database	*arenaceus* SE Africa
Mozambique	Salinas da Matola	-25.95	32.55	Pre-breeding migration	617	1997			AfWC database	*arenaceus* SE Africa
Mozambique	Sencara Island, Quirimbas Archipelago	-11.50	40.60	Non-breeding	500	2003			Diagana & Dodman 2007	*tenellus* E Africa coast
Namibia	Luderitz Coast: Total	-26.58	15.17	July-August	185	2000	104	1991-00 (2)	AfWC database	*marginatus*
Namibia	Orange river: Total	-28.58	16.87	Pre-breeding migration	200	1996	64	1994-98 (4)	AfWC database	*marginatus*
Namibia	Sandwich Harbour	-23.38	14.48	July-August	3160	1998	1937	1992-00 (5)	AfWC database	*arenaceus* SW Africa
Namibia	Swakop - Walvis	-22.92	14.50	July-August	183	2000			AfWC database	*arenaceus* SW Africa
Namibia	Walvis Bay Ramsar Site	-22.50	14.42	July-August	3108	1997-05	1516	1997-05 (9)	Wearne & Underhill	*arenaceus* SW Africa
South Africa	Botriviervlei	-34.35	19.10	Non-breeding	210	1994	60	1994-00 (5)	AfWC database	*arenaceus* SW Africa
South Africa	West Coast National Park	-33.08	18.10	July-August	197	1999	149	1997-00 (3)	AfWC database	*marginatus*
South Africa	St Lucia Wetland Park	-28.02	32.48	Non-breeding	127	-			Taylor *et al.* 1999	*arenaceus* SE Africa
South Africa	West Coast National Park	-33.15	18.08	All year	4000	-			WBDB Barnes 1998	*marginatus*
South Africa	Voelvlei	-34.27	21.82	July-August	140	1993	85	1993-97 (2)	AfWC database	*arenaceus* SE Africa
South Africa	Zwartkops Estuary	-33.85	25.58	Jul-Aug	164	1994	104	1995-99 (5)	AfWC database	*arenaceus* SE Africa

Mike Barker

Kentish Plover
Charadrius alexandrinus

Geographical variation and distribution

The Kentish Plover is almost cosmopolitan, inhabiting temperate and tropical coasts and inland wetlands in Eurasia, North Africa and the Americas. Five subspecies are widely recognised, but only the nominate form occurs in the area covered by this Atlas. The breeding range of this subspecies extends from Western Europe and North-west Africa to Central Asia. The breeding distribution in Europe is predominantly coastal and includes the western Baltic, North Sea, Atlantic coasts, Mediterranean Sea and Black Sea. Relatively small inland populations, which could be considered relicts, are found in Spain, Austria and former Yugoslavia. The relict population in Hungary had declined by 2004 to 30 – 35 breeding pairs (Pigniczki 2006). In West and Central Asia, the Kentish Plover also breeds around alkaline lakes and other brackish to saline wetlands in steppic regions. In North Africa, it is found breeding on the Atlantic coast south to Senegal, along the Mediterranean coast, and on the Red Sea coast south to northern Somalia. It also breeds along the coast of the Arabian Peninsula in the U.A.E., Saudi Arabia, Qatar and Bahrain. In the North African desert, some isolated oases support small breeding populations. There are also small isolated breeding populations in Madeira (10-20 pairs), the Azores (100-150 pairs), the Canary Islands (320 pairs) (Thorup 2006) and the Cape Verde Islands (200-250 pairs, T. Székely *in litt*.) Populations breeding north of 40ºN in Western Eurasia are migratory, wintering south to Guinea-Bissau and the Gulf of Aden (rarely to the equator in West Africa); southern populations are sedentary or dispersive. Most wintering areas are coastal, although significant concentrations have been found inland in Algeria, Egypt and Sudan. Birds of the nominate form breeding in Central Asia also migrate south to winter in the Indian subcontinent.

Movements

Adult birds breeding in Western Europe undergo their primary moult not far from their breeding sites. Baltic birds are an exception, moving to the Wadden Sea just after the fledging of the chicks. Although ringing recoveries indicate wintering around the Iberian Peninsula, in Morocco and in Guinea-Bissau, West Africa is probably the main wintering area for birds breeding in Western Europe (Schulz & Meininger 1996).

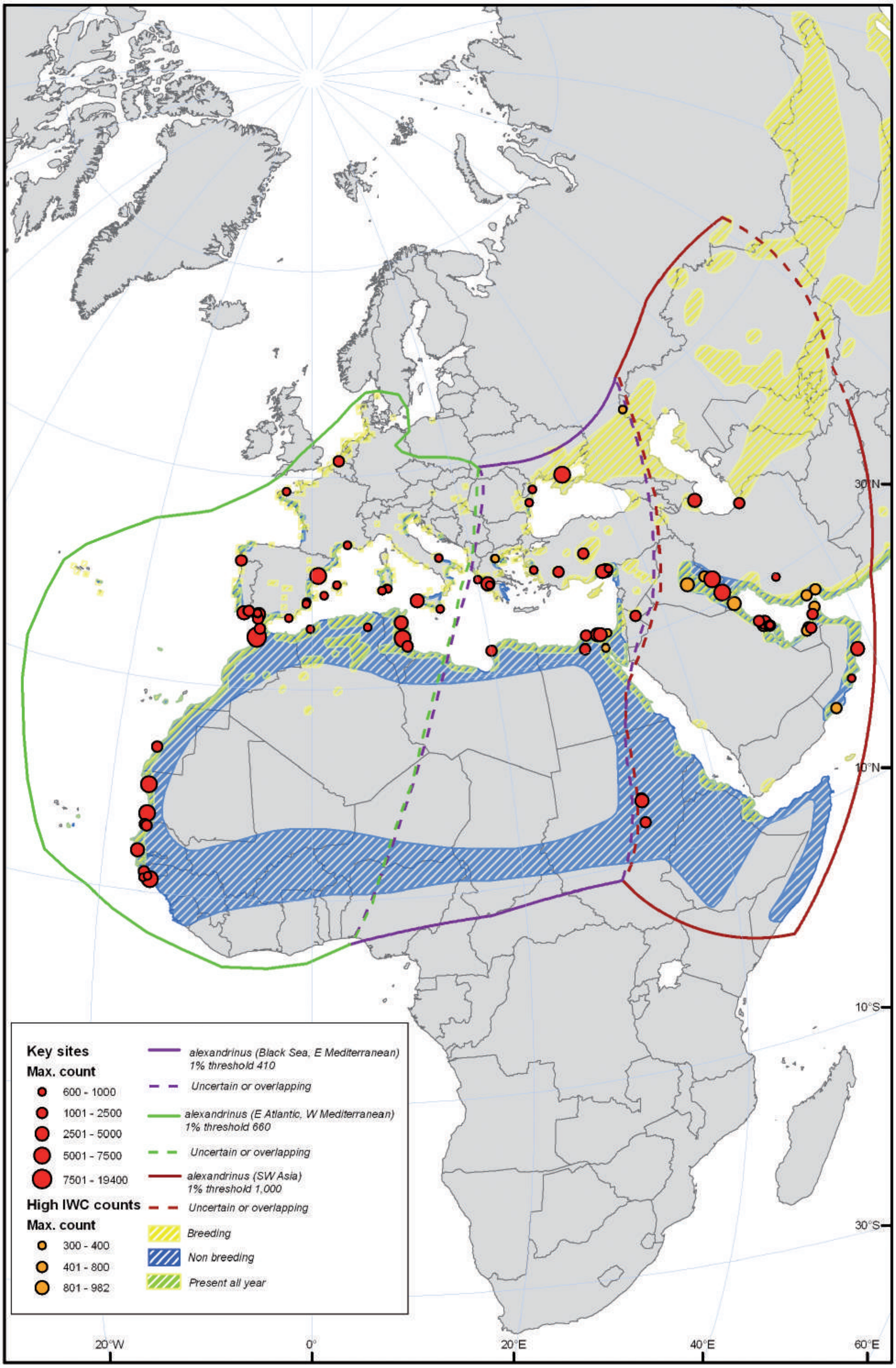
Birds from Austria and Hungary moult in the northern Adriatic and migrate south to southern Italy (Pigniczki 2006). Ringing recoveries from Morocco, as well as from Sardinia and Sicily, indicate a wide range of wintering sites. The high numbers of birds found wintering in Italy (3,000) and Spain (4,500) may consist mainly of birds that are resident in these countries. On the other hand, recoveries from Morocco and Senegal indicate that at least some of the birds breeding in the Mediterranean winter in West Africa (Schulz & Meininger 1996).

The origin of birds occurring in Tunisia is unclear. Despite the huge number of Kentish Plovers ringed here since 1962 (more than 10,000), there have been no controls of foreign birds, and only one recovery (from Algeria) is available. The many retraps show only local or short-distance movements (Arnould & Lachaux 1974). This could indicate that a considerable part of the breeding population is resident, and that the influx of foreign birds is limited. In July-September, birds concentrate in the few places in Tunisia that still have water at that time of the year. These are mainly on the coast, but in the occasional wet year also in the large interior salt lakes (M. Smart *in litt.*)

Birds wintering in North Africa may pass through Greece and Turkey in spring; there are clear peaks in numbers counted at various wetlands in these countries during mid- to late March (Berrevoets *et al.* 1994, van Huijssteeden & van Leeuwen 1995). A sighting in southern Turkey of a bird colour-marked in northern Egypt during the same spring has proven the

Kentish Plover

Charadrius alexandrinus



connection between Egypt and Turkey (Meininger & Atta 1994).

There are several recoveries in Israel of birds ringed around the Black Sea (Korzukov 1991), suggesting a north-south migration route. However, a bird ringed in Kazakhstan was subsequently found wintering in Spain (Barbosa 1993), indicating that there is much that remains unknown about the migrations of this species.

Population limits

Waterbird Population Estimates recognises three main populations of the nominate race in Western Eurasia and Africa, although in all cases there is extensive overlap of migratory and sedentary populations in the winter quarters:

1) a population breeding on the Atlantic coast of North Africa and Europe north to Denmark and Sweden and in the western Mediterranean, and wintering south to West Africa (south to and including Guinea-Bissau);
2) a population breeding in the Black Sea region and eastern Mediterranean, and wintering in the Near East and the eastern Sahel;
3) a population breeding in South-west Asia and wintering from the south Caspian region through the Arabian Peninsula to North-east Africa.

These three populations were adopted by Stroud *et al.* (2004) and are retained here, although it is acknowledged that there may be a considerable amount of overlap between all three populations. Thorup (2006) concluded that it was not possible to demarcate populations of this species in Europe, arguing that very little is known of the migration routes and winter quarters of eastern breeders, or of the origin of the large numbers of birds wintering in West Africa. Küpper *et al.* (2006) found no genetic differentiation between breeding Kentish plovers in Spain, Turkey and UAE using 36 microsatellite loci. Further work is, however, required to determine to what extent, if any, there are relatively discrete migratory and/or sedentary population units within Western Eurasia and North Africa.

Population size

1. *alexandrinus* East Atlantic and West Mediterranean

Population estimate	1% threshold	Population trend
62,000-70,000	660	Decreasing

Stroud *et al.* (2004) gave a revised population estimate of 62,000-70,000 individuals, based on national estimates of breeding populations collated by Thorup (2006) and a rough estimate of 7,500 pairs in North-west Africa. These totalled 20,646-23,275 pairs and thus 61,938-69,825 individuals, or 62,000-70,000 after rounding. National estimates collated by BirdLife International (2004a) total 10,536-16,429 pairs for the European range of this population. Adding 7,500 pairs for North-west Africa gives a total of 18,036-23,929 pairs equating to approximately 54,000-72,000 individuals. The estimate of 62,000-70,000 was adopted in *WPE3* and *WPE4*, but given the uncertainty in the size of the North-west African population, a somewhat broader range might be more appropriate.

The estimate of Stroud *et al.* (2004) for the 1990s is marginally (2%) lower than the previous estimate of 67,000 (Smit & Piersma 1989). It is a little higher than the estimate of Arts & Meininger (1997), who used winter census data from the 1980s and early 1990s and estimated there to be 65,000 birds using the East Atlantic Flyway (8,000 on the European Atlantic Coast, 14,000 in the western Mediterranean east to Tunisia, and 43,000 along the Atlantic coasts of West and North-west Africa).

A detailed compilation of records indicating considerably lower numbers in 1991 was not published in a widely available form and remains little known (Jönsson 1991b). This source estimated 7,610-10,470 pairs in a region comprising North-west Europe, the Iberian Atlantic coast, West Mediterranean and Central Europe. Combined with estimates for North-west Africa, this gave an overall estimate for this population of about 45,330–53,910 individuals. Given the decreases in the European portion of the population since 1991 (see below), even this estimate is now considered to be considerably inflated. There is clearly an urgent need for detailed and systematic re-assessment of this population.

2. *alexandrinus* Black Sea & East Mediterranean (breeding)

Population estimate	1% threshold	Population trend
32,000-49,000	410	Decreasing

Stroud *et al.* (2004) gave a population estimate of 32,000-49,000 based on national estimates of breeding populations collated by Thorup (2006), together with totals from Snow & Perrins (1998) for Israel, Egypt and Jordan (3,800-5,700 pairs). The total breeding population amounted to 10,775-16,499 pairs and thus 32,325-49,497 individuals, or 32,000-49,000 after rounding. This estimate, which was adopted in *WPE3* and *WPE4*, assumes that a third of the Turkish total of Kentish Plovers should be assigned to this population, whilst two thirds should be assigned to the South-west Asian population. A similar calculation on the basis of national estimates collated by BirdLife International (2004a) gave a total breeding population of 9,950-16,950 pairs, equating to approximately 30,000-51,000 individuals. Two of the most important countries in this region, Ukraine and Turkey, have not been thoroughly surveyed, and there is a large margin of error.

3. *alexandrinus* South-west Asia (breeding)

Population estimate	1% threshold	Population trend
C (25,000-100,000)	Provisionally 1,000	Unknown

This population is incompletely covered by the IWC and rather poorly known. Partial midwinter counts in the 1980s gave a total of at least 66,000 birds, while January counts and estimates in the 1990s totalled 24,500 (Stroud *et al.* 2004). On the basis of sample counts in 55 areas along the Gulf coast of Saudi Arabia in winter, Zwarts *et al.* (1991) estimated that there were some 800 Kentish Plovers on 200 sq.km of mudflat. Extrapolation from these data, which covered only about 7% of the 3,000 sq.km of inter-tidal mudflats in the whole of the Persian Gulf, might suggest that about 11,500 Kentish Plovers winter in the Persian Gulf. On the basis of currently available information, Stroud *et al.* (2004) considered that the range 25,000-100,000 (C) would be more realistic, and gave this as their estimate, which was adopted in *WPE3* and *WPE4*. The species is probably less numerous in Central Asia and more numerous in Arabia than current published information suggests (T. Székely unpublished data),

Conservation status

There has been a marked decline in most breeding populations in Europe since the early part of the twentieth century, accompanied by a marked contraction in range in North-west and Central Europe. The widespread declines have been attributed mainly to human activities such as disturbance at coastal breeding sites and destruction of breeding habitat. Breeding sites are lost to drainage, or to building hotels and resorts along coastal areas. In many salinas in Portugal, Spain and Italy salt production is no longer economic, and as salt production stops, the number of Kentish Plovers plummets, presumably, because the food supply declines. In Hungary reduced grazing, particularly by sheep, appears to be a major factor, since plovers nest on short grass grazed by sheep and the chicks feed on insects associated with livestock (Székely 1992). These declines are continuing throughout much of Europe. In the west, recent decreases have been reported in Sweden, Germany, The Netherlands, Belgium, Italy, Spain and the Canary Islands, while in the east, decreases have been reported in Albania, Hungary, Romania, Serbia & Montenegro, Turkey and Ukraine (Jönsson 1991b, Chernichko & Khomenko 1994, Jönsson 1994, Meininger & Arts 1997, Meininger & Székely 1997, BirdLife International 2004a, Pigniczki 2006). A maximum of 40 pairs nested in Kent and Sussex, southeast England, in the first half of the 20th century, but these birds died out in the 1950s (Cramp & Simmons 1983). However, according to Deceuninck (2001), there was a moderate increase in the numbers breeding in France between 1984 and 1996, and a recent increase has been reported in the small Danish population (BirdLife International 2004a).

The apparent stability of the Western European and North-west African population on the basis of population estimates (67,000 in the 1980s and 62,000-70,000 in the 1990s) is in contrast with information on trends from the breeding areas. To explain this discrepancy, Stroud *et al.* (2004) have suggested that Smit & Piersma's (1989) estimate of 67,000 was an underestimate. Thorup (2006) has pointed out that most of the declines in breeding populations in Europe are in the small populations in North-west and Central Europe, and thus affect only a small proportion of the total population. Declines have, however, also been reported from the large populations in Iberia and Italy. These declines in the western population have also been recorded on the wintering grounds, with recent decreases of 62% in Mauritania and 52% in Guinea-Bissau (Stroud *et al.* 2004). Some 17,380 Kentish Plovers were counted on the Banc d'Arguin, Mauritania, in 1980 (Altenburg *et al.* 1982), but a comprehensive survey in early 1997 found only 5,700 (Zwarts *et al.* 1998). This declined even further to 2,600 in 2000, but recovered to 6,100 in 2001 (Isenmann 2006). Numbers in the Bijagos Archipelago in Guinea-Bissau fell from an estimated 9,100 in the winter of 1986/87 (Zwarts 1988) to 5,000 in 1992/93 and 3,750 in 1993/94 (Salvig *et al.* 1994 1997) and just 1,000 in 2001 (Dodman & Sá 2005). Dodman (2002) concluded that overall declines in West Africa in the 1990s were in the order of 55-65%.

The Black Sea and East Mediterranean population appears to be declining both on its breeding grounds (Chernichko & Khomenko 1994, Jönsson 1994, Meininger & Székely 1997) and in some of its wintering areas, as shown by declining wintering numbers in Egypt (Atta *et al.* 1994). The number of breeding plovers was substantially lower in 2007 and 2008 than in the late 1990s at the Sivash and at Tuzla Lake, key sites in Ukraine and Turkey each holding several hundred pairs (J Chernichko *in litt.* A. Kosztolányi *in litt.*) Based on counts in the late 1970s, the number of birds wintering in the Nile Delta lakes in Egypt was estimated at 15,000-20,000 (Meininger & Mullié 1981). Counts in the winter of 1989/90 gave an estimate of only 10,000 (Atta *et al.* 1994), suggesting a clear decline. In some important sites in Egypt, large numbers of Kentish Plovers are captured or shot every year. At Lake Manzala alone, an estimated 1,750-1,850 Kentish Plovers were shot annually in the late 1970s and early 1980s, although in some years substantially more were taken (Mullié & Meininger 1983, Mullié, in Goodman & Meininger 1989). Shooting waders, including Kentish Plover, was still common practice here in the early 1990s (de Roder *et al.* 1994), and is likely to have continued more recently.

Very little is known of changes in the South-west Asian breeding population, although on the Karachi coast of Pakistan, the wintering population has reputedly increased (Ghalib & Hasnain 1993).

Habitat and ecology

The Kentish Plover breeds most often in sparsely vegetated sites on sea coasts, estuaries, lagoons, beaches and salt pans, but also at recently reclaimed wetlands, usually in the vicinity of coasts. It also breeds inland on bare mudflats around brackish and saline lakes in steppe and desert regions, as well as on grasslands far from the coast, especially where high salinity prevents the vegetation from covering the ground. They typically lay clutches of three eggs in a lined nest-scrape. Most nests are camouflaged, and are in the open, although they can also be found under small bushes. Both male and female incubate the eggs, and after hatching, one parent (usually the female) deserts the brood and often remates with a new mate (Székely & Lessells 1993, Amat *et al.* 1999). Many nests (up to 90%) fail due to predators that include hedgehogs, foxes and stray dogs (Székely 1992). Chicks have better chances of survival than eggs, especially if they pass through the critical first week of life (Székely *et al.* 2004). The breeding season can last for three to four months and failed breeders re-nest up to four times. Kentish Plover has one of the most flexible breeding systems among birds, and this flexibility is probably an adaptation to cope with unpredictable breeding habitats and predators. After the breeding season, the birds concentrate at favourable feeding areas in estuaries, along sea coasts and on lake shores. In warm climates, e.g. in Southern Europe and North Africa, they concentrate in the few areas that still hold water during the dry season. Here they undergo a complete moult in late June to early September. After the moult, birds in the northern, migratory populations gain considerable weight (mainly in late August-September) before their long-distance migration to the wintering areas. These post-breeding staging and moulting sites are particularly vulnerable to disturbance and habitat destruction. The most important wintering areas are tidal flats, inland mudflats, salt pans and desert lakes.

Network of key sites

In Europe, the Mediterranean and West Africa, the main staging areas are to a large extent the same as the important wintering sites. Some of the most important sites include Golfe de Boughrara in Tunisia, Merja Zerga in Morocco, Banc d'Arguin in Mauritania, the Senegal Delta and Sine-Saloum Delta in Senegal, and the Bijagos Archipelago in Guinea-Bissau. Several sites that are of international importance in autumn or spring have been identified, although information is generally scant. In the Black Sea and Eastern Mediterranean, 18 key sites have been identified in Ukraine, Romania, Greece, Turkey, Egypt and Libya. There are gaps in knowledge of important moulting and staging areas for the eastern population in the Caspian region and Middle East. Poorly known areas that may also hold significant wintering concentrations include the Red Sea coasts of Sudan and Saudi Arabia, and the Persian Gulf coast of Iran.

Protection status of key sites

Few key sites are afforded protection. Some of the most important wintering sites in West Africa are afforded some degree of protection (e.g. Banc d'Arguin in Mauritania and Senegal Delta in Senegal). Although the Sine-Saloum Delta in Senegal is a Ramsar site and parts are designated as a National Park and (a larger area) as a Biosphere Reserve, the most important sites for Kentish Plovers are outside the reserve boundaries (W.C. Mullié *in litt.*). Wetlands in northern Egypt are especially important for this species, but most areas are threatened, for example from land reclamation, urbanization and wetland degradation.

The conservation status of key sites in the Mediterranean basin is patchy, and effective conservation measures are typically lacking. Reserves often only cover parts of larger wetland complexes, where hunting is frequently practised. In Italy, Stago di Cagliari is a Ramsar site, Oristano includes several small Ramsar sites, and Palmas has no Ramsar status, while at Manfredonia, only the salina is a Ramsar site (N. Baccetti *in litt.*). The Akyatan Lake in southern Turkey is a Ramsar site, but Tuzla Lake, the largest concentration of breeding Kentish plovers in the world (1000 breeding pairs, Székely 1998) has only token protection by the Local Authority.

Table 33. Key sites for Kentish Plover. Sites where 1% or more of a population has been recorded

Country	Site	Lat.	Long.	Season	Max total	Year max	Average total	Basis for average	Source	Population(s) at site
Algeria	Marais De La Macta	35.68	-0.15	Non-breeding	800	1998	273	1996-98 (3)	IWC database	E Atlantic, W Mediterranean
Algeria	Sebkhet Djendli	35.69	6.47	Non-breeding	1000	1992			IWC database	E Atlantic, W Mediterranean
Azerbaijan	Kirov Bay	39.08	48.95	August	3600	1991			Shubin, 1992	SW Asia
Bahrain	Hidd. Muharraq	26.23	50.63	Non-breeding	1000	1988	650	1988-89 (2)	IWC database	SW Asia
Bahrain	Tubli Bay	26.18	50.57	Migration	1500	1991			WBDB	SW Asia
Egypt	El Malaha. Bur Fuad	31.22	32.32	Non-breeding	3290	1990	1788	1980-90 (2)	IWC database	Black Sea, E Mediterranean
Egypt	Lake Burullus	31.50	30.75	Non-breeding	1178	1994	898	1990-94 (2)	IWC database	Black Sea, E Mediterranean
Egypt	Lake Manzala	31.27	32.03	Non-breeding	4323	1990	3623	1979-90 (3)	WBDB	Black Sea, E Mediterranean
Egypt	Wadi El Natrun	30.33	30.25	Non-breeding	1122	1990	618	1979-90 (2)	IWC database	Black Sea, E Mediterranean
France	Baie de Goulven	48.60	4.20	Migration	1000	2002			WBDB	E Atlantic, W Mediterranean
France	Camargue	43.52	4.60	Migration	1000	2000			WBDB	E Atlantic, W Mediterranean
Greece	Amvrakikos Wetlands	38.87	20.08	Non-breeding	740	1999	565	1997-01 (5)	IWC database	Black Sea, E Mediterranean
Greece	Kalogria lagoon & Lamia marshes	38.17	21.37	Migration	775	1994			WBDB	Black Sea, E Mediterranean
Greece	Messolonghi Lagoon	38.33	21.22	Non-breeding	4060	1999	2734	1997-01 (5)	IWC database	Black Sea, E Mediterranean
Guinea-Bissau	Bijagos Archipelago	11.30	-16.00	January	5000	1993	3250	1992-01 (3)	Dodman & Sá 2005	E Atlantic, W Mediterranean
Guinea-Bissau	Geba Estuary	11.92	-15.90	January	1500	1987			Zwarts 1988	E Atlantic, W Mediterranean
Guinea-Bissau	Rio Tombali, Rio Cumbijã & Ilha de Melo	11.25	-15.33	January	6400	1987			Zwarts 1988	E Atlantic, W Mediterranean
Iran	Gomishan Marshes & Turkoman Steppes	37.25	53.92	January	2770	2004	1028	2004-07 (3)	DOEI / WIWO	SW Asia, NE Africa
Iran	Lake Bakhtegan, Lake Tashk & Kamjan Marshes	29.67	53.50	November	1000	1973			Evans 1994	SW Asia
Iran	Lake Maharlu	29.35	52.82	January	2030	2004	749	2004-07 (3)	DOEI / WIWO	SW Asia, NE Africa
Iran	Miankaleh Peninsula & Gorgan Bay	36.83	53.75	August	1350	1975			Evans 1994	SW Asia
Iran	Rud-i-Shur, Rud-i-Shirin & Rud-i-Minab Deltas	27.08	56.75	January	3606	2005	2113	2004-07 (3)	DOEI / WIWO	SW Asia, NE Africa
Iran	Shadegan Marshes, Khor -al Amaya and Khor Musa	30.17	48.67	January	2958	2005	1194	2004-07 (3)	DOEI / WIWO	SW Asia, NE Africa
Iran	Sooficam Marsh	37.31	54.4	January	1059	2005	494	2004-07 (3)	DOEI / WIWO	SW Asia, NE Africa
Iraq	Haur Al Hammar	30.73	47.05	January	6383	1975			Evans, 1994	SW Asia
Iraq	Haur Al Sa'adiyah	32.17	46.63	January	7000	1979			Evans, 1994	SW Asia
Italy	Cagliari wetlands	39.18	9.15	Non-breeding	902	1995			WBDB	E Atlantic,

Country	Site	Lat.	Long.	Season	Max total	Year max	Average total	Basis for average	Source	Population(s) at site
										W Mediterranean
Italy	Manfredonia	41.48	15.90	Non-breeding	706	1995	304	1999-03 (5)	IWC database	E Atlantic, W Mediterranean
Italy	Palmas - Sant'Antioco	39.07	8.50	Non-breeding	810	1993	296	1999-03 (5)	IWC database	E Atlantic, W Mediterranean
Italy	Pantani di Capo Passero	36.73	15.05	Migration	1000	1990			WBDB	E Atlantic, W Mediterranean
Italy	Stagno Di Cagliari	39.25	9.03	Non-breeding	905	1994	259	1999-03 (5)	IWC database	E Atlantic, W Mediterranean
Italy	Stagnone di Marsala & Trapani saltpans	37.78	12.50	Migration	3000	1989			WBDB	E Atlantic, W Mediterranean
Jordan	Azraq Oasis	31.83	36.83	Migration	2000	1992			Evans, 1994	Black Sea, E Mediterranean
Libya	Benghazi	32.18	20.10	Non-breeding	1500	1993			WBDB	Black Sea, E Mediterranean
Mauritania	Aftout es Sâheli	17.37	-16.13	Non-breeding	6500	1990s			WBDB	E Atlantic, W Mediterranean
Mauritania	Banc d'Arguin	20.12	-16.27	January	5800	1997	4830	1997-01 (3)	Zwarts *et al.* 1998	E Atlantic, W Mediterranean
Morocco	Baie D'Ad Dakhla	23.66	-15.87	Non-breeding	1288	1995	707	1993-95 (2)	IWC database	E Atlantic, W Mediterranean
Morocco	Merja Zerga: Kenitra	34.80	-6.30	Winter	19400	1995	11499	1994-95 (2)	IWC database	E Atlantic, W Mediterranean
Morocco	Mlalah Du Bas Takhadart	35.57	-5.95	Non-breeding	1020	1995	511	1993-95 (2)	IWC database	E Atlantic, W Mediterranean
Netherlands	Rhine-Maas-Schelde Delta	51.50	4.00	Autumn	1144	1990	359	1999-03 (5)	RWS WD RIKZ	E Atlantic, W Mediterranean
Oman	Barr al Hikman	20.63	58.47	Non-breeding	3500	1992	452	1993-01 (5)	IWC database	SW Asia
Oman	Dawhat Sawqirah	18.67	56.68	Non-breeding	1000	1995	462	1990-95 (5)	IWC database	SW Asia
Portugal	Estuário Do Minho	41.92	-8.83	Non-breeding	1030	2002	246	1998-02 (5)	IWC database	E Atlantic, W Mediterranean
Portugal	Ria De Faro	37.00	-7.92	Non-breeding	3485	1997	1824	1997-01 (5)	IWC database	E Atlantic, W Mediterranean
Romania	Razim-Sinoie Lagoons	44.67	29.00	April	615 205 prs	1996			Schmitz *et al.* 2001b	Black Sea, E Mediterranean
Saudi Arabia	Sabkhat al-Fasl Lagoons	27.00	49.67	Non-breeding	2000	1994	1225	1992-96 (4)	IWC database	SW Asia
Saudi Arabia	Tarut Bay	26.67	50.17	Non-breeding	2755	1993	1764	1992-96 (4)	IWC database	SW Asia
Senegal	Ndiael	16.23	-16.08	Non-breeding	1410	1994	99	1995-99 (5)	AfWC database	E Atlantic, W Mediterranean
Senegal	Parc National du Delta du Saloum	13.83	-16.75	Non-breeding	3490	1999	1987	1997-99 (3)	AfWC database	E Atlantic, W Mediterranean
Senegal	Senegal Delta	16.33	-16.25	Winter	1,500	1993-1997			Triplet & Yesou 1998	E Atlantic, W Mediterranean
Spain	Albufera de Mallorca & Albufereta de Pollença marshes	39.78	3.10	Resident	750	1992			WBDB	E Atlantic, W Mediterranean
Spain	Cádiz Bay	36.53	-6.27	Non-breeding	2260	1996	1373	1994-01 (5)	IWC database	E Atlantic, W Mediterranean
Spain	Coto Del Rey	37.03	-6.37	Non-breeding	773	1996	387	1995-96 (2)	IWC database	E Atlantic, W Mediterranean
Spain	Delta Del Ebro	40.72	0.80	Resident	5100	1996			WBDB	E Atlantic, W Mediterranean
Spain	Isla Cristina and Ayamonte marshes & Prado lagoon	37.22	-7.42	Breeding	1500	1996			WBDB	E Atlantic, W Mediterranean
Spain	Lucios de Veta La Palma-Isla Mayor (Se)	36.93	-6.24	Non-breeding	3111	2000	1411	1995-01 (5)	IWC database	E Atlantic, W Mediterranean
Spain	Mata & Torrevieja lagoons	38.05	-0.67	Resident	666	1995			WBDB	E Atlantic, W Mediterranean
Spain	Parque Nacional de Doñana	36.99	-6.37	Non-breeding	980	1995	297	1995-01 (5)	IWC database	E Atlantic, W Mediterranean
Spain	Salt-pans of Ibiza & Formentera & Freus isles	38.82	1.47	Resident	819	1996			WBDB	E Atlantic, W Mediterranean
Spain	Salinas de Santa Pola	38.22	-0.58	Resident	984	1995			WBDB	E Atlantic, W Mediterranean
Spain	Wetlands of western Almería	36.67	-2.67	Non-breeding	800	1995			WBDB	E Atlantic, W Mediterranean

Country	Site	Lat.	Long.	Season	Max total	Year max	Average total	Basis for average	Source	Population(s) at site
Sudan	Umshujaira	15.58	32.48	February	3500	2006			Dodman & Diagana 2007	SW Asia
Sudan	White Nile Bird Sanct. <20Km	13.50	32.50	Non-breeding	1100	1983			AfWC database	SW Asia
Tunisia	Golfe de Boughrara	33.62	10.8	December	2,000	1998			P.L.Meininger *in litt.*	E Atlantic, W Mediterranean
Tunisia	Gulf of Gabès	34.40	10.32	September	5173	1999			Bos *et al.* 2001	E Atlantic, W Mediterranean
Tunisia	Sebkha Kelbia	35.87	10.30	Non-breeding	5000	1995			IWC database	E Atlantic, W Mediterranean
Turkey	Acigöl lake	37.82	29.80	Non-breeding	1010	1991			WBDB	Black Sea, E Mediterranean
Turkey	Akyatan Golu	36.62	35.27	Migration	3918	1990			WBDB	Black Sea, E Mediterranean
Turkey	Camalti Salt Pans; Gediz Delta	38.60	26.95	Non-breeding	809	1999	309	1992-99 (5)	IWC database	Black Sea, E Mediterranean
Turkey	Tuz lake	38.75	33.38	Breeding	1200	1998			WBDB	Black Sea, E Mediterranean
Turkey	Tuzla Lake Cukurova Delta	36.70	35.05	Breeding	3000 1,000 prs.	1998	1000	1996-1999	T. Székely *in litt.*	Black Sea, E Mediterranean
Turkey	Yumurtalik Lagoons (Yapi+Omerg)	36.68	35.65	Non-breeding	805	1992	292	1990-99 (5)	IWC database	Black Sea, E Mediterranean
Ukraine	Shagany-Alibej-Burnas lake-system	45.78	30.00	Breeding	600	1999			WBDB	Black Sea, E Mediterranean
Ukraine	The Sivash, Azov Sea	46.17	34.58	August	5500	1998			Chernichko *et al.* 2001	Black Sea, E Mediterranean
U.A.E.	Al Ghar Lake	24.25	54.67	Non-breeding	1380	1995	625	1992-98 (4)	IWC database	SW Asia
U.A.E.	Dhayah / Rams	25.25	55.45	Non-breeding	1075	1998	315	1994-99 (4)	IWC database	SW Asia

Peter Meininger, Tamás Székely & Derek Scott

Nik Borrow

Chestnut-banded Plover

Charadrius pallidus

Geographical variation and distribution

The Chestnut-banded Plover is a small plover of saline habitats with a very patchy distribution in sub-Saharan Africa. Two subspecies have been described: the nominate form from Southern Africa and *venustus* from East Africa. In Southern Africa, it occurs along the west coast from southern Angola to the Western Cape of South Africa. It occurs in good numbers at Etosha Pan in Namibia and the Makgadikgadi Pans in Botswana, but elsewhere inland its distribution is rather patchy in these countries and in Northwest Province, the Free State and the Northern Cape of South Africa (Hockey *et al.* 2005). There are also small numbers in the Eastern Cape of South Africa and along the coast of southern Mozambique (Tree 1997). In East Africa, its range is much more restricted; here it is essentially confined to the Rift Valley lakes of central southern Kenya and northern Tanzania. *C. p. venustus* is generally about 15% smaller than the nominate form, and the mantle is darker and greyer (Urban *et al.* 1986, Hockey & Douie 1995). The bill of the nominate race is proportionally rather smaller than *venustus*, whilst females generally lack chestnut on the head (Hayman *et al.* 1986).

Population limits

Two populations are recognised, corresponding to the two subspecies:

1) birds of the form *pallidus* in Southern Africa;
2) birds of the form *venustus* at alkaline lakes in the Rift Valley of southern Kenya and northern Tanzania.

Movements

In Southern Africa, Chestnut-banded Plovers are resident, nomadic and migratory, although all are considered to form part of the same population. Birds are highly concentrated at favoured non-breeding sites on the west coast, such as Walvis Bay and Sandwich Harbour in Namibia, especially from June to August, moving away during the January rains to breed at vast salt pans inland, notably Etosha Pan in Namibia and Makgadikgadi Pans in Botswana (Simmons *et al.* 2007). However, many of these birds remain at the coast during drought years (Hockey *et al.* 2005). Some birds also breed on the coast of Namibia, mainly in the dry season between March and October, as well as in the winter-rainfall area of the Western Cape Province of South Africa, between September and February (Tree 1997). At other inland sites, breeding also occurs in the rainy and early dry season, and scattered records across the region suggest some nomadic movements, perhaps in search of suitable sites where their specialized habitats occur. There are also some movements away from smaller wetlands as these dry out. A breeding record from Beira, central Mozambique (Clancey 1996), may have been an opportunistic response to unusual conditions.

In Eastern Africa, the Chestnut-banded Plover is largely resident, although there are some movements or wanderings within the confines of the Rift Valley. Here, the more saline Rift Valley lakes provide permanent habitat and breeding may occur year round (Simmons *et al.* 2007). However, records from central areas of Tanzania indicate that this plover does wander and that it will breed at smaller sites if conditions are suitable (Baker & Baker 2005).

Population size

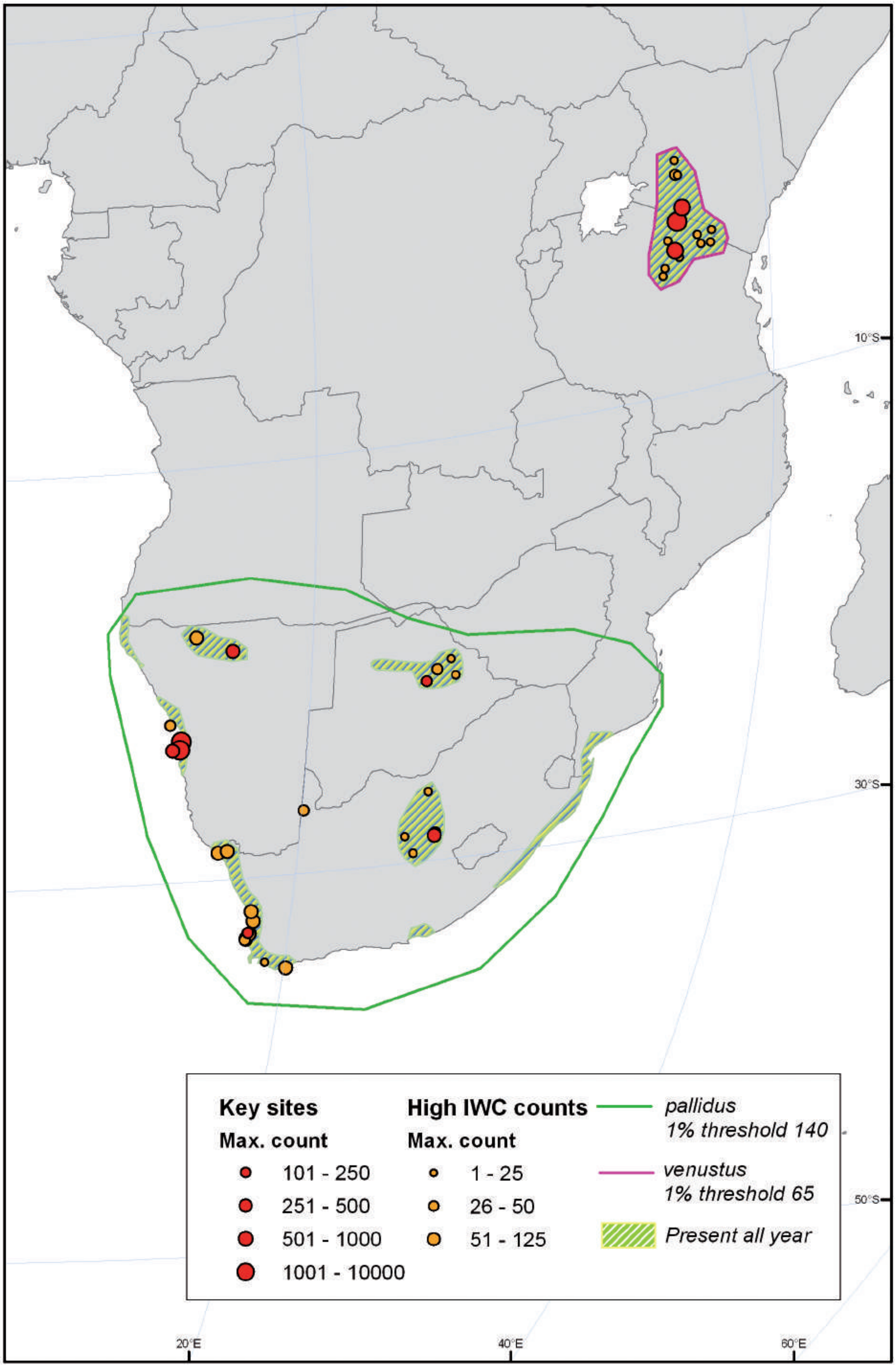
1. *pallidus*

Population estimate	1% threshold	Population trend
11,000-16,000	140	Stable

Simmons (2000) presented the results of a co-ordinated census of the entire population, yielding 11,192 birds and an estimate of 11,200, and this estimate was adopted in

Chestnut-banded Plover

Charadrius pallidus



WPE3 and *WPE4*. In a recent assessment, Simmons *et al.* (2007) produced a similar total of 11,486 birds based on co-ordinated counts from July 1998 onward, but also demonstrated the fluctuating nature of the population. Recent high counts for the region include >13,000 for July 2003 and 15,362 for July 2004 (AfWC database). In view of these fluctuations and taking into account the fact that estimates at Walvis Bay are based on extrapolations, Dodman (in press 2009) has suggested that a range would be more appropriate for this population, and has proposed a new estimate of 11,000-16,000, with a new 1% threshold of 140.

2. *venustus*

Population estimate	1% threshold	Population trend
6,500	65	Stable

V. Parker (*in litt.* 2002) proposed an estimate of 4,000-5,000, and this was adopted in *WPE3* and *WPE4*. This estimate used a figure of 3,500 for the Tanzanian population, following Baker (1996). However, in the co-ordinated counts of January 2005, a total of 4,896 were counted in Tanzania, including 4,357 at Lake Natron, where only 75% coverage was achieved (Baker in prep.). A further 529 birds were counted at Lake Magadi in Kenya at the same time. Based on these data, Simmons *et al.* (2007) gave a new population estimate of 6,338. This estimate, rounded to 6,500, is adopted here, with a new 1% threshold of 65.

Conservation status

Simmons *et al.* (2007) argued that the Chestnut-banded Plover merits Near Threatened status on the IUCN Red List on account of its high dependence on a very limited number of sites; Walvis Bay and Sandwich Harbour in Namibia and Lake Natron in Tanzania can hold 85% of the world population during non-breeding periods. Two of these sites are under threat from pollution, siltation and water abstraction, whilst the eight key sites in total comprise just 588 sq.km, less than 30% of the 2,000 sq.km threshold criteria for Vulnerable status under criterion B2 (Simmons *et al.* 2007, BirdLife International 2004b).

The *venustus* population was considered as regionally Near Threatened on account of its small population size, but stable with no obvious threats in the 1990s (Bennun & Njoroge 1996). In 2007-2008, a proposal for a large soda extraction plant, which would gravely threaten the entire ecosystem of Lake Natron, the most important site by far for *venustus,* was under consideration by the governement of Tanzania. The *pallidus* population is considered regionally Near Threatened in Southern Africa due to its small range, limited number of locations and fluctuations in both extent of occurrence and area of occupancy (Barnes 2000). *C. p. pallidus* has benefited from the growth of the salt industry since the 1950s (Hockey & Douie 1995) and is not presently declining, although it may have declined in central Mozambique, from where there are no recent records.

Both populations warrant regular monitoring due to their small sizes and dependence on a limited number of sites. Simmons *et al.* (2007) recommend that conservation efforts should focus in particular on Walvis Bay and Lake Natron.

Habitat and ecology

The Chestnut-banded Plover inhabits highly saline lakes and pans inland, and intertidal mudflats and commercial salt pans at the coast. Inland localities in Southern Africa are subject to sporadic drying up and flooding (with consequent reduced salinity), in which events birds tend to move to the coast. They forage singly and in pairs, but roost communally in flocks of up to 1,000 (Hockey & Douie 1995). They face negligible competition at inland localities, but compete with Palearctic migrant waders on the coast. Breeding occurs in most months in Tanzania, although there are more records of birds with eggs between July and September than in other months (Baker & Baker 2005). In Southern Africa, opportunistic breeding can occur throughout the year at inland sites; peak breeding seasons are from March to October in Namibia, from July to October in the Northern Cape, and from November to December in the Western Cape (Hockey *et al.* 2005).

Network of key sites

There are seven key sites in Southern Africa that regularly support more than 1% of the population, two of which may quite often support more than half the population. The most important area includes two sites in coastal Namibia: Walvis Bay and Sandwich Harbour. At times, these sites may support almost the entire population of *pallidus*. Key sites inland are Etosha National Park in Namibia and the Makgadikgadi Pans, especially Rysana Pan, in Botswana, whilst the most important sites for *pallidus* in South Africa are the Berg River estuary in Western Cape Province and Skoppan in Northern Cape Province. The main coastal and inland sites should be seen as complementary sites in a network of highly saline wetlands upon which this population depends.

In East Africa, there are three sites that support the bulk of the population: Lake Magadi in Kenya, and Lakes Natron and Manyara in northern Tanzania. These sites are all saline lakes within the Rift Valley; Natron and Magadi are particularly saline. Chestnut-banded Plovers may be found at other saline lakes within the valley, but none is as important as this network of three key sites.

Protection status of key sites

In Southern Africa, Walvis Bay is a Ramsar site and a local Nature Reserve. It receives some measure of protection, although the area is prone to a number of threats from various development plans; Sandwich Bay is a marine reserve within the Namib-Naukluft National Park (Simmons *et al.* 1998). Etosha, an important breeding site for Chestnut-banded Plovers in years of good rainfall, is a National Park and fully protected (Simmons *et al.* 1998). The Makgadikgadi Pans, also an important breeding site when flooded, are partially protected through the designation of the Makgadikgadi and Nxai Pan National Parks and the Nata Sanctuary, but large areas of the site are unprotected and subject to threats such as livestock grazing, habitat degradation and disturbance (Tyler & Bishop 1998).

In South Africa, the Lower Berg River Wetlands are unprotected, but the permanent water body and intertidal mudflats are State-owned and controlled by Cape Nature Conservation (Barnes 1998). Although the wetlands are in a generally good condition, the main long-term threat is from further reduced mean annual runoff due to water abstraction programmes (Barnes 1998).

In East Africa, Lake Manyara in Tanzania is partially protected by Lake Manyara National Park, but a large part of the lake, including the whole eastern shore, remains unprotected (Baker & Baker 2002). Although a designated Ramsar site, Tanzania's Lake Natron is unprotected, and subject to a number of potential threats to its long-term integrity including hydro-electric and soda ash developments and the tendency for increasing settlements and infrastructure (Baker & Baker 2002). In Kenya, Lake Magadi already has a major soda ash development, but due to its location it has minimal impact on wildlife (Bennun & Njoroge 1999).

All key sites are IBAs.

Table 34. Key sites for Chestnut-banded Plover. Sites where 1% or more of a population has been recorded

Country	Site	Lat.	Long.	Season	Max total	Year max	Average total	Basis for average	Source	Population(s) at site
Botswana	Rysana Pan	-21.25	25.07	Unknown	235	2001	138	1994-01 (3)	AfWC database	*pallidus*
Kenya	Lake Magadi	-01.87	36.28	January	529	2005			Simmons *et al.* (in press)	*venustus*
Namibia	Etosha National Park	-18.80	16.57	Non-breeding	415	1998	126	1993-98 (4)	AfWC database	*pallidus*
Namibia	Mile 4 (Swakopmund) Saltworks	-23.42	14.17	Non-breeding	500	1990s			A.J. Tree *in litt.*	*pallidus*
Namibia	Sandwich Harbour	-23.38	14.48	January	8428	1997-05	2284	1997-05 (9)	Wearne & Underhill 2005	*pallidus*
Namibia	Walvis Bay Ramsar Site	-22.98	14.51	July	6040	1996			Simmons 2000	*pallidus*
South Africa	Berg 3: Hotel Mudflats & Estuary	-32.78	18.18	July-August	204	1999	130	1996-00 (5)	AfWC database	*pallidus*
South Africa	Skoppan	-28.77	26.10	Non-breeding	256	2001			AfWC database	*pallidus*
Tanzania	Lake Natron	-02.42	36.00	January	4,357	2005			Simmons *et al.* (in press)	*venustus*
Tanzania	Lake Manyara	-03.67	35.83	Non-breeding	619	1995			WBDB	*venustus*

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Lesser Sandplover (Mongolian Plover)

Charadrius mongolus

Geographical variation and distribution

The Lesser Sandplover (or Mongolian Plover) has an extensive although discontinuous distribution that extends from the Pamir Mountains in the west, through Central and North-east Asia to the Chukotsky Peninsula in the north-east (Hirschfeld *et al.* 2000). Breeding has also been recorded in Alaska. Five subspecies are generally recognised: *mongolus* in Eastern Siberia and the Russian Far East; *pamirensis* in Central Asia; *atrifrons* in the Himalayas and southern Tibet; *schaeferi* from eastern Tibet to southern Mongolia; and *stegmanni* from the Kurile Islands and Kamchatka north to Chukotsky (del Hoyo *et al.* 1996). Only *pamirensis* (the most westerly breeding form) occurs in Western Eurasia and Africa. This breeds in the mountains of west-central Asia (Pamirs, Karakoram, Ladakh, Kun Lun and Tien Shan), and winters from Eastern Africa through the Red Sea and Persian Gulf to Pakistan, western India and Sri Lanka, with small numbers reaching Southern Africa (regularly as far south as Durban in South Africa), the Seychelles and Madagascar (Wetlands International 2000, Hirschfeld *et al.* 2000). Several reports of *C. mongolus* in Cyprus and Turkey are thought more likely to refer to Greater Sandplover *Charadrius leschenaultii* or Kittlitz's Plover *C. pecuarius* (Flint *et al.* 1997).

Movements

The Lesser Sandplover is highly migratory, all populations leaving their breeding grounds in late summer and early autumn and migrating south-west, south or south-east to winter widely along the coasts of Eastern Africa, the Indian subcontinent, South-east Asia and Australia. Birds breeding in Central Asia (*pamirensis*) probably migrate non-stop to the coasts of the Red Sea, Persian Gulf and Arabian Sea, as no inland staging areas have been reported and the species occurs only as a scarce vagrant in the south Caspian region (Snow & Perrins 1998, D.A. Scott unpubl. obs.). Some birds probably stage in the Persian Gulf and Red Sea before continuing on to the East African coast. Birds arrive on their wintering grounds in the Persian Gulf, southern Arabia and East Africa between early August and mid-September. Northward passage in spring apparently involves a non-stop flight from the shores of the Red Sea, Persian Gulf and Arabian Sea to the Central Asian breeding areas. Some non-breeders remain on the wintering grounds throughout the northern summer, but this is apparently rare in Southern Africa, where 95% of the records are in the period November-March (Hockey 1997).

Population limits

Only one population of *C. mongolus pamirensis* is recognised in *Waterbird Population Estimates*, and this comprises the entire population of the subspecies.

Population size

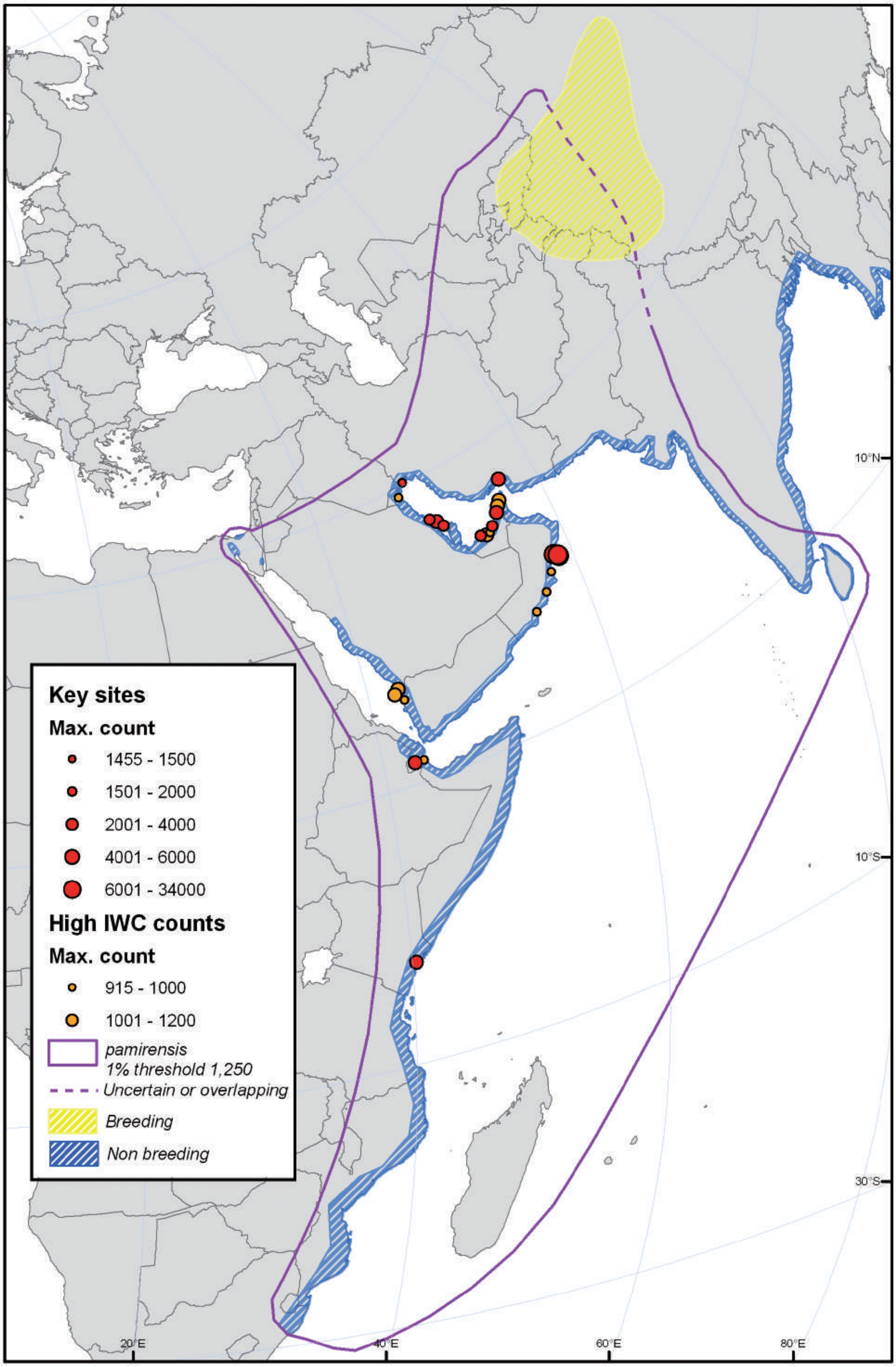
1. *pamirensis*

Population estimate	1% threshold	Population trend
100,000-150,000	1,250	Unknown

Little information is available on the size of this population, as no information is available from the breeding grounds and much of the wintering range is poorly covered by midwinter censuses. Perennou *et al.* (1994) gave a provisional estimate of 25,000, but it is now clear that this was a considerable underestimate. Del Hoyo *et al.* (1996) gave a somewhat higher estimate of at least 30,000 for the total population of *pamirensis*, including an estimated 28,000 along the Saudi Arabian Gulf coast. However, these authors noted that the Lesser Sandplover is one of the commonest waders on the coasts of Pakistan and India, and locally common to abundant from Ethiopia to Tanzania, with thousands in Kenya.

Lesser Sandplover (Mongolian Plover)

Charadrius mongolus



Dodman (2002) reviewed counts in Africa, and concluded that there were at least 20,000 on the Red Sea and Indian Ocean coastlines of Africa. Up to 2,340 have been recorded at the Tana River Delta in Kenya (Bennun & Njoroge 1999). There are regular records from Eritrea, and presumably a sizeable number may be found along the Somali coast. This seems especially likely given a recent count of 1,368 on the mudflats around Djibouti City in February 2001 (Welch & Welch 2001). A total of 476 was recorded in coastal Mozambique in January 1998, with 470 at Benguera Island in the Bazaruto Archipelago (Dodman *et al.* 1999). The species is also an annual migrant to Seychelles, occurring throughout the islands in small numbers from September to April (Skerrett *et al.* 2001). Small numbers also occur on other Indian Ocean islands and in Madagascar. Dodman (2002) therefore proposed a somewhat higher population estimate of 30,000-50,000, and this was adopted by Stroud *et al.* (2004) and *WPE3*.

However, even this appears to have been an underestimate, as it did not take into account the large numbers of *pamirensis* wintering on the coasts of Pakistan, western India and Sri Lanka. The situation in South Asia is confusing, as *C. mongolus atrifrons* is also known to winter in India and Sri Lanka, and has been recorded as far west as Pakistan. S. Balachandran (*in litt.* 2005) has recently estimated the wintering population of *pamirensis* in India at 100,000. This figure was taken into account in the new estimate of 100,000-150,000 for the total population of *pamirensis* adopted in *WPE4*.

Conservation status

This species appears not to be under threat. It uses a variety of coastal habitats and its range in Central and South-west Asia and Africa includes a lot of remote regions with sparse human populations. However, few of the preferred sites have been counted consistently or frequently enough to allow calculation of population trends.

Habitat and ecology

The disjunct breeding range is mainly in the mountains of south-central and eastern Asia up to 5,500 m in altitude. Nesting is invariably above the tree-line (latitudinal or altitudinal), in barren valleys and basins, elevated tundra and mountain steppes, mainly near water (e.g. bogs) on moist but well-drained gravelly, rocky or sandy substrates with little vegetation (del Hoyo *et al.* 1996). Egg-laying in *pamirensis* commences in mid-May. Breeding densities of one pair per sq km have been recorded, and rarely 3-12 nests only 100 m apart. The nest is placed in a scrape or cattle footprint in bare sand or shingle, sometimes beside bushes or big stones. Incubation is by both sexes, but in most cases only the males tend the chicks (del Hoyo *et al.* 1996). Outside the breeding season, the Lesser Sandplover is strictly coastal, frequenting tidal mudflats, especially in the vicinity of mangroves, sandy beaches and estuaries; also occasionally rocky shores with tidal pools. It feeds in typical plover fashion, either solitarily or in scattered flocks, often in company with other small waders including Greater Sandplover *C. leschenaultii*. Outside the breeding season, the diet consists of insects, crustaceans, such as crabs and amphipods, molluscs, particularly bivalves, and polychaete worms (del Hoyo *et al.* 1996, Snow & Perrins 1998).

Network of key sites

Ten key wintering areas have been identified in South-west Asia: two on the Persian Gulf in Iran, one in Bahrain, three in the United Arab Emirates, two on the Gulf coast of Saudi Arabia, and two on the Arabian Sea coast in Oman. The two sites in Oman, Barr Al Hikman and Masirah Island, are much the most important, supporting up to 13,000 and 6,400 birds respectively. Only two key sites have been identified on the African coast: the coastal mudflats at Salines Est in Djibouti and the Tana River delta in Kenya.

Protection status of key sites

The two key sites in Iran, have been protected as Wildlife Refuges and Shadegan Marshes and Khor Musa was designated as a Ramsar site in 1975. Tubli Bay in Bahrain is partly protected in a small Wildlife Reserve. Sabkhat al-Fasl Lagoons in Saudi Arabia are protected within a large Wildlife Sanctuary, but Tarut Bay apparently remains unprotected. In the United Arab Emirates, Khor Dubai is protected as a Bird Sanctuary, while in Oman, Barr Al Hikman and Masirah Island have been proposed for protection in National Nature Reserves. Neither of the key sites on the African coast is protected; the Tana River delta is seriously threatened by major agricultural developments.

Table 35. Key sites for Lesser Sandplover. Sites where 1% or more of a population has been recorded

Country	Site	Lat.	Long.	Season	Max total	Year max	Average total	Basis for average	Source	Population(s) at site
Bahrain	Tubli Bay	26.18	50.57	Migration	2000	1991			Evans 1994	
Djibouti	Salines Est	11.50	42.50	Non-breeding	2012	2002	1258	2001-02 (2)	AfWC database	
Iran	Rud-i-Shur, Rud-i-Shirin & Rud-i-Minab Deltas	27.08	56.75	January	3066	2005	2009	2004-07 (3)	DOEI / WIWO	
Iran	Shadegan Marshes, Khor-al Amaya & Khor Musa	30.17	48.67	January	1455	2004	818	1004-05 (2)	DOEI / WIWO	
Kenya	Tana River Delta	-2.50	40.33	Non-breeding	2340	1993			WBDB	
Oman	Barr Al Hikman	20.63	58.47	January	34000	2008	7560	1993-01 (5)	IWC database R. Klaasen & J. de Fouw *in litt*	
Oman	Masirah Island	20.50	58.75	Non-breeding	6443	1990	3355	1994-01 (5)	IWC database	
Saudi Arabia	Sabkhat al-Fasl Lagoons	27.00	49.67	April-May	1800	1992			Evans 1994	
Saudi Arabia	Tarut Bay	26.67	50.17	Non-breeding	2160	1993	1704	1993-96 (3)	IWC database	
U.A.E.	Khor Dubai	25.21	55.33	Non-breeding	3000	1992	1195	1995-99 (5)	IWC database	
U.A.E.	Merawah Island	24.33	53.25	Non-breeding	1939	1996	998	1994-98 (4)	IWC database	
U.A.E.	Sadiyat. Ghurab; Jubayl (inshore islands)	24.50	54.50	Non-breeding	1530	1995	569	1995-98 (3)	IWC database	

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Greater Sandplover

Charadrius leschenaultii

Geographical variation and distribution

The Greater Sandplover has an extensive breeding range across south temperate latitudes of Asia from Turkey and the Middle East to southern Siberia, Mongolia and western China. Three subspecies have been described (see Hirschfeld *et al.* 2000 for a full review and biometric analysis). *C. l. columbinus* breeds in Turkey, Israel, Syria and Jordan east through northern Iraq possibly as far as south-western Iran. It winters mainly in the Red Sea and Gulf of Aden and in the northern Persian Gulf, with smaller numbers in the eastern Mediterranean west to Tunisia and Greece (Hirschfeld *et al.* 2000). *C. l. crassirostris* breeds in Transcaucasia and Transcaspia east to south-eastern Kazakhstan and Pakistan, and winters around the Red Sea, Gulf of Aden and Persian Gulf. The few pairs of Greater Sandplover that were found breeding in Armenia have been assigned to this form (Bijlsma 1997), and it is probable that the very small numbers of birds occurring in Azerbaijan are also *crassirostris*. The nominate form breeds from extreme eastern Kazakhstan east through Central Asia to eastern Asia and thus largely outside the region covered by this Atlas. Most of these birds winter in the Indian subcontinent, South-east Asia and Australasia. However, it has recently been shown that birds of this form, presumably from the western part of the breeding range, winter in coastal Eastern Africa (Hirschfeld *et al.* 2000).

Movements

The Greater Sandplover is almost entirely migratory, although some birds breeding in Central Asia are reported to be resident (Snow & Perrins 1998). Flocks form after the breeding season between mid-July and early August (del Hoyo *et al.* 1996). These migrate south-west, south or south-east to spend the non-breeding season on the shores of Eastern and Southern Africa, the Arabian Peninsula, Southern Asia and Australasia. Many birds probably migrate on a broad front non-stop from the breeding areas to coastal staging and wintering areas, but small numbers also occur at inland lakes on passage, e.g. on the south coast of the Caspian Sea in Iran. The return migration begins early, in late February, with some birds reaching their breeding grounds by mid-March, although other birds do not leave East Africa and Southern Asia until mid-April or early May. The main spring passage through the south Caspian region occurs between mid-March and late April. Some non-breeders remain on their wintering grounds throughout the breeding season.

Birds breeding in the Near East (*columbinus*) move a relatively short distance to wintering areas in the eastern Mediterranean, Red Sea and northern Persian Gulf. Birds breeding in Armenia, Azerbaijan, northern Iran, Afghanistan and the Central Asian Republics east to south-eastern Kazakhstan and Pakistan (*crassirostris*) move south-west to winter in the Persian Gulf, Red Sea and Gulf of Aden, where they overlap extensively with *columbinus*. Birds of the nominate race from breeding areas in easternmost Kazakhstan, Kyrgyzstan and Xinjiang migrate south-west to the shores of Eastern Africa, possibly with staging areas on the Indian Ocean coast of the Arabian Peninsula (Hirschfeld *et al.* 2000). Birds of the nominate race breeding further east migrate south or south-east to wintering areas in the Indian subcontinent, South-east Asia and Australasia.

Population limits

In the first two editions of *Waterbird Population Estimates*, only two populations of *C. leschenaultii* were recognised in Western Eurasia and Africa: the entire population of the form *columbinus*, and the entire population of the form *crassirostris*. All populations of the nominate form were thought to breed further to the east and to spend the non-breeding season in South Asia, South-east Asia and Australasia. However, Hirschfeld *et al.* (2000) showed that the birds wintering in Eastern Africa (from southern Somalia to South Africa and including Madagascar) belong to the nominate form and not *crassirostris* as was previously supposed. This implies that in addition to the two populations of nominate *leschenaultii* recognised in the first two editions of *Waterbird Population Estimate* (i.e. those populations wintering in South Asia and South-east Asia/AustralAsia, respectively), there is a third population wintering on the western shores of the Indian Ocean. Accordingly, Stroud *et al.* (2004) distinguished a new biogeographical population of *C. l. leschenaultii*, and recognised three populations of the Greater Sandplover in Western Eurasia and Africa:

1) an Eastern Mediterranean breeding population comprising the whole of the form *columbinus*;
2) a South-west Asian breeding population comprising the whole of the form *crassirostris*;
3) an Eastern and Southern African wintering population of the nominate form *leschenaultii*.

These three populations were adopted in *WPE3* and retained in *WPE4*. However, two of these populations, the Eastern Mediterranean breeding population and the South-west Asian breeding population, overlap extensively in their winter quarters and are difficult to separate in the field. The population of nominate *leschenaultii* occurring in Eastern Africa breeds largely outside the region covered by this Atlas, although the western limits of the range south of Lake Balkash extend into the area covered by the African-Eurasian Waterbird Agreement.

Population size

1. *columbinus*

Population estimate	1% threshold	Population trend
A (<10,000)	Provisionally 100	Unknown

C. l. columbinus appears to be a very scarce bird. It is known to breed only in Turkey (800-1,200 pairs in 2001), Syria (20-30 pairs in 1967), Jordan (a few pairs in recent years) and Iran (<20 pairs in the 1970s) (BirdLife International 2004a, Scott 1995, Snow & Perrins 1998). It may also have bred in Egypt. Rose & Scott (1994) gave an estimate of A (<10,000) and this has been retained in successive editions of *Waterbird Population Estimates*, but as Stroud *et al.* (2004) noted, the actual total could be far fewer than 10,000.

2. *crassirostris*

Population estimate	1% threshold	Population trend
C (25,000-100,000)	Provisionally 1,000	Unknown

Perennou *et al.* (1994) estimated the size of this population as 65,000 individuals, but their estimate included birds now known to be nominate *leschenaultii* wintering in Eastern Africa. Hirschfeld *et al.* (2000) have established that *crassirostris* winters almost exclusively on the shores of the Red Sea, Gulf of Aden and Persian Gulf. The midwinter counts in South-west Asia can account for fewer than 10,000 birds: about 6,900 during the mid-1990s and 9,850 with 1970s data. It is now thought that there are no more than 25,000 nominate *leschenaultii* wintering in Eastern Africa, suggesting that of the 65,000 birds estimated by Perennou *et al.* (1994), at least 40,000 were *crassirostris*. Given the incomplete coverage of the counts throughout much of the wintering range of this population and the uncertainty with respect to overlap with *columbinus*, Stroud *et al.* (2004) proposed a rough estimate of C (25,000-100,000), and this was adopted in *WPE3* and *WPE4*.

3. *leschenaultii* Eastern Africa (non-breeding)

Population estimate	1% threshold	Population trend
25,000-50,000	380	Unknown

The totals of Greater Sandplover recorded in Eastern and Southern Africa by the African Waterbird Census are clearly unrepresentative: in January 1998, a total of 3,632 was recorded, including 3,570 in Tanzania (1,705 of which were at Chwaka, Zanzibar), 25 in Kenya, four in Mozambique, 13 in Madagascar, and 20 in Seychelles (Dodman *et al.* 1999). A total of 4,201 was recorded in Tanzania in January 1995 (Dodman & Taylor 1995), including 1,823 at Mnazi Bay and 2,200 at Kibo salt pans north of Tanga (Baker & Baker 2001). As many as 1,250 have been recorded at Mida Creek in Kenya (Seys *et al.* 1995), and a total of 927 was recorded in Kenya in January 2001, when there were also 405 in Djibouti (Dodman & Diagana 2003). There are also records of small numbers inland in East Africa. Dodman (2002) reviewed recent counts, and suggested that there were likely to be over 10,000 on the Tanzanian coast, perhaps some 10,000 in Somalia and Kenya, and probably over 10,000 for all other areas. He proposed a new estimate of 25,000-50,000, which was adopted by Stroud *et al.* (2004) and *WPE3*, and retained in *WPE4*.

Conservation status

Trends in the population of *C. l. columbinus* are poorly known, but the scarcity of this subspecies and the apparent pressure on its habitat give cause for concern. The Turkish breeding population is threatened by the destruction of breeding habitat through the drainage of lakes and marshes and conversion to agricultural land (Keijl 1994a). As such habitat conversion is widespread throughout the breeding range of this subspecies, the population as whole may be under considerable pressure.

Nothing is known of trends in the populations of *crassirostris* and *leschenaultii*.

Habitat and ecology

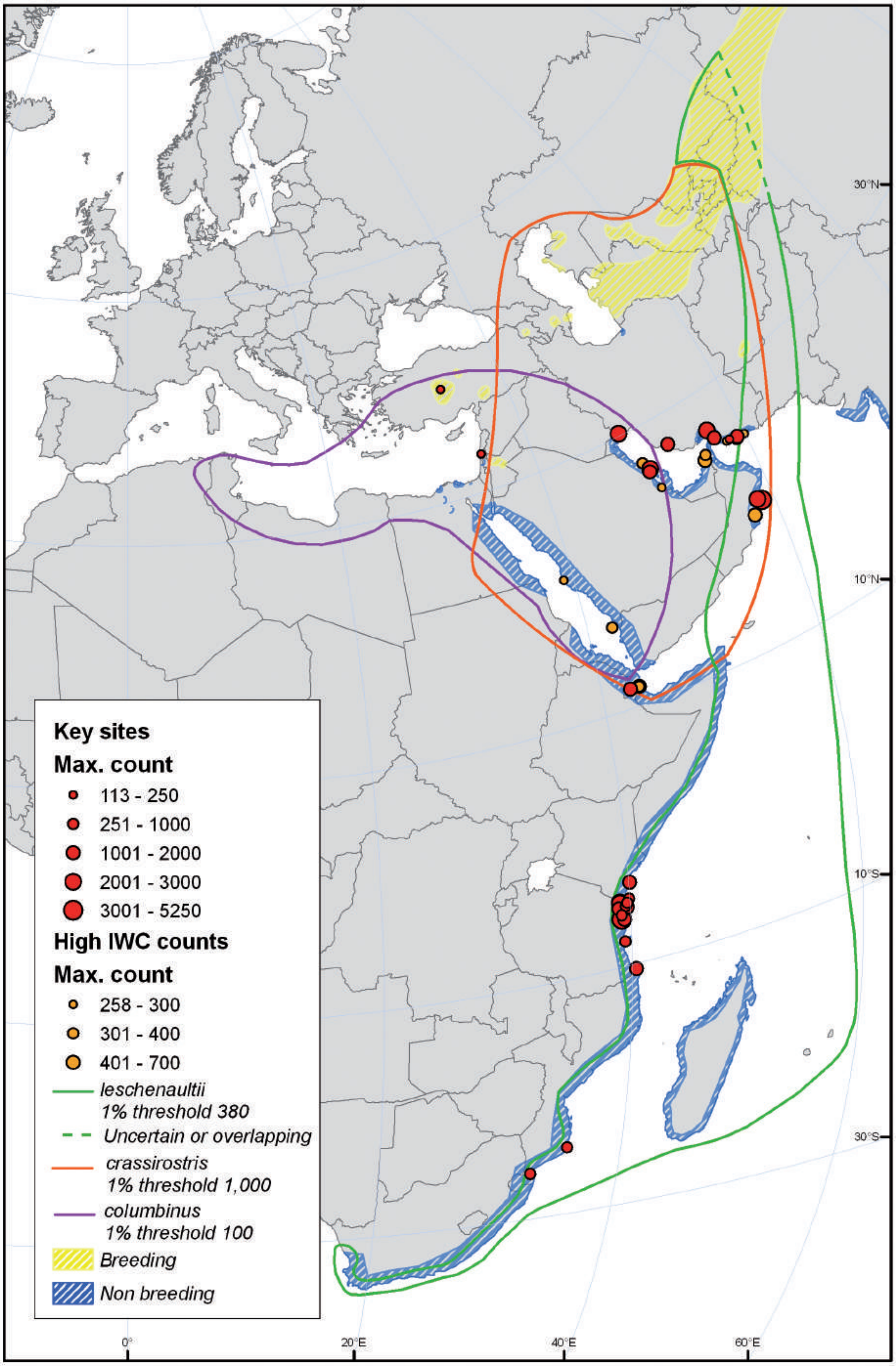
The Greater Sandplover breeds in arid steppe and desert habitats at lower altitudes and latitudes than its close congener the Lesser Sandplover. It is confined to open, flat, uncultivated, treeless areas with surfaces of dried mud, silt, clay or salt and features such as stony ridges or sparse vegetation growth. It frequently breeds near water, and is usually coastal outside the breeding season, but uses a greater variety of coastal habitats than Lesser Sandplover. The mating system is probably monogamous, with low breeding density, or loose, scattered neighbourhood groups. The male and female share nesting and chick-rearing duties. Eggs are laid from late March and through April, the nest being on the ground in the open, or among sparse vegetation. It is gregarious outside the breeding season (Snow & Perrins 1998).

Network of key sites

One key breeding site has been identified for *columbinus*, at Tuz Gol in central Turkey. This subspecies now appears to be a very scarce bird, and given the widespread threats to its breeding habitat, it might be appropriate to consider any regular breeding site as a key site. Outside the breeding season, this form mixes extensively with the much more abundant *crassirostris*, especially in the Red Sea and Persian Gulf, and identification of key wintering sites for *columbinus* in the region of overlap is impossible. The small numbers of

Greater Sandplover

Charadrius leschenaultii



birds wintering in the eastern Mediterranean are believed to be mostly *columbinus*, and one site, Galilee coastal plain in Israel, has exceeded the 1% threshold for this subspecies.

The size of the *crassirostris* population is poorly known and the provisional 1% threshold, based on the top of the range, is likely to be too high. Not surprisingly, therefore, only five key wintering sites have been identified within the range of *crassirostris*: The Shadegan Marshes and Rud-I Shur complexes in Iran, Tarut Bay in Saudi Arabia, Barr al Hikman and Masirah Island in Oman, and Salines Est in Djibouti. Furthermore, it is possible that the high counts at Barr Al Hikman include some nominate *leschenaultii*, although most of these are believed to winter further south. A better understanding of population size and extent of overlap with *leschenaultii* is required before an effective network of key sites can be identified for *crassirostris*.

Eleven key wintering sites have been identified for nominate *leschenaultii* on the east coast of Africa, one in Kenya, eight in Tanzania and two in Mozambique, with the highest counts (up to 3,090) coming from the island of Zanzibar.

Protection status of key sites

Tuz Gol in Turkey is protected under the Law on Protection of Cultural and Natural Assets (1983) and has been identified as an IBA (Heath & Evans 2000). Of the key sites in Tanzania, only Mnazi Bay is protected, forming a part of the Mnazi Bay – Ruvuma Estuary Marine Park, gazetted in 2000 (Baker & Baker 2002), though most other sites are IBAs

Table 36. Key sites for Greater Sandplover. Sites where 1% or more of a population has been recorded

Country	Site	Lat.	Long.	Season	Max total	Year max	Average total	Basis for average	Source	Population(s) at site
Djibouti	Salines Est	11.50	42.50	Non-breeding	1231	2002	670	2001-02 (2)	AfWC database	*leschenaultii*
Iran	Rud-i-Shur, Rud-i-Shirin & Rud-i-Minab Deltas	27.08	56.75	January	1776	2005	704	2004-2007(3)	DOEI / WIWO	*leschenaultii*
Iran	Shadegan Marshes, Khor -al Amaya and Khor Musa	30.17	48.67	January	1196	2005	699	2004-2007(2)	DOEI / WIWO	*leschenaultii*
Israel	Galilee Coastal Plain	32.92	35.12	Winter	113	1995	15	1999-03 (5)	IWC database	*columbinus*
Kenya	Mida Creek	-03.33	40.08	January	1250	1990s			Seys *et al.* 1995	*leschenaultii*
Mozambique	Bay Inhambane	-24.18	35.38	July - August	580	1999			AfWC database	*leschenaultii*
Mozambique	Salinas da Matola	-25.95	32.55	Pre-breeding migration	504	1997			AfWC database	*leschenaultii*
Oman	Barr Al Hikman	20.63	58.47	Non-breeding	3000	1997	1010	1993-01 (5)	IWC database	*crassirostris + leschenaultii*
Saudi Arabia	Tarut Bay	26.67	50.17	Non-breeding	2771	1992	968	1992-96 (4)	IWC database	*crassirostris + columbinus*
Tanzania	Indian Ocean Coastline	-8.00	39.50	Non-breeding	400	2000			AfWC database	*leschenaultii*
Tanzania	Kibo Salt Pans	-4.73	39.17	Non-breeding	2200	1995			AfWC database	*leschenaultii*
Tanzania	Mnazi Bay	-10.42	40.37	Non-breeding	1823	1995			WBDB	*leschenaultii*
Tanzania	Mwarongo Salt Pans	-5.22	39.08	Non-breeding	1800	1995			AfWC database	*leschenaultii*
Tanzania	Pemba Island	-5.17	39.67	January	930	1998			Geene 2001	*leschenaultii*
Tanzania	Tanga North-- Kibo saltpans	-4.82	39.17	Non-breeding	2200	1995			WBDB	*leschenaultii*
Tanzania	Tanga South	-5.25	39.77	Non-breeding	1823	1995			WBDB	*leschenaultii*
Tanzania	Zanzibar Island	-6.13	39.23	January	3090	1998			Geene 2001	*leschenaultii*
Turkey	Tuz lake	38.75	33.38	Breeding	120	1998			WBDB	*columbinus*

Jeff Kirby, Simon Delany & Derek Scott

Nik Borrow

Caspian Plover
Charadrius asiaticus

Geographical variation and distribution

The monotypic Caspian Plover breeds from extreme south-eastern Europe in the region of Volgograd (42ºE) east through Kazakhstan to about 84ºE, and migrates through South-west Asia to winter in Africa south of the Sahara. There are two main non-breeding destinations: in the upland plains of south-western Kenya and northern Tanzania, especially the Serengeti (Britton 1980), and in Botswana, northern and eastern Namibia, northern South Africa, Zimbabwe and western Zambia (Dodman 2002). It occurs only as a vagrant in West and Central Africa (Urban *et al.* 1986).

Movements

Following post-breeding flocking and dispersal, the main movement is south-west, overland across Iran, Iraq and Arabia, then across the Red Sea and perhaps the Gulf of Aden into North-east Africa. Autumn passage begins in the Middle East in mid-July and continues until the end of September. Reports of large migrant flocks in the Middle East in spring but not in autumn suggest that much of the autumn passage across the region is in high, non-stop flights (Snow & Perrins 1998).

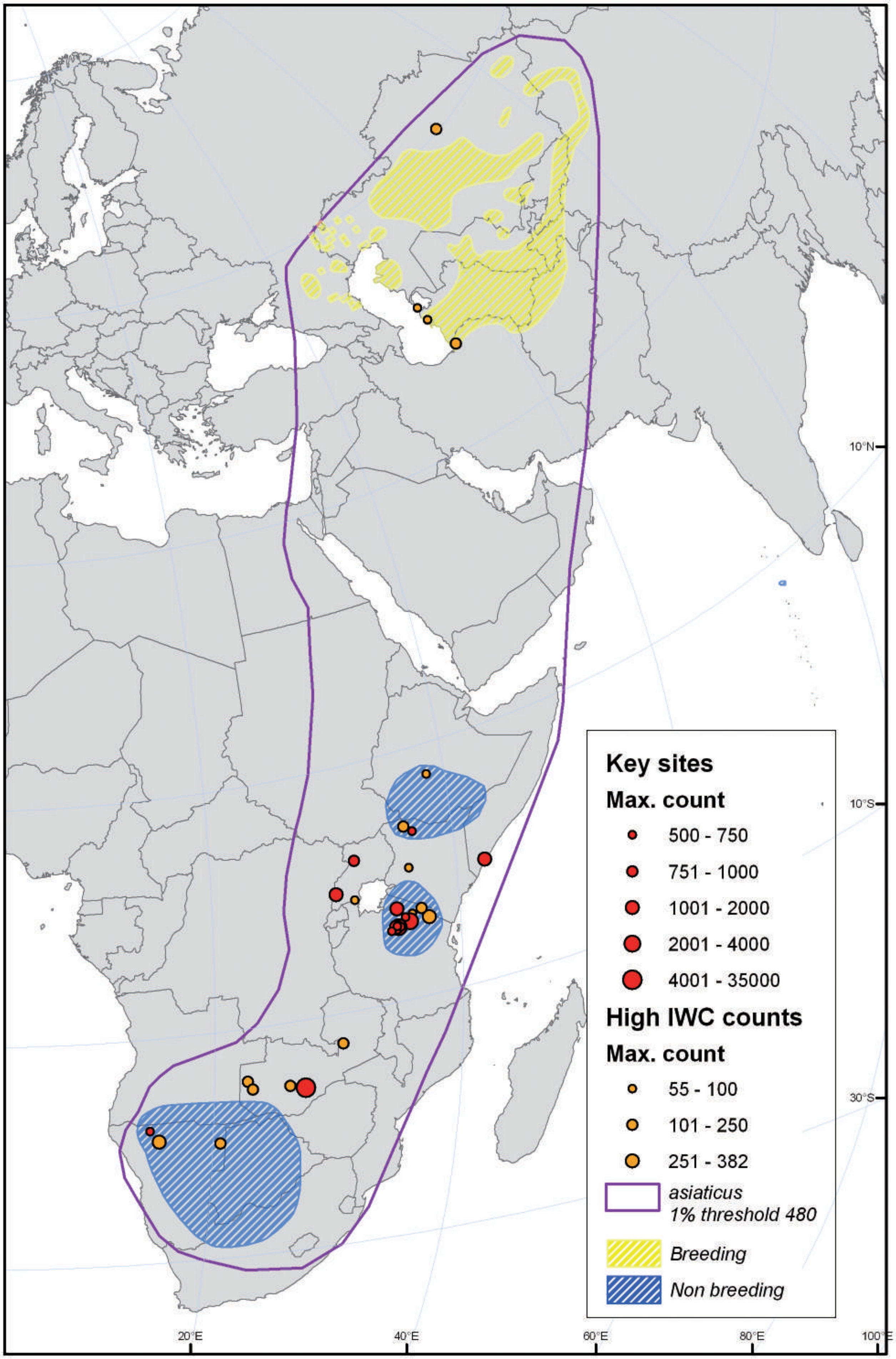
The Caspian Plover is rare on passage in Egypt, with most records from the Nile Delta being in autumn and all records from the Red Sea being in spring (Goodman & Meininger 1989, Miles 1998). It is numerous in Ethiopia between August and April, both as a winter visitor and on passage (Urban & Brown 1971), with autumn passage reaching a peak in August and September (Urban *et al.* 1986). It is mainly a passage migrant in Somalia, although small numbers overwinter; it occurs in the north-west mostly on autumn passage in September, while on the east coast it is an abundant passage migrant with the largest flocks appearing in March (Ash & Miskell 1998). In Kenya, it is a common passage migrant in October and April at Lake Turkana in the north, where it also winters, but the main wintering flocks occur on the plains south of Nairobi, whilst on the coast and at Tsavo East it occurs mainly on northward passage (Lewis & Pomeroy 1989, Zimmerman *et al.* 1996). The first flocks arrive in Tanzania in the first half of August (Urban *et al.* 1986). Large flocks winter in the Serengeti ecosystem in northern Tanzania, although it is possible that some birds move further south for a month or two first, given their somewhat late arrival here (Baker & Baker 2005). There is both northward and southward passage in Uganda, mainly in the west, with the largest flocks reported from March, although some birds also winter here (Carswell *et al.* 2005). Chapin (1939) reports it to be a late arrival in north-eastern Democratic Republic of Congo from January to March.

In West Africa, the Caspian Plover is essentially a vagrant, although four groups of 2-5 birds were found in coastal savanna of the Congo in December 1995 (Dowsett-Lemaire & Dowsett 1998). It is also a vagrant in the Seychelles, with records between October and March (Skerrett *et al.* 2001). In the Maldives, J. Jansen (*in litt.*) considers Caspian Plover to be regular in winter on the basis of "several observations", including eight at Male airport in January 1999.

Birds begin to arrive in Southern Africa in late August, with the major influx occurring in September-November (Tree 1997). The Caspian Plover is a regular visitor in small numbers in Malawi, mostly on southward passage (Dowsett-Lemaire & Dowsett 2006). One of the key staging areas is the Kafue Flats in Zambia, where the peak counts are mainly from November. From here birds move southwards, principally into Botswana where they arrive from late September onwards. The birds are highly nomadic, staying in the general area until the rains set in, and then moving out quickly with the flush of green grass from December (A. Tree *in litt.* 2005). From Botswana, the birds move west into drier areas of Namibia and Angola, before eventually continuing a loop migration back to or over East Africa; in Zimbabwe

Caspian Plover

Charadrius asiaticus



they are erratic and occur in low numbers mainly in drought years when conditions are too xeric in Botswana (A. Tree *in litt.* 2005). They are most abundant in Namibia between December and February (Hockey *et al.* 2005), and are found in Angola between September and February, mainly in the dry and moist grasslands of the south-west (Dean 2000), although there are a number of records from elsewhere in the country (Pinto 1983). The main northward movement out of Southern Africa is in late January and February, following a generally more westerly route than the southward migration (Hockey & Douie 1995); the main departure from Eastern Africa occurs in late March and early April (Snow & Perrins 1998).

There is a pronounced spring passage through the western half of Iran beginning at the end of February and continuing until the end of April (D.A. Scott unpubl. obs.). Spring migration is evidently rapid, since the first birds reach Turkmenistan and southern Kazakhstan in early April, and northern Kazakhstan in mid-April (Snow & Perrins 1998).

Population limits

Currently, only one population is recognised, the entire population of the species. However, there is a possibility that the two discrete wintering areas, in Eastern and Southern Africa respectively, reflect the presence of two discrete populations (Dodman 2002), and further study is required.

Population size

1. South-east Europe, West and Central Asia (breeding) (entire population of the species)

Population estimate	1% threshold	Population trend
40,000-55,000	480	Decreasing

The first two editions of *Waterbird Population Estimates* gave only a rough estimate for the total population of Caspian Plover in the range B/C (10,000-100,000). In his review of counts of birds during the non-breeding season in Africa, Dodman (2002) concluded that there may be more than 30,000 birds present in Southern Africa, and around 10,000-20,000 in Eastern Africa. Accordingly he proposed a new population estimate of 40,000-55,000. This estimate was adopted by Stroud *et al.* (2004) and *WPE3*, and retained in *WPE4*.

Perhaps the largest count yet made of Caspian Plovers is one of 30,000-35,000 in the Kafue Flats, Zambia in November 1995 (Leonard 2001). Elsewhere in Zambia, smaller numbers have been found at Liuwa Plain, Barotse Floodplain and Kafue National Park (Leonard 2001). The Caspian Plover appears to be fairly well scattered in its non-breeding grounds further south in Southern Africa, as there are few records of substantial flocks from Namibia, Botswana, South Africa or Zimbabwe (Dodman 2002). Simmons *et al.* (2001) gave figures of 119-382 for Etosha and 50-200 for the Tsumkwe Pan system in Namibia, and 541 were recorded at Oponono Lake and Oshitunto in Namibia during the African Waterbird Census in January 1999 (Dodman & Diagana 2003).

Some of the largest concentrations in Eastern Africa have been found in Tanzania; there were “several thousands” in Serengeti National Park and many hundreds at Ngorongoro in 1989, and 3,300 at Lake Manyara, 2,100 at the Singida Lakes, over 200 at Longido and one flock of 2,595 in the Serengeti in January 1995 (Baker 1996, Baker & Baker 2002), whilst Peterson & Zvulun (2007) found 1,678 in the Eyasi-Yaida Basin in January 2005. Bennun & Fasola (1996) estimated that there were 500 at Lake Turkana, Kenya, in February 1992, and there are counts of over 1,000 from western Uganda (Carswell *et al.* 2005) and the southern Somali coast (Ash & Miskell 1998).

Conservation status

There are indications that the Caspian Plover is in decline. It occurs in the same biogeographical regions and habitats as two other species of wader that have shown steep declines in numbers: the Sociable Lapwing *Vanellus gregarius* and Black-winged Pratincole *Glareola nordmanni*, and it remains poorly known. The small breeding population in European Russia (roughly estimated at 130-500 pairs; BirdLife International 2004a), at the western extremity of the species’ breeding range, is declining rapidly, mainly because of the loss of its arid steppe habitat through conversion to agriculture and overgrazing (Keijl 1994b, Snow & Perrins 1998, Belik in BirdLife International/EBCC 2000). However, breeding numbers further east are thought to be stable or decreasing only slightly (Keijl 1994b, Belik 1997). In Southern Africa, there has been a contraction in the non-breeding range and a decline in numbers since the beginning of the twentieth century, with a shift to the more mesic north-eastern part of the region, particularly during drought years (Tree 1997). Within its range in Botswana and Namibia, perhaps the greatest threat is from heavy overgrazing leading to desertification and soil erosion and subsequent loss of favoured food items such as grasshoppers and termites (Hockey & Douie 1995).

The Caspian Plover’s decline in numbers has been recognised (BirdLife International/EBCC 2000), and clearly this is a species that should now be monitored closely. Due to the plover’s complex movements in Africa, this will require counts and site visits to be made in some areas outside the normal period of the waterbird counts under the African Waterbird Census in January and July.

Habitat and ecology

The Caspian Plover breeds in lowland deserts, steppes and saline habitats in Central and South-west Asia and adjacent parts of Russia north of the Caucasus. The range of this species overlaps with that of the globally threatened Sociable Lapwing, and it shares a preference for inland, continental regions in all seasons, but breeds in a more arid zone, mostly south of the range of that species. The wintering range in Africa varies with the extent of local dry seasons. Preferred habitats in Africa include arid and semi-arid plains and grasslands, dry floodplains, burnt grasslands, pans and depressions, overgrazed and short pastures, lake edges particularly in dry areas, and coastal flats and beaches. Foraging in flocks in Southern Africa appears to relate to the patchy distribution of grasshoppers and termites (Hockey & Douie 1995). The Caspian Plover nests on the ground in the open, within reach of open water, and the main egg-laying period is the second half of April. Food is primarily insects and their larvae, which are caught in the typical stop-run-peck manner of *Charadrius* plovers (Snow & Perrins 1998). Outside the breeding season, the Caspian Plover typically occurs in small flocks of 5-20 birds, although flocks of up to several hundreds and less commonly several thousands have been recorded on migration. The birds moult into breeding plumage in January and February, before leaving for their breeding areas in March (Urban *et al.* 1986).

Network of key sites

A network of key sites has been identified for the non-breeding areas in Eastern and Southern Africa, whilst there are several potential key sites for which data are lacking; no key sites have been identified for breeding areas. The Kafue Flats in Zambia is a major staging area for the species, and regularly holds large flocks on their southward migration, once up to about two-thirds of the total estimated population. Other possible key sites in Zambia are the Liuwa Plains and Barotse Floodplain in the west of the country, where large flocks of Caspian Plovers have been recorded, although specific count data are lacking. Elsewhere in Southern Africa, this plover is much more widely scattered, and the only key site identifiable from count data is Lake Oponono and Oshitunto north of Etosha, Namibia.

In Kenya, Lake Turkana has been identified as a key passage and wintering site, while further south, the grassy plains of Masai Mara almost certainly qualify as a key site although detailed count data are not available. Several key sites have been identified from count data in northern Tanzania: the Serengeti, Lake Manyara, Ngorongoro and the Singida Lakes, Lake Kitangire and the Eyasi-Yaida Basin. Sizeable flocks have also been recorded at two sites in Uganda: Murchison Falls, where there were 1,000 in March 1970, and Lake Kikorongo, where there were 1,700 in March 1990 (Carswell *et al.* 2005). The southern coastline of Somalia is also a very important area for the species, especially during the northward migration, with reports of flocks of between 1,000 and 1,650 birds in March (Ash & Miskell 1998). However, further data are needed for better definition of the key area or areas along this coastline.

Protection status of key sites

The Kafue Flats in Zambia are under official protection status, with core areas designated as National Parks (Lochinvar and Blue Lagoon) and a Game Management Area. The Liuwa Plains have National Park status, although there are over 160 villages within the park boundary, and the integrity of the site is threatened by overgrazing, agriculture and general encroachment; the Barotse Floodplains are unprotected, although part of the plains form a Game Management Area (Leonard 2005). Lakes Oponono and Oshitunto are unprotected.

Parts of Lake Turkana in Kenya are protected, but direct human pressure on the lake is relatively low (Bennun & Njoroge 1999). The Masai Mara is under protection as a National Reserve. Across the border in Tanzania, the Serengeti is a National Park, World Heritage Site and Biosphere Reserve, whilst a number of adjoining areas are also under some form of protection (Bennun & Njoroge 1999, Baker & Baker 2001). Two other key sites in Tanzania also have protected area status: Ngorongoro Conservation Area is a World Heritage Site and Biosphere Reserve, and Lake Manyara is a National Park and Biosphere Reserve, although a large part of the lake shore is unprotected (Baker & Baker 2001). Nyumba ya Mungu Reservoir and Lake Kitangire, however, are unprotected, as are Lake Eyasi and Yaida Swamp, which are threatened by overgrazing and agriculture, and the Singida Lakes, which are affected by growing urban sprawl (Baker & Baker 2001). Murchison Falls in Uganda is a National Park, and Lake Kikorongo is protected within the Queen Elizabeth National Park. The Somali coastline is unprotected.

All sites in Zambia, Kenya, Tanzania and Uganda have been designated as Important Bird Areas.

Table 37. Key sites for Caspian Plover. Sites where 1% or more of a population has been recorded

Country	Site	Lat.	Long.	Season	Max total	Year max	Source
Kenya	Lake Turkana	3.45	36.67	Non-breeding	500	1992	WBDB
Namibia	Oponono Lake & Oshitunto	-18.00	15.00	July-August	541	1999	AfWC database
Somalia	South Somali coast			March	1650	1990s	Ash & Miskell 1998
Tanzania	Lake Eyasi	-03.83	34.78	January	545	2005	AfWC database
Tanzania	Lake Kitangire	-4.1	34.3	January	600	2005	AfWC database
Tanzania	Lake Manyara National Park	-3.67	35.83	Non-breeding	3302	1995	AfWC database
Tanzania	Ngorongoro Conservation Area	-3.25	35.50	Non-breeding	500	1998	WBDB
Tanzania	Serengeti National Park	-2.42	34.83	Non-breeding	2000	1989	WBDB
Tanzania	Singida Lake	-3.90	34.90	Non-breeding	2100	1995	AfWC database
Tanzania	Yaida Swamp	-03.92	35.06	January	533	2005	AfWC database
Uganda	Murchison Falls National Park	02.25	31.67	March passage	1000	1970	Carswell *et al.* 2005
Uganda	Lake Kikorongo	-00.17	30.00	March passage	1700	1990	Carswell *et al.* 2005
Zambia	Kafue Flats	-15.75	27.27	Non-breeding	35000	1995	WBDB

Jeff Kirby, Tim Dodman & Simon Delany


György Szimuly

Eurasian Dotterel
Eudromias morinellus

Geographical variation and distribution

The monotypic Eurasian Dotterel breeds across northern Eurasia from northern Britain and Scandinavia across northern Russia to Alaska, as well as in the mountain ranges of Central Asia south to north-western China and northern Mongolia. It is a rare, but regular breeder in the French Pyrenees (Lescouret & Genard 1982, Deceuninck 2001) and occasionally breeds in the mountain ranges of Central Europe (Sackl 1993, Valle & Scarton 1999) and the Spanish Pyrenees (Lescouret & Genard 1982, Gutiérrez *et al.* 1996). It also bred below sea level in newly reclaimed polders in The Netherlands in the 1960s (Bijlsma *et al.* 2001).

All populations winter in the semi-arid belt from south-western Iran across the Middle East and North Africa to Morocco.

Movements

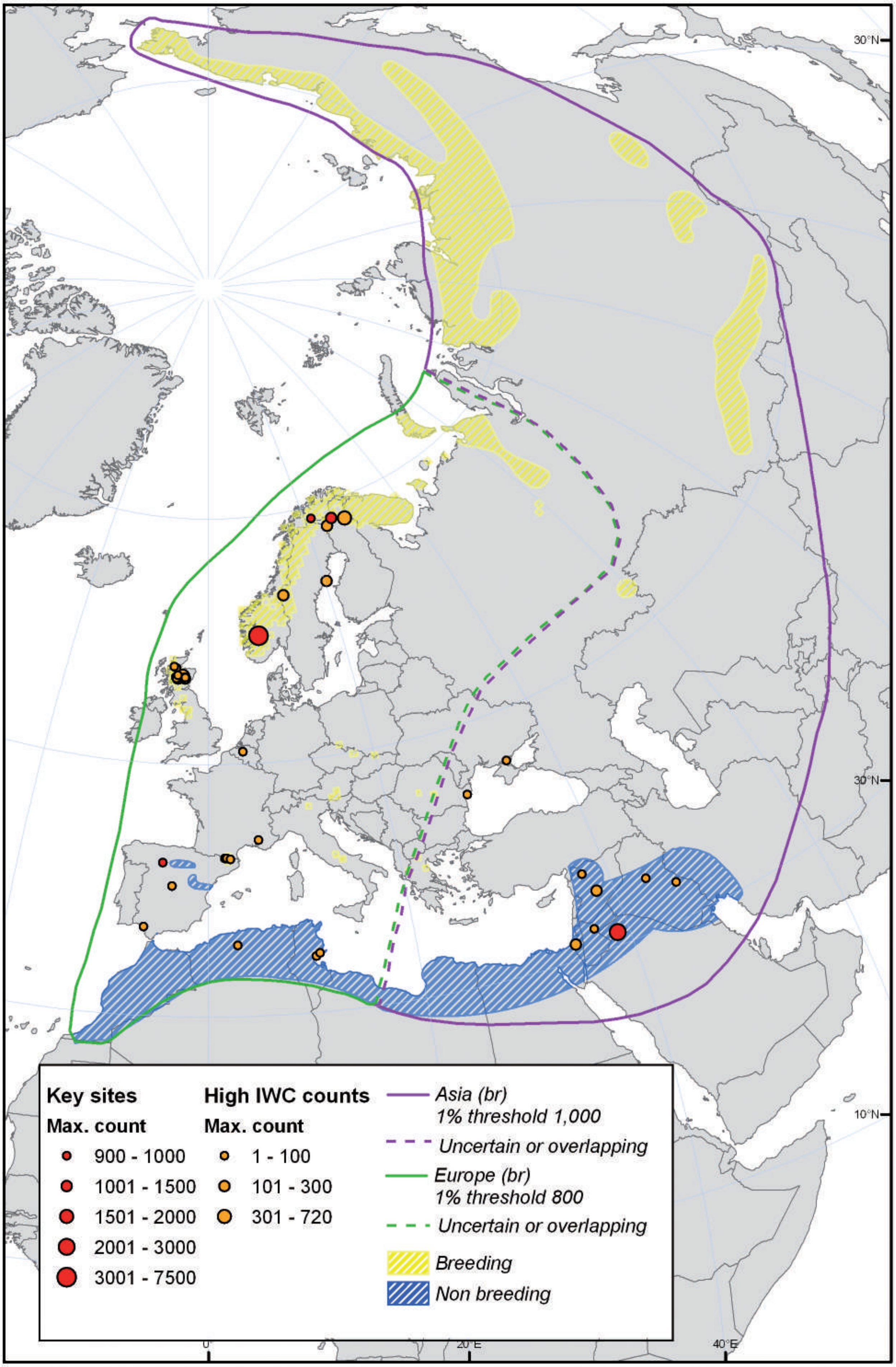
Most Eurasian Dotterels breeding in the western portion of their range probably migrate non-stop from the breeding grounds to the wintering areas, although there is a tendency for some birds to stage at a few, often traditional, stopping places, particularly in spring (Cramp & Simmons 1983, Whitfield *et al.* 1996, Hable & Saari 1997). Adverse weather may also halt migration, resulting in records south of the breeding range in Scandinavia (Cramp & Simmons 1983, Hable & Saari 1997). European breeding birds winter in North Africa, with passage occurring on a broad front overland (Cramp & Simmons 1983). Occasional crossing of the Sahara is indicated by a record in Mauritania in October 1980 (Browne 1981). Ringing recoveries indicate that western birds predominate in western wintering areas. For example, all but one of 18 North African recoveries of Scottish birds were found in Morocco. The exception was a juvenile found in Algeria in early September, and this may still have been on migration (Whitfield *et al.* 1996). Birds ringed in southern Norway have been recovered on passage in The Netherlands (September) and northern France (October), and also in Algeria in October and in Morocco in February (Bakken *et al.* 2003). Eurasian Dotterels from north of the Arctic Circle in Fennoscandia may tend to frequent more easterly destinations (Cramp & Simmons 1983). Evidence for this comes from Finnish and Norwegian ringing data. All five North African recoveries of Finnish ringed birds are from Algeria and Tunisia. A bird ringed as a chick in northern Norway was recovered on passage in September of the same year in central European Russia (Bakken *et al.* 2003). There is substantial passage through Denmark (Østergaard 2001) which is possibly composed of breeders from the southern highlands of Scandinavia (Cramp & Simmons 1983) or which may belong to the more northerly breeding populations (Meltofte 1993). Passage in France is more marked in autumn, when hundreds, or even thousands of birds may be recorded, compared with spring when birds move through more rapidly in apparently smaller numbers, typically a few dozen each year (Legendre 2002). Recoveries of Scottish ringed Dotterels from Morocco suggest that shifts in winter distribution, with birds moving progressively south, may be connected with seasonal rainfall patterns (Whitfield *et al.* 1996).

There have been few recoveries of birds on passage in Europe. Single southern Scandinavian birds have been found in September in The Netherlands and Belgium, and birds from Lapland have been recovered in the former Yugoslavia in November and Crimea and the former USSR in October. An Austrian bird was found in Hérault, France, in August. All of these recoveries except the latter were of juveniles which are known to occur more erratically than adults (Cramp & Simmons 1983). For example, in recent analyses of recoveries of Scottish ringed birds, eleven of twelve European recoveries were of juveniles (Whitfield *et al.* 1996).

Ringing studies indicate that there are low return rates of birds to the breeding grounds (Cramp & Simmons 1983 and

Eurasian Dotterel

Eudromias morinellus



references therein, Pulliainen & Saari 1993 and references therein). In addition, a few recoveries provide evidence of inter-seasonal movements. For example, a bird ringed as a chick in Finnish Lapland was found three years after ringing 4,000 km away in Yakutskya, Siberia; a migrant ringed in September in Ireland was recovered the following June in Krasnoyarsk, Siberia; a bird ringed as a chick in Scotland was found the following October in Jutland, Denmark (Cramp & Simmons 1983), and another Scottish bird was seen as an adult in southern Norway during spring (Whitfield 2002b). Marking studies have also shown that there is intra-seasonal movement, with birds breeding in Scotland and Norway in the same year as well as in different years (Thompson & Whitfield 1993). D.P. Whitfield (in Wernham *et al.* 2002) has shown that the majority of females leave the breeding grounds in Scotland after abandoning a first mate and their clutch, and apparently move further north to later breeding areas in Norway, where they may breed again with a second mate. Such movements, both within and between breeding seasons, are a powerful factor inhibiting geographical variation in this species (Whitfield 2002b).

Dispersal from the breeding areas begins during the first half of August, with the main autumn passage occurring from mid-August to late September. Juveniles may linger at their breeding localities until the end of August. Dotterels begin to leave their wintering areas from late February to March, although the main passage through Western Europe occurs from mid-April to mid-May. The breeding grounds are re-occupied in early May in Scotland, mid- to late May in southern Scandinavia and late May to mid-June in Lapland and northern Russia (Snow & Perrins 1998). Dotterels often migrate non-stop between wintering and breeding areas, although they do sometimes halt in small groups or "trips" at staging points, often at traditional sites e.g. in The Netherlands, Denmark and on the Hungarian steppes (Hable & Saari 1997, Østergaard 2001, Snow & Perrins 1998).

Little is known of the migration routes of birds breeding in Asia, although it seems likely that most of the birds wintering in North-east Africa and the Middle East originate from Asia (Whitfield 2002b).

Population limits

Two main groups are recognised: European breeders, wintering mainly in North Africa from Morocco to Libya; and Asian breeders, probably wintering mainly in the Middle East and North-east Africa. Western breeders generally winter further west than eastern breeders, but there appears to be considerable mixing between breeding areas. For example, birds ringed as chicks in Finland and Scotland have been recovered during the breeding season in Eastern Siberia and Mongolia, respectively (Hable & Saari 1997).

Population size

1. Europe (breeding)

Population estimate	1% threshold	Population trend
40,000-120,000	800	Stable or possibly decreasing

The first two editions of *Waterbird Population Estimates* gave a very rough estimate of D (100,000-1,000,000 individuals) for this population, based on the estimates of breeding populations in BirdLife International's European Bird Database in 1994. Recent compilations of information from the breeding areas allow a better estimation. Thorup (2006) gives the total breeding population in Europe as 15,100-37,700 pairs, while BirdLife International (2004a) gives a somewhat less precise estimate of 11,000-42,000 pairs. These figures roughly equate to a population of 40,000-120,000 non-breeding individuals – the estimate adopted in *WPE4*. This is slightly higher than the estimate of 39,000-110,000 given in *WPE3* and taken from Stroud *et al.* (2004) who used a provisional estimate for the number of pairs breeding in European Russia, rather than the estimate finally adopted by Thorup (2006).

2. Asia (breeding)

Population estimate	1% threshold	Population trend
B/C (10,000-100,000)	Provisionally 1,000	Unknown

Very little is known of the Asian breeding population, as there is no monitoring on either the breeding or the wintering areas. The rough estimate of B/C (10,000-100,000) given in all four editions of *Waterbird Population Estimates* and adopted by Stroud *et al.* (2004) follows Perennou *et al.* (1994).

Conservation status

There was a marked decline in the European population after about 1850 although, at present, the numbers breeding in some countries appear to be stable, e.g. in Norway, Russia and Sweden (BirdLife International/EBCC 2000, BirdLife International 2004a). The Finnish population apparently stabilised in the 1990s following a reduction in numbers of possibly more than 90% (Hable & Saari 1997, Snow & Perrins 1998), but is now reported to be decreasing again (BirdLife International 2004a). There was a marked increase in the British breeding population in the 1970s and 1980s, from an estimated 100 pairs in 1968-72 to 840-950 pairs in 1987/88, and this has been attributed to a slight cooling of the climate in Britain in the 1960s and 1970s (Gibbons *et al.* 1993). However, a national survey in Britain in 1999 identified a significant reduction in breeding numbers since the late 1980s, with numbers falling to 510-740 pairs (Whitfield 2002a). The very small populations in Central and Southern Europe have either recently decreased alarmingly, e.g. as in Austria (Sackl 1993), or are stable or too poorly known to assess status. A census in 1994 in the Catalonian Pyrenees of Spain estimated 2-15 pairs, although birds were also thought to breed in adjoining areas of the French and Andorran Pyrenees (Gutiérrez *et al.* 1996). Despite historical evidence suggesting that this population has been extant since at least the eighteenth century, there is no further information on its status. Overall the European population may be decreasing (Wetlands International 2006). The initial decline is thought to have been due to over-hunting in Europe, but recent declines may be due to the indirect effects of anti-locust pesticides as well as over-hunting in the wintering areas (Hable & Saari 1997). Thompson & Whitfield (1993) suggest that habitat modification in the form of over-grazing by sheep, human disturbance and acidic deposition may have been responsible for the demise of the English and Welsh breeding populations. Trends in the Asian breeding population are unknown (Wetlands International 2006).

Habitat and ecology

In the breeding season, the Eurasian Dotterel frequents the arctic-alpine zone, both continental and oceanic, above or beyond the tree-line but below the snowline. It is often found in cold, windy, moist or wet, cloudy or misty situations with wide gaps between occupied areas (Snow & Perrins 1998). Altitudinal range varies geographically e.g. 4 m below sea level in the former breeding areas of the Dutch Polders, 100-300 m in Finnmark, 460-1,300 m in Scotland, c. 1,000 m in southern Scandinavia, c. 2,000 m in Austria and up to 3,000 m in Mongolia (Cramp & Simmons 1983, Thompson & Whitfield 1993, Hable & Saari 1997). Breeding densities of 17 pairs per sq.km have been recorded on alpine heath in Finland and more than 10 pairs per sq.km in the Scottish highlands, but such densities are atypical of larger areas (Hable & Saari 1997). Breeding densities of 17 pairs per sq.km have been recorded on alpine heath in Finland and more than 10 pairs per sq.km in the Scottish highlands, but such densities are atypical of larger areas (Hable & Saari 1997). Wintering habitat includes dry sandy or stony areas on high plateaux, semi-desert, marginal cultivation and shrubby steppe (Hayman *et al.* 1986, Snow & Perrins 1998).

The roles of the sexes are reversed in the Eurasian Dotterel, with females taking the initiative in nuptial behaviour, such as the establishment of territories and courtship, and males undertaking nesting duties and care of young (Nethersole-Thompson 1973). Information on mating systems is limited, but pairs tend to be monogamous with serial polyandry as the main alternative. Nests are not usually isolated, and circumstances can produce loose neighbourhood groups of 2-5 pairs. Egg-laying commences from mid-May in central Norway, peaking at the end of May, and is two weeks later in Finnmark and Sweden (Nethersole-Thompson 1973, Snow & Perrins 1998). Natal philopatry is strongly sexually biased, with very few females returning to their natal site, as compared with about one third of males (Whitfield 2002b). The post-nuptial moult, which may start in June on the breeding grounds, is suspended on migration and completed in the winter quarters usually before early December (Cramp & Simmons 1983).

Network of key sites

Few key sites have been identified for the Eurasian Dotterel, which generally occurs in rather small flocks on migration and is widely dispersed over vast areas of desert and semi-desert during the winter months. Three very important breeding areas for the western population have been identified in Scandinavia, Hardangervidda in southern Norway, where there are thought to be about 2,500 pairs, and two sites in northern Finland, Käsivarsi Fjelds with up to 300 pairs, and Lemmenjoki-Hammastunturi-Pulju with up to 400 pairs (Heath & Evans 2000). In general, however, densities are low over much of the wide breeding range, and only huge sites are likely to hold the requisite number of breeding pairs.

Only two key sites have been identified outside the breeding season, a passage site for the western population at Tierra de Campos in north-western Spain, where there was a count of 1,000 in 1992 (Heath & Evans 2000), and a wintering site for the eastern population at Harrat al-Harrah in north-western Saudi Arabia, where 1,500-3,000 have been recorded in winter (Evans 1994). No key sites have been identified in North Africa according to count data, but there are several sites where 100-400 have been recorded in Tunisia, Algeria and Morocco (Isenmann *et al.* 2005, Isenmann & Moali 2000, Thévenot *et al.* 2003). Isenmann *et al.* (2005) consider the pre-desert areas of the Maghreb in Tunisia as a 'wintering area par excellence'.

Protection status of key sites

Hardangervidda (427,200 ha) in Norway is largely protected in a National Park (342,200 ha). Käsivarsi Fjelds (220,078 ha) in Finland is almost entirely included within a Wilderness Area (219,989 ha) and Special Protection Area (219,755 ha), while Lemmenjoki-Hammastunturi-Pulju (529,718 ha) is largely protected within a National Park (284,928 ha), two Wilderness Areas of 61,981 ha and 182,809 ha respectively, and two Special Protection Areas (totalling 490,895 ha). Of the two non-breeding sites, Tierra de Campos in Spain is unprotected, while Harrat al-Harrah in Saudi Arabia is a vast Special Nature Reserve of 1,377,500 ha. All five sites have been identified as IBAs.

Table 38. Key sites for Eurasian Dotterel. Sites where 1% or more of a population has been recorded

Country	Site	Lat.	Long.	Season	Max total	Year max	Source	Population(s) at site
Finland	Käsivarsi fjelds	69.00	21.50	Breeding	900	1996	WBDB	Europe
Finland	Lemmenjoki-Hammastunturi-Pulju	68.58	25.50	Breeding	1200	1991	WBDB	Europe
Norway	Hardangervidda	60.20	7.62	Breeding	7500	1999	WBDB	Europe
Saudi Arabia	Harrat al-Harrah	31.00	38.83	Non-breeding	3000	1992	Evans 1994	Asia
Spain	Tierra de Campos steppes	42.15	-5.20	Non-breeding	1000	1992	WBDB	Europe

Jeff Kirby

Michael Schmitz

Eurasian Woodcock
Scolopax rusticola

Geographical variation and distribution

The Eurasian Woodcock is a monotypic species with a wide distribution across north temperate Eurasia, from Britain, Ireland and northern Iberia in the west, across continental Europe and broadly across Central and Eastern Asia to the Pacific. The range does not extend to high latitudes, generally occurring between 50-65ºN (Snow & Perrins 1998). In the maritime west of its range (northern Spain, Britain, Ireland, France, and the Low Countries), the Eurasian Woodcock is largely sedentary. In Western Eurasia, the wintering range extends south to the Mediterranean, Black and Caspian Sea basins; further east, Asian populations winter in South Asia and South-east Asia north of the equator. Wintering birds can be found in suitable woodland habitats across Europe and South-west Asia, and as far south as the Mediterranean basin and south Caspian region (Snow & Perrins 1998). It is a locally common winter visitor to North Africa, occurring south to the High Atlas in Morocco and Algeria, in coastal Tunisia and Libya, and in the Nile Delta in Egypt (Urban *et al.* 1986). There are sedentary populations in the Azores, Madeira and the Canary Islands.

Movements

Many Eurasian Woodcocks breeding in maritime Western Europe are resident. British and Irish Woodcocks are typically sedentary, with the majority of birds remaining faithful to their breeding sites during winter, although a small proportion of British birds are migratory, moving south or south-west to Ireland, Belgium, France, Spain or Portugal (Hoodless. 2002). Recent analyses have shown that significant proportions of the birds wintering in France, Britain and Ireland originate in western and north-western Russia (Gossmann *et al.* 2000, Iljinsky *et al.* 2000). Russian birds also move to Spain and Italy. Woodcocks wintering in France have been considered to use 2 different flyways: a Scandinavian flyway and an Eastern flyway (Bauthian *et al.* 2007). The proportion of eastern woodcocks among those wintering in France varied spatially, ranging from 70% in northwest France to nearly 100% in southeast France, and increased substantially since the early 1990s. Birds breeding in Norway winter further west than those from Sweden and Finland, and make up a higher proportion of British and Irish wintering birds (Hoodless & Coulson 1994). Of 55 foreign recoveries of birds ringed in Norway, 45% were recovered in Britain, 22% in Ireland and 20% in France (Bakken *et al.* 2003). Hoodless (2002) has estimated the approximate proportions of the British and Irish winter population originating in various countries as 37% from Russia and Latvia, 25% from Finland, 14% from Britain, 12% from Sweden and 10% from Norway. This analysis suggests that there is a tendency for Eurasian Woodcocks from different continental breeding grounds to winter in different parts of Britain and Ireland. Birds wintering in Scotland and northern England appear to originate largely from Norway, Sweden and Denmark, while birds wintering in southern England and Wales seem to originate from Finland, Russia and Latvia. Ireland receives birds from throughout the European breeding range. Birds breeding in Western Siberia presumably winter mainly in the Caspian region, and particularly in the woodlands of the south Caspian lowlands in Iran. The populations in the Azores, Madeira and the Canary Islands were considered to be isolated and were recently identified as a separate biogeographic population (Wetlands International 2006) but a recovery in France of a bird ringed on San Miguel (Gonçalves *et al.* 2006) suggests that a re-appraisal of the status of these three populations may be necessary.

Population limits

The Eurasian Woodcock has a largely continuous distribution across Europe and Western Asia, and although the analysis of movements of ringed birds has demonstrated broad patterns of movements, no discrete populations have been identified, except on remote Atlantic islands. The first three editions of *Waterbird Population Estimates* treated all

Eurasian Woodcock

Scolopax rusticola

European breeders as belonging to a single population, and this treatment was adopted by Thorup (2006) and Stroud *et al.* (2004). The first two editions of *Waterbird Population Estimates* provided no clear indication of the limits of the European breeding population, and included birds breeding in Western Asia in a single, large Asian population. Stroud *et al.* (2004) defined the boundary between the European and West Asian Woodcock populations as the Urals (thus adopting the same limits for data as BirdLife International/EBCC 2000 and BirdLife International 2004a), and proposed that the birds breeding in Western Asia and wintering in South-west Asia be treated as a separate population, distinct from the birds breeding further east in Asia and wintering in South Asia and South-east Asia. This new West Asian population was adopted in *WPE3*, which thus recognised two populations of the Eurasian Woodcock in Western Eurasia and Africa:

1) a population breeding in Europe (west of the Urals), and wintering throughout Southern and Western Europe to North Africa:
2) a population breeding in Western Asia (east of the Urals) and wintering in South-west Asia, especially around the Caspian Sea.

These two populations were retained in the fourth edition of *Waterbird Population Estimates*. However, separate treatment was also given to the breeding populations of Eurasian Woodcocks in the Azores, Madeira and the Canary Islands, as these birds were thought to be sedentary (Snow & Perrins 1998, Kinda 1998). Thus *WPE4* recognises five populations of the Eurasian Woodcock in Western Eurasia and Africa: a large European breeding population, a large West Asian breeding population, and three tiny populations on remote Atlantic islands.

Population size

1. Europe (breeding)

Population estimate	1% threshold	Population trend
10,000,000-25,000,000	20,000	Stable

Estimates of Eurasian Woodcock populations are inevitably imprecise. The second edition of *Waterbird Population Estimates* drew its estimate of at least 15 million individuals from the lower end of the range of 14.8 to 37 million birds estimated by Hepburn (1983), based on hunting bags in Europe. BirdLife International/EBCC (2000) collated national totals to give a European total of at least 2,200,000 individuals in winter and between 1,500,000 and 11,000,000 breeding "pairs" (although actually the species is serially polygamous). This latter figure included a very rough estimate of 1,000,000 to 10,000,000 pairs for European Russia. Thorup (2006) presented revised totals for many European countries (including a much more precise figure of 6,000,000-7,000,000 pairs for European Russia), and an overall European total of 7,000,000-8,140,000 pairs, suggesting a post-breeding population of between about 21,000,000 and 25,000,000 individuals. This estimate was adopted by Stroud *et al.* (2004), while *WPE3* retained the earlier, more conservative estimate of >15,000,000. BirdLife International (2004a) adopted a very rough estimate of 1,200,000-5,000,000 pairs for European Russia, and gave a total European population of 1,800,000-6,600,000 pairs, equating to 5,500,000-19,800,000 individuals. Given the big discrepancy between these estimates and great uncertainty in the size of the Russian breeding population, a rough estimate of 10,000,000-25,000,000 was adopted in *WPE4*. A 1% threshold of 20,000 applies under Criterion 5 of the Ramsar Criteria for site selection, but this is academic for this non-congregatory species.

The French wintering population was estimated as between two and six million birds in 1997 (Fadat 1999). More recently Fadat (unpubl. data), estimated the wintering population in France as between three and seven million individuals, based on survival analysis of Tavecchia (2001). Hoodless & Saari (1997) considered that 90% of the European breeding population is found in Russia, Belarus, Finland, Sweden and Norway.

2. Western Asia (breeding)

Population estimate	1% threshold	Population trend
Unknown	Not established	Unknown

Eurasian Woodcocks breeding in Western Siberia are believed to winter in South-west Asia, particularly in the south Caspian region. Very little is known of the size of this population, although the species is abundant in the south Caspian region in winter.

3. Azores

Population estimate	1% threshold	Population trend
Unknown	Not established	Unknown

4. Madeira

Population estimate	1% threshold	Population trend
Unknown	Not established	Unknown

No information is available on the size of the populations in the Azores and Madeira, but given the limited extent of suitable habitat, it can be assumed that the populations are small.

5. Canary Islands

Population estimate	1% threshold	Population trend
3,000-7,000	50	Unknown

WPE4 gives the size of this population as unknown. However, BirdLife International (2004a) give an estimate of 1,000-2,500 pairs for the breeding population in the Canary Islands, based on information from 1997-2003. This would suggest a total population of 3,000-7,500 individuals and a 1% threshold of 50.

Conservation status

The Eurasian Woodcock is a cryptic and crepuscular woodland bird and is poorly covered by conventional survey and monitoring schemes. Such information on population trends as is available is typically inferred from changes in hunting bags over time (making various assumptions about hunting effort) (e.g. Hepburn 1983, Tapper 1992, Clausager 2000b). National assessments for European countries collated by BirdLife International/EBCC (2000) suggested that in most countries with significant breeding populations, these were either stable or fluctuating. An increase was reported in Denmark, Ireland, The Netherlands and Spain, whilst only in Germany, Latvia, Ukraine and the U.K. were significant declines reported. Point-count monitoring of roding males in France has shown that since the beginning of 1990s the French breeding population has been stable (Ferrand *et al.*, 2006) or slightly increasing (recent unpublished data). In the same way, migrating and wintering populations in France appear to be stable in the last decade (Ferrand *et al.,* op. cit.). BirdLife International (2004a) reports a possible decline in the large breeding population in European Russia, although the substantial populations in Estonia and Finland are reported to be increasing. Point-count monitoring of roding males in Russia since 2000 showed that the species is very common (90% of occurrence in randomly chosen point-counts) and no decline has been observed (Ferrand & Gossmann 2007 and unpublished data). More recent data from Estonia suggests a stable population of 30,000-60,000 pairs (Estonian Ornithological Society 2008). Estimates of the British and Irish breeding populations based on fieldwork carried out in 1968-72 and again in 1988-91 suggest that there was a marked reduction from 19,000-47,000 "pairs" in 1968-72 to 10,250-26,000 pairs in 1988-91, but some of this apparent reduction may have been due to differences in survey techniques (Gibbons *et al.* 1993). The most recent estimate for the British and Irish breeding populations is only 7,900-13,700 pairs (data from BirdLife International 2004a), suggesting that some further decline has occurred. Stroud *et al.* (2004) and Ferrand *et al.* (2006) concluded that the European population of the Eurasian Woodcock was relatively stable, but BirdLife International (2004a) concluded that the overall trend was one of moderate decline.

Nothing is known of trends in the populations in the Azores, Madeira and the Canary Islands (BirdLife International 2004a). However, the population on Madeira is considered to be Vulnerable in the Portuguese Red Data Book.

Habitat and ecology

The Eurasian Woodcock occurs widely in boreal and temperate forests (mainly broadleaved deciduous and mixed broadleaved/coniferous forests) with moist terrain, avoiding frosty and warm, dry conditions and very high altitudes. Undergrowth is an essential requirement and bracken is highly favoured. It uses a wider variety of habitats outside the breeding season, including scrub-land, hedgerows, young conifer plantations, coppices and, at night, mainly permanent grazed meadows as well as orchards, and in Mallorca, even sea-cliffs (Snow & Perrins 1998, Duriez *et al.* 2005). Egg-laying commences in late February and can continue into July. Birds return to their breeding areas in southern Norway in March and April, and in northern Norway somewhat later (Bakken *et al.* 2003). Nesting is typically in undergrowth close to the base of a tree, and the mating system is apparently successively polygynous. No territory is held, and birds are markedly solitary at all times of the year, with the pair-bond typically lasting only three or four days. The "roding" display flight of the males has the function of attracting or discovering females. The diet is principally earthworms, with additional insect larvae and plant material also being taken (Snow & Perrins 1998).

Network of key sites

The Eurasian Woodcock is a widely dispersed species at all times of the year, frequenting damp woodland and scrub rather than wetlands, and rarely if ever congregating in large numbers at particular sites. No key sites can be identified, and the key site approach is clearly inappropriate in the conservation of this species.

Jeff Kirby & Simon Delany


Niels Gilissen

Jack Snipe *Lymnocryptes minimus*

Geographical variation and distribution

The monotypic Jack Snipe has a wide breeding distribution at northern latitudes across Eurasia from northern Sweden and Finland in the west, eastwards between 55º and 70ºN across boreal Russia to 160°E. It is highly migratory, with birds moving south and west to winter in the western maritime countries of Europe (from southern Norway, Denmark and the U.K. southwards), the Mediterranean basin, sub-Saharan Africa mainly north of the equator (from Senegal to southern Sudan and the Nile Valley), South-west Asia, the Indian subcontinent and parts of South-east Asia (Cramp & Simmons 1983).

Movements

The Jack Snipe is a highly migratory species. West Eurasian populations move in a south-westerly direction on a broad front from their breeding grounds in Northern Europe and Western Siberia to wintering areas in Western and Southern Europe, North Africa, the northern tropics of Africa south of the Sahara, and South-west Asia. Ringing recovery data show that birds ringed in Finland, Sweden and Norway winter in Britain, Ireland, France, Spain and Portugal. Birds ringed on migration in Western Europe have subsequently been recovered mainly to the south-west or south-south-west, e.g. in Italy, Ireland, France and Iberia, with some individuals reaching Morocco, Algeria and Tunisia (Cramp & Simmons 1983, Smiddy 2002, Bakken *et al.* 2003). However, one bird ringed on passage in Germany was subsequently recovered in Greece (Smiddy 2002). Birds breeding in Western Siberia are thought to migrate south-west to wintering areas in South-west Asia and North-east Africa, although there are no ringing recoveries to support this. Wetlands in southern Sudan and the Nile Basin may be an important wintering area. Olivier (2007, and references therein) considers Africa to be a more important destination for non-breeding birds than Europe. In East Africa, however, Dodman (2002) considers the Jack Snipe to be a scarce visitor between October and March, with records in Uganda, Kenya and occasionally Tanzania.

Autumn passage commences in mid-August, but the main movements through Europe south of the Baltic occur from mid-September to mid-November. The first birds reach their wintering areas in Western and Southern Europe in October and in West and Eastern Africa from November. Return passage begins in February in southern wintering areas, with early birds reaching southern Fennoscandia in March. April is the main spring passage month, with breeding sites reoccupied from mid-April to mid-May in the west, and later in the east (Cramp & Simmons 1983).

Population limits

Waterbird Population Estimates and Stroud *et al.* (2004) recognise two main breeding populations in Western Eurasia, separated by the Urals:

1) a population breeding in northern Europe, and wintering mainly in Southern and Western Europe and West Africa;
2) a population breeding in Western Siberia, and wintering mainly in South-west Asia and in North-east Africa (south to Tanzania).

Thorup (2006) also treats all the birds breeding in Europe (i.e. west of the Urals) as a single population.

Population size

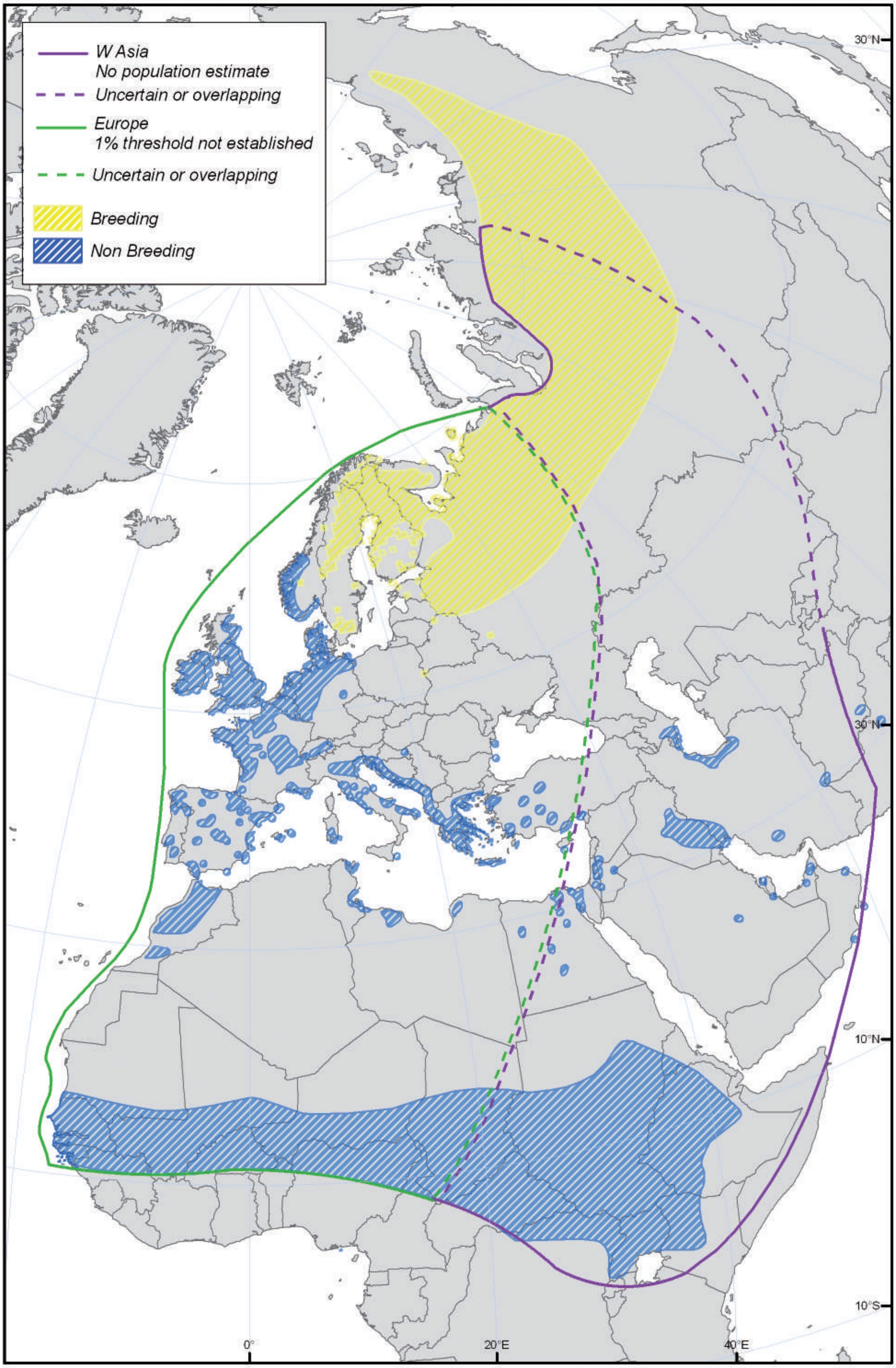
1. Europe (breeding)

Population estimate	1% threshold	Population trend
E (>1,000,000)	Not established	Stable

There is still considerable uncertainty as to the size of the European population of the Jack Snipe. This is a highly

Jack Snipe

Lymnocryptes minimus



cryptic and unobtrusive species, easily overlooked and very difficult to census in any season. The largest numbers of wintering birds are thought to occur in the western maritime countries of Europe (Snow & Perrins 1998), but only tiny numbers are recorded during the International Waterbird Census. BirdLife International/EBCC (2000) collated national estimates of wintering populations in Europe to give a total of 44,000-111,000 individuals. This excludes any European breeders that winter in Africa, but nevertheless, would seem to be a considerable underestimate, as the lower end of the range is less than the number of birds shot in France (49,640) during the winter of 1998/1989 (Tesson & Leray 2000). Estimates of the European population based on national estimates of breeding populations also seem very low. Thorup (2006) gave an estimate of 20,350-65,400 pairs, equating to about 61,000-196,000 individuals; Stroud *et al.* (2004) gave an estimate of 16,400-24,400 pairs equating to 49,000-73,000 individuals; and BirdLife International (2004a) gave an estimate of 18,000-70,000 pairs equating to 54,000-210,000 individuals. Morozov (2006) described the difficulty of censuses during the breeding season and concluded that estimates of breeding populations are likely to be too low because of the highly secretive nature of the species.

Estimates of the wintering populations of Jack Snipe based on sportsmen's bags give much higher figures. A study carried out by the British Association for Shooting and Conservation in the U.K. in the early 1980s estimated that some 10,000 Jack Snipe were being shot annually, and found that one Jack Snipe was shot for every eight Common Snipe. As the wintering population of Common Snipe in Britain and Ireland was thought to be many hundreds of thousands, it seemed possible that the total population of Jack Snipe could have been as many as 100,000 (Lack 1986). More recently, Kalchreuter (2002) has calculated that some 120,000-150,000 Jack Snipe are harvested annually in Europe and North Africa. Using information from ringing recoveries and hunting kill statistics, Kalchreuter (2002) estimated that the total autumn population of birds passing through Western Europe was in the region of 2.5-3.0 million. He suggested that these birds originated from a breeding population of about 500,000 pairs. The estimate of E (>1,000,000) given in *WPE3* and *WPE4* is based on this work by Kalchreuter.

2. Western Siberia (breeding)

Population estimate	1% threshold	Population trend
Unknown	Not established	Unknown

The West Siberian population of Jack Snipe remains virtually unknown. According to Rogacheva (1992), the species is much less common east of the Urals than in European Russia, but according to Tertitsky *et al.* (1999, cited in Thorup 2006), the reverse is the case, with the population in European Russia being much smaller than populations just east of the Urals.

Conservation status

Population trends and the conservation status of the Jack Snipe remain poorly known due to a lack of quantitative data (Pedersen 1997). Some breeding populations in Central and Eastern Europe are believed to have declined significantly during the nineteenth century, resulting in a range contraction from the south-west, and it is likely that this decline continued through much of the twentieth century due to the continuing loss and degradation of suitable habitat both on the breeding grounds and in the winter quarters (Cramp & Simmons 1983, Pedersen 1997, Morozov 2002). Olivier (2007) considers habitat loss and degradation to be the most important factor acting negatively on populations. Koskimies (1993) thought that the large Finnish breeding population was probably decreasing, and Kuresoo and Leibak (1994) reported a continuous decline in the small Estonian population since the nineteenth century. In Lithuania, the Jack Snipe now breeds only sporadically, and habitat loss and successional change are likely to result in further declines (Švažas *et al.* 2001). Tucker and Heath (1994) reported probable decreases in the large wintering populations in Denmark and Britain. However, estimates of breeding numbers for the period 1970-1990 suggested that some breeding populations had stabilised (Tucker & Heath 1994, Snow & Perrins 1998), while BirdLife International/EBCC (2000) reported stable populations in all four European countries with large breeding populations (Finland, Norway, Russia and Sweden). In a study of the population status of the Jack Snipe commissioned by the AEWA Secretariat, Kalchreuter (2002) concluded that although there had undoubtedly been declines in some of the smaller breeding populations at the southern and western edges of the breeding range in the nineteenth and early twentieth centuries, there was no evidence of any recent decline in the population as a whole. He found that long-term monitoring projects in The Netherlands and hunting kill statistics in France suggested stable or slightly increased populations. BirdLife International (2004a) reported stable or fluctuating populations in all European countries except Russia, where the population is thought to be decreasing. As European Russia holds a large part of the European breeding population, BirdLife International (2004a) concluded that the overall trend was one of moderate decline.

There is no information on population trends for the population breeding in Western Siberia. A review by Golovina (1998) found that although there are nineteenth century breeding records of Jack Snipe in the south-east of Western Siberia, the species is now recorded in the region only during spring and autumn migration.

Habitat and ecology

Jack Snipe breed in the upper and middle latitudes of the sub-arctic and boreal zones, principally occurring inland in mild, low-lying areas (Snow & Perrins 1998). Characteristically, the species nests in birch (*Betula*) or willow (*Salix*) taiga, where it keeps to open mires where sedge communities dominate, e.g. *Carex* with horsetail (*Equisetum*) and cotton-grass (*Eriophorum*) (Cramp & Simmons 1983). It is a solitary, ground-nesting species considered probably monogamous (e.g. Glutz von Blotzheim *et al.* 1977), with incubation and care of young thought to be by the female only. The mating system, however, may be more complex (Cramp & Simmons 1983). Breeding densities are poorly known and vary with habitat and survey technique, e.g. 2 pairs per sq.km in shrub tundra in northern European Russia (Morozov 2006), 1.9 pairs per sq.km in transition bog in southern Sweden (survey) and 0.07 pairs per sq.km (transect) in northern Norwegian mires (Pederson 1997). Owing to its crepuscular and nocturnal habits, diurnal survey of displaying males has been shown to give less reliable estimates of breeding abundance than those conducted at night (Pederson 1997). Egg-laying begins at the end of April or beginning of May in the Baltic States, two weeks later in northern Fennoscandia and in mid-June in northern European Russia (Morozov 2006).

Outside the breeding season, the Jack Snipe is markedly solitary. It frequents moist or wet terrain with vegetation cover and avoids deep and saline water (Snow & Perrins 1998). It occurs in various fresh and brackish habitats, such as swamp, fen, marsh, sewage farms, flooded arable fields and poorly drained pastures, and also utilises similar muddy habitats even if small in extent e.g. along lanes or ditches (Cramp & Simmons 1983). Site fidelity has been demonstrated on migration (e.g. Andrew 1994), and this may indicate that birds are also loyal to their wintering sites. A radio-telemetry study involving a bird wintering in Denmark found that the bird fed mainly at night and restricted its foraging to a few prime habitats within a small wintering resort of about 18 sq.km (Pedersen 1994). In France, a radio-telemetry study based on 5 birds showed a great heterogeneity in spatial occupation and birds living in suitable habitats appeared to be very mobile during the winter period (Leray *et al.* 2006). A post-nuptial moult commences in late June/early July and is apparently completed prior to autumn migration. The main food items are adult and larval insects (particularly Coleoptera and Diptera), molluscs, annelid worms and some plant material (mainly seeds).

Network of key sites

The Jack Snipe is a dispersed species at all times of the year, rarely if ever congregating in large numbers at particular sites. No key sites can be identified, and the key site approach is clearly inappropriate in the conservation of this species.

Jeff Kirby & Simon Delany

Ian Fulton

Pintail Snipe *Gallinago stenura*

Geographical variation and distribution

The monotypic Pintail Snipe is primarily an Asiatic species, breeding across Siberia east to the Kolyma Delta, north to about 71ºN in the Lena Delta, and south to the Baikal region and northern Mongolia. In the west, the breeding range extends into northern European Russia west to the Pechora River in the forest zone and the Chornaya River basin in the Bol'shezemel'skaya tundra, and south in the northern Urals to 62ºN (Estafiev *et al.* 1997). The main wintering range includes the whole of the Indian subcontinent and South-east Asia from southern China and the Philippines to Sumatra and Java, but small numbers of birds also winter in the Arabian Peninsula and North-east Africa.

Movements

This is the commonest migrant snipe in southern India and most of South-east Asia, but is recorded only rarely in Arabia and North-east Africa. It migrates overland, presumably on a broad front, to the winter quarters in Southern Asia, with western elements crossing the Tibetan Plateau and Himalayas to reach the Indian subcontinent (Cramp & Simmons 1983). A small proportion of the population, perhaps from the western extremity of the breeding range, migrates south-west to wintering areas in the Arabian Peninsula and North-east Africa. It was considered as a vagrant in Africa by Urban *et al.* (1986), who gave details of one record on Socotra, one in Somalia and five in Kenya, but is now recognised as an irregular migrant to North-east Africa in small numbers (del Hoyo *et al.* 1996). There have also been records from the Seychelles (Dodman 2002). It is a regular passage migrant and winter visitor in the United Arab Emirates and Oman, with records spanning the period early August to early June (Richardson & Aspinall 1998, Oman Bird Records Committee 1994). As many as 27 have been recorded together in the United Arab Emirates (Richardson & Aspinall 1998). The Pintail Snipe has also recently been recorded in winter (January 2004) near the Pakistan border in south-eastern Iran (van Winden & Oosterbaan 2004), and on spring passage (March 2000) on the Gulf coast of Iran (P.J. Dubois pers. com.).

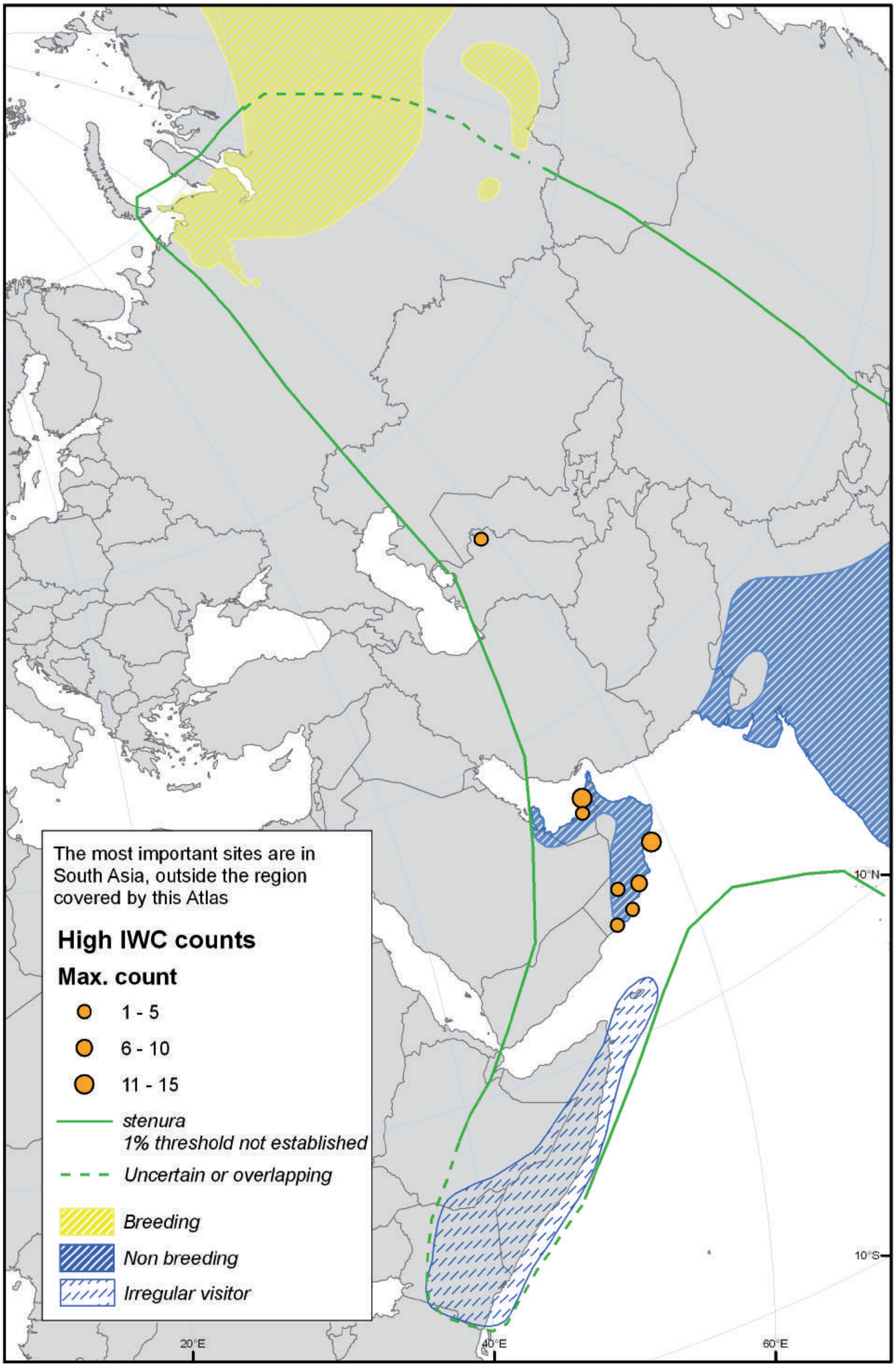
Movements have been observed on the breeding grounds in Siberia as early as late July, but the main exodus is in August-September. Pintail Snipe begin to arrive on the winter quarters in Southern Asia in the second half of August and early September, with the main influxes of winter visitors occurring in the second half of September and October. Return movements have been noted as early as February, but the main departures from South Asian wintering areas are in March and the first half of April, with stragglers lingering until May. The southern parts of the breeding range are reoccupied in May, but birds do not arrive back on the Arctic Circle on the Yenisey River until early June (Cramp & Simmons 1983).

Population limits

Waterbird Population Estimates recognises only two populations of the Pintail Snipe: a western population breeding from North-east Europe east to Central Siberia, and wintering commonly in South Asia and in small numbers in the Arabian Peninsula and North-east Africa; and an eastern population breeding from Central Siberia to the Sea of Okhotsk, and wintering mainly in South-east Asia. It is possible that the relatively small number of birds migrating south-west to winter in the Arabian Peninsula and North-east Africa belong to a discrete population breeding at the western end of the breeding range. However, in the absence of any evidence from ringing to support this, the treatment adopted in *Waterbird Population Estimates* is retained here. Only the western population is relevant to this Atlas, and only a tiny proportion of the birds in this population occur within the region covered by the Atlas.

Pintail Snipe

Gallinago stenura



Population size

1. South Asia, South-west Asia & Eastern Africa (non-breeding)

Population estimate	1% threshold	Population trend
C/D (25,000-1,000,000)	Not established	Unknown

Little is known of the size of this population, either on its breeding grounds or in the winter quarters. Because of their cryptic plumage and secretive habits, snipe are notoriously difficult to census, especially outside the breeding season, and this problem is compounded by identification problems in South Asia, where several very similar species of snipe occur together in winter. Thorup (2006) has given an estimate of 1,510-6,600 pairs for the population of Pintail Snipe breeding in North-east Europe, but no information is available on the size of the population breeding east of the Urals. Perennou *et al.* (1994) gave a rough estimate of C/D (25,000-1,000,000) for the population wintering in South Asia, but this was no more than a guess, as only about 1,200 birds could be accounted for by midwinter counts in the 1980s. During the period 1994-2001, the highest count in the IWC in South Asia was 2,463 in 1995, but in most years, far fewer than this were recorded (Lopez & Mundkur 1997, Li & Mundkur 2004). Counts in South-west Asia have been very low. The highest count during the period 1995-1999 was only 11 individuals, of which seven were in Oman and four in the United Arab Emirates (Delany *et al.* 1999, Gilissen *et al.* 2002). The estimate of "C/D" from Perennou *et al.* (1994) was adopted in all four editions of *Waterbird Population Estimates*, although it was acknowledged that even this broad estimate could be too low.

Conservation status

The Pintail Snipe is fairly numerous in its South Asian and South-east Asian wintering grounds, but the population trends are unknown. The species has been expanding its breeding range in north-eastern European Russia in recent years, and numbers are thought to be increasing overall, despite strong fluctuations from year to year (Estafiev *et al.*1997, Snow & Perrins 1998).

Habitat and ecology

The Pintail Snipe breeds mainly south of the tundra belt, through the forest tundra and taiga zones. It nests in grassy marshes, in moist open meadows, in bogs, and by small lakes and pools, often near or among trees such as willows. It differs from the Common Snipe *G. Gallinago* in also frequenting drier situations, such as hummocky ridges, low hills, dry bogs, and alpine tundra with stones, largely covered with birch woods (Cramp & Simmons 1983). In the Urals, it prefers shrub meadows and swamps scattered with stands of trees, various dwarf birch and willow tundra, and mossy bogs (Estafiev *et al* 1997). The breeding behaviour includes spectacular aerial displays by males in groups of up to 15. Outside the breeding season, the Pintail Snipe occurs in a wide variety of wetland habitats, especially ditches, flooded sedge and grassland, and wet rice stubble, often together with Common Snipe. It may also resort to drier, often grassy, ground. The diet consists mainly of insects and their larvae, molluscs and annelids, occasionally crustaceans, seeds and other vegetable matter (Cramp & Simmons 1983).

Network of key sites

The Pintail Snipe is a dispersed species at all times of the year, rarely if ever congregating in large numbers at particular sites. The total number of birds occurring within the region covered by this Atlas probably constitutes no more than one or two per cent of the "flyway" population. No key sites can be identified, and the key site approach is clearly inappropriate in the conservation of this species.

Simon Delany

Ian Nason

African Snipe *Gallinago nigripennis*

Geographical variation and distribution

The African (or Ethiopian) Snipe occurs in sub-Saharan Africa from the Ethiopian Highlands and southern Sudan south through western Kenya, north-western Tanzania and the Albertine Rift to Zambia and Southern Africa, although it is absent from the dry central and western zones of this sub-region. It is a polytypic species, with three subspecies currently recognised. The nominate form has darker head stripes and ground colour to the upperparts and wings than *aequatorialis,* as well as heavier facial markings, whilst *angolensis* stands apart by virtue of its longer bill (Urban *et al.* 1986). The African Snipe forms a superspecies with the Common Snipe *G. Gallinago* of the Holarctic and *G. paraguaiae* of the Neotropics (del Hoyo *et al.* 1996).

Movements

Key limiting factors to this snipe's distribution would appear to be its almost complete avoidance of arid and semi-arid areas, and, at least in Eastern Africa, its penchant for higher grounds, especially for breeding, which are also high-rainfall areas. These requirements affect its overall distribution and also influence the snipe's movements.

In Eastern Africa, where African Snipe breed in highland bogs up to 4,000 m above sea level, some altitudinal migration takes place to lower-lying and warmer areas during the non-breeding season (Britton 1980, Lewis & Pomeroy 1989). It would appear, however, that the species is more of a wanderer or local migrant, as some birds stay in the highland areas after breeding. In Kenya and Tanzania, its main distribution is closely associated with the highlands from Mount Kilimanjaro north-west through the Rift Valley to Uganda, and it is only an occasional visitor to ephemeral wetlands in the extensive semi-arid bush of East Africa during the rains.

During a year-long study of this species at Lake Ol'Bolossat in central Kenya, Gichuki *et al.* (2000) recorded peak breeding activity in June, and highest numbers outside the breeding season, with a maximum in October, when there were likely immigrants from other wetlands in the western and eastern highlands. Gichuki *et al.* considered that low numbers between April and September were due to young birds and potential breeders leaving the site for other less congested breeding sites, and marked birds were found at man-made dams in the same district. Further, there was a large influx of livestock into the area during this period. High snipe densities coincided with the post-hatching period and existence of suitable foraging sites. There is thus a picture from this site of local movements, with influxes when foraging conditions were most favourable and emigration in search of alternative breeding sites. Overall in the region, it is thus probably not highly dispersive or nomadic, but a local and, in some areas, altitudinal migrant.

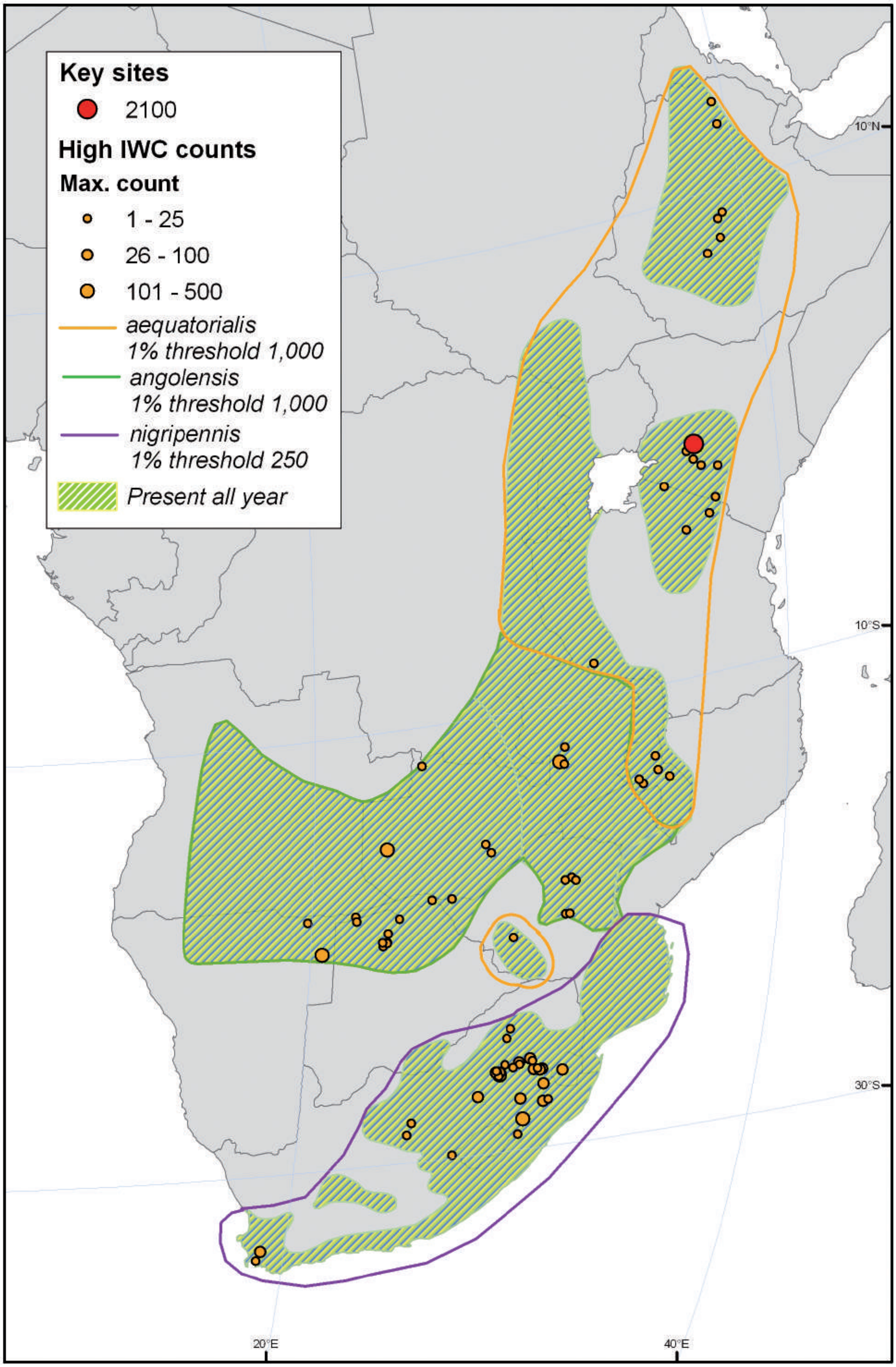
Birds of the Ethiopian Highlands could represent a separate population, as the semi-arid zone of northern Kenya offers no suitable habitat. However, there are quite regular records from Lake Turkana (at 400 m altitude) on the Kenya/Ethiopia border (Britton 1980), which could either originate from the Ethiopian Highlands or further south, or could represent movements between these two areas.

In Zambia, the form *angolensis* is found mainly in permanent wetlands in the north of the country, especially floodplains and dambos where it is widespread, although there are local fluctuations in numbers linked to the availability (or condition) of feeding grounds (Benson *et al.* 1971). It breeds in the Bangweulu Swamps in northern Zambia in July (T. Dodman unpubl. obs.). It would appear to be largely resident across its range, and the paucity of records from eastern and southern Zambia suggests that this species is not nomadic here.

South of the Zambezi, it is largely resident, but moves extensively in search of suitable wetlands, and as vleis and grasslands become flooded during the rains (Maclean 1997).

African Snipe

Gallinago nigripennis



These movements are associated with seasonal flooding and drying of habitat (Taylor *et al.* 1999). The longest distance between ringing and recovery sites from five recoveries in Zimbabwe is only 48 km (Underhill *et al.* 1999). Given the disjunct distributions in Southern Africa revealed by Maclean (1997), it is likely that movements in excess of this are rare.

Overall, the African Snipe shows somewhat varying movement patterns across its range, but in general would appear to be a resident and local migrant.

Population limits

Three populations are currently recognised, one for each of the three subspecies, although there is potential for future definition of a discrete population in Ethiopia. The population limits are given below, but there is some uncertainty, especially regarding the western limit of *aequatorialis*:

1) *nigripennis*, in southern Mozambique and South Africa;
2) *angolensis*, in northern Namibia, Angola, northern Botswana and western Zimbabwe northwards into Zambia and to Katanga in south-eastern Democratic Republic of Congo;
3) *aequatorialis*, in the Ethiopian Highlands, western Kenya and north-western Tanzania, and from southern Sudan through eastern Democratic Republic of Congo, Uganda, Rwanda, Burundi and western Tanzania to Malawi, eastern Zimbabwe and northern Mozambique.

Atlas fieldwork in Southern Africa has revealed four main foci of distribution within the sub-region (Maclean 1997, Parker 1999): the form *angolensis* in the Okavango floodplain and eastern Caprivi; the form *aequatorialis* on the Mashonaland plateau in Zimbabwe; and the nominate race in the grassland biome of the highveld in north-central South Africa and in the winter rainfall region of the Western Cape. The extent of fragmentation of the distribution into largely disjunct components was an unexpected result of the Southern African Bird Atlas Project (Maclean 1997) and the first phase of the Mozambique Bird Atlas Project (Parker 1999); it remains to be determined if this fragmented pattern is repeated in the northern component of the distribution.

Population size

Because of its skulking habits and crepuscular nature, the African Snipe is an extraordinarily difficult species to census, and counts made during general waterbird censuses probably do little more than provide an indication of the wetlands at which the species is present. African Snipes are only ever conspicuous when doing their drumming display flights; otherwise they tend to “freeze” in the vegetation, perfectly camouflaged, and flush reluctantly when the observer passes within a few metres. Fishpool & Evans (2001) estimated a species population in range C (25,000-100,000) and used a 1% level of 500 for the IBA Africa Programme. The site-based research of Gichuki *et al.* (2000) and development of population density estimates (see below) offer potential for extrapolation.

1. *nigripennis*

Population estimate	1% threshold	Population trend
B (10,000-25,000)	Provisionally 250	Unknown

The African Snipe is quite widely distributed and fairly common in southern Mozambique and eastern South Africa. It is regularly recorded during both July and January waterbird counts in South Africa, e.g. 322 in July 1998 and 345 in January 2001 (Dodman & Diagana 2003). Using the estimate of Fishpool & Evans (2001) as a guide, Dodman (2002) provided a very provisional population estimate of B (10,000-25,000), and this was adopted in *WPE3* and *WPE4*.

2. *aequatoralis*

Population estimate	1% threshold	Population trend
B/C (10,000-100,000)	Provisionally 1,000	Unknown

Considering this subspecies to be fairly local in the upland areas of Eastern Africa south to Zambia, and using the estimate of Fishpool & Evans (2001) as a guide, Dodman (2002) provided a rather broad provisional estimate of B/C (10,000-100,000), and this was adopted in *WPE3* and *WPE4*. Gichuki *et al.* (2000) found a mean population density of 12.2 ± 2.39 birds per sq.km in a 90 sq.km census area at Lake Ol’Bolossat in central Kenya, and a total population at the site varying between 780 and 2,100 birds, with a mean of 1,105 ± 147.5. It would no doubt be feasible to perform other site studies and extrapolate such figures to develop a more robust estimate. If all breeding sites hold densities similar to Lake Ol’Bolossat, the current estimate is likely to be too low.

3. *angolensis*

Population estimate	1% threshold	Population trend
B/C (10,000-100,000)	Provisionally 1,000	Unknown

Tyler (2001) reports only scattered records from the northern wetlands of Botswana during waterbird counts between 1991 and 2000, whilst numbers in the AfWC are always rather low for Zambia and Zimbabwe. However, much of the range of this population is only poorly covered by annual waterbird counts. In Namibia, it is largely restricted to the north-east of the country. Using the estimate of Fishpool & Evans (2001) as a guide, Dodman (2002) gave a provisional estimate of B/C (10,000-100,000), this was adopted in *WPE3* and *WPE4*.

Conservation status

Overall, the African Snipe does not appear to be threatened at present, but its specialized feeding habits, its requirements for natural wetlands, and its disjunct pattern of distribution, all make it a species that needs to be carefully watched. The most widespread threats to the species are the ongoing loss of suitable wetland habitat through drainage and reclamation, and changes to the character of wetlands through pollution and the construction of impoundments upstream. In central Kenya, threats to suitable wetlands are severe and increasing, especially from clearing and draining of marshes, increasing livestock densities and collection of eggs for human consumption (Gichuki *et al.* 2006). In South Africa, the species is declining in south-western Cape Province, probably because of the drainage of natural wetlands for development (Maclean 1997). Global climate change may also be a long-term threat, although its likely effect on highland wetlands in Africa has not been assessed. The African Snipe can adapt to some artificial wetlands such as sewage works which mimic the preferred natural habitat.

The sport hunting of African Snipe in Southern Africa is apparently less frequent than it was in earlier decades (Underhill *et al.* 1999), whilst in most other parts of Africa sport hunting has never posed a serious threat to the species (Gichuki *et al.* 2000).

Habitat and ecology

In the northern part of its range, the African Snipe is a highland species that breeds during the main rainy season in areas receiving more than 500 mm of rainfall per year (Lewis & Pomeroy 1989). At the 2,340 m altitude Lake Ol’Bolossat in central Kenya, it breeds in wet tussock grass, with clutches of 3-4 eggs laid in cup-shaped nests hatching after some 20 days (Gichuki *et al.* 2000). In the Western Cape, South Africa, it occurs and breeds down to sea level, for example in reed-beds at Langebaan Lagoon, West Coast National Park. The African Snipe is one of the few members of the genus with a standard monogamous mating system; both parents incubate and care for the young. Territorial males perform aerial displays, which are most intense during the pre-laying and egg-laying period (Gichuki *et al.* 2000). The preferred habitat of the African Snipe consists of a mosaic of exposed soft mud and emergent vegetation, where it feeds on insects, worms, crustaceans and molluscs. It is largely crepuscular and nocturnal, and generally occurs singly or in pairs; with small groups forming in favoured habitats.

Network of key sites

Although the African Snipe is found at a number of extensive wetlands, where it is no doubt present in high numbers, it also occupies chains of small and often ephemeral wetlands, especially in South Africa. No key sites can be identified from regular count data, but work by Gichuki *et al.* (2000) at Lake Ol'Bolossat in central Kenya suggests that good estimates can be obtained if special surveys are undertaken. The maximum estimate of 2,100 birds at Lake Ol'Bolossat easily surpasses the current 1% criterion for *aequatorialis*. Other key sites doubtless exist in the Ethiopian Highlands, in the central Rift Valley of Kenya, in northern Zambia, and in the wetlands of south-western Cape Province and highveld of southern Transvaal in South Africa.

Protection status of key sites

Lake Ol'Bolossat is largely unprotected and prone to various threats, such as clearing and drainage of marshes for agriculture and increasing livestock densities.

Table 39. Key sites for African Snipe. Sites where 1% or more of a population has been recorded

Country	Site	Lat.	Long.	Season	Max total	Year max	Source	Population(s) at site
Kenya	Lake Ol'Bolossat	-0.15	36.43	All year	2100	1990s	Gichuki *et al.* 2000	*aequatorialis*

Tim Dodman & Les Underhill


Margaret D Sloan

Madagascar Snipe

Gallinago macrodactyla

Geographical variation and distribution

This large monotypic snipe is endemic to Madagascar, where it occurs at wetlands in the east and north-west of the country. It has a continuous range in the eastern humid forest zone, which stretches from the far south to the north of the country and extends to the north-west coast in Antsiranana. It is not known from lowland wetlands in western Madagascar.

Movements

The Madagascar Snipe is apparently entirely sedentary, although in 1840 it was described as a migrant on the Île de Sainte Marie (Hayman *et al.* 1986). Local movements between neighbouring wetlands presumably occur.

Population limits

Only one population is recognised, the entire population of the species.

Population size

1. Madagascar (entire population of the species**)**

Population estimate	1% threshold	Population trend
A (<10,000)	Provisionally 100	Possibly decreasing

The Madagascar Snipe is fairly common in suitable wetland habitats. AfWC counts have included 23 in July 1997, 26 in January 1998 and 40 in January 1999 (Dodman *et al.* 1999, Dodman & Diagana 2003). Seven were recorded at Torotorofotsy wetland in central eastern Madagascar in June 2002, but none was found during the same month at Lake Itasy, where they have been recorded in the past (Rabarisoa 2002). F. Hawkins (*in litt.* in Dodman 2002) produced an estimate of 1,800-7,500 individuals based on the assumption that it probably occurs at around 500-1,000 small wetlands with 1-2 pairs at each, and at 20-50 larger wetlands with 5-10 pairs at each. An estimate of A (<10,000) was therefore adopted in *WPE3*, and this was retained in *WPE4*.

Conservation Status

The Madagascar Snipe is one of seven endemic species of the East Malagasy Wetlands Endemic Bird Area, where it occurs in at least nine IBAs, whilst it is also found in a further three IBAs outside the Endemic Bird Area within the East Malagasy biome (ZICOMA 2001). This species is listed as Near Threatened on the IUCN Red List because of its apparently small population size and restricted range (BirdLife International 2004b). The main threat to the snipe is habitat transformation; the valley-bottom marshes in particular are much in demand for rice cultivation (Morris & Hawkins 1998).

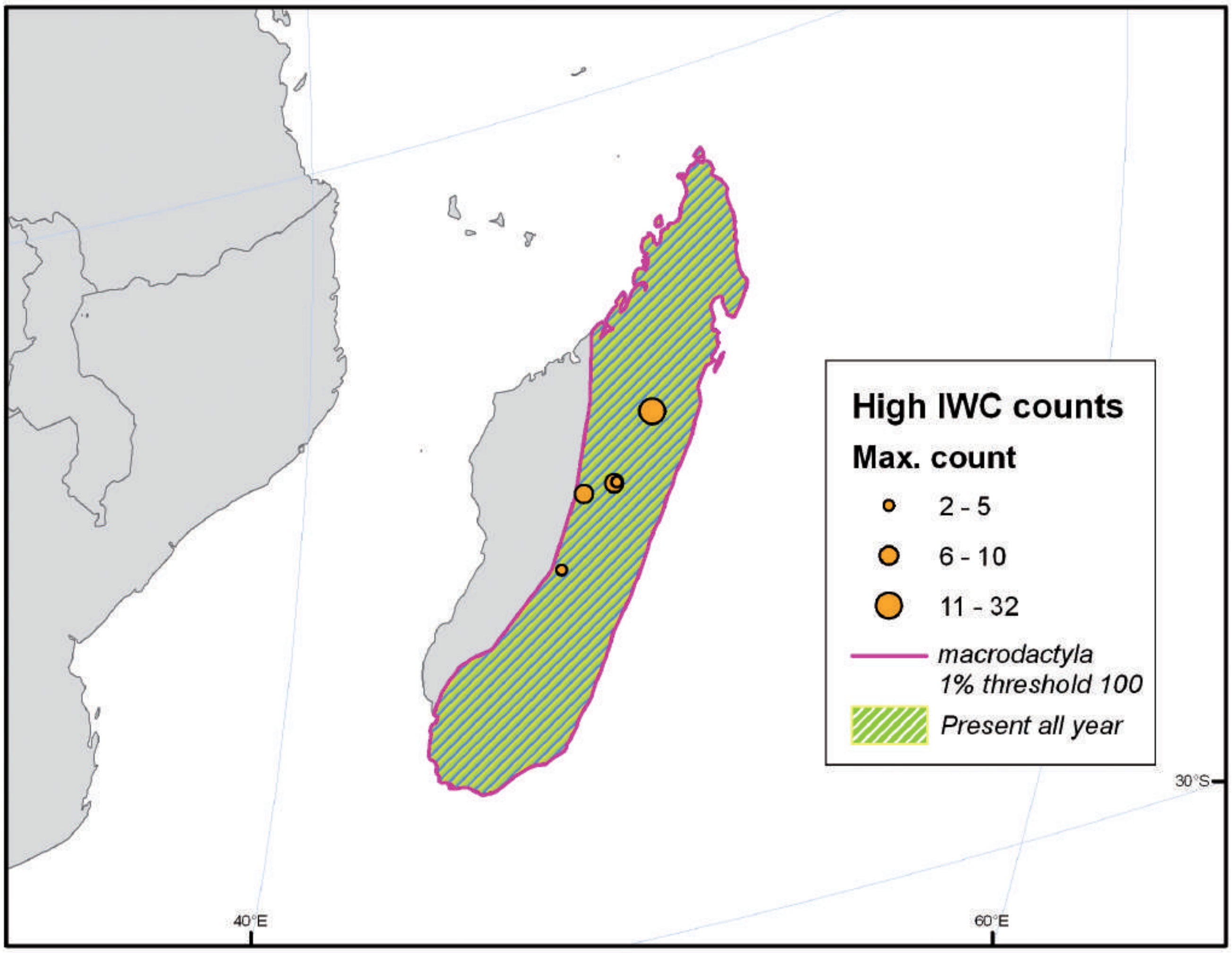
Many wetlands have already been lost or modified in eastern Madagascar, and this species has surely declined in the past. Extensive areas of natural marshlands around one of the largest lakes in eastern Madagascar, Lac Alaotra, have been converted to rice production (e.g. Langrand 1990). Although this snipe may still be in decline, the current population trend is not well established.

Habitat and Ecology

The Madagascar Snipe inhabits freshwater wetlands with dense vegetation and muddy areas, including swamps with grasses and sedges, rice fields and the edges of lakes and watercourses (Morris & Hawkins 1998). In forested areas, it occurs in small bogs and on the banks of streams (Hayman *et al.* 1986). It occupies these habitats from sea level to 2,700 m, although it is scarce below 700 m (Langrand 1990, Morris & Hawkins 1998). It is gregarious, often feeding in loose groups, mainly on invertebrates, seeds and other

Madagascar Snipe

Gallinago macrodactyla



vegetable matter (Morris & Hawkins 1998). Breeding has been observed between July and January; the nest is in a hollow hidden in a tuft of grass in or next to marshland (Langrand 1990). Like other snipes, territorial males indulge in aerial drumming displays.

Network of key sites

No key sites have been identified on the basis of the current 1% threshold of 100. The Madagascar Snipe occurs at a large number of small wetlands in the eastern humid forest zone of Madagascar. Most of these wetlands support only one or two pairs of snipe and are not significant individually, although collectively they undoubtedly support the bulk of the population. There are, however, some larger wetlands that stand out as being of particular importance for the species, notably the Torotorofotsy wetlands and Lake Itasy. The snipe also seems to be particularly common in the Didy and Ivondro wetlands (ZICOMA 2001). The 12 IBAs where the snipe occurs span some 1,000 km from Tsaratanana in the north-west to Midongy-South in south-eastern Madagascar, forming a chain of sites within the East Malagasy biome.

Other sites with good areas of marsh are Ranomafana, Isalo and Midongy-South National Parks (ZICOMA 2001).

Protection status of key sites

Although no key sites have been identified, the species has been recorded at 12 IBAs in Madagascar. The protection status of the IBAs where the Madagascar Snipe occurs are given below, along with an indication of the principal threats:

The three most important sites (Didy and Ivondro wetlands, Torotorofotsy and Lake Itasy) are unprotected; all include significant areas of marshland, ideal habitat for Madagascar Snipe. Whilst various threats are indicated at these and other sites, not all threats adversely affect the marshes within the sites. Collection of plant material from marshes for basket-making is one activity that takes place within the snipe's habitat, but this need not pose a threat when carried out on a sustainable basis. Proposed mining in the Ambatovy and Analamay region poses a more serious potential threat at Torotorofotsy (ZICOMA 1999).

Table 40. Important sites for Madagascar Snipe.

Important Bird Area (IBA)	Size (ha)	Status	Threats
Tsaratanana Strict Nature reserve & adjacent areas elsewhere	48,622	Reserve fully protected/ unprotected	Cattle grazing
Didy & Ivondro wetlands	26,880	Unprotected	Hunting, cultivation
Torotorofotsy wetlands	5,400	Unprotected	Cultivation, plant collection
Mantadia National Park & Analamazaotra Special Reserve	10,685	Fully protected	Slash and burn cultivation
Anjozorobe Forest	51,490	Unprotected	Clearing, fishing, hunting
Lake Itasy	3,500	Unprotected	Silting-up of lake from erosion
Ranomafana National Park	41,713	Fully protected	Cultivation, cattle-grazing
Andringitra National Park	31,160	Fully protected	Cultivation, cattle-grazing
Isalo National Park	81,540	Fully protected	Bush fires, mining (potential)
Vondrozo Classified Forest	29,850	Protected	Bird hunting, cultivation
Kalambatrita Special Reserve	28,250	Fully protected	Livestock grazing
Midongy-South National Park	67,568	Fully protected	Cultivation, cattle grazing

Tim Dodman & Simon Delany

Terje Kolaas

Great Snipe *Gallinago media*

Geographical variation and distribution

The monotypic Great Snipe breeds in Northern and Central Europe and North-west Asia east to 90ºE, and migrates south and south-west to winter in Africa south of the Sahara.

Movements

The Great Snipe is strongly migratory, but small numbers of birds remain throughout the winter in Europe, well north of the main wintering areas in sub-Saharan Africa. Some birds winter in West Africa from Mali to Chad, but the majority migrate to southern Democratic Republic of Congo, western and southern Tanzania, Angola, Zambia and Malawi. The relatively small breeding population in Norway and Sweden is thought to winter mainly in West Africa. The large population breeding in Western Siberia and North-east Europe is thought to migrate south on a relatively narrow front through Ethiopia and East Africa to wintering areas mainly in south-eastern Africa, and to return north in spring on a broad front across Central Africa, the central Sahel zone and the Mediterranean (Massoli-Novelli 1988).

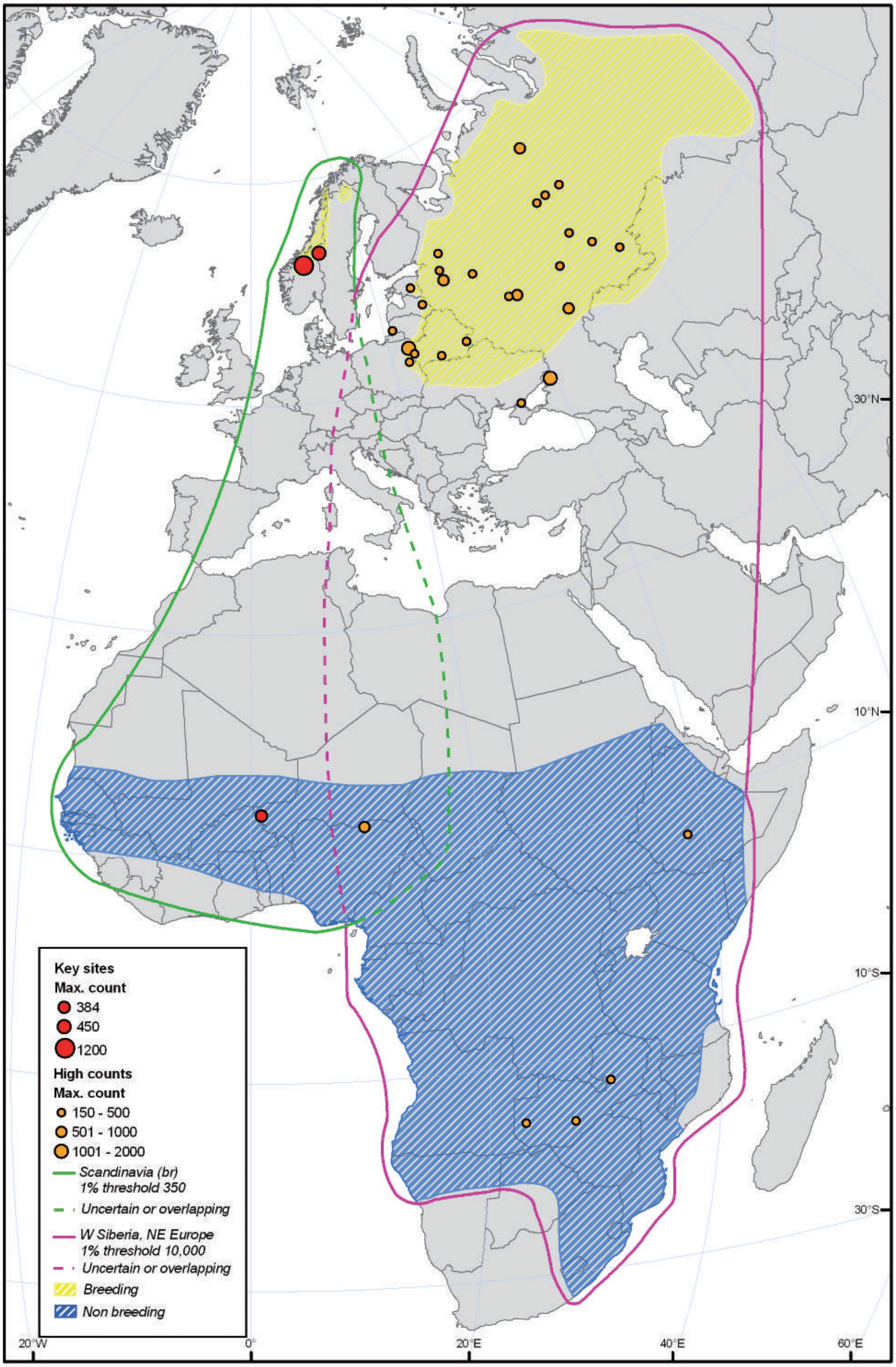
In West Africa, there are records from Senegal and The Gambia from October and January to March (Morel & Morel 1990, Barlow *et al.* 1997). Almost all records from monthly counts in the Inner Niger Delta in Mali between 1998 and 2002 were between February and April, with only two records in January, the highest count being of 140 at Walado-Debo in March 2001 (Diallo *et al.* 2002). The lack of records between August and December suggests that some birds are using the Inner Niger Delta as a staging area before heading northwards on spring migration across the Sahara. This would fit well with patterns of arrival in Tunisia, where most records are from March and April (Isenmann *et al.* 2005) and in Libya, where it occurs on spring passage (Toschi 1969). In Nigeria (from where there is one ringing record from Russia), it is most numerous on autumn passage between August and October, with numbers dipping until increases during spring passage in April (Elgood *et al.* 1994). There is a somewhat similar pattern of occurrence in northern Ghana (Grimes 1987) and in Togo, where almost all records are from August and March-April (Cheke & Walsh 1996). Schepers & Marteijn (1993) reported nine birds at Yenzi on the southern coast of Gabon and another bird near Gamba in January and February 1990.

Further east, it appears to be widely distributed throughout eastern Democratic Republic of Congo from September (Chapin 1939), probably on migration, whilst there are also records from October to December in central DR Congo (Schoutden 1961). It is a passage migrant in northern Sudan, with records around Khartoum from October and March (Macleay 1960), whilst in southern Sudan it occurs between September and November and in April, when it is regularly seen on grassy marshes near larger rivers; a bird ringed near Juba in November was recovered in the Kirov region of Russia in August (Nikolaus 1989). The species occurs commonly on autumn passage in the Ethiopian Highlands, at the height of the rainy season in August and September (Massoli-Novelli 1988). There is also a November record of five birds from a large swamp near the Juba River in southern Somalia (Ash & Miskell 1998). There are no recent records from Uganda, where it used to be occasionally plentiful on passage (Carswell *et al.* 2005). Declines have also been observed in Kenya, where records are mostly of birds on passage from October to December and April to May, with both north and south migrations regular in the west (Lewis & Pomeroy 1989). Perhaps the highest count in Tanzania is of 65 at the Moyowosi Swamp in January 1995 (Baker 1996). Some of the extensive swamps in western Tanzania could be important wintering sites.

Birds tend to arrive in Southern Africa from October to December. Most records in Malawi are between November and February (Dowsett-Lemaire & Dowsett 2006). It is present in Zambia between October and April, but in Luapula

Great Snipe

Gallinago media



Province (north-western Zambia) it seems to occur only on southward passage (Benson *et al.* 1971). It was found in the extensive floodplains of the Bangweulu Swamps in northern Zambia in January 1993 and 1994, but not in the Kafue Flats in southern Zambia (T. Dodman unpubl. obs.). It is present in Zimbabwe between November and early April, with the main arrival delayed until the rains have set in (Irwin 1981). Elsewhere in Southern Africa, almost all recent records are in a fairly narrow band extending from northern/north-eastern Namibia across northern Botswana and Zimbabwe to the Beira region of Mozambique (Hockey *et al.* 2005). This distribution takes in seasonal and permanent wetlands during peak flood, such as Nyae Nyae Pan and Caprivi wetlands in Namibia, Okavango and northern wetlands of Botswana and the high rainfall zone of Beira in Mozambique. There is one ringing recovery from Southern Africa: a bird ringed near Tampere in Finland was recovered near Ondangwa in northern Namibia (Underhill *et al.* 1999). The Great Snipe is a vagrant to the granitic islands of the Seychelles, with records between October and December (Skerrett *et al.* 2001).

In summary, the large eastern population of Great Snipe appears to enter Africa via the Nile Valley and Ethiopia, spending time in wetlands and flooded grasslands of Eastern Africa during the September-December rains, thence moving south as wetlands in Southern Africa become suitable during the November to February rains. Within Africa, they are thus rains migrants, and at least some birds follow loop migrations. The records from coastal Gabon may represent birds moving gradually northwards from further south, or this may be another, little known, wintering area. The relatively small numbers of birds reaching West Africa appear to belong to a discrete population, presumably of birds that breed in Scandinavia. Some evidence for this comes from ringing; two birds ringed on the breeding grounds in western Norway were recovered in western France in September, indicating a south-westerly migration route towards West Africa (Bakken *et al.* 2003).

Population limits

Two populations have been identified: a population breeding in Scandinavia, thought to winter mainly in West Africa; and a population breeding in Western Siberia and North-east Europe, and wintering mainly in south-eastern Africa.

Population size

1. Scandinavia (breeding)

Population estimate	1% threshold	Population trend
18,000-51,000	350	Stable

Recent estimates indicate that the Norwegian breeding population is in the range 5,000-15,000 pairs, and the Swedish population in the range 1,000-2,000 pairs (BirdLife International/EBCC 2000, Thorup 2006). These figures suggest a total Scandinavian population of 6,000-17,000 pairs or 18,000-51,000 individuals (Stroud *et al.* 2004). This estimate, adopted in *WPE3* and *WPE4*, was considerably higher than the estimate of 5,000-10,000 individuals given in *WPE1* and *WPE2* (derived from Koskimies 1993).

2. Western Siberia & Northeast Europe (breeding)

Population estimate	1% threshold	Population trend
D (100,000-1,000,000)	Provisionally 10,000	Possibly decreasing

The population breeding in Central and Eastern Europe (excluding Russia) is estimated at about 6,370-8,500 pairs, and that in European Russia at 53,371-167,735 pairs (Thorup 2006). This suggests a population of 179,000-529,000 individuals in Europe alone. National estimates given in BirdLife International (2004a) are broadly similar, and suggest a European population of 170,000-460,000 individuals. An unknown, but possibly large, number of birds breed in areas east of the Urals in Western Siberia. Thus the total population is considerably higher than the previous estimate of 10,000-100,000 individuals, given in the first two editions of *Waterfowl Population Estimates*. Massoli-Novelli (1988) estimated that approximately 10 million Great Snipe passed through the Ethiopian Highlands on autumn migration. This estimate was based on extrapolation from a single small study area, and is therefore very unreliable, but nevertheless suggests that the species is considerably more abundant than was formerly supposed. Stroud *et al.* (2004) revised the population estimate upwards to D (100,000-1,000,000), and this estimate was adopted in *WPE3* and *WPE4*.

Conservation status

The Great Snipe is listed as Near Threatened on the IUCN Red List (BirdLife International 2000) because of its widespread decline in Central and Eastern Europe.

The Scandinavian breeding population is thought to have been relatively stable since about 1945 (Morozov 1994, Kålås *et al.* 1997, Snow & Perrins 1998). Decreases were reported in southern Norway and southern Sweden in the latter part of the nineteenth century, but there has been some recovery since then.

The population breeding in North-east and Central Europe has been declining since the nineteenth century. There was a marked contraction in the breeding range in Central Europe in the second half of the nineteenth century and early twentieth century, and a long-term decline in numbers since then. Great Snipes became extinct as breeding birds in Denmark around the year 1900 (H. Meltofte *in litt.*) In recent decades, large decreases have been reported in the breeding populations in Belarus, southern European Russia and Ukraine, and smaller decreases in Estonia, Lithuania and Poland (Morozov 1994, Kålås *et al.* 1997). These declines were attributed to the loss and deterioration of floodplain meadows and marshland (Morozov 1994). BirdLife International (2004a) gives the trends in Belarus, Lithuania and Poland as stable or fluctuating, but concludes that overall the European population is undergoing a moderate decline.

Habitat and ecology

The Great Snipe breeds mainly in continental boreal upper-middle latitudes in the lowland interior taiga and wooded tundra belts. It prefers moist to wet terrain, but tolerates wooded or well-drained sites adjacent to bogs or marshes, up to 1,000 m or more in altitude in Scandinavia. In Africa, it uses a wide variety of habitats, e.g. marshes, short grass, wooded tracks, plough furrows, puddles or old cultivation. However, it is mostly found in seasonally flooded areas, both grasslands and floodplains. The mating system is promiscuous with males indulging in crepuscular or nocturnal lekking displays featuring complex vocalisations. A single clutch is laid from mid-May onward, the nest being on the ground and usually concealed by thick vegetation. The diet consists mostly of earthworms, with the addition of insects and their larvae and some seeds (Snow & Perrins 1998).

Network of key sites

Two important breeding areas have been identified in

Scandinavia, Dovrefjell in Norway, with c. 400 pairs in 1989, and the Lake Annsjön-Storlien area in Sweden with 25-150 pairs (Heath & Evans 2000). The Kokoro wetland in Niger is a key wintering area for this population; 384 were recorded in the winter of 1999/2000 (AfWC database). The Inner Niger Delta in Mali is probably also a key site for the Scandinavian breeding population; a count of 140 from one area of this extensive wetland is surely indicative of larger numbers present. It seems unlikely that there are any sites that hold concentrations of 10,000 or more individuals of the eastern population, but no doubt certain regions where large concentrations occur may be considered as key sites. One such area is the highland grasslands biome of Ethiopia. In general, the key site approach will be of only limited effectiveness in the conservation of this species.

Protection status of key sites

Dovrefjell (50,000 ha) in Norway is partly protected within a National Park (25,580 ha) and there is a small Nature Reserve (750 ha) and Landscape Protected Area (6,600 ha) at the site. The Lake Annsjön-Storlien area (90,000 ha) in Sweden is largely protected in three Bird Sanctuaries and a Nature Reserve; 11,000 ha are covered by a Ramsar site, and much of the area is a Special Protection Area. Kokoro wetland (2,100 ha) in Niger was designated as a Ramsar site in 2001. This wetland is heavily used by cattle towards the end of the dry season, and expansion of agricultural activities and excessive hunting could become problems in the future (Fishpool & Evans 2001).

Table 41. Key sites for Great Snipe. Sites where 1% or more of a population has been recorded

Country	Site	Lat.	Long.	Season	Max total	Year max	Source	Population(s) at site
Niger	Kokoro	14.17	0.92	Non-breeding	384	2000	AfWC database	Scandinavia
Norway	Dovrefjell	62.32	9.45	Breeding	1200	1989	WBDB	Scandinavia
Sweden	Lake Ånnsjön-Storlien	63.27	12.55	Breeding	450	1996	WBDB	Scandinavia

Simon Delany, Jeff Kirby & Tim Dodman

Boris Belchev

Common Snipe
Gallinago gallinago

Geographical variation and distribution

This is the world's most widely distributed snipe, with three subspecies divided into six biogeographical populations. It breeds across northern Eurasia and North America, and spends the non-breeding season mostly south of the breeding range but north of the equator. The nominate race has a wide breeding distribution across northern Eurasia from Ireland, Britain, France and northern Spain to the Russian Far East and Kamchatka. Populations breeding in Europe and Western Asia winter in Western and Southern Europe, South-west Asia, North Africa, and sub-Saharan Africa south to northern Democratic Republic of Congo and western Tanzania (rarely to Zambia and Malawi); populations breeding in Central and Eastern Asia winter south to the Indian subcontinent and South-east Asia. *G. g. faeroeensis* breeds in Iceland, the Faeroes, Orkney and Shetland, and winters mainly in Ireland. There is a very isolated population of Common Snipe breeding on five islands in the Azores (Cramp & Simmons 1983), but the subspecific status of this population appears not to have been determined. The form *delicata*, which breeds in northern North America, winters south through the southern U.S.A., Mexico, Central America and the Caribbean to northern South America. This form is now often considered to be a separate species, Wilson's Snipe *G. delicata*.

Movements

Northern breeding populations of the Common Snipe are highly migratory, but birds in western maritime countries of Europe are partially migratory. Most birds spend the non-breeding season in Southern and Western Europe, North Africa and South-west Asia, but a major element of the population comprises trans-Saharan migrants. Most of these birds remain north of the equator, but in East Africa, considerable numbers occur south to the southern Rift Valley lakes in Kenya and the Lake Victoria basin (Britton 1980), and small numbers penetrate south to 13ºS in Zambia (Cramp & Simmons 1983).

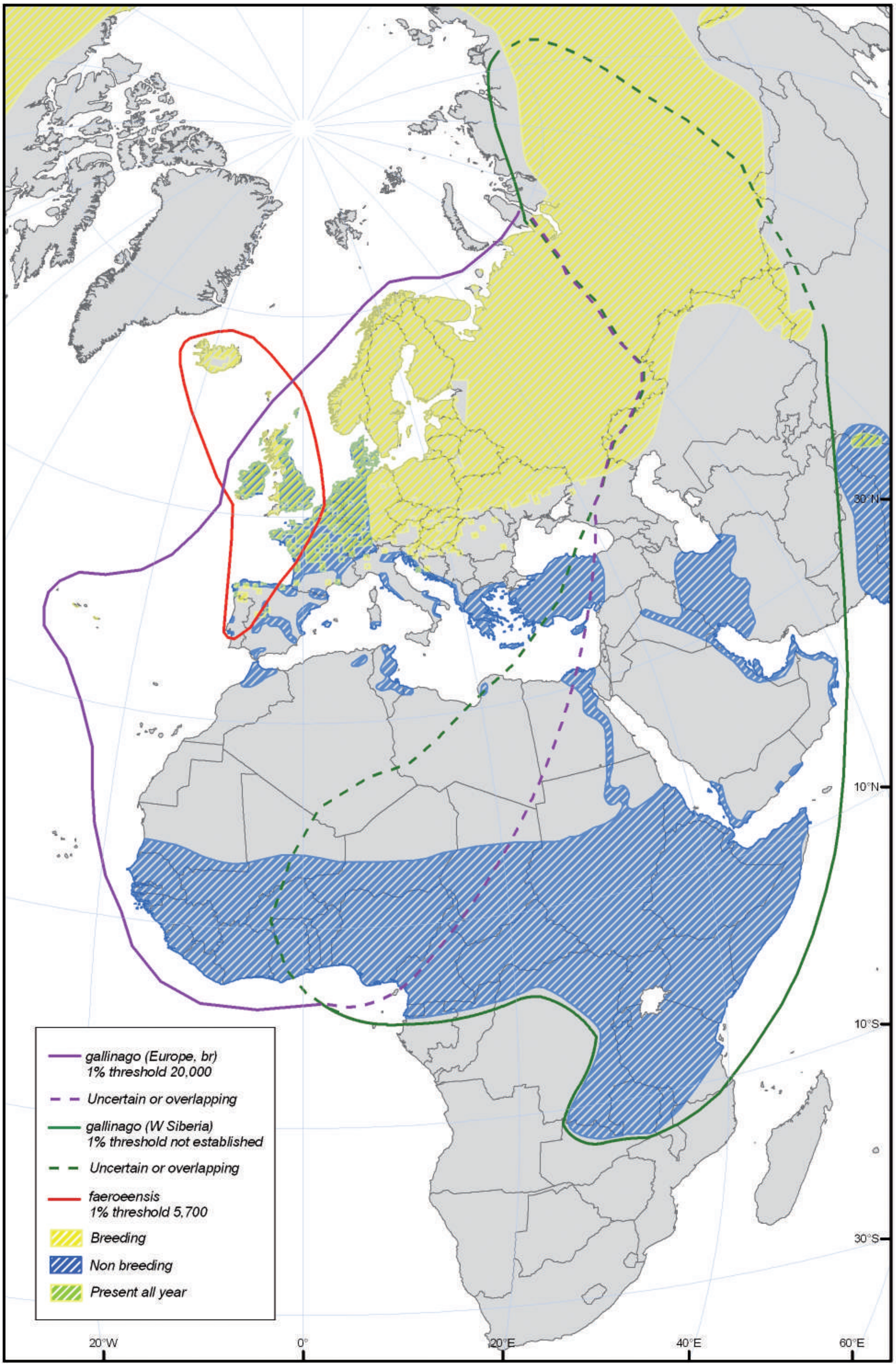
There is a strong south-westerly trend in autumn movements throughout Western and Central Europe, with many recoveries in France, Iberia, Morocco and Algeria of birds ringed on passage in Norway, Sweden, Finland, Poland, Germany, Denmark, The Netherlands and Britain (Cramp & Simmons 1983, Bakken *et al.* 2003, Bønløkke *et al.* 2006). Birds breeding in Fennoscandia migrate south-west to winter mainly in Ireland, Britain, France and Iberia, with Norwegian birds tending to winter somewhat further north than Swedish and Finnish birds. Birds ringed as chicks in The Netherlands have been recovered in France, Spain and Morocco (Cramp & Simmons 1983), while many birds ringed as chicks in Germany have been recovered in Britain and Ireland (Henderson 2002). Common Snipe recovered in Britain and Ireland outside the breeding season originate mainly from Fennoscandia and northern Europe east to Poland, the Baltic States, western European Russia and the Czech Republic (Henderson 2002). The movements of birds breeding in Eastern Europe are poorly known, but it seems likely that these birds winter mainly in the Black Sea region, Mediterranean basin and North Africa.

Birds breeding in Britain are partially migratory, with many birds from breeding areas in Scotland and northern England wintering in Ireland. Elsewhere in Britain, some birds remain near their natal area throughout the winter, while others move south-west within Britain and a minority continues on to western France and Spain (Cramp & Simmons 1983, Henderson 2002). One bird ringed during the breeding season in southern England was recovered in Morocco (Henderson 2002). Birds breeding in Ireland appear to be resident.

West Siberian breeders are thought to winter mainly in South-west Asia and sub-Saharan Africa. Two birds ringed as autumn migrants in Germany have been recovered in

Common Snipe

Gallinago gallinago



Senegal; a bird ringed in Sweden was recovered in Guinea-Bissau, and another from Germany was recovered in the Algerian Sahara, indicating that some European breeders reach sub-Saharan West Africa. There have been no recoveries of Danish ringed birds south of Morocco, however, and the general paucity of recoveries of birds from Europe in the Afrotropical region suggests that most birds wintering in Africa south of the Sahara are of Asian origin (Cramp & Simmons 1983, Bønløkke *et al.* 2006).

Icelandic breeders (*faeroeensis*) are mainly migratory, although a few winter near thermal springs (Cramp & Simmons 1983). The bulk of the population winters in Ireland, although there have been a few ringing recoveries from north-western Scotland, England, France and Portugal (Cramp & Simmons 1983, Henderson 2002). Some Faeroese birds are resident, while others are migratory, presumably also wintering mainly in Ireland. The movements of *faeroeensis* breeding in the Shetland and Orkney Islands are unknown (Henderson 2002).

Autumn passage begins in July or August. Peak numbers appear on passage in Denmark and The Netherlands in September-October, and most birds have arrived in their winter quarters by the end of November. The main influx in North Africa takes place in late September and early October, and the main arrival south of the Sahara in October and early November (Urban *et al.* 1986). The spring migration begins in late February south of the Sahara and in March in Southern Europe. The breeding grounds in Fennoscandia are reoccupied in April and May (Cramp & Simmons 1983).

Population limits

Waterbird Population Estimates recognises three populations of the Common Snipe in Western Eurasia:

1) birds of the nominate race breeding in Europe (west of the Urals), and wintering mainly in Southern and Western Europe and North-west Africa (mostly north of the Sahara);
2) birds of the nominate race breeding in Western Siberia (east of the Urals), and wintering mainly in South-west Asia and sub-Saharan Africa (mostly north of the equator);
3) the entire population of *G. g. faeroeensis* breeding in Iceland, the Faeroes and the Shetland and Orkney Islands, and migrating south-east to winter mainly in Ireland.

It is accepted that there may be a considerable amount of overlap between the two populations of the nominate race on their winter quarters in the eastern Mediterranean, and possibly also in West Africa.

The apparently isolated breeding population of Common Snipe in the Azores may constitute a discrete biogeographical population, as suggested by Thorup (2006), but until further information becomes available on the status and affinities of this population, it has been retained within the European breeding population of nominate *Gallinago*.

Population size

1. *gallinago* Europe (breeding)

Population estimate	1% threshold	Population trend
>2,500,000	20,000	Decreasing or stable

Beintema & Müskens (1983) estimated that between 20 million and 30 million birds passed through North-west Europe in late summer. This estimate was accepted by Kalchreuter (1994) and Devort (1997), and was the basis for the estimate of >20 million given in the first two editions of *Waterbird Population Estimates*. However, recent estimates of breeding populations in Europe suggest that this earlier estimate may have been too high. BirdLife International/ EBCC (2000) collated national estimates of breeding populations, and estimated the total breeding population of nominate *Gallinago* in Europe excluding Russia at 471,000-726,000 pairs, and that in European Russia at between one million and 10 million pairs. These figures would equate to a total of approximately 4,400,000-32,200,000 individuals. More recently, national totals collated by Thorup (2006) and BirdLife International (2004a) suggest significantly lower totals of 945,000-1.5 million pairs and 750,000-1.6 million pairs of Common Snipe in Europe, respectively. These much lower estimates are almost entirely the result of greatly improved information from Russia, where the total breeding population is now thought to number only 457,000-830,000 pairs (Thorup 2006) or 300,000-850,000 pairs (BirdLife International 2004a). These new estimates equate to about 2.5 million - 4.7 million individuals. Stroud *et al.* (2004) gave a somewhat lower estimate of 2.4 million -3.9 million individuals based on incomplete information from the Russian breeding areas. Given the uncertainty, *WPE3* adopted a conservative estimate of >2.4 million (the lower limit from Stroud *et al.* 2004), and this was increased to >2.5 million in *WPE4,* accepting that knowledge is incomplete and that numbers may be considerably higher. G-N Olivier (*in litt*. 2008) considers the population to be between five and eight million, based on analysis of ringing data from Russia. The 1% threshold has been set at 20,000 on the basis of Criterion 5 of the Ramsar Criteria for site selection.

2. *gallinago* Western Siberia (breeding)

Population estimate	1% threshold	Population trend
E (>1,000,000)	Not established	Unknown

Little detailed information is available on numbers of birds breeding in Western Asia, although it has been estimated that there are at least one million breeding birds in Western Siberia (del Hoyo *et al.* 1996). G. Nikolaus (in Summers *et al.* 1987) guessed that there could be as many as 1.5 million Common Snipe wintering in Sudan, mainly in the Sudd swamps in the south of the country. A conservative estimate of E (>1 million) was adopted in the first two editions of *Waterbird Population Estimates*, but Stroud *et al.* (2004) considered this to be too low, and proposed a higher figure of at least 1.5 million, which was adopted *WPE3*. This estimate was revised to E (>1,000,000) in *WPE4*.

3. *faeroeensis*

Population estimate	1% threshold	Population trend
570,000	5,700	Possibly stable

The total breeding population of *faeroeensis* has recently been estimated at about 190,000 pairs, equating to about 570,000 individuals (Stroud *et al.* 2004, Thorup 2006). This estimate includes 180,000 pairs in Iceland (Gudmundsson 2002), 2,500 pairs in the Faeroes (BirdLife International/ EBCC 2000), and 6,900 pairs in Orkney and Shetland (BTO in Stroud *et al.* 1987). The estimate of 570,000 individuals, adopted in *WPE3* and *WPE4*, is substantially lower than the estimate of 750,000 given in the first two editions. The discrepancy is thought to be largely, if not entirely, due to an improvement in the quality of the data, rather than to any decline in numbers.

Conservation status

Determination of trends in this widespread and abundant species is very difficult because of the paucity of detailed information from some of the main breeding areas in Eastern Europe (Devort 1997). Populations of nominate *gallinago* breeding in Europe have declined markedly since the end of the nineteenth century. This decline has been attributed to the drainage and degradation of wetlands, especially the loss of multiple small wetlands within agricultural landscapes. In recent years, marked decreases have been reported in Britain and The Netherlands, and smaller decreases in the large populations in Sweden, Finland, Germany, Poland and Ireland (Beintema & Saari 1997, Snow & Perrins 1998). Hötker (1991) concluded that the overall trend in the population breeding in the European Union (57,200-59,000 pairs) was decreasing, probably through loss of breeding habitat. In Finland, numbers more than doubled between the 1940s and the 1970s, but decreased by 33% during the 1980s, and have continued to decrease since then (Beintema & Saari 1997). In no European country are Common Snipe numbers thought to be increasing. BirdLife International (2004a) reports declines in 20 European countries and stable or fluctuating populations in a further 13, and concludes that overall the population is undergoing a moderate decline. A recent analysis of the numbers of Common Snipe shot at a marsh in north-western France revealed that although there was considerable fluctuation from year to year, the long-term trend from the early 1970s to the mid-1990s was more or less stable (Olivier 2000). Nevertheless, a French national survey showed a decrease of 50% in the numbers of Common Snipe shot there between 1983-84 and 1998-99 (274,910 in 1998-99, Tesson & Leray 2000) which can be due either to a decline of the migrating/wintering Snipe population or to lower hunting pressure. Numbers in European Russia are thought to have been relatively stable in recent decades, and there may have been increases on the Kola Peninsula during the twentieth century (Snow & Perrins 1998).

Nothing is known of overall trends in the population of *Gallinago* breeding in Western Siberia. Van der Kamp & Diallo (1999) suggest that the number of birds wintering in West Africa has decreased markedly, as it is now found only “by chance” in the Inner Niger Delta of Mali, whereas Lamarche (1980) recorded “thousands” in this area in the 1970s.

The breeding population in Iceland (i.e. the bulk of the population of *faeroeensis*) is thought to be stable (Asbirk *et al.* 1997, Snow & Perrins 1998), as apparently are the much smaller numbers in the Faeroes (BirdLife International 2004a).

Habitat and ecology

The Common Snipe breeds in the low Arctic, boreal and temperate zones, in a variety of habitats which include moist, soft substrate, access to shallow water (fresh or brackish), short vegetation within which to conceal the nest, and preferably access to raised lookout points one metre or more above the ground. Outside the breeding season, the species uses a wider variety of habitats which usually include wetland or moist open areas. A single clutch is laid in April or May. The mating system is monogamous, with a high degree of promiscuity. On migration and in winter, the species typically occurs in small groups, known colloquially as “wisps” (Snow & Perrins 1998).

Network of key sites

The Common Snipe is a rather dispersed species at all times of the year, seldom congregating in large flocks except occasionally during the migration seasons. Although the nominate form may be locally abundant at favoured staging and wintering sites, no key sites have been identified, and it is doubtful if there are any sites that regularly support more than 20,000 birds – the 1% threshold for the European breeding population of nominate *gallinago*. A key site approach is therefore inappropriate in the conservation of this species.

Jeff Kirby & Simon Delany

Niels Gilissen

Black-tailed Godwit
Limosa limosa

Geographical variation and distribution

Confined to the Palearctic as a breeding species, the Black-tailed Godwit has a widespread distribution outside the breeding season in the Old World. It breeds in upper middle latitudes, both oceanic and continental, mainly in the lowland temperate and boreal zones (Beintema & Drost 1986, Engelmoer & Roselaar 1998). Its range has spread, especially in the north, from about the mid-twentieth century or earlier, benefiting from man-made changes to landscapes, e.g. deforestation and pasturage (Snow & Perrins 1998).

Three subspecies are generally recognised. The nominate *limosa* breeds in continental Europe from western France and Belgium north to southern Sweden and southern Finland, eastwards across Europe, south to the southern Urals and Kyrgyz steppes, and east in Western Siberia to the Chulym River and upper Yenisey (at about 90ºE). There is a small breeding population of this form in Britain, mostly in south-east England. Wintering occurs from West and North Africa east through the Mediterranean basin, tropical Africa (south commonly to Kafue Flats, Zambia) and the Middle East to Pakistan, western India (south commonly to Bombay) and Sri Lanka. Stragglers reach Cape Province, South Africa.

L. l. islandica breeds mainly in Iceland and sporadically in the Faeroes, north-western Norway, northern Scotland and Ireland. It winters mainly in Britain, Ireland and western France, and south in smaller numbers to Morocco. *L. l. melanuroides* has a disjunct breeding distribution in Central and Eastern Siberia, eastern Mongolia, north-eastern China and the Russian Far East, and spends the non-breeding season in South and South-east Asia, New Guinea and Australia. It is a vagrant in Kazakhstan, but possibly overlooked (Wassink & Oreel 2007). While agreeing in general with these three subspecies, Engelmoer & Roselaar (1998), noted that there were large biometric and plumage differences between the Western Palearctic (*limosa* and *islandica*) and Eastern Palearctic (*melanuroides*) populations, and suggested that it might be better to consider these as separate allospecies forming a superspecies with the North American Hudsonian Godwit *L. haemastica*. These authors also considered that there might be a case for treating the relatively large East European and South-west Asian birds as a separate subspecies.

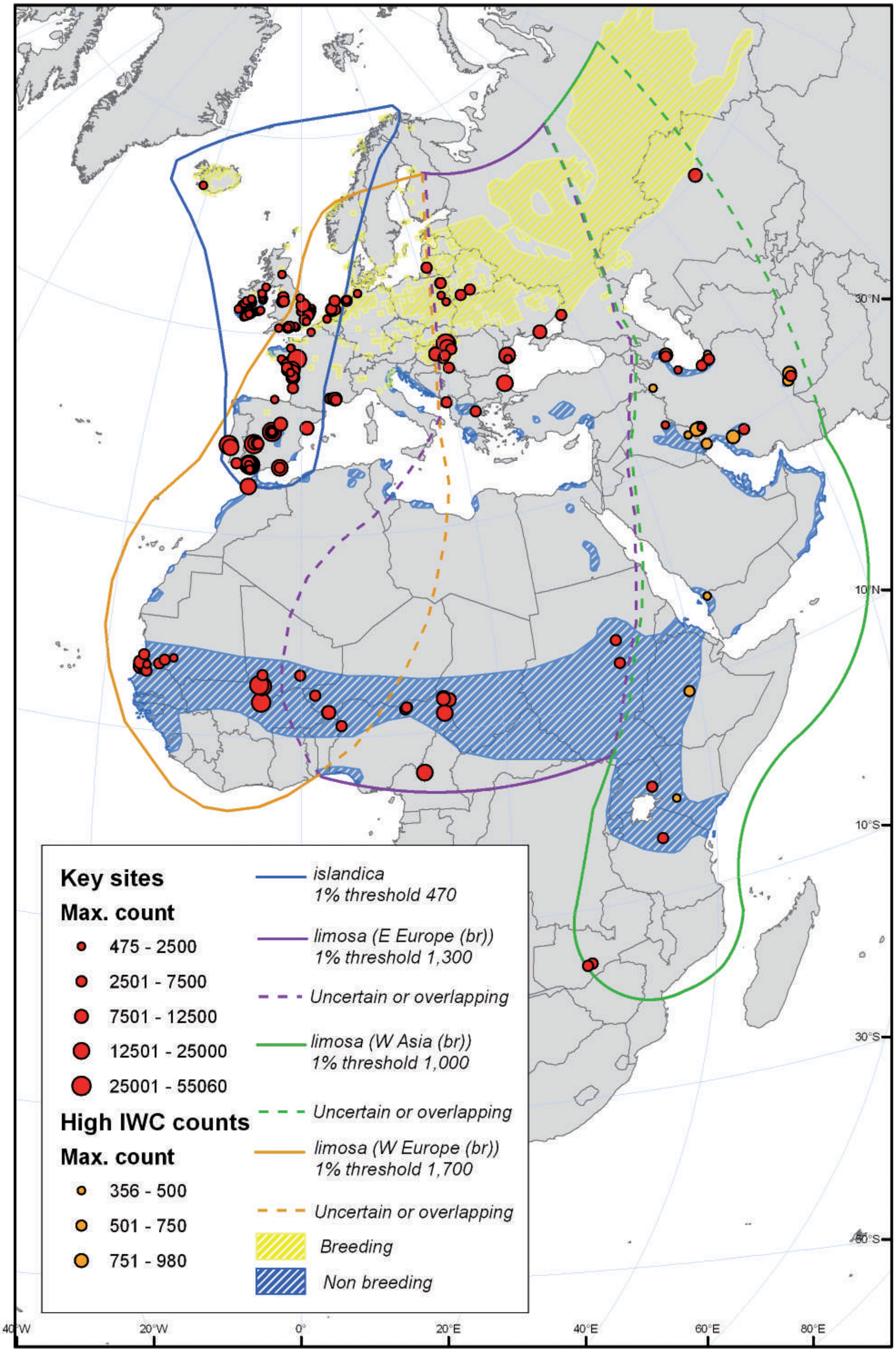
Movements

The migration system of the Black-tailed Godwit is complex and has been summarised by Beintema & Drost (1986). Individuals from the *islandica* population journey to winter in Britain and Ireland, and along the Atlantic coast of Western Europe from The Netherlands (few) south to Spain and Portugal, with some birds reaching Morocco. Here they mix with birds from the western population of *limosa*, especially in Iberia and Morocco.

Individuals from the western population of *limosa* migrate from Western and Northern Europe down the Atlantic coast into West Africa. Most adults in this population make a direct flight to Spain, Portugal or Morocco, with northern Morocco vital as a staging area for these birds (Beintema & Drost 1986). From there, they fly direct to Senegal and Guinea-Bissau, rarely stopping *en route*. Adults return to the breeding grounds using the same route. By contrast, first-year birds make several short autumn flights along the Atlantic coast and into West Africa. Those not returning to the breeding grounds spend the following summer in West Africa or move east into Mali. The adults return to breeding areas via the Atlantic coast route, immature birds via North Africa and Italy and then probably via a north-westerly, overland route. In this way, these young birds perform a loop migration, returning in spring along a more easterly route than that taken in autumn (Beintema & Drost 1986). Although a few pairs of nominate *limosa* breed in Britain (about 60 pairs in the 1990s), there is no evidence that *limosa* from continental breeding populations occur in Britain or Ireland on passage (Gill *et al.* 2002).

Black-tailed Godwit

Limosa limosa



Much less is known about the migrations of individuals from the East European breeding population of *limosa*. These birds moult in the northern and western Black Sea region, then cross the Mediterranean and Sahara to winter in tropical Africa from Mali and Lake Chad eastward (Urban *et al.* 1986, Kube *et al.* 1998). The origin of birds wintering in Mediterranean Spain and Tunisia remains obscure (Smit & Piersma 1989).

Black-tailed Godwits breeding east of the Urals in West and Central Asia migrate either to the south-west or south-east. Many birds, presumably from the western half of the Asian breeding range, migrate south-west through the Caspian region to winter in the Middle East and Eastern Africa, commonly in recent years as far south as Zambia. Small numbers of birds, presumably from this population, extend south into Botswana, Zimbabwe, northern Namibia and South Africa, especially in years in which there is widespread drought in Africa (Tree 1997). The non-breeding range in Eastern Africa appears to be expanding, and since the early 1990s, the Black-tailed Godwit has become a regular visitor to Zambia. At least 1,000 birds have spent the boreal winter at Kafue Flats each year since 1997, and 3,465 were recorded at Lochinvar National Park in the Kafue Flats in January 2001 (Dodman 2002).

Large numbers of nominate *limosa*, presumably from the eastern half of the Asian breeding range, migrate south or south-east to winter in Pakistan and western India. These birds, thought to number in the region of 100,000 individuals (Perennou *et al.* 1994), are treated as a different population from those wintering in the Middle East and Eastern Africa, although it is unclear to what extent populations mix on the breeding grounds.

In general, migration occurs on a broad front, commonly overland, and is often characterised by long-distance flights between relatively few staging and wintering areas (del Hoyo *et al.* 1996). In Europe, autumn migration occurs from late June through to October. Birds arrive in North Africa as early as July, but the main arrivals further south occur in September and October, with birds vacating drying Sahel habitats during December (Urban *et al.* 1986). The largest numbers occur in South Africa during widespread African drought years (Tree 1997). These are mainly young birds. The main moult occurs either on special moulting areas (e.g. in the Black Sea and northern Morocco) in July and August, or is delayed until arrival in the winter quarters (Cramp & Simmons 1983, Kube *et al.* 1998).

Spring departures from Africa are mainly in late February to March in the west and March to early April in the east (Urban *et al.* 1986). Birds are recorded on passage in Europe during February, March and April (del Hoyo *et al.* 1996). Breeding sites are re-occupied in mid-March to mid-April in the west of the range, and April to early May in the north-east of the range (Snow & Perrins 1998). Many one- and two-year old non-breeders remain on their winter quarters all year.

Population limits

Waterbird Population Estimates recognises four populations within the region covered by this Atlas: three populations of nominate *limosa* and one of *islandica*:

1) *limosa* breeding in Europe east to about 20ºE, and migrating south-west to winter partly in South-west Europe (Portugal and Spain, with a few as far north as France), but mainly in North-west and West Africa from the coastal regions of Morocco, Senegal and Guinea-Bissau eastward inland to the Niger inundation zone in Mali.
2) *limosa* breeding in Europe east of about 20ºE, and migrating south through the Black Sea region and eastern Mediterranean to winter inland in east-central Africa north of the equator.
3) *limosa* breeding east of the Urals in Western Asia, and wintering in South-west Asia and Eastern Africa, south commonly to Zambia. The eastern limits of the breeding range of this population are uncertain.
4) *islandica* breeding almost exclusively in Iceland, and wintering in Britain, Ireland, France, Portugal, Spain and Morocco. Throughout the southern part of the wintering range of *islandica*, intermixing occurs with the western population of *limosa*.

The easternmost population of nominate *limosa*, breeding in west-central Asia and wintering in Pakistan and western India, occurs largely outside the region covered by this Atlas, and is not considered here.

Population size

1. *limosa* Western Europe (breeding)

Population estimate	1% threshold	Population trend
160,000-180,000	1,700	Decreasing

Stroud *et al.* (2004) derived a total of 131,500 from midwinter counts and national estimates in the 1990s. This total was based on an assumption that approximately 85% of the birds wintering in Portugal, Spain and Morocco are *limosa* and 15% are *islandica*. For Portugal at least, counts of *islandica* have been made before the *limosa* birds arrive, and these were used to calculate the relative proportions of each population (R. Rufino *in litt.*). Stroud *et al.* (2004) acknowledged that the total of 131,500 based on winter counts was likely to be an underestimate. Many of the national totals, notably in West Africa, were known to be incomplete, owing to the widespread inland distribution in many countries. No estimate was included for Guinea-Bissau, where Altenburg & Van der Kamp (1985) estimated a total exceeding 100,000 in the autumn of 1983, while the estimate of 19,400 used by Stroud *et al.* (2004) for Mali may have been much too low, as over 35,000 were counted in January 1998 (Dodman *et al.* 1999) and over 40,000 in January 2001 (Dodman & Diagana 2003). Similarly, the figure of 6,100 used by Stroud *et al.* (2004) for Mauritania also seems low, as 9,768 were counted in January 2001 (Dodman & Diagana 2003), including over 7,900 in the Mauritanian part of the Senegal Delta alone (Schricke *et al.* 2004).

The breeding population of *limosa* in Europe west of 20ºE was estimated at about 95,000-120,000 pairs in the late 1980s, including 85,000-100,000 pairs in The Netherlands and 7,000-20,000 pairs in Germany (Tomialojc 1994a). However, considerable declines have been reported in this population, especially from the stronghold in The Netherlands (Schekkerman & Müskens 2000, Bijlsma *et al.* 2001). Recent compilations of national totals by Thorup (2006) and BirdLife International (2004a) indicate a total population of about 54,000-61,000 pairs, approximating to 162,000-183,000 individuals. This estimate, which was adopted in *WPE4*, is significantly lower than the estimate of 350,000 given in the first two editions of *Waterbird Population Estimates* and derived from BirdLife International's European Birds Database in 1994. The current estimate for the breeding population in The Netherlands is just 45,000-50,000 pairs (40,000-50,000 fewer than the estimate in the 1980s), while a significant decline has also occurred in Germany (now 6,000-7,300 pairs) (BirdLife International 2004a).

2. *limosa* Eastern Europe (breeding)

Population estimate	1% threshold	Population trend
90,000-165,000	1,300	Decreasing

The first two editions of *Waterbird Population Estimates* gave a rough estimate of D (100,000-1,000,000) derived from BirdLife International's European Birds Database in 1994. Stroud *et al.* (2004) were able to account for only 18,600 birds on the basis of winter counts and estimates from the range of this population in the 1990s. Although declines within the range of the population have been reported, there are clearly some significant gaps in the winter data currently available. The figure of 2,000 used by Stroud *et al.* (2004) for Egypt seems very low, as van Dijk *et al.* (1986) and Summers *et al.* (1987) provide estimates of 15,000-30,000 for Egypt. The figure used for Nigeria (2,628) may also be very low, as 6,473 were counted at Hadejia-Nguru wetlands in northern Nigeria in January 1997 (Dodman *et al.* 1997). No estimate was given for Cameroon, although Scholte *et al.* (1999) reported it to be common in the north of the country. The counts for Niger and Chad are also thought to be significant underestimates. Additionally, small but significant numbers have been recorded in Cyprus (200), Bulgaria (300), Syria (160) and Algeria (580) (data from van Dijk *et al.* 1986, Nankinov 1989). Allowing for these and other discrepancies, a more realistic minimum total in the non-breeding season is about 67,000. Counts on spring passage in South-east Europe suggest a minimum population size of about 50,000 birds (Kube *et al.* 1998). A further 5,000 are recorded in spring in Italy (Kube *et al.* 1998), but these may well be individuals from the western population of *limosa*, returning to Western Europe on their most easterly route as described by Beintema & Drost (1988).

National estimates of breeding populations in Eastern Europe give totals of 32,152-59,095 pairs (Thorup 2003) and 31,111-57,755 pairs (BirdLife International 2004a), which equate to a non-breeding population of about 95,000-175,000 individuals. These figures include the whole of European Russia, although at least some of the birds in south and south-east European Russia (2,640-4,740 pairs; data from Thorup 2003) breed in the Caspian region and should be assigned to the South-west Asian population. Some allowance was made for these birds in the new population estimate of 90,000-165,000 adopted in *WPE4*. This estimate is slightly lower than the estimate of 93,000-173,000 given in *WPE3* and taken from Stroud *et al.* (2004), who used slightly different national totals and included all birds breeding in European Russia.

3. *limosa* Western Asia (breeding)

Population estimate	1% threshold	Population trend
C (25,000-100,000)	Provisionally 1,000	Unknown

All four editions of *Waterbird Population Estimates* gave a rough estimate of C (25,000-100,000), following Perennou *et al.* (1994). The 1990s counts and estimates given in Stroud *et al.* (2004) total 35,300, but there are notable gaps and underestimates. For example, there are no estimates for Djibouti and Somalia, and the count for Sudan (181) is very low, as compared with an estimate of 15,000-30,000 in the 1970s (in Summers *et al.* 1987). Allowing for these discrepancies, the minimum count total in the non-breeding season is at least 58,000 birds, and given the incompleteness of the available data, the actual total is possibly many more

4. *islandica*

Population estimate	1% threshold	Population trend
47,000	470	Increasing

For convenience, Smit & Piersma (1989) considered all birds wintering on the Atlantic coast of Europe and northern Morocco to be *islandica*, and estimated the size of this population to be about 66,000 birds. Based on this, the first two editions of *Waterbird Population Estimates* gave a population estimate of 65,000. It is now known that many of the birds wintering in Iberia and northern Morocco belong to the nominate race, and thus the estimate of 65,000 for *islandica* was too high. Stroud *et al.* (2004) recalculated the 1980s data on the assumption that only 15% of the godwits wintering in Portugal, Spain and northern Morocco were *islandica*, and gave a revised total of 27,000 for the total population of *islandica* at that time.

The Icelandic breeding population was estimated at 10,000-30,000 pairs (or 30,000-90,000 individuals) in a compilation by Piersma (1986), but significantly fewer (5,000-15,000 pairs, or 15,000-45,000 individuals) in the late 1980s (Koskimies 1993). These estimates seemed to indicate that the population was declining, but Tomialojc (1994a) suggested that the trend was approximately stable. More recently, Gudmundsson (2002) has estimated a total of 25,000 pairs (or 75,000 individuals), and this figure was adopted by Thorup (2006) in his collation of national estimates of breeding populations. BirdLife International (2004a), however, gave a more conservative estimate of 15,000-25,000 pairs. Stroud *et al.* (2004) considered that the estimate of 25,000 pairs was much too high in the light of recent winter counts, which are believed to locate most non-breeding concentrations. Taking the numbers wintering in Britain (11,000), Ireland (8,000) and France (an average of 6,000 in the period 1993-99), allowing for about 6,000 *islandica* in Portugal and about 3,000 in Spain, and including small numbers elsewhere, Stroud *et al.* (2004) calculated the population in the 1990s at about 35,000 individuals, and this was the estimate adopted in *WPE3*. More recently, however, Gunnarsson *et al.* (2005) have estimated the size of the adult *islandica* population at about 37,500 individuals using resightings of individually colour-ringed birds in spring staging flocks in Iceland between 1999 and 2002. The number of first-year birds was estimated at about 9,375, assuming 0.5 chicks per breeding pair, to give a total population size of 47,000. This new estimate was adopted in *WPE4*. Gunnarsson *et al.* (2005) estimated that there were about 15,000 Icelandic Black-tailed Godwits wintering in areas where the two subspecies overlap (mostly in Portugal, Spain and Morocco). This represents about 20% of the birds wintering in Iberia and Morocco (76,000 in the 1990s; data from Stroud *et al.* 2004).

Conservation status

The western population of *limosa* increased considerably in the early twentieth century, but there has been a strong and widespread decrease in recent decades, notably in The Netherlands, which supports the bulk of the population. Here the breeding population decreased from 120,000-135,000 pairs in 1969 to 85,000-100,000 pairs in 1989-1991 (Tomialojc 1994a) and 45,000-50,000 pairs in 1998-2000 (Thorup 2006). This decrease, which is apparently continuing, has been attributed to loss of wetland habitat through drainage and changing land management practices causing reduction of reproductive success (Tucker & Heath 1994, Beintema & Melter 1997, Schekkerman & Müskens 2000, Bijlsma *et al.* 2001). The conservation of lowland wet grasslands and the regulation of farming-based disturbance are amongst the necessary steps identified to address such problems (Groen & Hemerick 2002). Drought in the West African winter quarters may also have had a negative impact on the European breeding population (Green *et al.* 1987). Significant declines have also become apparent in some wintering areas since the assessment by Smit & Piersma (1989). The numbers wintering in Tunisia fell from 2,200 to 800 in the mid-1990s, and those in Senegal from 12,300 to 5,300, although in Mauritania, numbers increased from 3,100 to 6,100 (Stroud *et al.* 2004). The increase in Mauritania appears to be continuing, as over 9,700 were recorded in January 2001 (Dodman & Diagana 2003). The numbers wintering in Portugal are also increasing, although this is believed to reflect a population shift towards the northern part of the wintering range (R. Rufino *in litt.*). The decrease in the population of nominate *limosa* has been enough to trigger IUCN red list criteria and the species was officially listed in the category Near Threatened in 2006 (BirdLife International 2006).

The Eastern European breeding population of *limosa* also appears to be in decline. Some increase has been reported in the small breeding population in Romania, but decreases have been reported during the past two decades in Belarus, Estonia, Lithuania, Poland, European Russia and Ukraine (Tomialojc 1994a, Beintema & Melter 1997, Belik 1998a, Nikiforov & Mongin 1998). The large population in Belarus declined from an estimated 15,000-17,000 pairs in 1990 (Tucker & Heath 1994) to only 6,000-8,500 pairs in the late 1990s (Nikiforov & Mongin 1998), although this population is now reported to be stable (BirdLife International 2004a)

The status of the Western Asian breeding population of *limosa* is unclear. In Eastern Africa, the non-breeding range has expanded southward into Zambia, where the species was first recorded in 1972. Numbers increased dramatically through the 1990s, and 4,300 were counted at Kafue Flats in 2000 (P Leonard *in litt.*).

The Icelandic breeding population has been increasing since about the 1920s, spreading to colonise the northern part of the island (Smit & Piersma 1989). The population is thought to have been relatively stable for a period in the late 1980s (Tucker & Heath 1994, BirdLife International/EBCC 2000), but numbers in at least a part of the wintering range (Britain) have been increasing steadily; the 1996/97 population index for Britain was more than three times the base year (1972-73) (Waters *et al.* 1998). This increase occurred mostly on wintering sites in eastern England and, to a lesser extent, north-western England (Gill *et al.* 2002). In France, a decrease occurred between 1980 and 1990, with numbers falling from 13,000 to 1,500, but counts started to increase again in 1991, and 9,000 were counted in 1999 (Deceuninck & Mahéo 2000). There are now increasing numbers (several thousand) occurring on spring staging areas in The Netherlands (Gerritsen & Tijsen *in litt*.) Stroud *et al.* (2004) concluded that there had been a 30% increase in the population between the 1980s and the 1990s and the population continued to increase into the 2000s (Delany *et al.* 2007).

Habitat and ecology

During the breeding season, the Black-tailed Godwit prefers damp grassy moorlands, blanket-bog, reclaimed land or lowland grassland, adjacent to freshwater habitats. It is a gregarious species, nesting in dispersed colonies and sub-colonies as a means of defence against predators. It is therefore less likely to breed successfully in small areas of habitat that can only support isolated pairs (Batten *et al.* 1990). In some colonies, nests are only 10-30 m apart. Breeding densities can reach 2-3 pairs/ha and up to 300 pairs/sq.km (Beintema *et al.*1995). Outside the breeding season, the Black-tailed Godwit favours the upper reaches of muddy estuaries, muddy inland lakes and nearby farmland, flooded grassland and, in some localities, rice fields (Hayman *et al.* 1986, Tucker & Heath 1994). Typical habitats in Africa are shallow floodplains along large river systems. Within this broad range of muddy habitats, the *islandica* population occurs primarily in maritime and coastal situations, while nominate *limosa* occurs mostly in freshwater habitats. It is a highly gregarious species, often occurring in flocks of thousands at favoured localities. This tendency for birds to congregate in large flocks at wintering, migratory stopover and roosting sites makes it vulnerable to loss of inter-tidal feeding habitats, human disturbance and hunting (Tucker & Heath 1994).

Network of key sites

The highly congregatory habits and low 1% thresholds of this species mean that there is a sizeable suite of key sites for each population. In Europe, a majority of key sites qualify as a result of January counts of *islandica*, which has a 1% threshold of 470. Most of these key sites are located in Western Europe with 32 in the UK, 24 in Ireland and 20 in France. In Iberia and Morocco, *islandica* mixes with the population of nominate *limosa* that breeds in Western Europe, but despite the higher 1% threshold, 23 sites in Spain, three in Portugal and one in Morocco still qualify as key sites.

Most key sites for the West European breeding population of nominate *limosa* have been identified in Africa, but one breeding site in Germany held over 1% of the population in the breeding season, and four sites in The Netherlands held numbers at this level in post-breeding congregations. Sites in Iberia and Morocco which are important for *islandica* have not been separated from this population. In Africa, six wetlands in Mauritania, five in Senegal and four in Mali have been identified as key sites for this population.

Key sites for breeding concentrations of the population of nominate *limosa* breeding in Eastern Europe have been identified in Lithuania, Poland and Belarus. Key staging sites important on migration for this population are found in Hungary (six sites), Ukraine (two sites), Romania, Bulgaria, Greece and Serbia. Key sites used outside the breeding season in Africa are in Sudan (two sites), Chad, Niger (two sites) and Cameroon. The Lake Chad Basin is of outstanding importance when conditions are suitable, and in January 2008, 39,700 were counted by aerial survey (B. Trolliet *in litt*.)

The population of nominate *limosa* breeding in West Asia is less well known. Key sites on migration have been identified in Russia, Kazakhstan, and Azerbaijan. Counts in January are the basis for key sites in Iran (eight sites) and single sites in Iraq, Uganda, Tanzania and Zambia.

Table 42. Key sites for Black-tailed Godwit. Sites where 1% or more of a population has been recorded

Country	Site	Lat.	Long.	Season	Max total	Year max	Average total	Basis for average	Source	Population(s) at site
Azerbaijan	Kirov Bay	39.08	48.95	Post-breeding migration	5000	1984			Shubin, 1998	W Asia
Belarus	Mid-Pripyat	52.15	27.00	Breeding	3000	1986			WBDB	E Europe
Bulgaria	Bourgas Bay	42.50	27.47	Post-breeding migration	20000	1990s			Kube *et al.* 1998	E Europe
Cameroon	Bas Chari (Cameroun)	6.00	12.00	Non-breeding	13226	2000			AfWC database	E Europe
Chad/ Cameroon/ Nigeria	Lake Chad	13.28	14.26	Non-breeding	39745	2008			B Trolliet, unpublished data	E Europe
France	Baie de Bourgneuf et Noirmoutier	47.04	-2.12	Non-breeding	615	1999	88	1999-04 (5)	IWC database	*islandica*
France	Baie de l'Aiguillon et Pointe d'Arçay	46.32	-1.17	Non-breeding	7950	2002	5989	1999-04 (5)	IWC database	W Europe + *islandica*
France	Baie du Mont Saint Michel	48.67	-1.51	Non-breeding	2500	1993	960	1999-04 (5)	IWC database	W Europe + *islandica*
France	Baie d'Yves	46.04	-1.08	Hard weather refuge	680	1997			R Mahéo, 2005 B Deceuninck & F Gabaillard	*islandica*
France	Basses Vallées Angevines	47.56	-0.58	Migration	30000	2001			WBDB	W Europe + *islandica*
France	Bassin d'Arcachon et Banc d'Arguin	44.67	-1.12	Migration	3000	2003			WBDB	W Europe + *islandica*
France	Camargue	43.52	4.60	Migration	10000	1997			WBDB	W Europe
France	Etangs Montpellierains	43.57	3.89	Migration	3000	1999			WBDB	W Europe + *islandica*
France	Golfe du Morbihan	47.56	-2.79	Non-breeding	1135	2003	630	1999-04 (5)	IWC database	*islandica*
France	Ile de Re	46.22	-1.50	Non-breeding	2100	2002	1505	1999-04 (5)	IWC database	W Europe + *islandica*
France	Ile d'Oléron, marais de Brouage-Saint-Agnant	45.77	-1.14	Migration	9000	1999			WBDB	W Europe + *islandica*
France	Littoral Picard	50.23	1.50	Non-breeding	863	1996	114	1999-04 (5)	IWC database	*islandica*
France	Marais de Brière	47.37	-2.17	Migration	2000	1999			WBDB	W Europe + *islandica*
France	Marais d'Olonne	46.53	-1.80	March	2800	1993			O. Girard *in litt.*	W Europe + *islandica*
France	Marais entre Crau: et Grand Rhône	43.43	4.71	Migration	2000	2003			WBDB	W Europe
France	Marais littoraux de Charente-Maritime, dont R.N. d'Yves	46.24	-1.48	Non-breeding	2350	2002	959	1999-04 (5)	IWC database	W Europe + *islandica*
France	Petite Camargue fluvio-lacustre	43.63	4.30	Migration	3000	1997			WBDB	W Europe + *islandica*
France	Presqu'île Guérandaise dont Traicts du Croisic	47.29	-2.51	Non-breeding	1146	2002	791	1999-04 (5)	IWC database	*islandica*
France	Résèrve Naturelle de Moeze (Charente-Seudre)	45.83	-1.14	Non-breeding	2715	2004	1525	1999-04 (5)	IWC database	W Europe + *islandica*
France	Sud-Loire	47.17	-2.13	Non-breeding	585	2004	284	1999-04 (5)	IWC database	*islandica*
Germany	Elbe marshes between Stade and Otterndorf	53.85	9.17	Breeding	2175	1995			WBDB	W Europe
Germany	Ems valley Leer to Emden	53.32	7.33	Autumn	1053				Melter & Schreiber 2000	W Europe
Germany	Rheiderland	53.23	7.32	Spring	3284				Melter & Schreiber	W Europe 2000
Greece	Axios, Loudias, & Aliakmon estuaries	40.50	22.72	Migration	4000	1990			WBDB	E Europe
Hungary	Biharugra fish-ponds	46.97	21.57	Migration	6000	1996			WBDB	E Europe
Hungary	Danube plain	46.82	19.25	Migration	8000	1996			WBDB	E Europe
Hungary	Dévaványa plain	47.17	21.15	Migration	13000	1996			WBDB	E Europe
Hungary	Hortobagy	47.62	21.07	Spring	30000	1995			Kube *et al.* 1998	E Europe
Hungary	Lake Fehér at Kardoskút	46.50	20.47	Migration	4000	1996			WBDB	E Europe
Hungary	Pusztaszer Landscape Protection Area	46.25	20.17	Migration	7000	1996			WBDB	E Europe
Iceland	Ósasvædi Ölfusár	63.95	-21.25	Breeding	600	1995			WBDB	*islandica*
Iran	Anzali Mordab complex	37.42	49.47	Wintering	1380	1970s			Evans 1994	W Asia
Iran	Fereidoonkenar Marshes	36.67	52.53	January	4751	2005	2501	2004-07 (3)	DOEI / WIWO	W Asia

Country	Site	Lat.	Long.	Season	Max total	Year max	Average total	Basis for average	Source	Population(s) at site
Iran	Gomishan Marshes & Turkoman Steppes	37.25	53.92	January	3679	2005	2878	2004-07 (3)	DOEI / WIWO	W Asia
Iran	Hoor Al-Azim Marsh	31.97	47.27	January	2015	2007			DOEI / WIWO	W Asia
Iran	Karun River Marshes	31.75	48.90	Wintering	2000	1975			Evans 1994	W Asia
Iran	Lake Bakhtegan, Lake Tashk & Kamjan Marshes	29.67	53.50	Wintering	4500	1992			Evans 1994	W Asia
Iran	Miankaleh Peninsula & Gorgan Bay	36.83	53.75	Wintering	1274	2007	908	2004-07 (3)	DOEI / WIWO	W Asia
Iran	South end of Hamoun-i Puzak	31.33	61.75	Wintering	5500	1973			Evans 1994	W Asia
Iraq	Attariya Floodplains	33.42	44.92	January	2500	1979			Scott & Carp 1982	W Asia
Ireland	Ballymacoda	51.84	-7.92	Non-breeding	1575	2001	1159	1999-04 (5)	BirdWatch Ireland 2005	*islandica*
Ireland	Bannow Bay	52.19	-6.80	Non-breeding	1070	1998	512	1994-99 (5)	IWC database	*islandica*
Ireland	Blackwater Callows	52.13	-7.87	Non-breeding	1243	2001	541	1999-04 (5)	BirdWatch Ireland 2005	*islandica*
Ireland	Blackwater Estuary	51.97	-7.84	Non-breeding	982	2001	690	1999-04 (5)	BirdWatch Ireland 2005	*islandica*
Ireland	Boyne Estuary	53.68	-6.27	Non-breeding	574	1998/99	393	1999/00-2003/04 (5)	BirdWatch Ireland 2005	*islandica*
Ireland	Broadmeadow (Malahide) Estuary	53.45	-6.17	Non-breeding	710	1998/99	356	1999/00-2003/04 (5)	BirdWatch Ireland 2005	*islandica*
Ireland	Clonakilty Bay	51.52	-8.93	Non-breeding	1600	2002	899	1997-03 (5)	BirdWatch Ireland 2005	*islandica*
Ireland	Cloyne	51.87	-8.12	Non-breeding	475	1996			WBDB	*islandica*
Ireland	Cork Harbour	51.83	-8.28	Non-breeding	3162	2003	2023	1999-04 (5)	BirdWatch Ireland 2005	*islandica*
Ireland	Corofin Lakes	52.87	-9.05	Non-breeding	1000	1999	210	1994-99 (5)	IWC database	*islandica*
Ireland	Courtmacsherry Bay, Broadstrand Bay & Dunworley	51.62	-8.63	Non-breeding	720	1996	403	1999-04 (5)	BirdWatch Ireland 2005	*islandica*
Ireland	Dublin Bay	53.34	-6.17	Non-breeding	1,448	2003/04	959	1999/00-2003/04 (5)	BirdWatch Ireland 2005	*islandica*
Ireland	Dundalk Bay	53.95	-6.33	Non-breeding	1950	1999	1399	1999-04 (5)	BirdWatch Ireland 2005	*islandica*
Ireland	Dungarvan Harbour	52.04	-7.54	Non-breeding	1608	2003	1021	1999-04 (5)	BirdWatch Ireland 2005	*islandica*
Ireland	Little Brosna Callows	53.07	-8.03	Non-breeding	4300	2000	2910	1999-04 (5)	BirdWatch Ireland 2005	*islandica*
Ireland	Lough Derg	52.98	-8.32	Non-breeding	1200	1995			WBDB	*islandica*
Ireland	Rahasane Turlough	53.13	-8.78	Non-breeding	1000	1998	391	1999-04 (5)	BirdWatch Ireland 2005	*islandica*
Ireland	Rogerstown Estuary	53.50	-6.13	Non-breeding	1253	2001/02	696	1999/00-2003/04 (5)	BirdWatch Ireland 2005	*islandica*
Ireland	Seagrange Park	53.38	-6.20	Non-breeding	750	2002/03	586	1999/00-2003/04 (5)	BirdWatch Ireland 2005	*islandica*
Ireland	Shannon & Fergus Estuary	52.66	-9.17	Non-breeding	3000	2001	1806	1997-04 (5)	BirdWatch Ireland 2005	*islandica*
Ireland	Shannon Callows	53.17	-8.00	Non-breeding	1150	1995	545	1994-02 (5)	BirdWatch Ireland 2005	*islandica*
Ireland	The Cull & Killag	52.20	-6.63	Non-breeding	770	1995/96	265	1999/00-2003/04 (5)	BirdWatch Ireland 2005	*islandica*
Ireland	Tralee Bay, Lough Gill & Akeragh Lough	52.25	-9.92	Non-breeding	802	2003	380	1999-04 (5)	BirdWatch Ireland 2005	*islandica*
Ireland	Wexford Harbour & Slobs	52.32	-6.42	Non-breeding	2340	1995	1377	1999-04 (5)	BirdWatch Ireland 2005	*islandica*
Kazakhstan	Tengiz - Korgalzhin Lakes	50.50	69.40	Post-breeding migration	8056	1999	7447	1999-04 (6)	Schielzeth *et al.* in prep.	W Asia
Lithuania	Nemunas river delta	55.30	21.33	April-September	2800	1999			Svazas *et al.* 1999	W Europe
Mali	Fleuve Niger: Downstream the Inner Delta	16.25	-0.08	Non-breeding	5760	1984	2277	1978-86 (5)	AfWC database	W Europe + E Europe
Mali	Inner Niger Delta	13.50	-4.00	Non-breeding	26852	1998-04			Zwarts *et al.* 2005	W Europe
Mali	Lac Horo	16.22	-3.92	Non-breeding	6200	1985			WBDB	W Europe

Country	Site	Lat.	Long.	Season	Max total	Year max	Average total	Basis for average	Source	Population(s) at site
Mali	Timisobo--Képagou	15.13	-3.97	Non-breeding	30000	1977			WBDB	W Europe
Mauritania	Aftout es Sâheli	17.37	-16.13	Non-breeding	6000	1987			WBDB	W Europe
Mauritania	Chott Boul	16.57	-16.43	Non-breeding	7900	2001			WBDB	W Europe
Mauritania	Lac d'Aleg	17.08	-13.98	Non-breeding	3112	1996	673	1984-01 (5)	AfWC database	W Europe
Mauritania	Lac de Magta Lahjar	17.35	-13.10	Non-breeding	1800	1996			AfWC database	W Europe
Mauritania	Podor-Bogue. Vallee du Senegal	16.67	-14.50	Post-breeding migration	5300	1975			AfWC database	W Europe
Mauritania	Rosso Total	16.50	-16.18	Non-breeding	8700	2001	1842	1997-01 (5)	AfWC database	W Europe
Montenegro	Ulcinj Salina	41.92	19.30	March	3423	2006			M Schneider-Jacoby *in litt.*	E Europe
Morocco	Merja Zerga: Kenitra	34.80	-6.30	Winter	16200	1995	7693	1991-95 (5)	IWC database	W Europe
Netherlands	Ilperveld, Varkensland & Twiske	52.45	4.93	Non-breeding	9850	1992			WBDB	W Europe + *islandica*
Netherlands	Oostvaardersplassen	52.43	5.35	Non-breeding	5596	1990			WBDB	W Europe + *islandica*
Netherlands	Oostzanerveld	52.45	4.87	Non-breeding	6000	1992			WBDB	W Europe + *islandica*
Netherlands	Rhine-Maas-Schelde Delta	51.50	4.00	Autumn	1608	2003	728	1999-03 (5)	RWS WD RIKZ 2005	W Europe + *islandica*
Netherlands	Wadden Sea - The Netherlands	53.30	5.38	Winter	5215	2003	1455	1999-03 (5)	SOVON, The Netherlands, 2005	W Europe + *islandica*
Netherlands	Wormer-and Jisperveld	52.52	4.83	Non-breeding	5500	1992			WBDB	W Europe + *islandica*
Niger	Fleuve Niger. Labbezanga -Niamey (Before 1985)	14.25	1.42	Non-breeding	2600	1972	1550	1972-84 (2)	AfWC database	W Europe + E Europe
Niger	Fleuve Niger. Niamey-Gaya (Before 1985)	12.57	2.73	Non-breeding	10500	1984			AfWC database	W Europe + E Europe
Nigeria	Baturiya Kafin Hansa	12.48	10.37	Non-breeding	7473	2000	3737	1999-00 (2)	AfWC database	E Europe
Nigeria	Hadejia-Nguru	12.67	10.50	Non-breeding	6473	1997	2171	1994-98 (5)	AfWC database	E Europe
Nigeria	Niger: Gaya-Kainji dam	11.17	4.00	Non-breeding	4900	1984			AfWC database	W Europe + E Europe
Poland	Biebrza river valley	53.50	22.83	Breeding	2988	1980			WBDB	E Europe
Poland	Tysmienica river valley	51.60	22.82	Breeding	2004	1995			WBDB	E Europe
Portugal	Estuário Do Sado	38.53	-8.83	Non-breeding	20030	1996	2219	1997-02 (5)	IWC database	W Europe + *islandica*
Portugal	Estuário Do Tejo	38.75	-9.08	Non-breeding	48980	1992	14203	1996-01 (5)	IWC database	W Europe + *islandica*
Portugal	Ria De Faro	37.00	-7.92	Non-breeding	4474	1995	2067	1997-01 (5)	IWC database	W Europe + *islandica*
Romania	Danube delta	45.00	29.00	March	15000	1994			Kube *et al.* 1998	E Europe
	Razim-Sinoie Lagoons	44.67	29.00	March	2500	1996			Schmitz *et al.* 2001	E Europe
Russia	Shabelskaja sand spit	46.87	38.50	Autumn	3000	1999			V. Belik unpub.	E Europe
Senegal	Lac de Guiers in Louga	15.80	-15.73	Non-breeding	3000	1984	694	1976-98 (5)	AfWC database	W Europe
Senegal	Ndiael	16.23	-16.08	Non-breeding	10935	1993	2337	1993-00 (5)	AfWC database	W Europe
Senegal	Parc National des Oiseaux de Djoudj	16.42	-16.25	Non-breeding	5520	1998	48	1997-01 (5)	AfWC database	W Europe
Senegal	Senegal river delta	16.42	-15.75	Non-breeding	2500	1976			AfWC database	W Europe
Senegal	Zic de Djeuss et environs (Total)	16.25	-16.30	Non-breeding	14000	1974	32	1993-00 (5)	AfWC database	W Europe
Serbia	Uzdin fish-pond	45.22	20.63	Migration	3000	1997			WBDB	E Europe
Spain	Arrozal De Hato Blanco (Se)	40.30	-3.75	Non-breeding	3100	1990	1064	1990-00 (3)	IWC database	W Europe + *islandica*
Spain	Arrozales De Puebla Y Villafranco (Se)	40.30	-3.75	Non-breeding	29900	1992	9418	1990-93 (4)	IWC database	W Europe + *islandica*
Spain	Brazo De La Torre Y Cantaritas (Se)	40.30	-3.75	Winter	5000	1991	5000	1991 (1)	IWC database	W Europe + *islandica*
Spain	Brazo De Los Pobres	40.30	-3.75	Non-breeding	4600	1990	2325	1990-94 (2)	IWC database	W Europe + *islandica*
Spain	Cádiz Bay	36.53	-6.27	Non-breeding	4250	1996	1985	1996-01 (5)	IWC database	W Europe + *islandica*
Spain	Caño Del Guadiamar Pnd (H)	36.97	-6.36	Winter	11000	2000	5502	1998-00 (2)	IWC database	W Europe + *islandica*
Spain	Del Palacio A La Algaida (H)	36.80	-2.60	Winter	14646	2001	5487	1998-03 (5)	IWC database	W Europe + *islandica*

Country	Site	Lat.	Long.	Season	Max total	Year max	Average total	Basis for average	Source	Population(s) at site
Spain	Del Puntal Al Palacio De Doñana (H)	36.97	-6.44	Winter	2000	2001	1080	1998-01 (3)	IWC database	W Europe + *islandica*
Spain	Delta Del Ebro	40.72	0.73	Migration	10000	1996			WBDB	W Europe + *islandica*
Spain	Entremuros De Los Pobres (Se)	40.30	-3.75	Winter	7000	1991	2640	1991-93 (3)	IWC database	W Europe + *islandica*
Spain	Extremadura Rice fields	39.00	-5.93	Migration	27500	2005	24314	2005-07 (3)	Masero *et al.* 2007	W Europe
Spain	Los Caracoles (Se)	40.30	-3.75	Winter	9400	1990			IWC database	W Europe + *islandica*
Spain	Lucio De Marilópez Grande (Se)	37.02	-6.34	Winter	18000	1992	6950	1991-95 (4)	IWC database	W Europe + *islandica*
Spain	Lucio Del Cangrejo Grande (Se)	40.30	-3.75	Winter	2200	1991	1500	1991-95 (4)	IWC database	W Europe + *islandica*
Spain	Lucio Del Lobo Grande (Se)	40.30	-3.75	Winter	3000	1990	1950	1990-93 (2)	IWC database	W Europe + *islandica*
Spain	Lucios de Veta La Palma -Isla Mayor (Se)	36.93	-6.24	Winter	21575	2001	13276	1996-03 (5)	IWC database	W Europe + *islandica*
Spain	Lucios Del Caballero Y Del Puntal (H)	36.96	-6.43	Winter	2000	1998	833	1992-01 (3)	IWC database	W Europe + *islandica*
Spain	Marisma De Hinojos (H)	36.98	-6.38	Winter	30000	2003	8466	1994-03 (5)	IWC database	W Europe + *islandica*
Spain	Marismas Del Rocío (H)	37.10	-6.47	Winter	8700	1998	2380	1998-03 (5)	IWC database	W Europe + *islandica*
Spain	Matasgordas (H)	40.30	-3.75	Winter	4400	1990	2250	1990-91 (2)	IWC database	W Europe + *islandica*
Spain	Parque Nacional de Doñana	36.99	-6.37	Non-breeding	20170	1992	12757	1997-01 (5)	IWC database	W Europe + *islandica*
Spain	Salinas De Bonanza (Hidalgo) (Ca)	36.82	-6.34	Winter	2420	1993	569	1992-01 (5)	IWC database	W Europe + *islandica*
Spain	Santoña Marshes	43.50	-3.50	Winter	657	2005	492	2002-06 (5)	Navedo et al. 2007	*islandica*
Sudan	White Nile Bird Sanct. <20Km	13.50	32.50	Non-breeding	3000	1983			AfWC database	E Europe
Sudan	White Nile Bird Sanct. 20-50Km	15.75	32.50	Non-breeding	4000	1983			AfWC database	E Europe
Tanzania	Singida lakes	-4.30	34.70	Non-breeding	7000	1993			WBDB	W Asia
Uganda	Doho Rice Scheme	0.95	34.00	Non-breeding	2792	1994	633	1992-01 (5)	AfWC database	W Asia
Ukraine	Pryp'yat' river valley	51.87	25.38	Breeding	7500	1996			WBDB	E Europe
Ukraine	The Sivash, Azov Sea	46.17	34.58	August	9000	1998			Chernichko *et al.* 2001	E Europe
U.K.	Abberton Reservoir	51.82	0.86	Autumn	1247	1996-03	627	1996-03 (5)	BTO, UK, 2005	*islandica*
U.K.	Alde complex	52.15	1.53	Autumn	600	1999-03	281	1999-03 (5)	BTO, UK, 2005	*islandica*
U.K.	Beaulieu Estuary	50.77	-1.38	Winter	725	1999-03	343	1999-03 (5)	BTO, UK, 2005	*islandica*
U.K.	Belfast Lough	54.67	-5.81	Autumn	875	1999-03	565	1999-03 (5)	BTO, UK, 2005	*islandica*
U.K.	Blackwater Estuary	51.72	0.80	Winter	2939	1999-03	1578	1999-03 (5)	BTO, UK, 2005	*islandica*
U.K.	Blyth Estuary	52.32	1.62	Spring	608	1995-01	354	1995-01 (5)	BTO, UK, 2005	*islandica*
U.K.	Breydon Water & Berney Marshes	52.59	1.66	Autumn	1630	1999-03	1197	1999-03 (5)	BTO, UK, 2005	*islandica*
U.K.	Chichester Harbour	50.78	-0.89	Winter	1050	1999-03	593	1999-03 (5)	BTO, UK, 2005	*islandica*
U.K.	Colne Estuary	51.78	0.98	Autumn	602	1999-03	281	1999-03 (5)	IWC database	*islandica*
U.K.	Dee Estuary	53.27	-3.10	Winter	4493	1999-03	3474	1999-03 (5)	BTO, UK, 2005	*islandica*
U.K.	Exe Estuary	50.63	-3.43	Winter	1113	1999-03	940	1999-03 (5)	BTO, UK, 2005	*islandic*
U.K.	Fen Drayton Gravel Pits	52.30	0.02	Winter	780	1996-01	267	1996-01 (5)	BTO, UK, 2005	*islandica*
U.K.	Forth Estuary	56.00	-3.27	Autumn	478	1999-03	235	1999-03 (5)	BTO, UK, 2005	*islandica*
U.K.	Hamford Water & the Naze	51.87	1.23	Winter	601	1999-03	406	1999-03 (5)	BTO, UK, 2005	*islandica*
U.K.	Humber Estuary	53.67	-0.17	Autumn	2108	1999-03	1355	1999-03 (5)	BTO, UK, 2005	W Europe + *islandica*
U.K.	Langstone Harbour	50.82	-1.00	Autumn	618	1998-03	547	1998-03 (5)	BTO, UK, 2005	*islandica*
U.K.	Meadow Lane Gravel Pits, St Ives	52.30	-0.05	Winter	800	2000-02	402	2000-02 (3)	BTO, UK, 2005	*islandica*
U.K.	Medway Estuary	51.40	0.65	Autumn	721	1999-03	328	1999-03 (5)	BTO, UK, 2005	*islandica*
U.K.	Mersey Estuary	53.30	-2.82	Autumn	2850	1999-03	2081	1999-03 (5)	BTO, UK, 2005	*islandica*

Country	Site	Lat.	Long.	Season	Max total	Year max	Average total	Basis for average	Source	Population(s) at site
U.K	Nene Washes	52.58	-0.02	Spring	1135	1995-99	315	1995-99 (5)	BTO, UK, 2005	*islandica*
U.K.	North Norfolk Coast	52.98	0.76	Winter	631	1999-03	309	1999-03 (5)	BTO, UK, 2005	*islandica*
U.K.	Orwell Estuary	52.00	1.23	Autumn	834	1999-03	513	1999-03 (5)	BTO, UK, 2005	*islandica*
U.K.	Ouse Washes	52.52	0.25	Winter	3468	1999-03	2372	1999-03 (5)	BTO, UK, 2005	*islandica*
U.K.	Pagham Harbour	50.75	-0.75	Winter	826	1999-03	410	1999-03 (5)	BTO, UK, 2005	*islandica*
U.K.	Poole Harbour	50.69	-2.00	Winter	2691	1999-03	2025	1999-03 (5)	BTO, UK, 2005	*islandica*
U.K.	Ribble Estuary	53.72	-2.92	Autumn	5583	1999-03	2829	1999-03 (5)	BTO, UK, 2005	*islandica*
U.K	River Avon - Ringwood to Christchurch	50.78	-1.78	January	3002	2000-03	1528	2000-03 (4)	BTO, UK, 2005	*islandica*
U.K.	Southampton Water	50.85	-1.35	Winter	1265	1999-03	555	1999-03 (5)	BTO, UK, 2005	*islandica*
U.K.	Stour Estuary	51.93	1.15	Winter	2593	1999-03	1979	1999-03 (5)	BTO, UK, 2005	W Europe + *islandica*
U.K.	Swale Estuary	51.35	0.83	Winter	2153	1999-03	1348	1999-03 (5)	BTO, UK, 2005	W Europe + *islandica*
U.K.	Thames Estuary	51.48	0.57	Autumn	3274	1999-03	2196	1999-03 (5)	BTO, UK, 2005	W Europe + *islandica*
U.K.	The Wash	52.93	0.30	Autumn	11451	1999-03	6882	1999-03 (5)	BTO, UK, 2005	W Europe + *islandica*
Zambia	Kafue Flats	-15.75	27.27	January	4300	2000			P Leonard *in litt.*	W Asia

Jeff Kirby & Derek Scott

Niels Gilissen

Bar-tailed Godwit
Limosa lapponica

Geographical variation and distribution

The Bar-tailed Godwit has a wide sub-arctic and low Arctic breeding distribution mainly in the Palearctic but also extending to northern and western Alaska. The northern limits of the breeding range are at about 67ºN on the Yamal Peninsula and 76ºN on the Taymyr Peninsula. There are five substantially disjunct breeding areas:

1) northern Fennoscandia, the northern part of the White Sea and the Kanin Peninsula;
2) from the Yamal Peninsula to the delta of the Anabar River;
3) from the Lena Delta east to Chaunsk Bay;
4) Anadyr and the southern part of the Chukotsky Peninsula;
5) northern and western Alaska.

Most authors have assigned the birds breeding in Northern Europe and Western Siberia east to eastern Taymyr (Khatanga River) to the nominate form, and birds breeding in Eastern Siberia (east of the Khatanga River) and Alaska to the form *baueri* (Peters 1934, Vaurie 1965, Johnsgard 1981, Cramp & Simmons 1983, Hayman *et al.* 1986). Birds breeding from the lower Lena River to the Kolyma Delta are intermediate in size and coloration between nominate *lapponica* and *baueri*, and were described under the name *menzbieri* by Portenko in 1936. Most authors have included "*menzbieri*" in *baueri*, although del Hoyo *et al.* (1996) recognise the form and give the breeding range as Northern Siberia between the River Khatanga and the Kolyma Delta. Engelmoer & Roselaar (1998) reviewed and re-defined the taxonomy of the Bar-tailed Godwit based on a global review of biometric and plumage characters from all breeding areas. They showed that birds from each of the five breeding areas listed above were morphologically distinct, and proposed subspecific status for each of them, respectively as follows:

1) L. l. lapponica;
2) L. l. taymyrensis: new sub-species;
3) L. l. menzbieri;
4) L. l. anadyrensis: new sub-species; (but see comments of Tomkovich & Serra 1999);
5) L. l. baueri.

The Bar-tailed Godwit winters widely on the coasts of Western Europe, Africa (south to South Africa), the Middle East, the Indian subcontinent, South-east Asia, Australia, New Zealand and the Pacific islands. Nominate *lapponica* (as defined by Engelmoer & Roselaar 1998) winters mainly in Western Europe; *taymyrensis* (included by most authors in *lapponica*) winters mainly in Africa, the Middle East, Pakistan and north-western India; and *menzbieri* and *anadyrensis* (included by most authors in *baueri*) winter from eastern India through South-east Asia to Australia. Birds breeding in western Alaska (*baueri* as defined by Engelmoer & Roselaar 1998) winter in the Pacific Islands, New Zealand and eastern Australia.

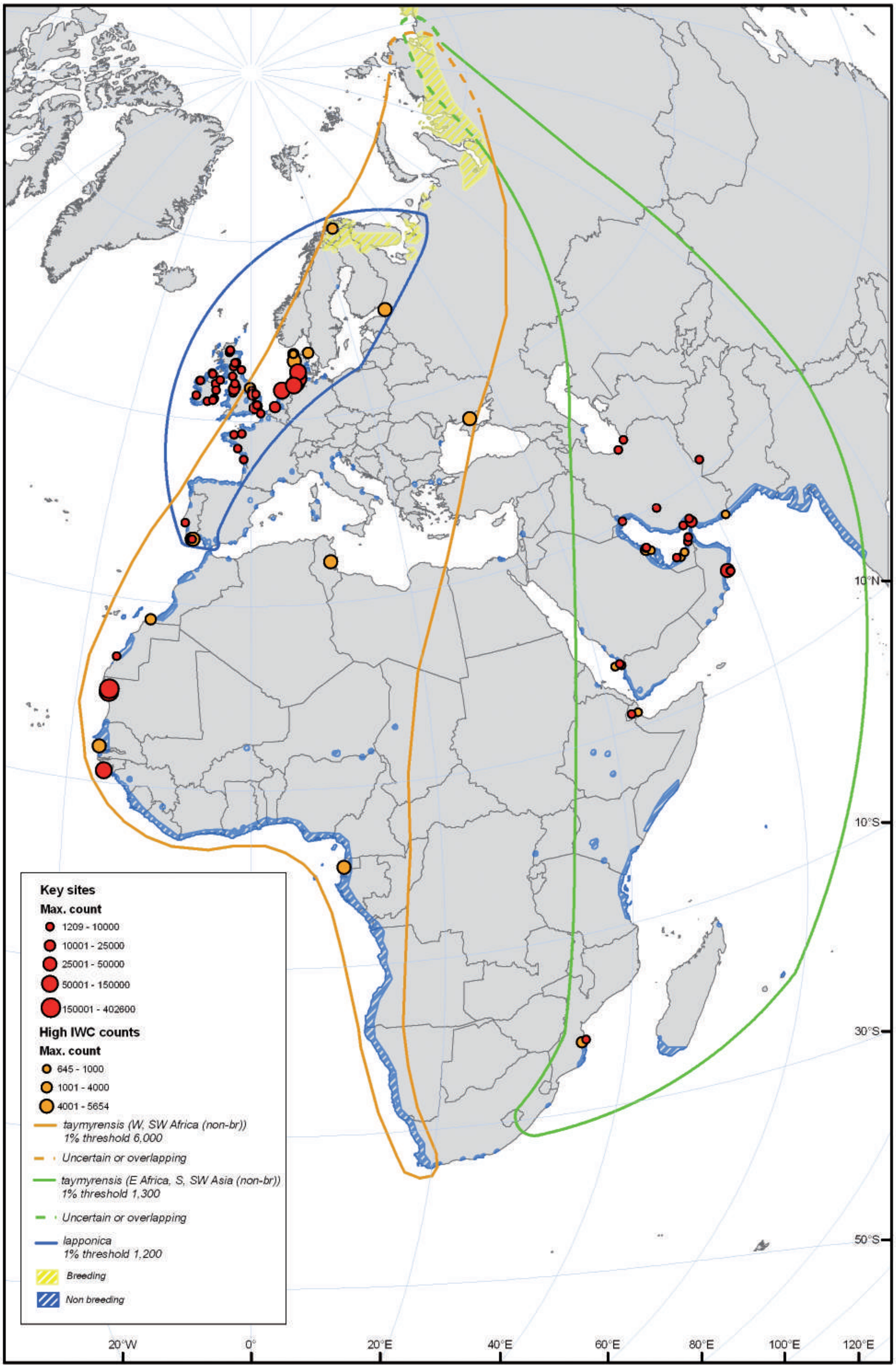
Movements

The Bar-tailed Godwit is a long-distance migrant, heavily dependent on a small number of coastal wetlands on passage and in winter. Birds from the subspecies *lapponica* with breeding areas in northern Fennoscandia and northern European Russia east to the Kanin Peninsula winter in Western Europe from the southern North Sea, Britain and Ireland south along the Atlantic coast to Portugal and southern Spain. Birds from the subspecies *taymyrensis* with breeding areas further east in Western Siberia (from Yamal east to the delta of the Anabar River) pass through Western Europe on their way to wintering areas on the coast of West Africa (Smit & Piersma 1989, Engelmoer 2008). Both populations reach Western Europe via the Baltic, and make extensive use of the Wadden Sea and other coastal wetlands in the southern North Sea as staging areas in spring and autumn.

The bulk of the West African wintering population is concentrated on the Banc d'Arguin in Mauritania and in the Bijagos Archipelago in Guinea-Bissau, but substantial numbers

Bar-tailed Godwit

Limosa lapponica



extend into the Gulf of Guinea at least as far as Gabon. In spring, birds from the West African wintering population gather on the Banc d'Arguin and apparently migrate from there in a single non-stop flight to their staging areas in the southern North Sea, mainly the Wadden Sea (Zwarts & Piersma 1990). The small numbers of birds wintering in Tunisia (fewer than 1,000 in recent years) presumably belong to the West African wintering population (Smit & Piersma 1989). Siberian breeders (*taymyrensis*) start southward migration by leaving their breeding grounds in mid-July and stage at coastal wetlands in the southern North Sea from mid-July to late August. About 10-15% of the birds caught in the Wash in mid- to late August are believed to belong to the West African wintering population (Atkinson. 2002), but birds stay only for a few weeks at their European staging sites before moving on to their African wintering areas where they undergo their post-breeding moult. Birds begin to arrive on the wintering areas in West Africa in late July, with the majority arriving between late August and October. Northward migration from the Banc d'Arguin starts at the end of April or the beginning of May, when they have already started to moult into breeding plumage (Piersma & Jukema 1990, 1993). Most of these birds gather in the Wadden Sea in April and May and continue to moult and fatten before moving on to the breeding grounds (Piersma & Jukema 1993, Scheiffarth *et al.* 2002). Peak numbers in the Wadden Sea (as many as 340,000) are reached in early May, when both, the *taymyrensis* and the *lapponica* subspecies are present (Smit & Piersma 1989, Meltofte *et al.* 1994, Blew *et al.* 2005).

The migration patterns of nominate birds wintering in the Wadden Sea and on British estuaries was reviewed by Scheiffarth (2001a). In March, birds wintering on British estuaries move to the Wadden Sea; some of these birds fly directly to the northern part of the Wadden Sea whereas others seem to stopover for a brief period in the western part (Meltofte *et al.* 1994). In late April, almost all Bar-tailed Godwits of the *lapponica* subspecies seem to gather in the Danish and northern German Wadden Sea. In the first half of May, European wintering Bar-tailed Godwits depart to their Fennoscandian and West-Siberian breeding sites where they can be observed from mid May onwards (Byrkjedal *et al.* 1989). In autumn, migration seems to be more complex. Numbers of Bar-tailed Godwits in the Wadden Sea are lower than in spring (Meltofte *et al.* 1994) which can be caused by shorter stopover times and/or by birds not visiting the same stopover areas as in spring. Ringing controls, as well as the phenology on the Wash (Atkinson 1996), indicate that some birds migrate directly from the breeding area to Great Britain. Others arrive in the Wadden Sea in August but move on to further sites in September, indicating that some European migrants may use shorter stopover times than in spring. Another group of birds arrives in August and September and stays in the Wadden Sea for overwintering.

Each subspecies appears to have a differential migration pattern between the sexes. In *taymyrensis* females have the tendency to winter further south than males (Zwarts & Piersma 1990). Similarly, in *lapponica* males and females tend to use different wintering areas, with females having a more north-easterly distribution than males (Scheiffarth 2001a).

Bar-tailed Godwits are generally scarce inland in Europe, and the species is rare in the eastern Mediterranean. However, as many as 1,000-1,200 have been recorded on spring passage in Sivash Gulf on the Sea of Azov, and up to 100-130 have occurred there on autumn passage (Chernichko *et al.* 1991). This suggests that there may be some overland passage of birds from West Africa to the Black Sea and Western Siberia. The migration routes of the birds wintering on the coasts of Angola (500) and northern Namibia (3,000) are uncertain, although it seems most likely that these constitute the southernmost limit of the West African wintering population. A scattering of inland records in Central Africa, mainly during the period August-November, suggests some overland migration of birds to the south-west coast of Africa (Urban *et al.* 1986). These may be birds that have staged in the Black Sea. Further evidence for an overland route from Western Siberia via the Black Sea and Mediterranean to the coast of South-west Africa is provided by the recovery in Namibia (in February) of a bird ringed on autumn passage in Italy (Underhill 1997).

Birds breeding in north-central Siberia are believed to migrate overland to winter on the coasts of the Arabian Peninsula, Eastern Africa (south in small numbers to South Africa), Madagascar, and southern Iran east to north-western India. Birds arrive in the Red Sea and Somalia mainly from September. A bird ringed in March in East Cape Province in South Africa was recovered in November of the following year in the south-west Caspian in Iran (Argyle 1975). The species is a relatively scarce passage migrant in the Caspian region. It occurs in small numbers on the west coast of the Caspian, mainly in autumn (maximum of 40 on the Agrakhan Peninsula), and is rare on the east coast (Shubin 1998). Similarly, only small numbers of birds pass through the south Caspian region of Iran in autumn (maximum count of 100) and even fewer in spring (maximum count of 10) (Scott 1995). This suggests that the bulk of the population wintering on the shores of the Indian Ocean reaches the Persian Gulf and Arabian Sea in a single overland flight from the Arctic, and returns the same way. The main departure from the wintering areas in Africa occurs between mid-April and early May (Urban *et al.* 1986).

Population limits

Waterbird Population Estimates distinguishes three relatively discrete populations of Bar-tailed Godwits in Western Eurasia and Africa, mainly on the basis of different wintering areas:

1) birds wintering in Western Europe (thought to breed mainly in Northern Europe and Western Siberia west of the Yamal Peninsula);
2) birds wintering in West Africa south in smaller numbers to south-western Africa (thought to breed mainly in Western Siberia east to the Taymyr Peninsula);
3) birds wintering in the Persian Gulf and on the shores of the Arabian Sea and Indian Ocean south to South Africa and east to western India (thought to breed mainly in eastern Taymyr).

The first of these groups is equivalent to the nominate race as defined by Engelmoer & Roselaar (1998). There has been considerable discussion and varying treatment of the taxonomy of birds found in Africa and South-west Asia outside the breeding season. Both these populations are now considered to belong to *taymyrensis* (Engelmoer & Roselaar 1998), with the western population wintering along the western seaboard of Africa from Morocco to the Cape, and the eastern population occurring along coasts from eastern India to Arabia and south to Mozambique.

The birds wintering in Pakistan and western India are presumably also the *taymyrensis* of Engelmoer & Roselaar (1998). These birds are included within the South-west Asia and Eastern Africa non-breeding population following Perennou *et al.* (1994), who drew attention to the abundance of the species along the Mekran coast of south-eastern Iran and western Pakistan, and scarcity of the species in southern India and Sri Lanka.

Although the two forms using the East Atlantic Flyway (*lapponica* and *taymyrensis*) make extensive use of the same sites around the southern North Sea during the migration seasons, there is a clear segregation in their wintering areas. Smit & Piersma (1989) used the Straits of Gibraltar as the border between the European (i.e. *lapponica*) and African (i.e. *taymyrensis*) wintering populations, and this boundary was retained by Stroud *et al.* (2004).

Population size

1. *lapponica*

Population estimate	1% threshold	Population trend
120,000	1,200	stable

Smit & Piersma (1989) gave an estimate of 115,000 based on counts of wintering birds, and this was adopted in the first two editions of *Waterbird Population Estimates*. Stroud *et al.* (2004) gave a slightly higher estimate of 120,000 based on midwinter counts and estimates in the 1990s, and this new estimate was adopted in *WPE3* and *WPE4*. The breeding population in Norway, Sweden and Finland has recently been estimated at 1,325-3,400 pairs, and that in north-west and north-east European Russia at only 311-4,000 pairs (sources in Thorup 2006). Thus the estimated total European breeding population can account for only about 4,900-22,200 post-breeding individuals. There is clearly a major discrepancy with winter counts, which are at least five times greater. This may suggest that either breeding estimates are too low, as suggested by Smit & Saari (1997), or that the winter counts include some *taymyrensis* (Stroud *et al.* 2004, Engelmoer 2008)).

2. *taymyrensis* West & South-west Africa (non-breeding)

Population estimate	1% threshold	Population trend
600,000	6,000	Possibly decreasing

Smit & Piersma (1989) gave an estimate of 707,000 based on counts of wintering birds, and this estimate, rounded to 700,000, was given in the first two editions of *Waterbird Population Estimates.* Stroud *et al.* (2004) gave an estimate of 520,000 based on counts of wintering birds in the 1990s, and this estimate was adopted in *WPE3*. However, Dodman (2002) noted that simultaneous data from the Banc d'Arguin, Mauritania, and Bijagos Archipelago, Guinea-Bissau, in January 2001 gave a total of 469,600, almost 12,000 more than the combined national totals used by Stroud *et al.* (2004). Allowing for an additional 6,700 birds elsewhere in Mauritania in January 2001, Dodman concluded that at least 18,500 could be added to the total of 520,000 given by Stroud *et al.* (2004), and proposed a new population estimate of 540,000. Trolliet & Fouquet (2004) produced an even higher estimate of 700,000 for this population, based on their compilation of data from West Africa. In view of the uncertainty, a conservative estimate of 600,000 was adopted in *WPE4* pending more precise data from the West African wintering areas. The previous population trend estimate of "decreasing" also appears to be less certain, and this has been amended to "Possibly decreasing".

3. *taymyrensis* Eastern Africa, South-west & South Asia (non-breeding)

Population estimate	1% threshold	Population trend
100,000-150,000	1,300	Unknown

Perennou *et al.* (1994) estimated the total population wintering in Eastern Africa, South-west Asia and South Asia at a minimum of 100,000 birds. The estimate of numbers wintering in South-west Asia and Eastern and Southern Africa based on 1990s counts and estimates is 59,700 (Stroud *et al.* 2004), but this is undoubtedly too low because of poor coverage in parts of the Arabian Peninsula and North-east Africa (Sudan, Djibouti and Somalia). The figure includes an old estimate of 30,000 for Iran. Aerial surveys of the entire south coast of Iran in the 1970s located a wintering population of 25,000-35,000 Bar-tailed Godwits, mainly along the shores of the Straits of Hormoz and Persian Baluchestan (Perennou *et al.* 1994, Scott 1995). No aerial surveys have been undertaken in southern Iran since the 1970s, and most of these birds have gone unrecorded in the recent ground counts, which have recorded only a few thousand birds, e.g. 2,455 in Hormozgan Province in January 2004 (Willems & Felix 2004). The number of Bar-tailed Godwits wintering in Pakistan and western India is uncertain, because of incomplete coverage. The highest midwinter counts in Pakistan and India in recent years have been 8,100 in 1994, 7,025 in 1995 and 19,290 in 1996 (Lopez & Mundkur 1997). Although there are major uncertainties in the total size of this population, current evidence suggests that the population size is at least 100,000 but unlikely to exceed 150,000. Stroud *et al*. (2004) gave the range as their estimate, and this was adopted in WPE3 and WPE4.

Conservation status

The current estimate of 120,000 for the number of *lapponica* wintering in Western Europe suggests that this population has remained stable since at least the mid-1980s (Stroud *et al.* 2004). In Britain, which supports almost half of this population, numbers fell by 14% between 1981-85 and 1988-92 (Cayford & Waters 1996), following an increase from 1971 to 1985. However, there was a marked increase in the numbers of birds wintering in Britain in 1995/96 and 1996/97 (Waters *et al.* 1998) and overall, the population of *lapponica* recovered to 1980s levels by the early 2000s (IWC data). A decrease was reported in the number of birds wintering in France between 1982 and 1993 from 12,000 to 3,000 (Smit 1994), but numbers have increased again since then (to 6,500 in 1999; Deceuninck & Mahéo 2000). The relatively small populations breeding in Norway and European Russia are thought to be stable, while the small population breeding in Finland is reported to be decreasing (BirdLife International 2004a).

Stroud *et al.* (2004) concluded that there had been a substantial and rapid decline in the population of *taymyrensis* wintering in West Africa since the mid-1980s. Their population estimate of 520,000 suggested that there had been a 26% decline in numbers between the mid-1980s and late 1990s. A comprehensive survey of the Banc d'Arguin, Mauritania, in early 1997 found only 342,000 Bar-tailed Godwits, a decrease of 37% on the 1980 total (Dodman *et al.* 1997). However, numbers appear to have recovered since then, as 401,000 were counted in January 2000 and 373,000 in January 2001 (Dodman & Diagana 2003). Other significant decreases appear to have taken place in Guinea-Bissau, where numbers fell from 115,800 in 1987 to 75,000 in 1994, but recovered to 97,000 in 2001 (Dodman & Sá 2005), Trolliet & Girard (2004) reviewed all available data and recommended an increase in the estimate for *taymyrensis* wintering in West Africa, not because numbers were thought to be increasing, but because previous estimates had been based on incomplete data.

Numbers of *taymyrensis* wintering in Morocco increased from 3,000 to 7,800 between the mid-1980s and the mid-1990s (Stroud *et al.* 2004). The numbers wintering in south-western Africa have also been increasing in recent decades, although these still represent only a small fraction of the total population. There were only two records of Bar-tailed Godwits in Southern Africa prior to 1939. Since then, the species has become a regular winter visitor to the west coast (Underhill 1997), with numbers building up to an estimated 2,600 by the mid-1980s (Summers *et al.* 1987) and over 3,000 in recent years.

No information is available on trends in the population wintering in Eastern Africa, South-west Asia and South Asia, and trends on the breeding grounds of *taymyrensis* in Northern Siberia are unknown (Smit & Saari 1997). The Bar-tailed Godwit is a vulnerable species due to its reliance on a relatively small number of coastal sites outside the breeding season. The populations of nominate *lapponica* and western *taymyrensis*, in particular, are concentrated at just a few sites, both in winter and during the migration seasons. Some of the sites in Western Europe are unprotected and seriously threatened by land-claim, pollution and disturbance.

Habitat and ecology

The Bar-tailed Godwit breeds in marshy places in mossy and shrub tundra, swampy heathlands in the willow and birch zones near the tree-line, and occasionally open bogs in the extreme northern portions of the coniferous forest belt. The breeding season extends from the end of May to August. In Alaska, nesting birds are at times associated with skua (*Stercorarius*) territories (Johnsgard 1981), but this appears not to be the case on the Taymyr peninsula (Yésou *et al.* 1992). In Scandinavia birds take advantage of anti-predator defence by breeding in association with Whimbrels (Larsen & Moldsvor 1992). Outside the breeding season, the Bar-tailed Godwit is essentially an estuarine species, occurring on muddy coastlines, in sheltered bays and estuaries with intertidal mudflats or sand bars, and less commonly on sandy beaches. Wintering birds around the North Sea show a preference for the outer parts of estuaries where substrates are usually sandy (Musgrove *at al.* 2003, Scheiffarth 2001a). On migration, areas where both, *lapponica* and *taymyrensis* occur, one can observe a spatial segregation with *lapponica* using the outer, sandy parts and *taymyrensis* the inner, more muddy parts (Prokosch 1988, Scheiffarth 2001a). Bar-tailed Godwits are rare inland, although small numbers of birds may appear at large freshwater and saline lakes during migration. The species is highly gregarious outside the breeding season, often forming flocks of many thousands.

For all areas from which information is available, polychaetes form the staple food for Bar-tailed Godwits on migration and during the wintering period (Scheiffarth 2001b). The second important prey group are molluscs, but there exists a large seasonal and geographical variation in the use of this prey. However, the share of molluscs in the diet rarely exceeds 20%. At least during migration and at some European wintering sites males and females show strong differences in diet choice which results in spatial segregation within flocks (Smith & Evans 1973) and over tidal flats (Both *et al.* 2003, Scheiffarth 2001b). Females usually feed deeper in the water or along the water line, searching for large polychaetes while males forage in the shallower parts along or above the water line or during some periods use high lying areas on the mudflats. Here they feed on small polychaetes and molluscs. This pattern is either driven by competition between the sexes (Both *et al.* 2003) or by the opportunity males take with the occurrence of profitable food emerging at some times of the year on high lying mudflats (Scheiffarth 2001b). The sexual differences in diet choice can vary seasonally, depending on food availability (Scheiffarth 2001b).

Many immature birds remain in their non-breeding range throughout their second year. It is possible that some Bar-tailed Godwits do not commence breeding until aged three years, and spend two austral winters in Southern Africa before returning to the breeding grounds (Underhill 1997). The species shows a high degree of site fidelity to staging and wintering areas in succeeding years (Tucker & Heath 1994, del Hoyo *et al.* 1996, Scheiffarth 2001a). In adults, the wing moult takes place between August and early November in Western Europe and West Africa (Smit & Piersma 1989). Young birds that remain throughout the year in their winter quarters begin their moult approximately six weeks before adults (Atkinson. 2002).

Network of key sites

By far the most important site in Europe is the Wadden Sea, which at different times of the year hosts the great bulk of both nominate *lapponica* and the western population of *taymyrensis*. At least 31 key wintering sites can be identified for *lapponica* in Western Europe: in Denmark (1), Ireland (7), The Netherlands (2), Germany (2) and U.K. (18). Other sites on the Atlantic coast of continental Europe that support over 1,200 Bar-tailed Godwits in midwinter, e.g. in France, Spain and Portugal, would also qualify as key sites for nominate *lapponica*, as *taymyrensis* winters almost exclusively in West Africa.

Only three key wintering sites have been identified for western *taymyrensis*, but together these sites hold the great bulk of the population: Banc d'Arguin in Mauritania (543,000 in 1980, 402,600 in 2000 and 372,000 in 2001), Bijagos Archipelago in Guinea-Bissau (115,800 in 1986/87, 75,000 in 1994 and 97,000 in 2001), and Baie d'Ad Dakhla in Morocco (7,440 in the 1990s).

Seven key wintering sites have been identified in South-west Asia for the eastern population of western *taymyrensis* on the basis of data from the 1990s: Barr Al Hikman (maximum count 50,000) and Masirah Island (2,800) in Oman, Jizan Beach (2,700) and Tarut Bay (2,300) in Saudi Arabia, and Khor Al Beidah (1,300), Khor Dubai (1,500) and Merawah Island (1,700) in the United Arab Emirates. A further four sites on the south coast of Iran exceeded the 1% threshold in the 1970s: Khor-al Amaya and Khor Musa (2,000), Khouran Straits (2,400), Deltas of Rud-i Shur, Rud-i Shirin and Rud-i Minab (5,000), and Deltas of Rud-i Gaz and Rud-i Hara (11,500). The Rud-i-Shur complex held 4,168 in 2007, and an additional site in Iran, Khoor-e-Kargoushki, was identified as a key site in recent surveys. Two key sites have also been identified for this population in Eastern Africa: Salines Est in Djibouti (1,700 in January 2002), and the Bazaruto Archipelago in Mozambique (8,500 in 1998). The maximum counts at these 13 sites in South-west Asia and Eastern Africa could account for about 90,000 birds, i.e. some 60-90% of the estimated population. Bar-tailed Godwits from this population are also known to winter in substantial numbers along the coasts of Pakistan and north-western India (Perennou *et al.* 1994), and it is possible that there are additional key sites in these two countries.

Protection status of key sites

Within the European Union, almost all staging and wintering sites are protected by EU legislation (Natura 2000). Additionally, the three administrative parts of the German Wadden Sea were declared as National Park in 1985, 1986, and 1990 and the Danish Wadden Sea will become a National Park in 2009. Furthermore, the Dutch and almost the entire German Wadden Sea are nominated as World Heritage Site (Common Wadden Sea Secretariat, World Heritage Nomination Project Group 2008).

The Banc d'Arguin (1,173,000 ha) in Mauritania was designated as a National Park in 1976, a Ramsar site in 1982 and a World Heritage Site in 1989; the principal threat comes from over-fishing in coastal waters and impact that this is having on the coastal ecosystem as a whole (Fishpool & Evans 2001). The Bijagos Archipelago (190,000 ha) in Guinea-Bissau was declared a Biosphere Reserve in 1996 and incorporates Ilhas de Orango National Park and part of João Vieira/Poilão Marine National Park. Some 20,000 people live in the reserve; threats include wood-cutting for fuel and land reclamation for rice production, and hunting is a potential problem (Fishpool & Evans 2001). The Baie d'Ad Dakhla in Morocco is unprotected.

All four sites in southern Iran were designated as Ramsar sites in 1975; the tidal mudflats of Khor-al Amaya and Khor Musa are protected within Shadegan Wildlife Refuge (296,000 ha) established in 1972, and Khouran Straits are partly protected in the Hara Protected Area and Biosphere Reserve (85,686 ha; Scott 1995). Most of the wintering sites in the Arabian Peninsula are unprotected, but Khor Dubai in the United Arab Emirates is a Bird Sanctuary (Scott 1995). The Bazaruto Archipelago in Mozambique is partly Protected in a National Park, but the island of Bazaruto, where the largest concentrations of waders occur, is unprotected (Fishpool & Evans 2001).

Table 43. Key sites for Bar-tailed Godwit. Sites where 1% or more of a population has been recorded

Country	Site	Lat.	Long.	Season	Max total	Year max	Average total	Basis for average	Source	Population(s) at site
Denmark	Wadden Sea - Denmark	55.16	8.58	Pre-breeding migration	28051	2004	20704	2000-04 (3)	NERI, Denmark, 2005	W *taymyrensis* + *lapponica*
Djibouti	Salines Est	11.50	42.50	Non-breeding	1720	2002		`	AfWC database	E *taymyrensis*
France	Baie de Bourgneuf et Noirmoutier	47.04	-2.12	Non-breeding	3173	2003	1500	1999-04 (5)	IWC database	*lapponica*
France	Baie de St-Brieuc-Yffiniac-Morieux	48.54	-2.73	Non-breeding	1300	1990	529	1999-04 (5)	IWC database	*lapponica*
France	Baie du Mont Saint Michel	48.67	-1.51	Non-breeding	1510	2004	880	1998-04 (5)	IWC database	*lapponica*
France	Résèrve Naturelle de Moeze (Charente-Seudre)	45.83	-1.14	Non-breeding	1844	2003	1389	1999-04 (5)	IWC database	*lapponica*
Germany	Wadden Sea - Lower Saxony	54.00	8.00	Spring	55701	1996	26883	1998-02 (5)	J . Blew, CWSS, 2005	W *taymyrensis* + *lapponica*
Germany	Wadden Sea - Schleswig-Holstein	54.50	8.50	Spring	101060	1995	55952	1998-02 (5)	J . Blew, CWSS, 2005	W *taymyrensis* + *lapponica*
Guinea-Bissau	Bijagos Archipelago	11.30	-16.00	January	108700	1993	94000	1992-01(3)	Dodman & Sa 2005	W *taymyrensis*
Iran	Khoor-e Kargoushki	26.17	57.18	January	1430	2005	1048	2005-07 (2)	DOEI / WIWO	E *taymyrensis*
Iran	Khouran Straits	26.83	55.67	Wintering	2410	1974			Evans 1994	E *taymyrensis*
Iran	Rud-i-Gaz & Rud-i-Hara Deltas	26.67	56.83	Wintering	11500	1973			Evans 1994	E *taymyrensis*
Iran	Rud-i-Shur, Rud-i-Shirin & Rud-i-Minab Deltas	27.08	56.75	Wintering	4168	2007	2716	2004-07 (3)	DOEI / WIWO	E *taymyrensis*
Iran	Shadegan Marshes, Khor -al Amaya & Khor Musa	30.17	48.67	Wintering	2120	1974			Evans 1994	E *taymyrensis*
Ireland	Dublin Bay	53.34	-6.17	Non-breeding	3371	1999	1822	1999-04 (5)	BirdWatch Ireland 2005	*lapponica*
Ireland	Dundalk Bay	53.95	-6.33	Non-breeding	4175	1997	2586	1999-04 (5)	BirdWatch Ireland 2005	*lapponica*
Ireland	Dungarvan Harbour	52.04	-7.54	Non-breeding	1892	2003	1116	1999-04 (5)	BirdWatch Ireland 2005	*lapponica*
Ireland	Killala Bay	54.24	-9.17	Non-breeding	1755	2003	807	1999-04 (5)	BirdWatch Ireland 2005	*lapponica*
Ireland	Shannon & Fergus Estuary	52.60	-9.50	Non-breeding	1565	1997	448	1997-01 (5)	IWC database	*lapponica*
Ireland	The Cull and Killag	52.20	-6.63	Non-breeding	1460	2000	429	1999-04 (5)	BirdWatch Ireland 2005	*lapponica*
Ireland	Wexford Harbour & Slobs	52.32	-6.42	Non-breeding	2126	1996	1042	1999-04 (5)	BirdWatch Ireland 2005	*lapponica*
Mauritania	Banc d'Arguin	20.12	-16.27	January	402600	2000	372570	1997-01 (3)	Hagemeijer *et al.* 2004	Western
Morocco	Baie d'Ad Dakhla	23.7	-15.85	Winter	7192	1995			WBDB	*taymyrensis*
Mozambique	Bazaruto, Benguera & Magaruque Is	-21.75	35.42	January	5523	1998	4282	1996-98 (3)	Köhler & Köhler 1999	E *taymyrensis*
Netherlands	Rhine-Maas-Schelde Delta	51.50	4.00	Spring	15679	2000	12847	1999-03 (5)	RWS WD RIKZ 2005	W *taymyrensis* + *lapponica*
Netherlands	Wadden Sea -	53.30	5.38	Spring	149438	2004	112160	1999-03 (5)	SOVON, The Netherlands, 2005	W *taymyrensis* + *lapponica*
Oman	Barr Al Hikman	20.63	58.47	Non-breeding	65000	2008	26400	1991-01 (5)	IWC database R. Klaasen & J. de Fouw *in litt*	E *taymyrensis*
Oman	Masirah Island	20.50	58.75	Non-breeding	2808	1994	1897	1994-01 (5)	IWC database	E *taymyrensis*

Country	Site	Lat.	Long.	Season	Max total	Year max	Average total	Basis for average	Source	Population(s) at site
Portugal	Estuário Do Tejo	38.75	-9.08	Non-breeding	1500	1996	925	1996-01 (5)	IWC database	*lapponica*
Portugal	Ria De Faro	37.00	-7.92	Non-breeding	4218	1995	1961	1994-99 (5)	IWC database	*lapponica*
Saudi Arabia	Jizan Beach	16.88	42.53	Non-breeding	2740	1992	1009	1991-96 (5)	IWC database	E *taymyrensis*
Saudi Arabia	Tarut Bay	26.67	50.17	Non-breeding	2273	1992	1695	1992-96 (4)	IWC database	E *taymyrensis*
U.A.E.	Khor Al Beidah	25.55	55.62	Non-breeding	1300	1992	468	1995-99 (5)	IWC database	E *taymyrensis*
U.A.E.	Khor Dubai	25.21	55.33	Non-breeding	1500	1994	395	1995-99 (5)	IWC database	E *taymyrensis*
U.A.E.	Merawah Island	24.33	53.25	Non-breeding	1704	1994	1195	1994-98 (4)	IWC database	E *taymyrensis*
U.K.	Alt Estuary	53.52	-3.05	Winter	12098	1999-03	7970	1999-03 (5)	BTO, UK, 2005	*lapponica*
U.K.	Cromarty Firth	57.72	-4.05	Winter	3439	1999-03	20885	1999-03 (5)	BTO, UK, 2005	*lapponica*
U.K.	Dee Estuary	53.16	3.60	Winter	1209	1999-03	731	1999-03 (5)	BTO, UK, 2005	*lapponica*
U.K.	Dengie Flats	51.41	0.56	Winter	4970	1999-03	2734	1999-03 (5)	BTO, UK, 2005	*lapponica*
U.K.	Dornoch Firth	57.82	-4.12	Winter	1561	1999-03	968	1999-03 (5)	BTO, UK, 2005	*lapponica*
U.K.	Forth Estuary	56.00	-3.27	Winter	1793	1999-03	1423	1999-03 (5)	BTO, UK, 2005	*lapponica*
U.K.	Humber Estuary	53.40	0.10	Winter	3669	1999-03	2848	1999-03 (5)	BTO, UK, 2005	*lapponica*
U.K.	Inner Moray & Inverness Firth	57.53	-4.20	Winter	1510	1999-03	1069	1999-03 (5)	BTO, UK, 2005	*lapponica*
U.K.	Lindisfarne	55.67	-1.82	Winter	5237	1999-03	4075	1998-03 (5)	BTO, UK, 2005	*lapponica*
U.K.	Lough Foyle	55.07	-7.06	Winter	4108	1999-03	1468	1999-03(5)	BTO, UK, 2005	*lapponica*
U.K.	Morecambe Bay	54.12	-2.93	Winter	5718	1999-03	3628	1999-03(5)	BTO, UK, 2005	*lapponica*
U.K.	North Norfolk Coast	52.98	0.76	Autumn	7429	1999-03	4855	1999-03 (5)	BTO, UK, 2005	*lapponica*
U.K.	Ribble Estuary	53.72	-2.92	Winter	20950	1999-03	8765	1999-03(5)	IWC database	*lapponica*
U.K.	Solway Estuary	54.92	-3.40	Winter	2106	1999-03	1561	1999-03 (5)	BTO, UK, 2005	*lapponica*
U.K.	Strangford Lough	54.45	-5.60	Winter	2019	1999-03	1299	1999-03 (5)	BTO, UK, 2005	*lapponica*
U.K.	Tay Estuary	56.43	-2.83	Winter	1944	1999-03	1371	1999-03 (5)	BTO, UK, 2005	*lapponica*
U.K.	Thames Estuary	51.48	0.57	Winter	8989	1999-03	4961	1997-03 (5)	BTO, UK, 2005	*lapponica*
U.K.	The Wash	52.93	0.30	Winter	23751	1999-03	17738	1999-03 (5)	BTO, UK, 2005	*lapponica*

Derek Scott & Gregor Scheiffarth

Tim Zuroski

Whimbrel *Numenius phaeopus*

Geographical variation and distribution

The Whimbrel breeds in the boreal, sub-arctic and low Arctic zones of Eurasia and North America, and winters mainly along coasts in the Southern Hemisphere and tropical regions of the Northern Hemisphere (Cramp & Simmons 1983). Engelmoer & Roselaar (1998) reviewed the taxonomy of the species based on plumage characters and biometrics of samples taken from all major breeding areas. They concluded that there are three distinct subspecies breeding in Western Eurasia:

- *N. p. phaeopus*, breeding in Scandinavia and the Baltic States in the west to south-western Taymyr, the middle Yenisey and the Omsk region in the east.
- *N. p. islandicus*, breeding in Iceland, the Faeroes, Orkney, Shetland and north-west mainland of Scotland. This subspecies was first described by Salomonsen (1947). The small number of pairs of Whimbrel breeding in East Greenland presumably belong to this form.
- *N. p. alboaxillaris*, breeding on the steppes east of the lower Volga and south and south-east of the Urals in south-east European Russia and adjacent parts of Kazakhstan.

The nominate form reaches the northern limit of its breeding range at about 70ºN in Norway, and the southern limit at about 55ºN in Belarus (Grant & Väisänen 1997). It winters mainly along the western and southern coasts of Africa and on the islands and coasts of the western Indian Ocean (Cramp & Simmons 1983). *N. p. islandicus* winters mainly in West Africa, while *N. p. alboaxillaris* is thought to winter in Eastern Africa (Engelmoer & Roselaar 1998).

Two other subspecies of the Whimbrel occur outside the region covered by this Atlas. *N.p. variegatus* breeds in north-eastern Siberia and winters from South Asia through South-east Asia to Australasia, while *N.p. hudsonicus* breeds in Alaska and Canada and winters along coasts in South and Central America, the Caribbean and southern North America. There has been an increasing tendency in recent years to consider the North American populations as a separate species, the Hudsonian Whimbrel *N. hudsonicus*. This may itself comprise two forms, *hudsonicus* and *rufiventris* (Engelmoer & Roselaar 1998).

Movements

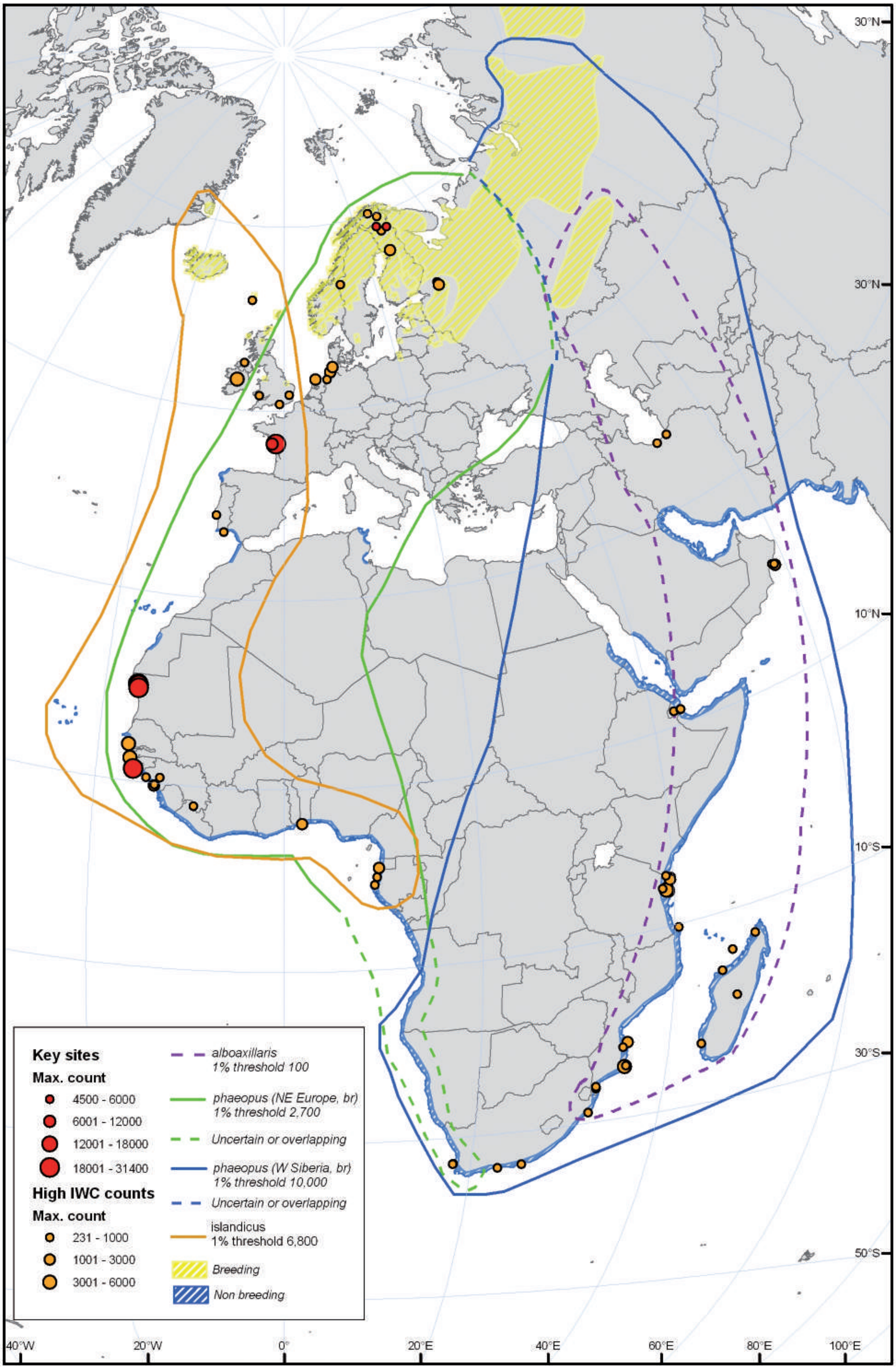
Whimbrels from western breeding populations (primarily Iceland, Faeroes, Fennoscandia and north-western Russia) migrate south or south-west to winter mainly in West Africa, with small numbers remaining further north in Southern Europe. The main wintering areas for these populations extend along the west coast of Africa probably at least as far south as Gabon. Zwarts (1990) considered it unlikely that large numbers wintered further south than Sierra Leone, but a review by Stroud *et al.* (2004) has shown that there are large wintering populations in Liberia, Cameroon and Gabon. Furthermore, of four African recoveries of Whimbrel ringed on breeding grounds in northern Britain, two were from Ghana and one from Nigeria, suggesting that wintering numbers in these countries may be underestimated (Grant 2002).

Departure from the breeding grounds begins in late June, with the peak passage of adults in Northern Europe in mid- to late July, and of juveniles from late July to early September (Meltofte 1993). Migration across Africa and Europe is along both coastal and overland routes, with migrants occurring regularly in the African Sahel and Sahara (Cramp & Simmons 1983). Migration to the wintering areas appears to occur without large concentrations at staging sites (Cramp & Simmons 1983). The passage is relatively rapid with numbers peaking in North-western Europe in August and in Iberia in September. Weight gains in south-east Britain in autumn suggest that reserves are sufficient for direct flights to Mauritania, whilst direct flights from Iceland to Africa may occur (Cramp & Simmons 1983, Glutz von Blotzheim *et al.* 1977).

The northward migration from Africa begins in March, though

Whimbrel

Numenius phaeopus



some birds may not depart until late April or early May. Many young birds remain throughout their second calendar year in Africa. The peak passage through Western Europe is in late April and early May (Zwarts 1990). Northward migration in spring is characterised by the large concentrations which occur at a relatively small number of staging sites in Western and Central Europe (Beretzk *et al.* 1959, Trolliet 1985, Voet 1983, van Dijk 1979). It has been estimated that during the 1980s, after allowance was made for turnover, at least 100,000 Whimbrels staged in western France in April and May. Numbers have since decreased because of habitat deterioration (Dubois *et al.* 2000).

Ringing recoveries show that the Whimbrels using migration routes through Western Europe are from Fennoscandian and Russian breeding grounds, as well as from the more western breeding areas in Iceland, Faeroes and northern Britain. Birds ringed on passage in Britain have been recovered on the breeding grounds in Finland, Russia and Iceland (Grant 2002). Migration through Central Europe is presumably largely, or solely, of birds from breeding grounds on the European continent. Migration from African wintering grounds to European staging sites may be rapid (Zwarts 1990) whilst weight gains of Whimbrels in south-west Britain in spring suggest that they have sufficient reserves for direct flights to Icelandic breeding grounds (Cramp & Simmons 1983). Arrival onto most southerly breeding grounds is in mid-April, but can be as late as June in the most northerly areas (Kumari 1977, Cramp & Simmons 1983).

The large numbers of Whimbrels which migrate to and from Eastern and Southern Africa via the Middle East are thought to be from Siberian breeding grounds, and may include south Russian *alboaxillaris*, but there appears to be little detailed information available on these movements (Cramp & Simmons 1983).

Population limits

The first two editions of *Waterbird Population Estimates* recognised only three populations of the Whimbrel in Western Eurasia and Africa: a European breeding population of nominate *phaeopus*, a West Siberian breeding population of *phaeopus*, and the entire population of *alboaxillaris*. In recognition of the form *islandicus* for the birds breeding in Iceland, the Faeroes and northern Scotland, Stroud *et al.* (2004) split the European breeding population of Whimbrel into two populations, nominate *phaeopus* and *islandicus*. The four populations recognised by these authors were adopted in *WPE3* and retained in *WPE4*:

1) the population of the form *islandicus*, wintering in West Africa south to the Gulf of Guinea (and probably in the same areas as population 2, below);
2) nominate birds breeding to the west of the Urals, and wintering in West Africa, primarily in Guinea, Guinea-Bissau and Mauritania;
3) nominate birds breeding east of the Urals in Western Siberia, and wintering in Southern and Eastern Africa, notably in Tanzania and Mozambique;
4) the population of the form *alboaxillaris,* breeding on the lower Volga steppe, south-east of the Urals in west-central Russia, and thought to winter in Eastern Africa, including Mozambique.

It is unlikely that the two *phaeopus* populations are discrete, and interchange is probable in the wintering areas, particularly in south-western Africa. The recovery of a South African ringed Whimbrel west of the Urals, at Ukhta, north-west Russia (Underhill *et al.* 1999) supports this suggestion, but no other information is available to assess the likely extent of such interchange.

Population size

1. *islandicus*

Population estimate	1% threshold	Population trend
600,000-750,000	6,800	Stable

The size of the large Icelandic breeding population is poorly known. BirdLife International/EBCC (2000) gave an estimate of 200,000 pairs, while Thorup (2006) gave an estimate of 250,000 pairs. Numbers elsewhere are small: 50-100 pairs in Greenland, 2,500 pairs in the Faeroes, and 530 pairs in the U.K. (data from Thorup 2006 and BirdLife International 2004a). Stroud *et al.* (2004) used the estimates from BirdLife International/EBCC (2000) to derive a total population estimate of 610,000 individuals, and this was adopted in *WPE3*. However, the recent estimate of 250,000 pairs in Iceland (from Thorup 2006) suggests that the total population could exceed 750,000 individuals. A rougher estimate of 600,000-750,000 was therefore adopted in *WPE4*. Trolliet (2006) observed that a high proportion - about 50% of the individuals wintering at many sites in Africa do not migrate north in spring and suggested that population estimates based on breeding numbers should be adjusted to allow for these birds. Numbers counted in Africa are, however, much lower than numbers estimated in the breeding season and it seems possible that breeding numbers have been over-estimated, especially in Iceland (Trolliet 2006).

2. *phaeopus* North-east Europe (breeding)

Population estimate	1% threshold	Population trend
190,000-340,000	2,700	Possibly stable

National breeding estimates for Scandinavia, the Baltic States, Belarus and European Russia amount to 69,200-116,000 pairs (Thorup 2006) or 55,560-110,770 pairs (BirdLife International 2004a). These estimates suggest a total population of 190,000-340,000 non-breeding individuals – the estimate adopted in *WPE4*. Stroud *et al.* (2004) used preliminary totals for some countries, and produced a lower estimate of 52,063-99,175 pairs which, when rounded, gave a population estimate of 160,000-300,000 individuals – the estimate adopted in *WPE3*.

Counts of Whimbrel at their winter quarters in Africa can account for only a small proportion of the populations concerned. Smit & Piersma (1989) could account for only 69,000 *islandicus* and *phaeopus* combined, and recognised that this was a major underestimate. The total from 1990s midwinter counts and estimates was only slightly higher at 89,000 birds (Stroud *et al.* 2004). These low figures suggest that either the main wintering areas in West Africa remain to be discovered, and/or that the species is readily underestimated by counts in the wintering areas. This might occur, for example, if a high proportion makes use of mangroves, and/or the wintering range for this population extends considerably further south in Africa than was previously believed (Stroud *et al.* 2004). It is also possible that breeding numbers may have been over-estimated.

3. *phaeopus* Western Siberia (breeding)

Population estimate	1% threshold	Population trend
D (100,000-1,000,000)	Provisionally 10,000	Unknown

No attempt was made to estimate the size of this population in the first two editions of *Waterbird Population Estimates*. Midwinter counts and estimates in the 1990s could account for only 78,600 birds (Stroud *et al.* 2004), but this was undoubtedly a considerable underestimate, given the dispersed nature of the population and the gaps in coverage. Stroud *et al.* (2004) concluded that the population size was most likely to be in the range "D" (100,000–1,000,000), and this estimate was adopted in *WPE3* and *WPE4*. However, Vartapetov (1998) estimated the population of north-western Siberia, an area of roughly 1,100 x 600 km, at 60,000-190,000 individuals, with a median of 100,000. This led Stroud *et al.* (2004) to suggest that the upper end of the range "D" was probably too high, although it was unclear to what extent Vartapetov's estimate matched the total range of the population.

4. *alboaxillaris*

Population estimate	1% threshold	Population trend
A (<10,000)	Provisionally 100	Decreasing

This poorly known subspecies was thought to be extinct in the early 1990s, until a colony of six pairs was found east of the Ural mountains and west of the Ural river in Russia, constituting the only recent breeding record. It is undoubtedly very scarce, and little is known about its movements and wintering range, presumed to be in Eastern Africa (Morozov 2000). In Kazakhstan, a few pairs could still survive in the steppe zone of the Volga-Ural region. A pair at Chelkar in northern West Kazakhstan province on 2 May 2003 could have been breeding there. The only recent record away from the possible breeding area was in the Astana region on 23 May 1999 (Wassink & Oreel 2007). Counts of this form in Africa are probably included within those of the Western Siberian population of *N. p. phaeopus*. Stroud *et al.* (2004) suggested a provisional population estimate of fewer than 10,000 individuals (range "A"), and this was adopted in *WPE3* and *WPE4.*

Conservation status

The overall status of *islandicus* is believed to be stable, as the breeding population in Iceland (the great bulk of the population) is reported to be stable (Asbirk *et al.* 1997). A decrease has been reported in the Faeroes, but numbers breeding in Scotland are increasing strongly (Richardson 1990b, Grant & Väisänen 1997, BirdLife International/EBCC 2000, BirdLife International 2004a). Breeding was first recorded in Greenland in 1970, and numbers have increased there to 50-100 pairs (Thorup 2006).

Changes in distribution and abundance within the breeding range of the European population of *phaeopus* suggest that the population has been relatively stable in recent decades. The large Finnish population has increased by over 50% since the late 1960s, with breeding now recorded on farmland habitats, but in recent years, some decline has been reported (BirdLife International 2004a). The large populations in Norway and European Russia are thought to be stable or fluctuating (BirdLife International 2004a), although decreases have been reported in some central and southern parts of Norway due to drainage (Bakken *et al.* 2003). A decrease has also been reported in Sweden, but the small population in Estonia is said to be increasing (BirdLife International 2004a). Numbers staging on spring migration at key sites in western France decreased from the 1990s onward because of habitat deterioration in the foraging areas caused by agricultural intensification (Dubois *et al.* 2000).

Trends in the West Siberian breeding population of *phaeopus* are unknown.

N. p. alboaxillaris seems to be a very rare bird. It was thought to be extinct in the early 1990s (Belik 1998a), but in 1997, Morozov (2000) found a colony with six pairs east of the Ural Mountains and south of the Ural River. Thorup (2006) concluded that only a few tens of pairs, at maximum, remain in the steppe zone between the Volga and Ural rivers in the Russian regions of Saratov, Orenburg and Bashkortostan, and adjacent parts of Kazakhstan. Morozov (2000) reviewed current knowledge of the breeding ecology and distribution of *alboaxillaris*, based on museum specimens and extensive field work in the Urals in 1996 and 1997. He considered that the current low numbers and fragmented range of this form were at least in part a consequence of the historically severe transformation of nesting habitats, in particular through the long-term trend to convert steppe grasslands to arable farmland. Morozov (2000) also suggested that long-term climate change may be a major contributory factor to the poor status of the population, in particular the increasing dryness of the climate in Southern Europe, Western Siberia and Central Asia, as also suggested by Krivenko (1991).

Habitat and ecology

The Whimbrel breeds in open, exposed habitats with short vegetation, such as wet moorlands, dry, dwarf-shrub heaths, alpine heaths and mires, and sparse mountain birch forests (Grant & Väisänen 1997). The form *alboaxillaris* has been found nesting on meadows and fields adjacent to floodplain meadows (Morozov 2000). In its winter quarters, the Whimbrel frequents a wide variety of coastal habitats, such as inter-tidal mudflats, creeks, mangroves, salt marshes, open sea beaches, rocky shores with tidal pools, and coral reefs. On migration, both coastal and inland habitats, such as fresh-water wetlands and meadows, are used as staging sites (Beretzk *et al.* 1959, Ferns *et al.* 1979, Cramp & Simmons 1983). In Denmark, Whimbrels occur on heathlands with berries during autumn passage (H. Meltofte *in litt*.).

The northern limits to the wintering range in West Africa may be imposed by the activity patterns of fiddler crabs (*Uca* spp.), the main prey in Mauritania and Guinea-Bissau. To gain body mass for spring migration, Whimbrels wintering in Mauritania depend upon the seasonal increase in the activity of these crabs, and further north such increases in activity may occur too late to allow Whimbrels to depart from the wintering areas on time (Zwarts 1990). Additionally, where departure from the wintering areas is limited in this way, the ability to arrive on the breeding grounds with sufficient time to breed may depend upon the availability of staging sites where food is sufficiently abundant to allow a rapid build up of body reserves (Zwarts 1990).

Whimbrels are highly territorial throughout the breeding season until the chicks have fledged. Small, loose flocks may then form prior to departure (M. Grant pers. obs.). They frequently defend feeding territories in their wintering areas, but are gregarious during migration (Cramp & Simmons 1983).

Network of key sites

Two important breeding sites for the western population of *phaeopus* have been identified in northern Finland, Lemmenjoki-Hammastunturi-Pulju with 500-1,500 pairs, and the Saariselkä and Koilliskaira area with 500-2,000 pairs (Heath & Evans 2000). Only two key staging areas have been located in Western Europe, at Baie de Aiguillon and Marais d'Olonne on the west coast of France. These sites are important during the spring migration, when up to 20,000 birds have been recorded at both localities, although counts in recent years have been considerably lower (B.Trolliet *in litt*.). Most of the birds probably belong to the western population of *phaeopus*, as there have been several recoveries in western France of birds ringed in Norway, but it is possible that some Icelandic birds are also involved. Two key wintering sites have been identified in West Africa, Banc d'Arguin in Mauritania (with up to 31,400 birds; Hagemeijer *et al.* 2004), and Bijagos Archipelago in Guinea-Bissau (with up to 22,000 birds; Wolff 1998). Both of these sites are thought to hold a mixture of western *phaeopus* and *islandicus*, but details of the relative abundance of the two forms are lacking. Considering that as many as 800,000-1,100,000 Whimbrel are estimated pass through Western Europe each autumn and spring *en route* to and from their wintering areas in West Africa, it seems remarkable that so few major staging and wintering areas have been located. It seems likely, therefore, that many Whimbrels undertake the journey between their breeding grounds and wintering areas in single non-stop flights.

Protection status of key sites

The two key breeding sites in Finland are well protected. Lemmenjoki-Hammastunturi-Pulju (529,718 ha) is largely protected within a National Park (284,928 ha), two Wilderness Areas of 61,981 ha and 182,809 ha respectively, and two Special Protection Areas (totalling 490,895 ha). The Saariselkä and Koilliskaira area (309,553 ha) is largely protected within a Wilderness Area, a Strict Nature Reserve, a National Park (255,000 ha), three Peatland Reserves and a Special Protection Area (Heath & Evans 2000).

Although the roost sites used on spring migration in western France are protected under the Natura 2000 network, feeding areas are being lost to agricultural intensification (drainage of wet meadows and replacement with cereals) and numbers are decreasing. Baie d'Aiguillon is largely incorporated within four Hunting Reserves, several Natural Reserves, a Private Reserve and four Special Protection Areas, while Marais d'Olonne is unprotected except for a 40 ha Hunting Reserve.

The Banc d'Arguin (1,173,000 ha) in Mauritania was designated a National Park in 1976, a Ramsar site in 1982 and a World Heritage Site in 1989; the principal threat comes from over-fishing in coastal waters and impact that this is having on the coastal ecosystem as a whole (Fishpool & Evans 2001).

The Bijagos Archipelago (190,000 ha) in Guinea-Bissau was declared a Biosphere Reserve in 1996 and incorporates Ilhas de Orango National Park and part of João Vieira/Poilão Marine National Park. Some 20,000 people live in the reserve; threats include wood-cutting for fuel and land reclamation for rice production, and hunting is a potential problem (Fishpool & Evans 2001

Table 44. Key sites for Whimbrel. Sites where 1% or more of a population has been recorded

Country	Site	Lat.	Long.	Season	Max total	Year max	Average total	Basis for average	Source	Population(s) at site
Finland	Lemmenjoki-Hammastunturi-Pulju	68.58	25.50	Breeding	4500	1991			WBDB	*islandicus* + *phaeopus*, N Europe
Finland	Saariselkä & Koilliskaira	68.25	28.00	Breeding	6000	1996			WBDB	*islandicus* + *phaeopus*, N Europe
France	Marais d'Olonne	46.52	-1.79	Spring	10130	2001	7000	2003-07 (5)	B. Trolliet *in litt.*	*islandicus*
France	Marais Poitevin et Baie de l'Aiguillon	46.52	-1.27	Spring	17000	1991			WBDB	*islandicus* + *phaeopus*, N Europe
Guinea-Bissau	Bijagos Archipelago	11.30	-16.00	January	22000	1993	18200	1992-2001 (3)	Dodman & Sá 2005	*islandicus* + *phaeopus*, N Europe
Mauritania	Banc d'Arguin	20.12	-16.27	January	31400	2000	20170	1997-01 (3)	Hagemeijer *et al.* 2004	*islandicus* + *phaeopus*, N Europe

Murray Grant & Derek Scott

Chris Gomersall/ RSPB Images

Slender-billed Curlew

Numenius tenuirostris

Geographical variation and distribution

The Slender-billed Curlew appears to be on the verge of extinction. This monotypic species is believed to breed in Russia, but the location of any current breeding areas is not known. The only definite breeding records were at one site in the Tara region 250 km north of Omsk (75ºE) in Western Siberia between 1914 and 1924 (Ushakov 1916, 1925).

The species migrates south-west to winter in the Mediterranean basin west to Morocco, and perhaps also in small numbers in Iraq, the Persian Gulf and the Arabian Peninsula. It was formerly widespread in the region, but by the 1980s and 1990s the species was only found wintering regularly at one site (Merja Zerga) in Morocco, where there were five birds in 1986, four in 1988, three from 1989 to 1992, two in 1993 and 1994, one in 1995, and none in the winter of 1995/96 or more recently (van der Have *et al.* 1997).

Movements

The main migration route appears to have been west-south-west from the presumed breeding areas via Turkmenistan, the Caspian steppes, Ukraine, Bulgaria, Romania, former Yugoslavia, Hungary, Greece and Italy to the wintering areas in Morocco, Algeria and Tunisia. There may have been a second group of birds that took a more southerly migration route from the breeding grounds to wintering areas in the Middle East, notably Iraq, but possibly also in southern Iran, Saudi Arabia and Oman.

Population limits

Only one population is recognised, comprising the entire population of the species.

Population size

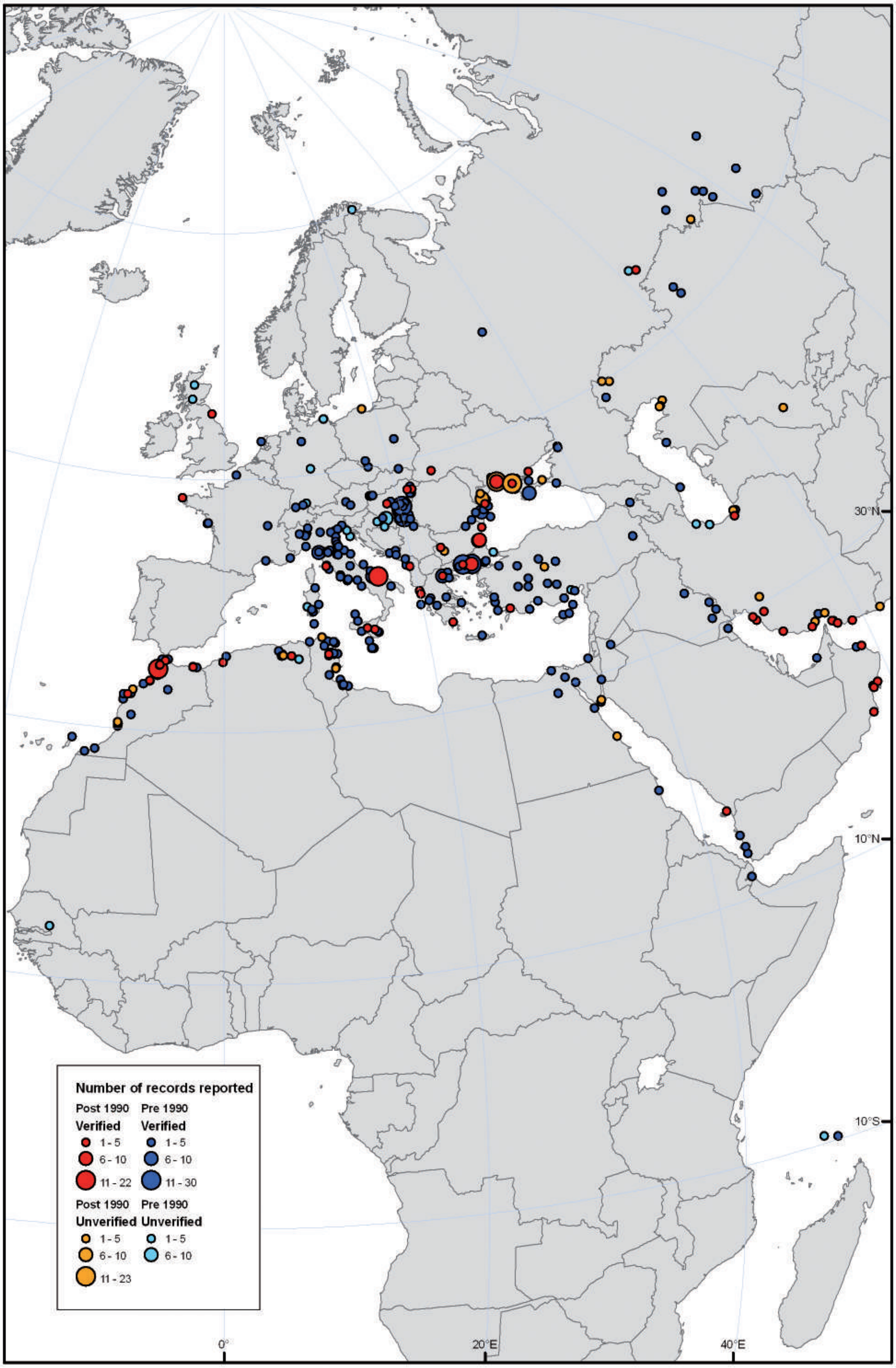
1. Mediterranean basin & South-west Asia
(non-breeding) (entire population of the species)

Population estimate	1% threshold	Population trend
<50	1	Strong decrease

Gretton (1991) estimated the total population at 100-400 birds, but this seems to have been optimistic, as there were on average only about 10 confirmed sightings of the species per year in the 1980s and early 1990s, involving only 15-22 individuals (A. Gretton in Heredia *et al.* 1996). Gretton (1994) revised the population estimate down to 50-270 birds, and this range was adopted by Stroud *et al.* (2004). However, *WPE3* gave an even lower estimate of <50, following BirdLife International (2000). BirdLife International (2004a) listed 52 confirmed records in Europe during the period 1990-2000 involving a maximum of 104 birds. Most of these records were from Greece (15 records involving 35 birds), Ukraine (14 records of single birds), Hungary (eight records involving 16 birds) and Bulgaria (six records involving 6-8 birds). The only substantial number of birds seen in recent years was a flock of 19 in Italy at a site where varying numbers of birds were recorded between January and March 1995. A first summer Slender-billed Curlew was seen in Northumberland, England, in May 1998, confirming that breeding occurred in 1997, and a single bird was recorded in Greece in 1999 (BirdLife International 2004a), but there have been no confirmed records since then (BirdLife International 2004a). Zhmud (2005) reported a series of nine sightings involving 19 individuals in the Ukrainian part of the Danube Delta between 1985 and 2004. These included four birds seen together in July and August 2003, and again in August 2004. Zhmud (2005) wrote that “In these cases, I regard the probability of misidentification as minimal”, but no birds were seen in subsequent follow-up surveys (Cleeves 2006). The most recent reliable record, and the only record so far this century that seems likely to be genuine, was at the Salina of Ulcinj in Montenegro in March 2005 (M Schneider-Jacoby & B Stumberger *in litt.*).

Slender-billed Curlew

Numenius tenuirostris



Survey and monitoring work is co-ordinated at international level by the Slender-billed Curlew Working Group. However, the extreme rarity of the species and lack of knowledge of any regularly used sites makes monitoring very opportunistic. Surveys are also complicated by difficulties in identification caused by the similarity of the species to the closely related Whimbrel *Numenius phaeopus* and Eurasian Curlew *Numenius arquata*. The eastern forms of these species, *Numenius arquata orientalis*, *Numenius arquata suschkini* and *Numenius phaeopus alboaxillaris* are less well known than the subspecies which occur further west, and matters are complicated by the fact that the latter two forms are themselves extremely rare and poorly known. The SBC Working Group has published a protocol for the collection of data by anyone observing any birds (Vangeluwe *et al.* 1998). Between 1990 and 2008 there were at least 17 expeditions, all unsuccessful, which attempted to locate Slender-billed Curlews at wintering, breeding and passage sites. These expeditions varied in length from three days to more than six weeks. The most recent expeditions have included Russia and Kazakhstan (1996-97), Russia, Baraba and Karasuk Steppe (1997), Kazakhstan (July – September 1998), Russia, Tumen Plains and Omsk region (1999), Iran (January-February 2000), Morocco, Lagune de Khnifiss (December 2001), Yemen (November 2001-January 2002), Iran (January 2002), Tunisia (January 2003), Libya (January 2005), Ukraine (July-August 2006) and Uzbekistan (April-May 2008) (e.g. van der Have *et al.* 1997, 1998, 2001, Boere & Yurlov 1998, Cresswell *et al.* 1999, Keijl *et al.* 2001, Azafzaf & Azafzaf 2003, Azafzaf *et al.* 2005). A major survey, billed “the last push to find one of the world’s rarest birds” is planned for the winter of 2009-2010. This was announced at the Ninth Meeting of the Conference of the Parties to the Convention on Migratory Species (UNEP-CMS COP 9), in Rome in December 2008, when a “toolkit” was also launched summarisiing identification characteristics of all Eurasian Curlew species and encouraging participation in the survey.

Conservation status

The Slender-billed Curlew is a globally threatened species categorised as Critically Endangered on the IUCN Red List (IUCN 1996, BirdLife International 2000, 2004b). It is listed in Appendix I of the Bonn Convention, and is the subject of a Memorandum of Understanding concluded under the Bonn Convention in 1994 (Memorandum of Understanding Concerning Conservation Measures for the Slender-billed Curlew *Numenius tenuirostris*). In the 1990s, The European Commission financed a conservation and monitoring project for the Slender-billed Curlew under its LIFE Programme. An Action Plan for *N. tenuirostris* in Europe has been compiled by A. Gretton (in Heredia *et al.* 1996) and updated in 2002 (Gallo-Orsi *et al.* 2002).

One of the main causes of the decline appears to have been excessive hunting in the nineteenth century and early part of the twentieth century, while habitat loss and degradation in some parts of the wintering range may also have contributed (Vangeluwe *et al.* 1998). Hunting remains a serious threat to any birds that remain, since the range of this species includes a high proportion of countries where hunting pressure is high. On 16 March 2007, a team from the Euronatur Adriatic Flyways Project were visiting the Velika Plaza protected area in Montenegro, close to Ulcinj, where the most recent probable sighting of a Slender-billed Curlew was made in 2005. Four small curlews flew over the beach and Italian hunters switched on a tape lure recording of a Eurasian Curlew to try to entice the birds within range (Schneider-Jacoby & Saveolic 2007). On this occasion the intended quarry were probably Whimbrels, but the risk to any remaining Slender-billed Curlews of hunting at this and other sites still gives cause for great concern.

It has been suggested that the main breeding grounds of the species were in wet areas in the forest-steppe and northern steppe zones of Western Siberia (Danilenko *et al.* 1996). Some of the old summer records of *N. tenuirostris* on the steppes of Eastern Europe, Western Siberia and Kazakhstan perhaps relate to breeding birds. If this was the case, the widespread conversion of these steppes to agricultural land and intensification of grazing on the remaining virgin steppes may have been the principal cause for the near-disappearance of this species. A survey of many of the remaining areas of suitable habitat in May and June 1997 failed to locate any *tenuirostris* (Boere & Yurlov 1998). A recent review has concluded that “the species appears to be heading inexorably for extinction” (Gretton *et al.* 2002). An attempt to narrow down the search for breeding and moulting sites using stable isotope analysis of museum skins is under way (BirdLife International 2006) and publication of results is expected in 2009.

Habitat and ecology

The only breeding records of the Slender-billed Curlew were in extensive peat bogs in transitional bog-forest habitat. On migration, it occurs in coastal lagoons and adjoining saltmarshes, estuaries, and inland soda lakes and salt lakes in steppe areas. In the wintering areas, it frequents coastal bays and lagoons with saltmarshes, adjacent grasslands and arable fields, and temporary inland marshes. Outside the breeding season, it feeds on annelids, molluscs, snails, crustaceans and small insects, taken by probing into soft mud, or by surface pecking (del Hoyo *et al.* 1996).

Network of key sites

The only site which is known to have supported Slender-billed Curlews on a regular basis since the 1970s is Merja Zerga in Morocco. However, the last individual was recorded there as long ago as 1995. In view of the extreme rarity of the species, any site at which it occurs must now be considered as potentially a key site. Accordingly, the mapped distribution of key sites for this species shows all sites with confirmed records since 1989 and earlier records are included for comparison. There have been 96 “confirmed” records of the Slender-billed Curlew since 1989 at 41 sites spread across 17 countries from Russia to Morocco. Standards of confirmation differ considerably between countries and many of these records remain controversial. Only seven sites have held birds on more than three occasions: Merja Zerga in Morocco (22 occasions), Evros Delta in Greece (10 occasions), Chengene Skelde in the Burgas area, Bulgaria (six occasions), Black Sea Nature Reserve in Ukraine (six occasions), Saline Margerita di Savoia in Apulia, Italy (five occasions), Hortobagy fish ponds in Hungary (four occasions), and Karkinistka and Dzharylgaska bays in the Crimea, Ukraine (four occasions). There have been a number of unconfirmed reports and controversial records, but only one probably genuine record of Slender-billed Curlew in the current century. It is evident that this enigmatic wader is on the very brink of extinction.

Protection status of key sites

Many of the sites at which the species has been recorded in the past have some protection status, including Merja Zerga in Morocco, which was classified as a Permanent Biological Reserve in 1978 and designated as a Ramsar site in 1980.

Table 45. "Key sites" for Slender-billed Curlew. Sites where 1 or more birds have been recorded since 1990

(Source: RSPB/BirdLife International Slender-billed Curlew Database, with addition of one record in Montenegro in 2005)
Note: Because of difficulties identifying this species and potential for confusion with eastern forms of *Numenius arquata* and *Numenius phaeopus*, the validity of many of these records remains uncertain.

Country	Site	Location	Max count	Date of max	No. of records	Reference
Albania	Butrintit	39°45'N 20°03'E	1	20-2-1993	1	Hagemeijer *et al.* 1994
Albania	Patok, Fushe-Kushe	41°44'N 19°37'E	5	9-10/11/1992	1	Vangeluwe *et al.* 1994
Algeria	Sebkret Ez Zemoul	35°53'N 06°33'E	1	27-1-1990	1	M. Trubridge
Bulgaria	Chelopechene, Sofia	42°41'N 23°25'E	1	11-3-1990	1	Gretton 1994
Bulgaria	Lake Atanasov, Bourgas area	42°30'N 27°30'E	3	29-11-1992	6	Gretton 1994, Nankinov 1994
France	Ouessant, Finistere	48°28'N 5°05'W		29-5-1991	1	per PJ Dubois
Greece	Axios Delta	40°30'N 22°43'E	1	1-4-1997	2	written rep to G. Handrinos
Greece	Evros Delta, Thraki	40°52'N 26°00'E	15	17-4-1990	10	written reps to G. Handrinos, Vangeluwe & Handrinos 1995
Greece	Evrotas delta, South Peloponnese	36°49'N 22°42'E	4	7-4-1999	1	Theodoros Kominos & Antonia Galanaki
Greece	Kalamas Delta, Ipiros	39°29'N 20°07'E	2	4-4-1997	1	I. Shogelev
Greece	Porto Lagos	41°00'N 25°05'E	1	14-4-1993	2	Handrinos 1994
Hungary	Darkany-to, Sarkeresztur	46°54'N 18°38'E	1	19-5-1991	1	Nagy 1994
Hungary	Hortobagy - Halasto	47°37'N 21°5'0E	6	2-12-1990	4	Nagy 1994, Birding World 8, 9, p334
Hungary	Viragoskut fish ponds	47°41'N 21°20'E	3	31-10-1991	3	Nagy 1994
Iran	Busher Helleh	29°01'N 50°42'E	7	19-1-1994	1	Unpublished report DOEI
Iran	Dasht-e-Arjan Marsh, Fars	29° 32'N 51° 58'E	3	10-1-1991	1	Unpublished report DOEI
Iran	Hara Protected Region, Persian Gulf Coast	26°50'N 55°40'E	4	21-1-1994	2	Unpublished report DOEI
Iran	Khore Keretan (Khor Kargan) Persian Gulf Coast	26°17'N 57°10'E	3	20-1-1995	3	Unpublished report DOEI
Iran	Khore Koheh Mobarakeh, Persian Gulf Coast	25°55'N 57°35'E	2	13-1-1995	1	Unpublished Report DOEI
Iran	Miankaleh Protected Region, Mazandaran	36°50'N 53°39'E	4	13-10-1992	3	Unpublished report DOEI
Iran	Mond Protected Area	29°10'N 50°42'E	2	23-2-1995	2	Unpublished report DOEI
Iran	Nayband Bay	27°35'N 52°40'E	4	15-1-1993	3	Unpublished report DOEI
Iran	Pozm Tiab	25°40'N 59°00'E	3	10-14/01/1994	1	Unpublished report DOEI
Italy	Lentini Lake, Sicilia	37°20'N 14°57'E	1	31-3-1996	1	Corso 1996
Italy	Margherita di Savoia, Apulia (Manfredonia)	41°23'N 16°09'E	18-19	5-2-1995	16*	Serra *et al* 1995
Montenegro	Ulcinj Salina	41°55'N 19°18'E	1	March 2005	1	M Schneider-Jacoby & B Stumberger
Morocco	Bas-Loukkos	35°12'N 06°7'W	3	18-2-1993	1	Gretton 1994
Morocco	Larache	35°10'N 06°10'W	1	13/02/1990	1	pub. Gretton '91
Morocco	Merja Zerga	34°52'N 06°16'W	5	30-12-1991	22	Gretton 1994; Oreel 1991, van den Berg 1992a, 1992b, 1994,1995 British Birds 1992, 1995, 1996
Morocco	Plage de Skhirate		2	11-1-1994	1	El Agbani & Dakki 1994
Morocco	Selbha Bou Areg nr Melilla	35°08'N 02°57'W	3	1990	2	A. El Ghazi & Jacques Franchimont
Morocco	Sidi Moussa Oualidia	32°47'N 08°57'W	1	14-11-1993	1	El Agbani & Dakki 1994
Oman	5 km west of Khor Dirif	18°55'N 57°16'E	2	10-2-1999	1	Oman Bird News 2: 1999
Oman	Barr Al Hikman Abb Island	20°30'N 58°30'E	1	5-1-1990	3	OSME Bulletin 1990, 31 p42
Oman	Yitti, near Muscat	23°33'N 58°40'E	3	24-8-1999	1	Eriksen & Sargeant, 2000
Romania	Danube Delta, Caraorman	45°05'N 29°22'E	1	18-7-1994	1	Information Bulletin SOR
Russia	Lake Bolshoye, Tukmaty, Chelyabinsk	54°54'N 62°20'E	1	9-7-1996	1	Bojko and Nowak 1996
Saudi Arabia	Jizan	16°56'N 42°22'W	1	19-1-1990	1	P. Symens & IWC database
Tunisia	Kairouan, Metbassta	35°48'N 10°09'E	1	18-20/11/1992	1	Ledant and Lafontaine 1994
Turkey	Dalyan Delta	36 49'N 28 32'E	1	22-8-1990	1	Gretton 1994
Ukraine	Belolesie (close Bolgrod-Odessa road)	45°55'N 29°15'E	2	29-9-1996	1	Nankinov, 1997
Ukraine	Black Sea Nature Reserve, Tendra Island	46°12'N 31°44'E	1	4-8-1996	1	Tomkovich 1997
Ukraine	Dolgy Island, Yagorlitsky Gulf, Nikolaev Region	46°40'N 31°48'E	1	19-4-1990	1	Lugovoy 1994
Ukraine	Dunayskye Plavin Reserve, Danube Delta	45°20'N 29°40'E	1	18-8-1994	3	Zhmud, 1997
Ukraine	Lebyashi Island, Crimea	44°45'N 34°30'E	4	24-25/10/1993	6	Lugovoy 1994
Ukraine	Molochnyy Liman	46°20'N 35°23'E	2	5-7-1993	1	Gretton 1994
Ukraine	Poplavyny, Halich District, Ivano-Frankovsk Region	48°40'N 24°40'E	2	10-10-1993	1	Lugovoy, 1994
Ukraine	Tendra Isl (Black Sea Nature Reserve)	46°12'N 31°44'E	2	2-8-1995	6	Lugovoy 1994; Ardamatskaya, 1996
U.K.	Druridge Bay, Northumberland	55°15'N 01°35'E	1	04/05-07/05/1998	1	Cleeves 1998, Cleeves 2002

* 14 records between January and March 1995 probably involved the same birds

Niels Gilissen

Eurasian Curlew

Numenius arquata

Geographical variation and distribution

The Eurasian Curlew is a widespread breeding wader of temperate latitudes in the Palearctic region, occurring across Europe and Asia from Britain and Ireland in the west to northern China in the east. Three subspecies are generally recognised. The nominate form breeds widely in Western, Central and Northern Europe, north to about the Arctic Circle, east to the Urals, and south to Ukraine. In the south-east of its range, it extends east at least to 40ºE (Engelmoer & Roselaar 1998) and possibly to 49ºE on the lower Volga, where it intergrades with *orientalis*. It winters mainly in Western Europe, the Mediterranean basin and West Africa, south commonly to Mauritania. Small numbers regularly winter in Iceland, the Faeroes and northern Norway north to 70ºN (Strann 1993).

N. a. orientalis breeds between latitude 48ºN and the Arctic Circle, east across Western and Central Siberia and Central Asia to Transbaikalia, northern Mongolia and Manchuria (Engelmoer & Roselaar 1998). It winters in the Middle East, tropical Africa west to the Gulf of Guinea and south to South Africa, the Indian sub-continent, China, Japan and South-east Asia to the Greater Sundas.

N. a. suschkini breeds in the southern Urals and Kazakhstan (Engelmoer & Roselaar 1998). The distribution of this form abuts *orientalis* near the Volga River in the southern part of the West Siberian lowlands and in the Altai region (Engelmoer & Roselaar 1998). The winter range is poorly known, but is believed to lie mainly in Africa (Peters 1934).

According to Vaurie (1965), the birds occurring as passage migrants or winter visitors in the south Caspian region, and from the Persian Gulf eastwards to India and south to Eastern Africa, appear to be chiefly intermediate between nominate *arquata* and *orientalis*, and cannot be identified with certainty to subspecies. Records of nominate *arquata* in the Middle East, Eastern Africa and western India probably refer to these intermediates which, according to Vaurie (1965), are perhaps best assigned to *orientalis*. Alternatively, they may refer to birds belonging to the form *suschkini*, which in several characteristics can be intermediate between *arquata* and *orientalis* (Engelmoer & Roselaar 1998).

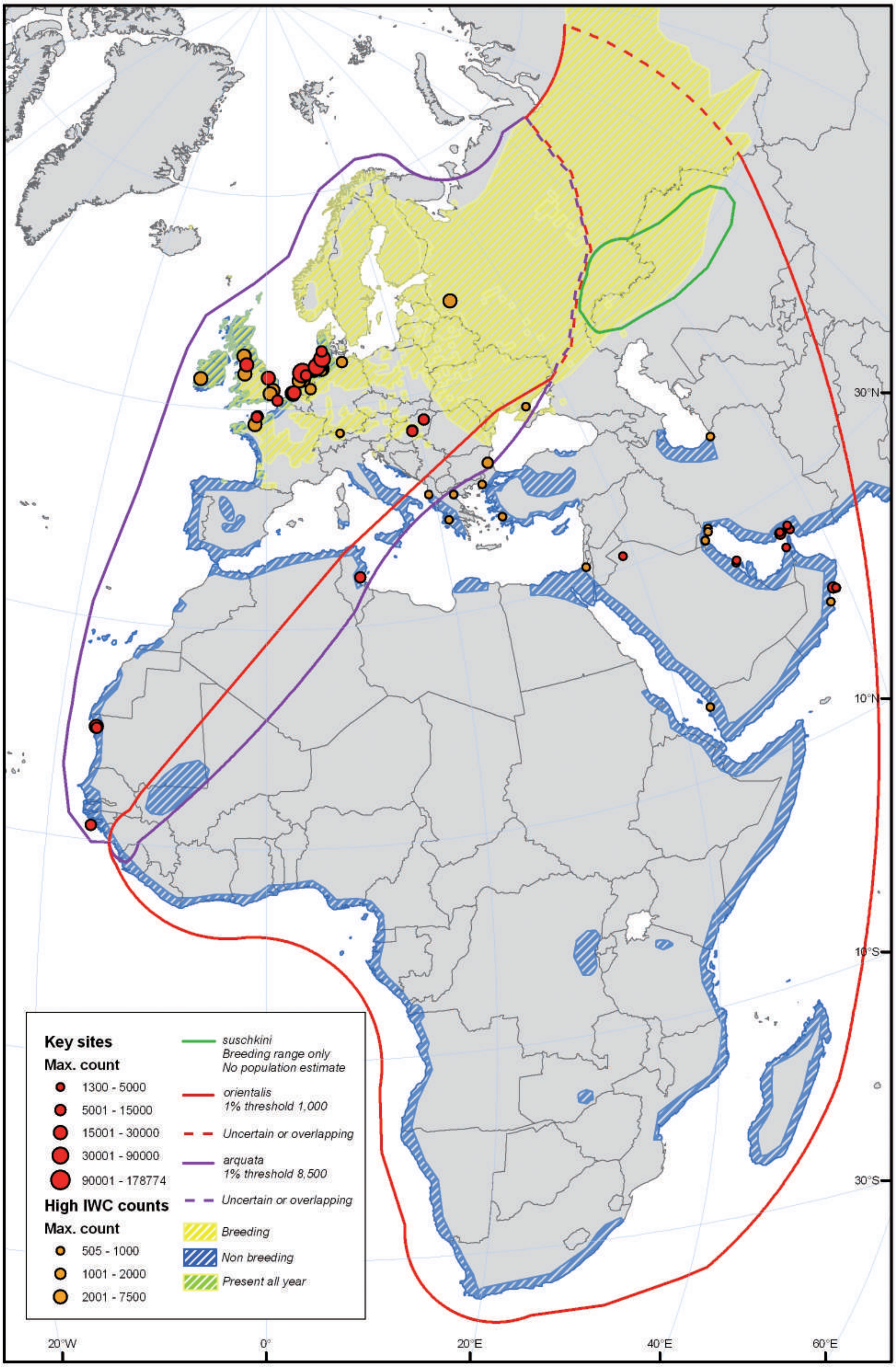
Movements

The Eurasian Curlew is mostly migratory, although some birds are resident in the western parts of the range. Birds breeding in Europe (nominate *arquata*) winter commonly as far south as the Banc d'Arguin in Mauritania and the Mediterranean basin. British and Irish birds make mostly local or short-distance movements. Birds breeding in Fennoscandia, the Baltic and north-west Russia winter from Britain and Ireland to western France, with some migrating further south to northern Spain and Portugal. Some German and Dutch breeding birds go even further south, reaching Morocco. Central and Eastern European birds winter on the Atlantic coast and in the Mediterranean (Smit & Piersma 1989). However, van Dijk *et al.* (1986) considered that the birds wintering in the Gulf of Gabès in Tunisia were mainly of north European origin. The origin of birds wintering in small numbers in Senegal and Gambia has not yet been determined (Smit & Piersma 1989).

The westernmost populations of *orientalis* winter through the Middle East to Eastern and Southern Africa, and also on the coast of south-west Africa north to the Gulf of Guinea and west at least to Nigeria. The small numbers of birds that winter in the Niger inundation zone in Mali are thought to be *orientalis* (Smit & Piersma 1989). These birds presumably reach Mali by crossing the Sahara from the eastern Mediterranean (Urban *et al.* 1986). The birds wintering in Guinea-Bissau have very long bills, and may also represent *orientalis* (Smit & Piersma 1989). This subspecies became more numerous in Eastern and Central Europe during the twentieth century, and there are indications that its migration routes now extend further west than in the early part of the century (Smit & Piersma 1989).

Eurasian Curlew

Numenius arquata



According to Underhill (1997), there have been no definite records of nominate *arquata* in Southern Africa, where the total number of Eurasian Curlews in winter is less than 1,000. There is some overland passage in Eastern and Southern Africa, especially in autumn, with birds moving south-west across the continent to wintering areas on the Atlantic coast (Urban *et al.* 1986, del Hoyo *et al.* 1996).

Eurasian Curlews arrive early on the breeding grounds, with males typically preceding females by a few days. The southward migration begins in June or early July and continues until November, with non-breeders leaving first, followed by breeding adults and then juveniles. In Western Europe, flocks gather on the coast from July onwards and begin their moult. The first migrants arrive in Southern Africa in August (Underhill 1997). The northward migration commences in February, and the main passage is in March and April. Birds reach the northernmost breeding areas in Fennoscandia and Russia from mid-April to early May. The wing moult takes place between late June and October. In Europe, most birds apparently winter at their moulting sites, and there is little evidence of any post-moulting movements (del Hoyo *et al.* 1996). Moulting flocks assemble on the north coast of the Caspian Sea from the middle of June (Lebedeva & Butiev 1999). Many first-year birds remain on the winter quarters throughout the year, including some birds in Southern Africa. The species shows a high degree of site fidelity both on its breeding grounds and in its winter quarters.

Population limits

The first two editions of *Waterbird Population Estimates* recognised only two populations of the Eurasian Curlew in Western Eurasia and Africa: the total population of nominate *arquata* and a western population of *orientalis*. The weakly defined form *suschkini* was assigned to *orientalis* and included within an enlarged population of *orientalis*. Engelmoer and Roselaar (1998) have argued for the validity of *suschkini* as a distinct form, and their treatment was adopted by Stroud *et al.* (2004) and in *WPE3* and *WPE4*. Thus, three populations are currently recognised in Western Eurasia and Africa:

1) the entire population of nominate *arquata* breeding in Europe, and wintering mainly in Europe and West Africa;
2) a population of *orientalis* breeding mainly at temperate latitudes in Western Siberia, and wintering in South-west Asia and Eastern and Southern Africa west to the Gulf of Guinea;
3) the entire population of *suschkini* breeding on the steppes to the south of the Urals and in Kazakhstan, and thought to winter mainly in Africa.

There is no clear dividing line between the first two populations. There is probably a broad zone of inter-gradation between *arquata* and *orientalis* which extends eastwards from Ukraine across southern European Russia to Kazakhstan. Birds from this intermediate zone presumably migrate south-west to the eastern Mediterranean and west-central Africa, and probably account for the records of *orientalis* as far west as Hungary and Guinea-Bissau. The southern limit of *arquata* is taken as Senegal and Gambia, following Smit & Piersma (1989), and the birds wintering further south and east in Africa are assigned to *orientalis.* The boundary on the breeding grounds between the population of *orientalis* wintering in Western Eurasia and Africa and other populations of *orientalis* wintering in South Asia and South-east Asia is poorly understood.

Population size

1. *arquata*

Population estimate	1% threshold	Population trend
700,000-1,000,000	8,500	Decreasing

Smit & Piersma (1989) gave an estimate of 348,000 based on midwinter counts at coastal wetlands on the East Atlantic Flyway, and acknowledged that this figure was an underestimate because of the significant number of birds wintering inland. The 1990s estimate of 420,000 (Stroud *et al.* 2004) was also based on midwinter counts and estimates, but included many of the birds wintering inland.

Van Dijk *et al.* (1989) estimated the European breeding population, excluding Russia, at 122,000-128,000 pairs in the late 1980s. Thorup (2006) treated all birds breeding west of the Urals as nominate *arquata* except for some 1,220-2,170 pairs in south and south-east Russia (assigned to *suschkini*), and gave an estimate of 240,000-347,000 pairs for this population. Even if the birds breeding in central-east Russia (2,530-5,720 pairs) are assigned to *orientalis*, the national estimates collated by Thorup (2006) still suggest a total midwinter population of 720,000-1,040,000 individuals. The national estimates collated by BirdLife International (2004a) are very similar, and give a total European breeding population of 220,000-360,000 pairs, equating to 660,000-1,080,000 individuals.

At least a part of the disparity between the totals derived from midwinter counts and the totals from national breeding estimates may be the allocation of Russian breeding totals to *arquata, orientalis* or *suschkini*, and further study is required to determine more precisely the distribution of these three forms within Russia. However, it is clear that the estimate of 420,000 given by Stroud *et al.* (2004) and adopted in *WPE3* is a considerable underestimate. A new population estimate of 700,000-1,000,000 was therefore adopted in *WPE4* on the basis of the breeding estimates.

2. *orientalis* South-west Asia & Eastern Africa (non-breeding)

Population estimate	1% threshold	Population trend
C (25,000-100,000)	Provisionally 1,000	Possibly decreasing

Perennou *et al.* (1994) estimated the population at a minimum of 28,000 birds, almost 25,000 of which were in South-west Asia, and acknowledged that this figure was almost certainly a considerable underestimate. The 1990s total of 44,600 based on midwinter counts and estimates (Stroud *et al.* 2004), is also probably an underestimate because of incomplete coverage in parts of the Arabian Peninsula and North-east Africa (Sudan, Ethiopia, Djibouti and Somalia). This figure includes an old estimate of 20,000 for Iran. Aerial surveys in Iran in the 1970s located a wintering population of 15,000-25,000 Eurasian Curlews on the north coast of the Persian Gulf and the coast of Persian Baluchestan (Perennou *et al.* 1994, Scott 1995). No aerial surveys have been undertaken in southern Iran since the 1970s, and these birds have gone unrecorded in the recent midwinter counts.

An unknown number of *orientalis* winter in West Africa (Zwarts 1988, Wymenga *et al.* 1990), and are thought to reach there via the Niger inundation zone and Mediterranean basin (Smit & Piersma 1989). Birds thought to be *orientalis* have been captured in Guinea-Bissau (Zwarts 1988), and birds occurring along the coast from the Gulf of Guinea to South Africa are thought to be predominantly *orientalis*. Birds of this form have also recently been captured on the Tunisian coast (Keijl

& Zenatello 2000), suggesting that some may winter in the Mediterranean basin.

No estimate is possible on the basis of the breeding numbers, as no information is available on the size of the breeding populations in Western Siberia. In view of the uncertainties, Stroud *et al.* (2004) gave only a rough estimate of population size in the range 25,000-100,000, and this estimate was adopted in *WPE3* and *WPE4*.

3. *suschkini*

Population estimate	1% threshold	Population trend
Unknown	Not established	Decreasing

Almost no information is available on the size of this population. Thorup (2006) assigned the 1,220-2,170 pairs breeding in south and south-east Russia to this form, but the numbers breeding in South-west Asia are unknown and probably very low.

Conservation status

The current status of the European population is complex (as also found by Smit & Piersma 1989) and Stroud *et al.* (2004) concluded that the population was stable or possibly increasing. Recent information on national trends summarized by BirdLife International (2004a) strongly suggests that the species is now in decline, and in 2008, BirdLife International upgraded its official IUCN Red List status from Least Concern to Near Threatened. Tomialojc (1994b) concluded that the species was declining both as a breeding bird and in winter, while Hötker (1991) considered the breeding population in the European Union (about 60,000 pairs) to be stable or decreasing slightly. Recent decreases have been reported in the breeding populations in many parts of Europe (Bednorz & Grant 1997), notably in Sweden, Norway, Ireland, southern Germany (Hotker, 2007) eastern France (Deceuninck & Mahéo 1998b), Latvia and Lithuania and there is also some evidence of a slight decline in the large British breeding population, especially in the south (Grant 1993). The decreases have been most pronounced near the edge of the species' breeding range in Southern and Central Europe, although Butiev & Lebedeva (1998) reported a widespread declining trend in central European Russia. A major decline occurred in the numbers of birds breeding in the Moscow region up until the 1960s, but in recent years, the small population surviving in this area has been relatively stable (Zubakin *et al.* 1998). The earlier decline in this area was attributed to the widespread drainage of peatlands and ploughing of floodplain meadows in the first half of the twentieth century (Zubakin *et al.* 1998). In the early 1990s, increases were reported in France, The Netherlands, Belgium, Denmark and parts of Germany, and the large population in Finland was thought to be relatively stable or increasing slightly (Tomialojc 1994b, Bednorz & Grant 1997). More recently, however, BirdLife International (2004a) has reported decreases in the breeding populations in 16 European countries including Finland, Germany, Ireland, The Netherlands, Norway, Russia, Sweden and the U.K. (the only countries with over 2,500 breeding pairs). BirdLife International (2004a) concludes that the species is undergoing a moderate decline.

The latest estimate of the numbers wintering in Western Europe and North-west Africa, based on counts in the 1980s and 1990s, is 21% higher than the estimate for the early 1980s (Stroud *et al.* 2004, Wetlands International, IWC data) and this apparent long-term increase may be genuine. However, Tomialojc (1994b) thought that there had been a decrease in the number of birds wintering in Western Europe, especially in France and Ireland. Certainly numbers in Ireland in the 1990s (25,500) were greatly reduced from the estimate of 100,000 in the 1970s (Hutchinson 1979, Crowe, 2005). Numbers wintering in Britain have shown a modest but steady increase since a low-point in the early 1980s, although there are signs that the trend has levelled off since the start of the 21st century (Banks *et al.* 2006). The major decline in Ireland has been offset to some extent by this increase in Britain. This may indicate a shift of distribution between the two countries, with more easterly wintering in the 1990s, as has been found within Britain for some other wader species by Austin *et al.* (2000). The Dutch Wadden Sea holds about 10-15% of this population in winter and numbers there appear to have increased since the 1970s, although the trend between 1992 and 2002 was stable, despite a high count of 152,000 individuals in January 2002. (van Roomen *et al.* 2004). An increase in the number of birds wintering in the Danish Wadden Sea in the 1990s is possibly related to protection from hunting in Denmark since 1994 (Laursen 2005.). This is a species which winters in some numbers inland, away from coasts, and it seems possible that as with Northern Lapwing *Vanellus vanellus* and Eurasian Golden Plover *Pluvialis apricaria*, habitat changes may have caused an increase in coastal wintering in some parts of Europe, and led to unrepresentative increases in count totals. Decreases have been reported in the numbers of birds wintering at the Banc d'Arguin in Mauritania (Hagemeijer *et al.* 2004) (from 14,200 to 8,500), and in the Gulf of Gabes in Tunisia (van der Have *et al.* 1997) (from 11,800 to 935) and it seems possible that decreases in Africa and increases in Europe are indicative of a shift in distribution.

N. a. orientalis is reported to have become rare in many parts of its breeding range in Central Siberia because of a loss of suitable habitat to development (Rogacheva 1992). This form has also become less abundant on its wintering areas in Southern Africa since the beginning of the twentieth century (Underhill 1997), and it seems likely that this population as a whole is in decline.

Historically, the form *suschkini* occurred throughout the steppe zone of southern Russia, but in the nineteenth century and first half of the twentieth century, it disappeared from almost all parts of the European steppes due to ploughing, increased grazing pressure and direct persecution by man. Only one small relict population survives in the Tsimlyansk Sands in southern Russia (Belik 1998a). Declines on the steppes at the south end of the Urals began in the 1920s, and were most rapid in the 1950s as a consequence of the widespread conversion of natural steppe habitats to agriculture (Samigullin 1998). Further east, numbers in the Transvolga region of Kazakhstan declined roughly tenfold in the 1980s and 1990s (Belik 1998b). It is apparent that this population as a whole is in serious decline.

Habitat and ecology

The Eurasian Curlew breeds in the boreal, temperate and steppe regions of Europe and Asia. It nests in open marshes, peat-bogs, upland moorland, swampy and dry heathlands, dune valleys, coastal marshes, natural and cultivated meadows or grasslands, and steppe. In some areas, it has adapted well to non-intensive farmland, particularly in river valleys. In the steppes of southern Russia and western Kazakhstan, it breeds in mainly dry meadows in lake depressions amidst large sandy expanses (Belik 1998). Outside the breeding season, the Eurasian Curlew occurs mainly on muddy shorelines of estuaries, coastal lagoons, lakes and rivers, and also on sandy beaches and coastal meadows, but rarely on rocky shorelines. Inland grasslands are also widely used by birds wintering in western Europe.

Network of key sites

The Eurasian Curlew is an abundant bird throughout much of Western Europe, and although it is highly gregarious outside the breeding season and often occurs in large flocks, it seldom occurs in numbers that exceed the high 1% threshold of 8,500. Thus few key sites can be identified, although there are numerous important sites that regularly support several thousand birds. Much the most important sites for the nominate form are the Wadden Sea in Germany and The Netherlands, and the Rhine-Maas-Schelde Delta in The Netherlands. The highest numbers occur in autumn, when there may be as many as 88,000 in the German Wadden Sea in Lower Saxony, 67,500 in the German Wadden Sea in Schleswig-Holstein, 179,000 in the Dutch Wadden Sea, and 28,000 in the Dutch Delta. Other extremely important sites include Morecambe Bay and The Wash in the U.K., the Baie des Veys in France, and the Banc d'Arguin in Mauritania. All these sites are coastal, and the only inland sites that are known to hold numbers exceeding the 1% threshold are the Danube Plain and Hortobagy in Hungary, where concentrations of 10,000-20,000 have been recorded (Heath & Evans 2000). Relatively small numbers of Eurasian Curlews winter in the Mediterranean basin, but one site is of outstanding importance, namely the Gulf of Gabès in Tunisia, where over 9,300 were recorded in February 1984 (van Dijk *et al.* 1986). Some of these birds may have been *orientalis* from the eastern population, but the majority were believed to be nominate *arquata*.

In South-west Asia, seven key wintering sites have been identified for *orientalis* on the basis of a provisional 1% threshold of 1,000: the Khouran Straits (5,850 in January 1974), Deltas of Rud-i Shur, Rud-i Shirin and Rud-i Minab (1,500 in January 1974) and Deltas of Rud-i Gaz and Rud-i Hara (5,000 in 1973) in Iran; Barr Al Hikman (1,720) and Masirah Island (1,330) in Oman; Tarut Bay (1,830) in Saudi Arabia; and Khor Al Beidah in the United Arab Emirates (1,300 in 1992). The Sivash Gulf on the Sea of Azov in Ukraine is probably a key staging area for this population in spring (up to 1,400) and autumn (up to 3,700) (Chernichko *et al.* 1991), but birds of the nominate form may also occur at this site and the higher 1% threshold applies.

Protection status of key sites

The Banc d'Arguin (1,173,000 ha) in Mauritania was designated as a National Park in 1976, a Ramsar site in 1982 and a World Heritage Site in 1989; the principal threat comes from over-fishing in coastal waters and the impact that this is having on the coastal ecosystem as a whole (Fishpool & Evans 2001).

The three wintering sites for *orientalis* in southern Iran were designated as Ramsar sites in 1975, and one of these, Khouran Straits, is partly protected in the Hara Protected Area and Biosphere Reserve (85,686 ha; Scott 1995). However, the four wintering sites in the Arabian Peninsula are unprotected.

A small part of the Gulf of Gabès in Tunisia is protected in the Kneiss Natural Reserve (5,850 ha), established in 1993. Sivash Gulf in Ukraine is covered by two large Ramsar sites, Eastern Syvash, (165,000 ha) and Central Syvash (80,000 ha), but is otherwise unprotected.

Table 46. Key sites for Eurasian Curlew. Sites where 1% or more of a population has been recorded

Country	Site	Lat.	Long.	Season	Max total	Year max	Average total	Basis for average	Source	Population(s) at site
Denmark	Wadden Sea	55.16	8.58	Spring	9455	2000	3501	2000-04 (3)	NERI, Denmark, 2005	*arquata*
France	Baie des Veys	49.40	-1.14	Non-breeding	13298	1997	1334	1999-04 (5)	IWC database	*arquata*
Germany	Wadden Sea - Lower Saxony	54.00	8.00	Autumn	88110	1996	53662	1997-01 (5)	J .Blew, CWSS, 2005	*arquata*
Germany	Wadden Sea - Schleswig-Holstein	54.50	8.50	Autumn	67476	1994	35104	1997-01 (5)	J .Blew, CWSS, 2005	*arquata*
Guinea-Bissau	Bijagos Archipelago	11.30	-16.00	January	9300	1993	6450	1992-01 (3)	Dodman & Sá 2005	*arquata*
Hungary	Danube plain	46.82	19.25	Migration	12000	1996			WBDB	*arquata*
Hungary	Hortobagy	47.62	21.07	Migration	10000	1996			WBDB	*arquata*
Iran	Khouran Straits	26.83	55.67	Wintering	1648	2007	1187	2004-2007(3)	DOEI / WIWO	*orientalis*
Iran	Rud-i-Gaz and Rud-i-Hara Deltas	26.67	56.83	Wintering	5000	1973			Evans 1994	*orientalis*
Iran	Rud-i-Shur, Rud-i-Shirin & Rud-i-Minab Deltas	27.08	56.75	Wintering	2217	2007	1568	2004-2007(3)	DOEI / WIWO	*orientalis*
Mauritania	Banc d'Arguin	20.12	-16.27	January	10200	2000	8430	1997-01 (3)	Hagemeijer *et al.* 2004	*arquata*
Netherlands	Friesland Province	53.10	5.90	Autumn	11414	2003			SOVON, The Netherlands, 2005	*arquata*
Netherlands	Rhine-Maas-Schelde Delta	51.50	4.00	Autumn	26888	2003	22423	1999-03 (5)	RWS WD RIKZ 2005	*arquata*
Netherlands	Wadden Sea	53.30	5.38	Autumn	178774	2000	145666	1999-03 (5)	SOVON, The Netherlands, 2005	*arquata*
Oman	Barr Al Hikman	20.63	58.47	Non-breeding	12000	2001	3270	1993-01 (5)	IWC database	*orientalis*
Oman	Masirah Island	20.50	58.75	Non-breeding	1333	1995	1015	1994-01 (5)	IWC database	*orientalis*
Saudi Arabia	Tarut Bay	26.67	50.17	Non-breeding	1831	1992	1373	1992-96 (4)	IWC database	*orientalis*
Tunisia	Gulf of Gabès	34.40	10.32	February	9323	1984			Van Dijk *et al.* 1986	*arquata* + *orientalis*
U.A.E.	Khor al Beidah	25.55	55.62	Oct-Nov	1300	1992			Evans 1994	*orientalis*
U.K.	Morecambe Bay	54.12	-2.93	Autumn	19170	1999-03	11988	1999-03 (5)	BTO, UK, 2005	*arquata*
U.K.	The Wash	52.93	0.30	Autumn	15336	1999-03	11158	1999-03 (5)	BTO, UK, 2005	*arquata*

Derek Scott

György Szimuly

Spotted Redshank
Tringa erythropus

Geographical variation and distribution

The Spotted Redshank is a monotypic species, breeding in a fairly narrow boreal and sub-arctic zone in northernmost Eurasia, north of the closed taiga, and extending to the sub-arctic zone in Eastern Siberia. It is common in the northern third of Sweden and in the northern half of Finland, but in Norway it breeds only in Finnmark. In Russia, the breeding range extends from at least the Pechora River west of the Ural Mountains east to the Chukotsky Peninsula, but the species is absent from northern Taymyr. The apparent gap in distribution around the White Sea may not exist since there is much suitable habitat to the east of Finland. In the poorly investigated Kola Peninsula and Russian Karelia, breeding has been recorded but is probably infrequent (Zimin *et al.* 1993). In Western Siberia, however, breeding densities may be higher than in Fennoscandia (Rogacheva 1992, *c.f.* Väisänen *et al.* 1998).

Western populations, breeding in Fennoscandia and north-western Russia, winter in small numbers at scattered localities, mainly on the coast, in Western and Southern Europe and North-west Africa, and more commonly in sub-Saharan Africa from Mauritania and Ethiopia south to northern Democratic Republic of Congo, Burundi and northern Tanzania. Birds breeding in Western Siberia winter mainly in the Middle East, and North-east and East Africa. Populations breeding in Central and Eastern Siberia winter in South and South-east Asia.

Movements

The Spotted Redshank is a highly migratory species wintering in temperate and tropical regions. Migration is mainly on a broad front, but important passage concentrations are also known.

The birds breeding in Fennoscandia and western Russia migrate south-west to Western Europe and West and Central Africa, while birds from breeding areas in Western Siberia winter in the Middle East and Eastern and Southern Africa. Birds in the western population use at least two migration routes. A major migration route runs along the Atlantic coast, with large numbers of birds staging in the Wadden Sea and the Dutch Delta area, while other birds cross Europe on a broad front. Many of these use staging areas in southern Hungary. In spring, the birds that have wintered in Mali, Nigeria and Chad appear to overfly the Sahara on a more direct route to their breeding areas (Cramp & Simmons 1983). Birds wintering in Ghana have been seen departing from their wintering areas in a north-easterly direction (Grimes 1974). It is not known if these differences in migration routes reflect different migratory strategies used by birds from different breeding areas or a more general loop migration system.

Spotted Redshanks usually migrate in small flocks of some tens of birds, although at the most important stopover sites, several hundred, or occasionally thousands of birds may gather together. Birds can make long, non-stop flights between staging areas, so that over large regions, they are seen only in low numbers which do not reflect the true scale of movement. At least some birds store substantial amounts of fat giving them a potential flight range of at least 2,000 km, but many may make shorter flights.

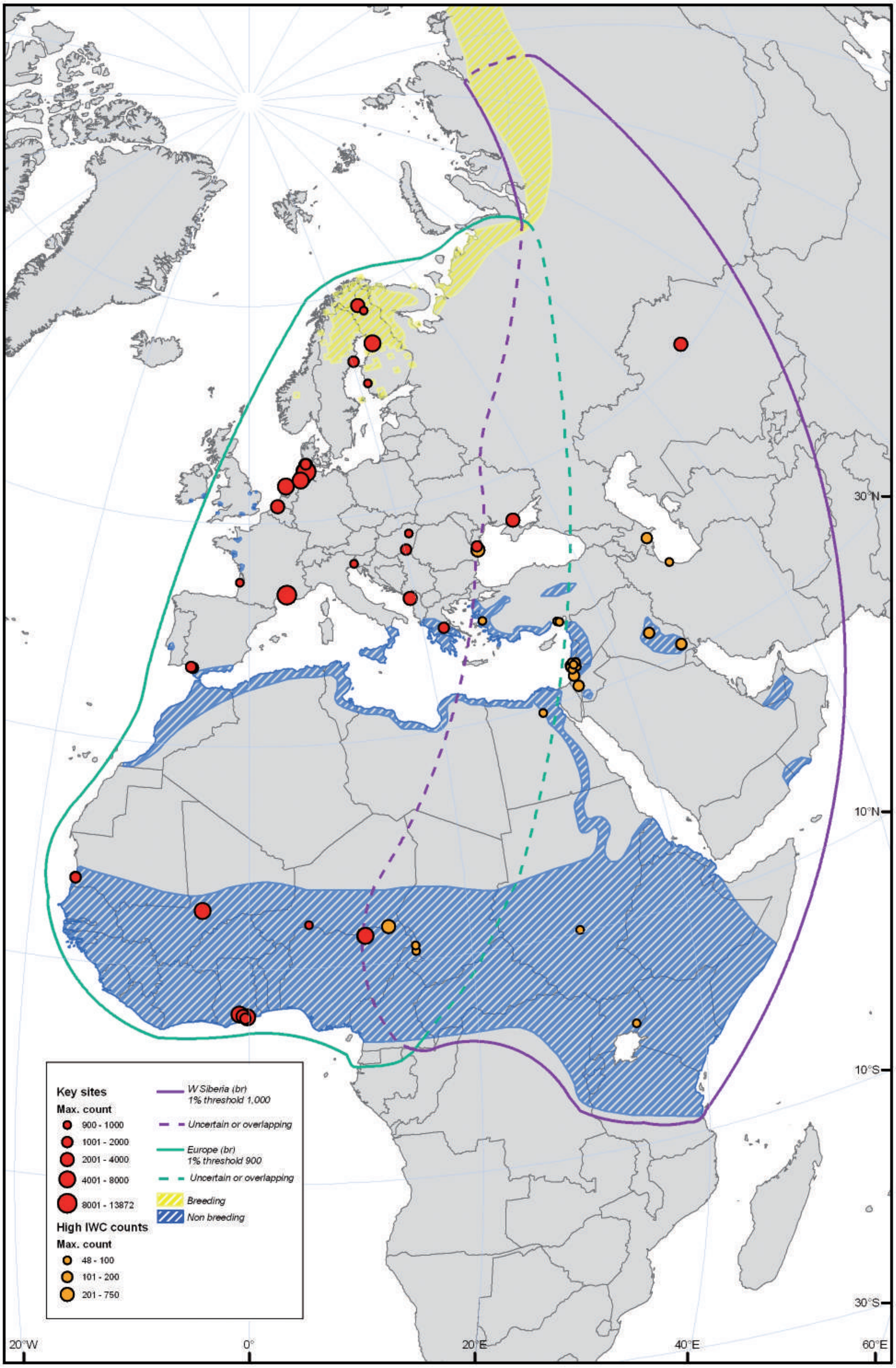
Birds migrate fairly rapidly in spring but over a longer period in autumn. The birds start to leave their African winter quarters in March, and arrive on their breeding grounds in May. Females leave their nesting areas in June, and the males follow in July and August. Juveniles leave their natal areas soon after. The majority of birds reach their Afro-tropical wintering grounds in September and October.

Population limits

No discrete biogeographical populations can be identified in

Spotted Redshank

Tringa erythropus



Western Eurasia, as neither on the breeding grounds nor in the wintering quarters are populations wholly separated from one another. However, two "flyway" populations have been recognised:

1) a western population comprising birds breeding in Fennoscandia and western Russia, west of the Ural Mountains, and migrating through Europe to West European coastal areas and West and Central Africa;
2) a more easterly population, breeding in Western Siberia (east of the Urals), and using a more easterly migration route through South-west Asia into the Middle East and Eastern Africa.

The combination of Fennoscandian and western Russian breeders seems appropriate: the Fennoscandian breeding population forms one coherent unit, and, although there are probably some large gaps in the distribution in western Russia, all of these birds probably mix during their migrations through Europe.

Population size

1. Europe (breeding)

Population estimate	1% threshold	Population trend
60,000-120,000	900	Probably stable

Recent midwinter counts give a total of only about 17,800 birds for Western Europe and West and Central Africa (Stroud *et al.* 2004). It is certain that many are missed, probably because they are widely dispersed at wetlands in Africa south of the Sahara. Wintering numbers in Europe are small: about 450 birds overwinter in the Wadden Sea, 700 in Italy, and 1,160 in Spain (Stroud *et al.* 2004).

The first two editions of *Waterbird Population Estimates* gave an estimate of 75,000-150,000 for this population, based on a collation of national breeding estimates (BirdLife International's European Bird Database, March 1994). The most recent estimates of the European breeding population, based on collations of national breeding estimates by Thorup (2006) and BirdLife International (2004a), are 27,000-41,500 pairs and 19,000-42,000 pairs, respectively. These figures suggest a total population of about 60,000-120,000 non-breeding individuals – the estimate adopted in *WPE4*. The figures given by Thorup (2006) include 17,000 pairs in Finland, 6,000 pairs in Sweden, 2,000-6,000 pairs in Norway and 2,000-12,500 pairs in European Russia. *WPE3* gave a slightly higher estimate of 77,000-131,000 individuals, based on Thorup's collation, but including some older and less precise national totals.

2. Western Siberia (breeding)

Population estimate	1% threshold	Population trend
B/C (10,000-100,000)	Provisionally 1,000	Unknown

The size of this population is even less well known than the European breeding population. Current midwinter counts account for only about 1,000 birds in South-west Asia and 8,000 in Africa, but many are undoubtedly missed (Wetlands International 2000). Perennou *et al.* (1994) set a broad range of 10,000-100,000 for this population, and in the absence of better information, this was adopted in all four editions of *Waterbird Population Estimates*. Stroud *et al.* (2004) also accepted this estimate, but with the caveat that the population size may be at the lower end of the range.

Conservation status

Very limited information is available on the status of the Spotted Redshank in Western Eurasia. In Finland, where the majority of the population breeds, both the range and population size seem to have remained more or less stable during the twentieth century (Väisänen *et al.* 1998), although some decrease has been reported in recent years (BirdLife International 2004a). No overall changes have been noted in Norway, Sweden or European Russia during recent decades (Koskimies 1993, Asbirk *et al.* 1997, BirdLife International 2004a). In Sweden, however, the species expanded its range some 150–200 km further south during the twentieth century, but the reasons for this are unknown (Koskmies & Svensson 1997).

There are no large-scale threats to breeding populations because wet, extensive, northern peatlands are unsuitable for forestry, peat digging and other economic purposes. The availability and quality of staging and wintering areas may be more critical for this species than conditions on the breeding grounds.

Habitat and ecology

The Spotted Redshank breeds at Arctic and sub-arctic latitudes, both in lowlands and uplands. It favours bogs and other open peatlands in northern taiga and wooded tundra, where open and thinly forested bogs and coniferous forest form a mosaic of different habitats. Northern Finland, with its extensive flat peatland areas, seems to be optimal for this species. Although dependent on access to wetlands for food and shelter, nesting may take place at some distance away in dry, open pine or birch forest and even hilly sites. Outside the breeding season, the Spotted Redshank is less marine than many congeners. It prefers many kinds of freshwater and brackish wetlands, including sheltered littoral sites, mudflats and saltmarshes, and also pools, salt pans, lagoons, shallow flood-lands and irrigated rice fields.

Adults undergo a complete post-breeding moult during the earlier part of their autumn migration, usually at temperate latitudes. A partial pre-breeding moult takes place in March and April. Juveniles undergo a partial moult in autumn and spring.

Network of key sites

Because the Spotted Redshank is generally a dispersed species, migrating on a broad front and wintering in small numbers at numerous sites over a wide area, the key site approach will not guarantee the future of the populations. A more appropriate approach is to address major land-use issues, combined with designation of the most important sites for this and other dispersed wader species.

Two important breeding sites have been identified in northern Finland, the Lemmenjoki-Hammastunturi-Pulju area with 300-1,000 pairs, and the Pomokaira-Koitelaiskaira area with 100-300 pairs, but in general the Spotted Redshank breeds at rather low densities over much of its wide range. Passage through Europe occurs on a broad front and this is reflected in the 17 key staging sites which are widely scattered in Denmark (1), Finland (2), France (2), Germany (2), Hungary (2), Italy (1), Montenegro (1), The Netherlands (2), Romania (1), Sweden (1) and Ukraine (1). Most of these passage sites hold no more than 1-2% of the population at any one time (i.e. <1,800 birds), but major concentrations have been recorded in recent years in the Oulu region of Finland (maximum 7,000), the Camargue in France (maximum 5,500), the German Wadden Sea (6,400 in Lower Saxony

Table 47. Key sites for Spotted Redshank. Sites where 1% or more of a population has been recorded

Country	Site	Lat.	Long.	Season	Max total	Year max	Average total	Basis for average	Source	Population(s) at site
Denmark	Wadden Sea	55.08	8.58	August	2888	1999	479	1999-02 (3)	NERI, Denmark, 2005	Europe
Finland	Lemmenjoki-68.58 Hammastunturi-Pulju	25.50		Breeding	3000	1991			WBDB 2005	Europe
Finland	Oulu Region Wetlands	64.92	25.17	Migration	7000	1997			Skov *et al.* 2000	Europe
Finland	Pomokaira-Koitelaiskaira	68.00	26.30	Breeding	900		1994		WBDB	Europe
Finland	Pori Archipelago & wetlands	61.53	21.60	Migration	1000	1997			Skov *et al.* 2000	Europe
France	Bassin d'Arcachon et Banc d'Arguin	44.67	-1.12	Migration	1000	1997			WBDB	Europe
France	Camargue	43.52	4.60	Migration	5500	1997			WBDB	Europe
Germany	Wadden Sea - Lower Saxony	54.00	8.00	Spring	6384	1994	1530	1998-02 (5)	J . Blew, CWSS, 2005	Europe
Germany	Wadden Sea - Schleswig-Holstein	54.50	8.50	Autumn	13872	1994	8647	1997-01 (5)	J . Blew, CWSS, 2005	Europe
Ghana	Densu Delta. Panbros Salt Pans	5.55	-0.30	Non-breeding	1170	1998	810	1997-98 (2)	AfWC database	Europe
Ghana	Keta Lagoon complex	5.92	-0.83	July-August	6346	2000	2781	1996-01 (4)	AfWC database	Europe
Ghana	Sakumo Lagoon	5.67	-0.17	July-August	4219	2000	2030	1999-01 (3)	AfWC database	Europe
Ghana	Songhor Lagoon	5.75	-0.50	July-August	2470	2000	1754	1999-01 (3)	AfWC database	Europe
Greece	Spercheios Delta (Lamia)	38.83	22.40	Non-breeding	1500	1989	757	1989-95 (2)	IWC database	Europe
Hungary	Hortobagy	47.62	21.07	Migration	1000	1996			WBDB	Europe
Hungary	Pusztaszer Landscape Protection Area	46.25	20.17	Migration	1500	1996			WBDB	Europe
Italy	Laguna Di Grado E Marano	45.75	13.32	Migration	1000	1993			WBDB	Europe
Kazakhstan	Tengiz-Korgalzhyn Lakes	50.50	69.40	Spring migration	2459	2000			Schielzeth *et al.* in prep.	W Siberia
Mali	Inner Niger Delta	13.50	-4.00	Non-breeding	4557	1998-04			Zwarts *et al.* 2005	Europe
Mauritania	Aftout es Sâheli	17.37	-16.13	Non-breeding	1150	1987			WBDB	Europe
Montenegro	Ulcinj Salina	41.92	19.30	September	2249	2006			M Schneider-Jacoby *in litt.*	Europe
Netherlands	Rhine-Maas-Schelde Delta	51.50	4.00	Autumn	3463	1995	2163	1999-03 (5)	RWS WD RIKZ 2005	Europe
Netherlands	Wadden Sea - The Netherlands	53.30	5.38	Autumn	6806	2002	4408	1999-03 (5)	SOVON, The Netherlands, 2005	Europe
Niger	Mozague Ouest	13.90	5.45	Non-breeding	1000	1995	266	1992-97 (4)	AfWC database	Europe
Nigeria	Hadejia-Nguru	12.67	10.50	Non-breeding	4065	1997	1327	1994-98 (5)	AfWC database	W Siberia + Europe
Romania	Danube delta	45.00	29.00	Spring	1275	1995			Kube *et al.* 1998	Europe
Spain	Lucios de Veta La Palma -Isla Mayor (Se)	36.93	-6.24	Non-breeding	1205	1993	314	1994-00 (5)	IWC database	Europe
Spain	Parque Nacional de Doñana	37.00	-6.42	Non-breeding	1195	1993			IWC database	Europe
Sweden	River Umeälven delta	63.75	20.32	Migration	1500	2001			WBDB	Europe
Ukraine	The Sivash, Azov Sea	46.17	34.58	Spring	2500	1992			van der Winden *et al.* 1993	W Siberia + Europe

and 13,900 in Schleswig-Holstein), and the Dutch Wadden Sea (maximum 6,800).

Although the bulk of the population winters in sub-Saharan Africa, significant numbers also winter in the Mediterranean basin, and three key wintering sites have been identified in Southern Europe, the Spercheios Delta in Greece (with up to 1,500 birds), and two sites in south-western Spain, each with a maximum count of about 1,200 birds. Eight key wintering sites have been identified in West Africa, four in Ghana, and one each in Mali, Mauritania, Niger and Nigeria. The most important of these are the Keta Lagoon complex (maximum 6,350) and Sakumo Lagoon (maximum 4,220) in Ghana, the Inner Delta of the Niger in Mali (maximum 4,560), and the Hadeija-Nguru wetlands in Nigeria (maximum 4,065). No key sites have been identified for the eastern population.

Protection status of key sites

The two important breeding sites in Finland are well protected: the Lemmenjoki-Hammastunturi-Pulju (529,718 ha) is largely protected within a National Park (284,928 ha), two Wilderness Areas (61,981 ha and 182,809 ha) and two Special Protection Areas (totalling 490,895 ha), while the Pomokaira-Koitelaiskaira area (141,630 ha) is largely included within a Peatland Reserve (43,665 ha), a Ramsar site (34,400 ha) and two Special Protection Areas (totalling 141,532 ha) (Heath & Evans 2000).

Pertti Koskimies & Derek Scott

György Szimuly

Common Redshank

Tringa totanus

Geographical variation and distribution

The Common Redshank breeds across the Palearctic in continental middle latitudes, mainly in the temperate and steppe zones but extending into the boreal and Mediterranean zones. Within oceanic regions, it also extends into the sub-arctic and marginally into the low Arctic (Snow & Perrins 1998, Engelmoer & Roselaar 1998). It breeds throughout much of Europe (including Iceland), locally in North Africa, and widely across Asia to the Himalayas, Tibetan Plateau, Mongolia, northern China and the Amur Valley in eastern Russia. It reaches the northern limit of its breeding range at about 70ºN in Fennoscandia and the Kola Peninsula, but extends no further north than 60ºN in eastern European Russia and 55ºN east of the Urals. In Western Eurasia and Africa, Common Redshanks winter from North-west Europe, the Black Sea and the Caspian Sea south through the Mediterranean basin and Middle East to West Africa, Eastern Africa and the Arabian Peninsula. Only small numbers penetrate south of the equator in Africa, and the species is rare in Southern Africa (Hockey 1997). Eastern populations winter south to India, Sri Lanka, South-east Asia and the Greater and Lesser Sundas.

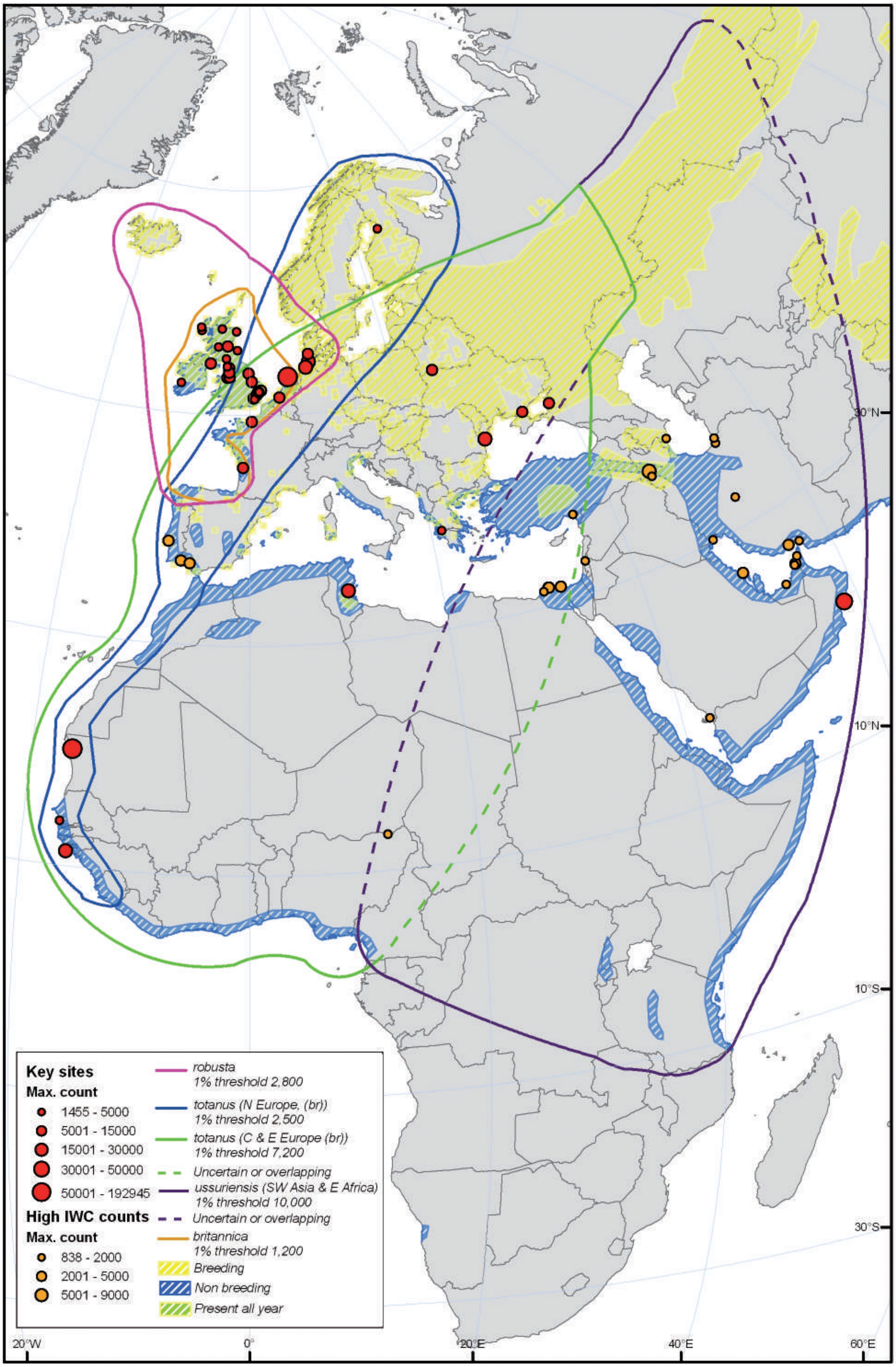
The taxonomy of the Common Redshank in the Western Palearctic has been the subject of much controversy. Most authors accept that the birds breeding in Iceland and the Faeroes belong to a distinct subspecies *robusta* and that the birds breeding in Fennoscandia and northern European Russia (around the White Sea) can be ascribed to nominate *totanus*. However, the status of the birds breeding in Britain and Ireland and throughout much of continental Europe is uncertain. Various authors have considered the birds breeding in Britain and Ireland to belong to a separate form, initially described under the name *bewickii* (Ticehurst 1932) and subsequently renamed *britannica* (Mathews 1935). This was the treatment adopted by Vaurie (1965), who gave the range of *britannica* as the British Isles – chiefly sedentary, but with a few individuals wintering along the coasts of western and northern France. Peters (1934), however, retained the name *bewickii*, and gave the range of this form as the British Isles and probably also the southern half of continental Europe south to the Mediterranean.

Hale (1971) considered that the highly polymorphic population of Common Redshanks in Central and Western Europe (including the British Isles) was a hybrid swarm derived from hybridization between eastern populations (*ussuriensis*) and nominate *totanus*, with only the populations of northern Scandinavia, northern European Russia and Spain now showing the original characteristics of nominate *totanus*. He considered that the birds breeding in Britain and Ireland should be included in *robusta*, and this treatment was adopted by Johnsgard (1981. However, Cramp & Simmons (1983) considered *britannica* to be a part of nominate *totanus*, which they saw as a polymorphic subspecies with a breeding range extending from the British Isles and Iberia to southern Russia. Hayman *et al.* (1986) also considered *britannica* to be a part of nominate *totanus*, as did Smit and Piersma (1989) and del Hoyo *et al.* (1996). However, the latter noted that there was increasing evidence for separation of the population of Britain, Ireland and The Netherlands as *britannica*.

Engelmoer & Roselaar (1998) reviewed the taxonomy of the Common Redshank in the Western Palearctic, and concluded that *totanus, robusta* and *britannica* are valid forms. However, they noted that the different subspecies are in contact with each other, resulting in processes of introgression and inter-gradation. They differ from many earlier authors in suggesting that *robusta* may breed in Orkney, Shetland and northern Scotland, as well as in Iceland and the Faeroes, and gave the breeding distribution of *britannica* as extending from south and east England through The Netherlands, Germany and Denmark to the southern Baltic and probably as far east as the Black Sea. They suggested that the birds breeding in Scotland, the north and west of England, Wales and Ireland (i.e. the great bulk of the British and Irish population) are intermediate between *britannica* and *robusta* (in the north-

Common Redshank

Tringa totanus



west) and between *britannica* and *totanus* in the north-east. They concluded that it is necessary to analyse more biometric data of British breeding birds before conclusions can be reached on the exact nature of intermixing of *robusta*, *totanus* and *britannica* in Britain & Ireland.

Thorup (2006) pointed out that the demarcation of the Fennoscandian and northern Russian *totanus* and the West and Central European *britannica* of Engelmoer & Roselaar was not known, and therefore preferred to treat the two subspecies together. It may well be appropriate to treat all the birds breeding in West, Central and Southern Europe (including Britain & Ireland) as a different subspecies from the *totanus* breeding in Fennoscandia and northern Russia, as was suggested by Peters (1934). However, it would be prudent to avoid this approach until more work has been carried out on the status of the bulk of the British and Irish population, and on the affiliations of birds in Eastern Europe and the Mediterranean.

The relatively large birds breeding in south-east European Russia and South-west Asia have been ascribed to the form *ussuriensis*, which breeds from the Urals east across central and eastern Russia to the Russian Far East and northern Manchuria, and south to the Aral Sea, the Tian Shan and Mongolia. The boundary between *totanus* and *ussuriensis* has not been well defined, especially south of the Urals where these two forms apparently intergrade. The birds breeding in eastern Turkey and north-western Iran probably lie within this zone of inter-gradation.

Three additional subspecies, *terrignotae*, *craggi* and *eurhinus*, have been described from Central Asia, south of the range of *ussuriensis*. These winter in South and South-east Asia, and outside the region covered by this Atlas.

Movements

The Common Redshank is mainly migratory, although some birds are resident in maritime countries of Western Europe (Cramp & Simmons 1983). In general, the smallest birds (nominate *totanus* from northern Fennoscandia) winter furthest south (in West Africa), while the largest birds (from Iceland) winter furthest north (in Iceland and around the North Sea). Intermediate-sized birds from Western and Central Europe winter at intermediate latitudes, in France, Iberia and the western Mediterranean. Thus there is a tendency towards leap-frog migration, although there is much overlap of wintering ranges (Cramp & Simmons 1983).

T. t. robusta is mainly migratory. Some winter in coastal habitats in southern Iceland and in the Faeroes, but the bulk of the population moves to the coasts of North-west Europe, especially Britain and Ireland which may support about 60% of the total population (Cramp & Simmons 1983), mainly in the north (Summers *et al.* 1988). Others move further and winter in the North Sea area from southern Norway and the south-west Baltic to north-western France. Some occur in Portugal and stragglers reach Morocco. By contrast, the birds breeding in Britain and Ireland ("*britannica*") are only partially migratory, with most birds remaining in Britain and Ireland throughout the winter. After breeding, most birds from inland breeding areas move to the coast, while many coastal breeders may stay within 10 km of their natal area, especially in the south of Britain (Cramp & Simmons 1983). Many move further south, with some birds reaching The Netherlands, Belgium, France and Iberia. Young birds tend to move further than adults. A higher proportion of northern breeders migrate than southern breeders, and northern breeders tend to move further, but the southern limit of both groups is about the same, i.e. the Bay of Biscay. Of two birds recovered in Portugal, one was from the south-east of England (Clark 2002b). The wintering range of British and Irish breeders is thus contained within that of *robusta* from Iceland, making geographical separation on the wintering grounds impractical.

Common Redshanks breeding in Fennoscandia and northern European Russia (typical *totanus*) are highly migratory, moving south-west along the Atlantic coast of Europe to winter mainly in West Africa. Recoveries of birds ringed in Norway and Sweden show major use of a coastal route out of the Baltic and down the Atlantic coast, with only a few recoveries coming from the western Mediterranean (Cramp & Simmons 1983, Bakken *et al.* 2003). There are some recoveries of these birds in south-west France and Iberia in winter, but the paucity of winter recoveries of Fennoscandian birds in Western Europe suggests that most of these birds go to West Africa, where there have been at least seven recoveries between Mauritania and Ghana (Cramp & Simmons 1983). Meltofte (1993) identified a separation between lowland breeding birds in Denmark, southernmost Norway and southern Sweden, and alpine and sub-arctic birds from northern Fennoscandia. The southern birds pass through Denmark during late March and April, while northern birds show a distinct peak in the first half of May. Southern adults leave already during the first half of July, while the northern birds pass in the second half of July and early August. Meissner (1999) also recognised these two populations migrating through the Gulf of Gdansk, Poland. Birds breeding further south in continental Europe migrate on a broad-front across Europe to wintering areas from the southern North Sea to the Bay of Biscay, Iberia and the Mediterranean, with many continuing on to West Africa (Cramp & Simmons 1983). Relatively few continental breeders reach Britain, and those which do are probably mostly autumn migrants from the Low Countries, western Norway and the Baltic east to Latvia (Cramp & Simmons 1983). However, some continental birds have been found wintering in south-east England, and their occurrence may be related to hard-weather movements from the continent (Lack 1986, Clark 2002b). Most birds breeding in the Low Countries appear to winter mainly around the Bay of Biscay and in western Iberia, although there have been some recoveries in the Mediterranean and in North-west Africa south to Senegal. Danish breeding birds winter mainly in the western Mediterranean east to Italy, and are thought to reach there on a broad front overland, rather than via the Atlantic coast. Birds from the Baltic States and Central Europe also appear to winter mainly in the Mediterranean (Cramp & Simmons 1983). Some of these birds from west-central Europe reach the south coast of West Africa (Guinea, Sierra Leone, Cote d'Ivoire and Ghana), apparently either via a coastal route or by crossing the Sahara (Urban *et al.* 1986, Smit & Piersma 1989). A bird ringed in the Algerian Sahara in April was recovered a month later near St. Petersburg, Russia (Cramp & Simmons 1983). Birds breeding in Eastern Europe apparently migrate on a broad front towards the eastern Mediterranean and Asia Minor, with many birds continuing on into sub-Saharan Africa (Urban *et al.* 1986, Snow & Perrins 1998). Chernichko *et al.* (1991) describe a notable autumn passage of up to 30,000 Common Redshanks through the Black Sea. Most of these birds probably originate from breeding areas in Eastern Europe, but there have been some recoveries in the Black Sea of birds ringed in the southern Baltic (Kube *et al.* 1998). Over 100,000 Common Redshanks have been observed in inter-tidal areas in Tunisia in spring (Kube *et al.* 1998). These may be birds that have wintered in southern West Africa and are returning on a trans-Saharan route via the central Mediterranean to breeding areas in Central and Eastern Europe.

Common Redshanks breeding further east, in south-east European Russia, Western Siberia and South-west Asia (*ussuriensis*), are thought to migrate south-west to winter from the Caspian region south through the Middle East to North-eastern and Eastern Africa. *T. t. ussuriensis* is said to be common to abundant in winter on the Red Sea coast and in Somalia, and locally common south to Kenya and Tanzania (to about 10ºS). It is regular along the Nile south to Sudan, but uncommon to rare in the rest of Eastern Africa and in Central and Southern Africa (Urban *et al.* 1986, Summers *et al.* 1987, Hockey 1997).

The Common Redshank breeds over a broad latitudinal range, and arrival dates on the breeding grounds vary between March and May. Birds move south from July to September. Arrival in North Africa occurs from July to August, and in the Red Sea in late August and September (Urban *et al.* 1986). Birds reach their West African winter quarters from late September and depart in March and April. The main spring passage of Fennoscandian breeders through Western Europe occurs in April and the first half of May, when southern breeders are already incubating (Cramp & Simmons 1983, Hayman *et al.* 1986). Adults moult between July and October, mostly within their wintering areas (Snow & Perrins 1998). However, some birds from the Baltic and North Sea initiate moult during gradual movements along the Atlantic coast (Cramp & Simmons 1983). Some birds, presumably immatures, remain throughout their first summer in North-west Africa.

Population limits

The first two editions of *Waterbird Population Estimates* recognised only three populations of the Common Redshank in Western Eurasia and Africa: an East Atlantic wintering population of nominate *totanus* (including birds breeding in Britain and Ireland); a population of *robusta* breeding in Iceland and the Faeroes; and a population of *ussuriensis* wintering in South-west Asia and Eastern Africa. The East Atlantic population of *totanus*, as defined by Smit & Piersma (1989), did not include the large numbers of nominate *totanus* breeding in Eastern Europe and thought to winter in the eastern Mediterranean and sub-Saharan Africa. Wetlands International (2000) therefore added a fourth population (Eastern Europe/East Mediterranean & Africa) to account for these birds. Wetlands International (2000) also suggested that there might be good justification for treating the relatively sedentary population in Britain and Ireland (*britannica*) as a separate population. Stroud *et al.* (2004) supported the separate treatment of British and Irish *britannica* on the basis of their patterns of movement and an improved ability to separate *britannica* from nominate *totanus* (e.g. Summers *et al.* 1988, Mitchell *et al.* 2000). These authors recognised five populations of the Common Redshank in Western Eurasia and Africa, as follows:

1) *robusta* breeding in Iceland and the Faeroes, and wintering locally or in Britain, Ireland and the North Sea area from southern Norway to north-west France;
2) *britannica* breeding in Britain and Ireland, and wintering mainly in Britain and Ireland, with a few birds crossing to northern and western France and occasionally Portugal;
3) a western population of *totanus*, breeding in Fennoscandia, the Baltic region and west-central Europe, and wintering on the Atlantic coast of Western Europe south to West Africa (to the Ivory Coast and Ghana), and in the western Mediterranean;
4) an eastern population of *totanus*, breeding largely in Central and Eastern Europe (including the Baltic states and Belarus) and wintering in the eastern Mediterranean, Asia Minor, and probably also sub-Saharan Africa;
5) a western population of *ussuriensis*, breeding in Western Siberia and South-west Asia, and wintering south through the Middle East to Eastern Africa.

These five populations were adopted in *WPE3* and *WPE4*.

In this Atlas, we support the separate treatment of a geographically discrete population of birds breeding in Britain and Ireland. This population, referred to as "*britannica*", differs from other populations of *Tringa totanus* (except perhaps the small number of birds breeding in south-west Europe) in making only short-distance movements to winter very largely within its breeding range. The population shows characteristics intermediate between *robusta* in Iceland and the Faeroes, and *totanus* on the continent. Whether this population constitutes a valid subspecies *britannica*, or might best be assigned to *robusta* or to nominate *totanus*, remains uncertain.

We differ from Stroud *et al.* (2004), *WPE3* and *WPE4* in proposing that the birds breeding in Fennoscandia be treated as a separate population. These are the only birds that Engelmoer & Roselaar (1998) assign to the nominate form *totanus*. They are smaller than other populations of *Tringa totanus* in Western Eurasia, and are long-distance migrants, following a coastal route along the Atlantic seaboard of Europe to winter mainly in West Africa. We include the relatively small number of birds breeding in adjacent parts of north-west European Russia (around the Kola Peninsula and White Sea) within this population. These birds were also regarded as "pure" *totanus* by Hale (1971).

We also differ from Stroud *et al.* (2004), *WPE3* and *WPE4* in treating all birds breeding in continental Europe south of the Baltic as belonging to a single population. Most of these birds appear to migrate south-west in autumn on a broad front, and there is no obvious break in distribution, either in the breeding areas or in the winter quarters. These birds, assigned to *britannica* by Engelmoer & Roselaar (1998), show intermediate characteristics between nominate *totanus* to the north and *ussuriensis* to the east.

Thus five populations are recognised in this Atlas:

(1) a population of *robusta* breeding in Iceland and the Faeroes (identical to population 1 of Stroud *et al.* 2004);

(2) a population of "*britannica*" breeding in Britain and Ireland (identical to population 2 of Stroud *et al.* 2004);

(3) a population of nominate *totanus* breeding in Fennoscandia and north-western European Russia, and migrating along the Atlantic coast of Europe to winter mainly in West Africa;

(4) a population of *totanus* (largely comparable to the "*britannica*" of Engelmoer & Roselaar 1998) breeding on the continent of Europe from France and Iberia north to the southern Baltic and east to the Urals and Black Sea region, and migrating on a broad front to winter in Iberia, the Mediterranean region, North Africa and West Africa east to the Gulf of Guinea;

(5) a western population of *ussuriensis* breeding in South-east Europe (Caspian drainage of European Russia), Western Siberia and South-west Asia, and migrating south-west to winter in South-west Asia, Eastern Africa and (sparingly) Southern Africa (identical to population 5 of Stroud *et al.* 2004).

There remains some uncertainty concerning the origins of the birds wintering in the central Sahelian zone, Gulf of Guinea and Central Africa. Those in the west are perhaps mainly "*totanus*" from breeding areas in Europe, while those in the east are perhaps mainly *ussuriensis* from south-east European Russia and South-west Asia, but there is little evidence from ringing to elucidate this.

Population size

1. *robusta*

Population estimate	1% threshold	Population trend
150,000-400,000	2,800	Possibly increasing

The small breeding population of *robusta* in the Faeroes consists of only about 25 pairs (Winkleman 1994). However, the breeding population in Iceland has been estimated at 100,000 pairs (Piersma 1986, BirdLife International/EBCC 2000); 50,000-100,000 pairs (Winkelman 1994, Trolliet 1997), 140,000 pairs (Gudmundsson 2002, in Thorup 2006), and 50,000-140,000 pairs (BirdLife International 2004a). The estimate of 140,000 pairs was derived by extrapolation from survey data, and is believed to reflect better knowledge of the population size rather than an increase in numbers (Thorup 2006). Considered together, these estimates suggest that there are least 150,000 individuals in the population, and possibly as many as 420,000.

Midwinter counts can account for only a small fraction of this total. Smit & Piersma (1989) gave an estimate of 109,000 for the total number of birds wintering in North-west Europe, and this figure included not only the entire population of *robusta*, but also most of the British and Irish birds ("*britannica*"). This estimate of 109,000 was adopted in the first two editions of *Waterbird Population Estimates* for the population of *robusta* alone. Midwinter counts from Britain, Ireland, other North Sea countries and north-west France (i.e. within the wintering range of *robusta*) in the 1990s gave a somewhat higher total of 147,000 (Stroud *et al.* 2004). However, this figure includes a mixture of *robusta* and *britannica*, plus small numbers of *totanus* from continental Europe. Stroud *et al.* (2004) assumed that about 75% of the *britannica* population would be counted within the range of *robusta*, and deducted the appropriate number of birds from the total to give an estimate of 64,500 for the size of the *robusta* population. This was the estimate adopted *WPE3*.

The considerable discrepancy between estimates of population size derived from breeding season surveys (150,000-420,000) and that derived from midwinter counts (64,500) is difficult to explain. Stroud *et al.* (2004) thought it possible that the breeding estimates for Iceland were too high. While this might account for some of the discrepancy, it is equally likely that counts in midwinter give a serious underestimate for this species, which winters widely in small numbers at inland sites (Lack 1986) and along non-estuarine coastlines which are poorly covered by the annual midwinter counts. Over 33,000 Common Redshanks were recorded during a national survey of non-estuarine coastlines in the U.K. in 1997/98 (Rehfisch *et al.* 2003), almost 30% of the national total of 113,500 given by Stroud *et al.* (2004).

2. *brittannica*

Population estimate	1% threshold	Population trend
95,000-135,000	1,200	Decreasing

The first two editions of *Waterbird Population Estimates* did not give a separate estimate for the size of this population. The British breeding population was estimated at 30,600-33,600 pairs in the early to mid- 1980s, and the Irish population at 4,400-5,000 pairs (Gibbons *et al.* 1993). Stroud *et al.* (2004) gave a very precise population estimate of 124,000-127,000 based on breeding data, and this was adopted in *WPE3*. The most recent estimates of breeding populations are 31,400-44,400 pairs in Britain and 250-1,000 pairs in Ireland (BirdLife International 2004a). These figures suggest a wintering population of 94,950-136,200 birds, and this figure, after rounding, was adopted in *WPE4*.

Since this population overlaps extensively with *robusta* from Iceland during the winter, it is not possible to provide any estimate of population size from winter data (Stroud *et al.* 2004).

3. *totanus* Northern Europe (breeding)

Population estimate	1% threshold	Population trend
200,000-300,000	2,500	Possibly stable

No previous estimates are available for the size of this population, as hitherto it has been regarded as part of a much larger "East Atlantic" wintering population along with birds breeding in western and central continental Europe. The breeding population in Fennoscandia has been estimated at 63,000-103,000 pairs and that in north-western European Russia at 800-4,500 pairs (data from Thorup 2006). These figures equate to a total of 191,400-322,500 individuals in winter. This estimate, rounded to 200,000-300,000, is adopted as the population estimate, with the 1% threshold set at 2,500 – the mid-point of the range. The total of counts and estimates of birds wintering in West Africa between southern Morocco and Sierra Leone in the 1990s is 205,700 (data from Stroud *et al.* 2004 and Dodman 2002). The great majority of these (196,700) are in Mauritania, Senegal, Guinea-Bissau and Guinea, which are thought to be the main wintering area for this population. These figures agree reasonably well with the estimate from the breeding grounds, given the gaps in coverage in West Africa. However, it should be noted that there are also substantial numbers of Common Redshanks from breeding areas in western and central continental Europe wintering in West Africa.

4. *totanus* Central & Eastern Europe (breeding)

Population estimate	1% threshold	Population trend
570,000-870,000	7,200	Decreasing

No previous estimates are available for the size of this population which combines many of the birds in the former "East Atlantic wintering" population with birds in the former "Eastern Europe/East Mediterranean & Africa" population. Using data from Thorup (2006), the number of *totanus* breeding within the range of this population can be estimated at about 190,000-291,000 pairs, which roughly equates to some 570,000-870,000 birds in winter. This is taken as the population estimate, with the 1% threshold set at 7,200 – the mid-point of the range. The total excludes 13,700-29,200 pairs breeding in south and south-east European Russia (assumed to be *ussuriensis*), as well as half of the pairs breeding in Turkey (2,500-10,000), which have also been assigned to *ussuriensis* following Stroud *et al.* (2004). A similar calculation based on data from BirdLife International (2004a) gives a slightly lower estimate of 137,000-298,000 pairs, but this includes a very rough estimate of 30,000-140,000 pairs for the breeding population in European Russia.

Midwinter counts can account for only a small proportion of these birds, and it must be assumed that the great majority remain undetected by the winter counts in parts of the eastern Mediterranean, North Africa, the Sahelian zone of West Africa, and along the south coast of West Africa perhaps as far east as the Gulf of Guinea. Midwinter counts and estimates along the Atlantic coast of Europe and West Africa in the 1990s produced a total of 238,000, but this total includes the whole of the Fennoscandian and north Russian population of *totanus*, about 25% of the population of "*britannica*", and an uncertainty, but possibly substantial, number of *robusta*. The 1990s midwinter counts from the Mediterranean basin (including North Africa) account for fewer than 25,000 birds (Dodman 2002, Stroud *et al.* 2004), but there are known to be many important gaps in coverage in this region, and no data from Libya were available for this estimate. An extensive survey of most of the Libyan coast in February 2007, however, counted only 437 Common Redshanks (Etayeb *et al.* 2007). Some 40,000 birds were counted in Tunisia in the winter of 1984 (van Dijk *et al.* 1986). Kube *et al.* (1998) have given an estimate of 60,000-70,000 for the number of birds wintering in the Black Sea and eastern Mediterranean region. Even this figure was considered to be an underestimate because the counts of moulting birds on passage were higher. Thus the number of birds wintering in the Mediterranean could well exceed 100,000. Most of the birds wintering along the south coast of West Africa from Sierra Leone to the Gulf of Guinea may belong to this population, but very little information is available from this region. Dodman (2002) considered there to be about 4,000 birds wintering along the coast from Sierra Leone to Benin, and suggested that the Niger Delta in Nigeria could be an important site for the species, although data were lacking. However, the Common Redshank is generally rather scarce inland in West Africa; e.g. only five were observed in the central area of the Inner Delta of the Niger in the winter of 1998/99 (Van der Kamp & Diallo 1999).

If the breeding estimates for this population are reasonably accurate, as many as 500,000 birds remain undetected by the midwinter censuses. It would seem that this population of the Common Redshank is poorly covered by winter counts, partly because it occurs widely at inland sites and along non-estuarine coasts, and partly because a large proportion of the population winters in parts of Africa that are not covered by the censuses. In this respect, it resembles its congeners Spotted Redshank *T. erythropus*, Common Greenshank *T. nebularia* and Marsh Sandpiper *T. stagnatilis*. Clearly, much more work is needed to ascertain the true size of this population.

5. *ussuriensis* South-west Asia & Eastern Africa (non-breeding)

Population estimate	1% threshold	Population trend
D (100,000-1,000,000)	Provisionally 10,000	Unknown

Very little is known of the size of this population. Perennou *et al.* (1994) suggested that the population was in the range C (25,000-100,000), and gave an estimate of 55,000 for the number of birds wintering in South-west Asia. However, the first two editions of *Waterbird Population Estimates* gave no estimate. Midwinter counts and estimates during the 1990s produced a total of only 39,000 birds (Stroud *et al.* 2004). The western limits of the breeding range in South-east Europe and Asia Minor are poorly known, as *ussuriensis* intergrades with *totanus* in this region. Stroud *et al.* (2004) supposed that the large numbers of birds breeding in central-east European Russia (54,700-69,600 pairs) belonged to this population, and added them to the 13,660-29,160 pairs breeding in south and south-east European Russia to give a total European breeding population of 68,360-98,760 pairs (data from Thorup 2006). They also assigned half the Turkish breeding population to this population, and this added a further 2,500-10,000 pairs (data from BirdLife International/EBCC 2000 and Thorup 2006). On this basis, the combined European and Turkish breeding population of "*ussuriensis*" came to 70,860-108,760 pairs, or about 213,000-326,000 individuals. Stroud *et al.* (2004) proposed that this be adopted as the population estimate, but acknowledged that it was a minimum estimate as it did not include any birds breeding in Western Asia or the Caucasus. This minimum estimate was adopted in *WPE3*, but then changed to the broad range D (100,000-1,000,000) in *WPE4* in recognition of the uncertainty with respect to the numbers of *ussuriensis* breeding in Western Asia.

In this Atlas, we differ from Stroud *et al.* (2004), *WPE3* and *WPE4* in including the birds breeding in central-east European Russia (west of the Urals) in the Central and Eastern European breeding population of "*totanus*". If these birds migrate in a south-westerly direction in autumn, as seems likely, they would pass through the Black Sea region and eastern Mediterranean. However, according to Engelmoer & Roselaar (1998), the birds breeding in south-east European Russia are distinct from other European breeders, and should be assigned to *ussuriensis*. Adding these birds (13,660-29,160 pairs) to half the Turkish breeding population (2,500-10,000 pairs), an estimated 850-5,850 pairs in Armenia and Azerbaijan (BirdLife International 2004a) and an estimated 3,000-4,000 pairs in north-western Iran (Scott 1995) gives a total of 20,010-49,010 pairs, or roughly 60,000-150,000 individuals. To this total should be added an unknown, but possibly very large, number of birds breeding east of the Urals in Western Asia. Given this major uncertainty, the broad range D (100,000-1,000,000) would be the most appropriate estimate for this population.

Conservation status

Widespread declines have been reported in breeding populations of the Common Redshank both in continental Europe (*totanus*) and in Britain and Ireland (*britannica*). These decreases have been attributed to drainage of wetlands and agricultural intensification on the breeding grounds. Tucker & Heath (1994) reported decreases in the large breeding populations in Britain, The Netherlands and Germany, and range contractions in several countries with smaller populations. Noble *et al.* (2000) found that a statistically significant decline of 36% had occurred in the British breeding population (*britannica*) between 1994 and 1999. This is in accord with other evidence suggesting widespread declines in the species in both upland and lowland areas of Britain (Stroud *et al.* 2004). In The Netherlands, the population of breeding Common Redshanks declined by over 50% between the 1960s and the 1990s (Trolliet 1997). Decreases have also been reported in the breeding populations in Belarus, Denmark, Estonia, Finland, Ireland, Latvia, Lithuania, Spain, Sweden, Turkey and Ukraine (Winkelman 1994, Grell 1998, Nikiforov & Mongin 1998, Elts et al. 2003, BirdLife International 2004a). However, the large populations of *totanus* in Norway and European Russia are thought to be stable (BirdLife International 2004a), and it may be that the northern population of *totanus* is not experiencing similar declines to the populations further south.

The Common Redshank is one of the few species of shorebirds to have shown considerable increases during recent surveys of the Banc d'Arguin in Mauritania, but numbers counted at West African key sites are prone to greater fluctuation than most other species. These birds are mainly *totanus* from the northern population. Over 102,000 were counted at the Banc d'Arguin during the 1997 survey, representing an increase of 46% over the 1980 total (Zwarts *et al.* 1998), and there was a further big increase at this site to 195,000 in January 2000. In

Table 48. Key sites for Common Redshank. Sites where 1% or more of a population has been recorded

Country	Site	Lat.	Long.	Season	Max total	Year max	Average total	Basis for average	Source	Population(s) at site
Denmark	Wadden Sea	55.16	8.58	Autumn	8494	2001	3981	1999-02 (4)	NERI, Denmark, 2005	C & E Europe + N Europe
Finland	Oulu Region Wetlands	64.92	25.17	Migration	5000	1997			Skov *et al.* 2000	N Europe
France	Estuaire de la Gironde : marais de la rive nord	45.43	-0.80	Migration	5500	1991			WBDB	C & E Europe + N Europe + *britannica*
France	Estuaire Seine	49.43	0.30	Migration	5500	1999			WBDB	C & E Europe + *robusta* + N Europe + *britannica*
Germany	Wadden Sea - Lower Saxony	54.00	8.00	Autumn	18464	1994	13838	1997-01 (5)	J . Blew, CWSS, 2005	C & E Europe + *robusta* + N Europe
Germany	Wadden Sea - Schleswig-Holstein	54.50	8.50	Autumn	24126	1993	11582	1997-01 (5)	J . Blew, CWSS, 2005	C & E Europe + N Europe
Greece	Messolonghi Lagoon	38.33	21.22	Non-breeding	3870	1998	1757	1997-01 (5)	IWC database	C & E Europe
Guinea-Bissau	Bijagos Archipelago	11.30	-16.00	January	53250	1994	39900	1992-01 (3)	Dodman & Sa 2005	C & E Europe + N Europe
Ireland	Shannon & Fergus Estuary	52.60	-9.50	Non-breeding	4000	1997	1754	1997-01 (5)	IWC database	*robusta* + *britannica*
Mauritania	Banc d'Arguin	20.12	-16.27	January	193000	2000	125330	1997-01 (3)	Hagemeijer *et al.* 2004	C & E Europe + N Europe
Netherlands	Rhine-Maas-Schelde Delta	51.50	4.00	Autumn	10635	2001	8664	1999-03 (5)	RWS WD RIKZ 2005	C & E Europe +*robusta* + N Europe + *britannica*
Netherlands	Wadden Sea	53.30	5.38	Autumn	51102	2001	32603	1999-03 (5)	SOVON, The Netherlands, 2005	C & E Europe + *robusta* + N Europe + *britannica*
Oman	Barr Al Hikman	20.63	58.47	Non-breeding	50000	1999	31560	1993-01 (5)	IWC database	*ussuriensis*
Romania	Danube delta & Razim Sinoe Lagoons	45.00	29.00	Post-breeding migration	25000	1995			Kube *et al.* 1998	C & E Europe
Russia	Salt lakes in the Primorsko-Akhtarsk area	46.00	38.17	Breeding	9000	1989			WBDB	C & E Europe
Senegal	Parc National du Delta du Saloum	13.83	-16.75	Non-breeding	3432	1999	2206	1997-99 (3)	AfWC database	C & E Europe +N Europe
Tunisia	Gulf of Gabès	34.40	10.32	February	21393	1984			Van Dijk *et al.* 1986	C & E Europe
Ukraine	Pryp'yat' river valley	51.87	25.38	Breeding	15000	1996			WBDB	C & E Europe
Ukraine	The Sivash, Azov Sea	46.17	34.58	August	13000	1998			Chernichko *et al.* 2001	C & E Europe
U.K.	Blackwater Estuary	51.72	0.80	Winter	4199	1999-03	2989	1999-03 (5)	BTO, UK, 2005	*robusta* + *britannica*
U.K.	Deben Estuary	52.02	1.33	Winter	2881	1999-03	2152	1999-03 (5)	BTO, UK, 2005	*robusta* + *britannica*
U.K.	Dee Estuary	53.27	-3.10	Autumn	11991	1999-03	9791	1999-03 (5)	BTO, UK, 2005	*robusta* + *britannica*
U.K.	Duddon Estuary	54.22	-3.22	Winter	2816	1999-03	2227	1999-03 (5)	BTO, UK, 2005	*robusta* + *britannica*
U.K.	Forth Estuary	56.00	-3.27	Autumn	5759	1999-03	5018	1999-03 (5)	BTO, UK, 2005	*robusta* + *britannica*
U.K.	Humber Estuary	53.67	-0.17	Autumn	10226	1999-03	7997	1999-03 (5)	BTO, UK, 2005	C & E Europe + *robusta* + N Europe + *britannica*
U.K.	Inner Firth of Clyde	55.95	-4.63	Autumn	2899	1999-03	1847	1999-03 (5)	BTO, UK, 2005	*robusta* + *britannica*
U.K.	Inner Moray & Inverness Firth	57.53	-4.20	Winter	2942	1999-03	2639	1999-03 (5)	BTO, UK, 2005	*robusta* + *britannica*
U.K.	Lindisfarne	55.67	-1.82	Autumn	2819	1999-03	1838	1999-03 (5)	BTO, UK, 2005	*robusta* + *britannica*

Country	Site	Lat.	Long.	Season	Max total	Year max	Average total	Basis for average	Source	Population(s) at site
U.K	Medway Estuary	51.40	0.65	Autumn	3709	1999-03	1470	1999-03 (5)	BTO, UK, 2005	C & E Europe + *robusta* + N Europe + *britannica*
U.K.	Mersey Estuary	53.30	-2.82	Autumn	11595	1999-03	7168	1999-03 (5)	BTO, UK, 2005	*robusta* + *britannica*
U.K.	Morecambe Bay	54.12	-2.93	Autumn	8816	1999-03	6681	1999-03 (5)	BTO, UK, 2005	*robusta* + *britannica*
U.K.	North Uist Machair	57.58	-7.47	Breeding	1455 485 prs	1995		1995 (1)	WBDB	*brittanica*
U.K.	Ribble Estuary	53.72	-2.92	Autumn	6411	1999-03	4295	1999-03 (5)	BTO, UK, 2005	*robusta* + *britannica*
U.K.	Solway Estuary	54.92	-3.40	Winter	4135	1999-03	2666	1999-03 (5)	BTO, UK, 2005	*robusta* + *britannica*
U.K.	South Uist Machair	57.32	-7.33	Breeding	1635 545 prs	1995		1995 (1)	WBDB	*brittanica*
U.K.	Stour Estuary	51.93	1.15	Autumn	3073	1999-03	1792	1999-03 (5)	BTO, UK, 2005	C & E Europe + *robusta* + N Europe + *britannica*
U.K.	Strangford Lough	54.45	-5.60	Autumn	5244	1999-03	4265	1999-03 (5)	BTO, UK, 2005	*robusta* + *britannica*
U.K.	Thames Estuary	51.48	0.57	Autumn	5905	1999-03	4386	1999-03 (5)	BTO, UK, 2005	C & E Europe + *robusta* + N Europe + *britannica*
U.K.	The Wash	52.93	0.30	Autumn	9339	1999-03	7072	1999-03 (5)	BTO, UK, 2005	C & E Europe + *robusta* + N Europe + *britannica*
U.K.	Ythan Estuary	57.32	-1.98	Winter	2990	1999-03	1117	1999-03 (5)	BTO, UK, 2005	*robusta* + *britannica*

2001, however the count of Common Redshank at the Banc d'Arguin dropped steeply to 80,400 (Isenmann 2006). Such big changes seem likely to reflect a number of factors including the difficulties of counting the Banc d'Arguin, and shifts in the wintering distribution. It also seems possible that there are opposite population developments between northern *totanus* breeding in natural habitats in Fennoscandia, and southern continental birds breeding in manipulated habitats (Stroud *et al.* 2004). Counts have also fluctuated at the Bijagos Archipelago, Guinea Bissau, where totals to date have been 70,400 in 1987, 38,400 in 1993, 53,200 in 1994 and just 28,000 in 2001. Van der Have *et al.* (1997) also found that there had been an increase of 28% in the numbers wintering in the Gulf of Gabès in Tunisia between 1984 and 1994.

Although the numbers of *robusta* breeding in Iceland are believed to be stable (Koskimies 1993, Trolliet 1997), Cayford & Waters (1996) found that the number of Common Redshanks wintering in Britain increased by 51% (from 75,400 to 114,000) during the period 1981-85 to 1988-92, while Rehfisch *et al.* (2003) found that the numbers wintering on non-estuarine coastlines in Britain increased by 35% (from 24,990 to 33,820) between 1984/85 and 1997/98. Stroud *et al.* (2004) showed that the numbers wintering in North-west Europe (believed to be mainly *robusta*, but with many *britannica*) increased by 34% between the mid-1980s and early 1990s.The numbers of Common Redshank counted in January in the UK and The Netherlands continued to increase, but at a more modest rate, between 1999 and 2005 (Banks *et al.* 2006, van Roomen *et al.* 2006).

Trends in the population of *ussuriensis* wintering in South-west Asia and Eastern Africa are unknown.

Habitat and ecology

The Common Redshank breeds in a wide variety of coastal and inland wetlands: on grassy marshes, natural and cultivated wet meadows and coastal salt marshes, on the shores of rivers, lakes and pools, and on swampy heathlands, moors and bogs in the willow zone (Snow & Perrins 1998). In Asia, it also occurs on high grassy steppes and sub-alpine areas up to 4,500 m above sea level. When not breeding, it is mainly coastal, occupying mudflats, tidal estuaries, and sandy and rocky shores, but can also be abundant at freshwater lakes, sewage farms and marshes where food supplies are locally rich (Hayman *et al.* 1986).

In most cases, first breeding probably occurs in the second year of life, although there are records of both sexes successfully breeding when one year old (Johnsgard 1981). The Common Redshank nests solitarily or in loose colonies, in favourable areas attaining densities of up to 100-300 pairs per sq.km (del Hoyo *et al.* 1996). The species exhibits a moderate degree of natal philopatry, and, especially in experienced and successful breeders, of site and mate fidelity. Some adults occur in isolation in winter, defending feeding territories, but others occur in large flocks and join other waders at large, communal roosts.

Network of key sites

In Europe, a majority of key sites qualify as a result of autumn and winter counts of *robusta* and *brittanica*, whose 1% thresholds (2,800 and 1,200 respectively) are considerably lower than that of the population of nominate *totanus* that winters in Europe. Most of these key sites (21 in all) are in the UK, and there are a further two in France, two in Germany, two in The Netherlands, one in Denmark and one in Ireland. Counts in the Wadden Sea of Denmark, Germany and The Netherlands can include up to four populations whose patterns of occurrence are complex and incompletely described (Meltofte *et al.* 1994).

A total of four key sites have been identified for the population of nominate *totanus* breeding in Northern Europe (Fennoscandia): one staging site in the Oulu region of Finland and three major non-breeding sites in West Africa, in Mauritania (Banc d'Argiuin), Guinea Bissau (Bijagos Archipelago) and Senegal (Delta du Saloum). The population of nominate *totanus* breeding in Central and Eastern Europe has a high 1% threshold (7,200) and there are rather few key sites: single breeding sites in each of Russia and Ukraine, and sites important on migration and in winter in Greece, Romania, Tunisia and Ukraine.

The 1% threshold of the population of *ussuriensis* breeding in West Asia is higher still at 10,000, and there is one key site of outstanding importance, Barr al Hikman in Oman, where a peak of 50,000 Common Redshanks was counted in 1999.

Derek Scott & Jeff Kirby

Michael Schmitz.

Marsh Sandpiper
Tringa stagnatilis

Geographical variation and distribution

The Marsh Sandpiper is a monotypic species breeding across a broad belt in the temperate zone from Bulgaria, Romania and Belarus east through central Ukraine, southern Russia and northern Kazakhstan to about 115ºE in Eastern Asia. It occurs north to 56º20'N in the Urals and 57ºN in Western Siberia, and south to 47-49ºN in southern Russia, Turkestan and northern Mongolia. It formerly bred in Austria, Hungary and Slovakia, and in recent years has bred more or less regularly in very small numbers in Denmark (since 1986), Finland (since 1983), Latvia (since 1974) and Poland (since 1988) (Snow & Perrins 1998). It has recently been found breeding in Sweden (E. Hirschfeld *in litt.*).

West Eurasian populations winter sparingly in the eastern Mediterranean, southern Iraq, southern Iran and the Arabian Peninsula, and commonly in sub-Saharan Africa south to the Cape. The centre of the wintering range is probably in Eastern Africa, where it is one of the commonest waders at many of the Rift Valley lakes in Ethiopia, Kenya and Tanzania (Urban *et al.* 1986). In Southern Africa, the main wintering concentrations are in the highveld plateau and Okavango Delta (Underhill 1997). The Marsh Sandpiper occurs as a very scarce migrant in Scandinavia, and is only a vagrant in the Low Countries, Britain and Ireland. It is a very scarce visitor to Madagascar, and has occurred as a vagrant in the Seychelles. Eastern populations winter south to southern India and Sri Lanka, South-east Asia, the Greater and Lesser Sundas and Australia.

Movements

The Marsh Sandpiper is a long-distance migrant, migrating overland on a broad front and apparently over-flying large areas between staging areas, as it is generally rather scarce at passage sites. The main passage between the Russian breeding areas and the winter quarters in Eastern and Southern Africa is believed to occur through the Black Sea, Kazakhstan, the Aral Sea, the Caspian region and the Middle East. There are major staging areas in Sivash Gulf, Sea of Azov, in Ukraine, where up to 5,000 have been recorded on passage (van Winden *et al.* 2001), and in the wetlands of the Uromiyeh Basin in north-western Iran, where several sites hold over 500 birds during the peak of the autumn migration (Scott 1995).

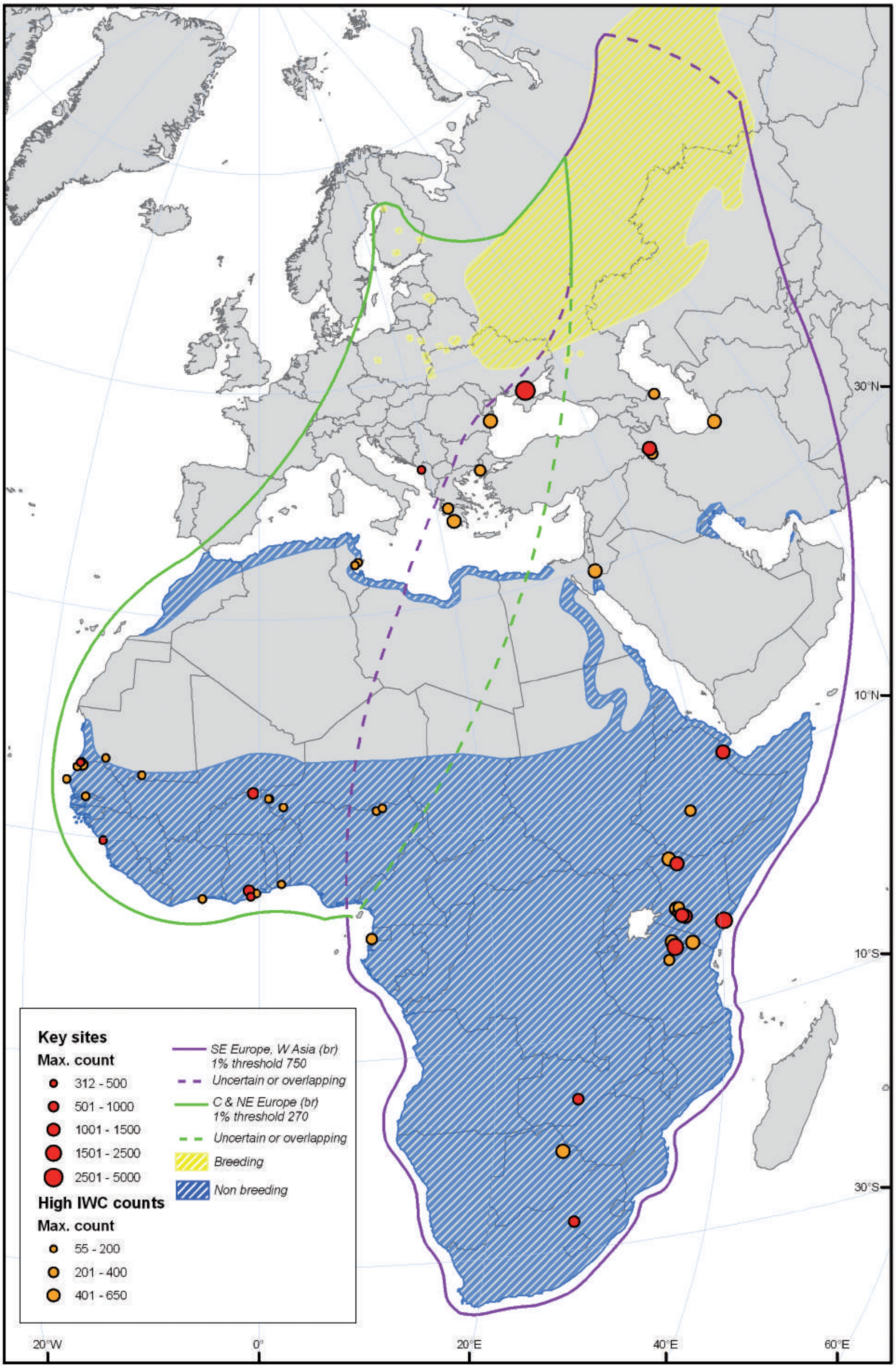
The East African Rift Valley lakes are especially important, both as a staging area and as a wintering area. A bird ringed in April at Lake Nakuru in Kenya, probably on its northward migration, was recovered in January in South Africa three years later (Underhill 1997). Another bird ringed at Lake Nakuru on passage was recovered during the breeding season in the Tyumen region of Russia (60°E), while a bird ringed in south-eastern Democratic Republic of Congo in December was found in northern Kazakhstan in late April (Cramp & Simmons 1983). A bird ringed as an adult in Ethiopia was subsequently recovered in south-western Siberia (Veen *et al.* 2005).

Much smaller numbers of Marsh Sandpipers pass through Eastern and Central Europe and the eastern Mediterranean. The species is regular on migration in Slovakia, Hungary, the Balkans, Italy, Turkey, Cyprus, Israel (where concentrations of up to 500 have been recorded) and Egypt, and occurs sparingly but regularly in eastern and southern France, southern Spain and Tunisia. However, it is uncommon in North-west Africa (Morocco and Algeria), and occurs only as a vagrant on the Atlantic seaboard of Western Europe. Thus the wintering areas in West Africa are far to the west of the breeding range and westernmost passage localities in Europe and North Africa, suggesting a north-east to south-west crossing of the Sahara from the eastern Mediterranean to tropical West Africa.

Departure from the breeding grounds begins in late June or early July, the birds departing in groups of 10-15, and most

Marsh Sandpiper

Tringa stagnatilis



birds have left by the beginning of September (Dement'ev & Gladkov 1951, Snow & Perrins 1998). Autumn passage in the south Caspian region and Iran extends from early July to the end of October, and peaks in late July and August. The main passage through Eastern Europe occurs in August and the first half of September, while passage through Egypt extends from early August to November (Cramp & Simmons 1983, Goodman & Meininger 1989). Most adults arrive on the winter quarters in tropical Africa in September. Young birds reach the equator by the end of August, but the main influx is in September and October (Urban *et al.* 1986). Departure from Southern Africa begins in February and March, and continues until the end of April. Spring passage in Egypt extends from mid-March to early May (Goodman & Meininger 1989), and in Iran from early March to mid-May, peaking in the second half of April. In Russia, the main spring passage takes place from early April to early May, and the birds arrive on their breeding grounds from mid-April to mid-May. Small numbers of non-breeders spend the northern summer at favoured localities in Southern Africa (Underhill 1997), while rather more spend the northern summer in Eastern Africa. Others summer at staging areas on the migration route (e.g. at wetlands in the Uromiyeh basin in north-western Iran), while a few non-breeders return to the breeding areas where they remain in small in flocks (Snow & Perrins 1998).

Population limits

Perennou *et al.* (1994) concluded that there were no discrete populations of Marsh Sandpiper in Eurasia, and therefore divided the species into "populations" on the basis of major wintering groups. One of these "populations" related to those birds wintering in South-west Asia and Eastern and Southern Africa which were believed to originate mainly from breeding areas east of the Urals. *WPE1* and *WPE2* adopted this treatment, and added a western "population" for those birds wintering in West Africa and believed to originate from breeding areas in Eastern Europe. These "default" populations were retained in the first edition of the AEWA Conservation Status Report (Wetlands International 2000). It seems very unlikely that there is any clear separation between these two "populations", either on their breeding grounds or on their winter quarters. However, Stroud *et al.* (2004) concluded that separation of the relatively small number of birds breeding in Central Europe and central-west European Russia from the much larger population breeding in southern and eastern European Russia (Caspian drainage) and Western Asia was justified on conservation grounds, and this was the treatment adopted in *WPE3* and *WPE4.*

Thus, two populations are recognised in Western Eurasia and Africa:

1) birds breeding in Central Europe and western European Russia, and migrating through the Black Sea and Mediterranean region to winter mainly in West Africa;
2) birds breeding in southern and eastern European Russia and Western Asia, and wintering mainly in South-west Asia and Eastern and Southern Africa.

Population size

1. Central & North-east Europe (breeding)

Population estimate	1% threshold	Population trend
14,000-40,000	270	Possibly decreasing

WPE1 and *WPE2* gave "C/D" as the estimate for this population, i.e. in the range 25,000-1,000,000, based on a rough estimate of 10,000-100,000 breeding pairs in European Russia derived from BirdLife International's European Birds Database in 1994, while *WPE3* gave an estimate of 21,000-52,000 based on a European breeding population of 6,900-17,300 pairs (Thorup 2006). The total breeding population in Europe outside Russia has been estimated at only 76-178 pairs (data from Thorup 2006) or 123-260 pairs (data from BirdLife International 2004a). These figures include 40-70 pairs in Belarus (Tomkovich & Lebedeva 1998) and up to 30 pairs in Latvia (Baumanis 1989). The population breeding in European Russia is estimated at 13,389-30,345 pairs (data from Thorup 2006), giving a total European breeding population of about 13,500-30,500 pairs (equating to about 40,000-90,000 individuals). However, in their assessment of this population, Stroud *et al.* (2004) included only those birds breeding in the north-east and central-west parts of European Russia, i.e. only some 4,665-13,085 pairs, and assigned the birds breeding in central-east, south and south-east European Russia (about 8,700-17,300 pairs) to the eastern population that is thought to winter mainly in South-west Asia, and Eastern and Southern Africa. Thus, these authors gave an estimate of only 14,000-40,000 individuals for their "Europe/West Africa" population. This was the estimate adopted in *WPE4*.

Only a few hundred birds winter in the eastern Mediterranean, mostly in Egypt, where Goodman & Meininger (1989) estimated the wintering population at 200-400, while the numbers wintering in the western Mediterranean are tiny. An estimate of the West African wintering population based on midwinter counts in the 1990s gave only 800 (Stroud *et al.* 2004), but recent midwinter counts have indicated that the total population must be substantially higher than this. Totals of 1,746, 1,220 and 1,004 were recorded in the winters of 1999, 2000 and 2001, respectively; these included 1,251 in Ghana in January 1999 and 424 in Mauritania in January 2001 (Dodman & Diagana 2003). Altenburg & van der Kamp (1986) estimated a wintering population of 2,500-5,000 in the rice fields of Guinea-Bissau, while Ntiamoa-Baidu & Grieve (1987) gave an estimate of 530 for the number wintering along the coast of Ghana alone. It is clear that the bulk of this wintering population, scattered at inland wetlands over a very wide region, is being overlooked

2. South-east Europe & Western Asia (breeding)

Population estimate	1% threshold	Population trend
50,000-100,000	750	Possibly decreasing

Perennou *et al.* (1994) concluded that the size of this population was in the range 25,000-100,000 birds, and this range was given in *WPE1* and *WPE2*. Although the species is apparently rather scarce over much of its breeding range, it was said to be abundant in eastern Kazakhstan (Dement'ev & Gladkov 1951), while Thorup (2006) gives breeding estimates of 1,254-6,260 pairs in central-east European Russia and 7,470-11,000 pairs in south and south-east European Russia. These birds alone would account for some 26,000-51,000 individuals outside the breeding season.

An estimate of the total wintering population in South-west Asia and Eastern and Southern Africa, based on midwinter counts in the 1990s, gave only 19,000 (Stroud *et al.* 2004), but it is clear that the great majority of birds at inland sites are being missed by co-ordinated counts. Counts in South-west Asia suggest that at most only a few thousand birds winter in this region, the majority being in southern Iran and probably also southern Iraq. It was estimated that 500-1,000 wintered in Iran in the 1970s, mostly in the extreme south-west (Summers *et al.* 1987), and up to 211 were recorded in Iraq during partial midwinter surveys in the 1960s and 1970s (Scott & Carp 1982). In Africa, Summers *et al.* (1987) estimated the wintering population in Kenya at 7,100 and that in Sudan at 5,000-10,000, while almost 4,700 were counted in Tanzania during the census in January 1995 (Dodman & Taylor 1995). Summers *et al.* (1987) estimated that about 1,000 birds spend the northern winter in coastal areas of Southern Africa, but the number of birds occurring at wetlands in the interior is now thought to be much higher (Underhill 1997). Recent AfWC counts in Southern Africa have produced totals of 1,868 in 1999, 1,441 in 2000 and 2,265 in 2001 (Dodman & Diagana 2003). Given the limited coverage of the counts at inland wetlands in sub-Saharan Africa, it seems likely that the total population is at the upper end of the range 25,000-100,000, if not higher. Accordingly, Dodman (2002) proposed a new estimate of 50,000-100,000, and this was adopted by Stroud *et al.* (2004) and *WPE3*, and retained in *WPE4*.

Conservation status

Stroud *et al.* (2004) and *WPE3* gave no indication of trends in either population, but it now seems that both populations may be experiencing some declines. There has been some expansion of the breeding range to the north and west in Europe in recent years (e.g. in Belarus, Finland and Poland), but breeding west of 30ºE remains irregular, with numbers fluctuating between years (Morozov 1997). The small breeding population in Belarus seems to be increasing (Tomkovich & Lebedeva 1998), as does the tiny population in Poland (BirdLife International 2004a). Since the 1960s, there has also been some northward expansion of the breeding range in Russia (e.g. in the St. Petersburg area), encouraged by widespread treeless farming, especially extensive grazing measures (Snow & Perrins1998). However, there have been recent reports of some decline in breeding populations in the Caspian and Aral Sea regions, and the species may have disappeared as a breeding bird in Moldova as a result of a loss of steppe habitat due to agricultural intensification (del Hoyo *et al.* 1996). A decline has also been reported in the Saratov region of European Russia (Piskunov & Belyachenko 1999). BirdLife International (2004a) reported declines in the large population in European Russia and small population in Ukraine, and concluded that the European population as a whole is undergoing a moderate decline.

Habitat and ecology

The Marsh Sandpiper is a relatively southern and steppe-adapted species, occurring during the breeding season (from April to September) at wetlands in the steppe, forest-steppe and southern boreal zones. It prefers open freshwater marshland with lush grassy vegetation, especially the grassy shores of predominantly freshwater pools in warm steppe areas. It often occurs in spring-fed marshes on the shores of salt lakes, and will tolerate brackish marshes where the water is quite shallow and where there are patches of low and scanty vegetation. It nests solitarily, or in loose colonies. Territories are poorly defined, and there are records of nests being placed only 5-10 metres apart (Johnsgard 1981). Breeding densities in prime habitat may reach 5.5 pairs/ha (Morozov 1990) and, exceptionally, as many as several dozen pairs may nest on a marsh of only 1-2 ha in area (Dement'ev & Gladkov 1951). The species is monogamous, both sexes sharing in incubation and tending the brood. Egg-laying takes place in late April to June, and fledging may begin as early as late June. The birds begin to assemble in small flocks of 10-15 birds (occasionally up to 50) in mid-July, prior to the autumn migration (Dement'ev & Gladkov 1951). Outside the breeding season, the Marsh Sandpiper typically frequents the marshy borders of inland lakes or pools, flooded areas of cultivated land, sewage farms, fish ponds and paddy fields. It also occurs at salt works, coastal lagoons and sheltered tidal estuaries, but is scarce on open mudflats and beaches. It usually forages in shallow water, often in tightly co-ordinated groups (Hayman *et al.* 1986). The food includes small crustaceans, gastropods and other small molluscs, as well as a variety of aquatic insects (Johnsgard 1981). Marsh Sandpipers are generally gregarious outside the breeding season, occurring in small parties of up to 15 or 20 birds, although they sometimes form mono-specific flocks of over 300 birds (Urban *et al.* 1986). They often forage in mixed groups with Common Greenshanks *Tringa nebularia* while on migration.

The complete post-nuptial moult commences in early or mid-July in or near the breeding areas, and is usually suspended during migration and completed in the winter quarters. However, there is great variation in the stage of moult at which suspension occurs, and some late migrants may complete the moult before migration starts (Cramp & Simmons 1983). Many birds complete their moult in Eastern Africa. A partial pre-nuptial moult begins in mid-December to late February, and is completed in early February to early April (Cramp & Simmons 1983).

Network of key sites

The Marsh Sandpiper migrates on a broad front in small groups, and rarely occurs in large concentrations. However, several key sites have been identified. The most important staging area discovered to date is the Sivash Gulf in the Sea of Azov, Ukraine, where up to 5,000 have been recorded in autumn (van Winden *et al.* 2001). This site is probably used by birds from both western and eastern populations. Lake Uromiyeh in north-western Iran is a key staging area for the eastern population, while several other wetlands in the Uromiyeh basin, such as Shur Gol, Yadegarlu and Dorgeh Sangi, would doubtless qualify as key sites if turnover could be taken into account. Other important staging areas in South-west Asia include Miankaleh Peninsula/Gorgan Bay in the south-east Caspian region of Iran and the southern Arava Valley is Israel, both of which have held as many as 500 Marsh Sandpipers at one time. It is likely that there are a number of important passage sites in southern Russia and Kazakhstan, and possibly also in North-east Africa, but these have yet to be documented.

Five key wintering sites have been identified in West Africa: Djoudj National Park in Senegal, Vasières de Sonfonia in Guinea, Mare d'Oursi in Burkina Faso, and the Keta Lagoon complex and Muni Lagoon in Ghana. In Eastern and Southern Africa, key sites include the Sac Allol region in Djibouti, four sites in Kenya, Lake Manyara in Tanzania, Kafue Flats in Zambia, and Koppies Dam in South Africa. Most of these sites hold only 1-2% of the population, but there have been high counts of 1,690 in the Tana River delta in Kenya and 2,440 at Lake Manyara in Tanzania. There are doubtless additional key wintering sites in Eastern and Southern Africa, but in general the species tends to be widely dispersed in small numbers throughout most of its wide range in Africa, and this is not a species for which the key sites approach to conservation is especially appropriate.

Protection status of key sites

Sivash Gulf (245,000 ha) is covered by two Ramsar sites, but has no formal protection. Lake Uromiyeh (465,000 ha) in Iran was designated as a National Park in the early 1970s, a Ramsar site in 1975 and a Biosphere Reserve in 1976. The wetlands of Shur Gol, Yadegarlu and Dorgeh Sangi in the Uromiyeh basin in Iran were designated as a Ramsar site in 1975, but are otherwise unprotected, while Miankaleh

Peninsula and Gorgan Bay are well protected in a Wildlife Refuge and Biosphere Reserve (68,800 ha) and Ramsar site (100,000 ha). Several of the key wintering sites in Africa are well protected, including Djoudj National Park in Senegal, parts of Lake Turkana in Kenya, Lake Manyara National Park in Tanzania, and Kafue Flats in Zambia.

Table 49. Key sites for Marsh Sandpiper. Sites where 1% or more of a population has been recorded

Country	Site	Lat.	Long.	Season	Max total	Year max	Average total	Basis for average	Source	Population(s) at site
Burkina Faso	Mare d'Oursi	14.67	-0.50	Pre-breeding migration	789	1998			AfWC database	C & NE Europe
Djibouti	Sac Allol Region	11.50	42.50	Non-breeding	1300	1999			AfWC database	SE Europe & W Asia
Ghana	Keta Lagoon complex	5.92	-0.83	July-August	935	1999	334	1996-01 (4)	AfWC database	C & NE Europe
Ghana	Muni Lagoon	5.37	-0.67	July-August	333	2000			AfWC database	C & NE Europe
Guinea	Sonfonia (Konkoure)	9.77	-13.68	Non-breeding	312	1998			AfWC database	C & NE Europe
Iran	Lake Uromiyeh	37.50	45.50	August	1395	1973			Evans, 1994	SE Europe & W Asia
Kenya	Dandora Oxidation Ponds	-1.25	36.92	Non-breeding	1110	2000	234	1996-00 (5)	AfWC database	SE Europe & W Asia
Kenya	Lake Turkana	03.45	36.67	January	1100	-			Urban *et al.* 1986	SE Europe & W Asia
Kenya	Manguo Floodplain	-1.10	36.65	Non-breeding	1110	2000	280	1994-00 (4)	AfWC database	SE Europe & W Asia
Kenya	Tana River Delta	-2.50	40.33	Non-breeding	1690	1993			WBDB	SE Europe & W Asia
Montenegro	Ulcinj Salina	41.92	19.30	November	500	2005			M Schneider-Jacoby *in litt*	C & NE Europe
Senegal	Parc National des Oiseaux de Djoudj	16.42	-16.25	Non-breeding	438	1995	102	1995-00 (5)	AfWC database	C & NE Europe
South Africa	Koppies Dam	-27.25	27.68	Non-breeding	850	1992	438	1992-01 (2)	AfWC database	SE Europe & W Asia
Tanzania	Lake Manyara National Park	-3.67	35.83	Non-breeding	2441	1995			WBDB	SE Europe & W Asia
Ukraine	The Sivash, Azov Sea	46.17	34.58	August	5000	1998		2001	Chernichko *et al.*	SE Europe W Asia+ C & NE Europe
Zambia	Kafue Flats	-15.67	27.17	Non-breeding	970	2001	336	1998-01 (3)	AfWC database	SE Europe & W Asia

Derek Scott

György Szimuly

Common Greenshank

Tringa nebularia

Geographical variation and distribution

The Common Greenshank is a monotypic species, confined as a breeding bird to the Palearctic Region. It breeds widely in Northern Eurasia from Scotland and Scandinavia across northern Russia and Siberia (between about latitude 55ºN and the northern limits of the taiga at 67ºN) to Anadyrland, Kamchatka and the Sea of Okhotsk, and south to Lake Baikal and the mouth of the Amur River. It winters from Britain and Ireland (few), the Mediterranean basin, the Middle East, eastern China and the Philippines south to Southern Africa, India, Sri Lanka, the Maldive Islands, South-east Asia, New Guinea and Australia. It is a common to abundant winter visitor in Africa from the northern tropics to the Cape, both inland and along the coasts (Urban *et al.* 1986).

Movements

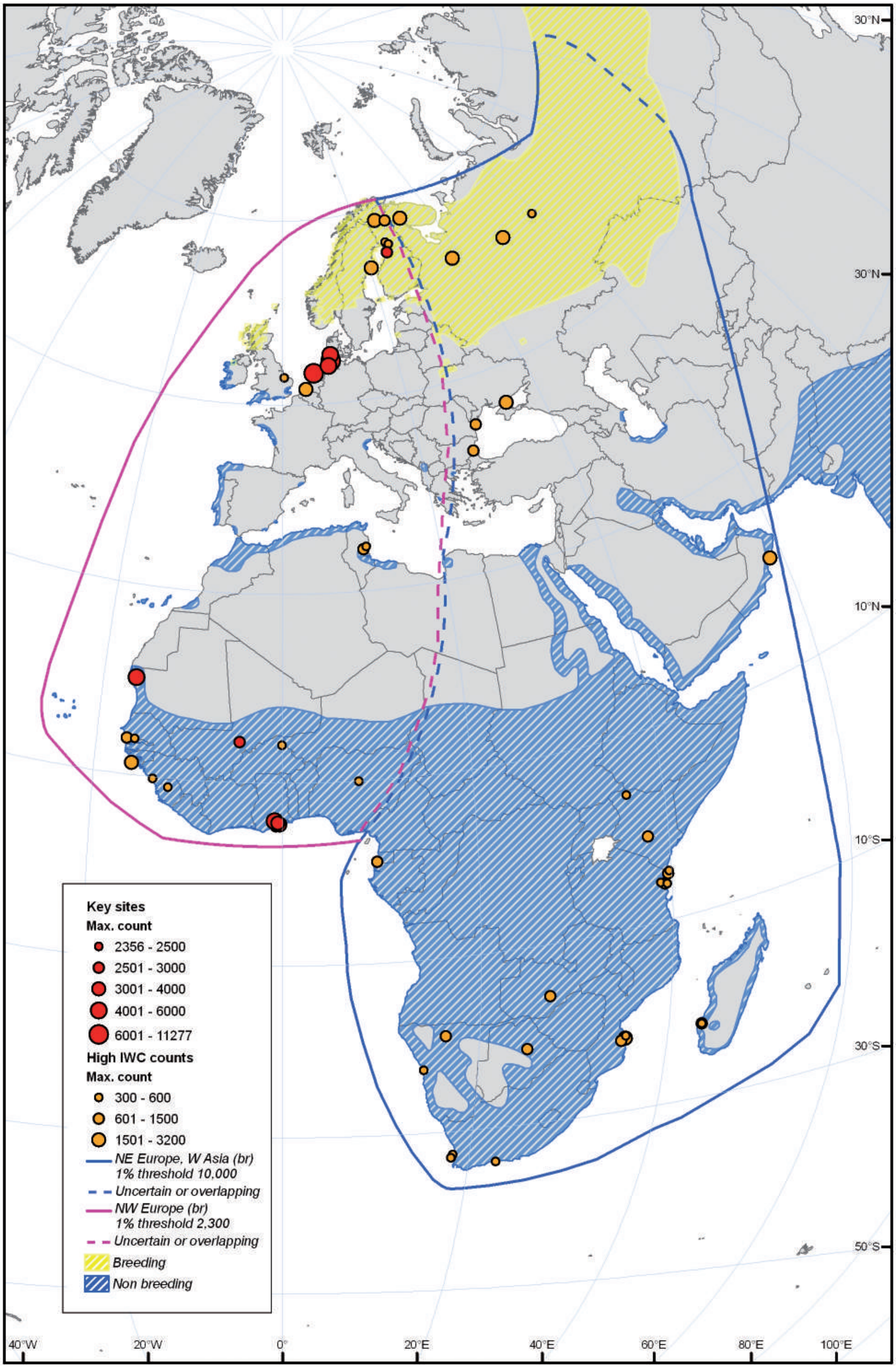
The Common Greenshank is mostly migratory, although some populations move only short distances. Populations breeding in Northern Europe and Western Siberia winter in Southern Europe (relatively few), South-west Asia and sub-Saharan Africa south to the Cape. Migration occurs on a broad front, birds from Fennoscandia and north-western Russia crossing Western and Central Europe, the Mediterranean basin and the Sahara to reach their wintering areas in tropical Africa. Birds ringed in Northern Europe have been recovered in Morocco, Mali, Sierra Leone, Ghana, Guinea, Nigeria and the Congo (Smit & Piersma 1989). Birds from North-east Europe and Western Siberia are thought to cross Central and Eastern Europe and South-west Asia on a Great Circle route to Central, Eastern and Southern Africa (Cramp & Simmons 1983). There have been four recoveries of South African birds within the presumed breeding area near the White Sea in north-western Russia, as well as recoveries on migration in Egypt, Cyprus and France (Underhill 1997).

The birds wintering in Britain and Ireland (1,000-1,500) and possibly also those wintering in north-western France probably originate mainly from the small breeding population in Scotland, estimated at 1,100-1,600 pairs in the 1980s (Lack 1986, Gibbons *et al.* 1993) and 720-1,500 pairs in 1995 (Hancock *et al.* 1997). Birds ringed on the breeding grounds in Scotland have been recovered in Ireland and north-western France (Thompson 2002). Furthermore, the birds wintering in Britain and Ireland disperse in late March and April, when Scottish territories are reoccupied and about four weeks before the main return movement of Fennoscandian birds through the North Sea countries (Cramp & Simmons 1983).

Males typically arrive on their breeding grounds in advance of the females (Johnsgard 1981). The birds show a high degree of site fidelity, but no natal philopatry (Nethersole-Thompson & Nethersole-Thompson 1979). Females begin their southward migration in late June. Most adults arrive in the Wadden Sea in July, followed by juveniles in August. Some adults arrive in North Africa as early as late June or July and moult there before crossing the Sahara. A few adults reach the winter quarters in sub-Saharan Africa in late July, but most arrive in August and September. The main influx of young birds in Southern Africa probably occurs in October. Departure from the southern wintering areas takes place mainly between late February and early April, and from equatorial regions between late March and late April (Urban *et al.* 1986). Spring passage through Europe is evident in April, although the main movement through North Sea countries and into Fennoscandia does not occur until the first half of May (Snow & Perrins 1998). Many birds bound for Fennoscandia stage in the Wadden Sea from late April to mid-May, and undertake their prenuptial moult in this area (del Hoyo *et al.* 1996). Many young birds remain in Africa throughout their first year. At Langebaan Lagoon in South Africa, the average counts during the austral winter are approximately 25% of those in the austral summer (Underhill 1997). However, some birds are known to return to the breeding grounds in their first summer, although the age of first breeding is unknown (del Hoyo *et al.* 1996).

Common Greenshank

Tringa nebularia



Wing moult takes place between late July and November, and the occurrence of suspended wing moult is common. Many birds in the East Atlantic Flyway probably moult in West Africa (Smit & Piersma 1989). Birds spending the northern winter in South Africa lay down large fat deposits, enabling them to reach the Arctic breeding areas with a small number of stops (Summers & Waltner 1979).

Population limits

Two populations of the Common Greenshank are recognised in Western Eurasia and Africa:

1) birds breeding in northern Europe from Scotland east to Finland and the Baltic States, and wintering mainly in South-west Europe, North-west Africa and West Africa east to Chad;
2) birds breeding in European Russia and Western Siberia, and wintering mainly in South-west Asia and Eastern and Southern Africa.

However, there is clearly a considerable amount of overlap between these populations, as ringing recoveries have shown that birds from breeding areas in Finland and north-western Russia may winter in areas as far apart as North Africa, Mali, the Congo, South Africa and India (Underhill 1997). In their review, Stroud *et al.* (2004) included the birds breeding in north-west and central-west European Russia in the western population, but in view of the recoveries linking breeding areas around the White Sea with Southern Africa, it seems more appropriate to include all birds breeding in European Russia in the eastern population. This was the treatment adopted in *WPE4* and retained here.

Based on a number of indications, Hutchinson (1986) suggested that the birds wintering in Britain and Ireland may derive largely if not exclusively from the Scottish breeding population. Stroud *et al.* (2004) retained them within a single, large Northern European breeding population, but recommended a review of recent information regarding the biogeographical distinctiveness of these birds.

Population size

1. North-west Europe (breeding)

Population estimate	1% threshold	Population trend
190,000-270,000	2,300	Stable

Smit & Piersma (1989) concluded that it was not possible to estimate total numbers on the basis of midwinter counts because of the large number of birds scattered at inland wetlands. They gave an estimate of 19,000 for the number of birds wintering at coastal wetlands in Europe and West Africa, but accepted that the total population was likely to be at least 250,000-300,000, based on estimates of breeding populations in Northern Europe (Piersma 1986). Counts at coastal wetlands in Western Europe and West Africa (to Nigeria) in the 1990s gave a total of 28,100 (Stroud *et al.* 2004), but even this figure only represents a small proportion of the total population, the bulk of which clearly winters inland at sites which are not regularly counted.

Thompson & Thompson (1997) estimated the European breeding population (excluding Russia) as 58,000-83,000 pairs, and that in European Russia at between 10,000 and 100,000 pairs. More recently, collations of national totals by Thorup (2006) and BirdLife International (2004a) have given totals of 66,500-82,000 pairs and 61,000-95,000 pairs for Europe excluding Russia, respectively. These figures suggest a North-west European population of between 190,000 and 270,000 non-breeding individuals. This estimate, adopted in *WPE4*, is much lower than the previous estimate of 234,000-395,000 taken from Stroud *et al.* (2004), who included the birds breeding in north-west and central-west Russia (11,600-50,000 pairs or about 35,000-150,000 individuals) in this population.

2. North-east Europe & Western Asia (breeding)

Population estimate	1% threshold	Population trend
D (100,000-1,000,000)	Provisionally 10,000	Unknown

The size of the North-east Europe and Western Asia breeding population remains poorly known. Perennou *et al.* (1994) gave a very crude estimate in the range 25,000-1,000,000. The breeding population in European Russia has recently been estimated at 29,300-75,000 pairs (Thorup 2006) or 14,000-65,000 pairs (BirdLife International 2004a), equating to about 65,000-210,000 individuals, but no information is available on the numbers breeding east of the Urals in Western Siberia. Midwinter censuses in South-west Asia and Eastern and Southern Africa in the 1970s and 1980s gave a total of 28,000 (Perennou *et al.* 1994), but given the incomplete coverage of the counts at inland wetlands in both regions, it was clear that this figure was a considerable underestimate. The 1990s midwinter estimate of 82,000 (Stroud *et al.* 2004) was based on much better counts in the Middle East and included "best guess" estimates for most African countries. However, this estimate was still too low as it did not include any estimates for Iraq, Sudan, Ethiopia, Somalia or Congo – countries which might be expected to hold large numbers of wintering Greenshanks. del Hoyo *et al.* (1996) suggested a figure of 100,000 for this population, and this seems a reasonable minimum estimate, given the large gaps in coverage. Stroud *et al.* (2004) therefore adopted an estimate of 100,000-1,000,000, and this estimate was adopted in *WPE3* and *WPE4*.

Conservation status

Little information is available on recent changes in numbers or distribution, and both populations are incompletely monitored in both summer and winter. Thompson & Thompson (1997) suggested that overall the European breeding population has been stable in recent decades, and BirdLife International (2004a) also considered the European population to be stable. There have been some local decreases in parts of European Russia, but the large breeding populations in Norway and Sweden appear to be relatively stable, and the large population in Finland is reported to be increasing (BirdLife International 2004a). The small breeding populations in Belarus and Estonia are also said to be increasing slightly (Nikiforov & Mongin 1998, BirdLife International 2004a). The Scottish population fluctuates considerably, and overall trends are unclear (Hancock & Avery 1998). However, there have been some local declines due to loss of breeding habitat, mainly because of afforestation (Stroud *et al* 1987, Thompson *et al.* 1998, Nethersole-Thompson & Nethersole-Thompson 1979). No information is available on trends in the large population breeding east of the Urals.

Habitat and ecology

The Common Greenshank breeds primarily in the boreal climatic zone, in open marshes, bogs, eutrophic lakes with wide margins of dead and decaying vegetation, swampy clearings in coniferous forest, and the birch zone where mosses and lichens are abundant. Breeding densities are generally low. During migration and in winter, the species occurs in a wide variety of wetland habitat types on the coast as well as inland. It is found on estuaries, muddy or sandy tidal flats, lagoons, mangrove swamps, salt pans, salt marshes, pools on tidal reefs, rivers, lakes, reservoirs, freshwater and brackish marshes and sewage farms. At inland habitats in Africa, it tends to prefer receding water lines, promoting a degree of nomadism (Underhill 1997). Greenshanks are normally solitary or occur in small parties well spread out whilst feeding, but may form larger flocks on migration, and gatherings of up to 100 or more are not unusual at roosts (Urban *et al.* 1986). There are numerous examples of birds returning to the same localities in subsequent non-breeding seasons (Underhill 1997).

Network of key sites

The Common Greenshank is primarily a solitary species, only occurring in large concentrations at a few sites on migration. It generally breeds at low densities, and forms only small flocks (usually of less than 10-20 individuals) during migration. It occurs in small numbers at a very wide variety of wetland types, and often frequents even tiny wetlands such as farm ponds, roadside pools and ephemeral ponds in semi-arid regions. Quite large concentrations can occur at especially favoured wetlands during the migration season, but on the whole, the key site approach is not appropriate for this species.

Six very important staging areas have been identified in North-west Europe: the Oulu region in Finland, where up to 3,000 have been recorded on passage (Skov *et al.* 2000), and five sites in the Wadden Sea and Dutch Delta, important on autumn passage: the Danish Wadden Sea (max. 5,710), German Wadden Sea in Lower Saxony (max. 5,220), German Wadden Sea in Schleswig-Holstein (max. 8,860), Dutch Wadden Sea (max. 11,280), and Rhine-Maas Schelde Delta, also in The Netherlands (max. 1,971). Five key wintering sites have been identified for this population, the Banc d'Arguin in Mauritania (5,100 in January 2001), the Inner Niger Delta in Mali (2,513 in winter), and three sites in Ghana: the Keta Lagoon complex (5,432 in January 1999), Songor Lagoon (3,574 in January 1999), and Panbros Salt Pans in the Densu Delta (3,994 in January 2000) (Dodman & Diagana 2003).

No key passage or wintering sites have been identified for the North-east European and West Asian breeding population, but the provisional threshold of 10,000, set at the top of the range, is almost certainly too high. The largest concentrations recorded in the IWC have been 3,200 at Barr Al Hikman in Oman in January 1991, and 2,600 at Lake Turkana in Kenya in January 1992.

Protection status of key sites

The wetlands in the Oulu Region (an IBA of 81,781 ha) are partly protected in two small private reserves and partly included within six Special Protection Areas covering 20,684 ha. (Heath & Evans 2000).

The Banc d'Arguin (1,173,000 ha) in Mauritania was designated a National Park in 1976, a Ramsar site in 1982 and a World Heritage Site in 1989; the principal threat comes from over-fishing in coastal waters and impacts that this is having on the coastal ecosystem as a whole (Fishpool & Evans 2001). The Inner Niger Delta in Mali is a Ramsar site, although this does not prevent potentially harmful activities such as bird hunting. All three sites in Ghana have been designated as Ramsar sites, but are otherwise unprotected and under pressure from human settlement, increasing urbanisation and industrial salt production (Fishpool & Evans 2001).

Table 50. Key sites for Common Greenshank. Sites where 1% or more of a population has been recorded

Country	Site	Lat.	Long.	Season	Max total	Year max	Average total	Basis for average	Source	Population(s) at site
Denmark	Wadden Sea	55.16	8.58	Autumn	5712	2001	2294	1999-02 (4)	NERI, Denmark, 2005	NW Europe
Finland	Oulu Region Wetlands	64.92	25.17	Migration	3000	1997			Skov *et al.* 2000	NW Europe
Germany	Wadden Sea - Lower Saxony	54.00	8.00	Autumn	5216	1993	3336	1997-01 (5)	J . Blew, CWSS, 2005	NW Europe
Germany	Wadden Sea - Schleswig-Holstein	54.50	8.50	Autumn	8863	1993	5347	1997-01 (5)	J . Blew, CWSS, 2005	NW Europe
Ghana	Densu Delta. Panbros Salt Pans	5.55	-0.30	July-August	3994	2000	1223	1997-01 (5)	AfWC database	NW Europe
Ghana	Keta Lagoon complex	5.92	-0.83	July-August	5432	1999	2974	1997-98 (2)	AfWC database	NW Europe
Ghana	Songhor Lagoon	5.75	-0.50	July-August	3574	1999	1055	1997-01 (5)	AfWC database	NW Europe
Mali	Inner Niger Delta	13.50	-4.00	Non-breeding	2513	1998-04			Zwarts *et al.* 2005	NW Europe
Mauritania	Banc d'Arguin	20.25	-16.33	Non-breeding	5100	2001	4060	1997-01 (3)	Isenmann 2006	NW Europe
Netherlands	Rhine-Maas-Schelde Delta	51.50	4.00	Autumn	1971	2000	1625	1999-03 (5)	RWS WD RIKZ 2005	NW Europe
Netherlands	Wadden Sea	53.30	5.38	Autumn	11277	1997	5997	1999-03 (5)	SOVON, The Netherlands, 2005	NW Europe

Derek Scott


György Szimuly

Green Sandpiper
Tringa ochropus

Geographical variation and distribution

The monotypic Green Sandpiper breeds widely across Northern Eurasia from Norway and Germany east to the Kolyma River at about 160ºE, north to the Arctic Circle, and south to central Ukraine, the Russian Altai, northern Mongolia and the Amur River. Small numbers breed in Austria, Bulgaria (where they are now regular), the Czech Republic (since the late 1970s) and Denmark (since the 1950s), and the species has bred in Britain, Italy, The Netherlands, Romania and Slovenia (Snow & Perrins 1998).

Western populations winter from Southern Europe, the Mediterranean basin and the south Caspian region south through the Middle East and Africa to Angola and Zambia. The main wintering areas in Africa lie in a belt between 20ºN and 15ºS, but small numbers regularly penetrate south into Zimbabwe, eastern and northern Botswana and the northern Transvaal, South Africa (Urban *et al.* 1986, Tree 1997). Small numbers winter as far north as Britain and southern Germany, and in exceptionally mild winters, as far north as southern Scandinavia. Eastern populations winter in the Indian subcontinent, eastern China (from the Yangtze Valley southwards), South-east Asia, the Philippines and Borneo.

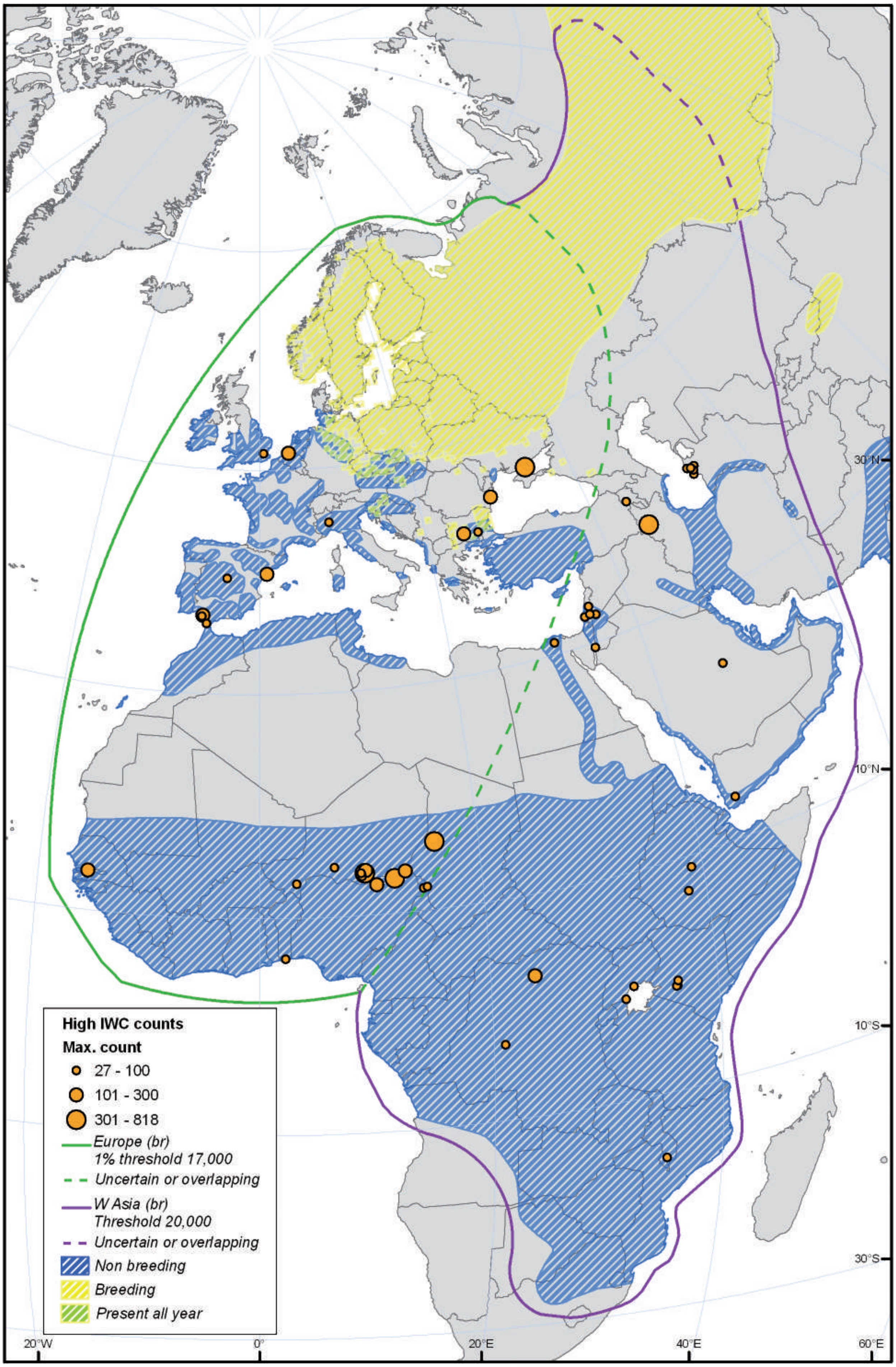
Movements

The Green Sandpiper is a long-distance migrant, although it does not migrate as far as its close relatives, and is scarce beyond about 15ºS in Africa. It migrates overland on a broad front, singly or in pairs or groups of a few birds, occasionally 10-15 together, but in general without large concentrations either at staging areas on migration or in the winter quarters. Flocks of up to 80 have been reported on passage in Egypt (Goodman & Meininger 1989), 130 in northern Iran in late July (D.A. Scott unpubl. obs.) and 200 in Turkey in August (Cramp & Simmons 1983), but these are exceptional. Migrating birds will stage at almost any type of small wetland, even small desert pools, and there are many records of birds on passage at oases in the Sahara and in the deserts of the Middle East, indicating a broad-front migration over these regions. Many recoveries of birds ringed as chicks or on passage in Northern Europe indicate a general south-westerly or southerly movement across Europe to the Black Sea, Mediterranean and North Africa. Birds ringed as chicks in Fennoscandia have been recovered in France, Spain and Morocco, and a bird ringed as a chick in Belarus was recovered in Tunisia. Many birds ringed on passage in Sweden, Britain, Belgium and Germany have been recovered in France, Spain, Portugal, Morocco, Italy and Sardinia, and two birds ringed in Latvia and the former Czechoslovakia were recovered in Bulgaria and the Crimea, respectively, while still on autumn passage (Cramp & Simmons 1983). The only ringing recovery that gives any indication of the origin of birds passing through Britain is of a young bird ringed in Britain on autumn passage and subsequently found in northern Sweden in mid-June, which suggests northern Scandinavia as a likely breeding area (Smith 2002).

The Green Sandpiper is a particularly early migrant, with departure from the breeding grounds beginning as early as early June (about 10 June in Finland), the females preceding the males (Snow & Perrins 1998). Migrants reach most of Western and Central Europe in the second half of June, and the main passage occurs in August and September. In South-west Asia, birds occur on passage in the south Caspian region and Iran from mid-June to the end of October, with the peak passage occurring in July and August. Passage through North Africa extends from July to early November. The first arrivals south of the Sahara appear in early August, and the species is common by September (Snow & Perrins 1998). In Southern Africa, the first arrivals are generally in September, and most records are in the period October to December, although some birds remain until late April or occasionally into early May (Tree 1997). Spring passage begins in late February in North Africa, in early March in South-west Asia,

Green Sandpiper

Tringa ochropus



and in March or early April in Europe, and is virtually over by mid-May (Snow & Perrins 1998, Urban *et al.* 1986). A few birds remain in the tropics throughout the northern summer, but there have been no records of non-breeders "over-summering" in Southern Africa (Urban *et al.* 1986, Tree 1997).

Population limits

No discrete populations are identifiable. There is, however, considerable evidence from ringing that birds breeding in Northern Europe winter mainly in Southern and Western Europe and North and West Africa, while birds breeding in Western Siberia are thought to winter mainly in South-west Asia and Eastern and Central Africa. This separation between European breeders and West Asian breeders has been adopted in all four editions of *Waterbird Population Estimates*, and was supported by Stroud *et al.* (2004). Thus two "populations" are recognised:

1) European breeders, wintering mainly in Southern Europe and North and West Africa;
2) West Asian breeders, wintering mainly in South-west Asia and Eastern and Central Africa.

Population size

1. **Europe** (breeding)

Population estimate	1% threshold	Population trend
1,000,000-2,400,00	17,000	Stable

The total breeding population of Green Sandpipers in Europe has recently been estimated at 402,000-809,000 pairs (Thorup 2006) or 330,000-800,000 pairs (BirdLife International 2004a), equating to between 1 million and 2.4 million individuals – the estimate adopted in *WPE4*. These figures include very rough estimates of 250,000-618,000 pairs (Thorup 2006) and 200,000-600,000 pairs (BirdLife International 2004a) in European Russia. The population estimate given in *WPE3* (1 million -1.89 million) was taken from Stroud *et al.* (2004), who used somewhat lower estimates of breeding populations than those given by Thorup (2006).

A recent estimate based on counts of birds in Europe and West Africa in midwinter gave only 1,900 (Stroud *et al.* 2004). Clearly, the midwinter waterbird counts are ineffective for this species, which is widely dispersed at wetlands of all sizes over a vast winter range, and which rarely occurs in concentrations exceeding 100, or even 10, individuals. The few estimates of wintering populations available, e.g. 500-1,000 in Britain and Ireland (Lack 1986), 200-300 in France, 100 in Italy, 200-500 in Egypt (Goodman *et al.* 1989), 2,500 in the coastal wetlands of Liberia (Gatter 1997), and 100-500 in the rice fields of Guinea-Bissau (Altenburg & Van der Kamp 1986), account for only a tiny proportion (<1%) of the total population.

2. **Western Asia** (breeding)

Population estimate	1% threshold	Population trend
D/E (100,000->1,000,000)	Not established	Unknown

The size of the West Asian breeding population is very poorly known, and no attempt was made by Perennou *et al.* (1994) or Rose and Scott (1994 & 1997) to assign a size category to this population. The species is a common and widespread passage migrant throughout the Middle East, and is a reasonably common winter visitor over large areas of Eastern and Central Africa. The wintering population in Iran, near the northern limit of the wintering range, was estimated at 750-1,500 in the 1970s (Scott 1995), and that in Angola, at the southern edge of the normal wintering range, at 1,000 (Stroud *et al.* 2004). Given the vast range of this population and its general abundance (comparable to that of the western population), it seems certain that the population exceeds 100,000 individuals, and like the western population, could exceed a million. A population estimate in the broad range D/E was therefore proposed by Stroud *et al.* (2004) and adopted in *WPE3* and *WPE4*.

Conservation status

Most breeding populations in Europe appear to be stable or increasing, and there has been no evidence of any major declines in population size or extent of range. Since the mid-1970s, increases have been reported in Finland, Norway and Germany (BirdLife International/EBCC 2000). The species colonised Denmark in the 1950s, and continues to increase there (Saari 1997). There has been a recent northward expansion in Finland, where the northern limit of the breeding range has shifted from about 67ºN to 69ºN since 1950 (Saari 1997). A similar northward spread has also been reported in the Kola Peninsula in European Russia (Saari 1997). The large breeding populations in Sweden, the Baltic States, Poland and Belarus are believed to be stable (BirdLife International 2004a). Declines have been reported only in the Kaliningrad region of European Russia (Tomkovich & Lebedeva 1998), and in the small population in Slovenia, where the species last bred in 1991 (Saari 1997).

Trends in the West Asian breeding population are unknown. However, the Green Sandpiper is becoming a more frequent visitor to Southern Africa, and is now a regular winter visitor in small numbers at some sites in Zimbabwe. Prior to the 1970s, it was recorded only as a vagrant this far south, with only 32 acceptable records in the whole of Southern Africa until 1970 (Tree 1997).

Habitat and ecology

As a breeding bird, the Green Sandpiper is closely associated with the boreal climatic zone, although locally it extends into the sub-arctic and temperate zones, and also into isolated mountain regions to the south. It breeds in late April to July in old, swampy forest rich in pines and spruces with many fallen logs and rotten tree trunks. It also breeds in alder swamps and marshy woods with a heavy carpet of lichens and mosses, and with ponds, lakes or streams nearby (Johnsgard 1981). It usually nests in old tree-nests of other birds, particularly thrushes *Turdus* spp and Wood Pigeon *Columba palumba*, but also crows and jays (Corvidae) and shrikes (Laniidae). It sometimes utilises a squirrel's drey or natural platform, and occasionally nests on the ground amongst tree roots. Pairs are generally fairly dispersed. In one study, 20-25 pairs were present in an area of 50 sq.km, with the most closely associated pair of nests some 400 m apart. The species is monogamous. Egg-laying begins in late April in the Baltic States, and up to four weeks later in northern Fennoscandia and Russia (Snow & Perrins 1998). Both sexes share in incubation, but only the males tend the young from about nine days after hatching (Johnsgard 1981). One parent, usually the female, leaves the territory as early as late May.

Outside the breeding season, the Green Sandpiper frequents inland fresh waters including marshes, ponds, narrow ditches, stream margins, riverbanks, rice fields, sewage farms, gravel pits, small dams, farm ponds and rain pools, often near villages and in cultivated areas. Wintering birds in Britain frequently occur along chalk streams and at watercress beds (Lack 1986). In Africa, it occurs up to at least 2,000 m above sea level. It is rarely found on tidal flats or the open seashore, but sometimes occurs in channels on salt marshes. It is usually found singly, although favoured sites may attract small flocks, rarely up to 30 or more. At least locally, birds are very faithful to their wintering areas from one year to the next (del Hoyo *et al.* 1996, Smith 2002). They feed mainly on insects and their larvae, but also small molluscs and crustaceans.

Adults begin their complete post-nuptial moult either on or near the breeding grounds, or during migration stopovers, or after arrival on the winter quarters. The moult may be completed in the north, or suspended during migration and completed at stopovers or on the winter quarters. Birds occasionally migrate in active wing moult, even undertaking trans-Saharan crossings in this state. The partial pre-nuptial moult occurs in late December to April (Cramp & Simmons 1983).

Network of key sites

No key sites have been identified. The Green Sandpiper occurs in low concentrations at stopover sites and in its winter quarters. Concentrations of over 100 individuals are unusual, and it is doubtful if there are any sites that ever support over 1% of either population. The key site approach is clearly inappropriate in the conservation of this species.

Derek Scott


György Szimuly

Wood Sandpiper *Tringa glareola*

Geographical variation and distribution

The monotypic Wood Sandpiper breeds widely across northern Eurasia from western Norway, Denmark, the Baltic States and northern Ukraine through European Russia and Siberia east to Anadyrland, Kamchatka and the northern Kuriles, and south from the southern edge of the tundra to the southern Urals, Kirgiz Steppes, Russian Altai, northern Mongolia and Amur River. Small numbers have bred in recent years in Scotland and Poland, and the species has bred in Bulgaria, Germany, Iceland and The Netherlands (Snow & Perrins 1998, BirdLife International 2004a).

West Eurasian populations winter mainly in sub-Saharan Africa from about 25ºN south to the Cape and also in Madagascar, although small numbers winter on the Atlantic coast of Morocco, around the Mediterranean, and in Iraq and south-western Iran. Occasional wintering individuals have been found as far north as Britain. Central and Eastern Asian populations winter throughout the Indian subcontinent and South-east Asia, south through the Sundas and New Guinea to Australia.

Movements

The Wood Sandpiper is a long-distance migrant and one of the strongest migrants in its genus. It is abundant in suitable habitat throughout sub-Saharan Africa, and is one of the most widespread wintering Palearctic waders from the northern tropics to the Cape (Urban *et al.* 1986). The bulk of the West Eurasian breeding population migrates overland on a broad front across South-west Asia, Eastern and Central Europe and North Africa to winter in sub-Saharan Africa. Many birds stopover at wetlands in the northern Mediterranean, especially the Camargue in France, where daily concentrations exceed 1,000 in autumn. It has been estimated that over 50,000 birds pass through Mediterranean France in autumn (Cramp & Simmons 1983). From here the birds cross the Sahara in a south-westerly direction to wintering areas in West Africa.

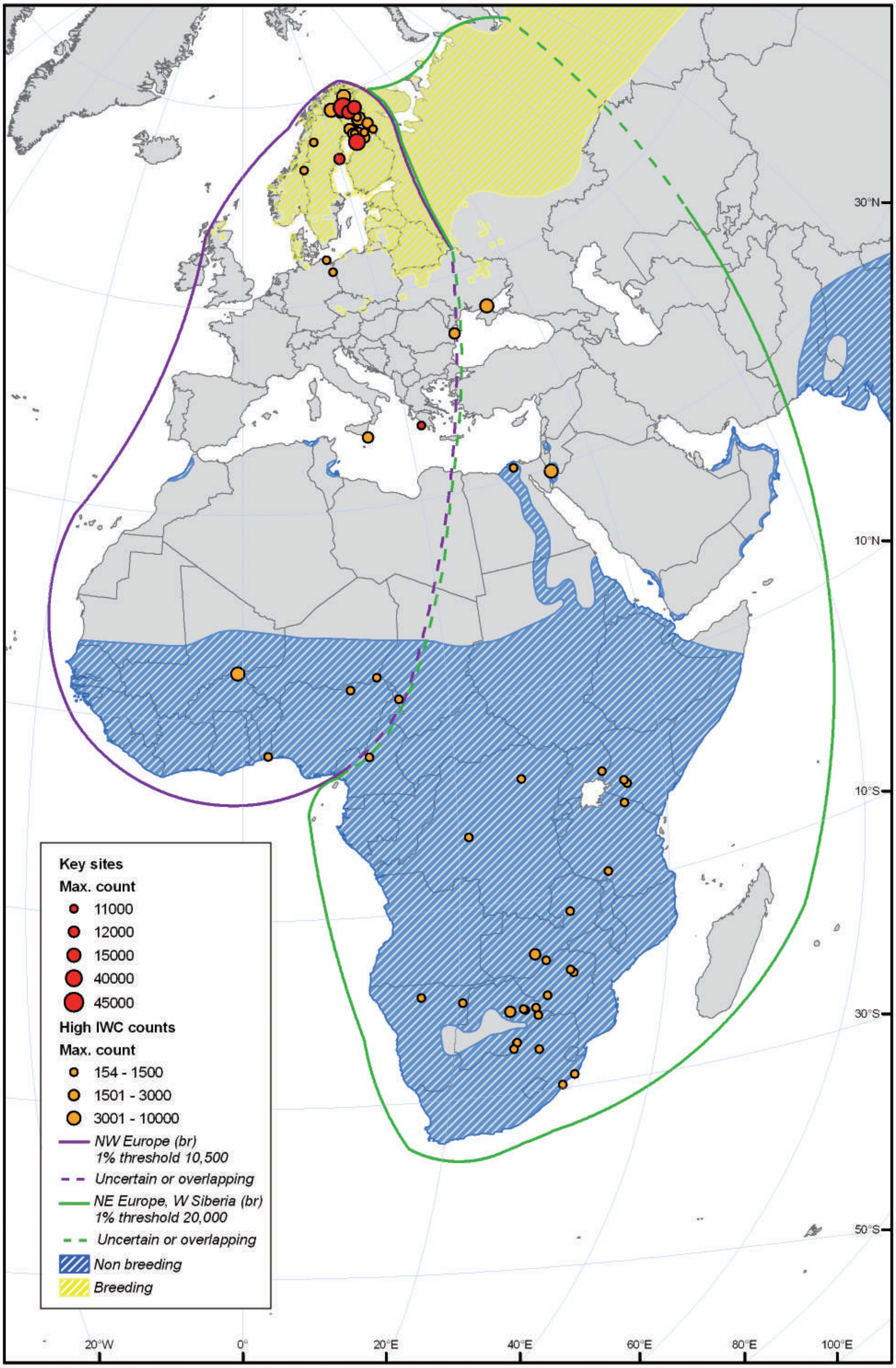
The Wood Sandpiper is rather scarce on passage in westernmost Europe, and this is especially the case in spring, when it appears that birds may take a more easterly route back to their breeding grounds (Cramp & Simmons 1983). There have been several hundred recoveries of birds ringed within the breeding range in Fennoscandia. These demonstrate a predominantly southerly or south-westerly movement through France, Italy, Iberia and North-west Africa to West Africa (Senegal, Mali, Niger and Chad). A relative paucity of recoveries in North Africa suggests that many birds cross the Mediterranean and Sahara in a single flight. Seven recoveries in the Balkans, one in Turkey and one in Egypt indicate that some birds from Fennoscandia take a more easterly route to Africa. Of 35 recoveries of European-ringed birds in Africa, all but two were in West and west-central Africa east to Niger, Nigeria, Cameroon and Gabon. The two exceptions were Finnish-ringed birds recovered in Zambia (Cramp & Simmons 1983).

There are several ringing recoveries which suggest that birds wintering in Eastern and Southern Africa originate from breeding areas in both Eastern Europe and Western Asia. Three birds ringed in Kenya were recovered within the breeding range in north European Russia at 44-49ºE, while birds ringed in Kenya and southern Sudan have been recovered in Western Siberia at 64ºE and 70ºE respectively (Urban *et al.* 1986). There have been two recoveries of birds ringed in Southern Africa on their Russian breeding grounds, one at 34ºE in European Russia, and one at almost 65ºE, just east of the Urals in Western Siberia. There have also been recoveries of birds in Southern Africa from Finland (May), Slovakia (August) and Italy (May) (Underhill *et al.* 1999). A bird ringed in Democratic Republic of Congo (in November) was recovered on autumn passage in Egypt (Goodman & Meininger 1989).

Adults begin to move away from the breeding areas in late June, with juveniles following a month later. Autumn

Wood Sandpiper

Tringa glareola



passage through the Caspian region and Iran extends from the second week of July to the end of October, with the peak occurring from the end of July to mid-September. In Europe, the main passage occurs in August to mid-September. At the Camargue staging area in France, adults arrive in July, a month ahead of juveniles, and most stay for about four weeks, beginning their moult there. The main purpose of this halt is to accumulate fat for the Mediterranean-Saharan crossing, with birds showing weight gains of 20-30% (Cramp & Simmons 1983). In North Africa, birds are present on passage from late July to late October. Most adults return to their wintering areas in Africa between late July and late September. Young birds begin to appear from late August, although most arrive in September to November (Urban *et al.* 1986, Underhill 1997). Birds begin to leave Southern Africa in March, and most have left their African wintering areas by the end of April, although some remain in equatorial regions and the northern tropics until mid-May (Urban *et al.* 1986). Spring passage in North Africa extends from mid-March to mid- or late May, and the main spring passage through Europe and the Middle East is in the second half of April and first half of May. The breeding grounds are reoccupied from late April to late May, or in early June in northern Russia. The spring migration proceeds rapidly, with briefer pauses than in autumn and no large concentrations (Cramp & Simmons 1983). A few non-breeders remain on their winter quarters in Africa throughout the northern summer, especially in the northern tropics, but the majority return north (Urban *et al.* 1986, Underhill 1997).

Population limits

The first two editions of *Waterbird Population Estimates* recognised two populations in Western Eurasia and Africa: birds breeding in Europe and wintering mainly in West Africa; and birds breeding in Western Siberia and wintering mainly in Eastern and Southern Africa. Evidence from ringing indicates that the birds breeding in Fennoscandia and migrating through Central and Southern Europe winter mainly in West Africa east to Cameroon and Gabon. However, the limited evidence available suggests that birds breeding in European Russia winter mainly in Eastern and Southern Africa, along with birds from Western Siberia. Stroud *et al.* (2004) therefore included the birds breeding in European Russia along with those breeding in Western Siberia in a single, large eastern population, and this treatment was adopted in *WPE3* and *WPE4*. The two populations currently recognised may be defined as follows:

1) birds breeding in Fennoscandia, the Baltic States and Central Europe, and wintering mainly in West Africa;
2) birds breeding in European Russia and Western Siberia, and wintering mainly in Eastern and Southern Africa.

There is likely to be considerable overlap between these two populations at wintering areas in Central Africa. Furthermore, the eastern limits of the breeding range of birds wintering in South-west Asia and Africa are poorly known. There may be considerable overlap on the breeding grounds between these birds and birds wintering in South Asia, as evidence from ringing indicates that many birds from breeding areas just east of the Urals winter in the Indian subcontinent (Viksne & Michelson 1985, Veen *et al.* 2005).

Population size

1. North-west Europe (breeding)

Population estimate	1% threshold	Population trend
900,000-1,200,000	10,500	Stable

The breeding population in Europe excluding Russia has recently been estimated at 335,000-357,000 pairs (data from Thorup 2006) or 275,000-450,000 pairs (data from BirdLife International 2004a), suggesting a total population of between 900,000 and 1,200,000 birds. This was the estimate adopted in *WPE4*. Stroud *et al.* (2004) gave a similar estimate of 855,000-1,220,000 (adopted in *WPE3*), based on a provisional estimate of 285,000-407,000 pairs for the breeding population. Very few birds are recorded during the IWC, and the only substantial estimates of wintering populations have been 25,000-50,000 in the rice fields of Guinea-Bissau (Altenburg & Van der Kamp 1986), and 3,500 in the coastal wetlands of Liberia (Gatter 1988).

2. North-east Europe & Western Siberia (breeding)

Population estimate	1% threshold	Population trend
>2,000,000	20,000	Probably stable

The breeding population in European Russia has been estimated at 114,000-763,000 pairs (Thorup 2006) or 75,000-750,000 pairs (BirdLife International 2004a). Applying Finnish breeding densities to the corresponding botanical zones in European Russia, Väisänen (1997) produced a crude estimate of 600,000-900,000 pairs for the European Russian breeding population, which agrees well with the top end of the ranges derived from Thorup (2006) and BirdLife International (2004a). To these can be added an unknown, but possibly very large, number of pairs breeding in Western Siberia. Thus, the total number of birds in this population almost certainly exceeds two million. Stroud *et al.* (2004) proposed a new population estimate of at least two million, and this was adopted in *WPE3* and *WPE4*.

Probably only a few hundred birds winter in South-west Asia, although the species is widespread and abundant on passage. The wintering population in Iran was estimated at only 20-50 in the 1970s (Scott 1995), and midwinter counts throughout the region in recent years have not exceeded 100. Goodman & Meininger (1989) estimated the wintering population in Egypt at 300-500, while Summers *et al.* (1987) gave estimates of 250,000-500,000 for the wintering population in Sudan and 7,500 in Kenya. A concentration of 30,000 has been reported on the west shore of Lake Edward in Democratic Republic of Congo (Urban *et al.* 1986). Wood Sandpipers are numerous outside the breeding season in the equatorial forest belt of Africa, where very few waterbird counts have yet taken place. Bapeamoni *et al.* (2007) reported that the Wood Sandpiper is the second most numerous waterbird at wetlands in the Kisangani region of Democratic Republic of Congo, where a peak count of 810 was made in January 2003. Recent rough estimates of wintering populations in Southern Africa include 28,000 in Angola, 40,000 in Zambia, 10,000 in Mozambique, 10,000 in Namibia, 20,000 in Botswana, 2,000 in Swaziland, 30,000 in Zimbabwe, 51,000 in South Africa and 5,500 in Madagascar (Stroud *et al.* 2004).

Conservation status

BirdLife International (2004a) has concluded that overall the European breeding population has been stable in recent years. The large breeding populations in Finland and Norway and the much smaller populations in Belarus and the Baltic States are currently thought to be fairly stable (BirdLife International 2004a). The very large breeding population in Finland (200,000-300,000 pairs) remained reasonably constant throughout the 1940s and 1950s, increased temporarily by about 20% by the 1970s, but then decreased to the previous level during the 1980s. This decrease was accompanied by some contraction in range. The decline in southern Finland since 1965 is thought to have been due to large-scale drainage of peatlands for forestry. However, wetland drainage does not appear to be a threat to the main breeding population in Finland, and it is more likely that the reasons for the current decline in this population are related to factors affecting the wintering areas in West Africa (Väisänen 1997).

Decreases have been reported since 1970 in the small breeding populations in Denmark (100 pairs), Lithuania (100-150 pairs) and Ukraine (60-100 pairs), and these have been attributed to the drainage and exploitation of peatlands (Kolmodin & Risberg 1994, Väisänen 1997). However, climate change has been suggested as a cause for the long-term declines in the small populations in Germany and Poland, at the southern edge of the breeding range in Europe (Kolmodin & Risberg 1994). A small breeding population became established in Scotland in the 1960s and peaked at 10-20 pairs in 1980, but then decreased to only 4-8 pairs in 1996-2000. This decrease has been attributed primarily to afforestation in the breeding marshes (Dennis 1993). A recent decline has also been reported in the breeding population in the Kaliningrad region of Russia (Tomkovich & Lebedeva 1998).

The large breeding population in European Russia is currently thought to be fairly stable (del Hoyo *et al.* 1996, Snow & Perrins 1998, BirdLife International 2004a). The status of populations breeding east of the Urals and trends in the Eastern and Southern African wintering population are unknown. However, there was no evidence of any change of status in Southern Africa in the twentieth century. Although many wetlands in Southern Africa have been destroyed, the species utilises degraded wetlands and has adapted well to artificial habitats, from sewage works to rice fields (Underhill 1997).

Habitat and ecology

The breeding range of the Wood Sandpiper is centred on the boreal zone, although it extends through the sub-arctic zone to the fringe of the low Arctic, and locally also to the temperate zone. The main breeding areas are in the coniferous forest zone, or further north on hillocky tundra with willow, dwarf birch or spruce, and extensive open mosses or marshes, often sedgy or grassy, especially in the forest steppe zone (Snow & Perrins 1998). The Wood Sandpiper usually nests on the ground, but occasionally, like the Green Sandpiper *T. ochropus*, uses the old tree-nest of another bird. It is territorial on the breeding grounds; breeding densities of 7-12 pairs per sq.km have been reported in the flark fens in northern Finland (Väisänen 1997). The Wood Sandpiper is monogamous. Egg-laying commences in early May at southern localities, two weeks later in northern Fennoscandia, and in the last few days of May or early June in northern Russia. Both sexes share in incubation, but only the male tends the young from about 7-10 days after hatching.

Outside the breeding season, the Wood Sandpiper frequents inland fresh waters and marshes, favouring the muddy areas of marshes, muddy or marshy edges of lakes and reservoirs, sewage farms, flooded agricultural land and rice fields. It occurs less commonly around brackish lakes, and avoids seashores and other tidal or marine habitats, although it is sometimes found along channels in salt marshes and in mangroves. In Southern Africa, it frequents ephemeral pans, vleis, dams, streams, floodplains and the upper reaches of estuaries, usually at sites with emergent or floating vegetation (Underhill 1997). It generally feeds in scattered groups and often forms flocks of 20-50 individuals on migration or in winter, but flocks of over 100 are unusual, except at favoured staging areas on migration where concentrations may exceed 1,000. The food consists of aquatic insects, insect larvae, small molluscs and crustaceans, and occasionally small fish (Urban *et al.* 1986).

The post-nuptial moult either commences during a halt in migration and is completed in the winter quarters, or is delayed until arrival on the winter quarters, with many birds arriving in sub-Saharan Africa in worn breeding plumage. In the Camargue, the moult commences in late July to late August, and is suspended in September when the birds depart for Africa. It is then completed on the winter quarters from December to February. A partial pre-nuptial moult, from early February to late March, is usually completed before departure on the spring migration (Cramp & Simmons 1983). Juveniles undergo a partial moult from September to January (Dement'ev & Gladkov 1951).

Network of key sites

Like many of its congeners, the Wood Sandpiper migrates on a broad front in small groups, and rarely occurs in large concentrations except at a few major wetland areas. Only six key sites have been identified. Three of these are huge IBAs in northern Finland with large breeding populations: Lemmenjoki-Hammastunturi-Pulju (529,718 ha; 5,000-15,000 pairs), the Saariselkä and Koilliskaira area (309,553 ha; 2,000-5,000 pairs), and the Pomokaira-Katelaiskaira area (141,630 ha; 2,000-5,000 pairs). Wetlands in the Oulu region of Finland and the River Umeälven delta in northern Sweden are key sites during migration, with counts of up to 40,000 and 12,000 respectively. Only one other key site has been identified, Divari Pilou Lagoon in southern Greece, where counts of 7,000-11,000 have been recorded during migration (Heath & Evans 2000). However, the Camargue in southern France would surely qualify as a key site if turnover were taken into account, as daily counts regularly exceed 1,000 individuals. Counts of 5,000 in a day have been recorded in the Southern Arava Valley in Israel, and this site would also doubtless qualify as a key site allowing for turnover. It is likely that there are several important passage sites in Eastern Europe, Kazakhstan and the Caspian region, but these have yet to be documented. Flocks of 250 birds in spring and 800 in autumn have been found in the Tengiz-Korgalzhyn region of Kazakhstan (Wassink & Oreel 2007).

No key sites have been identified in the main wintering areas in Africa. Urban *et al.* (1986) refer to an old count of 30,000 at Lake Edward in Democratic Republic of Congo, and it is possible that there is a scattering of very important sites throughout sub-Saharan Africa, but in general the species tends to be widely dispersed in relatively small numbers throughout most of its wide range in Africa.

Protection status of key sites

The three breeding sites in northern Finland have all been identified as IBAs, and are well protected in a series of Wilderness Areas, Nature Reserves, National Parks, Special Protection Areas and Peatland Reserves. Part of the Pomokaira-Katelaiskaira area is also a Ramsar site (34,400 ha). The wetlands in the Oulu region (an IBA of 81,781 ha) are partly protected in two small private reserves and partly included within six Special Protection Areas covering 20,684 (Heath & Evans 2000). Much of the River Umeälven delta (an IBA of 1,500 ha) in Sweden has been designated as a Ramsar site, but otherwise this site is largely unprotected. Divari Pilou Lagoon in Greece is also an IBA and is well protected in a Wildlife Refuge. The Camargue in France is fully protected under various designations, and the Southern Arava Valley in Israel in party protected.

Table 51. Key sites for Wood Sandpiper. Sites where 1% or more of a population has been recorded

Country	Site	Lat.	Long.	Season	Max	Year total	Average max	Basis total	Source for average	Population(s) at site
Finland	Lemmenjoki-Hammastunturi-Pulju	68.58	25.50	Breeding	45000	1991			WBDB	NW Europe
Finland	Oulu Region Wetlands	64.92	25.17	Migration	40000	1997			Skov *et al.* 2000	NW Europe
Finland	Pomokaira-Koitelaiskaira	68.00	26.30	Breeding	15000	1994			WBDB	NW Europe
Finland	Saariselkä and Koilliskaira	68.25	28.00	Breeding	15000	1996			WBDB	NW Europe
Greece	Divari Pilou lagoon (Gialova)	36.97	21.67	Migration	11000	1996			WBDB	NW Europe
Sweden	River Umeälven delta	63.75	20.32	Migration	12000	2001			WBDB	NW Europe

Derek Scott

Jan van de Kam

Terek Sandpiper *Xenus cinereus*

Geographical variation and distribution

The Terek Sandpiper is a monotypic Palearctic breeding wader, often placed in the genus *Tringa*, and often given the specific name *terek*. It has a wide breeding distribution across boreal and low Arctic Eurasia, extending from the Chukotsky Peninsula in the east across northern Russia to the Baltic States in the west (Cramp & Simmons 1983, Ojanen & Rauhala 1997). There are isolated breeding areas along the Volga River valley, in Ukraine and on the coast at the head of the Gulf of Bothnia in Finland (Snow & Perrins 1998).

The species migrates south to winter widely along tropical coasts. It can be found on most shores from Nigeria in the west, around Africa, Arabia, the Indian sub-continent and South-east Asia to Australia (Cramp & Simmons 1983). The Terek Sandpiper is a rare visitor to Western Europe, but records are increasing, especially during spring migration (Snow & Perrins 1998).

Movements

The Terek Sandpiper is strongly migratory. It makes use of inland habitats in its Eurasian breeding range and on migration, but is almost entirely confined to coasts on its winter quarters in the tropics. The population that migrates to South-west Asia, Eastern Africa and Southern Africa follows a route between the Ural and Volga rivers in Russia and through the Caucasus-Caspian region and Ukraine. A bird ringed in South Africa was recovered on the breeding grounds in eastern European Russia (Underhill *et al.* 1999). Many non-breeders spend the northern summer in their wintering grounds (del Hoyo *et al.* 1996).

Population limits

All four editions of *Waterbird Population Estimates* have recognised only one population of the Terek Sandpiper in Western Eurasia, comprising birds breeding in the western part of the range and migrating south-west to winter on the coasts of Africa (including Madagascar), the Persian Gulf and the southern Red Sea. This treatment was adopted by Stroud *et al.* (2004). However, no attempt has been made to define the eastern limits of this population, and it is uncertain to what extent, if any, birds breeding in Western Siberia should be included. Substantial numbers of Terek Sandpipers occur on passage in the Caspian region, but the origin and destination of these birds are unknown.

Population size

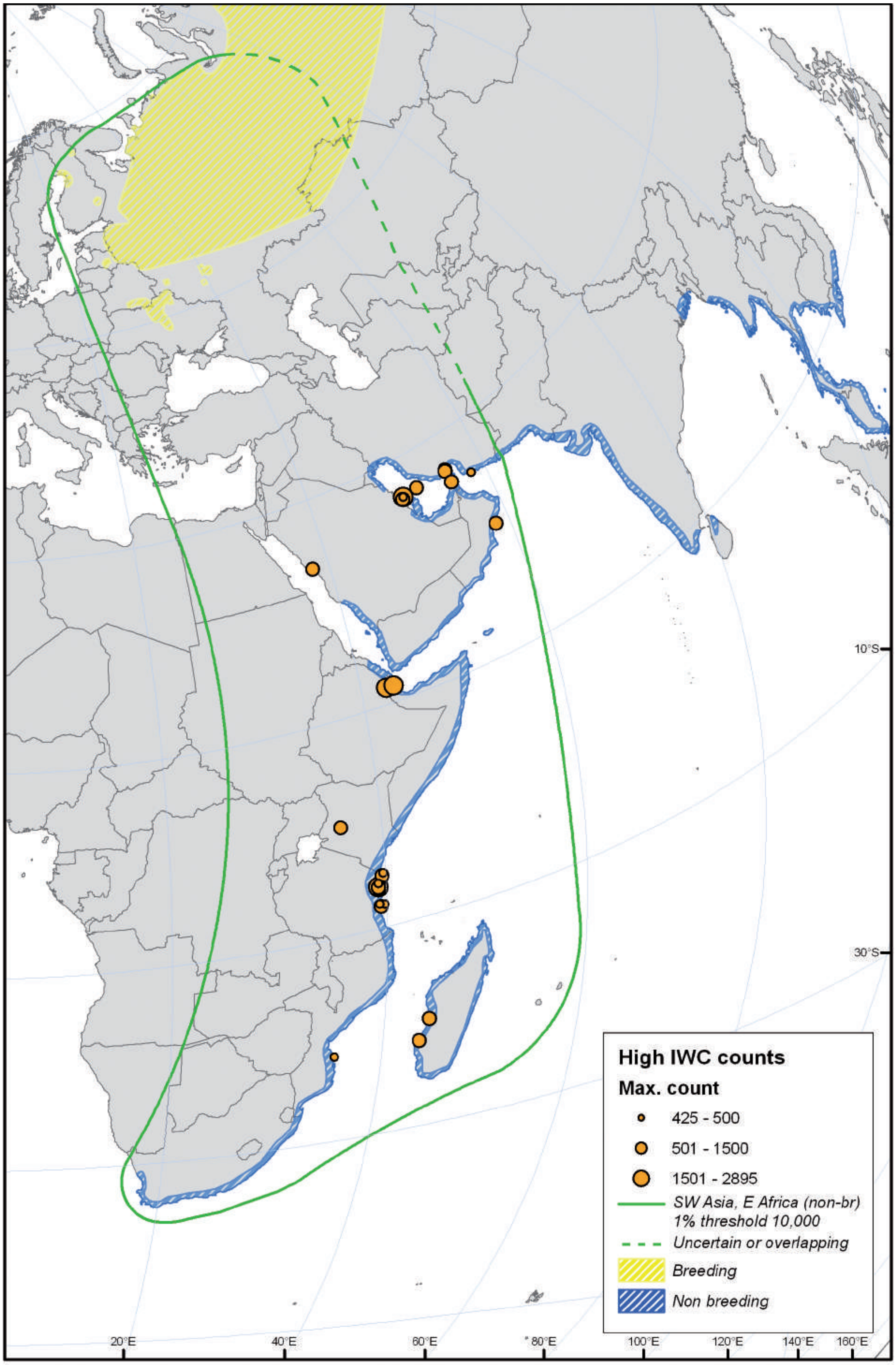
1. South-west Asia & Eastern Africa (non-breeding)

Population estimate	1% threshold	Population trend
D (100,000-1,000,000)	Provisionally 10,000	Probably stable

The breeding population in Europe, excluding Russia, is estimated at only 415-680 pairs, while that in European Russia is roughly estimated at between 15,000 and 80,000 pairs (BirdLife International 2004a). Thorup (2006) cited a much higher estimate for European Russia, and gave the European total as 22,600-223,000 pairs. The lower estimate provided by BirdLife International (2004a) suggests a total population of 45,000-240,000 non-breeding individuals from European breeding areas, while the figures given by Thorup (2006) suggest that the population could be as high as 670,000 individuals. To these should be added an unknown number of birds breeding in Western Siberia. In view of the uncertainties, Scott (2002) proposed a population estimate in the broad range D (100,000-1,000,000). This estimate was adopted by Stroud *et al.* (2004) and *WPE3*, and retained in *WPE4*.
Midwinter counts can account for very few of these birds. An estimate based on the midwinter counts in South-west Asia and Africa in the 1990s came to only 15,800 (Stroud *et al.* 2004). Countries holding significant numbers of wintering birds include Sudan, Tanzania, Madagascar, Bahrain and Qatar (Stroud *et al.* 2004). Only about 2,000 birds are thought to reach southern Mozambique and1,000 are thought to reach South Africa (Underhill 1997).

Terek Sandpiper

Xenus cinereus



Conservation status

The Terek Sandpiper is poorly monitored, both in the breeding areas and in the wintering areas, and its status is poorly known. There was some westward expansion of the breeding range in Europe during the twentieth century, with birds breeding in Finland since the 1950s and in Latvia in the 1980s (Ojanen & Rauhala 1997). The large breeding population in Russia is thought to be stable or fluctuating; the small population in Belarus in reported to be stable, and the tiny population in Finland has been decreasing in recent years (BirdLife International 2004a).

Habitat and ecology

The Terek Sandpiper breeds mainly in the boreal taiga zone, but extends north into sub-arctic tundra and south to the fringes of the steppe zone. It typically breeds at low densities, making use of inland, lowland valleys, sheltered sea coasts, overgrown moist grasslands, flooded meadows, marshes, lakesides and marshy stream banks. It avoids mountains, fast-flowing rocky streams, steep or broken terrain, and also tall, closed forest or extensive unvegetated open spaces. The species has a monogamous mating system. A single clutch is laid, usually in May, on the ground in the open, or in short vegetation. Outside the breeding season, the Terek Sandpiper usually occurs singly or in small groups, and seldom forms large flocks. The diet consists of invertebrates, especially aquatic insects, and in the breeding season, also seeds. (Snow & Perrins 1998).

Network of key sites

The Terek Sandpiper migrates on a broad front in small groups, and generally occurs at low densities in the wintering areas. No large concentrations have been located in the region covered by this Atlas, and it is doubtful if any site exceeds the very high provisional 1% threshold of 10,000. Only when a better estimate of population size becomes available will it be possible to identify key staging and wintering areas for this species.

Jeff Kirby & Simon Delany

Gordon Holtshausen

Common Sandpiper

Actitis hypoleucos

Geographical variation and distribution

The Common Sandpiper is a monotypic species, often placed in the genus *Tringa*. It is confined as a breeding bird to the Palearctic region, and breeds widely across Eurasia from Western Europe east to Kamchatka, the Sea of Okhotsk, Sakhalin and Japan, north to the northern limit of the coniferous forest zone at about 70ºN in Fennoscandia, and south to Spain, northern Italy, Greece, Turkey, northern and western Iran, Afghanistan, Kashmir, the Himalayas, Mongolia and Ussuriland. The main breeding range in Europe lies north of 55ºN from the northern half of Britain through Scandinavia and the Baltic States into Russia. Further south, it breeds mainly in upland areas with relatively high rainfall. However, in France it has spread into lowlands as much as into uplands: of the 900 pairs in France, nearly 450 are found in the lowlands, e.g. along the Loire and Allier rivers in Lorraine (Deceuninck & Mahéo 1998b).

A few pairs of Common Sandpipers breed in Belgium, Denmark (since 1977) and The Netherlands (Thorup 2006, BirdLife International 2004a). There are summer records in Syria, and breeding is suspected in north-eastern Iraq (Snow & Perrins 1998). Small numbers breed in the mountains of northern and western Iran, where there were thought to be no more than about 50 pairs in the 1970s (Scott 1995). There are reports of eggs and young in Uganda and Kenya, respectively, early in the twentieth century, but there have been no observations in recent decades to suggest any breeding in Africa (Urban *et al.* 1986).

West Eurasian breeding populations winter mainly in sub-Saharan Africa south to the Cape and in Madagascar, although small numbers remain throughout the winter on the Atlantic seaboard of Western Europe (north to Britain and Ireland), in the Mediterranean basin and in the Middle East (north to southern Iraq and the Persian Gulf). Central and Eastern Asian populations winter throughout the Indian subcontinent, and from the Yangtze Valley in eastern China southward through South-east Asia, the Philippines, the Sundas and New Guinea to Australia.

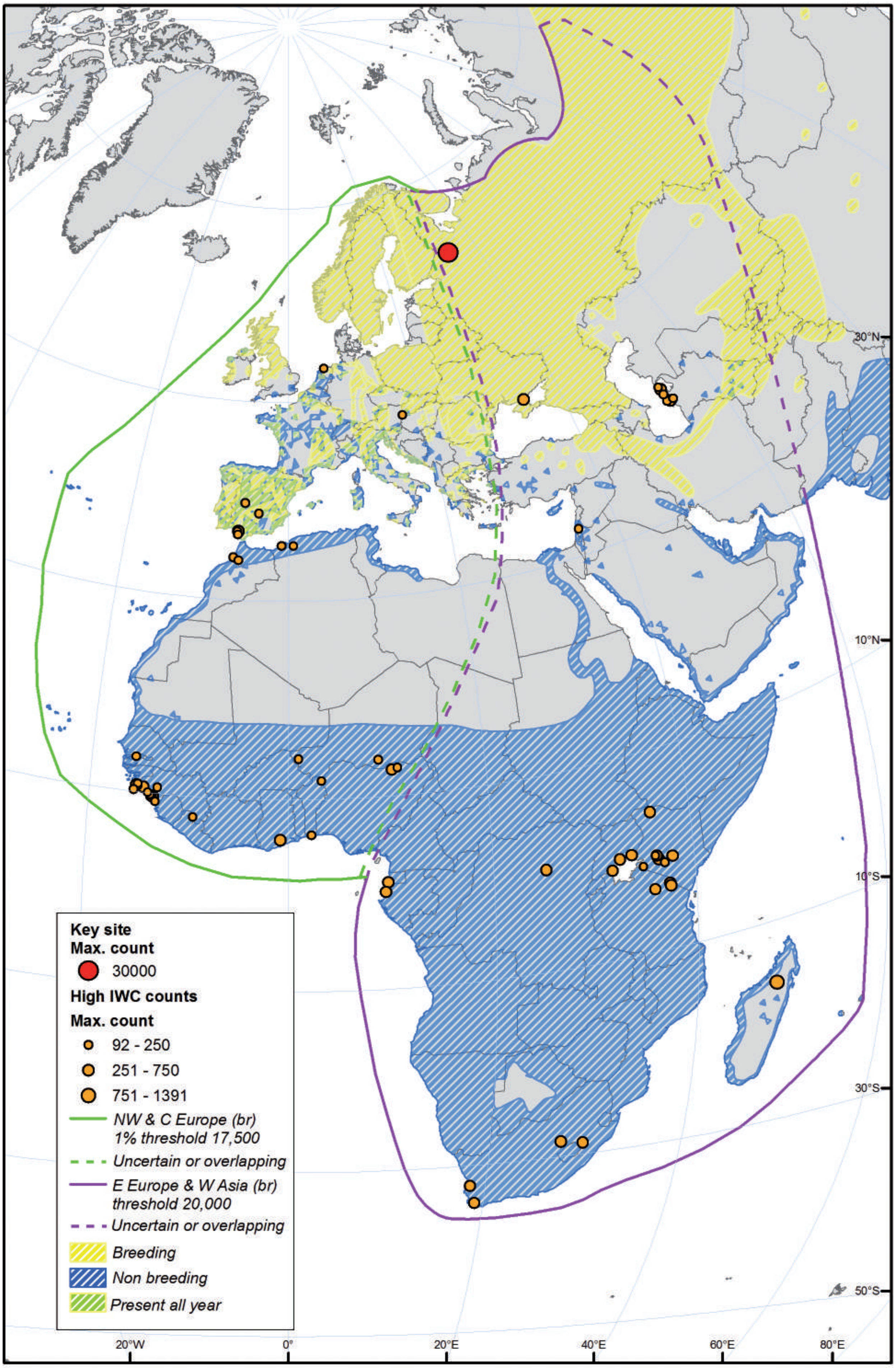
Movements

The Common Sandpiper is mainly a nocturnal migrant, migrating overland singly or in small groups, typically of 5-10 individuals, on a broad front, where necessary crossing mountains and deserts. There are numerous records of birds on passage at oases in the Sahara and deserts of the Middle East. Recoveries of birds ringed in Europe demonstrate a broad-front migration in a SSW-SW direction in autumn, and the reverse in spring. The recoveries indicate that Western and Central European breeders (east to about 30°E) winter mainly in West Africa. Birds ringed in Norway and Britain have been recovered mainly in the Low Countries, France, Iberia and North-west Africa (Bakken *et al.* 2003, Holland & Yalden 2002). Of 15 British-ringed migrants subsequently recovered in Fennoscandia, 11 were in Norway and four in Sweden (Cramp & Simmons 1983). Birds ringed in Finland and Sweden cross Europe from the Baltic, Czech Republic, Slovakia and Italy west to the North Sea countries, France and Iberia, while birds ringed in Central Europe have been recovered mainly in Italy (Cramp & Simmons 1983, Holland & Yalden 2002). However, some birds ringed in Central Europe have been found to migrate to Western Europe first, before continuing on to West Africa (Smit & Piersma 1989).

Of 14 birds ringed in Scandinavia and Western and Central Europe and recovered in Africa, all were in West Africa from Mali and Guinea-Bissau to Ghana and Nigeria. This suggests that birds wintering in Central, Eastern and Southern Africa come from more easterly Russian populations (Cramp & Simmons 1983, Smit & Piersma 1989). The few recoveries of birds ringed in Eastern and Southern Africa are consistent with this. Seven birds ringed in Southern Africa and single birds ringed in the Democratic Republic of Congo and Kenya have been recovered in European Russia, between 30ºE

Common Sandpiper

Actitis hypoleucos



and 57ºE (Urban *et al.* 1986, Underhill *et al.* 1999). One bird ringed in Natal and one from Zimbabwe were recovered in Sudan on their northward migration (Underhill *et al.* 1999). A single bird ringed during the breeding season at about 45ºE in European Russia was recovered in Central Africa (Holland & Yalden 2002). Given the abundance of the species on passage in western Iran and the Arabian Peninsula, it seems likely that the birds breeding in the southern Urals, parts of Western Siberia, and South-west Asia south to Turkey and northern Iran also migrate south-west to wintering areas in Eastern and Southern Africa, but there are as yet no ringing recoveries to confirm this.

The southward migration begins in late June or early July, and most birds have left their northern breeding areas by the second half of August (Rogacheva 1992). Females increase their body weight by about 50% before starting the autumn migration, and ringing recoveries indicate a fairly rapid migration over long stages (Holland & Geister 1997). The main autumn passage of adults through Europe, North Africa and the Middle East extends from late July to the end of August, with juveniles following one month later. Passage across the Sahara reaches a peak in late August and early September (Snow & Perrins 1998). The first adults penetrate south of the equator by mid-July, but the main influx in East and West Africa occurs in August (adults) and September (juveniles) (Urban *et al.* 1986). Arrival in Southern Africa commences in the second week of July. Movements continue throughout the southern summer as rainfall events create and modify suitable habitats (Underhill *et al.* 1999). Departure from Southern Africa begins as early as the end of February, and most birds have left their wintering areas in Africa by late April. Spring passage on the North African coast extends from mid-March to mid- or late May. The first migrants arrive in Europe and the Middle East in the last few days of March and early April, and the spring migration reaches a peak between mid-April and mid-May. The breeding grounds in temperate Europe are occupied in the second half of April or in early May, but in the northernmost breeding areas in Russia, birds do not arrive until late May or even early June (Dement'ev & Gladkov 1951). Many immatures remain in the northern winter quarters throughout the year (e.g. in Ethiopia and Mali), but rather few non-breeders spend the northern summer as far south as East Africa, and "overwintering" is rare in Southern Africa (Urban *et al.* 1986, Underhill *et al.* 1999).

Population limits

Waterbird Population Estimates recognises two populations of the Common Sandpiper in Western Eurasia and Africa, following Smit & Piersma (1989) and Perennou *et al.* (1994):

1) birds breeding in Western and Central Europe, and wintering mainly in West Africa;
2) birds breeding in Eastern Europe and Western Asia, and wintering mainly in Eastern, Central and Southern Africa.

These two populations were supported by Stroud *et al.* (2004), although it was acknowledged that there is likely to be a considerable degree of overlap between the two groups of birds on passage in the Black Sea and eastern Mediterranean region and in wintering areas in Central Africa.

Population size

1. North, West & Central Europe (breeding)

Population estimate	1% threshold	Population trend
1,500,000-2,000,000	17,500	Possibly decreasing

The breeding population in North, West and Central Europe has been estimated at 502,000-618,000 pairs (data from Thorup 2006) or 366,000-691,000 pairs (data from BirdLife International 2004a). These totals exclude the birds breeding in European Russia, Turkey and the eastern half of Ukraine, which are assigned to the eastern population. The great majority (>95%) of the western population breed in Norway, Sweden and Finland, and the rest mainly in Britain and Ireland, Estonia and Belarus (Holland & Geister) 1997). The breeding estimates equate to a total population of between 1.5 million and 2 million birds in autumn and winter – the estimate adopted in *WPE4*. Stroud *et al.* (2004) and *WPE3* gave a slightly lower estimate of 1.4 million-2 million based on preliminary estimates for some of the breeding populations.

Only a few thousand birds are counted during the IWC, and only about 1,000-1,500 of these are in West Africa. Some estimates of wintering populations have included 100 in Britain (Cayford & Waters 1996), 500-1,000 in France and 400 in Italy (Stroud *et al.* 2004), 9,100 in the coastal zone of Guinea-Bissau (Zwarts 1988), 2,000-5,000 in the rice fields of Guinea-Bissau (Altenburg & Van der Kamp 1986), 9,200 in Sierra Leone (Tye & Tye 1987), 25,000-30,000 in the coastal wetlands of Liberia (Gatter 1988), and 800 in the coastal zone of Ghana (Ntiamoa & Grieve 1987). Even these estimates account for only a few percent of the wintering population, and it is clear that the great majority of birds, scattered in ones and twos along rivers and streams, at small ponds and dams, and on lake shores and coastlines throughout a vast area of West Africa, are not being counted.

2. Eastern Europe & Western Asia (breeding)

Population estimate	1% threshold	Population trend
E (>1,000,000)	Not established	Possibly stable

The breeding population in European Russia has been estimated at between 545,000 and 1,086,000 pairs (Thorup 2006) or 350,000-900,000 pairs (BirdLife international 2004a). To these should be added about 1,000-5,000 pairs breeding in Turkey and some 2,000-4,000 pairs breeding in eastern Ukraine (50% of the Ukraine population) (data from Thorup 2006 and BirdLife international 2004a). No information is available on the numbers breeding in Western Asia, but these are likely to be large, given the wide distribution of the species and its abundance on migration. Thus the population almost certainly exceeds two million birds, and is probably much higher. A new estimate of E (>1,000,000) was proposed by Stroud *et al.* (2004), and this was adopted in *WPE3* and *WPE4*.

The IWC in South-west Asia and Eastern and Southern Africa accounts for only a few thousand birds, fewer than 500 of which are in South-west Asia. Some recent estimates of wintering populations include 50-150 in Iran (Scott 1995), 300-500 in Egypt (Goodman & Meininger 1989), 1,000-2,000 in Sudan and 2,650 in Kenya (Summers *et al.* 1987), and 500 in the Central African Republic, 11,000 in Angola, 5,000 in Zambia, 15,000 in Mozambique, 3,100 in Namibia, 5,000 in Botswana, 500 in Swaziland, 10,000 in Zimbabwe, and 12,000 in South Africa (Stroud *et al.* 2004). Common Sandpipers are numerous outside the breeding season in the equatorial forest belt of Africa, where very few waterbird counts have yet taken place. Bapeamoni *et al.*

(2007) reported that the Common Sandpiper is the third most numerous waterbird at wetlands in the Kisangani region of Democratic Republic of Congo, where a peak count of 519 was made in January 2003.

Conservation status

The breeding population in North, West and Central Europe appears to have been relatively stable in the latter part of the twentieth century, but may now be experiencing some decline. Holland & Geister (1997) considered the European population to be mainly stable, although there were some local decreases in the south. The huge breeding populations in Norway, Sweden and Finland, and the large breeding populations in Belarus, Estonia and Latvia were thought to be stable in the 1990s (Koskimies 1993, Holland & Geister 1997, Tomkovich & Lebedeva 1998). Numbers declined in Central Europe, Britain and Ireland, particularly in the 1930s and 1950s, and Dougall *et al.* (2004) estimated that the population breeding in Britain and Ireland decreased by 23% between the Atlas surveys of 1968-72 and 1988-91. This decline continues, with BirdLife International (2004a) reporting an overall decline in the British population. There was a 30% contraction in the breeding range in Ireland between 1968-72 and 1988-91 (Yalden 1993), and decreases were also reported in Germany, Poland, the Kaliningrad region, Austria, Switzerland and Slovenia. Holland & Geister (1997) suggested that the declines may have been the continuation of a trend with a mainly climatic basis, aggravated by agricultural and recreational pressures and by regulation of waterways and increased gravel extraction. Recreational disturbance (such as from anglers and hikers) is thought to have been a major cause of the declines in parts of Britain and Ireland (Yalden 1993). Declines have recently been reported in the large breeding populations in Finland and Sweden, and BirdLife International (2004a) concluded that overall the European breeding population is currently undergoing a moderate decline. However, the large breeding population in Norway is thought to be stable, as are the much smaller populations in Belarus, Estonia, France, Italy, Latvia and Poland, while the substantial population in Romania is thought to be increasing (BirdLife international 2004a). The large breeding population in European Russia is thought to be stable, but declines have recently been reported in Ukraine and Turkey (BirdLife International 2004a). The status of the breeding populations in Western Asia is unknown.

Habitat and ecology

The Common Sandpiper occupies an extremely broad breeding range from steppe and desert climates through temperate zones to boreal and mountain forests almost to the snowline in alpine and Arctic tundra, and from sea level to 4,000 m or more in mountains. It breeds in April to July in the vicinity of water, in a variety of habitat types including rivers and streams (usually stony and fast-flowing), small pools, lakesides and sheltered sea-coasts. It nests on the ground, sometimes at some distance from water, amongst trees or shrubs. The mating system is mainly monogamous, but occasional polyandry may be regular (Snow & Perrins 1998). Pairs defend linear territories with well-defined boundaries on suitable stretches of river, stream or shore.

There are indications that it is the female that establishes the territory and is mainly responsible for its advertisement (Johnsgard 1981). Egg-laying begins in late April in North-west Europe, and in the second half of May or early June in northern Fennoscandia and northern Russia. Both sexes share in incubation and brooding, but the female apparently loses interest in the brood first, leaving the male to care for the young during the latter part of the fledging period (Johnsgard 1981). In optimal habitat, nesting pairs may be as little as 60-70 m apart. A density of 4.7 pairs per sq.km has been recorded in the Peak District in Britain, where some territories are only 100-150 m long (Gibbons *et al.* 1993). The species shows a high degree of site fidelity, both on the breeding grounds and in the winter quarters, but a low degree of natal philopatry (del Hoyo *et al.* 1996). There are many examples of birds returning in subsequent years to the same or adjoining localities in Zimbabwe, Namibia and South Africa (Underhill 1997).

Outside the breeding season, the Common Sandpiper occurs in virtually all types of wetland habitat, including rocky headlands, ocean beaches, estuaries, salt marshes, tidal creeks in mangroves, and inland waters such as ponds and riverbanks. It also occurs commonly along rivers and streams in forested areas, including tropical rainforest, and in mountainous regions up to at least 2,000 m elevation in East Africa. It has adapted well to artificial wetlands, such as reservoirs, gravel pits and fish ponds, and often occurs in urban areas around rubbish tips, harbours, docks, jetties etc. It often perches on floating objects such as buoys, boats, logs or hippopotamuses. It tends to avoid open mud-flats and other open wetland habitats frequented by more gregarious species (Hayman *et al.* 1986). It is relatively scarce at brackish and saline lakes, and where it occurs along marine coasts, is often associated with freshwater seepage (Underhill 1997).

The Common Sandpiper usually occurs singly or in small groups of less than 10 individuals, although it sometimes gathers in flocks of 20-30 individuals, and exceptionally up to 200, before leaving on migration at dusk. Individuals often maintain feeding territories on their winter quarters. Gatherings of 20-30 individuals are not uncommon at night roosts, and a congregation of 100 individuals has been observed at a roost in the Save River in South Africa (Underhill 1997). At all seasons, the species feeds by pecking rather than probing, and generally confines its activities to wet ground, rather than wading as is typical of *Tringa* species (Johnsgard 1981). The diet consists primarily of free-flying adult invertebrates, particularly insects, but spiders, crustaceans, molluscs, annelids, snails, frogs, toads, small fish and occasionally even plant material including seeds are also taken (Urban *et al.* 1986).

The complete post-nuptial moult in adults does not usually begin until the birds have arrived on their winter quarters, although a few feathers, including some inner primaries, may be replaced when still near the breeding areas in late June or July. Thus, most birds are still in worn breeding plumage when they arrive in East Africa. The moult begins immediately on arrival, in late August to early October, and is completed by late January or February. The birds then undertake a partial pre-nuptial moult in February to May. Juveniles undergo a partial moult from August to November (Dement'ev & Gladkov 1951, Cramp & Simmons 1983).

Network of key sites

One key site has been identified on the breeding grounds: Zaonezh'ye in the Karelia region of Russia. This vast area of islands and peninsulas in Lake Onega covers 330,000 ha and supports an estimated 5,000-6,000 breeding pairs of Common Sandpipers and up to 30,000 individuals on migration (Heath & Evans 2000). Further south, however, the Common Sandpiper generally occurs in very low concentrations at stopover sites and in its winter quarters. Aggregations of over 100 individuals are unusual, and it is doubtful if there are any sites that ever support over 1% of either population. The key site approach is clearly inappropriate in the conservation of this species.

Protection status of key sites

Zaonezh'ye has been identified as an IBA and is partly protected in a "zakaznik" of 50,000 ha (Heath & Evans 2000).

Table 52. Key sites for Common Sandpiper. Sites where 1% or more of a population has been recorded

Country	Site	Lat	Long.	Season	Max total	Year max	Source	Population(s) at site
Russia	Zaonezh'ye	62.22	34.00	Migration	30000	1997	WBDB	SW Asia, E&S Africa

Jeff Kirby & Derek Scott

György Szimuly

Ruddy Turnstone
Arenaria interpres

Geographical variation and distribution

The breeding range of the Ruddy Turnstone is virtually circumpolar in the high and low Arctic zones. Two subspecies are generally recognised. The nominate form breeds on Ellesmere Island and Axel Heiberg Island in north-eastern Canada, in northern Greenland, across northern Eurasia from western Norway, Denmark (locally) and Estonia to Anadyrland, and in north-western Alaska. The breeding range extends north to 76º30'N on the Taymyr Peninsula, and the species has bred at 83ºN in Greenland and 80ºN in Svalbard (Hildén & Vuolanto 1997). Breeding has been recorded on Bear Island, and occasional pairs spend the summer in the Faeroes and Scotland. *A. i. morinella* breeds along the Alaskan coast of the Beaufort Sea and in much of low Arctic Canada north to about 74ºN. Boertmann (1994) has suggested that the small number of birds breeding in West Greenland probably belong to *morinella*.

The nominate form winters along coastlines of Western Europe, the Mediterranean, Africa west to the Cape Verde Islands and south to South Africa and Madagascar, the Middle East, the Indian subcontinent, South-east Asia, Australia, New Zealand, the Pacific islands, the Galapagos Islands and the west coast of South America south to Chile. *A. i. morinella* winters mainly on the coasts of North and South America from South Carolina and the Gulf of Mexico south to central Chile and northern Argentina (del Hoyo *et al.* 1996).

Birds breeding from eastern Taymyr east to Point Barrow, Alaska, have been assigned to *oahuensis*, a form originally described from the Hawaiian Islands but dismissed by Peters (1934) and most subsequent authors. Engelmoer & Roselaar (1998) could find no differences in measurements between *interpres* and *oahuensis*, and supported the conclusion of Hayman *et al.* (1986) that the colour variation in Palearctic Ruddy Turnstones was clinal. Engelmoer & Roselaar therefore retained "*oahuensis*" within nominate *interpres*. The wintering range of "*oahuensis*" as originally described is in East and South-east Asia, Australia, New Zealand and the Pacific islands, and thus outside the region covered by this Atlas. However, Tomkovich & Serra (1999) have recently considered *oahuensis* to be a valid form, and give the breeding range as extending as far west as Vaigach and Novaya Zemlya in extreme north-eastern Europe. As Stroud *et al.* (2004) concluded, the status of this form and the extent of its distribution are issues that clearly need further study.

Movements

Western populations of the nominate form winter on the coasts of Western Europe, the Middle East and Africa (including Madagascar) south to Cape Province, South Africa. Birds breeding in north-eastern Canada and northern Greenland migrate south-east across the North Atlantic to winter on the Atlantic seaboard of Europe, mainly from the Irish Sea and North Sea to Iberia, with smaller numbers in Iceland, south-western Norway and North-west Africa (Smit & Piersma 1989, Whitfield 2002c). All 36 recoveries of birds ringed in Britain and Ireland in winter and subsequently recovered during the breeding season were found in Iceland, Greenland or north-eastern Canada (Whitfield 2002c). Recoveries in Greenland and Iceland of birds ringed in Mauritania show that some birds from the Nearctic breeding population reach West Africa, and there has been one sighting of a colour-ringed bird from Ellesmere Island, north-eastern Canada, in Namibia (Underhill *et al.* 1999). Many birds in the Nearctic population stage in Iceland in spring; over 18,000 birds were identified and a total of 39,000 estimated staging in Iceland in May 1990 (Gudmundsson & Gardarsson 1993). Others apparently fly direct from North-west Europe to north-eastern Greenland in one flight (Summers *et al.* 1989, Whitfield 2002c). The return passage in autumn may be by a direct trans-Atlantic crossing or with a stopover in Iceland or south-western Norway. There are five recoveries linking birds ringed on passage in south-western Norway with staging areas in Iceland and breeding areas in

Greenland (Bakken *et al.* 2003). A few first-year birds spend the summer in Iceland and moult there.

Birds breeding in Fennoscandia and north-western Russia migrate south-west through the Baltic or along the Norwegian coast, and then along the coast of Western Europe, including Britain, to winter mainly on the Atlantic coast of Africa from Morocco to the Gulf of Guinea. Small numbers of mostly first-year birds remain throughout the winter in Western Europe and the western part of the Mediterranean, but the bulk of the population spends the winter south of 20ºN (Smit & Piersma 1989, Summers *et al.* 1989, Snow & Perrins 1998). Some birds apparently continue on to Southern Africa, as there have been sightings of one Finnish and two Polish ringed birds in Namibia and South Africa (Underhill *et al.* 1999). However, there have been no recoveries of birds ringed on passage in western Norway and Britain further south than Gabon (Bakken *et al.* 2003, Whitfield 2002c), suggesting that few birds from Fennoscandia travel as far south as Southern Africa. Numerous records of Ruddy Turnstones inland in Western Europe in autumn indicate some overland passage to the western Mediterranean. The small numbers of Ruddy Turnstones found wintering in the Inner Delta of the Niger in Mali in 1990/91 (Tinarelli 1998) suggest some movement across the Sahara from the Mediterranean to West Africa. The northward migration in spring takes place mainly along the coast of continental Europe, with few individuals passing through Britain (Summers *et al.* 1989). At least some birds show a loop migration, migrating along the Baltic coast in autumn, but returning in spring via the Black Sea region (Meissner & Koziróg 2001).

Birds breeding on the Arctic tundra east from about 50ºE to Central Siberia migrate overland via the Black Sea, the Caspian Sea and the lakes of Kazakhstan to winter in the eastern Mediterranean, Red Sea and Persian Gulf, and along the coasts of Eastern and Southern Africa. This population has been assigned to *A. i. oahuensis* by Tomkovich & Serra (1999). The eastern limits of the breeding range of this population are unknown. Some birds from this population reach the Seychelles, as a bird ringed in the Seychelles in March has been recovered in the south-west Caspian region of Iran in September (Argyle 1976). Many birds follow the Indian Ocean coast south to South Africa. However, the species is frequently encountered inland in Eastern Africa from southern Sudan, Ethiopia and East Africa south through Zambia, Malawi and Zimbabwe to South Africa (Urban *et al.* 1986). Most of these inland records refer to first-year birds on autumn passage (August-November), and suggest that many birds cross overland to the south-west coast of Africa (Urban *et al.* 1986, Underhill 1997). Others may cross the Sahara to the Gulf of Guinea, and then continue south along the east Atlantic coast to Angola, Namibia and South Africa (Summers *et al.* 1989). Ringing recoveries suggest that the northward migration is mainly along the west coast of Africa to the Gulf of Guinea and across the Sahara to the Mediterranean and Black Sea region (Underhill 1997). The northward migration may be accomplished in three flights, with possible stopovers in the Gulf of Guinea and in the Mediterranean or Black Sea (Summers *et al.* 1989). Large numbers of Ruddy Turnstones stage at Sivash Gulf on the Sea of Azov in spring (peaks of 2,900-3,900); while relatively smaller numbers (650-800) pass through in autumn (Chernichko *et al.* 1991). There is thus some evidence of a loop migration, with birds reaching Southern Africa via the east coast of Africa, and returning northward along the west coast of Africa to the Gulf of Guinea then across the Sahara to the eastern Mediterranean (Underhill *et al.* 1999). Three birds ringed in Southern Africa and recovered in May in Italy, Malta and Greece, respectively, are thought to have been birds of Siberian origin returning to their breeding grounds by this route (Underhill *et al.* 1999).[1]

In Greenland, birds arrive at their breeding grounds in late May and early June, and depart between early July and late August, the adults leaving before the juveniles (Meltofte 1985). In Siberia, birds arrive on the breeding grounds in early June, and depart by late August (Summers *et al.* 1989). The main arrival of birds in tropical regions of Africa is in August and September, with birds reaching South Africa in late September or October. The birds depart their African wintering areas mainly in April, southern birds fattening extensively before migration (Urban *et al.* 1986). The main spring passage of Fennoscandian and Russian birds in Western Europe takes place in May. The return passage occurs between mid-July and mid-September, with juveniles appearing about one month after the adults. Southward migration takes place through the Black and Caspian Seas in August and September. Most immature birds spend their first summer south of the breeding grounds, and many remain in Africa throughout the austral winter (Hayman *et al.* 1986, Underhill 1997, Urban *et al.* 1986). However, some first-year birds accumulate fat reserves in spring and migrate north with the adults (Summers *et al.* 1989). Birds have a strong tendency to return to the same staging and wintering areas in subsequent years, both in Western Europe and in Africa (del Hoyo *et al.* 1996, Snow & Perrins 1998, Summers *et al.* 1989, Whitfield 2002c).

Population limits

Three largely discrete populations of the nominate subspecies have been recognised as occurring in Western Eurasia and Africa (Smit & Piersma 1989, Summers *et al.* 1989):

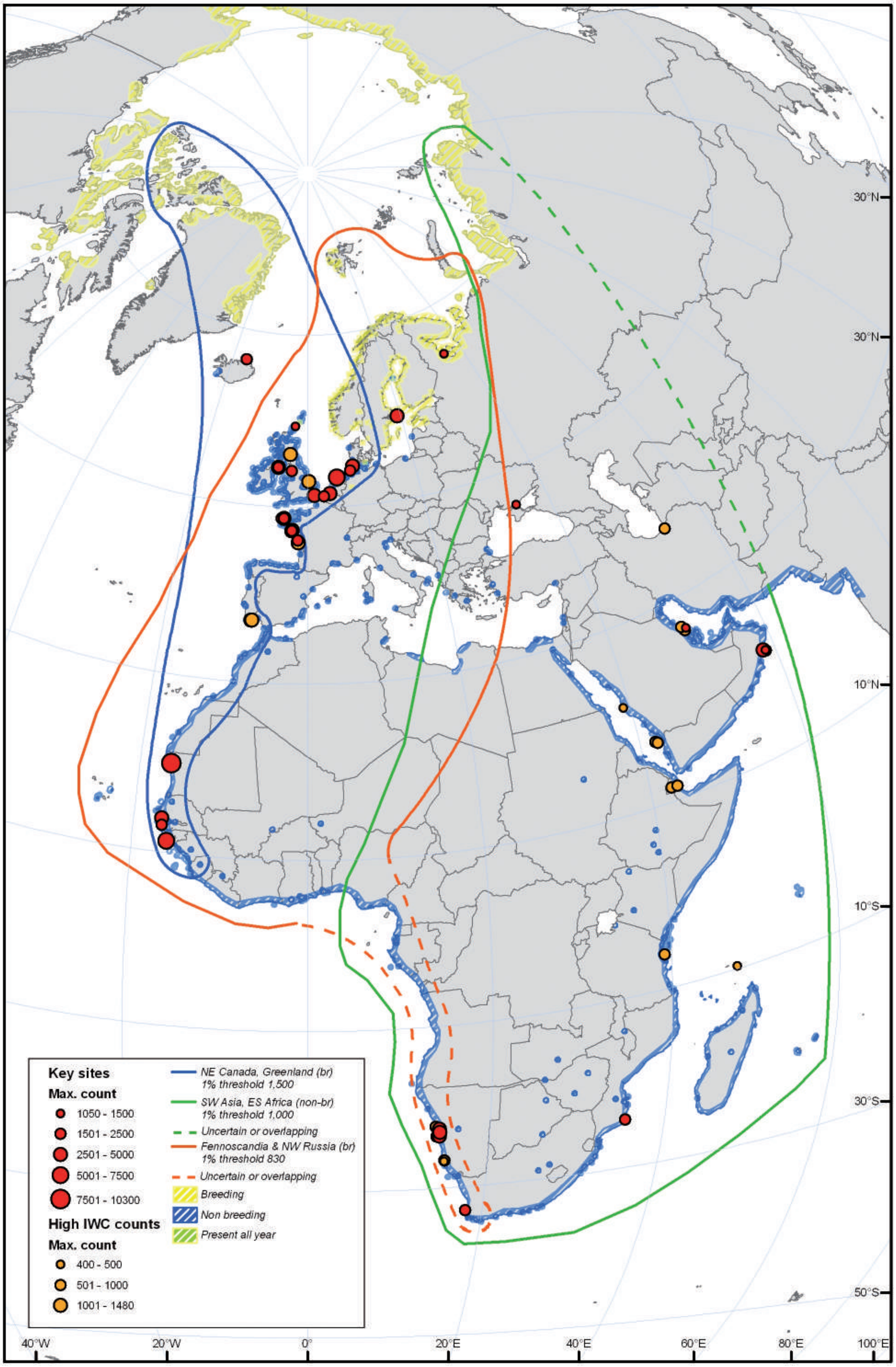
1) birds breeding in north-eastern Canada and northern and eastern Greenland, and wintering mainly in Western Europe, with some birds reaching West Africa;
2) birds breeding in Northern Europe (Fennoscandia and north-western Russia), and wintering mainly in West Africa, with some birds reaching Southern Africa;
3) birds breeding in Western and Central Siberia (from the Kara Sea eastwards), and wintering in South-west Asia and Eastern and Southern Africa (including South-west Africa).

Summers *et al.* (1989) showed that although only minor biometric differences exist between these populations, they clearly differ in terms of migration phenology and migration routes. Smit & Piersma (1989) acknowledged that there was some overlap in the first two of these populations in South-west Europe and Morocco, but argued that as the numbers wintering in this region were relatively small, the overlap should not greatly influence the estimates of population size. These authors therefore used the Straits of Gibraltar as the demarcation line between the wintering areas of the Nearctic population and the Fennoscandian and north-west Russian population. It is now recognised that there is also some overlap between all three populations in Southern Africa (Underhill *et al.* 1999, Meissner & Koziróg 2001).

[1] A Great Circle route from the Gulf of Guinea to the Yamal and Taymyr peninsulas would pass over Greece and slightly to the west of the Black Sea.

Ruddy Turnstone

Arenaria interpres



Population size

1. *interpres* North-eastern Canada & Greenland (breeding)

Population estimate	1% threshold	Population trend
100,000-200,000	1,500	Possibly decreasing

Smit & Piersma (1989) gave an estimate of 67,000 birds, but considered this to be too low because of the paucity of data from Iceland, southern Norway and Ireland, and the difficulty in counting this species which is widely dispersed along rocky coastlines. In the absence of other evaluations, their estimate of 67,000 was retained in the first two editions of *Waterbird Population Estimates* under the name "Western Palearctic".

Stroud *et al.* (2004) gave a new estimate of 94,000 based on midwinter counts and estimates in the 1990s, and this was adopted in *WPE3*. The estimate was considered to be more reliable than the earlier estimate because of great improvements in count coverage, but was still thought to be too low, partly because of underestimation of birds wintering along rocky coastlines, and partly because it did not include any birds that migrate further south to winter in West Africa. Stroud *et al.* (2004) were not able to incorporate the results of the European Non-Estuarine Coastal Waterbird Survey (NEWS) carried out in the 1990s. Some of the results of the NEWS project have since been published, and these have shown that for some countries, at least, the estimates given by Stroud *et al.* (2004) were considerable underestimates. For example, a national survey in Ireland in 1997/98 indicated that there were about 6,000 Ruddy Turnstones wintering along non-estuarine coastlines in addition to over 2,200 on estuarine coasts (Colhoun & Newton 2001). These figures suggest an Irish wintering population of about 8,200 birds – over three times the estimate of 2,400 used by Stroud *et al.* (2004) in their calculation of population size.

Meltofte (1985) estimated that there were 25,000 breeding pairs in north-eastern Canada and northern Greenland, and suggested a post-breeding population of about 120,000 individuals. More recently, Meltofte (2001) has revised estimates from the breeding grounds for this and other species in the light of advances in knowledge of breeding behaviour and census techniques. His revised estimate for Ruddy Turnstone is 40,000-80,000 pairs, suggesting a post-breeding population of 120,000-240,000 individuals. In his collation of breeding estimates, Thorup (2006) gave a slightly lower estimate of 35,000-70,000 pairs for this population (equating to 105,000-210,000 individuals). Both of these estimates are considerably higher than the current estimate derived from counts of birds wintering in Western Europe, almost certainly because the latter estimate is too low. Meltofte (2001) attributes the discrepancy to poor coverage of rocky-shore habitat in the wintering areas. In view of the difficulties encountered in censusing this species in winter and uncertainty as to how many birds reach Africa, Scott (2002) proposed a new population estimate of 100,000-200,000 based on the breeding estimates, and this was adopted in *WPE4*.

2. *interpres* Fennoscandia & North-west Russia (breeding)

Population estimate	1% threshold	Population trend
45,000-120,000	830	Possibly decreasing

Smit & Piersma (1989) gave an estimate of 31,700 birds based on counts of wintering birds in West Africa, and this estimate, rounded to 32,000, was adopted in the first two editions of *Waterbird Population Estimates.* Stroud *et al.* (2004) produced an estimate of 25,100 in the 1990s, based on counts of wintering birds in West Africa, but with wider geographical coverage than achieved by Smit & Piersma. This low estimate in the 1990s suggested either that there had been a decline in the population since the 1980s, or that there had been a shift in population.

Estimates derived from breeding populations are much higher, and suggest that between 50% and 75% of the wintering birds are being missed by the midwinter counts. The breeding population in Fennoscandia, the Baltic region and Svalbard is estimated at 12,500-22,700 pairs, and that in European Russia at 2,700-17,000 pairs (Hildén & Vuolanto 1997, Thorup 2006). These figures suggest a total population of 45,600-119,100 birds. Data from BirdLife International (2004a) give a similar total of 14,000-41,000 pairs for the European breeding population, equating to 42,000-123,000 individuals. Stroud *et al.* (2004) considered that the estimates from the breeding grounds were likely to be more accurate than estimates from incomplete winter counts, and therefore proposed a new population estimate of 46,000-119,000 based on the figures given by Thorup (2006). This estimate was adopted in *WPE3*. Given the uncertainties in the breeding estimates, a slightly broader estimate of 45,000-120,000 was adopted in *WPE4*.

3. *interpres* South-west Asia, Eastern & Southern Africa (non-breeding)

Population estimate	1% threshold	Population trend
100,000	1,000	Unknown

Perennou *et al.* (1994) estimated this population at a minimum of 50,000 birds, while a range of 25,000-100,000 was adopted in the first two editions of *Waterbird Population Estimates*. Stroud *et al.* (2004) produced a minimum estimate of 84,900, based on improved coverage of the winter counts and a series of "best guesses" for country totals for many countries in Africa. However, as there were still many important gaps in coverage, notably in parts of the Arabian Peninsula, Sudan, Djibouti and Somalia, Stroud *et al.* concluded that the total population was likely to be in the region of 100,000 birds. This estimate was adopted in *WPE3* and *WPE4*.

Conservation status

The estimate of 94,000 for the number of Ruddy Turnstones wintering in Western Europe (mainly birds from north-eastern Canada and Greenland) would seem to suggest that there was a 30% increase in this population between the mid-1980s and mid-1990s (Stroud *et al.* 2004). Some of this apparent increase was certainly due to improvements in count coverage. However, Smit & Piersma (1989) considered that there had been a slight increase in the numbers wintering in Europe between the 1970s and the mid-1980s. Stroud *et al.* (2004) found that in countries with good monitoring coverage, such as Belgium, there had been increases during the 1980s. In France, a strong increase occurred at a sample of 36 sites counted in mid-January, from 1,500 in 1981 to 8,000 in 1989 (Deceuninck & Mahéo 2000). Cayford & Waters (1996) found that the number wintering in Britain increased by 45% (from 44,480 to 64,400) during the period 1981-85 to 1988-92. It seems probable, therefore, that there was a substantial increase in this population between the 1970s and the mid-1990s. Stroud *et al.* (2004) therefore gave the trend in this population as "strong increase". This increase reversed in the 1990s and the trend in Britain from 1988 to 2006 was one of steady decrease, levelling off after 2002 (Banks *et al.* 2006). Comparing national surveys in Britain in 1984/85 and 1994/95, Browne *et al.* (1996) reported 44% declines, and long-term monitoring of some Scottish shores has also highlighted declines (Dott 1997). Rehfisch *et al.* (2003) found that the number of Ruddy Turnstones wintering along non-estuarine coastlines in the U.K. had decreased by 16% (from 46,920 to 39,560) during the period 1984/85 to 1997/98, while Colhoun & Newton (2001) found a massive 73.5% decline in the much smaller numbers wintering on non-estuarine coasts in Ireland during the period 1987 to 1997/98. Whitfield (2002c) also reported on marked recent declines in the British and Irish wintering populations. As the British and Irish wintering populations comprise at least half and probably more than two-thirds of the population breeding in north-eastern Canada and Greenland, it would seem very likely that the overall trend in this population is now one of decline. The Dutch wintering population also decreased in the 1990s, although there have been signs of recovery since 2000 (van Roomen *et al.* 2006). An analysis of population trends of waterbirds wintering in North-west Europe (Ireland, U.K., France, Belgium, The Netherlands and Germany combined) based on IWC data estimated that between 1989 and 2002 there was an overall decrease in numbers of 1.2% per annum The much smaller numbers wintering in the West Mediterranean region decreased by an estimated 1.5% per annum over the same period (Delany *et al.* 2007).

The estimate of 25,100 given by Stroud *et al.* (2004) for the number of Ruddy Turnstones wintering in West Africa (mainly birds from Fennoscandia and north-western Russia) would seem to suggest that there has been a decline in this population since the mid-1980s, when Smit & Piersma (1989) estimated the population at 32,000. Much of the decline in the numbers counted was due to a decrease in the number of birds found at the Banc d'Arguin in Mauritania. A comprehensive survey of the Banc d'Arguin in early 1997 found only 7,692 Ruddy Turnstones, representing a decrease of 58% on the 1980 total (Dodman *et al.* 1997, Zwarts *et al.* 1998). However, 10,060 were counted at the Banc d'Arguin in January 2000 (Dodman & Diagana 2003), followed by 8,524 in January 2001 (Dodman 2002). This suggested that the low count in 1997 may have been due to a temporary shift in the population, and not to any real decrease in numbers. Stroud *et al.* (2004) therefore concluded that this population was probably stable. However, in a more recent analysis, Davidson & Stroud (in prep.) have found evidence of long-term declines through the 1990s in most major West African wintering areas, following increases in the 1980s. *WPE4* followed Davidson & Stroud (in prep.) and gave the trend in the Fennoscandian and north-western Russian breeding population as declining. There was little evidence of this decline on the breeding grounds in the 1990s. No significant decrease was reported in the breeding areas in Northern Europe, and the main breeding populations in Fennoscandia and European Russia were considered to be stable (Hildén & Vuolanto 1997). In the northern Baltic, the population increased slowly until the 1950s and 1960s, since when there has been some decline in several areas, such as the Gulf of Finland (Hildén & Vuolanto 1997). The relatively small population in Estonia (currently 100-150 pairs) was in decline throughout much of the twentieth century and is still thought to be decreasing (Estonian Ornithological Society 2008), but in the 1990s, the small population of about 40 pairs in Denmark was considered to be stable or increasing slightly (Hildén & Vuolanto 1997, BirdLife International 2004a).

Trends in the population wintering in South-west Asia and Eastern and Southern Africa are unknown. However, there was no evidence of changes in distribution or abundance in Southern Africa during the twentieth century (Underhill 1997). Summers *et al.* (1989) found no long-term change in the size of the wintering population at Langebaan Lagoon in South Africa between 1976 and 1989. There were short-term fluctuations in the numbers of non-breeding birds (mainly first-year birds) which remained in the area throughout the austral winter, with peaks indicating successful breeding in the previous summer in Siberia. These peaks followed the three-year cycle typical at that time of birds breeding in parts of Siberia and linked to cycles of lemming abundance. In years of lemming abundance, predation of breeding waders was low and breeding success was high (Summers *et al.* 1989).

Habitat and ecology

During the breeding season, the Ruddy Turnstone typically occurs on raised ground or lowlands around the Arctic Ocean, although in the Baltic, the breeding range extends south almost to 55ºN. Breeding takes place between late May and early August on barren, stony or pebbly shores, sometimes with scanty vegetation, on rocky coasts, and also on the tundra in sites that are dry and stony, often with sparse vegetation, including dry dwarf-shrub tundra. In the Baltic, the birds breed on small treeless islands in the outermost archipelagos. In Finland and southern Sweden, a few birds breed inland on islets and the smaller islands in the largest lakes (Hildén & Vuolanto 1997). The Ruddy Turnstone is monogamous and highly territorial when breeding, with pairs often occurring in semi-social groups separated by extensive unoccupied areas (H.Meltofte *in litt.*). However, in the northern Baltic, it shows a strong breeding association with small gulls and terns, and reaches high breeding densities in gull and tern colonies (Hildén & Vuolanto 1997). Outside the breeding season, Ruddy Turnstones occur almost anywhere along stony or rocky seashores or on reefs, and even on sandy beaches or mudflats, provided there are some pebbles, stones, shells or patches of washed-up seaweed. Highest densities occur along sheltered rocky shores, mixed rocky and sandy shores, and on shorelines with washed-up kelp (Underhill 1997). Ruddy Turnstones sometimes occur inland on migration, when they frequent open lakeshores and the edges of large rivers. They usually occur in small scattered parties, but may form larger flocks (>100) on migration and at tidal roosts.

Adults may start their body moult on the breeding grounds, but the main moult of the flight feathers occurs after arrival on the wintering grounds. Body moult into breeding plumage may be largely completed at the wintering or staging sites (Whitfield 2002).

Network of key sites

Two important breeding sites have been identified in Northern Europe: Onega Bay in Russia, with 320-350 pairs, and the outer Stockholm Archipelago in Sweden, with 790-840 pairs (Heath & Evans 2000).

Outside the breeding season, Ruddy Turnstones are typically widely dispersed along rocky shorelines, and seldom occur in large concentrations, except at a small number of key staging areas and major wintering sites. Thus relatively few key sites can be identified for this species. A total of 13 passage and wintering sites have been identified in North-west Europe: in Belgium (1), France (4), Germany (2), The Netherlands (2) and the United Kingdom (4). The most important of these are the German Wadden Sea in Schleswig-Holstein (maximum 3,068 in spring), the Dutch Wadden Sea (maximum 6,567 in autumn), the Dutch Delta (maximum 2,424 in winter) and the Thanet Coast in the U.K. (maximum 3,348 in winter). Melrakkaslétta in north-eastern Iceland is a very important staging areas for the North-east Canada and Greenland breeding population, holding up to 2,200 on migration (Heath & Evans 2000).

Four key wintering sites have been identified in West Africa: the Banc d'Arguin in Mauritania (maximum 10,300 in recent years), the Sine Saloum Delta in Senegal (maximum 2,654), Allahein

River Mouth in The Gambia (maximum 2,025), and the Bijagos Archipelago in Guinea-Bissau (maximum 7,500). Most of the birds wintering at these sites in West Africa are believed to belong to the Fennoscandian and North-west Russian breeding population.

Eight key wintering sites have been identified for the Siberian breeding population: in Oman (2), Saudi Arabia (1), Mozambique (1), South Africa (1) and Namibia (3). The most important of these are Barr Al Hikman in Oman (maximum 3,500), and Sandwich Harbour (maximum 4,625) and Walvis Bay (4,640) in Namibia.

Sivash Gulf on the Sea of Azov in Ukraine is an important staging area for Ruddy Turnstones on spring passage, with peak counts of 2,900-3,900 (Chernichko *et al.* 1991). It is probable that birds from both the West African wintering population and the South-west Asian, Eastern and Southern African wintering populations are involved.

Protection status of key sites

In Southern Africa, a by-product of the reserve status of most of the offshore islands where seabirds breed is the conservation of prime Ruddy Turnstone habitat (Underhill 1997).

Table 53. Key sites for Ruddy Turnstone. Sites where 1% or more of a population has been recorded

Country	Site	Lat.	Long.	Season	Max total	Year max	Average total	Basis for average	Source	Population(s) at site
Belgium	Belgian Coast	51.23	2.92	Non Breeding	1514	2005	1412	2001-05 (5)	INC, Belgium 2005	NE Canada, Greenland + Fennoscandia & N Russia
France	Baie de Goulven	48.66	-4.28	Migration	2000	1999			WBDB	NE Canada, Greenland + Fennoscandia & N Russia
France	Baie de Morlaix + Penze	48.68	-3.87	Non-breeding	1520	1990	646	1999-04 (5)	R. Maheo, LPO *et al.* 2005	NE Canada, Greenland + Fennoscandia & N Russia
France	Ile de Re	46.22	-1.50	Non-breeding	1550	2003	1263	1999-04 (5)	R. Maheo, LPO *et al.* 2005	NE Canada, Greenland + Fennoscandia & N Russia
France	Presqu'île Guérandaise dont Traicts du Croisic	47.29	-2.51	Non-breeding	1724	2002	1502	1999-04 (5)	R. Maheo, LPO *et al.* 2005	NE Canada, Greenland + Fennoscandia & N Russia
Gambia	Allahein River Mouth	13.05	-16.67	Non-breeding	2025	1999	717	1999-01 (3)	AfWC database	NE Canada, Greenland + Fennoscandia & N Russia
Germany	Wadden Sea - Lower Saxony	54.00	8.00	Spring	1762	1995	568	1998-02 (5)	J . Blew, CWSS, 2005	NE Canada, Greenland + Fennoscandia & N Russia
Germany	Wadden Sea - Schleswig-Holstein	54.50	8.50	Spring	3068	1995	1392	1998-02 (5)	J . Blew, CWSS, 2005	NE Canada, Greenland + Fennoscandia & N Russia
Guinea -Bissau	Bijagos Archipelago	11.30	-16.00	January	7900	1993	6900	1992-2001 (3)	Dodman & Sa 2005	NE Canada, Greenland + Fennoscandia & N Russia
Iceland	Melrakkaslétta	66.48	-16.25	Migration	2220	1990			WBDB	NE Canada, Greenland
Mauritania	Banc d'Arguin	20.12	-16.27	January	10300	2000	8660	1997-01 (3)	Hagemeijer *et al.* 2004	NE Canada, Greenland + Fennoscandia & N Russia
Mozambique	Bay Inhambane	-24.18	35.38	July-August	1850	1999			AfWC database	SW Asia, E&S Africa
Namibia	Sandwich Harbour	-23.38	14.48	July-August	4625	2000	1,522	1992-00 (5)	AfWC database	SW Asia, E&S Africa
Namibia	Swakop - Walvis	-22.92	14.50	Non-breeding	3323	1998			AfWC database	SW Asia, E&S Africa
Namibia	Walvis Bay Ramsar Site	-22.50	14.42	Non-breeding	4641	1992	2440	1992-98 (5)	AfWC database	SW Asia, E&S Africa

Country	Site	Lat.	Long.	Season	Max total	Year max	Average total	Basis for average	Source	Population(s) at site
Netherlands	Rhine-Maas-Schelde Delta	51.50	4.00	Winter	2424	1994	1447	1999-03 (5)	RWS WD RIKZ 2005	NE Canada, Greenland + Fennoscandia & N Russia
Netherlands	Wadden Sea	53.30	5.38	Autumn	6567	2001	4075	1999-03 (5)	SOVON, The Netherlands, 2005	E Atlantic
Oman	Barr Al Hikman	20.63	58.47	January	5700	2008	2200	1993-01 (5)	IWC database R. Klaasen & J. de Fouw *in litt*	SW Asia, E&S Africa
Oman	Masirah Island	20.50	58.75	Non-breeding	1353	1997	631	1994-01 (5)	IWC database	SW Asia, E&S Africa
Russia	Onega Bay of White Sea	64.50	35.50	Breeding	1050	1995			WBDB	Fennoscandia & N Russia
Saudi Arabia	Tarut Bay	26.67	50.17	Non-breeding	1104	1993	671	1993-96 (3)	IWC database	SW Asia, E&S Africa
Senegal	Parc National du Delta du Saloum	13.83	-16.75	Non-breeding	2654	1999	2215	1997-99 (3)	AfWC database	NE Canada, Fennoscandia & N Greenland + Russia
South Africa	West Coast National Park	-33.08	18.10	Non-breeding	1902	1999			AfWC database	SW Asia, E&S Africa + Fennoscandia & N Russia
Sweden	Outer Stockholm Archipelago	59.42	19.33	Breeding	2520	1996			WBDB	Fennoscandia & N Russia
Ukraine	The Sivash, Azov Sea	46.17	34.58	Spring	1500	1992			van der Winden *et al.* 1993	SW Asia, E&S Africa
U.K.	East Sanday	59.27	-2.47	Non-breeding	1270	1994			BTO, UK, 2005	NE Canada, Greenland + Fennoscandia & N Russia
U.K.	Morecambe Bay	54.12	-2.93	Non-breeding	2106	1993	770	1999-03 (5)	IWC database	NE Canada, Greenland + Fennoscandia & N Russia
U.K.	Outer Ards Shoreline	54.47	-5.42	Non-breeding	1925	1990	961	1993-03 (5)	IWC database	NE Canada, Greenland + Fennoscandia & N Russia
U.K	Thanet Coast	51.37	1.25	Non-breeding	3348	1988	685	1999-03 (5)	BTO, UK, 2005	NE Canada, Greenland + Fennoscandia & N Russia

Derek Scott

Jan van de Kam

Great Knot *Calidris tenuirostris*

Geographical variation and distribution

The monotypic Great Knot breeds in north-eastern Siberia west to about 128ºE, from the Verhoyansk Range and south-eastern Yakutia east to Magadan, the Koryak Highlands and the southern part of the Chukotsky Peninsula (Johnsgard 1981, Snow & Perrins 1998). It winters mainly in eastern India, the Malay Archipelago, the Moluccas and especially northern and western Australia. However, a small and apparently discrete population winters on the shores of the southern Persian Gulf and Arabian Sea, from the United Arab Emirates, eastern Saudi Arabia and Oman to Pakistan and north-western India (Aspinall 1994). It was first recorded on the south coast of Iran as recently as January 2000 (Keijl *et al.* 2001), but may be regular there in small numbers, as there have been at least four further records. It has also recently been recorded from Yemen (Schaftenaar 1998).

Movements

The Great Knot is a long-distance migrant, seldom occurring inland on migration, and undertaking long flights between staging areas. The route taken by the birds wintering in the Persian Gulf and Arabian Sea is unknown. It seems likely that these birds breed either at the extreme western end of the known breeding range, or at some as yet undiscovered breeding area further west. They may reach their winter quarters either via a non-stop flight across the Tibetan Plateau, or with one or more stopovers in Eastern Asia, possibly in the Bay of Bengal. There have been relatively few records of Great Knot along either coast of peninsular India or in Sri Lanka, although the species occurs regularly in some numbers along the Orissa coast and in Bangladesh. This suggests that the western population may reach the Arabian Sea overland rather than around the coast of India.

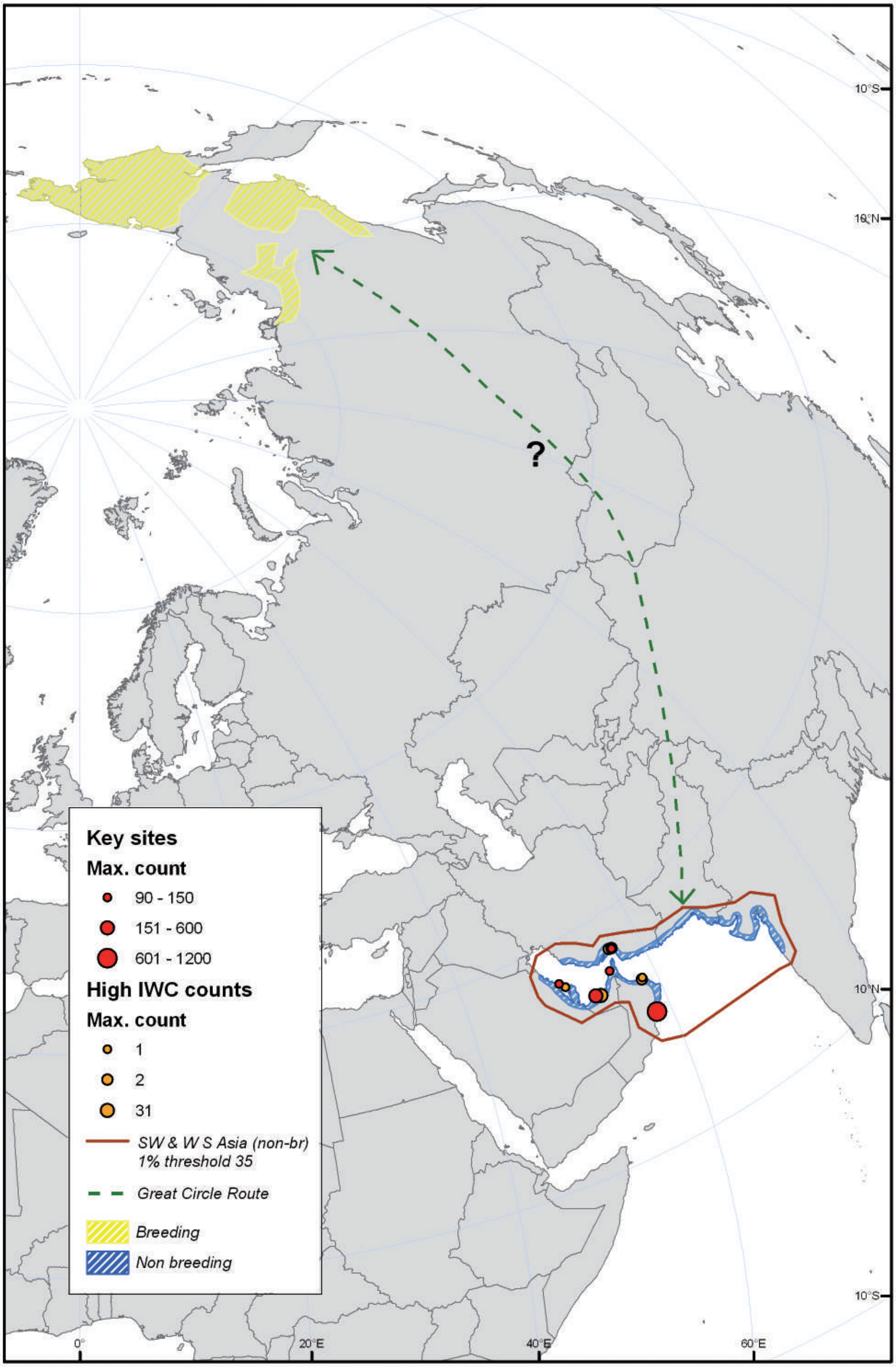
The females leave the breeding grounds in early July and the males and young follow in late July. From there, the birds appear to move directly to the coast. Most birds apparently migrate south via the Sea of Okhotsk, the Sea of Japan, eastern China and the Philippines. The autumn passage in south-eastern Siberia and eastern China takes place between late July and late October, with the main passage in August and September. Smaller numbers of birds occur on autumn passage in Japan and western Micronesia. The Great Knot is scarce on passage in western Indonesia, suggesting that most birds reach the wintering areas in Australia via China, the Philippines and New Guinea. Adults arrive in north-western Australia in late August and early September, and first year birds in October. The northward migration begins in Australia in March and April. The birds depart from north-eastern Australia between late March and mid-April, and probably fly non-stop from there to staging areas on the south China coast, where birds are present from early April until early June. The main spring passage through Japan occurs in the first half of May. The adults arrive back at their nesting areas in the second half of May or early June, as thawed areas are appearing on the tundra (Dement'ev & Gladkov 1951, Johnsgard 1981, del Hoyo *et al.* 1996). First-year birds apparently do not return to the breeding areas, spending the northern summer in the tropical parts of the non-breeding range (Hayman *et al.* 1986).

Population limits

Perennou *et al.* (1994) recognised the birds wintering in the Persian Gulf and western Indian Ocean as a separate population. This treatment has been adopted in all four editions of *Waterbird Population Estimates* and by Stroud *et al.* (2004). However, the breeding grounds of this population and the route by which the birds reach their winter quarters remain unknown.

Great Knot

Calidris tenuirostris



Population size

1. South-west Asia & western South Asia (non-breeding)

Population estimate	1% threshold	Population trend
2,000-5,000	35	Unknown

Perennou *et al.* (1994) thought that the population almost certainly exceeded 1,500 individuals, while *WPE1* & *WPE2* put the population at under 10,000 (category A).

The wintering population on the shores of the Persian Gulf and Arabian Sea remains poorly known. The species was first recorded in the United Arab Emirates in November 1986 (a single bird), and there were no further records until March 1990, when a party of five was found at Khor al Beidah (Richardson 1990, Aspinall 1994). However, the Great Knot is now recognised as a regular autumn migrant and winter visitor in the United Arab Emirates, occurring from August to April (Richardson & Aspinall 1998). The highest count was 600 at Merawah Island during the autumn migration season (Scott 1995). Small numbers have been observed along the Gulf coast of Saudi Arabia, the largest concentration being 108 at Tarut Bay in April 1991 (Perennou & Mundkur 1992). It is now known to be a regular winter visitor, sometimes in substantial numbers, to Barr al Hikman on the Oman coast (maximum of 1,193 in January 1990; Perennou *et al.* 1994), and also occurs as a scarce autumn and winter visitor on the Batinah coast of northern Oman. There are several recent records from the south-east coast of Iran, mostly involving only one or two birds, but a flock of 132 was observed at Khor-e Tiyab (a part of a total of 400 recorded at the Rud-I-Shur complex) in Hormozgan Province in January 2004 (de Boer *et al.* 2004).

Further east, small numbers of Great Knots winter along the Karachi and Makran coasts of Pakistan, from October to late May (exceptionally early June). About 200 were observed at Karachi in the late 1980s by E. Hirschfeld and others, and a flock of 70 was reported at Ghizri Creek in March 1981 (Roberts 1991). Recent high counts in Pakistan have included 300 in 1999, 270 in 2000 and 62 in 2001 (Li & Mundkur 2004). Only small numbers of birds have been recorded in north-western India in recent years. Perennou *et al.* (1994) mention only Charakla Saltworks in Gujarat, where there was an average of 40 birds in two years in the late 1980s. Since 1990, the highest count has been 21 in Gujarat in January 1993 (Mundkur & Taylor 1993).

These counts suggest a minimum population of about 2,000 birds. However, given the incomplete coverage of the counts in much of the winter range, notably along the Arabian Sea coast from the Straits of Hormoz to central Pakistan and in north-western India, it is probable that the population is substantially higher than this. On the other hand, it seems very unlikely that there could be as many as 10,000 birds, and a rather more conservative estimate of 2,000-5,000 was preferred by Stroud *et al.* (2004). This estimate was adopted in *WPE3* and retained in *WPE4*.

Conservation status

Nothing is known of trends in the western population. The large eastern population seems to be in decline, possibly because of hunting pressure and habitat loss at staging areas in eastern China (del Hoyo *et al.* 1996, Barter 2006).

Habitat and ecology

The Great Knot breeds in the sub-arctic highlands of north-eastern Siberia, frequenting barren or stony mountain tundra from about 300-420 m elevation in some areas to about 1,000 m in the upper Kolyma Basin. Breeding sites are characterised by an abundance of bare, gravelly areas covered by lichens and occasional patches of herbs, heathers and other stunted Arctic vegetation. Few nests have been reported, and the breeding habits are poorly known. The birds are monogamous and territorial on the breeding grounds, and show a high degree of site fidelity (Johnsgard 1981). A density of 13 pairs on 9.5 sq.km of suitable habitat has been recorded (del Hoyo *et al.* 1996). Egg-laying begins in late May. Both sexes incubate, but the females apparently leave the breeding area before the end of incubation, and only males have been observed accompanying broods (Johnsgard 1981). Summer foods include dipteran larvae, beetles, spiders, berries of *Empetrum nigrum*, and even seeds of *Pinus pumila* (Johnsgard 1981).

Outside the breeding season, the species appears to be exclusively coastal, occurring in large concentrations at favoured sites, but rarely elsewhere on passage. It prefers extensive sandy or muddy estuaries and coasts where a big tidal range leaves large areas of mud uncovered at low tide. Here it feeds mainly on bivalves, although it will also take gastropods, crustaceans, annelids and sea cucumbers. It is highly gregarious, feeding in flocks of hundreds to thousands, and forms dense packs at high-tide roosts where it associates freely with Red Knot *Calidris canutus*, Bar-tailed Godwit *Limosa lapponica*, sandplovers *Charadrius* spp. and Red-necked Stint *Calidris ruficollis* (Hayman *et al.* 1986).

Adults begin their post-nuptial moult on arrival in the winter quarters in late September to early November. This moult is completed from December to February. The birds also undergo a partial pre-nuptial moult from late February to mid-April, before the start of the spring migration. First-year birds begin their partial post-juvenile moult during the autumn migration (September to October), and complete the moult in the winter quarters (Cramp & Simmons 1983).

Network of key sites

Five sites are known to have held over 35 birds in recent years: Khor Tiab in Iran (131 in January 2004), Barr Al Hikman in Oman (maximum 1,200 in January 1992), Tarut Bay in Saudi Arabia (maximum 108 in April 1991), and Khor Al Beidah (maximum 90) and Merawah Island (up to 600 on passage and 90 in winter) in the United Arab Emirates. Two other sites just outside the region covered by this Atlas have hosted over 1% of this population: Ghizri Creek near Karachi in Pakistan (70 in March 1981) and Charakla Saltworks in Gujarat, India (average of 40 in two winters in the 1980s). However, none of these seven sites regularly holds large numbers, and in the nine midwinter censuses from 1991 to 1999, the total count throughout the range of this population exceeded 100 individuals only in 1999 (356 individuals). This suggests either that the numbers reaching the Persian Gulf and western Arabian Sea fluctuate widely from year to year, or quite possibly, that, big wintering concentrations have yet to be discovered.

Protection status of key sites

None of the sites in Iran, Oman or Saudi Arabia is formally protected, although all five have been identified as IBAs, and Khor Tiab in Iran is within a large Ramsar site (Deltas of the Rud-i Shur, Rud-i Shirin and Rud-i Minab). The protection status of the two sites in India and Pakistan is unknown.

Table 54. Key sites for Great Knot. Sites where 1% or more of a population has been recorded

Country	Site	Lat.	Long.	Season	Max total	Year max	Average total	Basis for average	Source
Iran	Rud-i-Shur, Rud-i-Shirin and Rud-i-Minab Deltas	27.08	56.75	January	400	2004	180	2005-07 (3)	DOEI / WIWO
Oman	Barr al Hikman	20.63	58.47	Non-breeding	1200	1990			Evans, 1994
Saudi Arabia	Tarut Bay	26.67	50.17	Migration	108	1991			Evans, 1994
U.A.E.	Khor al Beidah	25.55	55.62	Non-breeding	90	1988-92	32	1993-99 (4)	IWC database
U.A.E	Merawah Island	24.33	53.25	Non-breeding	600	early 1990s	55	1994-96 (3)	Scott 1995

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Red Knot *Calidris canutus*

Geographical variation and distribution

The breeding distribution of the Red Knot is circumpolar but discontinuous in the high Arctic north from 60ºN. The nominate race breeds largely on the northern tundras of Siberia: on the Taymyr Peninsula and perhaps also in the Yakutsk region (Tomkovich 1992a, Tomkovich & Soloviev 1996). During northward and southward migration, it makes a stopover in the Wadden Sea *en route* to the wintering areas along the Atlantic coast of Africa from Mauritania to South Africa, with over 75% in the Banc d'Arguin in Mauritania (Piersma *et al.* 1992). The small numbers of Red Knots wintering and occurring on passage in the eastern Mediterranean and southern Black Sea may also be *canutus* using an overland route from Siberian breeding grounds, but this remains to be confirmed. Although birds breeding on the New Siberian Islands were previously thought likely to be African-wintering *canutus* (Tomkovich 1992a), it is now known that they all winter in north-western Australia (Lindström *et al.* 1999, Piersma & Baker 2000). Engelmoer & Roselaar (1998) found that they were different in size (much smaller) than *canutus* from Taymyr, and considered them to be either *rogersi* or a new subspecies. They have now been recognised as a separate subspecies, *C. c. piersmai* (Tomkovich 2001).

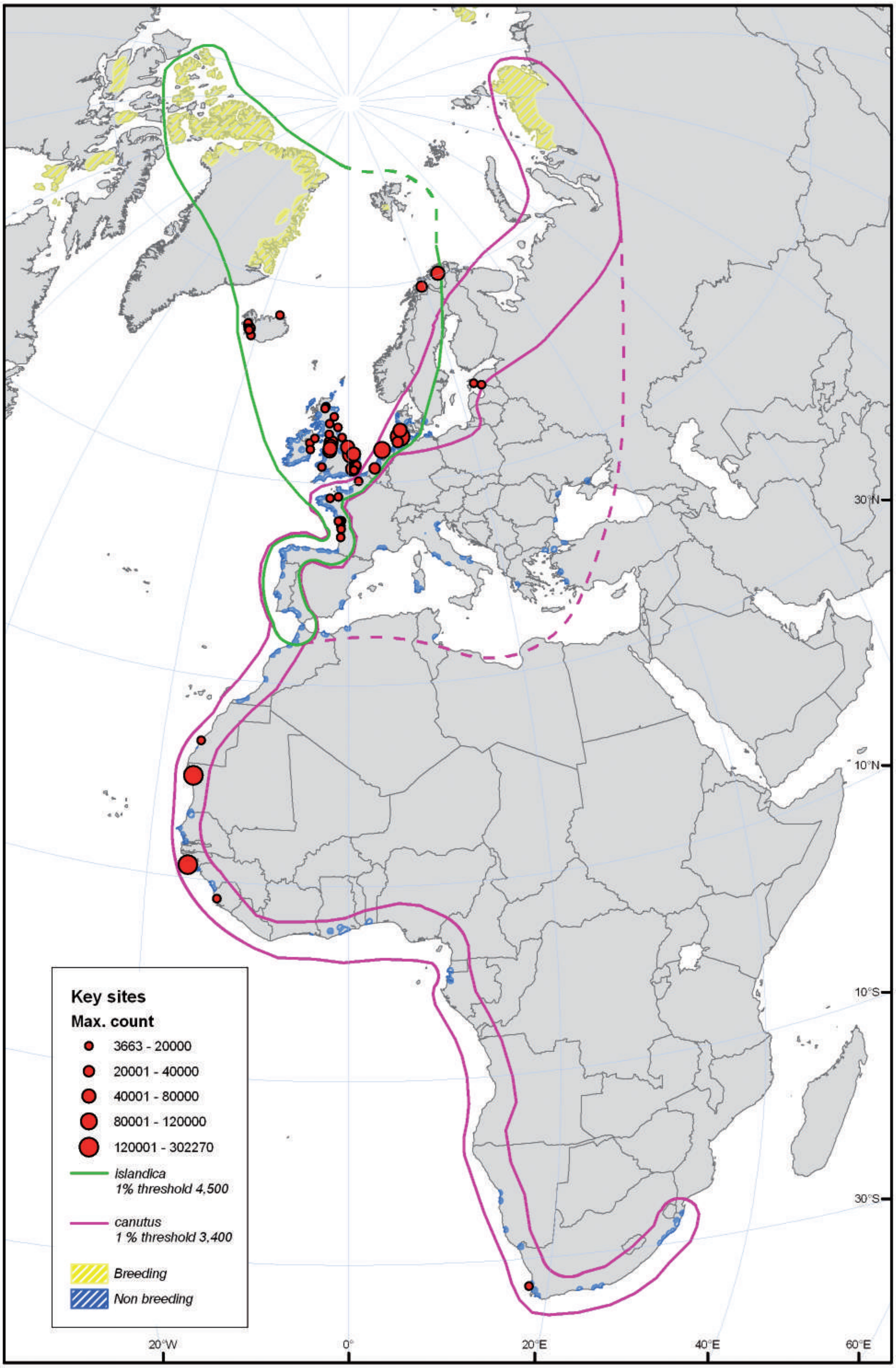
C. c. islandica breeds in northern Greenland and the Queen Elizabeth Islands of high Arctic Canada west to Prince Patrick Island, chiefly north of 75°N (Godfrey 1992). Part of this population breeds in Greenland, on the east coast north from 70°N and on the west coast north from about 75°N (Meltofte 1985). The racial affinity of the very small Svalbard breeding population is uncertain but is probably *islandica*. *C. c. islandica* migrates though western Iceland to overwinter in Western Europe, chiefly on the large estuaries of the southern North Sea and the British Isles, with 65% in the United Kingdom, although small numbers overwinter as far north as western Iceland (Wilson 1981). The return migration in spring is via northern Norway, where 15% make a stopover, and Iceland, which is used for staging by the remaining 85% (Davidson & Wilson 1992).

Outside the region included in this Atlas, *rogersi* breeds in the Chukotsky Peninsula and winters in Australasia, *roselaari* breeds on Wrangel Island and in north-western Alaska, and probably winters in Florida, *piersmai* breeds in the New Siberian Islands and winters in Australasia, and *rufa* breeds in the Canadian low Arctic and winters in South America. The small numbers of Red Knot that regularly winter in south-east India have been variously considered as either deriving from the Eastern Siberian subspecies *rogersi* (Balachandran 1998) or the Central Siberian *canutus* (Tomkovich 1992a).

Movements

The migration system of nominate *canutus* has been reviewed by Piersma *et al.* (1992). During the southward migration, most (possibly all) of the population stages in the Wadden Sea, perhaps after a non-stop flight from the breeding grounds, with adults occurring from late July and chiefly in August, and juveniles in September. Some birds appear to pause briefly in the Baltic, e.g. on the Polish coast (Gromadzka 1992, Meissner 1992). Birds are distributed throughout the Wadden Sea in autumn, where they occur simultaneously with many *islandica* Red Knots (Piersma *et al.* 1993), but there is some evidence of within-Wadden Sea geographical segregation of the populations (Meltofte *et al.* 1994). Remarkably, no birds (except juveniles in exceptional years) fly the short distance further west to stage in Britain (Boyd & Piersma 2001). Nominate *canutus* pause for 2-3 weeks to fatten up before departing mostly in mid- to late August on a probable non-stop flight to the West African wintering grounds (especially Banc d'Arguin). Some birds pass through Morocco in August and September. The timing of the arrival in West Africa is not known precisely, nor is it clear whether birds wintering in Guinea-Bissau fly direct or pause in Mauritania. Certainly those wintering in Southern

Red Knot
Calidris canutus



Africa, where both adults and juveniles start arriving only from late October, must stage and refuel either in West Africa or possibly in the Gulf of Guinea (Ntiamoa-Baidu 1993).

Spring migration northwards is well studied (Dick *et al.* 1987, Piersma *et al.* 1992, 1993). Red Knots leave Southern Africa in late April, undoubtedly staging *en route* to Europe, but in unknown areas. Birds leave Mauritania mostly in early May (Piersma *et al.* 1990). Most birds usually make a non-stop flight to the Wadden Sea where the whole population stops to store fat and protein for 2-3 weeks; most occur in the Schleswig-Holstein part of the Wadden Sea and are thus largely segregated from *islandica* Red Knots in a period of overlap in early May (Prokosch 1988, Piersma *et al.* 1993). Birds leave in very late May/early June for a probable non-stop flight across the Baltic and southern Scandinavia, although the regular passage of some thousands of Red Knots through the White Sea (Russia) in early June suggests that this area is used by at least part of the population as a final staging area. Birds arrive in the Taymyr in the second and third week of June (Tulp *et al.* 1998). Annually variable numbers of Red Knots occur on the coasts of Western Europe, notably the Atlantic coast of France (Bredin & Doumeret 1987), and also the Tejo Estuary (Portugal) and the Westerschelde (The Netherlands) during early May (Dick *et al.* 1987, Piersma 1994). These are considered emergency stopover sites when birds flying from West Africa to the Wadden Sea encounter headwinds, and have to pause to recover their condition for a few days before resuming their flight to the Wadden Sea (Piersma & van de Sant 1992). Such set-backs to their migration schedule may force birds to leave the Wadden Sea in a lower than optimal condition, with repercussions for the breeding success in that year (Piersma 1994).

Increasing evidence suggests a regular migration through the eastern Mediterranean and western Black Sea, involving small numbers of birds (perhaps no more than 1,000-2,000). Up to 500 Red Knots have been recorded in spring in Sivash Gulf, Ukraine (Chernichko *et al.* 1991). Birds also pass through there in autumn. Small numbers of Red Knots occur on passage on the Tyrrhenian coast of Italy, and these have been attributed on morphological grounds to nominate *canutus* (Baccetti *et al.* 1996). Red Knots are also regular passage migrants in small numbers through Turkey and Greece, and occasionally Egypt (Goodman & Meininger 1989). Spring staging appears more localised than autumn. Larger numbers occur in Tunisia in early spring than in winter, suggesting a passage population (van Dijk *et al.* 1986, van der Have *et al.* 1997). This implies a quite different migration route than the East Atlantic Flyway coastal routes used by the bulk of *canutus* and *islandica* birds: a Black Sea/ Mediterranean Flyway route overland to Siberian breeding grounds. Further investigation of the migration timing and numbers of birds involved is needed.

Although the migration system of *islandica* Red Knots is well studied, much detail remains uncertain (Davidson & Wilson 1992). Adults leave the breeding grounds from early July, with most departures occurring between mid-July and mid-August. Failed breeders and females whose eggs have hatched leave first. Recent evidence indicates that birds leave after storing sufficient fat for a non-stop flight across Greenland to western Iceland (R.I.G. Morrison pers. comm.). Almost all birds stage there for an average of 2-3 weeks to refuel (Wilson & Morrison 1992) before a non-stop flight to moulting areas in Britain and the Wadden Sea, where most adults arrive in July and August and juveniles in August and September (Meltofte 1993). Some (more juveniles than adults) pause in south-western Norway, Denmark and the south Baltic coast, and in some years, some birds may use emergency staging areas in northern parts of Britain. During the moult, birds concentrate in the Wadden Sea and a few large estuaries in Britain. From October to December, birds disperse to wintering grounds, many moving west from the Wadden Sea to Britain, and westwards in Britain from, for example, the Wash. There is also considerable movement between British and Irish estuaries during the winter (Davidson 2002).

In spring, many return eastwards to the Wadden Sea, particularly Schleswig-Holstein, during mid-late March, where 60-75% of the population begins to moult into breeding plumage and accumulates body stores (Prokosch 1988). The remainder remain on mostly British estuaries, congregating on the larger sites such as the Wash and Morecambe Bay, but numbers on the latter appear to have declined substantially since the 1970s. In the first two weeks of May, birds leave early spring sites (in the Wadden Sea mostly before the arrival of *canutus* from West Africa), and fly to two late spring staging areas, Iceland (chiefly the west coast) and northern Norway. Of 270,000 Red Knots counted during an aerial survey in Iceland in May 1990, 250,000 were on the west coast (Gudmunsson & Gardarsson 1993). Birds from many wintering sites mix on early spring staging areas and, likewise, birds staging in early spring in both the Wadden Sea and Britain mix on late spring sites. The arrival in Iceland and Norway is from late April, with most in the first and second weeks of May (Gudmundsson & Alerstam 1992, Strann 1992). Birds stage for about three weeks before departing on a largely non-stop flight to breeding grounds in the last week of May. Most birds arrive on the breeding grounds in early June (Meltofte 1985, Morrison & Davidson 1990). Two fjords (Balsfjord and Porsangerfjord) in Norway are used as staging sites, with 60,000-80,000 birds (c. 15% of the population) occurring there. There is considerable annual variation in distribution between the two fjords, with birds possibly using the more southerly Balsfjord more in years of heavy ice-cover in Porsangerfjord (Strann 1992).

Population limits

Two populations are recognised in Western Eurasia and Africa, both of which use the East Atlantic Flyway:

1) *C. c. canutus.* Birds breeding in Northern Siberia (Taymyr Peninsula), staging in the Wadden Sea, and wintering chiefly in coastal West Africa south to South Africa.
2) *C. c. islandica.* Birds breeding in north and east Greenland and northern Canada, and wintering in North-west Europe, chiefly the British Isles and southern North Sea south to Portugal, after moulting in Britain and the Wadden Sea and staging in Iceland (spring and autumn) and northern Norway (spring only).

These two populations are largely discrete on their wintering grounds, but both occur in the Baltic and Wadden Sea in autumn, and both move through the Wadden Sea in spring, but largely at different times and using different areas (Prokosch 1988, Meltofte *et al.* 1994). There remains uncertainty whether the small wintering population in northern Morocco is purely *canutus* (Cramp & Simmons 1983), or if there is some mixing with *islandica.* Stroud *et al.* (2004) included these birds (c. 800) in *islandica*, and this treatment is retained here The population affinities of the small numbers of Red Knots wintering in Mozambique (Vittery 1989) are not known, but they are probably nominate *canutus*.

The origins and migration routes of the small numbers of Red

Knot (probably less than 2,000) wintering in the southern Black Sea and eastern Mediterranean are unknown. For the present, these birds are included within the large population of nominate *canutus* rather than treated as a separate population, but further investigation is required. If these birds are found to comprise a discrete population, it would be one of the smallest and most vulnerable wader populations in Western Eurasia and Africa (Stroud *et al.* 2004).

Population size

1. *canutus*

Population estimate	1% threshold	Population trend
400,000	3,400	Possibly decreasing

Smit & Piersma (1989) gave a population estimate of 512,000 *canutus* Red Knots, and the actual population size in the early 1980s may have been higher. Although Smit & Piersma (1989) stated that their estimate included numbers wintering in both the main West African wintering areas and in Ghana, Namibia and South Africa, their tabulated total excluded these more southerly countries. Thus, 512,000 was probably a significant underestimate. Recent improved knowledge of numbers elsewhere on the Atlantic coast of Africa suggests that the early 1980s population may have exceeded 550,000 birds (Stroud *et al.* 2004).

Stroud *et al.* (2004) estimated that there were only about 340,000 *canutus* Red Knots in the mid-1990s, and concluded that a major decrease had occurred. Comprehensive counts in the remote main wintering areas in Mauritania and Guinea-Bissau since the 1980s have been infrequent, but major surveys in the Banc d'Arguin (Mauritania) and Archipélago dos Bijagos (Guinea-Bissau) in the 1990s (Salvig *et al.* 1994, Zwarts *et al.* 1998a, 1998b, Hagemeijer *et al.* 2004) indicated that there had been a 34% overall decrease since the mid-1980s. The decrease seems to have begun only in the 1990s, since Piersma *et al.* (1992) found no evidence of major population change on the wintering grounds from the mid-1970s to the mid-1980s. Numbers decreased from 364,000 to 255,000 in Mauritania (Hagemeijer *et al.* 2004), from 144,000 to 31,000 in Guinea-Bissau (Salvig *et al.* 1994), and from 2,500 to 300 in northern Morocco (Stroud *et al.* 2004). In Namibia and South Africa, numbers fell from 13,000 to 6,500, after an earlier long-term increase (Underhill 1997) and have fallen further in the 2000s (Summers *et al.* in prep). The estimate of 340,000 from Stroud *et al.* (2004) was adopted in *WPE3*, and the 1% threshold set at 3,400. Since then, however, there have been some very high counts in West Africa, including a total of almost 437,000 at just two sites (Banc d'Arguin and Bijagos Archipelago) in 2001, the first year that the two major West African sites were counted simultaneously (Dodman & Sá 2002). In recent compilations of data from West Africa, Dodman (2002) and Trolliet & Fouquet (2004) have concluded that there may still be as many as 500,000 birds in this population, although a more conservative estimate of 400,000 was adopted in *WPE4*. It has been suggested that the recent high counts are more likely to reflect better coverage of the wintering sites than any real increase in numbers (Wetlands International 2006), and as the population trend is still apparently decreasing in the European staging areas (T. Piersma *in litt.*), the 1% threshold of 3,400 from *WPE3* was retained in *WPE4*.

Estimates of densities on the breeding grounds in the Taymyr Peninsula can account for only about half of the wintering population (Tomkovich & Soloviev 1996).

2. *islandica*

Population estimate	1% threshold	Population trend
450,000	4,500	Decreasing

Since *islandica* Red Knots are concentrated in midwinter on major estuaries in Western Europe, count coverage of this population is very good. There was a major population decline from perhaps as many as 609,000 in the early 1970s (Prater 1976) to 345,000 in the early 1980s (Smit & Piersma 1989). This seems to have been a consequence primarily of severe Arctic weather in three summers in the 1970s that led to major adult mortality as well as breeding failures (Boyd 1992). Between the late 1970s and early 1990s, there was a steady recovery in population size, notably in the U.K. - the centre of this wintering population (Prŷs-Jones *et al.* 1994, Cranswick *et al.* 1999) and in France (Deceuninck & Maheo 2000). During the 1990s, the population size appears to have levelled off in these major wintering areas (Cranswick *et al.* 1999), but then a decrease was recorded (Pollitt *et al.* 2003). The increase continued in France, however, and by 2006 there were 45,000 Red Knots wintering in France (B. Trolliet *in litt.*) There may have been a redistribution of the population towards the British North Sea coast and France and away from western Britain, Ireland, the Wadden Sea and The Netherlands (T. Piersma & J. van der Meer *in litt.*). The population estimate of 450,000 for the mid-1990s (Stroud *et al.* 2004) agrees with the view of Meltofte *et al.* (1994), based on late 1980s spring and autumn numbers in the Wadden Sea, that the population had increased to 400,000-500,000 birds. This estimate of 450,000 was adopted in *WPE3* and retained in *WPE4,* although numbers may have decreased to below 400,000 by the early 2000s.

In the mid-1990s, the bulk of the wintering population was in the U.K. (average 292,000 birds; 65% of the population), with a further 90,000 (20%) wintering in The Netherlands, 27,000 (6%) in France, 25,000 (5.5%) in Ireland, and much smaller numbers elsewhere in the Wadden Sea, Belgium, Spain and Portugal (Stroud *et al.* 2004). Numbers staying to overwinter in The Netherlands and elsewhere in the Wadden Sea vary annually depending on the severity of winter weather, with evidence of birds moving west into Britain and Ireland in severe winters. Although between the 1970s and 1980s the population decline was most marked in the periphery of the range, overall the national distribution of *islandica* Red Knots in the mid-1990s was very similar to that of the early 1980s, with wintering numbers having increased in most wintering areas except Ireland.

Estimates of densities on the breeding grounds in Greenland and the northern Queen Elizabeth Islands, Canada, from a broad time period (chiefly 1960s to late 1980s) gave an estimated 304,000 birds in the autumn population (Whitfield *et al.* 1996). This is fairly close to the estimate of the wintering population at that time (345,000 in the early 1980s; Smit & Piersma 1989). However, recent estimates from the breeding grounds in Greenland and Canada fall far short of the estimates based on winter counts. Thorup (2006) gave estimates of 41,000 pairs in Canada and 15,000-30,000 pairs in Greenland, which would equate to only some 170,000-210,000 birds, while Morrison *et al.* (2001, 2006) gave an estimate of 80,000 for the total number of breeding birds in Canada.

Conservation status

Red Knots, more than many other waders, are dependent on relatively few major estuaries and bays between which they make long non-stop flights which require considerable and rapid accumulation of nutrient and fuel stores. This makes them particularly vulnerable to damaging change at these vital places (Piersma & Davidson 1992, Piersma & Baker 2000). Of paramount significance is the Wadden Sea, which supports up to 75% of *islandica* in spring, and probably the whole *canutus* population in spring and autumn. Nominate *canutus* is also particularly dependent (c. 77% of the population) on the Banc d'Arguin in winter.

The causes of the apparent population decrease in *canutus* are unclear. There is no clear evidence of major changes in habitat or food supply on the main West African wintering areas and the recent population trends of other waders with wintering populations largely on West African coasts are not consistent. There are increases in Curlew Sandpiper *Calidris ferruginea* and Dunlin *C. alpina schinzii*; but a decrease in the other species (Bar-tailed Godwit *Limosa lapponica*) which, like *canutus* Red Knots, depends heavily on the shellfish resources of the Wadden Sea during stopovers on southward and northward migration (Zwarts *et al.* 1998, Piersma & Baker 2000). Although, as with other high Arctic breeding waders, there are annual variations in breeding productivity associated with weather conditions and abundance of lemmings and their predators (Underhill *et al.* 1989), there is no recent evidence of consistently low breeding productivity or of major adult mortality on the breeding grounds, as led to the 1970s decline in *islandica* Red Knots. There have, however, been recent major changes in sediment type and inter-tidal macrobenthos in the Wadden Sea, attributed by Piersma & Koolhaas (1997) to the effects of an increasingly intensive mechanical shellfish industry. This may have led to changes in the way birds use the Wadden Sea, and to a major decrease in numbers (Piersma & Baker 2000). Mechanical shell-fishing was banned in the Wadden Sea in September 2004, and there is now a risk that harvesting activities will move to sub-tidal and inter-tidal areas elsewhere along the flyway, notably West Africa.

The small numbers of *canutus* wintering in the eastern Mediterranean occur on only a few deltas and other coastal wetlands and, if this proves to be a discrete population, it is one of the smallest wader populations in Western Eurasia and Africa, and so may be particularly vulnerable to any continuing habitat loss or deterioration in this region.

The steady increase in *islandica* numbers until the early 1990s is consistent with a recovery after the disastrous breeding years in the 1970s, but it is not clear why the population size appeared to level off at only about 70% of the early 1970s numbers. This may have been a consequence of progressive land-claim and/or a deterioration in habitat quality on Western European estuaries, with perhaps the changes in habitat and food supply on the Wadden Sea (Piersma & Koolhaas 1997) having a restricting effect also on this population. An analysis of IWC data shows a peak in 1992 followed by decline through the 1990s to a low point in 2002. For this reason, Stroud *et al.* (2004) gave the trend as “strong decrease”. The national trend in Britain has shown signs of recovery since 2000 (Banks *et al.* 2006), but numbers in the Dutch Wadden Sea have continued to decline (van Roomen *et al.* 2006). Van Gils *et al.* (2006) attribute this decline to decreased survival as a consequence of prey depletion caused by industrial shellfisheries. There have been some local increases. An increase in France in the early 1990s was attributed to better conditions in the main wintering sites since their designation as nature reserves (Deceuninck & Mahéo 2000) and numbers in the Dutch Delta region have increased steadily since the 1980s (van Roomen *et al.* 2006).

Changes such as land-claim, barrage construction and rising relative sea-levels that lead to narrowed shore width, changes in sediments that reduce food supply, and increased human disturbance to such areas pose a particular threat to the Red Knot. Disturbance on both feeding and roosting sites is known to cause Red Knots to change location, with increased energy costs of long flights between roosts and feeding areas (Davidson & Rothwell 1993). Many Red Knots need to use emergency staging sites if they encounter adverse weather on their long migrations, and a number of such places are known, notably on the spring route of *canutus* from West Africa to the Wadden Sea. Recent evidence has stressed the critical importance of late spring staging areas for adult survival (Atkinson *et al.* 2007; Morrison *et al.* 2007).

The effects of global climate change may have a number of impacts in addition to the loss of non-breeding feeding grounds through sea-level rise (Lindström & Agrell 1999, Meltofte *et al.* 2007). The predicted changes in weather patterns and increased storminess will increase the need for emergency stopover sites if adverse headwinds increase in frequency and could prevent birds reaching the Arctic in sufficiently good condition to breed successfully. The predicted warming of the Arctic will shrink the area of high Arctic tundra, so limiting the habitat suitable for breeding populations (Lindström & Agrell 1999). Red Knots are known to be vulnerable to reduction in breeding grounds, with molecular genetics indicating only very small populations at the height of previous ice-ages (Baker *et al.* 1994). The Red Knot may be a key indicator species for early warning of the impacts of climate change on migratory Arctic birds.

Habitat and ecology

Red Knots breed at low density, only on high Arctic dry tundras, and feed mostly on spiders and small insects and, in the first weeks after arrival, sometimes on plant material and insect larvae (Cramp & Simmons 1983, T. Piersma & J. Rydell *in litt.*). Nests are extremely well camouflaged on very sparsely vegetated rocky slopes. The sexes share incubation, but most females leave when the eggs hatch, with chicks guarded to fledging by males only (Whitfield & Brade 1991, Tulp *et al.* 1998). Outside the breeding season, Red Knots are wholly coastal, staging and wintering on large bays and estuaries where they feed in large, dense flocks on extensive areas of firm sandy mud, and to a lesser extent on weed-covered rocky shores and outcrops, notably when staging in Iceland and Norway (Piersma 1994, N. Davidson *in litt.*). Red Knots are mollusc specialists (Piersma *et al.* 1998), in Europe feeding chiefly on Baltic Tellins *Macoma balthica*, small Blue Mussels *Mytilus edulis*, small Cockles *Cerastoderma edulis* and, especially in early winter, the mud-snail *Hydrobia ulvae* (Zwarts *et al.* 1992, Piersma *et al.* 1993, 1994). In West Africa, they mostly feed on small buried bivalves (T. Piersma unpubl. obs.). Periwinkles *Littorina* spp. form a large part of the diet in Iceland (Alerstam *et al.* 1992). Red Knots sometimes fly many kilometres from feeding to roosting sites, which are usually undisturbed shorelines and high sand spits, and sometimes adjacent fields and lagoons, where they gather in flocks of often many thousands (Piersma *et al.* 1993).

Locations of the complete post-breeding moult and the partial pre-breeding (contour feather) moult vary between subspecies (Piersma & Davidson 1992). Nominate *canutus* undergo a complete moult after they have reached their West African wintering areas, where they begin the partial spring moult as early as March, suspending and completing this on the Wadden Sea before departure in early June (Prokosch

1988, Piersma *et al.* 1992). *C.c. islandica* moults in autumn on the Wadden Sea and large British estuaries before moving to its wintering grounds (Davidson & Wilson 1992). In spring, moult starts on early spring staging areas before being completed in Iceland and Norway in May.

Network of key sites

Thirty-nine key wintering sites have been identified for the *islandica* population in Britain (23), Ireland (2), The Netherlands (2) and western France (10), the most important numerically being The Wash and the Humber Estuary in eastern England, and the Dee Estuary, the Ribble Estuary and Morecambe Bay in western England; each of these at times supports over 10% of the wintering population. Seven major staging areas for this population are known in Iceland, the two most important being Hvalfjordur (with up to 23,500 birds) and Löngufjörur (up to 12,000). Two key sites in northern Norway are utilised only during the spring migration: Porsanger Fjord (with up to 60,000 birds) and Sørkjosen in Balsfjord (with up to 28,000). Many of the key wintering sites in the southern part of the range are also key staging areas important in spring and/or autumn.

There are at least five key wintering sites for *canutus* on the Atlantic coast of Africa: Baie d'Ad Dahkla in Morocco, Banc d'Arguin in Mauritania, Bijagos Archipelago in Guinea-Bissau, Yawri Bay in Sierra Leone, and Langebaan Lagoon in South Africa, but numbers of birds at Langebaan Lagoon have been much lower in the 2000s. Several parts of the Wadden Sea (notably in Schleswig-Holstein) are key sites in their own right for the staging population, and the Wadden Sea as a whole is of vital importance for this population, at times holding almost the entire population. Key sites for emergency spring staging are Tejo Estuary in Portugal, the French coast between the Loire and Gironde, and the Westerschelde in The Netherlands, but other such areas may be vital in different years. The White Sea in Russia may also be of international importance as a late spring staging area for the *canutus* population.

Since Red Knots breed at low density over extensive areas of the high Arctic, the key site approach is not readily applicable to their breeding grounds. However, highest density breeding sites (which may be an indication of important core breeding areas) have been identified for *islandica* Red Knots from the Blue Mountains, Borup Fjord and Fosheim Peninsula in north-western Ellesmere Island, Canada, and the southern half of north-eastern Greenland, where breeding densities may reach 1-2 pairs per sq.km (H. Meltofte *in litt.*).

Protection status of key sites

Davidson & Piersma (1992) assessed the coverage of the West Eurasian-African Red Knot populations in protected sites of international importance (notably Ramsar sites and EU Special Protection Areas), and concluded that almost all *islandica* and most *canutus* occur on protected sites (or those proposed for protection) from late autumn to early spring. There is, however, only partial protection of staging sites used in spring and autumn in Norway and Iceland, and some key West African sites remain unprotected. The majority of breeding Red Knots nesting in high Arctic Greenland are within the National Park, but their dispersed, low-density breeding means that although some large areas of the Arctic breeding grounds of Red Knot have protected status, the proportion of the breeding population so covered is probably small.

Table 55. Key sites for Red Knot. Sites where 1% or more of a population has been recorded

Country	Site	Lat.	Long.	Season total	Max max	Year	Average total	Basis for average at site	Source	Population(s)
Denmark	Wadden Sea	55.16	8.58	Spring	66796	2003	43722	2000-04 (3)	NERI, Denmark, 2005	*islandica* + *canutus*
Estonia	Väike Väin Strait	58.56	23.14	May	4000	1998			University of Life Sciences database	*canutus*
Estonia	Pikla	58.17	24.46		3900	2004			Kabli Bird Station database	*canutus*
France	Baie de l'Aiguillon et Pointe d'Arçay	46.32	-1.17	Non-breeding	10360	1996	4521	1999-04 (5)	R. Maheo, LPO *et al.* 2005	*islandica* + *canutus*
France	Baie de St-Brieuc-Yffiniac-Morieux	48.54	-2.73	Non-breeding	5300	1990	2888	1999-04 (5)	R. Maheo, LPO *et al.* 2005	*islandica* + *canutus*
France	Baie du Mont Saint Michel	48.67	-1.51	Non-breeding	11000	1994	5123	1999-04 (5)	R. Maheo, LPO *et al.* 2005	*islandica* + *canutus*
France	Bassin d'Arcachon et Banc d'Arguin	44.67	-1.12	Migration	10000	2003			WBDB	*islandica* + *canutus*
France	Ile d'Oléron, marais de Brouage-Saint-Agnant	45.77	-1.14	Non-breeding	10000	1999			WBDB	*islandica* + *canutus*
France	Littoral Picard	50.23	1.50	Non-breeding	8070	1996	113	1999-04 (5)	R. Maheo, LPO *et al.* 2005	*islandica* + *canutus*
France	Marais du Nord Medoc	45.49	-1.04	Non-breeding	6300	2002	2030	1999-04 (5)	R. Maheo, LPO *et al.* 2005	*islandica* + *canutus*
France	Marais littoraux de Charente-Maritime, dont R.N. d'Yves	46.24	-1.48	Non-breeding	5000	2004	3116	1999-04 (5)	R. Maheo, LPO *et al.* 2005	*islandica* + *canutus*
France	Marais poitevin et baie de l'Aiguillon	46.33	-1.00	Migration	20000	2003			WBDB	*islandica* + *canutus*
France	Résèrve Naturelle de Moeze (Charente-Seudre)	45.83	-1.14	Non-breeding	14900	1998	11319	1999-04 (5)	R. Maheo, LPO *et al.* 2005	*islandica* + *canutus*

Country	Site	Lat.	Long.	Season total	Max max	Year total	Average	Basis for average	Source	Population(s) at site
Germany	Wadden Sea - Lower Saxony	54.00	8.00	Spring	26981	1994	12614	1998-02 (5)	J . Blew, CWSS, 2005	*islandica + canutus*
Germany	Wadden Sea - Schleswig-Holstein	54.50	8.50	Spring	302270	1992	151100	1998-02 (5)	J . Blew, CWSS, 2005	*islandica + canutus*
Guinea-Bissau	Bijagos Archipelago	11.30	-16.00	January	133000	2001	69300	1992-2001 (3)	Dodman & Sa 2005	*canutus*
Iceland	Álftafjördur-Hofsstadavogur	65.00	-22.67	Migration	9000	1990			WBDB	*islandica*
Iceland	Álftanes-Akrar	64.52	-22.25	Migration	8574	1990			WBDB	*islandica*
Iceland	Hvalfjordur	64.53	-21.92	May	23500	1990			G.A. Gudmundsson, *in litt.*	*islandica*
Iceland	Innstavogsnes-Grunnafjördur	64.37	-21.92	Migration	6800	1990			WBDB	*islandica*
Iceland	Löngufjörur	64.75	-22.50	Migration	12000	1990			WBDB	*islandica*
Iceland	Melrakkaslétta	66.48	-16.25	Migration	7280	1990			WBDB	*islandica*
Iceland	Stokkseyri-Eyrarbakki	63.87	-21.12	Migration	7600	1990			WBDB	*islandica*
Ireland	Dublin Bay	53.34	-6.17	Non-breeding	5375	2003	3440	1999-04 (5)	BirdWatch Ireland, 2005	*islandica*
Ireland	Dundalk Bay	53.95	-6.33	Non-breeding	15545	1995	7081	1999-04 (5)	BirdWatch Ireland, 2005	*islandica*
Mauritania	Banc d'Arguin	20.12	-16.27	January	255700	2000	263000	1997-01 (3)	Hagemeijer *et al.* 2004	*canutus*
Morocco	Baie D'Ad Dakhla	23.66	-15.87	Non-breeding	8400	1995	4386	1993-95 (2)	IWC database	*canutus*
Netherlands	Rhine-Maas-Schelde Delta	51.50	4.00	Winter	28880	2000	25709	1999-03 (5)	RWS WD RIKZ 2005	*islandica + canutus*
Netherlands	Wadden Sea	53.30	5.38	Autumn	119628	1998	67289	1999-03 (5)	SOVON, The Netherlands, 2005	*islandica + canutus*
Norway	Inner part of Porsanger fjord	70.17	24.67	Migration	60000	1989			WBDB	*islandica*
Norway	Sørkjosen	69.25	19.25	Migration	28000	1998			WBDB	*islandica*
Sierra Leone	Yawri Bay	8.20	-12.92	Non-breeding	5000	1994			AfWC database	*canutus*
Souh Africa	West Coast National Park	-33.15	18.08	Non-breeding	2000	2007			A.J. Tree *in litt.*	*canutus*
U.K.	Alt Estuary	53.52	-3.05	Non-breeding	44012	1999-03	29636	1999-03 (5)	BTO, UK, 2005	*islandica*
U.K.	Blackwater Estuary	51.72	0.80	January	5982	1999-03	3389	1999-03 (5)	BTO, UK, 2005	*islandica*
U.K.	Burry Inlet	51.64	-4.17	Non-breeding	4800	1999-03	3532	1999-03 (5)	BTO, UK, 2005	*islandica*
U.K.	Cromarty Firth	57.72	-4.05	January	5050	2001	3464	1999-03 (5)	BTO, UK, 2005	*islandica*
U.K.	Dee Estuary	53.27	-3.10	January	52792	1999-03	26397	1999-03 (5)	BTO, UK, 2005	*islandica*
U.K.	Dengie Flats	51.68	0.93	Non-breeding	19400	1999-03	9934	1999-03 (5)	BTO, UK, 2005	*islandica*
U.K.	Forth Estuary	56.00	-3.27	Non-breeding	8936	1999-03	6330	1999-03 (5)	BTO, UK, 2005	*islandica*
U.K.	Hamford Water & the Naze	51.88	1.23	Non- breeding	5431	1999-03	3601	1999-03 (5)	BTO, UK, 2005	*islandica*
U.K.	Humber Estuary	53.67	-0.17	Non-breeding	49991	1999-03	30072	1999-03 (5)	BTO, UK, 2005	*islandica*
U.K.	Inner Moray and Inverness Firth	57.53	-4.20	Non-breeding	3663	1999-03	2828	1999-03 (5)	BTO, UK, 2005	*islandica*
U.K.	Lindisfarne	55.67	-1.82	Non-breeding	6751	1998-03	3807	1999-03 (5)	BTO, UK, 2005	*islandica*
U.K.	Medway Estuary	51.40	0.65	Winter	5055	1998-02	2855	1998-02 (5)	BTO, UK, 2005	*islandica*
U.K.	Montrose Basin	56.71	-2.49	Non-breeding	5800	1999-03	3597	1999-03 (5)	BTO, UK, 2005	*islandica*
U.K.	Morecambe Bay	54.12	-2.93	Non-breeding	72908	1999-03	65679	1999-03 (5)	BTO, UK, 2005	*islandica*
U.K.	North Norfolk Coast	52.98	0.76	Autumn	40832	1999-03	33154	1999-03 (5)	BTO, UK, 2005	*islandica*
U.K.	Ribble Estuary	53.72	-2.92	Spring	54300	1997-02	37192	1997-02 (5)	BTO, UK, 2005	*islandica*
U.K.	Solway Estuary	54.93	-3.30	Non-breeding	9620	1999-03	7811	1999-03 (5)	BTO, UK, 2005	*islandica*
U.K.	Stour Estuary	51.93	1.15	January	9677	1999-03	5890	1999-03 (5)	BTO, UK, 2005	*islandica*
U.K.	Strangford Lough	54.45	-5.60	Non-breeding	5863	1999-03	4193	1999-03 (5)	BTO, UK, 2005	*islandica*
U.K.	Swale Estuary	51.35	0.83	Non-breeding	4200	1999-03	3000	1999-03 (5)	BTO, UK, 2005	*islandica*
U.K.	Tees Estuary	54.63	-1.13	Non-breeding	4416	1999-03	2812	1999-03 (5)	BTO, UK, 2005	*islandica*
U.K.	Thames Estuary	51.48	0.57	Non-breeding	43873	1999-03	31931	1997-03 (5)	BTO, UK, 2005	*islandica*
U.K.	The Wash	52.93	0.30	Non-breeding	80452	1999-03	62823	1999-03 (5)	BTO, UK, 2005	*islandica*

Tim Zuroski

Sanderling *Calidris alba*

Geographical variation and distribution

The Sanderling has a disjunct circumpolar breeding range across the high Arctic. It is one of the most northerly of all Arctic-breeding waders, occurring along the north coast of Alaska, on the Arctic islands of northern Canada, in East and North-east Greenland, northern Svalbard and Franz Joseph Land, and in Arctic Siberia in the Taymyr Peninsula, Severnaya Zemlya and Novosibirskye (New Siberian) Archipelago (Engelmoer & Roselaar 1998, Lappo 1998). Reports of breeding in the Lena Delta have not been confirmed by recent studies (Lappo 1998).

It winters widely along sea coasts in Western Europe from Ireland, Britain and the North Sea southwards, in Africa south to South Africa and Madagascar, in the Middle East, Indian subcontinent, southern China and South-east Asia, in Australia, New Zealand and the South Pacific islands, and in North and South America from central California and the Gulf Coast south to southern Chile and Argentina.

Engelmoer & Roselaar (1998) reviewed the taxonomy of the Sanderling based on morphometric data and plumage characters of birds from all breeding areas. They concluded that there is strong evidence for two subspecies:

- *C. a. alba* – breeding in East and North-east Greenland, Jan Mayen, Svalbard, Franz Joseph Land and Taymyr;
- *C. a. rubidus* – breeding in northern Canada and Alaska, and possibly also in the delta of the Lena River and New Siberian Islands.

The birds occurring on passage and in winter in Western Eurasia and Africa belong to the nominate form *alba*. The subspecific status of the birds breeding on Ellesmere and Axel Heiberg Island in north-eastern Canada is unclear (Engelmoer & Roselaar 1998), but an adult male with a leg flag fitted on Ellesmere Island in June 2007 spent the winter of 2007-2008 on a beach in Brittany, France, suggesting that they are nominate *alba* (Reneerkens *et al.* 2008).

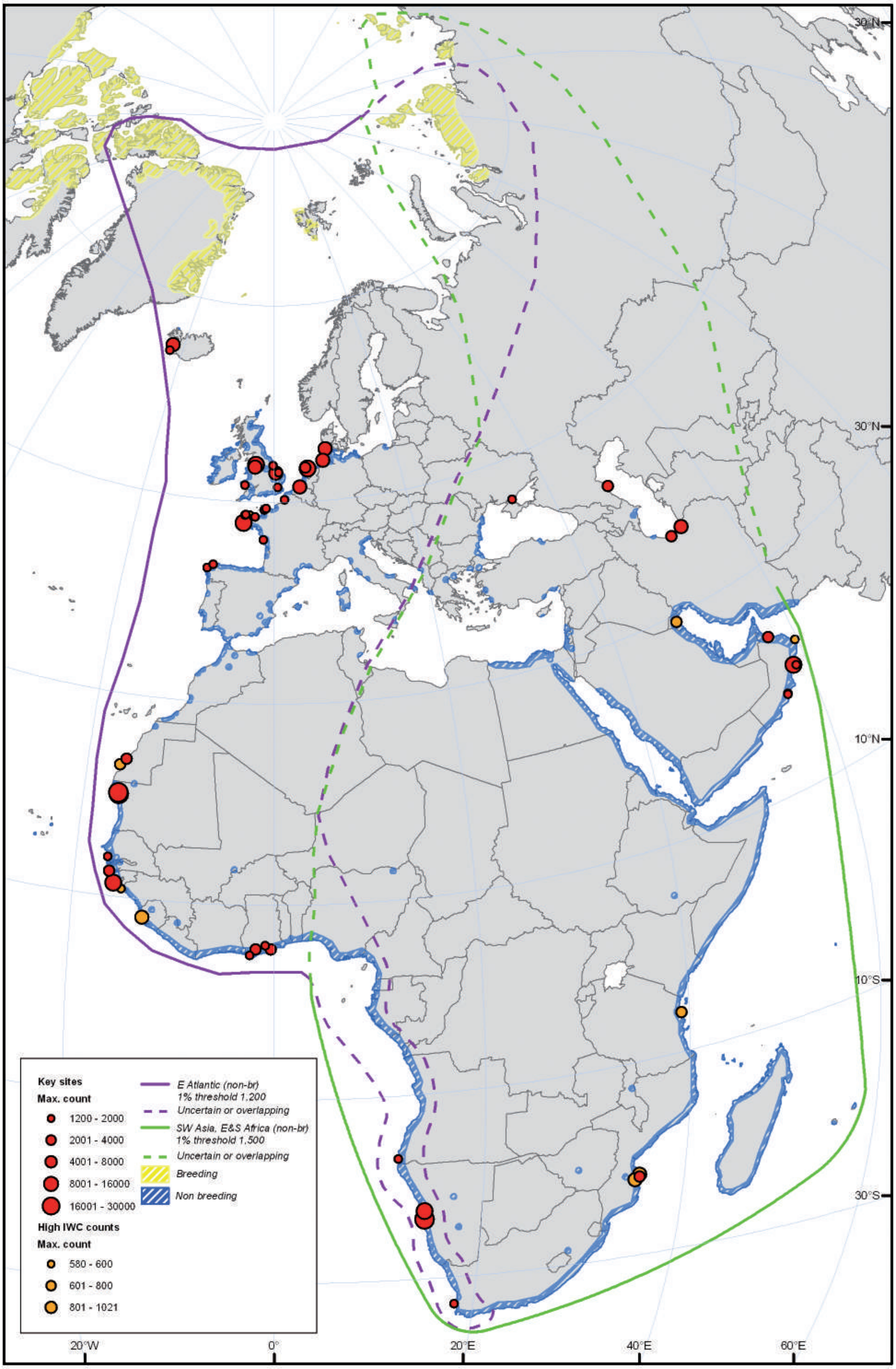
Movements

The Sanderling is a long-distance migrant, and virtually cosmopolitan outside the breeding season. The paucity of ringing recoveries from known breeding grounds means that there is still considerable uncertainty about the migration strategies of this species (Langston 2002). Birds of the nominate form breeding in North-east Greenland migrate south-east across the North Atlantic to North-west Europe, as far east as western Norway and western Denmark. The majority of these birds apparently then follow the Atlantic coast of Europe southwards to wintering areas in West Africa. Large numbers of breeders from north-eastern Greenland stage in Iceland in spring and autumn. Numbers are highest on spring passage, when up to a quarter of the population may be involved (Gudmundsson & Lindström 1992). Many ringing recoveries and sightings of colour-ringed birds indicate that substantial numbers of these birds spend the winter in Britain and Ireland. However, it seems that the bulk of the North-east Greenland population only stages in Britain and Ireland for some weeks before continuing on to winter quarters in Africa (Smit & Piersma 1989, Gudmundsson & Lindström 1992). There have been recoveries as far south as Ghana, of birds ringed in Iceland and it has been speculated that some birds continue on to South Africa (Gudmundsson & Lindström 1992). A ringing recovery between Iceland and Namibia supports this idea (Icelandic Institute of Natural History unpubl. data). The average departure direction of birds leaving Iceland in spring suggests that they are heading for breeding grounds in North-east Greenland, and there are no indications that Sanderlings staging in Iceland migrate across the Greenland ice-cap towards North-west Greenland and north-eastern Canada (Gudmundsson & Lindström 1992).

The westernmost breeding populations in Siberia migrate south-west along the Atlantic seaboard to winter in Western Europe and on the west coast of Africa possibly as far south as South Africa. There are some indications that many of the Siberian birds moult their flight feathers in North-west Europe and subsequently winter there (Smit & Piersma 1989), whilst

Sanderling

Calidris alba



most birds from North-east Greenland continue south to winter in West Africa. However, it seems that there is almost total overlap in the winter ranges of these two breeding groups. Recoveries of birds ringed at the Wash in the U.K. range from East Greenland and the Lena Delta in the north to the extreme southern tip of Africa in Cape Province (Smit & Piersma 1989).

Birds breeding in Central Siberia are believed to migrate overland via the Caspian Sea, Black Sea and eastern Mediterranean to winter from the Red Sea and Persian Gulf south along the East African coast to Madagascar and South Africa. Large numbers pass through the south-east Caspian region in Iran in May and again in August-October (Scott 1995), and there is a strong autumn passage of birds at Agrakhan Peninsula on the north-west coast of the Caspian in Russia (Shubin 1998). There is also a good spring passage through the Black Sea, although apparently few birds occur there in autumn. Concentrations of 1,300-1,700 have been recorded in spring at Sivash Gulf on the Sea of Azov (Chernichko *et al.* 1991).

The large numbers of birds wintering in Southern Africa are believed to be mostly of Siberian origin, although some birds from Greenland also penetrate this far south (Underhill 1997, Underhill *et al.* 1999). Most recoveries of birds ringed in South Africa suggest Siberian origin, and there have been three recoveries on the breeding grounds in the Taymyr Peninsula, but there have also been five recoveries in Southern Africa of birds ringed in Iceland and presumably of Greenland origin (Underhill *et al.* 1999). Recoveries of birds ringed in Southern Africa along the migration routes show a remarkable longitudinal spread (3ºW to 50ºE), from the Bay of Biscay to the Caspian Sea (Underhill 1997). Recoveries in spring have come from the North Sea area, the Mediterranean and the Caspian, and in autumn from the Black Sea and Caspian Sea (Argyle 1976, Urban *et al.* 1986, Smit & Piersma 1989). Underhill (1997) concluded that Sanderlings wintering in Southern Africa used two main migration routes. The likely western route (northbound) is along the west coast of Africa to the Gulf of Guinea, across the Sahara and the Mediterranean to refuel at wetlands in the North Sea, and on via the Baltic Sea and western Russia to Siberia. The eastern route (southbound) is thought to cross South-west Asia to the Caspian Sea and Black Sea, and then probably follows the east coast of Africa to South Africa. Ringing recoveries suggest that the western route is used on both the northward and the southward migrations, and the eastern route is used mainly on the southward migration. This suggests that some birds undertake a loop migration, using the eastern route southwards, and the western route northwards (Underhill 1997). An increase in the reporting rates of Sanderlings on the coast of Namibia in the austral late summer and autumn adds some support to the hypothesis of loop migration. Sanderlings are rare to uncommon inland in Africa, occurring from southern Sudan, Ethiopia and East Africa through Zambia and Malawi to Namibia and South Africa (Urban *et al.* 1986, Underhill 1997). Most of the inland records are between August and November, suggesting that some birds cross overland from the Indian Ocean coast to the Atlantic coast of south-western Africa (Urban *et al.* 1986).

Adult Sanderlings begin to leave the breeding grounds in mid-July, and by mid-August, nearly all of the adults have departed. Juveniles leave in late August and early September. The main arrival of adults in West and Eastern Africa occurs in late August and September, while birds reach Southern Africa in September and October. Young birds arrive in Eastern Africa in September and October, and in Southern Africa between late October and December. The northward migration begins in late March and continues until early June. The main departure from Southern and Eastern Africa takes place in late April and early May (Urban *et al.* 1986), and the main spring passage through Iceland takes place between mid-May and the beginning of June (Gudmundsson & Lindström 1992). The birds arrive back on their breeding grounds in late May or early June, usually in small flocks.

Population limits

Waterbird Population Estimates recognises two populations of the Sanderling in Western Eurasia and Africa:

1) birds wintering mainly on the Atlantic coast of Western Europe and Africa;
2) birds wintering mainly in the Arabian Peninsula and on the Indian Ocean coast of Africa.

Because of the extensive mixing of birds from Greenland with birds of Siberian origin in Western Europe and West Africa, Smit & Piersma (1989) combined all Sanderlings wintering in North-west Europe and along the west coast of Africa into a single East Atlantic population. This treatment was adopted in *Waterbird Population Estimates* and supported by Stroud *et al.* (2004).

Sanderlings passing through the Caspian and Black Sea regions to winter in South-west Asia and along the Indian Ocean coast of Africa are treated as a separate population, following Perennou *et al.* (1994). However, it is apparent that there is considerable overlap between these two populations in Southern Africa, and their validity as separate populations is questionable (Scott 2002). Birds wintering on the west coast of Southern Africa are especially problematic. Smit & Piersma (1989) included them within their East Atlantic Flyway population, while Perennou *et al.* (1994) included them within their South-west Asia and Eastern Africa population. As indicated above, there is good evidence for a loop migration in Africa, with many birds of Siberian origin reaching Southern Africa via the Indian Ocean coast, and returning northwards via the Atlantic coast to the Gulf of Guinea and then crossing overland to the Mediterranean and Black Sea (Cramp & Simmons 1983, Underhill 1997). There is also some evidence of an overland passage from the Indian Ocean coast to the Atlantic coast of Southern Africa. Although some birds in the East Atlantic Flyway undoubtedly reach Southern Africa, the numbers appear to be relatively small, and it would seem more appropriate to include all the birds wintering in Southern Africa in the eastern population. Only when better information becomes available on the normal southern limit of birds using the East Atlantic Flyway will this issue be resolved.

Sanderlings wintering along the south-east coast of Iran and in Pakistan and western India are currently treated as a separate "South Asian" population following Perennou *et al.* (1994), although it is doubtful if there is any real division between these birds and those wintering in the Persian Gulf and Arabian Peninsula.

Population size

1. *alba* East Atlantic (non-breeding)

Population estimate	1% threshold	Population trend
120,000	1,200	Stable or possibly increasing

Smit & Piersma (1989) gave a wintering estimate of 123,000, including 26,600 on the Atlantic coast of Western Europe, 600 in the western Mediterranean, 43,000 in West Africa, and the remainder (about 53,000) in Southern Africa. The 1990s estimate of 123,000 given by Stroud *et al.* (2004) and adopted in *WPE3* and *WPE4* includes 41,600 on the Atlantic coast of Western Europe, 3,700 in the western Mediterranean and 77,800 in West Africa, but does not include any birds wintering in Southern Africa which are now considered to belong to the South-west Asia, Eastern and Southern Africa population. Recalculating the 1980s total on this basis gives only 70,000, suggesting that there has been a substantial increase in the population since the 1980s (Stroud *et al.* 2004). However, much of this apparent increase in numbers in Western Europe and West Africa can be attributed to improvements in count coverage.

Meltofte (2001) has estimated the breeding population in Greenland at 25,000-50,000 pairs (equating to 75,000-150,000 post-breeding individuals). Only 20-100 pairs are thought to breed in Svalbard (BirdLife International 2004a), and the small population of 100-500 pairs in the Severnaya Zemlya Archipelago is perhaps irregular (Volkov & de Korte 1998).

2. *alba* South-west Asia, Eastern & Southern Africa (non-breeding)

Population estimate	1% threshold	Population trend
150,000	1,500	Probably stable

This population is currently estimated as 150,000 from 1990s midwinter counts and estimates (Stroud *et al.* 2004, Dodman 2002). Perennou *et al.* (1994) gave an estimate of 120,000, including 20,000 birds in South-west Asia and 100,000 in Eastern, Southern and South-west Africa. The current estimate includes about 16,000 in South-west Asia (excluding south-eastern Iran), 26,000 in Eastern Africa, 10,000 in the Indian Ocean states, and 98,000 in South Africa, Namibia and Angola. The apparent increase in numbers in Africa is likely to be a result of improvements in coverage since the early 1980s. The estimate for the population as a whole is still likely to be too low, as there are many important gaps in coverage, notably in parts of the Arabian Peninsula, Red Sea coast and Somalia.

Conservation status

The current estimate of the numbers wintering in Western Europe suggests that there has been an increase of over 56% between the mid-1980s and the mid-1990s, perhaps partly due to improved coverage (Stroud *et al.* 2004, IWC data). Cayford & Waters (1996) found that the number wintering in Britain had increased by 69% (from 13,700 to 23,200) during the period 1981-85 to 1988-92, and this increase appears to have continued until at least 1996/97 (Waters *et al.* 1998). A strong increase also occurred in France at 36 sample sites counted in mid-January, mostly between 1983 (2,000) and 1996 (6,500; Deceuninck & Mahéo 2000). However, in comparing national surveys of British non-estuarine shores in 1984/85 and 1994/95, Browne *et al.* (1996) reported no significant difference in Sanderling numbers between these two periods. U.K. indices indicate that there was a big increase in Sanderling counts in the U.K. between 1994 and 2000, but a modest decrease since then (Banks *et al.* 2006). Numbers counted in The Netherlands have continued to increase since the early 1990s (van Roomen *et al.* 2006).

The current estimate for the numbers wintering in West Africa (77,800) is considerably higher than the estimate in the early 1980s (43,000), but much of this difference can probably be attributed to improvements in coverage (Stroud *et al.* 2004). A comprehensive survey of the Banc d'Arguin in Mauritania in early 1997 found only 20,500, a decrease of 40% on the 1980 total (Zwarts *et al.* 1998, Altenburg *et al.* 1982), and Hagemeijer *et al.* (2004) reported a similarly reduced count of 20,600 in 2000, suggesting some redistribution of birds within the flyway. Stroud *et al.* (2004) concluded that the evidence for an increase in this population was inconclusive, and gave the trend as stable or possibly increasing

No information is available on trends in the population wintering in South-west Asia and Eastern and Southern Africa. However, there are no indications of any major changes in status and distribution within the flyway in recent decades.

Habitat and ecology

The Sanderling is a high Arctic breeder, nesting in extreme Arctic conditions to within 960 km of the North Pole on some of the northernmost land in the world, although locally the breeding range extends to just south of the Arctic Circle (Hayman *et al.* 1986). It breeds in a range of mesic habitats ranging from dense, high Arctic dwarf scrub heath, to sparsely vegetated gravelly slopes and plains. Breeding densities tend to be very low. The eggs are laid in mid-June, and sometimes later if the snow has not melted. Females often lay two clutches, one of which is incubated by the male, and are occasionally polyandrous.

Outside the breeding season, the Sanderling is gregarious, often occurring in large flocks. It is typically a bird of sandy beaches, although occasionally occurring on estuarine mudflats and shores of lakes and rivers during migration. Preferred habitats are beaches of fine sand, wave-cut platforms, shores with piled-up seaweed, sheltered inlets and estuaries with extensive inter-tidal sand banks (Underhill 1997). Inland records in Africa are mainly from sandy or stony shores of large freshwater lakes and soda lakes (Urban *et al.* 1986).

Typically, large flocks fly long distances between favoured sites at which they can regain weight rapidly. Very large fat reserves are deposited prior to the spring migration. In South Africa, adults commonly attain weights 60-90% above their typical winter weights before departure (Urban *et al.* 1986). Fat deposited in spring at the Wash in England is probably sufficient to allow direct flight to North-east Greenland (Snow & Perrins 1998). Many young birds apparently return to the breeding grounds in their first summer, while others remain as far south as South Africa throughout the year. The species often shows a high degree of site fidelity on the breeding grounds, in the winter quarters and at staging areas (Gudmundsson & Lindström 1992, Tomkovich & Soloviev 2001).

Network of key sites

Twenty-four key passage and wintering sites have been identified in North-west Europe: in Denmark (2), France (8), Germany (2), The Netherlands (3), Spain (2), and the United Kingdom (7). The most important of these are the Danish Wadden Sea (maximum 5,400 in spring), the German Wadden Sea in Schleswig-Holstein (29,500 in spring), the Dutch Wadden Sea (15,700 in spring), the Dutch Delta (7,955 in spring) and three sites in the U.K.: the Alt Estuary (6,900 in autumn), the Ribble Estuary (8,200 in spring) and The Wash (4,900 in spring). Allowing for population turnover during the migration seasons, several other sites may also exceed the threshold of 1,200.

The Alftanes-Myrar area on the central west coast of Iceland is an extremely important staging area in spring for Sanderling breeding in North-east Greenland; 7,000 birds were observed at a single roost on 22 May 1990 (Gudmundsson & Gardarsson 1993), and a coastal survey in this area in May 1996 located 7,045 (Wilson 1997). Further south, Sandgerdi is also a key staging area in spring; a count of 1,374 was recorded at this site in May 1989 (Gudmundsson & Lindstrom 1992).
A number of key wintering sites for the western population of

Sanderling have been located along the coast of West Africa. Much the most important of these are the Banc d'Arguin in Mauritania, with up to 22,300 birds (Hagemeijer *et al.* 2004), and the Bijagos Archipelago in Guinea-Bissau, with up to 13,500 (Salvig *et al.* 1997), but significant numbers of birds have also been found at one site in Morocco, two sites in Senegal and four sites in Ghana.

Four key staging areas have been identified for the eastern population in the Black Sea and Caspian Sea. Sivash Gulf on the Black Sea in Ukraine is a key staging area in spring (maximum 2,000; van der Winden *et al.* 1993). Two sites on the Caspian Sea are primarily important in autumn, the Agrakhanski Peninsula on the north-west coast in Dagestan, Russia (maximum 2,800; Shubin 1998), and the south Caspian shore between Now Farahabad and Jambol in Iran (maximum 2,000 in September), while Miankaleh Peninsula in the south-east Caspian in Iran is important in both spring (maximum 4,800 in May) and autumn (maximum 1,800 in August).

Five key wintering sites have been identified for the eastern population in South-west Asia, all in Oman: Al Batinah coast (maximum 2,500), Barr Al Hikman (maximum 11,000), Masirah Island (maximum 1,620), Dawhat Sawqirah (maximum 1,770) and Khawr Ghawi (maximum 1,500). Five key wintering sites have also been identified in Southern Africa: the Bazaruto Archipelago in Mozambique (maximum 2,270), Langebaan Lagoon in South Africa (maximum 1,680), Sandwich Harbour (maximum 30,000) and Walvis Bay (maximum 10,500) in Namibia, and Baia dos Tigres in Angola (maximum 1,640). The bulk of the birds at these five sites are likely to be from the eastern population, but a few birds from the population wintering mainly in West Africa may reach the sites in Angola and Namibia.

Protection Status of Key sites

Many of the key sites are protected by the Natura 2000 network in Europe and by National Parks and Ramsar sites in Africa. The preference of this species for open coasts and sandy beaches means that many occur at sites which are not recognised and counted. There are likely to be large concentrations of this species along unprotected stretches of sandy coast particularly in the Horn of Africa and Arabia.

Table 56. Key sites for Sanderling. Sites where 1% or more of a population has been recorded

Country	Site	Lat.	Long.	Season	Max total	Year max	Average total	Basis for average	Source	Population(s) at site
Angola	Baia dos Tigres	-16.68	11.75	July-August	1640	1999			AfWC database	SW Asia, E&S Africa + E Atlantic
Denmark	Wadden Sea	55.16	8.58	Spring	5405	2003	1995	2000-04 (3)	NERI, Denmark, 2005	E Atlantic
Denmark	Blåvands Huk	55.55	8.07	Winter	2000	-			Blåvand Bird Observatory *in litt.*	E Atlantic
France	Baie de Goulven	48.66	-4.28	Migration	2000	1999			WBDB	E Atlantic
France	Baie de St-Brieuc-Yffiniac-Morieux	48.54	-2.73	Non-breeding	2000	1994	29	1999-04 (5)	IWC database	E Atlantic
France	Havre de Regneville et Côte Ouest Cotentin	49.21	-1.46	Non-breeding	1901	2003	1010	1999-04 (5)	R. Maheo, LPO *et al.* 2005	E Atlantic
France	Ile de Re	46.22	-1.50	Non-breeding	1529	2003	959	1999-04 (5)	R. Maheo, LPO *et al.* 2005	E Atlantic
France	Littoral : de la Pointe de Saire à Aumeville-Lestre	49.35	-1.15	Non-breeding	1555	2002	1105	1999-04 (5)	R. Maheo, LPO *et al.* 2005	E Atlantic
France	Littoral Picard	50.25	1.60	Cold weather refuge	1500	1997			WBDB	E Atlantic
France	Littoral Plouescat-Roscoff	48.70	-4.15	Non-breeding	1452	2000	763	1999-04 (5)	R. Maheo, LPO *et al.* 2005	E Atlantic
France	Marais de la Baie d'Audierne	47.88	-4.37	Migration	10000	1997			WBDB	E Atlantic
Germany	Wadden Sea - Lower Saxony	54.00	8.00	Autumn	4924	1996	2194	1997-01 (5)	J . Blew, CWSS, 2005	E Atlantic
Germany	Wadden Sea - Schleswig-Holstein	54.50	8.50	Spring	29493	1994	15339	1998-02 (5)	J . Blew, CWSS, 2005	E Atlantic
Ghana	Densu Delta. Panbros Salt Pans	5.55	-0.30	July-August	2400	2000	1114	1998-01 (4)	AfWC database	E Atlantic
Ghana	Esiama Beach	4.93	-2.35	July-August	1995	2000	964	1998-01 (4)	AfWC database	E Atlantic
Ghana	Keta Lagoon complex	5.92	-0.83	July-August	1730	1999	854	1996-01 (5)	AfWC database	E Atlantic
Ghana	Korle Lagoon	5.55	-1.78	July-August	2450	2000	1264	2000-01 (2)	AfWC database	E Atlantic
Guinea-Bissau	Bijagos Archipelago	11.30	-16.00	January	24300	1993	16400	1992-01 (3)	Dodman & Sa 2005	E Atlantic
Iceland	Alftanes-Skoganes	64.67	-22.45	May	7045	1996			Wilson 1997	E Atlantic
Iceland	Sandgerdi	64.05	-22.72	May	1374	1989			G.A. Gudmundsson *in litt.*	E Atlantic
Iran	Miankaleh Peninsula & Gorgan Bay	36.83	53.75	May	4820	1973			Evans 1994	SW Asia, E&S Africa
Iran	South Caspian Shore, Now Farahabad-Jambol	36.58	52.00	September	2000	1972			Evans 1994	SW Asia, E&S Africa

Country	Site	Lat.	Long.	Season	Max total	Year max	Average total	Basis for average	Source	Population(s) at site
Mauritania	Banc d'Arguin	20.12	-16.27	January	22300	2000	21030	1997-01 (3)	Hagemeijer *et al.* 2004	E Atlantic
Morocco	Baie D'Ad Dakhla	23.66	-15.87	Non-breeding	3127	1995	1792	1993-95 (2)	IWC database	E Atlantic
Mozambique	Bazaruto, Benguera & Magaruque Is	-21.75	35.42	January	2273	1998	1302	1996-98 (3)	Köhler & Köhler 1999	SW Asia, E&S Africa
Namibia	Sandwich Harbour	-23.38	14.48	July-August	29745	2000	6898	1991-00 (5)	AfWC database	SW Asia, E&S Africa + E Atlantic
Namibia	Walvis Bay Ramsar Site	-22.50	14.42	Non-breeding	15169	1997-05	8847	1997-05 (9)	Wearne & Underhill 2005	SW Asia, E & S Africa + E Atlantic
Netherlands	North Sea Shore	53.38	5.02	Autumn	2081	1998	1135	1999-03 (5)	SOVON, The Netherlands, 2005	E Atlantic
Netherlands	Rhine-Maas-Schelde Delta	51.50	4.00	Spring	7955	2000	5124	1999-03 (5)	RWS WD RIKZ 2005	E Atlantic
Netherlands	Wadden Sea	53.30	5.38	Spring	15707	2003	9246	1999-03 (5)	SOVON, The Netherlands, 2005	E Atlantic
Oman	Al Batinah Coast	24.05	57.03	Non-breeding	2500	1992			Evans, 1994	SW Asia, E&S Africa
Oman	Barr al Hikman	20.63	58.47	Non-breeding	11000	1990	1500	1993-01 (5)	IWC database	SW Asia, E&S Africa
Oman	Dawhat Sawqirah	18.67	56.68	Non-breeding	1767	1991	480	1990-95 (4)	IWC database	SW Asia, E&S Africa
Oman	Khawr Ghawi	18.57	56.63	Non-breeding	1500	1992			Evans, 1994	SW Asia, E&S Africa
Oman	Masirah Island	20.50	58.75	Non-breeding	1623	1995	870	1994-01 (5)	IWC database	SW Asia, E&S Africa
Russia	Agrakhanski Peninsula	43.5	47.83	Autumn	2,800				Shubin 1998	SW Asia, E&S Africa
Senegal	Casamance delta	12.43	-16.48	December	2500	1985-87	2000	1985-87	R Mahéo *in litt* to P. Yésou.	E Atlantic
Senegal	Parc National du Delta du Saloum	13.83	-16.75	Non-breeding	1900	1997	1361	1997-99 (3)	AfWC database	E Atlantic
South Africa	West Coast National Park	-33.08	18.10	Pre-breeding migration	1680	2001			AfWC database	SW Asia, E&S Africa + E Atlantic
Spain	Costa de la Muerte (North coast)	43.23	-8.93	Migration	1200	1995			WBDB	E Atlantic
Spain	Ferrolterra-Valdoviño coast	43.60	-8.20	Migration	1200	1995			WBDB	E Atlantic
Ukraine	The Sivash, Azov Sea	46.17	34.58	Spring	2000	1992			van der Winden *et al.* 1993	SW Asia, E&S Africa
U.K.	Alt Estuary	53.52	-3.05	Autumn	6894	1999-03	3221	1999-03 (5)	BTO, UK, 2005	E Atlantic
U.K.	Carmarthen Bay	51.68	-4.51	January	1770	1999-03	661	1999-03 (5)	BTO, UK, 2005	E Atlantic
U.K.	Humber Estuary	53.67	-0.17	Spring	1626	1997-02	727	1997-02 (5)	BTO, UK, 2005	E Atlantic
U.K.	North Norfolk Coast	52.98	0.76	Autumn	1786	1999-03	1250	1999-03 (5)	BTO, UK, 2005	E Atlantic
U.K.	Ribble Estuary	53.72	-2.92	Spring	8203	1997-02	4722	1997-02 (5)	BTO, UK, 2005	E Atlantic
U.K.	Thames Estuary	51.48	0.57	Autumn	1394	1999-03	902	1999-03 (5)	BTO, UK, 2005	E Atlantic
U.K.	The Wash	52.93	0.30	Spring	4867	1997-02	2445	1997-02 (5)	BTO, UK, 2005	E Atlantic

Derek Scott

György Szimuly

Little Stint *Calidris minuta*

Geographical variation and distribution

The Little Stint is a monotypic species with an extensive breeding range in the tundra zone from north-eastern Norway east across northern Russia to the New Siberian Islands and Yana River at about 145ºE, with stragglers recorded east to Chukotsky Peninsula on the Bering Sea. The main breeding areas are concentrated on the Taymyr Peninsula. Western populations winter from Southern and Western Europe (few), North Africa and South-west Asia south through sub-Saharan Africa and Madagascar to South Africa. Eastern populations winter in the Indian subcontinent east to Myanmar, and the species occurs only as a rare straggler in South-east Asia and Australasia.

Movements

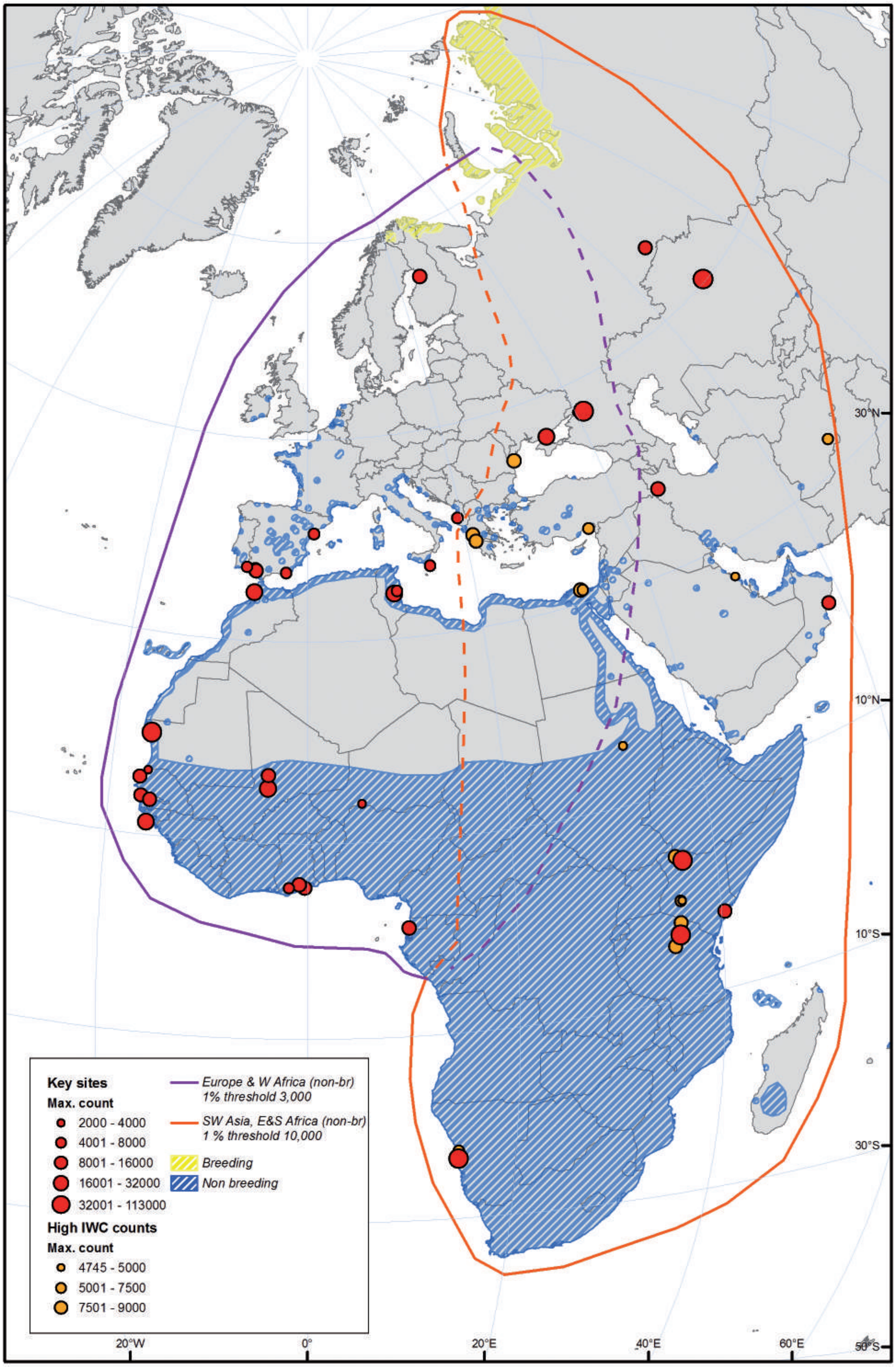
The Little Stint is highly migratory, with western populations moving south-west on a broad front from their Arctic breeding grounds to wintering areas in Southern Europe, Africa and South-west Asia. In Western Europe, many birds follow the Atlantic seaboard to West Africa, but many others occur at inland wetland habitats, although generally in smaller flocks than along the coast. Several wetlands in the Mediterranean are important staging areas for the species in autumn, indicating a substantial overland passage across Europe. Recoveries of birds ringed in Norway (mainly on passage) suggest that young birds tend to follow the Atlantic seaboard to West Africa, while adults take a more easterly, overland route via the Mediterranean basin (Bakken *et al.* 2003). Birds breeding in Finnmark, in northernmost Norway, depart from their breeding grounds mainly during August, although unsuccessful breeders may leave as early as mid-July (T. Breiehagen & K. B. Strann unpubl. obs.). A colour-ringed bird was sighted in southern Norway on 24 July, only 14 days after it was last sighted in the breeding area 1,753 km to the north-east (Mork & Runde 1994). In general, juvenile birds migrate later than adults, mainly from early August and September. The return migration in spring is almost entirely overland across Europe from the Mediterranean basin. There is only a small spring passage of Little Stints through Britain and Ireland (Toms 2002), and there are relatively few spring recoveries of Norwegian ringed birds in Western Europe (Bakken *et al.* 2003).

The numbers of juveniles passing through Europe are highly variable from year to year, depending on the breeding success, which appears to be related to lemming *Lemmus lemmus* cycles (Underhill *et al.* 1993). Most recoveries of birds ringed in Western Europe on autumn passage seem to indicate that North and West Africa are important wintering areas, but the eastern limit of the breeding range of these birds is uncertain. Meltofte (1993) argued that European breeders make up the migrants in Western Europe in “normal” years, while later-arriving Siberian juveniles dominate in years of peak reproduction. This is supported by their strong association with juvenile Curlew Sandpipers in such years. As these waves of migrants may involve hundreds of thousands of birds, Meltofte (1993) concluded that many Siberian Little Stints occur in West Africa along with birds from breeding areas in Northern Europe.

Of 17,375 birds ringed in Southern Africa, only one (from Rondevlei, South Africa) has been recovered within the breeding area: on the Yogosky Peninsula on the Russian coast north of the Ural Mountains (Underhill *et al.* 1999). Other recoveries of birds ringed in Southern Africa indicate a Great Circle route to breeding grounds in Siberia, passing through Eastern Africa, the Middle East, the Caspian region and Kazakhstan. Iran is particularly important on autumn migration; over 10,000 have been recorded at Lake Uromiyeh in north-western Iran in August and 2,300 along the southern shore of the Caspian Sea in September (Scott 1995).

Birds leave their non-breeding areas in Africa in March and April, and reach wetlands in the Mediterranean area in April or May. They arrive on the breeding areas in northern Norway

Little Stint
Calidris minuta



in early June, but the onset of breeding is dependent on local snow conditions (T. Breiehagen & K. B. Strann unpubl. obs.). According to Underhill *et al.* (1999), it is very uncommon for Little Stints to remain in Southern Africa throughout the austral winter, unlike most other Palearctic migrant waders.

Population limits

Waterbird Population Estimates recognises two main passage and wintering groups in Western Eurasia and Africa:

1) birds occurring on passage and in winter in Europe, the Black Sea, the Mediterranean and North and West Africa (thought to be mainly European breeders);
2) birds occurring on passage and in winter in the Caspian region, Middle East, and Eastern and Southern Africa (thought to be mainly West Siberian breeders).

These two populations were supported by Stroud *et al.* (2004) and are retained here, although it is acknowledged that there may be considerable overlap between European breeders and West Siberian breeders in West Africa, at least in years of high breeding success. A third population of Little Stints has been recognised for the birds wintering in the Indian subcontinent. These are thought to originate from the eastern end of the breeding range in Central Siberia, and lie outside the area covered by this Atlas.

Population size

1. Europe & West Africa (non-breeding)

Population estimate	1% threshold	Population trend
300,000	3,000	Possibly stable

Relatively small numbers of Little Stints (approximately 18,000 birds) overwinter as far north as Europe (mainly in Greece, Spain, southern France and Italy, but some regulary as far north as The Netherlands). The great majority of birds in this population occur in inland and coastal wetlands in North-west and West Africa from Tunisia and Morocco to Mauritania, Senegal and Guinea-Bissau, with substantial numbers also in Ghana and Guinea. Smit & Piersma (1989) gave an estimate of 211,000 based on 1980s data, and this was adopted in the first two editions of *Waterbird Population Estimates*. Estimates from the 1990s, including better coverage of West African countries and probably also more comprehensive coverage of major coastal areas in Mauritania and Guinea-Bissau, gave a total of 158,000-178,000 birds (Stroud *et al.* 2004). This suggests that there may have been some decline in numbers between the 1980s and the mid-1990s. An analysis of counts in the major wintering areas of Banc d'Arguin (Mauritania) and Bijagos Archipelago (Guinea-Bissau) also suggested that a decline had occurred (Zwarts 1988, Zwarts *et al.* 1998a, 1998b), but the situation is complex, as 65,000 Little Stints, the highest total ever, were counted at the Banc d'Arguin in January 2000 (Hagemeijer *et al.* 2004). In January 1998, almost 51,000 were counted in West Africa, in a year when neither the Bijagos Archipelago nor the Banc d'Arguin was surveyed (Dodman *et al.* 1999). In 2001, the only year when both these sites were surveyed simultaneously, the Banc d'Arguin held 41,300 and Bijagos 24,500, a total of 65,800 Little Stints (Isenmann 2006, Dodman & Sá 2005). Stroud *et al.* (2004) proposed a revised population estimate of 200,000, to allow for the fact that the count data were largely coastal and underestimated the numbers wintering inland in West Africa. This estimate was adopted in *WPE3* and *WPE4*. However, Dodman (2002) considered this to be a considerable underestimate. He noted that Little Stints were very widespread inland in West Africa, and thought that they were heavily under-recorded in the African Waterbird Census. Thus the figure of 8,600 used by Stroud *et al.* (2004) for Mali in the mid-1990s appears to be an underestimate, as over 25,000 were counted in Mali in January 1998 (Dodman *et al.* 1999), while Zwarts *et al.* (2005) presented a total of 31,802 as the maximum recorded in the Inner Niger Delta between 1998 and 2004. A new estimate of 300,000 is therefore adopted in this Atlas for this population, and former conclusions that the population was decreasing are now considered unsafe.

In a recent collation of national breeding estimates in Europe, Thorup (2006) gave totals of 1,000-5,000 pairs for Norway, 0-5 pairs for Finland, and 20,510-402,500 pairs for European Russia. Such rough estimates could equate to anything between 65,000 and 1,230,000 individuals.

2. South-west Asia, Eastern & Southern Africa (non-breeding)

Population estimate	1% threshold	Population trend
1,000,000	10,000	Unknown

Perennou *et al.* (1994) estimated that there were at least a million birds in the population, and on this basis, a figure of 1,000,000 was adopted in the first two editions of *Waterbird Population Estimates*. Stroud *et al.* (2004) derived a total of 379,000 from midwinter counts and estimates in the 1990s, but noted that this was certainly an underestimate, as there were many important gaps in coverage. The 1990s estimate of 10,900 for Sudan was believed to be very low, as the wintering population in Sudan had been estimated at 250,000-500,000 in the 1980s (G. Nikolaus, in Summers *et al.* 1987). Similarly, the 1990s estimate of 30,000 for Egypt was also thought to be too low, as Goodman & Meininger (1989) had estimated the wintering population at over 100,000 birds. Other important gaps in coverage included parts of the Persian Gulf and important inland wintering areas in Africa, such as the shores of large freshwater and soda lakes in Tanzania, Kenya, Zambia, Botswana, Namibia and South Africa. High counts inland in Eastern Africa have included tens of thousands at Lake Turkana and many thousands in the smaller Rift Valley lakes of Kenya (Britton 1980), and 78,675 at Lake Manyara in Tanzania in January 1995 (Baker & Baker 2001). In view of these uncertainties, Stroud *et al.* (2004) proposed that no change be made to the previous estimate of 1,000,000, and this was retained in *WPE3* and *WPE4*.

Conservation status

Overall trends in the European and West Siberian breeding populations are unknown. No clear trend is apparent in Norway, where breeding numbers are highly variable from year to year (T. Breiehagen & K.B. Strann unpubl. obs., Breiehagen & Hildén 1997a). BirdLife International (2004a) gives the trend in the large European Russian breeding population as stable, but recent counts of wintering birds in West Africa have suggested that there may have been some decline in numbers in this population since the 1980s (Stroud *et al.* 2004). At several important sites for Little Stints in Africa, e.g. in Guinea-Bissau, Mauritania and Kenya, there is considerable variation in numbers from year to year.

Habitat and ecology

During the breeding season, the Little Stint is widely distributed over both low and high Arctic habitats. It nests mainly on dry tundra heath with low vegetation near freshwater pools (Breiehagen & Hildén 1997a). On migration, it usually occurs in small flocks, but sometimes aggregates into large flocks of several hundred birds, often together with other waders such as Sanderling *Calidris alba*, Dunlin *C. alpina* and Common Ringed Plover *Charadrius hiaticula*. On migration and in the winter quarters in Europe and West Africa, the Little Stint occurs mainly in coastal habitats, including estuaries and lagoons. Here the birds sometimes defend territories. In Eastern and Southern Africa, many birds spend the non-breeding season at wetlands inland, particularly on the shores of large freshwater lakes and soda lakes.

Network of key sites

Twenty-five key sites have been identified for the western population of Little Stints: an important staging site in the Oulu region of Finland; seven passage and/or wintering sites in Southern Europe (Spain 5, Italy 1 and Albania 1); three wintering sites in North Africa (notably Merja Zerga in Morocco and the Gulf of Gabès in Tunisia); and 12 wintering sites in seven countries in West Africa, from Mauritania, Senegal and Guinea-Bissau in the west to Gabon in the east. Much the most important of the sites in West Africa are the Banc d'Arguin in Mauritania, with up to 65,000 Little Stints in winter, Bijagos Archipelago in Guinea-Bissau, with up to 41,600, and Inner Niger Delta in Mali, with up to 31,800. The sum of the maximum counts at the 20 most important wintering sites in Africa amounts to about 275,000, suggesting that the population estimate of 200,000 adopted in *WPE4* was too low, as suggested by Dodman (2002), and forming a basis for the new estimate of 300,000.

Rather few key sites have been identified for the eastern population which is known to be much larger. The five key wintering sites are Barr Al Hikman (maximum 16,000) in Oman, Lake Turkana (maximum 113,000) and the Tana River Delta (maximum 15,300) in Kenya, Lake Manyara (maximum 78,700) in Tanzania, and Sandwich Harbour (maximum 34,700) in Namibia. Important staging areas for this population include the Tobol River forest steppe in Russia and Kazakhstan, the Veselovsky area in Rostov Region, Russia, Sivash Gulf on the Sea of Azov in Ukraine, and Lake Uromiyeh in north-western Iran. Large numbers have been found on passage in Kazakhstan, with a flock of 8,000 birds on 2 June 2001 at Tyuntyugur lake in north-eastern Kustanay province, and with flocks of up to 20,000 birds in spring and up to 8,000 birds in autumn in the Tengiz-Korgalzhyn region (Wassink & Oreel 2007).

It seems likely that more key sites have yet to be located for this population which has a very wide non-breeding range in South-west Asia and Eastern and Southern Africa.

Table 57. Key sites for Little Stint. Sites where 1% or more of a population has been recorded

Country	Site	Lat.	Long.	Season	Max total	Year max	Average total	Basis for average	Source	Population(s) at site
Albania	Karavasta Complex	40.92	19.48	Non-breeding	4496	1996	221	1999-04 (5)	IWC database	Europe, W Africa
Finland	Oulu Region Wetlands	64.92	25.17	Migration	10000	1997			Skov *et al.* 2000	Europe, W Africa
Gabon	Baie de Corisco	1.20	9.67	Feb-Mar	10219	1992			AfWC database	Europe, W Africa
Gambia	Bao Bolon Wetland Reserve	13.52	-15.83	Non-breeding	12000	1996			WBDB	Europe, W Africa
Ghana	Densu Delta. Panbros Salt Pans	5.55	-0.30	July-August	8512	2000	3895	1999-01 (3)	AfWC database	Europe, W Africa
Ghana	Keta Lagoon complex	5.92	-0.83	July-August	8059	2000	3874	1996-01 (4)	AfWC database	Europe, W Africa
Ghana	Korle Lagoon	5.55	-1.78	July-August	4017	2000	2103	2000-01 (2)	AfWC database	Europe, W Africa
Guinea-Bissau	Bijagos Archipelago	11.30	-16.00	January	59700	1993	41600	1992-01 (3)	Dodman & Sa 2005	Europe, W Africa
Iran	Lake Uromiyeh	37.50	45.50	August	10000	1973			Evans 1994	SW Asia, E&S Africa
Italy	Pantani di Capo Passero	36.73	15.05	Migration	6000	1990			WBDB	Europe, W Africa
Kazakhstan	Tengiz-Korgalzhyn region	50.50	69.33	Spring migration	58235	2000	50330	1999-04 (6)	Schielzeth *et al.* In prep.	SW Asia, E&S Africa
Kazakhstan	Tobol river forest steppe	55.83	66.40	Spring	10000	1982-84			Calculated from Blinova & Blinov 1997	SW Asia, E&S Africa
Kenya	Lake Turkana	3.45	36.67	Non-breeding	113000	1992			WBDB	SW Asia, E&S Africa
Kenya	Tana River Delta	-2.50	40.33	Non-breeding	15310	1993			WBDB	SW Asia, E&S Africa
Mali	Inner Niger Delta	15.50	-4.00	Non-breeding	31802	1998-04			Zwarts *et al.* 2005	Europe, W Africa
Mali	Lac Faguibine	16.75	-4.00	Non-breeding	10000	1983			WBDB	Europe, W Africa
Mauritania	Banc d'Arguin	20.12	-16.27	January	65400	2000	39770	1997-01 (3)	Hagemeijer *et al.* 2004	Europe, W Africa
Morocco	Merja Zerga: Kenitra	34.80	-6.30	Winter	19700	1995	12527	1994-95 (2)	IWC database	Europe, W Africa
Namibia	Sandwich Harbour	-23.38	14.48	Non-breeding	34667	1991	9160	1993-98 (5)	AfWC database	SW Asia, E&S Africa
Oman	Barr Al Hikman	20.63	58.47	Non-breeding	16000	1993	10000	1991-01 (5)	IWC database	SW Asia, E&S Africa
Russia	Veselovsky Rice Field	47.08	41.17	Spring	100000	1975			Kazakov *et al.* 1984, per V. Belik	SW Asia, E&S Africa + Europe, W Africa
Senegal	Lagunes de St.Louis	15.67	-17.00	Non-breeding	9818	2001	2926	1997-01 (5)	AfWC database	Europe, W Africa

Country	Site	Lat.	Long.	Season	Max total	Year max	Average total	Basis for average	Source	Population(s) at site
Senegal	Parc National des Oiseaux de Djoudj	16.42	-16.25	Non-breeding	3655	1995	131	1997-01 (5)	AfWC database	Europe, W Africa
Senegal	Parc National du Delta du Saloum	13.83	-16.75	Non-breeding	14180	1997	13041	1997-99 (3)	AfWC database	Europe, W Africa
Spain	Del Palacio A La Algaida (H)	36.80	-2.60	Non-breeding	6000	2000	3125	2000-01 (2)	IWC database	Europe, W Africa
Spain	Delta Del Ebro	40.70	0.80	Non-breeding	7157	1999	3618	1997-03 (5)	IWC database	Europe, W Africa
Spain	Isla Cristina and Ayamonte marshes & Prado lagoon	37.22	-7.42	Non-breeding	5000	1996			WBDB	Europe, W Africa
Spain	Lucios de Veta La Palma-Isla Mayor (Se)	36.93	-6.24	Winter	9217	2000	2616	1996-03 (5)	IWC database	Europe, W Africa
Spain	Parque Nacional de Doñana	36.99	-6.37	Non-breeding	10065	1994	2277	1995-01 (5)	IWC database	Europe, W Africa
Tanzania	Lake Manyara National Park	-3.67	35.83	Non-breeding	78675	1995			WBDB	SW Asia, E&S Africa
Tunisia	Gulf of Gabès	34.40	10.32	February	22235	1984			Van Dijk *et al.* 1986	Europe, W Africa
Tunisia	Saline De Thyna	34.65	10.68	Non-breeding	4250	1994	2200	1992-94 (2)	IWC database	Europe, W Africa
Ukraine	The Sivash, Azov Sea	46.17	34.58	Spring	25000	1992			van der Winden *et al.* 1993	SW Asia, E&S Africa + Europe, W Africa

Torgrim Breiehagen & Derek Scott

Dean Eades

Temminck's Stint

Calidris temminckii

Geographical variation and distribution

The Temminck's Stint is a monotypic species. It breeds mainly in the sub-arctic and low Arctic zones from Scandinavia in the west, across northern Russia to the Chukotsky Peninsula, but also extends far into the boreal and alpine zones in Scandinavia (Tomkovich & Fokin 1983, Lappo 1998). The core of the breeding range is in the tundra of the Yamal, south Yenisey and Yakutia, and probably also in the Taymyr (Lappo 1998). There is also a tiny breeding population in northern Scotland. The non-breeding range extends from the Mediterranean basin and North Africa south in sub-Saharan Africa to about the equator, and east through the Middle East and Indian sub-continent to South-east Asia. Birds breeding in Fennoscandia are thought to migrate south or south-west through the Mediterranean to wintering areas in North and West Africa. Here, wetlands in Niger, Liberia and Nigeria are probably the most important wintering areas. Birds from North-east Europe and possibly also Western Siberia probably migrate south or south-west through the Black Sea and Caspian regions to winter in North-east and Eastern Africa. The species occurs regularly as far south as Kenya, Burundi and Zambia, but is only a rare visitor to South Africa (Hockey 1997). Eastern breeding populations are thought to winter in South and South-east Asia.

Movements

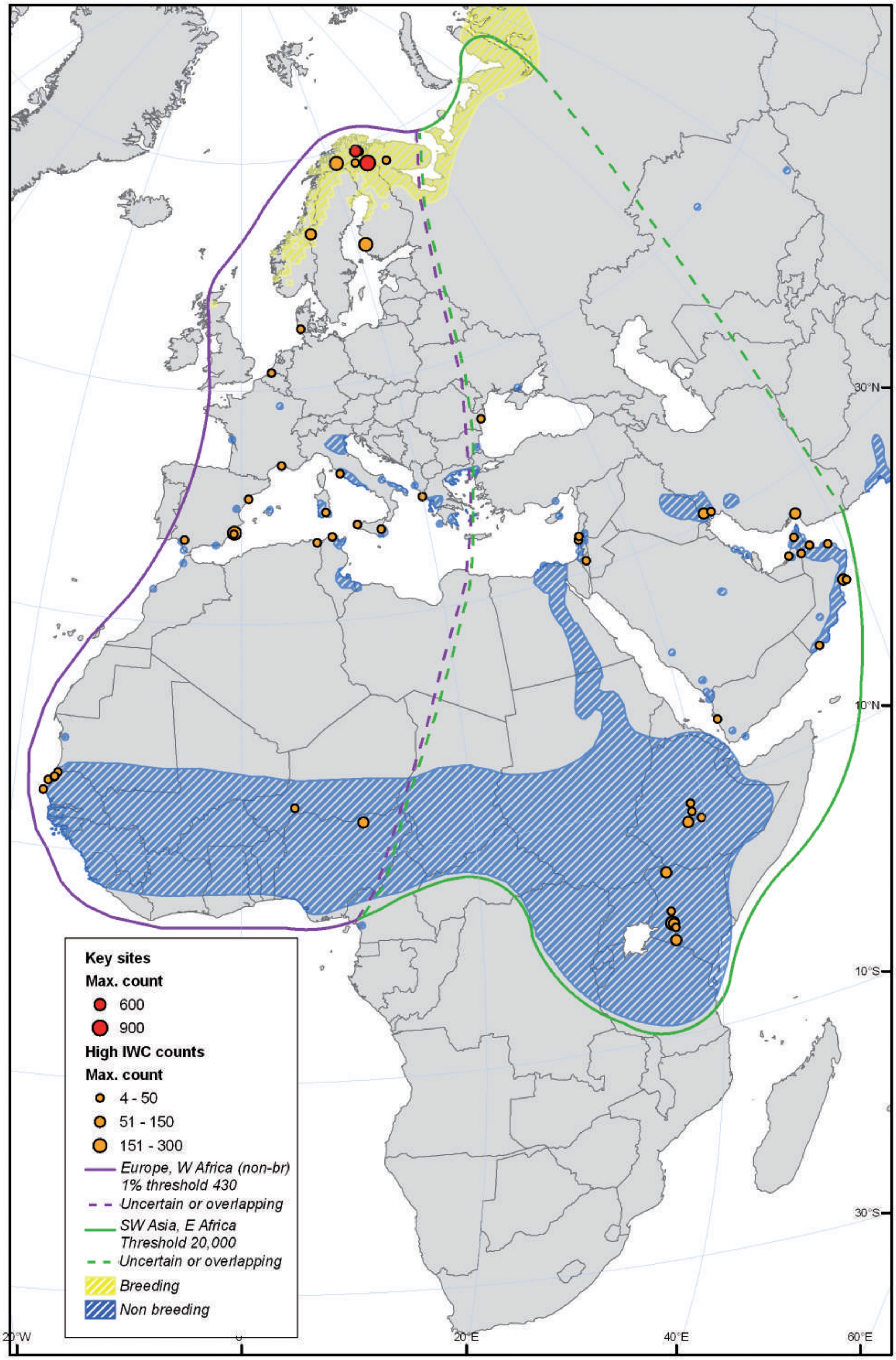
The Temminck's Stint is highly migratory, moving south on a broad front across Europe and Asia in autumn, often singly but commonly in small groups of two to five individuals. Birds breeding in Fennoscandia leave their breeding sites from mid-July to late August (Hildén 1975, Breiehagen 1989). These birds migrate in a south-westerly or southerly direction across Europe, and reach the Mediterranean basin (as far east as Greece) mainly in September and early October. One bird ringed as a chick in southern Norway was sighted in southern England as early as 17 August, at an age of 47 days (Breiehagen 1989), while another bird ringed as a chick at the same site was recovered in the south of France in October of the same year (Bakken *et al.* 2003). A bird ringed as a chick in Swedish Lapland was recovered in Greece in September (Cramp & Simmons 1983). A bird ringed on passage in Scandinavia was recovered in Tunisia in February, and a bird ringed in the south of France was recovered in Benin in March (Urban *et al.* 1986). Another bird ringed in Fennoscandia was recovered in Morocco in March. These recoveries suggest that Scandinavian breeders migrate south or south-west in autumn to winter mainly in West Africa, and support the belief that the small number of birds that winter irregularly along the Atlantic coast of France and in the Mediterranean are of Scandinavian origin (Boileau & Delaporte 1998).

Thirteen Temminck's Stints ringed on autumn migration at Ottenby, southern Sweden, have been recovered in the 55 years since ringing began (Hedenstrom 2004). These recoveries had a mean direction of south-south-west, and also point to a probable wintering destination in West Africa. The recoveries were concentrated in Southern Europe between Italy and Spain. Eleven out of these 13 recoveries were shot by hunters, seven of them in northern Italy, and although the distribution may be biased by the distribution of hunters, it suggests that northern Italy may be an important stopover area for Temminck's Stints on autumn migration (Hedenstrom 2004).

Six birds ringed on autumn passage in Finland showed a wide longitudinal scatter from England (July) and Italy (September) in the west to Romania (November), Ukraine (July), the St. Petersburg region (August) and near Ivanovo at 41ºE in Russia (August) in the east (Cramp & Simmons 1983). The last four of these recoveries suggest that some Finnish birds take a more southerly or south-south-easterly route through the Black Sea region to wintering areas in the

Temminck's Stint

Calidris temminckii



eastern Mediterranean and Eastern Africa. The migration routes of birds breeding further east in northern European Russia are unknown. Given the general scarcity of the species on migration in Western and Central Europe and the very large numbers of birds thought to breed in European Russia, it seems likely that many of these birds migrate south through Eastern Europe, the Black Sea and eastern Mediterranean to wintering areas in North-east and Eastern Africa. Similarly the migration routes of birds breeding in Western Siberia are poorly known. It has been assumed that many of the birds observed on migration in South-west Asia are birds migrating between breeding grounds in Western Siberia and wintering areas in North-east and Eastern Africa, but there is no evidence from ringing to support this, and it is possible that most are birds migrating to and from wintering areas in the Indian subcontinent, where the species is relatively common.

Birds depart from their wintering grounds in Africa from mid-March to April, and migrate on a broad front to several important staging areas in the Mediterranean, before continuing across Europe to reach their breeding grounds from mid-May to June, depending on the snow conditions (Hildén 1975, Breiehagen 1989).

Population limits

The first two editions of *Waterbird Population Estimates* recognised two main groups of birds in Western Eurasia and Africa:

1) birds breeding in Northern Europe, and thought to winter mainly in West Africa;
2) birds wintering in South-west Asia and Eastern Africa, and thought to breed mainly in Western Siberia.

Stroud *et al.* (2004) considered it likely that the large numbers of birds breeding in north-east European Russia wintered mainly in Central or Eastern Africa, and therefore excluded these birds from their "Europe (breeding)/West Africa (wintering)" population. A similar treatment was adopted in *WPE3* and *WPE4*, which recognised the following two populations:

1) birds breeding in Scandinavia and extreme north-west European Russia, and migrating via the Black Sea and Mediterranean to sub-Saharan West Africa (east to the Gulf of Guinea);
2) birds breeding in north-east European Russia and Western Siberia, and migrating via South-west Asia to North-east and Eastern Africa (south to Kenya and Burundi).

Evidence from ringing suggests that birds breeding in Scandinavia take a more westerly route than implied above, passing through Central Europe and the western and central Mediterranean on their way to West Africa. It may therefore be more appropriate to treat the Fennoscandian breeders as a separate population that migrates south-south-west to winter mainly in West Africa. Birds breeding in European Russia probably winter mainly in Central, Eastern and Southern Africa, but whether or not these are joined by birds from breeding areas in Western Siberia is unknown. Dodman (2002) considered it unlikely that there were large numbers of Temminck's Stints wintering in Central and Eastern Africa, unless they were concentrated in areas such as southern Sudan and the Congo Basin where coverage of the IWC has been very limited. It would seem more likely that most of the Western Siberian birds migrate south rather than south-west to winter in the Indian subcontinent. The IWC counts from South Asia certainly suggest that the species is much commoner there than in sub-Saharan Africa. High counts in South Asia in recent years have included 5,292 in 1995, 17,190 in 1996, 2,295 in 1999, 1,486 in 2000 and 3,414 in 2001 (AWC reports). The total number of Temminck's Stints found wintering in Western Eurasia and Africa in January 1999 was only 364 (data from Gilissen *et al.* 2002 and Dodman & Diagana 2003) – less than 16% of the total in South Asia in the same year.

In this Atlas, we adopt a slightly different treatment from *WPE3* and *WPE4* in confining the western population to birds breeding in Fennoscandia (believed to winter mainly in West Africa), and including all birds breeding in European Russia in a "North-east European" population (believed to winter mainly in Central and Eastern Africa. Whether or not this latter "population" includes any birds breeding in Western Siberia is unknown. These two populations are recognised for practical conservation purposes, and it is acknowledged that there may be a considerable amount of mixing between the two populations during the migration seasons in Central Europe and also on the wintering grounds in sub-Saharan Africa.

Population size

No attempt was made in the first two editions of *Waterbird Population Estimates* to give an estimate of population size for either of the populations recognised in Western Eurasia and Africa. The Temminck's Stint is very much under-recorded by waterbird monitoring schemes, and only a few hundreds of birds are counted each season by the International Waterbird Census in Africa and West Euasia. For example, the highest annual totals in the African Waterbird Census between 1999 and 2001 were only 225 in Eastern Africa (1999) and 49 in West Africa (2001) (Dodman & Diagana 2003), while the highest totals in the Western Palearctic and South-west Asian Census between 1997 and 1999 were 119 in South-west Asia (1997) and 34 in the Western Palearctic (1998) (Gilissen *et al.* 2002). The low counts can be attributed to the fact that the species exhibits skulking behaviour and a great majority of birds are scattered in ones and twos at inland, freshwater habitats, and often occur on tiny wetlands that are rarely if ever counted. Only breeding season estimates provide some insight into the likely magnitude of the populations.

1. Fennoscandia (breeding)

Population estimate	1% threshold	Population trend
30,000-55,000	430	Possibly decreasing

Breiehagen and Hildén (1997b) estimated the Fennoscandian breeding population at around 14,000 pairs. Data from Thorup (2006) and BirdLife International (2004a) give estimates of 11,500-18,500 pairs and 9,500-18,500 pairs, respectively. These figures suggest a total population of between about 30,000 and 55,000 post-breeding individuals. This is the estimate adopted here, with a 1% threshold of 430 based on the mid-point of the range.

Stroud *et al.* (2004) gave an estimate of 39,000-80,000 individuals for their "Europe (breeding)/West Africa (wintering)" population, but this included 4,500-24,000 individuals from an estimated 1,500-8,000 pairs breeding in north-west European Russia. However, there is considerable uncertainty as to the size of the breeding population in north-west European Russia, as Thorup (2006) gave a much higher estimate of 6,000-53,000 pairs. In the present treatment, these birds are included in the North-east Europe (breeding) population (see below).

2. North-east Europe (breeding)

Population estimate	1% threshold	Population trend
D/E (100,000->1,000,000)	Not established	Probably stable

Breiehagen and Hildén (1997b) considered that there were at least a million breeding pairs in European Russia, while Thorup (2006) and BirdLife International (2004a) gave very similar estimates of 76,000-403,000 and 75,000-400,000 pairs, respectively. Even these latter figures suggest that the total population originating from breeding areas in North-east Europe could amount to 225,000-1,200,000 non-breeding individuals. Stroud *et al.* (2004) concluded, on the basis of the birds breeding in north-east European Russia alone, that the size of the population was certainly in the hundreds of thousands and could even exceed one million birds. These authors also assumed that many birds in this population originated from breeding areas in Western Siberia. They therefore gave a rough estimate in the broad range D/E (100,000->1,000,000), and this was adopted in *WPE3* and *WPE4*. Given the uncertainty in the size of the European Russian breeding population and the migration routes of birds breeding in Western Siberia, this very rough estimate is retained here. No 1% threshold has been established, but this is of little consequence in a species that rarely occurs in concentrations of more than 150-200 birds.

Conservation status

The Scandinavian breeding population decreased during the twentieth century, especially in Finland, probably because of habitat deterioration and loss, increased predation and human disturbance (Rönkä 1996, Breiehagen & Hildén 1997b, Koivula & Rönkä 1998, Väisänen *et al.* 1998). It is possible that this population is continuing to decline, as BirdLife International (2004a) reported declines in Sweden and Finland during 1990-2000, although the breeding population in Norway is believed to be stable. The large breeding population in European Russia is also believed to be relatively stable (BirdLife International/EBCC 2000, BirdLife International 2004a).

Habitat and ecology

The Temminck's Stint is an Arctic breeding bird, but generally avoids the most extreme conditions and exposed coasts, extending far inland into sub-arctic and even richer boreal zones (Snow & Perrins 1998). It nests mainly in rank vegetation near inlets and fjords, deltas, and rivers and streams, but also in upland areas.

Unlike most congeners, it maintains similar habitat preferences on passage and in the winter quarters. It uses the margins of all kinds of inland waters, flooded lands, irrigated fields, sewage farms, and more or less densely vegetated wetlands. Along coastlines, it tends to avoid sandy and open beaches, strongly preferring mudflats in sheltered inlets, estuaries or saltmarshes (Snow & Perrins 1998). Unlike the Little Stint *C. minuta*, which migrates in large flocks along coastlines, the Temminck's Stint normally avoids open coastal areas, and migrates alone or in small flocks, sometimes mixing with other wader species. However, concentrations of up to 150-200 birds have been recorded at favoured staging areas in Central Europe (Snow & Perrins 1998).

Network of key sites

The Temminck's Stint is a dispersed species at all times of the year, migrating on a broad front both in spring and autumn, and rarely congregating in groups of more than a few individuals, although it may be locally common at favoured staging and wintering sites. As the total populations are large to very large, there are likely to be few sites that regularly support more than 1% of either population, and it is clear that a key site approach is of limited usefulness in the conservation of this species. Only two key sites have been identified, and both are breeding sites for the relatively small Fennoscandian population in northern Finland: the Kevo area with 50-200 pairs, and the Saariselkä and Koilliskaira area with 100-300 pairs (Heath & Evans 2000). Bourgas Bay in Bulgaria is an important passage site, with counts of up to 635 birds in autumn (Kube *et al.* 1998), but most of these birds probably belong to the very large population breeding in North-eastern Europe. No key sites can be identified in sub-Saharan Africa where the highest counts have been 148 at Hadejia Nguru, Nigeria, in 1994, 269 at Lake Nakuru, Kenya, in 1996, and 100 at Lake Abijatta, Ethiopia, in 1997.

Protection status of key sites

Both Finnish breeding sites have been identified as IBAs: the Kevo area (70,075 ha) is fully protected as a Strict Nature Reserve, and the Saariselkä and Koilliskaira area (309,553 ha) is largely protected within a Wilderness Area, a Strict Nature Reserve, a National Park (255,000 ha), three Peatland Reserves and a Special Protection Area (Heath & Evans 2000).

Table 58. Key sites for Temminck's Stint. Sites where 1% or more of a population has been recorded

Country	Site	Lat.	Long.	Season	Max total	Year max	Source	Population(s) at site
Finland	Kevo	69.58	26.78	Breeding	600	1997	WBDB	Fennoscandia
Finland	Saariselkä & Koilliskaira	68.25	28.00	Breeding	900	1996	WBDB	Fennoscandia

Torgrim Breiehagen & Derek Scott

György Szimuly

Curlew Sandpiper
Calidris ferruginea

Geographical variation and distribution

The monotypic Curlew Sandpiper breeds in the Central Siberian Arctic of northern Russia, between about 80ºE and 155ºE. It occasionally breeds both to the west and to the east of this normal range; breeding has been recorded as far west as the northern Yamal Peninsula (71 ºE) and as far east as Alaska (156ºE) (Lappo & Tomkovich 2006). The range is apparently discontinuous between the Taymyr Peninsula and the Lena River Delta (Kessel & Gibson 1978, Rogacheva 1992, Underhill 1995, Lappo 1998). Engelmoer & Roselaar (1998) compared birds from two widely separated breeding areas in Western and Eastern Siberia, and showed that while the species exhibits much sexual variation, it shows almost no geographical variation.

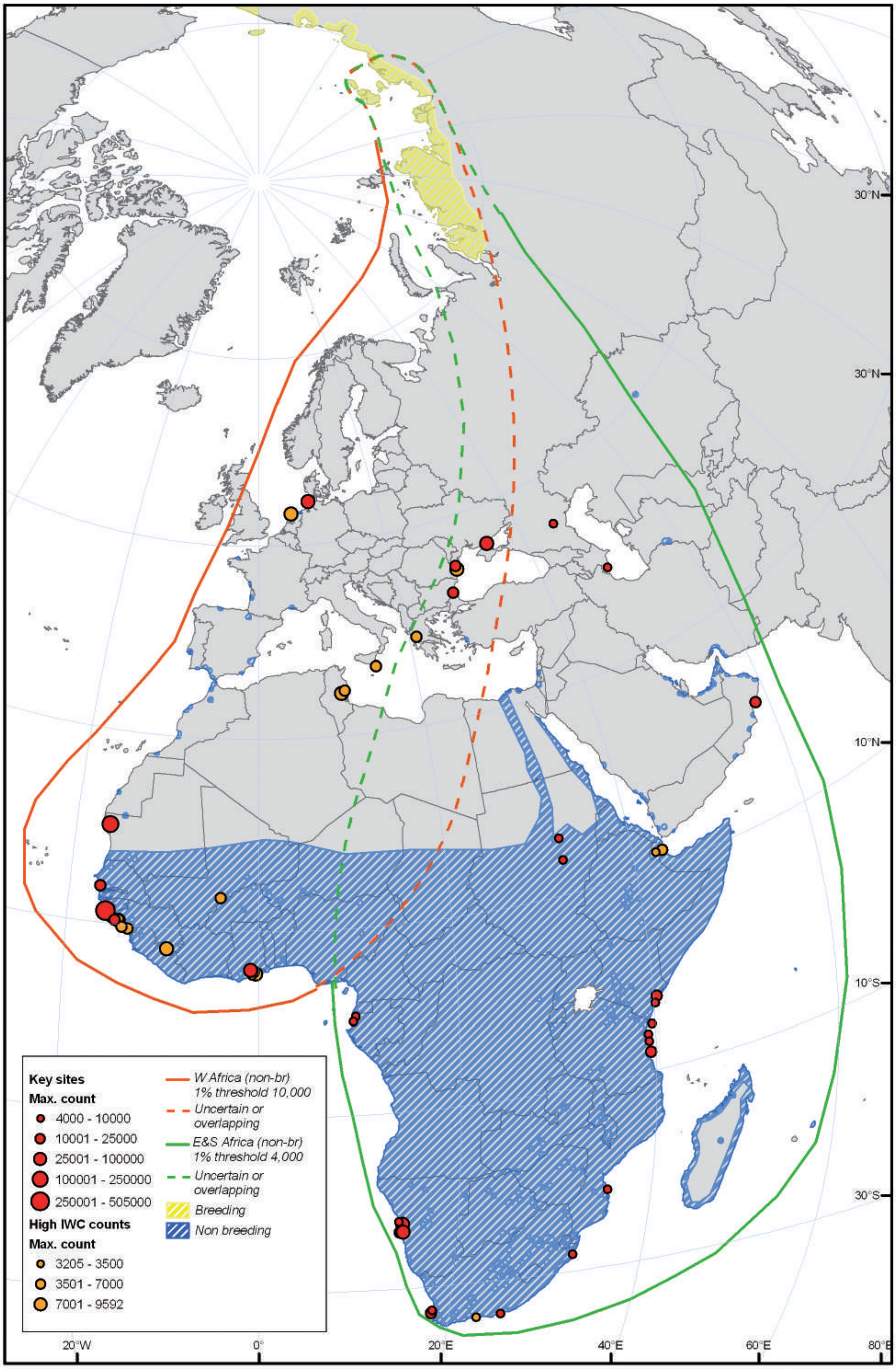
Outside the breeding season, the Curlew Sandpiper has a very wide distribution and a complex migration system (Wilson *et al.* 1980). During the boreal winter, it is found widely along the coastlines of sub-Saharan Africa, both west and east, as well as in inland Southern Africa. It also occurs at lower densities along the coasts of Southern Asia, from Pakistan in the west, through Indo-china to Australasia (Perennou *et al.* 1994, Cramp & Simmons 1983). Small numbers of birds remain throughout the winter in the Mediterranean basin (mainly Tunisia) and in the Persian Gulf and Arabian Peninsula. The ratio of non-breeding area to breeding area is greater for this species than for any other species of *Calidris* sandpiper (Underhill 1995).

Movements

Ringing recoveries show no clear migratory divide between birds migrating from the breeding grounds to Africa and those migrating to Southern Asia or Australasia (Underhill 1995). The easternmost recovery of a bird ringed in Africa is at 140ºE, and the westernmost recovery of a bird ringed in Australasia is at 80ºE (Underhill 1995); these are close to the opposite extremities of the breeding range. However, there is probably a tendency for birds in the western part of the breeding range to migrate south-west to Africa, and for birds from the eastern part of the breeding range to migrate south-east to Australasia (P.Tomkovich & C.D.T. Minton pers. com.) The migration of birds in the westernmost population occurs on a broad front, flocks travelling through Europe and continuing into West Africa (Wilson *et al.* 1980). Only a small proportion of these birds seem to follow the Atlantic coast, the main passage being overland to the Black Sea and Mediterranean (Smit & Piersma 1989). Major influxes take place in Western Europe in some years; the 1946, 1953, 1969, 1985 and 1988 events were well-documented, and consisted mainly of juveniles (Kirby *et al.* 1989 and references therein).

The median date of arrival on the breeding grounds is 8 June (Syroechkovsky & Lappo 1994). Arrival is about one week earlier in the eastern part of the breeding range (Yakutia and Chukotka) compared to the western part of the range (Yamal and Taimyr) (Tomkovich & Soloviev 2006). Males, which play no role in incubation or chick-rearing, leave the breeding grounds in late June or early July in low predation years; later in high predation years. Females leave after losing the clutch or chicks, or after their chicks fledge, usually in late July. The passage of adults through Europe is from mid-July and is bimodal in low predation years; presumably the passage of males produces the earlier peak and that of females, the later peak. At the Vistula River mouth in Poland, the peaks are from 15-25 July and 4-19 August. In high predation years, the passage is more synchronised, with a single peak at the Vistula mouth between 20-30 August. In low predation years, the migration of juveniles takes place in August and September, with peak passage through the Vistula mouth occurring from 24-29 September; few juveniles are produced in high predation years (data for Vistula mouth based on the observations of J. Gromadzka *in litt.*). Danish data show a different pattern, however, and Meltofte (1993) reported that juveniles pass through Denmark in the second half of August,

Curlew Sandpiper
Calidris ferruginea



extending into early and mid-September in "invasion" years.

Large numbers of Curlew Sandpipers have been ringed in South Africa and Namibia (over 29,000 by 1999), and recoveries from these birds have shed some light on the movements of birds migrating south-west from their breeding grounds through South-west Asia to wintering areas in Eastern and Southern Africa. Most of the recoveries, both on northward and southward migration, lie close to the Great Circle route through the eastern Mediterranean basin, the Black Sea and the Caspian Sea (Underhill *et al.* 1999). The passage of adults through the south Caspian begins in mid-July and peaks in the first few days of August; the main passage of juveniles occurs between late August and late September (D.A. Scott unpubl. obs.). Arrival at the southern limits of the non-breeding range, in South Africa, is between August and October, with the general sequence of arrival being adult males followed by adult females, and then juveniles (Elliott *et al.* 1976, Underhill 1997, L. Underhill unpubl. data). Moult takes place in South Africa between September and February. The return passage through Egypt, southern Turkey, Saudi Arabia and Iran peaks in mid-May. The duration of the northward migration is therefore approximately 45-50 days, of which the actual flying time is 7-9 days, with the remainder spent in refuelling. The birds appear to use rather few stopover sites on the northward migration (WIWO 1999). Most juveniles do not migrate north in their first April, but remain in the non-breeding areas throughout their second calendar year.

Population limits

No discrete populations are discernible on the breeding grounds. However, birds appear to depart from the Arctic by three main routes: westwards through Europe, south-westwards through the Middle East, and south-eastwards through China, and this provides a convenient delimitation of populations. Two populations occur in Western Eurasia and Africa (Pienkowski & Evans 1984):

1) birds migrating westwards from the breeding grounds, passing through Europe and the Mediterranean *en route* to West Africa;
2) birds migrating south-westwards, through the Black Sea region and the Middle East to Eastern and Southern Africa.

These "populations" are not discrete. Curlew Sandpipers have a complex migration pattern which includes loop migration (Wilson *et al.* 1980, Nikolaus & Chernichko 1995), and there is probably substantial mixing of the two populations on staging areas. Smit & Piersma (1989) noted that there was likely to be mixing of birds between the two populations at the major spring and autumn staging areas in the Black Sea. Nikolaus & Chernichko (1995), however, thought that the Curlew Sandpipers passing through Sivash Gulf, Ukraine, in autumn were heading for wintering areas in Central, Southern and Eastern Africa, while the birds staging in this area in spring used the East Atlantic Flyway in autumn on their way to wintering areas in West Africa. Underhill (1995) considered that there was apparently little strategy in Curlew Sandpiper migration, with birds from each of the breeding areas occurring in most wintering areas. Whilst individuals appear to be highly site faithful to their non-breeding areas between years, they apparently have low fidelity to their breeding sites (Lappo 1998). Underhill (1995) suggested that migration of young birds south from the breeding areas may be effectively in random directions as far south as the Tropic of Cancer. Once an individual locates a suitable non-breeding habitat, however, it seems to return there later in its adult life. More analysis of ringing data is needed to elucidate how distinct the breeding ranges of each population are.

Population size

1. West Africa (non-breeding)

Population estimate	1% threshold	Population trend
1,000,000	10,000	Strong increase

Stroud *et al.* (2004) gave a population estimate of 740,000 based on midwinter counts in the 1990s, and this estimate was adopted in *WPE3*. However, Dodman (2002) considered this estimate to be too low because of the many gaps in coverage, particularly in the Niger Delta, in parts of Mauritania, Senegal and Ghana, and at inland Sahelian wetlands, and proposed a new population estimate of 875,000. Trolliet & Fouquet (2004) also examined the data from West Africa and produced an even higher estimate of 1,300,000. In the light of these new estimates, a revised estimate of 1,000,000 was adopted in *WPE4*.

2. Eastern & Southern Africa (non-breeding)

Population estimate	1% threshold	Population trend
400,000	4,000	Stable

Stroud *et al.* (2004) derived a total of 322,000 from counts and estimates in the 1990s. Since this total included only minimum count totals from several parts of the range, the population estimate was set at 330,000, and this figure was adopted in *WPE3*. This estimate was only slightly higher than the previous estimate of 310,000, which was based on estimates of 9,000 in South-west Asia, 180,000 in Eastern Africa and 120,000 in Southern Africa (Perennou *et al.* 1994). Dodman (2002) considered the estimate of Stroud *et al.* (2004) to be too low because of the low figures used for Kenya (1,717) and Namibia (26,000), and significant gaps in coverage, notably in the Horn of Africa, Madagascar and the smaller Indian Ocean islands. He noted that almost 38,000 were counted in Namibia in January 1998, and suggested that there could be as many as 35,000 birds in Kenya. After making an allowance for missed birds, Dodman (2002) proposed a new estimate of 400,000 for this population, and this was adopted in *WPE4*.

Conservation status

Stroud *et al.* (2004) concluded that the population of Curlew Sandpipers wintering in West Africa was increasing rapidly. Their new population estimate of 740,000 was a marked increase (70%) over the 1980s estimate of 436,000 (Smit & Piersma 1989). Whilst it seems certain that there is now better coverage on the Atlantic coasts of Africa, there is evidence of substantial increases in parts of the wintering range. For example, there was an apparent increase of 30% in numbers wintering in Mauritania between 1980 and 1997 (Zwarts *et al.* 1998), and 249,000 were counted at the Banc d'Arguin in 2000 (Hagemeijer *et al.* 2004). The count at the Banc d'Arguin decreased to only 101,600 in 2001 (Isenmann 2006), but this decrease may explain an exceptionally high count in the same year in the Bijagos Archipelago, Guinea Bissau. Counts at this site increased spectacularly, from 197,000 in 1987 to 505,000 in 2001 (Dodman & Sá 2005). An increase in Morocco, however, has been attributed to improved census coverage (Dakki *et al.* 2001). Wennerberg (2001) has shown through genetic analysis (mtDNA) that there is good independent evidence for a recent population expansion and strong increase in population numbers of

Curlew Sandpiper, especially in the group migrating along the East Atlantic Flyway. The new estimate of 1,000,000 certainly suggests that there has been a substantial increase in this population since the 1980s, even allowing for improved coverage of the counts.

The new estimate of 400,000 for the Eastern and Southern African non-breeding population is more likely to reflect better coverage than any real increase in population size. Rather, the similarity between the 1980s estimate of 310,000 given by Perennou *et al.* (1994) and the 1990s estimate of 330,000 given by Stroud *et al.* (2004) suggests approximate stability in this population, as these two estimates would have suffered from similar weaknesses in coverage. The construction of artificial wetlands, such as sewage works and farm dams, especially over much of Southern Africa, has increased the available habitat in the interior of the continent. For example, Curlew Sandpipers now spend the entire austral summer in Zimbabwe, where they were formerly regarded as passage migrants (Underhill 1997). This new habitat may be intercepting birds that would otherwise have migrated to the southern extremity of Africa, and may account for the recent downward trend in numbers at Langebaan Lagoon north of Cape Town, South Africa (reported by the Western Cape Wader Study Group).

Habitat and ecology

The Curlew Sandpiper breeds mainly in Arctic tundra and more rarely in typical tundra; breeding farther south in scrub tundra is occasionally observed in years of particularly late spring thaws. Maximum breeding densities are 50 birds/sq.km (Rogacheva 1992). Breeding productivity is negatively correlated with lemming abundance in the tundra zone of Central Siberia. In years of peak lemming abundance, Arctic Foxes *Alopex lagopus* and other predators consume mainly lemmings, and the birds breed unmolested. If lemming densities decline between successive breeding seasons, there are generally large numbers of foxes and other predators, and these quarter the tundra, destroying most nests during incubation. In the Taymyr Peninsula, the lemming peaks are at approximately three-year intervals, producing a striking pattern of productivity, with years of peak productivity coinciding with the lemming peaks. Data are available from South Africa from 1969 onwards (Summers & Underhill 1987, Underhill *et al.* 1993, Schekkerman *et al.* 1998). Temperatures mediate breeding productivity in years of breeding success during the hatching period, which is in mid-July. Warm temperatures during this period lead to the most productive breeding years of all, whereas spells of freezing weather during the hatching period can result in breeding failure, in spite of the absence of predators (Schekkerman *et al.*1998).

Staging habitats used on migration may include extensive muddy or sandy tidal beaches, estuaries or saltmarshes, or inland lagoons and other shallow waters (Snow & Perrins 1998). In the Caspian region, food supply during northward migration seems to be more rich and diverse on steppe lakes, but during southward migration it is better on the Caspian Sea coasts (Shubin 2006). In Africa, Curlew Sandpipers frequent seashores, estuaries, brackish lagoons, and inland lakes and rivers. Here there is often a remarkably high degree of site fidelity, with very little interchange between years for sites even 100 km apart (Western Cape Wader Study Group unpubl. data). In contrast, there is a remarkable lack of fidelity to breeding sites: 0% in mid-Yamal Peninsula, 2% in Knipovich Bay and 2% at Pronchishcheva Lake (Ryabitsev & Alekseeva 1998, Underhill *et al.* 1993, Tomkovich & Soloviev 1994, Lappo 1998).

Network of key sites

The Curlew Sandpiper has a very extensive distribution in Africa and Western Eurasia, and although largely coastal in its terminal wintering areas, occurs widely inland during the migration seasons. However, there are several staging areas of outstanding importance, while a relatively small number of sites holds the bulk of the population during the winter months.

There is one important autumn staging areas on the Atlantic coast of Europe for the western population: the German Wadden Sea in Schleswig-Holstein (maximum 27,000). Much the most important wintering areas for this population are the Banc d'Arguin in Mauritania (maximum 250,000) and Bijagos Archipelago in Guinea-Bissau (maximum 505,000), which together can account for about 75% of the total population. Other key sites in West Africa include the Siné Saloum Delta in Senegal (maximum 18,000) and Keta Lagoon complex in Ghana (maximum 26,000).

There are three major staging areas in the Black Sea region: Sivash Gulf in Ukraine (maximum 75,000), the Danube Delta in Romania (maximum 15,000) and Bourgas Bay in Bulgaria (maximum 20,000). These sites are probably important for birds from both main wintering populations, although it has been suggested that the majority of birds staging here in autumn are bound for wintering areas in Eastern and Southern Africa, while many of the birds passing though in spring are returning from wintering areas in West Africa (Nikolaus & Chernicko 1995). However, birds staging in spring at Dadynskoe Lake in Stavropolski region, Russia, are presumably returning from wintering areas in Eastern and Southern Africa.

Twenty-two key wintering sites have been identified for this eastern population, in Russia (1), Azerbaijan (1), Oman (1), Sudan (2), Kenya (2). Tanzania (4), Mozambique (1), Gabon (2), Namibia (3) and South Africa (5). The most important of these are Barr Al Hikman (maximum 17,000) in Oman, Tana River Delta (13,000) in Kenya, Rufiji Delta (16,000) in Tanzania, Sandwich Harbour (83,000) and Walvis Bay (95,000) in Namibia, and Langebaan Lagoon (14,000) in South Africa. The maximum counts at these 20 sites could account for about 300,000 birds, or about three-quarters of the total population.

Table 59. Key sites for Curlew Sandpiper. Sites where 1% or more of a population has been recorded

Country	Site	Lat.	Long.	Season	Max total	Year max	Average total	Basis for average	Source	Population(s) at site
Azerbaijan	Kirov Bay	39.08	48.95	Autumn	4,000	1990s			Shubin, 2006	E&S Africa
Bulgaria	Bourgas Bay	42.50	27.47	Post-breeding migration	20000	1990s			Kube *et al.* 1998	W Africa + E&S Africa
Gabon	Baie de Corisco	1.20	9.67	Feb-Mar	8192	1992			AfWC database	E&S Africa
Gabon	Estuaire du Gabon	0.21	9.42	Feb-Mar	5920	1992			AfWC database	E&S Africa
Germany	Wadden Sea - Schleswig-Holstein	54.50	8.50	Autumn	27273	1996	10608	1997-01 (5)	J . Blew, CWSS, 2005	W Africa
Ghana	Keta Lagoon complex	5.92	-0.83	July-August	25743	1999	10685	1997-01 (5)	AfWC database	W Africa
Guinea	Khonibenki	10.27	14.62	January	17500	2002			B. Trolliet *in litt.*	W Africa
Guinea-Bissau	Bijagos Archipelago	11.30	-16.00	January	505000	2001	413000	1992-01 (3)	Dodman & Sa 2005	W Africa
Kenya	Sabaki river Mouth	-3.17	40.13	Non-breeding	4490	1999	1754	1995-00 (3)	AfWC database	E&S Africa
Kenya	Tana River Delta	-2.50	40.33	Non-breeding	12960	1993			AfWC database	E&S Africa
Mauritania	Banc d'Arguin	20.25	-16.33	Non-breeding	249000	2000	192200	1997-01 (3)	Hagemeijer *et al.* 2004	W Africa
Mozambique	Bazaruto, Benguera & Magaruque Is	-21.75	35.42	January	4410	1998			Köhler & Köhler *in litt.*	E&S Africa
Namibia	Cape Cross Salt Works	-22.17	14.00	July-August	4140	2000	1583	1991-00 (4)	AfWC database	E&S Africa
Namibia	Sandwich Harbour	-23.38	14.48	July-August	82983	2000	21938	1992-00 (5)	AfWC database	E&S Africa
Namibia	Walvis Bay Ramsar Site	-22.50	14.42	Non-breeding	95499	1995	30696	1997-05 (9)	AfWC database Wearne & Underhill 2005	E&S Africa
Oman	Barr Al Hikman	20.63	58.47	January	38000	2008	4313	1991-01 (5)	IWC database R. Klaasen & J. de Fouw *in litt.*	E&S Africa
Romania	Danube Delta & Razim Sinoe Lagoons	45.00	29.00	Post-breeding migration	15000	1990-98	12500	1990-98 (2)	Kube *et al.* 1998	W Africa + E&S Africa
Russia	Dadynskiye lake	45.25	45.12	Spring	3500-5000	1983			Khoklov 1993, per V. Belik	E&S Africa
Senegal	Parc National du Delta du Saloum	13.83	-16.75	Non-breeding	17786	1999	15488	1997-99 (3)	AfWC database	W Africa
South Africa	Berg 3: Hotel Mudflats & Estuary	-32.78	18.18	Non-breeding	4927	1998	3135	1997-01 (5)	AfWC database	E&S Africa
South Africa	Berg River	-32.83	18.23	Non-breeding	5414	1994			AfWC database	E&S Africa
South Africa	Lake St Lucia	-28.07	32.45	Non-breeding	4117	1992	944	1995-01 (5)	AfWC database	E&S Africa
South Africa	West Coast National Park	-33.08	18.10	Non-breeding	13872	1999			AfWC database	E&S Africa
South Africa	Zwartkops River Estuary	-33.87	25.63	Non-breeding	5165	1994	2105	1995-01 (5)	AfWC database	E&S Africa
Sudan	White Nile Bird Sanct. <20Km	13.50	32.50	Non-breeding	6000	1983			AfWC database	E&S Africa
Sudan	White Nile Bird Sanct. 20-50Km	15.75	32.50	Non-breeding	10000	1983			AfWC database	E&S Africa
Tanzania	Msimbazi Bay	-6.83	39.30	Non-breeding	6000	1995			AfWC database	E&S Africa
Tanzania	Pemba Island	-5.17	39.67	January	4000	1998			Geene 2001	E&S Africa
Tanzania	Rufiji Delta	-8.00	39.45	Non-breeding	16043	2000			AfWC database	E&S Africa
Tanzania	Zanzibar Island	-6.13	39.23	January	8636	1998			Geene 2001	E&S Africa
Ukraine	The Sivash, Azov Sea	46.17	34.58	August	75000	1998			Chernichko *et al.* 2001	W Africa + E&S Africa

Les Underhill & Derek Scott

Richard Ditch

Purple Sandpiper
Calidris maritima

Geographical variation and distribution

The Purple Sandpiper breeds in north-eastern Canada south to Hudson Bay, Greenland, Iceland, Bear Island, the Faeroes, Scandinavia, Svalbard, Franz Joseph Land, Novaya Zemlaya, Severnaya Zemlya and the north coast of the Taymyr Peninsula east to about 110°E. There is also a tiny breeding population in the north of Scotland. The wintering range extends south along the Atlantic seaboard of Europe from the Kola Peninsula and northern Norway to France, northern Spain and northern Portugal, and south on the eastern seaboard of North America from southern New Brunswick, Nova Scotia and Newfoundland to Maryland, U.S.A.

Engelmoer & Roselaar (1998) reviewed the taxonomy of the Purple Sandpiper on the basis of biometric and plumage characters, and recognised three subspecies: *C. m. littoralis* in Iceland; *C. m. belcheri* on the east coast of Hudson Bay in Canada; and the nominate form throughout the rest of the species' range. These authors showed that the birds breeding in Iceland were distinctly larger than all other birds breeding in the North Atlantic region, and resurrected the subspecies *littoralis*, originally described by Brehm in 1831. Engelmoer & Roselaar (1998) found only minor biometric differences between birds breeding in Greenland, northern Scandinavia, Svalbard, Franz Joseph Land, Novaya Zemlaya and Taymyr. However, they found that birds breeding in north-eastern Canada (north of Hudson Bay) were intermediate in size between the large Icelandic birds and the smaller birds from Greenland and the North Atlantic. Nicoll *et al.* (1991) have shown that birds breeding in southern Scandinavia (which Engelmoer & Roselaar did not examine) are smaller and have shorter bills than birds breeding further north.

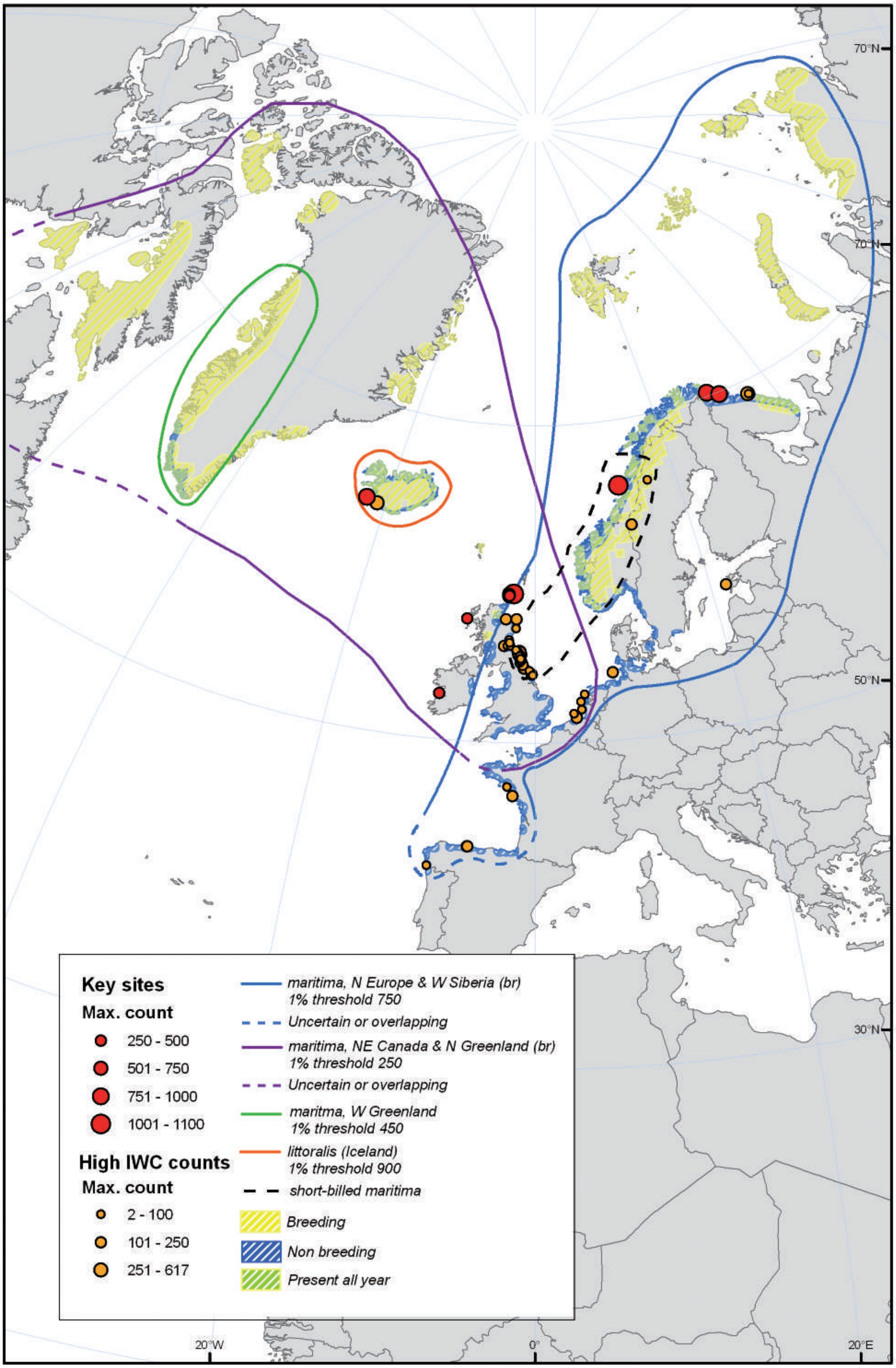
Movements

The Purple Sandpiper is partly sedentary and partly migratory, with migrants exhibiting both chain migration and leap-frog migration. The complex migration patterns have been reviewed by Summers (1994) and Summers (2002). Birds breeding in West Greenland are partially migratory, the northernmost breeders moving south to winter along the south-west coast of Greenland (Summers 1994), while Icelandic breeders (*littoralis*) are resident, remaining throughout the winter in Iceland (Cramp & Simmons 1983, Summers 1994, Kålås 1997). The movements of the small number of birds breeding in East Greenland are unknown. It has been suggested that some of these winter in Iceland (Salomonsen 1967), but there is no evidence from ringing to support this. The movements of the small numbers of birds breeding on Bear Island (>150 pairs) and in the Faeroes (25 pairs) are also unknown, although it is possible that these birds are sedentary.

The movements of birds of the nominate form breeding in north-eastern Canada remain poorly known. It has been assumed that some of these birds winter in North America, but the biometrics of birds wintering in New Brunswick match those of *belcheri* breeding in Hudson Bay, and there has been one recovery linking New Brunswick with the Belcher Islands in Hudson Bay (Summers 1994). Based on winter counts, Morrison *et al.* (2001) estimated the total wintering population of Purple Sandpipers in North America at only 15,000 birds, and this total included the entire population of *belcheri*. As Morrison *et al.* (2006) give a population estimate of 15,000 for *belcheri* alone, it is possible that very few nominate *maritima* migrate south-west to winter in North America. It seems more likely that the bulk of the population migrates south-east, leap-frogging resident populations in Greenland and Iceland, to winter mainly in Britain and Ireland, with some continuing on to The Netherlands, France and Spain (Summers 1994, Summers 2002). The biometrics of birds wintering in northern and western Britain match those of birds breeding in north-eastern Canada (Summers 2002),

Purple Sandpiper

Calidris maritima



and there are several ringing recoveries that indicate that such a movement takes place (Summers 1994). There have been six recoveries linking spring staging areas in Iceland with wintering areas in The Netherlands (three), Spain (one) and Scotland (two), two recoveries linking England with southern Greenland, and a single recovery linking Iceland (in May) with Baffin Island. It seems that these birds are using Iceland and southern Greenland as staging areas *en route* between breeding areas in north-eastern Canada and wintering areas in North-west Europe (Summers. 2002). A bird ringed in Iceland in May and recovered 12 years later in Newfoundland in December is particularly interesting. This bird is thought to have been a north-east Canadian breeder (*maritima*) that changed its wintering area from Western Europe to North America (Summers 2002).
All Scandinavian, north-east European and West Siberian breeders winter in Northern and Western Europe from the Kola Peninsula and northern Norway south to The Netherlands and north-western France. Nothing is known of the migrations of the small Faeroese and tiny British breeding populations, although the latter is thought to have originated from the Norwegian breeding population (Summers 2002). The relatively short-billed birds breeding in western Norway winter mainly on the east coast of Britain from Kincardine south to Yorkshire, although there have also been single recoveries in The Netherlands and Germany (Nicoll *et al.* 1988, Bakken *et al.* 2003). A bird ringed in central Norway, presumably also from this population, was recovered in winter in north-eastern Scotland (Summers 1994). Nicoll *et al.* (1988) estimated that there were about 4,000 short-billed birds wintering in eastern Britain, or about 25% of the British wintering population. If this proportion remains valid, there could be as many as 5,000 short-billed birds in Britain, as the British wintering population has recently been estimated at over 21,000 (Stroud *et al.* 2004).

Birds breeding in Svalbard appear to winter mainly along the Norwegian coast and in western Sweden (Summers 2002, Bakken *et al.* 2003). However, there has been one recovery in Svalbard of a bird ringed in north-eastern Scotland, indicating that a few birds from Svalbard may winter in Britain (Summers 2002). Purple Sandpipers wintering in Denmark (up to a few hundred in most winters, but maybe 500-1000 in severe winters) may also involve birds that breed in Svalbard, since there are two recoveries of birds ringed on the west coast of Sweden, apparently from this population, but numbers of Norwegian breeders also probably pass along the west coast of Jutland in autumn and spring (Meltofte 1993). Russian birds are thought to winter mainly in the Kola Peninsula and northern Norway. The biometrics of the Russian birds match those of birds wintering in northern Norway (Summers 1994), and three birds ringed in northern Norway in winter and spring have been recovered in Severnaya Zemlya, near the eastern extremity of the breeding range (Bakken *et al.* 2003). However, the biometrics of birds breeding in Svalbard are very similar to those of the Russian birds, and it seems likely that birds from both populations occur in northern Norway in winter (Summers 1994). Some birds of Russian origin may also winter much further south, passing through the Baltic to southern Sweden and the southern North Sea (Summers 1994). It has been suggested that the small number of long-billed birds wintering in south-eastern England belong to this population, as there have been several recoveries in Britain of long-billed birds ringed in Sweden on their northward passage in May (Summers 2002). However, since colour-ringing studies have shown that many birds from Svalbard reach western Sweden (Summers 2002), it is also possible that some of the long-billed birds reaching south-eastern England are from Svalbard.

The autumn migration of the Purple Sandpiper begins later than in other *Calidris* sandpipers. Short-billed birds from breeding areas in southern Norway start arriving in eastern Britain in the first half of July, and immediately begin their moult (Summers 2002). Most birds, however, moult on coasts close to their breeding areas in July and August, before onward passage to the wintering areas mainly between late September and November. Juveniles follow a similar schedule, but a few un-moulted juveniles appear in the wintering areas from mid-September (Hayman *et al.* 1986). Long-billed birds (thought to be mainly from Canada) do not arrive in Britain until late October and November, and have already completed their moult by that time (Nicoll *et al.* 1988). Spring passage takes place in April and May, with birds arriving on their northern breeding areas from mid-May to mid-June (del Hoyo *et al.* 1996). Many non-breeders remain throughout the summer just south of the breeding grounds (Hayman *et al.* 1986). Several colour-ringing schemes have reported strong site-fidelity in the wintering areas, both within and between winters (Summers 2002).

Population limits

The first two editions of *Waterbird Population Estimates* recognised only one population of the Purple Sandpiper in Western Eurasia, comprising all the birds wintering in the Eastern Atlantic, including Iceland. Stroud *et al.* (2004) accepted the subspecies *littoralis* for Icelandic breeders, and recognised two populations in Western Eurasia:

1) birds of the nominate form wintering in the Eastern Atlantic; these included all birds breeding in Europe (except Iceland) and Western Siberia, as well as an unknown proportion of the birds breeding in north-eastern Canada and possibly also some birds from Greenland;
2) The entire population of *C. m. littoralis* in Iceland.

These two populations were adopted in the third edition of *Waterbird Population Estimates*, along with two other populations: a population of nominate *maritima* wintering in North America, and the population of *belcheri* breeding in Hudson Bay, Canada.

There are several problems with this simplistic treatment. While there is good evidence that large numbers of birds from north-eastern Canada reach the Eastern Atlantic in winter, there is no evidence that any of the birds breeding in Greenland reach Western Europe. The great bulk of this latter population, estimated at 10,000-20,000 pairs (Thorup 2006), breeds on the west coast of Greenland, and apparently remains within Greenland throughout the year (Lyngs 2003). It therefore constitutes no part of an “Eastern Atlantic wintering population”. Furthermore, biometric analyses have revealed that there is considerable variation within *C. m. maritima*. Birds breeding in north-eastern Canada are larger than those occurring in Greenland and elsewhere in the North Atlantic (although not as large *C. m. littoralis* in Iceland), while birds breeding in southern Scandinavia are smaller and significantly shorter-billed than all other breeding populations except *C. m. belcheri* in Hudson Bay, Canada.

Based on geographic and biometric considerations, Stroud *et al.* (2004) concluded that there might be grounds for identifying a number of population units of the nominate form in the North Atlantic, and proposed that these might include the following:

- birds breeding in north-eastern Canada, and thought to winter mainly in North America, although apparently with

some moving to Britain;
- birds breeding in West Greenland, and apparently resident in Greenland throughout the year;
- relatively short-billed birds from breeding areas in central and southern Scandinavia, wintering mainly in eastern Britain;
- The entire population of *C. m. littoralis* in Iceland.
- birds breeding in Svalbard, Franz Joseph, northern Russia (east to Taymyr) and probably also northern Norway, and wintering from the Kola Peninsula and northern Norway south to western Sweden, south-eastern Britain, The Netherlands and France.

It seems likely that a much higher proportion of the north-east Canadian breeders migrate south-east to winter in the East Atlantic than Stroud *et al.* (2004) supposed. As indicated below, there is good evidence to suggest that perhaps as many as 19,500 of the Purple Sandpipers wintering in Britain, Ireland and the Faeroes are of Canadian origin, while the number of nominate *maritima* wintering in North America is likely to be under 15,000. It would appear, therefore, that the majority of nominate *maritima* breeding in Canada winter in the East Atlantic. As there is evidence that birds may winter on different sides of the Atlantic in different years, it might be more appropriate to treat all Canadian breeders as belonging to a single population, irrespective of the side of the Atlantic on which they winter.

There may well be grounds for treating the short-billed birds breeding in southern Scandinavia as a separate population, as Stroud *et al.* (2004) suggest. However, it is not clear where the dividing line lies between these birds and long-billed birds breeding in northern Scandinavia and Russia. Pending further study, it is recommended that these birds be retained within the much larger Northern European and Western Siberian population of nominate *maritima*.

Thus five populations of the Purple Sandpiper are recognised in this review:
1) birds of the nominate form breeding in north-eastern Canada, and thought to winter both on the Atlantic coast of North America (perhaps few) and on the Atlantic coast of Western Europe (mainly northern and western Britain and probably also Ireland and the Faeroes, with a few to The Netherlands, France and Spain);
2) birds of the nominate form breeding in West Greenland, and wintering in south-west Greenland;
3) birds of the nominate form breeding in Scandinavia, Svalbard, Franz Joseph Land and northern Russia (east to Taymyr), and wintering from the Kola Peninsula and northern Norway south to western Sweden, eastern Britain, The Netherlands and France.
4) birds of the form *littoralis*, resident in Iceland;
5) birds of the form *belcheri* breeding in Hudson Bay, and wintering on the Atlantic coast of North America (including New Brunswick).[1]

The fourth edition of Waterbird Population Estimates also recognises five populations of the Purple Sandpiper, but differs slightly from the above treatment in including some maritima from north-eastern Canada in a large East Atlantic wintering population of the nominate form, and giving separate treatment to the small number of nominate *maritima* from north-eastern Canada that winter in North America.

[1] This population lies outside the region covered by this Atlas.

Population size

Midwinter counts are relatively ineffective for this species, which is widely dispersed along rocky coasts and around offshore islands.

1. *maritima* North-east Canada & North-east Greenland (breeding)

Population estimate	1% threshold	Population trend
20,000-30,000	250	Possibly decreasing

Long-billed birds, assumed to be mainly of Canadian origin, comprise about 75% of the Purple Sandpipers that winter in Britain (Nicoll *et al.* 1988). It would seem likely that most of the birds wintering in Ireland and the Faeroes also belong to this population. Given that there are about 21,300 Purple Sandpipers wintering in the U.K. (Stroud *et al.* 2004), 2,700 in Ireland (Colhoun & Newton 2001) and 1,000 in the Faeroes (Stroud *et al.* 2004), there could be as many as 19,500 Canadian breeders in Britain, Ireland and the Faeroes in winter. Some birds from this population also reach The Netherlands, France and Spain, but the total numbers must be small, as the 1990s totals for these countries amount to only 2,300-2,800 birds (data from Stroud *et al.* 2004), and these include some birds from Northern Europe and Western Siberia. The number of Canadian breeders wintering in North America is unknown, but must also be small, as the total wintering population of Purple Sandpipers in North America has been estimated at only 15,000 birds (Morrison *et al.* 2001), and this total includes the entire population of *C. m. belcheri*. From the limited data available, it would seem that the total population of nominate *maritima* from breeding areas in north-eastern Canada and north-eastern Greenland is between 20,000 and 30,000 individuals. This is the estimate adopted here, with a 1% threshold of 250 based on the mid-point of the range.

2. *maritima* Northern Europe & Western Siberia (breeding)

Population estimate	1% threshold	Population trend
50,000-100,000	750	Probably stable

The first two editions of *Waterbird Population Estimates* gave an estimate of 50,500 for the “East Atlantic” wintering population of Purple Sandpipers, following Smit & Piersma (1998). The midwinter counts in the 1990s accounted for only about 27,500 birds (Stroud *et al.* 2004). Stroud *et al.* (2004) considered that the counts in North-west Europe related largely to birds from Scandinavia and Russia. However, over 24,000 of the birds counted were in Britain, Ireland and the Faeroes, where birds of Canadian origin are now believed to make up the majority of the wintering population. It appears, therefore, that possibly as few as 10,000 Purple Sandpipers of European origin are being located during the midwinter counts. About half of these (25% of the British wintering population) are short-billed birds from breeding areas in southern Norway.

The European breeding population of the nominate form (excluding Greenland) has been estimated at between 8,400 and 74,700 pairs (Thorup 2006) or 8,000-25,000 pairs (BirdLife International 2004a). Much of the discrepancy between these two estimates comes from the estimates for European Russia: 1,390-51,700 pairs according to Thorup (2006), and 400-1,700 pairs according to BirdLife International (2004a). East of the Urals, there are thought to be 1,000-5,000 pairs breeding on Severnaya Zemlaya (Thorup 2003), but little information is available on the size of the breeding populations elsewhere in Siberia. Nevertheless, the partial information available suggests a total population of at least 27,000 individuals, and possibly well over 250,000. Clearly, large numbers of birds are being missed by the midwinter counts. This is because there are large numbers of birds wintering along the rocky shores of western and northern Norway and the Kola Peninsula that have not yet been surveyed (Stroud *et al.* 2004). Nygård (1994) has presented totals from the sample Norwegian midwinter waterbird monitoring scheme. Counts during the period 1980-1993 ranged from only 1,463 to 5,022, although the estimated national total was 40,000-80,000.

Stroud *et al.* (2004) concluded that the estimate of 50,500 given by Smit & Piersma (1998) for the "East Atlantic" wintering population was too low, and proposed a somewhat higher (and less precise) estimate of 50,000-100,000, which was adopted in *WPE4*. This estimate included perhaps as many as 20,000 birds of Canadian origin, but did not include the 10,000-20,000 pairs (or 30,000-60,000 individuals) breeding in Greenland. A population estimate of 50,000-100,000 is also adopted here, but this is based on estimates of 40,000-80,000 birds wintering in Norway, 3,500-4,000 birds on the Atlantic coast of Western Europe (data from Stroud *et al.* 2004), and c. 5,000 short-billed birds in eastern Britain, with some allowance being made for birds wintering on the Kola Peninsula.

3. *maritima* West Greenland

Population estimate	1% threshold	Population trend
30,000-60,000	450	Unknown

The breeding population of Purple Sandpipers in Greenland has been estimated at 10,000-20,000 pairs (Thorup 2006). As only small numbers of birds are believed to breed elsewhere in Greenland (Salomonsen 1967), a population estimate of 30,000-60,000 individuals was adopted in *WPE4* and is retained here.

4. *littoralis*

Population estimate	1% threshold	Population trend
90,000	900	Unknown

Purple Sandpipers breed over much of Iceland and winter around the whole coastline. The most recent estimate of the breeding population is 30,000 pairs for 1999-2001 (Gudmundsson 2002), amounting to a post-breeding population of 90,000 individuals (Stroud *et al.* 2004). This estimate was adopted in *WPE3* and *WPE4*, and is retained here.

Conservation status

Little information is available on trends on the breeding grounds. BirdLife International (2004a) report stable breeding populations in the Faeroes, Finland, Norway (including Svalbard) and Sweden, but trends in the large breeding populations in Greenland, Iceland and Russia are unknown.

Cayford & Waters (1996) found that the number of Purple Sandpipers wintering in Britain apparently increased by 32% (from 16,140 to 21,300) during the period 1981-85 to 1988-92, but the sample of sites used for this species was not representative, and the apparent increase therefore includes an unknown element of bias. More recently there have been significant declines in the U.K. A national survey of non-estuarine coastlines in the U.K. during the winter of 1997/98 revealed that there had been a 21% decline in the numbers of Purple Sandpipers since 1984/85, from 21,660 to 17,220 (Rehfisch *et al.* 2003), and long-term monitoring of some Scottish shores also highlighted declines (Dott 1997). The reason for this decline, which did not affect all populations wintering in the U.K., is not known but it seems possible that birds are wintering further to the east and north, in Norway, where they are not included in surveys. There is also some evidence that an even greater decline (33%) occurred in the much smaller population wintering in the Republic of Ireland during the same period (Colhoun & Newton 2001). However, no statistical trend could be detected in the number of birds wintering in Norway between 1980-1993 (Nygård 1994). It is possible, therefore, that the recent declining trend in Britain (and probably also Ireland) applies only to the long-billed birds of presumed Canadian origin.

Habitat and ecology

In the high Arctic, the Purple Sandpiper occurs from sea level up to about 300 m, and in the low Arctic also on inland uplands close to the fringes of snow and ice. It breeds on rocky islands, shingle beaches, dry tundra with moss cover, and barren rocky upland tundra with patches of lichens and short vegetation (del Hoyo *et al.* 1996). At inland sites, breeding densities are normally low, while locally on the coast, densities may reach 10-30 pairs/sq.km (Kålås 1997). During the breeding season, the Purple Sandpiper feeds mainly on mudflats, shingle beaches and coastal lagoons. Outside the breeding season, it feeds chiefly on high-energy tidal rocky shores, with nearby rocky roosting sites above the high water mark. In summer, the diet consists mainly of insects, spiders, molluscs and worms, and also buds, berries and seeds; in winter, the birds feed mostly on gastropods and bivalves, and also insects and small crustaceans (del Hoyo *et al.* 1996). The Purple Sandpiper is gregarious throughout the year, usually occurring in small flocks but sometimes in concentrations of over 250 birds.

Network of key sites

Two factors make definition of key sites problematic for this species: a lack of census work in the preferred habitat (rocky coasts), and a shortage of well-defined sites in these poorly-covered habitats. Furthermore, the species often occurs widely scattered in small groups and rarely congregates in large flocks. Thus relatively few key sites can be identified for any of the populations. One key wintering site has been identified for the resident *littoralis* population in Iceland: Stafnes-Gardur in the south-west of the country, where up to 1,000 birds have been recorded in winter. Five sites in Scotland and one site in Ireland support wintering populations of over 250 birds, i.e. the 1% threshold for the North-east Canada and North-east Greenland population of *maritima*. Much the most important of these is East Sanday in Orkney, where up to 780 have been recorded in winter and 1,060 on passage (Heath & Evans 2000). An important concentration of 360 Purple Sandpipers on the Farne Islands off the north-east coast of England is thought to comprise mainly short-billed *maritima* from the small breeding population in southern Scandinavia. Three key sites have been identified for the large North European and West Siberian breeding population of *maritima*, a passage site in the Ainov Islands in Murmansk in Russia (with up to 800 on passage), and two wintering sites in Norway, Varangerfjord in Finnmark (up to 1,000) and the Vega Archipelago on the central Norwegian coast (up to 1,100).

Protection status of key sites

Most of the sites that have been identified as being of special importance for Purple Sandpipers are partly or wholly protected, although the one site in Iceland, Stafnes-Gardur, is unprotected. East Sandy in Scotland is well protected as a Site of Special Scientific Interest (SSSI), Special Protection Area (SPA) and Ramsar site. Papa Westray is partly protected as an SSSI and SPA, while the South Westray coast is unprotected. The North Uist Machair in the Outer Hebrides is partly protected in Balranald RSPB Reserve and partly in several SSSIs, while the Farne Islands in north-eastern England are protected as an SSSI and SPA. The Ainov Islands in Russia are protected within a large "zakaznik" (70,500 ha); Varangerfjord in northern Norway is unprotected except for a small nature reserve at Ekkerøya (160 ha), and the Vega Archipelago is partly protected in three nature reserves.

Table 60. Key sites for Purple Sandpiper. Sites where 1% or more of a population has been recorded

Country	Site	Lat.	Long.	Season	Max total	Year max	Average total	Basis for average	Source	Population(s) at site
Iceland	Stafnes-Gardur	64.07	-22.70	Non-breeding	1000	1989			WBDB	*littoralis* + NE Canada & NE Greenland
Ireland	Mid-Clare Coast (Mal Bay - Doonbeg Bay)	52.82	-9.47	Non-breeding	404	2000	202	1999-04 (5)	BirdWatch Ireland, 2005	NE Canada & NE Greenland
Norway	Varangerfjord	70.20	29.87	Non-breeding	1000	1990s			WBDB	N Europe & NW Siberia
Norway	Vega archipelago	65.82	11.75	Non-breeding	1100	1990s			WBDB	N Europe & NW Siberia +
Russia	Ainov islands	69.83	31.58	Migration	800	1996			WBDB	N Europe & NW Siberia
U.K.	East Sanday	59.27	-2.47	Migration	1060	1987			WBDB	N Europe & NW Siberia + NE Canada & NE Greenland
U.K.	Island of Egilsay	59.15	-2.92	January	334	1999-03	145	1999-03 (5)	BTO, UK, 2005	NE Canada & NE Greenland
U.K.	Island of Papa Westray	59.35	-2.88	January	220	2001-03	172	2001-03 (3)	BTO, UK, 2005	NE Canada & NE Greenland
U.K.	North Uist Machair	57.58	-7.47	Winter	365	1993			WBDB	NE Canada & NE Greenland
U.K.	South Westray Coast	59.27	-2.93	Non-breeding	415	1994			WBDB	NE Canada & NE Greenland

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Tim Zuroski

Dunlin *Calidris alpina*

Geographical variation and distribution

The Dunlin is a Holarctic wader, breeding widely in the sub-arctic and low Arctic zones across Europe, Asia and North America, and in parts of its range extending into temperate and high Arctic latitudes (Lappo & Tomkovich 1998). It winters on inter-tidal mudflats along temperate and subtropical coastlines north of the equator, and almost no birds reach the Southern Hemisphere.

Engelmoer & Roselaar (1998) have reviewed the global taxonomy of Dunlin based on biometrics, plumage characters and genetic studies. They list ten forms, four of which occur regularly within Western Eurasia and Africa: *arctica, schinzii, alpina* and *centralis*. Although these forms are morphologically distinct, there is low genetic differentiation between them (Wenink *et al.* 1996), suggesting recent evolutionary origin. The recent separation of *centralis* from *alpina* has been based on genetic studies (Wenink *et al.* 1996, Wennerberg *et al.* 1999), ringing recoveries, and large differences in moulting schedule (Kania 1990, Rösner 1997), but many authors still prefer to include it within nominate *alpina*.

Movements

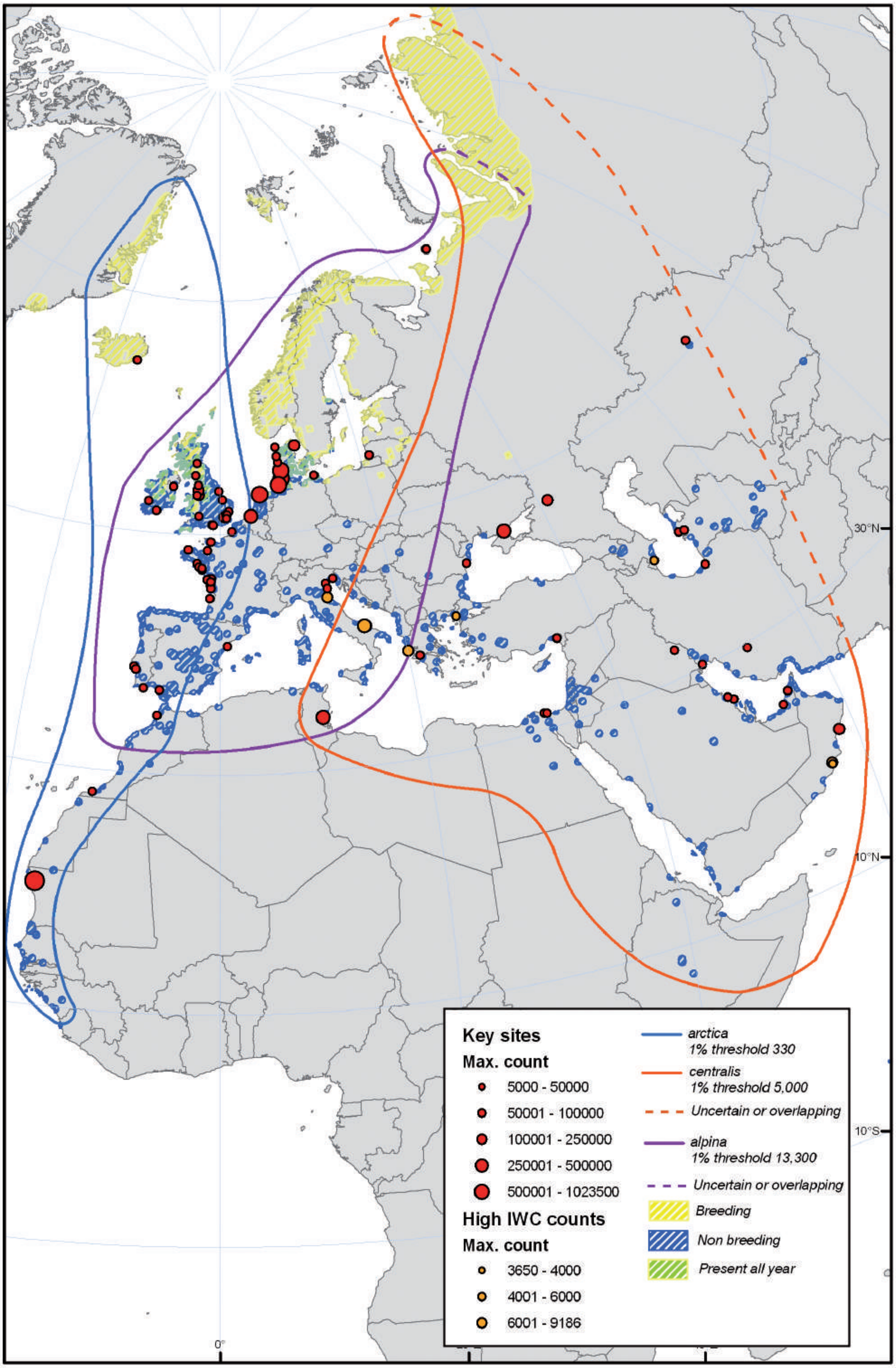
The Dunlin is highly migratory, but in general covers shorter distances than a number of other Arctic breeding waders. The northernmost wintering areas overlap with the southernmost breeding areas, e.g. in Britain and Ireland, the south-western Baltic and the northern Wadden Sea. In Western Europe, Dunlin prefer to migrate along coastlines, e.g. in the Baltic, but further east, birds travel overland from their northern breeding areas via the Caspian Sea and Black Sea to wintering areas in the Persian Gulf, Arabian Peninsula, Red Sea and eastern Mediterranean. Thousands of ringing recoveries give a good indication of movements within Western Europe (Brenning 1989, Greenwood 1984, Gromadzka 1983, Jönsson 1986, Leslie & Lessells 1978, Pienkowski & Evans 1984, Rösner 1990, 1997. Tjørve & Tjørve 2007), although even here, the results are considerably biased by differences in catching effort and probability of recovery at the various staging sites. The value of these data is further limited because very few recoveries relate the actual breeding areas to a particular migratory staging or wintering site. The best information is available for the Baltic population (Jönsson 1986), and little information is readily available for Siberian birds. Additional information has been obtained from observations of colour-ringed birds (Rösner 1997) and through comparisons of mitochondrial DNA (Wenink & Baker 1996, Wenink *et al.* 1996, Wennerberg *et al.* 1999, Lopes *et al.* 2008).

The nominate form breeds from northern Scandinavia east across northern European Russia and Western Siberia to about 85°E (Lappo & Tomkovich 1998), and migrates south-west through the Baltic to winter along the coast of Western Europe from Denmark, the Wadden Sea, Britain and Ireland south to Iberia and the western Mediterranean, with some birds moving as far as Morocco and Tunisia. The southward migration in autumn is relatively prolonged, spanning the period of the main moult (Clark 2002a). Juvenile *alpina* migrate on a much broader front than adults, with many birds occurring at inland sites in Europe. The coast of Norway is thought to be a major route used by migrating juvenile *alpina*, and Tjørve & Tjørve (2007) suggested that a majority of these birds migrate throught the Baltic in subsequent years. In spring, most adult *alpina* congregate in the Wadden Sea prior to their departure to the breeding grounds (Clark 2002a). The small number of birds breeding in Svalbard (100-200 pairs; BirdLife International 2004a) apparently belong to this form (Thorup 2006).

C. a. centralis breeds in Central and Eastern Siberia from the Yenisey at about 85°E to the Indigirka River at 150°E (Lappo & Tomkovich 1998, Engelmoer & Roselaar 1998). Many *centralis*, presumably birds from western parts of the

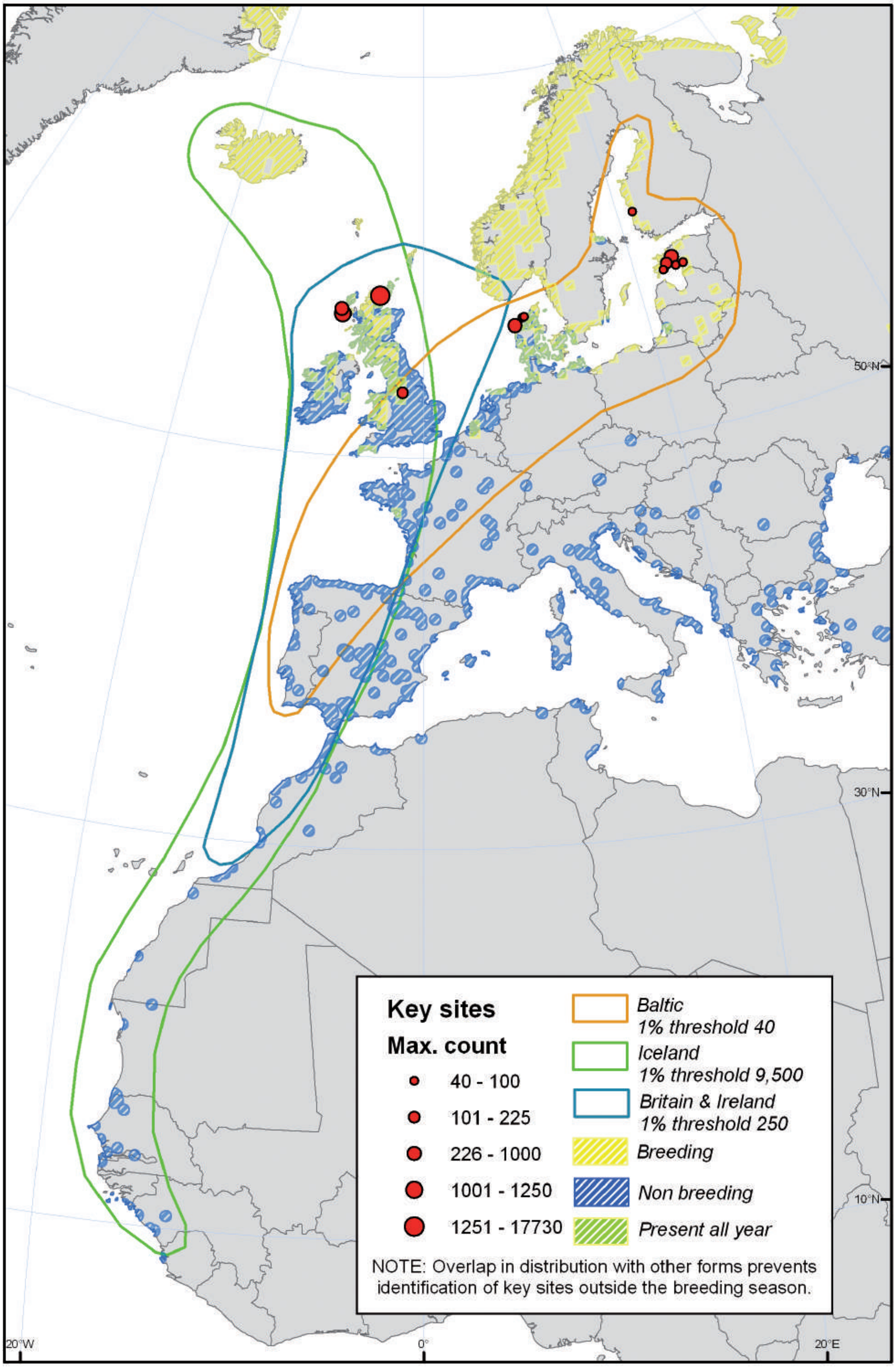
Dunlin

Calidris alpina (except schinzii)



Dunlin

Calidris alpina (schinzii only)



breeding range, migrate overland to important staging areas in the Caspian Sea and Black Sea before continuing on to wintering areas in South-west Asia, North-east Africa (south to Ethiopia) and the Mediterranean basin. Some birds travel as far west as Tunisia, and here they mix with nominate *alpina* (van der Have *et al.* 1997). Many other *centralis*, presumably birds from eastern parts of the breeding range, winter in the Indian subcontinent (mainly Pakistan and western India), and thus outside the region covered by this Atlas. The western limit of the breeding range of *centralis* is unclear. Lappo & Tomkovich (1998) suggest that this form intergrades with *alpina* in north-western Russia, while Engelmoer & Roselaar (1998) state that *alpina* intergrades with *centralis* east of the Yenisey (85°E).

C. a. schinzii breeds in southern Scandinavia, the Baltic region, Britain, Ireland, the Faeroes, Iceland and occasionally south-eastern Greenland. Birds breeding in the Baltic region are thought to migrate only a short distance to winter mostly in Western Europe between the British Isles and Iberia (Jönsson 1986), with perhaps a few birds moving as far south as North-west Africa. Birds breeding in Britain and Ireland probably winter mainly in North-west Africa, although some go no further than South-west Europe (Clark 2002a). There has been one recovery of a British breeder in the south of England in December (Clark 2002a), suggesting that a few birds may remain this far north throughout the winter. The small numbers of *schinzii* breeding in lowland grassland and heathland in western Norway (Thorup 2006) may join British and Irish *schinzii*, as there have been five recoveries of Norwegian *schinzii* on passage in Britain (Clark 2002a). Birds breeding in Iceland migrate via the Atlantic coast of Western Europe to winter in West Africa from Morocco to the Banc d'Arguin in Mauritania, with only small numbers occurring further south in Senegal and Guinea-Bissau (Dodman 2002). There is some suggestion that many more of these birds stage in Britain and Ireland in autumn than in spring (Clark 2002a).

C. a. arctica breeds in the high Arctic of East Greenland from approximately 69ºN to 81ºN, and occurs briefly on passage in Britain and Ireland *en route* to its winter quarters which are believed to be in West Africa.

Female Dunlin leave the breeding grounds a few days after the young have hatched, leaving the males to care for the chicks until they become independent. Once the males have departed, the juveniles congregate in small groups before the southward migration which begins in late July. Most British breeders have left the country by the middle of August. Birds leave the West African wintering areas between the end of March and mid-May. The first birds arrive back on the breeding grounds in Britain in April, while high Arctic breeders may not arrive back until early June (Clark 2002a). In their first summer, many Dunlin do not return to their breeding grounds, but tend to move part way back, only to return to their moulting grounds (Clark 2002a). Many adult *alpina* from western breeding areas arrive on the moulting grounds in the Wadden Sea and the Wash in July and August, before starting their moult. Other birds, especially those breeding in the east of the range, undergo at least part of their annual moult while on their breeding grounds or on passage through the Baltic (Clark 2002a). Juvenile *alpina* arrive in Britain and Ireland somewhat later than adults, mainly in September and October

Population limits

Smit & Piersma (1989) identified four populations of the Dunlin in the East Atlantic Flyway: a population of nominate *alpina*; a population of *arctica*; and two populations of *schinzii*, a western population (Iceland and south-east Greenland) and a temperate population (Baltic, Britain and Ireland). Perennou *et al.* (1994), who did not recognise *centralis*, identified a more easterly population of *alpina* breeding in Siberia and wintering in South-west Asia and North-east Africa. These five populations were recognised in the first two editions of *Waterbird Population Estimates*. Wennerberg & Bensch (2001) have shown that the *schinzii* Dunlin breeding in the Baltic region are genetically distinct from the *schinzii* breeding in Iceland. It has also been suggested that the *schinzii* breeding in the Baltic region should be separated from those breeding in Britain and Ireland, as there is increasing evidence of differences in wintering grounds and migration schedules (e.g. Jönsson 1986). This separation was supported by Stroud *et al.* (2004), and adopted in *WPE3* and *WPE4*. Thus, six populations of the Dunlin are now recognised in Western Eurasia and Africa:

1) *C. a. alpina* breeding in northern Scandinavia (including Svalbard), northern European Russia and Western Siberia east to about 85°E, and wintering mainly in Western Europe, but with some moving south to North-west Africa;
2) *C. a. centralis*, breeding in Northern Siberia east of about of 85°E, and wintering in the Caspian region, the Middle East, the Mediterranean basin and North-east Africa;
3) *C. a. schinzii* breeding in the Baltic region, and probably wintering mostly in Western Europe from Britain and Ireland to Iberia, with perhaps some moving as far south as North-west Africa;
4) *C. a. schinzii* breeding mainly in Britain and Ireland, and wintering mainly in North-west Africa, with some remaining further north in South-west Europe;
5) *C. a. schinzii* breeding mainly in Iceland, and wintering in North-west and West Africa;
6) *C. a. arctica* breeding in north-eastern Greenland, and wintering in West Africa.

There is considerable overlap between several of these populations both during the migration seasons and on their winter quarters in Western Europe and North-west Africa. Thorup (2006) included the small number of birds breeding in the Faeroes (10 pairs) and western Norway (20-150 pairs) in the British and Irish population of *schinzii*. The Baltic population of *schinzii* includes birds breeding in southern Sweden, southern Finland, west-central European Russia, Estonia, Latvia, Lithuania, Belarus, Poland, Denmark, Germany and The Netherlands. The Icelandic population of *schinzii* includes the few pairs of *schinzii* that occasionally breed in south-east Greenland.

Population size

1. *alpina*

Population estimate	1% threshold	Population trend
1,330,000	13,300	Stable

Smit & Piersma (1989) gave an estimate of 1,373,000 for *alpina* in the East Atlantic Flyway, and this estimate was adopted in the first two editions of *Waterbird Population Estimates*. Since 1970, the estimated annual totals have fluctuated from 0.9 to 1.5 million birds (Rösner 1997), with a mean of about 1.2 million birds. The 1990s midwinter estimate for the total number of birds in the European and North-west African wintering range of this population is 1,367,000 (Stroud *et al.* 2004). This figure lies within the annual range of variation. However, the 1990s estimate includes birds wintering in Tunisia and northern Morocco. Based on biometric and ringing evidence, only 58% of the

Tunisian birds are *alpina*, the rest being *centralis* (van der Have *et al.* 1997), and only 50% of the north Moroccan birds are *alpina*, the rest being mainly Icelandic *schinzii* (Kersten *et al.* 1983). Furthermore, the 1990s estimate includes the Baltic breeding population of *schinzii* (estimated at 3,300-4,100 birds) which is thought to winter in South-west Europe (Jönsson 1986), and probably also part of the British and Irish breeding populations of *schinzii*. After making allowances for the *centralis* and *schinzii* in Tunisia and Morocco respectively, and after subtracting the estimate for temperate *schinzii* from the total, Stroud *et al.* (2004) gave a revised figure of 1,331,000-1,334,000 for the population of *alpina*. This figure, rounded to 1,330,000, was adopted in *WPE3* and *WPE4*.

National estimates of breeding populations collated by Thorup (2006) indicate that there are a total of 101,000-211,000 pairs of *C.a. alpina* breeding in Europe, while data from BirdLife International (2004a) give a figure of 74,000-220,000 pairs. These figures equate to about 220,000-660,000 individuals in winter, or about 17-50% of the total population of *alpina* derived from midwinter counts. The numbers of *alpina* breeding in Western Siberia are unknown.

2. *centralis* South-west Asia, North-east Africa & East Mediterranean (non-breeding)

Population estimate	1% threshold	Population trend
500,000	5,000	Unknown

The size of the Central Siberian breeding population is poorly known. The highest number published for any individual site is 170,000-254,000 during spring migration in Sivash Gulf, Ukraine (Chernichko *et al.* 1991). Midwinter counts and estimates in the 1990s gave a total of 295,600 (Stroud *et al.* 2004), and this was rounded to give the population estimate of 300,000 adopted in *WPE3*. This estimate includes 42% of the Dunlin wintering in Tunisia, based on biometric and ringing evidence (van der Have *et al.* 1997).

The estimate of 300,000 given in *WPE3* was substantially higher than the estimate of 150,000 given by Perennou *et al.* (1994) and adopted in the first two editions of *Waterbird Population Estimates*. However, the latter estimate did not include any birds wintering in the Mediterranean or North-east Africa, and thus excluded any birds passing through the Black Sea region. Given the low levels of count coverage in many parts of the wintering range of this population and the fact that as many as 254,000 have been counted at one site, near the western limits of the range of the population, the estimate of 300,000 is still clearly too low. Midwinter counts in the 1990s account for 226,300 in the Middle East, 51,000 in Egypt and Tunisia, and 18,000 in South-east Europe and Turkey. There are large gaps in coverage along the Red Sea coast of North-east Africa and in parts of the Arabian Peninsula and Persian Gulf. It seems unlikely that birds breeding in the Taymyr and migrating to the Persian Gulf and Arabian Peninsula would occur on passage in the Black Sea, and it would therefore seem safe to add the 226,300 counted in the Middle East to the 254,000 occurring on passage in the Black Sea. Adding a further 20,000 to account for gaps in coverage in the Middle East gives a total of 500,000 – the estimate adopted in *WPE4*.

3. *schinzii* Baltic (breeding)

Population estimate	1% threshold	Population trend
3,330-4,100	40	Strong decrease

National estimates of breeding populations collated by Thorup (2006) gave a total of 1,110-1,360 pairs, or about 3,300-4,100 individuals – the estimate adopted in *WPE4*.[1] A large proportion of the population occurs in three countries: Denmark (340-360 pairs), Sweden (300 pairs) and Estonia (200-250 pairs) (data from Thorup (2006) and Estonian Ornithological Society (2008)). Since this small population winters wholly within the range of the much larger population of nominate *alpina*, separate monitoring of numbers in winter is not possible.

4. *schinzii* Britain & Ireland (breeding)

Population estimate	1% threshold	Population trend
23,000-26,000	250	Decreasing

The population of *schinzii* breeding in Britain, Ireland, the Faeroes and western Norway is considerably larger than the population breeding in the Baltic. Stroud *et al.* (2004) estimated the size of the population at about 23,300-25,600 individuals, based on a breeding population of about 7,800-8,500 pairs, and gave a population estimate of 23,000-26,000 after rounding. Their total included 10 pairs in the Faeroes, 150 pairs in Ireland and 7,635-8,385 pairs in Britain, but excluded the small number of birds breeding in Norway (20-150 pairs; Thorup 2006). Stroud *et al.* (2004) noted that there had been no re-estimation of the large British breeding population since the early 1980s. The estimate of 7,635-8,385 pairs that they used was derived largely from an assessment by Stroud *et al.* (1987), which adjusted the estimate of Reed (1985) for losses in numbers due to habitat destruction in the mid-1980s. Reed's estimate was based on extrapolations from surveys and other information from the first half of the 1980s.

The true size of the British breeding population remains unclear. Stroud *et al.* (1987) gave a figure of 9,900 pairs, while Gibbons *et al.* (1993) gave a figure of 9,150 pairs, following Batten *et al.* (1990). These two estimates were the source of the estimate of 9,150-9,900 pairs given by BirdLife International/EBCC (2000). More recently, Clark (2002a) has given an estimate of <10,000 pairs for the combined British and Irish populations. However, in their recent collations of national estimates of breeding populations, Thorup (2006) and BirdLife International (2004a) have both given an estimate of 18,300-33,500 pairs for the British population. Adding the small breeding populations in the Faeroes, Ireland and Norway gives a total of 18,480-33,810 pairs, which equate to a total population of about 55,500-101,400 individuals – two to four times higher than the estimate given by Stroud *et al.* (2004). *WPE3* and *WPE4* adopted the population estimate of 23,000-26,000 from Stroud *et al.* (2004), as it seems that the estimate of 18,300-33,500 pairs in Britain dates back to surveys carried out between 1980 and 2002. Since this small population, like the Baltic population of *schinzii*, winters wholly within the range of other, much larger Dunlin populations, separate monitoring of numbers in winter is not possible.

5. *schinzii* Iceland (breeding)

Population estimate	1% threshold	Population trend
940,000-960,000	9,500	Stable

Smit & Piersma (1989) estimated the size of the Icelandic *schinzii* population at 800,000 birds, and this was the estimate adopted in the first two editions of *Waterbird Population Estimates*. The total number of Dunlin within the wintering range of this population in the 1990s was estimated at 984,000 (Stroud *et al.* 2004). This figure included 50% of the birds wintering in northern Morocco (north of 28° N), based on biometric and ringing evidence (Kersten *et al.* 1983). All birds from southern Morocco (south of 28° N) were treated as *schinzii*. The 1990s total is a 23% increase over the previous estimate of 800,000, but this may, at least partly, be a result of better count coverage on the wintering grounds in West Africa (Stroud *et al.* 2004).

C. a. arctica is also believed to winter in West Africa (chiefly on the Banc d'Arguin), and thus occurs wholly within the wintering range of Icelandic *schinzii.* As there are believed to be some 21,000-45,000 *arctica* wintering in West Africa (see below), the actual population of *schinzii* will be this many birds fewer, i.e. 939,000-963,000 birds. This range, after rounding, was propsed by Stroud *et al.* (2004) as the 1990s population estimate, and adopted in *WPE3* and *WPE4*.

The Icelandic breeding population has been estimated at 270,000 pairs (Gudmundsson 2002), equating to about 810,000 individuals. This total agrees reasonably well with the estimate derived from winter counts. *C. a. schinzii* is only an irregular breeding bird in Greenland (D. Boertmann *in litt.*); Thorup (2006) gives an estimate of 0-20 pairs.

6. *arctica*

Population estimate	1% threshold	Population trend
21,000-45,000	330	Possibly stable

Since this population is believed to winter wholly within the West African wintering range of the numerically much larger Icelandic *schinzii* population, no separate midwinter estimate is possible. Meltofte (1985) estimated the breeding population to be 5,000 pairs, yielding a population estimate of 15,000 birds (Smit & Piersma 1989). This was the estimate adopted in the first two editions of *Waterbird Population Estimates*. Based on a more recent and comprehensive analysis of densities on the breeding grounds, Meltofte (2001) estimated the breeding population of Dunlin in Greenland at 7,000-15,000 pairs, equating to 21,000-45,000 birds - the estimate adopted in *WPE3* and *WPE4*.

Conservation status

Nothing is known of trends in the population of *C. a. centralis* breeding in Northern Siberia. In the 1980s, the Northern European and Western Siberian breeding population of *alpina* was considered to have been in decline for some years, as indicated by the change in numbers wintering in Britain in the 1970s and 1980s (Goss-Custard & Moser 1988). However, counts in the early 1990s indicated that the population was increasing again (Prŷs-Jones *et al.* 1994, Cranswick *et al.* 1997). Numbers wintering in the U.K. and The Netherlands reached low points in the mid-1980s and recovered in the 1990s. Numbers continued to increase in The Netherlands in the 2000s, but have been decreasing again in the U.K. since 1997 (Banks *et al.* 2006, van Roomen *et al.* 2006). The numbers wintering in France also increased in the 1980s and 1990s, from 200,000 to 292,000 (Deceuninck & Mahéo 2000). van der Have *et al.* (1997) found almost no change in the numbers wintering in the Gulf of Gabès in Tunisia between 1984 and 1994. More recently, BirdLife International (2004a) has reported declines in the large breeding populations in Sweden and European Russia. Over a longer term, it seems that the population is fluctuating, or perhaps even still increasing from a hunting-related low in the first half of the twentieth century (Rösner 1997, Tubbs *et al.* 1992).

The small Baltic population is decreasing in every country within its range (Clark 1994), as indicated by intensive breeding censuses from many breeding sites throughout Sweden (Jönsson 1988, 1991), Denmark (Thorup 1998), Estonia (Renno 1994, Elts *et al.* 2003, Estonian Ornithological Society 2008), Finland (Perttula 1990), Poland (Wlodarczak 1999) and Russia (Malchevski & Pukinski 1983). The main reasons for the decline are believed to be a decrease in the grazing of salt marshes on the Baltic coast and an increase in predators (Malchevski & Pukinski 1983, Stiefel & Scheufler 1989, Köppen 1998, Thorup 1998). The reasons for the decrease in the formerly considerable numbers breeding in the north-eastern part of the Wadden Sea are unknown. This Baltic population is now considered to be at risk of extinction in the next 20-30 years if breeding habitat continues to be lost (Stroud *et al.* 2004).

The population of *schinzii* breeding in Britain and Ireland has been negatively affected as a result of upland afforestation, agricultural intensification and human induced spread of predators (Stroud *et al.* 1987, Thompson *et al.* 1998, Reid 1993). Stroud *et al.* (1987) calculated the loss of 791 pairs from the main stronghold of Caithness and Sutherland as a consequence of afforestation in the 1980s (amounting to a decline of over 7% in the national population). Hancock & Avery (1998) compared numbers on unforested peatland plots in Caithness and Sutherland surveyed in 1979-87 with surveys on the same areas in 1993-94. They found a significant decrease in numbers and suggested that nationally numbers may have declined by 17% (i.e. to c. 8,200 pairs). On peatlands in Lewis and Harris, however, numbers may have increased slightly (Whitfield 1996), although further south in the Outer Hebrides numbers have crashed as a consequence of predation by introduced European Hedgehogs *Erinaceus europaeus* (Fuller & Jackson 1999, Jackson & Green 2000, Jackson 2001). The breeding range has both expanded and contracted in different parts of Scotland (Reid 1993).

The large population of *schinzii* breeding in Iceland is considered to be stable (Clark & Gromadzka 1997), and this is supported by recent counts at the main wintering area in Mauritania. A comprehensive survey of the Banc d'Arguin in early 1997 found almost 920,000 Dunlin, 12% more than in 1980 (Zwarts *et al.* 1998a), while the total counted in January 2000 was over 1,030,000 (Hagemeijer *et al.* 2004).

No detailed trend information is available for the population of *C. a. arctica*, although Smit & Piersma (1989) considered numbers to be stable, as did BirdLife International/EBCC (2000) and BirdLife International (2004a).

While in the first half of the twentieth century hunting may have caused a considerable reduction in some populations of the relatively long-lived Dunlin, this seems no longer to be the case in most of the Western Palearctic. However, many Dunlin which stage during migration in the Nile Delta are trapped by subsistence hunters (Meininger & Atta 1994). In recent decades, the principal threat to the Dunlin has been the loss and degradation of inter-tidal habitats. Dunlin are especially vulnerable because of their dependence on a relatively small number of key sites where they occur in very large numbers. In parts of their range, inter-tidal mudflats face ongoing destruction by embankments, oil or gas extraction and the construction of barrages. Important staging sites in the Persian Gulf were badly affected by oil pollution during and after the 1990-1991 Gulf War (Evans & Keijl 1993). In the U.K., the spread of *Spartina anglica* on upper mudflats has contributed to the loss of feeding habitat (Goss-Custard & Moser 1988). In the long term, further inter-tidal habitat could disappear as a result of the effects of sea-level rise.

Habitat and ecology

Dunlin breed in a wide range of wet or moist habitats, ranging from Arctic tussock and peat-hummock tundra to wet upland moorland, temperate wet grasslands and coastal salt marshes (Thorup 2006). Extremely high breeding densities equivalent to more than 300 pairs per sq.km have been reported in the machair (calcareous coastal grasslands) of the Outer Hebrides in Scotland (Etheridge 1982). During the migration seasons and in winter, Dunlin occur almost exclusively on estuarine or non-estuarine inter-tidal mudflats, feeding there during low tide and concentrating on adjacent terrestrial sites at high tide. During their first migration, some juveniles appear in other habitats, such as the muddy shores of lakes, river banks, sewage works, sandy beaches and small offshore islands (Rösner 1990, Dierschke 1998). Dunlin are highly site-faithful to their winter roost sites both within and between winters (Clark 2002a).

Network of key sites

There are at least three key sites of outstanding importance for Dunlin in Western Eurasia and Africa, each harbouring a substantial proportion of one or more populations during migration or in winter:

(1) The Wadden Sea on the Danish-German-Dutch coast of the North Sea. As many as 1.2 million Dunlin have been recorded at one time, with the highest densities occurring in the Danish and German parts (Meltofte *et al.* 1994). The area is used by the entire population of nominate *alpina* and probably most of the Baltic population of *schinzii* during migration (Meltofte *et al.* 1994, Rösner 1997). The numbers of *alpina* are lower in winter, but may still reach 250,000 in some years.

(2) The Banc d'Arguin in Mauritania. This site can harbour over one million Dunlin in winter (Isenmann 2006). These include almost the entire Icelandic population of *schinzii* and probably the bulk of the north-east Greenland population of *arctica*.

(3) Sivash Gulf, north of the Crimean Peninsula, Ukraine. This site harbours 170,000-254,000 Dunlin during the spring migration, and 100,000-160,000 during the autumn migration (Chernichko *et al.* 1991). This may represent over 50% of the Central Siberian population of *centralis*.

At Tipperne, Denmark, internationally important numbers are recorded regularly during the migration period, while at the Bock area (German Baltic Coast), high numbers occur on autumn passage only in years with many juveniles. It is possible that many more internationally important sites could be identified if more information were to become available on specific staging or wintering sites of the three small populations (Baltic *schinzii*, British & Irish *schinzii* and North-east Greenland *arctica*).

Protection status of key sites

Two of the three largest and most important key sites, the Wadden Sea and the Banc d'Arguin, are afforded some protection. While most of the German part of the Wadden Sea and the Banc d'Arguin are designated as National Parks, the Danish and Dutch parts of the Wadden Sea are protected by other designations. A number of other key sites are also protected.

Table 61. Key sites for Dunlin. Sites where 1% or more of a population has been recorded

Country	Site	Lat.	Long.	Season	Max total	Year max	Average total	Basis for average	Source	Population(s) at site
Denmark	Arup/Vesløs Vejle	57.02	8.92	Summer	81	1998			WBDB	Baltic
Denmark	Bøvling Fjord	56.40	8.15	May	15000	1990			H Meltofte *in litt.*	*alpina* + Baltic
Denmark	Bygholm Vejle	57.05	9.10	Summer	288	1998			WBDB	Baltic
Denmark	Harboøre Tange	56.65	8.17	Summer	315	1990			WBDB	Baltic
Denmark	Læsø, Rønnerne	57.20	8.13	May	40000	1994			WBDB	*alpina* + Baltic
Denmark	Northwestern Kattegat	57.20	11.00	Non-breeding	64000	1994			Skov *et al.* 2000	*alpina* + Baltic
Denmark	Tipperne	55.88	8.24	Jul-Nov	33928	1996			NERI, Denmark, 2005	*alpina* + Baltic
Denmark	Wadden Sea	55.16	8.58	Autumn	258450	2000	178411	1999-02 (4)	NERI, Denmark, 2005	*alpina* + Baltic
Egypt	El Malaha. Bur Fuad	31.22	32.32	Winter	10100	1990			IWC database	*centralis*
Egypt	Lake Manzala	31.27	32.03	Winter	11275	1990			IWC database	*centralis*
Estonia	Kihnu Väin strait	58.30	24.00	Breeding	53 13-22 pairs	2007			Erit *et al.* in press	Baltic
Estonia	Matsalu National Park	58.75	23.84	Breeding	240 72-88 pairs	2007			Erit *et al.* in press	Baltic
Estonia	Pärnu Bay & Kihnu Strait	58.20	24.17	Breeding	75	1998			WBDB	Baltic
Estonia	Southern Saaremaa	58.29	22.91	Breeding	57 13-25 pairs	2007			Erit *et al.* in press	Baltic
Estonia	Väike Väin strait	58.53	23.18	Breeding	225	1995			WBDB	Baltic

Country	Site	Lat.	Long.	Season	Max total	Year max	Average total	Basis for average	Source	Population(s) at site
Finland	Pori Archipelago & wetlands	61.53	21.60	Breeding	75	1997			WBDB	Baltic
France	Baie de Bourgneuf et Noirmoutier	47.04	-2.12	Non-breeding	22078	2002	16859	1999-04 (5)	IWC database	*alpina* + Iceland + *arctica* + Britain & Ireland + Baltic
France	Baie de l'Aiguillon et Pointe d'Arçay	46.32	-1.17	Non-breeding	32370	2003	25104	1999-04 (5)	R. Maheo, LPO *et al.* 2005	*alpina* + Iceland + *arctica* + Britain & Ireland + Baltic
France	Baie de Morlaix + Penze	48.68	-3.87	Non-breeding	17200	1991	11470	1999-04 (5)	R. Maheo, LPO *et al.* 2005	*alpina* + Iceland + *arctica* + Britain & Ireland + Baltic
France	Baie des Veys	49.40	-1.14	Non-breeding	16040	1998	13287	1999-04 (5)	R. Maheo, LPO *et al.* 2005	*alpina* + Iceland + *arctica* + Britain & Ireland + Baltic
France	Baie du Mont Saint Michel	48.67	-1.51	Non-breeding	46730	1997	28329	1999-04 (5)	R. Maheo, LPO *et al.* 2005	*alpina* + Iceland + *arctica* + Britain & Ireland + Baltic
France	Baie d'Yves	46.04	-1.08	Non-breeding	16517	1994-98	14461	1994-98	IWC database	*alpina* + Iceland + *arctica* + Britain & Ireland + Baltic
France	Bassin d'Arcachon et Banc d'Arguin	44.67	-1.13	Non-breeding	38289	2002	22781	1999-04 (5)	R. Maheo, LPO *et al.* 2005	*alpina* + Iceland + *arctica* + Baltic
France	Golfe du Morbihan	47.56	-2.79	Non-breeding	30900	1999	21673	1999-04 (5)	R. Maheo, LPO *et al.* 2005	*alpina* + Iceland + *arctica* + Britain & Ireland + Baltic
France	Ile de Rey	46.22	-1.50	Non-breeding	17050	1994	8587	1999-04 (5)	R. Maheo, LPO *et al.* 2005	*alpina* + Iceland + *arctica* + Britain & Ireland + Baltic
France	Ile d'Oléron, marais de Brouage-Saint-Agnant	45.77	-1.14	Migration	20000	1997			WBDB	*alpina* + Iceland + *arctica* + Britain & Ireland + Baltic
France	Littoral Picard	50.23	1.50	Non-breeding	21851	1996	8525	1999-04 (5)	R. Maheo, LPO *et al.* 2005	*alpina* + *arctica* + Britain & Ireland + Baltic
France	Marais du Nord Medoc	45.49	-1.04	Non-breeding	17000	2002	7815	1999-04 (5)	R. Maheo, LPO *et al.* 2005	*alpina* + Iceland + *arctica* + Britain & Ireland + Baltic
France	Marais littoraux de Charente-Maritime, dont R.N. d'Yves	46.24	-1.48	Non-breeding	20036	1992	7229	1999-04 (5)	R. Maheo, LPO *et al.* 2005	*alpina* + Iceland + *arctica* + Britain & Ireland + Baltic
France	Marais poitevin et baie de l'Aiguillon	46.33	-1.00	Migration	20000	2003			WBDB	*alpina* + Iceland + *arctica* + Britain & Ireland + Baltic
France	Presqu'île Guérandaise dont Traicts du Croisic	47.29	-2.51	Non-breeding	15344	2000	11547	1999-04 (5)	R. Maheo, LPO *et al.* 2005	*alpina* + Iceland + *arctica* + Britain & Ireland + Baltic
France	Résèrve Naturelle de Moeze (Charente-Seudre)	45.83	-1.14	Non-breeding	43671	2000	28416	1999-04 (5)	R. Maheo, LPO *et al.* 2005	*alpina* + Iceland + *arctica* + Britain & Ireland + Baltic
France	Sud-Loire	47.17	-2.13	Non-breeding	14506	2000	6553	1999-04 (5)	R. Maheo, LPO *et al.* 2005	*alpina* + Iceland + *arctica* + Britain & Ireland + Baltic
Germany	Bock - Hiddensee	54.48	13.05	Autumn	20000	1995			HW Nehls *in litt.*	*alpina* + *arctica* + Baltic
Germany	Krummhörn-Westermarsch	53.48	7.07	Autumn	25000				Melter & Schreiber 2000	*alpina* + *arctica* + Baltic
Germany	Wadden Sea - Lower Saxony	54.00	8.00	Autumn	250616	1992	133398	1997-01 (5)	J . Blew, CWSS, 2005	*alpina* + *arctica* + Baltic
Germany	Wadden Sea Schleswig-Holstein	- 54.50	8.50	Autumn	415592	1991	243230	1997-01 (5)	J . Blew, CWSS, 2005	*alpina* + *arctica* + Baltic
Germany	Western Pomerania coast	54.43	12.90	Autumn	30000	1991			Scheller *et al.* 2002	*alpina, arctica*, Baltic
Greece	Messolonghi Lagoon	38.33	21.22	Winter	6880	2001	3893	1997-01 (5)	IWC database	*centralis*
Iceland	Skardsfjördur	64.27	-15.07	Migration	10000	1990s			WBDB	Iceland + *arctica*
Iran	Gomishan marshes and Turkoman Steppes	37.25	53.92	January	11641	2007	5701	2004-07(3)	DOEI / WIWO	*centralis*

Country	Site	Lat.	Long.	Season	Max total	Year max	Average total	Basis for average	Source	Population(s) at site
Iran	Khouran Straits	26.93	55.7	January	8851	2007	4333	2004-2007 (3)	DOEI / WIWO	*centralis*
Iran	Lake Bakhtegan, Lake Tashk & Kamjan Marshes	29.67	53.50	Migration	6000	1973			Evans 1994	*centralis*
Iran	Miankaleh Peninsula & Gorgan Bay	36.83	53.75	Non-breeding	5000	1973			Evans 1994	*centralis*
Iran	Shadegan Marshes, Khor -al Amaya & Khor Musa	30.17	48.67	January	20787	2004	7453	2004-07 (3)	DOEI /WIWO	*centralis*
Iraq	Haur Al Sa'adiyah	32.17	46.63	January	9500	1979			Evans 1994	*centralis*
Ireland	Cork Harbour	51.83	-8.33	Non-breeding	18524	1991	5650	1999-04 (5)	IWC database	*alpina* + Iceland + *arctica* + Britain & Ireland
Ireland	Dundalk Bay	53.95	-6.33	Non-breeding	18880	2000	9241	1999-04 (5)	BirdWatch Ireland, 2005	*alpina* + Iceland + *arctica* + Britain & Ireland
Ireland	Shannon & Fergus Estuary	52.60	-9.50	Non-breeding	20,100	1996	5,650	1999-04 (5)	BirdWatch Ireland, 2005	*alpina* + Iceland + *arctica* + Britain & Ireland
Italy	Delta Del Po - Parte Veneta	44.97	12.43	Winter	13602	2002	8551	1999-03 (5)	IWC database	*alpina*
Italy	Laguna Di Grado E Marano	45.73	13.25	Non-breeding	35350	1997	9681	1998-03 (5)	IWC database	*alpina*
Italy	Laguna Di Venezia	45.40	12.32	Non-breeding	32778	2000	24913	1999-03 (5)	IWC database	*alpina*
Kazakhstan	Tengiz-Korgalzhyn Lakes	50.50	69.40	Spring migration	31746	2000	32056	1999-04 (6) in prep	Schielzeth *et al.*	*centralis*
Lithuania	Nemunas river delta	55.30	21.33	September	12500 15000	1998-1999			Svazas *et al.* 1999	*alpina* + Baltic
Mauritania	Banc d'Arguin	20.25	-16.33	Non-breeding	1023500	2000	907,930	1997-01 (3)	Hagemeijer *et al.* 2004	Iceland + *arctica*
Morocco	Lagune De Khnifiss	28.13	-11.98	Winter	10078	1995	2780	1991-95 (4)	IWC database	Iceland + *arctica*
Morocco	Merja Zerga: Kenitra	34.80	-6.30	Non-breeding	30900	1995	20964	1991-95 (3)	IWC database	*alpina* + Iceland + *arctica* + Britain & Ireland
Netherlands	Rhine-Maas-Schelde Delta	51.50	4.00	Winter	82968	2002	68518	1999-03 (5)	RWS WD RIKZ 2005	*alpina* + *arctica* + Baltic
Netherlands	Wadden Sea	53.30	5.38	Autumn	435988	2003	294620	1999-03 (5)	SOVON, The Netherlands, 2005	*alpina* + *arctica* + Baltic
Oman	Barr Al Hikman	20.63	58.47	January	87000	2008	41400	1993-01 (5)	IWC database R. Klaasen & J. de Fouw *in litt*	*centralis*
Portugal	Estuário Do Sado	38.53	-8.83	Non-breeding	17990	2000	8535	1996-02 (5)	IWC database	*alpina* + Iceland + *arctica* + Britain & Ireland + Baltic
Portugal	Estuário Do Tejo	38.75	-9.08	Non-breeding	25965	1994	11824	1996-01 (5)	IWC database	*alpina* + Iceland + *arctica* + Britain & Ireland + Baltic
Portugal	Ria De Faro	37.00	-7.92	Non-breeding	22667	1995	12491	1997-01 (5)	IWC database	*alpina* + Iceland + *arctica* + Britain & Ireland + Baltic
Romania	Razim-Sinoie Lagoons	44.67	29.00	April	17000	1990	8675	1990-96 (2)	C. Sudfeldt *in litt.*, Schmitz *et al.* 2001	*centralis*
Russia	Kolguev Island	69.08	49.12	Late summer	15000	2000s			C. Zöckler *in litt.*	*alpina*
Russia	Veselovsky Rice Field	47.08	41.17	Spring	60000	1975	60000	1975	Kazakov *et al.* 1984, per V. Belik	*centralis*
Saudi Arabia	Sabkhat al-Fasl Lagoons	27.00	49.67	Non-breeding	7950	1994	4397	1992-96 (4)	IWC database	*centralis*
Saudi Arabia	Tarut Bay	26.67	50.17	Non-breeding	8500	1994	6160	1993-96 (3)	IWC database	*centralis*
Spain	Cádiz Bay	36.53	-6.27	Winter	15983	2002			GCHC 2002	*alpina* + *arctica* + Iceland + Britain
Spain	Delta Del Ebro	40.70	0.80	Winter	30534	2003	19887	1997-03 (5)	IWC database	*alpina* + *arctica*
Spain Isla Mayor	Lucios de Veta La Palma-(Se)	36.93	-6.24	Winter	42240	2001	13246	1996-03 (5)	IWC database	*alpina* + Iceland + *arctica* + Britain & Ireland
Tunisia	Gulf of Gabès	34.40	10.32	February	111678	1984			Van Dijk *et al*1986	*alpina* + *centralis*
Turkey	Yumurtalik Lagoons (Yapi+Omerg)	36.68	35.65	Winter	7239	1992	2203	1990-99 (4)	IWC database	*centralis*
Turkmenistan	Balkhan Gulf	39.90	53.68	Winter	8409	2003	3483	1999-04 (4)	IWC database	*centralis*

Country	Site	Lat.	Long.	Season	Max total	Year max	Average total	Basis for average	Source	Population(s) at site
Turkmenistan	Krasnovodsk Bay	40.00	53.00	Non-breeding	10000	1975			Shubin 1998	*centralis*
Ukraine	The Sivash, Azov Sea	46.17	34.58	Spring	200000	1992			van der Winden *et al.* 1993	*centralis*
U.A.E.	Khor Dubai	25.21	55.33	Non-breeding	5330	1995	2736	1995-99 (5)	IWC database	*centralis*
U.A.E.	Mussafah Mudflats	24.45	54.40	Non-breeding	5870	1997	2810	1996-98 (3)	IWC database	*centralis*
U.K.	Blackwater Estuary	51.72	0.80	Winter	37550	1999-03	19580	1996-03 (5)	BTO, UK, 2005	*alpina* + Iceland + *arctica* + Britain & Ireland + Baltic
U.K.	Caithness & Sutherland Peatlands	58.37	-4.05	Breeding	17730 5910 prs	1995			WBDB	Britain & Ireland
U.K.	Chichester Harbour	50.78	-0.89	Winter	16773	1999-03	14750	1998-03 (5)	BTO, UK, 2005	*alpina* + Iceland + *arctica* + Britain & Ireland + Baltic
U.K.	Dee Estuary	53.27	-3.10	Winter	41679	1999-03	31752	1999-03 (5)	BTO, UK, 2005	*alpina* + Iceland + *arctica* + Britain & Ireland
U.K.	Dengie Flats	51.68	0.93	Winter	15720	1998-02	10494	1998-02 (5)	BTO, UK, 2005	*alpina* + Iceland + *arctica* + Britain & Ireland
U.K.	Forth Estuary	56.00	-3.27	Winter	13296	1999-03	11257	1999-03 (5)	BTO, UK, 2005	*alpina* + Iceland + *arctica* + Britain & Ireland
U.K.	Humber Estuary	53.67	-0.17	Winter	24378	1999-03	19870	1999-03 (5)	BTO, UK, 2005	*alpina* + Iceland + *arctica* + Britain & Ireland + Baltic
U.K.	Langstone Harbour	50.82	-1.00	Winter	24286	1999-03	21397	1999-03 (5)	BTO, UK, 2005	*alpina* + Iceland + *arctica* + Britain & Ireland + Baltic
U.K.	Mersey Estuary	53.30	-2.82	Winter	60330	2001	49368	1999-03 (5)	BTO, UK, 2005	*alpina* + Iceland + *arctica* + Britain & Ireland + Baltic
U.K.	Morecambe Bay	54.12	-2.93	Winter	28411	1999-03	22413	1999-03 (5)	BTO, UK, 2005	*alpina* + Iceland + *arctica* + Britain & Ireland
U.K.	North Uist Machair	57.58	-7.47	Breeding	915 305 prs	1995			WBDB	Britain & Ireland
U.K.	Ribble Estuary	53.72	-2.92	Spring	50729	1997-02	30729	1997-02 (5)	BTO, UK, 2005	*alpina* + Iceland + *arctica* + Britain & Ireland
U.K.	Severn Estuary	51.55	-2.72	Winter	25734	1999-03	21611	1999-03 (5)	BTO, UK, 2005	*alpina* + Iceland + *arctica* + Britain & Ireland
U.K.	Solway Estuary	54.92	-3.40	January	17564	1999-03	12122	1999-03 (5)	BTO, UK, 2005	*alpina* + Iceland + *arctica* + Britain & Ireland
U.K.	South Uist Machair	57.32	-7.33	Breeding	1215 405 prs	1995			WBDB	Britain & Ireland
U.K.	Stour Estuary	51.93	1.15	Winter	15822	1999-03	12585	1999-03 (5)	IWC database	*alpina* + *arctica* + Britain & Ireland + Baltic
U.K.	Swale Estuary	51.35	0.83	Winter	14761	1999-03	9207	1999-03 (5)	BTO, UK, 2005	*alpina* + Iceland + *arctica* + Britain & Ireland + Baltic
U.K.	Thames Estuary	51.48	0.57	Winter	53755	1999-03	40357	1999-03 (5)	BTO, UK, 2005	*alpina* + Iceland + *arctica* + Britain & Ireland + Baltic
U.K.	The Wash	52.93	0.30	Spring	45349	1997-02	32272	1997-02 (5)	BTO, UK, 2005	*alpina* + Iceland +

Martyn Sidwell.

Broad-billed Sandpiper

Limicola falcinellus

Geographical variation and distribution

The Broad-billed Sandpiper breeds in sub-arctic peatlands in four discrete areas of the Palearctic. The largest extent of breeding range is in Fennoscandia, in the west, with occurrence in three other small areas across northern Eurasia. Two subspecies are recognised: the nominate *falcinellus* breeding in Fennoscandia and north-western Russia east to the Kanin Peninsula and possibly Western Siberia; and *sibirica* breeding in Eastern Siberia (Svensson & Tomkovich 1997). The isolated breeding population in the Taymyr region east to about the Yenisey River is assigned by some authors to *falcinellus* (Ali & Ripley 1983, Cramp & Simmons 1983), and by others to *sibirica* (Hayman *et al.* 1986, del Hoyo *et al.* 1996). The eastern boundary of *L. f. falcinellus* is thus not clearly defined, but probably extends from the West Siberian plain to southern India, where this form may occur together with *sibirica* (Balachandran & Natarajan 1997). *L. f. sibirica* winters from north-eastern India through South-east Asia to Australia.

Only the population of the nominate subspecies occurs in the African-Western Eurasian region. This population breeds mainly on boreal, sub-arctic bogs in Fennoscandia and the Kola Peninsula, but there is also an isolated breeding area in the Kanin Peninsula. Outside the breeding season, it occurs commonly along the coasts of the Red Sea and Persian Gulf to western India and Sri Lanka (Snow & Perrins 1998). It also occurs in smaller numbers in north-eastern Africa from Sudan, Eritrea and Djibouti south to Kenya and Uganda (Dowsett 1980, Britton 1980). There are scattered records from Southern Africa, mostly on or near the coast (Becker *et al.* 1974, Hockey *et al.* 2005) and in West Africa (Borrow & Demey 2001), where it is a vagrant. It is also a vagrant in the granitic islands of the Seychelles (Skerrett *et al.* 2001). A small population of 75-100 individuals winters in the Gulf of Gabès, Tunisia (Spiekman *et al.* 1993, van der Have *et al.* 1997).

Movements

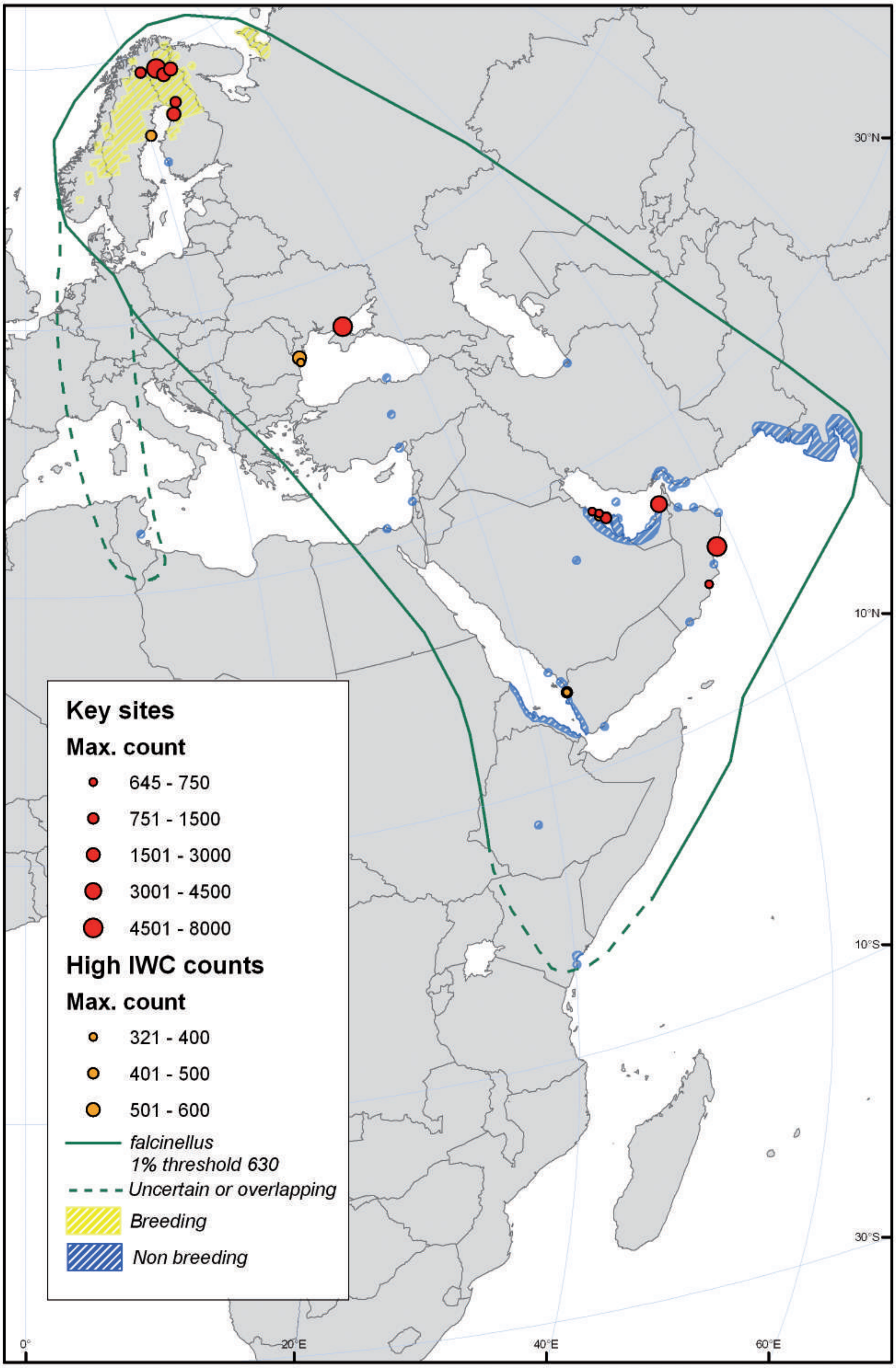
The Broad-billed Sandpiper has an unusual north-west to south-east migration system linking Fennoscandian breeding areas to wintering grounds in the Persian Gulf and Arabian Peninsula, and utilising the Black Sea area for spring and autumn staging. It has a specialist feeding ecology throughout the year (van der Winden *et al.* 1993, Verkuil *et al.* 1993, Rae *et al.* 1998), which inherently restricts its distribution to a range of quite specific wetland types.

Departure from the breeding areas begins with the females from the beginning of July, with males following shortly after. Numbers recorded on migration at Ottenby, south-east Sweden, from 1950-2000 showed no clear long-term trend. The median date of peak passage in this period was 21 July for adults and 17 August for juveniles. The relatively modest increases in weight of trapped individuals suggested that the species prefers migrating with relatively low stores of fat, making use of several stopover sites along the migration route (Waldenström & Lindström 2001). The peak migration at staging areas in Sivash Gulf (Sea of Azov) and the northern Black Sea is in late July-August (Chernichko *et al.* 1991), but stopovers are relatively short. Juveniles follow about two to three weeks after the adults. The main autumn passage through the south Caspian region occurs between the end of July and mid-September (D.A. Scott unpubl. obs.). The main arrival on the wintering grounds in the Persian Gulf occurs in late October and early November. The moulting sites are as yet unknown, as the birds arrive in an advanced stage of primary moult (Uttley *et al.* 1988).

The Broad-billed Sandpiper occurs in Egypt as a passage migrant in autumn from early August to mid-October and in spring from late March to late May (Goodman & Meininger 1989). Recent work indicates that relatively large numbers pass through the Nile Delta lakes, notably Lake Manzala and Suez Bay, between 5 and 21 May, with up to 80 birds counted; as many birds stay for only a day, the total passage could represent several hundred birds (Miles 1998). Birds have

Broad-billed Sandpiper

Limicola falcinellus



also been recorded on spring and autumn passage in Sudan (Nikolaus 1987) and on the southern Somali coastline between October and December (Ash & Miskell 1998). There is a regular wintering site at the Sabaki River mouth on the Kenya coast, where flocks of up to 80 birds have been recorded (Bennun & Njoroge 1999), and small numbers have also been recorded at other coastal sites in Kenya and inland at Ferguson's Gulf on Lake Turkana, where it is predominantly on southern passage (Lewis & Pomeroy 1989).

Although rare in Southern Africa, there are enough records to suggest that this is a regular destination for a small number of birds. Movements to and from Southern Africa, however, are not entirely clear. Hockey & Douie (1995) considered that birds may reach Namibia either by a west coast (East Atlantic) route or by an overland route through East and Central Africa. Tree (1999) considered that passage birds in Zimbabwe may be heading for the west coast. Northward departure from Southern Africa is early, with birds only present from September to January (Hockey *et al.* 2005).

Although the Broad-billed Sandpiper appears to be only a vagrant in West Africa, there is a small wintering population in North Africa centred on the Gulf of Gabès in Tunisia. Stegeman (1993) recorded as many as 78 on the coast at Kneiss between March and May 1990, and thought from biometric data that the birds were using this area to gain weight in preparation for a direct flight to the breeding grounds in Fennoscandia. Van der Have *et al.* (1997) found up to 62 birds at Kneiss in February 1994, and Isenmann *et al.* (2005) detailed birds on spring and autumn passage. These may have been birds moving along the coastline to or from other sites on the southern Mediterranean coast, including within the Gulf of Gabès. Of four ringed birds recovered in Italy, three were ringed in Sweden and one in Northern Germany and all appear to have been *en route* from Fennoscandia to Tunisia (Spina & Volponi 2008). Further west, it is only an accidental visitor in Algeria (Isenmann & Moali 2000) and Morocco (Thévenot *et al.* 2003), whilst east of Tunisia it is a scarce spring and autumn passage migrant on the coast of Libya (Toschi 1969).

Departure from the wintering grounds occurs in February-March. Passage has been observed at staging sites in Saudi Arabia in March and April (Evans & Keijl 1994) and in the eastern Mediterranean and southern Black Sea in April and May, e.g. in Egypt (Meininger & Atta 1994), southern Turkey (van der Have *et al.* 1989), Kizilirmak Delta, Turkey (Hustings & van Dijk 1994, 1993) and Bulgaria (Uhlig 1984). In Iran, the main spring passage occurs in the first half of May, although birds have been observed departing from their wintering areas in the Persian Gulf as late as the first week of June (D.A. Scott unpubl. obs.). Long stopovers are made in the Sivash in April and May (van der Winden *et al.* 1993), during which substantial increases in body weight have been observed (Chernichko *et al.* 1991). Small numbers of birds are found in the Wadden Sea of Schleswig-Holstein, northern Germany, in May each year (K. Günther *in litt.*). During adverse weather conditions, large numbers may occur in the Gulf of Bothnia in Finland and Sweden, e.g. up to 1,400 in June 1993. Birds return to their breeding areas in Norway from mid-May to mid-June (Bakken *et al.* 2003).

Population limits

Only one population is currently recognised in Western Eurasia and Africa: the population of the nominate form *falcinellus*. It has been suggested that the small number of birds wintering in Tunisia, and perhaps elsewhere in North and West Africa, may originate from the southernmost breeding localities in Norway and Sweden, and may comprise a discrete population, but further study is required.

Population size

1. *falcinellus*

Population estimate	1% threshold	Population trend
61,000-64,000	630	decreasing

The western population of the Broad-billed Sandpiper was estimated at 25,000 individuals by Perennou *et al.* (1994), using winter counts for all areas excluding Africa, and this estimate was adopted in the first two editions of *Waterbird Population Estimates.* However, midwinter counts and estimates during the 1990s accounted for only 6,800 birds – undoubtedly a substantial underestimate since many potential wintering sites in the Persian Gulf and Arabian Sea were not censused (Stroud *et al.* 2004). The IWC counts on the south coast of Iran in January 2007 located over 1,900 Broad-billed Sandpipers, mostly in Hormozgan Province, and it was thought that these represented less than 10% of the total present (F. Willems *in litt.*).

The patchy breeding distribution in Fennoscandia and the species' secretive behaviour make estimation of the breeding population difficult. Svensson & Tomkovich (1997) suggested that the European total was unlikely to exceed 17,000 breeding pairs. More recently however, Thorup (2006) collated national breeding totals to give an estimate of 20,400-21,400 pairs, equating to about 61,000-64,000 individuals. Stroud *et al.* (2004) gave this as their population estimate, and this was adopted in *WPE3* and *WPE4*. BirdLife International (2004a) gave a somewhat lower estimate of 9,200-22,000 pairs for the European breeding population, as they used a rough estimate of 5,000-15,000 pairs for the Finnish population, rather than the precise estimate of 15,000 pairs adopted by Thorup (2006).

Conservation status

The large breeding population in Finland has shown a slight decline since 1970, and there may have been some range contraction associated with this (Väisänen *et al.* 1998). The smaller breeding populations in Norway and European Russia are thought to be stable (Tucker & Heath 1994, Svensson & Tomkovich 1997, BirdLife International 2004a), but trends in the Swedish population are unknown. In view of the continuing decline in the large Finnish population, BirdLife International (2004a) concluded that the population as a whole was undergoing a moderate decline.

No information is available on trends in winter numbers, as very few sites have been regularly counted. In Khor Dubai, the peak count of 4,050 in 1986 (Uttley *et al.* 1988) has not been equalled, and the apparent decrease may be linked to a decrease in benthic productivity after treatment of sewage.

The Broad-billed Sandpiper uses quite specific habitats during most of its life cycle, which may explain its localised occurrence and rarity. Therefore, it is highly vulnerable to loss and degradation of habitat, in particular in the spring staging sites and in the breeding areas. A considerable proportion of the European population is found in May at just one staging area, Sivash Gulf, in Ukraine (van der Winden *et al.* 1993). The drainage of bogs in Finland will lead to irreversible loss of breeding habitat (Koskimies 1994). Economic development in the United Arab Emirates is extremely rapid and infrastructure development is having strong impacts on the country's wetlands (Green & Richardson 2008). Whether this will affect the key sites for Broad-billed Sandpiper in the U.A.E. remains to be seen.

Habitat and ecology

The Broad-billed Sandpiper breeds exclusively in the wettest parts of *Sphagnum* bogs, lightly overgrown with *Carex* and *Eriophorum* and with a dense cover of dark brown bryophytes (Rae *et al.* 1998). In northern Fennoscandia, the species is limited to "aapa" mires, or bogs containing "palsas" (ice-cored peat mounds) and permafrost (Rae *et al.* 1998). Outside the breeding season, it occurs mainly in coastal areas with inter-tidal mudflats (Keijl *et al.* 1998) or "wind-flats", i.e. mudflats exposed by wind force (Kube 1994, Verkuil *et al.* 1993a, 1993b). In the southern Persian Gulf, it occurs commonly on mudflats in mangrove areas (D.A. Scott, unpubl. obs.), and in Southern Africa, it favours areas with very soft mud (Hockey *et al.* 2005). In spring, it is mainly found in brackish "wind-flats" along the northern Black Sea and Sea of Azov and in Sivash Gulf, Ukraine (Chernichko *et al.* 1991, van der Winden *et al.* 1993).

Network of key sites

Thirteen key sites have been identified for this population. Five of these are important breeding sites in Finland, and together these support about 5,000 breeding pairs. Five important staging areas have been identified: one each in Bahrain, Finland, Saudi Arabia, Ukraine and United Arab Emirates. The most important of these is Sivash Gulf in Ukraine, where 6,000 birds were counted in May 1992 and the total present was estimated at 8,000 (van der Winden *et al.* 1993). This site is used only briefly during autumn migration; 2,700 were counted in autumn 1998 (Van Winden *et al.* 2001). Khor Dubai in the United Arab Emirates is also an extremely important staging area; a maximum count of 4,050 was recorded during the autumn migration season in 1992 (Evans 1994). Three key wintering areas have been identified in the Arabian Peninsula: Barr Al Hikman and Dawhat Sawqirah in Oman and Tarut Bay in Saudi Arabia. The Khouran Strait in the southern Persian Gulf in Iran probably also qualifies as a key site. A high-tide roost of at least 500 was located in this area in April 2001 (D.A. Scott pers. obs.), and over 1,900 Broad-billed Sandpipers were recorded during the IWC in southern Iran in January 2007, the great majority of these being in Hormozgan Province (F. Willems *in litt.*).
No key sites have been identified in Africa. However, Lake Manzala and Suez Bay in the Nile Delta in Egypt are likely to be important stopover sites on the northward migration, while Kneiss in the Gulf of Gabès, Tunisia, may be considered as a key site if birds of the southernmost breeding localities in Norway and Sweden are found to represent a discrete population.

Key moulting sites are as yet almost completely unknown.

Protection status of key sites

All six key sites in Finland are afforded some form of protection as Protected Areas, Peatland Preserves or Wilderness Areas. Sivash Gulf in Ukraine has been designated as a Ramsar site and is gaining further protection through designation as a National Park. Of the other six key sites, only Khor Dubai in the United Arab Emirates and Tubli Bay in Bahrain are protected (as Wildlife Refuges). The most important site in Iran, Khouran Strait in the southern Persian Gulf, is largely protected in the Hara Protected Area and Biosphere Reserve (85,686 ha) and was designated as a Ramsar site (100,000 ha) in 1975. Virtually all of the important sites for this species in the Persian Gulf are vulnerable to infrastructure development and oil spills.

Table 62. Key sites for broad-billed Sandpiper. Sites where 1% or more of a population has been recorded

Country	Site	Lat.	Long.	Season	Max total	Year max	Average total	Basis for average	Source
Bahrain	Tubli Bay	26.18	50.57	Migration	800	1991			WBDB
Finland	Lätäseno & Jietajoki mires	68.63	22.35	Breeding	1500	1997			WBDB
Finland	Lemmenjoki-Hammastunturi-Pulju	68.58	25.50	Breeding	6000	1991			WBDB
Finland	Litokaira	65.75	26.28	Breeding	1500	1996			WBDB
Finland	Oulu Region Wetlands	64.92	25.17	Migration	3000	1997			Skov *et al.* 2000
Finland	Pomokaira-Koitelaiskaira	68.00	26.30	Breeding	3000	1994			WBDB
Finland	Saariselkä and Koilliskaira	68.25	28.00	Breeding	3000	1996			WBDB
Oman	Barr al Hikman	20.63	58.47	Non-breeding	5000	1990	384	1989-01 (5)	IWC database
Oman	Dawhat Sawqirah	18.67	56.68	Non-breeding	700	1994	204	1990-95 (5)	IWC database
Saudi Arabia	Sabkhat al-Fasl Lagoons	27.00	49.67	Apr-May	700	1992			Evans 1994
Saudi Arabia	Tarut Bay	26.67	50.17	Non-breeding	645	1993	285	1993-96 (3)	IWC database
Ukraine	The Sivash, Azov Sea	46.17	34.58	Spring	8000	1992			van der Winden *et al.* 1993
U.A.E.	Khor Dubai	25.21	55.33	Migration	4050	1992			Evans 1994

Tom van der Have & Tim Dodman

Nicky Petkov

Ruff *Philomachus pugnax*

Geographical variation and distribution

The Ruff is a monotypic species with a wide breeding distribution across the Palearctic from the U.K. (few) and The Netherlands to the Chukotsky Peninsula at about 180ºE in the Russian Far East. The main breeding areas are in Siberia between 65ºN and 73ºN, but the range extends southwards to about 50ºN in temperate Western and Central Europe and also locally in Kazakhstan. Small numbers winter in Western Europe, the Mediterranean basin and South-west Asia, but the great majority spend the northern winter in sub-Saharan Africa, in the northern tropics from Senegal to Sudan and Ethiopia, and in parts of Eastern and Southern Africa. There is a much smaller wintering population in the Indian sub-continent (east to Bangladesh), but only tiny numbers of birds occur further east in South-east Asia, and the species is only a straggler to Australasia.

Movements

Evidence from ringing shows that birds breeding in Northern Europe generally move south-south-west on a broad front across Europe, North Africa and the Sahara to winter mainly in the Senegal and Niger inundation zones in West Africa east to Lake Chad (Cramp & Simmons 1983, Smart *et al.* 2002). There are numerous recoveries of birds ringed in Northern and Western Europe in Senegal, Mauritania, Mali and Guinea-Bissau (Cramp & Simmons 1983), although birds ringed on autumn passage in Finland and Sweden have also been recovered in Sudan (Urban *et al.* 1986). A small number of birds, predominantly males, remain throughout the winter in Western Europe (Denmark, southern Germany, The Netherlands, Britain and France) and the Mediterranean basin (east to Greece).

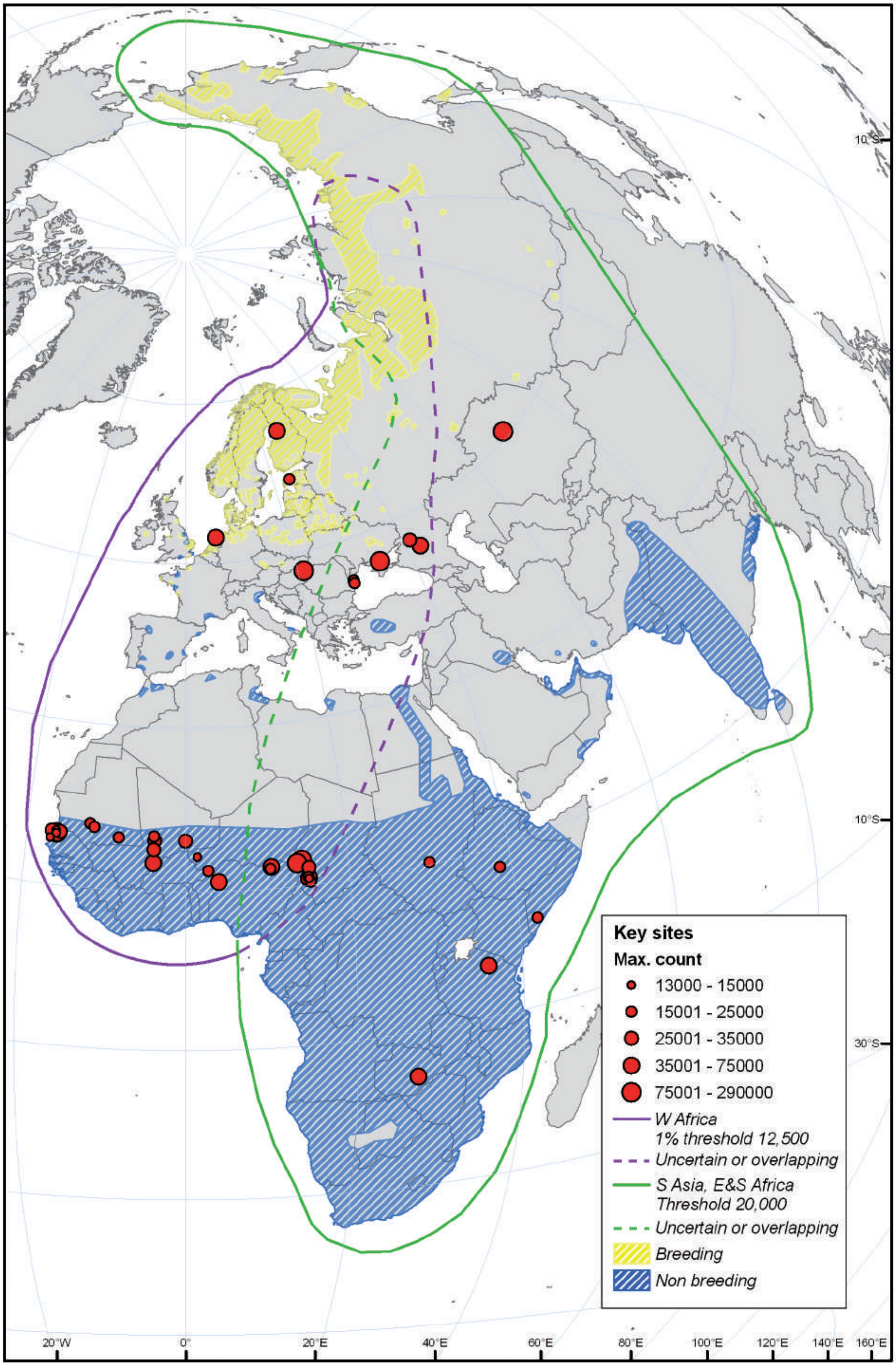
In most of Europe, Ruffs are a lot more numerous on spring migration than in autumn (Wymenga 1999). Birds ringed on autumn passage in northern Norway appear to follow two routes to West Africa: some migrate south-west along the coast of Western Europe, while others fly more directly southwards through Finland, western Russia and Ukraine to the Mediterranean basin (Bakken *et al.* 2003). Most recoveries of Ruff ringed on autumn passage in southern Norway, Sweden, Britain and Ireland are concentrated in Western Europe from The Netherlands to France and North Africa. On the return spring passage, however, there is some evidence of an easterly shift in distribution, as most recoveries are centred around Italy and to a lesser extent the Balkans (Cramp & Simmons 1983, Bakken *et al.* 2003, Smart *et al.* 2002). Also, Ruffs are more abundant in spring than in autumn in Israel (Krabbe 1980), Egypt (Goodman & Meininger 1989), Greece and Hungary. The possibility of there being a “loop” migration in Europe clearly requires further investigation.

Some of the birds wintering in West Africa and occurring on passage in Europe are of Siberian origin. A bird ringed in Senegal was recovered in the Ob basin (65ºE), and birds ringed in Tunisia and Nigeria have been recovered as far east as the Lena River (125ºE) (Urban *et al.* 1986). A number of birds ringed on autumn passage in Finland, Sweden, Norway, Denmark, The Netherlands, Germany and the U.K. have been recovered in Siberia, mostly in Western Siberia, but with some from as far east as Yakutia at 130ºE (Cramp & Simmons 1983, Bønløkke *et al.* 2006). This suggests that some birds are undertaking long east to west movements across Eurasia in sub-arctic and temperate latitudes before turning south and heading towards Africa (Cramp & Simmons 1983). Most recoveries of British and Norwegian ringed birds in summer have been in Europe east to the Urals (53ºE), but there has been one recovery of a British ringed bird from the Russian Far East (Smart *et al.* 2002) and one recovery of a Norwegian ringed bird in Western Siberia (Bakken *et al.* 2003, Smart *et al.* 2002).

Birds wintering in Eastern and Southern Africa appear to be almost entirely of Siberian origin, and show “leap-frog” migration, with the most easterly breeders migrating to the most southerly part of the non-breeding range in Africa (Underhill *et*

Ruff

Philomachus pugnax



al. 1999). Recoveries of birds ringed in Southern Africa indicate that the pre-nuptial migration follows a Great Circle route inland along the African Rift Valley, through the Black Sea and Caspian Sea, and through Kazakhstan and the Ob and Yenisey basins to staging areas on the southern Lena River. Recoveries within the breeding range lie from the Lena River (120ºE) eastwards to the Kolyma basin at 164ºE (Underhill *et al.* 1999). The southward post-nuptial migration is less well documented, but it appears that some birds first move west across northern Asia before heading south into Africa. While some birds from eastern breeding areas are known to reach Europe and West Africa, there is little indication that any western breeders reach Eastern or Southern Africa. Despite the considerable amount of ringing that has been carried out in Western and Central Europe and Southern Africa, there has been only one recovery linking anywhere in Europe west of Ukraine with Southern Africa – a bird ringed on passage in Germany and recovered in South Africa (Underhill *et al.* 1999).
The sexes differ somewhat in their migration strategies, the females generally migrating much further than the males. In winter, males outnumber females in Europe. In sub-Saharan Africa, the proportion of females increases from north to south. The ratio of females to males has been estimated at 1.85:1 in Senegal (Tréca 1994, OAG Münster 1996), 9:1 in Kenya (Pearson 1981), and between 8:1 and 15:1 in Southern Africa (Tree 1985). A similar situation is found amongst juveniles, with the proportion of females increasing gradually from north to south.

Adult males leave the breeding grounds first, from late-June to early-July, with adult females following from mid-July and juveniles in late July to August. The main staging and moulting areas are situated along the Atlantic coast of Europe, on the western side of the Black Sea, in the Volga Delta and along the Nile Valley. The first males arrive in Senegal in mid-July. Arrival in Southern Africa commences in early August and continues until November. Here the birds are highly nomadic, moving in response to rainfall events which create or drown suitable habitat (Underhill *et al.* 1999). The northward migration starts as early as mid-February for males. However, the main movement occurs between March and mid-May, with females departing a month later than males. Two peaks are evident in Europe: one in late March, involving birds from South-west Europe and North Africa, and the other in late April, involving birds from sub-Saharan Africa. There is some evidence that Ruffs are able to migrate from wintering areas in Senegal to staging areas in Central Europe in one non-stop flight (OAG Münster 1998). The breeding grounds are reoccupied from mid-April in Western Europe, but progressively later to the north and east. Birds arrive on the breeding areas in Siberia from mid-May to June. Large numbers of non-breeders remain in their winter quarters throughout the year (Cramp & Simmons 1983).

Population limits

No discrete populations are identifiable. All four editions of *Waterbird Population Estimates* recognise two "populations" of Ruff in Western Eurasia and Africa on the basis of separate wintering areas: a population wintering in West Africa, and a population wintering in Eastern and Southern Africa. Evidence from ringing has revealed that these two "populations" overlap extensively on the breeding grounds in Siberia. However, it appears that the birds wintering in West Africa originate mainly from breeding areas in Europe and Western Siberia, and migrate through Western Europe, the Black Sea and Mediterranean region, while the birds wintering in Eastern and Southern Africa originate entirely from breeding areas in Siberia (mainly between 70ºE and 164ºE) and migrate through Western Asia. Stroud *et al.* (2004) therefore retained two populations in Western Eurasia and Africa, and these were defined as follows:

1) birds breeding mainly in Northern and Central Europe and Western Siberia, and migrating through Western Europe, the Black Sea and Mediterranean region to winter in West Africa;
2) a population entirely of Siberian origin (breeding between 70ºE and 164ºE), migrating through Western Asia, and wintering in Eastern and Southern Africa.

Some evidence from ringing links the birds breeding in the Yamal-Nenetsk region east of the Urals with European breeders, and Thorup (2006) therefore suggested that the Yamal-Nenetsk birds should be included within an enlarged "European breeding population". This is consistent with the above treatment, which acknowledges that some birds of Western Siberian origin winter in West Africa.

The relatively small numbers of Ruff wintering in the Indian sub-continent and further east have been assigned to a third population in *Waterbird Population Estimates*. It has been supposed that these birds originate from breeding areas in Central and Eastern Siberia. Zöckler (2002a, 2002b), however, has suggested that they originate from breeding areas in the Taymyr and central Russian Arctic, thus "crossing over" birds on their way from breeding areas in the Russian Far East to Southern Africa. A bird ringed in Rajasthan in India (78ºE) and recovered during the breeding season in the Krasnoyarsk region at 94ºE in Western Siberia (Roberts 1991) lends some support to this view. However, Pearson (1981) has suggested that a high proportion of the males from breeding areas in Central and Eastern Siberia winter in India. If this is the case, it is possible that many of the females from the same breeding areas stage in northern India before continuing on in a south-westerly direction to Eastern and Southern Africa. This would explain the abundance of the Ruff as a passage migrant through Pakistan (Roberts 1991), south-eastern Iran (D.A. Scott unpubl. obs.) and the Arabian Peninsula (Jennings 1981, Richardson 1990), and would also explain the movements of a female ringed in northern India in September and recovered three months later in South Africa (Underhill *et al.* 1999). Another bird ringed at the same locality in India was subsequently recovered in Kenya (Underhill *et al.* 1999). It seems likely, therefore, that the birds wintering in the Indian sub-continent are an integral part of the main Siberia/Eastern and Southern Africa flyway, and should not be given separate treatment. Around 90% of the birds wintering in Eastern and Southern Africa are females (Pearson 1981, Tree 1985, OAG Münster 1996). The "short-stopping" by a substantial number of males in the Indian sub-continent could help to explain the whereabouts of some of the missing males in this population. In the present review, therefore, the birds wintering in the Indian subcontinent are included within an enlarged "Eastern & Southern Africa & South Asia" wintering population. Thus only two populations are recognised in Eurasia and Africa, primarily on the basis of their non-breeding ranges:

1) birds breeding mainly in Northern and Central Europe and Western Siberia, and migrating through Western Europe, the Black Sea and Mediterranean region to winter sparingly in Southern Europe and North-west Africa and commonly in West Africa east to Chad (identical to population 1 of Stroud *et al.* 2004);

2) a population of Siberian origin (breeding east to the Bering Sea), migrating through Central and Western Asia to winter in relatively small numbers in South Asia (probably<10%) and commonly in Eastern and Southern Africa.

There is a considerable amount of overlap between these two "populations" on the breeding grounds in Western and Central Siberia and probably also at staging areas in the eastern Mediterranean and Black Sea.

Population size

Population estimations for this species are very imprecise. Estimates of breeding populations are of low precision for most of the breeding range, and estimates of wintering numbers are very varied, due to the difficulty of surveying the main concentrations in sub-Saharan Africa.

1. West Africa (non-breeding)

Population estimate	1% threshold	Population trend
1,000,000-1,500,000	12,500	Decreasing

The first three editions of *Waterbird Population Estimates* and Stroud *et al.* (2004) gave the size of this population as >1 million based on estimates of breeding populations in Europe. The IWC database shows that only a few thousand birds winter in Europe (c. 6,800), whilst the total count within the entire range of this population during the 1990s was 430,000 (Stroud *et al.* 2004). However, this is known to be a serious underestimate because of incomplete coverage in much of West Africa. Indeed, other data for the main concentrations in West Africa suggest that this population is very much larger and probably over 1 million as suggested by Smit & Piersma (1989). Trolliet & Girard (2001) have presented a full review of numbers in West Africa and have reported the results of aerial surveys of the main concentrations between 1998 and 2001. These surveys located 300,000 Ruff in the Inner Niger Delta (Mali) and 500,000 in the Lake Chad basin (Chad, Cameroon, Nigeria and Niger). ONC studies in 1990-1993 found 170,000-200,000 Ruff in the Senegal Delta (Trolliet *et al.* 1992, 1993, Triplet & Yésou 1998). About 4,500 were counted In Mauritania outside the Senegal Delta in January 1999 and 2000 (Benmergui in Trolliet & Girard 2001). Altenburg & van der Kamp (1986) estimated that there were 50,000-75,000 Ruff wintering in rice fields in Guinea-Bissau. However, Ruff are not abundant in Burkina-Faso, and surveys in 1999 and 2000 found only a few hundred birds (Broyer in Trolliet & Girard 2001). Trolliet & Girard (2001) concluded that there were just over 1 million Ruff wintering in West Africa, while Dodman (2002) gave a very precise estimate of 1.15 million. In view of the uncertainties, a broader estimate of 1 million -1.5 million was adopted in *WPE4*.

Girard & Kirby (1997) estimated the European breeding population, excluding Russia, to be in the region of 105,500-139,200 pairs, and the Russian population to be around three million pairs. However, in recent compilations of national breeding totals, Thorup (2006) and BirdLife International (2004a) have estimated the size of the European breeding population (including European Russia) at 244,000-526,000 pairs and 200,000-510,000 pairs, respectively. These estimates equate to about 600,000-1.55 million individuals. This number of birds (i.e. birds breeding west of the Urals) could account for the great majority of birds wintering in West Africa, and might suggest that relatively few birds of Siberian origin reach the region. However, Tertitsky *et al.* (1999) have estimated that there are between 2.1 and 3.5 million breeding females in the Yamal-Nenetsk region, just east of the Urals. This could equate to as many as 5-10 million birds in the non-breeding season. If these birds join European breeders to winter in West Africa, as Thorup (2006) suggests, a discrepancy arises between the population estimate derived from breeding numbers and the number of birds that can be accounted for on the winter quarters. The most likely explanation for the discrepancy is that the estimate of Tertitsky *et al.* (1999) is too high. Tomkovich (2002) has shown that the method of calculation used to derive this estimate produces overestimates, while Zöckler (2002a) has estimated that there are only about 2.28 million breeding females in the entire world population of the Ruff.

2. South Asia, Eastern & Southern Africa (non-breeding)

Population estimate	1% threshold	Population trend
E (>1,000,000)	Not established	Unknown

The first two editions of *Waterbird Population Estimates* gave the size of this population (excluding South Asia) in the broad range D/E (100,000->1 million). Only a few thousand Ruffs winter in South-west Asia; the total derived from midwinter counts and estimates in the 1990s was just 3,900 (Stroud *et al.* 2004). The 1990s count total for the entire region came to 245,000, including some 150,000 in Eastern Africa and 90,000 in Southern Africa, but these figures are known to be serious underestimates because of the very incomplete coverage (Stroud *et al.* 2004). The largest concentration of Ruff within Eastern and Southern Africa is probably in Sudan, where G. Nikolaus (in Summers *et al.* 1987) estimated the non-breeding population at between 300,000 and 1 million birds. It has not been possible to carry out extensive surveys in Sudan since then, and in recent years, the highest counts from Sudan have barely exceeded 1,000 (Stroud *et al.* 2004). Over 77,000 Ruffs were counted in Eastern Africa in January 1995, including 45,500 at Lake Manyara in Tanzania (Dodman & Taylor 1995). There were over 71,000 at Kafue Flats and 20,000 in the Bangweulu Swamps in Zambia in January 2001 (Leonard 2001). Underhill *et al.* (1999) gave a very rough estimate of 50,000-500,000 for the total number of birds wintering in Southern Africa, and almost 83,000 were counted in this region in January 2001 (Dodman & Diagana 2003). Considering these figures and the patchy nature of the coverage, Stroud *et al.* (2004) concluded that this population almost certainly exceeds one million birds, and this was the estimate adopted in *WPE3* and *WPE4*. Dodman (2002) suggested that there were well over a million birds in this population, which he considered to be larger than the population in West Africa.

By comparison, the number of birds wintering in South Asia is small. Perennou *et al.* (1994) estimated the wintering population in South Asia at >100,000, although the midwinter counts could account for only 19,500 birds. The maximum midwinter count in South Asia during the period 1994-2001 was 11,380 in 1994, and in five years, fewer than 4,000 were recorded (Lopez & Mundkur 1997, Li & Mundkur 2004). Very few birds occur further east in winter. The highest midwinter counts in East Asia and South-east Asia during the period 1994-2001 were 44 (in 2000) and five (in 2001), respectively; the highest count in Australia during the period 1997-2001 was only two birds in 1998 (Lopez & Mundkur 1997, Li & Mundkur 2004).

In the absence of more precise information, the former estimate of E (>1 million) is retained here for the entire South Asia and Eastern and Southern African non-breeding population. Zöckler's (2002a) estimate of 2.28 million breeding females in the global population suggests that there should be at least 5 million and possibly as many as 6 million individuals at the end of the breeding season. As there are unlikely to be more than 200,000 Ruffs wintering in South Asia, it is possible that there are still at least 2.0-3.5 million Ruffs unaccounted for in Africa.

Conservation status

Although there is some monitoring of breeding populations in temperate regions of Europe, little information is available on the status of populations on their Arctic breeding grounds. Likewise, there is little information on trends from African wintering areas, a consequence of the large numbers and extensive distribution. Information on trends is accordingly very incomplete except in Western and Central Europe.

Declines in breeding numbers have taken place in most countries in the European part of the range (Zöckler 2002a, 2002b). Major declines (over 50% between 1970 and 1990) have occurred in Denmark, Finland, Latvia, The Netherlands and Poland (BirdLife International/EBCC 2000, Mägi 2002). In The Netherlands, the population has fallen by 90% since the 1950s (Osieck & Hustings 1994), and in Denmark, there was a 75% decrease between 1970 and 1995 (Grell 1998). The total population in England, France, Belgium, The Netherlands, Germany, Denmark, southern Sweden, Poland, Estonia, Latvia and Lithuania is now fewer than 2,000 breeding females, only 10% of the numbers about 50 years ago (Thorup 2006). The two largest populations in Europe, in Russia and northern Sweden, are now also thought to be declining, and only the populations in Norway and Belarus are believed to be stable (BirdLife International 2004a). Ruff have only been recorded wintering in Britain and Ireland since 1934, after which numbers increased rapidly to over 1,000 in the 1970s, and then declined to only a few hundred in recent years, e.g. 400 in 1998/99 (Smart *et al.* 2002).

The declines seem to have been caused by several factors but especially drainage of breeding and feeding areas, increased use of fertilisers (causing the depletion of insects) and deterioration of previously mown or grazed breeding sites, together with increased predation, and impacts from hunting and other human persecution. In areas of intensive farming, the Ruff has disappeared completely as a breeding bird (Zöckler 2002a). Away from the breeding grounds, shooting in Europe and “pest control” and other persecution on rice fields in some African countries have also had a negative influence on population sizes. In West Africa at least, there has been a dramatic reduction in floodplain habitat formerly used by Ruffs, with obvious consequences for the species (H. Hötker *in litt.*). However, in Mali, a wintering population of 150,000-250,000 appears to have been relatively stable between 1972 and 2008 (O. Girard pers. obs.) The numbers wintering in Southern Africa increased during the twentieth century, the birds apparently benefiting from the great increase in artificial wetlands, irrigation schemes and agricultural land (Harrison *et al.* 1997).

Zöckler (2002a, 2002b) explored at length the evidence that changing climate is the ultimate factor causing the observed declines, and showed that declines are most pronounced in the most southerly parts of the breeding range. He considers that the Ruff is highly sensitive to the consequences of a changing climate and that they may be a valuable indicator species. Disentangling climate change effects from those of habitat modification and destruction resulting from agricultural intensification is, however, problematic.

Habitat and ecology

The main breeding habitat of the Ruff in the temperate zone is wet, low-lying, grassy terrain at sea level (or below sea level, as on the polders in The Netherlands). Further north, it breeds on moorland bounded by pine forests, and still further north or above the tree-line, it occupies tundra (Girard & Kirby 1997). Outside the breeding season, the Ruff prefers muddy margins of lakes, pools, ponds, rivers, marshes and flooded areas, including brackish, saline or alkaline waters. During migration in Western Europe, birds commonly use shorelines, e.g. muddy creeks in salt marshes, and freshly mown or heavily grazed grasslands. Sometimes they occur on tidal mudflats and coastal lagoons, but this is not common. African wintering sites include flooded or dry plains, marshes and grass, wheat or rice fields (where they are considered by some to be a pest), not always close to water (Tréca 1994).

Site fidelity during the breeding season is generally low, and Ryabitsev & Alekseeva (1998) found no site fidelity on the breeding grounds on the Yamal Peninsula. Some young birds appear to settle at a considerable distance to the north-east of their natal area (Cramp & Simmons 1983). By contrast, there are some indications in Britain of a high degree of site fidelity to wintering sites, but this has not been quantified (Smart *et al.* 2002). Males and females appear to have different moult strategies that may be related to the different migration pattern of the sexes. Males caught in autumn in eastern Britain were in early stages of active moult, while females caught at the same time either had not started moult or had a maximum of three growing primaries (Smart *et al.* 2002). The wing moult is usually interrupted during migration and completed on the winter quarters.

Network of key sites

The 1% threshold for the population which spends the non-breeding season in West Africa is 12,500, and there is a sizeable network of key sites in both Africa and Europe. key sites on migration have been identified in The Netherlands, Hungary, Romania, Ukraine and Russia, and further north in Finland. These sites form a chain which appears strikingly equi-distant between breeding areas in Siberia and wintering areas in West Africa. Key sites in Africa are concentrated in the major river floodplains, and four key sites have been identified in Cameroon, three in Chad, five in Mali, four in Mauritania, two in Niger, four in Nigeria and six in Senegal.

The population wintering in Eastern and Southern Africa (and South Asia) is less well-known and the threshold for identifying key sites, 20,000 is based on Ramsar Criterion 5. Staging sites for this population are poorly known, and the seven key sites identified so far are spread between, Ethiopia, Somalia, Sudan, Tanzania and Zambia.

Protection status of key sites

Some of the key wintering sites in Africa are protected, e.g. Lake Manyara in Tanzania, Kafue Flats-Lochinvar in Zambia, and the Djoudj, Ndiael and Djeuss in Senegal. Others are only partially protected, e.g. the Logone floodplain in Cameroon, and there are vast zones without protected areas, e.g. Inner Niger Delta, Mali. Here the birds are extensively hunted.

Table 63. Key sites for Ruff. Sites where 1% or more of a population has been recorded

Country	Site	Lat.	Long.	Season	Max total	Year max	Average total	Basis for average	Source	Population(s) at site
Cameroon	Lac Maga	10.80	14.98	Non-breeding	14500	1986			AfWC database	W Africa + E & S Africa
Cameroon	Parc National de Waza Logone	10.83	15.00	Non-breeding	48861	1996	24434	1996-01 (5)	AfWC database	W Africa + E & S Africa
Cameroon	Plain d'Inondation Logone Environs Zina	11.00	14.97	Non-breeding	17090	1993			AfWC database	W Africa + E & S Africa
Cameroon	Semry I: Rizières Yagoua Nord	10.43	15.18	Non-breeding	22000	1984	20500	1984-87 (2)	AfWC database	W Africa + E & S Africa
Chad	Bas-Chari	12.17	15.12	December	30720	1999			B Trolliet, unpublished data	W Africa + E & S Africa
Chad	Plaine du Logone	11.00	15.20	December	33754	1999			B Trolliet, unpublished data	W Africa + E & S Africa
Chad/ Cameroon/ Nigeria/Niger	Lake Chad	13.17	14.25	Non-breeding	247327	1999			B Trolliet, unpublished data	W Africa + E & S Africa
Estonia	Matsulu National Park	58.75	23.84	May	20000	1997			ULS database	W Africa
Ethiopia	Lake Abijatta	7.55	38.52	Non-breeding	21481	1997	8008	1995-99 (5)	AfWC database	E & S Africa
Finland	Oulu Region Wetlands	64.92	25.17	Migration	50000	1997			Skov *et al.* 2000	W Africa
Hungary	Hortobagy	47.62	21.07	Spring	200000	1995			Kube *et al.* 1998	W Africa
Kazakhstan	Tengiz-korgalzhyn Lakes	50.50	69.40	Spring migration	195153	2000	194224	1999-04 (6)	Schielzeth *et al.* In prep.	S Asia, E & S. Africa
Mali	Fleuve Niger: Downstream the Inner Delta	16.25	-0.08	Non-breeding	27300	1983	10154	1978-86 (5)	AfWC database	W Africa
Mali	Inner Niger Delta	13.50	-4.00	Non-breeding	47281	1998-04			Zwarts *et al.* 2005	W Africa
Mali	Lac Faguibine	16.75	-4.00	Non-breeding	20500	1983			WBDB	W Africa
Mali	Lac Horo	16.22	-3.92	Non-breeding	32000	1978			WBDB	W Africa
Mali	Timisobo--Képagou	15.13	-3.97	Non-breeding	31000	1978			WBDB	W Africa
Mauritania	Bassin de R'Kiz	17.47	-11.55	Non-breeding	22612	2001			AfWC database	W Africa
Mauritania	Keur Massene	16.57	-16.32	Post-breeding migration	15000	1976			AfWC database	W Africa
Mauritania	Mahmouda	16.45	-8.38	Non-breeding	22000	2001	14050	2000-01 (2)	AfWC database	W Africa
Mauritania	Tâmourt en Na'âj	17.85	-12.12	Non-breeding	24000	2000			WBDB	W Africa
Netherlands	Friesland Province	53.10	5.90	Spring	47500	1998	39500	1997-03 (5)	SOVON, The Netherlands, 2005	W Africa
Niger	Fleuve Niger. Labbezanga -Niamey	14.25	1.42	Non-breeding	13000	1984			AfWC database	W Africa
Niger	Fleuve Niger. Niamey -Gaya	12.57	2.73	Non-breeding	15400	1984			AfWC database	W Africa
Nigeria	Baturiya Kafin Hansa	12.48	10.37	Non-breeding	16971	2000			AfWC database	W Africa + E & S Africa
Nigeria	Hadejia-Nguru	12.67	10.50	Non-breeding	70845	1995	51822	1994-98 (5)	AfWC database	W Africa + E & S Africa
Nigeria	Lac Tchad - Nigerian part	12.83	13.67	Non-breeding	217119	2000			AfWC database	W Africa + E & S Africa
Nigeria	Niger: Gaya-Kainji dam	11.17	4.00	Non-breeding	47000	1984			AfWC database	W Africa
Romania	Danube Delta & Razim Sinoe Lagoons	45.00	29.00	Spring	20000	1995			Kube *et al.* 1998	W Africa + E & S Africa
Romania	Razim-Sinoie Lagoons	44.67	29.00	April	18000	1992			C. Sudfeldt *in litt.*, Schmitz *et al.* 2001	W Africa + E & S Africa
Russia	Burukshunskiye limans	45.98	42.42	Migration	50000	1973			WBDB	W Africa + E & S Africa
Russia	Veselovsky Rice Field	47.08	41.17	Spring	30000	1975			Kazakov *et al.* 1984, per V. Belik	W Africa + E & S Africa
Senegal	Lagunes de St.Louis	15.67	-17.00	Non-breeding	14500	1977			AfWC database	W Africa
Senegal	Ndiael	16.23	-16.08	Non-breeding	75000	1993	16244	1996-00 (5)	AfWC database	W Africa
Senegal	Ntiagar	16.50	-16.83	Non-breeding	26000	1994	12000	1976-95 (3)	AfWC database	W Africa
Senegal	Parc National des Oiseaux de Djoudj	16.33	-16.25	Non-breeding	200000	1996			WBDB	W Africa
Senegal	River Sénégal (Ntiagar to Richard-Toll)	16.48	-15.77	Non-breeding	26000	1994			WBDB	W Africa
Senegal	Zic de Djeuss et environs	16.25	-16.30	Non-breeding	14900	1975			AfWC database	W Africa
Somalia	Far Waamo	0.40	42.27	Non-breeding	20000	1984			WBDB	E & S Africa

Country	Site	Lat.	Long.	Season	Max	Year total	Average max	Basis total	Source for average	Population(s) at site
Sudan	Lake Abiad	10.25	29.92	Non-breeding	20000	1983			AfWC database	E & S Africa
Tanzania	Lake Manyara National Park	-3.67	35.83	Non-breeding	45486	1995			WBDB	E & S Africa
Ukraine	The Sivash, Azov Sea	46.17	34.58	August	290000	1998			Chernichko *et al.* 2001	W Africa + E & S Africa
Zambia	Kafue Flats	-15.67	27.17	Non-breeding	71285	2001	35646	1999-01 (2)	AfWC database	E & S Africa

Oliver Girard , Derek Scott & Tim Dodman

Terje Kolaas.

Red-necked Phalarope (Northern Phalarope)

Phalaropus lobatus

Geographical variation and distribution

The Red-necked (or Northern) Phalarope is a monotypic species with a Holarctic breeding distribution. This extends from Alaska and the Aleutians east through northern Canada to Labrador and Baffin Island, Greenland, Iceland, the Faeroes, Scotland, Ireland (now extinct) and Svalbard (few), and thence across Scandinavia and northern Russia from the Kola Peninsula east to the Bering Sea, Kamchatka and the Commander Islands (Cramp & Simmons 1983, Lappo 1998). Lappo (1998) has highlighted extensive breeding areas in the east of the Palearctic range, not previously mapped.

It winters at sea in the Pacific from the Ryukyu Islands and central Pacific south to the Lesser Sundas and New Guinea and off southern South America, and in the Indian Ocean from Eastern Africa to Malaysia. The largest concentrations occur in the south-east Pacific off Peru, in the Arabian Sea and in the South China Sea. The species is locally abundant in offshore waters off Somalia and Kenya, and is fairly common inland in Kenya (especially at Lake Turkana) and on the Ethiopian Rift Valley lakes, but it is rare elsewhere in Africa (Urban *et al.* 1986). It occurs as a rare visitor to the west coast of Southern Africa, and there are old records of birds at sea off Argentina and the Falkland Islands, but no major wintering areas have as yet been discovered in the Atlantic.

Movements

The entire population breeding on the mainland of Western Eurasia (east to about the Taymyr Peninsula) apparently winters at sea off the Arabian Peninsula from the Gulf of Aden east almost to Pakistan. Ringing recoveries have shown that Fennoscandian breeders migrate south-east through the Gulf of Bothnia and Gulf of Finland and across Eastern Europe on a broad front to staging areas in the Black and Caspian Seas (Snow & Perrins 1998, Summers *et al.* 1987, Bakken *et al.* 2003). Here they join up with birds from breeding areas in European Russia. From there the birds continue overland to the Arabian Sea, entering via the Persian Gulf and Gulf of Oman, and spreading west to the Gulf of Aden, but not entering the Red Sea (Cramp & Simmons 1983). West Siberian breeders stage at lakes in Kazakhstan before continuing on to the Arabian Sea. Huge concentrations of birds, presumably of West Siberian origin, have been recorded on migration at large lakes in Kazakhstan and on the Turkoman Steppes in north-eastern Iran (Summers *et al.* 1987). Birds reach the Gulf of Aden by late October, and move south from there to the coast of Somalia and Kenya, with a few birds appearing inland along the northern Rift Valley (Urban *et al.* 1986).

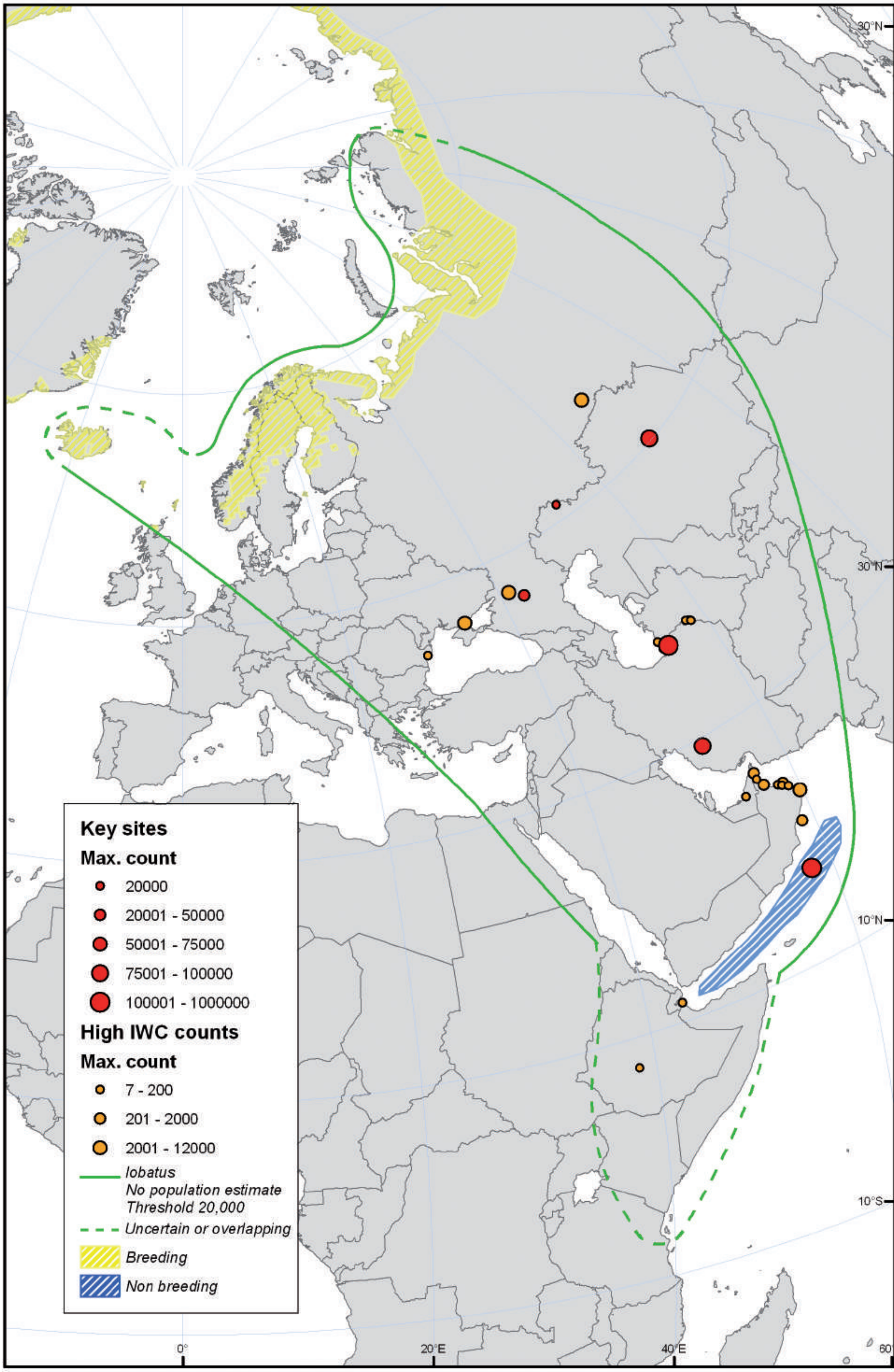
In the south Caspian region, autumn passage takes place between mid-July and mid-October, with a peak in late August and early September. Birds are present on their wintering grounds in the Arabian Sea from late July to the third week of May. Return passage through the Caspian region occurs in the second half of April and first half of May (D.A. Scott unpubl. obs.).

The bulk of the Nearctic breeding population migrates south-west across Canada and the western U.S.A. to the Pacific off California, and thence south to winter quarters in the Humboldt current off South America, especially off Peru. The North-east Asian breeding population and probably also the Alaskan breeding population migrate south through the western Pacific to winter at sea off Indonesia and New Guinea.

The winter quarters of the large Icelandic breeding population and the small populations in East Greenland, the Faeroes and Scotland are unknown. These birds are thought by some authors to cross Europe to join other European and West Siberian breeders in the Arabian Sea, but there is no evidence of any regular movements in the eastern Atlantic, and birds from Iceland and Greenland at least may join the Nearctic population to winter off the Pacific coast of South

Red-necked Phalarope (Northern Phalarope)

Phalaropus lobatus



America (Cramp & Simmons, 1983). Large-scale movements have been recorded on the Atlantic coast of Canada south in some numbers to New England, with up to 2,000,000 birds aggregating in the Bay of Fundy in Nova Scotia in May and August in the past, but the winter quarters of these birds are unknown. It seems unlikely that they fly further south to cross the Caribbean and Central America towards the Pacific, since the species is rarely observed in these zones (del Hoyo *et al.* 1996). It remains a possibility that there is a major wintering area for the species somewhere in the Atlantic, and if so, this is likely to be the destination of the Icelandic breeders.

The Red-necked Phalarope is a regular visitor to Southern Africa in very small numbers. Hockey (1997) refers to a total of 110 records of this species in Southern Africa, mostly from south-western Cape Province, and notes that some of these records have involved small flocks, e.g. 11 at Rondevlei, South Africa, in February 1971, and 27 at Walvis Bay, Namibia, in March 1992. During recent midwinter censuses in Southern Africa, counts of Red-necked Phalaropes have included 43 in Namibia in January 1999 and 56 in Namibia in January 2001 (Dodman & Diagana 2003). Hockey (1997) suggests that these records possibly relate to birds that have migrated south through the Atlantic in company with Grey Phalaropes. However, most of the records in South Africa and Namibia are from coastal pans and sewage works, and there have been no reports of birds at sea off Southern Africa (Hockey 1997). Another possibility is that these birds reach South-west Africa from the Indian Ocean population, either by rounding the Cape or by an overland crossing from North-east Africa. The latter possibility might explain the frequency of occurrence of Red-necked Phalaropes inland in the Rift Valley lakes in Eastern Africa.

Population limits

Perennou *et al.* (1994) recognised a single population in Western Eurasia comprising birds breeding in Northern Europe and Western Siberia and wintering in the northern Indian Ocean. This treatment, which was adopted in *Waterbird Population Estimates* and supported by Stroud *et al.* (2004), is retained here.

Population size

1. North-western Eurasia (breeding)

Population estimate	1% threshold	Population trend
E (>1,000,000)	20,000	Unknown

The size of the Western Eurasian population is unknown, but seems certain to exceed one million individuals. Concentrations of up to 600,000 have been reported on migration at Lake Tengiz in Kazakhstan (Hayman *et al.* 1986), and over one million are thought to winter in the Arabian Sea (del Hoyo *et al.* 1996, Fry 1996). About 100,000 were recorded in one transect off southern Arabia in January 1954 (Urban *et al.* 1986). Recent estimates of breeding populations in Europe include 30,000-50,000 pairs in Iceland, 50 pairs in the Faeroes, 15-45 pairs in the U.K., 25,000-60,000 pairs in Fennoscandia, 10-100 pairs in Svalbard, and 10,000-95,000 pairs in European Russia (Thorup 2006, BirdLife International 2004a). The size of the breeding population in Western Siberia is unknown.

Conservation status

Overall trends are uncertain. Numbers may be decreasing in some southern parts of the range in Europe, but there is no evidence of any widespread decline. The breeding populations in European Russia, Norway and Svalbard are thought to be stable (BirdLife International 2004a). Until recently, the Icelandic population was thought to be stable (Koskimies 1993) or increasing slightly (Snow & Perrins 1998), but this population is now reported to be declining (BirdLife International 2004a). Finnish coastal populations fluctuate greatly, making it difficult to identify long-term trends (Tomkovich *et al.* 1997). The small marginal populations breeding in northern Scotland and north-western Ireland have shown a long-term decline, probably due to habitat loss combined with climate change (Gibbons *et al.* 1993). In Ireland, the population declined from about 50 pairs in 1905 to 10 pairs by 1970, and has disappeared in recent years (Snow & Perrins 1998, BirdLife International 2004a). The Scottish population fell from about 60 pairs in the 1920s to 45 pairs in 1970 and 20 pairs in 1988-91 (Gibbons *et al.* 1993). However, the small population in the Faeroes is thought to be stable (BirdLife International 2004a). Nothing is known of trends in the large West Siberian breeding population.

Habitat and ecology

The Red-necked Phalarope breeds in the low Arctic and sub-arctic zones, from sea level up to at least 1,300 m (Hayman *et al.* 1986). It inhabits freshwater marshes and bogs with small ponds where moss or sedge cover near the waterline provides suitable nest sites (Johnsgard 1981). It may be loosely colonial where the habitat is restricted, with up to 50 nests at one site. The northernmost populations arrive on the breeding grounds from mid-May or early June, the females often arriving ahead of the males. Temperate populations arrive on the breeding grounds some three to four weeks earlier. The species shows a low degree of site fidelity and natal philopatry (del Hoyo *et al.* 1996). A substantial proportion of the birds are already paired when they arrive on the breeding grounds. Successive polyandry is a regular feature in this species provided excess males are available (Johnsgard 1981). The sex roles are reversed, and the females take no part in incubation or caring for the young. Some females leave the breeding grounds in late June, followed by successful males in late July and juveniles in August and early September (Hayman *et al.* 1986, Boertmann 1994).

The Red-necked Phalarope is highly gregarious and mainly pelagic when not breeding, forming small to large flocks (sometimes of many thousands) at sea, often far from land. During migration, however, it regularly occurs in estuaries and bays, and also inland on ponds, lakes, open marshes and sewage works. In South-west Asia, it sometimes occurs in enormous numbers on large brackish to saline lakes during the migration seasons.

Network of key sites

A key site approach is applicable only during the migration seasons, as the species is widely dispersed on Arctic tundra during the breeding season, and almost exclusively pelagic in its winter quarters. One site in Russia, two in Kazakhstan and two in Iran have exceeded the 1% threshold on migration, as has the Arabian Sea off Oman in winter. Tengiz Lake in Kazakhstan recorded 600,000 birds in late May 1959 (Hayman *et al.* 1986) and 80,000 in 1999 (G Eichhorn *in litt.*), with 300,000 being noted in spring by Wassink & Oreel (2007). There are reports of up to a million birds on passage at the Alagol and Ulmagol complex of lakes on the Turkoman Steppes east of the Caspian in Iran (L. Cornwallis pers. com.), but details are lacking. Up to 8,000 have been recorded on spring passage in Sivash Gulf on the Sea of Azov (Chernichko *et al.* 1991).

Protection status of key sites

Lakes Alagol and Ulmagol in Iran are part of a Ramsar site designated in June 1975 and have been identified as an IBA, but are otherwise unprotected.

Table 64. Key sites for Red-necked Phalarope. Sites where 1% or more of a population has been recorded

Country	Site	Lat.	Long.	Season	Max total	Year max	Source
Iran	Lakes Alagol, Ulmagol & Ajigol	37.38	54.63	Passage	1000000	1970s	L. Cornwallis pers. com.
Iran	Lake Maharlu	29.35	52.82	April	100000	1990	Ornis Fennica 67, 1990, 141-142
Kazakhstan	Aksay water reservoir	51.18	52.97	August	20000	1989-91	calculated from Khrokov *et al.* 1998.
Kazakhstan	Tengiz - Korgalzhin lakes	50.50	69.40	Autumn	588507	2004	Schielzeth *et al.* In prep.
Oman	Arabian Sea off Oman	18.37	56.87	Non-breeding	1000000	1996	Fry 1996
Russia	Manych-Gudilo lake	46.33	42.75	Spring	50000	1969	V. Belik unpublished

Derek Scott

Kev Joynes

Grey Phalarope (Red Phalarope)

Phalaropus fulicarius

Geographical variation and distribution

The Grey (or Red) Phalarope is a monotypic high Arctic species, breeding in North America from western Alaska east across northern Canada to Baffin Island and Ellesmere Island, in west and east Greenland, and in Arctic Siberia from the Yugorsky Peninsula in north-east European Russia east to the Anadyr River and Bering Strait, as well as on Novaya Zemlya, the New Siberian Islands (Novosibirskye) and Wrangel Island. In Arctic Siberia, the core breeding area is located in the Arctic and typical tundra sub-zones of Yakutia and Chukotka (Lappo 1998). The breeding density of this population decreases gradually westwards to the Yamal Peninsula, and breeding records on the Yugorsky Peninsula and in southern Novaya Zemlya are irregular and can be explained by fluctuations in the western limits of the core breeding range (Tomkovich 1997, Lappo 1998). There are also small breeding populations in Iceland (40-50 pairs in the late 1980s: Koskimies 1993), Svalbard (150-300 pairs in recent years: Bakken *et al.* 2003) and Bear Island (50 pairs in 1965: Snow & Perrins 1998).

Movements

The migration routes of the Grey Phalarope are entirely oceanic. All populations apparently leave the breeding grounds in an easterly direction, and then move south-east across the Atlantic or Pacific Oceans to reach the major wintering grounds off Chile and West Africa. The large population breeding in northern Canada and the low numbers breeding in Greenland, Iceland and Bear Island are believed to winter in the Atlantic in two main areas: in upwellings of the Guinea and Canary Currents off the bulge of West Africa between the Tropic of Cancer and 7-8ºN (especially off Mauritania); and in the Benguela Current off Southern Africa from central Namibia south to about 45ºS. Tomkovich (1997) has suggested that the birds breeding in Svalbard also join the Nearctic populations to winter in the Atlantic. There is one ringing recovery from Svalbard that would seem to support this: a bird ringed as an adult in Svalbard was recovered in December of the same year in the Gironde Delta in France (Bakken *et al.* 2003).

Details of the migratory routes to the main concentrations off the coast of West Africa are not known because of the lack of available ringing recoveries. However, many pelagic records spanning the North Atlantic suggest a major south-easterly autumn movement by the Nearctic population to West Africa. Birds have also been seen flying south-east between St Helena Island and the African mainland in August, suggesting an onward movement from West Africa towards the Benguela Current (Urban *et al.* 1986). The species is occasionally seen in large numbers on the European seaboard, especially in Britain and Ireland, north-western France, Spain and Portugal, following the passage of vigorous Atlantic depressions in autumn (Snow & Perrins 1998). For example, on 20 August 1996, 1,100 were observed off the coast of Portugal.[1] A few birds may remain throughout the winter as far north as the North Sea (Hayman *et al.* 1986).

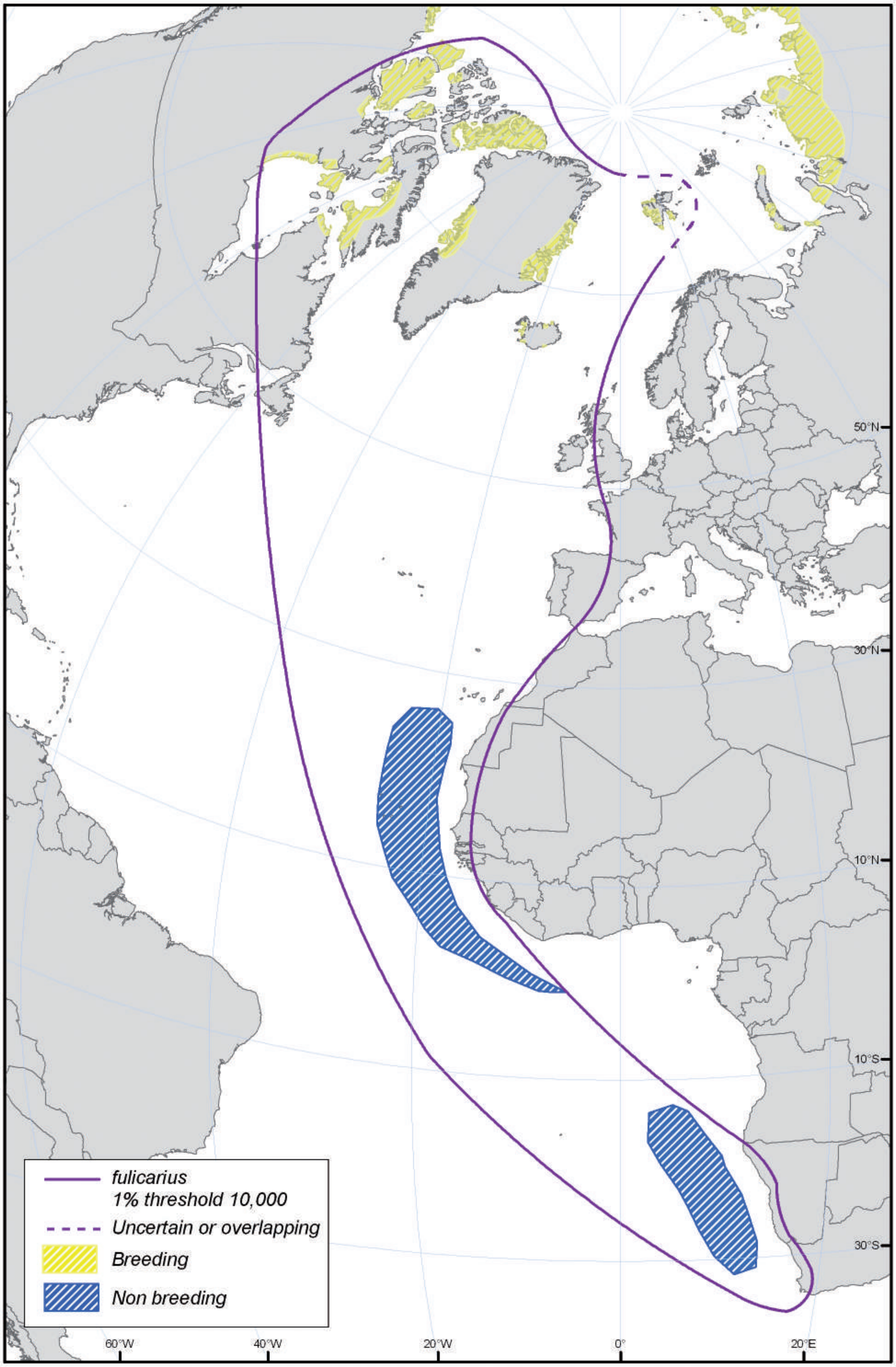
The birds breeding in northern Siberia (west to about 80ºE) and probably also those breeding in Alaska migrate south-east across the northern Pacific to winter off the west coast of South America south to Chile. The small numbers of birds breeding in Novaya Zemlya and on the Yugorsky Peninsula are believed to reflect the fluctuating westernmost boundary of this breeding population, and probably therefore join the Pacific wintering population (Tomkovich 1997).

There may also be a regular wintering area for small numbers of birds in the northern Indian Ocean. There have been several records of small groups of Grey Phalaropes amongst the large flocks of Red-necked Phalaropes in the Persian Gulf and Arabian Sea (e.g. Érard & Etchécopar 1970, Fry 1996). The

[1] See Dutch Birding 1996, 18 (5): 265. and Harrison (1983).

Grey Phalarope (Red Phalarope)

Phalaropus fulicarius



species has also been recorded as a rare passage migrant in Dagestan, on the west coast of the Caspian (Shubin 1998), in the South Caspian in Iran (Scott 1995), in Iraq and in eastern Saudi Arabia. There are five records from the Rift Valley lakes in Kenya (Short *et al.* 1990), and there is a single nineteenth century record from India (Grimmett *et al.* 1999). The origin of these birds is unknown, but it is possible that they belong to a discrete population breeding at the western extremity of the breeding range in Arctic Siberia and perhaps also Novaya Zemlaya.

Most birds return to the breeding areas in late May or early June. They arrive on the breeding grounds in Svalbard in mid-June, and at least some of them appear to be paired on arrival (Johnsgard 1981). Similarly, in Greenland, birds arrive at the breeding grounds in mid-June, although the birds probably arrive in polynyas and other ice-free waters off the coast somewhat earlier (Meltofte 1985). Females and non-breeding birds begin to flock and leave the breeding grounds soon after egg-laying in late June and early July. Adult males and most juveniles leave the breeding grounds in late July and August, although in Greenland, juveniles can remain until late September, October and occasionally November (Boertmann 1994). Few birds are found south of the equator before late August, but most are present on their winter quarters by the end of November. The first birds arrive on their wintering grounds off Southern Africa in October, but numbers do not peak until December. Most leave the Benguela region by mid- to late March and West African waters in April (del Hoyo *et al.* 1996, Hockey 1997). Unlike the spring migration, autumn movements are protracted, with large numbers of birds lingering off both coasts of North America until early December. Some birds may winter in these latitudes, as small numbers have been reported throughout the winter period in the north Pacific and north-west Atlantic

Population limits

In the absence of any firm evidence to link the small number of birds that overwinter in the Arabian Sea with any specific breeding areas, only two populations are recognised:

1) birds breeding mainly in the Nearctic and wintering at sea in the South Atlantic off West Africa and Southern Africa. The few birds breeding in Iceland, Bear Island and Svalbard presumably belong to this population.
2) birds breeding in Siberia and western Alaska, and wintering in the south-eastern Pacific. Birds from the isolated breeding populations on the Yugorsky Peninsula and in southern Novaya Zemlya probably belong to this population.

Only the first of these two populations occurs widely within Western Eurasia and Africa and is considered here.

Population size

1. Canada, Greenland & Iceland (breeding)

Population estimate	1% threshold	Population trend
1,000,000	10,000	Decreasing

Morrison *et al.* (2001) estimated the Canadian population of Grey Phalaropes at 920,000 individuals, although they acknowledged that this estimate was little more than an informed guess. This was believed to represent almost the entire population wintering in the Atlantic, as Alaskan breeders are thought to winter in the Pacific, and there are only 250-500 pairs in Greenland, 40-50 pairs in Iceland and 150-300 pairs in Svalbard (Thorup 2006, Bakken *et al.* 2003). Stroud *et al.* (2004) therefore proposed the figure of 920,000 as the estimate for the total population, and this estimate was adopted in *WPE3*. More recently, Morrison *et al.* (2006) have given an estimate of 1,000,000-1,500,000 individuals for the entire North American population (Canada and Alaska), but it is unclear what proportion of these birds should be assigned to the population wintering in the Atlantic. Recent estimates from the breeding grounds in Canada totalled 663,000 (Morrison *et al.* 2006). If these equate to 331,500 breeding pairs, the post-breeding population (including one fledged juvenile per breeding pair) would be 994,500 birds. Adding the small numbers of birds from breeding areas in Greenland, Iceland and Svalbard gives a total population of about 1,000,000 birds. This was the estimate adopted in *WPE4*.

Conservation status

The United States Shorebird Conservation Plan (2004) gives the status of the Alaskan and Canadian breeding populations as declining (Morrison *et al.* 2006). Numbers in Iceland are apparently also declining, possibly because of the effects of pesticides or other marine pollutants (Tomkovich 1997, BirdLife International/EBCC 2000, BirdLife International 2004a). However, the small population breeding in Svalbard is thought to be stable (BirdLife International/EBCC 2000, BirdLife International 2004a).

Habitat and ecology

The Grey Phalarope is the most oceanic of the three phalaropes. It breeds in lowland boggy and marshy tundra with numerous ponds surrounding the Arctic Ocean. In Siberia, the species is associated with polygonal and tussocky moss-sedge tundra rich in ponds, lakes and marshes (Johnsgard 1981). The birds breed in loose groups when habitat is limited, and often nest in colonies of aggressive seabirds, thus reducing the risk of predation. In western Greenland, breeding is often associated with colonies of Arctic Terns *Sterna paradisaea* (Boertmann 1994). Outside the breeding season, the Grey Phalarope is primarily pelagic, forming flocks at sea, typically of about 20 birds but up to several hundreds strong in rich feeding areas, and occasionally up to several thousands (Urban *et al.* 1986). During migration, it occurs in bays and estuaries and less frequently inland on ponds, lakes and reservoirs, usually during periods of strong winds. At sea, the species gathers at oceanic fronts at the edge of upwelling plumes where warm and cold water masses meet. These are the sites where the birds' planktonic food is brought to the surface and concentrated (Hockey 1997). Feeding birds often gather around cetaceans, and may pick parasites from their backs (Hayman *et al.* 1986).

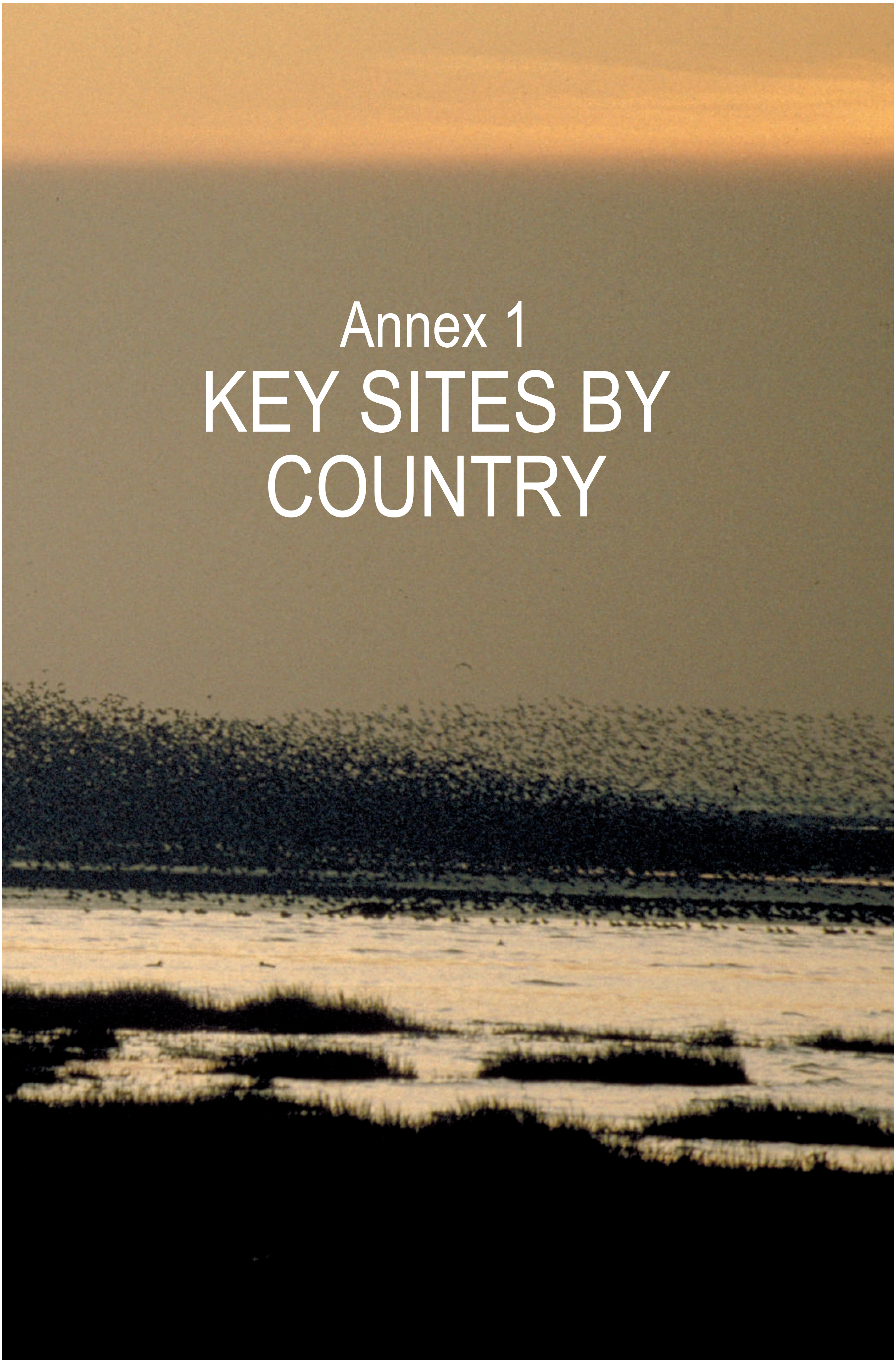
The species shows a low degree of site fidelity on the breeding grounds (del Hoyo *et al.* 1996). It is usually monogamous, but may be polyandrous where there is an excess of males. Successive polyandry has been recorded in Alaska (Johnsgard 1981). The sex roles are reversed, the female usually leaving the male as soon as the clutch is completed.

Network of key sites

A key site approach is inapplicable for this species, which is widely dispersed on Arctic tundra during the breeding season and almost exclusively pelagic outside the breeding season.

Derek Scott

Annex 1
KEY SITES BY COUNTRY



Nick Davidson

ALBANIA

Sitename	Lat	Long	Scientific name	English name	Season	maxcount	maxyear	average	Basis for average	Source	Population(s)
Butrintit	39.75	20.05	*Numenius tenuirostris*	Slender-billed Curlew	February	1	1993			Hagemeijer et al. 1994	
Karavasta Complex	40.92	19.48	*Recurvirostra avosetta*	Pied Avocet	Non-breeding	1763	1993	299	1999-04 (5)	IWC database	Mediterranean & SE Europe
			Glareola pratincola	Collared Pratincole	Breeding	390	1996			WBDB	Black Sea, E Mediterranean
			Vanellus vanellus	Northern Lapwing	Non-breeding	21158	1997	6982	1996-01 (5)	IWC database	Europe
			Calidris minuta	Little Stint	Non-breeding	4496	1996	221	1999-04 (5)	IWC database	Europe, W Africa
Patok (Complexe De Patoku)	41.60	19.57	*Recurvirostra avosetta*	Pied Avocet	Non-breeding	1034	1993	172	1995-04 (5)	IWC database	Mediterranean & SE Europe
			Numenius tenuirostris	Slender-billed Curlew	October	5	1992			Vangeluwe et al. 1994	

ALGERIA

Sitename	Lat	Long	Scientific name	English name	Season	maxcount	maxyear	average	Basis for average	Source	Population(s)
Marais De La Macta	35.68	-0.15	*Charadrius alexandrinus*	Kentish Plover	Non-breeding	800	1998	273	1996-98 (3)	IWC database	E Atlantic, W Mediterranean
Marais de Mekhada	36.75	8.03	*Glareola pratincola*	Collared Pratincole	Breeding	300	1984			WBDB	W Mediterranean
Sebkha d'Oran	35.37	-0.80	*Recurvirostra avosetta*	Pied Avocet	Non-breeding	1250	1979			WBDB	Mediterranean & SE Europe
Sebkhet Djendli	35.69	6.47	*Charadrius alexandrinus*	Kentish Plover	Non-breeding	1000	1992			IWC database	E Atlantic, W Mediterranean
Sebkret Ez Zemoul	35.88	6.55	*Numenius tenuirostris*	Slender-billed Curlew	January	1	1990			M. Trubridge	

ANGOLA

Sitename	Lat	Long	Scientific name	English name	Season	maxcount	maxyear	average	Basis for average	Source	Population(s)
Baia dos Tigres	-16.68	11.75	*Calidris alba*	Sanderling	July-August	1640	1999			AfWC database	SW Asia, ES Africa + E Atlantic

AUSTRIA

Sitename	Lat	Long	Scientific name	English name	Season	maxcount	maxyear	average	Basis for average	Source	Population(s)
Lake Neusiedl/Seewinkel	47.75	16.83	*Recurvirostra avosetta*	Pied Avocet	Breeding	643	2007			J Laber *in litt.* Laber 2003	Mediterranean & SE Europe

AZERBAIJAN

Sitename	Lat	Long	Scientific name	English name	Season	maxcount	maxyear	average	Basis for average	Source	Population(s)
Big Kyzyl-Agach Bay	39.17	49.00	*Recurvirostra avosetta*	Pied Avocet	Non-breeding	4250	1997	3326	1996-97 (2)	IWC database	SW Asia, E Africa
Hagygabul Gyolu (Hadgegabol Lake)	40.00	48.92	*Recurvirostra avosetta*	Pied Avocet	Non-breeding	3000	1996			IWC database	SW Asia, E Africa
Kirov Bay	39.08	48.95	*Recurvirostra avosetta*	Pied Avocet	Post-breeding migration	300	1985			Shubin, 1998	SW Asia, E Africa
			Charadrius alexandrinus	Kentish Plover	August	3600	1991			Shubin, 1992	SW Asia, NE Africa
			Limosa limosa	Black-tailed Godwit	Post-breeding migration	5000	1984			Shubin, 1998	W Asia
			Calidris ferruginea	Curlew Sandpiper	Autumn	4000	1990s			Shubin, 2006	E & S Africa
Kura River Estuary	39.33	49.33	*Recurvirostra avosetta*	Pied Avocet	Non-breeding	9730	1997			IWC database	SW Asia, E Africa
Shirvan Reservation Lakes	39.67	49.17	*Recurvirostra avosetta*	Pied Avocet	Non-breeding	6000	1997	3035	1996-97 (2)	IWC database	SW Asia, E Africa

BAHRAIN

Sitename	Lat	Long	Scientific name	English name	Season	maxcount	maxyear	average	Basis for average	Source	Population(s)
Hidd. Muharraq	26.23	50.63	*Charadrius alexandrinus*	Kentish Plover	Non-breeding	1000	1988	650	1988-89 (2)	IWC database	SW Asia, NE Africa
Tubli Bay	26.18	50.57	*Charadrius alexandrinus*	Kentish Plover	Migration	1500	1991			WBDB	SW Asia, NE Africa
			Charadrius mongolus	Lesser Sandplover	August	2000	1985			Evans 1994	*pamirensis*
			Limicola falcinellus	Broad-billed Sandpiper	Migration	800	1991			WBDB	*falcinellus*

BELARUS

Sitename	Lat	Long	Scientific name	English name	Season	maxcount	maxyear	average	Basis for average	Source	Population(s)
Mid-Pripyat	52.15	27.00	*Limosa limosa*	Black-tailed Godwit	Breeding	3000	1986			WBDB	E Europe

BELGIUM

Sitename	Lat	Long	Scientific name	English name	Season	maxcount	maxyear	average	Basis for average	Source	Population(s)
Harbour area Antwerpen Linkeroever	51.28	4.23	*Recurvirostra avosetta*	Pied Avocet	Breeding	939	2001	609	1999-03 (5)	INC, Belgium 2005	E Atlantic
Zeeschelde Estuary	51.33	4.25	*Recurvirostra avosetta*	Pied Avocet	Non-breeding	1106	1995	500	2001-05 (5)	INC, Belgium 2005	E Atlantic
Belgian Coast	51.23	2.92	*Arenaria interpres*	Ruddy Turnstone	Non-breeding	1514	2005	1412	2001-05 (5)	INC, Belgium 2005	NE Canada, Greenland + W Africa

BENIN

Sitename	Lat	Long	Scientific name	English name	Season	maxcount	maxyear	average	Basis for average	Source	Population(s)
Lac Nokoue	6.47	2.38	*Glareola pratincola*	Collared Pratincole	Non-breeding	258	1996	98	1996-01 (3)	AfWC database	*boweni*
Oueme - So: NW Depression Valley	6.95	2.33	*Glareola pratincola*	Collared Pratincole	Non-breeding	350	1996			AfWC database	*boweni*
Riviere So	6.53	2.40	*Glareola pratincola*	Collared Pratincole	Non-breeding	925	1996	520	1996-01 (3)	AfWC database	*boweni*

BOTSWANA

Sitename	Lat	Long	Scientific name	English name	Season	maxcount	maxyear	average	Basis for average	Source	Population(s)
Lake Ngami	-20.50	22.62	*Glareola nordmanni*	Black-winged Pratincole	Non-breeding	10000	1989			WBDB	*nordmanni*
Makgadikgadi Pans	-20.75	25.50	*Recurvirostra avosetta*	Pied Avocet	July	335	1993			S Tyler *in litt.*	S Africa
Nata Delta	-20.33	26.08	*Recurvirostra avosetta*	Pied Avocet	July-August	335	1993	169	1991-93 (2)	AfWC database	S Africa
Okavango Delta	-19.42	22.75	*Glareola nordmanni*	Black-winged Pratincole	Non-breeding	2,000	-			WBDB	*nordmanni*
Rysana Pan	-21.25	25.07	*Himantopus himantopus*	Black-winged Stilt	Non-breeding	467	1994	319	1991-96 (5)	AfWC database	Southern Africa
			Recurvirostra avosetta	Pied Avocet	Non-breeding	5094	2000	1710	1994-01 (3)	AfWC database	S Africa
			Glareola nordmanni	Black-winged Pratincole	Non-breeding	5200	1993	1816	1991-94 (3)	AfWC database	*nordmanni*
			Charadrius pallidus	Chestnut-banded Plover	Unknown	235	2001	138	1994-01 (3)	AfWC database	*pallidus*

BULGARIA

Sitename	Lat	Long	Scientific name	English name	Season	maxcount	maxyear	average	Basis for average	Source	Population(s)
Atonosovo Lake & Bourgas Bay	42.50	27.47	*Recurvirostra avosetta*	Pied Avocet	Post-breeding migration	20000	1995	15000	1990-99	Kube *et al.* 1998	Mediterranean & SE Europe
			Limosa limosa	Black-tailed Godwit	Post-breeding migration	20000	1990-99	15000	1990-99	Kube *et al.* 1998	E Europe
			Numenius tenuirostris	Slender-billed Curlew	November	3	1992			Gretton 1994, Nankinov 1994	
			Calidris ferruginea	Curlew Sandpiper	Post-breeding migration	20000	1990-99	15000	1990-99	Kube *et al.* 1998	W Africa + ES Africa
Chelopechene, Sofia	42.68	23.42	*Numenius tenuirostris*	Slender-billed Curlew	March	1	1990			Gretton 1994	

BURKINA FASO

Sitename	Lat	Long	Scientific name	English name	Season	maxcount	maxyear	average	Basis for average	Source	Population(s)
Béli River	14.97	-0.42	*Himantopus himantopus*	Black-winged Stilt	Non-breeding	1741	1990s			WBDB	Sub-Saharan Africa N of Southern Africa + W & SW Europe, W Africa
Mare d'Oursi	14.67	-0.50	*Himantopus himantopus*	Black-winged Stilt	Pre-breeding migration	2680	1998			AfWC database	Sub-Saharan Africa N of Southern Africa + W & SW Europe, W Africa
Vallee du Sourou	13.00	-3.42	*Glareola pratincola*	Collared Pratincole	Non-breeding	300	1983			AfWC database	*boweni* + W Mediterranean
			Tringa stagnatilis	Marsh Sandpiper	Pre-breeding migration	789	1998			AfWC database	Europe

CAMEROON

Sitename	Lat	Long	Scientific name	English name	Season	maxcount	maxyear	average	Basis for average	Source	Population(s)
Bas Chari (Cameroun)	6.00	12.00	*Limosa limosa*	Black-tailed Godwit	Non-breeding	13226	2000			AfWC database	E Europe
Depression Zilim	11.42	15.02	*Glareola pratincola*	Collared Pratincole	Non-breeding	1700	1993			AfWC database	*boweni* + Black Sea, E Mediterranean
Lac Maga	10.80	14.98	*Vanellus crassirostris*	Long-toed Lapwing	January	218	2008			B Trolliet, unpublished data	*crassirostris* - L Chad Basin
			Philomachus pugnax	Ruff	Non-breeding	14500	1986			AfWC database	W Africa + E & S Africa
Lake Chad – SEE CHAD											
Logone/Chari confluent (Fort-Foureau. Kousseri)	12.08	15.00	*Glareola pratincola*	Collared Pratincole	Non-breeding	3642	1999			AfWC database	*boweni* + Black Sea, E Mediterranean
Mare de Bounga (Wenu)	9.20	13.67	*Glareola cinerea*	Grey Pratincole	Non-breeding	320	1994			AfWC database	*cinerea*
Mare de Katoa	10.83	15.08	*Glareola pratincola*	Collared Pratincole	Non-breeding	250	1993			AfWC database	*boweni* + Black Sea, E Mediterranean
Parc National de Waza Logone	10.83	15.00	*Himantopus himantopus*	Black-winged Stilt	Non-breeding	2300	2000			P Scholte *in litt.*	Sub-Saharan Africa N of Southern Africa + C & E Europe, E Mediterranean
			Glareola pratincola	Collared Pratincole	Non-breeding	7191	1998	5121	1996-98 (3)	AfWC database	*boweni* + Black Sea, E Mediterranean
			Philomachus pugnax	Ruff	Non-breeding	48861	1996	24434	1996-01 (5)	AfWC database	W Africa + E & S Africa

CAMEROON (CONTINUED)

Sitename	Lat	Long	Scientific name	English name	Season	maxcount	maxyear	average	Basis for average	Source	Population(s)
Sanaga River	3.53	9.83	*Glareola cinerea*	Grey Pratincole	January	807	2007			AfWC database	*cinerea*
Semry I: Rizières Yagoua Nord	10.43	15.18	*Philomachus pugnax*	Ruff	Non-breeding	22000	1984	20500	1984-87 (2)	AfWC database	W Africa + E & S Africa
Semry II Rizières: Maga. Pousse; Guirvidig	10.83	15.05	*Glareola pratincola*	Collared Pratincole	Non-breeding	5530	1999	1988	1993-01 (4)	AfWC database	*boweni* + Black Sea, E Mediterranean
Zoung	6.00	12.00	*Glareola pratincola*	Collared Pratincole	Non-breeding	500	2001			AfWC database	*boweni*

CAPE VERDE

Sitename	Lat	Long	Scientific name	English name	Season	maxcount	maxyear	average	Basis for average	Source	Population(s)
Boavista: Arid Plains	16.08	22.83	*Cursorius cursor*	Cream-coloured Courser	March	30	1997			Sargeant 1997	*exsul*
Maio: Arid Plains	15.22	23.17	*Cursorius cursor*	Cream-coloured Courser	All year	50-100	1990s			C. Hazevoet *in litt.* 2002	*exsul*
Sal: Arid Plains	16.72	22.97	*Cursorius cursor*	Cream-coloured Courser	March	11	1997			Sargeant 1997	*exsul*

CHAD

Sitename	Lat	Long	Scientific name	English name	Season	maxcount	maxyear	average	Basis for average	Source	Population(s)
Katoa Sud Ouest	10.90	15.13	*Vanellus crassirostris*	Long-toed Lapwing	January	91	2001			AfWC database	*crassirostris* - L Chad Basin
Bas-Chari	12.17	15.12	*Himantopus himantopus*	Black-winged Stilt	February	2561	1999			B Trolliet, unpublished data	Sub-Saharan Africa + CE Europe, E Mediterranean
			Philomachus pugnax	Ruff	December	30720	1999			B Trolliet, unpublished data	W Africa + E&S Africa
Lac de Tikem	9.80	15.10	*Glareola pratincola*	Collared Pratincole	Non-breeding	2700	1987			AfWC database	*boweni* + Black Sea, E Mediterranean
Lake Chad	13.28	14.26	*Himantopus himantopus*	Black-winged Stilt	January	9701	2008			B Trolliet,	Sub-Saharan Africa + CE Europe,E Europe, E Mediterranean
			Vanellus crassirostris	Long-toed Lapwing	January	429	2008			B Trolliet, unpublished data	*crassirostris* Lake Chad Basin
			Vanellus spinosus	Spur-winged Lapwing	January	7189	2008			B Trolliet, unpublished data	Sub-Saharan Africa
			Limosa limosa	Black-tailed Godwit	Non-breeding	39745	2008			B Trolliet, unpublished data	E Europe
			Philomachus pugnax	Ruff	Non-breeding	247327	1999			B Trolliet, unpublished data	W Africa + E&S Africa
Lac Fitri	12.95	17.50	*Himantopus himantopus*	Black-winged Stilt	January	2272	2007			B Trolliet, unpublished data	Sub-Saharan Africa + CE E Europe, E Mediterranean
Plaine du Logone	11.00	15.20	*Vanellus crassirostris*	Long-toed Lapwing	Non-breeding	136	2008			B Trolliet, unpublished data	*crassirostris* Lake Chad Basin
			Glareola pratincola	Collared Pratincole	Non-breeding	1150	2000			AfWC database	*boweni* + Black Sea, E Mediterranean
			Philomachus pugnax	Ruff	December	33754	1999			B Trolliet, unpublished data	W Africa + E&S Africa

DENMARK

Sitename	Lat	Long	Scientific name	English name	Season	maxcount	maxyear	average	Basis for average	Source	Population(s)
Agero	56.70	8.55	*Pluvialis apricaria*	Eurasian Golden Plover	Spring	14000	1998			H Meltofte *in litt.*	Norway, W Russia + *apricaria*
Alrø – Gylling Næs	55.84	10.12	*Pluvialis apricaria*	Eurasian Golden Plover	Autumn	11880	1994			H Meltofte *in litt.*	Norway, W Russia + *apricaria*
Arup/Vesløs Vejle	57.02	8.92	*Calidris alpina*	Dunlin	Summer	81	1998			WBDB	Baltic
Aså-Gerå	57.10	10.40	*Pluvialis apricaria*	Eurasian Golden Plover	Autumn	10500	1991			H Meltofte *in litt.*	Norway, W Russia + *apricaria*
Bøvling Fjord	56.40	8.15	*Recurvirostra avosetta*	Pied Avocet	Autumn	2545	1999			H Meltofte *in litt.*	E Atlantic
			Calidris alpina	Dunlin	May	15000	1990			H Meltofte *in litt.*	*alpina* + Baltic
Bygholm Vejle	57.05	9.10	*Calidris alpina*	Dunlin	Summer	288	1998			WBDB	Baltic
Dråby Vig and Buksør Odde	56.83	8.83	*Pluvialis apricaria*	Eurasian Golden Plover	Migration	10000	1995			WBDB	Norway, W Russia + *apricaria*
Eastern part of Vejlerne	57.05	9.00	*Recurvirostra avosetta*	Pied Avocet	Breeding	840	1994			WBDB	E Atlantic
			Pluvialis apricaria	Eurasian Golden Plover	Migration	18000	1994			WBDB	Norway, W Russia + *apricaria*
Egholm	56.15	9.83	*Pluvialis apricaria*	Eurasian Golden Plover	Autumn	17000	1992			H Meltofte *in litt.*	Norway, W Russia + *apricaria*
Glomstrup Vig, Agerø, Munkholm & Katholm Odde, Lindholm, & Rotholme	56.67	8.58	*Pluvialis apricaria*	Eurasian Golden Plover	Non-breeding	13500	1994			WBDB	Norway, W Russia + *apricaria*
Harboøre Tange	56.65	8.17	*Recurvirostra avosetta*	Pied Avocet	Autumn	1062	1990			H Meltofte *in litt.*	E Atlantic
			Calidris alpina	Dunlin	Summer	315	1990			WBDB	Baltic
Læsø, Rønnerne	57.20	8.13	*Calidris alpina*	Dunlin	May	40000	1994			WBDB	*alpina* + Baltic
Northwestern Kattegat	57.20	11.00	*Recurvirostra avosetta*	Pied Avocet	Breeding	1554	1996			WBDB	E Atlantic
			Pluvialis apricaria	Eurasian Golden Plover	Migration	28000	1994			Skov *et al.* 2000	Norway, W Russia + *apricaria*
			Calidris alpina	Dunlin	Non-breeding	64000	1994	52000	1994	Skov *et al.* 2000	*alpina* + *arctica* + Baltic
Odense Fjord	55.47	10.52	*Pluvialis apricaria*	Eurasian Golden Plover	Migration	10000	1996			Skov *et al.* 2000	Norway, W Russia + *apricaria*
Randers Fjord	56.48	10.22	*Pluvialis apricaria*	Eurasian Golden Plover	Autumn	19000	1994-95	14500	1994-95	H Meltofte *in litt.*	Norway, W Russia + *apricaria*
Ringkøbing Fjord	56.00	8.25	*Recurvirostra avosetta*	Pied Avocet	Breeding	2010	1998			WBDB	E Atlantic
Rosvang	56.15	8.53	*Pluvialis apricaria*	Eurasian Golden Plover	Autumn	17000	1992			H Meltofte *in litt.*	Norway, W Russia + *apricaria*
Saltbæk Vig	55.75	11.17	*Recurvirostra avosetta*	Pied Avocet	Breeding	1500	1998			WBDB	E Atlantic
Sjørring Sø	56.95	8.57	*Pluvialis apricaria*	Eurasian Golden Plover	Migration	12000	1993			WBDB	Norway, W Russia + *apricaria*
Skjern Enge	55.90	8.40	*Pluvialis apricaria*	Eurasian Golden Plover	Autumn	11880	1994			H Meltofte *in litt.*	Norway, W Russia + *apricaria*

DENMARK (CONTINUED)

Sitename	Lat	Long	Scientific name	English name	Season	maxcount	maxyear	average	Basis for average	Source	Population(s)
Tipperne	55.88	8.24	*Recurvirostra avosetta*	Pied Avocet	Autumn	1437	1999			H Meltofte *in litt.*	E Atlantic
			Calidris alpina	Dunlin	July-November	33928	1996			NERI, Denmark, 2005	*alpina* + Baltic
Ulvedybet	57.08	9.64	*Pluvialis apricaria*	Eurasian Golden Plover	Autumn	20300	1989-98	11816	1989-98	H Meltofte *in litt.*	Norway, W Russia + *apricaria*
Vejlerne	57.02	9.01	*Pluvialis apricaria*	Eurasian Golden Plover	Autumn	26600	1992			H Meltofte *in litt.*	Norway, W Russia + *apricaria*
Voerså-Stensnæs	56.78	9.75	*Pluvialis apricaria*	Eurasian Golden Plover	Autumn	15000	1997			H Meltofte *in litt.*	Norway, W Russia + *apricaria*
Wadden Sea - Denmark	55.16	8.58	*Haematopus ostralegus*	Eurasian Oystercatcher	Non-breeding	39836	2000	25889	1999-02 (4)	NERI, Denmark, 2005	*ostralegus*
			Recurvirostra avosetta	Pied Avocet	Autumn	5671	2001	3652	1999-02 (4)	NERI, Denmark, 2005	E Atlantic
			Pluvialis apricaria	Eurasian Golden Plover	Spring	14322	2002	6091	1999-02 (04)	NERI, Denmark, 2005	Norway, W Russia + *apricaria*
			Pluvialis squatarola	Grey Plover	Spring	5373	2003	2666	2000-04 (3)	NERI, Denmark, 2005	E Atlantic
			Limosa lapponica	Bar-tailed Godwit	Spring	28051	2004	20704	2000-04 (3)	NERI, Denmark, 2005	W *taymyrensis* + *lapponica*
			Numenius arquata	Eurasian Curlew	Spring	9455	2000	3501	2000-04 (3)	NERI, Denmark, 2005	*arquata*
			Tringa erythropus	Spotted Redshank	Autumn	2888	1999	479	1999-02 (3)	NERI, Denmark, 2005	Europe
			Tringa totanus	Common Redshank	Autumn	8494	2001	3981	1999-02 (4)	NERI, Denmark, 2005	*robusta* + E & C Europe + N Europe
			Tringa nebularia	Common Greenshank	Autumn	5712	2001	2294	1999-02 (4)	NERI, Denmark, 2005	Europe
			Calidris canutus	Red Knot	Spring	66796	2003	43722	2000-04 (3)	NERI, Denmark, 2005	*islandica* + *canutus*
			Calidris alba	Sanderling	Spring	5405	2003	1995	2000-04 (3)	NERI, Denmark, 2005	E Atlantic
			Calidris alpina	Dunlin	Autumn	258450	2000	178411	1999-02 (4)	NERI, Denmark, 2005	*alpina* + Baltic

DJIBOUTI

Sitename	Lat	Long	Scientific name	English name	Season	maxcount	maxyear	average	Basis for average	Source	Population(s)
Sac Allol Region	11.50	42.50	*Tringa stagnatilis*	Marsh Sandpiper	Non-breeding	1300	1999			AfWC database	SW Asia, ES Africa
Salines Est			*Charadrius mongolus*	Lesser Sandplover	Non-breeding	2012	2002	1258	2001-02 (2)	AfWC database	*pamirensis*
			Charadrius leschenaultii	Greater Sandplover	Non-breeding	1231	2002	670	2001-02 (2)	AfWC database	*leschenaultii*
			Limosa lapponica	Bar-tailed Godwit	Non-breeding	1720	2002	76	2001-02 (2)	AfWC database	Eastern

EGYPT

Sitename	Lat	Long	Scientific name	English name	Season	maxcount	maxyear	average	Basis for average	Source	Population(s)
El Malaha. Bur Fuad	31.22	32.32	*Recurvirostra avosetta*	Pied Avocet	Non-breeding	8910	1990	4920	1980-90 (2)	IWC database	Mediterranean & SE Europe
			Pluvialis squatarola	Grey Plover	Non-breeding	1540	1990			IWC database	SW Asia, E Africa
			Charadrius alexandrinus	Kentish Plover	Non-breeding	3290	1990	1788	1980-90 (2)	IWC database	Black Sea, E Mediterranean
			Calidris alpina	Dunlin	Winter	10100	1990			IWC database	*centralis*
Lake Burullus	31.50	30.75	*Recurvirostra avosetta*	Pied Avocet	Non-breeding	2949	1990	1478	1990-94 (2)	IWC database	Mediterranean & SE Europe
			Charadrius alexandrinus	Kentish Plover	Non-breeding	1178	1994	898	1990-94 (2)	IWC database	Black Sea, E Mediterranean
Lake Manzala	31.27	32.03	*Recurvirostra avosetta*	Pied Avocet	Non-breeding	9491	1990	3795	1979-90 (3)	IWC database	Mediterranean & SE Europe
			Charadrius pecuarius	Kittlitz's Plover	Non-breeding	35	1990			IWC database	"*allenbyi*"
			Charadrius alexandrinus	Kentish Plover	Non-breeding	4323	1990	3623	1979-90 (3)	WBDB	Black Sea, E Mediterranean
			Calidris alpina	Dunlin	Winter	11275	1990			IWC database	*centralis*
Nile Delta Other Areas	31.00	31.00	*Charadrius pecuarius*	Kittlitz's Plover	Non-breeding	55	1990			IWC database	"*allenbyi*"
Wadi El Natrun	30.33	30.25	*Charadrius alexandrinus*	Kentish Plover	Non-breeding	1122	1990	618	1979-90 (2)	IWC database	Black Sea, E Mediterranean

ERITREA

Sitename	Lat	Long	Scientific name	English name	Season	maxcount	maxyear	average	Basis for average	Source	Population(s)
Dahlak & Howakil islands and adjacent coast	15.50	40.00	*Dromas ardeola*	Crab Plover	Breeding	15000-18000 5000-6000 Prs	2002-04			De Marchi *et al.* 2006	*ardeola*

ESTONIA

Sitename	Lat	Long	Scientific name	English name	Season	maxcount	maxyear	average	Basis for average	Source	Population(s)
Kihnu Väin strait	58.30	24.00	*Calidris alpina*	Dunlin	Breeding	53	2007			Erit *et al.* in press	*schinzii* Baltic
Pärnu bay and Kihnu strait	58.20	24.17	*Calidris alpina*	Dunlin	Breeding	75	1998			WBDB	Baltic
Väike Väin strait	58.53	23.18	*Calidris alpina*	Dunlin	Breeding	225	1995			WBDB	Baltic
	58.56	23.14	*Calidris canutus*	Red Knot	May	4000	1998			University of Life Sciences database	*canutus*
Matsulu National Park	58.75	23.84	*Philomachus pugnax*	Ruff	May	20000	1997			ULS database	W Africa
			Calidris alpina	Dunlin	Breeding	240 72-88 pairs	2007			Erit *et al.* in press	*schinzii* Baltic
Pikla	58.17	24.46	*Calidris canutus*	Red Knot	June	3900	2004			Kabli Bird Station database	*canutus*
Southern Saaremaa	58.29	22.91	*Calidris alpina*	Dunlin	Breeding	57 13-25 pairs	2007			Erit *et al.* in press	*schinzii* Baltic

ETHIOPIA

Sitename	Lat	Long	Scientific name	English name	Season	maxcount	maxyear	average	Basis for average	Source	Population(s)
Bale Mountains National Park	6.75	39.72	*Vanellus melanocephalus*	Spot-breasted Lapwing	Breeding	150	1990s	50+pr		WBDB	*melanocephalus*
Guassa area of Menz	10.37	39.80	*Vanellus melanocephalus*	Spot-breasted Lapwing	Non-breeding	136	1990s			WBDB	*melanocephalus*
Gudo Plain	9.13	38.58	*Vanellus melanocephalus*	Spot-breasted Lapwing	Non-breeding	210	1990s			WBDB	*melanocephalus*
Koka reservoir	8.33	39.00	*Glareola pratincola*	Collared Pratincole	Non-breeding	1000	1999			AfWC database	*limbata* + SW Asia

ETHIOPIA (CONTINUED)

Sitename	Lat	Long	Scientific name	English name	Season	maxcount	maxyear	average	Basis for average	Source	Population(s)
Lake Abijatta	7.55	38.52	*Recurvirostra avosetta*	Pied Avocet	Non-breeding	1471	1993	231	1997-01 (5)	AfWC database	E Africa
			Charadrius pecuarius	Kittlitz's Plover	Non-breeding	10968	-			WBDB	*pecuarius* E, C & S Africa
			Philomachus pugnax	Ruff	Non-breeding	21481	1997	8008	1995-99 (5)	AfWC database	E & S Africa
Shesher and Welala Marshes	9.00	39.00	*Glareola pratincola*	Collared Pratincole	Non-breeding	7105	2001	1823	1997-01 (5)	AfWC database	*limbata* + SW Asia
Sululta Plain	9.20	38.72	*Vanellus melanocephalus*	Spot-breasted Lapwing	Non-breeding	120	1990s			WBDB	*melanocephalus*

FINLAND

Sitename	Lat	Long	Scientific name	English name	Season	maxcount	maxyear	average	Basis for average	Source	Population(s)
Käsivarsi fjelds	69.00	21.50	*Eudromias morinellus*	Eurasian Dotterel	Breeding	900	1996			WBDB	Europe
Kevo	69.58	26.78	*Pluvialis apricaria*	Eurasian Golden Plover	Breeding	9000	1996			WBDB	Norway, W Russia
			Calidris temminckii	Temminck's Stint	Breeding	600	1997			WBDB	Europe, W Africa
Lätäseno & Jietajoki mires	68.63	22.35	*Limicola falcinellus*	Broad-billed Sandpiper	Breeding	1500	1997			WBDB	*falcinellus*
Lemmenjoki-Hammastunturi -Pulju	68.58	25.50	*Pluvialis apricaria*	Eurasian Golden Plover	Breeding	15000	1991			WBDB	Norway, W Russia
			Eudromias morinellus	Eurasian Dotterel	Breeding	1200	1991			WBDB	Europe
			Numenius phaeopus	Whimbrel	Breeding	4500	1991			WBDB	*islandicus* + Northern Europe
			Tringa erythropus	Spotted Redshank	Breeding	3000	1991			WBDB	Europe
			Tringa glareola	Wood Sandpiper	Breeding	45000	1991			WBDB	Europe
			Limicola falcinellus	Broad-billed Sandpiper	Breeding	6000	1991			WBDB	*falcinellus*
Litokaira	65.75	26.28	*Limicola falcinellus*	Broad-billed Sandpiper	Breeding	1500	1996			WBDB	*falcinellus*
Oulu Region Wetlands	64.92	25.17	*Tringa erythropus*	Spotted Redshank	Migration	7000	1997			Skov *et al.* 2000	Europe
			Tringa totanus	Common Redshank	Migration	5000	1997			Skov *et al.* 2000	N Europe
			Tringa nebularia	Common Greenshank	Migration	3000	1997			Skov *et al.* 2000	Europe
			Tringa glareola	Wood Sandpiper	Migration	40000	1997			Skov *et al.* 2000	Europe
			Calidris minuta	Little Stint	Migration	10000	1997			Skov *et al.* 2000	Europe, W Africa
			Limicola falcinellus	Broad-billed Sandpiper	Migration	3000	1997			Skov *et al.* 2000	*falcinellus*
			Philomachus pugnax	Ruff	Migration	50000	1997			Skov *et al.* 2000	W Africa
Pomokaira-Koitelaiskaira	68.00	26.30	*Tringa erythropus*	Spotted Redshank	Breeding	900	1994			WBDB	Europe
						300 prs					
			Tringa glareola	Wood Sandpiper	Breeding	15000	1994			WBDB	Europe
			Limicola falcinellus	Broad-billed Sandpiper	Breeding	3000	1994			WBDB	*falcinellus*
			Tringa erythropus	Spotted Redshank	Migration	1000	1997			Skov *et al.* 2000	Europe
Pori Archipelago and wetlands	61.53	21.60	*Calidris alpina*	Dunlin	Breeding	75	1997			WBDB	Baltic
Saariselkä and Koilliskaira	68.25	28.00	*Pluvialis apricaria*	Eurasian Golden Plover	Breeding	15000	1996			WBDB	Norway, W Russia
			Numenius phaeopus	Whimbrel	Breeding	6000	1996			WBDB	*islandicus* + Northern Europe
			Tringa glareola	Wood Sandpiper	Breeding	15000	1996			WBDB	Europe
			Calidris temminckii	Temminck's Stint	Breeding	900	1996			WBDB	Europe, W Africa
			Limicola falcinellus	Broad-billed Sandpiper	Breeding	3000	1996			WBDB	*falcinellus*

FRANCE Sitename	Lat	Long	Scientific name	English name	Season	maxcount	maxyear	average	Basis for average	Source	Population(s)
Baie de Bourgneuf et Noirmoutier	47.04	-2.12	*Recurvirostra avosetta*	Pied Avocet	Non-breeding	3102	2000	2441	1999-04 (5)	R Mahéo, LPO *et al.* 2005	E Atlantic
			Pluvialis squatarola	Grey Plover	Non-breeding	6110	1997	2787	1999-04 (5)	R Mahéo, LPO *et al.* 2005	E Atlantic
			Charadrius hiaticula	Common Ringed Plover	Non-breeding	978	1995	311	1999-04 (5)	IWC database	*hiaticula* + *psammodroma* + *tundrae*
			Limosa limosa	Black-tailed Godwit	Non-breeding	615	1999	88	1999-04 (5)	IWC database	*islandica*
			Limosa lapponica	Bar-tailed Godwit	Non-breeding	3173	2003	1500	1999-04 (5)	IWC database	*lapponica*
			Calidris alpina	Dunlin	Non-breeding	22078	2002	16859	1999-04 (5)	IWC database	*alpina* + Iceland + *arctica* + Britain + Baltic
Baie de Goulven	48.66	-4.28	*Charadrius alexandrinus*	Kentish Plover	Migration	1000	2002			WBDB	E Atlantic, W Mediterranean
			Arenaria interpres	Ruddy Turnstone	Migration	2000	1999			WBDB	NE Canada, Greenland + W Africa
			Calidris alba	Sanderling	Migration	2000	1999			WBDB	E Atlantic
Baie de Guisseny	48.65	-4.52	*Charadrius hiaticula*	Common Ringed Plover	Non-breeding	900	1992	254	1999-04 (5)	IWC database	*hiaticula* + *psammodroma* + *tundrae*
Baie de l'Aiguillon et Pointe d'Arçay	46.32	-1.17	*Recurvirostra avosetta*	Pied Avocet	Non-breeding	8288	2004	4508	1999-04 (5)	R Mahéo, LPO *et al.* 2005	E Atlantic
			Pluvialis squatarola	Grey Plover	Non-breeding	2555	2001	1912	1999-04 (5)	IWC database	E Atlantic
			Limosa limosa	Black-tailed Godwit	Non-breeding	7950	2002	5989	1999-04 (5)	IWC database	W Europe + *islandica*
			Calidris canutus	Red Knot	Non-breeding	10360	1996	4521	1999-04 (5)	R. Maheo, LPO *et al.* 2005	*islandica* + *canutus*
			Calidris alpina	Dunlin	Non-breeding	32370	2003	25104	1999-04 (5)	R. Maheo, LPO *et al.* 2005	*alpina* + Iceland + *arctica* + Britain + Baltic
Baie de l'Orne	49.30	-0.16	*Haematopus ostralegus*	Eurasian Oystercatcher	Hard weather refuge 1997	19500	1997			R Mahéo, LPO *et al.* 2005	*ostralegus*
			Charadrius hiaticula	Common Ringed Plover	Hard weather refuge 1997	750	1997			IWC database	*hiaticula* + *psammodroma* + *tundrae*
Baie de Morlaix + Penze	48.68	-3.87	*Charadrius hiaticula*	Common Ringed Plover	Hard weather refuge 1997	750	1989	526	1999-03 (5)	IWC database	*hiaticula* + *psammodroma* + *tundrae*
			Arenaria interpres	Ruddy Turnstone	Non-breeding	1520	1990	646	1999-04 (5)	R. Maheo, LPO *et al.* 2005	NE Canada, Greenland + W Africa
			Calidris alpina	Dunlin	Non-breeding	17200	1991	11470	1999-04 (5)	R. Maheo, LPO *et al.* 2005	*alpina* + Iceland + *arctica* + Britain + Baltic
Baie de Quiberon	47.49	-3.10	*Charadrius hiaticula*	Common Ringed Plover	Non-breeding refuge 1997	911	2001	611	1999-04 (5)	IWC database	*hiaticula* + *psammodroma* + *tundrae*
Baie de St-Brieuc-Yffiniac -Morieux	48.54	-2.73	*Limosa lapponica*	Bar-tailed Godwit	Non-breeding	1300	1990	529	1999-04 (5)	IWC database	*lapponica*
			Calidris canutus	Red Knot	Non-breeding	5300	1990	2888	1999-04 (5)	R. Maheo, LPO *et al.* 2005	*islandica* + *canutus*
			Calidris alba	Sanderling	Non-breeding	2000	1994	29	1999-04 (5)	IWC database	E Atlantic

FRANCE (CONTINUED)

Sitename	Lat	Long	Scientific name	English name	Season	maxcount	maxyear	average	Basis for average	Source	Population(s)
Baie de Vilaine	47.47	-2.51	*Recurvirostra avosetta*	Pied Avocet	Non-breeding	2147	2002	1639	1999-04 (5)	R Mahéo, LPO *et al.* 2005	E Atlantic
			Charadrius hiaticula	Common Ringed Plover	Non-breeding refuge 1997	927	2004	713	1999-04 (5)	IWC database	*hiaticula psammodroma + tundrae*
Baie des Veys	49.40	-1.14	*Haematopus ostralegus*	Eurasian Oystercatcher	Non-breeding	11500	1997	3887	1999-04 (5)	R Mahéo, LPO *et al.* 2005	*ostralegus*
			Pluvialis squatarola	Grey Plover	Non-breeding	3401	1997	1348	1999-04 (5)	IWC database	E Atlantic
			Numenius arquata	Eurasian Curlew	Non-breeding	13298	1997	1334	1999-04 (5)	IWC database	*arquata*
			Calidris alpina	Dunlin	Non-breeding	16040	1998	13287	1999-04 (5)	R. Maheo, LPO *et al.* 2005	*alpina* + Iceland + *arctica* + Britain + Baltic
Baie du Mont Saint Michel	48.67	-1.51	*Haematopus ostralegus*	Eurasian Oystercatcher	Non-breeding	21100	1997	7851	1999-04 (5)	R Mahéo, LPO *et al.* 2005	*ostralegus*
			Pluvialis squatarola	Grey Plover	Non-breeding	7200	2001	4329	1999-04 (5)	IWC database	E Atlantic
			Limosa limosa	Black-tailed Godwit	Non-breeding	2500	1993	960	1999-04 (5)	IWC database	W Europe + *islandica*
			Limosa lapponica	Bar-tailed Godwit	Non-breeding	1510	2004	880	1998-04 (5)	IWC database	*lapponica*
			Calidris canutus	Red Knot	Non-breeding	11000	1994	5123	1999-04 (5)	R. Maheo, LPO *et al.* 2005	*islandica + canutus*
			Calidris alpina	Dunlin	Non-breeding	46730	1997	28329	1999-04 (5)	R. Maheo, LPO *et al.* 2005	*alpina* + Iceland + *arctica* + Britain + Baltic
Baie d'Yves	46.04	-1.08	*Limosa limosa*	Black-tailed Godwit	Hard weather refuge 1997	680	1997			R Mahéo, B Deceuninck & F Gabaillard 2005	*islandica*
			Calidris alpina	Dunlin	Non-breeding	16517	1994-98	14461	1994-98 (5)	IWC database	*alpina* + Iceland + *arctica* + Britain + Baltic
Barthes de l'Adour	43.60	-0.30	*Vanellus vanellus*	Northern Lapwing	Migration	20000	2003			R Mahéo, LPO *et al.* 2005	Europe
Basses Vallées Angevines	47.56	-0.58	*Vanellus vanellus*	Northern Lapwing	Migration	35000	2003			R Mahéo, LPO *et al.* 2005	Europe
			Limosa limosa	Black-tailed Godwit	Migration	30000	2001			WBDB	W Europe + *islandica*
Bassin d'Arcachon et Banc d'Arguin	44.67	-1.13	*Recurvirostra avosetta*	Pied Avocet	Migration	5550	2003			R Mahéo, LPO *et al.* 2005	E Atlantic
			Pluvialis squatarola	Grey Plover	Migration	3000	1997			WBDB	E Atlantic
			Limosa limosa	Black-tailed Godwit	Migration	3000	2003			WBDB	W Europe + *islandica*
			Tringa erythropus	Spotted Redshank	Migration	1000	1997			WBDB	Europe
			Calidris canutus	Red Knot	Migration	10000	2003			WBDB	*islandica + canutus*
			Calidris alpina	Dunlin	Non-breeding	38289	2002	22781	1999-04 (5)	R. Maheo, LPO *et al.* 2005	*alpina* + Iceland + *arctica* + Baltic
Camargue	43.52	4.60	*Recurvirostra avosetta*	Pied Avocet	Non-breeding	1944	1995	1030	1999-04 (5)	R Mahéo, LPO *et al.* 2005	Mediterranean & SE Europe
			Vanellus vanellus	Northern Lapwing	Non-breeding	43625	1994	296	1999-03 (5)	R Mahéo, LPO *et al.* 2005	Europe
			Charadrius alexandrinus	Kentish Plover	Migration	1000	2000			WBDB	E Atlantic, W Mediterranean
			Limosa limosa	Black-tailed Godwit	Migration	10000	1997			WBDB	WC Europe
			Tringa erythropus	Spotted Redshank	Migration	5500	1997			WBDB	Europe

FRANCE Sitename	Lat	Long	Scientific name	English name	Season	maxcount	maxyear	average	Basis for average	Source	Population(s)
Confluent des vallées de la Meuse et de la Chiers	49.63	4.13	*Vanellus vanellus*	Northern Lapwing	Migration	25000	2000			R Mahéo, LPO *et al.* 2005	Europe
Côtes Nord et Ouest de l'Ile d'Oleron	45.97	-1.47	*Recurvirostra avosetta*	Pied Avocet	Non-breeding	902	1992	439	1990-03 (5)	IWC database	E Atlantic
			Pluvialis squatarola	Grey Plover	Non-breeding	3429	1992	486	1999-03 (5)	IWC database	E Atlantic
			Charadrius hiaticula	Common Ringed Plover	Non-breeding refuge 1997	753	1994	243	1999-03 (5)	IWC database	*hiaticula* + *psammodroma* + *tundrae*
Eure et Loire Departement	48.20	1.25	*Vanellus vanellus*	Northern Lapwing	January	817800	2007			B. Trolliet *in litt.*	Europe
Estuaire de la Gironde : marais de la rive nord	45.43	-0.80	*Pluvialis apricaria*	Eurasian Golden Plover	Migration	10000	1991			WBDB	Iceland, Faeroes + Norway, W Russia + *apricaria*
			Tringa totanus	Common Redshank	Migration	5500	1991			WBDB	E & C Europe + N Europe + *britannica* + *robusta*
Estuaire Seine	49.43	0.30	*Recurvirostra avosetta*	Pied Avocet	Migration	5000	1997			R Mahéo, LPO *et al.* 2005	E Atlantic
			Vanellus vanellus	Northern Lapwing	Non-breeding	21348	1998	1323	1999-04 (5)	R Mahéo, LPO *et al.* 2005	Europe
			Charadrius hiaticula	Common Ringed Plover	Migration refuge 1997	1000	2000			WBDB	*hiaticula* + *psammodroma* + *tundrae*
			Tringa totanus	Common Redshank	Migration	5500	1999			WBDB	Europe + *robusta* + Northern + *britannica*
Estuaires de Trieux. Jaudy et Anse de Paimpol	48.81	-3.12	*Charadrius hiaticula*	Common Ringed Plover	Non-breeding refuge 1997	1365	1992	489	1999-04 (5)	IWC database	*hiaticula*+ *psammodroma* + *tundrae*
Etangs dans region Argenton-Château	47.09	-0.31	*Vanellus vanellus*	Northern Lapwing	Non-breeding	23700	2004	10775	1999-04 (5)	R Mahéo, LPO *et al.* 2005	Europe
Etangs de la Brenne	46.66	1.18	*Vanellus vanellus*	Northern Lapwing	Non-breeding	71500	2001	20566	1999-04 (5)	R Mahéo, LPO *et al.* 2005	Europe
Etangs de Thau et de Bagnas	43.37	3.52	*Recurvirostra avosetta*	Pied Avocet	Non-breeding	1424	1992	19	1999-04 (5)	R Mahéo, LPO *et al.* 2005	Mediterranean & SE Europe
Etangs Montpellierains	43.57	3.89	*Recurvirostra avosetta*	Pied Avocet	Non-breeding	1611	2003	1065	1999-04 (5)	R Mahéo, LPO *et al.* 2005	Mediterranean & SE Europe
			Limosa limosa	Black-tailed Godwit	Migration	3000	1999			WBDB	W Europe + *islandica*
Golfe du Morbihan	47.56	-2.79	*Recurvirostra avosetta*	Pied Avocet	Non-breeding	1294	2000	1052	1999-04 (5)	R Mahéo, LPO *et al.* 2005	E Atlantic
			Pluvialis squatarola	Grey Plover	Winter	2600	1998	2113	1999-03 (5)	R Mahéo, LPO *et al.* 2005	E Atlantic
			Charadrius hiaticula	Common Ringed Plover	Non-breeding	1309	1994	815	1999-04 (5)	IWC database	*hiaticula* + *psammodroma* + *tundrae*
			Limosa limosa	Black-tailed Godwit	Non-breeding	1135	2003	630	1999-04 (5)	IWC database	*islandica*
			Calidris alpina	Dunlin	Non-breeding	30900	1999	21673	1999-04 (5)	R. Maheo, LPO *et al.* 2005	*alpina* + Iceland + *arctica* + Britain + Baltic
Havre de Regneville et Côte Ouest Cotentin	49.21	-1.46	*Calidris alba*	Sanderling	Non-breeding	1901	2003	1010	1999-04 (5)	R. Maheo, LPO *et al.* 2005	E Atlantic
Ile de Ré	46.22	-1.50	*Recurvirostra avosetta*	Pied Avocet	Non-breeding	1835	1995	754	1999-04 (5)	R Mahéo, LPO *et al.* 2005	E Atlantic
			Pluvialis squatarola	Grey Plover	Non-breeding	2572	2000	1560	1999-04 (5)	IWC database	E Atlantic

FRANCE (CONTINUED)

Sitename	Lat	Long	Scientific name	English name	Season	maxcount	maxyear	average	Basis for average	Source	Population(s)
Ile de Ré (continued)			*Charadrius hiaticula*	Common Ringed Plover	Non-breeding refuge 1997	1711	2002	947	1999-04 (5)	IWC database	*hiaticula* + *psammodroma* + *tundrae*
			Limosa limosa	Black-tailed Godwit	Non-breeding	2100	2002	1505	1999-04 (5)	IWC database	W Europe + *islandica*
			Arenaria interpres	Ruddy Turnstone	Non-breeding	1550	2003	1263	1999-04 (5)	R. Maheo, LPO *et al.* 2005	NE Canada, Greenland + W Africa
			Calidris alba	Sanderling	Non-breeding	1529	2003	959	1999-04 (5)	R. Maheo, LPO *et al.* 2005	E Atlantic
			Calidris alpina	Dunlin	Non-breeding	17050	1994	8587	1999-04 (5)	R. Maheo, LPO *et al.* 2005	*alpina* + Iceland + *arctica* + Britain + Baltic
Ile d'Oléron, marais de Brouage-Saint-Agnant	45.77	-1.14	*Limosa limosa*	Black-tailed Godwit	Migration	9000	1999			WBDB	W Europe + *islandica*
			Calidris canutus	Red Knot	Non-breeding	10000	1999			WBDB	*islandica* + *canutus*
			Calidris alpina	Dunlin	Migration	20000	1997			WBDB	*alpina* + Iceland + *arctica* + Britain + Baltic
Ile d'Ouessant	48.47	-05.08	*Numenius tenuirostris*	Slender-billed Curlew	May	1	1991			per P.J. Dubois	
Lac du Der-Chantecoq et étangs latéraux	48.55	4.70	*Vanellus vanellus*	Northern Lapwing	Migration	30000	1997			WBDB	Europe
Lac du Salagou	43.67	3.33	*Recurvirostra avosetta*	Pied Avocet	Non-breeding	1424	1992	561	1988-92 (5)	R Mahéo, LPO *et al.* 2005	Mediterranean & SE Europe
Littoral : de la Pointe de Saire à Aumeville-Lestre	49.35	-1.15	*Calidris alba*	Sanderling	Non-breeding	1555	2002	1105	1999-04 (5)	R. Maheo, LPO *et al.* 2005	E Atlantic
Littoral du Pas-de-Calais	50.39	1.34	*Haematopus ostralegus*	Eurasian Oystercatcher	Non-breeding	13044	1997	2363	1999-04 (5)	R Mahéo, LPO *et al.* 2005	*ostralegus*
Littoral Dunkerquois	51.08	2.35	*Haematopus ostralegus*	Eurasian Oystercatcher	Non-breeding	13400	1997	142	1999-04 (5)	R Mahéo, LPO *et al.* 2005	*ostralegus*
Littoral Picard	50.25	1.60	*Haematopus ostralegus*	Eurasian Oystercatcher	Non-breeding	13500	1998	8622	1999-04 (5)	R Mahéo, LPO *et al.* 2005	*ostralegus*
			Pluvialis squatarola	Grey Plover	Non-breeding	5053	1996	323	1999-04 (5)	IWC database	E Atlantic
			Limosa limosa	Black-tailed Godwit	Non-breeding	863	1996	114	1999-04 (5)	IWC database	*islandica*
			Calidris canutus	Red Knot	Non-breeding	8070	1996	113	1999-04 (5)	R. Maheo, LPO *et al.* 2005	*islandica* + *canutus*
			Calidris alba	Sanderling	Hard weather refuge	1500	1997			WBDB	E Atlantic
			Calidris alpina	Dunlin	Non-breeding	21851	1996	8525	1999-04 (5)	R. Maheo, LPO *et al.* 2005	*alpina* + *arctica* + Britain + Baltic
Littoral Plouescat-Roscoff	48.70	-4.15	*Charadrius hiaticula*	Common Ringed Plover	Non-breeding refuge 1997	1053	1993	599	1999-04 (5)	IWC database	*hiaticula* + *psammodroma* + *tundrae*
			Calidris alba	Sanderling	Non-breeding	1452	2000	763	1999-04 (5)	R. Maheo, LPO *et al.* 2005	E Atlantic
Littoral Roscoff/Santec	48.73	-3.98	*Charadrius hiaticula*	Common Ringed Plover	Non-breeding refuge 1997	905	1998	641	1994-98	IWC database	*hiaticula* + *psammodroma* + *tundrae*
Loire Amont	47.20	-1.65	*Vanellus vanellus*	Northern Lapwing	Non-breeding	29500	2000	11877	1999-04 (5)	R Mahéo, LPO *et al.* 2005	Europe
Loire Aval	47.27	-2.18	*Recurvirostra avosetta*	Pied Avocet	Non-breeding	2590	1997	846	1999-04 (5)	R Mahéo, LPO *et al.* 2005	E Atlantic
Marais Breton	46.97	-2.00	*Pluvialis squatarola*	Grey Plover	Non-breeding	12532	2001	4180	2001-03 (3)	IWC database	E Atlantic

FRANCE (CONTINUED)

Sitename	Lat	Long	Scientific name	English name	Season	maxcount	maxyear	average	Basis for average	Source	Population(s)
Marais de Brière	47.37	-2.17	*Limosa limosa*	Black-tailed Godwit	Migration	2000	1999			WBDB	W Europe + *islandica*
Marais de la Baie d'Audierne	47.88	-4.37	*Calidris alba*	Sanderling	Migration	10000	1997			WBDB	E Atlantic
Marais d'Olonne	46.53	-1.80	*Recurvirostra avosetta*	Pied Avocet	Non-breeding	1224	1998	154	1999-04 (5)	R Mahéo, LPO *et al.* 2005	E Atlantic
			Limosa limosa	Black-tailed Godwit	March	2800	1993			WBDB	W Europe + *islandica*
			Numenius phaeopus	Whimbrel	Spring	9310	1996	7500	1990-96	R Mahéo, LPO *et al.* 2005	*islandicus* + Western
Marais du Nord Medoc	45.49	-1.04	*Calidris canutus*	Red Knot	Non-breeding	6300	2002	2030	1999-04 (5)	R. Maheo, LPO *et al.* 2005	*islandica* + *canutus*
			Calidris alpina	Dunlin	Non-breeding	17000	2002	7815	1999-04 (5)	R. Maheo, LPO *et al.* 2005	*alpina* + Iceland + *arctica* + Britain + Baltic
Marais entre Crau et Grand Rhône: Meyranne, Chanoine, Plan de Bourg et Salins du Caban	43.43	4.71	*Limosa limosa*	Black-tailed Godwit	Migration	2000	2003			WBDB	WC Europe
Marais littoraux de Charente-Maritime, dont R.N. d'Yves	46.24	-1.48	*Limosa limosa*	Black-tailed Godwit	Non-breeding	2350	2002	959	1999-04 (5)	IWC database	W Europe + *islandica*
			Calidris canutus	Red Knot	Non-breeding	5000	2004	3116	1999-04 (5)	R. Maheo, LPO *et al.* 2005	*islandica* + *canutus*
			Calidris alpina	Dunlin	Non-breeding	20036	1992	7229	1999-04 (5)	R. Maheo, LPO *et al.* 2005	*alpina* + Iceland + *arctica* + Britain + Baltic
Marais Poitevin et Baie de l'Aiguillon	46.33	-1.00	*Recurvirostra avosetta*	Pied Avocet	Non-breeding	1500	2003			WBDB	E Atlantic
			Vanellus vanellus	Northern Lapwing	Non-breeding	40550	1998	6060	1999-04 (5)	R Mahéo, LPO *et al.* 2005	Europe
			Numenius phaeopus	Whimbrel	Spring	17000	1991			WBDB	*islandicus* + N Europe
			Calidris canutus	Red Knot	Migration	20000	2003			WBDB	*islandica* + *canutus*
			Calidris alpina	Dunlin	Migration	20000	2003			WBDB	*alpina* + Iceland + *arctica* + Britain+ Baltic
Marais salants de Noirmoutier	46.98	-2.27	*Recurvirostra avosetta*	Pied Avocet	Breeding	765	1991			WBDB	E Atlantic
Petite Beauce	47.73	1.33	*Pluvialis apricaria*	Eurasian Golden Plover	Migration	10000	2000			WBDB	Iceland, Faeroes + Norway, W Russia + *apricaria*
Petite Camargue fluvio-lacustre	43.63	4.30	*Limosa limosa*	Black-tailed Godwit	Migration	3000	1997			WBDB	W Europe + *islandica*
Petite Camargue laguno-marine	43.52	4.27	*Recurvirostra avosetta*	Pied Avocet	Breeding	1200	1991			WBDB	Mediterranean & SE Europe
Plateau de Bellefonds	46.63	0.62	*Pluvialis apricaria*	Eurasian Golden Plover	Migration	10000	1991			WBDB	Iceland, Faeroes + Norway, W Russia + *apricaria*
Presqu'île Guérandaise dont Traicts du Croisic	47.29	-2.51	*Recurvirostra avosetta*	Pied Avocet	Non-breeding	2750	2001	1841	1999-04 (5)	R Mahéo, LPO *et al.* 2005	E Atlantic
			Limosa limosa	Black-tailed Godwit	Non-breeding	1146	2002	791	1999-04 (5)	IWC database	*islandica*
			Arenaria interpres	Ruddy Turnstone	Non-breeding	1724	2002	1502	1999-04 (5)	R. Maheo, LPO *et al.* 2005	NE Canada, Greenland + W Africa
			Calidris alpina	Dunlin	Non-breeding	15344	2000	11547	1999-04 (5)	R. Maheo, LPO *et al.* 2005	*alpina* + Iceland + *arctica* + Britain + Baltic
Rade de Lorient	47.69	-3.36	*Charadrius hiaticula*	Common Ringed Plover	Non-breeding refuge 1997	1202	1992	511	1999-04 (5)	IWC database	*hiaticula* + *psammodroma* + *tundrae*

FRANCE (CONTINUED)

Sitename	Lat	Long	Scientific name	English name	Season	maxcount	maxyear	average	Basis for average	Source	Population(s)
Résèrve Naturelle de Moeze (Charente-Seudre)	45.83	-1.14	*Recurvirostra avosetta*	Pied Avocet	Non-breeding	1815	1997	698	1999-04 (5)	R Mahéo, LPO *et al.* 2005	E Atlantic
			Pluvialis squatarola	Grey Plover	Non-breeding	5943	2000	3320	1999-04 (5)	IWC database	E Atlantic
			Charadrius hiaticula	Common Ringed Plover	Non-breeding refuge 1997	1307	2004	903	1999-04 (5)	IWC database	*hiaticula* + *psammodroma* + *tundrae*
			Limosa limosa	Black-tailed Godwit	Non-breeding	2715	2004	1525	1999-04 (5)	IWC database	W Europe + *islandica*
			Limosa lapponica	Bar-tailed Godwit	Non-breeding	1844	2003	1389	1999-04 (5)	IWC database	*lapponica*
			Calidris canutus	Red Knot	Non-breeding	14900	1998	11319	1999-04 (5)	R. Maheo, LPO *et al.* 2005	*islandica* + *canutus*
			Calidris alpina	Dunlin	Non-breeding	43671	2000	28416	1999-04 (5)	R. Maheo, LPO *et al.* 2005	*alpina* + Iceland + *arctica* + Britain + Baltic
Sud-Loire	47.17	-2.13	*Vanellus vanellus*	Northern Lapwing	Non-breeding	21360	1996	4931	1999-04 (5)	R Mahéo, LPO *et al.* 2005	Europe
			Limosa limosa	Black-tailed Godwit	Non-breeding	585	2004	284	1999-04 (5)	IWC database	*islandica*
			Calidris alpina	Dunlin	Non-breeding	14506	2000	6553	1999-04 (5)	R. Maheo, LPO *et al.* 2005	*alpina* + Iceland + *arctica* + Britain + Baltic
Vallée de la Conie et Beauce centrale	48.23	1.60	*Pluvialis apricaria*	Eurasian Golden Plover	Migration	10000	1998			WBDB	Iceland, Faeroes + Norway, W Russia + *apricaria*
Vallée de la Saône de Corre à Broye	47.12	5.77	*Vanellus vanellus*	Northern Lapwing	Migration	20000	1999			R Mahéo, LPO *et al.* 2005	Europe

GABON

Sitename	Lat	Long	Scientific name	English name	Season	maxcount	maxyear	average	Basis for average	Source	Population(s)
Baie de Corisco	1.20	9.67	*Pluvialis squatarola*	Grey Plover	February-March	3900	1992			AfWC database	SW Asia, E Africa
			Charadrius marginatus	White-fronted Plover	February-March	517	1992			Schepers & Marteijn 1993	*mechowi* coastal W Africa
			Calidris minuta	Little Stint	February-March	10219	1992			AfWC database	Europe, W Africa
			Calidris ferruginea	Curlew Sandpiper	February-March	8192	1992			AfWC database	ES Africa
Baie de Mondah - Pointe Moka	0.65	9.45	*Charadrius marginatus*	White-fronted Plover	July-August	400	2000	230	1998-00 (2)	AfWC database	*mechowi* coastal W Africa
Baie du Cap Lopez	-0.59	9.20	*Charadrius marginatus*	White-fronted Plover	February	167	1992			AfWC database	*mechowi* coastal W Africa
Barre de l'Arabe	-1.27	9.00	*Charadrius marginatus*	White-fronted Plover	February-March	57	1992			AfWC database	*mechowi* coastal W Africa
Estuaire du Gabon	0.21	9.42	*Pluvialis squatarola*	Grey Plover	February-March	1176	1992			AfWC database	SW Asia, E Africa
			Charadrius marginatus	White-fronted Plover	February-March	74	1992			AfWC database	*mechowi* coastal W Africa
			Calidris ferruginea	Curlew Sandpiper	February-March	5920	1992			AfWC database	ES Africa

GAMBIA

Sitename	Lat	Long	Scientific name	English name	Season	maxcount	maxyear	average	Basis for average	Source	Population(s)
Allahein River Mouth	13.05	-16.67	*Arenaria interpres*	Ruddy Turnstone	Non-breeding	2025	1999	717	1999-01 (3)	AfWC database	NE Canada, Greenland + Northern Europe
Bao Bolon Wetland Reserve	13.52	-15.83	*Glareola pratincola*	Collared Pratincole	Non-breeding	2500	1996			WBDB	*boweni* + W Mediterranean
			Calidris minuta	Little Stint	Non-breeding	12000	1996			WBDB	Europe, W Africa

GAMBIA (CONTINUED) Sitename	Lat	Long	Scientific name	English name	Season	maxcount	maxyear	average	Basis for average	Source	Population(s)
Dankunku Swamp	13.53	-14.73	*Glareola pratincola*	Collared Pratincole	Pre-breeding migration	800	1998			AfWC database	*boweni* + W Mediterranean
Jakhaly Rice Fields	13.57	-14.97	*Glareola pratincola*	Collared Pratincole	Pre-breeding migration	862	1998			AfWC database	*boweni* + W Mediterranean
Pinyai Swamp	13.53	-14.73	*Glareola pratincola*	Collared Pratincole	Pre-breeding migration	520	1998			AfWC database	*boweni* + W Mediterranean
Tanbi wetland complex	13.42	-16.62	*Himantopus himantopus*	Black-winged Stilt	Non-breeding	2000	1990s			WBDB	Sub-Saharan Africa N of Southern Africa + W & SW Europe, W Africa

GERMANY Sitename	Lat	Long	Scientific name	English name	Season	maxcount	maxyear	average	Basis for average	Source	Population(s)
Aland-Elbe lowlands	52.96	11.80	*Pluvialis apricaria*	Eurasian Golden Plover	Spring	10000				G. Dornbusch, S. Fischer in litt.	*apricara*, *altifrons* Iceland, N Europe, W Siberia
Butjadingen	53.55	8.33	*Pluvialis apricaria*	Eurasian Golden Plover	Autumn	9292				Melter & Schreiber (2000)	*apricara*, *altifrons* Iceland, N Europe, W Siberia
			Vanellus vanellus	Northern Lapwing	Autumn	28493				Melter & Schreiber (2000)	Europe
Drömling	52.47	11.12	*Pluvialis apricaria*	Eurasian Golden Plover	Spring	12660	1998			Weber *et al.* 2003	*apricara*, *altifrons* Iceland, N Europe, W Siberia
			Vanellus vanellus	Northern Lapwing	Spring	46300	1995			Seelig *et al.* 1996	Europe
Dümmer	52.50	8.33	*Vanellus vanellus*	Northern Lapwing	Autumn	28748	1995			Melter & Schreiber (2000)	Europe
Eiderstedt peninsula	54.37	8.78	*Pluvialis apricaria*	Eurasian Golden Plover	Autumn	20192	2003			Jeromin 2003	*apricara*, *altifrons* Iceland, N Europe, W Siberia
Einswarder & Tegeler Plate	53.52	8.52	*Recurvirostra avosetta*	Pied Avocet	Autumn	2100				Melter & Schreiber (2000)	W Europe
Elbe lowlands Jerichow	52.56	11.99	*Pluvialis apricaria*	Eurasian Golden Plover	Spring	10000				G. Dornbusch, S. Fischer in litt.	*apricara*, *altifrons* Iceland, N Europe, W Siberia
Elbe valley of Mecklenburg	53.32	11.02	*Vanellus vanellus*	Northern Lapwing	Autumn	45000				BfN 2008	Europe
Ems valley Leer to Emden	53.32	7.33	*Recurvirostra avosetta*	Pied Avocet		Autumn	1053			Melter & Schreiber (2000)	W Europe
			Limosa limosa	Black-tailed Godwit	Spring	1860				Melter & Schreiber (2000)	W Europe
Engerhafer Meede	53.48	7.25	*Pluvialis apricaria*	Eurasian Golden Plover	Autumn	10000				Melter & Schreiber (2000)	*apricara*, *altifrons* Iceland, N Europe, W Siberia
Fiener Bruch	52.32	12.22	*Pluvialis apricaria*	Eurasian Golden Plover	Spring	10000				G. Dornbusch, S. Fischer in litt.	*apricara*, *altifrons* Iceland, N Europe, W Siberia
			Vanellus vanellus	Northern Lapwing	Autumn	40000				ABBO 2003	Europe
Greifswalder Bodden	54.22	13.52	*Pluvialis apricaria*	Eurasian Golden Plover	Autumn	20000				Scheller *et al.* 2002	*apricara*, *altifrons* Iceland, N Europe, W Siberia
			Vanellus vanellus	Northern Lapwing	Spring & Autumn	36000	2000	20000	1994-04 (5)	J. Kube *in litt.*	Europe

GERMANY (CONTINUED) Sitename	Lat	Long	Scientific name	English name	Season	maxcount	maxyear	average	Basis for average	Source	Population(s)
Havelländisches Luch	52.58	12.54	*Vanellus vanellus*	Northern Lapwing	Spring	20000				T. Ryslavy *in litt.*	Europe
Hellwegbörde	51.60	8.32	*Vanellus vanellus*	Northern Lapwing	Autumn	>20000	2001			A .Hegemann *in litt.*	Europe
Island of Fehmarn	54.48	11.13	*Pluvialis apricaria*	Eurasian Golden Plover	Autumn	15000				Berndt *et* al. 2002	*apricara*, *altifrons* Iceland, N Europe, W Siberia
Jadebusen, inland	53.38	8.22	*Vanellus vanellus*	Northern Lapwing	Autumn	58025				Melter & Schreiber (2000)	Europe
Krummhörn-Westermarsch	53.48	7.07	*Recurvirostra avosetta*	Pied Avocet	Autumn	3500				Melter & Schreiber (2000)	W Europe
			Pluvialis apricaria	Eurasian Golden Plover	Autumn	14300				Melter & Schreiber (2000)	*apricara*, *altifrons* Iceland, N Europe, W Siberia
			Calidria *alpina*	Dunlin	Autumn	25000				Melter & Schreiber (2000)	*alpina* + *arctica* + Baltic
Lake Putzar, Lake Galenbeck and surrounding lowlands	53.65	13.75	*Vanellus vanellus*	Northern Lapwing	Spring	>21000	1999			Müller 2001	Europe
Landgraben & Dumme lowlands	52.90	11.30	*Vanellus vanellus*	Northern Lapwing	Autumn	21450				Melter & Schreiber (2000)	Europe
Lewitz	53.47	11.63	*Vanellus vanellus*	Northern Lapwing	Spring & Autumn	70000				Scheller *et* al. 2002	Europe
			Pluvialis apricaria	Eurasian Golden Plover	Autumn	10000				Scheller *et* al. 2002	*apricara*, *altifrons* Iceland, N Europe, W Siberia
Lower Aller lowlands	52.77	9.57	*Vanellus vanellus*	Northern Lapwing	Autumn	35000				Melter & Schreiber (2000)	Europe
Lower Elbe valley Brandenburg	53.02	11.65	*Vanellus vanellus*	Northern Lapwing	Spring	77000				ABBO 2003	Europe
			Pluvialis apricaria	Eurasian Golden Plover	Spring	7500				T. Ryslavy *in litt*	*apricara*, *altifrons* Iceland, N Europe, W Siberia
Lower Havel & Dosse lowlands	52.75	12.27	*Vanellus vanellus*	Northern Lapwing	Spring	>10000				Dornbusch, Fischer & Ryslavy *in litt.*	Europe
			Pluvialis apricaria	Eurasian Golden Plover	Spring	>30000				Dornbusch, Fischer & Ryslavy *in litt*	*apricara*, *altifrons* Iceland, N Europe, W Siberia
Lower Rhine	51.77	6.40	*Vanellus vanellus*	Northern Lapwing	Non-breeding	100000	1997			WBDB	Europe
Lower Saxony Wadden Sea (Dollart to Stade)	53.75	7.57	*Haematopus ostralegus*	Eurasian Oystercatcher	Autumn	193218	1992	102803	1997-01 (5)	J . Blew *in litt.* TMAP/ NP Lower Saxony	*ostralegus*
			Recurvirostra avosetta	Pied Avocet	Autumn	30392	1994	12594	1997-01 (5)	J . Blew *in litt.* TMAP/ NP Lower Saxony	E Atlantic
			Vanellus vanellus	Northern Lapwing	Autumn	26640	2001	12714	1997-01 (5)	J . Blew *in litt.* TMAP/ NP Lower Saxony	Europe
			Pluvialis apricaria	Eurasian Golden Plover	Autumn	24363	2001	16670	1997-01 (5)	J . Blew *in litt.* TMAP/ NP Lower Saxony	*apricara*, *altifrons* Iceland N Europe, W Siberia
			Pluvialis squatarola	Grey Plover	Spring	58036	1993	25679	1998-02 (5)	J . Blew *in litt.* TMAP/ NP Lower Saxony	E Atlantic

GERMANY (CONTINUED) Sitename	Lat	Long	Scientific name	English name	Season	maxcount	maxyear	average	Basis for average	Source	Population(s)
Lower Saxony Wadden Sea (continued)			*Limosa lapponica*	Bar-tailed Godwit	Spring	55701	1996	26883	1998-02 (5)	J . Blew *in litt.* TMAP/ NP Lower Saxony	Western *taymyrensis* + *lapponica*
			Numenius arquata	Eurasian Curlew	Autumn	88110	1996	53662	1997-01 (5)	J . Blew *in litt.* TMAP/ NP Lower Saxony	*arquata*
			Tringa erythropus	Spotted Redshank	Spring	6384	1994	1530	1998-02 (5)	J . Blew *in litt.* TMAP/ NP Lower Saxony	Europe
			Tringa totanus	Common Redshank	Autumn	18464	1994	13838	1997-01 (5)	J . Blew *in litt.* TMAP/ NP Lower Saxony	E & C Europe + *robusta* + N Europe
			Tringa nebularia	Common Greenshank	Autumn	5216	1993	3336	1997-01 (5)	J . Blew *in litt.* TMAP/ NP Lower Saxony	Europe
			Arenaria interpres	Ruddy Turnstone	Spring	1762	1995	568	1998-02 (5)	J . Blew *in litt.* TMAP/ NP Lower Saxony	NE Canada, Greenland + Northern Europe
			Calidris canutus	Red Knot	Spring	26981	1994	12614	1998-02 (5)	J . Blew *in litt.* TMAP/ NP Lower Saxony	*islandica* + *canutus*
			Calidris alba	Sanderling	Autumn	4924	1996	2194	1997-01 (5)	J . Blew *in litt.* TMAP/ NP Lower Saxony	E Atlantic
			Calidris alpina	Dunlin	Autumn	250616	1992	133398	1997-01	J . Blew *in litt.* TMAP/ NP Lower Saxony	*alpina* + Baltic
Milde lowlands (Altmark)	52.69	11.49	*Pluvialis apricaria*	Eurasian Golden Plover	Spring	10000				G. Dornbusch & S. Fischer *in litt*	*apricara*, *altifrons* Iceland, N Europe, W Siberia
Norden-Esens, inland	53.66	7.34	*Pluvialis apricaria*	Eurasian Golden Plover	Autumn	8826				Melter & Schreiber 2000	*apricara*, *altifrons* Iceland, N Europe, W Siberia
Oderbruch	52.63	14.45	*Pluvialis apricaria*	Eurasian Golden Plover	Spring	7500				T. Ryslavy *in litt*	*apricara*, *altifrons* Iceland, N Europe, W Siberia
Ostfriesische Meere	53.43	7.30	*Pluvialis apricaria*	Eurasian Golden Plover	Autumn	15900				Melter & Schreiber 2000	*apricara*, *altifrons* Iceland, N Europe, W Siberia
Plane-Niederung and Belziger Landschaftswiesen	52.21	12.69	*Pluvialis apricaria*	Eurasian Golden Plover	Spring	>10500				T. Ryslavy *in litt*	*apricara*, *altifrons* Iceland, N Europe, W Siberia
			Vanellus vanellus	Northern Lapwing	Spring	>20000				T. Ryslavy *in litt*	Europe
Randow-Welse-Bruch	53.23	14.13	*Pluvialis apricaria*	Eurasian Golden Plover	Autumn	14000				ABBO 2003	*apricara*, *altifrons* Iceland, N Europe, W Siberia
Rheiderland	53.23	7.32	*Recurvirostra avosetta*	Pied Avocet		Autumn	2200			Melter & Schreiber (2000)	W Europe
			Vanellus vanellus	Northern Lapwing	Autumn	>40000				Melter & Schreiber (2000)	Europe
			Pluvialis apricaria	Eurasian Golden Plover	Autumn	22600				Melter & Schreiber (2000)	*apricara*, *altifrons* Iceland, N Europe, W Siberia
			Limosa limosa	Black-tailed Godwit	Spring	3284				Melter & Schreiber (2000)	W Europe

GERMANY (CONTINUED)

Sitename	Lat	Long	Scientific name	English name	Season	maxcount	maxyear	average	Basis for average	Source	Population(s)
Rhin-Havelluch	52.79	12.87	*Pluvialis apricaria*	Eurasian Golden Plover	Spring	7500				T. Ryslavy *in litt*	*apricara*, *altifrons* Iceland, N Europe, W Siberia
			Vanellus vanellus	Northern Lapwing	Spring	>20000				T. Ryslavy *in litt*	Europe
Schleswig-Holstein coast: Brunsbüttel to Eider mouth	54.13	9.04	*Pluvialis apricaria*	Eurasian Golden Plover	Autumn	9334	2003			Jeromin 2003	*apricara*, *altifrons* Iceland, N Europe, W Siberia
Schleswig-Holstein coast: Husum to Danish border	54.65	8.92	*Pluvialis apricaria*	Eurasian Golden Plover	Autumn	28210	2003			Jeromin 2003	*apricara*, *altifrons* Iceland, N Europe, W Siberia
Schleswig-Holstein Wadden Sea	54.49	8.54	*Haematopus ostralegus*	Eurasian Oystercatcher	Autumn	149983		93075	1997-01 (5)	J.Blew, K Günther *in litt.* TMAP/NP Schleswig-Holstein	*ostralegus*
			Recurvirostra avosetta	Pied Avocet	Breeding	>10000		8000		J . Blew, CWSS,2005 TMAP/NP Schleswig-Holstein	E Atlantic
			Vanellus vanellus	Northern Lapwing	Autumn	62700	1994	16773	1997-01 (5)	J . Blew, CWSS,2005 TMAP/NP Schleswig-Holstein	Europe
			Pluvialis apricaria	Eurasian Golden Plover	Autumn	43016	1992	19042	1997-01 (5)	J . Blew, CWSS,2005 TMAP/NP Schleswig-Holstein	Norway, W Russia + *apricaria*
			Pluvialis squatarola	Grey Plover	Autumn	46812	1992	20458	1997-01 (5)	J . Blew, CWSS,2005 TMAP/NP Schleswig-Holstein	E Atlantic
			Charadrius hiaticula	Common Ringed Plover	Spring	14627	2002	10211	1998-02 (5)	J . Blew, CWSS,2005 TMAP/NP Schleswig-Holstein	*tundrae* + *psammodroma* + *hiaticula*
			Limosa lapponica	Bar-tailed Godwit	Spring	130617		55952	1998-02 (5)	J . Blew, CWSS,2005 TMAP/NP Schleswig-Holstein	W *taymyrensis* + *lapponica*
			Numenius arquata	Eurasian Curlew	Autumn	67476	1994	35104	1997-01 (5)	J . Blew, CWSS,2005 TMAP/NP Schleswig-Holstein	*arquata*
			Tringa erythropus	Spotted Redshank	Autumn	13872	1994	8647	1997-01 (5)	J . Blew, CWSS 2005 TMAP/NP Schleswig-Holstein	Europe
			Tringa totanus	Common Redshank	Autumn	24126	1993	11582	1997-01 (5)	J . Blew, CWSS,2005 TMAP/NP Schleswig-Holstein	E & C Europe + N Europe
			Tringa nebularia	Common Greenshank	Autumn	8863	1993	5347	1997-01 (5)	J . Blew, CWSS,2005 TMAP/NP Schleswig-Holstein	Europe

GERMANY (CONTINUED)

Sitename	Lat	Long	Scientific name	English name	Season	maxcount	maxyear	average	Basis for average	Source	Population(s)
Schleswig-Holstein Wadden Sea (continued)			*Arenaria interpres*	Ruddy Turnstone	Spring	3404		1392	1998-02 (5)	J . Blew, CWSS,2005 TMAP/NP Schleswig-Holstein	NE Canada, Greenland + Northern Europe
			Calidris canutus	Red Knot	Spring	302270	1992	151100	1998-02 (5)	J . Blew, CWSS,2005 TMAP/NP Schleswig-Holstein	*islandica* + *canutus*
			Calidris alba	Sanderling	Spring	38797		15339	1998-02 (5)	J . Blew, CWSS,2005 TMAP/NP Schleswig-Holstein	E Atlantic
			Calidris ferruginea	Curlew Sandpiper	Autumn	27273	1996	10608	1997-01 (5)	J . Blew, CWSS,2005 TMAP/NP Schleswig-Holstein	W Africa
			Calidris alpina	Dunlin	Autumn	440171		243230	1997-01 (5)	J . Blew, CWSS,2005 TMAP/NP Schleswig-Holstein	*alpina* + Baltic
Unteres Rhinluch	52.78	12.43	*Pluvialis apricaria*	Eurasian Golden Plover	Spring	8000				ABBO 2003	*apricara*, *altifrons* Iceland, N Europe, W Siberia
Western Pomerania coast	54.43	12.90	*Recurvirostra avosetta*	Pied Avocet	Moult	2600	1992	1943	1992-04	Dierschke & Helbig In press	W Europe
			Vanellus vanellus	Northern Lapwing	Autumn	>20000				H.W. Nehls *in litt.*	Europe
			Pluvialis apricaria	Eurasian Golden Plover	Autumn	30000				Scheller *et al.* 2002	*apricara*, *altifrons* Iceland N Europe, W Siberia
			Pluvialis squatarola	Grey Plover	Autumn	3200				Graumann 2007	E Atlantic
			Calidris alpina	Dunlin	Autumn	440171		243230	1997-01 (5)	Scheller *et al.* 2002	*alpina* + Baltic
Wittmund-Wangerland	53.69	7.95	*Pluvialis apricaria*	Eurasian Golden Plover	Autumn	11448				Melter & Schreiber (2000)	*apricara*, *altifrons* Iceland, N Europe, W Siberia

GHANA

Sitename	Lat	Long	Scientific name	English name	Season	maxcount	maxyear	average	Basis for average	Source	Population(s)
Densu Delta. Panbros Salt Pans	5.55	-0.30	*Tringa erythropus*	Spotted Redshank	Non-breeding	1170	1998	810	1997-98 (2)	AfWC database	Europe
			Tringa nebularia	Common Greenshank	July-August	3994	2000	1223	1997-01 (5)	AfWC database	Europe
			Calidris alba	Sanderling	July-August	2400	2000	1114	1998-01 (4)	AfWC database	E Atlantic
			Calidris minuta	Little Stint	July-August	8512	2000	3895	1999-01 (3)	AfWC database	Europe, W Africa
Esiama Beach	4.93	-2.35	*Calidris alba*	Sanderling	July-August	1995	2000	964	1998-01 (4)	AfWC database	E Atlantic
Keta Lagoon complex	5.92	-0.83	*Himantopus himantopus*	Black-winged Stilt	Non-breeding	3953	1999			AfWC database	Sub-Saharan Africa N of Southern Africa + W & SW Europe, W Africa
			Recurvirostra avosetta	Pied Avocet	July-August	1144	2000			AfWC database	Mediterranean & SE Europe
			Glareola pratincola	Collared Pratincole	July-August	640	1996	203	1996-01 (5)	AfWC database	*boweni*
			Charadrius pecuarius	Kittlitz's Plover	July-August	725	1999	303	1997-01 (5)	AfWC database	W Africa
			Tringa erythropus	Spotted Redshank	July-August	6346	2000	2781	1996-01 (4)	AfWC database	Europe

GHANA (CONTINUED)

Sitename	Lat	Long	Scientific name	English name	Season	maxcount	maxyear	average	Basis for average	Source	Population(s)
Keta Lagoon complex (continued)			*Tringa stagnatilis*	Marsh Sandpiper	July-August	935	1999	334	1996-01 (4)	AfWC database	Europe
			Tringa nebularia	Common Greenshank	July-August	5432	1999	2974	1997-98 (2)	AfWC database	Europe
			Calidris alba	Sanderling	July-August	1730	1999	854	1996-01 (5)	AfWC database	E Atlantic
			Calidris minuta	Little Stint	July-August	8059	2000	3874	1996-01 (4)	AfWC database	Europe, W Africa
			Calidris ferruginea	Curlew Sandpiper	July-August	25743	1999	10685	1997-01 (5)	AfWC database	W Africa
Korle Lagoon	5.55	-1.78	*Calidris alba*	Sanderling	July-August	2450	2000	1264	2000-01 (2)	AfWC database	E Atlantic
			Calidris minuta	Little Stint	July-August	4017	2000	2103	2000-01 (2)	AfWC database	Europe, W Africa
Muni Lagoon	5.37	-0.67	*Tringa stagnatilis*	Marsh Sandpiper	July-August	333	2000			AfWC database	Europe
Sakumo Lagoon	5.67	-0.17	*Himantopus himantopus*	Black-winged Stilt	July-August	1638	2000			AfWC database	Sub-Saharan Africa N of Southern Africa + W & SW Europe, W Africa
			Tringa erythropus	Spotted Redshank	July-August	4219	2000	2030	1999-01 (3)	AfWC database	Europe
Songhor Lagoon	5.75	-0.50	*Himantopus himantopus*	Black-winged Stilt	Non-breeding	1900	1998			AfWC database	Sub-Saharan Africa N of Southern Africa + W & SW Europe, W Africa
			Glareola pratincola	Collared Pratincole	July-August	851	2000	380	1996-01 (5)	AfWC database	*boweni*
			Tringa erythropus	Spotted Redshank	July-August	2470	2000	1754	1999-01 (3)	AfWC database	Europe
			Tringa nebularia	Common Greenshank	July-August	3574	1999	1055	1997-01 (5)	AfWC database	Europe

GREECE

Sitename	Lat	Long	Scientific name	English name	Season	maxcount	maxyear	average	Basis for average	Source	Population(s)
Agios Mamas marsh	40.23	23.33	*Himantopus himantopus*	Black-winged Stilt	Breeding	900	1996			WBDB	CE Europe, E Mediterranean
Alyki Kitrous	40.42	22.38	*Recurvirostra avosetta*	Pied Avocet	Non-breeding	670	1989	82	1994-99 (5)	IWC database	Mediterranean & SE Europe
Amvrakikos Wetlands	38.87	20.08	*Himantopus himantopus*	Black-winged Stilt	Breeding	1080	1996			WBDB	CE Europe, E Mediterranean
			Glareola pratincola	Collared Pratincole	Breeding	480	1996			WBDB	Black Sea, E Mediterranean
			Charadrius alexandrinus	Kentish Plover	Non-breeding	740	1999	565	1997-01 (5)	IWC database	Black Sea, E Mediterranean
Arogi Lagoon (Karatza)	40.93	25.85	*Recurvirostra avosetta*	Pied Avocet	Non-breeding	958	1998	456	1997-01 (5)	IWC database	Mediterranean & SE Europe
Axios, Loudias & Aliakmon Deltas	40.48	22.40	*Recurvirostra avosetta*	Pied Avocet	Non-breeding	1237	1997	636	1996-00 (5)	IWC database	Mediterranean & SE Europe
			Glareola pratincola	Collared Pratincole	Breeding	300	1996			WBDB	Black Sea, E Mediterranean
			Limosa limosa	Black-tailed Godwit	Migration	4000	1990			WBDB	E Europe
			Numenius tenuirostris	Slender-billed Curlew	April	1	1997			Report to G. Handrinos	
Divari Pilou lagoon (Gialova)	36.97	21.67	*Tringa glareola*	Wood Sandpiper	Migration	11000	1996			WBDB	Europe
Evros Delta	40.77	26.05	*Recurvirostra avosetta*	Pied Avocet	Non-breeding	900	1990	446	1997-01 (5)	IWC database	Mediterranean & SE Europe
			Glareola pratincola	Collared Pratincole	Breeding	750	1997			WBDB	Black Sea, E Mediterranean
			Numenius tenuirostris	Slender-billed Curlew	April	15	1990			Report to G. Handrinos	
Evrotas Delta, South Peloponnese	36.82	22.70	*Numenius tenuirostris*	Slender-billed Curlew	April	4	1999			Theodoros Kominos & Antonia Galanaki	
Kalamas Delta, Ipiros	39.48	20.12	*Numenius tenuirostris*	Slender-billed Curlew	April	2	1997			I. Shogelev	
Kalogria Lagoon, Strofilia forest, and Lamia marshes	38.17	21.37	*Himantopus himantopus*	Black-winged Stilt	Breeding	810	1994			WBDB	CE Europe, E Mediterranean
			Charadrius alexandrinus	Kentish Plover	Migration	775	1994			WBDB	Black Sea, E Mediterranean
Kerkini	41.22	23.52	*Recurvirostra avosetta*	Pied Avocet	Non-breeding	1070	1999	512	1996-00 (5)	IWC database	Mediterranean & SE Europe

GREECE (CONTINUED)

Sitename	Lat	Long	Scientific name	English name	Season	maxcount	maxyear	average	Basis for average	Source	Population(s)
Lake Mitrikou (Ismarida)	40.97	25.28	*Recurvirostra avosetta*	Pied Avocet	Non-breeding	2500	1996			WBDB	Mediterranean & SE Europe
Lakes Volvi-Langada	40.68	23.37	*Himantopus himantopus*	Black-winged Stilt	Migration	600	1995			WBDB	CE Europe, E Mediterranean
			Recurvirostra avosetta	Pied Avocet	Migration	1150	1995			WBDB	Mediterranean & SE Europe
Messolonghi Lagoon	38.33	21.22	*Recurvirostra avosetta*	Pied Avocet	Non-breeding	1540	2001	772	1997-01 (5)	IWC database	Mediterranean & SE Europe
			Charadrius alexandrinus	Kentish Plover	Non-breeding	4060	1999	2734	1997-01 (5)	IWC database	Black Sea, E Mediterranean
			Tringa totanus	Common Redshank	Non-breeding	3870	1998	1757	1997-01 (5)	IWC database	E & C Europe
			Calidris alpina	Dunlin	Winter	6880	2001	3893	1997-01 (5)	IWC database	*centralis*
Nestou Delta and coastal lagoons	40.97	24.80	*Glareola pratincola*	Collared Pratincole	Breeding	300	1996			WBDB	Black Sea, E Mediterranean
Porto Lagos	41.00	25.08	*Numenius tenuirostris*	Slender-billed Curlew	April	1	1993			Handrinos 1994	
Ptelea Lagoon (Karakatsali) / Elos	40.93	25.85	*Recurvirostra avosetta*	Pied Avocet	Non-breeding	2285	1989	501	1997-01 (5)	IWC database	Mediterranean & SE Europe
Spercheios Delta (Lamia)	38.83	22.40	*Recurvirostra avosetta*	Pied Avocet	Non-breeding	3500	1989	1116	1993-98 (5)	IWC database	Mediterranean & SE Europe
			Tringa erythropus	Spotted Redshank	Non-breeding	1500	1989	757	1989-95 (2)	IWC database	Europe

GUINEA

Sitename	Lat	Long	Scientific name	English name	Season	maxcount	maxyear	average	Basis for average	Source	Population(s)
Khonibenki	10.27	-14.62	*Calidris ferruginea*	Curlew Sandpiper	January	17500	2002			B. Trolliet *in litt.*	W Africa
Kobayah	9.67	-13.50	*Recurvirostra avosetta*	Pied Avocet	Non-breeding	2205	1988			AfWC database	E Atlantic
Plaine Rizicole de Koba	10.00	-13.15	*Glareola pratincola*	Collared Pratincole	Non-breeding	2420	2000	2360	1999-00 (2)	AfWC database	*boweni* + W Mediterranean
Sonfonia (Konkoure)	9.77	-13.68	*Tringa stagnatilis*	Marsh Sandpiper	Non-breeding	312	1998			AfWC database	Europe
Vasières de Sonfonia	9.67	-13.56	*Recurvirostra avosetta*	Pied Avocet	Non-breeding	1482	1999	826	1999-00 (2)	AfWC database	E Atlantic
			Pluvialis squatarola	Grey Plover	Non-breeding	2876	2000	2738	1999-00 (2)	AfWC database	E Atlantic

GUINEA-BISSAU

Sitename	Lat	Long	Scientific name	English name	Season	maxcount	maxyear	average	Basis for average	Source	Population(s)
Bijagos Archipelago	11.30	-16.00	*Pluvialis squatarola*	Grey Plover	January	39100	1993	32600	1992-2001 (3)	Dodman & Sa 2005	E Atlantic
			Charadrius hiaticula	Common Ringed Plover	January	33000	1994	25100	1992-2001 (3)	Dodman & Sa 2005	*tundrae* + *psammodroma*
			Charadrius alexandrinus	Kentish Plover	January	5000	1993	3250	1992-2001 (3)	Dodman & Sa 2005	E Atlantic, W Mediterranean
			Limosa lapponica	Bar-tailed Godwit	January	108700	1993	94000	1992-2001 (3)	Dodman & Sa 2005	W *taymyrensis*
			Numenius phaeopus	Whimbrel	January	22000	1993	18200	1992-2001 (3)	Dodman & Sa 2005	*islandicus* + Northern Europe
			Numenius arquata	Eurasian Curlew	January	9300	1993	6450	1992-2001 (3)	Dodman & Sa 2005	
			Tringa totanus	Common Redshank	January	53250	1994	39900	1992-2001 (3)	Dodman & Sa 2005	E & C Europe + N Europe
			Arenaria interpres	Ruddy Turnstone	January	7900	1993	6900	1992-2001 (3)	Dodman & Sa 2005	NE Canada, Greenland + Northern Europe
			Calidris canutus	Red Knot	January	133000	2001	69300	1992-2001 (3)	Dodman & Sa 2005	*canutus*
			Calidris alba	Sanderling	January	24300	1993	16400	1992-2001 (3)	Dodman & Sa 2005	E Atlantic
			Calidris minuta	Little Stint	January	59700	1993	41600	1992-2001 (3)	Dodman & Sa 2005	Europe, W Africa
			Calidris ferruginea	Curlew Sandpiper	January	505000	2001	413000	1992-2001 (3)	Dodman & Sá 2005	W Africa
Rio Mansôa and Gêba estuary	11.92	-15.90	*Glareola pratincola*	Collared Pratincole	Non-breeding	2500	1983			WBDB	*boweni* + W Mediterranean
			Charadrius alexandrinus	Kentish Plover	January	1500	1987			Zwarts 1988	E Atlantic, W Mediterranean
Rio Tombali, Rio Cumbijã & Isla de Melho	11.25	-15.33	*Charadrius alexandrinus*	Kentish Plover	January	6400	1987			Zwarts 1988	E Atlantic, W Mediterranean

HUNGARY

Sitename	Lat	Long	Scientific name	English name	Season	maxcount	maxyear	average	Basis for average	Source	Population(s)
Biharugra fish-ponds	46.97	21.57	*Limosa limosa*	Black-tailed Godwit	Migration	6000	1996			WBDB	E Europe
Danube plain	46.82	19.25	*Limosa limosa*	Black-tailed Godwit	Migration	8000	1996			WBDB	E Europe
			Numenius arquata	Eurasian Curlew	Migration	12000	1996			WBDB	*arquata*
Darkany-to, Sarkeresztur	46.90	18.63	*Numenius tenuirostris*	Slender-billed Curlew	May	1	1991			Nagy 1994	
Dévaványa plain	47.17	21.15	*Limosa limosa*	Black-tailed Godwit	Migration	13000	1996			WBDB	E Europe
Hortobagy	47.62	21.07	*Limosa limosa*	Black-tailed Godwit	Spring	30000	1995			Kube *et al.* 1998	E Europe
			Numenius tenuirostris	Slender-billed Curlew	December	6	1990			Nagy 1994, Birding World 8, 9, p334	
			Numenius arquata	Eurasian Curlew	Migration	10000	1996			WBDB	*arquata*
			Tringa erythropus	Spotted Redshank	Migration	1000	1996			WBDB	Europe
			Philomachus pugnax	Ruff	Spring	200000	1995			Kube *et al.* 1998	W Africa
Lake Fehér at Kardoskút	46.50	20.47	*Limosa limosa*	Black-tailed Godwit	Migration	4000	1996			WBDB	E Europe
Pusztaszer Landscape Protection Area	46.25	20.17	*Limosa limosa*	Black-tailed Godwit	Migration	7000	1996			WBDB	E Europe
			Tringa erythropus	Spotted Redshank	Migration	1500	1996			WBDB	Europe
Viragoskut fish ponds	47.68	21.33	*Numenius tenuirostris*	Slender-billed Curlew	October	3	1991			Nagy 1994	

ICELAND

Sitename	Lat	Long	Scientific name	English name	Season	maxcount	maxyear	average	Basis for average	Source	Population(s)
Álftafjördur-Hofsstadavogur	65.00	-22.67	*Calidris canutus*	Red Knot	Migration	9000	1990			WBDB	*islandica*
Álftanes-Akrar	64.52	-22.25	*Calidris canutus*	Red Knot	Migration	8574	1990			WBDB	*islandica*
Alftanes-Skoganes	64.67	-22.45	*Calidris alba*	Sanderling	May	7045	1996			Wilson, 1997	E Atlantic
Hvalfjordur	64.53	-21.92	*Calidris canutus*	Red Knot	May	23500	1990			G.A. Gudmundsson, *in litt.*	*islandica*
Innstavogsnes-Grunnafjördur	64.37	-21.92	*Calidris canutus*	Red Knot	Migration	6800	1990			WBDB	*islandica*
Löngufjörur	64.75	-22.50	*Calidris canutus*	Red Knot	Migration	12000	1990			WBDB	*islandica*
Melrakkaslétta	66.48	-16.25	*Arenaria interpres*	Ruddy Turnstone	Migration	2220	1990			WBDB	NE Canada, Greenland
			Calidris canutus	Red Knot	Migration	7280	1990			WBDB	*islandica*
Ósasvædi Ölfusár	63.95	-21.25	*Limosa limosa*	Black-tailed Godwit	Breeding	600	1995			WBDB	*islandica*
Sandgerdi	64.05	-22.72	*Calidris alba*	Sanderling	May	1374	1989			G.A. Gudmundsson, *in litt.*	E Atlantic
Skardsfjördur	64.27	-15.07	*Calidris alpina*	Dunlin	Migration	10000	1990s			WBDB	Iceland + *arctica*
Stafnes-Gardur	64.07	-22.70	*Calidris maritima*	Purple Sandpiper	Non-breeding	1000	1989			WBDB	*littoralis* + Canada, NE Greenland
Stokkseyri-Eyrarbakki	63.87	-21.12	*Calidris canutus*	Red Knot	Migration	7600	1990			WBDB	*islandica*

IRAN

Sitename	Lat	Long	Scientific name	English name	Season	maxcount	maxyear	average	Basis for average	Source	Population(s)
Anzali Mordab complex	37.42	49.47	*Limosa limosa*	Black- tailed Godwit	Wintering	1380	1970s			Evans, 1994	W Asia
Bandar Mahshahr saltworks (Mahshahr Saltworks)	30.54	40.97	*Recurvirostra avosetta*	Pied Avocet	January	304	2007	221	2004-2007(3)	DOEI / WIWO	SW Asia, E Africa
Fereidoonkenar marshes	36.67	52.53	*Limosa limosa*	Black- tailed Godwit	January	4751	2005	2501	2004-2007(3)	DOEI / WIWO	W Asia

IRAN (CONTINUED) Sitename	Lat	Long	Scientific name	English name	Season	maxcount	maxyear	average	Basis for average	Source	Population(s)
Gomishan marshes and Turkoman Steppes	37.25	53.92	*Himantopus himantopus*	Black-winged Stilt	Non-breeding	1700	1992			Evans, 1994	SW Asia,
			Recurvirostra avosetta	Pied Avocet	January	641	2004	330	2004-2007(3)	DOEI / WIWO	SW Asia, E Africa
			Charadrius alexandrinus	Kentish Plover	January	2770	2004	1028	2004-2007(3)	DOEI / WIWO	SW Asia, NE Africa
			Limosa limosa	Black- tailed Godwit	January	3679	2005	2878	2004-2007(3)	DOEI / WIWO	W Asia
			Calidris alpina	Dunlin	January	11641	2007	5701	2004-2007(3)	DOEI / WIWO	*centralis*
Hamidieh (Omidiyeh) plains	31.33	48.33	*Himantopus himantopus*	Black-winged Stilt	Non-breeding	650	1992			Evans, 1994	SW Asia,
			Recurvirostra avosetta	Pied Avocet	January	1131	2005	799	2004-2005(2)	DOEI / WIWO	SW Asia, E Africa
Hamoun-i Sabari and Hamoun-i Hirmand	31.17	61.17	*Himantopus himantopus*	Black-winged Stilt	April	790	1972			Evans, 1994	SW Asia,
Harm Lake	28.17	53.5	*Recurvirostra avosetta*	Pied Avocet	January	412	2005	137	2004-2007(3)	DOEI / WIWO	SW Asia, E Africa
Hilleh River Delta	29.19	50.78	*Recurvirostra avosetta*	Pied Avocet	Wintering	300	1975			Evans, 1994	SW Asia, E Africa
Hoor Al-azim marsh	31.97	47.27	*Vanellus leucurus*	White-tailed Lapwing	January	626	2007	322	2005-2007(2)	DOEI / WIWO	SW Asia, NE Africa
			Limosa limosa	Black- tailed Godwit	January	2015	2007			DOEI / WIWO	W Asia
Horeh Bamdej	31.75	48.6	*Vanellus leucurus*	White-tailed Lapwing	January	395	2005	206	2004-2007(3)	DOEI / WIWO	SW Asia, NE Africa
Hoveyzeh marshes	31.29	47.95	*Recurvirostra avosetta*	Pied Avocet	January	683	2007	252	2004-2007(3)	DOEI / WIWO	SW Asia, E Africa
Izeh and Sheikho Lakes	31.87	49.9	*Recurvirostra avosetta*	Pied Avocet	Wintering	400	1992			Evans, 1994	SW Asia, E Africa
Karun River Marshes	31.75	48.9	*Limosa limosa*	Black- tailed Godwit	Wintering	2000	1975			Evans, 1994	W Asia
Khoor-e Kargoushki	26.17	57.18	*Limosa lapponica*	Bar- tailed Godwit	January	1430	2005	1048	2005-2007(2)	DOEI / WIWO	Eastern *taymyrensis*
Khoor-e Meydani	25.44	59.17	*Charadrius leschenaultii*	Greater Sandplover	January	697	2004	541	2004-2007(2)	DOEI / WIWO	*leschenaultii*
Khor Musa	30.33	48.82	*Dromas ardeola*	Crab Plover	January	1037	2005	519	2004-2005(2)	DOEI / WIWO	*ardeola*
Khouran Straits	26.83	55.67	*Dromas ardeola*	Crab Plover	January	3644	2007	2762	2004-2007(3)	DOEI / WIWO	*ardeola*
			Numenius arquata	Eurasian Curlew	January	1648	2007	1187	2004-2007(3)	DOEI / WIWO	*orientalis*
			Limosa lapponica	Bar- tailed Godwit	Wintering	2410	1974			Evans, 1994	Eastern *taymyrensis*
			Calidris alpina	Dunlin	January	8851	2007	4333	2004-2007(3)	DOEI / WIWO	*centralis*
Lake Bakhtegan, Lake Tashk And Kamjan Marshes	29.67	53.5	*Recurvirostra avosetta*	Pied Avocet	August	1000	1970s			Evans, 1994	SW Asia, E Africa
			Charadrius alexandrinus	Kentish Plover	November	1000	1973			Evans, 1994	SW Asia, NE Africa
			Limosa limosa	Black- tailed Godwit	Wintering	4500	1992			Evans, 1994	W Asia
			Calidris alpina	Dunlin	Migration	6000	1973			Evans, 1994	*centralis*
Lake Kobi	36.95	45.5	*Himantopus himantopus*	Black-winged Stilt	August	600	1972			Evans, 1994	SW Asia,
Lake Maharlu	29.35	52.82	*Charadrius alexandrinus*	Kentish Plover	January	2030	2004	749	2004-2007(3)	DOEI / WIWO	SW Asia, NE Africa
			Phalaropus lobatus	Red-necked Phalarope	April	100000	1990			Ornis Fennica 67, 1990, 141-142	*lobatus*
Lake Uromiyeh	37.5	45.5	*Recurvirostra avosetta*	Pied Avocet	August	13600	1973			Evans, 1994	SW Asia, E Africa
			Tringa stagnatilis	Marsh Sandpiper	August	1395	1973			Evans, 1994	SW Asia, ES Africa
			Calidris minuta	Little Stint	August	10000	1973			Evans, 1994	SW Asia, ES Africa
Lakes Alagol, Ulmagol and Ajigol	37.38	54.63	*Phalaropus lobatus*	Red-necked Phalarope	Passage	1000000	1970s			L. Cornwallis pers. com.	*lobatus*
Miankaleh Peninsula & Gorgan Bay	36.83	53.75	*Himantopus himantopus*	Black-winged Stilt	April	938	1973			Evans, 1994	SW Asia,
			Recurvirostra avosetta	Pied Avocet	January	622	2007	540	2004-2007(3)	DOEI / WIWO	SW Asia, E Africa
			Charadrius alexandrinus	Kentish Plover	August	1350	1975			Evans, 1994	SW Asia, NE Africa
			Limosa limosa	Black- tailed Godwit	January	1274	2007	908	2004-2007(3)	DOEI / WIWO	W Asia
			Calidris alba	Sanderling	May	4820	1973			Evans, 1994	SW Asia, ES Africa
			Calidris alpina	Dunlin	Non-breeding	5000	1973			Evans, 1994	*centralis*

IRAN (CONTINUED)

Sitename	Lat	Long	Scientific name	English name	Season	maxcount	maxyear	average	Basis for average	Source	Population(s)
Mirza Koochak Khan Farm	30.88	48.28	*Recurvirostra avosetta*	Pied Avocet	January	423	2005	280	2004-2005(2)	DOEI / WIWO	SW Asia, E Africa
Naseri marsh	30.67	48.17	*Recurvirostra avosetta*	Pied Avocet	January	3412	2004	1141	2004-2007(3)	DOEI / WIWO	SW Asia, E Africa
Nayband Bay	27.7	52.67	*Charadrius leschenaultii*	Greater Sandplover	January	576	2007	242	2004-2007(3)	DOEI / WIWO	*leschenaultii*
Rud-i-Gaz and Rud-i-Hara Deltas	26.67	56.83	*Haematopus ostralegus*	Eurasian Oystercatcher	Non-breeding	2000	1975			Evans, 1994	*longipes*
			Charadrius leschenaultii	Greater Sandplover	January	441	2005	149	2004-2007(3)	DOEI / WIWO	*leschenaultii*
			Limosa lapponica	Bar- tailed Godwit	Wintering	11500	1973			Evans, 1994	Eastern *taymyrensis*
			Numenius arquata	Eurasian Curlew	Wintering	5000	1973			Evans, 1994	*orientalis*
Rud-i-Jagin & Rud-i-Gabrik deltas	25.59	58.35	*Charadrius leschenaultii*	Greater Sandplover	January	381	2007	231	2004-2007(3)	DOEI / WIWO	*leschenaultii*
Rud-i-Shur, Rud-i-Shirin and Rud-i-Minab Deltas	27.08	56.75	*Dromas ardeola*	Crab Plover	January	1327	2005	844	2004-2007(3)	DOEI / WIWO	*ardeola*
			Haematopus ostralegus	Eurasian Oystercatcher	January	2180	2007	1522	2004-2007(3)	DOEI / WIWO	*longipes*
			Charadrius alexandrinus	Kentish Plover	January	3606	2005	2113	2004-2007(3)	DOEI / WIWO	SW Asia, NE Africa
			Pluvialis squatarola	Grey Plover	January	1130	2005	652	2004-2007(3)	DOEI / WIWO	SW Asia, E & S Africa
			Charadrius mongolus	Lesser Sandplover	January	3066	2005	2009	2004-2007(3)	DOEI / WIWO	*pamirensis*
			Charadrius leschenaultii	Greater Sandplover	January	1776	2005	704	2004-2007(3)	DOEI / WIWO	*leschenaultii*
			Limosa lapponica	Bar- tailed Godwit	January	4168	2007	2716	2004-2007(3)	DOEI / WIWO	E *taymyrensis*
			Numenius arquata	Eurasian Curlew	January	2217	2007	1568	2004-2007(3)	DOEI / WIWO	*orientalis*
			Calidris tenuirostris	Great Knot	January	400	2005	180	2004-2007(3)	DOEI / WIWO	*tenuirostris*
Sarbandar Saltworks, Persian Gulf Coast	32.35	48.23	*Recurvirostra avosetta*	Pied Avocet	January	450	2004	236	2004-2007(3)	DOEI / WIWO	SW Asia, E Africa
Shadegan Marshes, Khor-al Amaya and Khor Musa	30.17	48.67	*Haematopus ostralegus*	Eurasian Oystercatcher	Non-breeding	1820	1974			Evans, 1994	*longipes*
			Himantopus himantopus	Black-winged Stilt	Wintering	800	1972			Evans, 1994	SW Asia,
			Recurvirostra avosetta	Pied Avocet	Wintering	883	1970s			Evans, 1994	SW Asia, E Africa
			Vanellus leucurus	White-tailed Lapwing	Wintering	320	1975				Evans, 1994 SW Asia, NE Africa
			Charadrius alexandrinus	Kentish Plover	January	2958	2005	1194	2004-2007(3)	DOEI / WIWO	SW Asia, NE Africa
			Charadrius mongolus	Lesser Sandplover	January	1455	2004	818	2004-2005(2)	DOEI / WIWO	*pamirensis*
			Charadrius leschenaultii	Greater Sandplover	January	1196	2005	699	2004-2005(2)	DOEI / WIWO	*leschenaultii*
			Limosa lapponica	Bar- tailed Godwit	Wintering	2120	1974			Evans, 1994	Eastern
			Calidris alpina	Dunlin	January	20787	2004	7453	2004-2007(3)	DOEI / WIWO	*centralis*
Shur Gol, Yadegarlu and Dorgeh Sangi	37.02	45.52	*Himantopus himantopus*	Black-winged Stilt	August	1500	1972			Evans, 1994	SW Asia,
			Recurvirostra avosetta	Pied Avocet	July	500	1971			Evans, 1994	SW Asia, E Africa
Sooficam Marsh	37.31	54.4	*Charadrius alexandrinus*	Kentish Plover	January	1059	2005	494	2004-2007(3)	DOEI / WIWO	SW Asia, NE Africa
South Caspian Shore, Farahabad-Jambol	36.58	52.00	*Calidris alba*	Sanderling	September	2000	1972			Evans, 1994	SW Asia, ES Africa
South end of Hamoun-i Puzak	31.33	61.75	*Himantopus himantopus*	Black-winged Stilt	October	650	1975			Evans, 1994	SW Asia,
			Limosa limosa	Black- tailed Godwit	Wintering	5500	1973			Evans, 1994	W Asia
Ummal Korm & Nakhilu Islands	27.83	51.50	*Dromas ardeola*	Crab Plover	Breeding	9723 3241 pairs	2007	8163 2721 pairs	2004-08 (5)	H Amini *in litt.* 2008	*ardeola*

IRAQ

Sitename	Lat	Long	Scientific name	English name	Season	maxcount	maxyear	average	Basis for average	Source	Population(s)
Attariya Floodplains	33.42	44.92	*Limosa limosa*	Black-tailed Godwit	January	2500	1979			Scott & Carp 1982	W Asia
Bahr Al Milh	32.67	43.67	*Himantopus himantopus*	Black-winged Stilt	Migration	500	1979			Evans 1994	SW Asia
			Recurvirostra avosetta	Pied Avocet	January	300	1979			Evans 1994	SW Asia, E Africa
			Vanellus leucurus	White-tailed Lapwing	Breeding	900	1975			Evans 1994	SW Asia, NE Africa
Haur Al Hammar	30.73	47.05	*Charadrius alexandrinus*	Kentish Plover	January	6383	1975			Evans 1994	SW Asia, NE Africa
Haur Al Haushiya	32.08	46.90	*Recurvirostra avosetta*	Pied Avocet	January	500	1979			Evans 1994	SW Asia, E Africa
Haur Al Sa'adiyah	32.17	46.63	*Charadrius alexandrinus*	Kentish Plover	January	7000	1979			Evans 1994	SW Asia, NE Africa
			Calidris alpina	Dunlin	January	9500	1979			Evans 1994	*centralis*
Haur Al Suwayqiyah	32.70	45.92	*Recurvirostra avosetta*	Pied Avocet	January	373	1975			WBDB	SW Asia, E Africa
Haur Uwainah	31.42	46.33	*Recurvirostra avosetta*	Pied Avocet	January	380	1979			Evans 1994	SW Asia, E Africa

IRELAND

Sitename	Lat	Long	Scientific name	English name	Season	maxcount	maxyear	average	Basis for average	Source	Population(s)
Ballymacoda	51.84	-7.92	*Pluvialis apricaria*	Eurasian Golden Plover	Non-breeding	12500	2001	10410	1999-04 (5)	BirdWatch Ireland 2005	Iceland, Faeroes + *apricaria*
			Limosa limosa	Black-tailed Godwit	Non-breeding	1575	2001	1159	1999-04 (5)	BirdWatch Ireland 2005	*islandica*
Bannow Bay	52.19	-6.80	*Limosa limosa*	Black-tailed Godwit	Non-breeding	1070	1998	512	1994-99 (5)	IWC database	*islandica*
Blackwater Callows	52.13	-7.87	*Limosa limosa*	Black-tailed Godwit	Non-breeding	1243	2001	541	1999-04 (5)	BirdWatch Ireland 2005	*islandica*
Blackwater Estuary	51.97	-7.84	*Limosa limosa*	Black-tailed Godwit	Non-breeding	982	2001	690	1999-04 (5)	BirdWatch Ireland 2005	*islandica*
Boyne Estuary	53.68	-6.27	*Pluvialis apricaria*	Eurasian Golden Plover	Non-breeding	10000	2002	6388	1999-04 (5)	BirdWatch Ireland 2005	Iceland, Faeroes + *apricaria*
			Limosa limosa	Black-tailed Godwit	Non-breeding	574	1998/99	393	1999/00-2003/04 (5)	BirdWatch Ireland 2005	*islandica*
Broadmeadow (Malahide) Estuary	53.45	-6.17	*Limosa limosa*	Black-tailed Godwit	Non-breeding	710	1998/99	356	1999/00-2003/04 (5)	BirdWatch Ireland 2005	*islandica*
Cahore Marshes	52.56	-6.19	*Pluvialis apricaria*	Eurasian Golden Plover	Non-breeding	10250	1996	3710	1999-04 (5)	BirdWatch Ireland 2005	Iceland, Faeroes + *apricaria*
Clonakilty Bay	51.52	-8.93	*Limosa limosa*	Black-tailed Godwit	Non-breeding	1600	2002	899	1997-03 (5)	BirdWatch Ireland 2005	*islandica*
Cloyne	51.87	-8.12	*Limosa limosa*	Black-tailed Godwit	Non-breeding	475	1996			WBDB	*islandica*
Cork Harbour	51.83	-8.33	*Limosa limosa*	Black-tailed Godwit	Non-breeding	3162	2003	2023	1999-04 (5)	BirdWatch Ireland 2005	*islandica*
			Calidris alpina	Dunlin	Non-breeding	18524	1991	5650	1999-04 (5)	IWC database	*alpina* + Iceland + *arctica* + Britain & Ireland
Corofin Lakes	52.87	-9.05	*Limosa limosa*	Black-tailed Godwit	Non-breeding	1000	1999	210	1994-1999 (5)	IWC database	*islandica*
Courtmacsherry Bay, Broadstrand Bay & Dunworley	51.62	-8.63	*Limosa limosa*	Black-tailed Godwit	Non-breeding	720	1996	403	1999-04 (5)	BirdWatch Ireland 2005	*islandica*

IRELAND (CONTINUED)

Sitename	Lat	Long	Scientific name	English name	Season	maxcount	maxyear	average	Basis for average	Source	Population(s)
Dublin Bay	53.34	-6.17	*Limosa limosa*	Black-tailed Godwit	Non-breeding	1448	2003/04	959	1999/00-2003/04 (5)	BirdWatch Ireland 2005	*islandica*
			Limosa lapponica	Bar-tailed Godwit	Non-breeding	3371	1999	1822	1999-04 (5)	BirdWatch Ireland 2005	*lapponica*
			Calidris canutus	Red Knot	Non-breeding	5375	2003	3440	1999-04 (5)	BirdWatch Ireland 2005	*islandica*
Dundalk Bay	53.95	-6.33	*Haematopus ostralegus*	Eurasian Oystercatcher	Non-breeding	14696	2000	10668	1999-04 (5)	BirdWatch Ireland 2005	*ostralegus*
			Pluvialis apricaria	Eurasian Golden Plover	Non-breeding	15330	2004	8143	1999-04 (5)	BirdWatch Ireland 2005	Iceland, Faeroes + *apricaria*
			Limosa limosa	Black-tailed Godwit	Non-breeding	1950	1999	1399	1999-04 (5)	BirdWatch Ireland 2005	W Europe + *islandica*
			Limosa lapponica	Bar-tailed Godwit	Non-breeding	4175	1997	2586	1999-04 (5)	BirdWatch Ireland 2005	*lapponica*
			Calidris canutus	Red Knot	Non-breeding	15545	1995	7081	1999-04 (5)	BirdWatch Ireland, 2005	*islandica*
			Calidris alpina	Dunlin	Non-breeding	18880	2000	9241	1999-04 (5)	BirdWatch Ireland, 2005	*alpina* + Iceland + *arctica* + Britain & Ireland
Dungarvan Harbour	52.04	-7.54	*Limosa limosa*	Black-tailed Godwit	Non-breeding	1608	2003	1021	1999-04 (5)	BirdWatch Ireland 2005	*islandica*
			Limosa lapponica	Bar-tailed Godwit	Non-breeding	1892	2003	1116	1999-04 (5)	BirdWatch Ireland 2005	*lapponica*
Killala Bay	54.24	-9.17	*Limosa lapponica*	Bar-tailed Godwit	Non-breeding	1755	2003	807	1999-04 (5)	BirdWatch Ireland 2005	*lapponica*
Little Brosna Callows	53.07	-8.03	*Pluvialis apricaria*	Eurasian Golden Plover	Non-breeding	16330	2000	9321	1999-04 (5)	BirdWatch Ireland 2005	Iceland, Faeroes + *apricaria*
			Limosa limosa	Black-tailed Godwit	Non-breeding	4300	2000	2910	1999-04 (5)	BirdWatch Ireland 2005	*islandica*
Lough Derg	52.98	-8.32	*Limosa limosa*	Black-tailed Godwit	Non-breeding	1200	1995			WBDB	*islandica*
Mid-Clare Coast (Mal Bay - Doonbeg Bay)	52.82	-9.47	*Calidris maritima*	Purple Sandpiper	Non-breeding	404	2000	202	1999-04 (5)	BirdWatch Ireland, 2005	Canada, NE Greenland
Rahasane Turlough	53.13	-8.78	*Pluvialis apricaria*	Eurasian Golden Plover	Non-breeding	16500	1997	5666	1999-04 (5)	BirdWatch Ireland 2005	Iceland, Faeroes + *apricaria*
			Limosa limosa	Black-tailed Godwit	Non-breeding	1000	1998	391	1999-04 (5)	BirdWatch Ireland 2005	*islandica*
Rogerstown Estuary	53.50	-6.13	*Limosa limosa*	Black-tailed Godwit	Non-breeding	1253	2001/02	696	1999/00-2003/04 (5)	BirdWatch Ireland 2005	*islandica*
Seagrange Park	53.38	-6.20	*Limosa limosa*	Black-tailed Godwit	Non-breeding	750	2002/03	586	1999/00-2003/04 (5)	BirdWatch Ireland 2005	*islandica*
Shannon and Fergus Estuary	52.60	-9.50	*Vanellus vanellus*	Northern Lapwing	Non-breeding	52973	1995	12799	1997-01 (5)	IWC database	Europe
			Pluvialis apricaria	Eurasian Golden Plover	Non-breeding	13627	1995	4812	1997-01 (5)	IWC database	Iceland, Faeroes + *apricaria*

IRELAND (CONTINUED)

Sitename	Lat	Long	Scientific name	English name	Season	maxcount	maxyear	average	Basis for average	Source	Population(s)
Shannon and Fergus Estuary (continued)			*Limosa limosa*	Black-tailed Godwit	Non-breeding	3000	2001	1806	1997-04 (5)	BirdWatch Ireland 2005	*islandica*
			Limosa lapponica	Bar-tailed Godwit	Non-breeding	1565	1997	448	1997-01 (5)	IWC database	*lapponica*
			Tringa totanus	Common Redshank	Non-breeding	4000	1997	1754	1997-01 (5)	IWC database	*robusta* + *britannica*
			Calidris alpina	Dunlin	Non-breeding	20100	1996	5650	1999-04 (5)	BirdWatch Ireland, 2005	*alpina* + Iceland + *arctica* + Britain & Ireland
Shannon Callows	53.17	-8.00	*Vanellus vanellus*	Northern Lapwing	Non-breeding	23409	2000	11158	1998-04 (5)	BirdWatch Ireland 2005	Europe
			Pluvialis apricaria	Eurasian Golden Plover	Non-breeding	11200	2002	5803	1999-04 (5)	BirdWatch Ireland 2005	Iceland, Faeroes + *apricaria*
			Limosa limosa	Black-tailed Godwit	Non-breeding	1150	1995	545	1994-02 (5)	BirdWatch Ireland 2005	*islandica*
Southern Roscommon Lakes	53.58	-8.17	*Pluvialis apricaria*	Eurasian Golden Plover	Non-breeding	10000	2000	6410	1999-04 (5)	BirdWatch Ireland 2005	Iceland, Faeroes + *apricaria*
The Cull & Killag	52.20	-6.63	*Limosa limosa*	Black-tailed Godwit	Non-breeding	770	1995/96	265	1999/00-2003/04 (5)	BirdWatch Ireland 2005	*islandica*
			Limosa lapponica	Bar-tailed Godwit	Non-breeding	1460	2000	429	1999-04 (5)	BirdWatch Ireland 2005	*lapponica*
The Mullet, Broadhaven and Blacksod Bays	54.15	-10.00	*Charadrius hiaticula*	Common Ringed Plover	Non-breeding	1069	2004	735	1999-04 (5)	BirdWatch Ireland 2005	*hiaticula, psammodroma*
Tralee Bay, Lough Gill and Akeragh Lough	52.25	-9.92	*Pluvialis apricaria*	Eurasian Golden Plover	Non-breeding	12000	2000	6652	1999-04 (5)	BirdWatch Ireland 2005	Iceland, Faeroes + *apricaria*
			Charadrius hiaticula	Common Ringed Plover	Non-breeding	770	1999	344	1999-04 (5)	BirdWatch Ireland 2005	*hiaticula, psammodroma*
			Limosa limosa	Black-tailed Godwit	Non-breeding	802	2003	380	1999-04 (5)	BirdWatch Ireland 2005	*islandica*
Wexford Harbour and Slobs	52.32	-6.42	*Pluvialis apricaria*	Eurasian Golden Plover	Non-breeding	13017	2003	7412	1999-04 (5)	BirdWatch Ireland 2005	Iceland, Faeroes + *apricaria*
			Limosa limosa	Black-tailed Godwit	Non-breeding	2340	1995	1377	1999-04 (5)	BirdWatch Ireland 2005	W Europe + *islandica*
			Limosa lapponica	Bar-tailed Godwit	Non-breeding	2126	1996	1042	1999-04 (5)	BirdWatch Ireland	*lapponica*

ISRAEL

Sitename	Lat	Long	Scientific name	English name	Season	maxcount	maxyear	average	Basis for average	Source	Population(s)
Central Coastal Plain	32.32	34.93	*Vanellus spinosus*	Spur-winged Lapwing	Winter	2033	1990	1326	1999-03 (5)	IWC database	SW Asia, SE Europe
Galilee Coastal Plain	32.92	35.12	*Charadrius leschenaultii*	Greater Sandplover	Winter	113	1995	15	1999-03 (5)	IWC database	*columbinus*
Judean Foothills	31.75	34.92	*Himantopus himantopus*	Black-winged Stilt	Migration	1000	1980-89			Evans 1994	C & E Europe, E Mediterranean
Northern Arava Valley	30.88	35.32	*Himantopus himantopus*	Black-winged Stilt	Migration	500	1980-89			IWC database	CE Europe, E Mediterranean
Northern Lower Jordan Valley	32.42	35.58	*Glareola pratincola*	Collared Pratincole	Migration	250	1991			WBDB	Black Sea, E Mediterranean

ISRAEL (CONTINUED)

Sitename	Lat	Long	Scientific name	English name	Season	maxcount	maxyear	average	Basis for average	Source	Population(s)
Southern Arava Valley and Elat Mountains	29.67	35.00	*Himantopus himantopus*	Black-winged Stilt	Migration	500	1980-89			IWC database	CE Europe, E Mediterranean
Southern Coastal Plain	31.75	34.70	*Vanellus spinosus*	Spur-winged Lapwing	Winter	1379	1990	586	1996-00 (5)	IWC database	SW Asia, SE Europe
Valley Of Yesreel	32.67	35.25	*Himantopus himantopus*	Black-winged Stilt	Winter	1101	1991	124	1996-00 (5)	WBDB	CE Europe, E Mediterranean
			Vanellus spinosus	Spur-winged Lapwing	Winter	1513	1991	592	1996-00 (5)	IWC database	SW Asia, SE Europe
Western Negev	31.17	34.67	*Glareola pratincola*	Collared Pratincole	Migration	500	1991			WBDB	Black Sea, E Mediterranean

ITALY

Sitename	Lat	Long	Scientific name	English name	Season	maxcount	maxyear	average	Basis for average	Source	Population(s)
Biviere and Plain of Gela	37.02	14.33	*Glareola pratincola*	Collared Pratincole	Breeding	450	1997			WBDB	W Mediterranean
Cagliari wetlands	39.18	9.15	*Recurvirostra avosetta*	Pied Avocet	All year	1500	1995			WBDB	Mediterranean & SE Europe
			Charadrius alexandrinus	Kentish Plover	Non-breeding	902	1995			WBDB	E Atlantic, W Mediterranean
Cervia saltpans	44.25	12.35	*Recurvirostra avosetta*	Pied Avocet	Breeding	720	1994			WBDB	Mediterranean & SE Europe
Delta Del Po - Parte Veneta	44.97	12.43	*Recurvirostra avosetta*	Pied Avocet	Winter	2458	2003	971	1999-03 (5)	IWC database	Mediterranean & SE Europe
			Calidris alpina	Dunlin	Winter	13602	2002	8551	1999-03 (5)	IWC database	*alpina*
Laguna Di Grado E Marano	45.73	13.25	*Tringa erythropus*	Spotted Redshank	Migration	1000	1993			WBDB	Europe
			Calidris alpina	Dunlin	Non-breeding	35350	1997	9681	1998-03 (5)	IWC database	*alpina*
Laguna Di Venezia	45.40	12.32	*Recurvirostra avosetta*	Pied Avocet	Winter	980	2003	641	1999-03 (5)	IWC database	Mediterranean & SE Europe
			Calidris alpina	Dunlin	Non-breeding	32778	2000	24913	1999-03 (5)	IWC database	*alpina*
Lentini Lake, Sicilia	37.33	14.95	*Numenius tenuirostris*	Slender-billed Curlew	March	1	1996			Dutch Birding 1996, 18 p302	
Manfredonia (Margherita di Savoia)	41.48	15.90	*Recurvirostra avosetta*	Pied Avocet	Non-breeding	4770	1995	945	1999-03 (5)	IWC database	Mediterranean & SE Europe
			Charadrius alexandrinus	Kentish Plover	Non-breeding	706	1995	304	1999-03 (5)	IWC database	E Atlantic, W Mediterranean
			Numenius tenuirostris	Slender-billed Curlew	January-March	19	1995			Serra *et al.* 1995	
Oristano wetlands and Cape San Marco	39.87	8.48	*Recurvirostra avosetta*	Pied Avocet	Non-breeding	2400	1995			WBDB	Mediterranean & SE Europe
Palmas - Sant'Antioco (Palmas Gulf wetlands)	39.07	8.50	*Charadrius alexandrinus*	Kentish Plover	Non-breeding	810	1993	296	1999-03 (5)	IWC database	E Atlantic, W Mediterranean
			Recurvirostra avosetta	Pied Avocet	All year	600	1996			WBDB	Mediterranean & SE Europe
Pantani Di Capo Passero	36.73	15.05	*Charadrius alexandrinus*	Kentish Plover	Migration	1000	1990			WBDB	E Atlantic, W Mediterranean
			Calidris minuta	Little Stint	Migration	6000	1990			WBDB	Europe, W Africa
Salina Di Cervia	44.27	12.32	*Recurvirostra avosetta*	Pied Avocet	Non-breeding	522	2001	350	1998-02 (5)	IWC database	Mediterranean & SE Europe
Stagno Di Cagliari	39.25	9.03	*Recurvirostra avosetta*	Pied Avocet	Winter	768	2002	518	1999-03 (5)	IWC database	Mediterranean & SE Europe
			Charadrius alexandrinus	Kentish Plover	Non-breeding	905	1994	259	1999-03 (5)	IWC database	E Atlantic, W Mediterranean
Stagnone di Marsala and Trapani saltpans	37.78	12.50	*Recurvirostra avosetta*	Pied Avocet	Breeding	600	1996			WBDB	Mediterranean & SE Europe
			Charadrius alexandrinus	Kentish Plover	Migration	3000	1989			WBDB	E Atlantic, W Mediterranean
Valli Di Comacchio E Vene Di Bellocchio	44.60	12.18	*Recurvirostra avosetta*	Pied Avocet	Non-breeding	567	1999	234	1999-03 (5)	IWC database	Mediterranean & SE Europe
Vercelli rice-fields	45.20	8.27	*Himantopus himantopus*	Black-winged Stilt	Breeding	990	1995			WBDB	SW Europe, NW Africa

JORDAN

Sitename	Lat	Long	Scientific name	English name	Season	maxcount	maxyear	average	Basis for average	Source	Population(s)
Azraq Oasis	31.83	36.83	*Himantopus himantopus*	Black-winged Stilt	Breeding	1395	1992			Evans 1994	C E Europe, E Mediterranean
			Charadrius alexandrinus	Kentish Plover	Migration	2000	1992			Evans 1994	Black Sea, E Mediterranean

KAZAKHSTAN

Sitename	Lat	Long	Scientific name	English name	Season	maxcount	maxyear	average	Basis for average	Source	Population(s)
Aksay water reservoir	51.18	52.97	*Phalaropus lobatus*	Red-necked Phalarope	August	20000	1989-91			calculated from Khrokov *et al.* 1998.	*lobatus*
Tengiz-Korgalzhyn lakes	50.5	69.4	*Himantopus himantopus*	Black-winged Stilt	Post-breeding	575	1999	559	1999-04 (6)	Schielzeth *et al.* in prep.	*himantopus* SW Asia
			Recurvirostra avosetta	Pied Avocet	Post-breeding migration	2770	1999	2904	1999-04 (6)	Schielzeth *et al.* in prep	SW Asia, E Africa
			Glareola nordmanni	Black-winged Pratincole	Breeding	4500 1500 pairs	2006			Kamp *et al.* 2006.	E Europe, W & C Asia
			Vanellus gregarius	Sociable Lapwing	Breeding/ Post-breeding	787	2007	498	2004-07 (4)	R. Sheldon,& J. Kamp *in litt*	SW Asia & NE Africa
			Limosa limosa	Black-tailed Godwit	Post-breeding	8056	1999	7447	1999-04 (6)	Schielzeth *et al.* in prep.	W Asia
			Tringa erythropus	Spotted Redshank	Spring migration	2459	2000			Schielzeth *et al.* in prep.	W Siberia
			Calidris minuta	Little Stint	Spring migration	58235	2000	50330	1999-04 (6)	Schielzeth *et al.* in prep	SW Asia, ES Africa
			Calidris alpina	Dunlin	Spring migration	31746	2000	32056	1999-04 (6)	Schielzeth *et al.* in prep	*centralis*
			Philomachus pugnax	Ruff	Spring migration	195153	2000	194224	1999-04 (6)	Schielzeth *et al.* in prep	S Asia, E & S Africa
			Phalaropus lobatus	Red-necked Phalarope	Spring migration	588507	2004	642725	1999-04 (6)	Schielzeth *et al.* in prep	NW Eurasia
Tobol river forest steppe	55.83	66.83	*Calidris minuta*	Little Stint	Spring	10000	1982-84			calculated from Blinova & Blinov 1997	SW Asia, ES Africa

KENYA

Sitename	Lat	Long	Scientific name	English name	Season	maxcount	maxyear	average	Basis for average	Source	Population(s)
Dandora Oxidation Ponds	-1.25	36.92	*Himantopus himantopus*	Black-winged Stilt	Non-breeding	1558	2000			AfWC database	Sub-Saharan Africa N of Southern Africa
			Tringa stagnatilis	Marsh Sandpiper	Non-breeding	1110	2000	234	1996-00 (5)	AfWC database	SW Asia, ES Africa
Kiunga Marine National Reserve	-1.83	41.43	*Dromas ardeola*	Crab Plover	Non-breeding	800	1996			WBDB	*ardeola*
Lake Bogoria	0.25	36.12	*Himantopus himantopus*	Black-winged Stilt	Non-breeding	1934	1997			AfWC database	Sub-Saharan Africa N of Southern Africa
Lake Elmenteita	-0.42	36.20	*Recurvirostra avosetta*	Pied Avocet	Non-breeding	4186	1997	1622	1996-00 (5)	WBDB	E Africa
Lake Magadi	-1.87	36.28	*Recurvirostra avosetta*	Pied Avocet	Non-breeding	1236	1998	751	1996-00 (5)	AfWC database	E Africa
			Charadrius pallidus	Chestnut-banded Plover	January	529	2005			Simmons *et al.* (2007)	*venustus*
Lake Nakuru National Park	-0.37	36.08	*Himantopus himantopus*	Black-winged Stilt	Non-breeding	3121	1991			AfWC database	Sub-Saharan Africa N of Southern Africa

KENYA (CONTINUED)

Sitename	Lat	Long	Scientific name	English name	Season	maxcount	maxyear	average	Basis for average	Source	Population(s)
Lake Ol'Bolossat	-0.15	36.43	*Gallinago nigripennis*	African Snipe	All year	2,100	1990s			Gichuki *et al.* 2000	*aequatorialis*
Lake Turkana	3.45	36.67	*Vanellus spinosus*	Spur-winged Lapwing	Non-breeding	6930	1992			WBDB	Sub-saharan Africa, S Arabia
			Charadrius hiaticula	Common Ringed Plover	Non-breeding	13600	1992			WBDB	*tundrae*
			Charadrius pecuarius	Kittlitz's Plover	Non-breeding	8600	1992			WBDB	ECS Africa
			Charadrius asiaticus	Caspian Plover	Non-breeding	500	1992			WBDB	*asiaticus*
			Tringa stagnatilis	Marsh Sandpiper	January	1,100	<1986			Urban *et al.* 1986	SW Asia, ES Africa
			Calidris minuta	Little Stint	Non-breeding	113000	1992			WBDB	SW Asia, ES Africa
Manguo Floodplain	-1.10	36.65	*Himantopus himantopus*	Black-winged Stilt	Non-breeding	1558	2000			AfWC database	Sub-Saharan Africa N of Southern Africa
			Tringa stagnatilis	Marsh Sandpiper	Non-breeding	1110	2000	280	1994-00 (4)	AfWC database	SW Asia, ES Africa
Mida Creek	-3.33	40.08	*Dromas ardeola*	Crab Plover	Non-breeding	1043	2000			AfWC database	*ardeola*
			Charadrius leschenaultii	Greater Sandplover	January	1,250	1990s			Seys *et al.* 1995	*leschenaultii*
Mwea-Tibera Rice Scheme	-1.30	37.37	*Himantopus himantopus*	Black-winged Stilt	July-August	1550	1999			AfWC database	Sub-Saharan Africa N of Southern Africa
Sabaki River Mouth	-3.17	40.13	*Glareola ocularis*	Madagascar Pratincole	Non-breeding	2500	1999			Bennun & Njoroge 1999	*ocularis*
			Calidris ferruginea	Curlew Sandpiper	Non-breeding	4490	1999	1754	1995-00 (3)	AfWC database	ES Africa
Tana River Delta	-2.50	40.33	*Charadrius marginatus*	White-fronted Plover	Non-breeding	1070	1993			WBDB	*tenellus* Coastal E Africa
			Charadrius mongolus	Lesser Sandplover	Non-breeding	2340	1993			WBDB	*pamirensis*
			Tringa stagnatilis	Marsh Sandpiper	Non-breeding	1690	1993			WBDB	SW Asia, ES Africa
			Calidris minuta	Little Stint	Non-breeding	15310	1993			WBDB	SW Asia, ES Africa
			Calidris ferruginea	Curlew Sandpiper	Non-breeding	12960	1993			AfWC database	ES Africa

KUWAIT

Sitename	Lat	Long	Scientific name	English name	Season	maxcount	maxyear	average	Basis for average	Source	Population(s)
Sulaibikhat Bay	29.33	47.83	*Recurvirostra avosetta*	Pied Avocet	Non-breeding	260	2000	92	1990-00 (4)	IWC database	SW Asia, E Africa

LIBYA

Sitename	Lat	Long	Scientific name	English name	Season	maxcount	maxyear	average	Basis for average	Source	Population(s)
Benghazi	32.18	20.10	*Charadrius alexandrinus*	Kentish Plover	Non-breeding	1500	1993			WBDB	Black Sea, E Mediterranean

LITHUANIA

Sitename	Lat	Long	Scientific name	English name	Season	maxcount	maxyear	average	Basis for average	Source	Population(s)
Nemunas River delta	55.30	21.33	*Pluvialis squatarola*	Grey Plover	August	4500	1996			Svazas *et al.* 1999	E Atlantic
			Limosa limosa	Black-tailed Godwit	April-September	2800	1999			Svazas *et al.* 1999	WC Europe
			Calidris alpina	Dunlin	September	10000-15000	1998-99			Svazas *et al.* 1999	*alpina* + Baltic

MADAGASCAR

Sitename	Lat	Long	Scientific name	English name	Season	maxcount	maxyear	average	Basis for average	Source	Population(s)
Ambavanankarana	-13.12	48.77	*Dromas ardeola*	Crab Plover	July-August	902	1999			AfWC database	*ardeola*
Baie de Baly	-16.07	45.28	*Dromas ardeola*	Crab Plover	July-August	1411	2001			AfWC database	*ardeola*
			Charadrius thoracicus	Black-banded Plover	All year	92	2003-05			Long *et al.* 2008	*thoracicus*
			Charadrius pecuarius	Kittlitz's Plover	July-August	155	2001	82	1999-01(2)	AfWC database	Madagascar
			Charadrius marginatus	White-fronted Plover	July-August	313	1999	248	1999-01(2)	AfWC database	*tenellus* Madagascar
Belo sur Mer	-20.75	44.00	*Charadrius thoracicus*	Black-banded Plover	Non-breeding	40	2003-05			Long *et al.* 2008	*thoracicus*
Bombetoka Bay	-15.92	46.52	*Charadrius marginatus*	White-fronted Plover	July-August	314	1999			AfWC database	*tenellus* Madagascar
Kirindy-Mite area	-21.17	44.00	*Charadrius thoracicus*	Black-banded Plover	Breeding	71	2000s			Young *et al.* 2005	*thoracicus*
Lac Alaotra	-17.58	48.33	*Charadrius pecuarius*	Kittlitz's Plover	July-August	242	2000	95	1997-00 (3)	AfWC database	Madagascar
Lac Ihotry	-21.93	43.68	*Glareola ocularis*	Madagascar Pratincole	Non-breeding	250	1990s			ZICOMA 1999	*ocularis*
			Charadrius thoracicus	Black-banded Plover	Non-breeding	46	1990s			ZICOMA 2001	*thoracicus*
			Charadrius pecuarius	Kittlitz's Plover	July-August	286	1997			AfWC database	Madagascar
Lac Tsimanampetsotsi	-24.00	43.73	*Charadrius thoracicus*	Black-banded Plover	Non-breeding	133	2003-05			Long *et al.* 2008	*thoracicus*
			Charadrius pecuarius	Kittlitz's Plover	Breeding	300	2003			Zefania & Székely. *in litt*	*pecuarius* Madagascar
Marambitsy Bay	-15.96	45.40	*Charadrius thoracicus*	Black-banded Plover	All year	86	2003-05			Long *et al.* 2008	*thoracicus*
North Pangalanes wetlands	-18.68	49.22	*Glareola ocularis*	Madagascar Pratincole	Non-breeding	121	1990s			WBDB	*ocularis*
Tambohorano wetlands	-17.47	44.10	*Charadrius thoracicus*	Black-banded Plover	Non-breeding	61	1990s			WBDB	*thoracicus*
Tsiribihina delta	-19.75	44.43	*Glareola ocularis*	Madagascar Pratincole	Non-breeding	250	1990s			WBDB	*ocularis*
& upper Tsiribihina river			*Charadrius thoracicus*	Black-banded Plover	Non-breeding	46	1990s			WBDB	*thoracicus*

MALI

Sitename	Lat	Long	Scientific name	English name	Season	maxcount	maxyear	average	Basis for average	Source	Population(s)
Bani River	13.63	5.63	*Glareola cinerea*	Grey Pratincole	January	200	1999			AfWC database	*colorata*
Fleuve Niger: Downstream	16.25	-0.08	*Pluvianus aegyptius*	Egyptian Plover	Non-breeding	390	2008			O. Girard *in litt*	Western
of the Inner Delta			*Limosa limosa*	Black-tailed Godwit	Non-breeding	5760	1984	2277	1978-86 (5)	AfWC database	WC Europe + E Europe
			Philomachus pugnax	Ruff	Non-breeding	27300	1983	10154	1978-86 (5)	AfWC database	West Africa
Inner Niger Delta	15.50	-4.00	*Himantopus himantopus*	Black-winged Stilt	Non-breeding	12200	2006	11600	2006-08 (3)	O. Girard *in litt.*	Sub-Saharan Africa, W & SW Europe, W Africa
			Glareola pratincola	Collared Pratincole	Non-breeding	18310	1998-04			Zwarts *et al.* 2005	*boweni* + W Mediterranean
			Vanellus spinosus	Spur-winged Lapwing	Non-breeding	5732	1998-04			Zwarts *et al.* 2005	W Africa
			Charadrius pecuarius	Kittlitz's Plover	Non-breeding	13676	1998-04			Zwarts *et al.* 2005	W Africa
			Charadrius marginatus	White-fronted Plover	Non-breeding	791	1998-04			Zwarts *et al.* 2005	*mechowi* West Africa
			Limosa limosa	Black-tailed Godwit	Non-breeding	26852	1998-04			Zwarts *et al.* 2005	WC Europe
			Tringa erythropus	Spotted Redshank	Non-breeding	4557	1998-04			Zwarts *et al.* 2005	Europe
			Tringa nebularia	Common Greenshank	Non-breeding	2513	1998-04			Zwarts *et al.* 2005	W Africa
			Calidris minuta	Little Stint	Non-breeding	31802	1998-04			Zwarts *et al.* 2005	Europe, W Africa
			Philomachus pugnax	Ruff	Non-breeding	47281	1998-04			Zwarts *et al.* 2005	W Africa

MALI (CONTINUED)

Sitename	Lat	Long	Scientific name	English name	Season	maxcount	maxyear	average	Basis for average	Source	Population(s)
Lac Faguibine	16.75	-4.00	*Himantopus himantopus*	Black-winged Stilt	Non-breeding	3060	1990s			WBDB	Sub-Saharan Africa N of Southern Africa + W & SW Europe, W Africa
			Calidris minuta	Little Stint	Non-breeding	10000	1983			WBDB	Europe, W Africa
			Philomachus pugnax	Ruff	Non-breeding	20500	1983			WBDB	W Africa
Lac Horo	16.22	-3.92	*Himantopus himantopus*	Black-winged Stilt	January	2230	2008			O. Girard *in litt.*	Sub-Saharan Africa N of Southern Africa + W & SW Europe, W Africa
			Limosa limosa	Black-tailed Godwit	Non-breeding	6200	1985			WBDB	WC Europe
			Philomachus pugnax	Ruff	Non-breeding	32000	1978			WBDB	W Africa
Plaine de Seri	14.98	-5.38	*Glareola pratincola*	Collared Pratincole	Non-breeding	650	1995			AfWC database	*boweni* + W Mediterranean
Séri	14.83	-4.67	*Glareola pratincola*	Collared Pratincole	Non-breeding	9000	1986			WBDB	*boweni* + W Mediterranean
Timisobo--Képagou	15.13	-3.97	*Limosa limosa*	Black-tailed Godwit	Non-breeding	30000	1977			WBDB	WC Europe
			Philomachus pugnax	Ruff	Non-breeding	31000	1978			WBDB	W Africa

MAURITANIA

Sitename	Lat	Long	Scientific name	English name	Season	maxcount	maxyear	average	Basis for average	Source	Population(s)
Aftout es Sâheli	17.37	-16.13	*Recurvirostra avosetta*	Pied Avocet	Non-breeding	1650	2000			WBDB	E Atlantic
			Charadrius alexandrinus	Kentish Plover	Non-breeding	6500	1990s			WBDB	E Atlantic, W Mediterranean
			Limosa limosa	Black-tailed Godwit	Non-breeding	6000	1987			WBDB	WC Europe
			Tringa erythropus	Spotted Redshank	Non-breeding	1150	1987			WBDB	Europe
Banc d'Arguin	20.12	-16.27	*Pluvialis squatarola*	Grey Plover	January	19500	2000	17660	1997-01 (3)	Hagemeijer *et al.* 2004	E Atlantic
			Charadrius hiaticula	Common Ringed Plover	January	58100	2000	58730	1997-01 (3)	Hagemeijer *et al.* 2004	*tundrae* + *psammodroma*
			Charadrius alexandrinus	Kentish Plover	January	5800	1997	4830	1997-01 (3)	Zwarts *et al.* 1998	E Atlantic, W Mediterranean
			Limosa lapponica	Bar-tailed Godwit	January	402600	2000	372570	1997-01 (3)	Hagemeijer *et al.* 2004	W *taymyrensis*
			Numenius phaeopus	Whimbrel	January	31400	2000	20170	1997-01 (3)	Hagemeijer *et al.* 2004	*islandicus* + Northern Europe
			Numenius arquata	Eurasian Curlew	January	10200	2000	8430	1997-01 (3)	Hagemeijer *et al.* 2004	*arquata*
			Tringa totanus	Common Redshank	January	193000	2000	125330	1997-01 (3)	Hagemeijer *et al.* 2004	E & C Europe + N Europe
			Tringa nebularia	Common Greenshank	Non-breeding	5100	2001	4060	1997-01 (3)	Isenmann 2006 1997-01 (3)	Europe
			Arenaria interpres	Ruddy Turnstone	January	10300	2000	8660	1997-01 (3)	Hagemeijer *et al.* 2004	NE Canada, Greenland + N Europe

MAURITANIA (CONTINUED) Sitename	Lat	Long	Scientific name	English name	Season	maxcount	maxyear	average	Basis for average	Source	Population(s)
Banc d'Arguin (continued)			*Calidris canutus*	Red Knot	January	255700	2000	263000	1997-01 (3)	Hagemeijer *et al.* 2004	*canutus*
			Calidris alba	Sanderling	January	22300	2000	21030	1997-01 (3)	Hagemeijer *et al.* 2004	E Atlantic
			Calidris minuta	Little Stint	January	65400	2000	39770	1997-01 (3)	Hagemeijer *et al.* 2004	Europe, W Africa
			Calidris ferruginea	Curlew Sandpiper	Non-breeding	249000	2000	192200	1997-01 (3)	Hagemeijer *et al.* 2004	W Africa
			Calidris alpina	Dunlin	Non-breeding	1023500	2000	907930	1997-01 (3)	Hagemeijer *et al.* 2004	*schinzii*, Iceland + *arctica*
Bassin de R'Kiz	17.47	-11.55	*Philomachus pugnax*	Ruff	Non-breeding	22612	2001			AfWC database	W Africa
Bell Ndiaoul et Khurumbum	20.00	-12.00	*Recurvirostra avosetta*	Pied Avocet	Non-breeding	800	1972	184	1973-97 (5)	AfWC database	Mediterranean & SE Europe
Chott Boul	16.57	-16.43	*Recurvirostra avosetta*	Pied Avocet	Non-breeding	5650	2001			WBDB	E Atlantic
			Limosa limosa	Black-tailed Godwit	Non-breeding	7900	2001			WBDB	WC Europe
Diawling National Park	16.22	-16.38	*Recurvirostra avosetta*	Pied Avocet	Non-breeding	2200	1974			WBDB	E Atlantic
Entre Keur Massene et Diawling	16.55	-16.34	*Recurvirostra avosetta*	Pied Avocet	Non-breeding	2056	1999			AfWC database	E Atlantic
Gâat Mahmoûdé	16.45	-8.38	*Himantopus himantopus*	Black-winged Stilt	Non-breeding	13200	2001			AfWC database	Sub-Saharan Africa N of Southern Africa + SW Europe, NW Africa
			Glareola pratincola	Collared Pratincole	Non-breeding	2457	2000			WBDB	*boweni* + W Mediterranean
Keur Massene	16.57	-16.32	*Philomachus pugnax*	Ruff	Post-breeding migration	15000	1976			AfWC database	W Africa
Lac d'Aleg	17.08	-13.98	*Himantopus himantopus*	Black-winged Stilt	Non-breeding	4280	2001			AfWC database	Sub-Saharan Africa N of Southern Africa + W & SW Europe, W Africa
			Recurvirostra avosetta	Pied Avocet	Non-breeding	5200	2001			AfWC database	Mediterranean & SE Europe
			Glareola pratincola	Collared Pratincole	Non-breeding	1341	1996	612	1996-00 (4)	AfWC database	*boweni* + W Mediterranean
			Charadrius pecuarius	Kittlitz's Plover	Non-breeding	1432	2001	381	1996-01 (4)	AfWC database	W Africa
			Limosa limosa	Black-tailed Godwit	Non-breeding	3112	1996	673	1984-01 (5)	AfWC database	WC Europe
Lac de Magta Lahjar	17.35	-13.10	*Limosa limosa*	Black-tailed Godwit	Non-breeding	1800	1996			AfWC database	WC Europe
											SW Europe, W Africa
			Calidris minuta	Little Stint	Non-breeding	2000	2000			AfWC database	Europe, W Africa
			Philomachus pugnax	Ruff	Non-breeding	22000	2001	14050	2000-01 (2)	AfWC database	W Africa
Podor-Bogue. Vallee du Senegal	16.67	-14.50	*Limosa limosa*	Black-tailed Godwit	Post-breeding migration	5300	1975			AfWC database	WC Europe
Rosso Total	16.50	-16.18	*Recurvirostra avosetta*	Pied Avocet	Non-breeding	5650	2001	1388	1997-01 (5)	AfWC database	E Atlantic
			Limosa limosa	Black-tailed Godwit	Non-breeding	8700	2001	1842	1997-01 (5)	AfWC database	WC Europe
Sawana--Oum Lellé	16.33	-9.28	*Himantopus himantopus*	Black-winged Stilt	Non-breeding	2135	>1989			WBDB	Sub-Saharan Africa N of Southern Africa + W & SW Europe, W Africa

MAURITANIA (CONTINUED)

Sitename	Lat	Long	Scientific name	English name	Season	maxcount	maxyear	average	Basis for average	Source	Population(s)
Tâmourt en Na'âj	17.85	-12.12	*Philomachus pugnax*	Ruff	Non-breeding	24000	2000			WBDB	W Africa
Tamourt Sawana	16.33	-10.70	*Himantopus himantopus*	Black-winged Stilt	Non-breeding	2135	2000			AfWC database	Sub-Saharan Africa N of Southern Africa + W & SW Europe, W Africa
Trarza. Aftout Es Saheli	17.42	-16.25	*Recurvirostra avosetta*	Pied Avocet	Non-breeding	9900	2001	5377	1987-01 (5)	AfWC database	E Atlantic

MONTENEGRO

Sitename	Lat	Long	Scientific name	English name	Season	maxcount	maxyear	average	Basis for average	Source	Population(s)
Ulcinj salina	41.92	19.30	*Glareola pratincola*	Collared Pratincole	Non-breeding	270	1988			WBDB	Black Sea, E Mediterranean
			Limosa limosa	Black-tailed Godwit	March	3423	2006			M Schneider-Jacoby *in litt.*	E Europe
			Numenius tenuirostris	Slender-billed Curlew	March	1	2005			M Schneider-Jacoby & B Stumberger *in litt.*	Mediterranean basin
			Tringa erythropus	Spotted Redshank	September	2249	2006			M Schneider-Jacoby *in litt*	Europe
			Tringa stagnatilis	Marsh Sandpiper	November	500	2005			M Schneider-Jacoby *in litt*	C & NE Europe

MOROCCO

Sitename	Lat	Long	Scientific name	English name	Season	maxcount	maxyear	average	Basis for average	Source	Population(s)
Baie d'Ad Dakhla	23.70	-15.85	*Charadrius alexandrinus*	Kentish Plover	Non-breeding	1288	1995	707	1993-95 (2)	IWC database	E Atlantic, W Mediterranean
			Limosa lapponica	Bar-tailed Godwit	Winter	7192	1995			WBDB	W *taymyrensis*
			Calidris canutus	Red Knot	Non-breeding	8400	1995	4386	1993-95 (2)	IWC database	*canutus*
			Calidris alba	Sanderling	Non-breeding	3127	1995	1792	1993-95 (2)	IWC database	E Atlantic
Bas Loukkos	35.20	-6.12	*Numenius tenuirostris*	Slender-billed Curlew	February	1	1993			Gretton 1994	
Lagune De Khnifiss	28.13	-11.98	*Calidris alpina*	Dunlin	Winter	10078	1995	2780	1991-95 (4)	IWC database	Iceland + *arctica*
Lagune De Sidi Moussa-Oualidia:	32.78	-8.95	*Himantopus himantopus*	Black-winged Stilt	Non-breeding	919	1995	651	1991-95 (5)	IWC database	W & SW Europe, W Africa
			Numenius tenuirostris	Slender-billed Curlew	November	1	1993			El Agbani & Dakki 1994	
Larache	35.17	-6.17	*Numenius tenuirostris*	Slender-billed Curlew	February	1				Gretton 1991	
El Jadida											
Merja Zerga: Kenitra	34.80	-6.30	*Recurvirostra avosetta*	Pied Avocet	Winter	6945	1991	4407	1991-95 (5)	IWC database	E Atlantic
			Pluvialis squatarola	Grey Plover	Winter	5260	1990	2365	1990-95 (5)	IWC database	E Atlantic
			Charadrius hiaticula	Common Ringed Plover	Winter	11500	1995	10214	1994-95 (2)	IWC database	*tundrae* + *psammodroma* + *hiaticula*
			Charadrius alexandrinus	Kentish Plover	Winter	19400	1995	11499	1994-95 (2)	IWC database	E Atlantic, W Mediterranean
			Limosa limosa	Black-tailed Godwit	Winter	16200	1995	7693	1991-95 (5)	IWC database	WC Europe
			Numenius tenuirostris	Slender-billed Curlew	December	5	1991			Gretton 1994; 5 references in Dutch Birding, 3 references in British birds	
			Calidris minuta	Little Stint	Winter	19700	1995	12527	1994-95 (2)	IWC database	Europe, W Africa
			Calidris alpina	Dunlin	Non-breeding	30900	1995	20964	1991-95 (3)	IWC database	*alpina* + *schinzii*, Iceland + *arctica* + Britain

MOROCCO (CONTINUED)

Sitename	Lat	Long	Scientific name	English name	Season	maxcount	maxyear	average	Basis for average	Source	Population(s)
Mlalah Du Bas Takhadart	35.57	-5.95	*Charadrius alexandrinus*	Kentish Plover	Non-breeding	1020	1995	511	1993-95 (2)	IWC database	E Atlantic, W Mediterranean
Selbha Bou Areg, nr Melilla	35.13	-2.95	*Numenius tenuirostris*	Slender-billed Curlew	Winter	2	1990			A. El Ghazi & Jacques Franchimont	

MOZAMBIQUE

Sitename	Lat	Long	Scientific name	English name	Season	maxcount	maxyear	average	Basis for average	Source	Population(s)
Bay Inhambane	-24.18	35.38	*Pluvialis squatarola*	Grey Plover	July-August	2070	1999			AfWC database	SW Asia, E Africa
			Charadrius marginatus	White-fronted Plover	July-August	130	1999			AfWC database	*arenaceus* SE Africa
			Charadrius leschenaultii	Greater Sandplover	July-August	580	1999			IWC database	*leschenaultii*
			Arenaria interpres	Ruddy Turnstone	July-August	1850	1999			AfWC database	SW Asia, ES Africa
Bazaruto, Benguera and Magaruque Is	-21.75	35.42	*Pluvialis squatarola*	Grey Plover	Non-breeding	1135	1997	908	1996-98 (3)	AfWC database	SW Asia, E Africa
			Charadrius marginatus	White-fronted Plover	July-August	157	1999			AfWC database	*arenaceus* SE Africa
			Limosa lapponica	Bar-tailed Godwit	Non-breeding	8522	1998			Köhler & Köhler 1999	E *taymyrensis*
			Calidris alba	Sanderling	Non-breeding	2273	1998			Köhler & Köhler 1999	SW Asia, ES Africa
Inhaca Island	-26.00	32.62	*Pluvialis squatarola*	Grey Plover		900	1995			Parker 1999	SW Asia, E Africa
Lake Xigunte	-26.48	32.80	*Charadrius marginatus*	White-fronted Plover	Pre-breeding migration	104	1997			AfWC database	*arenaceus* SE Africa
Maputo beach	-26.17	32.58	*Charadrius marginatus*	White-fronted Plover	Pre-breeding migration	216	1997			AfWC database	*arenaceus* SE Africa
Salinas da Matola	-25.95	32.55	*Charadrius marginatus*	White-fronted Plover	Pre-breeding migration	617	1997			AfWC database	*arenaceus* SE Africa
			Charadrius leschenaultii	Greater Sandplover	Pre-breeding migration	504	1997			IWC database	*leschenaultii*
Sencara Island, Quirimbas Archipelago	-11.50	40.60	*Charadrius marginatus*	White-fronted Plover	Non-breeding	500	2003			Diagana & Dodman 2007	*tenellus* coastal E Africa

NAMIBIA

Sitename	Lat	Long	Scientific name	English name	Season	maxcount	maxyear	average	Basis for average	Source	Population(s)
Bushmanland Pan: Total	-19.75	20.50	*Himantopus himantopus*	Black-winged Stilt	July-August	946	1991	327	1991-00 (3)	AfWC database	Southern Africa
Cape Cross Salt Works	-22.17	14.00	*Calidris ferruginea*	Curlew Sandpiper	July-August	4140	2000	1583	1991-00 (4)	AfWC database	ES Africa
Eastern Caprivi Wetlands	-18.83	23.75	*Glareola nordmanni*	Black-winged Pratincole	Non-breeding	1000	-	750		WBDB	*nordmanni*
Etosha National Park	-18.80	16.57	*Himantopus himantopus*	Black-winged Stilt	Non-breeding	319	1997	147	1993-98 (5)	AfWC database	Southern Africa
			Recurvirostra avosetta	Pied Avocet	Non-breeding	355	1998	113	1992-98 (4)	AfWC database	S Africa
			Charadrius pallidus	Chestnut-banded Plover	Non-breeding	415	1998	126	1993-98 (4)	AfWC database	*pallidus*
Lüderitz Bay islands	-26.62	15.12	*Haematopus moquini*	African Black Oystercatcher	Non-breeding	400	2000			WBDB	*moquinii*
Luderitz Coast: Total	-26.58	15.17	*Haematopus moquini*	African Black Oystercatcher	Non-breeding	270	1997	124	1992-97 (3)	AfWC database	*moquinii*
			Charadrius marginatus	White-fronted Plover	July-August	185	2000	104	1991-00 (2)	AfWC database	*marginatus*
Mile 4 (Swakopmund) Saltworks	-23.42	14.17	*Haematopus moquini*	African Black Oystercatcher	July-August	115	1998	41	1992-98 (3)	AfWC database	*moquini*

NAMIBIA (CONTINUED)

Sitename	Lat	Long	Scientific name	English name	Season	maxcount	maxyear	average	Basis for average	Source	Population(s)
Mile 4 (Swakopmund) Saltworks (cont)			*Charadrius pallidus*	Chestnut-banded Plover	Non-breeding	500	1990s			A.J. Tree *in litt.*	*pallidus*
Oponono Lake and Oshitunto	-18.00	15.00	*Himantopus himantopus*	Black-winged Stilt	July-August	307	1999	212	1999-00 (2)	AfWC database	Southern Africa
			Recurvirostra avosetta	Pied Avocet	July-August	616	1999	318	1999-00 (2)	AfWC database	S Africa
			Charadrius asiaticus	Caspian Plover	July-August	541	1999			AfWC database	*asiaticus*
Orange river: Total	-28.58	16.87	*Recurvirostra avosetta*	Pied Avocet	Non-breeding	374	1998	203	1994-98 (3)	AfWC database	S Africa
Orange river: Total (continued)			*Charadrius marginatus*	White-fronted Plover	Pre-breeding migration	200	1996	64	1994-98) (4)	AfWC database	*marginatus*
Pomona Island	-27.20	15.27	*Haematopus moquini*	African Black Oystercatcher	Non-breeding	60	1996			AfWC database	*moquinii*
Possession Island	-27.02	15.20	*Haematopus moquini*	African Black Oystercatcher	All year	300				WBDB	*moquinii*
Sandwich Harbour	-23.38	14.48	*Recurvirostra avosetta*	Pied Avocet	July-August	1569	1998	590	1992-00 (5)	AfWC database	S Africa
			Pluvialis squatarola	Grey Plover	July-August	1207	1999	394	1992-00 (5)	AfWC database	SW Asia, E & S Africa
			Charadrius marginatus	White-fronted Plover	July-August	3160	1998	1937	1992-00 (5)	AfWC database	*arenaceus* SW Africa
			Charadrius pallidus	Chestnut-banded Plover	July-August	4350	1998	2353	1992-00 (5)	AfWC database	*pallidus*
			Arenaria interpres	Ruddy Turnstone	July-August	4625	2000	1,522	1992-00 (5)	AfWC database	SW Asia, ES Africa + N Europe
			Calidris alba	Sanderling	July-August	29745	2000	6898	1991-00 (5)	AfWC database	SW Asia, ES Africa + E Atlantic
			Calidris minuta	Little Stint	Non-breeding	34667	1991	9160	1993-98 (5)	AfWC database	SW Asia, ES Africa
			Calidris ferruginea	Curlew Sandpiper	July-August	82983	2000	21938	1992-00 (5)	AfWC database	ES Africa
Swakop - Walvis	-22.92	14.50	*Charadrius marginatus*	White-fronted Plover	July-August	183	2000			AfWC database	*arenaceus* SW Africa
			Arenaria interpres	Ruddy Turnstone	Non-breeding	3323	1998			AfWC database	SW Asia, ES Africa + N Europe
Walvis Bay Ramsar Site	-22.50	14.42	*Haematopus moquini*	African Black Oystercatcher	Non-breeding	167	1996	89	1992-98 (5)	AfWC database	*moquinii*
			Himantopus himantopus	Black-winged Stilt	July-August	768	1997-05	262	1997-05 (9)	Wearne & Underhill 2005	Southern Africa
			Recurvirostra avosetta	Pied Avocet	July-August	4102	1997-05	1592	1997-05 (9)	Wearne & Underhill 2005	S Africa
			Pluvialis squatarola	Grey Plover	July-August	2598	1999	1061	1991-99 (4)	AfWC database	SW Asia, E Africa
			Charadrius marginatus	White-fronted Plover	July-August	3108	1997-05	1516	1997-05 (9)	Wearne & Underhill 2005	*arenaceus* SW Africa
			Charadrius pallidus	Chestnut-banded Plover	January	8428	1997-05	2284	1997-05 (9)	Wearne & Underhill 2005	*pallidus*
			Arenaria interpres	Ruddy Turnstone	Non-breeding	4641	1992	2440	1992-98 (5)	AfWC database	SW Asia, ES Africa + N Europe
			Calidris alba	Sanderling	Non-breeding	15169	1997-05	8847	1997-05 (9)	Wearne & Underhill 2005	SW Asia, E & S Africa + E Atlantic
			Calidris ferruginea	Curlew Sandpiper	Non-breeding	95499	1995	30686	1997-05 (9)	AfWC database Wearne & Underhill 2005	ES Africa
Zambezi river - Kalizo 10 Km	-17.75	24.83	*Glareola pratincola*	Collared Pratincole	July-August	2700	1999			AfWC database	*fuellebomi*

NETHERLANDS

Sitename	Lat	Long	Scientific name	English name	Season	maxcount	maxyear	average	Basis for average	Source	Population(s)
Drenthe Province	52.90	6.62	*Vanellus vanellus*	Northern Lapwing	Autumn	26929	2003			SOVON, The Netherlands, 2005	Europe
Flevoland Province	52.52	5.62	*Vanellus vanellus*	Northern Lapwing	Autumn	22909	2003			SOVON, The Netherlands, 2005	Europe
Friesland Province	53.10	5.90	*Vanellus vanellus*	Northern Lapwing	Autumn	84797	2003			SOVON, The Netherlands, 2005	Europe
			Pluvialis apricaria	Eurasian Golden Plover	Autumn	70364	2003			SOVON, The Netherlands, 2005	Iceland, Faeroes + Norway, W Russia + *apricaria*
			Numenius arquata	Eurasian Curlew	Autumn	11414	2003			SOVON, The Netherlands, 2005	*arquata*
			Philomachus pugnax	Ruff	Spring	47500	1998	39500	1997-03 (5)	SOVON, The Netherlands, 2005	W Africa
Gelderland Province	52.10	5.92	*Vanellus vanellus*	Northern Lapwing	Autumn	22181	2003			SOVON, The Netherlands, 2005	Europe
Groningen Province	53.22	6.73	*Vanellus vanellus*	Northern Lapwing	Autumn	30971	2003			SOVON, The Netherlands, 2005	Europe
			Pluvialis apricaria	Eurasian Golden Plover	Autumn	28594	2003			SOVON, The Netherlands, 2005	Iceland, Faeroes + Norway, W Russia + *apricaria*
Ilperveld, Varkensland and Twiske	52.45	4.93	*Limosa limosa*	Black-tailed Godwit	Non-breeding	9850	1992			WBDB	W Europe + *islandica*
NL North Sea Shore	53.38	5.02	*Calidris alba*	Sanderling	Autumn	2081	1998	1135	1999-03 (5)	SOVON, The Netherlands, 2005	E Atlantic
Noord Holland Province	52.58	4.88	*Vanellus vanellus*	Northern Lapwing	Autumn	61585	2003			SOVON, The Netherlands, 2005	Europe
			Pluvialis apricaria	Eurasian Golden Plover	Autumn	32299	2003			SOVON, The Netherlands, 2005	Iceland, Faeroes + Norway, W Russia + *apricaria*
Oostvaardersplassen	52.43	5.35	*Recurvirostra avosetta*	Pied Avocet	Non-breeding	4281	1990			WBDB	E Atlantic
			Limosa limosa	Black-tailed Godwit	Non-breeding	5596	1990			WBDB	W Europe + *islandica*
Oostzanerveld	52.45	4.87	*Limosa limosa*	Black-tailed Godwit	Non-breeding	6000	1992			WBDB	W Europe + *islandica*
Rhine-Maas-Schelde Delta	51.50	4.00	*Haematopus ostralegus*	Eurasian Oystercatcher	Winter	110574	1995	51156	1999-03 (5)	RWS WD RIKZ 2005	*ostralegus*
			Recurvirostra avosetta	Pied Avocet	Winter	3198	2000	1990	1999-03 (5)	RWS WD RIKZ 2005	E Atlantic
			Vanellus vanellus	Northern Lapwing	Winter	110712	2000	52582	1999-03 (5)	RWS WD RIKZ 2005	Europe
			Pluvialis apricaria	Eurasian Golden Plover	Winter	36264	2003	27687	1999-03 (5)	RWS WD RIKZ 2005	Iceland, Faeroes + Norway, W Russia + *apricaria*
			Pluvialis squatarola	Grey Plover	Autumn	13450	1995	9542	1999-03 (5)	RWS WD RIKZ 2005	E Atlantic
			Charadrius alexandrinus	Kentish Plover	Autumn	1144	1990	359	1999-03 (5)	RWS WD RIKZ 2005	E Atlantic, W Mediterranean
			Limosa limosa	Black-tailed Godwit	Autumn	1608	2003	728	1999-03 (5)	RWS WD RIKZ 2005	W Europe + *islandica*
			Limosa lapponica	Bar-tailed Godwit	Spring	15679	2000	12852	1999-03 (5)	RWS WD RIKZ 2005	W *taymyrensis* + *lapponica*
			Numenius arquata	Eurasian Curlew	Autumn	26888	2003	22423	1999-03 (5)	RWS WD RIKZ 2005	*arquata*
			Tringa erythropus	Spotted Redshank	Autumn	3463	1995	2163	1999-03 (5)	RWS WD RIKZ 2005	Europe
			Tringa totanus	Common Redshank	Autumn	10635	2001	8664	1999-03 (5)	RWS WD RIKZ 2005	E & C Europe + *robusta* + N Europe + *britannica*
			Tringa nebularia	Common Greenshank	Autumn	1971	2000	1625	1999-03 (5)	RWS WD RIKZ 2005	Europe

NETHERLANDS (CONTINUED) Sitename	Lat	Long	Scientific name	English name	Season	maxcount	maxyear	average	Basis for average	Source	Population(s)
Rhine-Maas-Schelde Delta (continued)			*Arenaria interpres*	Ruddy Turnstone	Winter	2424	1994	1447	1999-03 (5)	RWS WD RIKZ 2005	NE Canada, Greenland + Northern Europe
			Calidris canutus	Red Knot	Winter	28880	2000	25709	1999-03 (5)	RWS WD RIKZ 2005	*islandica* + *canutus*
			Calidris alba	Sanderling	Spring	7955	2000	5124	1999-03 (5)	RWS WD RIKZ 2005	E Atlantic
			Calidris alpina	Dunlin	Winter	82968	2002	68518	1999-03 (5)	RWS WD RIKZ 2005	*alpina* + Baltic
Utrecht Province	52.10	5.22	*Vanellus vanellus*	Northern Lapwing	Autumn	20143	2003			SOVON, The Netherlands, 2005	Europe
Wadden Sea - The Netherlands	53.30	5.38	*Haematopus ostralegus*	Eurasian Oystercatcher	Winter	236804	1996	183661	1999-03 (5)	SOVON, The Netherlands, 2005	*ostralegus*
			Recurvirostra avosetta	Pied Avocet	Autumn	17573	1990	11039	1999-03 (5)	SOVON, The Netherlands, 2005	E Atlantic
			Vanellus vanellus	Northern Lapwing	Winter	80044	2000	35622	1999-03 (5)	SOVON, The Netherlands, 2005	Europe
			Pluvialis apricaria	Eurasian Golden Plover	Winter	58908	2001	48462	1999-03 (5)	SOVON, The Netherlands, 2005	Iceland, Faeroes + Norway, W Russia + *apricaria*
			Pluvialis squatarola	Grey Plover	Spring	60361	2004	50411	1999-03 (5)	SOVON, The Netherlands, 2005	E Atlantic
			Charadrius hiaticula	Common Ringed Plover	Autumn	10830	2000	6983	1999-03 (5)	SOVON, The Netherlands, 2005	*tundrae* + *psammodroma* + *hiaticula*
			Limosa limosa	Black-tailed Godwit	Winter	5215	2003	1455	1999-03 (5)	SOVON, The Netherlands, 2005	W Europe + *islandica*
			Limosa lapponica	Bar-tailed Godwit	Spring	149438	2004	112160	1999-03 (5)	SOVON, The Netherlands, 2005	W *taymyrensis* + *lapponica*
			Numenius arquata	Eurasian Curlew	Autumn	178774	2000	145666	1999-03 (5)	SOVON, The Netherlands, 2005	*arquata*
			Tringa erythropus	Spotted Redshank	Autumn	6806	2002	4408	1999-03 (5)	SOVON, The Netherlands, 2005	Europe
			Tringa totanus	Common Redshank	Autumn	51102	2001	32603	1999-03 (5)	SOVON, The Netherlands, 2005	E & C Europe + *robusta* + N Europe + *britannica*
			Tringa nebularia	Common Greenshank	Autumn	11277	1997	5997	1999-03 (5)	SOVON, The Netherlands, 2005	Europe
			Arenaria interpres	Ruddy Turnstone	Autumn	6567	2001	4075	1999-03 (5)	SOVON, The Netherlands, 2005	NE Canada, Greenland, N Europe
			Calidris canutus	Red Knot	Autumn	119628	1998	67289	1999-03 (5)	SOVON, The Netherlands, 2005	*islandica* + *canutus*
			Calidris alba	Sanderling	Spring	15707	2003	9246	1999-03 (5)	SOVON, The Netherlands, 2005	E Atlantic
			Calidris alpina	Dunlin	Autumn	435988	2003	294620	1999-03 (5)	SOVON, The Netherlands, 2005	*alpina* + Baltic
Wormer-and Jisperveld	52.52	4.83	*Limosa limosa*	Black-tailed Godwit	Non-breeding	5500	1992			WBDB	W Europe + *islandica*

NIGER

Sitename	Lat	Long	Scientific name	English name	Season	maxcount	maxyear	average	Basis for average	Source	Population(s)
Atchi	13.80	9.47	*Himantopus himantopus*	Black-winged Stilt	Non-breeding	2500	2000			AfWC database	Sub-Saharan Africa N of Southern Africa + C & E Europe, E Mediterranean
Chiya	13.80	9.15	*Himantopus himantopus*	Black-winged Stilt	Non-breeding	4300	2000			AfWC database	Sub-Saharan Africa N of Southern Africa + C & E Europe, E Mediterranean
Complexe des Retraits du Lac Tchad	16.00	16.00	*Himantopus himantopus*	Black-winged Stilt	Pre-breeding migration	7720	2001			AfWC database	SubSaharan Africa N of Southern Africa + C & E Europe, E Mediterranean
			Vanellus spinosus	Spur-winged Lapwing	Pre-breeding migration	4095	2001			AfWC database	Sub-Saharan Africa
Falke (Taouna)	13.68	9.17	*Himantopus himantopus*	Black-winged Stilt	Non-breeding	6027	2001			AfWC database	Sub-Saharan Africa N of Southern Africa + C & E Europe, E Mediterranean
Fleuve Niger. Labbezanga-Niamey	14.25	1.42	*Limosa limosa*	Black-tailed Godwit	Non-breeding	2600	1972	1550	1972-84 (2)	AfWC database	WC Europe + E Europe
			Philomachus pugnax	Ruff	Non-breeding	13000	1984			AfWC database	W Africa
Fleuve Niger. Niamey-Gaya	12.57	2.73	*Limosa limosa*	Black-tailed Godwit	Non-breeding	10500	1984			AfWC database	WC Europe + E Europe
			Philomachus pugnax	Ruff	Non-breeding	15400	1984			AfWC database	W Africa
Kokoro	14.17	0.92	*Gallinago media*	Great Snipe	Non-breeding	384	2000			AfWC database	Scandinavia
Lassouri + Karandi	14.02	9.57	*Himantopus himantopus*	Black-winged Stilt	Pre-breeding migration	2717	2001			AfWC database	Sub-Saharan Africa N of Southern Africa + C & E Europe, E Mediterranean
Mozague Ouest	13.90	5.45	*Tringa erythropus*	Spotted Redshank	Non-breeding	1000	1995	266	1992-97 (4)	AfWC database	Europe
Tam	13.13	12.13	*Himantopus himantopus*	Black-winged Stilt	Pre-breeding migration	4300	2001			AfWC database	Sub-Saharan Africa N of Southern Africa + C & E Europe, E Mediterranean

NIGERIA

Sitename	Lat	Long	Scientific name	English name	Season	maxcount	maxyear	average	Basis for average	Source	Population(s)
Baturiya Kafin Hansa	12.48	10.37	*Limosa limosa*	Black-tailed Godwit	Non-breeding	7473	2000	3737	1999-00 (2)	AfWC database	E Europe
			Philomachus pugnax	Ruff	Non-breeding	16971	2000			AfWC database	W Africa + E & S Asia
Hadejia-Nguru	12.67	10.50	*Limosa limosa*	Black-tailed Godwit	Non-breeding	6473	1997	2171	1994-98 (5)	AfWC database	E Europe
			Tringa erythropus	Spotted Redshank	Non-breeding	4065	1997	1327	1994-98 (5)	AfWC database	SW Asia, E Africa + Europe
			Philomachus pugnax	Ruff	Non-breeding	70845	1995	51822	1994-98 (5)	AfWC database	W Africa + E & S Asia
Lake Chad	12.83	13.67	*Himantopus himantopus*	Black-winged Stilt	Non-breeding	1826	2000			AfWC database	Sub-Saharan Africa + C & E Europe, E Mediterranean
SEE ALSO UNDER CHAD			*Glareola cinerea*	Grey Pratincole		500	-			Del Hoyo *et al.* 1996	*cinerea*
			Philomachus pugnax	Ruff	Non-breeding	217119	2000			AfWC database	W Africa + E & S Asia
Niger: Gaya-Kainji dam	11.17	4.00	*Limosa limosa*	Black-tailed Godwit	Non-breeding	4900	1984			AfWC database	WC Europe + E Europe
			Philomachus pugnax	Ruff	Non-breeding	47000	1984			AfWC database	W Africa
Sandbanks near Lagos	6.43	3.33	*Glareola cinerea*	Grey Pratincole		300	-			Del Hoyo *et al.* 1996	*cinerea*

NORWAY

Sitename	Lat	Long	Scientific name	English name	Season	maxcount	maxyear	average	Basis for average	Source	Population(s)
Dovrefjell	62.32	9.45	*Gallinago media*	Great Snipe	Breeding	1200	1989			WBDB	Scandinavia
Hardangervidda	60.20	7.62	*Pluvialis apricaria*	Eurasian Golden Plover	Breeding	15000	1999			WBDB	Norway, W Russia
			Eudromias morinellus	Eurasian Dotterel	Breeding	7500	1999			WBDB	Europe
Inner part of Porsanger fjord	70.17	24.67	*Calidris canutus*	Red Knot	Migration	60000	1989			WBDB	*islandica*
Sørkjosen	69.25	19.25	*Calidris canutus*	Red Knot	Migration	28000	1998			WBDB	*islandica*
Varangerfjord	70.20	29.87	*Calidris maritima*	Purple Sandpiper	Non-breeding	1000	1990s			WBDB	Europe, Siberia
Vega archipelago	65.82	11.75	*Calidris maritima*	Purple Sandpiper	Non-breeding	1100	1990s			WBDB	Europe, Siberia + short-billed *maritima*

OMAN

Sitename	Lat	Long	Scientific name	English name	Season	maxcount	maxyear	average	Basis for average	Source	Population(s)
Al Batinah Coast	24.05	57.03	*Calidris alba*	Sanderling	Non-breeding	2500	1992			Evans 1994	SW Asia, ES Africa
Arabian Sea off Oman	18.37	56.87	*Phalaropus lobatus*	Red-necked Phalarope	Non-breeding	1000000	1996			Fry 1996	*lobatus*
Barr Al Hikman	20.63	58.47	*Dromas ardeola*	Crab Plover	January	6900	2008	1043	1991-01(5)	IWC database R. Klaasen & J. de Fouw *in litt.*	*ardeola*
			Haematopus ostralegus	Eurasian Oystercatcher	Non-breeding	10700	1991	1038	1993-01 (5)	IWC database	*longipes*
			Recurvirostra avosetta	Pied Avocet	Non-breeding	1400	1997	725	1997-01 (2)	IWC database	SW Asia, E Africa
			Pluvialis squatarola	Grey Plover	Non-breeding	3300	1997	1310	1993-01 (5)	IWC database	SW Asia, E Africa
			Charadrius alexandrinus	Kentish Plover	Non-breeding	3500	1992	452	1993-01 (5)	IWC database	SW Asia, NE Africa
			Charadrius mongolus	Lesser Sandplover	January	34,000	2008	7560	1993-01 (5)	IWC database R. Klaasen & J. de Fouw *in litt*	*pamirensis*
			Charadrius leschenaultii	Greater Sandplover	Non-breeding	3000	1997	1010	1993-01 (5)	IWC database	*crassirostris + leschenaultii*
			Limosa lapponica	Bar-tailed Godwit	January	65000	2008	26400	1991-01 (5)	IWC database R. Klaasen & J. de Fouw *in litt*	E *taymyrensis*
			Numenius arquata	Eurasian Curlew	Non-breeding	12000	2001	3270	1993-01 (5)	IWC database	*orientalis*
			Numenius tenuirostris	Slender-billed Curlew	January	1	1990			OSME Bulletin 1990, 31, p42	
			Tringa totanus	Common Redshank	Non-breeding	50000	1999	31560	1993-01 (5)	IWC database	*ussuriensis*
			Arenaria interpres	Ruddy Turnstone	January	5700	2008	2200	1993-01 (5)	IWC database R. Klaasen & J. de Fouw *in litt*	SW Asia, ES Africa
			Calidris tenuirostris	Great Knot	Non-breeding	1200	1992			Evans 1994	*tenuirostris*
			Calidris alba	Sanderling	Non-breeding	11000	1990	1500	1993-01 (5)	IWC database	SW Asia, ES Africa
			Calidris minuta	Little Stint	Non-breeding	16000	1993	10000	1991-01 (5)	IWC database	SW Asia, ES Africa
			Calidris ferruginea	Curlew Sandpiper	January	38000	2008	4313	1991-01 (5)	IWC database R. Klaasen & J. de Fouw *in litt*	ES Africa
			Calidris alpina	Dunlin	January	87000	2008	41400	1993-01 (5)	IWC database R. Klaasen & J. de Fouw *in litt*	*centralis*
			Limicola falcinellus	Broad-billed Sandpiper	Non-breeding	5000	1990	384	1989-01 (5)	IWC database	*falcinellus*

OMAN (CONTINUED)

Sitename	Lat	Long	Scientific name	English name	Season	maxcount	maxyear	average	Basis for average	Source	Population(s)
Dawhat Sawqirah	18.67	56.68	*Charadrius alexandrinus*	Kentish Plover	Non-breeding	1000	1995	462	1990-95 (5)	IWC database	SW Asia, NE Africa
			Calidris alba	Sanderling	Non-breeding	1767	1991	480	1990-95 (4)	IWC database	SW Asia, ES Africa
			Limicola falcinellus	Broad-billed Sandpiper	Non-breeding	700	1994	204	1990-95 (5)	IWC database	*falcinellus*
Khor Dirif – 5 km west	18.92.	57.27	*Numenius tenuirostris*	Slender-billed Curlew	February	2	1999			Oman Bird news 2: 1999	
Khawr Ghawi	18.57	56.63	*Calidris alba*	Sanderling	Non-breeding	1500	1992			Evans 1994	SW Asia, ES Africa
Masirah Island	20.50	58.75	*Dromas ardeola*	Crab Plover	Non-breeding	1352	1995	955	1994-01 (5)	IWC database	*ardeola*
			Haematopus ostralegus	Eurasian Oystercatcher	Non-breeding	2094	1995	1285	1994-01 (5)	IWC database	*longipes*
			Pluvialis squatarola	Grey Plover	October	1600	1992			Evans 1994	SW Asia, E Africa
			Charadrius mongolus	Lesser Sandplover	Non-breeding	6443	1990	3355	1994-01 (5)	IWC database	*pamirensis*
			Charadrius leschenaultii	Greater Sandplover	August	5250	1992			Evans 1994	*crassirostris* + *leschenaultii*
			Limosa lapponica	Bar-tailed Godwit	Non-breeding	2808	1994	1897	1994-01 (5)	IWC database	E *taymyrensis*
			Numenius arquata	Eurasian Curlew	Non-breeding	1333	1995	1015	1994-01 (5)	IWC database	*orientalis*
			Arenaria interpres	Ruddy Turnstone	Non-breeding	1353	1997	631	1994-01 (5)	IWC database	SW Asia, ES Africa
			Calidris alba	Sanderling	Non-breeding	1623	1995	870	1994-01 (5)	IWC database	SW Asia, ES Africa
Yitti, near Muscat	23.55	58.67	*Numenius tenuirostris*	Slender-billed Curlew	August	3	1999			Eriksen & Sargeant 2000	

POLAND

Sitename	Lat	Long	Scientific name	English name	Season	maxcount	maxyear	average	Basis for average	Source	Population(s)
Biebrza river valley	53.50	22.83	*Limosa limosa*	Black-tailed Godwit	Breeding	2988	1980			WBDB	E Europe
Tysmienica river valley	51.60	22.82	*Limosa limosa*	Black-tailed Godwit	Breeding	2004	1995			WBDB	E Europe

PORTUGAL

Sitename	Lat	Long	Scientific name	English name	Season	maxcount	maxyear	average	Basis for average	Source	Population(s)
Castro Marim	37.22	-7.43	*Himantopus himantopus*	Black-winged Stilt	Breeding	1200	1996			WBDB	SW Europe, NW Africa
Estuário Do Minho	41.92	-8.83	*Charadrius hiaticula*	Common Ringed Plover	Non-breeding	5280	2002	1091	1998-02 (5)	IWC database	*hiaticula*
			Charadrius alexandrinus	Kentish Plover	Non-breeding	1030	2002	246	1998-02 (5)	IWC database	E Atlantic, W Mediterranean
Estuário Do Sado	38.53	-8.83	*Himantopus himantopus*	Black-winged Stilt	Breeding	2400	1996			WBDB	SW Europe, NW Africa
			Recurvirostra avosetta	Pied Avocet	Non-breeding	5855	1996	2480	1997-02 (5)	IWC database	E Atlantic
			Charadrius hiaticula	Common Ringed Plover	Non-breeding	930	1998	439	1997-02 (5)	IWC database	*hiaticula*
			Limosa limosa	Black-tailed Godwit	Non-breeding	20030	1996	2219	1997-02 (5)	IWC database	W Europe + *islandica*
			Calidris alpina	Dunlin	Non-breeding	17990	2000	8535	1996-02 (5)	IWC database	*alpina* + Iceland + *arctica* + Britain + Baltic
Estuário Do Tejo	38.75	-9.08	*Himantopus himantopus*	Black-winged Stilt	Breeding	2250	1996			WBDB	SW Europe, NW Africa
			Recurvirostra avosetta	Pied Avocet	Non-breeding	13661	1989	4642	1996-01 (5)	IWC database	E Atlantic
			Pluvialis squatarola	Grey Plover	Non-breeding	6836	1989	2415	1996-01 (5)	IWC database	E Atlantic
			Charadrius hiaticula	Common Ringed Plover	Non-breeding	887	1992	272	1996-01 (5)	IWC database	*hiaticula*
			Limosa limosa	Black-tailed Godwit	Non-breeding	48980	1992	14203	1996-01 (5)	IWC database	W Europe + *islandica*
			Limosa lapponica	Bar-tailed Godwit	Non-breeding	1500	1996	925	1996-01 (5)	IWC database	*lapponica*

PORTUGAL

Sitename	Lat	Long	Scientific name	English name	Season	maxcount	maxyear	average	Basis for average	Source	Population(s)
Estuário Do Tejo (continued)			*Calidris alpina*	Dunlin	Non-breeding	25965	1994	11824	1996-01 (5)	IWC database	*alpina* +Iceland + *arctica* + Britain + Baltic
Pera marsh	37.10	-8.33	*Himantopus himantopus*	Black-winged Stilt	All year	900	2001			WBDB	SW Europe, NW Africa
Ria De Aveiro	40.67	-8.67	*Charadrius hiaticula*	Common Ringed Plover	Non-breeding	1772	1992	1195	1992-96 (5)	IWC database	*hiaticula*
Ria De Faro	37.00	-7.92	*Himantopus himantopus*	Black-winged Stilt	Non-breeding	884	1997	539	1997-01 (5)	IWC database	W & SW Europe, W Africa
			Recurvirostra avosetta	Pied Avocet	Non-breeding	827	1997	529	1997-01 (5)	IWC database	E Atlantic
			Pluvialis squatarola	Grey Plover	Non-breeding	3028	1995	513	1997-01 (5)	IWC database	E Atlantic
			Charadrius hiaticula	Common Ringed Plover	Non-breeding	4334	1995	1949	1997-01 (5)	IWC database	*hiaticula*
			Charadrius alexandrinus	Kentish Plover	Non-breeding	3485	1997	1824	1997-01 (5)	IWC database	E Atlantic, W Mediterranean
			Limosa limosa	Black-tailed Godwit	Non-breeding	4474	1995	2067	1997-01 (5)	IWC database	W Europe + *islandica*
			Limosa lapponica	Bar-tailed Godwit	Non-breeding	4218	1995	1961	1994-99 (5)	IWC database	*lapponica*
			Calidris alpina	Dunlin	Non-breeding	22667	1995	12491	1997-01 (5)	IWC database	*alpina* + Greenland + *arctica* + Britain + Baltic

ROMANIA

Sitename	Lat	Long	Scientific name	English name	Season	maxcount	maxyear	average	Basis for average	Source	Population(s)
Danube Delta	45.00	29.00	*Recurvirostra avosetta*	Pied Avocet	Post-breeding migration	3000	1995	2000		Kube *et al.* 1998	Mediterranean & SE Europe
			Limosa limosa	Black-tailed Godwit	March	2500	1996			Schmitz *et al.* 2001	E Europe
			Numenius tenuirostris	Slender-billed Curlew	July	1	1994			SOR Bulletin 1995	
			Tringa erythropus	Spotted Redshank	Spring	1275	1995			Kube *et al.* 1998	Europe
			Philomachus pugnax	Ruff	Spring	20000	1995	13959		Kube *et al.* 1998	W Africa, E & S Africa
Danube Delta and Razim-Sinoe complex	45.30	29.20	*Burhinus oedicnemus*	Stone Curlew	Breeding	540	1996			WBDB	E Europe
			Tringa totanus	Common Redshank	Post-breeding migration	25000	1995	20000		Kube *et al.* 1998	Europe
			Calidris ferruginea	Curlew Sandpiper	Post-breeding migration	15000	1990-99	12500		Kube *et al.* 1998	W Africa, E & S Africa
			Philomachus pugnax	Ruff	Spring	20000	1995	13959		Kube *et al.* 1998	Europe + Asia
Razim-Sinoie Lagoons	44.67	29.00	*Himantopus himantopus*	Black-winged Stilt	May	500	1996			C. Sudfeldt *in litt.*, Schmitz *et al.* 2001	CE Europe, E Mediterranean
			Recurvirostra avosetta	Pied Avocet	March	1500	1995			C. Sudfeldt *in litt.*, Schmitz *et al.* 2001	Mediterranean & SE Europe
			Glareola pratincola	Collared Pratincole	May	270 90 pairs	1996			C. Sudfeldt *in litt.*, Schmitz *et al.* 2001	Black Sea, E Mediterranean
			Charadrius alexandrinus	Kentish Plover	April	615 205 pairs	1996			Schmitz *et al.* 2001b	Black Sea, E Mediterranean
			Limosa limosa	Black-tailed Godwit	March	15000	1994			Schmitz *et al.* 2001b	E Europe
			Calidris alpina	Dunlin	April	17000	1990	8675	1990-96 (2)	C. Sudfeldt *in litt.*, Schmitz *et al.* 2001	*centralis*
			Calidris ferruginea	Curlew Sandpiper	Post-breeding migration	15000	1990-99	12500		Kube *et al.* 1998	W Africa + ES Africa
			Philomachus pugnax	Ruff	April	18000	1992			C. Sudfeldt *in litt.*, Schmitz *et al.* 2001	W Africa, E & S Africa

RUSSIA Sitename	Lat	Long	Scientific name	English name	Season	maxcount	maxyear	average	Basis for average	Source	Population(s)
Agrakhanski Peninsula	43.50	47.83	*Calidris alba*	Sanderling	Autumn	2800				Shubin 1998	SW Asia, ES Africa
Ainov islands	69.83	31.58	*Calidris maritima*	Purple Sandpiper	Migration	800	1996			WBDB	Europe, Siberia
Akhtari Lagoons	46.00	38.25	*Himantopus himantopus*	Black-winged Stilt	Summer	1050	1995			Krivenko 1998, per V. Belik	C & E Europe, E Mediterranean
Bejsug Lagoons	46.17	38.38	*Himantopus himantopus*	Black-winged Stilt	Breeding	750	1995			Mischenko 1999, per V. Belik	CE Europe, E Mediterranean
			Recurvirostra avosetta	Pied Avocet	Breeding	750	1995			Mischenko 1999, per V. Belik	Mediterranean & SE Europe
Bolshove Lake	54.90	62.33	*Numenius tenuirostris*	Slender-billed Curlew	July	1	1996			Bojko and Nowak 1996	
Bolshovskaja flood-plain	47.50	41.67	*Himantopus himantopus*	Black-winged Stilt	Summer	2100	1979			V. Belik unpublished	C & E Europe, E Mediterranean
Burukshunskiye limans	45.98	42.42	*Philomachus pugnax*	Ruff	Migration	50000	1973			WBDB	W Africa, E & S Africa
Chagraiskoje Reservoir	36.51	40.03	*Vanellus gregarius*	Sociable Plover	September	1017	2003			Field *et al.* 2007	NE Africa
Dadynskiye lake	45.25	45.12	*Himantopus himantopus*	Black-winged Stilt	Breeding	600	1996			WBDB	SW Asia
			Glareola nordmanni	Black-winged Pratincole	Breeding	900	1996			WBDB	*nordmanni*
			Calidris ferruginea	Curlew Sandpiper	Spring	5000	1983	3500	1983	Khoklov 1993, per V. Belik	ES Africa
Delta of the River Don	47.17	39.42	*Himantopus himantopus*	Black-winged Stilt	Migration	3000	1997			WBDB	C & E Europe, E Mediterranean
			Glareola nordmanni	Black-winged Pratincole	Migration	500	1997			WBDB	*nordmanni*
Eastern coast of the Sea of Azov	45.77	38.08	*Himantopus himantopus*	Black-winged Stilt	Breeding	2640	1995			WBDB	CE Europe, E Mediterranean
			Recurvirostra avosetta	Pied Avocet	Breeding	2010	1995			WBDB	Mediterranean & SE Europe
Kiziltash lakes	45.12	37.05	*Recurvirostra avosetta*	Pied Avocet	Breeding	900	1995			Krivenko 1998, per V. Belik	Mediterranean & SE Europe
Kolguev Island	69.08	49.12	*Calidris alpina*	Dunlin	Late summer	15000	2000s			C. Zöckler *in litt.*	*alpina*
Kuban river delta	45.70	37.75	*Recurvirostra avosetta*	Pied Avocet	Breeding	1260	1995			Krivenko 1998, per V. Belik	Mediterranean & SE Europe
Manych-Gudilo lake	46.33	42.75	*Phalaropus lobatus*	Red-necked Phalarope	Spring	50000	1969	30000	1969	V. Belik unpublished	*lobatus*
Onega Bay of White Sea	64.50	35.50	*Arenaria interpres*	Ruddy Turnstone	Breeding	1050	1995	1005	1995	WBDB	N Europe
Ptich'je Lake	42.42	44.50	*Himantopus himantopus*	Black-winged Stilt	Breeding	600	1984			Khoklov *et al.* 1986, per V. Belik	SW Asia
Salt-lakes in the Primorsko-	46.00	38.17	*Himantopus himantopus*	Black-winged Stilt	Breeding	1290	1989			WBDB	C & E Europe, E Mediterranean
Akhtarsk area			*Recurvirostra avosetta*	Pied Avocet	Breeding	1650	1989			WBDB	Mediterranean & SE Europe
			Tringa totanus	Common Redshank	Breeding	9000	1989			WBDB	Europe
Seskar Island	60.02	28.40	*Pluvialis squatarola*	Grey Plover	Migration	3000	1997	2500	1997	Skov *et al.* 2000	E Atlantic
Shabelskaja sand spit	46.87	38.50	*Limosa limosa*	Black-tailed Godwit	Autumn	3000	1999	2500	1999	V. Belik unpublished	E Europe
Shalkaro-Zhetykolski lake system	50.92	60.83	*Glareola nordmanni*	Black-winged Pratincole	Breeding	450	1996			WBDB	*nordmanni*
Shilovo flood-plain of Oka river	54.33	40.75	*Pluvialis apricaria*	Eurasian Golden Plover	Migration	10000	1996			WBDB	Norway, W Russia + NC Siberia
Solonoe Lake	45.58	41.70	*Himantopus himantopus*	Black-winged Stilt	Breeding	750	1979			Khoklov 1987, per V. Belik	CE Europe, E Mediterranean

RUSSIA (CONTINUED)

Sitename	Lat	Long	Scientific name	English name	Season	maxcount	maxyear	average	Basis for average	Source	Population(s)
Stavropol Region	45.05	41.98	*Glareola nordmanni*	Black-winged Pratincole	September	20,000	2006			BirdWatch Magazine	*nordmanni*
Suskanski Nature Reserve	53.75	49.25	*Vanellus vanellus*	Northern Lapwing	Migration	180000	1996			WBDB	Europe
Veselovsky Rice Field	47.08	41.17	*Calidris minuta*	Little Stint	Spring	100000	1975			Kazakov *et al.* 1984, per V. Belik	SW Asia, ES Africa W Africa
			Calidris alpina	Dunlin	Spring	60000	1975			Kazakov *et al.* 1984, per V. Belik	*centralis*
			Philomachus pugnax	Ruff	Spring	30000	1975			Kazakov *et al.* 1984, per V. Belik	West Africa + E & C Africa
Zaonezh'ye	62.22	34.00	*Vanellus vanellus*	Northern Lapwing	Migration	70000	1976			WBDB	Europe
			Pluvialis apricaria	Eurasian Golden Plover	Migration	20000	1976			WBDB	Norway, W Russia
			Tringa hypoleucos	Common Sandpiper	Migration	30000	1997			WBDB	SW Asia, ES Africa

SAUDI ARABIA

Sitename	Lat	Long	Scientific name	English name	Season	maxcount	maxyear	average	Basis for average	Source	Population(s)
Harrat al-Harrah	31.00	38.83	*Eudromias morinellus*	Eurasian Dotterel	Non-breeding	3000	1992			Evans 1994	Asia
Jizan Beach	16.88	42.53	*Pluvialis squatarola*	Grey Plover	Non-breeding	2232	1992	653	1991-96 (5)	IWC database	SW Asia, E Africa
			Numenius tenuirostris	Slender-billed Curlew	January	1	1990			IWC database	
			Limosa lapponica	Bar-tailed Godwit	Non-breeding	2740	1992	1009	1991-96 (5)	IWC database	E *taymyrensis*
Makkah Waste-water Stream	21.28	39.68	*Himantopus himantopus*	Black-winged Stilt	Non-breeding	980	1992			Evans 1994	SW Asia
Mecca By-Pass Pool (Makkah)	21.42	39.83	*Himantopus himantopus*	Black-winged Stilt	Non-breeding	980	1993	373	1993-96 (4)	IWC database	SW Asia
Red Sea Shore: (Southern) Jeddah To Jizan	19.00	41.00	*Dromas ardeola*	Crab Plover	Winter	2353	1995	1149	1992-96 (4)	IWC database	*ardeola*
Sabkhat al-Fasl Lagoons	27.00	49.67	*Recurvirostra avosetta*	Pied Avocet	Non-breeding	665	1996	425	1992-96 (4)	IWC database	SW Asia, E Africa
			Charadrius alexandrinus	Kentish Plover	Non-breeding	2000	1994	1225	1992-96 (4)	IWC database	SW Asia, NE Africa
			Charadrius mongolus	Lesser Sandplover	April-May	1800	1992			Evans 1994	*pamirensis*
			Calidris alpina	Dunlin	Non-breeding	7950	1994	4397	1992-96 (4)	IWC database	*centralis*
			Limicola falcinellus	Broad-billed Sandpiper	Apr-May	700	1992			Evans 1994	*falcinellus*
Tarut Bay	26.67	50.17	*Pluvialis squatarola*	Grey Plover	Non-breeding	1708	1993	1102	1993-96 (3)	IWC database	SW Asia, E Africa
			Charadrius alexandrinus	Kentish Plover	Non-breeding	2755	1993	1764	1992-96 (4)	IWC database	SW Asia, NE Africa
			Charadrius mongolus	Lesser Sandplover	Non-breeding	2160	1993	1704	1993-96 (3)	IWC database	*pamirensis*
			Charadrius leschenaultii	Greater Sandplover	Non-breeding	2771	1992	968	1992-96 (4)	IWC database	*crassirostris* + *columbinus*
			Limosa lapponica	Bar-tailed Godwit	Non-breeding	2273	1992	1695	1992-96 (4)	IWC database	E *taymyrensis*
			Numenius arquata	Eurasian Curlew	Non-breeding	1831	1992	1373	1992-96 (4)	IWC database	*orientalis*
			Arenaria interpres	Ruddy Turnstone	Non-breeding	1104	1993	671	1993-96 (3)	IWC database	SW Asia, ES Africa
			Calidris tenuirostris	Great Knot	Migration	108	1992			Evans 1994	*tenuirostris*
			Calidris alpina	Dunlin	Non-breeding	8500	1994	6160	1993-96 (3)	IWC database	*centralis*
			Limicola falcinellus	Broad-billed Sandpiper	Non-breeding	645	1993	285	1993-96 (3)	IWC database	*falcinellus*

SENEGAL Sitename	Lat	Long	Scientific name	English name	Season	maxcount	maxyear	average	Basis for average	Source	Population(s)
Casamance Delta	12.43	-16.48	*Himantopus himantopus*	Black-winged Stilt	December	7000	1985-87	6500	1985-87	R Mahéo *in litt.* to P. Yésou	Sub-Saharan Africa N of Southern Africa + W & SW Europe, W Africa
			Pluvialis squatarola	Grey Plover	December	4000	1985-87	3500	1985-87	R Mahéo *in litt.* to P. Yésou	E Atlantic
			Calidris alba	Sanderling	December	2500	1985-87	2000	1985-87	R Mahéo *in litt.* to P. Yésou	E Atlantic
Joal Fadiout	14.17	-16.83	*Recurvirostra avosetta*	Pied Avocet	Non-breeding	1200	1998	875	1997-98 (2)	AfWC database	E Atlantic
Lac de Guiers in Louga	15.80	-15.73	*Glareola pratincola*	Collared Pratincole	Non-breeding	204	1999			AfWC database	W Mediterranean
			Limosa limosa	Black-tailed Godwit	Non-breeding	3000	1984	694	1976-98 (5)	AfWC database	WC Europe
Lac Wouye (Malika)	14.80	-17.37	*Recurvirostra avosetta*	Pied Avocet	Non-breeding	3200	1975	857	1972-97 (5)	AfWC database	E Atlantic
Lagunes de St.Louis	15.67	-17.00	*Recurvirostra avosetta*	Pied Avocet	Non-breeding	3634	2000	1749	1997-01 (5)	AfWC database	E Atlantic
			Calidris minuta	Little Stint	Non-breeding	9818	2001	2926	1997-01 (5)	AfWC database	Europe, W Africa
			Philomachus pugnax	Ruff	Non-breeding	14500	1977			AfWC database	W Africa
Langue de Barbarie P.N.	15.99	-16.52	*Burhinus senegalensis*	Senegal Thick-knee	Non-breeding	1071	1999	384	1997-01 (3)	AfWC database	*senegalensis*
Ndiael	16.23	-16.08	*Charadrius alexandrinus*	Kentish Plover	Non-breeding	1410	1994	99	1995-99 (5)	AfWC database	E Atlantic, W Mediterranean
			Limosa limosa	Black-tailed Godwit	Non-breeding	10935	1993	2337	1993-00 (5)	AfWC database	WC Europe
			Philomachus pugnax	Ruff	Non-breeding	75000	1993	16244	1996-00 (5)	AfWC database	W Africa
Ntiagar	16.50	-16.83	*Philomachus pugnax*	Ruff	Non-breeding	26000	1994	12000	1976-95 (3)	AfWC database	W Africa
Parc National des Oiseaux de Djoudj	16.42	-16.25	*Himantopus himantopus*	Black-winged Stilt	Non-breeding	10001	1992			AfWC database	Sub-Saharan Africa + SW Europe, NW Africa
			Recurvirostra avosetta	Pied Avocet	Non-breeding	1755	1998	772	1997-01 (5)	AfWC database	E Atlantic
			Glareola pratincola	Collared Pratincole	Non-breeding	1650	1994	206	1996-01 (5)	AfWC database	*boweni* + W Mediterranean
			Limosa limosa	Black-tailed Godwit	Non-breeding	5520	1998	48	1997-01 (5)	AfWC database	WC Europe
			Tringa stagnatilis	Marsh Sandpiper	Non-breeding	438	1995	102	1995-00 (5)	AfWC database	Europe
			Calidris minuta	Little Stint	Non-breeding	3655	1995	131	1997-01 (5)	AfWC database	Europe, W Africa
			Philomachus pugnax	Ruff	Non-breeding	200000	1996			WBDB	W Africa
Parc National du Delta du Saloum	13.83	-16.75	*Recurvirostra avosetta*	Pied Avocet	Non-breeding	3788	1999	1914	1987-99 (4)	AfWC database	E Atlantic
			Pluvialis squatarola	Grey Plover	Non-breeding	5539	1999	3185	1973-99 (4)	AfWC database	E Atlantic
			Charadrius alexandrinus	Kentish Plover	Non-breeding	3490	1999	1987	1997-99 (3)	AfWC database	E Atlantic, W Mediterranean
			Tringa totanus	Common Redshank	Non-breeding	3432	1999	2206	1997-99 (3)	AfWC database	E & C Europe + N Europe
			Arenaria interpres	Ruddy Turnstone	Non-breeding	2654	1999	2215	1997-99 (3)	AfWC database	NE Canada, Greenland + W Africa
			Calidris alba	Sanderling	Non-breeding	1900	1997	1361	1997-99 (3)	AfWC database	E Atlantic
			Calidris minuta	Little Stint	Non-breeding	14180	1997	13041	1997-99 (3)	AfWC database	Europe, W Africa
			Calidris ferruginea	Curlew Sandpiper	Non-breeding	17786	1999	15488	1997-99 (3)	AfWC database	W Africa
River Sénégal (Ntiagar to) Richard-Toll	16.48	-15.77	*Philomachus pugnax*	Ruff	Non-breeding	26000	1994			WBDB	W Africa
Senegal Delta	16.33	-16.25	*Recurvirostra avosetta*	Pied Avocet	January	6608	2000			Triplet & Yésou 1998, P. Yésou *in litt.*	E Atlantic
			Charadrius alexandrinus	Kentish Plover	Winter	1,500	1993-1997			Triplet & Yesou 1998	E Atlantic, W Mediterranean
			Limosa limosa	Black-tailed Godwit	Non-breeding	2500	1976			AfWC database	WC Europe

SENEGAL (CONTINUED)

Sitename	Lat	Long	Scientific name	English name	Season	maxcount	maxyear	average	Basis for average	Source	Population(s)
Zic de Djeuss et environs	16.25	-16.30	*Glareola pratincola*	Collared Pratincole	Non-breeding	210	1998			AfWC database	W Mediterranean
			Limosa limosa	Black-tailed Godwit	Non-breeding	14000	1974	32	1993-00 (5)	AfWC database	WC Europe
			Philomachus pugnax	Ruff	Non-breeding	14900	1975			AfWC database	W Africa

SERBIA

Sitename	Lat	Long	Scientific name	English name	Season	maxcount	maxyear	average	Basis for average	Source	Population(s)
Uzdin fish-pond	45.22	20.63	*Limosa limosa*	Black-tailed Godwit	Migration	3000	1997			WBDB	E Europe

SEYCHELLES

Sitename	Lat	Long	Scientific name	English name	Season	maxcount	maxyear	average	Basis for average	Source	Population(s)
Aldabra	-9.43	46.37	*Dromas ardeola*	Crab Plover	Non-breeding	3000-3800	2007			Pistorius & Taylor 2007	*ardeola*
Cosmoledo Atoll	-9.70	47.57	*Dromas ardeola*	Crab Plover	Non-breeding	2000				WBDB	*ardeola*
St Francois Atoll, Alphonse Group	-7.00	53.00	*Dromas ardeola*	Crab Plover	January	1500	2001			T Dodman *in litt.*	*ardeola*

SIERRA LEONE

Sitename	Lat	Long	Scientific name	English name	Season	maxcount	maxyear	average	Basis for average	Source	Population(s)
Yawri Bay	8.20	-12.92	*Recurvirostra avosetta*	Pied Avocet	January-February	1023	2005			van der Winden *et al.* 2007	Western Europe
			Calidris canutus	Red Knot	Non-breeding	5000	1994			AfWC database	*canutus*
			Pluvialis squatarola	Grey Plover	January-February	2684	2005			Van der Winden *et al.* 2007	E Atlantic

SOMALIA

Sitename	Lat	Long	Scientific name	English name	Season	maxcount	maxyear	average	Basis for average	Source	Population(s)
Far Waamo	0.40	42.27	*Philomachus pugnax*	Ruff	Non-breeding	20000	1984			WBDB	E & S Africa
Near Jowhar	2.53	45.78	*Glareola ocularis*	Madagascar Pratincole	Non-breeding	3000	-			Ash & Miskell 1998	*ocularis*
Near War Maxan	2.40	45.02	*Glareola ocularis*	Madagascar Pratincole	Non-breeding	3000	-			Ash & Miskell 1998	*ocularis*
South Somali Coast	-1.25	41.82	*Charadrius asiaticus*	Caspian Plover	March	1650	-			Ash & Miskell 1998	*asiaticus*

SOUTH AFRICA

Sitename	Lat	Long	Scientific name	English name	Season	maxcount	maxyear	average	Basis for average	Source	Population(s)
Alexandria coastal belt	-33.70	26.90	*Vanellus melanopterus*	Greater Black-winged Lapwing	Breeding	30-200	1990s			Barnes 1998d	*minor,* Southern Africa
Amersfoort-Bethal-Carolina District	-26.53	29.83	*Glareola nordmanni*	Black-winged Pratincole	Non-breeding	100-1000	-			WBDB	*nordmanni*
			Vanellus melanopterus	Greater Black-winged Lapwing	Breeding.	100-300	1990s			Barnes & Tarboten 1998a	*minor,* Southern Africa
Berg 3: Hotel Mudflats & Estuary	-32.78	18.18	*Himantopus himantopus*	Black-winged Stilt	July-August	472	1998	358	1996-00 (5)	AfWC database	Southern Africa

SOUTH AFRICA (CONTINUED) Sitename	Lat	Long	Scientific name	English name	Season	maxcount	maxyear	average	Basis for average	Source	Population(s)
			Recurvirostra avosetta	Pied Avocet	September	533	2005	119	1996-00 (5)	A.J. Tree *in litt.* AfWC database	S Africa
			Charadrius pallidus	Chestnut-banded Plover	July-August	204	1999	130	1996-00 (5)	AfWC database	*pallidus*
			Calidris ferruginea	Curlew Sandpiper	Non-breeding	4927	1998	3135	97-01 (5)	AfWC database	ES Africa
Berg River: Total	-32.83	18.23	*Calidris ferruginea*	Curlew Sandpiper	Non-breeding	5414	1994			AfWC database	ES Africa
Bloemhof Dam	-27.68	25.67	*Himantopus himantopus*	Black-winged Stilt	July-August	355	1993	47	1995-00 (5)	AfWC database	Southern Africa
			Recurvirostra avosetta	Pied Avocet	February	836	2004	196	1992-98 (4)	A.J. Tree *in litt.* AfWC database	S Africa
Botriviervlei	-34.35	19.10	*Charadrius marginatus*	White-fronted Plover	Non-breeding	210	1994	60	1994-00 (5)	AfWC database	*arenaceus* SW Africa
Chatty Salt pans	-34.00	25.50	*Recurvirostra avosetta*	Pied Avocet	January	490	1996			A.J. Tree *in litt.*	S Africa
Chrissie Pan	-26.32	30.25	*Glareola nordmanni*	Black-winged Pratincole	Non-breeding	5,000	-			WBDB	*nordmanni*
Dassen Island	-33.42	18.08	*Haematopus moquini*	African Black Oystercatcher	All year	436				WBDB	*moquinii*
Deelpan	-29.17	25.75	*Recurvirostra avosetta*	Pied Avocet	January	231	2001			AfWC database	S Africa
De Hoop Vlei	-34.43	20.38	*Recurvirostra avosetta*	Pied Avocet	November	207	2004			A.J. Tree *in litt.*	S Africa
Dwea & Cwebe Nature reserves	-32.27	28.88	*Vanellus melanopterus*	Greater Black-winged Lapwing	Breeding	10-100	1990s			Johnson et al. 1998	*minor,* Southern Africa
Dyer Island	-34.68	19.42	*Haematopus moquini*	African Black Oystercatcher	All year	201				WBDB	*moquinii*
East London	-33.02	27.93	*Vanellus melanopterus*	Greater Black-winged Lapwing	Breeding	200-300	1990s			Tree *in litt.* 2008	*minor,* Southern Africa
Grassland Biosphere Reserve	-27.25	30.02	*Glareola nordmanni*	Black-winged Pratincole	Non-breeding	5,000	-	3000		WBDB	*nordmanni*
			Vanellus senegallus	African Wattled Lapwing	Breeding	1500		300-500 prs		WBDB	*lateralis*
			Vanellus melanopterus	Greater Black-winged Lapwing	Breeding	500-1000	1990s			Barnes & Tarboten 1998a	*minor,* Southern Africa
Itala Game Reserve	-27.50	31.42	*Vanellus melanopterus*	Greater Black-winged Lapwing	Breeding	80-100	1990s			Johnson *et al.* 1998 1998a	*minor,* Southern Africa
Kamfers Dam	-28.67	24.77	*Himantopus himantopus*	Black-winged Stilt	Pre-breeding migration	774	2000	474	2000-01 (2)	AfWC database	Southern Africa
			Recurvirostra avosetta	Pied Avocet	Pre-breeding migration	307	2000	202	2000-01 (2)	AfWC database	S Africa
Kanhym Pan 1	-25.83	29.52	*Recurvirostra avosetta*	Pied Avocet	Non-breeding	368	2001			AfWC database	S Africa
Knysna Lagoon	-34.05	23.03	*Haematopus moquini*	African Black Oystercatcher	Non-breeding	74	1999	55	1997-01 (5)	AfWC database	*moquinii*
Koppies Dam	-27.25	27.68	*Tringa stagnatilis*	Marsh Sandpiper	Non-breeding	850	1992	438	1992-01 (2)	AfWC database	SW Asia, ES Africa
			Recurvirostra avosetta	Pied Avocet	July-August	300	1993	101	1996-00 (5)	AfWC database	S Africa
			Calidris ferruginea	Curlew Sandpiper	Non-breeding	4117	1992	944	1995-01 (5)	AfWC database	ES Africa
Kwazulu Natal Mistbelt Grasslands	-29.00	30.50	*Vanellus melanopterus*	Greater Black-winged Lapwing	Breeding	100-300	1990s			Johnson *et al.* 1998	*minor,* Southern Africa

SOUTH AFRICA (CONTINUED) Sitename	Lat	Long	Scientific name	English name	Season	maxcount	maxyear	average	Basis for average	Source	Population(s)
Langebaan Beach	-33.13	18.07	*Haematopus moquini*	African Black Oystercatcher	Non-breeding	55	2000	39	1999-00 (2)	AfWC database	*moquinii*
			Pluvialis squatarola	Grey Plover	Pre-breeding migration	1860	1998			AfWC database	SW Asia, E Africa
Leeu Gamka Dam	-32.60	22.02	*Recurvirostra avosetta*	Pied Avocet	February	214	1999	66	1998-01 (4)	AfWC database	S Africa
Midmar Nature Reserve	-29.52	30.15	*Vanellus melanopterus*	Greater Black-winged Lapwing	Breeding	80-100	1990s			Johnson et al. 1998	*minor,* Southern Africa
Nqweba Dam	-32.22	24.53	*Recurvirostra avosetta*	Pied Avocet	Non-breeding	500	2001			AfWC database	S Africa
Nyl River Floodplain	-24.65	28.70	*Glareola nordmanni*	Black-winged Pratincole	Non-breeding	500	-	340		WBDB	*nordmanni*
Orange River Estuary	-28.63	16.45	*Recurvirostra avosetta*	Pied Avocet	August	890	2001	237	1999-01 (3)	A.J. Tree *in litt.* AfWC database	S Africa
Paarl Bird Sanctuary	-33.68	18.97	*Himantopus himantopus*	Black-winged Stilt	July-August	376	1999			AfWC database	Southern Africa
Port Alfred	-33.60	26.90	*Vanellus melanopterus*	Greater Black-winged Lapwing	Breeding	100	1990s			Tree *in litt.* 2008	*minor,* Southern Africa
Platfontein Pans	-28.65	24.62	*Himantopus himantopus*	Black-winged Stilt	Pre-breeding migration	874	2000	162	1997-00 (2)	AfWC database	Southern Africa
			Recurvirostra avosetta	Pied Avocet	Non-breeding	530	1997			AfWC database	S Africa
Redhouse Saltpans	-33.83	25.58	*Recurvirostra avosetta*	Pied Avocet	January	248	2004			A.J. Tree *in litt.*	S Africa
Rietvlei Wetland Reserve	-33.83	18.47	*Recurvirostra avosetta*	Pied Avocet	January	669	1993	60	1994-01 (4)	A.J. Tree *in litt.* AfWC database	S Africa
Robben Island Dolphin Beach	-33.82	18.37	*Haematopus moquini*	African Black Oystercatcher	All year	181				WBDB	*moquinii*
Rondevlei Nature Reserve	-34.07	18.50	*Himantopus himantopus*	Black-winged Stilt	Non-breeding	407	1997			AfWC database	Southern Africa
			Recurvirostra avosetta	Pied Avocet	Non-breeding	1401	1998	803	1997-01 (5)	AfWC database	S Africa
Skoppan	-28.77	26.10	*Charadrius pallidus*	Chestnut-banded Plover	Non-breeding	256	2001			AfWC database	*pallidus*
Songimvelo Game Reserve	-25.92	31.00	*Vanellus melanopterus*	Greater Black-winged Lapwing	Breeding	50-150	1990s			Barnes & Tarboten 1998a	*minor,* Southern Africa
St Lucia Wetland Park	-28.07	32.45	*Himantopus himantopus*	Black-winged Stilt	July-August	383	1992	68	1996-00 (5)	AfWC database	Southern Africa
			Recurvirostra avosetta	Pied Avocet	May	3400	2007	101	1996-00 (5)	A.J. Tree *in litt.*	S Africa
			Charadrius marginatus	White-fronted Plover	Non-breeding	127	-			Taylor *et al.* 1999	*arenaceus* SE Africa
Stan Madden Bird Sanctuary	-26.40	28.47	*Recurvirostra avosetta*	Pied Avocet	Non-breeding	200	1994			AfWC database	S Africa
Steenkampsberg	25.42	29.92	*Vanellus melanopterus*	Greater Black-winged Lapwing	Breeding	200-500	1990s			Barnes & Tarboten 1998a	*minor,* Southern Africa
Strandfontein Sewage Works	-34.00	25.50	*Recurvirostra avosetta*	Pied Avocet	February	1700	2001			A.J. Tree *in litt.*	S Africa
Sunnyside Pan	-28.65	26.13	*Himantopus himantopus*	Black-winged Stilt	Non-breeding	320	1999			AfWC database	Southern Africa
Verloren Vlei	-32.32	18.38	*Recurvirostra avosetta*	Pied Avocet	February	1250	2006			A.J. Tree *in litt.*	S Africa
Voelvlei	-34.27	21.82	*Himantopus himantopus*	Black-winged Stilt	Non-breeding	250	1997			AfWC database	Southern Africa
			Recurvirostra avosetta	Pied Avocet	January	600	1993	118	1993-97 (4)	A.J. Tree *in litt.* AfWC database	S Africa
			Charadrius marginatus	White-fronted Plover	July-August	140	1993	85	1993-97 (2)	AfWC database	*arenaceus* SE Africa

SOUTH AFRICA (CONTINUED)

Sitename	Lat	Long	Scientific name	English name	Season	maxcount	maxyear	average	Basis for average	Source	Population(s)
West Coast National Park	-33.15	18.08	*Haematopus moquini*	African Black Oystercatcher	Breeding	510				WBDB	*moquinii*
			Recurvirostra avosetta	Pied Avocet	July	521	2003			A.J. Tree *in litt.*	S Africa
			Pluvialis squatarola	Grey Plover	Non-breeding	3915	1999			AfWC database	SW Asia, E Africa
			Charadrius marginatus	White-fronted Plover	July-August	197	1999	149	1997-00 (3)	AfWC database	*marginatus*
			Charadrius marginatus	White-fronted Plover	All year	4000	-			WBDB	*marginatus*
			Arenaria interpres	Ruddy Turnstone	Non-breeding	1902	1999			AfWC database	SW Asia, ES Africa + W Africa
			Calidris canutus	Red Knot	Non-breeding	6219		2504		WBDB	*canutus*
			Calidris alba	Sanderling	Pre-breeding migration	1680	2001			AfWC database	SW Asia, ES Africa + E Atlantic
			Calidris ferruginea	Curlew Sandpiper	Non-breeding	13872	1999			AfWC database	ES Africa
Zandvlei - Upper Estuary	-34.10	18.47	*Recurvirostra avosetta*	Pied Avocet	Non-breeding	440	2000	95	1994-01 (5)	AfWC database	S Africa
Zwartkops Estuary	-33.85	25.58	*Haematopus moquini*	African Black Oystercatcher	July-August	57	1998	43	1995-99 (5)	AfWC database	*moquinii*
			Himantopus himantopus	Black-winged Stilt	Non-breeding	369	2001	185	1995-01 (5)	AfWC database	Southern Africa
			Recurvirostra avosetta	Pied Avocet	July-August	247	1996	131	1995-99 (5)	AfWC database	S Africa
			Pluvialis squatarola	Grey Plover	Non-breeding	914	1994			AfWC database	SW Asia, E Africa
			Charadrius marginatus	White-fronted Plover	July-August	164	1994	104	1995-99 (5)	AfWC database	*arenaceus* SE Africa
			Calidris ferruginea	Curlew Sandpiper	Non-breeding	5165	1994	2105	1995-01 (5)	AfWC database	ES Africa

SPAIN

Sitename	Lat	Long	Scientific name	English name	Season	maxcount	maxyear	average	Basis for	Source average	Population(s)
Albufera de Mallorca and Albufereta de Pollença marshes	39.78	3.10	*Charadrius alexandrinus*	Kentish Plover	All year	750	1992			WBDB	E Atlantic, W Mediterranean
Albufera de Valencia marshes	39.33	-0.25	*Himantopus himantopus*	Black-winged Stilt	Breeding	1026	1996			WBDB	W & SW Europe, W Africa
			Glareola pratincola	Collared Pratincole	Migration	200	1996			WBDB	W Mediterranean
Arroyo Conejo Reservoir	38.40	-5.80	*Glareola pratincola*	Collared Pratincole	Breeding			225	1997-07 (11)	GIC 2007	W Mediterranean
Arrozal De Hato Blanco	40.30	-3.75	*Limosa limosa*	Black-tailed Godwit	Non-breeding	3100	1990	1064	1990-00 (3)	IWC database	W Europe + *islandica*
Arrozales De Puebla Y Villafranco	40.30	-3.75	*Limosa limosa*	Black-tailed Godwit	Non-breeding	29900	1992	9418	1990-93 (4)	IWC database	W Europe + *islandica*
Brazo De La Torre Y Cantaritas	40.30	-3.75	*Limosa limosa*	Black-tailed Godwit	Winter	5000	1991			IWC database	W Europe + *islandica*
Brazo De Los Pobres	40.30	-3.75	*Limosa limosa*	Black-tailed Godwit	Non-breeding	4600	1990	2325	1990-94 (2)	IWC database	W Europe + *islandica*
Brozas-Membrío	39.67	-6.83	*Burhinus oedicnemus*	Stone Curlew	All year	1500	1996			WBDB	W Europe
Cabo de Gata	36.83	-2.08	*Recurvirostra avosetta*	Pied Avocet	All year	579	1996			WBDB	Mediterranean & SE Europe
Cádiz Bay	36.53	-6.27	*Himantopus himantopus*	Black-winged Stilt	Breeding	2184	1991			F. Hortas *in litt.*	SW Europe, NW Africa
			Recurvirostra avosetta	Pied Avocet	Winter	2738	1996	1921	1996-01 (5)	IWC database	E Atlantic
			Pluvialis squatarola	Grey Plover	Non-breeding	2624	1996	1227	1996-01 (5)	IWC database	E Atlantic
			Charadrius hiaticula	Common Ringed Plover	Non-breeding	2593	1996	1365	1996-01 (5)	IWC database	*hiaticula* + *psammodroma*
			Charadrius alexandrinus	Kentish Plover	Non-breeding	2260	1996	1373	1994-01 (5)	IWC database	E Atlantic, W Mediterranean

SPAIN (CONTINUED) Sitename	Lat	Long	Scientific name	English name	Season	maxcount	maxyear	average	Basis for average	Source	Population(s)
Albufera de Mallorca and Pollenca Marshes	39.78	3.10	*Charadrius alexandrinus*	Kentish Plover	All year	750	1992			WBDB	
			Limosa limosa	Black-tailed Godwit	Non-breeding	4250	1996	1985	1996-01 (5)	IWC database	W Europe + *islandica*
			Calidris alpina	Dunlin	Winter	15983	2002			GCHC 2002	*alpina* + *arctica* + Iceland + Britain
Canal De Guadaira	40.30	-3.75	*Recurvirostra avosetta*	Pied Avocet	Non-breeding	2650	1991			IWC database	E Atlantic
Caño Del Guadiamar Pnd	36.97	-6.36	*Recurvirostra avosetta*	Pied Avocet	Winter	1100	2000			IWC database	E Atlantic
			Limosa limosa	Black-tailed Godwit	Winter	11000	2000	5502	1998-00 (2)	IWC database	W Europe + *islandica*
Colonia De La Isleta De Puebla	40.30	-3.75	*Recurvirostra avosetta*	Pied Avocet	Non-breeding	2600	1992	735	1994-01 (5)	IWC database	E Atlantic
Cortados del Jarama	40.17	-3.52	*Himantopus himantopus*	Black-winged Stilt	Migration	1500	1996			WBDB	W & SW Europe, W Africa
Costa de la Muerte (North coast)	43.23	-8.93	*Calidris alba*	Sanderling	Migration	1200	1995			WBDB	E Atlantic
Coto Del Rey	37.03	-6.37	*Charadrius hiaticula*	Common Ringed Plover	Non-breeding	1479	1996	741	1995-96 (2)	IWC database	*hiaticula* + *psammodroma*
			Charadrius alexandrinus	Kentish Plover	Non-breeding	773	1996	387	1995-96 (2)	IWC database	E Atlantic, W Mediterranean
De La Algaida A Hato Villa	36.80	-2.60	*Recurvirostra avosetta*	Pied Avocet	Winter	840	1998	324	1990-03 (5)	IWC database	Mediterranean & SE Europe
Dehesa De Abajo	40.30	-3.75	*Himantopus himantopus*	Black-winged Stilt	Non-breeding	1200	1998	422	1998-03 (5)	IWC database	SW Europe, NW Africa
			Recurvirostra avosetta	Pied Avocet	Non-breeding	1200	2000	416	1995-01 (5)	IWC database	E Atlantic
Del Palacio A La Algaida	36.80	-2.60	*Himantopus himantopus*	Black-winged Stilt	Non-breeding	9100	2001	2007	1998-03 (5)	IWC database	W & SW Europe, W Africa
			Charadrius hiaticula	Common Ringed Plover	Non-breeding	982	2000			IWC database	*hiaticula* + *psammodroma*
			Limosa limosa	Black-tailed Godwit	Winter	14646	2001	5487	1998-03 (5)	IWC database	W Europe + *islandica*
			Calidris minuta	Little Stint	Non-breeding	6000	2000	3125	2000-01 (2)	IWC database	Europe, W Africa
Del Puntal Al Palacio	36.97	-6.44	*Himantopus himantopus*	Black-winged Stilt	Non-breeding	2300	2001	639	1999-03 (4)	IWC database	W & SW Europe, W Africa
De Doñana			*Limosa limosa*	Black-tailed Godwit	Winter	2000	2001	1080	1998-01 (3)	IWC database	W Europe + *islandica*
Delta Del Ebro	40.70	0.80	*Himantopus himantopus*	Black-winged Stilt	Pre-breeding migration	5000	1992			IWC database	W & SW Europe, W Africa
			Recurvirostra avosetta	Pied Avocet	Non-breeding	1405	1997	883	1997-03 (5)	IWC database	Mediterranean & SE Europe
			Glareola pratincola	Collared Pratincole	Breeding	297	1996			WBDB	W Mediterranean
			Charadrius alexandrinus	Kentish Plover	All year	5100	1996			WBDB	E Atlantic, W Mediterranean
			Limosa limosa	Black-tailed Godwit	Migration	10000	1996			WBDB	W Europe + *islandica*
			Calidris minuta	Little Stint	Non-breeding	7157	1999	3618	1997-03 (5)	IWC database	Europe, W Africa
			Calidris alpina	Dunlin	Winter	30534	2003	19887	1997-03 (5)	IWC database	*alpina*
El Hito	39.87	-2.68	*Himantopus himantopus*	Black-winged Stilt	Breeding	858	1997			WBDB	W & SW Europe, W Africa
El Moro marshes	39.58	-0.25	*Himantopus himantopus*	Black-winged Stilt	Breeding	900	1996			WBDB	SW Europe, NW Africa
Extremadura Rice fields	39.00	-5.93	*limosa limosa*	Black-tailed Godwit	Migration	27500	2005	24314	2005-07 (3)	Masero *et al.* 2007	W Europe + *islandica*
Entremuros De Los Pobres	40.30	-3.75	*Limosa limosa*	Black-tailed Godwit	Winter	7000	1991	2640	1991-93 (3)	IWC database	W Europe + *islandica*
Ferrolterra-Valdoviño coast	43.60	-8.20	*Calidris alba*	Sanderling	Migration	1200	1995			WBDB	E Atlantic
Isla Cristina and Ayamonte marshes and Prado lagoon	37.22	-7.42	*Glareola pratincola*	Collared Pratincole	Breeding	300	1996			WBDB	W Mediterranean
			Charadrius hiaticula	Common Ringed Plover	Non-breeding	5000	1996			WBDB	*hiaticula* + *psammodroma*
			Charadrius alexandrinus	Kentish Plover	Breeding	1500	1996			WBDB	E Atlantic, W Mediterranean
			Calidris minuta	Little Stint	Non-breeding	5000	1996			WBDB	Europe, W Africa

SPAIN (CONTINUED) Sitename	Lat	Long	Scientific name	English name	Season	maxcount	maxyear	average	Basis for average	Source	Population(s)
La Corta De Los Olivillos Rio Guadalquivir	37.18	-6.09	*Recurvirostra avosetta*	Pied Avocet	Winter	1200	2003			IWC database	E Atlantic
La Janda	36.25	-5.85	*Glareola pratincola*	Collared Pratincole	Breeding	300	1996			WBDB	W Mediterranean
La Serena	38.83	-5.50	*Burhinus oedicnemus*	Stone Curlew	All year	1500	1996			WBDB	W Europe
Laguna de Zarracatín	37.02	-5.80	*Himantopus himantopus*	Black-winged Stilt	Non-breeding	1021	1997	347	1990-98 (3)	IWC database	W & SW Europe, W Africa
Lerida steppes	41.67	1.13	*Burhinus oedicnemus*	Stone Curlew	Breeding	2100	1995			WBDB	W Europe
Llanos de Cáceres	39.38	-6.37	*Glareola pratincola*	Collared Pratincole	Breeding			113	1997-07 (11)	GIC 2007	W Mediterranean
Los Caracoles	40.30	-3.75	*Limosa limosa*	Black-tailed Godwit	Winter	9400	1990			IWC database	W Europe + *islandica*
Lucio De Marilópez Grande	37.02	-6.34	*Limosa limosa*	Black-tailed Godwit	Winter	18000	1992	6950	1991-95 (4)	IWC database	W Europe + *islandica*
			Limosa limosa	Black-tailed Godwit	Winter	2200	1991	1500	1991-95 (4)	IWC database	W Europe + *islandica*
Lucio Del Lobo Grande	40.30	-3.75	*Limosa limosa*	Black-tailed Godwit	Winter	3000	1990	1950	1990-93 (2)	IWC database	W Europe + *islandica*
Lucio Del Membrillo	36.87	-6.38	*Recurvirostra avosetta*	Pied Avocet	Winter	2236	2000	805	1998-00 (3)	IWC database	E Atlantic
Lucios de Veta La Palma-Isla Mayor	36.93	-6.24	*Himantopus himantopus*	Black-winged Stilt	Winter	2062	2000	999	1996-03 (5)	IWC database	SW Europe, NW Africa
			Recurvirostra avosetta	Pied Avocet	Winter	11883	2003	7178	1998-03 (5)	IWC database	E Atlantic
			Charadrius hiaticula	Common Ringed Plover	Non-breeding	1143	1996	330	1995-01 (5)	IWC database	*hiaticula* + *psammodroma*
			Charadrius alexandrinus	Kentish Plover	Non-breeding	3111	2000	1411	1995-01 (5)	IWC database	E Atlantic, W Mediterranean
			Limosa limosa	Black-tailed Godwit	Winter	21575	2001	13276	1996-03 (5)	IWC database	W Europe + *islandica*
			Tringa erythropus	Spotted Redshank	Non-breeding	1205	1993	314	1994-00 (5)	IWC database	Europe
			Calidris minuta	Little Stint	Winter	9217	2000	2616	1996-03 (5)	IWC database	Europe, W Africa
			Calidris alpina	Dunlin	Winter	42240	2001	13246	1996-03 (5)	IWC database	*alpina* + Iceland + *arctica* + Britain
Lucios Del Caballero Y Del Puntal	36.96	-6.43	*Himantopus himantopus*	Black-winged Stilt	Non-breeding	1260	2001	631	1999-01 (2)	IWC database	W & SW Europe, W Africa
			Limosa limosa	Black-tailed Godwit	Winter	2000	1998	833	1992-01 (3)	IWC database	W Europe + *islandica*
Marisma De Hinojos	36.98	-6.38	*Recurvirostra avosetta*	Pied Avocet	Winter	1350	1990			IWC database	E Atlantic
			Limosa limosa	Black-tailed Godwit	Winter	30000	2003	8466	1994-03 (5)	IWC database	W Europe + *islandica*
Marisma De Isla Cristina	37.19	-7.33	*Charadrius hiaticula*	Common Ringed Plover	Non-breeding	798	2003	442	1994-03 (2)	IWC database	*hiaticula* + *psammodroma*
Marismas Del Odiel	37.26	-6.96	*Recurvirostra avosetta*	Pied Avocet	Non-breeding	1374	1992	481	1991-03 (5)	IWC database	E Atlantic
Marismas Del Rocío	37.10	-6.47	*Limosa limosa*	Black-tailed Godwit	Winter	8700	1998	2380	1998-03 (5)	IWC database	W Europe + *islandica*
Mata and Torrevieja lagoons	38.05	-0.67	*Charadrius alexandrinus*	Kentish Plover	All year	666	1995			WBDB	E Atlantic, W Mediterranean
Matasgordas	40.30	-3.75	*Limosa limosa*	Black-tailed Godwit	Winter	4400	1990	2250	1990-91 (2)	IWC database	W Europe + *islandica*
Odiel and Tinto marshes and Huelva coastal lagoons	37.25	-6.83	*Recurvirostra avosetta*	Pied Avocet	Migration	1550	1996			WBDB	E Atlantic
Parque Nacional de Doñana	36.99	-6.37	*Himantopus himantopus*	Black-winged Stilt	Non-breeding	13256	2001	3489	1997-01 (5)	IWC database	SW Europe, NW Africa
			Recurvirostra avosetta	Pied Avocet	Non-breeding	3688	2000	1167	1997-01 (5)	IWC database	E Atlantic
			Glareola pratincola	Collared Pratincole	Breeding	12000 4000 pairs	1990			Calvo *et al.* 1993	W Mediterranean
			Charadrius hiaticula	Common Ringed Plover	Non-breeding	993	2000	360	1993-00 (5)	IWC database	*hiaticula* + *psammodroma*
			Charadrius alexandrinus	Kentish Plover	Non-breeding	980	1995	297	1995-01 (5)	IWC database	E Atlantic, W Mediterranean
			Limosa limosa	Black-tailed Godwit	Non-breeding	20170	1992	12757	1997-01 (5)	IWC database	W Europe + *islandica*
			Tringa erythropus	Spotted Redshank	Non-breeding	1195	1993			IWC database	Europe
			Calidris minuta	Little Stint	Non-breeding	10065	1994	2277	1995-01 (5)	IWC database	Europe, W Africa

SPAIN (CONTINUED) Sitename	Lat	Long	Scientific name	English name	Season	maxcount	maxyear	average	Basis for average	Source	Population(s)
Parque Natural De El Hondo	38.33	-0.70	*Himantopus himantopus*	Black-winged Stilt	Breeding	993	1995			WBDB	W & SW Europe, W Africa
			Recurvirostra avosetta	Pied Avocet	Winter	727	2003	391	1995-03 (5)	IWC database	Mediterranean & SE Europe
Prat de Cabanes-Torreblanca	40.23	0.20	*Glareola pratincola*	Collared Pratincole	Breeding	270	1996			WBDB	W Mediterranean
River Mijares mouth	39.95	-0.02	*Himantopus himantopus*	Black-winged Stilt	All year	1185	1993			WBDB	SW Europe, NW Africa
Salina San Federico	40.30	-3.75	*Recurvirostra avosetta*	Pied Avocet	Non-breeding	786	1993	394	1993-94 (2)	IWC database	E Atlantic
Salinas Cabo De Gata	36.75	-2.22	*Recurvirostra avosetta*	Pied Avocet	Winter	522	1999	295	1998-03 (5)	IWC database	Mediterranean & SE Europe
Salinas De Bonanza (Hidalgo)	36.82	-6.34	*Himantopus himantopus*	Black-winged Stilt	Non-breeding	900	1998	400	1994-01 (5)	IWC database	W & SW Europe, W Africa
			Recurvirostra avosetta	Pied Avocet	Winter	1450	1991	275	1994-01 (5)	IWC database	E Atlantic
			Limosa limosa	Black-tailed Godwit	Winter	2420	1993	569	1992-01 (5)	IWC database	W Europe + *islandica*
Salinas De Bonanza (Portugueses)	36.88	-6.33	*Recurvirostra avosetta*	Pied Avocet	Winter	1243	2000	284	1995-01 (5)	IWC database	E Atlantic
Salinas De San Pedro Del Pinatar	37.81	-0.77	*Recurvirostra avosetta*	Pied Avocet	Non-breeding	1403	1991	21	1994-03 (5)	IWC database	Mediterranean & SE Europe
Salinas De Santa Pola	38.22	-0.58	*Recurvirostra avosetta*	Pied Avocet	Non-breeding	1412	1994	412	1997-03 (5)	IWC database	Mediterranean & SE Europe
			Charadrius alexandrinus	Kentish Plover	All year	984	1995			WBDB	E Atlantic, W Mediterranean
Salt-pans of Ibiza & Formentera and Freus isles	38.82	1.47	*Charadrius alexandrinus*	Kentish Plover	All year	819	1996			WBDB	E Atlantic, W Mediterranean
Santoña Marshes	43.50	-3.50	*Limosa limosa*	Black-tailed Godwit	Winter	657	2005	492	2002-06 (5)	Navedo et al. 2007	*islandica*
Tierra de Campos steppes	42.15	-5.20	*Eudromias morinellus*	Eurasian Dotterel	Non-breeding	1000	1992			WBDB	Europe
Vegas Altas-La Serena	38.93	-5.22	*Glareola pratincola*	Collared Pratincole	Breeding			563	1997-07 (11)	GIC 2007	W Mediterranean
VegasAltas - Orellana	38.98	-5.43	*Glareola pratincola*	Collared Pratincole	Breeding			300	1997-07 (11)	GIC 2007	W Mediterranean
Vegas Altas-Cubilar	39.22	-5.45	*Glareola pratincola*	Collared Pratincole	Breeding			120	1997-07 (11)	GIC 2007	W Mediterranean
Vegas Altas Rice Filelds	39.03	-5.93	*Glareola pratincola*	Collared Pratincole	Breeding			188	1997-07 (11)	GIC 2007	W Mediterranean
Vegas Bajas-Alarge	38.75	-5.25	*Glareola pratincola*	Collared Pratincole	Breeding			450	1997-07 (11)	GIC 2007	W Mediterranean
Vegas Bajas-Canchales	38.95	-5.52	*Glareola pratincola*	Collared Pratincole	Breeding			120	1997-07 (11)	GIC 2007	W Mediterranean
Villafáfila	41.83	-5.58	*Himantopus himantopus*	Black-winged Stilt	Breeding	1371	1996			WBDB	SW Europe, NW Africa
Wetlands of western Almería	36.67	-2.67	*Charadrius alexandrinus*	Kentish Plover	Non-breeding	800	1995			WBDB	E Atlantic, W Mediterranean

SPAIN (Canary Is) Sitename	Lat	Long	Scientific name	English name	Season	maxcount	maxyear	average	Basis for average	Source	Population(s)
Cuchillete de Buenavista-gully of La Torre-Los Alares	28.40	-13.83	*Burhinus oedicnemus*	Stone Curlew	All year	30	1990s			WBDB	*insularum*
			Cursorius cursor	Cream-coloured Courser	All year	45	1994			WBDB	*bannermani*
El Médano coast	28.03	-16.55	*Burhinus oedicnemus*	Stone Curlew	All year	18	1993			WBDB	*distinctus*
Isthmus of Jandía sandy plain	28.15	-14.27	*Burhinus oedicnemus*	Stone Curlew	All year	30	1995			WBDB	*insularum*
			Cursorius cursor	Cream-coloured Courser	All year	120	1994			WBDB	*bannermani*
Lajares sandy plain-Cotillo-Ezquinzo	28.63	-13.97	*Cursorius cursor*	Cream-coloured Courser	All year	60	1994			WBDB	*bannermani*
Sandy plain of Corralejo	28.68	-13.80	*Cursorius cursor*	Cream-coloured Courser	All year	45	1995			WBDB	*bannermani*

ST HELENA

Sitename	Lat	Long	Scientific name	English name	Season	maxcount	maxyear	average	Basis for average	Source	Population(s)
North-east St Helena	-15.95	-5.67	*Charadrius sanctaehelenae*	St Helena Plover	Breeding	335	2000s			WBDB (out of date)	
South-west St Helena	-15.98	-5.75	*Charadrius sanctaehelenae*	St Helena Plover	Breeding	100	2000s			WBDB (out of date)	

SUDAN

Sitename	Lat	Long	Scientific name	English name	Season	maxcount	maxyear	average	Basis for average	Source	Population(s)
Lake Abiad	10.25	29.92	*Philomachus pugnax*	Ruff	Non-breeding	20000	1983			AfWC database	E & S Africa
White Nile Bird Sanct. <20Km	13.50	32.50	*Charadrius alexandrinus*	Kentish Plover	Non-breeding	1100	1983			AfWC database	SW Asia, NE Africa
			Limosa limosa	Black-tailed Godwit	Non-breeding	3000	1983			AfWC database	E Europe
			Calidris ferruginea	Curlew Sandpiper	Non-breeding	6000	1983			AfWC database	ES Africa
Umshujaira	15.58	32.48	*Charadrius alexandrinus*	Kentish Plover	February	3500	2006			Dodman & Diagana 2007	SW Asia, NE Africa
White Nile Bird Sanct. 20-50Km	15.75	32.50	*Limosa limosa*	Black-tailed Godwit	Non-breeding	4000	1983			AfWC database	E Europe
			Calidris ferruginea	Curlew Sandpiper	Non-breeding	10000	1983			AfWC database	ES Africa

SWAZILAND

Sitename	Lat	Long	Scientific name	English name	Season	maxcount	maxyear	average	Basis for average	Source	Population(s)
Malolotja	26.10	31.08	*Vanellus melanopterus*	Greater Black-winged Lapwing	Breeding	>50				Boycott & Parker 2003	*minor,* Southern Africa

SWEDEN

Sitename	Lat	Long	Scientific name	English name	Season	maxcount	maxyear	average	Basis for average	Source	Population(s)
Bay of Lommabukten	55.73	12.98	*Pluvialis apricaria*	Eurasian Golden Plover	Migration	5000-10000	1996			Skov *et al.* 2000	Norway, W Russia + *apricaria*
Bay of Lundåkrabukten	55.87	12.83	*Pluvialis apricaria*	Eurasian Golden Plover	Migration	8000-10000	1996			Skov *et al.* 2000	Norway, W Russia + *apricaria*
Coastal areas around Öland island	56.67	16.75	*Recurvirostra avosetta*	Pied Avocet	Breeding	900	1988			WBDB	E Atlantic
Falsterbo-Bay of Foteviken	55.42	12.92	*Recurvirostra avosetta*	Pied Avocet	Breeding	900	1996			WBDB	E Atlantic
Foteviken-Lommabukten	55.50	12.92	*Pluvialis apricaria*	Eurasian Golden Plover	Post-breeding migration	20000	1990-99	13500	1990-99	L Nilsson *in litt.*	Norway, W Russia + *apricaria*
Gotland Coast	57.40	18.95	*Charadrius hiaticula*	Common Ringed Plover	Breeding	1000	1995			Skov *et al.* 2000	*hiaticula*
Lake Ånnsjön-Storlien	63.27	12.55	*Gallinago media*	Great Snipe	Breeding	450	1996			WBDB	Scandinavia
Outer Stockholm archipelago	59.42	19.33	*Arenaria interpres*	Ruddy Turnstone	Breeding	2520	1996			WBDB	N Europe
River Umeälven delta	63.75	20.32	*Tringa erythropus*	Spotted Redshank	Migration	1500	2001			WBDB	Europe
			Tringa glareola	Wood Sandpiper	Migration	12000	2001			WBDB	Europe

SYRIA

Sitename	Lat	Long	Scientific name	English name	Season	maxcount	maxyear	average	Basis for average	Source	Population(s)
Al Fedha	35.02	39.04	*Vanellus gregarius*	Sociable Lapwing	February	113	2007			Hofland & Keijl 2008	NE Africa
Ar Ruweira	36.03	39.03	*Vanellus gregarius*	Sociable Lapwing	March	2000	2007			Hofland & Keijl 2008	NE Africa
	36.03	39.03	*Vanellus gregarius*	Sociable Lapwing	October	95	2008			D. Murdoch *et al. in litt.*	NE Africa
Al Aumair	36.26	39.39	*Vanellus gregarius*	Sociable Lapwing	February	192	2007			Hofland & Keijl 2008	NE Africa

TANZANIA

Sitename	Lat	Long	Scientific name	English name	Season	maxcount	maxyear	average	Basis for average	Source	Population(s)
Dar es Salaam coast	-6.83	39.32	*Dromas ardeola*	Crab Plover	Non-breeding	700	1995			WBDB	*ardeola*
			Glareola ocularis	Madagascar Pratincole	Non-breeding	2000	1982			WBDB	*ocularis*
Indian Ocean Coastline	-8.00	39.50	*Charadrius leschenaultii*	Greater Sandplover	Non-breeding	400	2000			IWC database	*leschenaultii*
Kibo Salt Pans	-4.73	39.17	*Charadrius leschenaultii*	Greater Sandplover	Non-breeding	2200	1995			IWC database	*leschenaultii*
Kilombero River System (140 Km)	-8.27	36.67	*Vanellus albiceps*	White-headed Lapwing	Non-breeding	476	1995			AfWC database	Tanzania
Koeni River Mouth + Beach	-5.35	39.05	*Dromas ardeola*	Crab Plover	Non-breeding	750	1995			AfWC database	*ardeola*
Lake Eyasi	-3.83	34.78	*Recurvirostra avosetta*	Pied Avocet	Non-breeding	2002	1995			WBDB	E Africa
			Charadrius asiaticus	Caspian Plover	January	545	2005			T. Dodman *in litt.*	*asiaticus*
Lake Kitangire	-4.10	34.30	*Recurvirostra avosetta*	Pied Avocet	Non-breeding	4000	1995			WBDB	E Africa
			Charadrius asiaticus	Caspian Plover	January	600	2005			T. Dodman *in litt.*	*asiaticus*
Lake Manyara National Park	-3.67	35.83	*Himantopus himantopus*	Black-winged Stilt	Non-breeding	8367	>1989			WBDB	Sub-Saharan Africa N of Southern Africa
			Recurvirostra avosetta	Pied Avocet	Non-breeding	4940	1995			WBDB	E Africa
			Charadrius pallidus	Chestnut-banded Plover	Non-breeding	619	1995			WBDB	*venustus*
			Charadrius asiaticus	Caspian Plover	Non-breeding	3302	1995			AfWC database	*asiaticus*
			Tringa stagnatilis	Marsh Sandpiper	Non-breeding	2441	1995			WBDB	SW Asia, ES Africa
			Calidris minuta	Little Stint	Non-breeding	78675	1995			WBDB	SW Asia, ES Africa
			Philomachus pugnax	Ruff	Non-breeding	45486	1995			WBDB	E & S Africa
Lake Masek	-3.17	35.58	*Himantopus himantopus*	Black-winged Stilt	Non-breeding	2613	1995			AfWC database	Sub-Saharan Africa N of Southern Africa
Lake Natron	-2.42	36.00	*Charadrius pallidus*	Chestnut-banded Plover	January	4357	2005			Simmons *et al.* (2007)	*venustus*
Mafia Island	-7.83	39.78	*Dromas ardeola*	Crab Plover	Non-breeding	1887	1988			WBDB	*ardeola*
Mnazi Bay	-10.42	40.37	*Dromas ardeola*	Crab Plover	Non-breeding	750	1995			WBDB	*ardeola*
			Charadrius leschenaultii	Greater Sandplover	Non-breeding	1823	1995			WBDB	*leschenaultii*
Msimbazi Bay	-6.83	39.30	*Calidris ferruginea*	Curlew Sandpiper	Non-breeding	6000	1995			AfWC database	ES Africa
Mwarongo Salt Pans	-5.22	39.08	*Charadrius leschenaultii*	Greater Sandplover	Non-breeding	1800	1995			IWC database	*leschenaultii*
Ngorongoro Conservation Area	-3.25	35.50	*Charadrius asiaticus*	Caspian Plover	Non-breeding	500	1998			WBDB	*asiaticus*
Pemba Island	-5.17	39.67	*Dromas ardeola*	Crab Plover	January	4250	1998			Geene 2001	*ardeola*
			Pluvialis squatarola	Grey Plover	January	2150	1998			Geene 2001	SW Asia, E Africa
			Charadrius leschenaultii	Greater Sandplover	January	930	1998			Geene 2001	*leschenaultii*
			Calidris ferruginea	Curlew Sandpiper	January	4000	1998			Geene 2001	ES Africa
Ruaha National Park	-8.00	34.67	*Vanellus albiceps*	White-headed Lapwing	Non-breeding	500	1997			WBDB	Tanzania

TANZANIA (CONTINUED)

Sitename	Lat	Long	Scientific name	English name	Season	maxcount	maxyear	average	Basis for average	Source	Population(s)
Rufiji Delta	-8.00	39.45	*Dromas ardeola*	Crab Plover	Non-breeding	3402	2000			WBDB	*ardeola*
			Vanellus albiceps	White-headed Lapwing	Non-breeding	318	1995			AfWC database	Tanzania
			Calidris ferruginea	Curlew Sandpiper	Non-breeding	16043	2000			AfWC database	ES Africa
Selous Game Reserve	-9.50	38.25	*Vanellus albiceps*	White-headed Lapwing	Non-breeding	515	1995			WBDB	Tanzania
Serengeti National Park	-2.42	34.83	*Vanellus melanopterus*	Greater Black-winged Lapwing	Non-breeding	1000	1998			WBDB	Kenya, Tanzania
			Charadrius asiaticus	Caspian Plover	Non-breeding	2000	1989			WBDB	*asiaticus*
Singida Lake	-3.90	34.90	*Charadrius asiaticus*	Caspian Plover	Non-breeding	2100	1995			AfWC database	*asiaticus*
			Limosa limosa	Black-tailed Godwit	Non-breeding	7000	1993			WBDB	W Asia
Tanga North--Kibo saltpans	-4.82	39.17	*Charadrius leschenaultii*	Greater Sandplover	Non-breeding	2200	1995			WBDB	*leschenaultii*
Tanga South	-5.25	39.77	*Dromas ardeola*	Crab Plover	Non-breeding	750	1995			WBDB	*ardeola*
			Charadrius leschenaultii	Greater Sandplover	Non-breeding	1823	1995			WBDB	*leschenaultii*
Ugalla river: Total	-5.75	31.75	*Vanellus albiceps*	White-headed Lapwing	Non-breeding	72	1995			AfWC database	Tanzania
Yaida Swamp	-3.92	35.06	*Charadrius asiaticus*	Caspian Plover	January	600	2005			T. Dodman *in litt.*	*asiaticus*
Zanzibar Island	-6.13	39.23	*Dromas ardeola*	Crab Plover	January	4258	1998			Geene 2001	*ardeola*
			Pluvialis squatarola	Grey Plover	January	2388	1998			Geene 2001	SW Asia, E Africa
			Charadrius leschenaultii	Greater Sandplover	January	3090	1998			Geene 2001	*leschenaultii*
			Calidris ferruginea	Curlew Sandpiper	January	8636	1998			Geene 2001	ES Africa

TOGO

Sitename	Lat	Long	Scientific name	English name	Season	maxcount	maxyear	average	Basis for average	Source	Population(s)
Namgbéto Amont	7.70	1.72	*Glareola pratincola*	Collared Pratincole	Pre-breeding migration	842	1997			AfWC database	*boweni*

TUNISIA

Sitename	Lat	Long	Scientific name	English name	Season	maxcount	maxyear	average	Basis for average	Source	Population(s)
Bahiret El Bibene	35.25	11.25	*Recurvirostra avosetta*	Pied Avocet	Winter	900	1993			IWC database	Mediterranean & SE Europe
Golfe de Boughrara	33.62	10.80	*Charadrius alexandrinus*	Kentish Plover	December	2,000	1998			P.L. Meininger	E Atlantic, W Mediterranean
Gulf of Gabès	34.40	10.32	*Recurvirostra avosetta*	Pied Avocet	February	2625	1984			Van Dijk *et al.* 1986	Mediterranean & SE Europe
			Pluvialis squatarola	Grey Plover	February	16790	1984			Van Dijk *et al.* 1986	E Atlantic + SW Asia, E Africa
			Charadrius alexandrinus	Kentish Plover	September	5173	1999			Bos *et al.* 2001	E Atlantic, W Mediterranean
			Numenius arquata	Eurasian Curlew	February	9323	1984			Van Dijk *et al.* 1986	*arquata* + *orientalis*
			Tringa totanus	Common Redshank	February	21393	1984			Van Dijk *et al.* 1986	CE Europe
			Calidris minuta	Little Stint	February	22235	1984			Van Dijk *et al.* 1986	Europe, W Africa
			Calidris alpina	Dunlin	February	111678	1984			Van Dijk *et al.* 1986	*alpina* + *centralis*
Lac Ichkeul	37.17	9.67	*Recurvirostra avosetta*	Pied Avocet	Winter	662	1992	341	1992-97 (2)	IWC database	Mediterranean & SE Europe
Kairouan, Metbassta	35.80	10.15	*Numenius tenuirostris*	Slender-billed Curlew	November	1	1992			Ledant & Lafontaine 1994	
Lagune de Korba	36.47	10.93	*Glareola pratincola*	Collared Pratincole	Breeding	600	1990s			WBDB	W Mediterranean
Saline De Thyna	34.65	10.68	*Recurvirostra avosetta*	Pied Avocet	Winter	627	1993	511	1990-93 (3)	IWC database	Mediterranean & SE Europe
			Calidris minuta	Little Stint	Non-breeding	4250	1994	2200	1992-94 (2)	IWC database	Europe, W Africa

TUNISIA (CONTINUED)

Sitename	Lat	Long	Scientific name	English name	Season	maxcount	maxyear	average	Basis for average	Source	Population(s)
Sebkha Kelbia	35.87	10.30	*Charadrius alexandrinus*	Kentish Plover	Non-breeding	5000	1995			IWC database	E Atlantic, W Mediterranean
Sebkha Sidi Mansour	34.23	9.50	*Recurvirostra avosetta*	Pied Avocet	Winter	600	1992			IWC database	Mediterranean & SE Europe

TURKEY

Sitename	Lat	Long	Scientific name	English name	Season	maxcount	maxyear	average	Basis for average	Source	Population(s)
Acigöl lake	37.82	29.80	*Charadrius alexandrinus*	Kentish Plover	Non-breeding	1010	1991			WBDB	Black Sea, E Mediterranean
Aksehir and Eber lakes	38.60	31.30	*Himantopus himantopus*	Black-winged Stilt	Breeding	933	1995			WBDB	CE Europe, E Mediterranean
Akyatan Golu	36.62	35.27	*Recurvirostra avosetta*	Pied Avocet	Non-breeding	601	1993	197	1990-99 (5)	IWC database	Mediterranean & SE Europe
			Charadrius alexandrinus	Kentish Plover	Migration	3918	1990			WBDB	Black Sea, E Mediterranean
Beylemi Golu ;Calti [Drained]	37.77	29.68	*Recurvirostra avosetta*	Pied Avocet	Non-breeding	647	1999			IWC database	Mediterranean & SE Europe
Bulaniýk/ Malazgirt	42.00	42.50	*Vanellus gregarius*	Sociable Lapwing	October	155	2002			in Bozdogan *et al.*	NE Africa
Bulanik plain	39.17	42.23	*Glareola nordmanni*	Black-winged Pratincole	Migration	1000	1989			WBDB	*nordmanni*
Büyük Menderes delta	37.57	27.20	*Recurvirostra avosetta*	Pied Avocet	Non-breeding	1000	1989			WBDB	Mediterranean & SE Europe
Camalti Salt Pans; Gediz Delta	38.60	26.95	*Charadrius alexandrinus*	Kentish Plover	Non-breeding	809	1999	309	1992-99 (5)	IWC database	Black Sea, E Mediterranean
Ceylanpýnar	36.51	40.03	*Vanellus gregarius*	Sociable Lapwing	October	3200	2007			Hofland& Keijl 2008	NE Africa
Çol lake and Çalikdüzü	39.30	32.90	*Himantopus himantopus*	Black-winged Stilt	Breeding	3000	1986			WBDB	C & E Europe, E Mediterranean
Dalyan Delta	36.82	28.53	*Numenius tenuirostris*	Slender-billed Curlew	August	1	1990			Gretton 1994	
Eregli marshes	37.53	33.75	*Himantopus himantopus*	Black-winged Stilt	Breeding	1800	1986			WBDB	CE Europe, E Mediterranean
Hotamis marshes	37.58	33.05	*Himantopus himantopus*	Black-winged Stilt	Breeding	2850	1985			WBDB	C & E Europe, E Mediterranean
Kizilirmak Delta	40.67	35.97	*Himantopus himantopus*	Black-winged Stilt	Breeding	825 250-300 pairs	1992			Hustings & van Dijk 1994	CE Europe, E Mediterranean
			Glareola pratincola	Collared Pratincole	Breeding	270 65-115 pairs	1992			Hustings & van Dijk 1994	Black Sea, E Mediterranean
Kulu lake	39.08	33.15	*Himantopus himantopus*	Black-winged Stilt	Breeding	12000	1986			WBDB	CE Europe, E Mediterranean
			Recurvirostra avosetta	Pied Avocet	Non-breeding	1000	1987			WBDB	Mediterranean & SE Europe
Marmara Golu	38.58	28.10	*Recurvirostra avosetta*	Pied Avocet	Non-breeding	1402	1992			IWC database	Mediterranean & SE Europe
Meric delta	40.77	26.23	*Himantopus himantopus*	Black-winged Stilt	Breeding	1050	1994			WBDB	C & E Europe, E Mediterranean
			Glareola pratincola	Collared Pratincole	Breeding	600	1994			WBDB	Black Sea, E Mediterranean
Samsam lake	39.10	32.75	*Recurvirostra avosetta*	Pied Avocet	Migration	616	1995			WBDB	Mediterranean & SE Europe
Saros bay	40.62	26.85	*Glareola pratincola*	Collared Pratincole	Breeding	300	1989			WBDB	Black Sea, E Mediterranean
Sodalìgöl	38.82	42.98	*Himantopus himantopus*	Black-winged Stilt	Breeding	1320	1996			WBDB	CE Europe, E Mediterranean
Sultansazligi	38.33	35.27	*Himantopus himantopus*	Black-winged Stilt	Breeding	1170	1994			WBDB	C & E Europe, E Mediterranean
			Recurvirostra avosetta	Pied Avocet	Non-breeding	2115	1994			WBDB	Mediterranean & SE Europe
Tuz lake	38.75	33.38	*Glareola pratincola*	Collared Pratincole	Breeding	600	1998			WBDB	Black Sea, E Mediterranean
			Charadrius alexandrinus	Kentish Plover	Breeding	1200	1998			WBDB	Black Sea, E Mediterranean
			Charadrius leschenaultii	Greater Sandplover	Breeding	120	1998			WBDB	*columbinus*

TURKEY (CONTINUED)

Sitename	Lat	Long	Scientific name	English name	Season	maxcount	maxyear	average	Basis for average	Source	Population(s)
Tuzla Lake	36.70	35.05	*Charadrius alexandrinus*	Kentish Plover	Breeding	3000 1000 prs	1998	1000	1996-99	T. Székely *in litt.*	Black Sea, E Mediterranean
Yumurtalik Lagoons(Yapi+Omerg)	36.68	35.65	*Recurvirostra avosetta*	Pied Avocet	Non-breeding	1217	1999	390	1990-99 (5)	IWC database	Mediterranean & SE Europe
			Charadrius alexandrinus	Kentish Plover	Non-breeding	805	1992	292	1990-99 (5)	IWC database	Black Sea, E Mediterranean
			Calidris alpina	Dunlin	Winter	7239	1992	2203	1990-99 (4)	IWC database	*centralis*

TURKMENISTAN

Sitename	Lat	Long	Scientific name	English name	Season	maxcount	maxyear	average	Basis for average	Source	Population(s)
Balkhan Gulf	39.90	53.68	*Calidris alpina*	Dunlin	Winter	8409	2003	3483	1999-04 (4)	IWC database	*centralis*
Krasnovodsk Bay	40.00	53.00	*Calidris alpina*	Dunlin	Non-breeding	10000	1975			Shubin 1998	*centralis*

UGANDA

Sitename	Lat	Long	Scientific name	English name	Season	maxcount	maxyear	average	Basis for average	Source	Population(s)
Doho Rice Scheme	0.95	34.00	*Limosa limosa*	Black-tailed Godwit	Non-breeding	2792	1994	633	1992-01 (5)	AfWC database	W Asia
Kyambura Game Reserve: Total	0.05	30.25	*Himantopus himantopus*	Black-winged Stilt	Non-breeding	8090	1998			AfWC database	Sub-Saharan Africa N of Southern Africa
Lake Kikorongo	-0.17	30.00	*Charadrius asiaticus*	Caspian Plover	March passage	1700	1990			Carswell *et al.* 2005	*asiaticus*
Murchison Falls National Park	2.25	31.67	*Charadrius asiaticus*	Caspian Plover	March passage	1000	1970			Carswell *et al.* 2005	*asiaticus*

UKRAINE

Sitename	Lat	Long	Scientific name	English name	Season	maxcount	maxyear	average	Basis for average	Source	Population(s)
Ajgul and Karleut lakes	45.92	34.07	*Himantopus himantopus*	Black-winged Stilt	Breeding	1050	1999			WBDB	CE Europe, E Mediterranean
Danube Delta, Black Sea Nature Reserve	46.20	31.73	*Numenius tenuirostris*	Slender-billed Curlew	August	2	1995			Ardamatskaya 1996, Lugovov 1994, Tomkovich 1997, Zhmud 1997	
Dolgy Island, Yagorlitsky Gulf, Nikolaev Region	46.67	31.80	*Numenius tenuirostris*	Slender-billed Curlew	April	1	1990			Lugovov 1994	
Kryva peninsula	47.08	38.12	*Glareola pratincola*	Collared Pratincole	Breeding	246	1999			WBDB	Black Sea, E Mediterranean
Lake near Magazinka village	45.92	34.07	*Himantopus himantopus*	Black-winged Stilt	Breeding	1050	1997			WBDB	CE Europe, E Mediterranean
Lebyashi Island, Crimea	44.75	34.50	*Numenius tenuirostris*	Slender-billed Curlew	October	4	1993			Lugovov 1994	
Molochna river valley	47.08	35.50	*Himantopus himantopus*	Black-winged Stilt	Breeding	600	1997			WBDB	CE Europe, E Mediterranean
			Glareola pratincola	Collared Pratincole	Breeding	240	1997			WBDB	Black Sea, E Mediterranean
Molochnyj Liman	46.32	35.32	*Recurvirostra avosetta*	Pied Avocet	Breeding	750	1992			WBDB	Mediterranean & SE Europe
			Glareola pratincola	Collared Pratincole	Migration	600	1999			WBDB	Black Sea, E Mediterranean
			Numenius tenuirostris	Slender-billed Curlew	July	2	1993			Gretton 1994	

UKRAINE (CONTINUED)

Sitename	Lat	Long	Scientific name	English name	Season	maxcount	maxyear	average	Basis for average	Source	Population(s)
Poplavyny, Halich District, Ivano-Frankovsk District	48.67	24.67	*Numenius tenuirostris*	Slender-billed Curlew	October	2	1993			Lugovov, 1994	
Pryp'yat' river valley	51.87	25.38	*Limosa limosa*	Black-tailed Godwit	Breeding	7500	1996			WBDB	E Europe
			Tringa totanus	Common Redshank	Breeding	15000	1996			WBDB	E & C Europe
Shagany-Alibej-Burnas lake-system	45.78	30.00	*Recurvirostra avosetta*	Pied Avocet	Migration	1300	1992			WBDB	Mediterranean & SE Europe
			Charadrius alexandrinus	Kentish Plover	Breeding	600	1999			WBDB	Black Sea, E Mediterranean
The Sivash, Azov Sea	46.17	34.58	*Himantopus himantopus*	Black-winged Stilt	August	5200	1998			Chernichko *et al.* 2001	CE Europe, E Mediterranean
			Recurvirostra avosetta	Pied Avocet	August	25000	1998			Chernichko *et al.* 2001	Mediterranean & SE Europe
			Glareola pratincola	Collared Pratincole	August	2700	1998			Chernichko *et al.* 2001	Black Sea, E Mediterranean
			Pluvialis squatarola	Grey Plover	Spring	5000	1992			van der Winden *et al.* 1993	SW Asia, E Africa
			Charadrius alexandrinus	Kentish Plover	August	5500	1998			Chernichko *et al.* 2001	Black Sea, E Mediterranean
			Limosa limosa	Black-tailed Godwit	August	9000	1998			Chernichko *et al.* 2001	E Europe
			Tringa erythropus	Spotted Redshank	Spring	2500	1992			van der Winden *et al.* 1993	SW Asia, E Africa + Europe
			Tringa totanus	Common Redshank	August	13000	1998			Chernichko *et al.* 2001	E & C Europe
			Tringa stagnatilis	Marsh Sandpiper	August	5000	1998			Chernichko *et al.* 2001	SW Asia, ES Africa + Europe
			Arenaria interpres	Ruddy Turnstone	Spring	1500	1992			van der Winden *et al.* 1993	SW Asia, ES Africa
			Calidris alba	Sanderling	Spring	2000	1992			van der Winden *et al.* 1993	SW Asia, ES Africa
			Calidris minuta	Little Stint	Spring	25000	1992			van der Winden *et al.* 1993	SW Asia, ES Africa + Europe, W Africa
			Calidris ferruginea	Curlew Sandpiper	August	75000	1998			Chernichko *et al.* 2001	W Africa + ES Africa
			Calidris alpina	Dunlin	Spring	200000	1992			van der Winden *et al.* 1993	*centralis*
			Limicola falcinellus	Broad-billed Sandpiper	Spring	8000	1992			Van der Winden *et al.* 1993	*falcinellus*
			Philomachus pugnax	Ruff	August	290000	1998			Chernichko *et al.* 2001	W Africa, E & S Africa
Yagorlyts'ka and Tendrivs'ka Bays	46.33	31.83	*Recurvirostra avosetta*	Pied Avocet	Breeding	750	1992			WBDB	Mediterranean & SE Europe

UNITED ARAB EMIRATES

Sitename	Lat	Long	Scientific name	English name	Season	maxcount	maxyear	average	Basis for average	Source	Population(s)
Abu al Abyadh island	24.18	53.75	*Dromas ardeola*	Crab Plover	Breeding	840	1992			Evans 1994	*ardeola*
Al Ghar Lake	24.25	54.67	*Charadrius alexandrinus*	Kentish Plover	Non-breeding	1380	1995	625	1992-98 (4)	IWC database	SW Asia, NE Africa
Dhayah / Rams	25.25	55.45	*Charadrius alexandrinus*	Kentish Plover	Non-breeding	1075	1998	315	1994-99 (4)	IWC database	SW Asia, NE Africa
Khor al Beidah	25.55	55.62	*Limosa lapponica*	Bar-tailed Godwit	Non-breeding	1300	1992	468	1995-99 (5)	IWC database	E *taymyrensis*
			Numenius arquata	Eurasian Curlew	October-November	1300	1992			Evans 1994	*orientalis*
			Calidris tenuirostris	Great Knot	Non-breeding	90	1988-92	32	1993-99 (4)	Evans 1994, IWC database	*tenuirostris*
Khor Dubai	25.21	55.33	*Pluvialis squatarola*	Grey Plover	Non-breeding	1000	1992	394	1995-99 (5)	Evans 1994	SW Asia, E Africa
			Charadrius mongolus	Lesser Sandplover	Non-breeding	3000	1992	1195	1995-99 (5)	IWC database	*pamirensis*
			Limosa lapponica	Bar-tailed Godwit	Non-breeding	1500	1994	395	1995-99 (5)	IWC database	E *taymyrensis*
			Calidris alpina	Dunlin	Non-breeding	5330	1995	2736	1995-99 (5)	IWC database	*centralis*
			Limicola falcinellus	Broad-billed Sandpiper	Migration	4050	1992			Evans 1994	*falcinellus*
Merawah Island	24.33	53.25	*Pluvialis squatarola*	Grey Plover	Non-breeding	932	1995	587	1994-98 (4)	IWC database	SW Asia, E Africa
			Charadrius mongolus	Lesser Sandplover	Non-breeding	1939	1996	998	1994-98 (4)	IWC database	*pamirensis*
			Limosa lapponica	Bar-tailed Godwit	Non-breeding	1704	1994	1195	1994-98 (4)	IWC database	E *taymyrensis*
			Calidris tenuirostris	Great Knot	Migration	600	1990s			Scott 1995	*tenuirostris*
Mussafah Mudflats	24.45	54.40	*Calidris alpina*	Dunlin	Non-breeding	5870	1997	2810	1996-98 (3)	IWC database	*centralis*
Sadiyat. Ghurab; Jubayl (inshore islands)	24.50	54.50	*Charadrius mongolus*	Lesser Sandplover	Non-breeding	1530	1995	569	1995-98 (3)	IWC database	*pamirensis*

UNITED KINGDOM

Sitename	Lat	Long	Scientific name	English name	Season	maxcount	maxyear	average	Basis for average	Source	Population(s)
Abberton Reservoir	51.82	0.86	*Limosa limosa*	Black-tailed Godwit	Autumn	1247	1996-03	627	1996-03 (5)	BTO, UK, 2005	*islandica*
Alde complex	52.15	1.53	*Recurvirostra avosetta*	Pied Avocet	Winter	1330	2000	1135	1999-03 (5)	BTO, UK, 2005	E Atlantic
			Limosa limosa	Black-tailed Godwit	Autumn	600	1999-03	281	1999-03 (5)	BTO, UK, 2005	*islandica*
Alt Estuary	53.52	-3.05	*Pluvialis squatarola*	Grey Plover	Spring	4890	1997-02	3214	1997-02 (5)	BTO, UK, 2005	E Atlantic
			Limosa lapponica	Bar-tailed Godwit	Winter	12098	1999-03	7970	1999-03 (5)	BTO, UK, 2005	*lapponica*
			Calidris canutus	Red Knot	Non-breeding	44012	1999-03	29636	1999-03 (5)	BTO, UK, 2005	*islandica*
			Calidris alba	Sanderling	Autumn	6894	1999-03	3221	1999-03 (5)	BTO, UK, 2005	E Atlantic
Arun Valley	50.90	-0.53	*Vanellus vanellus*	Northern Lapwing	Non-breeding	29863	1995	1890	1997-02 (5)	IWC database	Europe
Beaulieu Estuary	50.77	-1.38	*Limosa limosa*	Black-tailed Godwit	Winter	725	1999-03	343	1999-03 (5)	BTO, UK, 2005	*islandica*
Belfast Lough	54.67	-5.81	*Limosa limosa*	Black-tailed Godwit	Autumn	875	1999-03	565	1999-03 (5)	BTO, UK, 2005	*islandica*
Benfleet and Southend Marshes	51.52	0.67	*Calidris canutus*	Red Knot	Non-breeding	8550	1995			WBDB	*islandica*
Blackwater Estuary	51.72	0.80	*Vanellus vanellus*	Northern Lapwing	Winter	20309	1999-03	11844	1999-03 (5)	BTO, UK, 2005	Europe
			Pluvialis apricaria	Eurasian Golden Plover	Winter	18826	1999-03	10981	1999-03 (5)	BTO, UK, 2005	Iceland, Faeroes + Norway, W Russia + *apricaria*
			Pluvialis squatarola	Grey Plover	Winter	4649	1999-03	2992	1999-03 (5)	BTO, UK, 2005	E Atlantic
			Limosa limosa	Black-tailed Godwit	Winter	2939	1999-03	1578	1999-03 (5)	BTO, UK, 2005	*islandica*
			Tringa totanus	Common Redshank	Winter	4199	1999-03	2989	1999-03 (5)	BTO, UK, 2005	E & C Europe + *robusta* + N Europe + *britannica*
			Calidris canutus	Red Knot	January	5982	1999-03	3389	1999-03 (5)	BTO, UK, 2005	*islandica*

UNITED KINGDOM (CONTINUED)

Sitename	Lat	Long	Scientific name	English name	Season	maxcount	maxyear	average	Basis for average	Source	Population(s)
Blackwater Estuary (continued)			*Calidris alpina*	Dunlin	Winter	37550	1999-03	19580	1996-03 (5)	BTO, UK, 2005	*alpina* + Iceland + *arctica* + Britain + Baltic
Blyth Estuary	52.32	1.62	*Pluvialis apricaria*	Eurasian Golden Plover	Winter	10000	1995-01	3663	1995-01 (5)	BTO, UK, 2005	Iceland, Faeroes + Norway, W Russia + *apricaria*
			Limosa limosa	Black-tailed Godwit	Spring	608	1995-01	354	1995-01 (5)	BTO, UK, 2005	*islandica*
Bodmin Moor	50.58	-4.58	*Pluvialis apricaria*	Eurasian Golden Plover	Non-breeding	10000	1995			WBDB	Iceland, Faeroes + Norway, W Russia + *apricaria*
Breydon Water & Berney Marshes	52.59	1.66	*Recurvirostra avosetta*	Pied Avocet	Autumn	1069	1999-03	770	1999-03 (5)	BTO, UK, 2005	E Atlantic
			Vanellus vanellus	Northern Lapwing	Winter	20500	1999-03	17860	1999-03 (5)	BTO, UK, 2005	Europe
			Pluvialis apricaria	Eurasian Golden Plover	Winter	13280	1999-03	10689	1999-03 (5)	BTO, UK, 2005	Iceland, Faeroes + Norway, W Russia + *apricaria*
			Limosa limosa	Black-tailed Godwit	Autumn	1630	1999-03	1197	1999-03 (5)	BTO, UK, 2005	*islandica*
Burry Inlet	51.64	-4.17	*Haematopus ostralegus*	Eurasian Oystercatcher	Winter	17867	1999-03	14578	1999-03 (5)	BTO, UK, 2005	*ostralegus*
			Calidris canutus	Red Knot	Non-breeding	4800	1999-03	3532	1999-03 (5)	BTO, UK, 2005	*islandica*
Caithness & Sutherland Peatlands	58.37	-4.05	*Pluvialis apricaria*	Eurasian Golden Plover	Breeding	7230 2410 prs	1995			WBDB	*apricaria*
			Calidris alpina	Dunlin	Breeding	17730 5910 prs	1995			WBDB	Britain & Ireland *schinzii*
Carmarthen Bay	51.68	-4.51	*Pluvialis apricaria*	Eurasian Golden Plover	Winter	9832	1999-03	3228	1999-03 (5)	BTO, UK, 2005	Iceland, Faeroes + Norway, W Russia + *apricaria*
			Calidris alba	Sanderling	January	1770	1999-03	661	1999-03 (5)	BTO, UK, 2005	E Atlantic
Chichester Harbour	50.78	-0.89	*Pluvialis squatarola*	Grey Plover	Winter	3180	1999-03	2144	1999-03 (5)	BTO, UK, 2005	E Atlantic
			Limosa limosa	Black-tailed Godwit	Winter	1050	1999-03	593	1999-03 (5)	BTO, UK, 2005	*islandica*
			Calidris alpina	Dunlin	Winter	16773	1999-03	14750	1998-03 (5)	BTO, UK, 2005	*alpina* + Iceland + *arctica* + Britain + Baltic
Colne Estuary	51.78	0.98	*Limosa limosa*	Black-tailed Godwit	Autumn	602	1999-03	281	1999-03 (5)	IWC database	*islandica*
Cromarty Firth	57.72	-4.05	*Limosa lapponica*	Bar-tailed Godwit	Winter	3439	1999-03	20885	1999-03 (5)	BTO, UK, 2005	*lapponica*
			Calidris canutus	Red Knot	January	5050	2001	3464	1999-03 (5)	BTO, UK, 2005	*islandica*
Deben Estuary	52.02	1.33	*Tringa totanus*	Common Redshank	Winter	2881	1999-03	2152	1999-03 (5)	BTO, UK, 2005	*robusta* + *britannica*
Dee Estuary	53.16	3.60	*Haematopus ostralegus*	Eurasian Oystercatcher	Autumn	26713	1999-03	21898	1999-03 (5)	BTO, UK, 2005	*ostralegus*
			Limosa limosa	Black-tailed Godwit	Winter	4493	1999-03	3474	1999-03 (5)	BTO, UK, 2005	W Europe + *islandica*
			Limosa lapponica	Bar-tailed Godwit	Winter	1209	1999-03	731	1999-03 (5)	BTO, UK, 2005	*lapponica*
			Tringa totanus	Common Redshank	Autumn	11991	1999-03	9791	1999-03 (5)	BTO, UK, 2005	*robusta* + *britannica*
			Calidris canutus	Red Knot	January	52792	1999-03	26397	1999-03 (5)	BTO, UK, 2005	*islandica*
			Calidris alpina	Dunlin	Winter	41679	1999-03	31752	1999-03 (5)	BTO, UK, 2005	*alpina* + Iceland + *arctica* + Britain
Dengie Flats	51.68	0.93	*Pluvialis squatarola*	Grey Plover	Winter	7826	1999-03	4144	1999-03 (5)	BTO, UK, 2005	E Atlantic
			Limosa lapponica	Bar-tailed Godwit	Winter	4970	1999-03	2734	1999-03 (5)	BTO, UK, 2005	Western + *lapponica*
			Calidris canutus	Red Knot	Non-breeding	19400	1999-03	9934	1999-03 (5)	BTO, UK, 2005	*islandica*
			Calidris alpina	Dunlin	Winter	15720	1998-02	10494	1998-02 (5)	BTO, UK, 2005	*alpina* + Iceland + *arctica* + Britain

UNITED KINGDOM (CONTINUED)

Sitename	Lat	Long	Scientific name	English name	Season	maxcount	maxyear	average	Basis for average	Source	Population(s)
Dornoch Firth	57.82	-4.12	*Limosa lapponica*	Bar-tailed Godwit	Winter	1561	1999-03	968	1999-03 (5)	BTO, UK, 2005	*lapponica*
Druridge Bay	55.25	01.58	*Numenius tenuirostris*	Slender-billed Curlew	May	1	1998			Cleeves 1998	
Duddon Estuary	54.22	-3.22	*Tringa totanus*	Common Redshank	Winter	2816	1999-03	2227	1999-03 (5)	BTO, UK, 2005	*robusta* + *britannica*
East Sanday	59.27	-2.47	*Arenaria interpres*	Ruddy Turnstone	Non-breeding	1270	1994			BTO, UK, 2005	NE Canada, Greenland + N Europe
			Calidris maritima	Purple Sandpiper	Migration	1060	1987			WBDB	Europe, Siberia + Canada, NE Greenland
Exe Estuary	50.63	-3.43	*Limosa limosa*	Black-tailed Godwit	Winter	1113	1999-03	940	1999-03 (5)	BTO, UK, 2005	*islandica*
Fen Drayton Gravel Pits	52.30	0.02	*Limosa limosa*	Black-tailed Godwit	Winter	780	1996-01	267	1996-01 (5)	BTO, UK, 2005	*islandica*
Forth Estuary	56.00	-3.27	*Haematopus ostralegus*	Eurasian Oystercatcher	Autumn	10498	1999-03	8317	1999-03 (5)	BTO, UK, 2005	*ostralegus*
			Limosa limosa	Black-tailed Godwit	Autumn	478	1999-03	235	1999-03 (5)	BTO, UK, 2005	*islandica*
			Limosa lapponica	Bar-tailed Godwit	Winter	1793	1999-03	1423	1999-03 (5)	BTO, UK, 2005	*lapponica*
			Tringa totanus	Common Redshank	Autumn	5759	1999-03	5018	1999-03 (5)	BTO, UK, 2005	*robusta* + *britannica*
			Calidris canutus	Red Knot	Non-breeding	8936	1999-2003	6330	1999-03 (5)	BTO, UK, 2005	*islandica*
			Calidris alpina	Dunlin	Winter	13296	1999-03	11257	1999-03 (5)	BTO, UK, 2005	*alpina* + Iceland + *arctica* + Britain
Hamford Water and the Naze	51.88	1.23	*Pluvialis squatarola*	Grey Plover	Winter	3267	1999-03	2494	1999-03 (5)	BTO, UK, 2005	E Atlantic
			Limosa limosa	Black-tailed Godwit	Winter	601	1999-03	406	1999-03 (5)	BTO, UK, 2005	*islandica*
			Calidris canutus	Red Knot	Non-breeding	5431	1999-03	3601	1999-03 (5)	BTO, UK, 2005	*islandica*
Humber Estuary	53.67	-0.17	*Vanellus vanellus*	Northern Lapwing	Winter	39865	1999-03	27297	1999-03 (5)	BTO, UK, 2005	Europe
			Pluvialis apricaria	Eurasian Golden Plover	Winter	50662	1999-03	37674	1999-03 (5)	BTO, UK, 2005	Iceland, Faeroes + Norway, W Russia + *apricaria*
			Pluvialis squatarola	Grey Plover	Spring	6135	1997-02	2742	1997-02 (5)	BTO, UK, 2005	E Atlantic
			Limosa limosa	Black-tailed Godwit	Autumn	2108	1999-03	1355	1999-03 (5)	BTO, UK, 2005	W Europe + *islandica*
			Limosa lapponica	Bar-tailed Godwit	Winter	3669	1999-03	2848	1999-03 (5)	BTO, UK, 2005	W *taymyrensis* + *lapponica*
			Tringa totanus	Common Redshank	Autumn	10226	1999-03	7997	1999-03 (5)	BTO, UK, 2005	E & C Europe + *robusta* + N Europe + *britannica*
			Calidris canutus	Red Knot	Non-breeding	49991	1999-2003	30072	1999-03 (5)	BTO, UK, 2005	*islandica*
			Calidris alba	Sanderling	Spring	1626	1997-02	727	1997-02 (5)	BTO, UK, 2005	E Atlantic
			Calidris alpina	Dunlin	Winter	24378	1999-03	19870	1999-03 (5)	BTO, UK, 2005	*alpina* + Iceland + *arctica* + Britain + Baltic
Inner Firth of Clyde	55.95	-4.63	*Tringa totanus*	Common Redshank	Autumn	2899	1999-03	1847	1999-03 (5)	BTO, UK, 2005	*robusta* + *britannica*
Inner Moray and Inverness Firth	57.53	-4.20	*Limosa lapponica*	Bar-tailed Godwit	Winter	1510	1999-03	1069	1999-03 (5)	BTO, UK, 2005	*lapponica*
			Tringa totanus	Common Redshank	Winter	2942	1999-03	2639	1999-03 (5)	BTO, UK, 2005	*robusta* + *britannica*
			Calidris canutus	Red Knot	Non-breeding	3663	1999-03	2828	1999-03 (5)	BTO, UK, 2005	*islandica*
Island of Egilsay	59.15	-2.92	*Calidris maritima*	Purple Sandpiper	January	334	1999-03	145	1999-03 (5)	BTO, UK, 2005	Canada, NE Greenland
Island of Papa Westray	59.35	-2.88	*Calidris maritima*	Purple Sandpiper	January	220	2001-03	172	2001-03 (3)	BTO, UK, 2005	Canada, NE Greenland
Langstone Harbour	50.82	-1.00	*Limosa limosa*	Black-tailed Godwit	Autumn	618	1998-03	547	1998-03 (5)	BTO, UK, 2005	*islandica*
			Calidris alpina	Dunlin	Winter	24286	1999-03	21397	1999-03 (5)	BTO, UK, 2005	*alpina* + Iceland + *arctica* + Britain + Baltic

UNITED KINGDOM (CONTINUED)

Sitename	Lat	Long	Scientific name	English name	Season	maxcount	maxyear	average	Basis for average	Source	Population(s)
Lindisfarne	55.67	-1.82	*Limosa lapponica*	Bar-tailed Godwit	Winter	5237	1999-03	4075	1998-03 (5)	BTO, UK, 2005	*lapponica*
			Tringa totanus	Common Redshank	Autumn	2819	1999-03	1838	1999-03 (5)	BTO, UK, 2005	*robusta* + *britannica*
			Calidris canutus	Red Knot	Non-breeding	6751	1998-03	3807	1999-03 (5)	BTO, UK, 2005	*islandica*
Lough Foyle	55.07	-7.06	*Limosa lapponica*	Bar-tailed Godwit	Winter	4108	1999-03	1468	1999-03(5)	BTO, UK, 2005	*lapponica*
Loughs Neagh and Beg	54.61	-6.39	*Pluvialis apricaria*	Eurasian Golden Plover	Non-breeding	10025	1992	2365	1999-03 (5)	BTO, UK, 2005	Iceland, Faeroes + *apricaria*
Meadow Lane Gravel Pits, St Ives	52.30	-0.05	*Limosa limosa*	Black-tailed Godwit	Winter	800	2000-02	402	2000-02 (3)	BTO, UK, 2005	*islandica*
Medway Estuary	51.40	0.65	*Recurvirostra avosetta*	Pied Avocet	Winter	860	1999-03	560	1999-03 (5)	BTO, UK, 2005	E Atlantic
			Pluvialis squatarola	Grey Plover	Winter	3221	1999-03	1990	1999-03 (5)	BTO, UK, 2005	E Atlantic
			Limosa limosa	Black-tailed Godwit	Autumn	721	1999-03	328	1999-03 (5)	BTO, UK, 2005	*islandica*
			Tringa totanus	Common Redshank	Autumn	3709	1999-03	1470	1999-03 (5)	BTO, UK, 2005	E & C Europe + *robusta* + N Europe + *britannica*
			Calidris canutus	Red Knot	Winter	5055	1998-02	2855	1998-02 (5)	BTO, UK, 2005	*islandica*
Mersey Estuary	53.30	-2.82	*Limosa limosa*	Black-tailed Godwit	Autumn	2850	1999-03	2081	1999-03 (5)	BTO, UK, 2005	W Europe + *islandica*
			Tringa totanus	Common Redshank	Autumn	11595	1999-03	7168	1999-03 (5)	BTO, UK, 2005	*robusta* + *britannica*
			Calidris alpina	Dunlin	Winter	60330	2001	49368	1999-03 (5)	BTO, UK, 2005	*alpina* + Iceland + *arctica* + Britain + Baltic
Mid-Essex Coast	51.78	1.00	*Haematopus ostralegus*	Eurasian Oystercatcher	Non-breeding	15800	1995			WBDB	*ostralegus*
			Limosa limosa	Black-tailed Godwit	Non-breeding	1130	1995			WBDB	*islandica*
			Limosa lapponica	Bar-tailed Godwit	Winter	7550	1995			WBDB	W *taymyrensis* + *lapponica*
			Tringa totanus	Common Redshank	Non-breeding	5650	1995			WBDB	E & C Europe + *robusta* + N Europe + *britannica*
			Calidris canutus	Red Knot	Non-breeding	37600	1995			WBDB	*islandica*
			Calidris alpina	Dunlin	Non-breeding	48300	1995			WBDB	*alpina* + *arctica* + Britain + Baltic
Montrose Basin	56.71	-2.49	*Calidris canutus*	Red Knot	Non-breeding	5800	1999-03	3597	1999-03 (5)	BTO, UK, 2005	*islandica*
Moray Basin, Firths and Bays	57.60	-4.00	*Haematopus ostralegus*	Eurasian Oystercatcher	Non-breeding	11100	1995			WBDB	*ostralegus*
Morecambe Bay	54.12	-2.93	*Haematopus ostralegus*	Eurasian Oystercatcher	Autumn	72653	1999-03	52761	1999-03 (5)	BTO, UK, 2005	*ostralegus*
			Vanellus vanellus	Northern Lapwing	Winter	20750	1999-03	16595	1999-03 (5)	BTO, UK, 2005	Europe
			Limosa lapponica	Bar-tailed Godwit	Winter	5718	1999-03	3628	1999-03(5)	BTO, UK, 2005	*lapponica*
			Numenius arquata	Eurasian Curlew	Autumn	19170	1999-03	11988	1999-03 (5)	BTO, UK, 2005	*arquata*
			Tringa totanus	Common Redshank	Autumn	8816	1999-03	1681	1999-03 (5)	BTO, UK, 2005	*robusta* + *britannica*
			Arenaria interpres	Ruddy Turnstone	Non-breeding	2106	1993	770	1999-03 (5)	IWC database	NE Canada, Greenland + N Europe
			Calidris canutus	Red Knot	Non-breeding	72908	1999-2003	65679	1999-03 (5)	BTO, UK, 2005	*islandica*
			Calidris alpina	Dunlin	Winter	28411	1999-03	22413	1999-03 (5)	BTO, UK, 2005	*alpina* +Iceland + *arctica* + Britain, N Europe
Nene Washes	52.58	-0.02	*Vanellus vanellus*	Northern Lapwing	Winter	21016	1999-03	9859	1999-03 (5)	BTO, UK, 2005	Europe
			Limosa limosa	Black-tailed Godwit	Spring	1135	1995-99	315	1995-99 (5)	BTO, UK, 2005	*islandica*
North Norfolk Coast	52.98	0.76	*Pluvialis squatarola*	Grey Plover	Autumn	2890	1999-03	2104	1999-03 (5)	BTO, UK, 2005	E Atlantic
			Limosa limosa	Black-tailed Godwit	Winter	631	1999-03	309	1999-03 (5)	BTO, UK, 2005	*islandica*
			Limosa lapponica	Bar-tailed Godwit	Autumn	7429	1999-03	4855	1999-03 (5)	BTO, UK, 2005	W *taymyrensis* + *lapponica*
			Calidris canutus	Red Knot	Autumn	40832	1999-03	33154	1999-03 (5)	BTO, UK, 2005	*islandica*
			Calidris alba	Sanderling	Autumn	1786	1999-03	1250	1999-03 (5)	BTO, UK, 2005	E Atlantic

UNITED KINGDOM (CONTINUED)

Sitename	Lat	Long	Scientific name	English name	Season	maxcount	maxyear	average	Basis for average	Source	Population(s)
North Uist Machair	57.58	-7.47	*Charadrius hiaticula*	Common Ringed Plover	Breeding	1005 335 prs	1995			WBDB	*hiaticula*
			Tringa totanus	Common Redshank	Breeding	1455 485 prs	1995			WBDB	*brittanica*
			Calidris maritima	Purple Sandpiper	Winter	365	1993			WBDB	Canada, NE Greenland
			Calidris alpina	Dunlin	Breeding	915 305 prs	1995			WBDB	Britain & Ireland *schinzii*
Orwell Estuary	52.00	1.23	*Limosa limosa*	Black-tailed Godwit	Autumn	834	1999-03	513	1999-03 (5)	BTO, UK, 2005	*islandica*
Ouse Washes	52.52	0.25	*Limosa limosa*	Black-tailed Godwit	Winter	3468	1999-03	2372	1999-03 (5)	BTO, UK, 2005	*islandica*
Outer Ards Shoreline	54.47	-5.42	*Arenaria interpres*	Ruddy Turnstone	Non-breeding	1925	1990	961	1993-03 (5)	IWC database	NE Canada, Greenland + N Europe
Pagham Harbour	50.75	-0.75	*Limosa limosa*	Black-tailed Godwit	Winter	826	1999-03	410	1999-03 (5)	BTO, UK, 2005	*islandica*
Peak District Moors	53.35	-1.73	*Calidris alpina*	Dunlin	Breeding	210	1991			WBDB	*schinzii*, Britain
Poole Harbour	50.69	-2.00	*Recurvirostra avosetta*	Pied Avocet	Winter	1893	1999-03)	1341	1999-03 (5)	BTO, UK, 2005	E Atlantic
			Limosa limosa	Black-tailed Godwit	Winter	2691	1999-03	2025	1999-03 (5)	BTO, UK, 2005	W Europe + *islandica*
Ribble Estuary	53.72	-2.92	*Haematopus ostralegus*	Eurasian Oystercatcher	Autumn	23881	1999-03	14018	1999-03 (5)	BTO, UK, 2005	*ostralegus*
			Pluvialis squatarola	Grey Plover	Spring	16395	1997-02	7922	1997-02 (5)	BTO, UK, 2005	E Atlantic
			Limosa limosa	Black-tailed Godwit	Autumn	5583	1999-03	2829	1999-03 (5)	BTO, UK, 2005	W Europe + *islandica*
			Limosa lapponica	Bar-tailed Godwit	Winter	20950	1999-03	8765	1999-03 (5)	IWC database	*lapponica*
			Tringa totanus	Common Redshank	Autumn	6411	1999-03	4295	1999-03 (5)	BTO, UK, 2005	*robusta* + *britannica*
			Calidris canutus	Red Knot	Spring	54300	1997-02	37192	1997-02 (5)	BTO, UK, 2005	*islandica*
			Calidris alba	Sanderling	Spring	8203	1997-02	4722	1997-02 (5)	BTO, UK, 2005	E Atlantic
			Calidris alpina	Dunlin	Spring	50729	1997-02	30729	1997-02 (5)	BTO, UK, 2005	*alpina* + Iceland + *arctica* + Britain
River Avon - Ringwood to Christchurch	50.78	-1.78	*Limosa limosa*	Black-tailed Godwit	January	3002	2000-03	1528	2000-03 (4)	BTO, UK, 2005	W Europe + *islandica*
Severn Estuary	51.55	-2.72	*Calidris alpina*	Dunlin	Winter	25734	1999-03	21611	1999-03 (5)	BTO, UK, 2005	*alpina* +Iceland + *arctica* + Britain
Solway Estuary	54.92	-3.40	*Haematopus ostralegus*	Eurasian Oystercatcher	Autumn	52765	1999-03	44267	1999-03 (5)	BTO, UK, 2005	*ostralegus*
			Limosa lapponica	Bar-tailed Godwit	Winter	2106	1999-03	1561	1999-03 (5)	BTO, UK, 2005	*lapponica*
			Tringa totanus	Common Redshank	Winter	4135	1999-03	2666	1999-03 (5)	BTO, UK, 2005	*robusta* + *britannica*
			Calidris canutus	Red Knot	Non-breeding	9620	1999-2003	7811	1999-2003 (5)	BTO, UK, 2005	*islandica*
			Calidris alpina	Dunlin	January	17564	1999-03	12122	1999-03 (5)	BTO, UK, 2005	*alpina* + Iceland + *arctica* + Britain
Somerset Levels	51.15	-2.98	*Vanellus vanellus*	Northern Lapwing	Winter	50328	1999-03	32115	1999-03 (5)	BTO, UK, 2005	Europe
South Uist Machair	57.32	-7.33	*Charadrius hiaticula*	Common Ringed Plover	Breeding	1395 465 prs	1995			WBDB	*hiaticula*
			Tringa totanus	Common Redshank	Breeding	1635 545 prs	1995			WBDB	*brittanica*
			Calidris alpina	Dunlin	Breeding	1215 405 prs	1995			WBDB	Britain & Ireland *schinzii*

UNITED KINGDOM (CONTINUED)

Sitename	Lat	Long	Scientific name	English name	Season	maxcount	maxyear	average	Basis for average	Source	Population(s)
South Westray Coast	59.27	-2.93	*Calidris maritima*	Purple Sandpiper	Non-breeding	415	1994			WBDB	Canada, NE Greenland
Southampton Water	50.85	-1.35	*Limosa limosa*	Black-tailed Godwit	Winter	1265	1999-03	555	1999-03 (5)	BTO, UK, 2005	*islandica*
Stour Estuary	51.93	1.15	*Pluvialis squatarola*	Grey Plover	Winter	3739	1999-03	3188	1999-03 (5)	BTO, UK, 2005	E Atlantic
			Limosa limosa	Black-tailed Godwit	Winter	2593	1999-03	1979	1999-03 (5)	BTO, UK, 2005	W Europe + *islandica*
			Tringa totanus	Common Redshank	Autumn	3073	1999-03	1792	1999-03 (5)	BTO, UK, 2005	E & C Europe + *robusta* + N Europe + *britannica*
			Calidris canutus	Red Knot	January	9677	1999-03	5890	1999-03 (5)	BTO, UK, 2005	*islandica*
			Calidris alpina	Dunlin	Winter	15822	1999-03	12585	1999-03 (5)	IWC database	*alpina* + *arctica* + Iceland + Britain
Strangford Lough	54.45	-5.60	*Pluvialis apricaria*	Eurasian Golden Plover	Non-breeding	14095	1997	4455	1999-03 (5)	BTO, UK, 2005	Iceland, Faeroes + *apricaria*
			Limosa lapponica	Bar-tailed Godwit	Winter	2019	1999-03	1299	1999-03 (5)	BTO, UK, 2005	*lapponica*
			Tringa totanus	Common Redshank	Autumn	5244	1999-03	4265	1999-03 (5)	BTO, UK, 2005	*robusta* + *britannica*
			Calidris canutus	Red Knot	Non-breeding	5863	1999-03	4193	1999-03 (5)	BTO, UK, 2005	*islandica*
Swale Estuary	51.35	0.83	*Pluvialis apricaria*	Eurasian Golden Plover	Winter	13898	1999-03	7246	1999-03 (5)	BTO, UK, 2005	Iceland, Faeroes + Norway, W Russia + *apricaria*
			Limosa limosa	Black-tailed Godwit	Winter	2153	1999-03	1348	1999-03 (5)	BTO, UK, 2005	W Europe + *islandica*
			Calidris canutus	Red Knot	Non-breeding	4200	1999-2003	3000	1999-03 (5)	BTO, UK, 2005	*islandica*
			Calidris alpina	Dunlin	Winter	14761	1999-03	9207	1999-03 (5)	BTO, UK, 2005	*alpina* + Iceland + *arctica* + Britain + Baltic
Tay Estuary	56.43	-2.83	*Limosa lapponica*	Bar-tailed Godwit	Winter	1944	1999-03	1371	1999-03 (5)	BTO, UK, 2005	*lapponica*
Tees Estuary	54.63	-1.13	*Calidris canutus*	Red Knot	Non-breeding	4416	1999-03	2812	1999-03 (5)	BTO, UK, 2005	*islandica*
Thames Estuary	51.48	0.57	*Haematopus ostralegus*	Eurasian Oystercatcher	Winter	25958	1999-03	19265	1999-03 (5)	BTO, UK, 2005	*ostralegus*
			Recurvirostra avosetta	Pied Avocet	Winter	1447	1999-03	855	1999-03 (5)	BTO, IWC database	E Atlantic
			Pluvialis apricaria	Eurasian Golden Plover	Non-breeding	12500	1995			World Bird Database	Iceland, Faeroes + Norway,
			Pluvialis squatarola	Grey Plover	Winter	6923	1999-03	4939	1999-03 (5)	BTO, UK, 2005	E Atlantic
			Charadrius hiaticula	Common Ringed Plover	Winter	954	1999-03	783	1999-03 (5)	BTO, UK, 2005	*hiaticula*
			Limosa limosa	Black-tailed Godwit	Autumn	3274	1999-03	2196	1999-03 (5)	BTO, UK, 2005	W Europe + *islandica*
			Limosa lapponica	Bar-tailed Godwit	Winter	8989	1999-03	4961	1997-03 (5)	BTO, UK, 2005	W *taymyrensis* + *lapponica*
			Tringa totanus	Common Redshank	Autumn	5905	1999-03	4386	1999-03 (5)	BTO, UK, 2005	E & C Europe + *robusta* + N Europe + *britannica*
			Calidris canutus	Red Knot	Non-breeding	43873	1999-03	31931	1997-03 (5)	BTO, UK, 2005	*islandica*
			Calidris alba	Sanderling	Autumn	1394	1999-03	902	1999-03 (5)	BTO, UK, 2005	E Atlantic
			Calidris alpina	Dunlin	Winter	53755	1999-03	40357	1999-03 (5)	BTO, UK, 2005	*alpina* + iceland + *arctica* + Britain + Baltic
Thanet Coast	51.37	1.25	*Arenaria interpres*	Ruddy Turnstone	Non-breeding	3348	1988	685	1999-03 (5)	BTO, UK, 2005	NE Canada, Greenland + N Europe
The Wash	52.93	0.30	*Haematopus ostralegus*	Eurasian Oystercatcher	Autumn	28765	1999-03	18562	1999-03 (5)	BTO, UK, 2005	*ostralegus*
			Vanellus vanellus	Northern Lapwing	Winter	86129	1999-03	46775	1999-03 (5)	BTO, UK, 2005	Europe
			Pluvialis apricaria	Eurasian Golden Plover	Winter	42761	1999-03	23103	1999-03 (5)	BTO, UK, 2005	Iceland, Faeroes + Norway, W Russia + *apricaria*
			Pluvialis squatarola	Grey Plover	Spring	16112	1997-02	13514	1997-02 (5)	BTO, UK, 2005	E Atlantic
			Limosa limosa	Black-tailed Godwit	Autumn	11451	1999-03	6882	1999-03 (5)	BTO, UK, 2005	W Europe + *islandica*
			Limosa lapponica	Bar-tailed Godwit	Winter	23751	1999-03	17738	1999-03 (5)	BTO, UK, 2005	W *taymyrensis* + *lapponica*

UNITED KINGDOM (CONTINUED)

Sitename	Lat	Long	Scientific name	English name	Season	maxcount	maxyear	average	Basis for average	Source	Population(s)
The Wash (continued)			*Numenius arquata*	Eurasian Curlew	Autumn	15336	1999-03	11158	1999-03 (5)	BTO, UK, 2005	*arquata*
			Tringa totanus	Common Redshank	Autumn	9339	1999-03	7072	1999-03 (5)	BTO, UK, 2005	E & C Europe + *robusta* + N Europe + *britannica*
			Calidris canutus	Red Knot	Non-breeding	80452	1999-2003	62823	1999-03 (5)	BTO, UK, 2005	*islandica*
			Calidris alba	Sanderling	Spring	4867	1997-02	2445	1997-02 (5)	BTO, UK, 2005	E Atlantic
			Calidris alpina	Dunlin	Spring	45349	1997-02	32272	1997-02 (5)	BTO, UK, 2005	*alpina* + Iceland + *arctica* +Britain + Baltic
Ythan Estuary	57.32	-1.98	*Tringa totanus*	Common Redshank	Winter	2990	1999-03	1117	1999-03 (5)	BTO, UK, 2005	*robusta* + *britannica*

YEMEN

Sitename	Lat	Long	Scientific name	English name	Season	maxcount	maxyear	average	Basis for average	Source	Population(s)
Kamaran Island	15.33	42.67	*Dromas ardeola*	Crab Plover	Breeding	2040 680 pr				PERSGA/GEF 2003	*ardeola*

ZAMBIA

Sitename	Lat	Long	Scientific name	English name	Season	maxcount	maxyear	average	Basis for average	Source	Population(s)
Chikuni(Bangweulu Floodplain): Lukulu river	-11.92	30.42	*Glareola pratincola*	Collared Pratincole	July-August	3200	1993	1317	1993-96 (3)	AfWC database	*fuellebomi*
			Vanellus crassirostris	Long-toed Lapwing	Non-breeding	500	1991	142	1991-95 (5)	AfWC database	*leucopterus*
Kafue Flats	-15.75	27.27	*Himantopus himantopus*	Black-winged Stilt	July-August	735	1993	313	1993-97 (5)	AfWC database	Southern Africa
			Glareola pratincola	Collared Pratincole	Non-breeding	13897	1995	7438	1994-98 (5)	AfWC database	*fuelleborni*
			Vanellus crassirostris	Long-toed Lapwing	Non-breeding	1523	1994	901	1998-01 (3)	AfWC database	*leucopterus*
			Charadrius pecuarius	Kittlitz's Plover	Non-breeding	6000	2000			WBDB	ECS Africa
			Charadrius asiaticus	Caspian Plover	Non-breeding	35000	1995			WBDB	*asiaticus*
			Limosa limosa	Black-tailed Godwit	January	4300	2000			P Leonard *in litt.*	W Asia
			Tringa stagnatilis	Marsh Sandpiper	Non-breeding	970	2001	336	1998-01 (3)	AfWC database	SW Asia, ES Africa
			Philomachus pugnax	Ruff	Non-breeding	71285	2001	35646	1999-01 (2)	AfWC database	E & S Africa
Liuwa Plains National Park	-14.53	22.62	*Glareola nordmanni*	Black-winged Pratincole	Non-breeding	100000	-			WBDB	*nordmanni*

ZIMBABWE

Sitename	Lat	Long	Scientific name	English name	Season	maxcount	maxyear	average	Basis for average	Source	Population(s)
Lakes Manyame & Chivero	-17.83	30.62	*Himantopus himantopus*	Black-winged Stilt	July-August	632	1995	285	1993-95 (3)	AfWC database	Southern Africa
Whitehead Ponds	-18.13	30.12	*Himantopus himantopus*	Black-winged Stilt	April	1030	1993	246	1993-97 (2)	A.J. Tree 1993. AfWC database	Southern Africa

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