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Back: Common Snipe *Gallinago gallinago faroeensis* on Icelandic breeding grounds. © Nigel Clark

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Stroud, D.A.[1], Davidson, N.C.[2], West, R.[3], Scott, D.A.[4], Haanstra, L.[5], Thorup, O.[6], Ganter, B.[7] & Delany, S.[5] (compilers) on behalf of the International Wader Study Group 2004. Status of migratory wader populations in Africa and Western Eurasia in the 1990s. *International Wader Studies* 15: 1-259.

Estimates of the size of wader populations need to be regularly updated for use in flyway and site conservation, and up-to-date information on population trends is an essential basis for identifying priorities for conservation action and assessing progress towards the target of significantly reducing the rate of loss of biodiversity by 2010 made by world leaders at their 2002 global summit in Johannesburg. This paper presents the results of a major collation and reanalysis of 1990s migratory wader population data for all countries in Africa and Eurasia. The review was undertaken by the International Wader Study Group between 1996 and 2000, and updates previous estimates dating from the mid-1980s. Estimates were compiled from national data sources and through workshops of wader experts, pending redevelopment of the Wetlands International's Wader Counts Database.

We present status information on 131 populations of 55 species that have at least one migratory population. Of these we report size estimates (to varying precision) for 124 populations, 1% population thresholds (or provisional thresholds) for 116 populations, and indications of trends between the mid 1980s and mid 1990s for 80 populations. The analysis reveals changes in the population sizes of 72 populations of 32 species. For 18 populations, no new data have become available to reassess numbers, and for six of these, numbers are completely unknown.

Comparisons between flyways show that data quality is better for populations using the largely coastal East Atlantic Flyway, than for other flyways in the region: it has been possible to assess trends for 97% of East Atlantic Flyway populations, but for only 71% of the Black Sea / Mediterranean populations and for just 35% of West Asian / East African wader populations.

It is difficult to draw conclusions on the overall status of waders in Africa and Western Eurasia, since reliable estimates of population trends can be made for only 54 of the 131 populations using the region. There are, however, nearly four times as many populations in decline as those that are increasing: there is a decrease or possible decrease in 37 populations and an increase or possible increase in ten, with 33 being stable or possibly stable. Although it is not clear from this analysis whether the changes reflect real population trends or are at least in part due to differences in count coverage and / or handling of national population estimates, some evidence from British population trends corroborates the population change pattern.

Overall, the East Atlantic flyway appears in the healthiest state: only a little over one-third (37%) of populations are decreasing. This is in contrast to the Black Sea / Mediterranean Flyway where, of populations with known or probable trends, 55% are declining, and the West Asian / East Africa Flyway which has 53% of populations in decline. Taking all populations together, 3.7 times as many populations are definitely (or probably) in decline as are definitely (or probably) increasing. This pattern varies between flyways: 'only' 2.3 times as many on the East Atlantic Flyway, nine times as many declining as increasing on the West Asia / East Africa Flyway, and 11 times as many declining as increasing on the Black Sea / Mediterranean flyway.

Of the 131 populations of migratory wader, 45 are of significant conservation concern because their populations are in decline and / or are small. Some populations are known to be severely threatened and in decline, notably Slender-billed Curlew *Numenius*

tenuirostris (in imminent danger of global extinction), the Canary island race of Cream-coloured Courser *Cursorius cursor*, both populations of Sociable Lapwing *Vanellus gregarius* (categorised by IUCN as Vulnerable), the two Canary Islands races of Stone Curlews *Burhinus oedicnemus,* and both the Baltic and Britain / Ireland breeding populations of Dunlin *Calidris alpina schinzii.* Extremely rapid population declines (>50% since the mid 1980s) have been recorded for four populations: two of Sociable Lapwing, the single population of Black-winged Practincole *Glareola nordmanni* and the western European breeding population of Black-tailed Godwit *Limosa limosa.* Only the European / North African wintering population of Great Ringed Plover *Charadrius hiaticula* has shown a correspondingly large (>50%) population increase over the same period.

Geographic patterns of population trends are not uniform across the region and three groups of populations facing severe decline can be identified: a) populations breeding in arid and semi-arid areas of the Middle East, West and central Asia and the Mediterranean Basin; b) populations breeding in temperate wet grasslands across Europe; and c) arctic-breeding long-distance migrant populations on the East Atlantic Flyway which are heavily dependent on the Wadden Sea for spring and autumn staging. Habitat deterioration is implicated as the major driver of decline in these populations.

A review of progress in improving data and information shows that there has been significant improvement with respect to some aspects (especially knowledge of European distribution of breeding waders and their population trends, particularly in the Mediterranean Basin and in Russia). However, very little progress has been made for many other priority areas, such as waders wintering on non-estuarine coasts or inland. Indeed, for 78 populations (60% of those considered) monitoring provision is not adequate to provide even the most basic information on trends in abundance. Only in 16 populations (12%) is there a sound basis for assessing changes in population sizes. For the remaining 37 (28%) populations, monitoring provides some information although this is usually far from adequate in extent or quality. For no biogeographical population is it currently possible to assess trends with any defined degree of statistical precision. This lack of monitoring provision is a serious conservation deficiency given not only the need to assess population change at local and country scales, but also the need to assess the potential major impacts predicted from a changing global climate. It is also of major conservation concern given the high apparent level of conservation provision for these taxa under a number of different intergovernmental conservation conventions and treaties.

The African-Eurasian Waterbird Agreement has highlighted monitoring as a major priority for the international conservation of waterbirds within the region and we hope this review will stimulate concrete urgent actions to this end. The current development of a major project for potential funding by the Global Environment Facility would specifically assist the development of monitoring capacity in many developing countries — were this to come to fruition.

At least for migratory waders within the Africa, Europe and West Asia, the pattern of extremely widespread population declines indicates that major and concerted conservation actions by governments and others will be needed to achieve the aspirational target of significantly reducing the rate of loss of biodiversity by 2010.

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Contents

INTRODUCTION

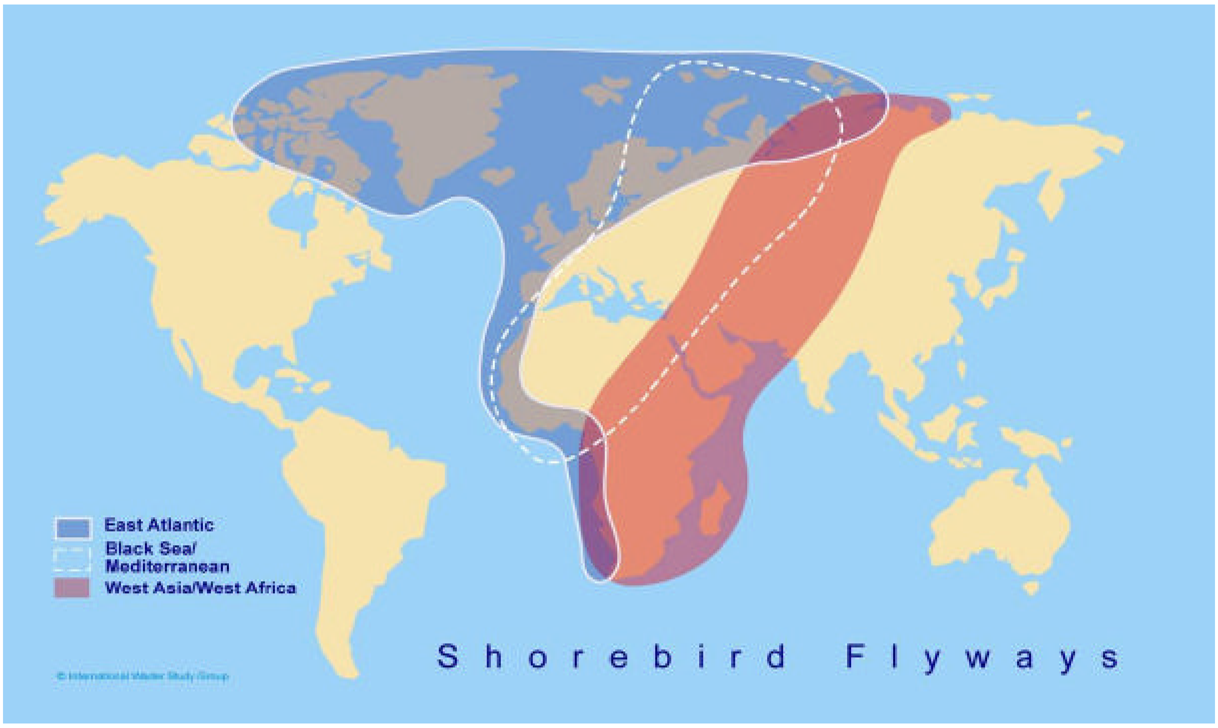
Migratory waders or shorebirds (Charadrii) are a major feature of coastal and estuarine ecosystems. They are the subjects of extensive conservation effort throughout their range and distribution, notably through the designation under the Ramsar Convention (as wetlands of international importance) of sites supporting internationally important numbers. Flyway conservation strategies focus particularly on their needs, notably the Bonn Convention's African-Eurasian Waterbird Agreement - AEWA), the Asia-Pacific Migratory Waterbird Conservation Strategy (Anonymous 1996; Watkins & Mundkur 1997; Weaver 1997; Asia-Pacific Migratory Waterbird Conservation Committee 2001), East Asian-Australasian Shorebird Reserve Network (Watkins 1997), and the Western Hemisphere Shorebird Reserve Network (Hunter *et al.* 1991).

An essential basis for implementing these, and other, national and international conservation measures is an understanding of the size and distribution of each biogeographical population of waders and trends in these populations (Davidson *et al.* 1998). Since population size varies with time, a regular assessment of how these populations are changing is needed, firstly, to determine conservation priorities, and then to ensure that these remain accurately focussed. Indeed, most of these international strategies and treaties have the monitoring of populations as a core activity of primary importance.

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 mid-northern Siberia in the east. Many subspecies and biogeographical 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 western 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 the central Siberia tundra with the

Figure 1. The East Atlantic Flyway, the Black-Sea Mediterranean, and West Asian/East African Flyways.



Caspian Sea, the Middle East (especially the Gulf Region) and eastern and southern African (Summers *et al.* 1987). The waders of the latter flyway are particular poorly known.

An internationally accepted criterion under the Ramsar Convention for identifying sites that qualify as internationally important is that 1% or more of their relevant biogeographical population regularly occurs here. In support of this criterion, Wetlands International co-ordinates an International Waterbird Census (IWC) which collects January count data from wetlands worldwide (Rose 1994; Dodman 1997; Dodman *et al.* 1999; Delaney *et al.* 1999). January was selected as the time of Northern Hemisphere winter when waterbirds are least mobile. Analysis of these waterbird count data permit periodic estimation of total population sizes which in turn gives a basis for updating 1% thresholds for key site selection (Stroud 1996).

For coastal waders using the East Atlantic Flyway, population estimates have been made previously in the early 1970s Prater (1976) and again in the early 1980s (Smit & Piersma 1989). A protocol for future updates of estimates of the size of waterbird populations on a three-year cycle, with review of 1% thresholds on a nine-yearly cycle, has been agreed by the Contracting Parties to the Ramsar Convention (Rose & Stroud 1994; Stroud 1996; Ramsar Resolution VI.4). Recommendations from these reviews are then included in listings of global *Waterbird Population Estimates* published by Wetlands International in support of waterbird conservation (Rose & Scott 1994 (referred to here as *WPE1*), 1997 (*WPE2*), Wetlands International 2002 (*WPE3*)).

In its rôle as a global wader expert network for Wetlands International, the International Wader Study Group (WSG) undertakes the compilation and interpretation of wader population estimates (although the responsibility for data collation from the IWC resides with Wetlands International). Since the last published estimates date from the early-mid 1980s (Smit & Piersma 1989), a major review of wader populations has been overdue. This paper, prepared by the WSG's expert network, provides a comprehensive review and update of the size and trends in most migratory wader populations that overwinter in the African-Eurasian region, except for populations of migratory waders that are confined to the Afrotropical Region (sub-Saharan Africa). It thus updates the 1980s estimates for the East Atlantic Flyway (Smit & Piersma 1989) and estimates, also mostly from the 1980s, for populations on other African-Eurasian flyways compiled in Rose & Scott (1994, 1997).

The results of this review have been incorporated in the third edition of global waterbird population estimates (Wetlands International 2002) for use as the basis for the identification and designation of wetlands of international importance under the Ramsar Convention, and in the implementation of the African-Eurasian Migratory Waterbird Agreement.

In 2002, world leaders at their World Summit on Sustainable Development, Johannesburg, expressed their desire to achieve "*a significant reduction in the current rate of loss of biological diversity*" by 2010. The previous year, the Heads of European Union Member States in Göteborg had expressed their intention "*that biodiversity decline should be halted with the aim of reaching this objective by 2010.*" This review provides an initial assessment as to how challenging the achievement of these targets will be for waders in the African-Western Eurasian region.

METHODS

General

Our analysis covers all wader species for which some or all populations are migratory within the region of Africa, Europe and western Asia. For the great majority of species covered, all populations are migratory. For a few migratory species, notably Black-winged Stilt *Himantopus himantopus*, Avocet *Recurvirostra avosetta*, Stone Curlew *Burhinus oedicnemus*, Cream-coloured Courser *Cursorius cursor* and Spur-winged Plover *Vanellus spinosus*, some populations included in the analysis are considered to be either resident (non-migratory) or nomadic. These few populations are not further differentiated from the migratory populations in this review.

Compilation and estimation of population size estimates has been undertaken through the work of the WSG expert network, which has established a "Wader Species Expert Network" to facilitate the process. The process was further assisted by two workshops held in conjunction with annual WSG conferences (Belgium 1996 and Hungary 1998), which brought together national and international wader population experts to review compilation and expert interpretation of national population estimates and trends (Davidson 1998).

The 1996 workshop focussed on national and international population estimates for East Atlantic Flyway populations in Europe and North Africa. The 1998 workshop updated this information and extended the compilation and review to all other countries in Europe and Africa.

The workshops were also valuable in identifying a number of issues concerning the quality of data, gaps in coverage and interpretation issues for different species to be taken into account in deriving population estimates from available count data and other population estimates.

Population estimates, ranges and trends have been compiled by combining data and information from four major recent and linked exercises:

1. WSG's extensive compilation of national midwinter counts and estimated of migratory wader populations in Africa, Europe and the Middle East;

2. Further expert analysis of this population data compiled for the Phase 1 Consultation draft of the *Atlas of Wader Populations in Africa and western Eurasia*, prepared by the WSG for Wetlands International and AEWA; and

3. Up-to-date information on some other migratory species not yet covered by the Phase 1 Wader Atlas, from Wetlands International's 1999 *Report on the conservation status of migratory waterbirds*, prepared for AEWA (Wetlands International 2000).

4. Data from the above sources were checked against additional information from the breeding grounds (Heath *et al.* 2000). At a late stage, new national population estimates became available from Wader Study Group's *Breeding Waders in Europe 2000* project (Thorup 2002). These data were used to update BirdLife International's compilation and to develop a data matrix by country and wader population (Annex 4). This allowed the systematic comparison of winter estimates against breeding estimates for those populations where estimates exist for the whole of the breeding range.

At a late stage in the preparation of the review the migratory status of Madagascar Pratincole *Glareola ocularis*, Cream-coloured Courser *Cursorius cursor*, Forbes's Plover *Charadrius forbesi*, Spur-winged Plover *Vanellus spinosus* and Brown-chested Lapwing *Vanellus superciliosus* became clear. For the sake of consistency we have included summary data and information for these species in this publication, drawn with thanks and acknowledgement largely from Scott (2002) and Dodman (2002).

National population sizes

Owing to the great variations in capacity and counting coverage in different parts Africa, Europe and the Middle East it is not possible to derive national population sizes in a consistent way for all countries. Wetlands International's IWC has, since 1967 compiled site-based count data from January (a single weekend for each year is set as the standard count period). January is selected as the period of the year in which between-site movements of migratory populations is least – and so the risk of "double-counting" lowest.

Wherever possible national IWC count co-ordinators and others were requested to produce an estimate based on the average January numbers counted for the most recent five-year period in the mid-late 1990s for which data were available. Choosing a five-year average rather than a single year better takes into account annual differences in numbers due to variations in breeding productivity, missing count data and effects of severe midwinter weather on distribution of the birds and the extent to which they can be counted at such times. For some countries, counts were available for less than a five-year period in the 1990s. For a small number of countries no new count data or estimates were available since before the 1990s, and where necessary these older data have been used, although it is recognised that population sizes may have changed in the intervening period.

For as many countries as possible national population size estimates for each species were produced by either the national IWC count co-ordinator or directly from the IWC Wader Database. Such direct national totals generally underestimate the total number of birds present, since, even in well-covered countries, not all sites can be counted in every year, for a variety of reasons – unavailability of volunteer counters, bad weather conditions *etc*. Wherever possible the national totals of birds actually counted were therefore corrected for gaps in site-counts in different years to produce a national midwinter (January) population estimate. If this was not possible to derive, actual totals counted averaged over a five-year period have been used.

For countries for which regular count coverage of known wader sites was known to be limited, two alternative approaches were employed. Wherever possible, a best estimate for each species was sought from a national wader expert knowledgeable about numbers and distribution of each species. If no such national expert could be identified, total numbers counted for an often small number of sites from data in the IWC Wader Database are used, accepting that such data will provide a minimum estimate of population sizes and that in many instances total numbers actually overwintering in the country will be very much larger.

For some countries different estimation methods were used for different species where, for example, a more accurate estimate could be made for some, *e.g.* localised, species than for others.

Types of national population size estimate are listed in Table 1 and that employed for each country is listed in Annex 1.

Table 1. Types of national population estimate used in estimating biogeographic population sizes of African-Eurasian waders.

Category	Type of estimate
1	Comprehensive/good coverage: five-year average January totals, adjusted to correct for missing site counts
2	Comprehensive/good coverage: Five-year average January totals, not adjusted to correct for missing site counts
3	Comprehensive/good January totals for less than a five-year period
4	January totals: limited coverage
5	Best expert estimate of national totals

Defining geographical limits of populations

The Ramsar Convention (Resolution VII.11), based on Scott & Rose (1996) have defined the term "biogeographical population" as follows. Several types of 'populations' are recognized:

i. the entire population of a monotypic species;

ii. the entire population of a recognized subspecies;

iii. 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;

iv. that 'population' of birds from one hemisphere which spend the non-breeding season in a relatively discrete portion of another hemisphere or region. In many cases, these 'populations' may mix extensively with other populations on the breeding grounds, or mix with sedentary populations of the same species during the migration seasons and/or on the non-breeding grounds;

v. a regional group of sedentary, nomadic or dispersive birds with an apparently rather continuous distribution and no major gaps between breeding units sufficient to prohibit interchange of individuals during their normal nomadic wanderings and/or post-breeding dispersal.

Wetlands International (2000), in some cases further interpreted from additional sources of recent ringing information in WSG's draft *Atlas of Wader Populations in Africa and western Eurasia*, defined the geographic limits of biogeographic population for each species and described the breeding and non-breeding ranges of each. These sources were used to derive a list of range states for each biogeographic population.

For some species, the separation of biogeographic populations based on recent improvements in knowledge differs from those defined by Smit & Piersma (1989) and other sources for Rose & Scott (1997). All such differences in treatment are identified and described in the relevant species texts here, since such differences are important in interpreting observed differences in population size.

Engelmoer & Roselaar (1998) have recently reviewed the taxonomy and characteristic of 14 species of mainly NW European wintering waders. Where possible we have noted the results of their review as these relate to this review, noting where our conclusions differ – typically this is where there remains taxonomic uncertainty at sub-specific level. In these cases, we have recommended further review (see Discussion – Population definitions).

Population estimates, 1% thresholds and trends

To derive midwinter population estimates for each biogeographic population, the population estimate for each country was allocated to a biogeographic population, and the totals summed. In some cases it is known that more than one biogeographic population occurs in a country, either because of overlap in wintering grounds or because range boundaries cut across a country.

In the former case, the total national population was divided by the proportion estimated of different biogeographic populations present, from published (or in a few cases, unpublished) analyses based on morphometric, ringing and phenology data. All such interpretations are documented in species texts. Where range boundaries cut across a country, population estimates were derived for each part of a country separately, and each then allocated to a biogeographic population.

All January estimates derived in this way are shown in Annex 2. Where a derived estimate from national totals was known to be a major underestimate owing to lack of count coverage the wintering range of the population (as is the case for many populations overwintering in Africa and the Middle East), breeding ground estimates, especially from Piersma (1986), Hagemeijer & Blair (1997), Heath *et al.* (2000) and other sources, have been used as the basis of population estimates. We have used the established convention for most species of multiplying the number of breeding pairs by a factor of three for the estimate of midwinter numbers of individuals (unless otherwise specified). These sources of breeding ground estimates have also been used as a cross-check for those populations where midwinter count coverage was considered adequate so as to identify and evaluate any discrepancies in the two sources.

A best available population size estimate was made from these sources and analyses (Annex 2). For populations where neither midwinter nor breeding ground estimates gives adequate coverage, a population size range estimate based on available information is given.

Range estimates follow the conventions used in *Waterbird Population Estimates:*

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.

For each population for which a reliable estimate could be made, a 1% threshold is proposed for use in the application of Ramsar's site selection Criterion 6 for the identification and designation of Wetlands of International Importance under the Ramsar Convention on Wetlands. Standard rounding conventions for these 1% thresholds have been used (see below). It is important to note that proposed 1% thresholds are generally, but not always, precisely 1% (as rounded) of the population estimate. In a few cases a proposed 1% threshold is either lower or higher than this figure to take into account expert interpretation of the current status of the population. Justification for all such deviations from a simple 1% of the population estimate are made in the relevant species accounts.

For populations for which only a size range estimate could be made, a provisional 1% threshold is given in Annex 2. This is derived in most cases as 1% of the mid-point of the population size range estimate. For a few populations the provisional 1% threshold differs from this figure and is based on additional knowledge of likely minimum population size.

Techniques have recently been developed for estimating population sizes and trends that include imputed values for sites that were not counted in particular years. Two similar methods - the "Underhill index" (Underhill & Prys-Jones 1994) and TRIM (Trends and Indices for Monitoring data – Pannekoek & van Strien 1998) are increasingly-widely used for indexing waterbird populations (*e.g.* Prys-Jones *et al.* 1994; Delany *et al.* 1999; Cayford & Waters 1996; Cranswick *et al.* 1999; Deceuninck & Mahéo 2000), and permit the inclusion in indexes and population estimates of the maximum proportion of available counts. They also permit the statistical accuracy of the calculated trends to be derived. For population size estimates the method requires, however, computerised time-series data from as many sites as possible, throughout the range of the population. At the time of the workshops, the Wader Database, managed by the Alterra institute in the Netherlands as part of the IWC was beginning a major reconstruction and could not be used to generate reliable population sizes and trends. Furthermore, for many of the populations reviewed in this paper, no adequate site-based time-series data are available. We have therefore adopted the alternative approach of first making a simple comparison of the difference in estimated population from the mid 1980s to the mid-late 1990s, and then making an expert interpretation of the overall trend based on knowledge of any changes in count coverage, trends in breeding populations, changes to the range of biogeographic populations and any other relevant factors. All trend interpretations are justified in the species texts.

Although trends derived in this manner are not statistically verifiable, the approach has the advantage that it permits establishment of trends through a consistent procedure for a much larger number of populations than would be possible compared with the number for which time-series count data would be available.

Rounding conventions

In compiling this paper it has become apparent that a wide range of different rounding conventions have previously been used to derive 1% thresholds, with little logical consistency even within a source. We strongly urged that all future population size estimates and derived 1% thresholds follow a globally standard convention, or at least, internally standardise and document the conventions used. In deriving 1% thresholds in this paper, the following rounding conventions have been used, which we recommend as a global standard.

Table 2. Conventions adopted for rounding population estimates and derived 1% thresholds.

Population size estimate	Population estimate rounded to the nearest:	1% of population rounded to the nearest:	Range of derived 1% thresholds
1-1,000	Not rounded	1	1-10
1,001-10,000	Not rounded	5	10-100
10,001-100,000	1,000	10	100-1,000
>100,001	10,000	100	>1,000

Key sites for waders in Africa-Eurasia

So as to identify the location and distribution of key sites for wader populations in Africa-Eurasia, we follow Smit & Piersma (1989) in listing all sites known to support ≥20,000 waders in midwinter (Table 3) or in spring and autumn migration (Table 4). Sites were identified from data in the IWC Wader Database, BirdLife International's Important Bird Areas database and other published sources. Where possible, sites listed are those that have regularly supported (*i.e.* a five-year average) ≥20,000 waders during the 1990s. We have also identified sites that are known to have supported ≥20,000 waders at least once during the period, including listing of those sites for which fewer than five years counts are available and, where there are no more recent data, sites supporting ≥20,000 waders prior to the 1990s.

The key sites for overwintering waders on the East Atlantic Flyway permit a comparison with the distribution and knowledge of such sites in the 1980s (Smit & Piersma 1989). In this paper we have also identified key sites used by waders in midwinter on the other two flyways in the region, and sites used only during northern spring or autumn as migration staging and moulting areas, indicating also where an overwintering key site also meets this threshold in spring or autumn.

Although the key sites identified that regularly support ≥20,000 waders would qualify as wetlands of international importance under site selection Criterion 6 of the Ramsar Convention, it should be noted that since this Criterion addresses sites supporting ≥20,000 waterbirds of all species (not just waders) other sites that support smaller wader populations will also qualify as internationally important.

In this paper, we do not present key site information for individual biogeographic populations, since comprehensive listings of such sites are in preparation for WSG's draft *Atlas of Wader Populations in Africa and western Eurasia*.

Comparisons between flyways and between breeding areas

In order to compare the characteristics and the conservation status of migratory wader populations of the three flyways (East Atlantic, Black Sea/Mediterranean, West Asian/African) in the African-Eurasian region (Figure 1), each biogeographic population listed in Annex 2 was assigned to one flyway. Analysis of the migration demography of African-Eurasian migratory wader populations has confirmed that the migrations of almost all biogeographic populations in the region (with the exception of phalaropes *Phalaropus* spp.) fit within one or other of these three flyways (Davidson 1999).

Comparisons are made of the population status on each flyway, examining the proportion of populations for which size and trend data are available, population sizes and trends, and presence of globally threatened species and populations. These analyses provide the basis for recommending priority flyways for improving levels of available data and information, and priorities for conservation action.

In order to assess the conservation status, and adequacy of monitoring provision, of populations breeding in different parts of the Africa-Western Eurasia region, each biogeographic population was allocated to one or more of 22 breeding areas, and comparisons made of the population trends of all biogeographic populations breeding in each area.

RESULTS: COVERAGE

Country coverage and quality of population totals

Best estimate totals for each migratory species in each country in the African – Eurasian region are listed in Annex 3. Of 96 countries, an estimate or some count data were found for 89 countries or islands, with no estimate or counts being identified for five countries (Libya, Djibouti, Somalia, Equatorial Guinea and Democratic Republic of Congo). However for two European countries (Iceland and the Faeroe Islands), three in Africa (Egypt, Guinea and Ghana) and three in the Middle East (Iran, Iraq and Saudi Arabia) no adequate 1990s estimates could be obtained and accordingly, counts or estimates from the late 1970s and 1980s have had to continue to be used.

Despite the extensive overall coverage achieved, for many countries the quality of counts and estimates remains less than comprehensive. In Europe, only nine of 31 countries had estimates rated as good or comprehensive, counts for only a limited number of sites were available for 15 countries, and best expert estimates were made for two countries. However these countries do support the great majority of overwintering wader numbers so overall estimation quality for Europe is good.

For the 50 countries and islands in Africa, information is more limited. Only two countries (Morocco and Ghana) had good or comprehensive counts, 20 had only limited site counts and best expert estimates were used for 15 countries. For the Middle East, all 12 countries had only limited recent site count data, with old (1970s), more comprehensive counts being used for Iran.

For the East Atlantic Flyway, it has been possible to extend estimate coverage substantially in Africa in comparison with Smit & Piersma's (1989) data. Smit & Piersma included estimates for only seven countries on the West African coast; in this paper we have been able to include at least minimum estimates from 20 of the 21 countries and islands of this part of the region.

Causes of population changes

It is important to distinguish between changes in estimated population size and the interpretation of these as trends in population sizes. For several reasons, changes in estimated population size cannot readily be treated as reflecting trends in 'real' (*i.e.* biological) population sizes. Changes in observed population size can arise for several reasons, and these cannot be fully disentangled without more detailed analysis using techniques for assessing population trends involving the estimation of numbers on sites missing from the counts in some years. The population changes reported (Annex 2) may be due to one or more of the following:

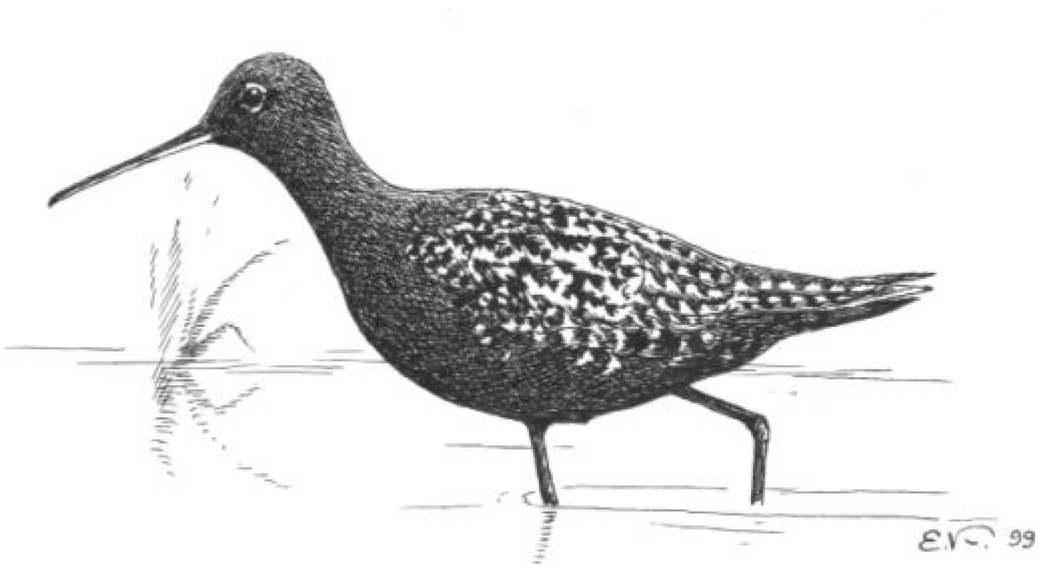
- *genuine changes in the size of the biogeographic population;*

- *differences in count coverage within the range of the biogeographic population between the two periods (*i.e. *change of census activity within countries);*

- *differences in the selection of sites and countries included for each population.* For some species the countries included in the 1990s analysis differ from analyses by Smit & Piersma (1989), but for the comparison Smit & Piersma's figures have been recalculated to allow for this;

- *changes in the distribution of different populations of the same species.*

- *differences in the analysis of count data at national level.* From the Wadden Sea, Smit & Piersma (1989) used totals of birds counted (*i.e.* not taking into account gaps in count site coverage). The 1990s data for the Wadden Sea, however, are for estimated populations derived from analyses that include imputation of numbers present on sites for which counts were missing for some years. A rough indication of the effect that such differences may have on the apparent changes in population size between the 1980s and 1990s can be gained from recalculating Smit & Piersma's (1989) figures by the addition of the average differences between actual and inferred counts for the Wadden Sea for January 1988-91 given by Meltofte *et al.* (1994). For most species, this results in a difference in change of only a few percentage points (decreasing apparent increases and increasing apparent declines). For Oystercatcher, however, this approach reduces the estimated change in international population size from +19% to only +1%, and alters the total wader population from a small increase to a small decrease. This emphasizes the pitfalls in attempting to interpolate trends from apparent changes in national population data, and the importance of making such interpretations based on statistically sound index-based trend analyses.



D:\Documents\WSG\Populations\Final\MASTER Discussion May 2004.doc
D:\Documents\WSG\Populations\Final\Table 3 Wader key sites table midwinter May 2004.doc
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D:\Documents\WSG\Populations\Final\Annex 5 Regional trends May 2004.doc

The International Wader Study Group (WSG) is a voluntary association of amateur ad professional researchers on all aspects of the biology of waders (shorebirds). The Group has rapid access to experienced people throughout the international field of wader research. Founded in Britain in 19780, the group now has worldwide membership. The WSG acts as the wader Specialist Group for Wetlands International and IUCN-The World Conservation Union's Species Survival Commission.

Estimates of the size of wader populations need to be regularly updated for use in flyway and site conservation, and up-to-date information on population trends is an essential basis for identifying priorities for conservation action. This review presents the results of a major collation and reanalysis of 1990s migratory wader population data for all countries in Africa and Eurasia. The review was undertaken by the International Wader Study Group between 1996 and 2000, and updates previous estimates dating from the mid-1980s. Estimates for 131 populations of 55 wader species were compiled from national data sources and through workshops of wader experts.

The review provides a major review of the current status of these populations and future priorities are identified for survey and monitoring and well as conservation.

The Common Snipe is declining across much of its European range as a consequence of the loss and agricultural intensification of its wetland breeding habits.

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