INTRODUCTION

A great deal of effort has been expended during the last 20 years aimed at understanding the migration patterns and wintering grounds of waders, especially those populations passing through Western Europe. The results of this work have identified many of the most important wintering grounds and migration staging areas for waders in the East Atlantic area, which extends from breeding areas in arctic Canada in the west to Siberia in the east, through western Europe to western and southern Africa. During the same period international measures e.g. the 'Ramsar' Convention on the Conservation of Wetlands of International Importance especially as Waterfowl Habitat, and the EEC Directive on the Conservation of Wild Birds, as well as national measures to safeguard wetlands of importance to migrating and wintering waders, have been developed and strengthened. However, despite such safeguards, many important wader habitats and sites remain threatened, and continue to be lost, through a wide variety of developments, land-claim and pollution.

Studies over large geographical areas, aimed at determining where birds are, and when, where and how they move between sites, are vital in providing the information on which to base the case for the conservation of sites, and to identify the conservation strategies needed to safeguard migratory populations. During the last few years there has been a resurgence of studies on the migration systems of waders, especially those breeding in arctic, sub-arctic and northern temperate regions throughout the world. This has led to much new information of use in wader conservation becoming available. Major investigations now in progress, or reaching completion, on migration systems of waders include the Wader Study Group project on the spring migration of waders along the East Atlantic, and studies in the western European and West African part of the flyway; the Pan-American Shorebird Program; Interwader, in South-East Asia; and the Royal Australian Ornithologists' Union Wader Studies Program. Many of these projects operate internationally (as do the birds they study), some with the extensive involvement of the Wader Study Group (WSG) in a co-ordinating role.

One of the major aims of many of these studies has been to provide baseline information about the importance of wintering and migration staging sites and the links between them, that can help in promoting a cohesive strategy for improving the conservation of waders throughout their entire migration systems. It is especially important for wader biologists working on such studies to understand the needs and priorities of those engaged in the conservation of waders and wetlands, so that the fundamental information on how waders use the various areas can be applied most effectively to the conservation of the birds and their habitats.

There are many lessons from the differing approaches used by the various research studies that can be valuably shared by those involved in wader research and conservation. WSG recognised that the stage reached by these various projects made it appropriate to bring together those involved, to compare methodologies, to exchange information and views on the current achievements, to identify the gaps remaining in the understanding of migration patterns, and to assess future directions for international and national efforts to conserve waders and their habitats. This resulted in a workshop held in conjunction with the WSG annual meeting, at Oatridge Agricultural College, near Edinburgh, on 13 and 14 September 1986. The papers in this volume result from this Workshop on the Conservation of International Flyway Populations of Waders.

In arranging such a workshop, the Wader Study Group was functioning in its major role of promoting contact between wader workers throughout the world. The timing of the workshop was especially appropriate in view of the forthcoming meeting of the contracting parties to the 'Ramsar' Convention, to be held in Regina, Canada in May/June 1987, since part of the workshop sessions associated with this meeting will be concerned with updating information on wader flyways. The International Waterfowl Research Bureau (IWRB), who act as technical advisors to the secretariat to the 'Ramsar' Convention, have joined WSG in financing the production of this volume of workshop proceedings, and will use them as background information for the meeting in Regina.

The proceedings concentrate on knowledge and conservation of migratory species of waders, particularly those that breed in arctic, sub-arctic and northern temperate regions. Species breeding in the tropics and southern temperate regions are not covered in detail. We define a wader flyway in its simplest sense, as the migration route(s) and areas used by a wader population in moving between its breeding and wintering grounds. In using the term 'flyway' which has a varied history, we wished to draw attention to the various approaches which have been used in the major regions of the world, into which the migrations of individual species and populations can be more or less conveniently grouped. We do not wish to imply that there is any hard and fast separation between such 'flyways', nor any excessive generalisation as to their biological sigificance as opposed to the convenience of this approach.

Like wader populations, terminologies differ geographically, and to maintain the international flavour of the proceedings we treat "wader" and "shorebird" as synonymous for the Charadrii, although we have tried to achieve consistency of usage within each paper. However, some authors have defined shorebird in rather wider terms. Provided that their definition is clear within their paper, we have not altered this.

The proceedings, like the workshop they report, are in 4 sections. Firstly reviews of wader flyways worldwide. These focus on the ways in which information has been collected; a summary of the main breeding, wintering and migration staging areas, and the routes between them; the major identifiable gaps in this information, and the future directions for research. To aid presentation of the information on flyways, the reviews divide the world into 4 regions. This is not meant to indicate that these regions have discrete wader populations, since there are certainly links between the wader populations in these regions. For example some waders that overwinter in southern Africa migrate to Siberian breeding grounds along the East Atlantic seaboard, whilst others pass through East Africa and West Asia.

The amount of detail presented in these reviews differs, depending on how extensive is the knowledge of the flyways. For poorly-known flyways such as those through East Africa and the Middle East, the review assembles for the first time much published and unpublished detailed information about the numbers and identities of waders and their migration routes. In contrast, such a detailed review of the vast number of studies of waders using the East Atlantic flyway is not possible within the confines of space in this volume, and accordingly this review provides a broad overview of the migration routes and staging areas. We are grateful to the authors of these regional reviews, who have been prepared to take considerable trouble to collaborate with each other, and other workers who have freely provided further information, to reduce the bulk of the material to a limited number of reviews of readable length. Such efforts amply illustrate the great value of such international collaboration in the study of wader migration systems.

To complement these overviews of wader flyways, and to illustrate the kind of research studies that are currently expanding knowledge of wader flyways, the second section of the proceedings presents some recent work on the distributions and migrations of waders. In addition to reports of individual studies, we have also included in this section a summary of the recent WSG publication that assesses the breeding populations of waders throughout much of Europe, a progress report of a major analytical study of the origins of waders in the Wadden Sea, and a listing of other papers on flyway populations published recently in *Wader Study Group Bulletin*.

Having described the research and knowledge of wader populations, the third part of the proceedings turns to the conservation of these populations and the habitats they use. Summaries of the current threats to wader populations on breeding, staging and wintering areas are followed by assessments of the various attempts to conserve waders and their habitats worldwide, from international conventions and national measures on the conservation of existing habitats to habitat restoration and restoration. The final paper in this section, considering the socio-economic aspects of conservation, leads onto the final part of the proceedings: a discussion of future directions and priorities for those aspects of wader research and conservation relevant to the workshop. This focusses particularly on whether the amount of information now available on wader numbers and distributions is sufficient for effective implementation of wader and wetland conservation, and where the priorities for the limited amount of funding for research and conservation should lie.

Rather than reporting the workshop discussions verbatim, we have attempted to bring together the views of the workshop participants under a number of topics. Likewise, authors have incorporated in their papers in the proceedings relevant information arising from the discussions at the workshop. The discussion was lively and we hope that this is clear in the summary, despite the need to cut this to a reasonable length.

Although we have tried as far as possible to achieve a consistency of approach and presentation, we should make it clear that the views expressed in this volume, particularly in the 'Approaches to Flyway Conservation' section, are those of the authors. These are not necessarily the views of WSG or IWRB, but rather represent the range of views and ideas current in wader research and conservation throughout the world.

We hope that these proceedings will provide a useful summary of what is known about migrations of wader populations throughout the world, and of the measures used to conserve them. We hope also that the information will will encourage and direct wader workers towards filling the gaps in current knowledge that are highlighted here. The workshop, and these proceedings, have brought together those working on the biology of waders and those conserving them, and resulted in a much clearer understanding for many who attended of the future needs of wader research and how it can be best utilised. There is great value in continuing such dialogue. The need for close liason between researchers and conservationists is clear, and is essential if measures to conserve waders and their habitats are to succeed in the face of the many threats that face them worldwide.

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