Strategies for Conserving Migratory Waterbirds

Proceedings of Workshop 2 of the 2nd International Conference on Wetlands and Development held in Dakar, Senegal, 8–14 November 1998

Edited by Albert Beintema and Janine van Vessem

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Ministry of Environment and Nature Protection of Senegal

The 2nd International Conference on Wetlands and Development aimed to review progress in wetland conservation and development since the 1st Conference (Malaysia, 1995). The conference reviewed trends in wetland development and management, and identified issues and solutions which could benefit agencies and individuals concerned with the wise use of wetlands at all levels. Special focus was given to Africa, with the aim of developing new partnerships, networks and programmes for the future.

Endorsements for the conference were received from the Convention on Biological Diversity, The Convention to Combat Desertification, the Convention on the Conservation of Migratory Species of Wild Animals, the Ramsar Convention on Wetlands, the UN Economic Commission for Africa, and the World Heritage Convention. More than 40 donors provided funds to the conference (see back page).

The Conference was opened by the Senegalese Minister of Environment and Nature Protection, in the presence of the Senegalese Minister of Foreign Affairs. Opening and keynote speeches were made by the President of Wetlands International (also representing IUCN – The World Conservation Union and The World Wide Fund for Nature – WWF), the Commissioner for Rural Development of the Economic and Monetary Union of West Africa, the Director of National Parks in Senegal, the Chair of Wetlands International – Asia Pacific, HRH The Litunga Ilute Yeta IV of Barotseland, and representatives of the UN Economic Commission for Africa and the UN Environment Programme.

The conference included 5 workshops covering:
1. Strategies for wise use of wetlands: best practices in participatory management.
2. Strategies for conserving migratory waterbirds.
3. Integrated wetlands and water resources management.
4. Wetland inventory, assessment, monitoring and valuation.
5. Mechanisms for financing the wise use of wetlands.

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All chairpersons – Carlos Bento, Oliver Biber, Djahida Boukhalfa, Allix Brenninkmeijer, Simon Delany, Augustine Ezealor, Oliver Nasirwa, Brahim Ould Messaoud, Rivo Rabarisoa, Paul Schmidt, David Stroud, Mohammed Younis Abdel Salam, and Jeff Kirby – did a wonderful job, and managed to keep their sessions in a tight schedule. We also thank the rapporteurs – Sherif Baha El Din, Bart Ebbinge, Andy Green, Heinz Hafner, Stephan Pihl, Eileen Rees, and Emmanuel Williams – for their invaluable input.

All chairpersons and rapporteurs also helped in the formulation of the conclusions of the workshop.

Many thanks also to all those who contributed to the workshop through presentations, posters, or active input during discussions.

Thanks to Wendelien Ordelman for secretarial support throughout the process of preparation, execution, and follow-up of the workshop, and also to Claire Nivet for the French proof reading.

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Albert Beintema and Janine van Vessem
September 1999

Foreword

At the time of writing this Foreword it became known that the 7th African country had ratified the African-Eurasian Migratory Waterbird Agreement. This extremely important but as such, small event, means that the AEWA will come into force on 1 November 1999! This is good news and marks the end of a long process of international consultations and negotiations which, in its very first stage, started in 1985 in Bonn, Germany, at the First Meeting of the Conference of the Parties to the Bonn Convention. Originally it was intended to be a small Agreement for Anatidae in the Western Palearctic only. However, during the development of that Agreement it became apparent that a much wider range of species and geographical area should be taken into account.

That of course slowed down the process but the wait was worthwhile so that the many wishes from the African countries to be included could be incorporated. After all, the migratory Palearctic waterbird species winter all over Africa, making the continent an integral part of their life cycle. We now have the world's largest flyway Agreement in place and, on several issues, already functioning.

This all is only about one year after we had our well attended and productive workshop at the Wetlands International Conference in Dakar. The workshop addressed the Strategies for Conserving Migratory Waterbirds worldwide. We were both impressed by the enthusiasm of the participants, the fully occupied meeting room and the many questions from the audience. It shows an important and close commitment to an issue which sometimes by other people is considered as "just these birds". They have the strong belief that there are other, more important issues to be looked at and solved.

The countries and people of the African continent and Central and Eastern Europe face major problems, but we are convinced that the presence of birds (waterbirds as a case in point) is an essential element of people's environment and of nature in general. Waterbirds are important indicators of the wellbeing of wetlands (whose enormous worth is so often undervalued) and they also themselves have significant economic, cultural scientific and aesthetic value.

The proceedings of this workshop are a vital part of the work of letting the AEWA become a living international instrument and an example for other regions of the world. We will be most happy to work together with all of you to implement the results and recommendations of the workshop.

Dr Gerard C. Boere and Ing. Bert Lenten

Interim Secretariat African Eurasian Migratory Waterbird Agreement
Ministry of Agriculture, Nature Management and Fisheries, The Netherlands

Introduction

Workshop 2 was organised by Janine van Vessem and Albert Beintema (Wetlands International-AEME), in co-operation with the Interim Secretariat of the African-Eurasian Migratory Waterbird Agreement (AEWA), and co-ordinated by Albert Beintema and David Stroud (JNCC, UK).

Workshop objectives

The main objective was to promote the AEWA, and emphasise the opportunities the AEWA agreement offers for waterbird conservation at flyway level. The workshop did:

- provide a global overview of migratory waterbird conservation strategies
- focus on the example of the African-Eurasian Migratory Waterbird Agreement (AEWA)
- review draft documents and Conservation Guidelines for AEWA
- discuss options for the implementation of AEWA, with special emphasis on Africa.

Workshop outline

This workshop reviewed conservation strategies for one aspect of wetland biodiversity – migratory waterbirds. These spectacular and highly mobile species can only be conserved by co-ordinated efforts at intercontinental flyway level. The workshop compared strategies developed in the Asia-Pacific and the American region, with the African-Eurasian Migratory Waterbird Agreement (AEWA), a new instrument under the Bonn Convention to conserve waterbirds across the African/Eurasian region. Keynote speakers explained large-scale conservation strategies, while case studies and poster presentations dealt with activities at a smaller scale. As called for in the AEWA Action Plan, a set of nine so-called Conservation Guidelines is being produced, seven of which were discussed in draft during the workshop.

Conservation strategies

On a global scale, there are three major flyway systems: one connecting northern North America with South America, one connecting Siberia with South Asia, South-east Asia and the Pacific, and one connecting Siberia, the Middle East and Europe with Africa. Each of these three regions can be subdivided into different flyways. The Central Asian flyway, connecting Siberia and the Central Asian countries with the Indian subcontinent and the Indian Ocean, is considered to be part of the Asia/Pacific region, although there is overlap with the Eurasia/Africa region. In all three regions efforts are made to co-ordinate international conservation of wetlands and their waterbirds.

The African-Eurasian Migratory Waterbird Agreement (AEWA)

The AEWA is an agreement under the Bonn Convention (1979) or the Convention on Migratory Species of Wild Animals, which was finalised in 1995. The AEWA will come into force as of 1 November 1999. The AEWA encompasses the flyway system covering all of Europe and Africa, islands included, the Middle East, Siberia east to 130°E, the lowlands of Central Asia east to 90°E, Greenland, and even part of the Canadian arctic islands, which harbour shorebird populations which migrate via Greenland to the eastern shore of the Atlantic. As of 31 August 1999, 28 countries have signed the AEWA agreement, and 19 ratified it. Within the AEWA region, 170 species of migratory waterbirds have been listed.

The fields of activities provided by the AEWA encompass:

- species conservation (e.g. single species action plans)
- habitat conservation
- management of human activities
- research and monitoring
- education and information
- implementation.

The workshop particularly focused upon the so-called Conservation Guidelines. Although many guidelines already do exist, a need is felt for an ‘own’ set of guidelines for the AEWA. A set of easily recognisable guidelines may help to promote the Bonn Convention in general, and the AEWA in particular. The whole set will consist of nine Guidelines, seven of which were discussed at the workshop.

This volume first presents the conclusions of the workshop, and then is divided into three sections, dealing with global waterbird conservation strategies, regional aspects of the African-Eurasian Migratory Waterbird Agreement (AEWA), and case studies in the AEWA region, respectively. The final programme and the abstracts of the posters presented, are given as appendices.

Conclusions of Workshop 2

Review waterbird conservation strategies globally

Mechanisms for the international conservation of waterbirds were reviewed at the 1993 Conference on Wetlands and Development in Kuala Lumpur. Further recommendations include:

- the implementation of the Kushiro Protocol, which has led to the establishment of the crane and shorebird flyway networks in the Asia-Pacific region;
- the implementation of the Brisbane Initiative in 1996, regarding a shorebird reserve network in the Asia-Pacific region;
- the implementation of the Odessa Protocol, regarding worldwide promotion of shorebird flyway networks and information exchange;
- the conclusion of the Final Act of the Agreement on the Conservation of African-Eurasian Migratory Waterbirds under the Bonn Convention.

Networks of protected wetlands for waterbirds are required at different scales:

- Hemispheric (e.g. the Western Hemisphere Shorebird Reserve Network);
- Flyway level (orientated around the needs of specific taxonomic groups as have been developed in the Asia-Pacific region for cranes and shorebirds);
- National (as urged by the Ramsar Convention).

Networks should reflect the ecological needs of species and these needs should therefore be reflected in appropriate site selection criteria.

Major gaps in the international networks of protected wetlands include the need for a multi-lateral government treaty in South America, and major co-ordination in the central Asian flyway. Protected areas are also urgently required for globally threatened waterbird species, many of which are neither migratory nor occurring in large numbers. Thus, sites for globally threatened waterbirds may be different from those identified under agreements relating to migratory waterbirds.

Wetlands International should continue to develop its international waterbird censuses and to enhance their global coverage (geographical and species coverage). This is a fundamental requisite for the identification of wetlands of importance for waterbirds, and an essential source of information to establish estimates of population sizes and trends.

Whilst there is a wide range of waterbird monitoring activity around the world, there is not yet a single source which adequately summarises current activity. Since monitoring of waterbird populations is a fundamental activity for the planning of international conservation initiatives, there is an urgent need to review the extent of current monitoring programmes to determine who is doing what, where, and how. This is a task which Wetlands International, through its network of Waterbird Specialist Groups, would be very well placed to undertake.

Consider the example of the African-Eurasian Migratory Waterbird Agreement (AEWA)

AEWA will positively benefit waterbird conservation in the region by providing a framework for conservation actions. However, this framework needs to be fleshed out by the provision of more detailed guidance regarding implementation needs.

Governments throughout the African-Eurasian region should be encouraged to sign and ratify the Agreement. Allthough the AEWA is a treaty concerned with migratory birds, the site protection, monitoring and other mechanisms which will occur to implement the Agreement have the potential to help conserve a wide range of other wetland fauna, flora and habitats.

The implementation of the AEWA will be constrained by:

- lack of finances (essential for the adequate implementation in many countries);
- lack of trained staff;
- lack of governmental and other capacity;
- lack of communication between and within Contracting Parties.

These constraints will need to be addressed by AEWA Contracting Parties in order to assure the effective implementation of the Agreement.

Implementation of the AEWA will depend on:

- sound science (with the monitoring and inventory activities of Wetlands International and its specialist groups having a key rôle);
- flexibility to accommodate a wide range of national conservation systems and capacity;
- the urgent need for enhanced co-ordination (both within government structures and between government agencies);
- cross-border co-operation in monitoring and census activity, implementation of responses to emergency situations, and other aspects of Agreement implementation. (There is strong potential for the establishment of contact networks in groups of neighbouring countries, which could lead to synergy at regional and sub-regional levels.)

Implementation of the AEWA will also depend on the establishment of clear priorities by the first Meeting of the Parties (1999). Countries with limited conservation capacity need guidance to ensure that the most important tasks are tackled first. Priorities include:

- inventory and monitoring;
- research and survey for species that are currently deficient in basic data;
- actions for globally threatened waterbird species, including implementation of existing action plans;
- close cross-border co-operation, since many wetlands form political boundaries.

There is scope in the implementation of the AEWA to develop linkages and synergies with aspects of other conventions, such as the Ramsar Convention, the Convention on Biological Diversity, the Convention on Migratory Species of Wild Animals, and the European Union Birds Directive. Such linkages and synergies should ensure that scarce conservation resources throughout the region are devoted primarily to conservation activity, rather than unnecessary bureaucracy. In particular, the considerable guidance developed by the Ramsar Convention, in relation to wise-use and other policies, is widely applicable to the implementation of the AEWA in Africa.

Review Draft Conservation Guidelines for the AEWA

Nine guidelines are being drafted for the AEWA Interim Secretariat by Wetlands International. The workshop provided an opportunity for peer review, in particular obtaining input of African waterbird specialists. Draft texts for seven of these guidelines (printed in boldface below) were reviewed at the workshop. The remaining two will be developed later, but in time for the first Meeting of the Parties to the AEWA in 1999.

Guidelines will be prepared for:

- **preparation of single species action plans**
- **identifying and tackling emergency situations**
- **preparation of site inventories**
- **management of critical sites**
- **sustainable harvest**
- trade regulation
- development of eco-tourism
- **reducing crop damage**
- a waterbird monitoring protocol.

Consider implementation priorities for the AEWA, especially in Africa

Waterbirds can be important 'flagships' for wider wetland values. The needs of migratory waterbirds are easily understood and birds are a visible and potent symbol. Conservation actions related to waterbirds enable the establishment of a dialogue with local communities which in turn can assist in developing a wider conservation agenda relating to community involvement in wetland management.

The implementation of the AEWA requires close co-operation between governments, NGOs and local communities. Training of conservation professionals, development of networks, and capacity building, both within governmental and non-governmental organisations will be essential. Financing options need to be addressed by the first Meeting of the Parties in 1999. There are severe economic constraints on the potential to implement the AEWA, especially in Africa.

Generic issues

- In many areas, it is difficult to identify clear sites due to either the extensive nature of wetlands or the temporary nature of many wetland habitats.
- There is a need to link conservation and management activities within protected areas with activities occurring in surrounding areas ("no park is an island").
- Planning of activities is the easier task; the implementation of treaty obligations and practical conservation on the ground is much more challenging.
- With at least 120 potential range states and 170 species the implementation of the AEWA is a major challenge; there is therefore a need for a menu of options to accommodate existing systems of conservation and political infrastructure.

Monitoring and research

- The development of an intra-Africa ringing co-ordination scheme ("AFRING") is a very high priority.
- Whilst the counting of water birds is a priority activity, opportunities should be taken to record and monitor other species when census visits are made to wetlands. Counters could record other wetland birds, such as raptors, other wetland vertebrates e.g. hippopotamus, and other species relating to land-use or human activity.
- There is scope to establish a global network of key shorebird sites; the criteria for selection need to be carefully developed, to reflect the ecological needs of the species.
- Current guidance relates particularly to Europe where census activity is particularly undertaken through mid-winter counts. Whilst this is appropriate for Anatidae the AEWA relates also to storks, spoonbills and ibises. The Waterbird Monitoring Protocol should also give due emphasis for appropriate methods for these and other colonial species.

Main conclusions

- Conservation planning for sites and species is an activity of fundamental importance. This needs to be underpinned by basic inventory data for wetlands (as discussed in detail in Workshop 4) and population monitoring data for waterbirds.
- Community involvement in wetland management is essential (discussed in Workshop 1).
- The AEWA should develop linkages with other conventions and treaties (e.g. the Ramsar Convention) but some aspects will be unique since protection under Ramsar will also encompass wetlands of little importance for waterbirds, whilst the AEWA requires protection for non-wetland habitats used by some species (such as geese on farmland).
- Conservation guidelines under the AEWA will need to remain flexible and subject to regular review and development, as well as allowing latitude in international implementation according to differing national capacity.
- AEWA conservation guidelines need to be written in non-bureaucratic language and widely translated to reach many target audiences throughout the region.
- In implementing the AEWA, a fundamental need will be the establishment of an inventory of key sites to underpin any co-ordinated conservation planning for

priority wetlands and for species conservation. It should draw on existing inventory processes such as the Important Bird Areas initiative of BirdLife International. The conclusions of Workshop 4 are also particularly relevant, and the development of a key site inventory for AEWA is an activity that Wetlands International would be well placed to co-ordinate and develop.

- Sound data and information are essential for adequate conservation planning; research and survey for species that are currently deficient in basic data should be a priority.

Part I:

Global waterbird conservation strategies

Promoting Migratory Waterbird Conservation in the Asia-Pacific

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Key words: Asia-Pacific, strategy, conservation, Anatidae, cranes, shorebirds, flyway.

Conservation of migratory waterbirds provides a challenge in a region as vast as the Asia-Pacific – with its great diversity in species, habitats, peoples and cultures, threats and potential solutions. To draw attention to conservation priorities at a regional and flyway level, the *Asia-Pacific Migratory Waterbird Conservation Strategy: 1996–2000* has been developed through a process of extensive and intensive international consultation and debate. The *Strategy* covers seven broad, overlapping themes: Conservation of Species; Conservation of Habitats; Research and Monitoring; Education; Information and Awareness; Training; and Policy and Legislation. Initiatives to address these themes include the development of action plans for three species groups (shorebirds, cranes, and Anatidae), through the establishment of networks of sites of importance for shorebirds and cranes (to be established for Anatidae in 1999), training and public information, and awareness plans. The work is promoted by Wetlands International in close collaboration with, and support from wetland/species conservation conventions, governments, NGOs and experts. This paper summarises the philosophy adopted in developing the *Strategy*, achievements to date, proposed activities and an outline of a vision for the future.

Introduction

The Asia-Pacific region covers a large part of the globe and is home to a great variety of waterbirds. Of the more than 400 waterbird species recorded, 243 undertake annual migrations along different flyways and depend on wetlands in about 57 countries and territories. These include globally threatened and enigmatic species like Siberian Crane *Grus leucogeranus,* Scaly-breasted Merganser *Mergus squamatus* and Spoonbilled Sandpiper *Eurynorhynchus pygmeus* (Collar *et al.* 1994).

There is a growing recognition amongst people in different countries of the need to work co-operatively at all levels, to promote conservation of birds and their habitats. The need to identify regional conservation priorities led to extensive international consultation between 1994 and 1996. This has resulted in the development of the *Asia-Pacific Migratory Waterbird Conservation Strategy: 1996–2000*.

The *Strategy* aims to provide a framework for all waterbird conservation initiatives to be undertaken by agencies/ organisations in the region over the 1996–2000 period, and has identified those that should be developed further. The success of the Strategy lies in its acceptance by parties and the willingness of countries in the region to undertake activities together, in a co-ordinated manner.

Background information on the philosophy and process of development of the *Strategy* was presented at the first International Conference on Wetlands and Development held in Malaysia in November 1995 (Mundkur and Matsui 1997). An update on the actions developed under the Strategy was presented in China in March 1997 (Mundkur and Matsui, 1998). This paper is the third in the series; it outlines the scope of the *Strategy,* focuses on achievements and proposed activities, and briefly outlines a vision for the future.

Scope and focus of the strategy

Flyways

At a global scale, flyways of migratory birds can be divided into three major regions: the flyways of the Americas, African-Eurasian flyway and Asia-Pacific flyways. Taking a conservative approach, and because of geographic considerations, the *Strategy* adopts the three overlapping Asia-Pacific flyways used by long-distance migratory shorebirds (Figure 1):

- Central Asian-Indian Flyway
- East Asian-Australasian Flyway
- West Pacific Flyway.

Geographic area

The Asia-Pacific region is taken to include the Asian continent east of the Ural mountains and Sea of Azov, south to the Caspian Sea and Persian Gulf across all the countries of Asia and the former Soviet Union to Alaska (USA), Australasia, and the island countries and territories of the Pacific Ocean east to the Pitcairn Islands (United Kingdom).

The geographic coverage of the *Strategy* complements and partially overlaps other major international conservation initiatives. These include the African-Eurasian Migratory Waterbird Agreement (AEWA) under the Convention of the Conservation of Migratory Species of Wild Animals (CMS), the North American Waterfowl

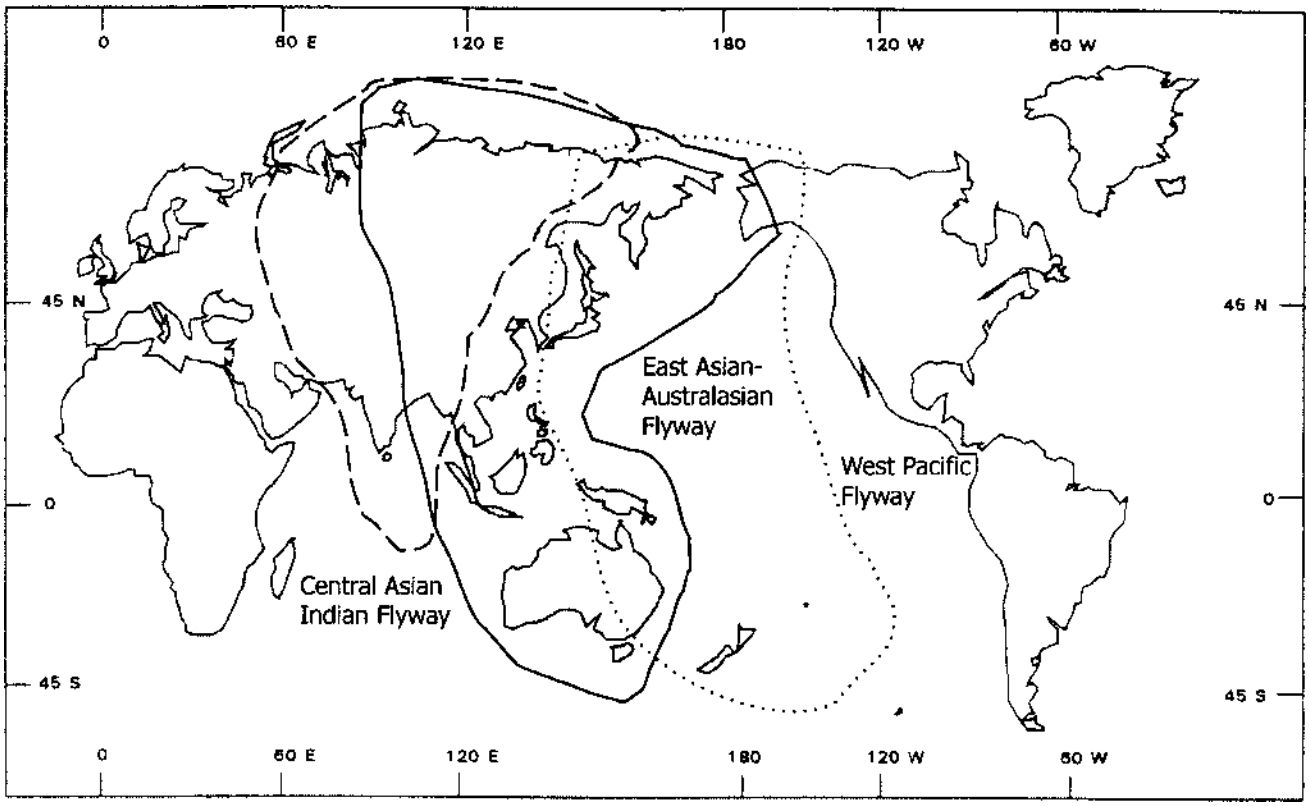

Figure 1. Flyways in the Asia-Pacific region.

Management Plan (NAWMP) and the Western Hemisphere Shorebird Reserve Network in the Americas (WSHRN).

Species

The *Strategy* adopts the Ramsar Convention definition of waterbirds: "birds ecologically dependent on wetlands", with the exception of wetland-related raptors (see Table 1 for a list of families included).

Table 1. Waterbird groups covered by the *Asia-Pacific Migratory Waterbird Conservation Strategy: 1996–2000.*

Gaviidae	Divers
Podicipedidae	Grebes
Phalacrocoracidae	Cormorants
Pelecanidae	Pelicans
Ardeidae	Herons, Egrets and Bitterns
Ciconiidae	Storks
Threskiornithidae	Ibises and Spoonbills
Phoenicopteridae	Flamingoes
Anatidae	Swans, Geese and Ducks
Gruidae	Cranes
Rallidae	Rails, Gallinules and Coots
Heliornithidae	Finfoots
Jacanidae	Jacanas
Dromadidae	Crab Plover
Haematopodidae	Oystercatchers
Recurvirostridae	Stilts and Avocet
Glareolidae	Pratincoles
Charadriidae	Plovers
Scolopacidae	Sandpipers
Laridae	Gulls, Terns and Skimmer

Focus of conservation action

The *Strategy* outlines six overlapping themes. Each theme has one or two main objectives, and to achieve the total of 11 objectives, 49 priority actions have been identified (Table 2). The first two themes, *Conservation of Habitats* and *Conservation of Species*, are the central themes. The other four themes present actions in support of the objectives related to the two central themes.

These actions are being addressed independently or in collaboration with governments, conventions, NGOs and local people. Wetlands International has itself initiated a number of actions to promote implementation of these priority actions.

Administrative/technical support from Wetlands International

The Council of Wetlands International – Asia-Pacific has established an international consultative committee – the Asia-Pacific Migratory Waterbird Conservation Committee (MWCC) with a mandate to promote and monitor implementation of the *Strategy*. The MWCC currently comprises government members, representatives of the Ramsar and Bonn Conventions, representatives of international NGOs and Chairs of the Shorebird and Crane Working Groups. A Strategy Co-ordination Officer provides secretariat support to the Committee and works closely with three flyway officers to implement initiatives developed under the *Strategy*. The flyway officers are responsible for co-ordinating activities to promote development of networks of sites of international importance for migratory shorebirds, cranes and Anatidae. These four staff are based in the offices of Wetlands International in Australia, Japan and Malaysia. Ongoing

Table 2. Themes, objectives and actions outlined in the *Asia-Pacific Migratory Waterbird Conservation Strategy: 1996–2000.*

Theme	Objectives		Actions
Conservation of Habitats	A	Enhancement of site conservation	4
	B	Establishment of flyway reserve networks	4
Conservation of Species	C	Development and implementation of waterbird conservation action plans	3
	D	Promotion of the sustainable management of migratory waterbirds	5
Research and Monitoring	E	Conservation-oriented monitoring and research activities	10
	F	Establishment of advanced migratory waterbird and wetland information storage and retrieval systems	3
Education, Information and Awareness	G	Increase of education and public awareness	4
	H	Promotion of information flow among waterbird and wetland conservation researchers	3
Training	I	Training of personnel associated with the survey, study and management of waterbirds and their habitats	5
Policy and Legislation	J	Review and strengthening of waterbird and habitat conservation policies and legislation	4
	K	Development of an Asia-Pacific Multilateral Migratory Waterbird Conservation Agreement	4

financial support from the Environment Agency of Japan and Environment Australia has permitted Wetlands International to employ three flyway officers and the Strategy Co-ordination Officer to work on a part-time basis.

Achievements to date

Wetlands International has focused its attention on five initiatives (three new and two on-going) recognised as priorities under the *Strategy*. The new initiatives focus largely on the countries in the East Asian-Australasian flyway because of the existing links with governments and funding agencies. These initiatives are being undertaken in addition to actions, projects and programmes of Wetlands International which promote wetland conservation at both national and local level. The five initiatives are briefly outlined below.

1. Promoting conservation of migratory shorebirds in the East Asian-Australasian Flyway

The East Asian-Australasian Flyway is now one of the better studied shorebird flyways within the Asia-Pacific (Wells and Mundkur 1996). Work to date has revealed the multitude of threats to shorebirds and their habitats. To stimulate international co-operation to promote conservation of these shorebirds, a draft Asia-Pacific Shorebird Action Plan was developed in 1996. The draft plan has served to guide the establishment of the East Asian-Australasian Shorebird Reserve Network. A background to the rationale and focus of the action plan has been provided by Watkins and Mundkur (1997). The Plan has been finalised in 1998 and identifies 15 actions for implementation during the 1998–2000 period. The Australian Government has committed significant funding over three years to support implementation of the plan. Wetlands International is now seeking complementary support from other government agencies, international funding agencies and the corporate sector.

The launch of the East Asian-Australasian Shorebird Reserve Network at the 6th Conference of Contracting Parties of the Ramsar Convention in March 1996 in Brisbane, Australia has marked the start of the first major initiative under the *Strategy*. At the launch, 19 sites were nominated from eight countries in the flyway. Contracting Parties of the Ramsar Convention called for the promotion of the network through a special recommendation (# 6.4) at the Conference (Ramsar Convention Bureau 1996). Since then, two more sites from two countries have been added (Figure 2).

Activities to promote the network to date have focused on:

- The East Asian region where it is considered that shorebirds are under greatest threat from habitat loss.
- A training programme at three Network sites in China and Papua New Guinea.
- Development of projects relating to site management at three sites in China, one site in the Philippines, and two sites in Australia.
- Commencement of community based monitoring programmes at three sites in Australia.
- Production of a flyway poster in English, Chinese and Japanese along with brochures in English.
- Distribution of news on activities of the Network in an existing regional newsletter *The Tattler* and a bulletin *The Stilt*. Environment Australia is funding complementary distribution of these publications to 100 people in developing countries in the Flyway.
- Environment Australia has funded and co-ordinated the development of a colour marking protocol for shorebirds in the Asia-Pacific to facilitate migration research.

Implementation of the Shorebird Action Plan and the network is being co-ordinated by the Shorebird Working Group. The Group comprises of technical and government experts from the flyway. The Group has met for the first time in China in April 1998 and the next meeting is proposed for January 1999.

2. Promoting Crane conservation in North East Asia

North East Asia is home to four globally threatened species of cranes. Three of these are only known from the region and nearly the entire population of the Siberian Crane migrates between three countries in the region. To promote their conservation, a draft Asia-Pacific Crane Action Plan was developed in 1997 and has served to guide the establishment of a North East Asian Crane Site Network. Background information of the rationale and focus of the action plan and network are provided by Masatomi and Kanai (1997) and Chan (in press). The Plan

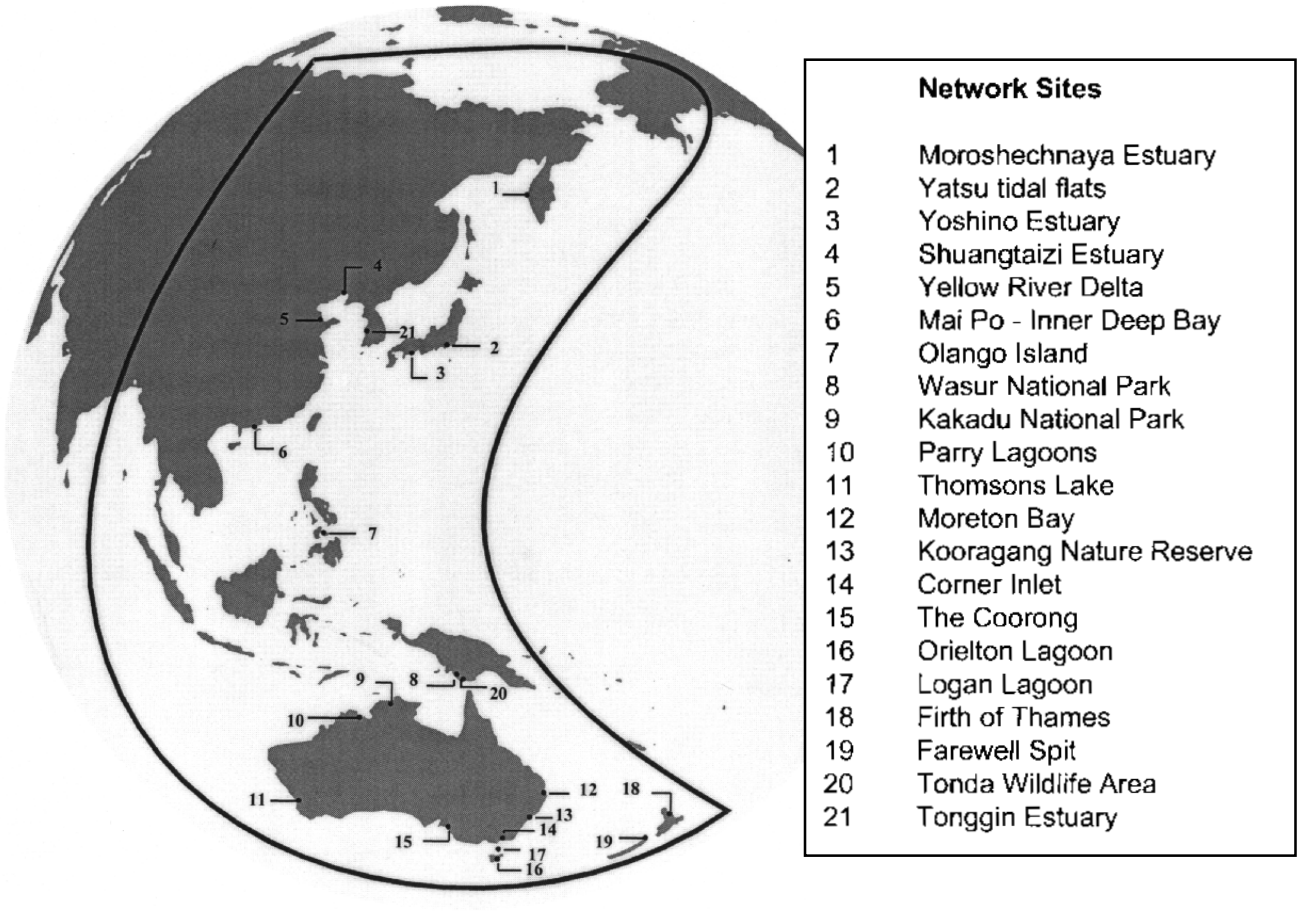

Figure 2. The East Asian-Australasian Shorebird Reserve Network.

builds on the Global Crane Action Plan (Meine and Archibald 1996).

The North East Asian Crane Site Network was launched in Beidaihe, China, in March 1997 in conjunction with the International Workshop on Wetland and Waterbird Conservation in North East Asia. At the launch, 16 sites were nominated from five countries (Russia, Mongolia, China, South Korea, and Japan) in the flyway. Shortly after, two sites were nominated from North Korea, thus covering all the countries in the region (Figure 3).

Activities to promote the network to date have focused on:

- Awareness – the first issue of the Newsletter dedicated to promoting the network has been published in March 1998 in English, Japanese, Chinese and Russian. A Korean edition is still to be released. The next issue is expected in early 1999. There are plans to host future editions of the newsletter on the web-site of the North East Asian Crane Site Network, which is linked to the website of the BirdLife Asia Partners.
- Distribution of news updates on network activities through other existing newsletters, for e.g. *China Crane News (*a newsletter of the Crane and Waterbird Specialist Group).
- Publication of a research handbook of field study in 1999.
- Formulation of a joint census of wintering cranes to be organised in January 1999.
- Assisting Russian conservationists in organising an international childrens' art exhibition.

A successful workshop of the North East Asian Crane Site Network was held at Muraviovka, Amur Province, Russia (9–13 September 1998), along with the inaugural meeting of the Crane Working Group. The meeting has elected a Chairman (Noritaka Ichida, Japan) and Vice-Chairman (Wang Wei, China) of the Working Group. By-laws of the Working Group have also been drafted and will be approved at the next meeting. The next working group meeting was proposed for early 1999 in South Korea to discuss a review of progress and more details of network activities.

3. Promoting conservation of Anatidae in East Asia

East Asia is an important region for Anatidae with several threatened species and populations, some of which are restricted to the region. To promote their conservation, a draft East Asian Anatidae Action Plan was developed in 1996. A background to the rationale and focus of the

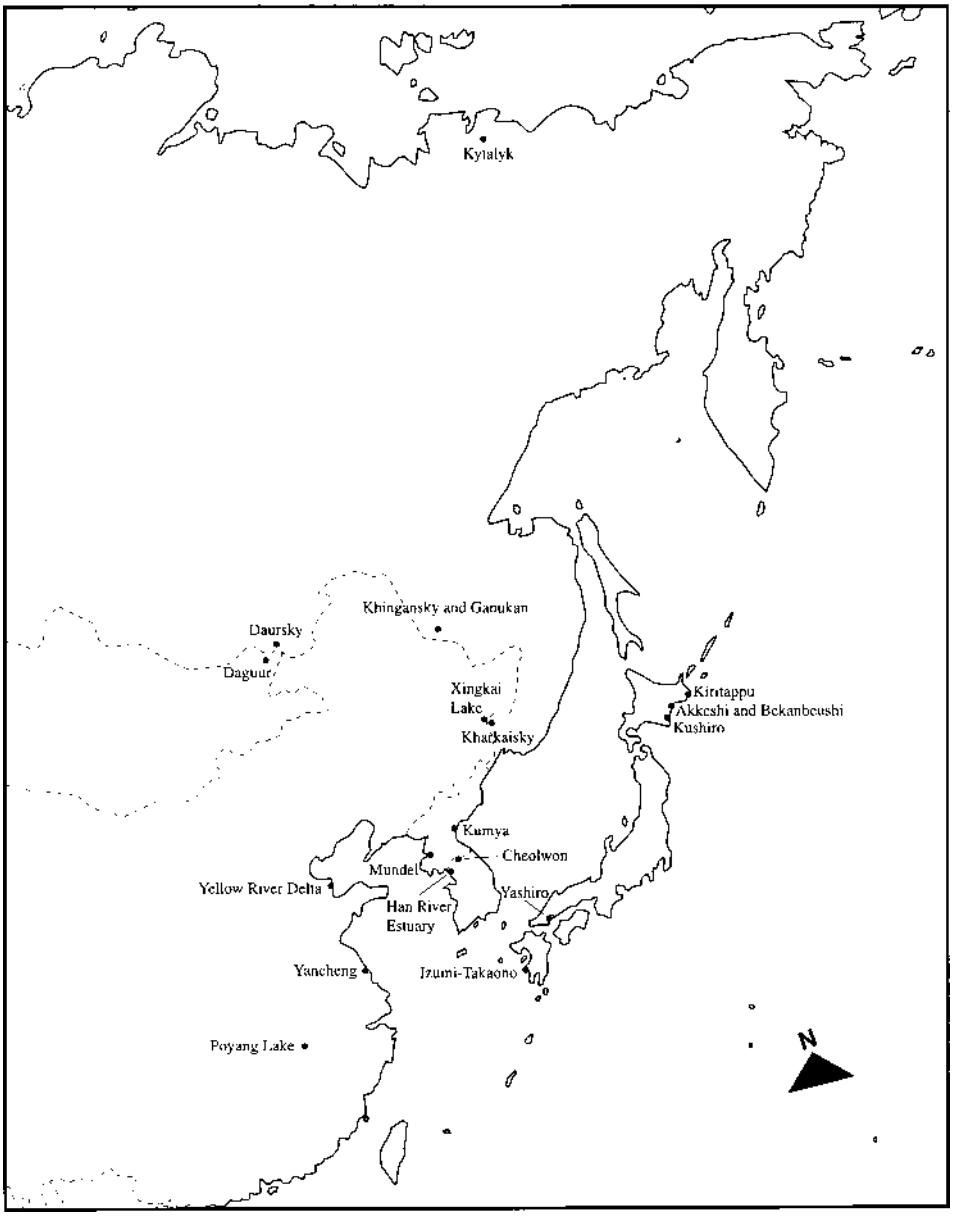

Figure 3. The North East Asian Crane Site Network.

action plan and network is provided by Miyabayashi and Mundkur (1997), similar to the preparatory work for a proposed African-Eurasian site network (Rose and Scott 1997).

Learning from the experiences gained in building the shorebird and cranes networks, the Environment Agency of Japan and Wetlands International are working to establish an East Asian Anatidae Site Network, proposed for a launch at the forthcoming Conference of Parties of the Ramsar Conference in Costa Rica, May 1999. Implementation of the Action Plan and network will be co-ordinated by the Anatidae Working Group.

In parallel, an initiative has been launched to collate information on sites of international importance for Anatidae in Asia. As a first step, a project is underway to develop an atlas of sites of importance in the East Asian Flyway.

4. Promoting information flow among wetland and waterbird conservation researchers

Over the last few years, Wetlands International has organised several sub-regional and national level workshops to encourage information exchange amongst different target audiences, aiming at promotion of wetland and waterbird conservation issues. Two of these have included special sessions on promoting *Strategy* related initiatives:

- International Workshop on Wetland and Waterbird Conservation in North East Asia, Beidaihe, China, March 1997.
- International Workshop on Wetland conservation in Mongolia and North East Asia, Ulaan Baatar, Mongolia, September 1997.

Other workshops and meetings to promote the networks and related issues are being proposed for the next two years.

5. Promoting monitoring of wetlands and waterbirds

Wetlands International – Asia-Pacific has co-ordinated the Asian Waterfowl Census since 1987, as part of the International Waterfowl Census. The programme currently involves national volunteer networks in over 20 countries and territories to collect information on wetlands and waterbirds. Data is collected each January and summarised into national reports and regional overviews. The most recent overview covers the 1994–1996 period (Lopez and Mundkur 1997). Efforts are currently underway to consolidate and expand the census programme by stimulating and strengthening national networks.

In assessing success of the implementation of the *Strategy* at this half-way juncture, it would be fair to state it has been successful in building on interest for migratory waterbird conservation within the East Asian-Australasian region to mobilise greater support and participation for these activities. It has demonstrated that through strong and sustained efforts, and relatively small amounts of funds, it is possible to forge strong partnerships between various stake holders to promote and facilitate conservation action on the ground. Thus the networks are "slowly but surely" demonstrating that they are serving to link not only sites but people of the flyway. In doing so, they are living up to the popular slogan to "think globally, act locally".

Efforts to promote migratory waterbird conservation in Central Asian-Indian Flyway and West Pacific Flyway have largely been carried out in an opportunistic manner. Consolidation of initiatives and actions in the East Asian-Australasian region and efforts to promote implementation of the priority actions in the Central Asian-Indian Flyway and West Pacific Flyway would help to truly realise the vision of the *Strategy* in the Asia-Pacific region as a whole.

To date, funds to implement the critical co-ordination work and projects have been secured on an annual basis, primarily from the Environment Agency of Japan and Environment Australia. This has understandably restricted the quality and amount of work possible – and a large potential remains to be realised. To ensure that this work can be sustained in the long-term, it is desirable that a firm funding base from multiple and secure sources can be developed on a priority basis.

Vision for the future

Wetlands International's *raison d'être* is to work in collaboration with governments, habitat and species conservation conventions, NGOs, local people and the corporate sector to promote the long-term conservation of wetlands (and waterbirds) in the Asia-Pacific region and the rest of the world.

As outlined above, the programme is currently focusing on activities to promote and strengthen the shorebird, crane and Anatidae networks and to identify other ways to conserve waterbirds and their habitats in the East Asian-Australasian region. Over the next year or so, it is necessary to identify ways to ensure the long-term viability and sustainability of the networks. This would need to include a programme of activities to increase communication and interactions between network sites. In order to review action and develop new plans, it is proposed that a major post-2000 waterbird/wetland meeting will be organised in 2000 (venue and funds remain to be identified). Given the increasing interest and commitment of the participating governments and organisations to implement the *Strategy*, and the time and efforts taken to build up these initiatives, it is desirable that this unique partnership be renewed for at least another five years.

One of the priorities recognised by the *Strategy,* is the need to develop a multilateral legal framework for migratory waterbird conservation in the Asia-Pacific region (also see Weaver 1997). Based on the experience from other parts of the world in developing a legal framework – in terms of time, complexity and cost, it will certainly need considerable efforts. As a multilateral framework is a valuable mechanism, Wetlands International will continue to work with governments in the region and conventions to achieve this. However, given the ever increasing pressures on wetlands and migratory waterbirds in this region, implementation of the other priorities of the *Strategy* will need to remain on the top of our common agenda.

Acknowledgements

This paper reflects the work of many people around the region involved in promoting conservation of migratory waterbirds and their habitats, fortunately, too numerous to name. Ongoing financial support from Environment Agency of Japan and Environment Australia to Wetlands International has ensured that the core co-ordination work can be continued and this is greatly appreciated. The paper has benefited from comments from Fumiko Nakao, Koji Tagi, Tom Scotney and Joost van der Ven, and we are grateful to them. Ms Ayu Rahayu kindly made improvements to the presentation and language. Nelson Yeoh assisted by preparing the figures and overheads used in the presentation of the paper.

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Moving migratory bird management to the next level in North America

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Key words: migratory, birds, conservation, United States, North America.

Bird conservation in North America changed dramatically in 1986 as we began to manage bird populations on a landscape level with full consideration of critical habitat needs under the North American Waterfowl Management Plan. With millions of acres of wetland habitats conserved and nearly a half billion US dollars invested, many successes can be claimed, however, there is much more to do. It is time to use the lessons learned and what has been built to have a more comprehensive approach to bird conservation through the development of a regionally based, biologically driven, landscape oriented approach with partnerships delivering the full spectrum of bird conservation. Migratory bird conservation is most effective at landscape levels. These landscapes often cross state and national borders, creating the need to work with both biological and political boundaries. To be effective bird conservation must be integrated among all species of birds. With the maturing of the Partners-in-Flight initiative for conservation of neotropical songbirds and the Western Hemisphere Shorebird Reserve Network and its development of a national shorebird plan, and the initiation of a North American Colonial Waterbird Conservation Plan, we have most of the ingredients we need to integrate conservation strategies throughout every habitat type and take bird conservation to the next level.

Introduction

More than a decade ago, in 1986, a dream was created and put forth as a challenge to the American and Canadian people, and later to our counterparts in Mexico. The challenge was this: Can we, as diverse societies working together, bring back a treasured natural resource that has been instrumental in shaping the natural and cultural histories of North America? That natural resource was waterfowl (Anatidae); that dream forms the heart of the "North American Waterfowl Management Plan."

Materials and methods

The North American Waterfowl Management Plan was one of the first of its kind in bird conservation. A plan whose goals were dependent upon two, somewhat novel approaches, both of which seemed risky at the time. First was the need to view conservation from a landscape perspective. Before the Plan, most bird conservation activities were developed and implemented in isolation of other, similar actions. They were local projects, developed by local conservationists, to meet the needs of local people. Rarely were projects developed with an eye on the entire, surrounding landscape. The Plan changed that perspective.

And second, for the North American Waterfowl Management Plan to be successful, close international co-operation was absolutely essential. Most waterfowl species were dependent upon the habitats found in more than one these countries. Canada, Mexico, and the United States already were linked via several treaties, but those treaties did not spell out specific ways in which the countries were to co-operate. The North American Waterfowl Management Plan provided the road map by which these three nations could come together to conserve waterfowl (Anatidae), and the wetland habitats upon which they depend.

What else made the Plan unique? One of the first things people notice when they read the Plan is the quantitative population objectives that are put forth. Because a long history of aerial and other surveys had given us reasonable estimates of waterfowl population numbers and trends in North America, the crafters of the Plan had some idea of where waterfowl population levels had been, and which direction – up or down – they had been heading for more than 30 years. Their only decision was to decide how many individuals of each species was a reasonable goal.

These goals were set for each waterfowl species, based largely on the presumption that population levels in the late 1970s were attainable and biologically meaningful targets. Another first for the Plan was the way in which it went about developing and implementing management actions. In line with a landscape perspective, 12 Joint Ventures have been established in the United States so far. Canada also has nearly that many. Each Joint Venture covers a specific geographic area, often encompassing a biologically distinct collection of wetland habitats. For example, the Lower Mississippi River Valley Joint Venture is responsible for ensuring restoration and protection of bottomland hardwoods forests, which are naturally flooded up to six months of the year.

These actions help sustain breeding, migrating, and overwintering populations of mallards, wood ducks, pintails, and nearly a dozen other waterfowl species. Each Joint Venture has what is called a "Management Board." The Management Board is comprised of individuals from organisations with an interest in waterfowl and wetland conservation. Representatives from federal, state, provincial, and local governments, and conservation organisations make up each Management Board and decide on the most appropriate actions necessary to meet the goals established for their Joint Venture.

Taken together, all of these Joint Ventures, and their respective Boards and other partners, make up the North American Waterfowl Management Plan. International co-ordination is carried out under the auspices of a North American Waterfowl Management Plan Committee, on which each of the three countries is represented. Mexico did not enter as an official Plan partner until 1994, but is rapidly catching up to the successes of its northern neighbours.

One of the pivotal events for the North American Waterfowl Management Plan was passage of legislation in 1989 by the US Congress – the North American Wetlands Conservation Act – that funded a major grants program for wetlands conservation. Each year, more than US$40 million of Act money is used to match private funds for the benefit of waterfowl and other wetland species.

Results

So now you know about some of the history and organisation of the North American Waterfowl Management Plan, but what about the waterfowl? Have they benefited during the past 12 years? Let me give you a few examples why we think so. In the Central Valley of California, one of the Joint Ventures, farmers and conservationists have joined forces in one of the most successful efforts under the Plan. Plenty of farmland still remains in this fertile valley, but the ducks and geese have returned. Flooding of fields after harvest creates prime habitat for overwintering waterfowl. Some of each year's crop is even left by farmers to benefit the birds.

The Prairie Potholes of the northern United States once was a vast, continuous haven for nesting waterfowl. Hundreds of millions of ducks and geese once nested in this region. But demands for agricultural goods caused many of these wetlands to be filled earlier in this century, such that waterfowl populations crashed. The North American Waterfowl Management Plan sought to bring back this area as a premier duck nesting area of North America.

In the past 12 years, the Plan has restored, enhanced, and protected more than 1.2 million acres of wetlands in the Prairie Potholes. And with this change in habitat, so too have the birds returned. For example, in 1997, the number of ducks breeding in key nesting areas rose to 42.6 million, the highest level since 1955.

The Atlantic Coast Joint Venture is the largest of the Joint Ventures. It spans the entire Atlantic Coast of the United States. The large cities and high human population densities in these coastal areas, along with agricultural interests in the floodplain, have been the driving forces behind the filling of more than half of the wetlands in this region.

The North American Waterfowl Management Plan's goal, however, is to bring back more than 1 million of these acres along the Atlantic Coast. And we're closing in fast on that goal. Marshes along the Chesapeake Bay near Washington, DC and adjacent to New York City are now prime spots for migrating and overwintering waterfowl.

In total, the North American Waterfowl Management Plan has been responsible for restoring or protecting more than 4 million acres of wetland habitat in the United States, as well as millions acres in Canada and in Mexico. And the birds have responded. Record numbers of waterfowl have been recorded in the past few years and there is no reason to believe that the goals laid out in the dream of 1986 won't be realised.

Discussion

But many challenges remain. Despite better than average conditions during the last few years, some species are not responding to conservation efforts as much as we would hope. For example, pintail *Anas acuta* and scaup *Aythya marila* populations remain below goals. Wetlands continue to be lost, even as the Plan is working hard to put other wetlands back in place.

Our successes from the North American Waterfowl Management Plan have been commendable. Waterfowl are in far better shape today than they have been in the past 50 years. But many of us now realise that in the big picture of North American migratory bird conservation, waterfowl are just a small component. More than 1,500 species of birds are found in North America, and fewer than 5% of those species are waterfowl.

So today, we are trying to get to step up to the next level of migratory bird conservation. And our new challenge is this: How can we use the North American Waterfowl Management Plan to stimulate and bolster conservation efforts for the other species? Can we use the Plan as a model for conservation of other species? Can the existing Joint Ventures serve as delivery mechanisms for these efforts?

Thankfully, our counterparts working on other migratory bird species have already begun to make progress. Partners in Flight, for example, is an international initiative aimed at conserving wild birds that are not hunted; species like warblers *Dendroica*, tanagers *Piranga*, and sparrows *Aimophila* and *Spizella*.

Partners in Flight are just about to complete approximately 50 conservation plans based upon physiographic regions of the United States. These plans will identify the highest priority species and habitats in each area.

The Western Hemisphere Shorebird Reserve Network and the National Shorebird Plan will complete plans and identify high priority areas and species throughout the Western Hemisphere within the next year.

Likewise, a number of government agencies and nongovernmental groups are now forming to develop a plan for colonial waterbirds, the waders, seabirds, and charadriforms.

Thanks to the maturing of Partners in Flight, the Western Hemisphere Shorebird Reserve Network, the National

Shorebird Plan, and the burgeoning efforts for colonial waterbirds, we are on the verge of a significant window of opportunity for moving to comprehensive and integrated bird conservation throughout all habitats. The international effort sponsored by the Commission for Environmental Cooperation, known as the North American Bird Conservation Initiative, has underscored the international co-ordination that is critical to our success.

But what all these initiatives lack is a clear mechanism to deliver conservation actions to the ground. What role might the North American Waterfowl Management Plan play in getting these efforts off the ground? The key is integration – making certain that the benefits of conservation actions aimed at one group of species also provides benefits for other species. Let me give you a few examples of how conservation of all these species are interrelated.

From our experiences over the past 12 years, it is clear that many of the actions taken for waterfowl also benefit these other species groups. For example, shallow water impoundments are excellent habitat for certain dabbling ducks, like blue-winged teal *Anas discors*.

If drawdowns are timed to coincide with shorebird migration, the resulting habitat provides excellent foraging sites not only for dabbling ducks, but also for many different species of shorebirds.

Integrated management is critical to many migratory species. For example, most migrating long-billed dowitchers *Limnodromus scolopaceus* use stopover sites managed for wildlife. A National Shorebird Plan is being developed in response to these needs and opportunities.

Many shorebirds face special risks when they concentrate for short periods during their annual migrations. For example, red knots *Calidris canutus* gather each year in Delaware Bay to take advantage of the availability of a seasonally abundant resource and the large concentrations of horseshoe crab eggs available for several weeks each spring. After a non-stop flight from South America, several different shorebirds use this high concentration of food to gas-up for their continuing flights to breeding grounds in the Arctic.

Shorebirds face different challenges in other parts of the country. On the Pacific coast, shorebirds such as dunlins *Calidris alpina* use strikingly different habitats at different times of the year. In the winter, they forage on the San Francisco Bay coast. But as they prepare for their northern migration, they move inland to grassland areas. Although these sites have historically been managed primarily for waterfowl, drawdowns are now being timed to provide critical shorebird habitat.

In the interior of the country, migrating shorebirds face still other challenges. Long-billed curlews *Numenius americanus* and many other species winter in coastal wetlands in Texas, then migrate north through the central plains where they use scarce grassland areas for nesting and foraging. These same grasslands are critical for nesting waterfowl. Recent experience makes clear that duck reproductive success depends not just on wetlands, but on healthy grassland/wetland ecosystems.

The most vulnerable grassland songbirds thrive in those same ecosystems used by many migrating shorebirds and nesting waterfowl. This kind of opportunity for integrated conservation is being embraced by wildlife managers.

Habitat fragmentation is a problem throughout the continent. For example, greater prairie chickens don't reproduce well in fragmented or degraded grasslands. The same problem exists in forest ecosystems. Small fragments of habitat and edges between forest and agricultural habitat in many parts of the country are occupied by birds that undergo almost complete reproductive failure.

Some species only thrive in extremely large blocks of suitable habitat. The swallow-tailed kite may require 100,000 acre blocks of bottomland forest, but these acres can be undergoing active silvicultural programs. Forestry and bird conservation are not incompatible. At the same time that the Lower Mississippi Valley Joint Venture was working to protect and restore forested wetlands, Partners in Flight was documenting the need of neotropical migrants for large contiguous blocks of bottomland hardwoods upon which deer, turkey, and waterfowl also depend.

Many landbirds, shorebirds, and ducks migrate each winter to habitats south of the border of the United States. While most duck species do not extend much farther south than Mexico, migrant landbirds use a wide variety of habitat types throughout Central America and the Caribbean as well as in much of South America.

The impacts of rapidly changing land use in the tropics on populations of migrant birds that breed in the United States are difficult to assess, but widespread clearing such as this certainly puts additional pressure on these birds.

Assuring the long-term health of the migratory birds of the United States will require international co-operation beyond existing treaties, relationships, and experience. This means not only focusing on species that occur in North America, but also species that occur in tropical areas further to our south.

As you can see, many things that are done for waterfowl also bring direct benefits to other species of wildlife. Healthy wood duck *Aix sponsa* populations that nest in bottomland forests also means healthy prothonotary warbler *Protonotaria citrea* populations that nest along side them. The landscape approach that we alluded to previously is still the lynchpin that is necessary to pull all of these initiatives together.

The North American Waterfowl Management Plan, Partners in Flight, the North American Shorebird Conservation Plan, and the Colonial Waterbird Plan are all pointing in the same direction ... healthy landscapes are the key to sustainable migratory bird populations. Regional partnerships driven by biological goals and a common vision are now more than ever the ingredients for delivering conservation on a landscape scale.

Over the years, the unique challenges of conserving this continent's waterfowl resources have drawn us together as few would have ever imagined. And today, the landscape and partnership approach first put into place for waterfowl is again driving development of other conservation initiatives. The Plan has not only succeeded in bringing back waterfowl, but it appears poised to help bring back other species of birds as well. It is about to step up to the next level.

There are still a lot of questions surrounding how we are going to integrate all of these initiatives? Do we need additional Joint Ventures, or will the existing Joint Ventures for waterfowl sufficient? How can we get sufficient funding to carry these other initiatives, much like the North American Wetlands Conservation Act has carried waterfowl recovery? What sort of partnerships will be necessary? How do we work more efficiently across international borders?

African-Eurasian Migratory Waterbird Agreement

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Abstract only

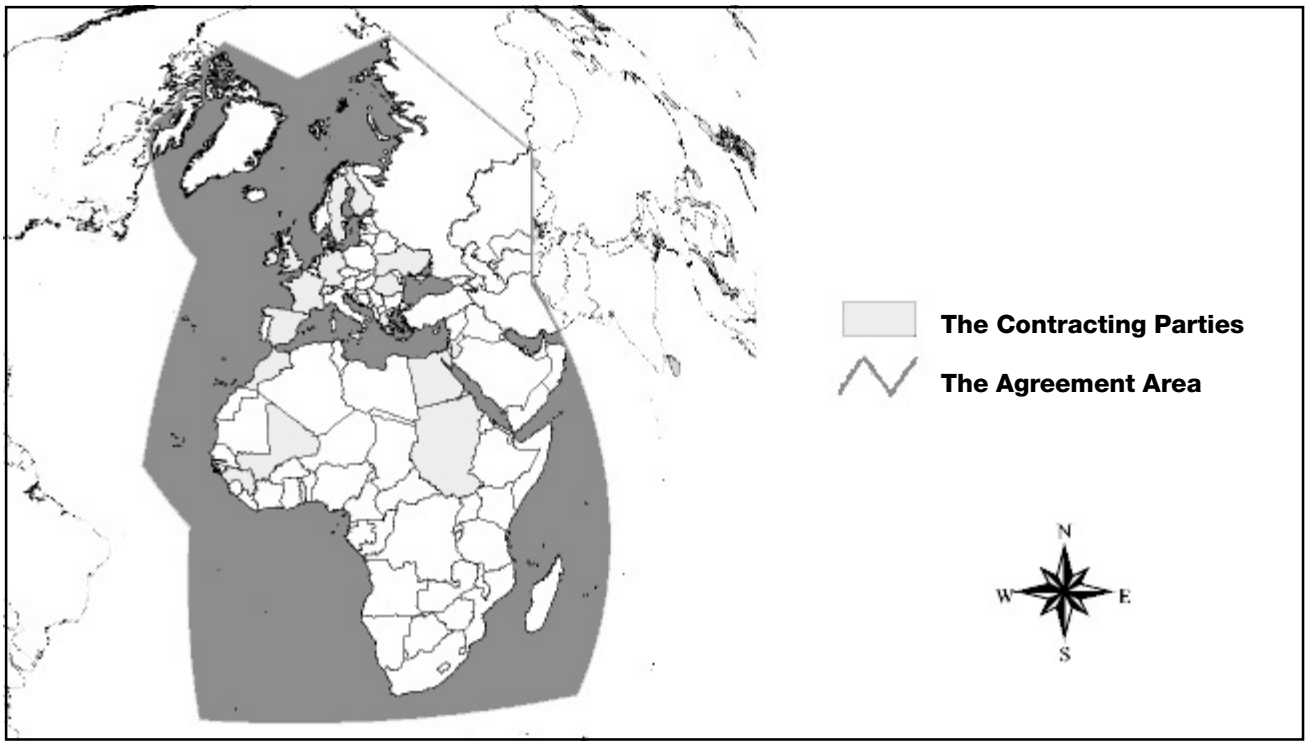
Key words: AEWA Agreement, Africa, Eurasia, migratory, waterbirds, conservation, flyway.

The African-Eurasian Migratory Waterbird Agreement (AEWA) is an Agreement under the Convention on the Conservation of Migratory Species of Wild Animals commonly referred to as the Bonn Convention. AEWA aims to create a legal basis for a concerted conservation and management policy by the Range States for migratory waterbird species. It covers the entire continent of Africa and Europe (see Map 1), as well as parts of Asia and a few Arctic islands of North-eastern Canada encompassing about 117 Range States and it covers 170 species.

AEWA is a regional Agreement that not only consist of Agreement text but also includes an Action Plan. This Action Plan is for the time being restricted to geese, swans, ducks, spoonbills, ibises and storks. In the nearby future this Action Plan will be broadened to especially the group of waders. The Action Plan specifies actions Parties shall undertake in relation to priority species and issues, under the following headings: a) species conservation; b) habitat conservation; c) management of human activities; d) research and monitoring; e) education and information and; f) implementation.

Since August 15 1996 the African-Eurasian Migratory Waterbird Agreement (AEWA) has been open for signing at the Ministry of Foreign Affairs in The Hague (The Netherlands). At present the following Range States have signed the Agreement with reservations with respect to ratification: Ireland, the United Kingdom and Northern Ireland, Germany, Egypt, the European Community, Mali, Luxembourg, Morocco, Spain, Ukraine and Togo. Without the need of ratification Guinea, Switzerland, Sudan, Jordan, Romania, Sweden and the Netherlands signed.

The Interim Secretariat expects that AEWA will come into force mid 1999. The first Meeting of the Parties is planned in November 1999. The Meeting will be organised back to back with the Sixth Conference of the Parties of the Convention on the Conservation of Migratory Species of Wild Animals (CMS) and will take place in South Africa.



Developing a Global Waterbird Monitoring Network

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Abstract only

Key words: Waterbirds, monitoring, network, global, conservation.

Sound information on the size, distribution and trends of waterbird populations is an essential basis for developing conservation priorities for flyways and the sites within them. There are many waterbird census and monitoring activities taking place around the world (some national or international multi-species schemes; others targeted at monitoring of particular taxa or species) but the accessibility and ability to link the information they collect varies greatly. At the same time, the need for this information to be available in an increasingly flexible way is increasing, as the requirements for such information widen with developing emphasis on wetland species biodiversity conservation, catchment-scale integrated management and flyway-level conservation – in addition to the more traditional use of such information to provide international population size and trend assessments as the basis of setting 1% thresholds for the selection of internationally important sites under the Ramsar Convention.

No waterbird monitoring scheme is truly global in its coverage. Wetlands International's International Waterbird Census (IWC) is probably most geographically widespread, covering Europe, Middle East, Africa, Asia and South America. Elsewhere there are other major schemes such as through the North American Waterfowl Management Plan, and many more geographically restricted activities. As flyway-scale conservation for migratory waterbirds now expands, through activities including the African-Eurasian Migratory Waterbird Agreement (AEWA), the Asia-Pacific Migratory Waterbird Conservation Strategy (APMWS), the Western Hemisphere Shorebird Reserve Network (WHSRN) and US and Canadian National Shorebird Plans, better knowledge of sources of information on waterbird numbers and how to access them is becoming increasingly essential if such information is to be efficiently and comprehensively provided to support conservation action.

Wetlands International, through its long-term expertise in compiling and providing waterbird information can play a major role in promoting steps to create such a situation. These should include:

- Reviewing and developing the data handling capability of censuses such as the IWC, such that it can more effectively provide spatially selected datasets through links with wetland site information;
- Undertaking a "global review of waterbird monitoring", through a questionnaire survey, to develop and widely disseminate a metadatabase of survey schemes;
- Developing a "global waterbird alliance" of these survey schemes to facilitate more effective supply of information for international analyses of waterbird populations; and
- Enhancement of the capacity of the network of waterbird experts, notably through further development of Wetlands International's waterbird Specialist Groups, to aid identification of information sources and interpretation of flyway populations.

Working through the expert networks, there are a number of initiatives and analyses that could be developed to enhance the conservation of worldwide waterbird flyways. Using the example of waders (shorebirds), steps to support implementation of a flyway conservation strategy could include, *inter alia*, compilation of a sourcebook and comparative assessment of species/populations on each flyway; preparation of flyway atlases; a review of knowledge of globally threatened wader species and their conservation; and the development of a global shorebird network promoting the conservation of globally important key sites.

Part II:

Regional aspects of the African-Eurasian Migratory Waterbird Agreement (AEWA)

Signification de l'AEWA pour l'Afrique

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Mots-clés: L'Accord AEWA, l'Afrique, oiseaux d'eau migrateurs, zones humides, conservation.

L'accord sur la conservation des oiseaux d'eau d'Afrique Eurasie est une procédure régulière et constitutionelle de la convention relative à la conservation des espèces migratrices appartenant à la fauna sauvage dite convention de Bonn. La substance de l'Accord est la reprise d'une nouvelle liste des espèces migratrices avec une nouvelle aire de répartition. Sa mise en oeuvre est assujettie à un plan d'action dont tous les membres de l'aire de répartition ont déjà donné leur accord de principe.

L'honneur pour le continent africain est la couverture totale de l'ensemble des pays. Ceci donne une plus grande possibilité de coopération dans l'harmonisation des politiques en matière de conservation et de gestion des ressources biologiques mais et surtout de renforcer la mise en application de l'Accord entre l'Europe et l'Afrique.

Les profits immédiats et concrets de la première génération de projets est le renforcement des capacités techniques et scientifiques à travers un réseau régional, d'une part et d'autre part la formation des coordonnateurs nationaux pour assurer la collecte des donneés de base pour les rapports annuels sur les dénombrements des oiseaux d'eau à travers toute l'Afrique.

L'Accord sur la conservation des oiseaux d'eau migrateurs d'Afrique et d'Eurasie (AEWA) est un processus légal et régulier de la Convention pour la conservation des espèces migratrices appartenant à la faune sauvage dite Convention de Bonn. Celle-ci avait une aire de répartition assez limitée pour les espèces migratrices. Par conséquent, elle ne couvrait qu'une partie de l'Afrique, surtout la partie nord du continent descendant jusqu'à la Mauritanie.

Heureusement, dans le développement de la convention de Bonn, le conseil scientifique a reconnu la nécessité de réviser les limites de l'aire de répartition de la faune, en particulier des oiseaux d'eau migrateurs dont l'aire de répartition couvre l'Afrique, l'Europe et le Moyen Orient.

C'est ainsi que l'Accord sur les oiseaux d'eau migrateurs Afrique Eurasie s'est mis en place et suit la procédure de mise en vigueur qui ne sera obtenue qu'après la ratification de 14 pays de l'aire de répartition des oiseaux d'eau migrateurs compris dans les annexes de l'Accord.

Pendant la réunion de négociation pour l'adoption de l'Accord sur la conservation des oiseaux d'eau migrateurs tenue à La Haye du 12 au 16 juin 1995, l'Afrique a été représentée par 30 pays sur un total de 64 Etats présents. Cette réponse remarquable est un signe de considération et d'intérêt de la part du continent qui voit son étendue entièrement couverte par l'aire de répartition retenue dans l'Accord.

A partir du moment où le continent Africain dans sa totalité constitue une partie de l'aire de l'Accord, les observateurs s'interrogent sur les modalités de son application et qu'est-ce que cela demande ou exige comme mesures, orientations techniques et scientifiques mais aussi comme stratégie de la part de l'ensemble des pays africains.

Le souhait le plus fort des partenaires d'Afrique dans ce processus de coopération est d'abord de faire signer et ratifier l'Accord (AEWA) dans les plus brefs délais, malgré les procédures administratives plus ou moins longues et les instabilités politiques.

Pour ce faire le Royaume des Pays-Bas a fait des efforts considérables pour appuyer les pays africains dans leur politique de gestion des ressources naturelles et en particulier des zones humides et des oiseaux d'eau migrateurs. Pour le moment il est le principal pays industrialisé à supporter le programme de Wetlands International–AEME tant sur le plan financier que technique et scientifique. En même temps, la promotion de l'Accord (AEWA) est fortement lié à ce programme et c'est la raison pour laquelle l'Afrique apprécierait énormément la participation d'autres pays du Nord pour créer une synergie et pérenniser le programme Afrique.

Dans un deuxième temps, il faut s'assurer de la ratification de l'Accord par 7 pays africains au début de l'année 1999 pour espérer voir l'entrée en vigueur de cet Accord à la fin de cette même année. A présent 5 pays africains ont signé l'Accord suivant les procédures indiquées, et 3 sont en cours de régularisation ; le Soudan l'a ratifié, et la Guinée, la Guinée Equatoriale et la Gambie sont en cours de régularisation de la procédure de ratification.

C'est un défi lancé à l'Afrique qui voit l'Accord (AEWA) comme un de ses instruments crédibles de coopération pour la conservation des oiseaux migrateurs.

D'ores et déjà, des dispositions spéciales sont prises pour susciter l'intérêt de quelques états africains sur la conservation des oiseaux d'eau migrateurs.

Ainsi 9 pays (le Burkina Faso, la Gambie, le Cameroun, le Niger, le Mali, la Mauritanie, le Togo, la Sierra Léone et le

Sénégal) ont soumis des sous-projets concrets de terrain qui sont maintenamt en cours d'exécution.

Par l'installation d'un premier bureau régional en Afrique avec un programme spécifique pour l'Afrique de l'Ouest, Wetlands International donne une nouvelle orientation à sa démarche dans le continent.

En effet, le renforcement des capacités techniques et scientifiques pour le dénombrement des oiseaux d'eau était une attente. Dans l'Accord (AEWA), le plan d'action prend en compte la conservation des espèces et des habitats.

Cet objectif global de Wetlands International-AEME aidera à mettre en oevre les activités de ce plan d'action avec une plus grande efficacité d'une part, et d'autre part à impliquer les populations vivant autour des zones humides pour une gestion durable des ressources naturelles.

La formation à travers les réseaux (et la création de réseaux si nécessaire) est une réponse aux besoins formulés par les pays africains pour mieux échanger leurs expériences en matière de gestion des oiseaux d'eau et de leurs habitats, tant il a été démontré que la migration Sud Sud existe réellement de même que la migration Nord-Sud.

De ce fait, le cloisonnement est terminé et l'ère de l'ouverture aux autres a sonné et les gagnants dans cette course sont ceux qui sauront rester en bloc et travailler en synergie pour un développement raisonné.

Au plan sous-régional, deux cours régionaux de formation se sont tenus en 1998 à Dakar pour regrouper les coordonnateurs nationaux pour le recensement des oiseaux d'eau. A ces occasions, tous les aspects concernant la gestion des zones humides ont été développés pour renforcer les capacités techniques et scientifiques. Ce genre de rencontres sont très utiles pour établir et consolider les échanges entre les personnes ressources sélectionnées pour le plan d'action de l'Accord AEWA.

Au niveau national, les cours nationaux de formation ont déjà eu lieu dans 5 pays (Burkina Faso, Côte d'Ivoire, Gambie, Niger, Sénégal), et en 1999, la Guinée, le Bénin, le Mali et le Togo sont programmés.

L'Afrique a un bon atout en place par l'étendue des zones humides d'hivernage mais aussi un rôle responsable à jouer dans leur conservation malgré de multiples contraintes majeures. C'est dans ce cadre que l'Accord AEWA a proposé des solutions, contenues dans son plan d'action.

Par ailleurs, l'implication des organes politiques de décideurs à un haut niveau est à considérer. A titre d'exemple, la Conférence des Ministres Africains pour l'Environnement (CMAE) doit travailler sur les moyens de mise en application concrète de l'Accord en inscrivant la conservation des oiseaux d'eau migrateurs à l'ordre du jour ordre du jour des rencontres annuelles.

Par ce biais, l'Accord aura tout son poids en tant qu'outil de coopération pratique. Dans le même temps, la CMAE suscitera la contribution financière d'autres pays industrialisés pour développer le programme Afrique dans le domaine de la gestion des zones humides et des oiseaux d'eau.

La création de réseaux régionaux dans toute l'Afrique est un souhait entendu par Wetlands International qui met en exergue l'importance du renforcement des capacités techniques par la formation nationale et régionale. Par cette approche, l'Afrique est à même de contribuer de façon importante aux activités du plan de mise en œuvre de l'AEWA que sont :

Activité n°1:
Amendement du plan d'action visant à l'inclusion des 170 espèces d'oiseaux migrateurs figurant à l'annexe 2 de l'Accord;

Activité n°2:
Rapport sur l'état de conservation de toutes les espèces d'oiseaux d'eau migrateurs couvertes par l'Accord;

Activité n°3:
a. Etude des plans d'actions par espèce dans la zone de l'Accord et développement des lignes directrices pour la préparation de ces plans;
b. Lignes directrices pour l'identification et la prise en main des situations urgentes;
c. Lignes directrices pour la préparation de l'inventaire des sites;
d. Lignes directrices pour la gestion des sites cruciaux pour les oiseaux migrateurs;
e. Lignes directrices pour un protocole de surveillance des oiseaux d'eau.

Pour mener à bien toutes ces activés du plan de l'AEWA, des mesures d'accompagnement adéquates ont été mises en oevre sous forme de:
- Formations nationales sous-régionales et internationales;
- Réalisation de sous-projets;
- Soutien pour assister aux fora internationaux;
- Facilitation des échanges internationaux;
- Consolidation des rapports humains dans la formation des réseaux nationaux et régionaux.

L'adéquation entre les activités du plan et les mesures d'accompagnement fait ressortir l'AEWA comme un outil d'intégration d'un grand ensemble condamné à rester plus que jamais soudé pour un idéal : sauvons la terre et les hommes pendant qu'il est encore temps.

Une idée partagée par toute l'Afrique est que les liaisons entre les peuples dépassent les aspects culturels et économiques. Elles vont au-delà des limites de notre imagination. Les oiseaux d'eau nous ont plusieurs fois émerveillés par leurs apparitions et leurs disparitions momentanées par la magie de ce phénomène spécial qu'on appelle migration.

Le sentiment que l'Afrique nourrit est celui de sa responsabilité de co-gestionnaire de ce patrimoine de l'humanité que sont les oiseaux d'eau migrateurs. Ils nous ont mieux fait connaître les valeurs et les fonctions de leurs différents habitats qu'on appelle zones humides.

L'Accord AEWA a donné un nouvel élan et une lueur d'espoir en Afrique. Les premiers résultats enregistrés laissent augurer une meilleure implication à tous les niveaux pour la gestion durable des zones humides et en particulier des oiseaux d'eau migrateurs.

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Analysis of the position of Russia on the possibility of joining the African-Eurasian Migratory Waterbird Agreement (AEWA)

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Key words: AEWA Agreement, Russia, hunting impact, lead poisoning, migratory waterbirds, conservation.

Waterbirds play a substantial part in the functioning of wetlands, as well as in the economy in Russia, since many species are fair game. Russia is taking measures on conservation and sustainable use of nature, including waterbirds. Federal laws and decrees have been adopted, habitats are being conserved, the Red List of the Russian Federation is being updated, etc. Detailed information is given in "Conservation of the Biological Diversity of Russia".

Russia is a key state to the AEWA. Yet until now Russia joined neither the Bonn Convention, nor the AEWA. AEWA offers an international legal mechanism of conservation of waterbirds which cross country borders. However, so far, a mechanism of sustainable use of species was not properly developed in the Agreement and its' Action Plan.

Russia is interested in international co-operation on conservation of migrating waterbirds. Expert estimation shows that it is necessary and reasonable for Russia to join the AEWA, although the lack of some documents that will be presented only at the First Meeting of the Parties, makes it difficult to understand some articles of the Agreement. Also, there are problems with the Russian version of the Agreement.

The Action Plan can be carried out in Russia on the basis of current legislation. An official list of fair game is compiled, as well as the Red List of the Russian Federation. All geese and ducks, apart from those mentioned in the Red List of the Russian Federation and Red Lists of the subjects of the Russian Federation, are fair game. The Action Plan would make it difficult to prohibit use of birds and eggs, and derivatives. Prohibitions, if approved, will be hardly manageable and not efficient. It is possible to control international trade.

Paragraph 2.2 of the Action Plan suggests making species action plans. It would not be a problem to make these documents. However, the juridical status of them in Russia is not defined. If Russia joins the Agreement, international action plans will be fulfilled, yet national action plans are likely to remain advisory documents having no legal power.

Paragraph 4.1.4. says that Parties shall endeavour to phase out the use of lead shot for hunting in wetlands by the year 2000. Current Russian legislation does not have this prohibition. Russia has started manufacturing steel shot. The industry can satisfy requirements of hunters, but tests showing the effect of this shot on barrels of the Russian guns have not been carried out yet. As more than 2 million of the 3,5 million Russian hunters live within the Agreement Area, it is hard to predict social and economic consequences.

These peculiarities force Russia, if the Agreement is ratified, to make reservations. However, it is important to stress that this would not indicate major disagreement with the Action Plan, but that Russia is not yet ready to fully comply at the moment, in difficult social and economic conditions.

Introduction

The Russian Federation is not a Party to the Convention on the Conservation of Migratory Species of Wild Animals (the Bonn Convention). This convention is, in its essence, a frame convention, which enables conclusion of multilateral agreements on the conservation and sustainable use of species and groups of animals, listed in the Annex to the Convention. According to Article V, paragraph two, of the Convention, any range state regardless of being a Party of the Convention, has the right to voluntarily participate, taking into account its national interests and possibilities, in international agreements within the framework of the Convention. Thus, Russia participates in an Agreement on the conservation of the western population of White Crane.

The African-Eurasian Migratory Waterbird Agreement (AEWA) was also worked out in the framework of the Bonn Convention and has been open for signature in the Ministry of Foreign Affairs of the Netherlands since 15 June 1996. In June 1995, the final negotiation meeting was held in the Hague (The Netherlands). At this meeting sixty-four Range States and the European Union were represented. The Meeting adopted the AEWA and the Final Act of the Negotiation Meeting by consensus.

According to the text of the Agreement, the Agreement Area embraces a huge territory of three continents, from the Taymyr tundra and Central Siberia to South Africa. The entire eastern half of the Agreement Area lies within the borders of the Russian Federation and is the main breeding site for most migratory waterbirds to which this Agreement applies. Hence, Russia is the key state for the Agreement. Yet, Russia did not take part in the Final Negotiation Meeting in 1995 and until now did not join the Agreement. The possible refusal of Russia to participate in the Agreement threatens its very idea. This is why the Interim Agreement Secretariat and the Depositary country of the Agreement (The Netherlands) asked to analyse the situation in detail, especially as the First Meeting of the Parties of the Agreement is planned for 1999.

This paper includes an expert estimation of the possibility for Russia to join the Agreement, as well as possible reservations in case the Agreement is ratified.

Relation to other international conventions

The Agreement sets international standards for conservation and sustainable use of migratory waterbirds within the limits of their migration routes, and facilitates co-operation between Range States, to meet special requirements for protection of migratory species.

As a European regional convention, the Bern Convention covers part of the Agreement Area. It aims at the conservation of wildlife species and their habitats, but not of migratory waterbirds. The Ramsar Convention ensures conservation of wetlands as habitats of waterfowl, including migratory birds. The Convention on Biological Diversity secures conservation of biological diversity within national territories of range states on a global scale. The Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES) regulates international trade in migratory species.

Thus, the present Agreement paves the way for the conservation of migratory waterbird species and their habitats within a large territory. Consultations and co-operation between the conventions listed above and the present Agreement should ensure adequate conservation within the Agreement Area.

Russia is a Party to the Ramsar Convention, the Convention on International Trade in Endangered Species of Wild Fauna and Flora, and the Convention on Biological Diversity. Participation in the regional Agreement on migratory species is necessary and very useful. Taking it into account that important documents on working bodies, financing, action plans and management will be discussed at the First Meeting of the Parties in 1999, the question of joining this agreement should be urgently officially considered.

Joining the Agreement: political, economical and social consequences for Russia

According to the Federal law “On International Agreements”, decisions concerning the participation of Russia in international agreements of this kind should be ratified. Since the present Agreement presupposes expenses from the Federal Budget and involves changes in national legislation as well, it should be ratified by the State Duma. The ratification should be based on an analytical review of social, economic and political consequences of joining the Agreement. The present report contains a standpoint of experts concerning these consequences.

The AEWA includes the Agreement, the Action Plan and the Conservation Guidelines. The Final Act of the Negotiation Meeting on 16 June 1995 invited the interim Secretariat to prepare for submission to the Meeting of the Parties at its first session in 1999 proposals concerning:

- amendment to the Action Plan;
- a review of the conservation status of populations covered by the Action Plan;
- criteria related to emergency situations;
- the Conservation Guidelines;
- a format for reports of the Parties;
- a budget, financial rules, and any other matters relating to the financial arrangements for the Agreement;
- the establishment of the Technical Committee.

The Meeting of Parties was also invited to consider at its first session the possibility of accepting from a given Party contributions in kind in lieu of contributions in cash to the budget of the Agreement, with the understanding that such contributions in kind from a given Party should be permitted only in exceptional circumstances and that the nature of the contribution must correspond to the needs and objectives of the Agreement.

The list of the proposals given shows the necessity for Russia to participate in the first session of the Meeting of Parties. Otherwise the decisions made will not take the position of Russia into account, with respect to important activities in the framework of the Agreement. Experts did not have Annex II to the Final Act of the Negotiation Meeting in their possession, so they could not see statements made by delegations of the states listed in the Final Act and to estimate their importance for Russia.

Expert estimate of the position of Russia on Articles of the Agreement

Article III. General Conservation Measures

Paragraph 2(g) prohibits deliberate introduction on non-native waterbird species into the environment. The Russian legislation does not have the direct prohibition of introduction. According to the Law “On Animal Life”, to plan and carry out these activities one requires a permission of a state ecological commission of experts. Thus, this paragraph of the Agreement exceeds the norm of the Russian legislation.

According to paragraph 2.5.1. of the Action Plan, Parties shall, if they consider it necessary, prohibit the introduction of non-native species of animals and plants. In our opinion, this contradicts the above-mentioned paragraph of the Agreement for two reasons: firstly, the article does not specify that Parties prohibit introduction, if they

consider it necessary; secondly, the Agreement refers to migratory waterbirds only, and not to any other animal or plant species.

Moreover, changes in the Agreement can be made by two-thirds of votes, and reservations are not presupposed. Parties can make reservations about any of the species to which the Agreement applies, or any paragraph of the Action Plan.

Thus, in the process of ratification the State Duma of the Russian Federation should agree to direct prohibition of the introduction of non-native species, and in the process of adopting of the Action Plan it should consider the possibility of prohibiting introduction of other animal and plant species, or make a reservation.

Article IV. Action Plan and Conservation Guidelines

Since the Action Plan will be adopted at the first Meeting of the Parties and the Conservation Guidelines have not been completed either, there is no possibility to fully estimate economical, political and social consequences of their adoption for Russia.

Article V. Implementation and financing

According to paragraph 2(a), each Party shall contribute to the budget of the Agreement. Experts suppose, that at the present moment Russia can agree to a contribution in kind only, as it is mentioned in the Final Act of the Negotiation Meeting. However, as there are no comments on what can be considered "exceptional circumstances", it is not possible to estimate financial consequences.

Article VI. Meeting of the Parties

According to paragraphs 7(e) and 9(b), at its first session, the Meeting of the Parties shall adopt criteria to define emergency situations with require urgent conservation measures, determine the modalities for assigning responsibility for actions to be taken and for immediate measures in emergency situations. Obviously, these criteria and modalities must correspond to the international law. However, as the experts do not have drafts of these documents in their possession, they can not estimate possible political consequences of their adoption for the sovereign right of the Russian Federation to use its biological resources.

Article VII. Technical Committee

Paragraph 1 states that the Technical Committee shall comprise nine experts representing different regions of the Agreement Area in accordance with a balanced geographical distribution, one representative from the International Union for Conservation of Nature and Natural Resources (IUCN), one from the International Waterfowl and Wetlands Research Bureau (IWRB), one from the International Council for Game and Wildlife Conservation (CIC); and one expert from each of the following fields: rural economics, game management, and environmental law.

According to the draft project on establishment of the Technical Committee prepared by the Interim Agreement Secretariat, the following geographical distribution is suggested: South Africa, West Africa, East Africa, North Africa, Middle East, Central Asian Republics, Russian Federation, Central Europe and North-West Europe/ Canada. But it should be stressed that representatives of each region do not necessarily enter the Technical Committee. In practice it means that, according to the procedure, the wish of a region to have its representative in the Technical Committee can be bypassed by voting at the Meeting of the Parties.

In the opinion of the experts, this geographical distribution is unacceptable for Russia. The apportionment of Russia into a separate geographical region has no precedent in international agreements and organisations. This is contrary to the principles of international integration and will oppose Russia to international associations and to the world community in general.

Paragraph 4 refers to convening urgent meetings of the Parties in case an emergency situation has arisen. It is not clear from this paragraph, if one third of the Parties concerned should agree to convene such a meeting, as it is required by Article VI, paragraph 3, and what the financial conditions of its convening are.

Paragraph 5 gives the Technical Committee the right to establish working groups. However, according to Articles V and VI, financial activity of these groups is regulated by the Meeting of the Parties.

Thus, the experts can not give any conclusions for Russia on economic and political consequences of joining the Agreement.

Article XVII. Depositary

Paragraph 1 presupposes that the Depositary shall transmit certified copies of the Agreement to the states concerned. The text given to the experts was not authentic to the English version. For instance, the expression "Sites shall…" was translated into Russian as **"Стороны должны..."**, while, in our opinion, it would be more correct to say **"Сторонам следует..."** or **"Сторонам рекомендовано..."**. There can be many of these inaccuracies which are rather important from the political point of view. So, Russia can consider the question of joining the Agreement after the Depositary, according to paragraph 1, transfers a copy of the certified Russian version to the Party concerned.

Action Plan

The Russian legislation currently in force does not put quotas for the annual harvest of waterfowl; there are only seasonal restrictions, as well as those for the number of birds taken by a hunter per day. Besides, there are very few hunting clubs that specialise on waterfowl. For these reasons, the experts suppose that Russia will have to make reservations about 23 species, namely: *Anser fabalis*, *Anser albifrons*, *Anser anser*, *Branta bernicla bernicla*, *Tadorna ferruginea*, *Tadorna tadorna*, *Anas penelope*, *Anas strepera*, *Anas crecca*, *Anas*

platyrhynchos, *Anas acuta*, *Anas clypeata*, *Netta rufina*, *Aythya ferina*, *Aythya marila*, *Polysticta stelleri*, *Clangula hyemalis*, *Melanitta nigra*, *Melanitta fusca*, *Bucephala clangula*, *Mergellus albellus*, *Mergus serrator*, *Mergus merganser*. Some populations marked out look doubtful to the experts, for example *Anser fabalis* – Western Taiga, Western Tundra.

Paragraph 4.1.4. says that Parties shall endeavour to phase out the use of lead shot for hunting in wetlands by the year 2000. The Russian legislation currently in use does not have this prohibition. However, the State Ecological Committee of Russia forwarded to the Russian Government "The Report on the Lead Environmental Pollution of the Russian Federation and its effect on the health of the population", which points out the following. Russia has 90 000 square km of water basins. These are distributed unevenly. There are many lakes in the tundra zone, less in the forested tundra. Taiga ponds are numerous in the north-west of the European Russia, in Western Siberia and Central Yakutia, as well as in the forested steppe and steppe of West-Siberian depression. Flood plain lakes, shallow parts of artificial lakes, overgrown peateries, ponds and other extensive and shallow water basins have the largest numbers of waterbirds. 1 120 000 square km of the territory of Russia are marshes. Those of the forested steppe zone of Russia are the most productive. Wetlands are very attractive for amateur hunters and for trade hunters as well, especially in the North, and also in areas before and across the Urals, and in Western Siberia. Here there are from 370 to 450 ha of wetlands for one hunter. The impact on wetlands is much higher in the Central, Volga-Don, North-western and Cis-Ural regions, with 60 to 100 ha for one hunter. The number of hunters is the highest here, and so is the impact on wetlands.

As one can see from Table 1, the impact is especially high in Central Russia, where in the early seventies there was up to 62 ha of wetlands for one hunter. 1732 thousands ducks were taken and more than 5 million cartridges (counting 3 cartridges for a duck) were used. About 156 tons of lead annually pollute hunting grounds of Central Russia. Estimates (water basins – 90 million ha, marshes – 112 million ha, an average cartridge contains 30 g of lead shot) show that as much as 1377 tons of lead annually pollute the wetlands of Russia. At the present moment this estimate should probably be slightly reduced, as expenses on cartridges and transport have

Table 1. Hunting impact on wetlands in Russia.

Zone	Wetland area per hunter, ha	Waterbirds taken, 1000's
Northern	450	635
North-western	106	796
Central	62	1732
Volga-Don	61	1529
Caspian	550	607
Caucasian Mountain	154	192
Cis-Ural	101	706
Trans-Ural and W-Siberian	372	9105
Total	**1856**	**15 302**

increased lately. In places of intensive hunting, waterbirds with lead poisoning due to swallowing grains of shot have been observed. Annually about 3000 tons of lead shot get into water basins of the former USSR. In Russia the percentage of birds with lead shot found in the stomach varies from 3 to 28.8%. The amount of lead shot in water basins in some regions of Russia is also high and exceeds the known data for other countries. For instance, in some lakes in the Vladimir region, where ducks on passage are intensively hunted, up to 5000 grains of shot per square meter of the bottom were found. These data show that waterbirds face the danger of lead poisoning. Lead shot is dangerous not only for waterbirds, but negatively affects other components of wetland systems, including the quality of drinking water in different reservoirs where waterbirds are intensively hunted.

In recent years state facilities in Russia practically stopped manufacturing lead shot, since lead supplies from Kazakhstan are very limited. However, more and more imported cartridges of poor quality become available from the trade, which relates to restrictions on using lead shot in Europe. Preliminary calculations show that these cartridges are cheaper than those with steel shot.

Lately Russia has started manufacturing steel shot. The industry can satisfy requirements of hunters. But industrial tests that would show the effect of this shot on barrels of the Russian guns have not been carried out yet. Taking it into account that from 3.5 million Russian hunters more than 2 million live within the Agreement Area, it is hard to predict social and economic consequences of phasing out the use of lead shot for hunting in wetlands. Probably this will be another reservation of the Russian Federation.

The significance of the Central Asian flyway for waterbirds within the AEWA region

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Abstract only

Key words: Central Asia, flyway, waterbirds, wetlands.

The West Siberian part of the Central Asian flyway is used by waterbirds migrating to the Indian Subcontinent as well as to the Middle East and Africa. Of the 115 waterbird species breeding, migrating, and moulting in this area, about 90 are listed within the AEWA region, and 65% of them were proved by ringing and other methods to winter in this region. Main routes and winter grounds of these species are discussed.

There are more than 120 000 lakes and marshes of various types in the steppe and forest steppe zones between the rivers Ob and Tobol, forming a large network of wetlands. At present there are only three Ramsar sites and few protected areas in this territory. According to the latest observations several other wetlands can be identified as Ramsar sites. Numbers and dynamics of waterbirds, including rare species on the two Ramsar sites and other wetlands, are also discussed.

Part III:

Case studies from the AEWA region

Small isolated wetlands in the Central Sahel: a resource shared between people and waterbirds

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Key words: Niger, "mares", waterbird census, human interaction, wetland ecology.

From 1992 to 1997, annual waterbird censuses were carried out in southern Niger. Sites were either located along the river Niger (maximum coverage 250 km of the 550 km the river flows through Niger), or they were isolated, permanent, semi-permanent or temporary lakes (a maximum of 42 lakes covered in one year). The size of the lakes varied between 2 and 2000 ha. Detailed information on rainfall was available for each rainy season preceding the winter counts. In 1995 a large number of environmental and anthropogenic factors were measured for 32 lakes. These included surface area, water and soil characteristics, hydrology, (semi-)aquatic and woody vegetation, ichtyofauna and benthic fauna. Human influence was scored based on a number of activities that were determined beforehand. These included fisheries, brick making, grazing and horticulture or cropping. Statistical analysis of environmental and ornithological data reveals interesting patterns for several species or species groups, but not for all. Some may be rather indifferent, as long as there is water available and sufficient food. Small lakes hold higher waterbird densities than larger lakes. Smaller lakes usually have a higher nutrient load, and when lakes dry out densities of aquatic macrofauna increase. Human influence does not , or not yet, seem to be a major determinant for bird distribution. However, shyness of Anatidae was sometimes markedly different between lakes, suggesting an influence from hunting.

Isolated wetlands are an important habitat for both Palearctic and Afrotropical waterbirds. More than 100 wetland-related bird species were recorded, with a maximum of 130 000 individuals, of which 80 000 on the lakes. The total number of waterbirds present in Niger in January/February might well be over half a million, making this country and the lake habitat in particular extremely important from a conservation point of view. The importance of these wetlands and their resources for the local population is discussed, as well as their future developments. Given the increasing pressure on these wetlands, conflicts may arise in the near future. Exploration of this type of wetlands elsewhere in the Sahel is highly recommended.

Introduction

Isolated wetlands on the fringe of the Sahara and in the Sahel, in addition to the floodplains of the larger rivers, have been recognised as important staging areas for palearctic and afrotropical waterbirds (Jarry *et al*. 1987, Perennou 1991). Until the start of the annual African Waterfowl Census in 1991, information on isolated wetlands was mainly restricted to Mauritania and Burkina Faso (Roux and Jarry 1984, Perennou 1991, Weesie 1996). This information showed that, at least in some years, a number of these sites held important concentrations of waterbirds. Apart from these rather incomplete censuses, there existed neither information on distribution of isolated wetlands within the Sahel, nor data on the numbers of waterbirds they held. Thus their importance for waterbird populations could not be evaluated.

The early censuses in the Sahel mainly concentrated on the major floodplains, rivers and lakes. One of these lakes, Lake Chad, has considerably decreased in size, due to gradual climatic change: from 25 000 km^2 in 1963, to 3000 km^2 in 1986, to 2150 km^2 on 24 February 1994. This was further reduced to 1390 km^2 by 31 May 1994, due to evaporation during the dry season and the shallow nature of the lake (Mullié and Brouwer 1994). Furthermore, the floodplains of the larger rivers have increasingly been converted to e.g. rice fields, and the rivers themselves dammed (e.g. Drijver and Marchand 1985). No information exists on how waterbirds have reacted to these changes in hydrological conditions.

All these questions have led to the establishment in 1991 of a research programme in Niger in order to:
1. Evaluate, by means of an annual census, the importance for waterbirds of small isolated temporary and semi-permanent wetlands, compared to river Niger sites;
2. Understand the ecology and hydrology of these wetlands, and to relate these features to the types and numbers of birds using them;
3. Evaluate the use of these wetlands by people and livestock, and to identify actual and potential conflicts between human usage and conservation issues.

From the very start the census was part of the African Waterfowl Census AfWC, and results have been made available to the international community in the annual reports of the AfWC. Further documentation on the 1992–1994 censuses was presented in a workshop on wetland management in Niamey in 1994 (Brouwer and Mullié

1994a, Mullié and Brouwer 1994) and in the IUCN Wetland Programme Newsletter (Brouwer and Mullié 1994b). Meanwhile additional annual censuses were carried out from 1995–1997. This paper gives an overview of the main results of the study.

How the censuses were organised

In January 1992 a first set of inland wetlands and river sites along the Niger was chosen for a census. This selection was based on local knowledge, since few published accounts existed, and on available manpower and transport. Counts were done by car, by boat and on foot. At a later date several reconnaissance flights were also made by light aircraft.

Until 1995 we were able to gradually increase our coverage and add new sites. The 1995 census included 42 isolated wetlands, covering 8000 ha, and 23 river sites, covering 250 km (one side only) of the 550 km (45%) of the Niger river within the boundaries of Niger. This coverage was found to be the maximum possible with our limited resources, given also the distance of 8000 km to be shared between two vehicles in one month. This also shows the physical limitations one has to face when organising ground based surveys in a country of over 1 million km^2 with only two Tarmac roads.

An effort was made to count birds as completely as possible. In many cases this proved to be impossible due to time restrictions, unaccessible parts of the area and other reasons. If a count was incomplete, the percentage of the wetland that was covered in the count was estimated. At each visit a number of features was noted, such as lake size and vegetation, human use, etc. Only in 1995 this was standardised and a GPS was used for size estimates.

In 1995 we also systematically took samples for physical and chemical measurements of water and soil, including Secchi values, pH, granulometry and nutrient contents. In several years human activity was evaluated on a scale of 0–3 (none to a great deal) for agriculture, pastoralism, fisheries, brick making, salt extraction, hunting and collection of natural products. Activity scores were added up to get a combined index for total human activity. Human influence was scored based on a number of activities that were determined beforehand. These included fisheries, brick making, grazing and horticulture or cropping. Benthic fauna was sampled as well, and a herbarium was made for identification of aquatic vegetation.

The censuses of 1996 and 1997 were less complete, but covered at least some of the longer-term count sites. In addition in 1997 some sites could be visited in April or June, thus improving our understanding of temporal changes in habitat use. A general problem which these complicated multi-year comparisons was that no long series were available for a sufficiently large number of sites. Because there was also important between-year variability at the various sites, it was decided to limit ourselves to two years for this paper: 1994 and 1995. These years were not only the most complete in coverage, they also represent contrasting situations after respectively a rather bad 1993 rainy season (the 1994 counts) and after a very prolific 1994 rainy season (the 1995 counts). This allows us to analyse in some detail if and how precipitation in the preceding rainy season influences numbers and distribution of waterbirds in the two subsystems of river sites and isolated wetlands.

To calculate correlations between bird species and environmental variables, data were subjected to Co-inertia Analysis with a Row Weighed Correspondence Analysis (for log-transformed bird numbers), and to Principal Components Analysis (for environmental variables), using ADE-4 software (Thioulouse *et al*. 1997).

Description of the sites

River sites comprised irrigated rice schemes as well as stretches of river bordered by floodplains. At Ayorou there is an inland delta of the Niger of some 10 000 ha which, however, is directly threatened by the plans to construct a dam just downstream at Kandadji. The inland wetlands comprise different types. There are oasis-like wetlands with usually alkaline water with a very high conductivity, in direct contact with the groundwater, and with a vegetation of *Phragmites* spp. and various palms. There are several reservoirs on calcareous rocks, with a naturally high phosphorus content in their sediment which gives rise to a high fish density. There are temporary or semi-permanent rain-fed lakes, often in valleys, on soils with a variable clay content. Their vegetation bears a striking resemblance to that of the floodplains in Northern Cameroon (Van der Zon 1992) and of the Inner Delta of the Niger in Mali (Duong-Huu-Thoi 1950), but less so with the (ex-)floodplains of the Senegal River (Trochain 1940) or of temporary lakes in eastern Senegal (Vanden Berghen 1990)). In these wetlands vegetation occurs in zones parallel to the shoreline, which are characterised respectively by *Veteveria nigritana* (shortest inundation time), *Oryzia longistaminata* (wild rice), *Echinochloa stagnina* (Bourgou) and *Nymphaea lotus* and *N. caerulaea* (where there is water a meter or more deep at least four to five months of the year).

Results

Species distributions

A summary of the January/February counts for the entire period 1992–1997 is given in Table 1. The maximum number of waterbirds counted in any one year was 132 000 individuals. The most important species groups were ducks, herons/egrets and waders.

When we look at numbers and species composition of birds at the lakes (Fig. 1), we notice that Palearctic species outnumber Afrotropical species. Ducks are predominant among Afrotropical species, ducks and waders among Palearctic species. Overall, numbers and densities of Palearctic birds tended to fluctuate much more than numbers and densities of Afrotropical birds. In the comparisons, 250 ha of lake habitat is considered equivalent to 10 km of river counted (one side only, including bordering river valley habitats).

Table 1. Summary of census results 1992–1997.

Year	1992	1993	1994	1995	1996	1997	1992–97
River (km)	30	69	183	248	144	126	%
Lakes (ha)	3250	4191	3465	7941	3247	1596	
grebes, cormorants	124	239	354	852	1271	1160	0.98
herons/egrets	3982	8705	24 437	19 088	19 981	8554	20.86
Bubulcus ibis	*2668*	*6893*	*22 681*	*15 537*	*17 943*	*6552*	*17.79*
storks, spoonbills	923	2579	2825	4925	3880	2700	4.39
ducks, geese	5477	24 910	47 293	90 336	20 037	33 359	54.50
rails, cranes	171	186	370	1054	510	1435	0.92
waders	7018	4698	20 344	14 644	11 718	11 961	17.32
gulls, terns	357	1062	675	726	184	269	0.81
raptors	30	53	56	144	118	64	0.11
kingfishers	21	28	65	126	92	88	0.10

Figure 1. Numbers (left) and densities (right) of waterbirds using lake and riverine habitats in Niger after a dry (1994) and a prolific rainy season (1995).

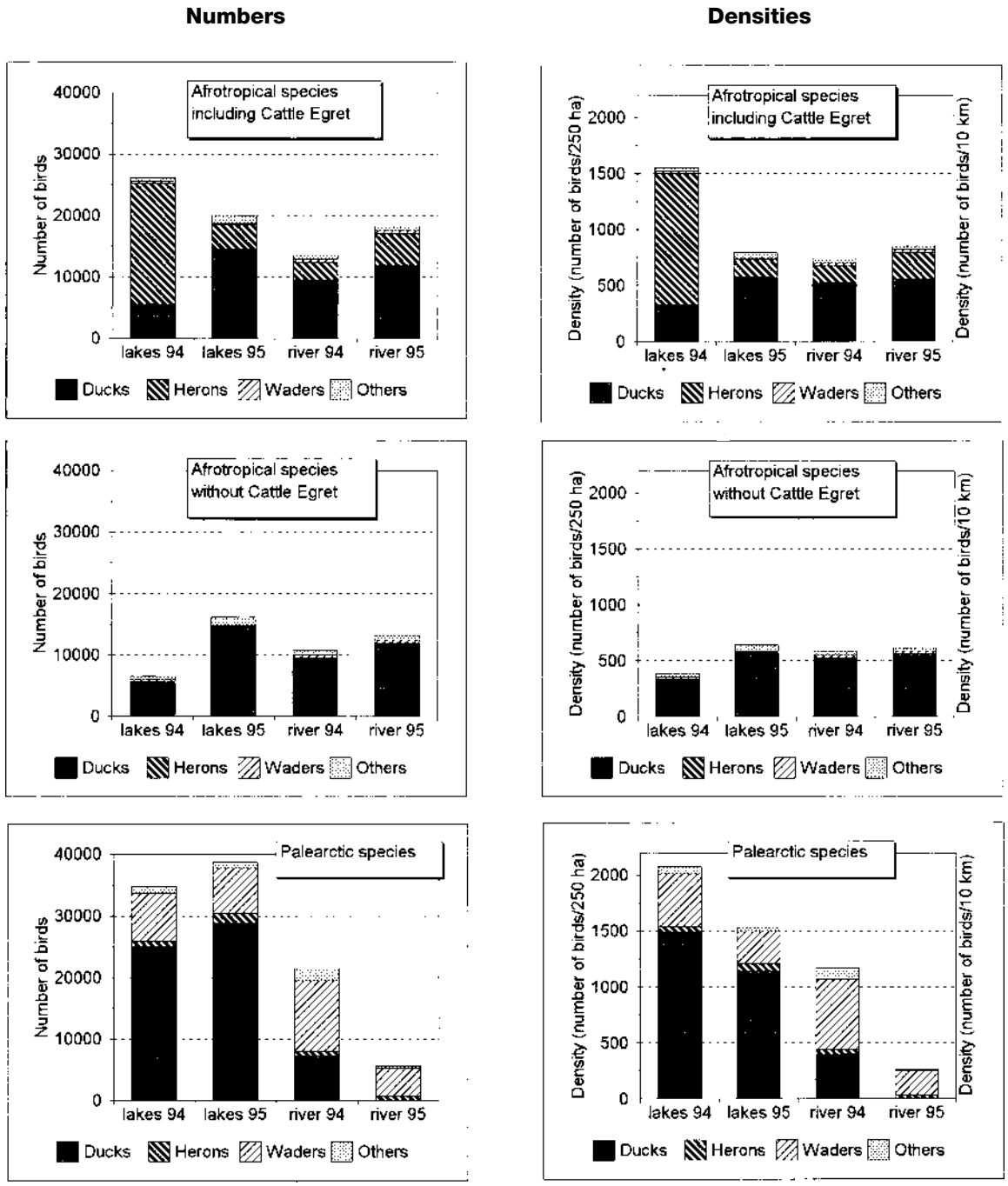
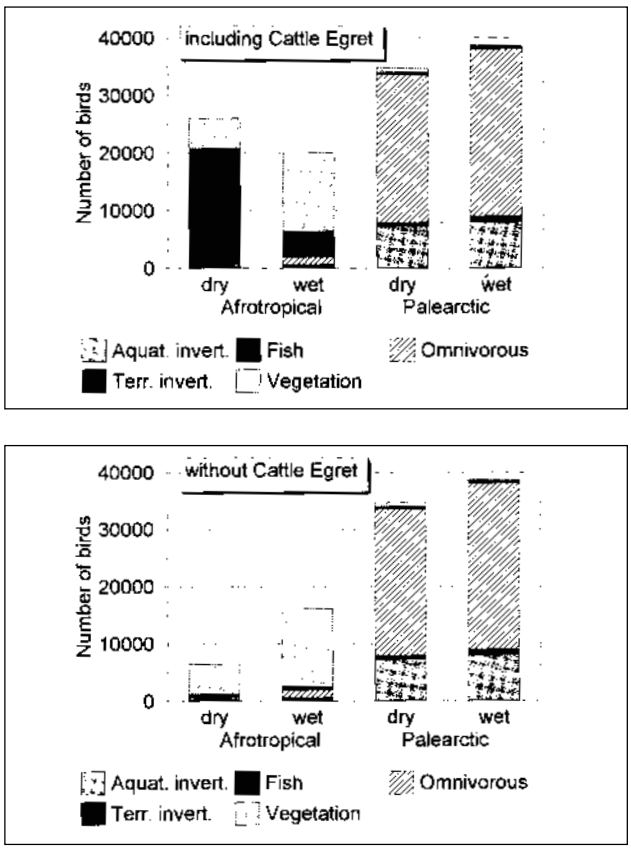


Figure 2. Number of Afrotropical and Palearctic waterbirds using lakes according to their food preference, after a dry (1994) and a prolific rainy season (1995).



A single species, the Cattle Egret, dominated in 1994. Since this included observations of roosting birds, not seen the year afterwards because the counts took place at a different time of day, data are also presented without this species. After a wet year (1995 counts) Afrotropical species numbers increased significantly on the lakes, but Palearctic species only marginally. However, overall densities of Palearctic species decreased from 2000 to 1500 per 250 ha.

Along the river the situation is different. Palearctic species predominate in dry years, Afrotropical species after a good rainy season. A striking phenomenon is that Palearctic ducks disappear from the river after a good rainy season, apparently preferring to stay at the lakes, which showed a concomitant increase in duck numbers.

Although two years of data is not much to go by, we suggest that palearctic ducks prefer lakes to the river, if the lakes contain enough water. The river acts as a refuge following dry years. At the same time Afrotropical ducks seemed to 'hang around' in greater numbers following the good rains (1995 counts), particularly on the lakes. We recognise that conditions north of the Sahara can also play a role for Palearctic ducks: harsh winter weather at northern latitudes in some years forced species such as White-fronted Goose *Anser albifrons*, Mallard *Anas platyrhynchos* and Wigeon *A. penelope* to traverse the Sahara and we noticed them as vagrants in the lakes.

Palearctic waders, all species confounded, showed somewhat less of a preference for either lakes or river. At least, lake numbers do not increase from 1994 to 1995. River numbers did go down, but the reasons are not clear. Black-tailed Godwit *Limosa limosa* and to a lesser extent Ruff *Philomachus pugnax* are typical for the river habitat, in particular where there are irrigated ricefields. This is consistent with observations in Senegal, where these species show a gradual shift from macroinvertebrates to rice in their diets during their wintering period (Tréca 1984, 1992). The Spotted Redshank *Tringa erythropus* was found to be a typical lake species, which was rather rare along the river. This is perhaps the reason that this species is under-represented in the AfWC (annual reports 1991–97), except in the coastal lagoons of Ghana, where it preys on small fish (Piersma and Ntiamoa-Baidu 1995).

Effects of environmental characteristics of individual wetlands

Whatever the reasons, isolated temporary and semi-permanent wetlands apparently hold high numbers of waterbirds under all conditions, so let us look more closely to see what makes them so attractive. In Fig. 2 birds have been divided according to their food, and what is immediately obvious is the difference between Afrotropical and Palearctic species. Among Afrotropical species vegetarians dominate, whereas among Palearctic species omnivores dominate, followed by species that feed upon aquatic invertebrates. Among this latter group tactile surface foraging species are the least represented which might be an indication that their food availability is the limiting factor. Indeed, benthic samples that we have taken showed relatively low densities (a maximum of 800 ind/m^2) of Oligochaetes and up to 250 Chironomids per m^2, while maximum densities of 700–3000 Chironomids/m^2 have been reported from the same habitat in Senegal (Lahr *et al.* 1997).

In contrast to the situation on tidal mudflats, densities of benthic as well as pelagic macrofauna in temporary wetlands in semi-arid areas show very distinct fluctuations in time in relation to the dry-wet cycle of the site as has been shown in the pans of South Africa (Meintjes 1996) and temporary lakes of Senegal (Lahr *et al.* 1997). These fluctuations are not necessarily synchronous among sites because different sites faced differences in the onset and the amount of rainfall. We hypothesise that specialist species will have to sample lakes in a larger area in order to be there when their preferred prey peaks. Generalist species can shift from one prey to another and therefore do not need to move. Our observation that species could be abundant in one year and absent in another in any particular site can be seen as an indication of this phenomenon. A particularly erratic behaviour was observed in the Spotted Redshank, and to some extent also in the Black-winged Stilt *Himantopus himantopus*. This can have important consequences for conservation, since the basic unit to protect will not be one particular wetland but rather a complex of temporary wetlands. Therefore it is recommended to initiate a detailed study to elucidate the more complex relationships between the birds and their food on temporary wetlands throughout the season.

Figure 3. Species distribution after a dry (1994) and a prolific rainy season (1995).

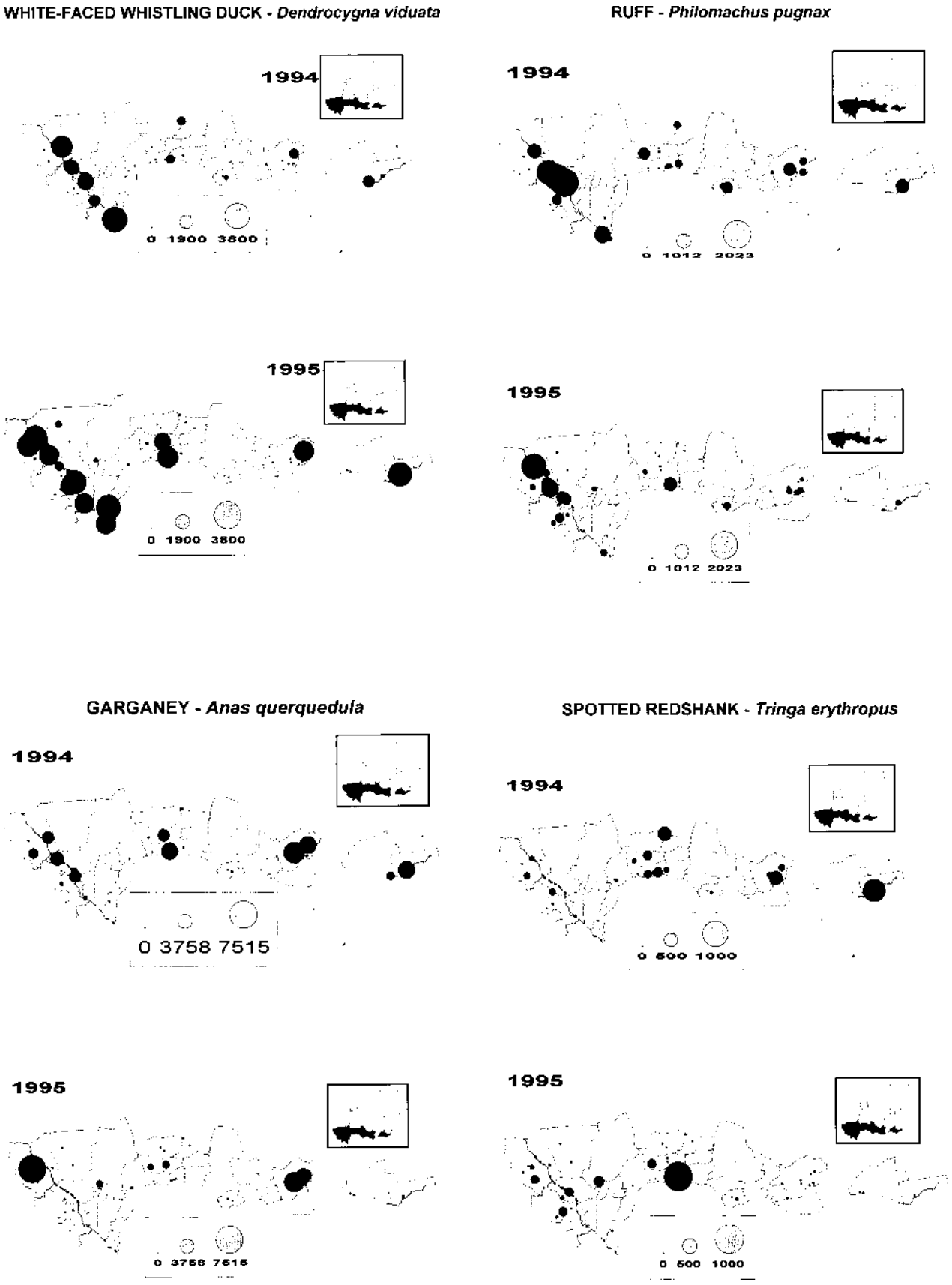


Figure 3. continued.

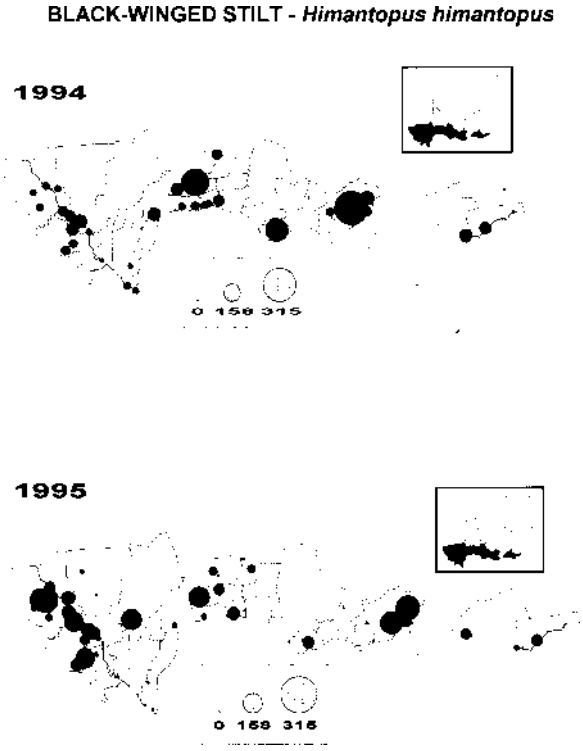
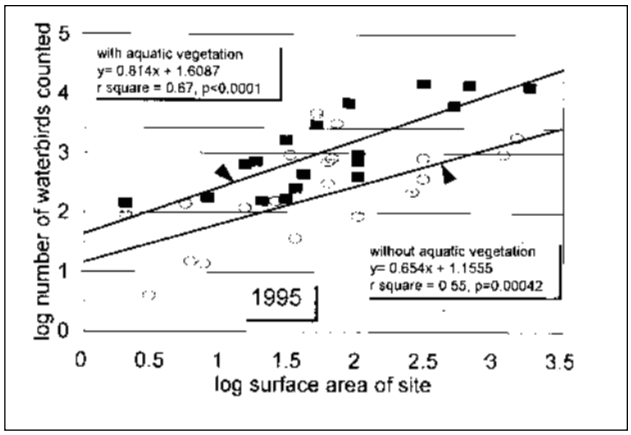
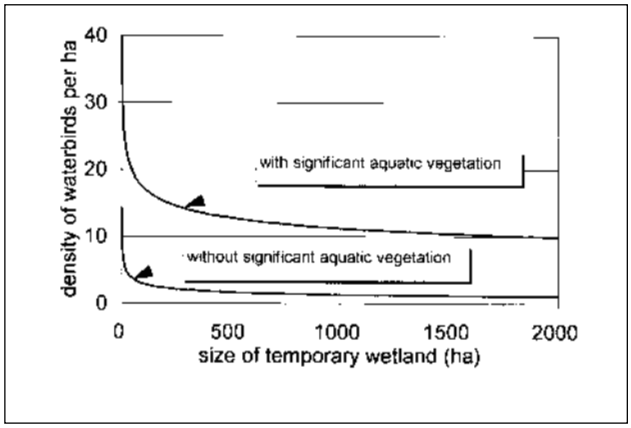


Figure 4. Correlation between log surface area and log number of birds in temporary wetlands with or without aquatic vegetation (upper panel), and correlation between size of temporary wetland and density of waterbirds (lower panel).





Box 1. Explanatory variables for species occurrence in lakes resulting from co-inertia analysis.

Group 1

1st Axis, 25.4% explained

Species: Black-necked Grebe, European Spoonbill, African Spoonbill, White-winged Black Tern, Long-tailed Cormorant, Pochard

Explanatory variables: % sand, pH, Secchi-value, ppm P-total, Oxygen, Log surface area of lake, Number of fish species

Group 2

1st Axis

Species: Black Crowned Crane, Ruff, Avocet, Wood Sandpiper, Spotted Redshank, Black-winged Stilt

Explanatory variables: % Clay, N-total, Organic Carbon %, K^+, CEC-NH_4,NH_{4+}

Group 3

2nd Axis, 19.3% explained

Species: Avocet, Egyptian Plover, Caspian Tern, Grey-headed Gull, Gull-billed Tern, White-winged Black Tern, Whiskered Tern

Explanatory variables: Ca^{2+}, ECEC, Rainfall 1993, Relative wetness-time 1993, Mg^{2+}, Na^+, Conductivity

Group 4

3rd Axis, 14.4% explained

Species: Purple Gallinule, Moorhen, Shoveler, Garganey, Pintail, Unidentified ducks, Mallard, Teal, Tufted Duck, Pochard, Ferruginous Duck

Explanatory variables: Aquatic vegetation, Woody vegetation, Relative wetness-time 1993, Longitude, % N-total, Organic carbon %, Sand %, Log surface area, pH water

The maps, Fig. 3, show distribution patterns in 1994 and 1995 for a few species. Those with a primary preference for riverine habitats (White-faced Whistling Duck *Dendrocygna viduata* and Ruff), and those with a stronger preference for lake habitats (Garganey *Anas querquedula*, Spotted Redshank and Black-winged Stilt).

When we look at the outcome of the co-inertia analysis the following conclusions can be drawn. The numbers present of the majority of bird species (55% by numbers) cannot be explained by any of the parameters studied. Either these birds are rather indifferent to the parameters studied as long there is food available, or they depend on factors that we did not measure. Some results are presented in Box 1.

Species such as European Spoonbill *Platalea leucorodia* and Long-tailed Cormorant *Phalacrocorax africanus* (first group) occur where there are lakes with a sandy bottom, clear water and a large diversity of fish species (often as a result of artificial stocking). Other species prefer lakes on clay with a high nutrient loading, e.g. Crowned Cranes *Balearica pavonina*, Spotted Redshanks and Stilts (second group). Palearctic ducks and rails are clearly correlated with larger lakes with aquatic and woody vegetation on sandy bottoms with a relatively high nitrogen loading, whereas there appears to be a decrease

in their occurrence from east to west. If this is related to the original presence of the now in size largely reduced Lake Chad in the east is unknown. It is of interest to notice that the presence of Palearctic ducks and also of some gulls and terns is correlated with rainfall one-and-a-half years previously. Perhaps this indicates a site fidelity, rather than an environmental effect.

Variability in food availability

The importance of aquatic vegetation can also be shown in another manner (Fig. 4). Lakes with aquatic vegetation not only hold more birds per ha, they also have a steeper slope in the log surface-log number plot (slope 0.814, $p<0.0001$, $r^2=0.67$)) than lakes without aquatic vegetation (slope 0.654, p=00042, $r^2=0.55$). This means that, when there is aquatic vegetation, bird densities decrease more slowly (slope closer to 1) with increasing size of lakes than they do in lakes without aquatic vegetation. It is probably the combination of cover and food that makes these sites particularly attractive. Small lakes have the highest densities of birds and also the highest fish production (Brouwer and Mullie 1994a, Mullie and Brouwer 1994). In January/February most of these lakes are almost at the end of their annual cycle. When they dry out their circumference/surface ratio increases sharply, which means an increasing influence of e.g. cattle manure on water quality. Also conductivity increases and nutrient loading due to a concentration effect. As has been shown by Lahr *et al.* (1997) this coincides with an increase of aquatic invertebrate biomass per unity of volume.

From the statistical analysis no important correlations could be established with human influence. We noticed, however, that ducks appeared to be more difficult to approach in areas where signs of illegal hunting were found. This was also found in Burkina Faso (Weesie 1996). Even lakes that were completely surrounded by vegetable gardens and partly covered by Water Lettuce *Pistia stratiotes* still held important numbers of birds. If a wetland was sufficiently large, human influence in general was rather diffuse and birds could move to another side of the lake when disturbed.

Increasing pressure on small wetlands

For the past decade or two there has been a marked intensification of the use of small wetlands for market gardening. For instance, we have observed the installation of motor pumps for irrigation. How this eventually will influence the use by birds remains to be studied. What we can say is that human pressure on isolated wetlands in the Sahel is likely to increase. Particularly in arid and semi-arid areas, wetlands can have enormous local and regional significance for agricultural production and as a safety net following poor harvests (Brouwer and Mullié 1994a). The population of Niger is increasing at about 3% per annum. At the same time IPCC predictions have it that, due to the greenhouse effect, rainfall in the western Sahelian and Sudanian zones will decrease (Greco *et al.* 1994, Brouwer and Mullié 1996). This means that flows in the Niger river would decrease. For Niger itself a moderate increase is predicted, but its effect on the number and size of lakes in Niger is unlikely to offset the effects of population increase. Another indirect impact on the lake habitat comes from recent intensification in land-use practice in the catchment areas in which temporary lakes are situated. Removal of woody vegetation and shorter fallow periods lead to increased erosion, which subsequently fills up lakes through run-off (Brouwer and Mullié 1994b). This phenomenon has been observed in several lakes. On the other hand, new lakes have been formed in recent years through major hydrological events, presumably aided by clogging up of valley bottoms by silt and clay particles of eolian and alluvial origin (Brouwer and Mullié 1994b). With such increases in pressure on isolated wetlands in Niger, their co-ordinated management for both human and conservation purposes becomes ever more urgent.

The overall importance for waterbirds of temporary wetlands in the Sahel

The number of lakes that were counted in any one year was not more than a small sample from the vast number of temporary and (semi-)permanent lakes that are present in the Sahel. In Niger alone 818 lakes have been registered (MHE-DRE Niger 1993), and this number is known to be incomplete (information DFPP). Information on lake sizes was available from a subsample of 530 lakes from the Departments of Zinder (Alio and Halikou 1993), Tahoua (Anon. 1993) and Tillabery (Hirigoyen 1989, Piaton

Figure 5. Size distribution of lakes counted in 1995 compared to a representative subsample of lakes present in Niger (upper panel), and cumulative estimated numbers of waterbirds present on all known temporary and (semi)permanent wetlands in Niger.

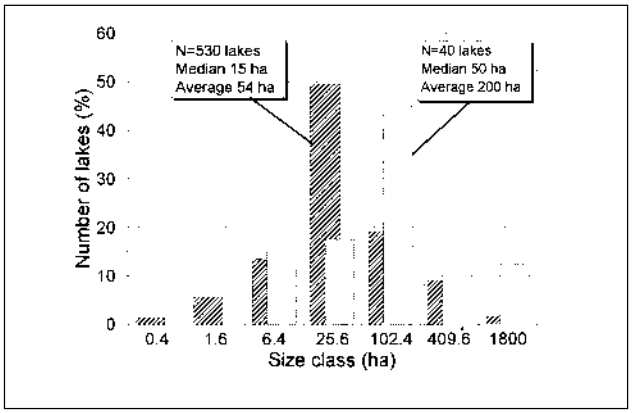


Figure 5a.

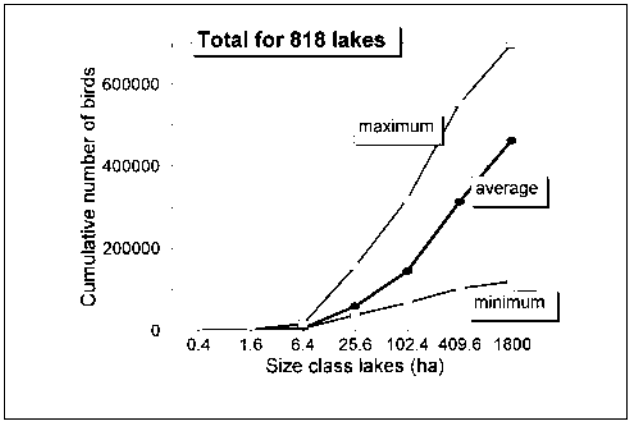


Figure 5b.

and Puech 1992). The lake size distribution is given in Fig. 5a. The information shows that the sizes of the lakes that we counted deviate from the lakes that are present: small lakes were under-represented in the counts. Since the "official" lake sizes are based on maximum sizes at the end of the rainy season in October, the discrepancy is mainly caused by the drying out of smaller lakes by January/February.

Results from the counts have been extrapolated for the total of 818 lakes (Fig. 5b), using the lake size distribution established in Fig. 5a. The average given in Fig. 5b is based on the correlation between log surface area and log number of birds for all lakes counted up to and including 1995 (log y = 1.04 log x + 0.93). Because of the rather large variance of the data set, minimum and maximum estimates have not been established using confidence limits, but by using the (1995) regression data for lakes without and with aquatic vegetation respectively, as shown in Fig. 4. With an independent data set (1996) the established correlation was verified and found to be a good predictor of bird numbers counted.

With about half a million of waterbirds estimated to be present on the temporary and (semi)permanent lakes of Niger at the time of counting, and with about 100 000 waterbirds estimated to use the river Niger within the limits of the country at any one time in January/February of non-drought years (Mullié and Brouwer 1994), Niger is an important wintering area for populations of an array of waterbird species. In these figures the turn-over of waterbirds that only temporarily use Niger's wetlands has not even been taken into account. Exploring the lake habitat elsewhere in the Sahel is likely to confirm our findings and to add important new discoveries.

Acknowledgements

It is clear that this project builds on teamwork and for this reason we should like to thank all those persons who have been involved in the organisation and execution of the censuses. In particular we thank our co-workers Adamou Kounou and Mahamadou Salifou (DFPP), Tim Crisler and Chris Jameson (Peace Corps), Maazou Garba (Centre Agrhymet, DFPV), Peter Kristensen and Pierre Poilecot (IUCN) for their help with the counts. Gaby Schmelzer (Centre Agrhymet, DFPV) kindly identified plants that were collected and Gerard van der Velde (Dept of Aquatic Ecology, Catholic University, Nijmegen) kindly quantified and identified macro-benthos samples. WCM thanks the DFPV management for allowing him to include the wetland study in his research programme and for financing parts of the study. We thank IUCN Niger (Anada Tiega and Peter Kristensen) for their financial support, and DFPP, IUCN and DFPV for putting 4x4 vehicles at our disposal.

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The East Atlantic Ramsar Network

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Key words: Ramsar, Danone, wetlands, network.

As announced on the Ramsar website early in 1998 the protocol of the Evian Project was signed in Paris, France. The project was jointly developed by the Conservatoire du Littoral (France) and the Ramsar Bureau. Part funding has been obtained from the Danone food conglomerate. This is the first private-sector enterprise to associate itself with the Ramsar Convention. The Fonds Français Environnement Mondial (FFEM, French GEF), together with the Conservatoire du Littoral and the town of Evian, will also be funding different parts of the project. This ambitious project has six action themes with actions worldwide: transfer of know-how; training; water and health; awareness raising for decision-makers; support for Ramsar communications; cash prize for Ramsar award.

The East Atlantic Ramsar Network has been set up as an experimental network under the theme "Transfer of know-how". Eleven Ramsar or potential Ramsar sites have been selected in eight different countries along the East Atlantic seaboard, from the Netherlands to Senegal. The Ligue pour la Protection des Oiseaux, BirdLife Partner for France, has been asked by the Conservatoire du Littoral to co-ordinate this network and its activities. Over a period of three years (1998–2000) three workshops will be held, the first took place in the Baie de Somme, France on 24–27 September 1998, and bilateral exchanges between sites will be set up in order to aid the transfer of knowledge and methods of dealing with wetland and waterbird management and conservation issues.

Introduction

In January 1998, the French food conglomerate Danone agreed to partially fund wetland conservation efforts under the Ramsar Convention through the "Evian Project". This portfolio of activities in support of the wetland convention will be funded by the Groupe Danone (which includes the Evian mineral water company) and the French Global Environment Facility (FFEM), and developed with the support of the French government, the town of Evian and the Conservatoire du Littoral. The overall budget is 6.65 million French Francs (approximately US$1.1 million). This is the first time a private company in France has supported the Ramsar Convention.

The overall project, entitled "Caring for Water Resources and Water Quality", is made up of six action themes: transfer of know-how, training, water and health, awareness raising for decision-makers, support for Ramsar communications and a cash prize for the Ramsar Award. A wetland information/visitor centre is to be developed on a property owned by the Conservatoire du Littoral on the edge of the town of Evian; this part of the project is to be financed separately by the town of Evian and the CEL to a level of 7 million FF.

Transfer of know-how

The East Atlantic Ramsar Network is one of two experimental networks of (potential) Ramsar sites established to promote technical exchanges on the issue of water resources and water quality. This particular part of the project is in response to Action 7.1.2. of the Ramsar Strategic Plan 1997–2002 which states: 'Encourage twinning of transfrontier wetlands, and of other wetlands with similar characteristics, and use successful cases for illustrating the benefits of international cooperation.'

Why is there a need for "Transfer of know-how"? Over a 100 countries are party to this international convention, which has been in place since 1971. There are nearly 1000 designated Ramsar sites but there is currently very little exchange of information or experience between sites. To improve the effectiveness of the convention exchange of information is essential. How can effective communication be achieved?

It was decided to set up two experimental networks of a small number of Ramsar sites: "The East Atlantic Network" and the "Deltas of Closed Seas Network" (Mediterranean, Black Sea, Caspian). The Ramsar Bureau wished to explore how to best set up a network. The budget (2.1 million FF) for the two networks will allow transfer of know-how to take place through:

- multilateral workshops – one a year for three years and
- bilateral exchanges between the different sites within each network.

The Ligue pour la Protection des Oiseaux (LPO), the French partner of BirdLife International, was invited to co-ordinate the East Atlantic Network. LPO is one of the four largest environmental NGOs in France working at a national level. The Deltas of Closed Seas Network is run by Christian Perennou of the Station Biologique de la Tour du Valat, Camargue, France.

Within the East Atlantic Network there are eleven sites (Table 1) in eight countries from Senegal through to the Netherlands, including UK. The sites are managed by Government Organisations or Non-government Organisations, and cover either part of, or all of the Ramsar site; the sites on the African continent correspond to the Ramsar site.

Table 1. List of sites in the East Atlantic Network.

COUNTRY	Site	Organisation	Participant
The Netherlands	Zuid Kust Schouwen	Vereniging Natuurmonumenten	Gert de Groot
Great Britain	Snettisham Reserve	Royal Society for the Protection of Birds	Paul Fisher
France	Baie de Somme	Syndicat Mixte de la Côte Picarde	Patrick Triplet
France	Marais de Séné	Bretagne Vivante (SEPNB)	Guillaume Gélinaud
France	Marais de Moëze	Ligue pour la Protection des Oiseaux	Nicolas Boileau
Portugal	Ria Formosa	Parque Natural de Ria Formosa	Nuno Grade
Spain	Cadiz Bay	Universidade de Cadiz-GEAM	Macarena Castro Casas
Morocco	Merja Zerga	Direction Régionale des Eaux et Forêts du Nord Ouest-Kénitra	Mustapha Azdad
Mauritania	Banc d'Arguin	Parc National	Mohamed Mahmoud Ould Yehdih
Mauritania	Diawling	Parc National	Amadou Ba
Senegal	Parc National du Djoudj	Direction des Parcs Nationaux du Sénégal	Sara Diouf

The first workshop

The first workshop was held at the end of September 1998 in the Baie de Somme, northern France, with support on the ground from one of the organisations in the network – the Syndicat Mixte de la Côte Picarde (SMACOPI), which manages the nature reserve in the Baie de Somme. The theme for this workshop was "The importance of water quality and quantity for birds in wetlands".

It was the first occasion for the site managers to meet and discuss their sites. Site managers have a tendancy to focus on their patch. This network will allow them to broaden their view and see their site in the context of the East Atlantic flyway as a whole and help them find solutions to general problems. Many of the managers have had little opportunity to visit other sites along the flyway 'their' birds take each migration. For example, six out of the seven European managers in the network have not visited the African continent, and two out of four of the African managers had not visited Europe until the first workshop.

The positive outcome of the first workshop is that good contact was made between the managers because the size of the meeting was small enough to enable people to have the opportunity to talk and discuss with all the other participants, despite language problems. There are at least seven languages within the network, but it was decided to have two working languages: French and English. Only four out of seven people are more or less bilingual. And the initial ideas for bilateral exchanges between sites were developed.

Given the variety of habitat, conservation and cultural contexts of these sites it was also the opportunity to decide on which of the many topics we should choose to work on over the next three years.

This first workshop was an opportunity for the site managers to give an insight into the values and services of their sites and their management problems. Here is an extract from each site:

Netherlands – Zuid Kust Schouwen

Protected by a tidal barrage the Ramsar site in the Netherlands, Oosterschelde, 35,000 ha of open water, mud and sand flats at low tide. This tidal barrage is upsetting the sediment balance within the Ramsar site, and as a consequence the feeding areas for the birds are declining. To compensate for this loss, wetland sites on the islands behind the huge dykes are to be created; Natuurmonumenten's (NGO) site will be 750 ha.

UK – Snettisham Reserve, The Wash

This reserve of the Royal Society for the Protection of Birds (RSPB, a NGO) covers 1250 ha largely of mudflats and saltmarsh, and 40 ha of lagoons. Only the lagoons can be actively managed. Surrounded by intensive farming and being used by large numbers of birds these lagoons tend to suffer from water quality problems – blue-green algal blooms which are combated by huge sausages made of barley straw. Water levels can be controlled to enhance the roosting and breeding areas. On high tides, 80 000 waders can be observed right in front of the hides, this draws the crowds and makes members, RSPB currently has over 1 million members.

Northern France – Baie de Somme

This is one of the most unspoilt estuaries in France, and became a Ramsar site in 1998. The national nature reserve (3000 ha) is part of this network, of which only 200 ha are managed lagoons behind wooden dykes. The major problem for the bay is the sedimentation, like on many coastal wetlands in France. Unlike the northern countries the pressure of hunting is important, 7000 waterbird hunters over 13 000 ha, which is mostly estuary and mudflats.

North-west France – Marais de Séné, Gulf of Morbihan

This national nature reserve was recently extended to include 400 ha of old salines and mudflats within the Ramsar site of the Gulf of Morbihan. Within the gulf there is multiple use by fishermen, tourism and it is surrounded by urban pressure.

Western France – Marais de Moëze

This national nature reserve managed by LPO (NGO) is more than 6000 ha, with only 200 ha of lagoons and old salines. The area is Europe's most important region for oyster production. On the mudflats of the reserve 12 000 tons of oysters are produced per year, this represents 1000 jobs. This site suffers from a heavy hunting pressure on its borders. It is not yet a Ramsar site but on the list of potential sites.

Portugal – Ria Formosa

A large, essentially natural system of dunes and lagoons 18 400 ha along 60 km of coastline. It became a Natural Park in 1987 (the management organisation, a GO, of the

park is the participant of the network), and it is also a Ramsar site, a Special Protection Area under the European Birds Directive and is proposed as a Natura 2000 site under the European Habitats Directive.

It is very important as a nursery area for marine fish, 80% of Portugal's clams for export are produced in the park. 8000 people live within it earning a living from activities related to the lagoons. It was designated as Park by the government to balance the development of economic activities and its protection. The Park remains under constant pressure of illegal development within the Park and along the continental shore.

Southern Spain – Cadiz Bay
10 000 ha of estuarine habitats, part of which has been developed for salt production over the last 2000 years. Today many of them have been abandoned and are currently being developed for intensive and extensive aquaculture. The bay is a Natural Park surrounded by 5 major towns with a population of 500 000 people with one of the highest unemployment rates in Spain. There is great development pressure on this natural site. It is currently not a Ramsar site yet easily fulfils the criteria. This wetland is of international importance for six species of migratory waders and four species of breeding birds. The organisation which participates in the network is a research group at Cadiz University working in collaboration with the Natural Park of Cadiz Bay.

Morocco – Merja Zega
A large natural lagoon of 4500 ha, 3000 of which are open water. The site is under state ownership. The local population have always used the natural resources of the site – fish, juncus for mats. With the increase in the population there has been a large increase in the number of fishermen, juncus cutting, encroachment on the site by agriculture with serious pollution from run-off from intensive agriculture, transformation of the hydrology of the site by water abstraction from the rivers flowing into the site; and today use of the site for tourism. A management plan has been written for the site, but money is needed to implement it.

The organisation participating in the network is a GO.

Mauritania – Banc d'Arguin
This is the only truly natural system within the network, with huge natural resources – vital nursery site for fish and very important wintering area for waders and breeding sites for a variety of fish-eating birds. It was declared a national park (managed by a GO) in 1976 and covers 1.2 million ha, half continental and half marine along 180 km of coastline. It became a Ramsar site in 1982. Only a very small population of traditional fishermen live in the park.

This site is under serious pressure from the national and international fishing community, and the terrestrial section is under pressure from uncontrolled tourism

Mauritania – Diawling
This national park (managed by a GO) and Ramsar site of 16 000 ha was created in 1991. Once part of a natural delta system, the hydrology has been completely changed by the Diama dam on the Senegal river. The hydrological system is having to be recreated not just for the natural interest but also to provide fresh water for the local community and natural resources such as fish, and grasses for mat making. Much information on the hydrology in the past has been provided by the local people which has been invaluable for the recreation project.

Djoudj, Senegal
The other side of the river from the Diawling, the Djoudj national park (managed by a GO) and Ramsar site (16 000 ha) is a now also artificial, and thus the hydrology must be carefully managed. Until 1990 the policy of the Park was one of strict protection, which led to conflict with the local population. Since then attempts have been made, particularly through the new five year management, to integrate the local population. The challenge is to conserve the natural resources but also to allow controlled use of them by the local population.

In addition to the site case studies there were a small number of talks given by invited speakers on the general theme of the water quality and quantity.

1. Aicha Amezal of the Agence de l'Eau Seine-Normandie, France.
   This region includes Paris and it was particularly interesting and encouraging to hear this organisation taking a very positive approach to wetlands, with the recognition of their natural functions and values for people and actually putting a $ sign to these functions. The wetlands in this region of France play a very important role in the East Atlantic flyway.

2. Stephen Bolt, Anglian Water, UK discussed the difficult situation in which Rutland Reservoir finds itself in today; it is a national water resource and an international site for birds. Twenty years ago at the design stage of this reservoir, a nature reserve was integrated in to the scheme. It has been a huge success for wintering ducks and so was designated a Ramsar site and a Special Protection Area under the European Birds Directive in 1991. As a result, today any development to this reservoir has to go through a special planning process. The reservoir is not yet at maximum capacity. Due to water shortages in the region Anglian Water wish to develop the reservoir to its maximum capacity. The question now is whether the planning permission will be given. Which is more important, water for people, or a internationally important site for birds?

3. Philip Benstead, RSPB, UK gave an overview of the impact of the variation in water quality on bird communities. Within Europe the principal problem is eutrophication. Increasingly water entering protected areas has to pass through a buffer zone to remove excess nitrates and phosphate. An example is RSPB's new wetland reserve at Otmoor where there will be two reedbeds through which the water will pass before reaching the main part of the reserve.

4. Bert Lenten, secretariat of the African-Eurasian Migratory Waterbird Agreement provided us with an overview of the Agreement and its complementarity with the Ramsar Convention.

Conclusions

Which is the best approach for the establishment of a successful network?

The “bottom-up” approach, in which managers on the ground decide to work together in a network will result in a highly motivated network as it will respond directly to the specific needs of the managers.

The “top-down” approach implies authority from above with less flexibility. Interestingly this network started with the “top-down” approach, the site managers were invited to join the network. However, by the first workshop the “bottom-up” approach had taken over with the managers deciding on the themes of the next two workshops and their bilateral exchanges.

Birds may be a symbol or raison-d’être for this network because of the East Atlantic flyway but it is not the centre of its activity – which is

- habitat conservation and management and
- integration of the local population

And this is reflected in the choice of the topics for the following two workshops:

- Ecotourism and integration of the local people
  a transfrontalier workshop, between Senegal and Mauritania held in the Senegal delta, in Feb/ March1999.
- Food resources in wetlands: for birds or for man
  for the year 2000.

Conservation of threatened waterbirds in the AEWA Region: the case of the Marbled Teal

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Key words: Marbled Teal, *Marmaronetta angustirostos*, action plan, Spain, Europe.

The Marbled Teal is a globally threatened waterbird (IUCN category 'vulnerable') which has undergone a widespread population decline in the AEWA region. Several conservation plans for Marbled Teal have been prepared at a global level (published by Wetlands International in 1993), European level (published by the Council of Europe in 1996) and regional level (in the autonomous Spanish regions of Valencia and Andalusia). Although implementation of these plans by governments has been rather slow, various specific initiatives are now underway in Spain, Morocco, Turkey and Uzbekistan. We describe these initiatives in detail. In the case of Spain, they have already begun to translate into population recovery, helped by this species' high reproductive capacity. We outline the major steps that need to be taken in the future. Improvement in the conservation of temporary Mediterranean wetlands is a top priority.

The Marbled Teal *Marmaronetta angustirostris* is considered a globally threatened species (IUCN Vulnerable) owing to the rapid rate of decline of its global population (Collar *et al*. 1994, Green 1996a). It constitutes an interesting case study for action planning in the AEWA region, as it is one of the waterbirds for which most action plans have already been prepared. Prior to the 1990s, conservationists and ecologists paid relatively little attention to this threatened species. This began to change at the start of the decade, when the autonomous government of the valencian region in Spain contracted a team of ornithologists to prepare a regional recovery plan for Marbled Teal (Ambiental 1992), focusing particularly at El Hondo, the most important site for the species in Spain (Green and Navarro 1997). At the same time, IWRB and RSPB contracted The Wildfowl and Wetlands Trust to prepare a global review of the conservation status of Marbled Teal, and a global action plan (Green 1993a).

These first action plans were soon followed by more documents. The European Commission contracted IWRB to produce a plan to "reduce additional mortality" of the species in the European Union (van Vessem 1994), whilst the Council of Europe and BirdLife sponsored the production of a further action plan for Marbled Teal for the European region (Heredia *et al*. 1996). In Spain, many biologists interested in the species collaborated in the production of a detailed monograph, which including an unofficial national action plan (Navarro and Robledano 1995). Most recently, the regional Andalusian government in Spain has sponsored the production of a draft regional recovery plan for the species (Raya 1998). This considerable set of action plan documents permits a useful review of the effectiveness and pros and cons of different kinds of initiatives. This paper represents no more than the personal opinions of the author based on his experience playing a central role in the production of the plans. They do not necessarily reflect the opinions of any of the organisations involved in producing these plans.

Although all the plans have attempted to prioritise the various action recommendations in some way, with hindsight the ability to identify measures most likely to be effective in producing recovery of Marbled Teal populations has been strongly hampered by the initially poor understanding of the ecology of the species. Before the 1990s, almost no scientific studies of this bird had been conducted (Valverde 1964 being the major exception). Ignorance of its ecology made it difficult to identify the local causes of decline with certainty, or to make sound recommendations for habitat management at sites occupied by the species. Recent research, which came after the production of the first action plans for Marbled Teal, has largely solved these problems, leading to a clearer understanding of conservation problems and appropriate actions (Green in press). For example, there have been notable advances in the understanding of the conservation problems in the Guadalquivir marshes in Andalusia or the Göksu Delta in Turkey (compare Green 1993a with Green 1998a, 1998b; Raya 1998). Focused ecological research on the target species is extremely important to provide the basis for effective action plans, and the ecology of a high proportion of globally threatened waterbirds is poorly known at present (Green 1996b).

As has been pointed out before (e.g. Green and Salathé 1992, Green *et al.* 1993), action plans should not be seen as an end in themselves, but merely a means to the end of achieving recovery of threatened populations. Implementation of many waterbird action plans has been relatively weak, partly due to the limited capacity or willpower for organisations sponsoring the plans to pursue the implementation of the action

recommendations (Green and Salathé 1992, Green 1993b, Green *et al*. 1993). Experience with the Marbled Teal illustrates how the production and circulation of a well-prepared document is rarely sufficient to effectively stimulate conservation action in the range countries for which national recommendations are made. Government administrations in Marbled Teal range countries have not shown strong interest in implementing the plans prepared by NGOs in which they are not officially implicated. NGOs sponsoring the plans have also failed to provide the strong funding base necessary to finance the implementation of the numerous action points. Consequently, preparation of action plans has not itself guaranteed any improvement in the conservation status of the Marbled Teal.

In fact, a variety of important advances in Marbled Teal conservation have been made in recent years, but these have been largely achieved following initiatives of individuals and national or local NGOs with a particular interest in the species rather than as a direct consequence of the action plans or the actions of the organisations sponsoring them. A "bottom-up" approach has been more responsible for action plan implementation than a "top-down" approach. Thus, progress has been made on a "piecemeal" basis, and the action plans have served mainly as a guide to and a reference for lobbying activities. For example, SEO/ BirdLife-Spain has made extensive reference to the BirdLife/Council of Europe plan (Heredia *et al*. 1996) as a lobbying tool, and also declared the species as their "bird of the year" in 1997.

Some of the main recent advances in Marbled Teal conservation are as follows. At El Hondo, the most important breeding site in Europe (Green and Navarro 1997), hunting bans have been introduced in the central reservoirs that form the majority of the reserve. These bans have been introduced by the regional government on an annual basis in the 1996–1997, 1997–1998 and 1998–1999 winter seasons, and have led to a notable increase in the number of Marbled Teal surviving the winter period in the area (Navarro 1997, Anon. 1998). Also at El Hondo, large numbers of Marbled Teal broods were being trapped every year in a concrete-lined drainage canal (Navarro *et al*. 1995, Green *et al*. 1999). In late 1998, using LIFE funding, the regional administration broke the canal walls in several places and introduced ramps there to allow the broods to climb out. In the Brazo del Este, one of the breeding sites within the Guadalquivir marshes in Andalusia, nets set to trap crayfish were killing large numbers of waterbirds (Gutiérrez *et al*. 1997). Their use was banned during the breeding season starting in 1997.

Specific action for Marbled Teal in other countries (i.e. outside Spain) has particularly focused on surveys to increase information on their distribution and conservation problems at key sites. Special surveys were organised in Uzbekistan with funding from the Chicago Zoological Society via the IUCN-WI Threatened Waterfowl Specialist Group (Mukhina 1995, Mukhina and Lanovenko 1998). Special surveys are also being conducted in Morocco, with funding from the Andalusian and Moroccan governments (Green and El Hamzaoui 1998).

The Spanish case also illustrates the potential limitations of drawing up action plans at a *national* level. In Spain, the national law 4/89 requires the preparation of recovery plans at a *regional* level for endangered species such as the Marbled Teal (Heredia *et al*. 1996). It is only at the level of autonomous communities that such plans have a strong legal framework for enforcement. Such plans have already been drawn up separately for the Valencian and Andalusian regions, although neither regional government has so far given these plans the necessary legal approval to bring them into force. It may be difficult to apply the concept of a "national action plan" to countries with strong decentralisation. In Spain, a key body is the "Marbled Teal working group" co-ordinated at a national level by the Ministry of Environment and including representatives from regional governments, NGOs and other interested parties. However, this group only has an advisory capacity.

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Wetlands and waterbird conservation in East Africa

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Key words: East Africa, waterbird, wetland, management, conservation, threats.

The aim of this paper is to provide:
- a review of the size, coverage and distribution of different wetland types in Kenya, Tanzania and Uganda,
- a discussion of the diversity of waterbirds in these wetlands,
- an analysis of the problems and threats to the birds and wetlands in the region,
- a list of the key players and their roles in wetland management in the region,
- some conservation achievements and opportunities and lastly,
- some key steps required to achieve greater impact in the conservation of wetlands and waterbirds in the region.

The paper draws from published works available in Uganda and personal communications with wetland and waterbird conservation practitioners scattered in the region.

The main conclusion from this analysis is that Governments, NGOs, Local People and the International Community each have roles to play and these roles to a large extent complement each other. Greater networking and coordination is needed to achieve more effective conservation of wetlands and waterbirds in the region.

Introduction

Wetlands mean different things to different people. Most local people living near or within them, define wetlands according to the profit they can extract out of them. In densely populated agricultural areas, wetlands are seen as potential agricultural land that contains too much water. Where the population pressure is not very high, wetlands are recognised as an inexhaustible supply of free food and materials for crafts and construction. For the cattle-herdsmen, wetlands are watering points and dry season grazing areas.

This kind of thinking is not restricted to rural poor communities. People in towns, and the industrialists view wetlands in the same way. These are seen as sites for factories which only require drainage and/or filling. Even environmentalists may view them in a similar way. Environmentalists, however, realise that the true value of wetlands is not necessarily in what they become after conversion, but that they are most valuable in their natural state.

Wetlands do not only keep the world healthy but also provide home to a wide variety of living things, including waterbirds. Wetlands are seen as the universe's kidneys purifying and balancing the water flooding them.

Wetlands in East Africa

Wetland coverage ranges from 2.5 % in Kenya to over 10% in Uganda. The total extent in Kenya, Uganda and Tanzania is over 130 000 km^2.

Various kinds of wetlands exist in East Africa. This paper will not attempt to classify them in detail. The classification system most commonly used for wetlands, is the Ramsar classification system (Frazier 1999). Ramsar sites in the region are Lake Nakuru and Lake Naivasha in Kenya, and Lake George in Uganda.

Marine types include coastal wetlands which are solely influenced by seawater and estuaries which receive both seawater and fresh water, e.g. from a river. These are found in Kenya and Tanzania along the Indian Ocean.

Lacustrine wetlands also vary according to the amount of salt in their waters. Saline lakes are commonly found in both the eastern and western arms of the East African Rift Valley. Examples of saline lakes include Lake Nakuru and Lake Bogoria in Kenya, Lake Natron and Lake Manyara in Tanzania and Lake Katwe and Lake Kasenyi in Uganda. Not all lakes in the rift valley are saline: Lake Naivasha in Kenya and Lake George in Uganda, for example, are freshwater lakes. Lake Turkana on the other hand is saline.

Riverine wetlands are found along rivers. Most are papyrus swamps along River Nile. Some rivers are seasonally flooded and they spread over their banks during the floods, creating floodplains. The large ones include the Tana in Kenya and Pangani in Tanzania.

Deltaic wetlands also appear in two states, with internal deltas, such as the Victoria Nile Delta on Lake Albert, conveying fresh water to lakes. Marine deltas spew their fresh water through estuaries to the ocean.

Flooding regimes have a big impact on the wetlands. Permanent flooding results in permanent swamps while seasonal flooding gives grass swamps. The level of salt in the water determines the particular species of plants that

will grow in the wetlands. Altitude, through its impacts on temperature, modifies the vegetation composition and rates of decomposition of dead material. This leads to bog formation in high altitude wetlands.

Waterbirds in East Africa

There are several definitions of waterbirds, mainly falling into two groups. The functional definition, most commonly used in East Africa, examines each species' dependence on wetlands. In Uganda, we have two categories of waterbirds namely, the wetland specialists (to some extent related to the core species on the African Waterfowl Census form) and the generalists or non-specialists.

Specialist waterbirds are those dependent on wetlands to the extent that they cannot survive without them. Examples include Black Crake *Amaurornis flavirostris*, Grey Crowned Cranes *Balearica regulorum*, etc. Generalists are those birds which though commonly recorded in wetlands, are found elsewhere as well such as Hadada *Ibis Bostrychia hagedash* and Black-headed Herons *Ardea melanocephala*.

The taxonomic definition is derived from Rose and Scott (1994) and is convenient for the global treatment of populations. This definition considers birds from families Gaviidae, Podicipedidae, Pelecanidae, Phalacrocoracidae, Anhingidae, etc as waterbirds, whether or not all the species are dependent on wetlands.

East Africa supports over 1500 species of birds, of which the largest number of species have been recorded in Tanzania. Kenya is second and Uganda third. Of these species, about 300 are waterbirds. About 60 species are threatened both at regional and global levels.

Threats

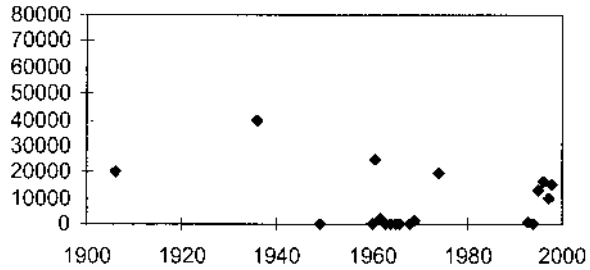
Habitat loss

The biggest single problem facing birds in East Africa is habitat loss. An example will clarify this. The Lesser Flamingo *Phoenicopterus minor* is the most numerous large waterbird in East Africa, with a stable population estimated at 4 million birds.

In Tanzania, there is only one frequently used breeding site: Lake Natron. Two major projects are planned, which are likely to compromise the suitability of Lake Natron as a breeding ground. One is a dam on Mara river in Kenya and the other commercial Soda extraction in Tanzania. Although Lesser Flamingos are long-lived birds and opportunistically breed in other sites, it is inconceivable that they can survive in such large numbers without Lake Natron.

Uganda had one suitable breeding site for the Lesser Flamingo, used probably every 30 years. In 1954, a Tarmac road was constructed passing about 200 m from the Lake. Since that time, Lesser Flamingoes stopped making breeding attempts. In 1961, the lake was flooded by freshwater from nearby Lake George. This sealed its

Figure 1. Lesser Flamingoes in western Uganda.



fate as a flamingo breeding ground. It is possible that the current downward trend in these birds in western Uganda (Fig. 1) is a result of loss of this one site.

Losing lake Natron can cause similar trends to manifest in the whole population. Indeed, it is generally believed that these birds are declining contrary to what is shown in Rose and Scott (1997).

Other birds are losing breeding grounds too for example the Grey Crowned Crane whose seasonal swamps are being drained for paddy rice and dairy farming.

Persecution

Persecution can be both deliberate and accidental. As an example, rice-growing communities consider waterbirds, especially ducks and shorebirds as pests to young rice and rice nurseries. People control these 'pests' by killing them, or using other means to scare them away. These methods are usually not specific to the target bird species and hence many other birds may be adversely affected.

Another case of direct persecution is hunting for food. Most waterbirds are eaten by different communities in East Africa. In Uganda, the people in the northern parts and eastern region eat most species of birds, and usually the larger the bird, the more it is prized.

Accidental persecution is mainly as a result of fishing. Some fish eating birds get entrapped in fishermen's nets and for the Great Crested Grebe *Podiceps cristatus* and African Darter *Anhinga melanogaster*, this is a significant cause of mortality. These species are regionally threatened (Bennun and Njoroge 1996) and are priorities for conservation action.

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The desert-breeding Damara Tern *Sterna balaenarum*: a case study

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Key words: Damara Tern, *Sterna balaenarum,* Namibia, Random Sampling, Red Data species.

The desert-breeding Damara Tern *Sterna balaenarum*, is one of the world's smallest terns, and was classified as an African Red Data species in the 1980s. Then, its world population was thought to number 4000 individuals. Determining its global status has been hampered by (i) the hyper-arid nature of the Namib Desert where it breeds; (ii) censussing birds along 1470 km of uninhabited coastline; and (iii) the bird's non-colonial breeding patterns. Three surveys were organised in 1992, 1994 and 1996 using random sampling techniques covering all of its presumed breeding grounds in Namibia. Coastal strips 3 km wide and 10 km long were chosen, and in each strip two squares of 1km^2 were randomly chosen and marked on a map. These were located in the desert with a Global Positioning System and a pair of observers from a team of ten then scoured each square for all eggs, chicks, and adults. A total of 123 km^2 squares in the first Skeleton Coast survey, 79 squares in the central Meob region and 66 squares in the southern Diamond Area were covered, giving a 7% to 10% sampling intensity. Extrapolations showed that previous estimates (2000–4000 birds) were pessimistically low and present world populations stand at about 13 500 adults. High density breeding areas, habitat preferences and associations with ocean upwellings could also be deduced and few threats are evident. This survey indicates the importance of basic biological data and population monitoring as the first step in conserving red data birds. However, we still know nothing of its biology or requirements in its West African winter quarters where few birds are ever seen.

Introduction

One of the most important initial steps in conservation biology is to assess the population status of threatened organisms. However, even this simple step can be problematic when species are rare, highly dispersed, or occur in inaccessible habitats. One such species is the Damara Tern which is classed as threatened among Africa's Red Data birds (Collar and Stuart 1985). This bird is a breeding endemic to the Namibian coast and ranks among the world's smallest terns at less than 50 g (Simmons and Braine 1994). Previous research has indicated that the birds lay a single egg on the barren gravel plains and salt pans of the western Namib Desert (Frost and Shaughnessy 1976, Clinning 1978). Most breeding occurs within 3 km of the coast (Braby and Braby in prep.), and isolated colonies occur in South Africa (Brooke 1984) and possibly southern parts of Angola.

Estimates of the world population were first made by Johnson and Frost (1978) and Clinning (1978) who both suggested that no more than 4 000 individuals existed. These estimates were proven incorrect when a single flock of 5085 terns were observed and photographed in March 1991 on the northern Namib Desert coast (Braby *et al.* 1992). This event prompted a reappraisal of efforts to estimate Damara Tern populations, and this paper reports on three surveys in 1992 (northern Skeleton Coast), 1994 (central Meob region) and 1996 (southern Diamond Area) which covered all breeding areas of Damara Terns nesting in Namibia. These efforts necessitated random survey techniques because of the very large area of desert coast to be covered and a species whose widely dispersed nests precluded simple visits to breeding colonies. Since the entire coast was surveyed which extends over 10° of latitude, we could also assess density trends over this region and relate them to known ocean conditions where the bird's forage.

Study areas

Damara Terns breed along the west coast of Namibia from the Cunene River (17°14.9'S 11°45.2'E) in the north to the Orange River (28°38'S 16°24'E), 1470 km south. Approximately half of the lower coastline is unsuitable because of the shifting sand sea, but isolated aggregations are reported from large salt pans near Lüderitz (26°38 S15°10') (Siegfried and Johnson 1977, De Villiers and Simmons in press) and on some cliffs further north. Because most "colonies" are known from Sandwich Harbour northwards (Clinning 1978), we surveyed this 750 km long coastline to the Cunene River first (1992). The area comprises mainly undulating gravel plains varying from pink to black in southern regions, grading into sandy plains and some dunes in the northern sections. Salt pans and rocky outcrops form the remainder of the geological types here, and vegetation is confined to hummocks in ancient river washes, or larger ephemeral rivers that support some flow in the austral summer months. Strong southwest winds predominate year round and ocean temperatures of 13–17°C reduce desert temperatures in tern breeding areas to some 15° C lower than further inland.

In 1994, we tackled a less accessible area of gravel plains covering 790 km^2 surrounded by the high dunes of the Namib Sand Sea between Meob and Conception (Fig. 1). Salt pans and gravel plains predominated here and suitable habitat extends up to 12 km inland.

In 1996, the remaining Diamond Area, a 300 km linear section of rocky coast, salt pans and sandy plains from Lüderitz to the Orange River was surveyed.

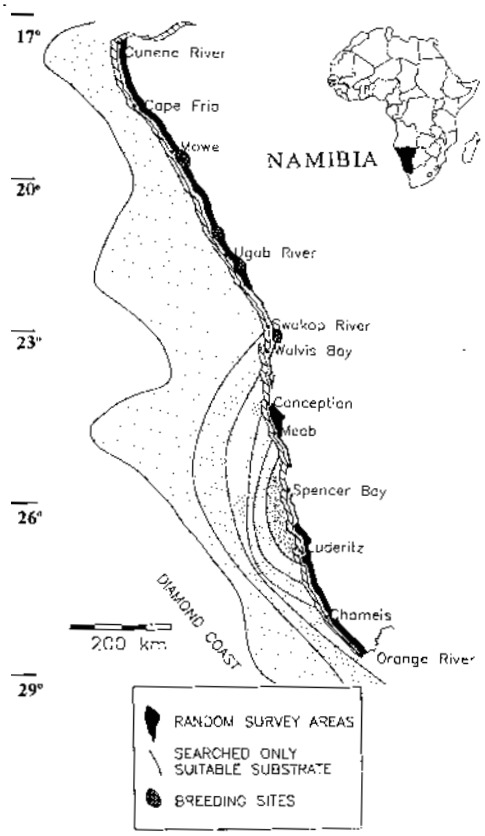


Figure 1: Ocean upwellings along Namibia's 1470 km long coastline, and areas of random surveys for Damara Terns in 1992, 1994 and 1996. Breeding sites intensively studies are cross hatched, while random surveys are designated by thick black lines. The main area of upwelling typical for December is taken from a December 1994 satellite image where, the darkest area is 13°C and each iotherm represents an increase of 1°C.

Methods

Previous studies (Clinning 1978, Johnson and Frost 1978), attempted to visit all likely habitats and made extrapolations from breeding aggregations to total populations. This proved inappropriate because Damara Terns nest in large loose colonies at a maximum density of c. 8 nests/km^2, with large areas of apparently suitable habitat in between. I decided therefore, that a systematic sampling approach incorporating stratified random methods would be best. The area covered would stretch for 750 km and 3 km inland. A distance of 3 km was used since studies from Mowe Bay by R. and S.J. Braby (unpubl.), indicate that 93% of all nest records are within 3 km of the coastline. This allowed me to estimate the number of missed nests (7%) and concurrently helped logistically by cutting down the area to be searched to 2250 km^2 (750 km x 3 km).

Random sampling

The northern coastline was divided into 75, 10 x 3 km strips (30 km^2) and each strip was divided into 30, 1 km^2 squares. From these, two randomly chosen squares were designated for searching, and marked on a 1: 50 000 map. This was done for 150 squares. Since 2 km^2 were randomly designated per 30 km^2, the area searched was 7% of the total. The latitude and longitude of the northwest corner of each square was calculated and entered into a Garmin 100 Global Positioning System (GPS). This hand-held device is able to locate one's position anywhere on the earth's surface to within about 40 m; we used it to locate each north west corner once we were in the desert.

Once each corner was located using a three-wheel bike (to minimise impact on the fragile gravel plains), it was marked with a fence post and the other three corners were located and similarly marked using the GPS. Teams of two experienced Damara Tern observers, drawn from nature conservation officials familiar with desert conditions, were then asked to walk to the squares and thoroughly search them for any eggs, chicks, adults or post-breeding flocks. Only birds grounded within the block were recorded, but flying birds and those outside were also noted. Habitat type (dune, sandy plain, gravel plain, rocky plain, salt pan), colour, and presence of predators and vehicle tracks were concurrently recorded. Four such teams covered up to 4 squares each per day and an estimated distance of 200 km by foot in 12 days. By recording the habitat within each random square we were later able to assess tern habitat preferences relative to availability (Simmons *et al.* 1998).

The first survey, carried out from 5–17 February 1992, was timed to include as many breeding birds as possible. Since terns first begin breeding in October and mainly finish egg-laying in February (Namibian Nest Record Scheme), a February census would include successful and unsuccessful breeders as well as January- and February-breeding birds. From previous nest records we could calculate the proportion of nests started after February which would thus be missed (~1%). The other regions in 1994 and 1996 were sampled in a similar fashion with two exceptions; in Meob, 10% of suitable habitat was surveyed, and in both surveys fewer counters were used. In 1994, four counters with one motorbike covered the area in 3 weeks, while in 1996 two counters with motorbikes covered 300 km of coast in about two weeks. This occurred because of improved field techniques.

Results

Of the 150 squares planned in 750 km of coastline, the first survey team covered 123 squares along 615 km of coast. Thereafter, because no terns occurred within random blocks (breeding finished), we scoured the beaches (known roosting areas of post-breeding flocks) and all five colonies known from previous work. This maximised our chances of recording terns in an area where they had obviously bred and moved away from.

Skeleton Coast

In the 615 km of randomly surveyed coast, 792 adult terns were recorded in 123 km^2, a density of 6.4 adults/km^2. Since the area surveyed comprised 1/15th of the

Table 1. Numbers of Damara Terns and their progeny, recorded along Namibia's coastline in three surveys in February 1992, December 1994 and January–February 1996.

Region surveyed	Area	Number recorded			Extrapolations (x15)		
(random squares)	(km^2)	eggs	chicks	adults	eggs	chicks	adults
1992							
Cunene – Omaruru	1845 km^2	28	59	792	420	885	11 880
(123 squares)							
Omaruru - Sandwich*	405 km^2				0	23	236
1994							
Meob	790 km^2	14	7	41	40	70	410
(79 squares)							
Sandwich*	50 km^2				1	14	143
1996							
Diamond Area	990 km^2	10	6	60	150	90	900
(66 squares)							
TOTALS	**4080 km^2**				**711**	**1082**	**13 569**

* These areas were not random surveyed but all known "colonies" were visited and counted. The totals are given under "extrapolations".

total, the extrapolated number of adults recorded was (15 x 792) or 11 880 adults. Similar calculations for the number of eggs (28) and chicks/immatures (59) recorded are given in (Table 1). For the remaining 135 km where no terns occurred within random squares, a total 236 adults, 23 young and 0 eggs were recorded. The total estimated population of Damara Terns along the 750 km main breeding area (Table 1) was thus 13 024 terns (12 116 adults) – a density of 5.8 terns/km^2.

Meob-Conception

In 79 1-km^2 squares, 41 adult terns, five chicks, two fledglings and 14 eggs were discovered. Extrapolations (x10) indicate that an estimated 410 adults, and 210 nests occurred in this region in December 1994. A multiple of 10 was used because 10% of the area was sampled.

Diamond Area

In 66 squares, we encountered 60 adults, two fledglings, four chicks and 10 eggs. Extrapolations (x15) give 900 adults with 240 nests.

Total populations

The total number of birds with one additional survey in central regions at Sandwich Harbour (143 adults: Simmons *et al.* 1998), totalled approximately 13 500 adults.

Proportion of Damara Terns in Namibia

If we accept that about 120 pairs of terns occur in South Africa (Brooke 1984), and some non breeding birds probably occur (total ~300 birds), then Namibian populations account for 97.8% of all Damara Terns. This lends credence to the notion that for all intents and purposes the Damara Tern is a breeding endemic to Namibia. Populations in Angola, however, remain largely unknown and require investigation. A recent (January 1999) beach survey from the Cunene River mouth to Porto Alexandre (~150 km) by Dr A. Sakko revealed 160 Damara Terns but breeding was not assessed.

Discussion

An estimated total of 13 400 adult Damara Terns occurred in the main Namibian breeding area in February 1992, December 1994 and December 1996. This total is considerably larger than previous estimates which ranged from 2000 to 4000 birds. Since these estimates were loosely based on extrapolations from known colonies with no formal methodology, it is fruitless to discuss reasons for differences. However, the 5000 birds encountered in one flock in 1991, and the extrapolations to about 7000 terns in the world (Braby *et al.* 1992) give sound reason to think that earlier estimates were pessimistic. It is also unlikely that terns have increased dramatically since the mid 1970s since nature conservation officials monitoring colonies in these areas for almost 20 years have reported no apparent increase in the size, density or number of colonies in coastal Namibia.

Error estimates on the total

At the outset of the survey I had hoped, by adopting a stratified random approach, to assign confidence limits to the total. This proved impossible because of the wide variation in the number of birds found in the squares (range 0–250). The resultant frequency distribution of terns recorded in random squares did not fit any known distribution (H. Biggs pers. comm.). In turn, the wide variation of birds within squares was due to the behaviour of post-breeding terns to occur in large flocks. Therefore, one simple method to overcome this unforseen problem with Damara Terns is to undertake earlier surveys before such flocks form. This would mean that one would then have to account for errors involved in missing birds that had yet to start breeding. For example a January survey would miss about 7% of all birds (Namibian Nest Record Scheme), while a December survey would miss 30% of all birds, an unacceptably high variation. The best compromise for these terns would be a survey in mid January before large flocks have formed and when approximately 85% of the population have initiated breeding.

Solutions to disadvantages with survey methods

In the remote areas which were surveyed, several problems arose in the 1992 survey which with the foresight gained from hindsight was avoided in future surveys. Special care was taken to pick the most experienced (desert-wise), and fittest conservation officials available, all of whom had previously found Damara Tern nests. Despite this, the schedule decided on in the comfort of an office proved physically very demanding. Several counters had to be rested as a result of walking up to 20 km daily for 10 days in the arid landscape. Future surveys, therefore, employed smaller teams, each equipped with a GPS and a fat-wheeled motorbike to reach the designated squares. Each of the later survey took 2–3 weeks.

Advantages of survey methods

Clearly despite these disadvantages, systematic methods outlined here and used rarely elsewhere (e.g. Partridge 1988), hold numerous advantages. Foremost among these is the ability to cover large and remote areas relatively quickly, where other methods are simply inappropriate. Provided that variations in numbers within random plots are not too great, confidence estimates on the total can also be provided. Surveys using identical methods can also be repeated and compared between years to assess possible declines in such Red Data species. Perhaps the greatest potential disadvantage which can floor stratified random sampling over large areas and one not always appreciated by statisticians is the ability to find a random plot in the field once designated on paper. With the advent of the portable Global Positioning System this problem is very efficiently overcome, and worked with great success in this survey. Habitat preferences can also be assessed very accurately because the substrate is randomly determined and the tern's choices relative to that available can be rapidly assessed. In this survey we found an interesting trend away from a preference for nesting on gravel plains in the north to a preference for salt pans in the south.

To conclude, stratified random surveys can cover large areas relatively quickly allowing estimates of difficult to census animals such as Red Data species. The first attempt at doing so for Damara Terns increased population estimates from 4 000 birds to 13 500 individuals. Such surveys must take careful account of the physical limitations of survey members, but can overcome problems with locating random plots with the use of a portable GPS.

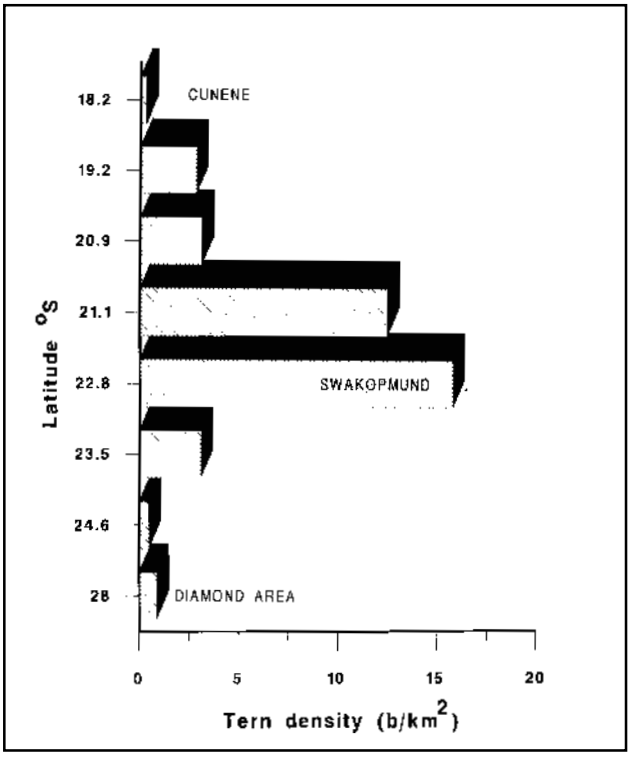
Density trends

With the Namibian shoreline covering 10° of latitude, it is possible to assess latitudinal trends in tern density from our results. Included in this assessment are breeding studies in Mowe Bay (Simmons and Braine 1994), the Ugab River and Huab River mouths and Swakopmund (Fig. 2). Particularly high densities were evident in central districts of Swakopmund, and smooth declines both north and south of here were evident. We have related these trends to ocean upwellings that are most intense in the Lüderitz area 400 km south of the high density tern breeding areas (Simmons *et al.* 1998). These upwellings bring nutrients to the surface, supporting phytoplankton blooms, which are swept northwards by the strong Benguela Current. Onshore winds in the central regions drive some of this increased productivity inshore, supporting high fish populations as well as high shorebirds densities (R. Simmons and I. Cordes unpubl.). Because of the similar trends in tern breeding densities, linear shorebird densities and invertebrate biomass estimates, we are more confident that a large scale oceanographic (or similar ecological process) is driving the system. We have yet to test our "delayed blooming" hypothesis, but oceanographers and fisheries scientists have yet to find any logical flaws.

Conclusions and further research

I conclude from these population surveys of Damara Terns and the spinoffs which gave insights into ecological process driving tern breeding in Namibia, that Damara Terns can no longer be considered as threatened on its breeding grounds. However, there is little data from its West African "winter" quarters. Reports of Damara Terns numbering a handful of birds have been received from areas such as Ghana, and the Ivory Coast, and participants in the Dakar Wetlands International Conference revealed other small groups as far west as Sierra Leone (34 birds, 1994: Hazell Thompson). Yet no large concentrations have been recorded, and some biologists believe they are caught by local fishermen with simple sprung wire traps along open shores. However, oceanographic events may have a bigger impact on terns that rely on areas of upwelling (or areas of tropical convergence off the West African coast). Fluctuations in breeding performance or population numbers may

Figure 2. Latitudinal trends in Damara Tern breeding density along the entire Namibian coast.



indicate El Niño-like events, or even sea-borne pollution. I would thus urge West African ornithologists to search for this bird between April and September, possibly offshore, and determine if trapping or other human activities are currently influencing its survival there. For now, however, we can state that the Damara Tern, once seen as a threatened African Red Data species is no longer in need of urgent conservation attention. This does not mean that populations should no longer be monitored. These surveys indicate the importance of gathering systematic population data and illustrate that even for widely dispersed, desert-breeding species occurring in uninhabited areas, methods exist that make such assessments both quick and reliable.

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Case studies of migratory waterbirds in southern Africa and a motivation for an "AFRING"

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Key words: southern Africa, migration, waterbirds, ringing, AFRING.

Although southern Africa is remote from the Palearctic breeding areas, it hosts high proportions of palearctic migrant waterbirds, especially Turnstone *Arenaria interpres*, Curlew Sandpiper *Calidris ferruginea*, Sanderling *C. alba*, Ruff *Philomachus pugnax*, Sandwich Tern *Sterna sanvisensis*, Common Tern *S. hirundo*, and Whitewinged Tern *Chlidonias hybrida*. While ringing recoveries have been used to establish migration patterns, there are many limitations. The Atlas of Southern African Birds, published in 1997, provides new information on the distribution of avian species in Botswana, Lesotho, Namibia, South Africa, Swaziland and Zimbabwe. More accurate distributions of Palearctic migratory waterbirds during the nonbreeding season are now available, giving improved insights into their migration phenology. In addition, the waterbird monitoring project in South Africa, the Co-ordinated Waterbird Counts, is beginning to provide more realistic estimates of population sizes of migrants than have previously been available.

Excluding vagrants, some 29 species of migrants depend on wetlands in southern Africa. Habitat requirements in the wintering area of these birds ranges from streams and reedbeds, through pans, lakes and vleis, to the coastal habitats including rocky and sandy shores, estuaries and lagoons. The key areas for the conservation of these species lie not only on the coastline of South Africa and Namibia, but also at sites in the interior of southern Africa, especially the pans in the grasslands of the Highveld of South Africa.

Introduction

Migratory waterbirds in southern Africa (Botswana, Lesotho, southern Mozambique, Namibia, South Africa, Swaziland and Zimbabwe) involve two main groups of birds. The Palearctic migrants have generated much interest and something is known of their breeding areas, migration routes and wintering areas. Less is known of their stop-over sites on migration which are as important to their conservation as are the breeding and wintering areas. The second group of birds consists of the intra-African migrants. The movements of these birds are very poorly known.

In southern Africa a consistent ringing programme has been in existence since 1948 (Underhill and Oatley 1994). This has provided data in the form of recoveries, mainly in Africa and Eurasia. These recoveries are being analysed by groups of birds, with the first publication covering the birds of prey (Oatley *et al*. 1998). The Southern African Bird Atlas Project (Harrison *et al*. 1997a, b) has provided data on habitats and seasonality of migrants and residents in southern Africa. Selected case studies are presented using these sources.

Palearctic migrants

Some 29 species of Palearctic migrants associated with wetlands overwinter in South Africa (Underhill 1995). This number excludes vagrant species, some of which are regular migrants to countries neighbouring South Africa.

Although some waterbirds, particularly terns and some wader species, depend on the coast, most migratory waterbirds depend to some extent on both coastal and inland water habitats (Table 1). The birds associated with inland wetlands are largely passerines associated with

Table 1. Habitat requirements of migratory waterbirds in southern Africa.

Coast	Inland pans	Coast, some inland	Inland, some coast	Coast and inland
Greater Sandplover	Little Bittern	Grey Plover	Wood Sandpiper	Ringed Plover
Terek Sandpiper	White-winged Tern	Turnstone	Marsh Sandpiper	Common Sandpiper
Knot	Blue-cheeked Bee-eater	Sanderling	Ruff	Greenshank
Lesser Crested Tern	European Swallow	Bar-tailed Godwit		Curlew Sandpiper
Sandwich Tern	Sand Martin	Whimbrel		Little Stint
Common Tern	Great Reed Warbler			Curlew
Little Tern	European Sedge Warbler			
	Yellow Wagtail			

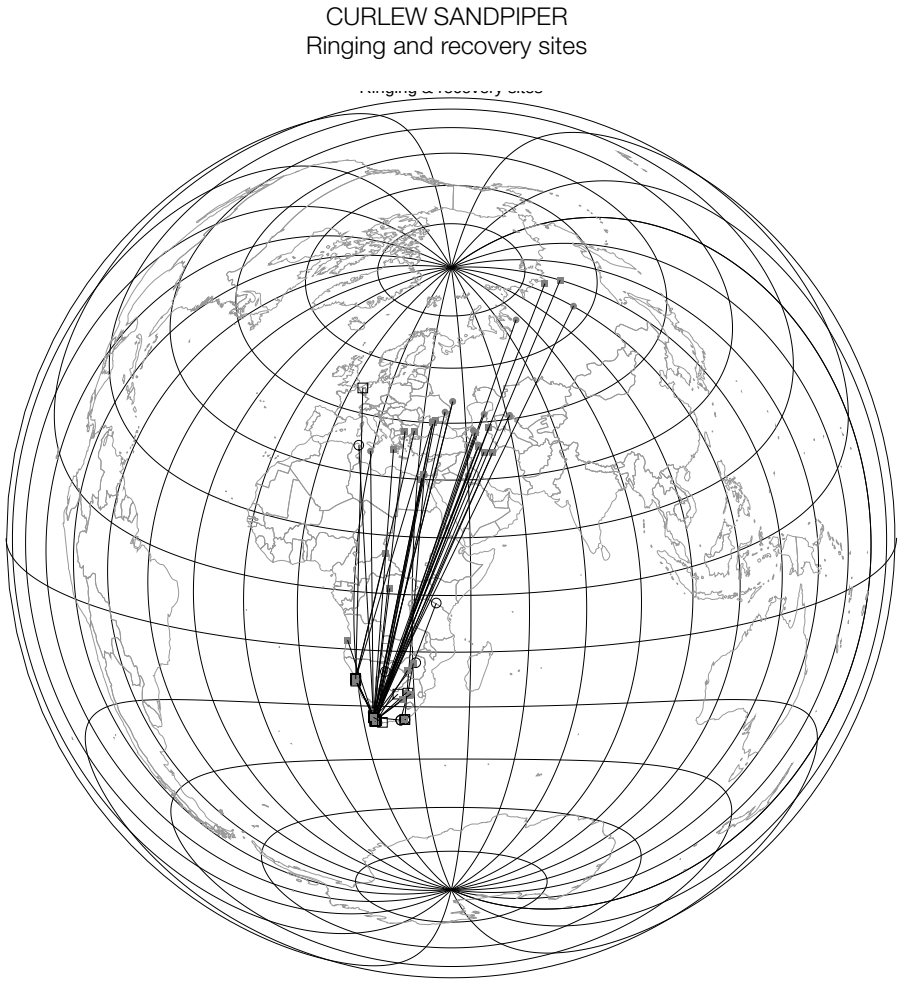

Figure 1. Ringing and recovery sites of Curlew Sandpiper.

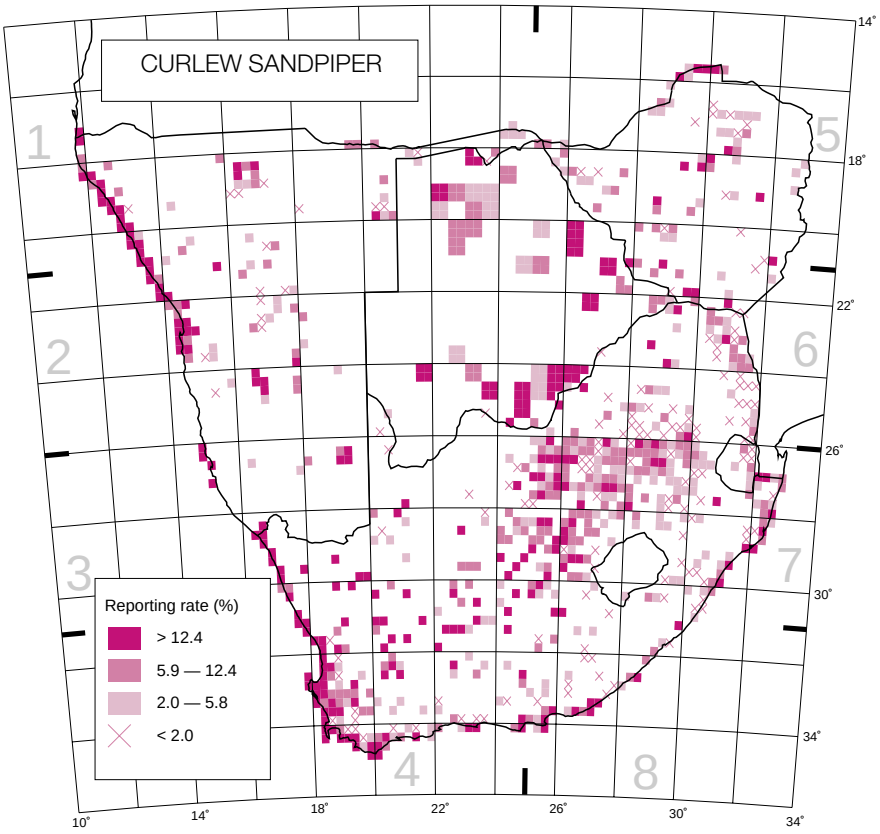

Figure 2. Distribution of Curlew Sandpiper recoveries in southern Africa.

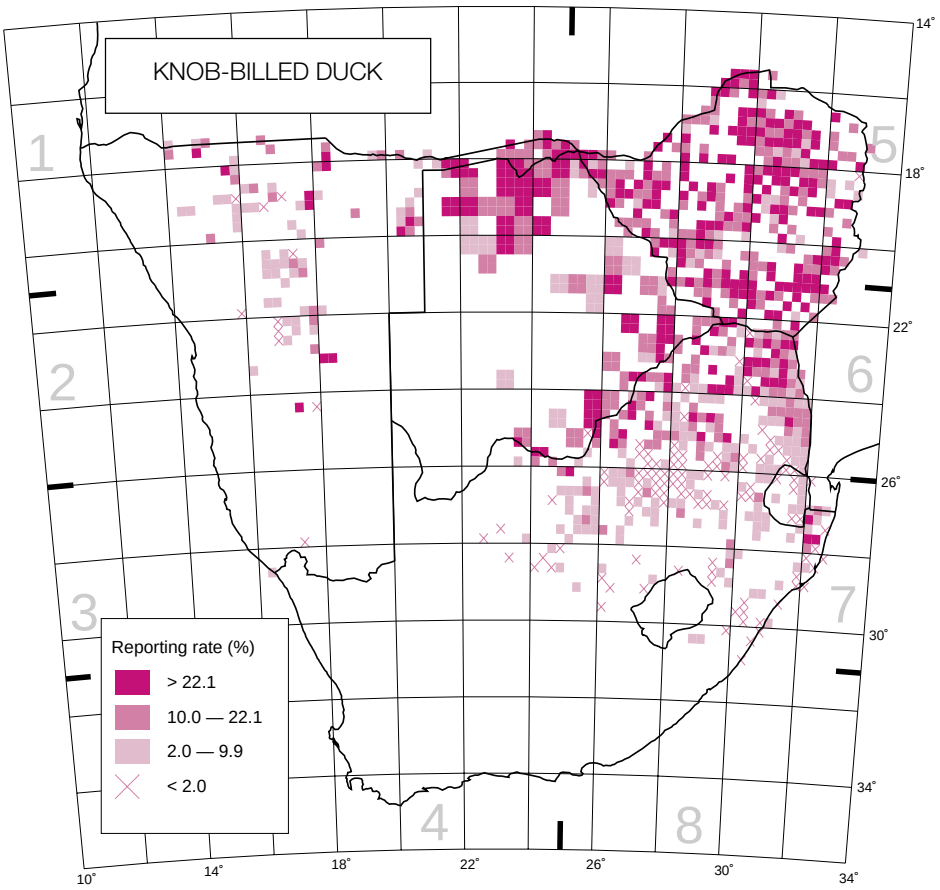

Figure 3. Distribution of Knob-billed Duck recoveries in southern Africa.

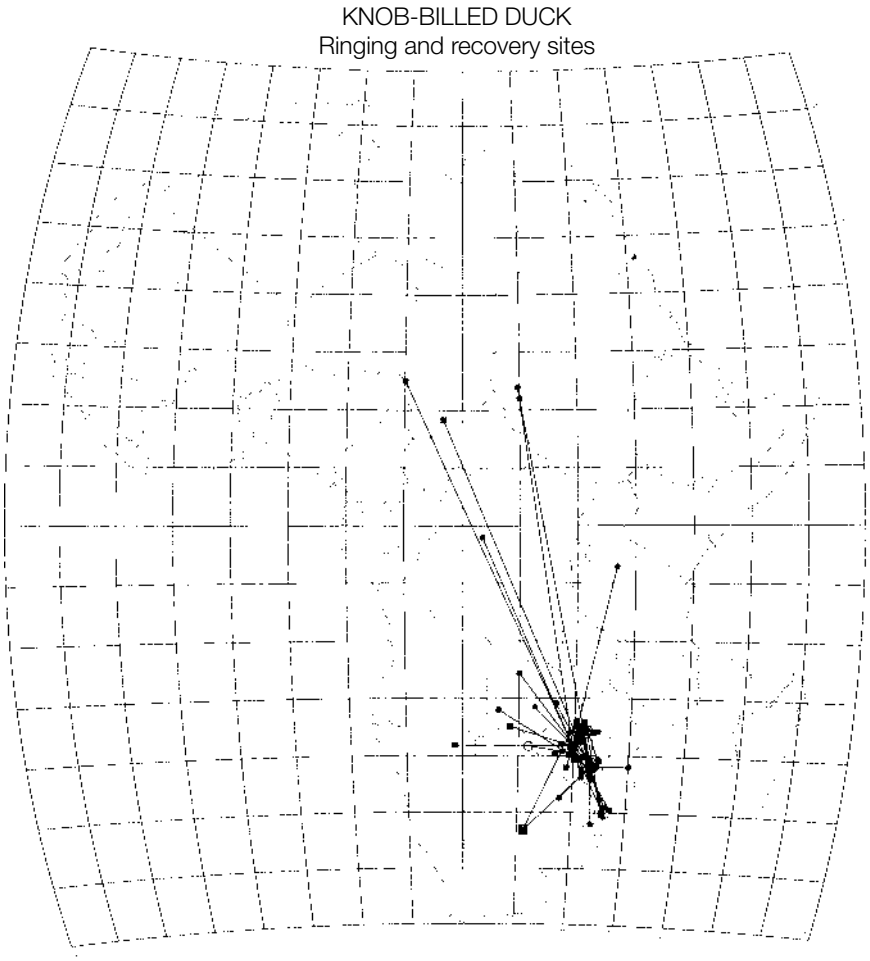

Figure 4. Ringing and recovery sites of Knob-billed Duck.

reedbeds and are not further considered here. The other long distance migrants are mainly terns and waders. The Curlew Sandpiper *Calidris ferruginea* is chosen as a case study.

The Curlew Sandpiper

This species migrates to breeding grounds in the Taimyr Peninsula along the great circle route (Fig. 1). Relative to other southern African waders, the migration of this species has been well studied (Elliott *et al*. 1976, Wilson *et al.* 1980, Vandewalle 1988, Underhill *et al*. 1989, Underhill *et al*. 1993, Underhill 1997). It occurs at wetlands throughout southern Africa, although the main areas are along the coast and the temporary pans in the grassy high-lying area of South Africa (Fig. 2). These pans dry up seasonally but are important for a large variety of waterbirds.

Nomadic and intra-African migrants

Anatidae are very nomadic, being dependent on waterlevels in pans, dams and lakes. Large numbers have been ringed in southern Africa, generating some recoveries locally and some in Africa. We will focus on two species, the Knob-billed Duck *Sarkidiornis melanotos* and White-faced Whistling Duck *Dendrocygna viduata*.

Knob-billed Duck

The Knob-billed Duck prefers seasonally flooded pans in savanna but has also adapted to artificial dams (Maclean 1997). It occurs in the more tropical northeastern part of southern Africa (Fig. 3). The seasonality models show that it breeds towards the end of the austral summer, and that it has large scale movement out of southern Africa during the austral winter.

This species is the widest ranging duck species within the Afrotropics (Fig. 4). The longest distance between ringing and recovery is 3880 km (southern African recoveries). Oatley and Prys-Jones (1986) considered a part of the population to be migratory rather than merely dispersive.

Table 2. Numbers of subspecies of southern African ducks, in relation to their 98% distance of movement. (Oatley and Prys-Jones 1986)

Species	98% distance	Subspecies in Africa	Recoveries
White-faced Whistling Duck	463	1	54
Spur-winged Goose	571	2	136
Yellow-billed Duck	607	2	753
SA Shelduck	987	1	328
Egyptian Goose	1001	1	329
Red-billed Teal	1607	1	269
Cape Teal	1649	1	68
Southern Pochard	2955	1	123
Knob-billed Duck	3649	1	77

White-faced Whistling Duck

Oatley and Prys-Jones (1986) found a correlation between distance moved and number of African subspecies in nine southern African duck species (Table 2). In wide ranging species there is genetic mixing and thus less opportunity

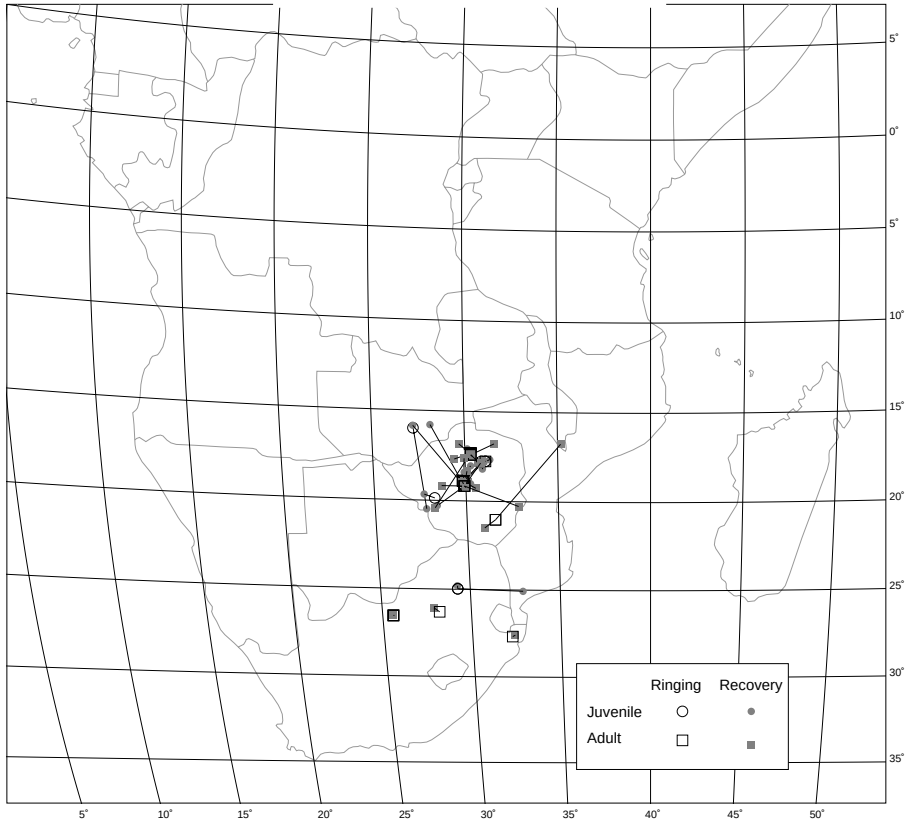

Figure 5. Ringing and recovery sites of White-faced Whistling Duck.

for distinct subspecies. The one exception is the White-faced Whistling Duck (Fig. 5). In this species the ringing data is scant and the recoveries indicate little movement. Curry-Lindahl (1981) suggested that some birds move across the equatorial forests into north-central Africa. It is likely that a proportion of this species undertake extensive movements and that the recovery data set is inadequate for this species. This makes it an ideal target for ringers who wish to add to the knowledge of waterbird movements in Africa.

Conclusion

Habitat requirements in the wintering area of these species ranges from streams and reedbeds, through pans, lakes and vleis, to the coastal habitats including rocky and sandy shores, estuaries and lagoons. The key areas for the conservation of these species lie not only on the coastline of South Africa and Namibia, but also at sites in the interior of southern Africa, especially the pans in the grasslands of the highveld of South Africa. The Important Bird Areas for southern Africa provides decision-makers with a guideline with respect to conservation of important areas (Barnes 1998).

Southern Africa is the endpoint of many Palearctic and intra-African migrants. Through the ringing activities and the atlas project southern Africa has a base, albeit scant, to give data on distribution, habitat and movements. All of Africa, however, is important in the conservation of migratory waterbirds. To understand the movements of intra-African migrants and to determine the vital stop-over sites for Palearctic migrants the implementation of an African ringing scheme “AFRING” is the next step. This was proposed as early as 1969 (Anon. 1971) nothing has been done. An “AFRING” scheme could work on the lines of EURING whereby any ringing programs in Africa would submit data to a central repository. This includes both long-term ringing stations as is Ngulia, as well as short term expeditions. Several ringing schemes have started and ceased functioning in Africa, with the data becoming lost. Adding the EURING recoveries relating to Africa to an “AFRING” database would already improve the maps on movements. A logical place for the co-ordination and storage of data would be at the Avian Demography Unit, University of Cape Town, where SAFRING is presently housed.

Acknowledgements

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Problématique de la gestion des Oiseaux d'eau dans le delta du fleuve Sénégal; cas du Parc National des Oiseaux du Djoudj

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Mots-clés: Sénégal, Djoudj, oiseaux d'eau, gestion, conservation.

Due to the construction of the Diama Reservoir, the Senegalese side of the Senegal Delta floodplain has not been flooded since 1963. In 1971 the Djoudj National Park was established, and in 1976 it was enlarged to 16 000 ha. The park is inundated annually, between August and October, to imitate the former floodplain system. The park is usually dry by April-May. The park attracts large numbers of migratory waterbirds, both breeding and wintering. As a result of the artificial flooding regime, great changes have taken place in the vegetation, such as an invasion of aquatic plants and marsh vegetation, reducing the area available for waterbirds. Changes have also taken place outside the park, such as the completion of the adjacent Diama Reservoir, which is now a permanent lake, a great expansion of irrigated rice cultivation in the area, and the establishment of the Diawling National Park on the Mauritanian side of the river. Consequently, there also have been changes in the birds using the park, both in numbers and species.

Introduction

Le Parc National des Oiseaux du Djoudj (PNOD) est situé à l'extrême Nord-Ouest du Sénégal, à la limite du désert du Sahara, non loin de l'embouchure du fleuve Sénégal. Placé au coeur de la région naturelle du delta du fleuve Sénégal, le PNOD est localisé dans la zone du Moyen delta caractérisée par un climat de type soudano-sahélien, marqué par une saison pluvieuse courte (juillet à septembre) et une sécheresse quasi absolue s'établissant d'octobre à juin. Cette position deltaïque lui permet d'être l'un des tous premiers refuges, après le Sahara, pour les oiseaux d'eau migrateurs du paléarctique occidental, mais aussi afrotropicaux.

Erigé en Parc National en avril 1971, site Ramsar en 1977 et Patrimoine mondial en 1981, le PNOD couvre une superficie de 16 000 ha. Il est constitué de lacs, marigots et mares reliés entre eux par des chenaux. Ainsi le Parc du Djoudj fait front à l'avancée du désert, ce qui lui confère en plus de son importance biologique, une fonction de stabilisation écologique.

La végétation est constituée de tapis herbacé dont les espèces les plus représentatives sont: *Typha australis, Phragmites vulgaris, Vossia cuspidata, Pistia stratiotes, Sporobolus robustus*. Les plantes ligneuses sont représentées par *Tamarix senegalensis, Acacia nilotica, Prosopis juliflora*, etc.

Les oiseaux migrateurs du paléarctique, disposant de plans d'eau pratiquement à longueur d'année depuis la construction de Diama, trouvent ici une escale de tout premier choix au cours de leur migration (pré- ou post-nuptiale selon les espèces). Ceci explique l'extraordinaire progression des effectifs qu'a enregistré le parc, à tel point que ce site est considéré aujourd'hui comme un des maillons essentiels de la conservation de l'avifaune aquatique migratrice de l'ouest paléarctique et de l'Afrique tropicale.

Avant la politique des aménagements hydro-agricoles sur le fleuve Sénégal, les facteurs essentiels déterminant l'écologie du parc étaient les crues d'eau douce annuelles du fleuve Sénégal à la fin de la saison des pluies (octobre) et les incursions annuelles d'eau de mer à travers les ouvrages hydrauliques pendant la saison sèche (avril à juin). En effet l'alimentation en eau du PNOD se fait grâce à deux ouvrages vannés directement connectés au fleuve Sénégal.

Une digue (route départementale) limite les actions néfastes du fleuve Sénégal sur l'environnement du Parc (crue ou débordement de la retenue d'eau de Diama). L'ouverture des vannes s'effectue en juillet-août (admission des eaux douces de la crue du fleuve). Les vannes sont hermétiquement fermées dès la fin de la crue en octobre).

La qualité de l'eau changeant avec le temps (eau douce, eau saumâtre, eau salée), l'assèchement d'une bonne partie du Parc (2/3) est atteint au mois de mai. La combinaison des différents éléments: niveau d'eau, durée de la submersion et salinité a une influence non négligeable sur la végétation du parc et la faune qu'il accueille. C'est cette combinaison d'apports d'eaux douce et saline qui donnait au PNOD son caractère original et faisait sa richesse.

Les aménagements hydro-agricoles

Dans la mouvance évolutive du delta, la problématique de la gestion des oiseaux d'eau est bien réelle. Unique échantillon naturel représentatif du delta, le PNOD souffre des perturbations écologiques qui sévissent dans le secteur à savoir:

- la sécheresse accentuée de ces dernières années,
- la désertification liée à la sécheresse mais aussi au surpâturage et au défrichement excessif pour les besoins de l'agriculture ou du bois de chauffe.

Cependant le principal danger auquel fait face le Parc National des Oiseaux du Djoudj est vraisemblablement la politique de la mise en valeur agricole des terres du Delta pour le développement des cultures irriguées qui a conduit à la mise en place de grands aménagements hydrauliques. A l'initiative de la Mission d'Aménagement du Sénégal (MAS), une digue de ceinture a été édifiée, en 1964, sur la rive gauche du Fleuve Sénégal sur une longueur de 80 Km entre Saint-Louis et Richard-Toll afin de permettre le contrôle partiel (en empêchant les débordements latéraux) de la crue et limiter les intrusions des eaux marines. Elle représente le premier élément d'un dispositif progressif qui est aujourd'hui presque complet. Les principales étapes en sont les suivantes:

1983 - Création de la digue anti-sel provisoire de Kheune à 115 km de l'embouchure pour limiter les intrusions salines en amont du delta et dans la basse vallée.

1986 - Fermeture du barrage anti-sel de Diama permettant la protection de la majeure partie du delta, et créant une retenue d'eau douce de 900 millions de m^3 à la côte.

1989 - Fermeture du barrage de Manantali pour la régulation du régime du fleuve et la création d'un lac de retenue de 11 milliards de m^3 d'eau.

1992 - Endiguement de la rive droite entre Diama et Rosso pour la protection des terres et le contrôle des écoulements.

1994 - Réhabilitation de l'endiguement de la rive gauche avec possibilité d'une gestion optimisée des ouvrages hydrauliques.

La construction de l'Emissaire du Delta (en 2007) complétera le dispositif final de mise en oeuvre hydraulique du Delta et de la Vallée du Fleuve Sénégal.

Le régime hydrologique du fleuve n'a jamais cessé d'être modifié pour permettre le contrôle du système fluvial naturel. Déjà la digue de ceinture édifiée sur la rive gauche du fleuve par la MAS a eu pour conséquence de réduire considérablement la superficie des zones inondables, notamment lors des conditions hydriques déficitaires.

La mise en service du barrage antisel de Diama en 1986 a entraîné de profonds bouleversements dans les écosystèmes humides de la région, et en particulier sur celui du Djoudj, en rendant le système fluvial presque totalement artificiel. Si le barrage de Diama est favorable à la mise en eau du Parc, le blocage des eaux de mer en aval et la perte de son rythme d'assèchement normal entraînent un dessalement progressif du Djoudj qui se répercute sur sa végétation.

La colonisation du Parc par certaines espèces végétales prend des proportions inquiétantes. *Typha australis, Vossia cuspidata* et d'autres espèces de graminées aquatiques progressent à grande vitesse. Mais c'est surtout *Pistia stratiotes* encore appelée salade d'eau qui prolifère et envahit les chenaux, bouchant complètement les marigots. Ceci a pour conséquence de supprimer l'effet de miroir c'est-à-dire la surface d'eau libre nécessaire aux anatidés dont plusieurs centaines de milliers fréquentent le Djoudj. Une tentative d'éradication du Pistia par le relèvement du taux de sel et l'assèchement partiel des plans d'eau est en cours au PNOD depuis 1994.

Par ailleurs la création des casiers rizicoles autour du PNOD entraîne du coup une diminution préoccupante des zones dites banales utilisées pour le pâturage du cheptel domestique et les besoins de survie des populations riveraines (bois de chauffe, récolte de nénuphars, pêche de subsistance). Ainsi le PNOD, étant un des rares endroits où toutes ces conditions sont réunies, subit des pressions massives sur son environnement et particulièrement sur la faune et l'avifaune inféodées au parc. L'ichtyofaune est souvent l'objet de convoitise. Pour leurs activités de pêche non autorisée dans le parc, communément appelée braconnage, les populations utilisent généralement des filets de barrage à mailles non réglementaires ou des lignes de fonds. Ces engins non sélectifs causent de grands dommages à la faune aquatique (poissons et reptiles) mais aussi aux oiseaux plongeurs et barboteurs (cormorans, pélicans, canards) qui meurent souvent pris entre les mailles des filets ou par les hameçons des lignes de fonds.

L'avifaune

Les animaux les mieux étudiés dans le Parc National des Oiseaux du Djoudj sont les Oiseaux. Déjà en 1971 un recensement complet de l'avifaune avait été fait par Dupuy et Morel. Des missions d'études se sont succédées, menées par différentes institutions, notamment le Muséum d'histoire naturelle de Paris, l'ORSTOM et depuis 1990 IBN-DLO (Pays-Bas), Rumsey et Rodwell (Angleterre), la Station Biologique de Zwillbrock (Allemagne), l'Office National de la Chasse (France), la Station ornithologique de Helligoland (Allemagne), la Station Biologique du Parc National des Oiseaux du Djoudj. Les oiseaux du Djoudj sont régulièrement recensés et on trouve des données significatives de leur évolution (Altenburg et van der Kamp 1985; Diouf 1986; Dupuy 1987; Girard *et al*. 1991, 1992; Roux 1973; Roux *et al*. 1976, 1977; Shricke *et al*. 1990, 1991; Triplet & Yésou 1994; Trolliet *et al*. 1993).

Près de 360 espèces d'oiseaux, dont 322 espèces réellement observées, parmi lesquelles 58 espèces nicheuses (Rodwell *et al*. 1994, Morel & Morel 1990), ont été recensées au PNOD et le stock d'avifaune est estimé à plus de 3 000 000 d'individus (toutes espèces confondues) au plus fort de la saison (décembre) avec 90% d'oiseaux d'eau qui sont pour la plupart des migrateurs du paléarctique.

Etat des lieux de l'avifaune nicheuse au PNOD

L'espèce la plus spectaculaire et inféodée au PNOD est le pélican blanc *Pelecanus onocrotalus*. Son éthologie par

rapport à la fluctuation du niveau des eaux du Parc, pour la détermination des périodes et des conditions de ponte mais aussi du succès de la reproduction, a de tout temps été la préoccupation des gardes et chercheurs du Parc. La première tentative de reproduction a été enregistrée en 1971/1972 où 1500 couples ont niché avec succès dans le Parc; depuis lors d'autres nidifications réussies se sont succédées, excepté les années 1972/74, 1976/1977, 1983/1986 coïncidant avec les années de grande sécheresse où la nidification a été un échec total (manque d'eau, présence de prédateurs: chacals, varans, phacochères).

Le Parc National des Oiseaux du Djoudj abritait d'importantes colonies nicheuses d'ibis, de hérons, de cormorans, d'anhingas et de pélicans gris *Pelecanus rufescens*. La période de nidification des espèces piscivores dépend du stock halieutique et de la quantité d'eau disponible. Bien qu'il n'existe pas encore d'étude sur l'alimentation de ces oiseaux dans le Parc, on suppose qu'il existe une relation entre la taille des poissons et la nidification des différentes espèces piscivores. Les hérons, anhingas et petits cormorans nichent pendant la saison des pluies en août au moment où les petits poissons sont supposés plus nombreux. Les cormorans suivent aussitôt après (octobre-novembre). Les pélicans sont les derniers à s'installer et leur consommation de poissons est maximale en janvier quand les poussins sont à la crèche.

De 1971 à 1987 d'importantes colonies de nidification (colonies mixtes) appelées communément héronnières étaient localisées aux endroits ci-après: Canal du Crocodile (tableau 1), Marigot du Khar, Dinko et Marigot du Gorom. Il y a peu d'informations chiffrées disponibles pour ces colonies car le parc n'est pas visité pendant la saison des pluies et la plupart des colonies étaient difficiles d'accès. Dans ces colonies mixtes, les oiseaux nichaient dans les reliques de forêts impénétrables d'*Acacia nilotica* ou de *Tamarix senegalensis*.

Signalons qu'il existait une importante colonie de nidification de hérons pourprés dans la phragmitaie du marigot du Djoudj au sein du secteur de Gainthe.

Toutes ces colonies ont été désertées en 1986, période coïncidant avec la mise en service du barrage de Diama. En effet, la vétusté des ouvrages vannés des marigots du Djoudj et Crocodile, le manque de maîtrise du fonctionnement hydrologique du parc et la

Tableau 1. Oiseaux présents dans la héronnière du Crocodile en décembre 1985 (post-nidification).

Anhinga	1868
Petit cormoran	29
Grand cormoran	908
Pélican gris	16
Ibis sacré	898
Spatule d'Afrique	362
Ibis Tantale	306
Héron bihoreau	2334
Grande aigrette (y compris Aigrette intermédiaire)	1598
Aigrette garzette	1228

méconnaissance totale des périodes de migration de l'ichtyofaune sur le fleuve Sénégal devenu artificiel depuis cette date ont conduit à l'abandon des héronnières au profit d'une nouvelle, localisée sur un îlot de végétation (submergé par l'eau et ne laissant apparaître qu'un groupement réduit d'*Acacia nilotica* et *Tamarix senegalensis*) en face du poste de Crocodile où les conditions ichtyologiques étaient certes plus propices. Cette colonie n'a fonctionné que 3 ans, en 1986, 1987 et 1988. Elle a ensuite été désertée. Depuis cette date aucune réelle installation n'a été enregistrée dans le Parc et sa zone limitrophe. Une tentative timide d'occupation de la héronnière du Crocodile a été enregistrée en 1996 mais la nidification n'a pas été effective.

La taille de la population de grues couronnées inféodées au Parc n'est pas encore connue, mais elle peut très probablement représenter une bonne partie de l'actuelle population ouest africaine de cette espèce menacée d'extinction.

Les Oiseaux d'eau du Parc National des Oiseaux du Djoudj

Le Parc National des Oiseaux du Djoudj est, en Afrique de l'Ouest, l'une des zones d'hivernage les plus importantes pour les oiseaux migrateurs du paléarctique. La diversité des plans d'eau (mares, marigots et lacs) et la disponibilité de la nourriture favorisent le séjour pour de longues périodes (6 mois) d'un bon nombre d'oiseaux migrateurs. D'autres y font des escales pour ensuite poursuivre leur route vers les quartiers d'hiver en Afrique centrale ou du Sud.

Tableau 2. Effectifs des canards recensés au PNOD de 1986 à1998.

années	canards paléarctiques				canards afro-tropicaux			Total général
	Sarcelle d'été	Pilet	Souchet	Total	Dendro. veuf	Dendro. fauve	Total	
1986	121 500	240 984	8 800	371 284	66 050	30 050	96 100	467 384
1988	83 417	39 125	437	132 979	9 015	942	9 957	142 936
1990	51 691	42 390	13 205	107 286	11 960	88	12 048	119 334
1992	100 990	72 621	8 740	182 351	7 064	213	7 277	189 628
1994	128 632	77 233	6 823	212 688	10 179	920	11 099	223 787
1996	61 763	44 324	17 178	123 265	12 186	2 810	14 996	138 261
1998	221 840	119 460	11 401	352 701	35 700	1 296	36 996	389 697

Parmi les migrateurs paléarctiques, les canards (sarcelles d'été *Anas querquedula*, canards pilet *Anas acuta*, canards souchet *Anas clypeata*) et les limicoles (chevaliers combattants *Philomachus pugnax* et barges à queue noire *Limosa limosa*) sont les plus représentatifs. Les canards s'alimentent la nuit, principalement dans les vasières (ou rizières) et viennent se reposer le jour dans le PNOD où ils trouvent une quiétude absolue. Les chevaliers combattants et barges à queue noire se retirent le jour dans les rizières où ils s'attaquent aux germes de riz (Tréca 1990).

D'autre part le parc abrite d'importantes concentrations de canards éthiopiens (dendrocygne veuf *Dendrocygna viduata* et dendrocygne fauve *Dendrocygna bicolor*, oie d'Egypte *Alopochen egyptiacus* et oie de Gambie *Plectropterus gambensis*), flamants roses *Phoenicopterus ruber*, flamants nains *Phoenicopterus minor*, spatules d'Europe *Platalea leucorodia* et d'Afrique *Platalea alba*.

Evolution des anatidés au PNOD

La fréquence des opérations de comptage qui ont été effectuées dans le moyen delta du Fleuve Sénégal montre l'importance du PNOD pour les anatidés paléarctiques et afro-tropicaux. Le Parc National des Oiseaux du Djoudj accueille pendant la période de migration selon les conditions hydro-climatiques plusieurs milliers d'anatidés parmi lesquels cinq espèces dominent: la sarcelle d'été, le canard pilet, le canard souchet, migrateurs paléarctiques, le dendrocygne veuf et le dendrocygne fauve, voir tableau 2.

D'après la littérature les perturbations de l'évolution de l'avifaune dans le PNOD dans les années 1960 étaient d'origine climatique. En revanche, l'évolution récente des effectifs serait due à l'artificialisation du delta. En effet, pratiquement rien ne reste du delta originel et de son fonctionnement naturel. Même le PNOD, qui avait été créé pour conserver un paysage significatif du delta, est maintenant alimenté par un système de vannes qui permettent une gestion de l'eau selon un rythme et des niveaux d'inondation qui diffèrent des crues naturelles du fleuve.

La brutale mise en service du barrage de Diama sans mesure d'accompagnement (application des mesures d'impact sur l'environnement), l'occupation et l'existence de périmètres irrigués autour du PNOD, la vétusté, le manque de maîtrise des ouvrages vannés et la méconnaissance totale de l'éthologie des oiseaux d'eau de la part des personnes chargées de leur gestion ont amené une véritable perturbation dans le rythme d'évolution de l'avifaune aquatique particulièrement les anatidés, ce qui s'est répercuté dans leur distribution au niveau du moyen delta.

Ainsi nous enregistrons une baisse importante des anatidés de référence durant la période après barrage (1986–1990) liée à la forte prolifération des plantes aquatiques envahissantes (*Pistia stratiotes, Vossia cuspidata, Typha australis*) qui ont eu pour effet la réduction des plans d'eau libre (effet de miroir) et la diminution de la microfaune et de l'ichtyofaune favorables pour l'alimentation des oiseaux d'eau. L'effectif des migrateurs paléarctiques (sarcelles d'été, canards souchet et canards pilet) a fortement chuté (2/3 pour la sarcelle d'été, 4/5 pour le pilet et presque nul pour le souchet) durant cette période. Notons néanmoins un resaisissement du souchet en 1990 avec son effectif quasiment multiplié par 1,5 comparé à 1986.

De la même manière les effectifs des canards éthiopiens ont chuté dans cet intervalle et la situation a été dramatique pour le dendrocygne fauve qui s'est pratiquement raréfié au parc de 1988 à 1992, année où il a commencé à faire une apparition très timide. De nos jours son adaptation aux conditions actuelles du milieu n'est pas évidente.

La reprise de l'avifaune depuis 1990 correspond à la période de remise en cause de la gestion du Parc National des Oiseaux du Djoudj et de l'implication des instituts de recherche nationaux et internationaux comme conseil au PNOD pour l'élaboration d'un plan d'aménagement et de gestion des ressources naturelles du PNOD. Ce plan a abouti à la création d'une Station Biologique en 1993 et la mise en place d'un Plan Quinquennal de Gestion Intégrée du PNOD et de sa périphérie (PQGI) où tous les aspects concernant la recherche et le développement socio-économique à l'intérieur et dans la périphérie du Parc sont pris en compte (Baldé *et al*. 1994; Beintema *et al*. 1995).

Ceci a favorisé la réhabilitation de la digue départementale, mais surtout la réfection et le dimensionnement des ouvrages vannés du Parc qui ont permis un meilleur contrôle du flux hydraulique du PNOD. Ainsi les cotes d'inondation provoquée du Parc ont pu être contrôlées grâce à la mise en place d'échelles limnimétriques dans les différents plans d'eau et à l'application du système d'asséchement progressif du parc pour favoriser l'installation des différentes espèces d'avifaune inféodées au PNOD.

Les effectifs de canards tendent tous vers la normale depuis 1994 malgré une baisse remarquée en 1996 chez la sarcelle d'été et le canard pilet. Une bonne reprise a d'ailleurs été notée à partir de cette année jusqu'à nos jours, car comparé à l'année de référence (1986) sarcelles d'été (221 840) et canards souchet (11 401) ont presque doublé leur effectif. Canards pilet et dendrocygnes veufs sont en progression constante, mais le dendrocygne fauve reste malheureusement toujours en fluctuation régressive.

L'idée de la gestion parcellaire du Parc née à partir de 1994 par la mise en place d'un bouchon à la hauteur de la colonie de reproduction des pélicans pour la lutte contre la salade d'eau a beaucoup contribué à la progression des effectifs des anatidés. Il s'agissait d'éradiquer la salade d'eau grâce au sel résiduel dans le parc en asséchant progressivement les plans d'eau à l'aval du bouchon tout en favorisant le tourisme et l'ichtyofaune par une admission de l'eau en amont du barrage. Ce système non seulement a dégagé les plans d'eau de la végétation envahissante (*Pistia* et *Typha*) mais aussi a créé différents habitats favorables aux anatidés inféodés au PNOD.

Conclusion

De toute évidence, la construction du barrage de Diama a créé un certain déséquilibre dans le fonctionnement du Parc lié à la non application des mesures d'impact sur l'environnement. Sa brutale mise en service sans préalable (préparation des acteurs de développement et des gestionnaires des sites naturels) a amené d'énormes balbutiements dans la gestion des ouvrages hydrauliques du parc, ce qui a eu pour conséquence la prolifération des plantes aquatiques, la réduction des plans d'eau libres et la diminution des substances nutritives (poissons et micro-organismes) favorables à la migration et au stationnement des différentes espèces d'avifaune aquatique inféodées au PNOD.

En effet tout le système de fonctionnement hydraulique du parc a été remis en cause depuis la date du blocage de la langue salée en aval du parc. Ainsi un nouveau type de gestion mettant en relation la fluctuation des eaux au PNOD (période et durée d'inondation du parc, hauteur des eaux, qualité des eaux suivant les périodes de l'année, assèchement du parc si nécessaire) doit être mis en œuvre et fait partie des volets les plus importants issus du PQGI. C'est ainsi que les Universités de Dakar et de Saint-louis combinent leurs efforts avec d'autres instituts nationaux et internationaux pour trouver une solution à ce propos.

Néanmoins la situation des oiseaux d'eau, particulièrement des canards, n'est pas inquiétante pour autant, si on compare l'effectif des anatidés de 1986 (467 384) à celui enregistré en 1998 (389 697) qui devait être sensiblement égal si la population des dendrocygnes fauves (30 050 en 1986 et seulement 1 296 en 1998) s'était reconstituée.

La désertion des dendrocygnes fauves de même que d'autres espèces d'anatidés doit être due au fait que le delta du Sénégal est actuellement artificialisé, l'eau et la nourriture se trouvent en permanence sur l'ensemble du delta du fleuve Sénégal constitué d'un chapelet de zones humides allant de l'embouchure au moyen delta. Les zones humides les plus significatives sont la Réserve du Ndiaël, les trois marigots, la langue de barbarie, la réserve de Guembeul, le Djeuss et le Parc National du Diawling (Mauritanie).

Ces différentes zones accueillent plus ou moins le surplus en avifaune du PNOD où de manière permanente des oiseaux ne s'adaptent pas aux nouvelles conditions hydrauliques du milieu. L'extension de l'expérience du PQGI dans d'autres zones humides du delta pour constituer un programme global de gestion du Bas delta où tous les problèmes liés à la gestion des sites seront pris en compte pourrait être la solution de l'épineux problème de rendre le PNOD comme principal réceptacle et lieu de stationnement de l'avifaune paléarctique et éthiopienne.

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Appendix 1
Final Programme of Workshop 2

Wednesday 11 November 1998

Keynotes: Global waterbird conservation strategies
chair: Carlos Bento (Eduardo Mondlane University, Mozambique), Paul Schmidt (US Fish and Wildlife Service, USA)

9.00–9.10
Introduction to workshop (David Stroud, JNCC, UK and Albert Beintema, Wetlands International – AEME, The Netherlands)

9.10–9.30
Activities in the Asia-Pacific region (Taej Mundkur, Wetlands International – Asia Pacific, Malaysia *et al*.)

9.30–9.55
Activities in the America's (Paul Schmidt, US Fish and Wildlife Service, USA)

9.55–10.15
The Waterbird Agreement AEWA (Gerard Boere, Ministry of Agriculture, Nature Management and Fisheries, The Netherlands)

10.15–10.30
Developing a global waterbird monitoring network (Nick Davidson, Wetlands International – ICU, The Netherlands)

10.30–11.00
Coffee/tea

Keynotes: Regional aspects of AEWA

11.00–11.20
Significance of AEWA for Africa (Seydina Issa Sylla, Wetlands International – AEME, Senegal)

11.20–11.40
What does AEWA mean for Russia? (Valery Orlov, State Committee of the Russian Federation for Environmental Protection, Russian Federation)

11.40–12.00
Importance of the Central Asian Flyway for AEWA (Alex Yurlov, Institute for Systematics and Animal Ecology, Russian Federation)

Case studies in the AEWA region

12.00–12.15
The importance of small Sahelian wetlands (Wim Mullié, FAO, Senegal *et al*.)

12.15–12.30
The East Atlantic Ramsar Network (Alison Duncan, LPO, France)

12.30–14.00
Lunch

Case studies in the AEWA region (continued)
chair: Olivier Biber (Swiss Agency for the Environment, Switzerland)

14.00–14.15
Conservation of threatened waterbird species (Andy Green, EBD, CSIC, Spain)

14.15–14.30
Wetlands and waterbirds in East Africa (Julius Arinaitwe, Makerere University, Uganda)

14.30–14.45
Damara Tern, an inter-Africa migrant (Rob Simmons, Ministry of Environment and Tourism, Namibia)

14.45–15.00
Migratory waterbirds in South Africa (Dieter Oschadleus, University of Cape Town, South Africa)

15.00–15.15
Changes in the Djoudj, the classic site of Senegal (Sara Diouf, Direction des Parcs Nationaux du Senegal, Senegal)

15.15–16.00
Coffee/tea

Group discussion on AEWA Conservation Guidelines
chair: Rivo Rabarisoa (Peregrine Fund Project, Madagascar)
co-chair: Simon Delany (Wetlands International – AEME, The Netherlands)
rapporteur: Stephan Pihl (National Environmental Research Institute, Denmark)

16.00–17.30
Towards a waterbird monitoring protocol for the AEWA region
Introduction: Simon Delany (Wetlands International – AEME, The Netherlands)

Friday 13 November 1998

Parallel group discussions on AEWA Conservation Guidelines

Group 1:

9.00–10.00
Guidelines on species action plans
chair: David Stroud (JNCC, UK)
co-chair: Albert Beintema (Wetlands International – AEME, The Netherlands)
rapporteur: Andy Green (EBD, CSIC, Spain)
Introduction: Albert Beintema (Wetlands International – AEME, The Netherlands)

10.00–10.30
Guidelines on tackling emergency situations
chair: David Stroud (JNCC, UK)
co-chair: Albert Beintema (Wetlands International – AEME, The Netherlands)
rapporteur: Eileen Rees (Wildfowl and Wetlands Trust, UK)
Introduction: Albert Beintema (Wetlands International – AEME, The Netherlands)

10.30–11.00
Coffee/tea

11.00–11.30
Guidelines on tackling emergency situations (continued)

11.30–12.30
Guidelines on management of critical sites
chair: Brahim Ould Messaoud (IUCN, Mauritania)
co-chair: Albert Beintema (Wetlands International – AEME, The Netherlands)
rapporteur: David Stroud (JNCC, UK)
Introduction: Albert Beintema (Wetlands International – AEME, The Netherlands)

Group 2:

9.00–10.00
Guidelines on site inventories
chair: Djahida Boukhalfa (Ministère de l'Agriculture Algeria)
co-chair: Simon Delany (Wetlands International – AEME, The Netherlands)
rapporteur: Sherif Baha El Din (Egypt)
Introduction: Simon Delany (Wetlands International – AEME, The Netherlands)

10.00–10.30
Guidelines on reducing crop damage
chair: Augustine Ezealor (*Ahmadu Bello University, Nigeria)*
co-chair: Allix Brenninkmeijer (Wetlands International – AEME, The Netherlands)
rapporteur: Bart Ebbinge (IBN-DLO Institute for Forestry and Nature Research, The Netherlands)
Introduction: Allix Brenninkmeijer (Wetlands International – AEME, The Netherlands)

10.30–11.00
Coffee/tea

11.00–11.30
Guidelines on reducing crop damage (continued)

11.30–12.30
Guidelines on sustainable harvest
chair: Mohammed Younis Abdel Salam (Ministry of Interior, Wildlife Conservation General Administration, Sudan)
co-chair: Jeff Kirby (Just Ecology, UK)
rapporteur: Emmanuel Williams (Conservation Society of Sierra Leone, Sierra Leone)
Introduction: Jeff Kirby (Just Ecology, UK)

12.30–14.00
Lunch

Reports and synthesis of discussions on the Conservation Guidelines

chairs: Oliver Nasirwa (National Museums of Kenya, Kenya), and David Stroud (JNCC, UK)
rapporteur: Heinz Hafner (Station Biologique de la Tour du Valat, France)

14.00–14.30
Reports from discussion groups on conservation guidelines

14.30–15.00
Formulation of main conclusions

15.00–15.25
General discussion on implementation of the AEWA

15.25–15.30
Closure of formal workshop

Appendix 2
Abstracts of posters

The potential use of natural resource damage assessment and restoration methodologies as a tool to quantify fully the wetland impacts of projects or other proposed actions to ensure accurate planning, and decision-making, and adequate mitigation

Mark Barash
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Although natural resource damage assessment is used in the United States to quantify injuries and restoration requirements, after injuries to natural resources have occurred, the methodologies employed are well suited to prospective analysis, and can identify with greater precision than any other approach the resource and societal implications of project decisions. This paper will explain the approaches utilized in damage assessment, and explore how the underlying tools and methodologies can be used to ensure that project decisions are made with full understanding of their natural resource implications.

Mise en Place d'un Réseau de Suivi des Populations d'Oiseaux d'Eau en Afrique SubSaharienne

Maurice Benmergui
Office National de la Chasse, Station de la Dombes, "Montfort", 01 330 Birieux / France

L'objectif de ce projet est de mettre en place un réseau de suivi des populations d'oiseaux d'eau en Afrique subsaharienne. Une première phase concerne cinq pays d'Afrique de l'Ouest présentant une certaine cohérence biogéographique et accueillant en hivernage une forte concentration d'oiseaux d'eau du paléarctique occidental : Sénégal, Mali, Burkina Faso, Mauritanie, Guinée.

Sa reproductibilité dans d'autre pays est envisageable. Le budget prévisionnel total du projet s'élève à 1 033 004 écus. Sa durée totale est de six ans, trois ans avec le soutien financier de l'Union Européenne (44,5%), trois ans en fonctionnement technique autonome et avec une aide au financement de différents partenaires (55,5%).

Ce projet est requis et coordonné par l'Office National de la Chasse, organisme sous tutelle du Ministère Français de l'Aménagement du Territoire et de l'Environnement, et possédant une solide expérience de collaboration avec des partenaires africains.

Le projet vise à l'amélioration des capacités nationales par la formation des cadres et la constitution de réseaux de surveillance nationaux dont le but est de fournir des indicateurs biologiques sur l'état des populations d'oiseaux d'eau et des zones humides. Le financement prévoit équipement notamment optique et informatique.

A terme, le réseau autonome constitué fournira les informations nécessaires à une exploitation durable par les populations villageoises de leurs ressources en avifaune. Il permettra aux états africains concernés de se constituer une banque de données, d'assurer une meilleure gestion de leurs ressources, de remplir certaines des obligations contractées par la signature de conventions internationales pour l'environnement : AEWA/CMS, Ramsar, Rio. Il créera une synergie entre les organismes oeuvrant pour la gestion durable des zones humides et des oiseaux d'eau, notamment par une collaboration institutionnelle entre l'ONC, Wetlands International et les délégations nationales de l'UICN.

Threats to waterfowl habitats by human disturbance, resource utilisation and industrial development at Matola Lingamo salt marsh, Maputo Bay, Mozambique

Carlos M. Bento and Almeida T. Guissamulo
Museu de História Natural, Universidade Eduardo Mondlane, C.P. 257. Maputo. Mozambique

During the 1998 waterfowl census, 15 705 birds were counted in the intertidal areas of Maputo Bay and 6152 in inland wetlands; 54% were common residents and 26% were Palearctic migrants. High bird densities occurred Inhaca Island

(surface area = 53 km²; D = 115 birds/km²) and Matola saltmarsh (surface area = 3.5 km²; D = 1.158 birds/km²). Among the inland wetlands, Lake Xambanhane and Futí River were important. The Matola Saltmarsh has also high economic value. About 244 people directly exploit the marine resources, to support about 1779 family aggregations. On average, 97 204 kg of mussels, 30 483 kg of fish and 24 134 kg of shrimps are collected monthly. Several established industries discharge their polluted effluents directly to the saltmarsh. The area is in high demand for large development projects: there is an aluminium smelter, a steel production plant, and 127 km of new powerlines surrounding the area, posing a threat of bird mortality by collisions. The reduction of the protective inland belt of reed vegetation by farming increases the disturbance to birds. All these activities affect the bird populations. A management programme covering all activities in the area is required.

Evolution des Dénombrements d'Oiseaux d'eau en Algérie

Djahida Boukhalfa
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Les dénombrements hivernaux d'oiseaux d'eau ont commencé en Algérie au début des années 1970. A cette époque, seuls les sites d'El-Kala (extrême Nord-Est) étaient couverts par des équipes étrangères. Jusq'au début des années 1980, le nombre de sites couverts chaque janvier ne dépassait pas une dizaine. A la fin des années 1980, et grâce aux grands efforts déployés d'une part par les quelques spécialistes ornithologues algériens et d'autre part, par l'administration en charge de la protection de la nature, une équipe de compteurs d'oiseaux d'eau a été formée sur les techniques d'identification et de dénombrements. Ces équipes réparties sur plusieurs régions du pays ont permis d'augmenter considérablement le nombre de sites couverts chaque année. C'est ainsi qu'actuellement, le nombre de sites couverts au moins une fois est de 120. Parmi ces sites, 30 sont connus pour avoir rempli au moins l'un des critères Ramsar. Malgré le progrès enregistré d'autres efforts sont nécessaires pour couvrir la totalité du territoire, notamment la zone saharienne et présaharienne qui recèle des richesses non encore identifiées.

Implementing a preliminary waterbird monitoring strategy for Africa

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A preliminary waterbird monitoring strategy for Africa was recently published (Dodman, 1997) as a result of an extensive continent-wide review process, an international workshop and some basic analyses of data held in the African Waterfowl Census (AfWC) database. The strategy presents key issues to help the practical development of more definitive and specific action plans, especially at the sub-regional, species and site levels. Particular emphases are given to maximising the practical use of AfWC data for conservation purposes, developing the capacities of participating organisations and involving local communities.

This strategy is now being implemented in West Africa through field training courses, e.g. in Burkina Faso, Niger and The Gambia, surveys, e.g. of coastal sites in Mauritania and Cameroon and of colonial *Laridae* in Senegal's Saloum Delta, and the exchange of personnel within the sub-region. A sub-regional training programme and network development provide further support, whilst a committee monitors progress and guides development of a wetland monitoring strategy for West Africa.

At the international level, data uses include the identification of shadow Ramsar Sites and 300 potential Important Bird Areas (IBAs) for Africa and the support of the Agreement on the Conservation of African-Eurasian Migratory Waterbirds. Thus, mechanisms are being established for enabling biological data – and the process of obtaining this data – to contribute to conservation action, awareness and site and species management.

Hutovo Blato, a resting place for migratory waterbirds on the flyway Europe-Asia

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The estuary of the river Neretva (Neretva Delta) is a unique Mediterranean wetland area, with several internationally important and protected wetlands, ornithological and ichthyological reserves. One of the most important parts of the system is Hutovo Blato, situated near the border of Bosnia and Herzegovina and Croatia. With 7411 ha of wetland (swamps, lakes, river) it is unique in Europe. It includes the hilly part of Londa and Koscela, the lakes Deransko, Jelim, Orah and Drijen, and the region of Donje Blato including Karaotok, the ornithological reserve Skrka, the lake Svitavsko Jezero and the river Kupa.

Climate, hydrology, and proximity of the Adriatic Sea favour development and survival of many animal species, especially waterbirds. It is an important resting place for birds from North and Central Europe, and the permanent habitat of several endangered species. In the period 1983–1991, 148 bird species have been observed in the region of Hutovo Blato.

Recent war activities (the first front line was very close to Hutovo Blato) have caused degradation of the area, through fire, uncontrolled deforestation, over-fishing, etc. The most numerous wintering species have also decreased significantly.

Monitoring of colonial waterbird colonies in the "Banc d'Arguin," Islamic Republic of Mauritania

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The Banc d'Arguin figures amongst the most important breeding areas for colonial waterbirds in West Africa. In 1997, a long-term monitoring programme was initiated after aerial surveys from 1990 to 1994 showed a perceptible decline in total numbers compared to those counted in 1984–85. However, more than 56000 pairs were counted in 1997, as opposed to 37000 pairs in 1984–85. These fluctuations are presumably related to those occurring in other parts of a vast network of wetlands in West Africa. It is therefore being considered to conduct aerial surveys that would range from Guinea Bissau in the south to the Banc d'Arguin in the north. The diversity and abundance of breeding birds is a good biological indicator for the health of coastal ecosystems. Over the years, the monitoring program will provide a better insight into the movements within a meta-population system in relation to environmental factors. A training programme for Mauritanian ornithologists is essential for the long-term continuity of this conservation project.

Suivi des colonies d'oiseaux d'eau coloniaux du Parc National du Banc d'Arguin, République Islamique de Mauritanie

H. Hafner [1], O. Pineau [1], Y. Kayser [1], A. Gueye[2] et M.A. Sall[2] B. Lamarche[3]
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Le Banc d'Arguin figure parmi les quartiers de reproduction les plus importants pour les oiseaux d'eau coloniaux en Afrique de l'Ouest. Suite aux dénombrements aériens 1990–1994 qui semblaient indiquer une baisse sensible des effectifs par rapport aux années 1984–85, un projet de suivi à long terme a été initié en 1997 (6 missions aériennes). Plus de 56000 couples d'oiseaux d'eau furent recensés en 1997, contre 37000 couples en 1984–85. Les fluctuations qui caractérisent ces effectifs s'intègrent dans celles des populations réparties sur un vaste réseau de zones humides en Afrique de l'ouest. Il est donc envisagé d'effectuer des recensements aériens depuis la Guinée-Bissau au sud jusqu'au Banc d'Arguin au nord. La diversité et l'abondance des oiseaux nicheurs représentent un marqueur biologique valable de la santé des écosystèmes côtiers et les données futures nous renseigneront sur le fonctionnement des méta-populations en relation avec les facteurs environnementaux. Afin d'assurer une pérennité indispensable à ce projet de conservation, un important volet consiste en la formation de techniciens mauritaniens.

Les dénombrements et la conservation des oiseaux d'eau en Mauritanie

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Dans les années 70 et 80 un certain nombre de zones humides mauritaniennes ont fait l'objet de missions ponctuelles par des équipes venant de l'extérieur pour les dénombrements internationaux en janvier. Depuis 1993 une collaboration s'est instituée entre équipes nationales et partenaires étrangers avec comme zones cible le bas-delta autour du Parc National du Diawling et les lacs R'kiz, Mâl et Aleg. Ces sites sont couverts par une équipe composé d'agents du Parc National du Diawling, du Groupe de Recherche sur les Zones Humides de l'Université, de volontaires et dernièrement de la Direction de l'Environnement et de l'Aménagement Rural. Ces équipes ont été encadrées par l'OMPO et l'ONC. Le Parc National du Banc d'Arguin de son côté a plusieurs programmes de dénombrement et de formation appuyés par WIWO (migrateurs) et la Tour du Valat (nidification). Les données accumulées par ces différents programmes ont permis de mettre en exergue l'importance des zones humides mauritaniennes. Ceci devrait se traduire à l'avenir par une meilleure gestion de certains sites par la sensibilisation des décideurs et des collectivités locales.

Depuis janvier 1998, dans le cadre du projet de mise en place d'un réseau de suivi des populations d'oiseaux en Afrique subsaharienne, l'équipe nationale a pu s'équiper et est en train de s'élargir. Le défis sera de pérenniser ces acquis après la fin du projet. En plus, la couverture des zones à l'intérieur du pays reste faible et demande des moyens plus importants, notamment pour les dénombrements aériens.

The waterbird monitoring programme in Kenya

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The waterfowl census programme was initiated in Kenya in 1991. The programme was aimed at training Kenyan volunteers to monitor the ecological status of wetlands using waterbirds. The strategy was to start by covering a few manageable sites and then increase the coverage of sites with an increase in the capacity to handle wider co-ordinated counts and the number of experienced volunteers. Starting with eight sites and 82 volunteers in 1991, the list of regularly monitored sites has increased to thirty in 1998 and over 600 volunteers have been involved. The counts started with the Rift valley lakes and expanded south to cover sites in Amboseli, to the west around Lake Victoria and east along the Kenyan coast.

This poster summarises the trends in waterbird numbers over the period 1991–1998 and the programme expansion process showing the involvement of volunteers and supporting organisations. The use of the data in increasing our understanding on waterbird population distribution, especially the migratory species abundance, and wetland conservation endeavours in the region is also shown. The current status of the programme and future plans are highlighted.

Recensement et Suivi des Oiseaux d'eau a Madagascar

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La protection de l'avifaune aquatique nécessite une base de connaissances sur le statut et la distribution des oiseaux ainsi que l'état de leur habitat. Le dénombrement des oiseaux d'eau contribue à rassembler ces informations, permettant de prendre des mesures adéquates pour leur conservation. Depuis l'intégration de Madagascar dans le réseau africain en 1992, le dénombrement réalisé par différentes institutions nationales ou internationales touche actuellement 22 sites, contre seulement six sites en 1992. Seulement 12 sites font l'objet de suivis bi-annuels réguliers, dont huit ont été identifiés comme zones d'importance internationale pour les oiseaux d'eau en Afrique australe. Quatre de ces huit sites ont été proposés comme sites Ramsar en raison de leur importance en avifaune aquatique et leur potentiel économique. 64 espèces ont été identifiées au niveau de ces sites dont 20 sont endémiques de Madagascar.

L'insuffisance de participants et de moyens logistiques limite la couverture de dénombrement. Or, davantage de zones humides nécessitent encore d'être visitées, en particulier les mangroves, les estuaires, et les îles côtières qui sont les lieux les plus fréquentés par les espèces migratrices. Un réseau est en cours de création pour développer cette activité à Madagascar.

Mass mortality of birds from oil near the Caspian sea coast of Azerbaijan in March 1998

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Mass mortality of birds from oil occurred around the island Gil (60 km SW of Baku). A first survey was made 20 April. We registered a 2–3 cm thick band of oil around the perimeter of the island, varying in width from 1–3 m to 3–10 m on the north side. There were on average 0.5 birds per m shoreline on the S coast, and 0.3 on the N coast, sometimes up to 5 birds/m. Many birds were covered with sand and if they were more than 50 m away, only a tail, wing or leg could be seen, and we could not count them all. With an estimated 1 bird/km for the perimeter (near 6 km) there would be 5–6 thousand dead birds, but because only 10–15% of all oiled birds can be seen on the coast, the total estimation of casualties will be between 30–60 thousand birds. March is the time of intensive migration of waterbirds in Azerbaijan and we registered up to 60 thousand birds during one day during migration, and 30–40 thousand in winter in the region of the island Gil.

Of the birds identified, 92% Coots, 5% Herring Gull, 1.5% Cormorant and 1.5% ducks (Pochard, Teal, Mallard). There may have been more ducks and more duck species, but most corpses were too heavily oiled to be identifiable. Expeditions in May and June showed little change, but during the last expedition, on 27 July, only 3–5% of corpses remained, and there was less oil pollution. We suppose the oil conserved bird bodies a long time but from the middle of June the air temperature rose above 30 °C (32–36), so the oil evaporated more quickly, and the bodies decomposed and disappeared.

The oil had an important, prolonged effect on the island Gil, which hosts the largest breeding colony of Herring Gulls (more 3000 pairs) in the Caspian Sea. During May and June we registered new dead Herring Gulls, which possibly died from intoxication. In 1998, only 2.3 thousand birds were present, and only about 250 nests were registered, indicating a sharp decline.

We thank ISAR-Azerbaijan very much, for the grant which meant we could make this survey.

Designation and conservation of the key staging sites for migratory waterbirds in the Eastern Baltic region and in North-west Russia

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The continuous survival of many migratory waterfowl species totally depends on protection and wise management of a chain of wetlands of critical importance as staging areas. It is necessary to designate and conserve the entire network of key stop-over sites between wintering and breeding grounds. The first country-wide inventory of all important sites in Lithuania was performed in 1996–1997. Detailed studies on staging waterbirds (abundance of separate species, carrying capacity of wetlands, mapping of most important areas) were carried out in 37 key wetlands. The results, supported by 'Migratory Birds of Western Palearctic' (OMPO), showed numerous sites of international importance in Lithuania. However, large knowledge gaps remain in East and Central Europe. It is important to identify key staging areas for migratory waterbirds in the East Baltic Region and North-west Russia. Such a programme, covering North-west Russia, Belarus, the Baltic states, and Poland, is planned for 1999–2000. This would identify the chain of important wetlands serving as key staging areas for the greater majority of the European and Siberian waterbirds using the East Atlantic Flyway. The programme would also help to implement international obligations of states concerned, incurred at the signing of the Ramsar, Berne, and Bonn Conventions, and the African Eurasian Migratory Waterbird Agreement (AEWA).

Waterbird monitoring and conservation in Sierra Leone

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Sierra Leone is located on the East Atlantic flyway and regularly support more than one hundred thousand migratory waterbirds of palearctic origin. Studies have revealed that increasing human activities on the wetlands they inhabit (eg fishing, hunting, mangrove cutting etc) are the main threats to waterbird survival in Sierra Leone. This revelation led to the 1992 African Waterfowl Census in Sierra Leone with the aim of monitoring waterfowl populations by regular census. Their numbers are used to infer whether they are facing favourable condition and as a tool for advocating the need for Sierra Leone to become party to relevant conventions (Ramsar, Bonn). Propagating waterbird monitoring and conservation initiatives in Sierra Leone is the Conservation Society (CSSL a non-governmental and non-profit making organisation) with activities like mangrove planting sensitisation campaigns Wildlife Week Celebrations, World bird Watch, and AfWC. Presently moves are being made to establish a wetland-waterbird unit within CSSL to improve and maintain waterbird monitoring and conservation throughout the Country. Clearly though, there is a need for Sierra Leone to co-operate with other countries in effectively monitoring and conserving waterbirds through conventions and agreements such as the African-Eurasian Migratory Waterbird Agreement (AEWA).

Kazakstan's wetlands as important areas for globally threatened bird species

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Kazakstan, with a territory of 2 717 300 km^2 is the largest country of Central Asia, and ninth in the world. There are about 85 000 rivers, over 48 000 lakes, and 4200 artificial water bodies in Kazakstan. Of the 17 globally threatened and nine near threatened bird species inhabiting Kazakstan, eight threatened species (Dalmatian Pelican, White-headed Duck,

Swan Goose, Lesser White-fronted Goose, Red-breasted Goose, Marbled Teal, Ferruginous Duck, Pallas's Sea-eagle) and five near-threatened species (Pygmy Cormorant, White-tailed Eagle, Asian Dowitcher, Relict Gull and White-winged Woodpecker), are associated with wetlands. Globally threatened species as Lesser White-fronted Goose, Lesser Kestrel, and Corncrake, and the near-threatened species as Pygmy Cormorant, Cinereous Vulture, Pallid Harrier, Black-winged Pratincole and White-winged Woodpecker, are not included in the list of the Red Data Book of Kazakstan (1996). There are nine State Nature Reserves ("Zapovednik") and four State National Natural Parks (National Parks). Some wetlands are included in the five State Nature Reserves (Korgalzhin, Markakol, Naurzum, Alakol and Barsa-Kelmes) and just one National Park – Altyn-Emel. Korgalzhin, Alakol and Markakol Sanctuaries are typical Wetland Reserves. Two wetlands are now designated Ramsar sites (Korgalzhin and Teniz Lakes, Lower Irghiz and Turghay Rivers), but others will be added to the list. Currently, the most important wetlands for vulnerable bird species are the Ili River delta and Balkhash Lake, the Tentek River delta and Alakol, Sasykkol Lakes, the Kara Ertis River delta and Zaisan Lake, the northeastern shore and coast of the Caspian Sea, the lower Syrdaria River, and the Aral Sea.

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In addition, a large number of participants have been sponsored through projects supported directly by a number of additional agencies.

Mission:

To sustain and restore wetlands, their resources and biodiversity for future generations through research, information exchange and conservation activities, worldwide.

M. Souty Touré, Minister of Environment and Nature Protection, Senegal

"As you know, the Sahelian wetlands of West Africa are at the heart of the rural economy of our countries. They constitute, at the same time, extremely valuable ecosystems for wildlife."

HRH The Litunga Ilute Yeta IV of Barotseland

"We envisage a situation in which the people of Barotseland achieve enhanced well-being and freedom to participate fully in community issues. We look forward to seeing our people gaining increased benefits from the wetland resources and improving household food security. At the same time maintaining an environment that is healthy, aesthetically pleasing, rich in vegetation cover thereby reducing land degradation and improved flow of water in rivers and water courses in a land characterised by wildlife and lush pastures ... Let us all make wetlands a source of life for now and the future."

Chris Kalden, President of Wetlands International, opening the conference, also on behalf of IUCN and WWF

"Today, this conference brings together the greatest gathering of wetland experts ever seen in Africa, with almost 500 participants from more than 90 countries, including 36 African countries. This excellent participation reflects the rapid rise of wetlands on the sustainable development agenda."

For further information please contact the appropriate office.

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