Doc: AEWA/ Inf 2.13
2 June 2002
Original: English

AEWA

African-Eurasian Migratory Waterbird Agreement

Conservation Guidelines

Prepared by Wetlands International

~~April 1999~~ November 2001

Prepared with financial support from

The Swiss Agency for the Environment, Forests and Landscape

and

The Ministry of Agriculture, Nature Management and Fisheries of the Netherlands

Contents

Introduction

In Article II of the Agreement on the Conservation of African/Eurasian Migratory Waterbirds, Parties agree, as a fundamental principle, to take co-ordinated measures to maintain migratory waterbird species in a favourable conservation status or to restore them to such a status. To this end, the Parties agree to apply within the limits of their national jurisdiction a number of general conservation measures prescribed in Article III of the Agreement, as well as a number of more specific actions determined in the Action Plan appended to the Agreement. In paragraph 7.3 of the Action Plan, the Agreement Secretariat is required to co-ordinate the development of a series of Conservation Guidelines to assist the Parties in the implementation of their obligations under the Agreement. These Conservation Guidelines, which should be prepared in co-ordination with the Technical Committee and with the assistance of experts from Range States, should be submitted to the Meeting of the Parties for adoption at its first session, and should be regularly reviewed (Article IV, paragraph 4 of the Agreement). The Technical Committee should then assess the guidelines, and formulate draft recommendations and resolutions relating to their development, content and implementation for consideration at sessions of the Meeting of the Parties (paragraph 7.6 of the Action Plan).

Paragraph 7.3 of the Action Plan gives a list of some of the topics that should be covered by the Conservation Guidelines. These are as follows:

(a) single species action plans;
(b) emergency measures;
(c) preparation of site inventories and habitat management methods;
(d) hunting practices;
(e) trade in waterbirds;
(f) tourism;
(g) reducing crop damage;
(h) a waterbird monitoring protocol.

Preparation of the Conservation Guidelines was identified as a major activity in the *International Implementation Plan for the Agreement of the Conservation of African-Eurasian Migratory Waterbirds 1997-1999*, prepared by Wetlands International in April 1997 with financial support from the Ministry of Agriculture, Nature Management and Fisheries in The Netherlands. Activity 3 of the *Implementation Plan* involved the preparation of nine sets of conservation guidelines, following the list in paragraph 7.3 of the Action Plan, but treating site inventories and habitat management methods as two separate topics.

The nine sets of guidelines, as set out in the *Implementation Plan* and presented here, are as follows:

1. Guidelines on the preparation of Single Species Action Plans for migratory waterbirds

In paragraph 2.2.1 of the Action Plan, Parties are required to co-operate with a view to developing and implementing international single species action plans for populations listed in Category 1 in Column A of Table 1 as a priority ~~and~~ and also for those populations listed with an asterisk in Column A of Table 1. Furthermore, in paragraph 2.2.2, Parties are required to prepare and implement national single species action plans for all those populations listed in Column A of Table 1 with a view to improving their overall conservation status. The Agreement Secretariat is required to co-ordinate the development, harmonisation and implementation of these plans. The present guidelines focus on national single species action plans. They outline a standard procedure for the preparation of such action plans, and identify the priority species and populations occurring in the Agreement Area.

2. Guidelines on identifying and tackling emergency situations for migratory waterbirds

In some situations, populations of waterbirds can suddenly be subjected to much higher levels of mortality than normal. These emergency situations can arise as a result of natural phenomena, such as periods of exceptionally cold weather or

prolonged droughts, or as a result of man-made disasters, such as major ~~oil spills~~ pollution incidents. International co-operation is required to address these situations without delay. In Article III, paragraph 2 (f) of the Agreement, Parties agree to co-operate in emergency situations requiring international concerted action and in identifying the species of migratory waterbirds which are the most vulnerable to these situations. Furthermore, Parties agree to co-operate in developing appropriate emergency procedures to provide increased protection to these species in such situations. In paragraph 2.3 of the Action Plan, Parties are required, in close co-operation with each other whenever possible and relevant, to develop and implement emergency measures for populations listed in Table 1, when exceptionally unfavourable or endangering conditions occur anywhere in the Agreement Area. At its ~~first~~ third ~~second~~ session, the ~~Meeting of the Parties~~AEWA Technical Committee ~~should~~ adopted criteria to define emergency situations which require urgent conservation measures, and determined the modalities for assigning responsibility for action to be taken (Article VI, paragraph 7 (e) of the Agreement). The present guidelines identify many of the possible emergency situations that may arise, and outlines procedures for establishing early warning systems and tackling these situations at national level. At a later stage a special guidelines will be developed for international emergency situations.~~[add sentence about international emergency situations]~~

3. Guidelines on the preparation of site inventories for migratory waterbirds

In Article III, paragraph 2 (c) of the Agreement, Parties are required to identify sites and habitats for migratory waterbirds occurring within their territory. More specifically, in Paragraph 3.1.1 of the Action Plan, Parties are required, in liaison where appropriate with competent international organisations, to undertake and publish national inventories of the habitats within their territory which are important to populations listed in Table 1. Parties should endeavour, as a matter of priority, to identify all sites of international or national importance for populations listed in Table 1 (Paragraph 3.1.2). These guidelines develop a step-wise approach to the inventory process which takes full advantage of existing regional and national wetland inventories and lists of sites important for migratory waterbirds.

4. Guidelines on the management of key sites for migratory waterbirds

In Article III, paragraph 2 (c) of the Agreement, Parties are required to encourage the protection, management, rehabilitation and restoration of sites and habitats for migratory waterbirds occurring within their territory. More specifically, in Paragraph 3.2.1 of the Action Plan, Parties are required to endeavour to continue establishing protected areas to conserve habitats important for the populations listed in Table 1 of the Action Plan, and to develop and implement management plans for these areas. These guidelines set forth the basic procedures for the design and implementation of management plans, with special reference to sites of importance for migratory waterbirds.

5. Guidelines on sustainable harvest of migratory waterbirds

If populations of migratory waterbirds are to be maintained in a favourable conservation status, it is essential that any exploitation of these populations be carried out on a sustainable basis. Article III, paragraph 2 (b) of the Agreement requires that Parties ensure that any use of migratory waterbirds is based on an assessment of the best available knowledge of their ecology, and is sustainable for the species as well as for the ecological systems that support them. In paragraph 4.1.1 of the Action Plan, Parties are required to co-operate to ensure that their hunting legislation implements the principle of sustainable use as envisaged in the Action Plan, taking into account the full geographical range of the waterbird populations concerned and their life history characteristics. The present guidelines promote the establishment of 'harvest frameworks' at both international and national levels, and identify a series of steps to assist Range States in adopting a sustainable approach to the harvesting of waterbirds.

6. Guidelines on regulating trade in migratory waterbirds

Paragraph 7.3 of the Action Plan requires that guidelines be provided on the regulation of trade in waterbirds. Although it seems that there is relatively little international trade in migratory waterbirds in the Agreement Area, national (or domestic) trade can be very high, involving annual harvests of many thousands of birds for sale as food in local markets. In some areas, such trade may be o~~n~~f considerable importance to the local economies. These guidelines concern both international and domestic trade, and offer practical advice on how trade in waterbirds can be regulated within the framework of sustainable harvests.

7. Guidelines on the development of ecotourism at wetlands

The development of ecotourism based on spectacular concentrations of migratory waterbirds can not only increase support amongst the general public for waterbird conservation, but can also, if properly managed, provide a valuable source of income for local people with negligible harm to the environment. In Paragraph 4.2.1 of the Action Plan, Parties are required to encourage, where appropriate, the elaboration of co-operative programmes to develop sensitive and appropriate ecotourism at wetlands. Furthermore, in Paragraph 4.2.2, Parties are required, in co-operation with competent international organisations, to endeavour to evaluate the costs, benefits and other consequences that can result from ecotourism at wetlands with concentrations of waterbirds. The present guidelines examine a wide range of issues relating to nature-oriented tourism in general, and offer practical advice for the sensitive development of ecotourism at wetlands important for migratory birds.

8. Guidelines on reducing crop damage, damage to fisheries and other forms of conflict between waterbirds and human activities

Changes in population levels and distribution of waterbirds, combined with an intensification of agriculture and aquaculture, have led to increased conflicts between some waterbird species and human activities, notably agriculture, aquaculture, and commercial and recreational fisheries. With the great increase in air traffic in recent decades, many large waterbirds now pose a~~s~~ serious hazard to aircraft. In Paragraph 4.3.2 of the Action Plan, Parties are required to endeavour to gather information on the damage, in particular to crops, caused by populations listed in Table 1, and report the results to the Agreement Secretariat. In paragraph 4.3.3, Parties are required to co-operate with a view to identifying appropriate techniques to minimise the damage, or to mitigate the effects of damage, in particular to crops, caused by populations of waterbirds listed in Table 1. The present guidelines examine the major causes of ~~damage by~~ conflict between migratory waterbirds ~~to~~ and ~~crops~~ agriculture, fisheries and ~~aircraft~~ aviation, outline procedures for investigating the problems, and suggest a number of measures that can be taken to reduce the damage.

9. Guidelines for a waterbird monitoring protocol

Populations of all migratory waterbirds in the Agreement Area should be monitored on a continuous basis to determine population trends and to provide an early-warning system for species in difficulty. This will enable appropriate measures to be implemented before the populations fall to dangerously low levels. Paragraph 5.2 of the Action Plan requires that Parties endeavour to monitor the populations of waterbirds listed in Table 1, and make the results of such monitoring available to appropriate international organisations, to enable reviews of population status and trends. Paragraph 5.3 requires that they co-operate to improve the measurement of bird population trends as a criterion for describing the status of such populations. In Paragraph 5.8, Parties agree to co-operate with relevant international organisations to support research and monitoring projects. The present guidelines examine the value of monitoring in the conservation of migratory waterbirds, review existing monitoring practices, and provide guidance on the development of national waterbird monitoring schemes that are most appropriate for international conservation efforts.

The preparation of the accompanying Conservation Guidelines has been co-ordinated by Wetlands International. Individual authors were appointed to formulate each set of guidelines, and were encouraged to take full advantage of Wetlands International's extensive networks of Specialist Groups, national delegates and partner organisations. The work has required input from a broad range of expertise from throughout the Agreement Area, and has also benefited greatly from expertise gained elsewhere in the world. In a few instances, *e.g.* in the case of Single Species Action Plans, much of the work necessary for the production of guidelines had already been accomplished, and the present guidelines have been compiled largely on the basis of existing material (reports of workshops, topic reviews *etc.*). In most cases, preliminary drafts of the guidelines were ~~circulated~~ considered and discussed at a Technical Review Workshop held in conjunction with the Wetlands International Board Meeting in Senegal in November 1998.

Acknowledgements

These conservation guidelines ~~have been~~ were produced with financial support from the Swiss Agency for the Environment, Forests and Landscape/Division of Nature, the Ministry of Agriculture, Nature Management and Fisheries/ Department of Nature Conservation and the DLO-Institute for Forestry and Nature Research (IBN-DLO, now Alterra, Wageningen) of the Netherlands.

Guidelines ~~have been~~ were drafted by Albert Beintema, Dineke Beintema, Allix Brenninkmeijer, Simon Delany and Jeff Kirby and edited by Derek Scott.

Drafts of five guidelines ~~have been~~ were discussed in Workshop 2 during the 2nd International Conference on Wetlands and Development in Dakar, November 1998. Many workshop participants gave useful comments.

The following people, in alphabetical order, provided information used for these guidelines, or commented on various drafts: Rachel Adams, Mindy Baha El Din, Sherif Baha El Din, Carlos Bento, Olivier Biber, Gerard Boere, Joost Brouwer, Luit Buurma, John Caldwell, John Clorley, Luis Costa, Earle Cummings, Nick Davidson, Bernard Deceuninck, Tim Dodman, Bob Douthwaite, Paul Eagles, Bart Ebbinge, Augustine Ezealor, Lincoln Fishpool, Vincent Fleming, Scott Frazier, Umberto Gallo-Orsi, Mariano Gimenex-Dixon, Andy Green, Patrick Green, Elizabeth Halpenny, Jens Haugaard, René Henkens, John Haerradine, David Hill, Baz Hughes, Alan Johnson, Tim Jones, Heribert Kalchreuter, Elena Kreuzberg-Mukhina, Namory Keita, Alexander Kozulin, Tony Laws, Yves Lecocq, Vicky Lee, Aivar Leito, Bert Lenten, Peter Leonard, Alison Littlewood, Heidi Luquer, Sonja Macys, Gernant Magnin, Jamshid Mansoori, David Melville, Jerôme Mokoko Ikonga, Jean-Yves Mondain-Monval, Johan Mooij, Mike Moser, Wim Mullié, Paul Murphy, Stephen Nash, Kike Olsder, Michael Oneka, Dwight Peck, Stephan Pihl, Jim Porter, Crawford Prentice, Rivo Rabarisoa, Marc van Roomen, Paul Rose, Rui Rufino, Luc Schifferli, Valentin Serbryakov, Marcel Silvius, David Stroud, Wolf Teunissen, Graham Tucker, Janine van Vessem, Zoltan Waliczky, George Wallace, Rob van Westrienen, Johanna Winkelman, Marja Wren, Henk Zingstra.

~~[Add missing AEWA TC Members]~~

AEWA Conservation Guidelines No.1

Guidelines on the preparation of National Single Species Action Plans for migratory waterbirds

Step chart

In the preparation of national Single Species Action Plans, each country should take the following steps:

Step 1: Identify a co-ordinator and agencies to be involved in the development and implementation of national Single Species Action Plans (SSAPs).

Step 2: Identify and prioritise the species in need of a SSAP.

Step 3: Identify working groups and sources of information for each species.

Step 4: Produce a status report as a background document for each SSAP.

Step 5: Produce the actual SSAPs using a standardised format.

Step 6: Implement the SSAPs.

Step 7: Monitor the implementation and impact of the SSAPs.

Introduction

A Single Species Action Plan (SSAP) is defined as a prescriptive plan for a species or a population of a species, aimed at ~~-~~restoring that species and maintaining it in ~~that species to~~ a favourable conservation status.

Why do we need SSAPs? All over the world, there is a tendency towards a more ecosystem-oriented approach in nature conservation, as opposed to species-oriented protection. With the species-oriented approach, there is always the risk of favouring one species at the expense of other valuable species, possibly from other groups of animals or plants, of which the conservation body responsible for protection may not even be aware.

However, some species cannot be adequately protected by ecosystem- or habitat-oriented measures alone. During migration, waterbirds may depend on locations that cannot be fully protected, or they may be particularly threatened by developments on their breeding grounds, at specific staging areas, or on their wintering grounds. ~~As~~ Because migratory species cross national boundaries, it is essential that measures for the protection of these species and conservation of their habitats be co-ordinated ~~on~~ at an international scale. Single Species Action Plans may help to achieve this co-ordination.

Parties to the African-Eurasian Waterbird Agreement (AEWA) are obliged to co-operate with a view to developing and implementing *international* SSAPs for those populations of migratory waterbirds with the least favourable conservation status. These are the populations listed in Category 1 in Column A of Table 1 in the Action Plan and the populations marked with an asterisk in Column A of Table 1 (Paragraph 2.2.1 in the Action Plan). Parties are also obliged to prepare and implement *national* SSAPs for all populations of waterbirds listed in Column A of Table 1 (Paragraph 2.2.2 in the Action Plan).

The relationship between international and national SSAPs is controversial. Some people argue that it is not practical to draw up a national SSAP when no international SSAP is available, and that the international SSAP should always come first. This may be true for globally threatened species, but for species in which only certain populations have an unfavourable conservation status, a national SSAP may be more appropriate.

A compromise may be a regional SSAP, in which two or more neighbouring countries combine their efforts and resources, although it should be remembered that the AEWA Action Plan specifically calls for SSAPs at the national level (Paragraph 2.2.2 in the Action Plan).

It should be noted that there is an inverse relationship between the level of detail needed in SSAPs and their geographical scope. Thus, international SSAPs may be more general ~~and political~~ in character, while national SSAPs should give more practical details. International and national SSAPs may overlap greatly, but they are not the same, and the existence of either one does not mean that there is no need for the other.

These guidelines are concerned primarily with the preparation and implementation of national Single Species Action Plans, although most of the activities involved are equally applicable to international Single Species Action Plans. Seven major steps are identified.

Step 1: Identify a co-ordinator and agencies to be involved in the development and implementation of national Single Species Action Plans (SSAPs)

Whether or not to embark on a~~n~~ SSAP initiative at national level will depend on capacity and priorities with respect to other AEWA related activities and obligations.

The initiative for setting up a SSAP task force lies with the national AEWA focal point, usually a person in the ministry responsible for nature conservation or wildlife/game management. This person should appoint a project (task force) co-ordinator, who need not be a government employee, but could come from an institute, university, consultancy or NGO dealing with conservation or wildlife/game management, provided he/she can obtain sufficient government support (financial and logistical) to fulfil his/her task.

The AEWA focal point and task force co-ordinator should investigate funding options within the government and elsewhere, and identify other team members, at two levels:

- the permanent task force,
- temporary species working groups, on a project basis.

The permanent task force should prioritise species (Step 2), identify sources, authors and working groups for each species (Step 3), and maintain contact with the AEWA Secretariat for co-ordination and the AEWA Technical Committee for technical advice.

The species working groups should include not only the authors of the SSAPs, but also representatives of the major stakeholders at grassroots level, to ensure that in the implementation phase, plans are carried out with care, sensitivity and open-mindedness to all points of view (Step 3).

Plans for SSAPs may be presented to funding agencies as attractive, well-defined projects. Such projects should consider preparation of the actual SSAP as phase 1 of a process, and should already envisage implementation as phase 2. This distinction should be maintained in the budget, as the costs of phase 1 can be estimated much more accurately than those of phase 2 (which depend on the outcome of phase 1).

Step 2: Identify and prioritise the species in need of a SSAP

The AEWA Action Plan calls for national SSAPs for all populations listed in Column A of Table 1 in the Action Plan. A list of these populations is given in Appendix I to these guidelines.

Highest priority should be given to populations listed in Category 1 in Column A. These are:
- Populations of species that are included in Appendix I to the Bonn Convention (Category 1a).
- Populations of species that are listed as globally threatened in the *IUCN Red List of Threatened Animals* (Category 1b).
- Populations that number less than around 10,000 individuals (Category 1c).

These populations and the populations listed in Categories 2 and 3 in Column A and marked with in asterisk should be the subjects of both international and national SSAPs. Only national SSAPs are required for the other populations listed in Categories 2 and 3 in Column A.

Priority 1: Globally threatened species

In these guidelines, the designation 'globally threatened species' is based on the ~~*1996*~~ *2000 IUCN Red List of Threatened* ~~*Animals*~~ *Species*~~,~~ which differs slightly from the 199~~6~~4 version of this list, and from Appendix I to the Bonn Convention.

The following migratory waterbirds occurring in the AEWA area are currently listed as globally threatened:
~~Dalmatian Pelican - *Pelecanus crispus*~~ *[now Conservation Dependent]*
- Slaty Egret - *Egretta vinaceigula*
- Waldrapp - *Geronticus eremita*
- White-headed Duck - *Oxyura leucocephala*
- Lesser White-fronted Goose - *Anser erythropus*
- Red-breasted Goose - *Branta ruficollis*
- Marbled Teal - *Marmaronetta angustirostris*

~~Ferruginous Duck - *Aythya nyroca*~~*[now Near Threatened]*
- ~~Steller's Eider - *Polysticta stelleri*~~*[now Near Threatened]*
- Siberian Crane - *Grus leucogeranus*
- Blue Crane - *Grus paradisea*
- Wattled Crane - *Grus carunculatus*
- Sociable Lapwing - *Vanellus gregarius*
- Slender-billed Curlew - *Numenius tenuirostris*

~~White-eyed Gull - *Larus leucophthalmus*~~ *[now Near Threatened]*

All of these species except Slaty Egret, Blue Crane and Wattled Crane are also included in Appendix 1 to the Bonn Convention. The ~~six~~ four species of Anatidae are listed in Category 1 in Column A of Table 1 in the AEWA Action Plan, and the other ~~nine~~ seven species ~~are proposed for inclusion~~ were included in the *Proposed Amendments to the Action Plan Accepted by MoP 1 in Cape Town*. Appendix 1 to the Bonn Convention also includes Audouin's Gull *Larus audouinii*, but this species has shown a remarkable recovery in recent years, and is now considered by IUCN to be 'near-threatened' rather than globally threatened (see below).

To help individual countries select priority species for national SSAPs, Appendix II to these guidelines gives an overview of the occurrence of globally threatened migratory waterbirds in the AEWA Range States (see also Box 1).

Box 1: Top ~~12~~ 8 AEWA countries hosting globally threatened migratory waterbird species

Number of threatened waterbird species per country (for details, see Appendix II)

Russian Federation	~~10~~7
Turkey	6
Iran	~~7~~5
~~Turkey~~	~~7~~
Azerbaijan	4
Bulgaria	~~6~~4
~~Egypt~~	~~6~~
Iraq	~~6~~4
Romania	~~6~~4
Turkmenistan	~~6~~4
~~Azerbaijan~~	~~4~~5
~~Greece~~	~~5~~
~~Kazakhstan~~	~~5~~
~~Tunisia~~	~~5~~

Appendix 1 to the Bonn Convention includes the Palearctic populations of the Great White Pelican *Pelecanus onocrotalus.* Although this species is not globally threatened, the population breeding in Europe and Western Asia has a highly unfavourable conservation status, and should therefore also be considered as one of the highest priorities for a SSAP.

Priority 2: Populations that number less than around 10,000 individuals

These small populations, although not necessarily declining or under imminent threat, give cause for concern because of their extreme vulnerability to sudden change and catastrophic events. In some cases, the loss of even a single site may have a disastrous effect on the population. Most of the populations concerned have very restricted distributions, often confined to only a few countries.

Priority 3: Populations marked with an asterisk in Column A of Table 1

These populations, listed in Categories 2 or 3 in Column A of Table 1, are considered to have an unfavourable conservation status only by virtue of their small population size. The AEWA Action Plan makes an exception for these populations to allow hunting to continue on a sustainable basis where hunting is a long-established cultural practice (Paragraph 2.1.1 in the Action Plan). The national SSAPs for these populations should therefore include provisions for sustainable use, where appropriate. This sustainable use should be conducted within the framework of special provisions of a species action plan at the appropriate international level (Paragraph 2.1.1 of the Action Plan).

Priority 4: Other populations in Column A of Table 1

These are populations listed in Categories 2 or 3 in Column A of Table 1 in the Action Plan and not marked with an asterisk.

Category 2: Populations numbering between around 10,000 and around 25,000 individuals.

Category 3: Populations numbering between around 25,000 and around 100,000 individuals and considered to be at risk as a result of:

(a) concentration onto a small number of sites at any stage of their annual cycle;
(b) dependence on a habitat type which is under severe threat;
(c) showing significant long-term decline; and
(d) showing extreme fluctuations in population size of trend.

Only national SSAPs are required for these populations.

The ~~*1996*~~ *2000* *IUCN Red List of Threatened* ~~*Animals*~~ *Species* lists ~~eight~~ 11 species of migratory waterbirds occurring in the AEWA area as 'near-threatened' or 'conservation dependent'.

- Dalmatian Pelican - *Pelecanus crispus*
- Pygmy Cormorant - *Phalacrocorax pygmeus*
- Socotra Cormorant - *Phalacrocorax nigrogularis*
- Madagascar Pond Heron - *Ardeola idea*
- Ferruginous Duck - *Aythya nyroca*
- Steller's Eider - *Polysticta stellrii*
- Lesser Flamingo - *Phoenicopterus minor*
- ~~Black-winged Pratincole – *Glareola nordmanni*~~
- Great Snipe - *Gallinago media*
- White-eyed Gull - *Larus leucopthalmus*
- Audouin's Gull - *Larus audouinii*
- Damara Tern - *Sterna balaenarum*

- Black-winged Pratincole – *Glareola nordmanni* is in decline in many areas but is listed as Data Deficient

Populations of ~~five~~ eight of these ~~are proposed~~ were accepted by MoP 1 in Cape Town for inclusion in Column A of Table 1: Dalmatian Pelican, Pygmy Cormorant, Madagascar Pond Heron, Lesser Flamingo, Great Snipe, White-eyed Gull, Audouin's Gull and Damara Tern. The Madagascar Pond Heron ~~is proposed~~ was accepted for inclusion in Category 1c, and as such is included in Priority 2. The relevant populations of the other ~~four~~ species should be given special consideration within Priority 4 because of their relatively unfavourable global status. The Dalmatian Pelican, Pygmy Cormorant, Ferruginous Duck, Steller's Eider and Audouin's Gull were previously considered to be globally threatened, and have already been the subjects of international SSAPs.

Step 3: Identify working groups and sources of information for each species

It is essential that the species working group includes not only the authors of the SSAP, but also the stakeholders at all levels, from the very start. This greatly facilitates acceptance and successful implementation of the Action Plan. SSAPs should never adopt the sort of top-down approach that does not take into account the concerns of people living and working in the places where the species in need of an SSAP occurs. Such an approach may increase tensions and problems, and may prove counterproductive ~~in the end~~. Stakeholders should be fully involved in the SSAP process from the beginning, so that they feel they 'own' the plan and have a personal interest in its successful implementation.

Members of the working group may be sought within:

- the government (departments responsible for environment, water resources, fisheries, agriculture, infrastructure *etc.*) and statutory agencies;
- universities;
- BirdLife International Partners and representatives of other relevant NGOs~~;~~;
- specialised institutes;
- hunters' organisations;
- the national co-ordinator of the International ~~Waterfowl~~Waterbird Census (IWC, including the African ~~Waterfowl~~Waterbird Census AfWC);
- other stakeholders (*e.g.* landowners, farming and fisheries representatives).

Working groups will vary in their composition depending on the species concerned, although there is likely to be overlap between different working groups, both in members and in time.

Useful sources of information may include:

- existing Action Plans;
- other literature on the species concerned;
- scientific databases;
- expert knowledge;
- field research, to fill in any gaps identified from the above.

Authors should be sought from within the country, and do not necessarily have to be specialists on the species concerned, but must have strong communication skills. If necessary, one or more specialists can be brought in as co-authors.

Experts can also be found in other countries, through international networks, either through government contacts, or through international and national NGOs. These experts should be selected for their expertise on:

- the species concerned;
- drafting other action plans;
- management and restoration practices.

Existing international SSAPs can be used as a source of information for the following:

- Pygmy Cormorant, Dalmatian Pelican, Lesser White-fronted Goose, Red-breasted Goose, Marbled Teal (see Box 2), White-headed Duck, Slender-billed Curlew and Audouin's Gull (Heredia *et al*. 1996);
- Ferruginous Duck (Callaghan 2001);
- Steller's Eider (Pihl, ~~1997~~2001);
- Roseate Tern (BirdLife International, in prep);
- Greenland White-fronted Goose (Stroud, 1992).

Global Action Plans for groups of species relevant to the AEWA area have been, or are being, compiled for the following:

- Grebes (O'Donnell & Fjeldsa, 1997);
- Herons (Kushlan & Hafner ~~*et al.*, in prep~~2000);

- Cranes (Meine & Archibald, 1996);
- Anseriformes (Callaghan *et al*., in prep.);
- Eiders (Circumpolar Seabird Working Group, 1997).

Many national SSAPs have been produced, and their number is increasing rapidly. The members of a national working group should be able to find out which national SSAPs are already available in their country without too much difficulty.

Box 2: The Marbled Teal in Spain

The Marbled Teal *Marmaronetta angustirostris* has a restricted range in the Mediterranean and the Middle East, where it was formerly common in eutrophic wetlands rich in submerged and emergent aquatic vegetation. It often favours temporary wetlands and other wetlands that fluctuate widely in size, depending on water levels, rainfall and drought.

Many Mediterranean wetlands have been destroyed or severely degraded, and water levels have been reduced almost everywhere. In Spain, where the species was once numerous, it came close to extinction. Full protection for the species and designation of reserves did not stop the decline.

Various Action Plans were prepared on a global, national and regional scale.

Research revealed that at its last remaining resorts, the Marbled Teal was suffering unacceptably high mortality from:

- shooting by hunters who did not recognise the bird, or had no respect for its protected status;
- broods becoming trapped in concrete irrigation canals;
- birds being killed in crayfish traps;
- lead poisoning.

Hunting bans in the core areas, construction of escape routes from irrigation canals, and local bans on crayfish traps led to an increase in the population from a low point of 35 pairs in 1994 to about 160 pairs in 1998. Further expansion of the population will now be dependent on the restoration of suitable habitat.

(source: Andy Green)

Step 4: Produce a status report as a background document for each SSAP

SSAPs have to be read by government officials and other people with limited time. Therefore, it is recommended that authors limit the size of their national SSAPs to about 10 pages, following the examples in *Globally threatened birds in Europe: Action plans*, published by the Council of Europe in 1996. Extensive descriptive information in the form of a species status report can be placed in a separate background document, to which the SSAP can refer.

As with SSAPs, there is a controversy about the usefulness of national status reports versus international status reports. As the status report is not a formal part of the SSAP, countries have greater freedom to combine their efforts, and should base their choice between an international, regional or national species status report on the availability of information and resources.

No fixed format is proposed for the species status report, but the report should, as a minimum, include the following:

- Geographical range;
- Species information (many sub-headings are possible);
- Environmental information (many sub-headings are possible);
- Ecological relationships and implications for conservation;
- Bibliography.

Geographical range should cover the breeding, moulting, 'wintering' and migration periods, each of which will be different and may impose different strategic requirements on the species. Special attention should be given to key sites at any time in the annual cycle, and numbers of individuals (or percentage of the flyway population) using the key sites.

Species information includes:

- reference to existing important studies on the species;
- numbers and trends of breeding and non-breeding populations;
- information on breeding ecology and ecology at staging and wintering areas;
- food and feeding ecology;
- habitat requirements during the breeding and non-breeding seasons;
- population dynamics (mortality, productivity, recruitment, turnover).

Environmental information includes:

- habitat changes in the past, present and future which may affect the occurrence of the species;
- changes in land use at key sites;
- other threats, including threats from both human and natural causes (note that natural causes are often indirectly related to human causes);
- environmental enhancement schemes currently operating in the area.

Ecological relationships and implications for conservation include:

- effects of habitat changes;
- habitat management and the response of the species to management (if known);
- habitat fragmentation and site networks;
- food abundance;
- use of food by competitors, including man;
- competition with other species (including introduced species), predation and disease;
- additional mortality factors, and (if applicable) mitigation.

Step 5: Produce the actual SSAPs using a standardised format

A recommended general format for a national SSAP is as follows:

Executive summary
Introduction
Chapter 1. Current status
- Distribution and population
- Life history
- Threats and limiting factors
- Conservation status and recent conservation measures
- Key sites

Chapter 2. Objectives
- Population development
- Policy and legislation
- Species and habitat protection
- Monitoring and research
- Public awareness and training

Chapter 3. Implementation
- Lead agencies
- Actions (including timetable)
- Evaluation

Sources
- Literature
- Experts

This general format combines recommendations and examples adopted by the Council of Europe and IUCN Species Survival Commissions. Close adherence to this fixed format throughout the AEWA area is essential to ensure the compatibility of national SSAPs covering the same species in different Range States.

Chapter 1: Current Status

This chapter briefly summarises the status report. Of special interest is the list of key sites, which is not always given in international SSAPs, but is essential for national SSAPs.

The chapter should include details of threats and limiting factors. A separate paragraph should describe each of the threats and the factors which affect population sizes. These should be ranked on the following scale of importance:
Critical: a factor that could lead to the extinction of the species or sub-species in 20 years or less
High: a factor that could lead to a decline of more than 20% of the population in 20 years or less
Medium: a factor that could lead to a decline of less than 20% of the population in 20 years or less
Low: a factor that is only affects the species or sub-species at a local level
Unknown: a factor that is likely to affect the species or sub-species but it is unknown to what extent

Chapter 2: Objectives

The general objective of a national SSAP should be to improve the overall conservation status of the species concerned (Paragraph 2.2.2 in the Action Plan). Specific objectives relating to population development might include reaching a target population size, stabilising a downward trend, or setting limits to acceptable change. Depending on feasibility, objectives can be set for a five- or ten-year period, or left open-ended. Objectives may be revised after a specified period (*e.g.* five or ten years) if, for example, the situation ~~becomes more~~

~~optimistic~~ changes. Similarly, objectives relating to policy and legislation may be very specific in describing the laws that need to be introduced, or may be concerned more generally with a change in the direction of policy development.

Chapter 3: Implementation

Defining the required actions is the most difficult part of drafting a SSAP. Actions must be clearly linked to the objectives, and are the actual means of meeting these objectives. Therefore, it is essential that the objectives are realistic and that the associated actions are feasible. In the design of actions and allocation of responsibility for implementation, it is essential that there is close communication between the working group and the stakeholders. Actions must also be prioritised, taking into account biological needs, urgency, likelihood of success, cost and other factors that may vary from species to species. In brief, actions should be:

- well defined;
- realistic;
- measurable (to allow monitoring);
- budgeted;
- given a timetable for initiation and completion;
- allocated to appropriate bodies or individuals for implementation.

An indication of the priority of each action point should be given, according to the following scale:
Essential: an action that is needed to prevent a large decline in the population which could lead to the species or sub-species extinction
High: an action that is needed to prevent a decline of more than 20 % of the population in 20 years or less
Medium: an action that is needed to prevent a decline of less than 20% of the population in 20 years or less
Low: an action that is needed to prevent local population declines or which is likely to have only a small impact on the population across the range

Additionally, time scales should be attached to each action using the following criteria:
Immediate: completed within the next year
Short: completed within the next 1-3 years
Medium completed within the next 1-5 years
Long: completed within the next 1-10 years
Ongoing: an action that is currently being implemented and should continue
Completed: an action that was completed during preparation of the AP

The AEWA Action Plan calls for the preparation of many national SSAPs. Since these will be crossing the desks of very busy people, the Executive Summary is particularly important, as stressed by IUCN. It should be attractive, informative and less than one page in length, and should give the reader:

- an explanation of why the species needs a SSAP (threats);
- the goal of the plan;
- a list of activities and the partners involved;
- some remarks on validation and timetable.

Copies of the national SSAPs should be submitted to the AEWA Secretariat and the AEWA Technical Committee.

Step 6: Implement the SSAPs

The actions to be taken are usually so species-specific that no general guidelines can be given.

Activities should be planned for an initial project period of five years, although many populations are unlikely to show a significant response within ten years. An evaluation after the first five-year period may or may not result in a decision being taken to seek funding for a second five-year period, but a final decision to abandon the project should not be taken until after ten years.

The amount of money required for the project will vary enormously from case to case. As the drafting and implementation of SSAPs within the AEWA framework are government commitments, funding should primarily be the responsibility of the government. However, in practice it will not always be feasible to mobilise government funding. Where government funding is not available, funds can be sought from international and national NGOs, international funding agencies or the corporate sector. Raising public awareness is an essential part of the implementation of SSAPs, and can be especially useful in mobilising funds.

Step 7: Monitor the implementation and impacts of the SSAPs

Monitoring should be planned and budgeted from the start.

An annual report should be produced containing:
- population estimates for each site;
- trends;
- activities carried out;
- discussion on effectiveness of measures taken;
- a financial report;
- plans for the following year.

The annual report should be kept as brief as possible, and should be submitted to the AEWA Secretariat, the national AEWA focal point and the sponsors.

Every five years, a more extensive evaluation report should be produced. This may lead to a revision of the SSAP. The evaluation report should compare results with the targets set out in the objectives of the plan. Success indicators are an increase in population or some other favourable change in population status (*e.g.* halting a decline after the removal of a man-induced threat).

A logical partner in the monitoring process would be the national co-ordinator of the International ~~Waterfowl~~Waterbird Census (IWC), if such a person has been appointed.

AEWA Conservation Guidelines No.2

Guidelines on identifying and tackling emergency situations for migratory waterbirds

Step chart

To identify and tackle emergency situations affecting migratory waterbirds, each country should take the following steps:

Step 1: Identify lead agencies, and divide tasks both nationally and internationally.

Step 2: Produce a list of possible emergency situations involving migratory waterbirds.

Step 3: Rank waterbird sites according to their susceptibility to emergency situations.

Step 4: Identify potential risks and negotiate safety measures with industries located near waterbird sites.

Step 5: Establish a national Emergency Response Notification System.

Step 6: Adopt new legislation or ~~A~~adapt existing legislation where appropriate.

Step 7: Raise public awareness.

Introduction

An emergency situation for migratory waterbirds is a situation where a sudden, unusual change takes place (or is likely to take place) in the occurrence or mortality rate of waterbirds, or in the extent or condition of the habitats on which they depend. While it might not always be possible to deal with such situations effectively, it is very important to react as publicly as possible to draw people's attention to the situation. Public awareness is of extreme importance, especially in the case of human-induced catastrophic events, because it may help to prevent similar events from happening in the future.

Thus, keywords in successfully addressing emergency situations are:
- alertness
- public awareness
- prevention

Emergency situations can be recognised when:
- populations of waterbirds show sudden changes in size, distribution or mortality rate;
- conditions occur which by experience are known to lead to such changes.

Although it is the effect on populations that really matters, it is important to be able to recognise the conditions as soon as they occur, because by the time population changes are apparent, it is often too late to take effective action.

It is not easy to define criteria for recognising conditions that lead to emergency situations for the entire AEWA area. This will vary between regions and countries. In some areas, a small change in numbers may be alarming, while in other areas huge fluctuations are normal. Severe frost, for example, may be catastrophic in temperate Europe, will never occur in most of Africa, and is quite normal in Siberia. Peat fires may destroy waterbird habitats in northern latitudes, but are irrelevant to desert countries in Africa and the Middle East, and so on. Each country (or group of adjacent countries with similar conditions) will have to develop its own criteria.

Development of national criteria within the AEWA framework should be based specifically on the effects of an event on waterbirds. For migratory waterbirds, an event can always be classified as an emergency situation when:
- individuals of a globally threatened species are involved;
- more than 10% of the flyway population of a species with an unfavourable conservation status is threatened (these species are listed in Columns A and B of Table 1 of the AEWA Action Plan);
- more than 30% of the flyway population of a species with a favourable conservation status is threatened (these species are listed in Column C of Table 1 of the AEWA Action Plan).

A clear distinction should be made between permanent or slowly developing threats and sudden emergencies. Permanent threats and threat assessment are dealt with in Guidelines No.4: *Guidelines on the management of key sites for migratory waterbirds*.

Step 1: Identify lead agencies, and divide tasks both nationally and internationally

A national co-ordinator for emergency situations concerning migratory waterbirds should be appointed. As implementation of the AEWA Action Plan is a governmental responsibility, it is logical for the national co-ordinator for emergency situations to be someone with a position in a governmental agency or institute. However, it would also be possible to appoint an independent individual, or someone working in a non-governmental organisation (NGO), provided he or she can get sufficient support (financial, logistical and legal) from the government agency responsible for implementation of the AEWA.

Emergency situations are, by definition, unexpected, and very often call for rapid input of resources (especially manpower) for relatively short periods of time. Very often this includes a great deal of private effort from volunteers, and heavy involvement of NGOs. The respective roles of all agencies, both governmental and non-governmental, that might be involved in tackling emergency situations should be clearly defined.

The industrial sector and sometimes also governmental institutions are often reluctant to take safety measures because these may be costly. It often takes a disaster to change attitudes, and this is where NGOs may play an important role. In the case of emergency situations that arise as a result of neglect or failing legislation, government agencies are often eager to avoid publicity. However, public opinion is often extremely important in creating the pressure needed to stimulate action. NGOs may sometimes be better situated than government agencies in this respect. The national co-ordinator should therefore endeavour to locate financial resources to support NGOs dealing with emergency situations.

Emergency situations affecting migratory waterbirds often have international dimensions. The national co-ordinators of countries involved in a particular emergency situation should liase with each other and with the AEWA Secretariat. International co-ordination of measures taken in the case of an international emergency situation should rest with the AEWA Secretariat, acting on the advice of the AEWA Technical Committee.

Step 2: Produce a list of possible emergency situations involving migratory waterbirds

Emergency situations for migratory waterbirds can be caused by human actions or by natural causes, although the distinction is not always clear (see Box 1).

Box 1: The human factor in the impact of a natural disaster

A non-AEWA example

This example features a non-migratory, non-waterbird from outside the AEWA area, but is one of the best examples to illustrate how human activities can affect the impact of natural disasters.

In 1989, Hurricane Hugo hit the coast of South Carolina in the USA, and severely damaged the Francis Marion National Forest. This would not have been a national ornithological emergency situation, had this forest not been the last stronghold of the Red-cockaded Woodpecker *Picoides borealis*, a species threatened with extinction.

The Red-cockaded Woodpecker lives in long-leaf pine forests, nesting in trees of 90 years of age and older that suffer from heart rot. Forestry management had rendered virtually all forests in its former range unsuitable for nesting, reducing its range to a few pockets, with over 60% of the world population in one single forest: the Francis Marion National Forest. Hurricane Hugo knocked down 90% of the trees suitable for nesting.

After some years with very low productivity, the species is now gradually recovering, thanks to new nesting trees becoming available through ageing, and the use of artificial nest sites.

(source: South Carolina Department of Natural Resources)

An AEWA example

Due to eutrophication and impoverishment of wetland habitats, the number of large insect species in Northwest European marshes has been greatly reduced. Large insects such as dragonflies are the main source of food for chicks of the Black Tern *Chlidonias niger*.

The occurrence of dragonflies shows distinct seasonal peaks, which differ between species. With fewer species available, there is an increased risk of short periods when no food is available for the tern chicks. This problem does not appear in breeding seasons with fine weather, but can occur during breeding seasons with periods of adverse weather.

Mass mortality of Black Tern chicks is often observed during prolonged periods of cold, rainy weather, and it may be concluded that the weather is causing an emergency situation. However, in a more diverse habitat with more prey species available, the same weather conditions would not cause an emergency at all.

In The Netherlands, a former major stronghold of the species in the Western Palearctic, Black Terns have shown a decline of more than 90% in recent decades.

(source: Beintema 1997)

Possible causes of emergency situations are:

- Extreme weather
- Earthquakes and volcanic activity
- Infectious diseases
- Botulism
- Harmful algal blooms
- Predation

- Introduction of alien species
- Fire
- Oil spills
- Chemical pollution
- Nuclear accidents
- Lead poisoning
- War

These are briefly discussed below.

Extreme weather

Extreme weather conditions affecting waterbirds include:
- adverse weather during the breeding season, causing low reproductive success;
- unusually cold weather in winter at temperate and northern latitudes, causing high mortality;
- excessive rainfall and flooding;
- drought.

The weather is beyond human control. Once populations of waterbirds have been affected, the only practical measure that can be taken is to optimise conditions for the recovery of the populations by increasing protection (see Box 2).

Box 2: Migratory waterbirds in the cold

Problems with cold weather are typical of those parts of the AEWA that lie close to the frost-line in the northern winter and support large numbers of wintering waterbirds. The countries involved lie in a belt running from Northwest Europe southeast through Central Europe and the Black Sea region to the countries bordering the southern half of the Caspian Sea.

Two possible measures to help waterbirds through a severe winter are winter feeding and shooting bans.

Winter feeding

Winter feeding is popular in many parts of Europe, but should not be encouraged. Common species such as the Mallard *Anas platyrhynchos* and Common Coot *Fulica atra* tend to profit disproportionately, because they are well adapted to the human environment. The shyer, rarer or more vulnerable species often escape attention, and may even suffer from competitive disadvantages.

Shooting bans

As winter conditions vary greatly between countries, the criteria for imposing shooting bans will have to be defined specifically for each country involved, in close collaboration with hunting organisations. Co-ordination between countries is necessary to avoid situations in which birds fleeing from cold weather in one country are shot in large numbers in a neighbouring country. The AEWA Technical Committee could play a central role in this international co-ordination.

The following example of a protocol for the introduction of a temporary shooting ban was developed in Great Britain, and is based on ground conditions. The protocol consists of six steps:
1. If the ground has been reported frozen for 5 successive days for more than half of the British weather stations, a state of alert is declared.
2. On the 7th day the hunters' organisation is informed. This organisation will then gather its own data, and call for voluntary restraint in shooting.
3. On the 13th day, the Secretary of State is asked to institute a shooting ban which, after signing, comes into effect at 9 am on the 15th day.
4. Three consecutive days of intermittent thaw terminates the count-down process.
5. Shooting is banned for an initial period of 14 days, but this period can be extended or shortened, depending on conditions.
6. Bans can be instituted for Great Britain as a whole, or for Scotland, Wales or England alone.

(Source: Stroud, 1992).

Flooding is not normally a problem for waterbirds outside the breeding season, but may be catastrophic for nesting birds. River flooding is compounded by deforestation and loss of wetlands upstream, both of which lead to accelerated runoff. Wise management of river basins often requires international co-operation.

Drought may cause waterbirds to move out of an area. If there are insufficient alternative sites for the displaced birds, this may be classified as an emergency situation. Drought affects both breeding birds and non-breeding birds. Artificial flooding as a remedy for drought should be treated with caution, as irregular drought may be essential to the maintenance of certain natural ecosystems (*e.g.* in the Sahelian floodplains in Africa).

Infectious diseases

Infectious diseases, such as bird malaria, bird influenza (bird 'plague') and bird cholera, are serious threats to poultry, but rarely reach epidemic proportions in nature. A more serious potential threat is Newcastle disease (see Box 3).

Botulism

Botulism is caused by the bacterium *Clostridium botulinum* Type C, which develops in decaying protein where it may produce a highly poisonous toxin. The toxin is only produced when the bacterium itself is infected with a specific bacteriophage, and only at temperatures above 20^{o}C.

Outbreaks may occur when infected carcasses lie exposed on the surface and insects spread the infection to other carcasses. Botulism occurs in shallow water with little flow, and is often associated with oxygen depletion after collapsing algal blooms. This happens more often in artificial water bodies than in nature, and is aggravated by eutrophication (see Box 3).

The USA and Canada have the longest tradition of combating botulism, and have developed a variety of measures aimed at reducing the frequency of outbreaks. However, some of these are considered to be inappropriate for the AEWA area, as they bring about drastic permanent changes to the wetlands. The only measures that are ecologically acceptable are temporarily increasing water depth, improving water circulation (and oxygenation) and, if the site is accessible and enough people can be mobilised, removal of carcasses. Emphasis should be on prevention through the maintenance of water quality.

Harmful algal blooms

Red tides (brown tides) are massive blooms of microscopic algae occurring in relatively warm seas. When algae die off, bacterial breakdown may result in anoxic conditions. Mortality of fish and shellfish may be followed by mass mortality of waterbirds (see Box 3), especially if the birds are unable to move elsewhere, *e.g.* young birds at breeding colonies. Red tides have been known since historic times, but now occur with increasing frequency in coastal areas where the sea has been enriched with nutrients (eutrophication). Blooms of blue-green algae also occur in fresh water.

Once an algal bloom is in progress, it is too late to do much, as the algae will die and decompose anyway. The problem can be 'diluted' by increasing water flow, which also helps to aerate the water. The main solution to the problem of harmful algal blooms is prevention through the maintenance of water quality.

Box 3: Dangerous micro-organisms

Newcastle disease

Newcastle disease is a highly infectious, debilitating viral poultry disease that may be very dangerous for concentrations of waterbirds. Symptoms are rapid breathing, neck twisting and paralysis.

Species of Anatidae are fortunate in being resistant to Newcastle disease, but other families of waterbirds are vulnerable. There have been no recorded outbreaks of the disease in the AEWA area, but mass mortality of cormorants *Phalacrocorax* spp. and terns *Sterna* spp has been reported in the USA and Canada. Newcastle disease has been found in poultry in the AEWA area, and there is therefore always a risk of an outbreak occurring at sites with concentrations of waterbirds.

South Africa has imposed severe restrictions on the taking of poultry products to their outlying weather stations on Marion Island in the Indian Ocean and Gough Island in the Atlantic, to avoid the possibility of introducing Newcastle disease amongst the millions of nesting seabirds.

Botulism

Mass mortality of waterbirds from botulism was first observed in the USA, where it now affects millions of waterbirds every year. In the AEWA area, botulism has been reported in Europe and South Africa. Countries that have reported outbreaks of botulism include:

Year first reported	Country
1910	USA
~~1914~~	Canada
~~1923~~	Uruguay
~~1937~~	Australi~~a~~a
~~1960~~	South Africa [remove strikethrough on these 4 dates (track changes being too clever)]
1967	Denmark
1969	UK
1970	Netherlands
1971	Germany
1972	New Zealand
1973	Italy
1973	Spain
1973	Japan
1976	Mexico

(Source: *Avian botulism overview* : http://www.mb.ec.gc.ca/english/life/migbirds/avianb/ab_1.html).

Poisonous algal blooms

Some dinoflagellates causing algal blooms, such as *Alexandrium* spp., produce toxins that accumulate in filter-feeding molluscs, which are not affected themselves. Consumption of such molluscs may produce various kinds of poisoning in humans, one of which, Paralytic Shellfish Poisoning (PSP), can be lethal, and may also kill large numbers of seabirds. PSP is indigenous to North America, but PSP-toxin producing algae have been found in European and Australian waters since the 1980s, and outbreaks have been recorded in Portugal in recent years.

Predation

An emergency situation warranting predator control may arise when predators reach previously predator-free islands with breeding colonies of waterbirds. In such cases, total eradication of the predator on the island may be the only solution, especially if the birds have no safe alternative sites in the vicinity.

Introduction of alien species

The three main types of alien species that may threaten waterbirds to the point of an emergency situation are:

- alien predators (*e.g.* North American Mink *Mustela vison* in Europe);
- alien waterbirds (*e.g.* Ruddy Duck *Oxyura ~~dominica~~ jamaicensis* competing with White-headed Duck *Oxyura leucocephala*);
- invasive plant species that cause major changes to the habitat (*e.g. Pistia stratiotis* and *Eichhornia crassipes* in warm countries).

Once an alien species has become widely established, eradication may prove to be impossible. Public awareness of the potential problems of alien species and prevention of further introductions are therefore the key issues. No alien species should ever be deliberately introduced ~~without detailed assessment of the possible consequences~~.

Fire

Fire can pose a threat to waterbird habitats in two main ways:

- direct effects of peat fires;
- indirect effects of oil fires.

Peat fires may destroy boreal and sub-arctic bogs and tropical peat swamps. The risk is increased when water levels have been lowered for agriculture. Peat fires are difficult to combat, as they can burn underground and continue to smoulder and spread unnoticed for long periods. Digging ditches to stop the spread of a fire may help, but there is a risk that opening up the soil will enable fresh air to reach the smouldering peat, thus re-activating the fire. Ditches are also damaging to wetlands, and if not thoroughly closed afterwards, will increase drainage. Legal restrictions on the use of fire in sensitive areas may help in the prevention of fires.

Oil fires are related to large spills or accidents at oil plants. Burning oil produces thick, black smoke that may be carried by wind over great distances. Soot pollution can cause ~~in~~digestive problems in waterbirds. In northern regions, blackened snow alters melting patterns, and this can disrupt ecological processes. Soot-covered food resources may be unsuitable or poisonous for waterbirds.

Oil spills

The most common causes of major oil spills are accidents with ships, illegal emissions from ships, and accidents or leakages at oil plants or pipelines (see Box 4). Spills from ships most often affect coastal wetlands, but may also occur in lakes and rivers. Oil contamination may kill large numbers of waterbirds by:

- affecting the waterproofing of the feathers;
- poisoning through ingestion when preening;
- affecting the food resources.

Prevention of spills from ships is difficult. Legal measures, which often require international agreements, include:

- restrictions on the use of inshore shipping lanes by oil tankers;
- mandatory safety procedures;
- bans on dumping.

In the case of coastal spills, the use of detergents is often presented as a solution, but the side effects on marine food webs may be as serious as the effects of the oil spill. Mechanical removal of oil is preferable, but this requires great human resources and may be costly. Involvement of volunteers is important. The removal of oil involves:

- cleaning coastlines manually (*e.g.* with shovels);
- use of high-pressure water hoses (especially on rocky shores);
- containing inshore floating oil in inflatable devices;

- sucking up floating oil from ships (in combination with floaters).

The rehabilitation of individual oiled birds is difficult and costly, and often has poor results. Even if successful, the impact on population levels is likely to be minimal. However, such operations have good media value for raising public awareness.

Box 4: When the pipeline bursts

A major leak in a Russian pipeline in the Ousinsk Region, Republic of Komi (Siberia), in August 1994 resulted in 14,000 tons of oil spilling into the environment.

The response included clean-up operations, the construction of four dams on watercourses and the construction of various embankments.

In September/October 1994, the dams collapsed due to heavy rainfall. Oil contaminated two tributaries of the Pechora River, the Kolva and the Ousa.

In November/December 1994, the damaged pipeline was repaired, and clean-up operations were carried out along the affected rivers.

The Komi oil spill may have affected populations of swans, ducks and seabirds. No figures are available for the numbers of birds affected. However, AEWA species vulnerable to oiling in the area include:

- Bewick's Swan *Cygnus columbianus bewickii*
- Whooper Swan *Cygnus cygnus*
- Common Eider *Somateria mollissima*
- King Eider *Somateria spectabilis*
- Steller's Eider *Polysticta stelleri*
- Long-tailed Duck *Clangula hyemalis*

(Source: World Conservation Monitoring Centre).

Chemical pollution

Major sources of chemical pollution are:

- incidents and accidents (spills, situations comparable to oil spills);
- permanent pollution from untreated industrial waste;
- permanent pollution from agro-chemicals.

Untreated chemical waste flowing into rivers may cause incidental mass mortality in fish and waterbirds, but as chemicals often bind to silt, which accumulates in estuaries, pollution ~~is~~ may be more structurally present in estuarine habitats. As the problem often develops gradually, it rarely leads to sudden emergency situations (see Box 5). Direct poisoning of birds by pesticides does not often occur, and is most commonly reported in Africa. In wet agriculture, such as rice fields, mortality may include waterbirds.

Nitrogen emission from agricultural fertilisers rarely leads directly to emergencies, but the resulting eutrophication of water bodies increases the risk of algal blooms and botulism. Acid rain resulting from nitrogen emission may sterilise poorly buffered waters in northern latitudes, but it is difficult to decide at what stage an emergency should be declared.

Box 5: Gradual pollution leading to a global emergency

A gradual development turned into an emergency in the 1960s when organo-chloride compounds building up through food chains suddenly caused mass mortality in piscivorous birds.

Over a period of years, fish-eating birds had accumulated the poisonous compounds in their fat. When the fat reserves were needed, the poison was released into the bloodstream, and the victims died instantaneously as the poison affected their nervous systems. Sandwich Terns *Sterna sandvicensis* literally dropped dead from the sky.

The problem was most acute in countries bordering the North Sea in Europe, where waste products from the DDT manufacturing industry contaminated the sea.

Species of tern *Sterna* spp. and Eider Ducks *Somateria mollissima* suffered the greatest mortality, with the population of Sandwich Terns declining by more than 95%.

Widespread publicity and research led to a world-wide ban on DDT and some of its derivatives. Since the ban on DDT, populations of the affected waterbirds have been recovering gradually.

(source: Koeman & Van Genderen 1966)

Nuclear accidents

Radiation following nuclear accidents is a serious health risk for individuals, but nothing is known about its effects at population level. For example, it is not known how waterbird populations might have been affected, numerically or genetically, by the April 1986 accident at Chernobyl, Ukraine ~~accident~~.

Lead poisoning

~~Lead poisoning in waterbirds, resulting from the ingestion of spent lead shot, is not generally believed to cause emergency situations, and often remains unnoticed. It is a common mortality factor in Europe and North America. Millions of waterbirds died annually in the USA before the use of lead shot was banned. In some instances, a sudden increase in mortality had the character of an emergency situation~~[deleted under Annex to Cape Town Resolution 1.10. not included in TC Minutes]

An emergency situation may develop when lowered water levels bring large ~~pellet~~ deposits of spent lead shotgun pellets within reach of waterbirds, causing sudden mass mortality. A slight rise in water level can cure the problem temporarily. An incident of this type involving Greater Flamingos *Phoenicopterus ruber* has been reported in the AEWA area.

~~Amongst~~ A number of AEWA Range States~~, Denmark, Finland and The Netherlands~~ have banned the use of lead shot in hunting, while a number of others ~~Belgium, Latvia, Sweden, Switzerland, Spain and the UK~~ have similar bans under study. Parties to the AEWA agreed to endeavour to phase out the use of lead shot for hunting in wetlands by the year 2000 (Paragraph 4.1.4 in the AEWA Action Plan).

Raising public awareness is an important issue, as in many countries lead poisoning is not recognised as a problem, and the environmental dangers have yet to be acknowledged.

War

Where waterbird sites are threatened or destroyed in war situations, records should be kept of the changes that occur, for use in possible future restoration projects.

Step 3: Rank waterbird sites according to their susceptibility to emergency situations

At this stage, susceptibility is based purely on the occurrence of important numbers of migratory waterbirds, irrespective of the presence of nearby threats (see Step 4). The more important a site is for migratory waterbirds, the more serious an emergency situation would be.

Sites should be ranked according to their importance for migratory waterbirds. Ranking can be based on the national site inventory (see Guidelines No.3: *Guidelines on the preparation of site inventories for migratory waterbirds*), if available. Alternatively, ranking can be based on the best possible judgement of local experts.

Ranking is important if resources are insufficient to carry out risk assessments at all sites, or to include all sites in an early warning system (Step 5).

The ranking system should be kept simple. It does not really matter whether similar sites rank sixth or seventh in the list, and any large differences will usually be evident. Thus, complicated, time-consuming calculations should be avoided. Furthermore, in many cases the available data will be incomplete.

Sites harbouring globally threatened species or other species or populations qualifying for Single Species Action Plans should be given the highest ranking. These species and populations are listed in Column A of Table 1 in the AEWA Action Plan (see Appendix I to these guidelines; for further details see Guidelines No.1 *Guidelines on the preparation of Single Species Action Plans for migratory waterbirds*).

Step 4: Identify potential risks and negotiate safety measures with industries located near waterbird sites

If the national site inventory has been completed, those waterbird sites lying adjacent to, or downstream of, an industrial complex should be identified and listed. Otherwise, local experts should be consulted.

For each combination of listed waterbird site and industrial complex (*e.g.* oil refinery, chemical plant, oil terminal), a full analysis should be made of all possible accidents, spills, explosions, leaks *etc*. The relevant industries should be involved in this process.

Special attention should be given to the relative positions of the waterbird site and the industrial complex, especially with respect to altitude and direction of flow of contaminated water, as this information will be required in the design of safety measures.

Safety measures include:

- proper technical control and regular maintenance;
- guarding of sensitive areas;
- construction of dikes or ditches around the industrial area, to contain the oil or chemicals in the case of a disaster,
- careful routing of transportation routes for hazardous substances (*e.g. s*hipping lanes for oil tankers) away from sensitive areas;
- clear definition of responsibilities for safety procedures within the industrial organisation.

Legislation should be developed and implemented to ensure that companies are financially responsible for the consequences of their neglect (the 'polluter pays' principle).

Risk analysis and the design of appropriate safety measures are complicated procedures requiring special skills. In the EU, standard procedures have been developed for HAZOP (Hazard and Operability) studies undertaken at industrial sites. Under the EC Directive on Major Hazards (commonly known as the Seveso Directive), potentially dangerous sites are required to prepare a safety study and also to carry out a HAZOP study, which they must finance themselves.

Existing statistics on incidents in the past are an important source of information in any risk analysis. In Europe, such statistics can be obtained from MARS (Major Accident Reporting System) at the European Commission's Joint Research Centre. The Seveso Directive places an obligation on EU Member States to exchange information on major accidents.

Details of MARS and HAZOP can be found in *The Dobris Assessment*, published by the European Environment Agency in 1991.

Step 5: Establish a national Emergency Response Notification System

Several countries have established a central organisational structure where all oil or chemical incidents are reported, and where remedial measures are co-ordinated. It is important that all relevant information on incidents is entered into an easily accessible database for future reference and use.

Emergency Response Notification Systems are particularly well developed in the USA (see Box 6). For most countries in the AEWA area, a much less complicated (and less costly) structure would suffice.

Box 6: Emergency Response Notification Systems – the US example

The US Coast Guard operates a National Response Center (NRC) 365 days a year, 24 hours a day, where all incidents such as oil spills, chemical releases, transportation accidents, liquid pipeline releases and gas pipeline releases can be reported toll-free in a standard format. These incidents are entered directly into an online database, to be electronically disseminated as part of the National Response System (NRS, see below). The data are stored centrally in the Emergency Response Notification System (ERNS).

The ERNS is a computer database containing information on incidents throughout the US that have been reported either to the NRC, to one of the ten regions of the Environmental Protection Agency (EPA), or to the US Coast Guard.

The National Response System (NRS) is a governmental mechanism for emergency response to oil and chemical discharges in the environment. It has three organisational levels:

- a National Response Team (NRT);
- 13 Regional Response Teams (RRTs);
- a large and flexible number of On-Scene Co-ordinators (OSCs).

The NRT consists of 16 members of government agencies from different departments. The EPA serves as chair, and the US Coast Guard, which operates the NRC, as vice-chair. The NRT also operates special forces to assist the OSCs. These include:

- Coast Guard National Strike Force (NSF);
- Coast Guard Public Information Assist Team (PIAT);
- EPA's Environmental Response Team (ERT);
- Scientific Support Co-ordinators (SSCs).

Information on the NRC (including the standard format used in reporting incidents), ERNS and NRT can be found on the Internet (see References and useful web sites).

Where Emergency Response Notification Systems (ERNS) already exist, these are usually environmental in a general sense, and not particularly focused on birds. It may therefore be necessary to involve a separate body to maintain records of all emergency situations involving waterbirds, and to co-ordinate actions and publicity in close co-operation with the general ERNS.

In the EU, ERNS-related activities should always be linked to MARS.

For continuity, a centralised ERNS and its database are best located within an established government department or institute.

To provide the ERNS with information, an early warning system should be established, based on a network of local contacts at the sites identified as being susceptible to emergency situations. NGOs could play an important role in the establishment of a network of people watching individual sites. This network should be carefully maintained, and names and addresses should be kept in a database, which is regularly updated.

In some countries (mostly in Europe) where BirdLife International has compiled a list of Important Bird Areas (IBAs), networks of IBA caretakers have been established. These networks already function as an early warning system for IBAs (see Box 7). As virtually all important sites for migratory waterbirds are listed as IBAs, these caretaker networks should be involved in the national Emergency Response Notification System.

Box 7: An early warning system based on IBA-caretakers

Lists of Important Bird Areas (IBAs), compiled by BirdLife International, exist for most countries in Europe and the Middle East, and are being developed for ~~several~~ African countries.

Sites that are important for migratory waterbirds usually qualify as IBAs.

In an increasing number of countries, BirdLife International is establishing an early warning system for emergency situations in designated IBAs by setting up a network of volunteer IBA-caretakers. These are individuals who agree to keep a watchful eye on one or more IBAs in their neighbourhood. In the case of an emergency, these caretakers can respond immediately to a central focal point.

Step 6: Adapt legislation where appropriate

Legal measures can be temporary or permanent. An example of a temporary legal measure is a shooting ban instituted by the Secretary of State in Great Britain after a certain number of days of cold weather (see Box 2). Permanent legal measures are designed to change the behaviour of people or industries or to force them to take certain precautions. Such measures are often introduced after a major disaster, and while coming too late to help in that event, may prevent repetition of similar events in the future. An important aspect of permanent legal measures is that they can provide for a system of fines which, in the event of future violations, can produce funds to be used in mitigation. Legal measures are only effective if they are supported by adequate law enforcement.

The introduction of legal measures may be required by international agreements and conventions or, for example within the EU, by regional standards. In such cases, public awareness of the broader issues is especially important, otherwise individual countries may feel that unnecessary measures are being imposed upon them.

Step 7: Raise public awareness

Reports should be published on all emergency situations involving migratory waterbirds, and the press and other media should be involved wherever possible.

Emergency situations involving waterbirds should be reported to the AEWA Secretariat in a brief, standardised format. The report, which may be no more than a single page, should contain the following:

- date and duration of emergency situation;
- location;
- type of emergency situation;
- sites affected;
- species involved;
- estimated impact of emergency situation;
- measures taken;
- estimated effect of measures taken;
- organisations involved;
- public awareness activities undertaken.

AEWA Conservation Guidelines No.3

Guidelines on the preparation of site inventories for migratory waterbirds

Step chart

In the preparation of an inventory of key sites for migratory waterbirds, each country should take the following steps:

Step 1: Identify lead agencies in the inventory process; define objectives and phasing.

Step 2: Using published sources, draft a list of key sites and habitats.

Step 3: Circulate the draft list amongst as many specialists and agencies as possible.

Step 4: Identify new sites using maps, aerial photographs and satellite images; organise inspection visits to potential new sites.

Step 5: For each site, fill in basic information, using standard forms.

Step 6: Map each site to define its boundaries.

Step 7: Refine the site descriptions using the Ramsar habitat coding system.

Step 8: Monitor the sites and update the inventory at regular intervals.

Steps 1-5 may form one well-defined, fundable project. Steps 6-8 (Phase 3, as defined in Step 1) require more skills, and could form a separate project, perhaps separately funded.

Introduction

An inventory of important sites is one of the basic tools for the conservation and management of migratory waterbirds.

In order to protect or manage populations of migratory waterbirds, it is first necessary to locate and prioritise sites throughout their flyway (breeding, moulting, staging and wintering areas). The importance of the site inventory is recognised in Paragraph 3.1.1 of the AEWA Action Plan, which requires Parties to undertake and publish national inventories of the habitats within their territory which are important to the populations of waterbirds listed in Table 1 of the Action Plan.

Although there will be considerable overlap between AEWA site inventories and national inventories of sites designated as wetlands of international importance under the Ramsar Convention (Ramsar Sites), the AEWA inventories differ from the Ramsar inventories in that they:

- are specific to migratory waterbirds;
- may contain habitats other than wetlands;
- may contain sites that are not of international importance according to the Ramsar criteria.

In the context of the AEWA, a site should be considered to be a key site for migratory waterbirds if:

- it harbours one or more of the globally threatened species listed in Annex 2 to the Agreement (see also Guidelines No.1: *Guidelines on the preparation of Single Species Action Plans for migratory waterbirds*);
- it meets the numerical Ramsar criteria (see below), in particular the 1% threshold (criterion 3c), for one or more of the species listed in Annex 2 to the Agreement;

The Ramsar criteria specifically applicable to migratory waterbirds are as follows:
A wetland should be considered internationally important if:

- it regularly supports 20,000 waterfowl (criterion ~~3a~~ 5);
- ~~it regularly supports substantial numbers of individuals from particular groups of waterfowl, indicative of wetland values, productivity or diversity (criterion 3b);~~
- where data on populations are available, it regularly supports 1% of the individuals in a population of one species or subspecies of waterfowl (criterion ~~3c~~ 6).

Ramsar Criteria 2,3 and 4 apply to wetland biodiversity and are applicable to waterbirds in certain circumstances.

In the application of the '1% criterion', there has been much discussion on the interpretation of the word 'regularly'. In regions where good data are available, two interpretations are now widely used. A site is considered to support the requisite number of birds on a regular basis if the mean of the maximum counts in the last five years for which data are available (five-year mean) exceeds the 1% threshold, or if the 1% threshold has been exceeded in at least three-quarters of the years for which data are available. For many areas outside Europe, where fewer count data are available and the coverage of sites is often much poorer, it has become customary to regard sites that hold the requisite number of birds in three years out of five as fulfilling the criterion.

The 1% criterion applies throughout the year, *i.e.* also in the breeding season, although in practice this will only be relevant to colonial nesting species. At staging areas on the migration routes, it is customary to claim that the 1% criterion has been fulfilled when 75% of the requisite number of birds have been recorded at one time, because of the turnover of birds at these sites. Where evidence from ringing studies shows higher turnover rates, a site might still qualify even though the number of birds present at any one time is much lower than 75% of the 1% criterion (in some cases as low as 10-15%).

Step 1: Identify lead agencies in the inventory process; define objectives and phasing

The primary responsibility for fulfilling obligations under the AEWA lies with national governments. In many cases, the actual inventory process will be carried out by a government agency. Alternatively, it could be contracted out to an institute, non-governmental organisation (NGO) or private individual, given adequate government support (financial, logistical and legal). Funding can be governmental or regional (*e.g.* EU), or can be sought from national or international nature conservation organisations.

Data obtained in the AEWA site inventory should be maintained in a central database, which for the sake of continuity should be housed within a government institution.

The general objectives of any site inventory are:
- to locate all relevant sites, and identify those that are priority sites for conservation;
- to identify the functions and values (ecological, social, cultural) of each site;
- to establish a baseline for measuring future change;
- to provide a tool for planning and management
- to permit local, national, and international comparisons.

Furthermore, the inventory process should:
- facilitate the creation of a network of experts;
- stimulate co-operation in conservation and management;
- promote awareness amongst the general public and decision makers.

In order to achieve the desired objectives, any inventory should:
- use standardised methods;
- incorporate data as a baseline for monitoring changes;
- be regularly updated;
- be easily disseminated to managers, decision makers and the general public.

An inventory process will usually be divided into three phases:

Phase 1: Compilation of existing knowledge

Three major sources of information are:
- existing inventories;
- bibliographic research;
- networks of experts.

Phase 2: Preparation of a preliminary site list

This is the most important part of the inventory. The objective should be to complete a national list of key sites as soon as possible, without wasting too much time gathering detailed information for individual site descriptions.

Phase 3: Preparation of the detailed inventory (not always implemented).

Each site and its surroundings should be described in more detail. Important features in this phase include:
- precise delineation and good maps of the site;
- delineation and detailed description in synergy with other inventories, where appropriate;
- for wetland habitats: identification, delineation and description of the catchment area;
- a detailed, standardised habitat description of the site;
- detailed information on sustainable and non-sustainable forms of land use (including hunting and ecotourism) and threats;

- a database with data on the occurrence of waterbirds at the site. See Guidelines No. 9: Guidelines for a waterbird monitoring protocol.

Step 2: Using published sources, draft a list of key sites and habitats

There are many different listings of protected areas and designated sites that may contain sites that qualify as key habitats for migratory waterbirds. A site may already be listed as one or more of the following:

- Ramsar Site,
- World Heritage Site,
- UNESCO Man and the Biosphere Reserve,
- Important Bird Area - IBA (BirdLife International),
- CORINE Biotope (EU only),
- Natura 2000 site (SPA or SAC, EU only),
- site in the European Network of Biogenetic Reserves (Europe only),
- Mediterranean Special Protected Area (Mediterranean countries only),
- site in a published directory of wetlands (IWRB/Wetlands International, IUCN, WWF and others),
- wetland of national importance (national initiative),
- site in a MedWet Database (Mediterranean countries only),
- site in the *Atlas of Anatidae Populations in Africa and Western Eurasia*,
- site in the International ~~Waterfowl~~Waterbird Census (including the African ~~Waterfowl~~Waterbird Census) (Wetlands International).

Not all listings are readily available in published form, although in each case there will be a national representative or co-ordinator who can be consulted. Some of the most useful sources to begin with are listed in Box 1. Some useful international contact addresses are given in ~~Appendix V.~~ The “Useful Contacts” section (page xxx).

Box 1: Useful lists of key sites for migratory waterbirds

Ramsar Sites

- *A Directory of Wetlands of International Importance.* ~~*Part I, Africa, Part II, Asia and Oceania, Part III, Europe* (Jones, 1993)~~ CD-RoM. (Frazier , S. (ed) 1999).
- ~~*An Overview of the World's*~~ *Ramsar Sites* *Overview: A Synopsis of the World's Wetlands of International Importance* (Frazier, 199~~6~~9).

Wetland inventories

- *Project Aqua: a source book of inland waters proposed for conservation* (Luther & Rzóska, 1971).
- *African Wetlands and Shallow Water Bodies* (Burgis & Symoens, 1987).
- *A Directory of African Wetlands* (Hughes & Hughes, 1992).
- *Zones Humides d'Afrique septentrionale, centrale et occidentale. II: Inventaire préliminaire et méthodologie* (De Beaufort & Czajkowski, 1986).
- *A Directory of Western Palearctic Wetlands* (Carp, 1980).
- *Project MAR. List of European and North African Wetlands of International Importance* (Olney, 1965).
- *A Preliminary Inventory of Wetlands of International Importance for Waterfowl in West Europe and Northwest Africa* (Scott, 1980).
- *The Status of Wetland Inventories in the Mediterranean Region* (Hecker & Tomàs Vives, 1995).
- *A Directory of Wetlands in the Middle East* (Scott, 1995).

Important Bird Areas

- *Important Bird Areas in Europe* (~~Grimmett & Jones, 1989~~ Heath & Evans 2000).
- *Important Bird Areas in the Middle East* (Evans, 1994).
- National lists of Important Bird Areas

Other lists of sites including key sites for waterbirds

- *Natura 2000. Special Protection Areas* (European Commission, 1994).
- *CORINE Biotopes: the design, compilation and use of an inventory of sites of major importance for nature conservation in the European Community. Report and Manual (3 volumes)*. (European Communities, 1991).
- The list of World Heritage Sites on the Internet.

Other useful sources

- The list of key sites in the *Atlas of Anatidae Populations in Africa and Western Eurasia* (Scott & Rose, 1996).
- Recent annual reports of the International ~~Waterfowl~~Waterbird Census (including African ~~Waterfowl~~Waterbird Census) published by Wetlands International. (Delany *et al.* 1999, Dodman *et al.* 1999)

Step 3: Circulate the draft list amongst as many specialists and agencies as possible

This needs no further explanation. Special care should be taken to include people living or working in the more remote parts of the country, to maximise coverage.

New sites identified in this way should always be visited by experts at the appropriate time of year, to verify their significance for migratory waterbirds.

Step 4: Identify new sites using maps, aerial photographs and satellite images; organise inspection visits to potential new sites

Satellite images, if available, can be very useful in the identification of wetlands not covered by the methods listed in Steps 2 and 3, especially if areas are very large and not easily accessible (*e.g.* in the case of the Sahelian floodplains in Africa). Ideally, different sets of images should be examined, taken in different years and in different seasons, to allow for annual or seasonal changes in size or even existence.

It is important to find out which images already exist and have been used by others for different purposes. In many countries, this can be very complicated. Images have most often been used for land-use projects or agricultural development programmes.

The interpretation of aerial photographs and satellite images is not an easy task, and is best left to professional research institutes or universities.

Possible identification of new sites on maps or photographs should always be verified through field visits and/or by consulting people living near the site.

Countries with no access to sources of remote sensing will have to rely on field investigations (by car, boat, plane, or on foot), combined with local knowledge.

Step 5: For each site, fill in basic information, using standard forms

It is strongly recommended that the site descriptions be modelled on the format adopted in the Ramsar Information Sheet (RIS). This will ensure compatibility with many other inventory schemes.

The Ramsar Information Sheet has been expanded over the years, and the order in which the items appear has changed more than once. As a result, different sources may give different formats. The most recent version of the RIS is given in Appendix III to these guidelines. Further explanation on how to complete the RIS can be obtained from the Ramsar Convention Bureau, or copied from the Ramsar web site.

To save time and effort in the preparation of a preliminary site inventory (as defined in Step 1, Phase 2), the types of information to be gathered can be limited to the following headings:

1. Date the sheet was completed/updated
2. Country
3. Name of wetland
4. Geographical co-ordinates
5. Altitude
6. Area (in hectares)
7. Overview (brief description)
10. Availability of map
11. Name and address of compiler
13. General location (nearest town and administrative region)
18. Fauna (with specific reference to the occurrence of AEWA species)
19. Social and cultural values
20. Land tenure/ownership of the site and surrounding area
21. Current land use at the site and in surrounding areas
22. Threats at the site and in surrounding areas
23. Conservation measures taken
28. Jurisdiction
29. Management authority
30. Bibliography (scientific/technical)

Special emphasis should be given to the significance of the site for migratory waterbirds. For each of the species listed in Annex 2 to the Agreement, information should be given on the number of birds using the site, the season or seasons at which the species occurs, and whether the site serves as a breeding area, staging area, and/or wintering area.

Sites that are already well covered in other inventories do not need full treatment. It is then sufficient to list only:

- the name of the site;
- a reference to the source which contains full information on the site;
- the key values of the site for migratory waterbirds.

An assessment of the threats to the site (Item 22) is particularly important in deciding whether or not a site is in urgent need of management. This is treated in more detail in Guidelines No.4: *Guidelines on the management of key sites for migratory waterbirds.*

Step 6: Map each site to define its boundaries

From the start, it is extremely important to determine fixed boundaries for each site to be covered by the inventory. Many monitoring projects suffer from changes to site boundaries during the course of the projects, rendering comparisons between years (and trend analyses) virtually impossible.

Very often, one is confronted with site boundaries that have already been defined by others, for very different purposes. Boundaries can correspond to the habitat itself and its topography, or they may be boundaries of a protected area or an administrative unit. This leads to three different situations:

- the site includes waterbird habitat and other biotopes,
- the site covers part of a larger area of waterbird habitat,
- the site coincides with a more or less discrete area of waterbird habitat.

The third case is the ideal situation. The site then probably also forms a hydrological unit, which greatly facilitates site description, monitoring and management issues.

Each wetland should be viewed in the context of the catchment area to which it belongs. What happens upstream ~~from~~ of a site is often of critical importance to the site. For example, the construction of a dam a considerable distance upstream, and possibly even in another country, may effectively annihilate the site. Thus, a map showing the location of the site in its wider surroundings should also be provided.

In the preparation of site descriptions, characteristics of a site that are also characteristics of the whole catchment area can be copied for other sites in the same catchment area.

Good maps of sites and their catchment areas are indispensable for monitoring and management purposes.

Step 7: Refine the site descriptions using the Ramsar habitat coding system

Different inventory programmes have used different habitat classification systems. For instance, MedWet promotes a sophisticated habitat classification system, based on a system developed for the classification of wetlands and deepwater habitats in the USA. For many countries in the AEWA area, this system will be too complicated to be readily used by everybody.

One of the simplest and most widely used systems is the Ramsar habitat coding system (Item 8 on the Ramsar Information Sheet). The codes are based upon the Ramsar Classification System for Wetland Type as approved by the Contracting Parties to the Ramsar Convention. The categories listed in the classification system are intended to provide only a very broad framework to aid rapid identification of the main wetland habitats represented at each site.

The Ramsar habitat codes and brief descriptions are listed in Appendix IV to these guidelines.

More detailed descriptions are to be found in Annex 1 to the *Explanatory Note and Guidelines* for the Ramsar Information Sheet. This document is available from the Ramsar Convention Bureau, and can be found on the Ramsar web site.

Step 8: Monitor the sites and update the inventory at regular intervals

A site inventory is not a static end product. Ecological changes, changes in status and changes in threats should be monitored, and the management of sites should be steered accordingly.

The national site inventory is a basic requirement for a national waterbird monitoring scheme (see Guidelines No.9: *Guidelines for a waterbird monitoring protocol*). In turn, the results of monitoring may lead to amendments in the site inventory.

The national site inventory is also a basic requirement for site management planning (see Guidelines No.4: *Guidelines on the management of key sites for migratory waterbirds*). In turn, site management planning (also a continuing process) may lead to amendments in the site inventory.

Thus, site inventory, monitoring and site management planning are linked in a continuous, iterative process of change and improvement.

A national site inventory should be updated at least every ten years, but preferably every five years, the choice of interval depending on the quality of the initial inventory, and the amount of change that is taking place.

AEWA Conservation Guidelines No.4

Guidelines on the management of key sites for migratory waterbirds

Step chart

In the management of key sites for migratory waterbirds, each country should take the following steps:

Step 1: Prioritise sites in need of urgent management.

Step 2: List threats and possible conflicts in land use.

Step 3: Identify all parties involved in the management of the site.

Step 4: Where appropriate, install a site management committee.

Step 5: Assess the type of management required.

Step 6: Draft a management plan.

Step 7: Implement the management plan.

Step 8: Revise the management plan as required.

Introduction

Why do we need guidelines on site management, when excellent publications on the subject already exist? The reason that the AEWA Action Plan calls for the preparation of site management plans is that management aimed specifically at the conservation of migratory waterbirds may at times differ from general site management.

There is a tendency in nature conservation to abandon the sectoral approach (*e.g.* birds versus flowers), and to direct management towards the maintenance of healthy ecosystems, with a high degree of biodiversity. In truly natural systems, this is undoubtedly the best approach. However, migratory waterbirds often rely on areas that are intensively used by man for other purposes (*e.g.* geese in agricultural land). In these cases, an ecosystem approach would not work, and for the purposes of the AEWA, it is necessary to revert to the sectoral approach. It is always important to recognise that the best way to approach the management of a particular site (sectoral versus ecosystem oriented) will differ from case to case, depending on the nature of the site.

Although, there are many excellent publications on site management and the development of management plans, these are not readily available to everyone in the AEWA area. The present guidelines therefore include a rather detailed summary of procedures for the development of site management plans.

The development of site management plans is time-consuming, and may draw heavily on financial and human resources. When resources are limited, priority should be given to those sites which can be expected to lose their value for migratory waterbirds if no management measures are implemented (see Step 1).

Step 1: Prioritise sites in need of urgent management

Prioritising is essential to optimise the benefits for waterbird populations and to minimise the input of limited resources (financial and manpower).

All of the information needed to establish priorities should be available in the national site inventory (see Guideline No.3: *Guidelines on the preparation of site inventories for migratory waterbirds*). When no inventory is available, priority sites should be identified on the basis of expert and local knowledge.

Initially, sites should be ranked according to their importance for migratory waterbirds. This can only be established on the basis of census data. The creation of a waterbird monitoring programme is therefore of the utmost importance (see Guidelines No.9: *Guidelines for a waterbird monitoring protocol*).

Prioritising on the basis of the occurrence of migratory waterbirds should focus on those species and populations listed in Table 1 of the AEWA Action Plan, in the following order of priority:

1. Species and populations qualifying for international Single Species Action Plans (SSAPs), *i.e.* species listed in Category 1 in Column A of Table 1, or in Categories 2 or 3 in Column A and marked with an asterisk. (For details, see Guidelines No.1: *Guidelines on the preparation of Single Species Action Plans for migratory waterbirds* and Appendix I).
2. Other species and populations listed in Column A of Table 1, *i.e.* in Categories 2 or 3 but not marked with an asterisk.
3. Species listed in Column B of Table 1.
4. Species listed in Column C of Table 1.

Information on the occurrence of waterbirds in their breeding areas may be available through national or international atlas projects. The European Bird Census Council (EBCC) can provide data for Europe, while BirdLife International can provide information for many other regions. Information on the occurrence of waterbirds in mid-winter (January in Europe, North Africa and the Middle East, and January and July in sub-Saharan Africa) is available from Wetlands International through the International ~~Waterfowl~~Waterbird Census. Information on the occurrence of waterbirds at staging areas during the migration seasons is less readily available. In the case of waders, information may be obtained through the Wader Study Group or Wetlands International's wader database. For other taxa, some information may be available from the co-ordinators of Wetlands International's various Specialist Groups.

Once sites have been ranked according to their importance for migratory waterbirds, those sites in most urgent need of management should be identified on the basis of their current conservation status:

- Is there any form of protection?
- Is protection effective?
- Is the site undergoing detrimental changes?

It might be easier and more practical to prioritise sites by starting at the bottom of the list and working up. Obviously, sites which are considered to be 'safe', either because they are well functioning reserves or simply because there are no threats, and sites which already have functioning management plans go to the bottom of the list.

In the establishment of priorities, consideration should be given to the position of critical staging areas in the total flyway. As an example, small coastal sites in Morocco may seem unimpressive as compared to the Banc d'Arguin in Mauritania or the Wadden Sea in Northwest Europe, but they are vital stepping stones in the migration of waders between these two key areas.

Step 2: List threats and possible conflicts in land use

A distinction should be made between permanent or gradually developing threats, which should be addressed in a management plan, and sudden threats, which should be treated as emergency situations (see Guidelines No.2: *Guidelines on identifying and tackling emergency situations for migratory waterbirds*).

Common threats causing negative trends in numbers of waterbirds include:

- Drainage;
- Conversion to agricultural land;
- Urban and industrial development, including the development of infrastructure;
- Habitat degradation through over-use (*e.g.* over-grazing and over-fishing);
- Undesirable natural succession in the vegetation through under-use (*e.g.* following the abandonment of traditional agriculture, as described in Box 1);
- Agricultural pollution (eutrophication);
- Industrial pollution (chemicals);
- Disturbance (*e.g.* from tourism and hunting);
- Man-induced ~~C~~changes in the water regime;
- Introduced predators.

Box 1: The dangers of under-use

In Western Europe, Africa and the Middle East, wetlands are often threatened by over-use: too much development, too much harvesting of fish and wildlife, and especially too much intensification of agriculture. The opposite can also be true, and is often seen in countries with economies in transition, *e.g.* in parts of Eastern Europe and the former USSR. These countries have large, relatively undisturbed river systems that have traditionally been used for low-intensity agriculture (mowing and grazing of seasonally flooded grasslands).

The Biebrza and Narew river systems in northeastern Poland are excellent examples. In developing economies, the continued existence of such systems is no longer guaranteed. They are either lost due to drainage, fertilisation and intensification, or abandoned as low-intensity use is no longer economically ~~feasible~~ viable. Abandoned wetlands of this type rapidly become overgrown with bushes and trees, and lose their value as habitat for migratory waterbirds. Large National Parks have been established in the Biebrza and Narew systems, but future management poses a problem, as artificial continuation of labour-intensive, low-intensity agriculture in a growing economy becomes increasingly expensive.

Threats should be ranked according to their importance, which will vary between habitats and between regions and/or countries. Box 2 gives some examples of threat assessment in Europe. Detailed threat assessment at the species level is very time-consuming. It is therefore recommended that in the development of management plans for AEWA sites, only simple systems be adopted for ranking threats.

Alterations to the water regime require special attention, as these are often not very visible. A distant dam may affect the timing or amplitude of floods in a downstream wetland. It may seem that not much has changed, but over the years, adaptation of the vegetation may alter the appearance of the wetland, thus affecting its value for waterbirds. Between-year dynamics should not be neglected. For example, the ecology of Sahelian floodplains, which are of extreme importance for millions of migratory waterbirds from the Palearctic, is strongly influenced by the irregular occurrence of ‘disastrous’ droughts or extreme floods.

Box 2: Threat assessment in Europe

Example 1: The most important threats in different habitats

- Marine habitats: introduced predators
- Coastal habitats: tourism and recreation
- Inland wetlands: drainage/land reclamation
- Tundra, mires and moorland: oil/gas exploitation
- Agricultural and grassland habitats: crop improvement

Example 2: Ranked threats for inland wetlands

1. Drainage/land reclamation
2. Loss of riparian habitat
3. Tourism/recreation
4. Management of vegetation
5. Pollution from nutrients
6. Water abstraction
7. Pollution from toxic chemicals
8. Water-level regulation
9. Hunting disturbance
10. Wetland impoundment
11. Canalisation
12. Increased predators
13. Angling/fisheries
14. Acidification
15. Excessive sedimentation
16. Aquaculture
17. Introduces species

Example 3: Threat assessment for a particular habitat or site

Each species is given a priority score ranging from 1 (low priority) to 4 (high priority).
For each threat, each species is given an impact score: 0 (none), 1 (medium), or 2 (serious).
For each threat, all species impact scores are multiplied by their priority scores and summed.

(Source: Tucker *et al*., 1997)

It is unlikely that there is an important site for waterbirds anywhere in the world without some land-use conflicts, even in the case of established nature reserves. The ‘classic’ reserve with nature and people on either side of the fence may survive in industrialised countries, but is no longer considered acceptable in developing countries, where the use of natural resources is vital for local people.

In many countries, responsible agencies now enter into open dialogue with local people to improve relationships and to identify sustainable forms of land use that are acceptable to all parties. This can be a lengthy and tedious process, but is vital for long-term success in the management of natural resources, especially in Africa.

Land use conflicts not only exist between those who wish to conserve and those who wish to exploit, but also between people practising different forms of exploitation. An example of this can be seen in the Sahelian floodplains (see Box 3). Field studies, including interviews with local people and their representatives, are essential so that the opinions of all stakeholders can be taken into account.

Box 3: Community based wetland management in Africa

Africa's vast expanses of seasonal floodplains, notably in Sahelian countries in the north and in Zambia in the south, provide some of the most important habitats for migratory waterbirds in the world. In most cases, traditional, sustainable, community-based management systems were in place in pre-colonial times. These have usually been corrupted by colonial regimes and subsequent independent governments through the imposition of centralised legal systems on local populations. In spite of conservation efforts, these new systems have often proved to be counterproductive with respect to wetland management, as local people no longer feel responsible for their natural resources.

Wetland projects in the Barotse Floodplain and Kafue Flats in Zambia seek to restore the traditional land-use systems, and return part of the responsibility for the management of wetlands and wildlife to local populations. In the Senegalese part of the Senegal Delta, development of community-based wetland management is hampered by the fact that the Djoudj National Park was imposed on the people in 1971, without consultation, and consequently without wide acceptance. In contrast, the newly established Diawling National Park in the Mauritanian part of the Delta has been based on community participation since the earliest planning phases, and now shows promising results.

These examples have demonstrated that development of community-based sustainable management is an extremely slow process, once the original, traditional systems have been lost.

Step 3: Identify all parties involved in the management of the site

The inventory of land-use conflicts yields a list of stakeholders.

Government bodies or private companies involved in the development of wetlands for agricultural use are usually powerful bodies, by tradition often unsympathetic to nature conservation. When large structural works are planned (*e.g.* drainage and irrigation projects, road-building schemes, and programmes of land reform), there is a great deal of money and power involved. With the right approach, these powerful institutions can be converted into powerful allies. This applies in exactly the same way in both developed and developing countries.

In developing countries, various donor organisations may be involved in the management of a site. Because of differences in the scope and objectives of these organisations, it is possible that they may come into conflict with one another.

If the site has potential for tourism (including ecotourism), tour operators and hotel owners in the region may also be involved.

To summarise, possible stakeholders include:
- the owners;
- local villagers;
- fishermen's organisations;
- farmers' organisations;
- hunters' organisations;
- local politicians;
- the Ministry of Environment or equivalent;
- ministries dealing with agriculture, fisheries, water, public works and education;
- governmental conservation agencies;
- land development bodies;
- national non-governmental conservation agencies;
- international non-governmental conservation agencies;
- donor agencies;
- local and national tourist boards.

The list of stakeholders should, if possible, be maintained in a database linked to the site inventory, and should be updated at regular intervals.

Step 4: Where appropriate, install a site management committee

It is important to establish a management committee for the site, especially in developing countries where the involvement of local communities is vital. In some cases, a single management committee could be responsible for two or more sites in the same region.

The management committee should include representatives of as many as possible of the stakeholders. The choice of which of the groups of stakeholders are represented will depend on ownership of the site, present use, possible future developments and threats. In addition, a management committee should always include scientific advisors.

There is no need for the management committee to receive formal power. Most importantly, it provides a platform where views and opinions can be shared and discussed.

The management committee should meet at least once a year, although sub-committees (involving individuals who may not be present at the main committee meetings) could meet more often, if necessary. This may be especially true at the village level and for the scientific advisors. The latter may even consider establishing a separate scientific committee that reports back to the management committee.

Step 5: Assess the type of management required

The type of management required will depend on the ecological function of the site for waterbirds. Functionally, a site can be a:

- breeding site for dispersed breeding species;
- breeding site for colonial breeding species;
- moulting area;
- staging area;
- wintering area.

~~Many~~ Most sites have more than one function, and can be divided into sub-sites, according to function.

Dispersed breeding species occur in many different habitats throughout the AEWA area. ~~The t~~Two of the most important habitats for waterbirds are the Arctic tundra and temperate grasslands. There is usually little if any need for management in the tundra, where the main issues are conservation of the fragile ecosystems and protection against permanent damage, especially from oil exploitation.

Temperate grasslands may be natural (*e.g.* in the Russian Federation) or man-made. The main threat to natural grasslands is conversion to agricultural land, and here the emphasis should be on the creation of protected areas. Breeding populations of waders and ducks on agricultural grasslands in Europe are threatened by intensification in farming practices by private farmers. Two conservation strategies that have been used to combat this threat are buying land to establish grassland reserves, and concluding management agreements with the farmers (see Box 4).

Colonial breeding species are found in temperate and tropical wetlands. In Europe, many wetlands supporting large colonies of waterbirds have been given protected status. Elsewhere, this is often not the case. Where colonies host species in need of Single Species Action Plans, management must be linked to developing SSAPs (see Guidelines No.1: *Guidelines on the preparation of Single Species Action Plans for migratory waterbirds*).

Breeding colonies of waterbirds can be situated at a considerable distance from water. They are often on private land, or may even be in trees in cities. One option worth investigating is the possibility of offering tax incentives to landowners who do not make any changes to their property that might affect colonies of waterbirds on their land. This works successfully in the USA (*e.g.* in lowland swamps in South Carolina), and could be of interest in countries in the AEWA area where there are still large private estates with much undeveloped ground (*e.g.* in the Mediterranean).

Some colonial waterbirds nest on the ground in agricultural land, salt pans and other man-made habitats (*e.g.* Collared Pratincole *Glareola pratincola* and Black-winged Stilt *Himantopus himantopus* in the Mediterranean). These birds can benefit from management agreements with private landowners.

Moulting areas for waterbirds are often isolated or inaccessible, and out of reach of most predators. This is because many species of waterbirds have impaired flight during the moult. Some species, such as many dabbling ducks *Anas* spp., disperse and hide individually, while others, such as the Common Shelduck *Tadorna tadorna*, concentrate in large groups. Little is known about the moulting areas of many species, and the location of key moulting sites is therefore a high priority.

Staging and wintering areas can be in reserves, on unprotected government land or common land (*e.g.* the Sahelian floodplains), or on private land. In some parts of Europe, the Government pays farmers compensation for the damage caused by wintering geese and swans to their harvest (see Box 4). The potential for using financial compensation as a tool in waterbird conservation outside Europe, with financial aid coming from the international

community, has yet to be properly investigated. (See also Guidelines No.8: *Guidelines on reducing crop damage, damage to fisheries, bird strikes and other forms of conflict between waterbirds and human activities*).

Other activities related to migratory waterbirds that require management include:

- Hunting (see Guidelines No.5: *Guidelines on sustainable harvest of migratory waterbirds*);
- Trade (see Guidelines No.6: *Guidelines on regulating trade in migratory waterbirds*);
- Ecotourism (see Guidelines No.7: *Guidelines on the development of ecotourism at wetlands*).

Box 4: Paying farmers for tolerating migratory waterbirds

The intensification of agriculture has caused great losses in natural values all over the world. In the AEWA area, this is especially so in Europe. Various financial mechanisms have been developed to ~~minimise~~ reduce ecological losses, either by offering farmers payment for refraining from certain activities, or by paying them compensation for damage caused by animals. Some of these measures relate to migratory waterbirds, notably nesting waders and ducks, and wintering geese and swans.

Paying farmers for tolerating migratory waterbirds is particularly well developed in the United Kingdom, The Netherlands, Germany, ~~Denmark~~ and France.

In grassland areas important for nesting waders and ducks, farmers can conclude management agreements with their local or national government (usually financed with government funds, but in Europe also with EU funding), whereby they receive various kinds of payments, *e.g.* for

- not changing the physical characteristics of their land;
- maintaining high ground water tables;
- reducing the use of fertilisers;
- reducing the intensity of grazing;
- postponing mowing until later in the season.

Payments are calculated on the basis of the estimated average reduction in income associated with each of these measures (for each type of agreement, a fixed price per ha per annum). Management agreements of this kind affect the habitat. An alternative approach is to pay farmers a small premium for each successfully hatched nest of certain valuable species. This may be more economical, but is much more complicated to implement, and is ecologically less sound.

In the case of wintering geese and swans, farmers are not paid for producing less intensively, but for the damage caused to their crops caused by the birds. Farmers can be paid after the harvest, the level of payment depending on an assessment of the damage to the crop, or can be paid a fixed amount per ha per year to tolerate the birds, regardless of their numbers and length of stay. Hunting opportunity and income from hunters can encourage farmers to tolerate crop damage. (See also Guidelines No.8: *Guidelines on reducing crop damage, damage to fisheries, bird strikes and other forms of conflict between waterbirds and humans*).

Step 6: Draft a management plan

Two major sources of information on management planning are:
- *Guidelines on Management Planning for Ramsar Sites and Other Wetlands*, available from the Ramsar Convention Bureau or from the Ramsar web site.
- *European Guide for the Preparation of Management Plans for protected and managed natural and semi-natural areas*, prepared by the EUROSITE Working Group on 'Management Plans: Methods and Techniques' in 1996.

There are many other useful publications, especially in North America and various parts of Europe, but the two mentioned above give good coverage and are widely accepted in the AEWA area. ~~Furthermore, these two~~ They are, moreover, reasonably compatible.

A management plan should consist of a preamble, explaining the need for the plan, followed by three major parts:
1. Description
2. Evaluation and objectives (what to do)
3. Action plan/prescriptions (how to do it)

Part 1: Description

The description of the site can be straightforward, and includes all that is known about the site, including the threats to it. The presentation of information should follow the format used in the site inventory, but there should be more detail. (See Guidelines No.3: *Guidelines on the preparation of site inventories for migratory waterbirds*).

The EUROSITE guide suggests many more subheadings than are given on the Ramsar Information Sheet. These are grouped under the headings:
- General information
- Physical/abiotic features
- Biological/biotic features
- Socio-economic features
- Additional information

In a European context, this order of headings is logical, with nature first and people last, but in developing countries, where involvement of the local people is a very sensitive issue, there is a tendency to change the sequence, and treat socio-economic features before biological features.

Relevant research reports should be referred to as accompanying background documents, but as little detailed research information as possible should be included in the main document, to limit its size. A management plan of 100 pages is acceptable, but one of under 50 pages is better.

Part 2: Evaluation and objectives

The evaluation lists what the site has to offer, and may deal with the following topics (in no particular order, as treatment may vary from site to site):
- Size, and position in ecological unit (*e.g.* catchment area);
- Biological diversity;
- Naturalness;
- Rarity (sensitive information on rare species should be kept confidential);
- Fragility (with respect to both natural and man-induced causes);
- 'Typicalness';
- Recorded history;
- Potential for improvement;
- Aesthetic, cultural and religious values;
- Social and economic values;

- Education and public awareness;
- Recreation;
- Research.

The objectives can be divided into:
- Long-term management objectives
- Operational objectives

The long-term objectives should always be the ideal situation, irrespective of constraints, and should match the preamble. They should be followed by a list of constraints, such as:
- Internal natural factors (succession, water level dynamics);
- Internal human-induced factors;
- External natural factors (*e.g.* climate);
- External human-induced factors (*e.g.* dams located upstream);
- Factors arising from legislation or tradition;
- Physical considerations (*e.g.* inaccessibility);
- Available resources (including finance).

Thus, there are three ingredients that lead towards the operational objectives:
- Evaluation
- Long-term objectives
- Constraints

Operational objectives can be many-fold, and should:
- describe achievable and measurable targets;
- be realistic in relation to the constraints;
- point in the direction of the long-term objectives.

Part 3: Action plan/prescriptions

Different sources propose different structures for Part 3, but there are always four major elements:
- Zoning
- Management strategies
- Projects and work programmes
- Monitoring and review

Zoning may be useful for large sites, where some parts, for example, may be suitable for recreational use, while other parts hosting vulnerable species may require total protection. Zoning can be a powerful tool to concentrate and/or limit access to certain parts of the site. Zoning may require separate sets of action plans/prescriptions. Criteria for zoning should be derived from an assessment of threats.

Management strategies (or options, such as non-intervention versus intervention, re-introduction versus control of pest species, restrictions on access versus open access) should be categorised under:
- Habitat/species management;
- Human usage (taking account of 'wise use');
- Access, public use, education/demonstration;
- Research (facilities, opportunities);
- Training of personnel;
- 'Estate' management (maintenance of buildings, roads, dams *etc*.).

'Wise use' includes management agreements, *e.g.* for farmland, fish farms and salt pans.

Projects (if there are many, grouped into **programmes**) define what should actually be done in practice. Each project should describe who is involved (personnel), what exactly should be carried out and when, and how much it will cost. This part of the management plan typically

becomes more detailed in each successive version of the plan. In early versions of the plan, the section can be kept very brief.

Monitoring and **review** are sometimes presented as projects or programmes, but they are of sufficient importance to merit separate treatment. Monitoring of wetland values (such as the numbers of waterbirds using the site) is the only way to keep track of developments and to judge whether or not the objectives are being met. The results of monitoring will form the basis for decisions on whether or not to change or adapt the plan. Review of the management plan should be a continuous process leading to periodic reports on how the various projects are proceeding. Review reports should be prepared every three to five years, but it is recommended that a brief internal evaluation be made every year. Review may lead to a revision of the management plan (Step 8).

Additional information

In addition to the three basic parts of the plan, there can be varying amounts of additional information, much of which can be presented in appendices. Examples include:

- References;
- List of resource persons;
- Species lists;
- List of material needs;
- Timetable for implementation.

Finally, there should be a:

- Budget

The budget should be structured in such a way that sizeable parts can easily be taken out to be tailored to the specific tastes of a potential donors. Some donors prefer to give money for equipment, such as vehicles, boats, bicycles, binoculars, bird books, computers and pencils. Some donors have a taste for digging canals or building sluices, while others might prefer to finance a craft shop for local women, a health care centre in a village located near the wetland, or a demonstration project to promote sustainable forms of land use.

Step 7: Implement the management plan

Preparation of the management plan is relatively straightforward. Implementation of the plan is much more difficult, and will depend totally on the goodwill of all those involved. If the plan does not have wide support, implementation may prove impossible. It is for this reason that considerable emphasis has been placed on identifying all the stakeholders and their respective roles. It is important to ensure their continuing involvement through the management committee (Step 4).

One mechanism for stimulating support for a management plan is to link the management of the site to that of another site in another country in the same flyway (*i.e.* a site which harbours the same birds at a different time of the year). The significance of this linkage can be a useful tool in raising public awareness (see Box 5). If a site in a poor country is linked to one in a rich country, this 'twinning' of sites may also facilitate fund raising. The potential for twinning in the AEWA area has not as yet been adequately investigated.

Box 5: Site twinning - linking two worlds through sites for migratory waterbird

Where political pressure is useful to promote the protection of a site, 'Site twinning' may be a powerful tool. This has been very successful with many sites in North and South America. In South America, the system focuses mainly on stimulating private landowners to protect their wetlands, but governments may also be stimulated to protect wetlands if a clear link with sites in other parts of the world can be demonstrated. However, there are still rather few examples of site twinning In the AEWA area.

Site twinning can also be effective in developing ecotourism. If an ecotourism strategy has already been designed and implemented in one of the areas, the experience gained may be of considerable assistance in the development of ecotourism in the other. The development of joint projects and exchange programmes may be appropriate, and in some cases, one of the partners may be prepared to provide the bulk of the funding.

Site twinning appeals most if ringing records actually show that the same individual birds use both sites. An example is the Djoudj National Park in Senegal, which is twinned with the Camargue in France. Several species of herons and egrets that breed in the Camargue migrate to spend the winter in Djoudj National Park.

Ideally, responsibility for implementation and follow-up should be assigned to someone who can carry out his or her duties as part of a regular job (*e.g.* a representative of the owners or someone from a National Park Service or equivalent). If this is not possible, responsibility should be with the project staff. The question of long-term responsibility should be taken into account in the management plan, and also in the budget.

If responsibility for implementation is initially in the hands of temporary project staff, a major goal should be to institutionalise the management of the site, so that someone can take over on a permanent (or semi-permanent) basis.

The key to successful implementation of a management plan is a flexible and dynamic approach.

Step 8: Revise the management plan as required

Step 6 outlines the drafting of a document known as a management plan. In fact, a management plan should not be seen as a static document, but as a dynamic process. Steps 1 to 5 are as essential to this process as is any document that may be produced during the process. Furthermore, a management plan is never a final product. It must constantly be revised and updated, and typically completely re-written every three to five years. Management plans that have been written primarily to generate funds are especially likely to become outdated very quickly.

If funding remains insecure and frequent redrafting is anticipated, it is advisable to keep the document rather general and as concise as possible. In such cases, it may be better to refer to the document as a Master Plan, which can serve as an umbrella document for a variety of partial plans with partial budgets, aimed at different donors. These partial plans can be quickly modified to take advantage of funding opportunities, without affecting the overall Master Plan.

AEWA Conservation Guidelines No.5

Guidelines on sustainable harvest of migratory waterbirds

Step chart

To ensure that any harvest of migratory waterbirds is sustainable, each country should take the following steps:

Step 1: Conduct baseline assessment of the scale of hunting of waterbirds.

Step 2: Commit to and support international harvest management.

Step 3: Introduce or revise systems to manage harvests at the national level.

Step 4: Adjust harvest frameworks to address national objectives.

Step 5: Set the nation's hunting regulations.

Step 6: Introduce procedures to maintain high standards amongst hunters.

Step 7: Minimise the negative impacts of hunting.

Step 8: Introduce, where possible, the monitoring of hunting harvests.

Step 9: Raise awareness of the value of hunting and of sustainable practices amongst hunters and non-hunters.

Introduction

Migratory waterbirds provide a fantastic resource for millions of people worldwide. Whilst many simply watch and study, others hunt them, either for sport, subsistence[1] or to raise income ~~at~~ in the market place (*i.e.* to trade). Exactly how many are taken for each purpose in the AEWA area is not known, but may in some places be very large and of considerable socio-economic importance.

Hunting is a legitimate and traditional use of the rural environment, and hunters make important contributions to the conservation of waterbirds and other wildlife and habitats. Problems to avoid include over-exploitation or excessive disturbance, lead poisoning, the spread of exotic species and farm-reared stock, and the degradation of habitats through 'improvements' solely designed to increase harvesting opportunity.

The African-Eurasian Waterbird Agreement makes a number of provisions with respect to the hunting of waterbirds (see Box 1), but more generally requires that any exploitation of waterbirds is sustainable and that populations are maintained in a 'favourable' conservation status. International co-operation is needed, as is a framework within which Range States may operate.

Box 1: Extracts from the AEWA Action Plan concerning hunting

4.1.1 Parties shall cooperate to ensure that their hunting legislation implements the principle of sustainable use as envisaged in this Action Plan, taking into account the full geographical range of the waterbird populations concerned and their life history characteristics.
4.1.2 The Agreement secretariat shall be kept informed by the Parties of their legislation relating to the hunting of populations….
4.1.3 Parties shall cooperate with a view to developing a reliable and harmonized system for the collection of harvest data in order to assess the annual harvest of populations….
4.1.4 Parties shall endeavour to phase out the use of lead shot for hunting in wetlands by the year 2000.
4.1.5 Parties shall develop and introduce measures to reduce, and as far as possible, eliminate the use of poisoned baits.
4.1.6 Parties shall develop and implement measures to reduce, and as far as possible, eliminate illegal taking.
4.1.7 Where appropriate, Parties shall encourage hunters, at local, national and international levels, to form clubs or organisations to co-ordinate their activities and to help ensure sustainability.
4.1.8 Parties shall, where appropriate, promote the requirement of a proficiency test for hunters, including among other things, bird identification.

These guidelines assume that such a framework - a 'harvest framework' - is developed and explains:

- how individual Range States may participate in the harvest management process;
- the best harvesting practice to counteract any of the problems associated with hunting;
- how to maximise the positive benefits from hunter participation.

A series of steps is identified to assist Range States in adopting a sustainable approach to waterbird harvesting. Guidelines No.6: *Guidelines on regulating trade in migratory waterbirds* are also of some relevance in this context, because of the close relationship between some forms of hunting and trade in waterbirds.

[1] taking of adults, eggs and young for food, bedding, clothing or ceremonial reasons.

Step 1: Conduct baseline assessment of the scale of hunting of waterbirds

The numbers of each population of migratory waterbirds harvested ~~hunted~~ within the AEWA area are ~~only poorly~~ incompletely known. Further guidance on baseline assessment of the scale of hunting of waterbirds should be developed. This information is vitally important and is needed to:

- consider the sustainability of hunting harvests;
- introduce protection measures where they are needed to conserve threatened or vulnerable species;
- assess the socio-economic importance of waterbird hunting;
- contribute to an assessment of trade in migratory waterbirds (see Guidelines No.6: *Guidelines on regulating trade in migratory waterbirds*).

Step 2: Commit to and support international harvest management

~~The development of an international harvest framework is a task for the Parties to AEWA. The key aim would be to conserve migratory waterbirds whilst providing opportunities for harvesting in a manner compatible with such protection. The framework would require widespread support from all involved and maximum cooperation to ensure that the programme works. The framework would need to be regularly reviewed given the dynamic nature of migratory waterbird populations~~.

A~~ny international~~ harvest framework ~~would need to~~ should be based on clear and unambiguous objectives for harvest management, these being related to the conservation status of particular waterbird populations. Analysis of the best available monitoring data for waterbirds (see Guidelines No.9: *Guidelines for a waterbird monitoring protocol*) and hunting harvests (see below) would allow informed judgement about sustainable levels of hunting harvest.

The harvest framework should address the following:

- which species may and may not be hunted;
- policies to be adopted to protect endangered 'look-alike' species;
- the seasons when hunting may occur;
- the maximum length of the seasons;
- whether bag limits would be appropriate;
- wise and unwise hunting practices, resulting in an AEWA code of practice.

After appropriate consultation, a harvest framework would be adopted as the goal for Range States to aim for in setting their own harvest regulations. Such frameworks should be synergistic with existing treaties and conventions.

Step 3: Introduce or revise systems to manage harvests at the national level

If overall management of waterbird harvests is to work, harvest frameworks should be adopted at the national and local level. This may be achieved through legislation or through a voluntary approach, using a national hunting organisation and/or local network of hunting clubs. The use of hunting clubs is relatively inexpensive, can be effective and long lasting, and provides a strong motive for involvement and a sense of ownership in the overall process. Alternatively, Range States may chose to adopt a more enforceable, legislative approach.

Whichever method a Range State selects to manage hunting activity, training of relevant personnel (*i.e.* employees or voluntary groups of hunters) is essential, to help with the enforcement of harvest regulations. Checks on hunters and observations of hunting in progress can be undertaken, with penalties (fines, bans, seizure of equipment *etc.*) introduced to discourage bad practice.

Step 4: Adjust harvest frameworks to address national objectives

Range States ~~would~~ should have flexibility in implementing the recommended measures from the international harvest framework. On the one hand, national regulations can be more conservative, sometimes prohibiting the taking of some species altogether. This may be appropriate where hunting of particular waterbird species is illegal within a Range State or where the species is declining nationally. Alternatively, Range States might choose to be more liberal, perhaps extending season lengths or increasing bag limits. However this should be an exception, and should not be to the detriment of the populations concerned. The specific reasons for the derogation should be reported to the AEWA ~~Parties~~ Secretariat. A national committee, with adequate representation from all interested parties, is ~~probably necessary~~ helpful to formulate the detail of national harvest regulations.

Step 5: Set the nation's hunting regulations

Components of the regulations would include when,where and how ~~and where~~ hunting can take place, and might include the maximum permissible take for each waterbird population. The latter necessitates good information on population status and trends (see Guidelines No.9: *Guidelines for a waterbird monitoring protocol*) and on the numbers and activities of hunters (see Step 8). The setting of national regulations is a question of realism and balance. If too liberal, hunters may be tempted to compromise hunting standards in order to take the maximum number of birds permissible, and if too strict, violations may occur because the hunters view the regulations as too restrictive.

Range States should decide on the timing of the hunting season and when hunting is to be permitted within a 24-hour period. Restricting hunting hours may be useful in leaving birds undisturbed for at least a part of the day, or where there might be safety or identification problems in poor visibility. Management control over hunting hours may be achieved through legislation or voluntarily through national or local hunting groups.

All Range States are likely to want to ~~prohibit~~ manage hunting ~~where it is unsafe~~, and to minimise disturbance in important conservation areas, *e.g.* internationally important wetlands. ~~Wherever possible, these refuge areas~~ Refuges, where appropriate, should be:

- free from all activities that cause disturbance, not just those related to hunting;
- of sufficient size to be effective, usually calculated according to the sensitivity of the most vulnerable species;
- sufficiently diverse to include all habitat components required by the full range of waterbirds present;
- protected by buffer zones where hunting activity is managed, to increase the effectiveness of the refuge area;
- created where endangered species are difficult to distinguish from quarry species, and may therefore be at risk from accidental hunting mortality.

Local hunting clubs should be encouraged to play an active role in the implementation of a network of refuges.

Step 6: Introduce procedures to maintain high standards amongst hunters

All organisations can contribute to maintaining high hunting standards. Hunting clubs should endeavour to ensure that individual hunters are proficient and well trained. A ~~mandatory~~ licensing system for hunters ~~has often proved essential~~ can be helpful for monitoring hunter numbers and to provide revenue for the administration of harvest management. Acquiring a licence ~~may~~ can be made dependent on the passing of a proficiency test, attending a training course and/or supplying hunting statistics at the end of the season. All of these improve the overall quality of hunting activity within a particular Range State. Those who fail to adhere to regulations ~~may~~ can be prevented from obtaining a hunting licence.~~, an excellent way of discouraging poor practice.~~

The ability of hunters to identify waterbirds is an important component of harvest management. Hunters should be able to recognise both the common and rare species encountered, with special attention given to endangered species (including 'look-alikes'). Identification skills can be tested and a minimum level of proficiency expected. Training materials may help, such as general field guides and videos for birdwatchers and hunters. Training courses can include more than just identification. Firearm safety, responsible hunting practices, wildlife conservation, hunter ethics and shooting skills are amongst topics commonly included. Courses can include practical demonstrations, shooting practice, films and lectures. Where possible, encouraging contact between experienced and inexperienced hunters is a good way of improving standards. ~~It is the responsibility of the governing body and/or hunting clubs to ensure that hunting individuals are proficient and well trained.~~

Training must be extended to the tourists ~~that~~ who hunt in some countries and to their guides and agents. Guides may be offered official registration with a national hunting organisation to signify that they can provide safe and responsible services to others. There can also be formal licensing agreements between hunting organisations and guides.

Codes of practice, such as the one proposed as part of the harvest framework (Step 2), will help to ensure that high standards are maintained amongst resident and visiting hunters.

Step 7: Minimise the negative impacts of hunting

Hunting is a legitimate and traditional use of the rural environment. Progressive hunters and hunting organisations favour and actively ~~pursue~~ support species and habitat conservation projects. ~~Many hunting groups thus have a positive influence on the environment for waterbirds and other wildlife. However, there are negative effects of waterbird harvesting, raised here simply to help promote best practice amongst hunting participants.~~

Use of non-toxic ammunition

Spent lead shot from hunting cartridges is toxic, and has been highlighted as a key problem for waterbirds. The use of steel, tungsten or bismuth instead of lead can address the problem of poisoning. These alternatives are already widely available and in use. Lead poisoning is an unacceptable waste of the waterbird resource, and in recognition of this, the Agreement encouraged Parties to phase out the use of lead shot for hunting in wetlands by the year 2000 (Paragraph 4.1.4 in the AEWA Action Plan).

Minimising disturbance

Assessment of hunting disturbance must distinguish between short-term effects and long-term impacts on population size and health, and should be made in relation to disturbance caused by all factors at each site. Disturbance may cause the displacement of birds, the disruption of daily activities and the break-up of family units. Where nutrient reserves are lost at critical times, disturbance may also affect rates of reproduction and survival. An assessment of disturbance levels can be obtained by counting the number of shots heard from a fixed point over a fixed period of time per day. This can be an efficient way of monitoring the relative degree of disturbance to particular areas.

Management authorities and hunting clubs can establish disturbance free areas and reduce the intensity of hunting where this is judged to be too high. Further measures can include reducing season lengths, hunter numbers and density, bag sizes *etc*. These aspects should be incorporated within a plan for disturbance management, both on and around the site. Hunting plans are best developed and agreed locally with all interested parties.

Further measures to limit disturbance may be desirable during times of stress, *e.g.* when the birds are breeding, moulting or on migration, during prolonged periods of severe weather, or during incidents of pollution (see Guidelines No.2: *Guidelines on identifying and tackling emergency situations for migratory waterbirds*). Under such circumstances, the governing agency or hunting groups themselves may call for restraint on hunting disturbance.

~~Avoid stocking~~ Exotic species

The introduction of exotic species outside their native range inevitably causes alterations to the structure of native waterbird communities. It can cause genetic erosion, and may threaten the survival of some waterbird populations. It is now regarded as poor practice and should be actively discouraged.

Stocking

The release of farm-reared birds may reduce the harvest of wild birds, increase hunter satisfaction and boost local hunting economies. However, such birds may be prone to disease and relatively tame, and may offer poor sport. ~~Instead of stocking, h~~Habitat protection and improvement~~s~~ are probably a better way of increasing waterbird harvests and should be part of any stocking programme.

Good habitat management

Hunting organisations and individual hunters already carry out major and important wetland creation and improvement projects. Hunters can be engaged in habitat conservation and management and the control of predators, including alien species. Several hunting organisations have developed 'habitat stamp' schemes using designs by famous artists, with sales producing substantial amounts of revenue for habitat conservation projects. Such efforts should be ~~acknowledged,~~ recognised and encouraged.

Conversely, the management of wetlands to 'improve' harvesting opportunities may include undesirable activities for the ecosystem as a whole, *e.g.* disruption of the hydrological regime, destruction of wetland vegetation or removal of fish as competitors of waterbirds. Such habitat degradation should be avoided. Care should be taken not to damage or degrade existing wildlife habitats, including surrounding and nearby lands. The involvement of conservation groups and habitat specialists is recommended to obtain maximum benefit from any wetland enhancement projects.

Step 8: Introduce, where possible, the monitoring of hunting harvests

Essential to the regular review of harvest frameworks is information on the size and composition of hunting harvests. This information should be collected, where possible, by individual Range States, and made available centrally for international analysis.

An annual survey by means of questionnaires to hunters should be a high priority for implementation in each Range State. This is useful in providing standardised information on both hunting success and hunter effort. Such questionnaires may form an integral part of a licensing system for hunters, and should at least include the date of the hunt, location and, for each species, the number taken or shot but not collected.

Of secondary importance is a 'Parts Survey' which provides a sample of wings, tails or other parts of the birds shot during the hunting season. These parts are identified to species, sex and age, providing valuable data on the composition of the waterbird harvest. Such data can be used to assess the degree of hunting 'pressure' on the different sexes and age-components, information of great value in assessing harvesting impact on particular populations. These data also complement and extend the information gained from hunter questionnaire surveys.

Ideally, parts should be collected from hunters throughout the hunting season, and may be deposited at, or mailed to, regional collection points. An alternative approach is to rely on a small number of purposely-trained hunters who examine and report on the bags themselves. Training, regular experience and identification materials are needed for operating a Parts Survey successfully.

To achieve compatibility in methods and reporting for both harvest and parts surveys, it is best to adopt minimum, internationally agreed standards for recording in the AEWA area. Also, it is vital that a summary of the information gained is reported back to the contributors, if interest and support are to be maintained. This can be done both nationally and internationally. Ringing recoveries are also valuable in assessing harvest rates, and hunters should be encouraged to report any rings that are found.

Step 9: Raise awareness of the value of hunting and of sustainable practices amongst hunters and non-hunters

Many existing hunting organisations currently run education and awareness programmes for hunters, teachers and the general public. Some groups hold conferences and local meetings, produce videos, publish magazines and newsletters, and provide information on the World Wide Web. Such materials aim to place hunting in perspective. They explain the various forms of hunting, consider the importance of predation and the conservation of populations and habitats, and may explain the environmental and societal benefits of hunting. For the future, a particular challenge will be to secure the involvement of subsistence and market hunters into the broader management framework for harvests. Not only will this allow improved decision-making, but it will also ensure a local commitment to waterbird conservation and that all-important sense of ownership in the shared resource.

AEWA Conservation Guidelines No.6

Guidelines on regulating trade in migratory waterbirds

Step Chart

To ensure that any trade in migratory waterbirds is adequately regulated, each country should take the following steps:

Step 1: Conduct baseline assessment of the scale and significance of trade in waterbirds.

Step 2: Join CITES to monitor and regulate trade in endangered and vulnerable species.

Step 3: Ensure effective implementation of CITES regulations.

Step 4: Introduce measures to monitor and regulate other international and domestic trade.

Step 5: Ensure any trade is sustainable for waterbird populations.

Step 6: Educate and raise awareness of trade issues.

Introduction

Trade can be defined as the exchange of goods for money or other goods. Such exchanges can take place between people in different countries (international trade) or amongst people within a nation (domestic trade). Food, pets, hunting trophies, zoo specimens or traditional medicines can be traded, and trade can involve a low level of commercialisation (*e.g.* rural market trade) or be very commercial (*e.g.* international trade in rare species). Trade can involve live or dead intact birds, or parts of birds, such as skins and feathers, or eggs or young. Both wild and captive-bred birds may be traded.

Trade is sometimes criticised by animal welfare groups, and leads to concerns about adverse impacts on ecosystems from trapping activities and the spread of exotic species and diseases. Conversely, domestic trade seems important to some local economies, there being examples where markets are trading many thousands of birds each year. This trade may provide important incentives for maintaining and protecting existing wildlife habitats.

Accurate figures for the volume of trade in waterbirds are lacking, owing to the absence of comprehensive reporting requirements. The best available information is collected under CITES, the Convention on International Trade in Endangered Species of Wild Fauna and Flora. Recent CITES data provide some insights into the waterbird species subject to international trade (see Box 1), and also the types of trade taking place (see Box 2). When compared with the trade in cage birds (*e.g.* parrots and songbirds), only small numbers of migratory waterbirds are subject to international trade in the AEWA area. Much more significant, both from a species conservation and a socio-economic viewpoint, is trade in domestic markets. Some studies have reported that hundreds of thousands of waterbirds are traded in this way.

In Article III, paragraph 2 of the Agreement, Parties agree to accord the same strict protection for endangered migratory waterbird species as is provided under Article III, paragraphs 4 and 5, of the Bonn Convention. In general terms, Parties should prohibit trade in birds or eggs, or any recognisable parts or derivatives of such birds and their eggs. (See Appendix II to these guidelines for a list of globally threatened waterbirds in the AEWA area). Appendix I of the Bonn Convention lists species in danger of extinction and for which taking, for any purpose, is prohibited

These guidelines concern both international and domestic trade in migratory waterbirds in the AEWA area. They offer practical advice on regulating trade through a series of steps identified to assist AEWA Range States in this task. Inevitably, there is some overlap between the regulation of trade in waterbirds and management of hunting harvest (see Guidelines No.5: *Guidelines on sustainable harvest of migratory waterbirds*).

Box 1. Recent CITES trade figures for the AEWA region for species listed in the AEWA Action Plan. [ADJUST TABS on final version]

	1996		1997
Alopochen aegyptiacus	36		357
Anas acuta	70		221
Anas capensis	20		8
Anas clypeata	50		547
Anas crecca	227		771
Anas penelope	80		305
Anas querquedula	83		26
Aythya nyroca	43		17
Branta ruficollis	148		50
Bubulcus ibis	10		32
Casmerodius albus	0		4
Ciconia ciconia	6		6
Ciconia nigra	4		8
Dendrocygna bicolor	13		26
Geronticus eremita	16		26
Grus carunculatus	1		1
Grus grus	1		0
Grus leucogeranus	5		10
Grus paradisea	4		2
Grus virgo	2		52
Nettapus auritus	110		177
Oxyura leucocephala	2	12	
Pelecanus crispus	4		3
Phoenicopterus minor	1190	626	
Phoenicopterus ruber roseus	105		116
Platalea leucorodia	5		16
Plectropterus gambensis	24		46
Sarkidiornis melanotos	30		15
Threskiornis aethiopicus	34		33
Grand totals	2323		2469

(Data supplied by The World Conservation Monitoring Centre)

Box 2. Recent CITES information on the type of trade for species either currently listed in the AEWA Action Plan or proposed for addition. Based on trade figures for the AEWA region. Data supplied by The World Conservation Monitoring Centre. [ADJUST TABS on final version]

		1996 (%)		1997 (%)
Source of birds	Captive bred	33		13
	Wild taken	67		87
Type of specimen	Live bird	93		16
	Dead whole bird	3		13
	Eggs	0.5		0.2
	Parts	3.5		70.8
Reason for trade	Zoo trade/captive breeding	13		6
	Science/Medicine	0.5		1.5
	Commercial	82		85
	Hunting trophy/Personal use	4.5	7.5	

Step 1: Conduct baseline assessment of the scale and significance of trade in waterbirds

Within the AEWA area, the total number of migratory waterbirds involved in trade is currently unknown. Data on international trade are based only on CITES-listed species and only on the number of live exports. They do not take into account any mortality that occurs before export, although this may be considerable. CITES-listed species include few of the migratory waterbirds currently listed in, or proposed for, the AEWA Action Plan (see Appendix V to these guidelines). Interestingly, three species listed in Appendix I of the Bonn Convention and 12 species currently afforded the highest conservation status in the AEWA Action Plan (Category 1 in Column A of Table 1) are not currently listed by CITES. These should be afforded a similar degree of protection from trade.

At the domestic level, only incomplete records are available for the number of migratory waterbirds harvested for trade. This information is necessary to:

- determine accurately whether such trade is sustainable or not, this being a key requirement for the protection of threatened and vulnerable populations;
- assess the scale and significance of trade in waterbirds;
- evaluate the impact of trade and its socio-economic importance;
- provide information for the setting of quotas or other control measures (see below).

The information on harvesting for trade must be coupled with monitoring the status of waterbirds (see Guidelines No.9: *Guidelines for a waterbird monitoring protocol*). There is little point in setting trade quotas if it is not known how many birds there are in the population that can be harvested in a sustainable way. In fact, the regulation of trade should move from being a reactive to being a proactive planning process. Currently trade continues until there is some evidence of severe depletion. Instead, trade should be regulated on the basis of recent population performance, with the precautionary principle being invoked where there is doubt about whether particular levels of harvests can be sustained.

Both the monitoring of populations and the monitoring of harvests are likely to be expensive, and each AEWA Range State must adopt procedures according to its capabilities. International guidance and a framework would clearly be important in the adoption of common standards to allow international syntheses and comparisons (see Guidelines No.9: *Guidelines for a waterbird monitoring protocol*). Revenues may be generated from the operation of both international and national trade regulations (*e.g.* export taxes, permit fees and dealer's authorisation certificates). It would seem beneficial for a portion of these revenues to be allocated to assessment and monitoring studies, including work at the local level.

Step 2: Join CITES to monitor and regulate trade in endangered and vulnerable species

CITES is the largest of all international wildlife conventions, with over 140 member countries. The aim of the Convention is to regulate international trade in endangered species and species that may become so unless their exploitation is controlled. CITES controls are mainly enforced at external frontiers. The species afforded some protection by CITES are listed in three different appendices.

- **Appendix I** lists species threatened with extinction and subject to international trade. International trade in wild specimens of these species is banned, save in exceptional circumstances. Trade in artificially propagated or captive-bred specimens is allowed, subject to licence.

- **Appendix II** lists species that may become threatened if trade is not regulated. International trade is monitored through a licensing system to ensure it stays below a level at which the species may become endangered. Trade in wild, captive-bred and artificially propagated specimens is allowed, subject to licence.

- **Appendix III** lists species not necessarily threatened worldwide but protected within individual Party States. These states need the help of other Parties to control trade in these species.

CITES regulations set out the rules for the import and export of CITES-listed species. Parties must ensure that all living specimens, during any period of transit, holding or shipment, are properly cared for so as to minimise the risk of injury, damage to health or cruel treatment. Parties must maintain adequate records of trade in CITES regulated specimens, including:

- names and addresses of exporters and importers;
- number and types of permits and certificates granted;
- country with which the trade occurred;
- numbers or quantities and types of specimens;
- names of species of the specimens traded.

In most Party States, the provisions of CITES are given the force of law by national legislation.

In the EU, CITES is implemented through Council Regulation (EC) No. 338/97 and Commission Regulation (EC) No. 939/97 (with amendments). Certain CITES Appendix II and Appendix III species are afforded stricter protection than under the Convention. Here, species are listed in four annexes.

- **Annex A** includes all CITES Appendix I species plus a number on Appendix II and Appendix III, and several species not listed by CITES.

- **Annex B** includes all Appendix II species plus a number on Appendix III and several species not listed by CITES.

- **Annex C** includes Appendix III species on which Member States do not have a reservation.

- **Annex D** includes four Appendix III species on which Member States have reservations, and species not listed by CITES which are imported into the EU in sufficient quantities to warrant monitoring.

The EU regulations set out the rules for importing species into or exporting them from the EU. A principal requirement is the undertaking of checks on imports at the first point of entry into the EU, irrespective of final destination. There is also an obligation on Member States to introduce comprehensive national legislation to enforce the regulations. This must address

both import and export controls and controls on internal sales and movement (including a power to obtain samples for DNA analysis). For some specimens, there are controls on movement and restrictions on purchase, sale and display. Member States also prohibit the holding of certain specimens, particularly live animals of the species listed in Annex A. The regulations also extend the controls to certain species not listed by CITES which need extra protection or monitoring.

There are a number of very comprehensive handbooks to CITES aimed at encouraging effective implementation, both globally and within the EU. These address definitions and the issue of documents, permits and certificates; enforcement measures, powers and penalties; the marking of specimens; health and welfare provisions; record keeping and reporting *etc*. Guidance is available from the Management Authorities of individual countries or from the CITES Secretariat.

AEWA Range States currently not party to CITES can make an important contribution to the regulation of international trade by adopting and implementing CITES. Some states may believe that trade should be stopped altogether, citing conservation or welfare reasons. Adherence to CITES does not in any way restrict the freedom of individual countries to adopt stricter measures for the regulation of trade, should they so wish.

Step 3: Ensure effective implementation of CITES regulations

For CITES to be effective, all parties to it must strive for comprehensive and responsible implementation and compliance. There ~~have been~~ were major problems during the implementation~~gestation~~ of CITES, since regulations are easily circumvented, corruption can be rife, quotas can have no scientific basis, conditions for specimens can be poor, and protected species sometimes continue to be traded through legal channels. Some countries, although signatories, lack sufficient personnel and other resources necessary for effective implementation of CITES. It is widely accepted that all countries can improve their implementation and compliance of CITES regulations.

On committing to CITES, national governments should review their overall policy towards wildlife conservation and utilisation, to ensure that CITES procedures can be incorporated and that sufficient resources can be made available. An overall management policy for trade in birds is likely to be needed, including context, objectives and components. Context is provided by the overall wildlife management framework, whilst objectives might include the provision of incentives for species or habitat conservation, to ensure long-term sustainability of populations harvested. Components might include biological monitoring (see Step 1), harvest and export controls (quota, permit and monitoring), maintaining animal welfare standards and ensuring that local communities benefit (see below).

Each party should ensure that it is legally equipped to enforce the provisions of CITES. This step should include adopting national legislation that incorporates a number of basic elements, such as:

- designation of enforcement agencies and officers;
- introduction of permit systems and quotas;
- setting of meaningful penalties;
- application of the law to all species listed in the CITES Appendices.

The national legislation should include immediate restrictions on the species that can be taken to those that are sufficiently abundant and have a favourable conservation status. Note that CITES requires that domestic legislation allows the use of penalties and confiscation to deter trade.

CITES also requires that each Party designates a Management Authority which issues import and export permits on the basis of advice from one or more Scientific Authorities. The involvement of customs teams, the police and wildlife rangers is also required for enforcement at national borders and within countries.

Good enforcement is the key to the effective regulation of trade in waterbirds. Fines, penalties and, for sustained illegal activities, convictions must be imposed to deter persistent offenders. Inspection of animal holding facilities and shipments should be used in conjunction with other trade control mechanisms to encourage compliance. It is important that such inspections are unannounced and of such a frequency that they serve as an adequate deterrent to illegal trapping and trade. Trappers, traders and exporters may be required, either for pragmatic reasons ~~morally~~ or legally, to affiliate and form associations. Associations should always adopt high standards and expel any members who violate these standards. The use of the law together with a tough stance towards those who contravene it will help to raise awareness amongst the public, wildlife traders and law enforcers.

Throughout every part of the trade regulation process, training, exchange of information and co-operation between agencies are paramount. Even existing enforcement personnel may lack the training and resources necessary to identify species in trade, and to verify the legitimacy of accompanying export documents. Illustrated manuals in local languages, best-fit identification systems, software tools and workshops can all help with increasing trade regulation and animal welfare standards. Many such materials are already available, but international agencies could take the lead in developing further training and information programmes.

CITES listings are dynamic, and it is important that Parties keep up to date. This is a role for the Management Authorities of individual countries and for the CITES Secretariat, but effective communication routes are required for information transfer to the local level. TRAFFIC International can help with a variety of guidance documents on the effective implementation of CITES. The CITES Secretariat can provide training seminars, legal advice and assistance with scientific studies.

Step 4: Introduce measures to monitor and regulate other international and domestic trade

Few countries in the AEWA area currently monitor all imports and exports of birds, including species not listed by CITES (only Denmark and the U.K.). Data on trade in migratory waterbirds could be substantially improved if all countries with known trade (determined through Step 1) were to introduce such comprehensive monitoring.

The monitoring and regulation of domestic trade in migratory waterbirds is likely to be substantially more difficult and resource intensive than is the case with international trade. Individual traders may work with many hundreds of contacts in dispersed rural villages who trap, or arrange for the trapping of, wild birds. It is therefore not surprising that there is currently little monitoring or control of domestic trade in wild birds, legal or otherwise, in many countries.

In those countries where capture of migratory waterbirds is serving a significant domestic market, there should, where possible, be more detailed assessments of the impact of harvests for domestic trade on wild bird populations. Ideally, an annual capture quota should be developed to cover species harvested for domestic use or export. Quotas should be allocated and monitored to keep harvests within established limits. To be effective, capture and export regulatory systems should be linked to ensure that permitted trapping levels do not exceed established harvest quotas.

High standards of animal welfare should be a fundamental component of all bird trade. This is also a conservation measure, since trade-associated mortality (through poor welfare) is likely to increase the number of birds removed from the wild to meet demand. As a result, this mortality may itself be considered a factor contributing to the decline of wild bird populations. Trade-associated mortality has been linked to inadequate provision of food and water, exposure to extreme temperatures, lack of adequate ventilation, disease, aggression and other causes. Ensuring acceptable levels of care is the responsibility of the trappers, the traders and all other persons involved.

Overall, where domestic trade appears significant for migratory waterbirds, regulatory procedures may be modelled on, and integrated with, those developed for CITES, and implemented through domestic legislation, as far as the resources and infrastructures of individual AEWA Range States will permit.

Step 5: Ensure any trade is sustainable for waterbird populations

Priority should be placed on determining the capacity of particular waterbird species to sustain various levels of harvest for trade. Using general knowledge of species biology and basic census techniques, it should be possible to establish safe harvest quotas without performing detailed studies of each and every species in trade. A sustainable trade harvest regime might include at least three major elements:

- harvest and export quotas based on monitoring of populations and ecological studies;
- monitoring and reporting of trapping and export activities;
- a system of profit-sharing with local communities.

The latter is important to ensure a sense of ownership and provide an incentive for wildlife conservation at the local level. Without such a programme of harvest management, any revision of quotas will be scientifically unfounded and cannot be expected to ensure that harvest levels are sustainable. It seems possible that harvest frameworks for hunting (see Guidelines No.5: *Guidelines on sustainable harvest of migratory waterbirds*) could be integrated with a framework for sustainable trade, since hunted birds may often be traded.

Step 6: Educate and raise awareness of trade issues

Many people, such as tourists and business travellers, remain unaware of international trade controls. Campaign materials, posters and information leaflets can be displayed or distributed, for example at airports, public meeting places and markets, to advise the general public about trade regulations. CITES materials are already available, but local education programmes, targeted where waterbirds are being collected for domestic or international trade, seem to be needed.

So too are partnerships that build links amongst all interested groups. These groups, which may involve governmental, non-governmental or commercial interests, may look at problems, share information, investigate issues and implement changes. When working together, each becomes more aware of the priorities of its partners. Further, the interest generated in combined efforts continues beyond the individual project, and with improved communication and information dissemination, each partner becomes more effective in regulating or managing trade on a sustainable basis.

AEWA Conservation Guidelines No.7

Guidelines on the development of ecotourism at wetlands

Step chart

In the development of ecotourism at wetlands, each country should take the following steps:

Step 1: Appoint a governmental committee for ecotourism.

Step 2: Undertake an evaluation of the ecotourism potential of AEWA sites.

Step 3: Prepare a priority list of areas in need of tourism management.

Step 4: Decide on the type of management plan required at each site.

Step 5: Conduct a feasibility study at the site.

Step 6: Assess the vulnerability of the waterbirds at the site.

Step 7: Assess tools for the management of ecotourism.

Step 8: Install a local ecotourism management committee.

Step 9: Draft an ecotourism management plan.

Step 10: Implement the ecotourism management plan and revise as necessary.

Introduction

Tourism is an important source of income for many countries. Nature-related tourism is a world-wide phenomenon that is expanding rapidly. Nature-related tourism is only profitable in the long run if it is managed in a sustainable way. If the people profiting from tourism come to realise this, tourism becomes a stimulus for nature conservation. As is said in park management in East Africa: “Wildlife pays, so wildlife stays”.

Ecotourism may be defined as nature tourism that contributes to nature conservation. In a well-managed area with ecotourism, the right balance is struck between use and preservation.

Ecotourism is the only form of tourism acceptable in most AEWA sites. Many countries have yet to make full use of the possibilities for ecotourism at their important wetlands, and it is here that the development of ecotourism should be promoted.

If ecotourism is to succeed in the long term, the following principles should be adopted:

- Ecotourism should lead to nature conservation.
- Culturally and economically sensitive community development is necessary.
- Ecotourism should be designed in such a way that local communities become less dependent on non-sustainable forms of land use. This will also increase awareness of the importance of nature conservation.
- Ecotourism companies in both the public and private sectors should have an environmental strategy. Well-educated staff~~s~~ are essential.
- Tour operators and tourists demand high environmental standards from their associates, hotels, transportation providers and destinations.
- High-quality information and services are essential.
- Planning and management capabilities are essential for long-term success.
- Environmental protection is based upon the financial viability of management, both in the public and private sectors.

Usually, protected area managers, especially in less developed countries, lack the technical, economical and organisational resources required to manage and develop tourist activities effectively. In most cases, it is more appropriate to let out concessions to individuals, companies or local communities for specific tourist activities. This implies having a sound management plan for the site, and also the need for good enforcement of the relevant regulations. Concessions, along with entrance fees, contribute to self-financing mechanisms.

Improper management of ecotourism often results in damage to the environment, problems with visitor satisfaction, group conflicts and problems with funding.

The government should recognise that tax-based budgets should, as far as possible, fund resource management, and the private sector should recognise its role in providing some of the required funding, especially for tourist management and research on tourism. Both the government and the private sectors should be involved in and may benefit financially from ecotourism. In some countries, such as Kenya and Canada, parts or all of the national park service have been converted into parastatal self-funding corporations, with the ability to set fees, provide services and operate with the same flexibility as operators in the private sector. These corporations earn the money they need for park management from their visitors and the ~~larger~~ wider community.

Step 1: Appoint a governmental committee for ecotourism

Many countries already have an inter-departmental body dealing with tourism and another body dealing with nature conservation and the management of protected areas. In the latter body, the sector responsible for visitor management is often weakly developed (see Box 1).

Box 1: Ecotourism in Africa

Within Africa, there is a contrast between Western and Eastern Africa in the management of ecotourism in national parks. Levels of tourism in Eastern Africa are much higher than the levels in Western Africa, although the latter also has significant natural resources.

The reasons for this are:
- more visible wildlife concentrations in Eastern Africa
- more highly developed national transportation networks
- better hotel facilities
- better trained tourism staff
- stronger marketing
- better tourism infrastructure in the parks

The development and monitoring of sustainable ecotourism projects should be co-ordinated by a special committee. For countries that do not have special governmental structures dealing with tourism and nature conservation, a first step should be the appointment of a governmental development and monitoring committee for ecotourism.

Many different government departments will have to be involved to cover all of the issues involved, *e.g.*:
- tourism
- nature conservation
- economic affairs
- transport and infrastructure
- agricultural affairs
- water management
- justice (legislation and law enforcement).

The committee should further include:
- an expert on ecotourism
- an expert on wetlands and migratory waterbirds
- an expert on sustainable building design and infrastructure
- representatives of the non-profit (NGO) and academic sectors.

These may have access to resources and specialised information or they may have a direct connection with the local people that the government and the private sector do not have.

If foreign experts are to be called in, national counterparts should be appointed, to be trained in evaluation and management of natural resources, environmental impact and ecotourism. Eventually, these national experts will be able to evaluate other projects by themselves.

In some countries, it may not be possible to do everything at once, but ideally the tasks of the committee should be:
- Developing insight into the present situation and the future potential of ecotourism in the country.
- Designing a strategy for developing sustainable ecotourism.

- Promoting national legislation that provides a legal framework for ecotourism activities in both the public and private sectors. The World Conservation Union-IUCN maintains an office in Bonn in Germany that specialises in environmental law and assessment, and could provide assistance in this regard.
- Preparing a national inventory of sites appropriate for the development of ecotourism, and a priority list of sites that are in most urgent need of ecotourism management (see Steps 2 and 3).
- Facilitating the preparation and implementation of management plans for these sites by helping to find the necessary funds and technical assistance for the parts concerning ecotourism (see Step 9, section 14).
- Promoting ecotourism, planning facilities and programmes related to ecotourism, encouraging public and private investment in facilities for ecotourists, and co-ordinating activities in all sectors of the ecotourism industry.
- Providing information on ecotourism.
- Serving as a liaison between countries about ecotourism.
- Evaluating the initiatives of others concerning ecotourism in protected and unprotected AEWA sites.
- Preparing national guidelines for handling ecotourism plans involving third parties. These should address:
  - fairness and a stable administrative environment for concessionaires;
  - a fair market value and reimbursement of costs to the government;
  - public safety and health;
  - assurances that tourism facilities and services offered to the public are satisfactory;
  - periodic inspection of concessions.
- Collecting data on national ecotourism.
- Monitoring and regulating ecotourism activities in the country.

Step 2: Undertake an evaluation of the ecotourism potential of AEWA sites

The potential for ecotourism should be evaluated at each site in the AEWA site inventory (see Guidelines No.3: *Guidelines on the preparation of site inventories for migratory waterbirds*).

For each site, the evaluation should consist of:

- Part 1: A description of the present situation regarding tourism and recreation.
- Part 2: An indication of the ecotourism potential, and a prognosis of:
  - the carrying capacity of the site, *i.e.* the maximum number of tourists that the site can accommodate on a sustainable basis;
  - the types of recreational activity possible in the area depending on the species of waterbirds occurring in the area, how the area is used by waterbirds, and the sensitivity of the habitats (see also Steps 6 and 7).

An expert on ecotourism and an expert on wetlands and migratory waterbirds should undertake the evaluation. Experts should visit sites for which the required information is not readily available. A draft of the resulting evaluation should be circulated to as many specialists as possible, and improvements made as necessary. The evaluation might then form the basis for one or more fundable projects.

Step 3: Prepare a priority list of areas in need of tourism management

Highest priority should be given to important waterbird sites in danger of becoming degraded by uncontrolled tourism. These will be the sites where tourism is intensive (Part 1 of the evaluation) and the carrying capacity is low (Part 2).

When a management plan is prepared for an AEWA site (see Guidelines No.4*: Guidelines on the management of key sites for migratory waterbirds*), all possibilities for sustainable ecotourism should be taken into consideration, especially if there is high potential for ecotourism.

Priority should also be given to protected areas for which management plans have already been prepared, and which seem suitable, according to information obtained in Part 2, for higher or more varied use by ecotourists than is presently the case (as established in Part 1). The management plan should then be updated with special regard to the development of a strategy for ecotourism.

If funds are already available to develop facilities for ecotourism at a particular site, this may be a reason to move the site higher up ~~on~~ the priority list.

A draft of the resulting priority list should be circulated to as many specialists as possible, and improvements made as necessary.

Step 4: Decide on the type of management plan required at each site

The initiative to develop ecotourism at a specific site may be taken either by the government (through the governmental committee for ecotourism), or by other bodies such as:

- officials of a local, regional or national park;
- a local, regional, national or international nature conservation NGO;
- a local, regional, national or international tourism organisation or tour operators;
- other organisations or individuals, such as hotel owners and operators of craft shops;
- a local community as a whole.

It is recommended that in each case a complete management plan be prepared (see Guidelines No.4: *Guidelines on the management of key sites for migratory waterbirds*). If this is not possible at the time, a special ecotourism plan could be prepared first. However, a comprehensive management plan should be developed as soon as possible.

The public sector, landowners, the private sector service providers and the local community as a whole have a responsibility to guide commercial development in an appropriate direction. In many instances, it will be necessary to adopt an integrated approach to regional planning throughout a much larger area than the site itself.

The public sector (local, regional or national government) is responsible for:

- environmental protection;
- the limits of acceptable change;
- monitoring of impacts and evaluation of quality;
- infrastructure (roads, airports, railway lines, electricity, sanitation);
- security and law enforcement;
- the resolution of conflicts.

The public or private sector, together with the local community as a whole, could provide:

- personal services (accommodation, food);
- transportation (buses, boats, ~~automobiles~~ motor vehicles, ~~air planes~~ aircraft);
- information (guides, films, books, videos);
- site promotion and advertising;
- consumer products (clothes, souvenirs, equipment).

Step 5: Conduct a feasibility study at the site

Before embarking on a detailed ecotourism management plan, a feasibility study should be carried out by a group of key persons including individuals who are involved or may have a future interest in management of ecotourism at the site. This study should include the environmental, socio-cultural and financial aspects.

If a nation-wide evaluation of the tourism potential of AEWA sites has already been undertaken by the governmental committee (see Step 2), this may be used as the basis for a site-specific feasibility study. The preparation of this feasibility study might form a fundable project.

The group of persons carrying out the study should, as a minimum, include:

- the owner of the site;
- representatives of local communities;
- an expert on ecotourism;
- an expert on waterbirds and wetland habitats;
- an expert in sustainable building design and infrastructure.

It is important that an experienced professional from the ecotourism sector is involved at this early stage.

The group should prepare a detailed outline of the potential of the site for ecotourism by exploring the possibilities for tourists to observe waterbirds without causing too much disturbance (Step 6), the available management tools (Step 7) and the possibilities for establishing facilities for ecotourists (Step 9). Taking socio-cultural aspects into consideration, the group should assess the financial viability of ecotourism at the site. If the results of the feasibility study are positive and a decision is taken to go ahead with the development of ecotourism, the group may itself form the nucleus of the ecotourism management committee for the site (see Step 8).

Step 6: Assess the vulnerability of the waterbirds at the site

The feasibility of developing sustainable ecotourism at an important site for migratory waterbirds will depend on how the birds use the site. Information on where, when and how each species uses the site should be gathered from the literature, waterbird experts and the local people. Special attention should be given to the requirements of globally threatened and near-threatened species using the area.

The site may be used by waterbirds as:
- a breeding site for dispersed species;
- a breeding site for colonial species;
- a moulting area;
- a staging area;
- a wintering area.

Different measures and precautions have to be taken for each of these different types of use.

A detailed study of the effects of disturbance on breeding birds in The Netherlands came up with a number of general conclusions that are ~~probably~~ applicable elsewhere in the AEWA area.
- A walking individual is more threatening to birds than are people in a ~~car~~ vehicle or on horseback.
- The disturbance caused by a group of people is comparable to that caused by a single person.
- The level of disturbance is linear to the logarithm of recreational intensity; thus, as the intensity of recreation increases, the extra disturbance caused becomes relatively less important.
- Sensitivity to disturbance is a combination of the level of 'shyness' of a bird and its risk of exposure to the disturbing factors.
- The level of 'shyness' is different for each species.
- Birds are more sensitive to disturbance in open habitats.
- The closer a bird nests to the ground, the more likely it is to be affected by disturbance.
- The greater the intensity of recreation, the lower the density of breeding birds, because birds move away from the disturbed areas to find alternative nesting sites elsewhere.
- The longer the breeding season, the greater the effects of disturbance. This is especially the case in Western Europe, because of the increase in recreation as the spring progresses. In this region, species with synchronised breeding early in the season are less sensitive to disturbance than species with protracted or late breeding seasons.
- Flocks of birds are more easily disturbed than solitary birds.
- Nidifugous birds can walk away from disturbance and therefore are less vulnerable to disturbance than nidicolous birds
- The more closely a species is tied to a specific habitat, the more sensitive it is to disturbance of that habitat.
- The more obvious and visible the species, the more sensitive it is to disturbance.

The breeding birds of the Netherlands were divided into sensitivity classes, and waterbirds were generally found to belong to the more sensitive groups (see Box 2).

Much research has been carried out on the effects of disturbance on waterbirds wintering and staging in estuarine habitats in Western Europe~~, but again,~~ and the results may be applicable elsewhere in the AEWA area. The most important requirement for migratory waterbirds on their staging and wintering areas is to secure enough energy (food) to reach their wintering grounds or their breeding grounds, to lay eggs and to raise their young. They need enough time to do this. In general, human disturbance adds to disturbance from natural causes, *e.g.* disturbance caused by birds of prey or the rising of the tide. At critical stages, this extra disturbance may be just too much. If the birds are disturbed, they have less time left for feeding, and also waste energy ~~fleeing~~ escaping from the disturbance. Furthermore, the

density of feeding birds is highest in the best feeding areas and, as with breeding birds, groups of birds are more easily disturbed than solitary individuals.

Box 2: Vulnerability of ~~Dutch~~ some European breeding waterbird~~s~~ species to disturbance from ~~———~~ recreation

Class 1: Very vulnerable to disturbance	**Class 2: Vulnerable to disturbance**	**Class 3: Fairly vulnerable to disturbance**
Ardea purpurea	*Podiceps grisegena*	*Ciconia ciconia*
Casmerodius albus	*Anser anser*	*Cygnus olor*
Ixobrychus minutus	*Tadorna tadorna*	*Anas platyrhynchos*
Botaurus stellaris	*Anas strepera*	*Bucephala clangula*
Ciconia nigra	*Anas crecca*	*Mergus serrator*
Platalea leucorodia	*Anas querquedula*	*Porzana pusilla*
Anas penelope	*Anas clypeata*	*Fulica atra*
Anas acuta	*Netta rufina*	*Charadrius dubius*
Somateria mollissima	*Aythya ferina*	*Charadrius alexandrinus*
Grus grus	*Aythya fuligula*	*Vanellus vanellus*
Recurvirostra avosetta	*Porzana parva*	*Tringa ochropus*
Eudromias morinellus	*Pluvialis apricaria*	
Numenius arquata	*Charadrius hiaticula*	
Philomachus pugnax	*Gallinago media*	
Larus melanocephalus	*Gallinago gallinago*	
Sterna nilotica	*Limosa limosa*	
Sterna sandvicensis	*Tringa totanus*	
Sterna hirundo	*Tringa glareola*	
Sterna paradisaea	*Tringa hypoleucos*	
Sterna albifrons	*Calidris alpina*	
Chlidonias leucopterus		
Chlidonias niger		

(Source: Henkens, 1998).

Disturbance is especially damaging at certain critical stages in the birds' annual cycle, when the energy demand is highest.

- Immediately after the breeding season, when the birds need to fatten up for migration.
- Immediately after migration, when they arrive at a staging or wintering area, and are still in poor condition.
- Immediately before the start of migration back to the breeding grounds and during stop-overs on or at the end of this migration. In these cases, the effects of insufficient food intake on individuals or populations may not be visible in the wintering or staging areas, but become apparent on the breeding grounds later in the season.
- During periods of extreme cold weather in winter.
- During the moult.

Step 7: Assess tools for the management of ecotourism

Powerful tools for the management of ecotourism at sites with important waterbird populations include:

- zoning in space;
- zoning in time;
- planning and mapping of the infrastructure;
- planning and mapping of other ecotourism facilities;
- ~~information for~~ informing ~~the~~ ecotourists and tour operators~~,~~ and marketing a site.

Zoning in space

This tool may be used to disperse visitors by opening up large parts of the area, or to concentrate use in certain parts by offering access possibilities there and limiting the possibilities elsewhere. Thus, a whole range of visitor densities in different parts of the area may be created. In addition, different types of visitors may be separated by providing different opportunities for recreation in different parts of the area, without imposing limitations on access. If necessary, parts of the area might be closed to the public, or declared open only for the purposes of scientific research.

Zoning in time

Waterbirds often use an area differently at different times of the year. In open areas, it is difficult to shield approaching visitors from the birds' view. It may be necessary to limit the number of visitors during certain times of the year, or to close down certain roads and paths so that a large proportion of the area (in the middle or at one corner) remains undisturbed. Seasonal restrictions on boating activities may be required at water bodies which support large concentrations of feeding or roosting waterbirds during the migration seasons and/or in winter. Moulting birds are especially vulnerable to disturbance, and visitors should be kept out of moulting areas during the moulting season.

In some cases, a little disturbance may not be too harmful. It may then be possible to satisfy the demands of two types of tourists by allowing them access at different times of the day. For example, in the morning visitors might be given access in slow-moving ~~cars~~ vehicles. This would give visitors an opportunity to see flocks of birds at close range. In the afternoon, access could be restricted to visitors on foot. The birds would move further away, but the visitor would have more of an outdoor experience.

Planning and mapping of the infrastructure

If possible, the existing infrastructure should be used as a starting point in the establishment of a network of trails, roads, boardwalks *etc.*, to prevent any unnecessary damage to the environment. The design should indicate the way the route is meant to be used (driving, walking, cycling). A trail can:

- lead visitors to observe and experience special features and spectacular localities;
- point out less obvious characteristics that most visitors would normally fail to notice;
- guide people away from places that the site managers do not want them to visit;
- confine visitors to specific points and narrow corridors in vulnerable areas.

Planning and mapping of other ecotourism facilities

- No facilities should be planned in open areas important for waterbirds, unless these are very large.
- In wooded areas, well-maintained hides or observation towers with carefully hidden access paths can be constructed to enable visitors to obtain close views of concentrations of waterbirds, *e.g.* breeding colonies of waterbirds.
- In sites that are used as wintering and staging areas, special attention could be given to constructing facilities (*e.g.* an open observation tower with a bench) for people to watch

the daily movements of certain species between feeding areas and roosts, both inside and outside the protected area. Such flights can be very spectacular, and many visitors enjoy standing or sitting at a strategic spot to see these at sunrise and/or sunset. It is often possible to find a good location for viewing these flights that does not cause any disturbance to the birds.

- Facilities such as benches and picnic tables encourage visitors to remain in one area for a considerable period of time, and should only be provided in areas where there is a low risk of disturbing birds. It may be advisable to plan clusters of such facilities at well-hidden sites, and provide only single benches or tables in more open areas, if at all.
- The planning of other facilities will depend on the numbers of visitors that are acceptable in the area. Large and attractive facilities will encourage large numbers of visitors; a lack of facilities will tend to keep numbers down.
- Facilities such as visitor centres and lodges, if advisable at all, must be situated well away from the areas important for the birds, and are often best planned outside the actual AEWA site. The capacity of lodges, hotels and campgrounds must be adapted to the carrying capacity of the site.

~~Information for the~~ Informing ecotourists and tour operators~~,~~ and marketing a site

- Visitors should be well informed about the measures that have been taken and the reasons for them. Ecotourists will appreciate good information, and are more likely to obey the rules if they understand them.
- Visitors should be given information on why the site exists, what there is to see, how they can see it, how to behave, and what there is to attract them back again. The objective is not to restrict user behaviour, but to modify it through improved understanding. There should be pre-trip information, information on arrival, and on-site information, given by guides, by leaflets or by signs along self-guided tours.
- Marketing and the distribution of accurate information may be a tool to attract more of the intended type of visitors, both nationally and internationally.

The feedback from tourists and other visitors may also be used as a management tool.

Step 8: Install a local ecotourism management committee

A local committee should be established to manage the development of ecotourism at an AEWA site. The extent to which the governmental committee (Step 1) should be involved will depend on the stage of implementation of an ecotourism management strategy for the country as a whole.

The local committee should manage the development of ecotourism at the site from the very beginning, and should have the authority to enforce the rules and regulations of the management plan it is to develop.

The ecotourism management committee may consist of the following:
- ecotourism experts;
- experts on waterbirds and their wetland habitats;
- experts in building design and infrastructure;
- resource managers and park officers (public, private);
- guides, if already available;
- local and regional politicians and administrators;
- subsistence farmers, local hunters and fishermen;
- commercial 'safari' hunters;
- commercial tourist operators;
- owners of hotels, lodges and campgrounds;
- service personnel;
- local vendors;
- other individuals who have an interest in the area.

It may be practical to begin with a number of sub-committees to analyse the different aspects of the work.

The tasks of the committee will be to:
- supervise collection and analysis of data on natural resources, visitor use and local use of the area;
- identify possible resource conflicts (*e.g.* between ecotourism and fishing);
- determine objectives for each tourist zone;
- design an ecotourism management plan (Step 9);
- evaluate the financial viability of each part of the plan.

If financial viability of the essential parts of the plan is secured, the committee will then take responsibility for:
- implementation of the plan (Step 10);
- monitoring, reviewing and revisi~~on~~ng ~~of~~ the plan.

The implementation plan should be a gradual, phased plan that can accommodate limited numbers of tourists and low finances in the early phases, and can be expanded in later phases as the need arises (*i.e.* as more tourists become interested in the site). Such a step-wise approach should be planned from the start. An additional advantage of this approach is that it is easier to incorporate modifications into the plan if the need for these becomes apparent from monitoring. A phased approach also provides better opportunities to measure success in implementation, and therefore better opportunities to demonstrate that the project is worthwhile and worthy of further investment. It may be difficult to obtain political support for a project if there are enormous initial capital costs but only long-term expectations.

Step 9: Draft an ecotourism management plan

Many examples of outlines for management plans can be found in the literature. The model used here is based on Guidelines No.4: *Guidelines on the management of key sites for migratory waterbirds*.

The ecotourism management plan should consist of the following:
1. Description of the site.
2. Ecotourism strategy.
3. Involvement of the local community.
4. Facilities inside the protected area.
5. Facilities that may be constructed inside or outside the area.
6. Facilities in the wider region.
7. Information material.
8. Marketing plan.
9. Education plan.
10. Monitoring plan.
11. Management strategies.
12. Co-operation in the public and private sectors.
13. Projects, programmes and work plans.
14. Financial plan.
15. Review plan.
16. Additional information.

As was emphasised in Step 5, a gradual step-wise approach should be adopted in the development and implementation of the management plan. The plan should accommodate limited numbers of tourists and low finances in the early stages, but should be designed to be expandable as the need arises (*i.e.* as more tourists visit the area).

1. Description of the site

Natural resources:
- Many countries have aerial photographs and land-use maps. Standardised data sheets can be used for the following:
  - a description of the habitats;
  - information on existing infrastructure and human activities (*e.g.* roads, docks, fishing, agriculture) that can serve as a starting point for the development of infrastructure for ecotourism;
  - an inventory of the species of waterbirds in the area and the way they use it (see Step 6).

  Much of this information may already be available as a result of the implementation of other AEWA guidelines.
- The relationship of the site to other ecosystems (*e.g.* the presence of important wildlife corridors) should be documented at all seasons.
- The possibility of twinning the site with one or more related areas should be considered (see Box 5 in Guidelines No.4: *Guidelines on the management of key sites for migratory waterbirds*).

Visitors:
- Data on the use of the area by visitors in different parts of the year and the day should be collected and analysed.

Local use:
- Data on the use of the site by the local population should be collected and analysed, to identify possible resource conflicts.

~~1.~~2. Ecotourism strategy

- Establish goals for the maintenance of environmental integrity, and determine limits of acceptable change.
- Determine the various types of zones for ecotourism in the protected area in both space and time, and delineate these on a map.
- Decide which types of activity are acceptable (hiking, cycling, rowing, driving off-road), in which zones and in which period of the year.
- Decide on the 'recreational carrying capacity' of the site, *i.e.* the number of people that the site can absorb at different times of the year.
- Develop ideas for guided tours, nature walks, self-guiding tours *etc*.
- Decide on procedures for allocation of access. Alternatives include:
  - First-come, first-served at the gate.
  - First-come, first-served at pre-registration. Pre-registration should guarantee visitors access to campgrounds, hotels, special tours and other facilities that may be limited. Pre-registration will depend on the availability of ~~inexpensive~~ simple computer systems and on good marketing.
  - A combination of both. A proportion of the available places is allocated at the gate, and the remainder at pre-registration. The proportions may vary at different times of the year according to holiday seasons.
  - Limit the length of stay by limiting the amount of time visitors can spend in the area, at the campgrounds or in the lodges or hotels.
  - Ensure that no exceptions are made to the rules, to prevent irritation amongst ~~the~~ visitors.
- Decide on access fees for tourists and tour operators. In some cases, the fees are higher for foreign tourists than for domestic tourists.
- Formulate guidelines for visitor behaviour and use. The Ecotourism Society has produced strict guidelines to govern all aspects of the ecotourism experience.
- Formulate guidelines for tour operators.
- Formulate guidelines for other user groups, *e.g.* local fishermen and hunters (see also Guidelines No.5: *Guidelines on sustainable harvest of migratory waterbirds*).
- Formulate contracts for concessionaires (tour guides, operators of hotels, lodges, campgrounds *etc*.).

3. Involvement of the local community

- Any restrictions on resource use indicated in the ecotourism strategy for the site should be taken into consideration. Implementation of other AEWA guidelines can provide information in this respect (sustainable harvest, crop damage, *etc.*).
- The main objectives of community involvement should be increased employment opportunities, diversification of the local economy, increased markets for local products and improved infrastructure for transportation.
- In some cases, the entire community can be involved in the management of ecotourism (community-based ecotourism).

A forum should be created with the local community to discuss local involvement in ecotourism activities.

- An inventory should be made of other local 'resources' of interest to ecotourists, *e.g.* historical sites, sites of architectural or archaeological interest, local crafts, local produce and folklore. This inventory should include not only the site itself but also the surrounding areas.
- Discuss which areas or buildings ~~the~~ tourists should not visit ~~because of~~ for religious or social reasons.
- Decide on possibilities for 'ethnic' tourist accommodation in the villages.
- Decide on the types and numbers of shops (souvenirs, local produce) and tours that will be permitted in and around the area.
- Discuss local involvement in bicycle and/or canoe rental or guided tours in the area.

Ecotourists require no special luxuries. Facilities should be well positioned ~~in~~ and well adapted to the environment, and preferably constructed in the local building style. Basic requirements include clean drinking water, good sanitation and good waste disposal facilities. These should be clearly sign-posted. The local surroundings should be kept as authentic, traditional, attractive and clean as possible.

It is possible that not all facilities and services can be owned and operated by local people from the outset, because of a lack of money and/or expertise. However, this could be a goal for the future. ~~The same applies to services.~~

4. Facilities inside the protected area

The type and number of ~~these~~ facilities will depend on the habitats, the way the waterbirds use the area, and on the ecotourism strategy. They may include:

- Roads. A network of well-defined viewing roads should be developed, and a strict policy against off-road driving should be enforced.
- Boardwalks, walking paths, nature trails and other interpretative trails.
- Cycling paths.
- Observation towers and hides, and, if necessary, screens along roads, paths and entrances to hides to shield approaching visitors from view.
- Rest areas and picnic areas; for ~~many~~ most ecotourists, a simple bench or picnic table will suffice.
- Boat ramps or piers for embarking on boat trips.
- Explanatory panels, signs, directions *etc*. These should not spoil the landscape.
- Facilities for clean drinking water.
- Energy.
- Facilities for sanitation and waste disposal.

5. Facilities that may be constructed in or outside the site

Depending on the ecotourism strategy, these may include:

- An education centre, with information and programmes for:
  - ecotourists;
  - guides and guards;
  - the local population.
- Guard posts in or along the edges of the site.
- Hotels and lodges.
- Campgrounds.
- Accommodation in or near people's homes.
- Cafes and restaurants.
- Restrooms.
- Bicycle rental facilities.
- Canoe rental facilities.
- Souvenir shops, local craft shops and shops selling local produce.
- Other shops, *e.g.* an outfitting company with specialised books, other relevant information, specialised equipment (binoculars, cameras, film *etc.*), appropriate clothing and food.

These facilities may be privately or publicly funded and/or managed. If they are privately constructed, a standard outline for a 'Tourism Concession Operational Plan' (see Box 3) and a set of standard conditions should be used, to ensure that the facility is developed in accordance with the ecotourism strategy for the site. It is important to ensure that even if the facility is not locally owned, local people are involved as much as possible in the running of the facility. Private guides (local or otherwise) should be required to operate within the framework of a pre-designed contract or concession.

Above all:

- Use a sensitive design for facilities that fits in well with the authentic local style. Fancy modern buildings should not be erected near attractive local villages.
- Construct facilities with a minimum of environmental impact. If possible, use local materials.
- Use low quantities of water.
- Use low quantities of electricity. Whenever possible, use water, wind or solar energy to generate electricity on site.
- Implement an appropriate system for the treatment of solid waste and wastewater.

Box 3: Concessions for tourist facilities

A report on the assessment of ecotourism in Bao Bolon and Kiang West National Park in the Gambia (USAID, 1994) contains an example of an outline for a Tourism Concession Operational Plan. This could provide a useful model for the management of tourist facilities in other areas.

The main contents of the operational plan are as follows:

I. Brief description of concession size and facilities

II. Visitor management
  A. Rules and regulations
    1. Storage areas
    2. Vehicle and boat parking
    3. Roads and traffic
    4. Beach and boat use
    5. Day use
    6. Length of stay
    7. Number of people

III. Facility management
  A. Hours of operation
    1. Yearly
    2. Seasonally
    3. Weekly
    4. Holidays
  B. Reservation and refund policy
  C. Services
    1. Scope
    2. Quality
    3. Rates
    4. Public comments
  D. Safety and sanitation
    1. Inspections
    2. Signs
    3. Garbage
    4. Fire detection
    5. Fire suppression
    6. Accident reporting

IV. Staffing and employment practices
  A. Number of employees
  B. Training

V. Public information
  A. Signs
  B. Literature
  C. Advertising

6. Facilities in the wider region

The regional and/or national government should take responsibility for providing adequate infrastructure in the surrounding area. If the ecotourism strategy allows for many more visitors than are currently using the area, it is important to ensure that the road network and public transportation services in the surrounding area are sufficient to cope with the predicted increase in numbers.

7. Information material

A variety of information materials should be made available to ecotourists and tour operators.

- Information on the natural resources of the site, especially the waterbirds. Books, a periodically published magazine or newsletter, posters, postcards and audio-visual materials might be prepared in co-operation with commercial publishers, with some of the profits going to the site.
- Interpretative trails. Information on signs in the area or in pre-recorded audio devices located at significant points along the trails. This information may also be available in brochures, nature trail guides and trail maps.
- Information on what is going on in the park, *e.g.* guided tours and programmes, such as slide shows, nature talks and campfire programmes.
- Information on other natural and cultural resources in the area.
- Practical information on accommodation (hotels, lodges, campgrounds), restaurants, shops *etc*.
- Practical information on access, restrictions, the range of opportunities for different experiences, the transportation network, prices *etc*.
- General information on the site that is available at other places within and outside the country, and can be sent out to visitors who book in advance. Good technical information should be available to assist visitors in planning their trips (*e.g.* information on whether or not they will require a 4-wheel drive vehicle).
- Information on how the facilities have been constructed and are run with minimum impact on the environment. This makes good advertising. If part or all of the visitor fees are being used in the management of the site, this fact should be made clear to the visitors.
- Information materials (slides, films, exhibits) for display in the visitor centre.
- Materials for training courses for reserve personnel and local guides (see section 9, below).

8. Marketing plan

Marketing materials should not only consist of information about the site itself, but also include information about other biological, cultural, historical and archaeological features of the area. In this way, it can be made clear that a visit to the region is worthwhile.

- National marketing can be carried out in combination with other sites in the country. Obtain expert advice on the best ways of advertising the opportunities for ecotourism, and decide how widely these opportunities should be advertised internationally.
- Develop a plan for the distribution of information materials.
- Develop a plan for the distribution of guidelines for ecotourists and tour operators.

9. Education plan

Education should be provided for all people working at the site. In several parts of the AEWA area, there are training possibilities for the employees of nature reserves. Some of the available courses include visitor management.

In many cases, training will have to be arranged at the site, with experts brought in from outside to run the training courses. Training is required for:

- Site managers.
- Guides (reserve personnel, local people).
- Guards.
- Personnel of visitor centres and education centres.

- Personnel of hotels, lodges, campgrounds and shops.
- Local volunteers.
- Tour guides and tour operators.

As many of the reserve personnel as possible should be fluent in one or more foreign languages. Environmental education programmes should also be organised for the local people (*e.g.* school children and people not directly employed in ecotourism).

10. Monitoring plan

Monitoring programmes, using standard data sheets, should be designed to measure:

- The impact of tourist use on environmental quality.
- Visitor numbers at different times of the year and in different parts of the site, group size, type and duration of visits, interactions between visitors, crowding *etc*.
- The quality and adequacy of the facilities (erosion of paths, development of undesirable paths *etc*.).
- The adequacy of the programmes offered to visitors, employees and the local population.
- Social impacts on local residents.
- Visitor satisfaction, and the extent to which the expectations of visitors (from oral and written pre-trip information) have been fulfilled. High visitor satisfaction is very important to promote the site.
- The financial results.

11. Management strategies

Strategies should be designed to manage:

- Environmental impact (trail maintenance programmes *etc*.). The maintenance of hides and screens, for example, is very important to prevent disturbance to the waterbirds.
- Tourist numbers and problems with over-crowding.
- Water resources, energy and human waste.
- Law enforcement. A small number of badly behaved visitors can have a large negative impact on the natural and social environment.

12. Co-operation in the public and private sectors

Good management is dependent, in the long run, on ~~permanent~~ regular feedback from all people involved. This is the only way to prevent conflict between different interest groups. The local ecotourism committee should meet regularly at or near the site, and experts should be invited to attend these meetings as necessary.

13. Projects, programmes and work plans

All proposed ecotourism activities at the site should be formulated in well-defined projects, programmes and work plans. These should describe exactly what should be carried out and when, who will be involved, and how much it will cost.

14. Financial plan

The aim of financial management should be to make the area self-financing. Funding is required for:

- construction of facilities;
- maintenance of facilities;
- management personnel;
- education;
- monitoring;
- research.

The government will be responsible for some elements of the funding, while the private sector may be largely responsible for others (see Step 4). Private entrepreneurs should cover a proportion of the costs of construction and maintenance of those public facilities that benefit private enterprise.

The national government may ask for a small part of the revenues derived from ecotourism at the site, for example to develop and maintain the infrastructure in the region. As far as possible, however, the bulk of the profits should be used for management of the park itself and the economic, social and ecological development of the surrounding area.

Implementation of the plan should not be started until funding for the essential parts of the plan has been secured.

15. Review of the plan

Review of the plan is a continuous process. Reports reviewing progress with projects, programmes and work plans should be produced at frequent intervals.

16. Additional information

The ecotourism plan can also include:
- a list of references (literature);
- a list of resource persons (experts) and organisations;
- a list of tour operators who could be involved;
- a timetable for the implementation of the plan;
- a timetable for the associated projects, programmes and work plans;
- the budget.

A draft of the ecotourism plan should be circulated to experts in all relevant fields for comments and improvement.

Step 10: Implement the ecotourism management plan and revise as necessary

In the development of ecotourism at a site, initial financial investments are required before any revenues can be generated**.** Implementation of the ecotourism plan should not be started until financing of all essential parts of the plan (as formulated in projects, programmes and work plans) is assured. Otherwise, in the long run the costs, in terms of damage to the natural environment and other resources, may forever exceed the profits.

For implementation and revision procedures, see Guidelines No.4: Guidelines on the management of key sites for migratory waterbirds.

AEWA Conservation Guidelines No.8

Guidelines on reducing crop damage, damage to fisheries, bird strikes and other forms of conflict between waterbirds and human activities

Step chart

To reduce crop damage, damage to fisheries, bird strikes and other forms of conflict between waterbirds and human activities, each country should take the following steps:

Step 1: Identify the problem of damage to crops, fisheries, aircraft or other forms of conflict between waterbirds and human activities.

Step 2: Organise a multidisciplinary team to tackle problems.

Step 3: Develop an action plan for the reduction of damage to crops, fisheries or aircraft.

Step 4: Implement action plan and follow up with project activities.[?]

Introduction

Reducing damage by birds to crops, fisheries or aircraft can be a complex, lengthy and expensive process. Solutions will vary greatly between species, sites and countries. These guidelines should therefore be interpreted as a flexible code of conduct.

General problem

In many parts of the AEWA area, local reductions in hunting pressure, the creation of ~~numerous~~ bird sanctuaries~~,~~ and the expansion of rubbish tips have led to increased survival rates amongst some species of birds, and this has allowed several populations of waterbirds to undergo dramatic increases in recent decades. ~~This,~~ These increases, coupled with the intensification of human activities in agriculture, aquaculture, commercial and recreational fisheries, and aviation, ~~has~~ have led to ~~much~~ greater conflict between some waterbird species and these and other human activities. Furthermore, populations of migratory waterbirds that are increasing as a result of increased protection in one country may cause damage to crops or fisheries in one or more other countries. International co-operation is therefore required to address these conflict situations. It is important to note that critically small populations of waterbirds may become threatened as a result of the loss of individuals due to collisions with aircraft or accidental capture in fishing nets, as well as through measures taken to reduce damage caused by the birds.

Although the [Red-faced Dioch] [Red-billed Quelea?] *Quelea quelea* is known to cause more damage to crops in Africa than any other wetland-related bird, the problems with this species are not considered in these guidelines for two reasons. Firstly, the birds are not migratory waterbirds and are therefore not covered by the AEWA, and secondly, the problems are of a very different magnitude, involving concentrations of up to tens of millions of birds.

Definition

It is possible to distinguish three main types of damage to human interests caused by waterbirds.

1. *Crop damage* is the degradation by waterbirds of crops cultivated for objectives other than the conservation of waterbirds. Crop damage involves consumption of the crops by waterbirds, but it may also involve damage to the crops through trampling. The most frequently recorded damage in Europe occurs through grazing of cereal crops and pasture by ducks, geese and swans during the winter and spring periods. In some limited circumstances, other crops such as vegetables may be involved. In Africa, most crop damage is caused by ducks and waders in rice fields (see Box 1).

2. *Damage to fisheries* is defined as the consumption of fish, shrimps or bivalves by waterbirds, especially from aquaculture ponds. ~~Furthermore, it~~ It may also involve damage to aquaculture ponds through water pollution from defecation. Consumption of free-living stocks of fish, shrimps or bivalves by waterbirds is also included in this definition. Cormorants, pelicans, herons and gulls are the most important problem species (see Box 2).

3. *Bird strikes* are defined as collisions between single birds or flocks of birds and fixed-winged aircraft or helicopters. Bird strikes pose a great danger to both birds and aircraft. Jet propulsion engines are especially vulnerable to bird collisions. A wide variety of species may cause bird strikes, but the most important species are gulls and other large waterbirds (see Box 3).

Objectives

The principal objectives of these guidelines are to maintain the conservation status of migratory waterbirds while minimising or preventing damage to agricultural crops, fisheries or aircraft.

Box 1: Examples of crop damage

Negative effects of grazing

Ducks and geese in northern Tanzania damage up to 10% of the rice nurseries by foraging and up to 30% of the newly replanted plots by trampling, uprooting and fouling (Birkan *et al.*, 1996).

Over two million geese, swans and ducks in Europe cause damage to grassland and cereal crops through grazing on pasture and arable land in winter and spring (Fox *et al.*, 1991; Van Roomen & Madsen, 1992; Birkan *et al.*, 1996; Van Eerden, 1997).

In Southern Europe, trampling of recently planted rice by storks, flamingos, herons and waders is frequently reported (Luis Costa & Rui Rufino, pers. comm.). Purple Swamphens *Porphyrio porphyrio* and Common Moorhens *Gallinula chloropus* are also said to be responsible for a 'considerable' loss of the rice harvest and other crops in Spain, at least on a local scale (Andy Green, pers. comm.).

Hypothetical negative effects of grazing

Species of Anatidae, especially geese, may compete with livestock for critical pasture resources around water holes, ponds and lakes in the Sahel zone of Africa. There is also a potential for the transfer of epizootic pathogens when livestock feed on the droppings of birds concentrated around these ponds and lakes.

Neutral effects of grazing

Several species of Anatidae, *e.g.* Garganey *Anas querquedula* and Fulvous Whistling-Duck *Dendrocygna bicolor*, commonly forage in rice fields in West Africa (Senegal and Mali), and yet do not eat important quantities of rice (up to 3-6% of the annual production). Waders, *e.g.* Black-tailed Godwit *Limosa limosa* and Ruff *Philomachus pugnax*, in West Africa (Senegal, Mali, Guinea-Bissau and Nigeria) forage mainly on spilt rice after the harvest, and are not generally regarded as pests on the rice crop (Tréca, 1990; Birkan *et al.*, 1996; Ezealor & Giles, 1997; Leo Zwarts, pers. comm.).

The damage caused by grazing geese to cereal harvests in Europe may vary from no effect to a 30% loss in yield. Early winter grazing by geese on arable land often causes no damage (Fox *et al.*, 1991; Van Roomen & Madsen, 1992; Birkan *et al.*, 1996).

Positive effects of grazing

Early winter grazing on wheat in Europe may actually increase the harvest. Grazing by geese and swans on waste, such as waste potatoes, waste sugar-beet or spilled grain after harvest, may help in preventing the dispersion of diseases, such as potato-root eel worms (Fox *et al.*, 1991; Van Roomen & Madsen, 1992; Birkan *et al.*, 1996).

In Southern Europe, rice crops may benefit from the predation on American Cray-fish by storks and herons (Luis Costa & Rui Rufino, pers. comm.).

Box 2: Examples of damage to fisheries

Terns, *e.g.* Caspian Tern *Sterna caspia*, and gulls *Larus* spp. are hunted in Romania to protect fishponds (Glutz von Blotzheim & Bauer, 1982).

In Israel, egrets *Egretta* spp. that become trapped under the netting over fishponds are killed by the fishermen (Thor Veen, pers. comm.).

In Canada and Scotland, Red-breasted Mergansers *Mergus serrator* and Goosanders *M. merganser* feed on salmon and trout, and thus come into conflict with sport fishermen (Murton & Wright, 1968).

In The Netherlands and the U.K., Common Eiders *Somateria mollissima* and Eurasian Oystercatchers *Haematopus ostralegus* feed on commercial stocks of mussels *Mytilus edulis* and cockles *Cerastoderma edule* (Murton & Wright, 1968; Piersma & Koolhaas, 1997).

Great Cormorants *Phalacrocorax carbo* at Lake Ijsselmeer in The Netherlands forage on the young of commercial fish species. The total amounts (kg/ha) of Perch *Perca fluviatilis* and Pike-Perch *Stizostedion lucioperca* consumed by the cormorants are of similar magnitude to the amounts caught by the commercial fishery. However, the total quantity of Eels *Anguilla anguilla* consumed by the cormorants is less than 5% of the commercial catch (Van Dam *et al.*, 1995; Van Eerden, 1997).

Gulls often carry bacteria, such as *Salmonella, Campylobacter* and *Listeria,* which may cause enteric disease (Monaghan *et al.*, 1985). Defecating Herring Gulls *Larus argentatus* and Lesser Black-backed Gulls *L. fuscus* infect shellfish ponds with bacterial contamination in the Delta Area in The Netherlands.

Box 3: Examples of bird strikes

The first reported crash of an aircraft as a result of a bird strike was in 1912 in the USA**,** when a gull was caught in the control cables of a Model EX Wright Pusher.

In 1960, at Boston in the USA, an Electra flew into a flock of Common Starlings *Sturnus vulgaris* soon after take-off, and three engines were damaged. The aircraft crashed, and 62 persons were killed.

In 1975, at J.F. Kennedy Airport in the USA, a DC-10 crashed during take-off, after colliding with several feral Canada Geese *Branta canadensis*. The aircraft was subsequently destroyed by fire, but none of the 139 persons on board was seriously injured.

Also in 1975, at Dusfold in the UK, a HS125 Viper flew into a flock of Northern Lapwings *Vanellus vanellus* during its initial climb. Birds were sucked into both engines, and the plane crash-landed on a passing car. The nine occupants of the aircraft escaped, but the six occupants of the car were killed.

In 1988, at Bahar Dar in Ethiopia, a Boeing 737-200 sucked numerous pigeons into both engines during take-off, and crashed at the airport. Thirty-one passengers were killed.

In 1991, in Masai Mara in Kenya, the windshield of a Piper PA31 was penetrated by a White-headed Vulture *Trigonoceps occipitalis*. The crash killed all nine people on board.

In 1992, also in Masai Mara in Kenya, a Cessna 401 at cruising altitude struck a Marabou Stork *Leptoptilos crumeniferus*, lost a wing tip fuel tank and crashed**.** All seven occupants of the aircraft died in the crash.

In 1996, at Eindhoven Airport in The Netherlands, a Lockheed C-130 Hercules aircraft crashed during its approach as a result of flying into a small group of migrating Common Starlings *Sturnus vulgaris*. Thirty-four people were killed in the crash.

(Sources: Linell *et al.*, 1996; Murton & Wright, 1968; http://www.airsafe.com/birds/signif.htm).

Step 1: Identify the problem of damage to crops, fisheries, aircraft or other forms of conflict between waterbirds and human activities

General

Once a problem of damage by waterbirds has been reported, the first step should be to document all those sites at which the problem occurs and to identify the species of waterbird concerned. The status, trends, migratory routes and ecological requirements of the species should then be determined. Where the survival of a species or population of waterbird is at risk, measures should be taken to minimise this risk. A case history should be developed: has there always been this conflict, and what has caused it~~:~~? are there any similar cases in the literature, and if so, how was the problem solved? (See Boxes 1, 2 and 3).

The socio-economic and legal aspects of the problem should also be investigated. The national policy, if any, regarding waterbird conservation and damage reduction should be assessed. This might include checking existing provincial, national and international legislation and regulations, and provision of new measures ~~and required permits~~ as necessary. Socio-economic studies should be carried out to assess the impacts, costs and benefits of the damage reduction measures to the people concerned, such as farmers (see Box 4) and fishermen. A thorough assessment should be made of the attitudes of the local people, especially the affected farmers or fishermen, to the proposed measures. The measures should be fully understood, accepted and supported by the local people concerned. Damage reduction must take place with the full permission and involvement of all relevant government agencies. It should be noted that damage reduction measures are often long-term projects that require the commitment of long-term financial, local and political support.

Box 4: Damage assessment.

Assessment of loss in yield due to grazing by geese is complicated. Many methods have been used in an attempt to assess the extent of crop damage (Van Roomen & Madsen, 1992; Bruggers & Elliott 1989).

1. The yield of grazed parts of a field can be measured and compared with the yield of ungrazed parts of the same field. This is a rapid method, but as most fields are not homogeneous, it may result in under-estimation or over-estimation of the damage, depending on the productivity of grazed and ungrazed parts.
2. The extent of the damage can be measured by comparing fields with different grazing pressures. Grazing pressure is expressed as numbers of goose-hours, based on regular counts of the numbers of geese utilising the area. This method can be quite inaccurate, because of the unreliability of estimates of grazing pressure, especially if these are based only on weekly counts.
3. The most common method of calculating grazing pressure is to relate the cumulative number of goose droppings to the yield. Exclosures can be used as control plots to assess the loss in yield.
4. Experimental methods that expose vegetation to extremely high grazing pressures by captive geese are of limited value, as they do not reflect the natural situation.
5. The simulation of grazing by clipping and artificial trampling can be used to exclude variables that may influence yield. However, natural grazing can differ considerably from this simulation.

The impact of goose grazing on yield is much greater in spring than in winter, especially after a severe winter. Other factors, such as soil condition, may also be important.

Crop damage

In cases of crop damage, an inventory should be made of the extent of the damage (actual and potential), through both desk and field studies (see Box 5). The financial damage should be estimated by calculating the actual or potential loss of harvest due to grazing or trampling by waterbirds (see Box 4).

Box 5: Crop damage statistics.

In Canada, the government spends $3 million a year on a crop damage prevention plan and $10 million a year on a programme of compensation. This is only 1.3% of the estimated $1 billion a year that is generated by activities related to waterfowl hunting, viewing and tourism. Compensation is paid at a rate of 80% of the value of the crop that has been lost. This, in effect, constitutes 100% compensation, as there are no harvesting expenses associated with a destroyed crop (Van Roomen & Madsen, 1992).

In the European Union, losses in yield of cereals range from 0 to 56% and losses in yield of grass from 0 to 40%. Although the annual loss to the individual farmer may be as high as £402 per hectare, the loss to the EU is less than this because of the resulting reduction in agricultural surpluses. In this way, grazing by geese can save the EU up to £69 per hectare. Furthermore, geese may benefit the local economy by attracting bird-watchers who spend money in the area, create employment and extend the tourist season (Van Roomen & Madsen, 1992).

The extent of the damage to crops caused by waterbirds in Europe, and the national policies and management measures used to alleviate the problem, are indicated by country in Appendix I in Van Roomen & Madsen (1992). In The Netherlands, the Game Fund and the Government have paid between Dfl 1 million and Dfl 3 million annually in compensation to farmers for damage to grassland and arable land. Damage caused by geese and swans is fully compensated; damage caused by ducks is only compensated under exceptional circumstances. In Germany, the annual damage to crops has been estimated at DM 2 to 3 million, of which DM 1 to 1.5 million is paid in the form of compensation or nature management contracts.

Damage to fisheries

In cases of damage to fisheries, various complementary investigations are required. The nature of the problem should be determined by identifying the fish habitats (fishponds, fishery areas, foraging areas for waterbirds) and the species of waterbirds involved. The status, trends and ecological requirements of the fish species should be identified. If possible, the composition of the diets of both the waterbirds and the fish species should be determined, to establish the ecological food chain. An estimate should be made of the quantities of fish taken by industrial and artisanal fisheries, by fish farmers, by waterbirds and by predatory fish. The financial damage should be estimated by: (1~~a~~) calculating the carrying capacity of the area for fish (stocked or free-living) and fish-eating waterbirds; and (2) calculating the loss of fish harvest due to predation by waterbirds or predatory fish (see Box 6). However, this can be difficult because of a lack of funding, time and local expertise.

Box 6: Statistics on damage to fisheries.

In the USA, the damage to fisheries caused by cormorants *Phalacrocorax* spp. has been estimated at $20 million annually, in an aquaculture industry worth $174 million. To reduce the damage, cormorants are being scared away to refuge areas, and are being shot (92,400 birds annually, or 5-10% of the total population of 1-2 million birds).

State fish farms in Poland have estimated the annual loss of both fish and fish food due to waterbirds to be 240 million Zloty (Van Roomen & Madsen, 1992).

Bird strikes

Bird strikes can be very dangerous to both humans and birds (see Box 3). Measures should be taken to maximise human safety both inside the aircraft and outside ~~near~~ in the vicinity of airstrips and other potential bird strike areas. The financial and social damage that would be

incurred in the event of a plane crash should be estimated (see Box 7). In order to minimise or prevent bird strikes, potential bird strike areas should be identified. Most bird strikes occur in the vicinity of the following:

- Airports and runways. The risk of air strikes is highest during take-off and landing.
- Important bird sanctuaries (especially wetlands). Aircraft flying at altitudes of less than 1,000 ft over wetland reserves are especially susceptible to bird strikes because of the regular movement of large waterbirds between feeding and roosting areas.
- Large rubbish tips. These may create a high risk of bird strikes because of the considerable numbers of birds that they attract, especially gulls, vultures, kites and herons.
- Migratory corridors.
- Other places where large concentrations of birds are known to occur.

Box 7: Bird strike statistics.

Annual losses in the USA due to bird strikes have been estimated at $200 million in damage to civilian aircraft, and $45 million in damage to military aircraft. There has been an average of seven human fatalities a year (Linell *et al.*, 1996).

A risk assessment suggests that between 1997 and 2006 there is a 25% probability of a bird strike event in the USA or Canada causing a fatal accident in jet transportation, involving the loss of 9.2 lives, 1.3 aircraft and $149 million (www.airsafe.com/birds/birdrisk.htm).

Over 300 people have been killed world-wide as a result of bird strikes (www.lrbcq.com/nwrcsandusky/bscusa.html).

Between 1988 and 1992, over 25,000 bird strikes involving civil aircraft were reported world-wide (www.airsafe.com/birds/threat.htm).

Of an estimated 11,000 bird strikes per year, about 2,200 (20%) are reported by civil aircraft in the USA (www.lrbcq.com/nwrcsandusky/bscusa.html). In Canada, it is estimated that only about 30% of all bird strike incidents are reported (www.tc.gc.ca/aviation/aerodrme/birdstke/info/hazard.htm).

UK registered aircraft of over 5700 kg (12,500 pounds) strike a bird about once every thousand flights (www.airsafe.com/birds/threat.htm).

More than half of all bird strikes occur at less than 30 metres (100 feet) above ground level (www.airsafe.com/birds/threat.htm).

The parts of an aircraft most frequently damaged by bird strikes are engines (22%), wings (21%), noses (19%) and windshields (www.afsc.saia.af.mil/AFSC/Bash/ impacstat.htm).

About 6-7% of all bird strikes result in aircraft damage (www.airsafe.com/birds/threat.htm).

Bird strikes can involve over 100 birds at a time (www.airsafe.com/birds/threat.htm).

Gulls (30%) and waterfowl (13%) are the most commonly reported birds struck by civil aircraft in the USA. In recent decades, populations of Double-crested Cormorants *Phalacrocorax auritus* (around the Great Lakes), American White Pelicans *Pelecanus erythrorhynchos* and Canada Geese *Branta canadensis* have increased dramatically in the USA, resulting in higher risks of bird strikes involving these species (www.lrbcq.com/nwrcsandusky/bscusa.html).

Over 99% of all bird strikes in the USA involve species that are protected at federal level under the Migratory Bird Treaty Act (www.lrbcq.com/nwrcsandusky/bscusa.html).

While any airport may have bird strikes, airports near migration routes or adjacent to wetlands or wildlife reserves are at a higher risk of having a significant bird strike hazard (www.airsafe.com/birds/threat.htm).

An inventory should be made of all those bird species that are potentially dangerous to aircraft. The risk of bird strikes should be estimated for various densities of flying birds at different altitudes through a combined field study and literature review of the aerial, breeding and migratory behaviour of the birds (see Box 7). The density, maximum and preferred flight altitudes, and seasonal occurrence of each species should be determined. At most major airports, there is a universal, scaled radar list with bird migration/activity intensities, varying from 0 (no birds on the radar screen) to 8 (radar screen completely filled with birds). The complete scale is: 0 - no risk of bird strikes; 1 - extremely small risk; 2 - very small risk; 3 - small risk; 4 - fairly small risk; 5 - fairly great risk; 6 - great risk; 7 - very great risk; 8 - extremely great risk. Note that no attempt has been made to translate this scale into a measure of the actual intensity of bird migration or other bird activity.

Step 2: Organise ~~a~~ multidisciplinary team~~s~~ to tackle problems

If there appear~~s~~ to be ~~a~~ problem~~s~~ involving conflict between waterbirds and human activities (agriculture, fisheries, aviation), ~~a~~ multidisciplinary team~~s~~ should be assembled to investigate measures for reducing the~~se~~ conflict~~s~~. A national focal point, responsible for co-ordinating all activities relating to conflicts between waterbirds and human activities, should be identified. This focal point should define any project to be carried out, and should appoint a project leader and a multidisciplinary team for the duration of the project.

Team composition

The project leader and team members may all be selected from government sources, or they may include:

- stakeholders (*e.g.* farmers, fish farmers, fishermen or air traffic controllers);
- representatives of responsible agencies (*e.g.* individuals from national and international bird strike committees, managers of nature reserves, or experts from international organisations such as the Food and Agriculture Organisation of the United Nations-FAO);
- biological or technical specialists (*e.g.* biologists, ornithologists, specialists in the assessment of crop damage, radar specialists or hunters);
- professional advisers (*e.g.* socio-economists, representatives of national conservation agencies such as NGOs and research institutes, and representatives of international conservation agencies such as BirdLife International and Wetlands International).

The project leader and team members should be given sufficient government support (financial and logistic~~al~~) to fulfil their task. The AEWA Secretariat could facilitate international co-ordination of the national teams.

Step 3: Develop an action plan for the reduction of damage to crops, fisheries or aircraft

Preparation

A multidisciplinary team should be assembled, with access to expert technical advice at all stages in the project. The duration of the project should be predicted, within the context of the agreed aims and objectives. A monitoring programme should be designed to measure the extent of the damage (to crops, fisheries or aircraft) before and after the project. Public awareness of the problem should be raised in all those Range States where it occurs. The approval of relevant governmental agencies, landowners, fish farmers and fishermen should be obtained, and co-ordination with national and international conservation organisations established. Indicators of damage reduction (to crops, fisheries or aircraft) should be identified.

Action plan

An action plan should be developed on the basis of the damage inventory, the review of comparable cases and the assessment of socio-economic and legal requirements carried out in Step 1. The action plan should take into account the fact that many waterbirds and their natural habitats are accorded protection under various international treaties and conventions. Various general measures and precautions can then be taken to avoid or minimise the damage. It should be remembered that birds might become accustomed to certain measures, *e.g.* scarecrows, with the result that these measures can lose much of their effectiveness in controlling damage. If possible, a 'win-win' scenario should be pursued, in which benefits accrue to both humans and waterbirds. Adequate funding should be secured for all measures to be taken.

General measures

- Crops, fish, or aircraft may be protected by keeping birds away from sensitive areas through the creation of physical or ecological barriers. Examples include erecting exclosures to protect valuable crops, stringing wires or nets over fishponds, changing water levels or the height of the vegetation to make the habitat unsuitable for waterbirds, and covering up potential food supplies.
- Crops, fish, or aircraft may be protected by scaring birds away from the site through the use of aerial predators (*e.g.* birds of prey), ground predators (*e.g.* foxes, dogs and cats), scarecrows, hunters, guards or loud noises (*e.g.* calls of predators, calls of birds in distress, and gun shots).
- Crops, fish, or aircraft may be protected, if keeping away birds from sensitive areas through the creation of physical or ecological barriers or by scaring birds away doesn't work, –by controlling the populations of the bird species causing the damage through trapping, shooting ~~or poisoning~~ of adults or destruction of eggs and nests. **[???]**
- The birds may be provided with alternative feeding and roosting areas (secure refuges) at a considerable distance from the sensitive areas.
- Financial compensation can be paid to companies or individuals suffering damage (see Box 5).
- Damage may be reduced or prevented by adopting alternative forms of land use in areas especially prone to damage from waterbirds.

Measures to reduce crop damage

- Damage to crops can be reduced or eliminated by growing crops that are unattractive to birds.
- The damage caused by migratory birds can often be reduced by changing the planting or harvesting times or by ~~clever~~ other husbandry practices.

- Land that is especially prone to crop damage by waterbirds could be purchased from the farmers and incorporated within protected areas.

Measures to reduce damage to fisheries

- Aquaculture ponds (fish and shellfish) may be protected from waterbirds by erecting netting over the water surface.
- Damage may be reduced or prevented by taking care in the selection of a location for aquaculture development (*e.g.* it would not be sensible to construct fishponds in the vicinity of a large cormorant colony).
- Free-living fish stocks may be protected from over-harvesting by limiting commercial fisheries and/or intensive artisanal fisheries through legislation or restrictions on catch. The regulation of extensive artisanal fishery catches by legislation and the control of fish-eating birds by reduction of bird populations do not normally have a large positive impact on the stocks of free-living fish, although there are great variations from case to case.
- In some cases, the removal of small fish by waterbirds actually enlarges the total fish yield. Control of waterbirds in these situations would be counter-productive.
- Seabirds that are used by fishermen to locate fish shoals at sea should be protected.

Measures to reduce bird strikes

- The incidence of bird strikes around airports can be reduced by clearing the area of large bird roosts, breeding colonies of waterbirds and rubbish tips, using one or more of the general measures listed above.
- Physical protection should be added to aircraft to minimise the damage when collisions do occur.
- A standard procedure should be followed during bird migration.
    1. Bird movements should be recorded on a network of radar stations.
    2. An international bird movement warning system should be developed through this radar network.
    3. Whenever a major bird movement is recorded on radar, bird intensity warnings should be sent out to other radar stations. These warnings should contain details of the observation station, observation method, observation time, species involved (if known), intensity of movement, flight direction, flight speed, flight altitude, and validity. If the intensity of the movement reaches 7 or 8 on the intensity scale, warnings should be issued to all aircraft in the vicinity to fly at a minimum altitude of 660 metres (2000 feet) above ground level. Measurements of the intensity of the movement should be stepped up, and the minimum altitude of 660 metres should remain in force until the intensity falls below 7. Warnings of movements of intensity 7 or 8 at one airport should apply equally to neighbouring airports in the close vicinity.
- No-fly zones for low-flying aircraft should be declared in particularly sensitive areas. These are especially relevant to military aircraft, helicopters and small private planes that commonly fly at low altitudes. Large civilian aircraft usually fly at altitudes well above the maximum altitude of most birds.
    4. Aircraft should try to avoid flying at low altitude over bird sanctuaries, large rubbish tips or other areas harbouring large concentrations of birds.
    5. If this is inevitable, aircraft should not be permitted to fly at altitudes of less than 330 metres (1,000 feet) or preferably 500 metres (1,500 ft) over bird sanctuaries, large rubbish tips and other known bird haunts.
    6. The minimum altitude should be increased or low-level flights banned completely during particularly dangerous periods, *e.g.* over major roosting sites during the migration season, and over large breeding colonies during the breeding season.

Some solutions for reducing the risk of bird strikes are discussed in Box 8.

Box 8: Potential solutions for damage reduction

The following techniques should be used in combination because most waterbirds quickly become accustomed to any single technique.

Modify the landscape
Many geese and ducks require short, green grass for food. Allow grass to grow longer to make it unpalatable to waterbirds, or plant less attractive vegetation along the edge of the water. Waterbirds prefer to build their nests on islands, peninsulas and undisturbed grounds. Make this favourable breeding landscape unfit for waterbirds. Weed control in rice fields reduces the attractiveness of this habitat for waterbirds that feed on small weed seeds.

Prevent nesting
An easy way to control nesting waterbirds is to destroy their eggs or nests. However, before interfering with nesting, check local and national regulations concerning permits.

Install barriers
Most species of Anatidae prefer to land on water and walk onto adjacent grassy areas to feed and rest. The most effective but expensive tools for controlling the movements of waterbirds are nets, wires, fences, hedgerows and other physical barriers (Van Roomen & Madsen, 1992).

Using scaring devices
Large helium-filled balloons, tricycles with balloon tyres, strobe lights, scarecrows with movable parts, bird-scaring reflecting tape, Mylar flags, screamer sirens, whistle bombs, shell crackers and automatic exploders will help to keep most waterbirds from feeding and resting properly. Scaring devices are only effective when several types of device are used alternately. Before using any scaring device, check local and national regulations concerning permits (Van Roomen & Madsen, 1992)

Utilise dogs
A very effective method of scaring waterbirds is the use of free-ranging dogs trained to chase waterbirds as soon as they land. However, local leash laws may prevent the use of such dogs.

Relocation
Small numbers of birds that constitute a particular nuisance can be moved to another area (*e.g.* a nature reserve) by live-trapping or tranquillising (*e.g.* with alpha-chloralose; Pimentel, 1991). Be sure to relocate the birds far enough away, so that they do not return to the original site. Check also to ensure that the relocation will not create a similar problem at the other site.

Financial compensation
If waterbirds still cause damage to crops or fisheries, the payment of compensation to farmers and fishermen can be another solution. An adequate system for estimating the damage in monetary terms is then required. Check that adequate funding is available (Van Roomen & Madsen, 1992).

Hunting
Hunting can ~~sometimes~~ be used to ~~c~~help manage crop damage problems, sometimes in combination with ~~ontrol the numbers of waterbirds. Hunting should be licensed and only permitted when~~ other measures ~~have failed. However, in many countries, hunting is the main method for controlling waterbirds. Check local and national regulations concerning permits and also safety regulations (Van Roomen & Madsen, 1992).~~ (See also Guidelines No.5: *Guidelines on sustainable harvest of migratory waterbirds*). Such use can increase the level of tolerance of waterbirds among landowners, farmers, fisheries managers, *etc*., while also providing them with alternative income. However, hunting to control the numbers of waterbirds should be licensed and only permitted when other measures have failed.

~~**Poisoning**~~
~~Poisoning is not normally recommended, because of the likely negative side effects on the entire ecosystem.~~

Refuges
The most elegant way of keeping waterbirds away from an area where they may cause damage is to create a refuge for the birds, possibly with lure-crops such as barley seed, sugar beet or fodder beet. Hunting should be banned in such refuges. In Denmark and Ireland, this method has proved to be effective in combination with the use of scaring devices. In the EU, acquisition of refuge areas can be partially financed by set-aside regulations. About half of the most important areas for geese in Denmark have become reserves. Check that adequate funding is available (Van Roomen & Madsen, 1992).

Netting over fishponds
Fish-eating birds can be kept away from fishponds by covering the ponds with netting. Waterbirds sometimes get caught under the netting, either by slipping under the edges or falling through holes. Pond owners usually kill these birds, but a more acceptable approach would be to catch, ring and release the birds, and improve the effectiveness of the netting.

Action stages

- Individuals involved in the measurement of bird damage to crops, fisheries or aircraft should be given professional training.
- Successful examples from elsewhere should be implemented wherever possible.
- An overview of the success and relative usefulness of measures for the control of bird damage should be maintained at an international level (*e.g.* at the International Bird Strike Committee), so that countries know whom to contact about their problem.
- Local people should be involved in the programme wherever possible.
- Public awareness should be raised through the mass media and amongst local communities.
- A long-term programme of conservation education should be developed.

Step 4: Implement action plan and follow up with project activities [?]

General

As soon as project activities for damage reduction have been initiated, a monitoring procedure should be established to measure the success of the project. Future damage to bird populations, crops, fish stocks or aircraft should be determined or estimated, and the cost-effectiveness of the project should be evaluated. The project should be revised, rescheduled or discontinued when necessary. Implementation of the project should be linked to public awareness activities, including education programmes and coverage by the mass media. The progress and results of the project should be published in both the scientific and popular literature, and the effectiveness of the project should be reported to the AEWA Secretariat by the national focal point.

Crop damage

Farmers and hunters should be convinced of the necessity of the project, especially when the recommended actions do not include direct control of bird populations.

Damage to fisheries

Fishermen should be convinced of the necessity of the project, especially when the recommended actions include limiting their catches or doing nothing to control the birds. In some instances, the introduction of an effective system to control illegal fishing will have greater benefits to the fishery as a whole than control of fish-eating birds.

Bird strikes

Pilots and aircraft mechanics should report all instances of bird strikes (*e.g.* to the project leader) to increase knowledge of bird strikes and to permit measurement of any changes in the frequency of bird strikes (see Box 7). Changes in the intensity of aircraft activity in areas prone to bird strikes should be monitored, and pilots who deliberately violate the regulations pertaining to minimum flight altitude should be sanctioned. The project leader should analyse any failure of measures taken to control bird strikes, suggest modifications for future efforts, and notify the AEWA Secretariat of these suggestions. If all precautions have failed and an aircraft crashes, the airport disaster guidelines should be followed.

AEWA Conservation Guidelines No.9

Guidelines for a waterbird monitoring protocol

Step chart

To establish and maintain a national waterbird monitoring scheme, each country should take the following steps:

Step 1: Draw up a list of sites for standardised monitoring of non-breeding waterbirds.

Step 2: Assemble a hierarchical network of observers, volunteers and professionals, as appropriate and available.

Step 3: Apply International Waterbird Census (IWC) methods to the monitoring of sites for non-breeding waterbirds.

Step 4: Consider the use of additional methods for monitoring species inadequately covered by standard methods.

Step 5: Create a computer database to allow management and use of the information collected.

Step 6: Ensure that optimum use is made of the information collected.

Step 7: Feed results into conservation policy.

Introduction

These guidelines are a summary of the waterbird monitoring practices at national level that are most appropriate for international conservation efforts. Conservation practitioners involved in waterbird monitoring at national level should follow the guidelines to enhance the quality of information available for international waterbird conservation.

Aims of waterbird monitoring

The main purpose of waterbird monitoring is to obtain objective, detailed and accurate information about the conservation status of each population of waterbird (see Box 1). This information forms a crucial basis for nature conservation policy at local, national and international levels.

Box 1: What is monitoring?

Monitoring is the measurement of variables over time with specific objectives in mind. The specific objectives of waterbird monitoring are the maintenance of baseline populations of waterbirds, and maintenance of favourable trends in waterbird populations.

The basis for much conservation action is provided by monitoring. Decisions about which waterbird species are most in need of conservation action, and judgement of the effectiveness of such action, can only be made if the numbers and distribution of waterbirds are closely monitored.

A large number of waterbird species are monitored in many countries in all seasons using a great variety of specific and generic methods. It is beyond the scope of these guidelines to summarise all these techniques and monitoring schemes. For information about many diverse monitoring methods, readers are referred to detailed manuals and handbooks, *e.g*. Gilbert *et al*. (1998) and Ecoscope (in press).

Numbers and distribution of populations

One of the most important uses made of waterbird count information is estimation of the number and distribution of individuals in different populations. As knowledge of waterbird populations increases, it becomes possible to set minimum baseline levels below which it is considered undesirable for populations to decline.

Priority species for monitoring are:
- globally threatened species;
- species listed in Table 1 of the AEWA Action Plan;
- at national level, species for which the country holds a large proportion of the population at some point in their annual cycle.

However, an important principle is that all waterbird species should be monitored equally. Whilst monitoring is able to provide information that is useful to the conservation of threatened species, a crucial aim is to monitor the fortunes of more numerous and widespread species for which even quite large changes in status and distribution might otherwise go unnoticed.

Population trends

Counts of waterbirds should be obtained on a regular basis, and in a standardised, routine manner. The frequency of counts should be regular enough to detect trends quickly. If this is done, it is possible to recognise the trends in numbers exhibited over time by different populations. This allows populations in decline, and those that are increasing, to be identified, and the rates of change to be estimated.

Conservation action for declining populations should be given the highest priority. Management in response to population increase may also be necessary.

Monitoring should continue in the long term, so that the consequences of any conservation or management actions are themselves monitored.

Identification of flyways and populations

For conservation purposes, waterbird biologists are increasingly studying birds at the level of individual populations and flyways. If key sites for each population throughout its life cycle can be identified (breeding, moulting, staging and wintering sites), the flyways used by different populations can be identified, and conservation of each population at a flyway level becomes possible.

Site importance

All waterbirds require a network of high quality sites for nesting, for moulting, for 'refuelling' during migration, and for surviving the non-breeding season. The best method of assessing the importance of a site for waterbirds is to organise regular counts of the waterbirds that use it. The overall numbers of birds and the proportions of each population at a site revealed by counting can then be used as an objective basis for assessing its importance.

Sites that are monitored should include:

- all sites designated under the Ramsar Convention as wetlands of international importance, and other sites with international or national designations because of their importance for waterbirds;
- as many additional sites representative of the country's wetlands as it is possible to count on at least an annual basis.

The International ~~Waterfowl~~Waterbird Census

For practical reasons, these guidelines concentrate on monitoring during the non-breeding season using methods developed under the International Waterbird Census (IWC), co-ordinated by Wetlands International since 1967. Waterbird monitoring already takes place in a majority of countries in the AEWA area as part of the IWC. The objectives of this Census are well established and the methods very successful (see Box 2). Guidelines for census techniques that complement IWC methodology and cover species inadequately monitored by the IWC are included in Step 4. Some of these additional methods include monitoring of waterbirds during the breeding and migration seasons, but the emphasis of these guidelines is on monitoring during the middle of the non-breeding season (*i.e.* 'mid-winter' period).

Box 2: The International ~~Waterfowl~~Waterbird Census (IWC)

At present, the IWC is the principal means by which the monitoring and research requirements under AEWA are met.

Objectives of IWC:

The International Waterbird Census uses information collected by four regional censuses over the long term:
- to estimate population sizes of waterbird species in the non-breeding season;
- to describe changes in numbers and distribution of these species.

Secondary aims are:
- to assess the importance of individual sites for waterbirds during the non-breeding season;
- to contribute significantly to international efforts to conserve waterbirds and their wetland habitats.

The IWC operates as four separate surveys:
- The Neotropical Waterbird Census,
- The Asian Waterbird Census,
- The African Waterbird Census,
- The Western Palearctic and Southwest Asia Waterbird Census.

- The IWC began in Europe, North Africa and the Middle East in 1967.
- Sites are counted in January, the month when inter-site movements by most waterbirds in the Northern Hemisphere are at a minimum. In sub-Saharan Africa, an additional July count is made.
- In the first years of the IWC, most participating countries included only Anatidae (ducks, geese and swans) and Common Coot (*Fulica atra*) in the counts.
- During the next 30 years, counting spread to more countries, and to additional groups of waterbirds.
- By ~~1998,~~ 2000, most countries in the region were operating monitoring programmes that counted a majority of waterbird species.
- The African ~~Waterfowl~~Waterbird Census began in 1991, using methodology based on work already carried out in the Western Palearctic.
- High quality annual reports are produced which provide feedback to counters and give incentive to maintaining and expanding the census.

Step 1: Draw up a list of sites for standardised monitoring of non-breeding waterbirds

The process of drawing up a site list is described in Guidelines No.3: *Guidelines on the preparation of site inventories for migratory waterbirds.*

Many countries in the AEWA area already conduct waterbird monitoring at a number of sites, and some have comprehensive waterbird monitoring schemes. It will nevertheless be a valuable exercise to follow the steps outlined in Guidelines No.3.

The first priority of any national waterbird monitoring scheme should be to select a sample of wetlands where it is possible to conduct regular counts in a standard way. These sites should be given the highest priority for counting each January, and also each July in sub-Saharan Africa.

- Sites selected by following Guidelines No.3 should form the basis of this priority site list.
- If resources allow, this sample of priority sites should be extended to include sites representative of all the wetlands in the country.
- The sample should include as many of the country's wetlands designated under the Ramsar Convention and as many other internationally and nationally designated sites as possible.

In this way, a high proportion of waterbirds will be counted.

Step 2: Assemble a hierarchical network of counters, volunteers and professionals, as appropriate and available

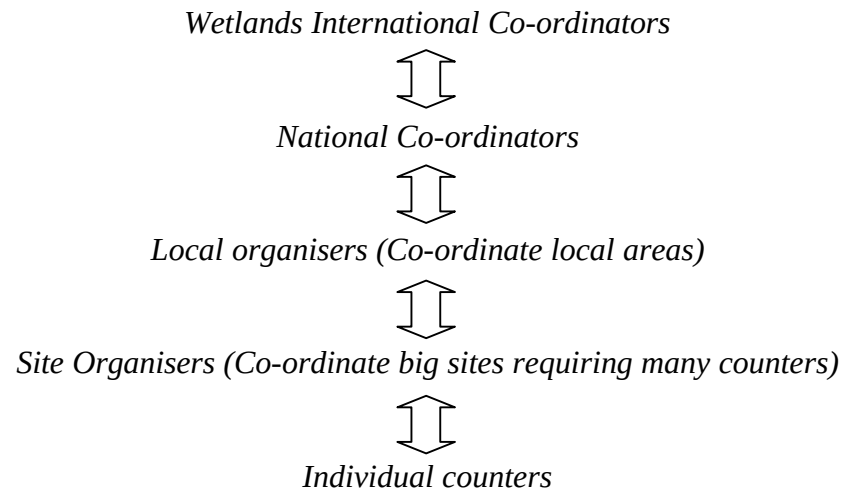
Successful waterbird monitoring at the international level cannot exist without good organisation at national and local levels. Waterbird monitoring schemes may be based in governmental or non-governmental organisations or research institutes, and may receive input from all of these types of body.

The best way to organise waterbird monitoring at a large number of wetlands in a country is through a hierarchical structure of organisation (see Box 3).

- A national co-ordinator is appointed who has overall responsibility for the census in the country.
- Local organisers (often volunteers) co-ordinate counts in different regions of the country.
- A number of counters (also often volunteers) are then responsible for counts at individual sites within each region of the country.
- At big sites, which are divided for the purposes of counting into a number of sub-sites, counters are organised into teams, and a site organiser reports to the local organiser.

Box 3: A National Waterbird Monitoring Network

This diagram represents a simple national waterbird monitoring network. Instructions flow down from the national co-ordinator, and count information flows up from the individual counters. This system is commonly adopted throughout the AEWA area. Professional input is often restricted to national co-ordination and the analysis and publication of results.



For international overviews produced under the International ~~Waterfowl~~Waterbird Census, the national co-ordinators send all January counts from Europe, North Africa and Southwest Asia to Wetlands International's co-ordinators in Wageningen, The Netherlands, and all January and July counts from sub-Saharan Africa to the co-ordinator of the African ~~Waterfowl~~Waterbird Census in Dakar, Senegal.

This system of organising waterbird monitoring is extremely productive and cost-efficient. In many countries, voluntary counters contribute thousands of hours of highly skilled survey work every year, free of charge. Such voluntary effort is best organised professionally. Enormous value is added to the costs incurred by professional organisation where this system is adopted.

In countries lacking a tradition of hobby bird watching, a different approach is necessary. In these countries, annual expeditions by volunteer birdwatchers and conservation professionals from governmental and non-governmental organisations and research institutes cover a sample of priority sites.

Training

In countries where waterbird monitoring is still small in scale, the training of professional and voluntary counters should be undertaken as a high priority. Training should concentrate on two main areas:

- Field techniques (how to identify and count birds);
- Data management techniques (how to collect, store, analyse and interpret waterbird monitoring data).

Step 3: Apply IWC methods to the monitoring of sites for non-breeding waterbirds

The most important element of waterbird monitoring methodology is standardisation.

The top priority of National Co-ordinators should be to count the same sites in the same way every year. Comparisons between countries and years are then straightforward and valid. Counts additional to the January and July (Africa) censuses are extremely valuable, and should be organised at national level when resources allow.

Field Methods

The methods used to count waterbirds in the field depend on many factors, for example:

- the species being monitored;
- the size of the site;
- the accessibility of the shoreline;
- the availability of vantage points from which the site can be scanned;
- the amount of time available to complete the count;
- the number of people involved;
- the available equipment.

~~Picture of somebody scanning, with a telescope, from a ***good vantage point*** with caption: *Using the best vantage points maximises efficiency when counting waterbirds*~~

- Many large or complex sites are divided into sub-sites for the purposes of counting. Each sub-site is a separate count unit. It is best if counting of sub-sites is closely co-ordinated and simultaneous, with one counter per site unit, especially at tidal sites where birds move around in response to the tidal cycle.
- Identifying the best vantage points can take a number of visits to the site in different conditions. The proportion of birds using a site that are registered by counts can be considerably improved by local knowledge of:
  - tidal conditions;
  - best light conditions at different vantage points;
  - periods of maximum disturbance;
  - other local variables which affect counting efficiency.
- Counts are usually made by scanning flocks of waterbirds (which usually comprise several species) with a telescope or with binoculars as appropriate. Flocks should usually be scanned several times, and birds counted one or two species at a time. If time allows, repeated scans can be used to obtain a consistent estimate, *i.e.* to improve the precision of the count. Scanning repeatedly has the additional advantage of maximising the chances of finding small, inconspicuous or rare species present in small numbers.
- A tally counter can be used to speed up this process and reduce errors. Some experienced observers use two or more tally counters simultaneously, and allocate a separate count of a different species to each.

~~Picture of a tally counter~~

- Large flocks introduce an inherent bias; small sites with few birds can be counted with greater accuracy than large sites with many birds.
- Birds should be counted one at a time at small sites. This procedure can be adopted at larger sites if there is no shortage of time. However, it is usually preferable to count faster than this to prevent problems caused by birds moving about in response to the tidal cycle or to disturbance.
- Experienced counters can accurately estimate 10, 20, 50, 100 or more birds almost instantaneously, and scan through flocks counting in these units with a tally counter.
- Flocks of birds in flight are often best counted from the back of the flock, scanning in the direction of flight with binoculars or a telescope.

- Records should be kept in a notebook (using a pencil in case of rain), or recorded on a small tape recorder.
- Counts from boats may be suitable at some sites, for example lakes and rivers fringed with vegetation. Some of the difficulties with boat surveys include:
  - low vantage point;
  - the inability to use a telescope;
  - disturbance of birds caused by the boat.
- Aerial survey is the best method for counting extensive, inaccessible areas, for example offshore waters and extensive river floodplains. Some of the difficulties with aerial surveys include:
  - high expense;
  - the considerable practice required to produce consistent results at high speed;
  - a very specialised technique, for which a separate instruction manual was produced by IWRB (now Wetlands International) in Komdeur *et al.* 1992).

The importance of mapping sites

Guidelines No.3: *Guidelines on the preparation of site inventories for migratory waterbirds* explain some of the uses of mapping. The mapping of sites plays a crucial role in successful waterbird monitoring.

- If possible, the total wetland area within each site should be counted. A map should be used at every site counted. The boundary of the area counted and any special vantage points used should be marked on the map. The main reason for this is to ensure consistency of coverage from year to year. When counters retire and new ones begin counting a site, it is crucial that coverage continues as it did before. Copies of all site maps should be kept by local and national co-ordinators of every national waterbird monitoring scheme.
- The area counted by each observer is called a count unit, and may comprise a single, self-contained site, or part of a larger, complex site.
- The map should be checked before (and, if necessary, during) every count, and at complex sites counted by a team, the site co-ordinator should ensure that everybody knows precisely the boundary of the count unit for which they are responsible.
- Mapping is extremely important at temporary wetlands and those with boundaries that vary according to the extent of seasonal flooding. Similarly, the extent of freezing at wetlands in cold climates should be recorded.
- At sites designated as Ramsar Sites or having other international or national status (*e.g.* nature reserves), the boundaries should coincide with the boundary of the designated area wherever possible. If a larger area is counted than that designated, the designated area should be counted as a sub-site of the whole so that species totals for the designated area can be calculated.

Step 4: Consider the use of additional methods for monitoring species inadequately covered by standard methods

All waterbird species should be counted during the January IWC counts (and the July IWC counts in sub-Saharan Africa). However, not all waterbird species can be adequately monitored using the standard approach outlined above. The methods outlined in this step will adequately monitor many additional species. Further methods, which are beyond the scope of these guidelines, can be found in specialised handbooks and manuals, such as *Bird Monitoring Methods: a manual of techniques for key UK species,* published by the Royal Society for the Protection of Birds in the U.K. in 1998, and *A species and habitats monitoring handbook*, currently being produced by Ecoscope Applied Ecologists.

Waterbird species well covered by IWC methodology: Analyses of data from the International Waterbird Census have shown that standardised counts in the non-breeding season can be used to obtain adequate population estimates and trends for a majority of swans, geese and ducks (Anatidae), Common Coot *Fulica atra*, and many populations of grebes (Podicipedidae), cormorants (Phalacrocoracidae) and waders (Haematopodidae, Recurvirostridae, Charadriidae and Scolopacidae). IWC methods work well for these species because their populations often congregate at a relatively small number of sites during the non-breeding season.

Waterbird species best counted at communal roosting sites: Some species, for example geese (*Anser* spp. and *Branta* spp.), waders (Haematopodidae, Recurvirostridae, Charadriidae and Scolopacidae**),** herons and egrets (Ardeidae) and gulls and terns (Laridae), form large, concentrated roosts outside the breeding season. Counts of some roosts, for example waders at high tide, may be included in the IWC methodology described above. Other roost counts, for example of geese, should only be undertaken as part of a specially organised monitoring scheme, to ensure that birds at the roosts are not double-counted at their feeding sites.

Colonially nesting waterbird species: Some species congregate at colonies during the breeding season, and closely co-ordinated counts at this time may be very productive. Many species in the following taxa can be counted at their colonies: pelicans (Pelecanidae), cormorants (Phalacrocoracidae), herons and egrets (Ardeidae), storks (Ciconiidae), ibises and spoonbills (Threskiornithidae), flamingos (Phoenicopteridae), and gulls and terns (Laridae). Many successful surveys of colonial nesting waterbirds have been carried out at the national level, and it may be possible in future to produce international analyses for some species.

Waterbird species with very dispersed distribution: Some numerous species distribute themselves thinly over the available landscape. Typical examples are the Mallard *Anas platyrhynchos* and Egyptian Goose *Alopochen aegyptiacus*. Only a small proportion of the populations of these species is included in counts. If the assumption is made that the same proportion of the populations of these species are counted each season, count data can provide a basis for estimates of population trends, even if they shed little light on actual numbers. That is, as long as the under-estimate remains constant between years, the monitoring scheme can be applied to species where only a relatively small proportion of the total is counted.

Waterbird species that congregate away from wetlands: Many waterbirds ~~utilise~~ use offshore habitats and habitats away from wetlands, such as farmland and rubbish tips. Offshore habitats are preferred by seaducks (*e.g. Somateria* spp. and *Melanitta* spp.), divers (Gaviidae), and some populations of grebes (Podicipedidae) and cormorants (Phalacrocoracidae). These species are best counted by aerial or ship surveys, which by their nature can usually only be conducted occasionally, for example every five years. Species making habitual use of farmland in Europe and Western Asia include most species of geese (*Anser* spp. and *Branta* spp.) and Northern Lapwing (*Vanellus vanellus*). Other lapwings of the genus *Vanellus* are often found far away from wetlands in Africa. Many species of gulls *Larus* spp. occur in large concentrations at rubbish tips.

Waterbird species that congregate in the region at times other than midwinter: The standard IWC methods, because they use data from the non-breeding season only, miss important congregations of waterbirds during migration and other periods. Many Arctic nesting wader populations pass through Europe and Southwest Asia during spring and autumn migration *en route* to wintering areas in Africa. It is very important that national programmes should include surveys during migration times to monitor these birds. The identification of key sites for species on passage should be included as an aim of national waterbird monitoring schemes wherever possible.

Waterbird species with skulking behaviour: Two groups of waterbirds well-known for skulking in dense vegetation, out of sight of observers, are the snipes (*Gallinago* spp. and *Lymnocryptes*) and most species of crakes and rails (Rallidae). Successful surveys of these groups pose particular challenges (see Box 4). As with widely dispersed species (see above), the assumption can be made that the proportion of these species missed by counts remains similar from year to year. It is therefore possible to use count data to obtain an indication of population trends of some species, although the absolute numbers remain unknown.

Box 4: Monitoring skulking species

Snipes (*Gallinago* spp. and *Lymnocryptes minimus*) are killed in large numbers by sport hunters. Hunting bags have been used to indicate the relative numbers of different species and variations in numbers from year to year. Shot birds can be aged, so that the proportion of birds of the year in the population can be used to give an indication of variations in breeding productivity.

Crakes and rails (Rallidae) are among the most skulking of birds, and many species remain very poorly known. Methods of monitoring need to be developed because at present, it is possible that even a catastrophic decline in some of these species would go unnoticed. Possible monitoring methods include intensive nocturnal surveys of calling birds during the breeding season. Detection rates could be increased by registering the response to playback of pre-recorded calls.

Waterbird populations that are hunted: Parts surveys, including wing and tail collections, can be used to monitor annual productivity, as well as age and sex compositions of wintering populations.

Threatened waterbird species: Special efforts are required to monitor rare and globally threatened species. Where threatened species are known to occur, special attention should be given to monitoring them at as many stages of their annual cycle as possible. Threats and potential threats should also be closely monitored. Globally threatened species occurring in the AEWA area are listed in Guidelines No.1: *Guidelines on the preparation of Single Species Action Plans for migratory waterbirds* and in Appendix II.

Counts at wetlands affected by freezing, floods and drought: Many wetlands vary in their extent each season as a result of freezing, flooding or drought. A careful record should be kept of the extent of flooding or freezing each season, and of the extent of coverage achieved by counters. This information should be recorded on maps. The extent to which some species concentrate and the location of the main concentrations are closely related to the distribution and extent of these changeable wetlands each season. For example, the distribution of Garganey *Anas querquedula*, Ruff *Philomachus pugnax* and Purple Heron *Ardea purpurea* in West Africa depends largely on variations in the nature and extent of flooding each season. The distribution of Smew *Mergellus albellus* in Europe each winter is similarly affected by the extent of freezing in Northern and Eastern Europe.

Step 5: Create a computer database to allow management and use of the information collected

A number of commercially available software packages have made data management easier in recent years. Information about counts and sites is usually stored on a database, and spreadsheet, mapping, graphics and statistics packages are available which allow clear and simple analysis, presentation and interpretation of the information.

Recording Forms

- Standard forms should be used to record waterbird count data. Many national schemes use their own recording forms, and Wetlands International produces forms for the International ~~Waterfowl~~Waterbird Census for use in countries where organisers prefer this.
- The form lists all waterbird species found in the country, and requires, as a minimum, the name of the site, the date of the count and the number of each species counted.
- It is very important to record whether any waterbird species are present at a site but not counted. The design of the form should make it clear whether the lack of a count of a particular species is because the species was not present, or because it was not counted.
- Additional information relating to factors such as weather conditions, water level and disturbance may also be recorded.
- One of the most important tasks undertaken by national and local co-ordinators each year is the distribution of forms to the counters. This gives organisers the opportunity to discuss the season's counts and any anticipated problems.
- The local and national co-ordinators are responsible for retrieval of completed forms at the end of each season.
- After the season's forms are returned to national co-ordinators, they should be carefully checked, and have standard site codes added. The code is unique to each site, and the same codes should be used for the same sites each season.

Computerising data

- After forms are checked and coded, the information on them should be input to computer. It is vital that checks are carried out at this stage to ensure that inputting errors are minimised.
- The best way to minimise inputting errors is to type all data into the computer twice. One version is then subtracted from the other, and any inputting errors are revealed.
- In countries that do not yet use computers to manage their data, the forms are sent directly to the international co-ordinators for computerisation.
- Countries that computerise their data should send them electronically to the international co-ordinators. Wetlands International advises national co-ordinators about the most appropriate software to use, and the best format for submitting the January data for international analysis.

Databases

- Computer databases are used to store and summarise information collected by waterbird counters.
- Box 5 gives a simple example of a good way to summarise waterbird count information in database tables.
- Modern database software is very flexible. Additional tables linked to the table of counts may store information about counters' contact details, or conditions of weather and disturbance at the site during a count. It is also a relatively simple matter to export data to graphics or mapping software packages, or to perform statistical analyses when required.

Box 5: Example of a simple waterbird count database

Such a database might consist of a table with information summarised in columns (or 'fields') under the following headings: **site name**, site **co-ordinates**, **date** of count, **species**, number **count**ed. A new row of the table is used to present each separate count of each species. An example of a database with this structure follows. To save space and typing, species codes are used:

site name	co-ordinates	date	species	count
West Lake	45°37'N35°47'E	150198	ANAPL	162
West Lake	45°37'N35°47'E	150198	FULAT	547
West Lake	45°37'N35°47'E	150198	CYGOL	38
Blue Bay	48°16'N32°58'E	160198	ANAPL	20
Blue Bay	48°16'N32°58'E	160198	TACRU	1

The computer software is capable of producing all kinds of different summaries of the data once it is entered in this table format. A database with this structure has the advantage of being very simple, but also the considerable disadvantage of repeating a lot of information. The site name and co-ordinates are repeated for every count of each species. If this simple database structure were used for summarising data at national and international levels, the amount of repetition would be enormous. Site details would need to be entered for every count of every species in every year, and computing capabilities would soon be overwhelmed.

It is much more efficient to create separate tables, one with information about the sites, the other holding the count information. This approach applied to the example above would result in tables that look like this:

Site table

site code	site name	co-ordinates
1234	West Lake	45°37'N35°47'E
5678	Blue Bay	48°16'N32°58'E

Count table

site code	date of count	species	count
1234	150198	ANAPL	162
1234	150198	FULAT	547
1234	150198	CYGOL	38
5678	160198	ANAPL	20
5678	160198	TACRU	1

The creation of an additional column, site code, on both tables, allows the information on the two tables to be linked. Site codes may be chosen by national organisers or at international level. The crucial feature of a site code is that it should be unique to the site, and that the same code should be used for each site in each season. Data forms should always be checked by national co-ordinators, and at this stage it is relatively simple to add the correct unique code to each form.

Site consolidation

- At sites that are divided for counting into a number of smaller count units (sub-sites), each count unit is treated as an ordinary site and given a unique site code.
- A second code then needs to be generated for the entire site, to enable the software to consolidate all the different count unit totals from the site into one overall total.
- These consolidation codes also need to be unique, and a database table with two fields relating all site codes to their respective consolidation codes needs to be created.
- This can then be linked to the table of sites and the table of counts to generate site totals at the level of consolidated sites.
- If a site code is changed on the site database, every record relating to that site also needs to be changed on the count database. Some database software packages automatically make these changes through links established between the different tables.
- To be certain of retaining the integrity between the site database and count database for every country, each country should submit its total data set to the international co-ordinators, including information going back to the time when counts were first started, every year.
- This will obviously only be possible for countries which have well-established computerised data management systems for their waterbird monitoring schemes.

Local, national and international databases

- Local organisers should return forms to their national co-ordinator promptly each year, and the information should be entered into the computer at the sub-site level.
- All information relating to every count unit should be maintained.
- For international analyses, information is usually required at the level of consolidated sites, and it is most convenient for international co-ordinators to receive data from large, complex sites already consolidated.

Accommodating changes

National waterbird count databases change every year. The new season's counts are added, and it is usual for changes to be made to the site list because of new sites being covered. National co-ordinators should inform international co-ordinators about all changes to the site list. The simplest way to do this is to submit a new site list every year, together with the new year's counts.

Step 6: Ensure that optimum use is made of the information collected

Summary of numbers and distribution

National co-ordinators should submit data for international analysis within one year of the count date.

National population estimates derived from count information can be used as the basis for identifying nationally important sites. Sites regularly holding 1% or more of the national population estimate can be said to qualify as being nationally important for the population in just the same way as sites regularly holding 1% of flyway populations qualify as being internationally important. Identifying sites on this basis should benefit national nature conservation policy, and should afford sites important for waterbird conservation some protection from development.

Identification of population trends

Simply comparing the number of birds counted in a country each year is not valid as an approach to trend analysis because of differences in coverage of sites from year to year. In order to identify population trends, it is necessary to achieve consistent coverage of a large sample of sites used by each population over a period of at least five years. A number of methods are available which make allowance for the missing values that result from changes in coverage of sites between seasons, but these methods can only be used if the number of missing values is relatively small.

Identification of key sites

Data from waterbird monitoring is used in the identification of key sites, as explained in Guideline No.3: *Guidelines on the preparation of site inventories for migratory waterbirds*

- Two of the Ramsar criteria for the identification of wetlands of international importance are based on the numbers of waterbirds present.
- It is relatively straightforward to extract sites that meet these criteria from the international databases, but the resulting lists are at present incomplete.
- Restriction of IWC data to the months of January and July (Africa) limit the capability of the international databases to identify key sites.
- Data collected at national level from other times of the year are therefore extremely important in the identification of key sites.
- It is highly desirable to organise national counts more than once a year, although the annual January and July (Africa) counts are the most important and should therefore be regarded as the minimum.

Identification of key sites for waterbirds away from wetlands, for example in the Arctic breeding grounds, is usually beyond the scope of national waterbird monitoring schemes. Important offshore areas may be identified by aerial and ship surveys.

Dissemination of results

Regular publication of results is very important in maintaining enthusiasm for waterbird monitoring among observers at national level.

- An annual report should be produced, or results should appear annually in a widely available ornithological journal.
- These reports do not need to be long and complicated. Simple summaries of the total numbers of birds counted and comparison with earlier seasons may be all that is required.
- An annual summary of results may reveal developments in the numbers of a particular species that require conservation or management action.

- If annual reports are kept simple, periodic reports with a more detailed analysis are desirable every three to five years.

Step 7: Feed results into conservation policy

Different uses at different scales

At the local scale, information collected by waterbird monitoring is often used in planning decisions and Environmental Impact Assessments.

Also at national level the information collected as mentioned before is used in planning decisions and Environmental Impact Assesments Furthermore ~~A~~at the national scale, the information may be used by public inquiries into potentially damaging developments. Waterbird monitoring information also forms the basis of national designation of protected sites, and of Important Bird Areas (IBAs) recognised by BirdLife International.

At international level, waterbird monitoring information is used in support of the Ramsar Convention on Wetlands, the African-Eurasian Waterbird Agreement under the Bonn Convention, and the Biodiversity Convention, and is also used as a basis for regional agreements, species management plans and species conservation action plans.

The information gained from waterbird monitoring has additional value as an education and public awareness tool, especially in Africa. The collection of new, baseline information about many species is a further valuable aspect of waterbird monitoring in Africa.

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Federation of Field Sports Associations of the EU~~Association of the EU~~ (FACE)
~~h~~ttp://www.face-europe.org/
Hunting and game bird management
The Game Conservancy Trust (UK)
http://www.gct.org.uk/
~~http://www.game-conservancy.org.uk~~
INTERNATIONAL COUNCIL FOR GAME AND WILDLIFE CONSERVATION
(C. I. C)
PO Box 74
H - 2092 Budakeszi
Hungary
Tel: 0036 60 444 647
Fax: 0036 60 444 648
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Useful Web Sites

Wetlands International - International Waterbird Census
http://www.wetlands.agro.nl/waterbird_monitoring/west_palearctic.html
http://www.wetlands.agro.nl/waterbird_monitoring/africa.html
http://www.wetlands.agro.nl/waterbird_monitoring/census/census_procedures.html

Avian Demography Unit, University of Cape Town
http://www.uct.ac.za/depts/stats/adu/

Patuxent Wildlife Research Center: Colonial Waterbird Inventory and Monitoring
http://www.im.nbs.gov/cwb/cwb.html

US Fish & Wildlife Service, Division of Migratory Bird Management, Bird Monitoring
http://migratorybirds.fws.gov/statsurv/mntrtbl.html

Useful contacts

General

~~AEWA Secretariat (new address)~~
African-Eurasian Waterbird Agreement
UNEP/ AEWA Secretariat
UN-Premises, Martin-Luther-King Str. 8
53175 Bonn, Germany
Tel: (+49) 228 815 2414, fax: (+49) 228 815 2450
E-mail: aewa@unep.de
Websiste: http://www.unep-wcmc.org.~~uk~~/AEWA

Bern Convention Secretariat (Secretariat of the Convention on the Conservation of European Wildlife and Natural habitats)
Environment Conservation and Management Division
67075 Strasbourg Cedex
France
Tel.: +33-3-88413559/2256
Fax: +33-3-88413751
E-mail: liri.kopaci@coe.fr
WWW: www.coe.fr/eng/legaltxt/104e.htm

BirdLife International
Wellbrook Court
Girton
Cambridge CB4 3QX
United Kingdom
Tel.: +44-1223-800
Fax.: +44-1223-277200
E-mail: birdlife@birdlife.org.uk
WWW: www.kt.rim.or.jp/~birdinfo/birdlife/

CBD Secretariat - Secretariat for the Convention on Biological Diversity
World Trade Centre
393 St. Jacques Street
Office 300
Montréal, Québec H2Y 1N9
Canada
Tel.: +1-514-2882220
Fax: +1-514-2886588
E-mail: secretariat@biodiv.org
WWW: www.biodiv.org

Convention on the Conservation of Migratory Species of Wild Animals, Bonn Convention)
UNEP/ CMS Secretariat
United Nations Premises in Bonn
Martin-Luther-King Straße 8
53175 Bonn
Germany
Tel.: +49-228-8152401 and +49-228-8152402
Fax.: +49-228-8152449
E-mail: cms@unep.de
WWW: www.unep-wcmc.org./cms

Council of Europe
Environment Conservation and Management Division
Palais de l'Europe
Avenue de l'Europe
67075 Strasbourg Cedex
Tel.: +33-3-88412253
Fax: +33-3-88413751
France
E-mail: information.point@seddoc.coe.fr
WWW: www.coe.fr

EC - European Commission
Wetstraat 200
1049 Brussels
Belgium
Tel.: +32-2-2351111
WWW: www.europa.eu.int/comm/index.htm

ECNC - European Centre for Nature Conservation
PO Box 1352
5004 BJ Tilburg
The Netherlands
Tel.: +31-13-4663240
Fax: +31-13-4663250
E-mail: ecnc@ecnc.nl
WWW: www.ecnc.nl

IUCN - the World Conservation Union
28, rue Mauverney
1196 Gland
Switzerland
Tel.: +41-22-9990001
Fax.: +41-22-9990002
WWW: www.iucn.org

IUCN/ELC - Environmental Law Centre
Adenauerallee 214
53113 Bonn
Germany
Tel.: +49-228-2692231
Fax: +49-228-2692250
E-mail: elcb@hq.iucn.org

Ramsar Convention Bureau
28, rue Mauverney
1196 Gland
Switzerland
Tel.: +41-22-9990170
Fax.: +41-22-9990169
E-mail: ramsar@ramsar.org
WWW: www.ramsar.org

UNEP - United Nations Environment Programme
PO Box 30552
Nairobi
Kenya
Tel.: +254-2-621234
Fax: +254-2-226890 and +254-2-215787
E-mail: oedinfo@unep.org

WWW: www.unep.org

~~UNEP/CMS Secretariat (Convention on the Conservation of Migratory Species of Wild Animals, Bonn Convention)~~
~~United Nations Premises in Bonn~~
~~Martin Luther King Straße 8~~
~~53175 Bonn~~
~~Germany~~
~~Tel.: +49-228-8152401 and +49-228-8152402~~
~~Fax.: +49-228-8152449~~
~~E-mail: cms@unep.de~~
~~WWW: www.wcmc.org.uk:80/cms~~

UNESCO/MAB - Man and Biosphere Programme
Ecological Sciences Division
1, rue Miollis
75732 Paris Cedex 15
France
Tel.: +33-1-45684151
Fax: +33-1-40659897
E-mail: mab@unesco.org
WWW: www.unesco.org/mab

UNESCO/WHC - World Heritage Centre
Place de Fontenoy 7
75352 Paris Cedex 07
France
Tel.: +33-1-45681443
Fax: +33-1-40569570
E-mail: wh-info@unesco.org
WWW: www.unesco.org/whc

UNEP - WCMC - World Conservation Monitoring Centre
219, Huntingdon Road
Cambridge CB3 0DL
United Kingdom
Tel.: +44-1223-277314
Fax: +44-1223-277136
E-mail: info@wcmc.org.uk
WWW: www.wcmc.org.uk

Wetlands International ~~- Africa, Europe, Middle East~~
PO Box 471~~7002~~
6700 AL~~CA~~ Wageningen
The Netherlands
Tel.: +31-317-4788548
Fax: +31-317-4788~~50~~85
E-mail: icu~~pos~~t@wetlands.agro.nl
WWW: www.wetlands.org~~agro.nl~~

WWF-International - World Wide Fund for Nature
Avenue du Mont-Blanc
1196 Gland
Switzerland
Tel.: +41-22-3649111
Fax: +41-22-3642926
WWW: www.panda.org

Species Action Plans

IUCN Species Survival Commission
c/o IUCN (see under **General**)

Wetlands International Specialist Group Co-ordinators
c/o Wetlands International (see under **General**)

CIC - Conseil International de la Chasse et de la Conservation du Gibier
30, rue de Miromesmil
75008 Paris
France
Tel.: +33 –1-47421360
Fax: +33-1-47421348

BirdLife International (see under **General**)

Emergency situations

No specific addresses. See under **General**, according to circumstances.

Site inventories

MedWet Coordinating Group
23 Bucurest street
10671 Athens
Greece

Ramsar Convention Bureau (see under **General**)

Site management

EUROSITE - European Network of Site Management Organizations
PO Box 1366
5004 BJ Tilburg
The Netherlands
Tel.: +31-13-4678638
Fax: +31-13-4634129
E-mail: eurosite@kub.nl
WWW: www.eurosite-nature.org

Ramsar Convention Bureau (see under **General**)

Sustainable harvest

CIC - Conseil International de la Chasse et de la Conservation du Gibier
30, rue de Miromesmil
75008 Paris
France
Tel.: +33 –1-47421360
Fax: +33-1-47421348

FACE - Fédération des Associations de chasseurs de l'EU
82 Rue F. Pelletier
B-1030 Brussels
Belgium
Tel: +32-2-732.69.00

Fax: +32-2-7327072
E-mail: face.europe@infoboard.be

Trade

TRAFFIC International
219c Huntingdon Road
Cambridge CB3 0DL
UK
Tel: (44) 1223 277427
Fax: (44) 1223 277237
e-mail: traffic@WCMC.org.uk

TRAFFIC Europe
Waterloosteenweg 608
1060 Brussels
Belgium
Tel.: +32-2-3470111
Fax: +32-2-3440511
WWW: www.traffic.org

UNEP/CITES Secretariat (Convention on International Trade of Endangered Species, Washington Convention)
PO Box 456
Geneva Executive Centre
1219 Châtelaine (Geneva)
Switzerland
Tel.: +41-22-9799139 and 9799140
Fax: +41-22-7973417
E-mail: cites@unep.ch
WWW: http://www.wcmc.org.uk/cites

Ecotourism

The Ecotourism Society TES
PO Box 755
North Bennington
VT 05257
USA
Tel: +1-802-447-2121
Fax: +1-802-447-2122
E-mail: ecomail@ecotourism.org
WWW: http://www.ecotourism.org

Bird damage

FAO - Food and Agriculture Organization
Forest Resources Division
Viale delle Terme di Caracalla
00100 Rome
Italy
Tel.: +39-06-57053589
Fax: +39-06-57055137
E-mail: fo-registry@fao.org
WWW: www.fao.org/fo

IBSC - International Bird Strike Committee

C/o National Bird Strike Committee
Royal Netherlands Airforce Airstaff
P.O..Box 20703
2500 EB The Hague
The Netherlands
Tel: +31-70-3396911
E-mail: sup.ops@dopklu.af.disp.mindef.nl.

Waterbird Monitoring

International Waterbird Census (IWC) & African Waterbird Census (AfWC)
Waterbird Conservation Officer
c/o Wetlands International (see under **General**)

SOVON
Rijksstraatweg 178
6573 Beek-Ubbergen
The Netherlands
Tel: 024 684 81 11
Fax: 024 684 81 88
e-mail: sovon@inter.nl.net

The Wildfowl & Wetlands Trust
Slimbridge
Gloucester
GL2 7BT
UK
Tel: +44 1453 890333
Fax: +44 1453 890827
e-mail: enquiries@wwt.org.uk
http://www.greenchannel.com/wwt/wwt_main.htm

British Trust for Ornithology
The Nunnery
Nunnery Place
Thetford
Norfolk
IP24 2PU
UK
Tel: +44-1842-750050
Fax: +44-1842-750030

The Avian Demography Unit
Department of Statistical Sciences
University of Cape Town
Rondebosch 7701
South Africa
Tel: +27 (021) 650 3219
Fax: +27 (021) 650 7578
e-mail: statdept@maths.uct.ac.za
http://www.uct.ac.za/depts/stats/adu/

The European Bird Census Council
http://www.bgytf.hu/

Training facilities

Within the AEWA region, there are many facilities for training at different levels, ranging from three-day courses on various environmental topics for people with no prior knowledge, to Ph.D. level at universities. Many universities and institutes offer courses of varying lengths on wildlife management, site management, wetland ecology, sustainable development, ecotourism development, and many other related topics. UNEP maintains a database listing hundreds of courses. The Ramsar Convention Bureau maintains a list of environmental courses specifically aimed at wetland management. For information contact:

UNEP Information and Public Affairs, P.O. Box 30552, Nairobi, Kenya
Tel: +254-2-623145; fax: +254-2-623917
E-mail: christian.strohman@unep.org

The Ramsar Convention Bureau
Rue Mauverney 28, CH-1196 Gland, Switzerland
Tel: +41-22-9990170; fax: +41-22-9990169
E-mail: ramsar@ramsar.org

There are several schools in Africa that specifically offer education in wildlife management and site management. These are attended by wardens and reserve managers from all over the continent. The most important are:

Ecole de Faune de Garoua
B.P. 271, Garoua, Cameroun
Tel/fax: +237-273135

College of African Wildlife Management
Mweka, P.O. Box 3031, Moshi, Tanzania
Tel/fax: +255-55-51113
E-mail: ulgtan@eoltz.com

Kenya Wildlife Training Institute
P.O. Box 842, Naivasha, Kenya
Tel: +254-0311-20267/21329
Fax: +254-0311-20577
E-mail: kwsti@users.africaonline.co.ke

Southern African Wildlife College
Private Bag X3015, Hoedspruit, 1380, South Africa
Tel/fax: +27-15-7932621
E-mail: sawc@iafrica.com

Special wetland courses for managers from developing countries and countries with economies in transition are given by the Wetland Advisory and Training Centre (WATC) of the Institute for Inland Water Management and Waste Water Treatment (RIZA) of the Netherlands Ministry of Transport, Public Works and Water Management. For information contact:

WATC
P.O. Box 17, 8200 AA Lelystad, The Netherlands
Tel: +31-320-298346; fax: +31-320-298339
E-mail: watc@riza.rws.minvenw.nl

IUCN also regularly organises short courses on wetland management ~~on~~ at different levels, both for managers with little prior education and for decision makers at higher levels. These courses are given in the region (*e.g.* in West Africa). For information contact:

IUCN

Rue Mauverney 28, CH-1196 Gland, Switzerland
Tel: +41-22-9990001; fax: +41-22-9990002

Appendix I

POPULATIONS OF WATERBIRDS REQUIRING NATIONAL SINGLE SPECIES ACTION PLANS

National Single Species Action Plans are required for all populations listed in Column A of Table 1 in the AEWA Action Plan (Paragraph 2.2.2 of the Action Plan). Populations are listed in Column A in one of three Categories:

Category 1:
(a) Species that are included in Appendix I to the Bonn Convention.
(b) Species that are listed as threatened in the IUCN Red List of Threatened Animals.
(c) Populations that number less than around 10,000 individuals.

Category 2: Populations numbering between around 10,000 and around 25,000 individuals.

Category 3: Populations numbering between around 25,000 and around 100,000 individuals and considered to be at risk as a result of:
(a) concentration onto a small number of sites at any stage of their annual cycle;
(b) dependence on a habitat type which is under severe threat;
(c) showing significant long-term decline; or
(d) showing extreme fluctuations in population size or trend.

Species listed ~~in boldface were included in the original Action Plan appended as Annex 3 to the Agreement text (June 1995). The remaining species have been~~ include those proposed for inclusion in the Action Plan in *Proposed Amendments to the Action Plan* (April 1999) and accepted by MoP 1 in Cape Town (November 1999). Categories are assigned on the basis of recent information on population sizes and trends, as summarised in the *AEWA Report on the Conservation Status of Migratory Waterbirds in the Agreement Area* (~~April 1999~~ New date). In a few cases, the category to which a population of a species of Ciconiidae, Threskiornithidae or Anatidae has been assigned differs from that given in the original Action Plan. When this is the case, the new category is given in boldface.

Species/subspecies	Population	Category
Gavia immer	Europe (wintering)[1]	1c
Gavia adamsii	Northern Europe (wintering)	2
Podiceps grisegena grisegena	Caspian (wintering)	2
Podiceps auritus auritus	Northwest Europe	1c
Podiceps auritus auritus	Caspian & South Asia (wintering)	2
Pelecanus onocrotalus	Europe & Western Asia (breeding)	1a 3c
Pelecanus crispus	Black Sea & Mediterranean (wintering)	1a 1b 1c
Pelecanus crispus	Southwest Asia (breeding)	1a 1b 2
Phalacrocorax pygmeus	Black Sea & Mediterranean	2
Egretta vinaceigula	Southern Africa	1b 1c
Ardea purpurea purpurea	West Mediterranean (breeding)	2
Casmerodius albus albus	Black Sea & Mediterranean (wintering)	2
Ardeola idae	Madagascar & Aldabra (breeding)	1c
Botaurus stellaris stellaris	Europe (breeding)	3c
Botaurus stellaris stellaris	Southwest Asia (wintering)	2
Ciconia nigra	Southwest Europe & West Africa	1c
Ciconia nigra	Central & Eastern Europe (breeding)	2
Ciconia ciconia ciconia	Southern Africa	1c
Ciconia ciconia ciconia	Iberia & Northwest Africa (breeding)	3b
Ciconia ciconia ciconia	Southwest Asia (wintering)	3b
Species/subspecies	Population	Category

Plegadis falcinellus falcinellus[2]	Black Sea & Mediterranean/West Africa	**3c**
Geronticus eremita	Morocco	1a 1b 1c
Geronticus eremita	Southwest Asia	1a 1b 1c
Threskiornis aethiopicus aethiopicus	Iraq & Iran	1c
Platalea leucorodia leucorodia	Eastern Atlantic	1c
Platalea leucorodia leucorodia	Central & Southeast Europe (breeding)	2
Platalea leucorodia archeri	Red Sea	1c
Platalea leucorodia major	Southwest and South Asia (wintering)	2
Platalea alba	Sub-Saharan Africa	2*
Phoenicopterus ruber roseus	West Africa	3a
Phoenicopterus ruber roseus	Eastern Africa	3a 3c
Phoenicopterus ruber roseus	Southern Africa	3a 3c
Phoenicopterus ruber roseus	West Mediterranean	3a
Phoenicopterus minor	West Africa	2
Phoenicopterus minor	Southern Africa	3a 3c
Thalassornis leuconotus leuconotus	West Africa	1c
Thalassornis leuconotus leuconotus	Eastern and Southern Africa	2*
Oxyura leucocephala	West Mediterranean	1a 1b 1c
Oxyura leucocephala	Algeria & Tunisia	1a 1b 1c
Oxyura leucocephala	East Mediterranean, Turkey & SW Asia	1a 1b 2
Cygnus cygnus[3]	Iceland/UK & Ireland	2
Cygnus cygnus	N Europe & West Siberia/Black Sea & E Med	2
Cygnus cygnus	Western & Central Siberia/Caspian	2
Cygnus columbianus bewickii[4]	Northern Siberia/Caspian	1c
Anser albifrons albifrons	Western Siberia/Central Europe	**3c**
Anser albifrons albifrons	Northern Siberia/Caspian & Iraq	2
Anser albifrons flavirostris	Greenland/Ireland & UK	3a*
Anser erythropus	N Europe & W Siberia/Black Sea & Caspian	**1a** 1b **2**
Anser anser anser	Central Europe/~~Caspian & Iraq~~ N Africa	2*
Branta leucopsis	Svalbard/Southwest Scotland	2
Branta bernicla hrota	Svalbard/Denmark & United Kingdom	1c
Branta bernicla hrota	Canada & Greenland/Ireland	2
Branta ruficollis	Northern Siberia/Black Sea & Caspian	**1a** 1b 3a
Alopochen aegyptiacus	Western Africa	**2**
Tadorna ferruginea	Northwest Africa	1c
Tadorna ferruginea	East Medit. & Black Sea/Northeast Africa	2
Plectropterus gambensis gambensis	West Africa	**3c**
Nettapus auritus	West Africa	**2**
Anas capensis	Eastern Africa to Western Africa	**2**
Anas erythrorhyncha	Madagascar	**2**
Anas hottentota	West Africa	1c
Marmaronetta angustirostris	West Mediterranean/West Africa	**1a** 1b 1c
Marmaronetta angustirostris	East Mediterranean, Turkey & SW Asia	**1a** 1b 1c
Marmaronetta angustirostris	Southwest Asia	**1a** 1b 2
Netta rufina	SW & Central Europe/West Mediterranean	2*
Netta rufina	Black Sea & East Mediterranean	3c
Aythya nyroca	West Mediterranean/West Africa	**1a 1b** 1c
Aythya nyroca	Eastern Europe/East Mediterranean & Africa	**1a 1b** 3c
Aythya nyroca	Western Asia/SW Asia & NE Africa	**1a 1b** 1c
Polysticta stelleri[5]	Western Siberia/Northwest Europe	**1a 1b**
Melanitta fusca fusca	Black Sea & Caspian	1c
Bucephala clangula clangula	Western Siberia & NE Europe/Black Sea	2*
Bucephala clangula clangula	Western Siberia/Caspian	2
Mergellus albellus	Northwest & Central Europe (wintering)	3a

Species/subspecies	Population	Category
Mergus serrator serrator	East Greenland, Iceland, UK & Ireland	**2**
Mergus serrator serrator	Western Siberia/West & Central Asia	1c
Mergus merganser merganser	Northeast Europe/Black Sea	1c
Mergus merganser merganser	Western Siberia/Caspian	2
Grus leucogeranus	Iran (wintering)	1a 1b 1c
Grus virgo	Black Sea (breeding)	1c
Grus virgo	Turkey (breeding)	1c
Grus paradisea	Extreme Southern Africa	1b 2
Grus carunculatus	Northernmost Southern Africa	1b 2
Grus grus	Black Sea & East Mediterranean (wintering)	3c
Grus grus	Black Sea & Turkey (breeding)	1c
Grus grus	Southwest Asia (wintering)	3c
Sarothrura boehmi	Central Africa	3b
Porzana pusilla intermedia	Europe (breeding)	2
Dromas ardeola	NW Indian Ocean, Red Sea & Gulf	3a
Himantopus himantopus himantopus	Southwest Asia (wintering)	2
Recurvirostra avosetta	Southern Africa (breeding)	2
Recurvirostra avosetta	Black Sea & East Mediterranean (breeding)	3c
Recurvirostra avosetta	West & Southwest Asia/Eastern Africa	2
Glareola pratincola pratincola	West Mediterranean (breeding)	2
Glareola pratincola pratincola	Black Sea & East Mediterranean (breeding)	2
Pluvialis apricaria apricaria	UK, Ireland, Denmark & Germany (breeding)	3c
Charadrius pallidus pallidus	Southern Africa	1c
Charadrius pallidus venustus	Eastern Africa	2c
Charadrius alexandrinus alexandrinus	Eastern Atlantic	3c
Charadrius alexandrinus alexandrinus	Black Sea & East Mediterranean (breeding)	3c
Charadrius leschenaultii columbinus	Black Sea & East Mediterranean (breeding)	1c
Charadrius asiaticus	Western Asia/Eastern & Southern Africa	3c
Vanellus ~~spinosus~~ superciliosus	West & Central Africa	2
Vanellus gregarius[6]	Western Asia/Northeast Africa	1a 1b 1c
Lymnocryptes minimus	Europe (breeding)	3c
Limosa limosa islandica	Iceland (breeding)	3a
Numenius phaeopus alboaxillaris	Southwest Asia/Eastern Africa	1c
Numenius tenuirostris	Gulf, Mediterranean & Morocco (wintering)	1a 1b 1c
Numenius arquata orientalis	Southwest Asia & Eastern Africa (wintering)	3c
Calidris tenuirostris	Southwest Asia & W South Asia (wintering)	1c
Calidris alpina schinzii	Baltic, UK & Ireland (breeding)	3c
Calidris alpina arctica	Greenland (breeding)	2
Limicola falcinellus falcinellus	Northern Europe/SW Asia & Eastern Africa	3c
Larus leucophthalmus	Red Sea & nearby coasts	1a 1b 2
Larus audouinii	Mediterranean/North & West African coasts	1a 3a
Larus armenicus	Armenia, E Turkey & W Iran	3a
Larus ichthyaetus	Black Sea & Caspian/Southwest Asia	3a
Larus genei	West Africa (breeding)	2
Sterna nilotica nilotica	Western Europe/West Africa	2
Sterna nilotica nilotica	Black Sea & East Mediterranean (breeding)	2
Sterna nilotica nilotica	Southwest Asia (wintering)	2
Sterna caspia caspia	Southern Africa (breeding)	1c
Sterna caspia caspia	West Africa (breeding)	2
Sterna caspia caspia	Europe (breeding)	1c
Sterna caspia caspia	Caspian (breeding)	1c
Sterna maxima albidorsalis	West Africa (breeding)	3a
Sterna bengalensis par	Red Sea/Eastern Africa	3a
Sterna bengalensis emigrata	South Mediterranean/NW & W African coasts	1c

Species/subspecies	Population	Category
Sterna bergii bergii	Southern Africa & Madagascar (breeding)	2
~~Species/subspecies~~	~~Population~~	~~Category~~
Sterna bergii thalassinus	East Africa & Seychelles (breeding)	1c
Sterna bergii velox	Red Sea & Northeast Africa	3a
Sterna dougallii dougallii	Europe (breeding)	1c
Sterna albifrons albifrons	Eastern Atlantic (breeding)	3b
Sterna albifrons albifrons	Black Sea & E Mediterranean (breeding)	3c
Sterna albifrons albifrons	Caspian (breeding)	2
Sterna albifrons guineae	West Africa (breeding)	2
Sterna balaenarum	Southern & Central Africa Atlantic	2

Footnotes:

1. Suffixes (breeding) or (wintering) in population listings are solely aides to population identification. They do not indicate seasonal restrictions to actions in respect of these populations under the Agreement and Action Plan.

2. The population of *Plegadis falcinellus* breeding in Southwestern Asia and wintering in Eastern Africa has been reassigned to Category 1 in Column B, and therefore no longer qualifies for a SSAP.

3. In the original Action Plan, the Black Sea population of *Cygnus olor* was assigned to Category 2 in Column A. This population has been reassigned to Category 1 in Column B, and therefore no longer qualifies for a SSAP.

4. The population of *Cygnus columbianus bewickii* wintering in Northwest Europe has been reassigned to Category 1 in Column B, and therefore no longer qualifies for a SSAP.

5. The original Action Plan included a tiny population of *Clangula hyemalis* wintering in the Caspian Sea (Category 1c). This is no longer considered to be a valid population, and should be deleted from the Action Plan.

6. *Vanellus gregarius* is listed under the name *Chettusia gregaria* in Appendix I to the Bonn Convention.

Appendix II

GLOBALLY THREATENED SPECIES IN AEWA RANGE STATES

The occurrence of globally threatened species of waterbirds in AEWA Range States, based on Collar *et al.* (1994) the *2000 IUCN Red List of Threatened Species*. Breeding species are indicated with a 'b'; species occurring only as passage migrants and winter visitors are indicated with a 'w'. No attempt has been made to indicate relative numbers, and in some instances, the numbers of birds involved may be very small. Species listed in boldface were included in the Action Plan appended as Annex 3 to the Agreement text (June 1995). The remaining species have been proposed for inclusion in the Action Plan in *Proposed Amendments to the Action Plan* (April 1999).

Key to species numbers

1. Dalmatian Pelican - *Pelecanus crispus*
2.1 Slaty Egret - *Egretta vinaceigula*
3.2. Waldrapp - *Geronticus eremita*
4.3. White-headed Duck - *Oxyura leucocephala*
5.4. Lesser White-fronted Goose - *Anser erythropus*
6.5. Red-breasted Goose - *Branta ruficollis*
7.6. Marbled Teal - *Anas angustirostris*
8. Ferruginous Duck - *Aythya nyroca*
9. Steller's Eider - *Polysticta stelleri*
10.7. Siberian Crane - *Grus leucogeranus*
11.8. Blue Crane - *Grus paradisea*
12.9. Wattled Crane - *Grus carunculatus*
13.10. Sociable Lapwing - *Vanellus gregarius*
11.
Slender-billed Curlew - *Numenius tenuirostris*
15.12. White-eyed Gull - *Larus leucophthalmus*

Species number	1	12	23	34	45	56	67	8	9	710	811	912	1013	1114	15	Total sp.
Albania	b	-	-	w	w	-	-	b	-	-	-	-	-	-	-	4
Algeria	-	-	b	b	-	-	b	b	-	-	-	-	-	-	-	24
Angola	-	-	-	-	-	-	-	-	-	-	b	-	-	-	-	1
Armenia	b	-	-	-	-	-	b	b	-	-	-	-	-	-	-	13
Austria	-	-	-	-	-	-	-	b	-	-	-	-	-	-	-	1
Azerbaijan	b	-	-	w	w	w-	b	b	-	-	-	-	-	-	-	45
Belarus	-	-	-	-	-	-	-	b	-	-	-	-	-	-	-	1
Belgium	-	-	-	-	-	-	-	w	-	-	-	-	-	-	-	1
Bosnia Herzegovina	-	-	-	-	-	-	-	b	-	-	-	-	-	-	-	1
Botswana	-	b	-	-	-	-	-	-	-	-	b	b	-	-	-	3
Bulgaria	b	-	-	w	w	w	-	b	-	-	-	-	-	w	-	46
Cameroon	-	-	-	-	-	-	-	w	-	-	-	-	-	-	-	1
Central African Republic	-	-	-	-	-	-	-	w	-	-	-	-	-	-	-	1
Chad	-	-	-	-	-	-	w	w	-	-	-	-	-	-	-	12
Croatia	-	-	-	-	-	-	-	b	-	-	-	-	-	-	-	1
Cyprus	-	-	-	w	-	-	-	w	-	-	-	-	-	-	-	21
Czech Republic	-	-	-	-	-	-	-	b	-	-	-	-	-	-	-	1
Denmark	-	-	-	-	-	-	-	-	w	-	-	-	-	-	-	1

Egypt	w	-	-	w	-	-	b	w	-	-	-	-	w	-	b	36
Eritrea	-	-	-	-	-	-	-	-	-	-	-	-	w	-	b	12
Estonia	-	-	-	-	-	-	-	-	w	-	-	-	-	-	-	1
Species number	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	Total sp.
Ethiopia	-	-	-	-	-	-	-	w	-	-	b	-	-	-	-	21
Finland	-	-	-	-	b	-	-	-	w	-	-	-	-	-	-	21
France	-	-	-	-	-	-	-	w	-	-	-	-	-	-	-	1
Georgia	-	-	-	-	-	-	b	b	-	-	-	-	-	-	-	12
GermanyGermany	-	-	-	-	-w	-	-	b	-	-	-	-	-	-	-	11
Greece	b	-	-	w	w	-	-	b	-	-	-	-	-	w	-	53
Hungary	-	-	-	-	w	-	-	b	-	-	-	-	-	w	-	23
Iran	b	-	-	b	w	-	b	b	-	w	-	-	w	-	-w?	57
Iraq	w	-	-	w	w	-	b	w	-	-	-	-	w	-	-	46
Israel	-	-	-	w	-	-	b	b	-	-	-	-	w	-	-	34
Italy	-	-	-	w	-	-	-	b	-	-	-	-	-	w	-	13
Jordan	-	-	-	-	-	-	-	w	-	-	-	-	-	-	-	1
Kazakhstan	b	-	-	b	-	-	b	b	-	-	-	-	b	-	-	35
Kyrgyzstan	-	-	-	-	-	-	-	-	-	-	-	-	w	-	-	1
Latvia	-	-	-	-	w	-	-	b	w	-	-	-	-	-	-	13
Lebanon	w	-	-	-	-	-	-	w	-	-	-	-	-	-	-	2
Libya	-	-	-	-	-	-	-	w	-	-	-	-	-	-	-	1
Lithuania	-	-	-	-	-	-	-	b	w	-	-	-	-	-	-	2
Macedonia	-	-	-	-	-	-	-	b	-	-	-	-	-	-	-	1
Malawi	-	-	-	-	-	-	-	-	-	-	b	-	-	-	-	1
Mali	-	-	-	-	-	-	w	w	-	-	-	-	-	-	-	12
Malta	-	-	-	-	-	-	-	w	-	-	-	-	-	-	-	1
Moldova	-	-	-	-	-	-	-	b	-	-	-	-	-	-	-	1
Morocco	-	-	b	-	-	-	b	b	-	-	-	-	-	w	-	34
Mozambique	-	b	-	-	-	-	-	-	-	-	b	-	-	-	-	2
Namibia	-	b	-	-	-	-	-	-	-	-	b	b	-	-	-	3
Netherlands	-	-	-	-	-	-	-	w	-	-	-	-	-	-	-	1
Niger	-	-	-	-	-	-	-	w	-	-	-	-	-	-	-	1
Nigeria	-	-	-	-	-	-	-	w	-	-	-	-	-	-	-	1
Norway	-	-	-	-	b	-	-	-	w	-	-	-	-	-	-	12
Oman	-	-	-	-	-	-	-	w	-	-	-	-	-	-	-	1
Poland	-	-	-	-	-	-	-	b	w	-	-	-	-	-	-	2
Romania	b	-	-	b	w	w	-	b	-	-	-	-	-	w	-	46
Russia	b	-	-	b	b	b	b	b	b	b	-	-	b	b	-	710
Saudi Arabia	-	-w	w	w	-	-	-	b	-	-	-	-	-	-	b	24
Senegal	-	-	-	-	-	-	b	w	-	-	-	-	-	-	-	12
Slovakia	-	-	-	-	-	-	-	b	-	-	-	-	-	-	-	1
Slovenia	-	-	-	-	-	-	-	b	-	-	-	-	-	-	-	1
South Africa	-	-	-	-	-	-	-	-	-	-	b	b	-	-	-	2
Somalia	-	-	-	-	-	-	-	-	-	-	-	-	-	-	b	1
Spain	-	-	-	b	-	-	b	b	-	-	-	-	-	-	-	23
Sudan	-	-	-	-	-	-	-	w	-	-	-	-	w	-	b	13
Syria	w	-	-	w	-	-	-	-	-	-	-	-	-	-	-	12
Swaziland	-	-	-	-	-	-	-	-	-	-	-	b	-	-	-	1
Sweden	-	-	-	-	b	-	-	-	w	-	-	-	-	-	-	12
Switzerland	-	-	-	-	-	-	-	w	-	-	-	-	-	-	-	1
Tajikistan	-	-	-	w	-	-	b	b	-	-	-	-	-	-	-	3

Tanzania	-	-	-	-	-	-	-	-	-	-	b	-	w	-	-	2
Tunisia	-	-	-	b	-	b	b	w	-	-	-	-	-	w	-	35
Turkey	b	-b	-	b	w	-	b	b	-	-	-	-	w	w	-	67
Species number	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	Total sp.
Turkmenistan	b	-	-	w	w	-	b	b	-	-	-	-	w	-	-	46
United Arab Emirates	-	-	-	-	-	-	-	w	-	-	-	-	-	-	-	1
Ukraine	b	-	-	-	-	w	-	b	-	-	-	-	-	w	-	24
Uzbekistan	b	-	-	b	-	-	b	b	-	-	-	-	-	-	-	24
Yemen	-	-	w	-	-	-	-	w	-	-	-	-	-	-	b	31
Yugoslavia (former)	b	-	-	-	w	-	-	b	-	-	-	-	-	w	-	24
Zaire	-	-	-	-	-	-	-	-	-	-	b	-	-	-	-	1
Zambia	-	b	-	-	-	-	-	-	-	-	b	-	-	-	-	2
Zimbabwe	-	-	-	-	-	-	-	-	-	-	b	-	-	-	-	1

Appendix III

INFORMATION SHEET ON RAMSAR WETLANDS (RIS)

Categories approved by Recommendation 4.7 of the Conference of the Contracting Parties

1. **Date this sheet was completed/updated**:

2. **Country**:

3. **Name of wetland**:

4. **Geographical co-ordinates**:

5. ~~**Altitude**~~ **Elevation**: (average and/or maximum and minimum)

6. **Area**: (in hectares)

7. **Overview**: (general summary, in two or three sentences, of the wetland's principal characteristics)

8. **Wetland Type**: (please circle the applicable codes for wetland types as listed in Annex I of
the Explanatory Note and Guidelines document)

marine-coastal:	A B C D E F G H I J K Zk(a)
inland:	L M N O P Q R Sp Ss Tp Ts U Va Vt W Xf Xp Y Zg Zk(b)
human-**made**:	1 2 3 4 5 6 7 8 9 Zk(c)

Please now rank these wetland types by listing them from the most to the least dominant:

9. **Ramsar Criteria**: (please circle the applicable criteria; see point 12 below)
~~1a 1b 1c 1d 2a 2b 2c 2d 3a 3b 3c 4a 4b~~ 1 2 3 4 5 6 7 8

Please specify the most significant criterion applicable to this site:

10. **Map of site included**? Please tick YES --or-- NO (Please refer to the Explanatory Note and Guidelines document for information regarding desirable map traits.)

11. **Name and address of the compiler of this form**:

Please provide additional information on each of the following categories by attaching extra pages (please limit extra pages to no more than 10):

12. **Justification of the criteria selected under point 9**. (Please refer to Annex II in the Explanatory Note and Guidelines document).

13. **General location**: (include the nearest large town and its administrative region)

14. **Physical features**: (e.g. geology, geomorphology; origins - natural or artificial; hydrology; soil type; water quality; water depth water permanence; fluctuations in water level; tidal variations; catchment area; downstream area; climate)

15. **Hydrological values**: (groundwater recharge, flood control, sediment trapping, shoreline stabilisation, etc.)

16. **Ecological features**: (main habitats and vegetation types)

17. **Noteworthy flora**: (indicating, e.g., which species/communities are unique, rare, endangered or biogeographically important, etc.)

18. **Noteworthy fauna**: (indicating, e.g., which species are unique, rare, endangered, abundant or biogeographically important; include count data, etc.)

19. **Social and cultural values**: (e.g., fisheries production, forestry, religious importance, archaeological site, etc.)

20. **Land tenure/ownership of**: (a) site (b) surrounding area

21. **Current land use**: (a) site (b) surroundings/catchment

22. **Factors (past, present or potential) adversely affecting the site's ecological character, including changes in land use and development projects**: (a) at the site (b) around the site

23. **Conservation measures taken**: (national category and legal status of protected areas - including any boundary changes which have been made: management practices; whether an officially approved management plan exists and whether it has been implemented)

24. **Conservation measures proposed but not yet implemented**: (e.g. management plan in preparation; officially proposed as a protected area, etc.)

25. **Current scientific research and facilities**: (e.g., details of current projects; existence of field station, etc.)

26. **Current conservation education**: (e.g., visitors centre, hides, information booklet, facilities for school visits, etc.)

27. **Current recreation and tourism**: (state if wetland is used for recreation/tourism; indicate type and frequency/intensity)

28. **Jurisdiction**: (territorial, e.g., state/region and functional, e.g., Dept. of Agriculture/Dept. of Environment etc.)

29. **Management authority**: (name and address of local body directly responsible for managing the wetland)

30. **Bibliographical references**: (scientific/technical only)

(Source: The Ramsar Convention Bureau: http://www.ramsar.org/key_ris_index.htm)

Appendix IV

RAMSAR CLASSIFICATION SYSTEM FOR WETLAND TYPES

Marine/Coastal

A. Permanent shallow marine waters in most cases less than six metres deep at low tide; includes sea bays and straits.
B. Marine subtidal aquatic beds; includes kelp beds, sea-grass beds, tropical marine meadows.
C. Coral reefs.
D. Rocky marine shores; includes rocky offshore islands, sea cliffs.
E. Sand, shingle or pebble shores; includes sand bars, spits and sandy islets; ~~also~~ includes dune systems and humid dune slacks.
F. Estuarine waters; permanent water of estuaries and estuarine systems of deltas.
G. Intertidal mud, sand or salt flats.
H. Intertidal marshes; includes salt marshes, salt meadows, saltings, raised salt marshes; ~~also~~ includes tidal brackish and freshwater marshes.
I. Intertidal forested wetlands; includes mangrove swamps, nipah swamps and tidal freshwater swamp forests.
J. Coastal brackish ~~to/~~saline lagoons; brackish to saline lagoons with at least one relatively narrow connection to the sea.
K. ~~K.~~ Coastal freshwater lagoons; includes freshwater delta lagoons.
Zk(a) Karst and other subterranean hydrological systems, marine/coastal.

Inland Wetlands

L. Permanent inland deltas.
M. Permanent rivers, streams and creeks; includes waterfalls.
N. Seasonal/~~,~~ intermittent ~~and /~~irregular rivers~~,~~/ ~~streams~~ and /~~creeks.
O. Permanent freshwater lakes (over 8 ha); includes large oxbow lakes.
P. Seasonal ~~and /~~intermittent freshwater lakes (over 8 ha); includes floodplain lakes.
Q. Permanent saline~~, /~~brackish ~~and /~~alkaline lakes.
R. Seasonal and intermittent saline, brackish and alkaline lakes and flats.*
Sp. Permanent saline~~, /~~brackish ~~and /~~alkaline marshes and pools.
Ss. Seasonal and intermittent saline, brackish and alkaline marshes and pools.*
Tp. Permanent freshwater marshes ~~and /~~pools; ponds (~~under~~ below 8 ha in area); marshes and swamps on inorganic soils with emergent vegetation ~~that is~~ water-logged for at least most of the growing season.
Ts. Seasonal ~~and /~~intermittent freshwater marshes and pools on inorganic soils; includes sloughs, potholes, seasonally flooded meadows, ~~and~~ sedge marshes.*
U. Non-forested peatlands; includes shrub or open bogs, swamps, ~~and~~ fens.
Va. Alpine wetlands; includes alpine meadows, ~~and~~ temporary waters from snowmelt.
Vt. Tundra wetlands; includes tundra pools, ~~and~~ temporary waters from snowmelt.
W. Shrub-dominated wetlands ~~on inorganic soils~~; includes shrub swamps, shrub-dominated freshwater marsh, shrub carr, ~~and~~ alder thicket on inorganic soils.*
Xf. Freshwater, tree-dominated wetlands ~~on inorganic soils~~; includes freshwater swamp forest, seasonally flooded forest and wooded swamps on inorganic soils.*
Xp. Forested peatlands; peatswamp forest.*
Y. Freshwater springs; oases.
Zg. Geothermal wetlands.
Zk (b). ~~Subterranean~~ Kkarst and other subterranean ~~cave~~ hydrological systems, inland.

~~* As appropriate, includes floodplain wetlands such as seasonally inundated grassland (including natural wet meadows), shrublands, woodlands or forest~~

Note : "**floodplain**" is a broad term used to refer to one or more wetland types, which may include examples from the R, Ss, Ts, W, Xf, Xp, or other wetland types. Some examples of floodplain wetlands are seasonally inundated grassland (including natural wet meadows), shrublands, woodlands and forests. Floodplain wetlands are not listed as a specific wetland type herein.

.

~~M~~Human-made wetlands

1. Aquaculture (*e.g.* fish and shrimp) ponds ~~(*e.g.* fish and shrimp ponds)~~.
2. Ponds; includes farm ponds, stock ponds, small tanks (generally less than 8 ha in area).
3. Irrigated land; includes irrigation channels and rice fields.
4. Seasonally flooded agricultural land.~~#~~ Includes intensively managed or grazed wet meadow or pasture.
5. Salt exploitation sites; salt pans, salines *etc*.
6. Water storage areas; reservoirs~~, /~~barrages~~, /~~dams ~~and /~~impoundments (generally over 8 ha ~~in area~~).
7. Excavations; gravel ~~pits, /~~brick ~~pits, /~~clay pits, borrow pits ~~and /~~mining pools.
8. Wastewater treatment areas; sewage farms, settling ponds, oxidation basins *etc*.
9. Canals and drainage channels, ditches.

Zk(c) Karst and other sub-terranean hydrological systems, human made.

~~# Includes intensively managed or grazed wet meadow or pasture.~~

Source: The Ramsar Convention Bureau http://www.ramsar.org/key_ris_types.htm

Appendix V

STATUS OF WATERBIRD POPULATIONS COVERED BY TRADE REGULATIONS

Key to columns

AEWA: see the AEWA Action Plan for details of the status classifications used. These classifications refer to populations and each is presented, separated by a colon (:). Classifications in normal typeface follow the Action Plan; classifications ~~in boldface follow~~ include the *Proposed Amendments to the Action Plan* (April 1999).

CITES: the appendix on which the species is listed is shown. Brackets are used where AEWA subspecies have been assumed to have the same CITES classification.

EC: the annex from trade regulations 338/97 and 2307/97 on which the *species* is listed is shown. Brackets are used where AEWA subspecies have been assumed to have the same EU classification.

Table 1~~a~~: Status of waterbird populations currently listed in the AEWA Action Plan against trade regulations.

	AEWA	CITES	EC[1]
Pelecanus crispus [2]	**A1a 1b 1c: A1a 1b 2**	I	A
Casmerodius albus albus	**A2: B(1)**	III	A
Ciconia nigra	A1c: A2	II	A
Geronticus eremita [2]	A1a **1b 1c:** A1a **1b 1c**	I	
Threskiornis aethiopicus aethiopicus	A1c: C1	III	C
Platalea leucorodia leucorodia	A1c: A2	II	A
Platalea leucorodia archeri	A1c	(II)	(A)
Platalea leucorodia major	A2	(II)	(A)
Phoenicopterus ruber roseus	**A3a: A3a 3c: A3a 3c: A3a: B2a**	II	A
Phoenicopterus minor	**A2: A3a 3c: B2a 2c**	II	B
Dendrocygna bicolor	**C(1): C(1)**	III	C
Dendrocygna viduata	**C1: C1**	III	C
Oxyura leucocephala [2]	**A1a 1b 1c: A1a 1b 1c:** A1a **1b 2**	II	A
Branta ruficollis [2]	**A1a** 1b **3a**	II	A
Alopochen aegyptiacus	**A2: C(1)**	III	C
Plectropterus gambensis gambensis	**A3c: C1**	III	C
Plectropterus gambensis niger	B1	(III)	(C)
Sarkidiornis melanotos melanotos	**B1: C1**	II	B
Nettapus auritus	**A2:** C(1)	III	C
Anas penelope	B2c: B2c: C1	III	C
Anas crecca crecca	B2c: C1: C1	III	C
Anas capensis	**A2: C1**	III	C
Anas acuta	B1: **B2c: C(1)**	III	C
Anas querquedula	**B2c**: **C(1)**	III	A

Anas clypeata	B1: **B(2c)**: **B2c**	III	C
Aythya nyroca [2]	**A1a 1b** 1c: **A1a 1b** 1c: **A1a 1b** 3c	III	A
Grus leucogeranus [2]	**A1a 1b 1c**	I	A
Grus virgo	**A1c: A1c: B1**	II	
Grus paradisea	**A1b 2**	II	
Grus carunculatus	**A1b 2**	II	
Grus grus	**A1c: A3c: A3c: B1: B1**	II	A
Numenius tenuirostris [2]	**A1a 1b 1c**	I	A
~~*Anas clypeata*~~	~~B1: **B(2c)**: **B2c**~~	~~III~~	~~C~~
~~*Aythya nyroca* [2]~~	~~**A1a 1b** 1c: **A1a 1b** 1c: **A1a 1b** 3c~~	~~III~~	~~A~~

[1] There are no Annex D waterbird species applicable to the AEWA area.
[2] Species also listed on Appendix 1 to the Bonn Convention.

~~**Table 1b: Status of waterbird populations proposed for addition to the AEWA Action Plan against trade regulations.**~~

	~~**AEWA**~~	~~**CITES**~~	~~**EC**~~ [1]
~~*Pelecanus crispus* [2]~~	~~**A1a 1b 1c: A1a 1b 2**~~	~~I~~	~~A~~
~~*Casmerodius albus albus*~~	~~**A2: B(1)**~~	~~III~~	~~A~~
~~*Phoenicopterus ruber roseus*~~	~~**A3a: A3a 3c: A3a 3c: A3a: B2a**~~	~~II~~	~~A~~
~~*Phoenicopterus minor*~~	~~**A2: A3a 3c: B2a 2c**~~	~~II~~	~~B~~
~~*Grus leucogeranus* [2]~~	~~**A1a 1b 1c**~~	~~I~~	~~A~~
~~*Grus virgo*~~	~~**A1c: A1c: B1**~~	~~II~~	
~~*Grus paradisea*~~	~~**A1b 2**~~	~~II~~	
~~*Grus carunculatus*~~	~~**A1b 2**~~	~~II~~	
~~*Grus grus*~~	~~**A1c: A3c: A3c: B1: B1**~~	~~II~~	~~A~~
~~*Numenius tenuirostris* [2]~~	~~**A1a 1b 1c**~~	~~I~~	~~A~~

~~[1] There are no Annex D waterbird species applicable to the AEWA area.~~
~~[2] Species also listed on Appendix 1 to the Bonn Convention.~~