



“People and Wetlands: The Vital Link”
**7th Meeting of the Conference of the Contracting Parties
to the Convention on Wetlands (Ramsar, Iran, 1971),
San José, Costa Rica, 10-18 May 1999**

**Strategic framework and guidelines for the future development of
the List of Wetlands of International Importance**

1. RECALLING that Article 2 of the Convention requires Contracting Parties to “*designate suitable wetlands within their territory for inclusion in a List of Wetlands of International Importance*”;
2. FURTHER RECALLING that following consideration of the issue at the first three Conferences of the Contracting Parties, the 4th Conference, in Recommendation 4.2, adopted *Criteria for Identifying Wetlands of International Importance*;
3. ACKNOWLEDGING that Resolution VI.2 of the 6th Conference of the Contracting Parties (COP6) adopted further specific criteria for identifying Wetlands of International Importance based on fish, which also included in its Annex detailed guidelines for the application of these criteria;
4. ALSO RECALLING Resolution VI.3 of Ramsar COP6, entitled *Review of the Ramsar Criteria for Identifying Wetlands of International Importance and the accompanying Guidelines*, which requested that the Scientific and Technical Review Panel (STRP) undertake further reviews of the Criteria and submit these for consideration by the Standing Committee and possibly by COP7;
5. AWARE that Action 6.2.3 of the Strategic Plan 1997-2002 urges Contracting Parties to give priority attention to the designation of new sites from “*wetland types currently under-represented on the Ramsar List, and, in particular, when appropriate, coral reefs, mangroves, sea-grass beds, and peatlands*”;
6. NOTING Action 6.3.1 of the Strategic Plan which establishes that the Criteria shall be kept “*under review to ensure they reflect global wetland conservation priorities and values*”;
7. BELIEVING that the application of the *Criteria for Identifying Wetlands of International Importance* should be undertaken within a strategic framework at the global, supranational/regional and national levels, in order that the Convention can move more rapidly towards achieving a global network of sites representative of all wetland types, which also contributes to the conservation of biological diversity and to maintaining the ecological and hydrological functions of wetlands that sustain human populations;
8. RECOGNIZING that Technical Session II of this COP has reviewed in detail the draft *Strategic Framework and guidelines for the future development of the List of Wetlands of International Importance*;

9. ALSO RECOGNIZING that Technical Session IV of this COP has reviewed the information available on the world's wetland resources and identified a number of priorities for inventory to improve this essential information base, in order to form the foundation for planning and future priority-setting for Ramsar site designations (Resolution VII.20);
10. FURTHER NOTING Decision IV/4 from COP4 of the Convention on Biological Diversity relating to the status and trends of the biological diversity of inland waters, and especially Annex I, Part B, referring to collaboration between the respective technical bodies of the two Conventions to "*achieve desirable convergence between the approaches on criteria and classification of inland water ecosystems*";
11. MINDFUL ALSO of the Memoranda of Understanding with the Convention on Migratory Species and with the World Heritage Convention and the Memorandum of Cooperation with the Convention to Combat Desertification, and the cooperative site-based actions identified therein;
12. EXPRESSING ITS APPRECIATION to the members of the STRP and the others that have contributed to the review of the Criteria and development of the Strategic Framework, especially the Convention's International Organization Partners and the officials within the following Ramsar Administrative Authorities who provided informal comment and advice: Australia, Bahamas, Canada, Colombia, Hungary, Indonesia, Malawi, Slovenia, South Africa and the United Kingdom;

THE CONFERENCE OF THE CONTRACTING PARTIES

13. ADOPTS the *Strategic Framework and guidelines for the future development of the List of Wetlands of International Importance* as annexed to this Resolution¹;
14. URGES all Contracting Parties to apply the Strategic Framework, and in particular, to develop at the national, and as appropriate at the regional level, a systematic approach to identifying wetlands for future Ramsar site designation in pursuit of the stated vision for the List of Wetlands International Importance;
15. INVITES Contracting Parties, the Convention's International Organization Partners and local community stakeholders to work, within the long-term strategic framework, to achieve the short-term global target of 2000 Ramsar sites by COP9 in the year 2005;
16. CALLS UPON Contracting Parties (in accordance with Resolution VII.20) also to give priority, where indicated, to wetland inventory programmes in order to provide the necessary information base for applying the Strategic Framework to the maximum extent possible;
17. ENCOURAGES all Contracting Parties to be mindful, when identifying priority sites for designation, of their obligations under Article 5 of the Convention (and the related *Guidelines for international cooperation under the Ramsar Convention*, adopted by Resolution

¹ The *Guidelines for identifying and designating karst and other subterranean hydrological systems as Wetlands of International Importance* (annex to Resolution VII.13) have also been added to the *Strategic Framework*, as instructed by Resolution VII.13.

VII.19), and to ensure that suitable transboundary wetlands and those providing important habitat for migratory wetland-dependent species are given prominence in these considerations;

18. FURTHER CALLS UPON Contracting Parties, where possible and appropriate, to promote the Ramsar sites within their jurisdictions as models or demonstration sites for the implementation of the *Guidelines for the implementation of the wise use concept* (Recommendation 4.10);
19. INSTRUCES the Ramsar Bureau, at the earliest opportunity, to draw to the attention of the expert scientific and technical bodies of the Convention on Biological Diversity, the Convention on Migratory Species, the Convention on International Trade in Endangered Species (CITES), the World Heritage Convention and the Convention to Combat Desertification, the contents of this Resolution and its Annex, and to seek appropriate future collaboration with its implementation.

Annex

Strategic Framework and guidelines for the future development of the List of Wetlands of International Importance of the Convention on Wetlands (Ramsar, Iran, 1971)

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Group A **Sites containing representative, rare or unique wetland types**
Criterion 1 Criterion for representative, rare or unique wetland types

Group B **Sites of importance for conserving global biological diversity**
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Appendix A The Ramsar Convention definition of “wetland” and classification system for wetland type
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I. Introduction

Background

1. At the time of signing, or when depositing their instrument of ratification or accession to the Convention on Wetlands (Ramsar, Iran, 1971), sovereign states are required under Article 2.4 to designate at least one site as a Wetland of International Importance. Thereafter, as prescribed by Article 2.1, each “*Contracting Party shall designate suitable wetlands within its territory for inclusion in the List of Wetlands of International Importance*”.
2. Assistance with interpreting the key word “*suitable*”, as used in Article 2.1 above, is provided in part by Article 2.2, which states that “*wetlands should be selected for the List on account of their international significance in terms of ecology, botany, zoology, limnology or hydrology. In the first instance wetlands of international importance to waterfowl at any season should be included.*”
3. Throughout its evolution, the Convention on Wetlands has developed Criteria for the designation of Wetlands of International Importance (Ramsar sites) which have been kept under constant review. It has supplemented these with regularly updated Guidelines to assist Contracting Parties with their interpretation and application of the Criteria reflecting the development of conservation science.
4. The strategic direction given to the development of the List of Wetlands of International Importance has previously been rather limited. Most notably, the 6th Conference of the Contracting Parties (COP6) urged Parties through the Convention’s Strategic Plan 1997-2002, to “*increase the area of wetland designated for the List of Wetlands of International Importance particularly for wetland types that are under-represented either at the global or national levels*” (Operational Objective 6.2).

Purpose

5. At the time of COP7, and as the number of designated Ramsar sites fast approaches 1,000, the Convention on Wetlands has adopted this *Strategic Framework and guidelines for the future development of the List of Wetlands of International Importance* (the Ramsar List). Its purpose is to provide a clearer view, or vision, of the long-term targets or outcomes which the Convention is seeking to achieve through the Ramsar List. Guidance is also provided to assist Contracting Parties in taking a systematic approach to identifying their priorities for future designations, in order to create comprehensive national networks of Ramsar sites, which, when considered at the global level, fulfil the stated vision for the Ramsar List (refer to Section II).

II. The vision, objectives and short-term target for the List of Wetlands of International Importance (the Ramsar List)

The vision of the Ramsar List

6. The Convention on Wetlands has adopted the following vision for the List of Wetlands of International Importance.

To develop and maintain an international network of wetlands which are important for the conservation of global biological diversity and for sustaining human life through the ecological and hydrological functions they perform.

7. Such an international network of wetland sites has to be built from coherent and comprehensive networks of Wetlands of International Importance established within the territory of each Contracting Party to the Convention.

Objectives for the Ramsar List

8. In order to realise the vision for the Ramsar List described above, the Contracting Parties, the Convention's International Organization Partners, local stakeholders, and the Ramsar Bureau will work cooperatively towards accomplishing the following four objectives (not necessarily in priority order).

Objective 1. To establish national networks of Ramsar sites in each Contracting Party which fully represent the diversity of wetlands and their key ecological and hydrological functions.

9. 1.1) To have included in the Ramsar List at least one suitable (i.e., internationally important) representative of every natural or near-natural wetland type (see the range of types in Appendix A) present in each biogeographic region (see definition of biogeographic region in Appendix B). These biogeographical regions are as defined globally, supranationally/regionally or nationally, and applied by the Contracting Party in a form appropriate to that Party.
10. 1.2) To give priority in determining suitable sites in relation to wetland type to those wetlands that play a substantial ecological or hydrological role in the natural functioning of a major river basin, lake, or coastal system.

Objective 2. To contribute to maintaining global biological diversity through the designation and management of appropriate wetland sites.

11. 2.1) To review the development of the Ramsar List and further refine the Criteria for identification and selection of Ramsar sites, as appropriate, to best promote conservation of biological diversity and wise use of wetlands at the local, sub-national, national, supranational/regional and international levels.

12. 2.2) To include in the Ramsar List wetlands that include threatened ecological communities or are critical to the survival of endemic species identified as vulnerable, endangered or critically endangered under national endangered species legislation/ programs or international designations such as the IUCN Red List and the Appendices of the Convention on International Trade in Endangered Species of Wild Flora and Fauna (CITES) and the Convention on Migratory Species (CMS or Bonn Convention).
13. 2.3) To include in the Ramsar List wetlands critical to the conservation of biological diversity in each biogeographic region (see Glossary for definition).
14. 2.4) To include in the Ramsar List wetlands that provide important habitat for plant and animal species at critical stages in their life cycle or during adverse conditions.
15. 2.5) To include in the Ramsar List wetlands that are of direct significance for waterbird and fish species or stocks as determined by the relevant Ramsar site selection criteria (see Section V).

Objective 3. To foster cooperation among Contracting Parties, the Convention's International Organization Partners , and local stakeholders in the selection, designation, and management of Ramsar sites.

16. 3.1) To pursue opportunities between two (or more) Contracting Parties for Ramsar site "twinning" agreements for wetlands along migratory species routes, across common borders, or with similar wetland types or species (Resolution VII.19).
17. 3.2) To undertake other forms of cooperative venture between two or more Contracting Parties that can demonstrate or assist with achieving long-term conservation and sustainable use of Ramsar sites and wetlands in general.
18. 3.3) To encourage and support, where appropriate, a stronger role for and contribution from non-government and community-based organizations in the strategic development of the Ramsar List and subsequent management of Ramsar sites locally, subnationally, nationally, supranationally/regionally, and internationally (Resolution VII.8).

Objective 4. To use the Ramsar site network as a tool to promote national, supranational/regional, and international cooperation in relation to complementary environment treaties.

19. 4.1) To use Ramsar sites as baseline and reference areas for national, supranational/ regional, and international environmental monitoring to detect trends in the loss of biological diversity, climate change, and the processes of desertification.
20. 4.2) To implement conservation and sustainable use demonstration projects at Ramsar sites, which will also provide tangible illustrations of cooperation with appropriate international environment treaties such as the Convention on Biological Diversity, the United Nations Framework Convention on Climate Change, the Convention to Combat Desertification, the Convention on International Trade in Endangered Species of Wild Flora and Fauna, the World Heritage Convention, and the Convention on Migratory

Species and its Agreements such as the African-Eurasian Waterbirds Agreement, and regional agreements and cooperative initiatives such as the North American Waterfowl Management Plan, the Western Hemisphere Shorebird Reserve Network, the Asia-Pacific Migratory Waterbird Conservation Strategy 1996-2000, the Mediterranean Wetlands Initiative (MedWet), South Pacific Regional Environment Programme, Southern Africa Development Community (SADC), Association of the South East Asian Nations (ASEAN), the European Union's Natura 2000 network, the Emerald Network of the Bern Convention on the Conservation of European Wildlife and Natural Habitats, the Pan-European Biological and Landscape Diversity Strategy, the Wetlands Programme for the High Andes, the Treaty on Amazon Cooperation, the Central American Commission on Environment and Development (CCAD), etc.

Short-term target for the Ramsar List to the year 2005

21. The Convention stresses the importance of wetlands as rich centres of biological diversity and productivity and as life support systems for human populations, and is concerned at the continuing loss and degradation of wetlands in many parts of the world. In response to this concern, the Convention has set the following short-term target for the Ramsar List.

To ensure that the List of Wetlands of International Importance contains at least 2000 sites by the time of Ramsar's 9th Conference of the Contracting Parties in the year 2005, recognizing that this expansion should take into consideration the long-term vision, strategic objectives, and targets for the Ramsar List adopted by the Convention.

III. Wetlands of International Importance and the Ramsar principle of Wise Use

22. Under the Ramsar Convention on Wetlands the two concepts of wise use and site designation are fully compatible and mutually reinforcing. Contracting Parties are expected to designate sites for the List of Wetlands of International Importance "*on account of their international significance in terms of ecology, botany, zoology, limnology or hydrology*" (Article 2.2), **AND** to "*formulate and implement their planning so as to promote the conservation of the wetlands included in the List, and as far as possible the wise use of wetlands in their territory*" (Article 3.1).
23. Ramsar COP3 (1987) defined wise use of wetlands as "*their sustainable utilisation for the benefit of mankind in a way compatible with the maintenance of the natural properties of the ecosystem.*" The Strategic Plan adopted at COP6 (1996) equates "wise use" with sustainable use. Contracting Parties to the Convention also recognize that wetlands, through their ecological and hydrological functions, provide invaluable services, products and benefits enjoyed by, and sustaining, human populations. Therefore, the Convention promotes practices that will ensure that all wetlands, and especially those designated for the Ramsar List, will continue to provide these functions and values for future generations as well as for the conservation of biological diversity.

Ramsar sites and the wise use principle. The act of designating (listing) under the Convention a wetland as internationally important is an appropriate first step along a conservation and sustainable use pathway, the endpoint of which is achieving the long-term wise (sustainable) use of the site.

24. Article 3.2 of the Convention determines that “*each Contracting Party shall arrange to be informed at the earliest possible time if the ecological character of any wetland in its territory and included in the List has changed, is changing or is likely to change*”. Pursuant to this the Ramsar Convention has developed the concept of “ecological character” for wetlands, which is defined as follows:

Ecological character is the sum of the biological, physical, and chemical components of the wetland ecosystem and their interactions which maintain the wetland and its products, functions and attributes. (Resolution VII.10)

25. Contracting Parties are expected to manage their Ramsar sites so as to maintain the ecological character of each site and, in so doing, retain those essential ecological and hydrological functions which ultimately provide its “*products, functions and attributes*”. Ecological character is therefore an indication of the ‘health’ of the wetland and Contracting Parties are expected at the time of designation to describe the site using the approved Ramsar Information Sheet (see Appendix C), in sufficient detail to provide a baseline for subsequent monitoring to detect any changes to these ecological and hydrological attributes. Changes to ecological character outside the natural variations may signal that uses of the sites, or externally derived impacts on the sites, are unsustainable and may lead to the degradation of natural processes and thus the ultimate breakdown of the ecological, biological and hydrological functioning of the wetland.
26. The Ramsar Convention has developed tools for monitoring ecological character and also for the development of management plans for Wetlands of International Importance. In preparing such management plans, which all Contracting Parties have been strongly urged to do, issues such as the impact of human activities on the ecological character of the wetland, the economic and socio-economic values of the site (especially for local communities), and the cultural values associated with the site need to be considered. Contracting Parties have also been strongly encouraged to include within management plans a regime for regular and rigorous monitoring to detect changes to ecological character (Resolution VII.10).

IV. Guidelines for adopting a systematic approach to identifying priority wetlands for designation under the Ramsar Convention

27. The introduction to this Strategic Framework (see Section I) states that its purpose is to provide a clearer understanding, or vision, of the long-term targets or outcomes which the Ramsar Convention is seeking to achieve through the List of Wetlands of International Importance.
28. In the section below, guidance is provided to assist Contracting Parties in taking a systematic approach to identifying priorities for future designations, in order to create coherent, comprehensive national networks of Ramsar sites which, when considered as a global network, will help to fulfil the vision for the Ramsar List.
29. When developing and implementing a systematic approach to identifying the priority wetlands for designation as Ramsar sites, Contracting Parties are urged to consider the following issues.

30. **Review national objectives.** As a precursor to developing a systematic approach for identifying future Ramsar sites, Contracting Parties are urged to give careful consideration to the Objectives described in Section II of this Strategic Framework. When considered within the context of the vision and long-term targets for the List of Wetlands of International Importance, these objectives provide a basis for all subsequent considerations in this area.
31. **Wetland definition, types and biogeographic regions.** For each Contracting Party it is important to reach an understanding at the national level of how the Ramsar definition of a wetland is to be interpreted and on the biogeographic regionalisation to be applied. The Ramsar definition of “wetland” (see Appendix A) is very broad, reflecting the global scale of the Convention, and gives Contracting Parties great scope and flexibility for ensuring compatibility between national, supranational/ regional and international wetland conservation efforts. Importantly, the Convention aims at the listing of natural or semi-natural wetlands, but also allows for the designation of purpose-built, or human-made, wetlands, assuming they satisfy at least one of the Criteria specified in Section V. The Convention’s classification system for wetland type (see Appendix A) indicates the full range which Contracting Parties are urged to consider fully in relation to possible listing under the Ramsar Criteria related to representative, rare or unique wetlands (see Section V, Criterion 1).
32. Under Criterion 1, Contracting Parties are expected to identify sites of international importance within an agreed biogeographic regionalisation. The Glossary (see Appendix B) defines this term as “a scientifically rigorous determination of regions as established using biological and physical parameters such as climate, soil type, vegetation cover, etc.” Note that for many Contracting Parties, biogeographic regions will be transboundary in nature and will require collaboration between countries to define those wetland types which are representative, unique, etc. In some regions and countries, the term “bioregion” is used as a synonym for “biogeographic region”.
33. **Inventories and data.** Contracting Parties are urged to establish the extent and quality of information which has been collected on wetlands within their territory and take steps to complete an inventory if this has not been done. Inventories should be undertaken using accepted models and standards as advocated by the Ramsar Convention (Resolution VII.20). The lack of an inventory should not, however, prevent designations where adequate information is already available for some sites.
34. Consistent with the developing scientific knowledge of the status and distribution of wetlands, their associated plants and animals, and their functions and values, national wetland inventories and/or lists of potential Ramsar sites should be subject to periodic review and updating (Ramsar Strategic Plan 1997-2002, Action 6.1.1).
35. **Territory of the Contracting Parties and transfrontier situations.** Wetland inventories should be certain to take into consideration all parts of the territory of the Contracting Party. In accordance with Article 5 of the Convention and the *Guidelines for international cooperation under the Ramsar Convention* (Resolution VII.19), special consideration should be given to identifying and designating transfrontier sites.
36. **Supranational/regional level guidance.** Contracting Parties should also be aware that in some instances they may require more detailed guidance at the supranational/ regional

level in establishing the relative importance of sites for possible designations. This may apply in the following situations:

- i. where plant or animals species do not occur in large concentrations (such as migratory waterbirds in northern latitudes) within the country; or
- ii. where collection of data is difficult (particularly in very large countries); or
- iii. where there may be a high degree of spatial and temporal variability of rainfall – particularly in semi-arid or arid zones – resulting in dynamic use of complexes of temporary wetlands within and between years by waterbirds and other mobile species and where the patterns of such dynamic use are insufficiently known; or
- iv. where, for certain types of wetland such as peatlands (Recommendation 7.1), coral reefs, karst and other subterranean hydrological systems, there may be limited national expertise as to the range and significance of international variation (additional guidance for the identification and designation of peatlands as Ramsar sites will be developed by the STRP in response to, and in parallel with, the *Global action plan for the wise use and management of peatlands*, Recommendation 7.1); or
- v. where several biogeographic regions come together and the transition zones may have high levels of biological diversity.

37. **Consider all of the Ramsar Criteria and all species.** Contracting Parties are urged to consider all of the Criteria fully when developing a systematic approach. Article 2.2 of the Convention indicates that sites should be considered on the basis of their “*ecology, botany, zoology, limnology or hydrology*”. Under the Ramsar Criteria (see Section V), this is further clarified in terms of wetland type and conservation of biological diversity.
38. Contracting Parties should also aim to use the criteria appropriately, meaning that although specific criteria have been developed for waterbirds (see Section V, Criteria 5 and 6) and for fish (see Section V, Criteria 7 and 8), these are not the only wetland taxa for which Ramsar sites can and should be listed. Waterbirds and fish are simply the ones for which specific guidance has been developed. Criteria 2, 3 and 4 provide latitude to identify sites for any other wetland species, but also for waterbirds and fish, where appropriate. There is also a risk that less obvious species and the microbiota may be overlooked in these considerations and care should be exercised to ensure all components of biological diversity are taken in consideration.
39. **Prioritising.** Having systematically applied the Criteria to develop a list of wetlands that qualify for designation, Contracting Parties are encouraged to identify priority candidate sites. Particular weight should be given to designating sites which include wetland types, or wetland species, that are either unique/endemic to the Contracting Party (found nowhere else in the world), or for which that country holds a significant proportion of the total global extent of a wetland type or population of a wetland species.
40. **Smaller sites should not be overlooked.** In developing a systematic approach to Ramsar site designation, Contracting Parties are encouraged to recognize that potential Ramsar sites are not necessarily the largest wetlands within the territory. Some wetland types either never were or are no longer found as large wetland systems, and these should not be overlooked. They may be especially important in maintaining habitat or ecological community-level biological diversity.

41. **Legal protected area status.** Contracting Parties should be aware that Ramsar site designation does not require that the wetland in question must enjoy any type of previously conferred protected areas status or must necessarily acquire this after designation. Likewise, wetlands being considered for designation need not be pristine areas which have not been subjected to impacts from human activities. In fact, Ramsar designation can be used to confer a special type of recognition on these areas by virtue of elevating them to the status of sites recognized as internationally important. In this way, Ramsar designation could represent the starting point for a process of recovery and rehabilitation of a particular site, provided the site meets the criteria for listing under the Convention when nominated.
42. While the existing protected area status of a site should not be a factor in determining priorities for listing, Contracting Parties are urged to be mindful of the need for consistency in approach when officially designating wetlands sites under international conventions and treaties as well as national policy or legal instruments. If a wetland site gains national protected area status because it provides critical habitat for an endemic wetland-dependent species, the Criterion indicates that it will qualify as a Ramsar site. Contracting Parties are therefore urged to review all of their current, proposed and future protected areas to ensure that consistency is applied.
43. **Flagship and keystone species.** The concepts of indicator, flagship and keystone species are important for Contracting Parties to consider as well. The presence of “indicator” species can be a useful measure of good wetland quality. Well known “flagship” species can also have great symbolic and awareness raising value for wetland conservation and wise use, whereas “keystone” species play vital ecological roles. Wetlands with significant populations of indicator, flagship and/or keystone species may merit special consideration as sites of international importance.
44. **Species presence in perspective.** When applying population figures to establish the relative importance of sites for designation, Contracting Parties should take care to put these within an appropriate context. It may be that in terms of relative importance for biological diversity conservation, a site providing habitat for a rare species is a higher priority for listing and subsequent management action than a site which has larger numbers of a more common species.
45. **Non-native species.** The introduction and spread of non-native species is of great concern due to the impact this can have on the biological diversity and natural functioning of wetland ecosystems (see Resolution VII.14 on invasive species and wetlands). It follows, therefore, that the presence of introduced or non-native species should not be used to support a case for designating a site as a Wetland of International Importance. In some circumstances native species can also be considered invasive to wetlands due to the disruption and imbalances they can introduce into the ecosystem. It is possible for introduced non-native species to be rare or endangered in their native habitats. Such situations need to be carefully assessed by the Contracting Party.
46. **Boundary definition of sites.** When designating sites, Contracting Parties are encouraged to take a management-oriented approach to determining boundaries, recognizing that these should allow management of the site to be undertaken at the appropriate scale for maintaining the ecological character of the wetland. Article 2.1 of the Convention indicates that Ramsar sites “*may incorporate riparian and coastal zones adjacent to the wetlands, and islands or*

bodies of marine water deeper than six metres at low tide lying within the wetlands". For very small and therefore potentially vulnerable sites, Contracting Parties are encouraged to include buffer zones around the wetland. These may also be a useful management tool for subterranean system wetlands as well as larger sites.

47. In determining the boundaries of sites identified as habitat for animal species, these should be established so as to provide adequately for all the ecological and conservation requirements of those populations. In particular, large animals, species at the top of food-chains, those with large home-ranges, or with feeding and resting areas that are widely separated, will generally require substantial areas to support viable populations. If it is not possible to designate a site extending to the entire range used or accommodating viable (self-sustaining) populations, then additional measures relating to both the species and its habitat should be adopted in the surrounding areas (or the buffer zone). These measures will complement the protection of the core habitat within the Ramsar site.
48. While some sites considered for designation will be identified at landscape scale, containing substantial elements of whole wetland ecosystems, others may be smaller. In selecting and delimiting such more restricted wetlands the following guidance may assist in determining their extent:
 - i. as far as possible, sites should include complexes or mosaics of vegetation communities, not just single communities of importance. Note that wetlands with naturally nutrient poor (oligotrophic) conditions generally exhibit low diversity of species and habitats. In these wetlands, high diversity may be associated with low conservation quality (indicated by markedly altered conditions). Thus, diversity must always be considered within the context of the norms of the wetland type;
 - ii. zonation of communities should be included as completely as possible in the site. Important are communities showing natural gradients (transitions), for instance from wet to dry, from salt to brackish, from brackish to fresh, from oligotrophic to eutrophic, from rivers to their associated banks, shingle bars and sediment systems, etc.;
 - iii. natural succession of vegetation communities often proceeds rapidly in wetlands. To the greatest extent possible and where these exist, all phases of succession (for example, from open shallow water, to communities of emergent vegetation, to reedswamp, to marshland or peatland, to wet forest) should be included in designated sites. Where dynamic changes are occurring, it is important that the site is large enough so that pioneer stages can continue to develop within the Ramsar site;
 - iv. continuity of a wetland with a terrestrial habitat of high conservation value will enhance its own conservation value.
49. The smaller the site, the more vulnerable it is likely to be to outside influences. In determining boundaries of Ramsar sites, particular attention should be given to ensuring that wherever possible the limits of the sites serve to protect them from potentially damaging activities, especially those likely to cause hydrological disturbance. Ideally, boundaries should include those areas of land necessary to provide and maintain the hydrological functions needed to conserve the international importance and integrity of the site. Alternatively, it is important that planning processes are operating to ensure that

potential negative impacts arising from land-use practices on adjoining land or within the drainage basin are suitably regulated and monitored to provide confidence that the ecological character of the Ramsar site will not be compromised.

50. **Site clusters.** Clusters of small sites, or individual small “satellite” sites associated with larger areas, should be considered for listing where these are:
- i. component parts of a hydrologically linked system (e.g., a complex of valley mires, or system of groundwater-fed wetlands along a spring line, or karst and subterranean wetland systems); and/or
 - ii. linked in their use by a common population of animal (e.g., a group of alternative roost or feeding areas used by one population of waterbirds); and/or
 - iii. formerly geographically continuous before being separated by human activity; and/or
 - iv. otherwise ecologically interdependent (e.g., sites forming part of a distinct wetland district/landscape with a common developmental history and/or supporting discrete species populations); and/or
 - v. found in arid or semi-arid zones, where complexes of dispersed wetlands (sometimes of a non-permanent nature) can both individually and collectively be of very great importance both for biological diversity and human populations (e.g., essential links in incompletely known chains).
51. Where a cluster of sites is designated, the Ramsar Information Sheet should state clearly the rationale for treating the component parts collectively as one listed site.
52. **Complementary international frameworks.** When considering Ramsar site designations Contracting Parties are urged, as specified in Objective 4.2 (see paragraph 20), to consider the opportunities this may also provide for contributing to other established and developing initiatives under related international and regional environment conventions and programmes. This applies in particular to the Convention on Biological Diversity and the Convention on Migratory Species and its Agreements, such as the African-Eurasian Waterbirds Agreement. Regionally, this may apply to cooperative initiatives such as the North American Waterfowl Management Plan, the Western Hemisphere Shorebird Reserve Network, the Asia-Pacific Migratory Waterbird Conservation Strategy 1996-2000, the Mediterranean Wetlands Initiative (MedWet), the South Pacific Regional Environment Programme, the Southern Africa Development Community (SADC), the Association of the South East Asian Nations (ASEAN), the European Union’s Natura 2000 network, the Emerald Network of the Bern Convention on the Conservation of European Wildlife and Natural Habitats, the Pan-European Biological and Landscape Diversity Strategy, the Wetlands Programme for the High Andes, the Treaty on Amazon Cooperation, the Central American Commission on Environment and Development (CCAD), etc.

IV.1 Guidelines for identifying and designating karst and other subterranean hydrological systems as Wetlands of International Importance

53. The **Values** of karst wetlands are numerous. In accordance with Article 2.2 of the Ramsar Convention, “*wetlands should be selected for the List on account of their international significance in terms of biology, botany, zoology, limnology or hydrology*”. From this perspective the principal wetland conservation values of karst and other subterranean hydrological systems include:
- a) uniqueness of karst phenomena/functions and functioning;
 - b) inter-dependency and fragility of karst systems and their hydrological and hydrogeological characteristics;
 - c) uniqueness of these ecosystems and endemism of their species;
 - d) importance for conserving particular taxa of fauna and flora.
54. In addition to their many natural values, karst systems also have important socio-economic values, which include (but are not limited to) the supply of drinking water, water for grazing animals or agriculture, tourism and recreation. Karst wetland systems may play an especially vital role in ensuring adequate water supplies for human communities in generally dry surface landscapes.
55. **Threats** can be generated within or outside of the karst area. In general terms, many “living” karst areas are wetlands, whether surface or subterranean. The subterranean systems are, in many cases, still well-preserved, but due to increasing development pressures they are becoming endangered. The pressures are both direct (visitors to caves, researchers) and indirect, including pollution of all kinds (particularly water pollution; dumping of solid waste, sewage; development of infrastructure, etc.), water abstraction, retention in reservoirs and other uses.
56. To avoid confusion in **terminology**, the formulations “karst and other subterranean hydrological systems” and “subterranean wetlands” should be used throughout. Regardless of genesis, these terms should be used to include all subterranean cavities and voids with water (including ice caves). Such sites would be eligible for inclusion in the Ramsar List whenever the site selection criteria are fulfilled. These terms should also clearly cover coastal, inland and human-made subterranean sites, following the broad approach of the Ramsar definition of “wetland” and thereby offering a high degree of flexibility for each Contracting Party.
57. The specialized technical terminology used to describe karst and other subterranean phenomena makes a glossary indispensable for non-experts. UNESCO’s *Glossary and Multilingual Equivalents of Karst Terms* (UNESCO, 1972) can be used as a detailed source of reference, but a simplified glossary is proposed for Ramsar purposes and is provided in the Glossary (Annex B) under “Karst”.
58. Information provided for the purposes of Ramsar site designation and management of subterranean wetlands should be according to:
- a) what is available (in many cases this may be limited, and subject to future research efforts); and
 - b) what is appropriate for the scale being considered. For example, local and national management authorities should have access to the full range and detail of

information available, whilst a summary will normally suffice for international purposes, notably completion of the Information Sheet on Ramsar Wetlands.

59. Ramsar designation should be considered as part of a mosaic of national and international instruments. In this way, the most representative part(s) of larger karst/subterranean systems might be designated under the Ramsar Convention, with land-use planning controls, etc., applied to achieve “wise use” of the whole system and its catchment area.
60. Site survey and mapping may present special problems and should be done according to practical possibilities. For example, a two dimensional ground plan of subterranean features, projected against surface features, would suffice as a Ramsar site map. It is recognized that many Contracting Parties will not have the resources to generate three-dimensional representations of subterranean sites, and the lack of such resources should not be a barrier to designation.
61. Optimal boundaries for karst/subterranean Ramsar sites would cover whole catchments, but this is unlikely to be realistic in most cases. Site boundaries should, however, cover the areas which have the most significant direct or indirect impacts on the features of interest.
62. In applying the Ramsar Criteria for Identifying Wetlands of International Importance, special attention should be given to unique and representative hydrological, hydrogeological, biological and landscape values. In this regard intermittent karst and thermal springs can be of special interest.
63. The flexible approach of the Convention allows countries to choose the most appropriate boundaries for national or site-specific situations. In particular, designation of either or both single cave and complex systems (for example, with surface and subterranean wetlands) can be envisaged.
64. The Ramsar definition of wetlands (Article 1.1) should be read/understood to include surface and subterranean wetlands, although the Convention text does not explicitly refer to these systems.
65. Special consideration should be given to the cultural and socio-economic values of karst and other subterranean hydrological systems and to the fact that their “wise use” must be implemented at both national and local levels. A clear distinction is required between designation, management and monitoring of these wetlands.

V. Criteria and long-term targets for the designation of Wetlands of International Importance, with guidance for their application

66. In this Section of the Strategic Framework for the Ramsar List, the Criteria for designating sites are presented, along with the long-term target the Convention has for each. For each Criterion, guidelines are also provided to assist Contracting Parties in taking a systematic approach to identifying their priority sites for designation. These guidelines should be considered in conjunction with the more general guidelines given in Section IV. In addition, Appendix B provides a Glossary of the terms used in the Criteria, long-term targets and guidelines presented below.

Group A of the Criteria. Sites containing representative,

rare or unique wetland types

Criterion 1: A wetland should be considered internationally important if it contains a representative, rare, or unique example of a natural or near-natural wetland type found within the appropriate biogeographic region.

Long-term target for the Ramsar List:

67. To have included in the Ramsar List at least one suitable representative of each wetland type, according to the Ramsar classification system (Section IV), which is found within each biogeographic region.

Guidelines

68. In applying this Criterion systematically, Contracting Parties are encouraged to:
- i. determine biogeographic regions within their territory or at the supranational/regional level;
 - ii. within each biogeographic region, determine the range of wetland types present (using the Ramsar classification system for wetland type, Appendix A), noting in particular any rare or unique wetland types; and
 - iii. for each wetland type within each biogeographic region, identify for designation under the Convention those sites which provide the best examples (see Glossary of terms, Appendix B).
69. Objective 1 and, in particular 1.2 (paragraph 10 above), indicates that another consideration under this Criterion is to give priority to those wetlands which play a substantial hydrological, biological or ecological role in the natural functioning of a major river basin or coastal system. In terms of hydrological functioning, the following is provided to assist Contracting Parties consider this aspect of determining priority sites under this Criterion. For guidance relevant to biological and ecological roles refer to Criterion 2 following.
70. **Hydrological importance.** As indicated by Article 2 of the Convention, wetlands can be selected for their hydrological importance which, *inter alia*, may include the following attributes. They may:
- i. play a major role in the natural control, amelioration or prevention of flooding;
 - ii. be important for seasonal water retention for wetlands or other areas of conservation importance downstream;
 - iii. be important for the recharge of aquifers;
 - iv. form part of karst or underground hydrological or spring systems that supply major surface wetlands;
 - v. be major natural floodplain systems;
 - vi. have a major hydrological influence in the context of at least regional climate regulation or stability (e.g., certain areas of cloudforest or rainforest, wetlands or wetland complexes in semi-arid, arid or desert areas, tundra or peatland systems acting as sinks for carbon, etc.);
 - vii. have a major role in maintaining high water quality standards.

Group B of the Criteria. Sites of international importance for conserving biological diversity

Criteria based on species and ecological communities

Criterion 2: A wetland should be considered internationally important if it supports vulnerable, endangered, or critically endangered species or threatened ecological communities.

Long-term target for the Ramsar List:

71. To have included in the Ramsar List those wetlands which are believed to be of importance for the survival of vulnerable, endangered or critically endangered species or threatened ecological communities.

Guidelines

72. Ramsar sites have an important role in the conservation of globally threatened species and ecological communities. Notwithstanding the small numbers of individuals that may be involved, or poor quality of quantitative data or information that may sometimes be available, particular consideration should be given to listing wetlands that support globally threatened species at any stage of their lifecycle using Criterion 2 or 3.
73. General Objective 2.2 within this Strategic Framework urges Contracting Parties to seek to include in the Ramsar List wetlands that include threatened ecological communities or are critical to the survival of species identified as vulnerable, endangered or critically endangered under national endangered species legislation/programmes or within international frameworks such as the IUCN Red Lists or the Appendices of CITES and CMS.
74. When Contracting Parties are reviewing candidate sites for listing under this Criterion, greatest conservation value will be achieved through the selection of a network of sites providing habitat for rare, vulnerable, endangered, or critically endangered species. Ideally, the sites in the network will have the following characteristics. They:
- i. support a mobile population of a species at different stages of its life cycle; and/or
 - ii. support a population of a species along a migratory pathway or flyway – noting that different species have different migratory strategies with different maximum distances needed between staging areas; and/or
 - iii. are ecologically linked in other ways, such as through providing refuge areas to populations during adverse conditions; and/or
 - iv. are adjacent to or in close proximity to other wetlands included in the Ramsar List, the conservation of which enhances the viability of threatened species' population by increasing the size of habitat that is protected; and/or
 - v. hold a high proportion of the population of a dispersed sedentary species that occupies a restricted habitat type.

75. For identifying threatened ecological communities, greatest conservation value will be achieved through the selection of sites that have the following characteristics. They:
- i. include significant areas having certain communities, particularly where these are of high quality or particularly typical of the biogeographic region; and/or
 - ii. are sites which have rare communities; and/or
 - iii. include ecotones, seral stages, and communities which exemplify particular processes; and/or
 - iv. have communities that can no longer develop under contemporary conditions (because of climate change or anthropogenic interference for example); and/or
 - v. have communities at the contemporary stage of a long developmental history and which support a well-preserved paleoenvironmental archive; and/or
 - vi. are sites which have communities that are functionally critical to the survival of other (perhaps rarer) communities or particular species; and/or
 - vii. contain communities which have been the subject of significant decline in extent or occurrence.
76. Note also the issues concerning habitat diversity and succession in paragraphs 46 to 49 above, "Boundary definition of sites".

Criterion 3: A wetland should be considered internationally important if it supports populations of plant and/or animal species important for maintaining the biological diversity of a particular biogeographic region.

Long-term target for the Ramsar List:

77. To have included in the Ramsar List those wetlands which are believed to be of importance for maintaining the biological diversity within each biogeographic region.

Guidelines

78. When Contracting Parties are reviewing candidate sites for listing under this Criterion, greatest conservation value will be achieved through the selection of a suite of sites that have the following characteristics. They:
- i. are "hotspots" of biological diversity and are evidently species-rich even though the number of species present may not be accurately known; and/or
 - ii. are centres of endemism or otherwise contain significant numbers of endemic species; and/or
 - iii. contain the range of biological diversity (including habitat types) occurring in a region; and/or
 - iv. contain a significant proportion of species adapted to special environmental conditions (such as temporary wetlands in semi-arid or arid areas); and/or
 - v. support particular elements of biological diversity that are rare or particularly characteristic of the biogeographic region.

Criterion 4: A wetland should be considered internationally important if it supports plant and/or animal species at a critical stage in their life cycles, or provides refuge during adverse conditions.

Long-term target for the Ramsar List:

79. To have included in the Ramsar List those wetlands which are the most important for providing habitat for plant or animal species during critical stages of their life cycle and/or when adverse conditions prevail.

Guidelines

80. Critical sites for mobile or migratory species are those which contain particularly high proportions of populations gathered in relatively small areas at particular stages of life cycles. This may be at particular times of the year or, in semi-arid or arid areas, during years with a particular rainfall pattern. For example, many waterbirds use relatively small areas as key staging points (to eat and rest) on their long-distance migrations between breeding and non-breeding areas. For Anatidae species, moulting sites are also critical. Sites in semi-arid or arid areas may hold very important concentrations of waterbirds and other mobile wetland species and be crucial to the survival of populations, yet may vary greatly in apparent importance from year-to-year as a consequence of considerable variability in rainfall patterns.
81. Non-migratory wetland species are unable to move away when climatic or other conditions become unfavourable and only some sites may feature the special ecological characteristics to sustain species' populations in the medium or long-term. Thus in dry periods, some crocodile and fish species retreat to deeper areas or pools within wetland complexes, as the extent of suitable aquatic habitat diminishes. These restricted areas are critical for the survival of animals at that site until rains come and increase the extent of wetland habitat once more. Sites (often with complex ecological, geomorphological and physical structures) which perform such functions for non-migratory species are especially important for the persistence of populations and should be considered as priority candidates for listing.

Specific criteria based on waterbirds

Criterion 5: A wetland should be considered internationally important if it regularly supports 20,000 or more waterbirds.

Long-term target for the Ramsar List:

82. To have included in the Ramsar List all wetlands which regularly support 20,000 or more waterbirds.

Guidelines

83. When Contracting Parties are reviewing candidate sites for listing under this Criterion, greatest conservation value will be achieved through the selection of a network of sites that

provide habitat for waterbird assemblages containing globally threatened species or subspecies. These are currently poorly represented in the Ramsar List (Green 1996). Refer also to paragraph 44 above, "Species presence in perspective".

84. Non-native waterbirds should not be included within the totals for a particular site (refer also to paragraph 45 above, "Non-native species").
85. This Criterion will apply to wetlands of varying size in different Contracting Parties. While it is impossible to give precise guidance on the size of an area in which these numbers may occur, wetlands identified as being of international importance under Criterion 5 should form an ecological unit, and may thus be made up of one big area or a group of smaller wetlands. Refer also to paragraphs 50 and 51 above, "Site clusters". Consideration may also be given to turnover of waterbirds at migration periods, so that a cumulative total is reached, if such data are available.
86. Refer also to paragraph 52 above, "Complementary international frameworks".

Criterion 6: A wetland should be considered internationally important if it regularly supports 1% of the individuals in a population of one species or subspecies of waterbird.

Long-term target for the Ramsar List:

87. To have included in the Ramsar List all wetlands which regularly support 1% or more of a biogeographical population of waterbird species or subspecies.

Guidelines

88. When Contracting Parties are reviewing candidate sites for listing under this Criterion, greatest conservation value will be achieved through the selection of a suite of sites that hold populations of globally threatened species or subspecies. Refer also to paragraph 44 above, "Species presence in perspective", and paragraph 52 above, "Complementary international frameworks". Consideration may also be given to turnover of waterbirds at migration periods, so that a cumulative total is reached, if such data are available.
89. To ensure international comparability, where possible, Contracting Parties should use the international population estimates and 1% thresholds published and updated every three years by Wetlands International as the basis for evaluating sites for the List using this Criterion. As urged by Resolution VI.4, for the better application of this Criterion, Contracting Parties should not only supply data for the future update and revision of international waterbird population estimates, but also support the national implementation and development of Wetlands International's International Waterbird Census, which is the source of much of these data.

Specific criteria based on fish

Criterion 7: A wetland should be considered internationally important if it supports a significant proportion of indigenous fish subspecies, species or families, life-

history stages, species interactions and/or populations that are representative of wetland benefits and/or values and thereby contributes to global biological diversity.

Long-term target for the Ramsar List:

90. To have included in the Ramsar List those wetlands that support a significant proportion of indigenous fish subspecies, species or families and populations.

Guidelines

91. Fishes are the most abundant vertebrates associated with wetlands. Worldwide, over 18,000 species of fishes are resident for all or part of their life cycles in wetlands.
92. Criterion 7 indicates that a wetland can be designated as internationally important if it has a high diversity of fishes and shellfishes. It emphasizes the different forms that diversity might take, including the number of taxa, different life-history stages, species interactions, and the complexity of interactions between the above taxa and the external environment. Species counts alone are thus not sufficient to assess the importance of a particular wetland. In addition, the different ecological roles that species may play at different stages in their life cycles needs to be considered.
93. Implicit in this understanding of biological diversity is the importance of high levels of endemism and of biodisparity. Many wetlands are characterized by the highly endemic nature of their fish fauna.
94. Some measure of the level of endemism should be used to distinguish sites of international importance. If at least 10% of fish are endemic to a wetland, or to wetlands in a natural grouping, that site should be recognized as internationally important, but the absence of endemic fishes from a site should not disqualify it if it has other qualifying characteristics. In some wetlands, such as the African Great Lakes, Lake Baikal in the Russian Federation, Lake Titicaca in Bolivia/Peru, sinkholes and cave lakes in arid regions, and lakes on islands, endemism levels as high as 90-100% may be reached, but 10% is a practical figure for worldwide application. In areas with no endemic fish species, the endemism of genetically-distinct infraspecific categories, such as geographical races, should be used.
95. Over 734 species of fish are threatened with extinction worldwide, and at least 92 are known to have become extinct over the past 400 years (Baillie & Groombridge 1996). The occurrence of rare or threatened fish is catered for in Criterion 2.
96. An important component of biological diversity is biodisparity, i.e., the range of morphologies and reproductive styles in a community. The biodisparity of a wetland community will be determined by the diversity and predictability of its habitats in time and space, i.e., the more heterogeneous and unpredictable the habitats, the greater the biodisparity of the fish fauna. For example, Lake Malawi, a stable, ancient lake, has over 600 fish species of which 92% are maternal mouthbrooding cichlids, but only a few fish families. In contrast, the Okavango Swamp of Botswana, a palustrine floodplain that fluctuates between wet and dry phases, has only 60 fish species but a wider variety of morphologies and reproductive styles, and many fish families, and therefore has a greater

biodisparity (Bruton & Merron 1990). Measures of both biological diversity and biodisparity should be used to assess the international importance of a wetland.

Criterion 8: A wetland should be considered internationally important if it is an important source of food for fishes, spawning ground, nursery and/or migration path on which fish stocks, either within the wetland or elsewhere, depend.

Long-term target for the Ramsar List:

97. To have included in the Ramsar List those wetlands which provide important food sources for fishes, or are spawning grounds, nursery areas and/or on their migration path.

Guidelines

98. Many fishes (including shellfishes) have complex life histories, with spawning, nursery and feeding grounds widely separated and long migrations necessary between them. It is important to conserve all those areas that are essential for the completion of a fish's life cycle if the fish species or stock is to be maintained. The productive, shallow habitats offered by coastal wetlands (including coastal lagoons, estuaries, salt marshes, inshore rocky reefs, and sandy slopes) are extensively used as feeding and spawning grounds and nurseries by fishes with openwater adult stages. These wetlands therefore support essential ecological processes for fish stocks, even if they do not necessarily harbour large adult fish populations themselves.
99. Furthermore, many fishes in rivers, swamps or lakes spawn in one part of the ecosystem but spend their adult lives in other inland waters or in the sea. It is common for fishes in lakes to migrate up rivers to spawn, and for fishes in rivers to migrate downstream to a lake or estuary, or beyond the estuary to the sea, to spawn. Many swamp fishes migrate from deeper, more permanent waters to shallow, temporarily inundated areas for spawning. Wetlands, even apparently insignificant ones in one part of a river system, may therefore be vital for the proper functioning of extensive river reaches up- or downstream of the wetland.
100. This is for guidance only and does not interfere with the rights of Contracting Parties to regulate fisheries within specific wetlands and/or elsewhere.

Appendix A.

The Ramsar Convention definition of “wetland” and classification system for wetland type

Definition

Under the Convention on Wetlands (Ramsar, Iran, 1971) “wetlands” are defined by Articles 1.1 and 2.1 as shown below:

Article 1.1:

“For the purpose of this Convention wetlands are areas of marsh, fen, peatland or water, whether natural or artificial, permanent or temporary, with water that is static or flowing, fresh, brackish or salt, including areas of marine water the depth of which at low tide does not exceed six metres.”

Article 2.1: provides that wetlands:

“may incorporate riparian and coastal zones adjacent to the wetlands, and islands or bodies of marine water deeper than six metres at low tide lying within the wetlands”.

Ramsar Classification System for Wetland Type

The codes are based upon the Ramsar **Classification System for Wetland Type** as approved by Recommendation 4.7 and amended by Resolution VI.5 of the Conference of the Contracting Parties. The categories listed herein are intended to provide only a very broad framework to aid rapid identification of the main wetland habitats represented at each site.

Marine/Coastal Wetlands

- 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; 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; includes tidal brackish and freshwater marshes.
- I -- **Intertidal forested wetlands;** includes mangrove swamps, nipah swamps and tidal freshwater swamp forests.
- J -- **Coastal brackish/saline lagoons;** brackish to saline lagoons with at least one relatively narrow connection to the sea.
- 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/creeks;** includes waterfalls.
- N -- **Seasonal/intermittent/irregular rivers/streams/creeks.**
- O -- **Permanent freshwater lakes** (over 8 ha); includes large oxbow lakes.
- P -- **Seasonal/intermittent freshwater lakes** (over 8 ha); includes floodplain lakes.
- Q -- **Permanent saline/brackish/alkaline lakes.**
- R -- **Seasonal/intermittent saline/brackish/alkaline lakes and flats.**
- Sp -- **Permanent saline/brackish/alkaline marshes/pools.**
- Ss -- **Seasonal/intermittent saline/brackish/alkaline marshes/pools.**
- Tp -- **Permanent freshwater marshes/pools;** ponds (below 8 ha), marshes and swamps on inorganic soils; with emergent vegetation water-logged for at least most of the growing season.
- Ts -- **Seasonal/intermittent freshwater marshes/pools** on inorganic soils; includes sloughs, potholes, seasonally flooded meadows, sedge marshes.
- U -- **Non-forested peatlands;** includes shrub or open bogs, swamps, fens.
- Va -- **Alpine wetlands;** includes alpine meadows, temporary waters from snowmelt.
- Vt -- **Tundra wetlands;** includes tundra pools, temporary waters from snowmelt.
- W -- **Shrub-dominated wetlands;** shrub swamps, shrub-dominated freshwater marshes, shrub carr, alder thicket on inorganic soils.
- Xf -- **Freshwater, tree-dominated wetlands;** includes freshwater swamp forests, seasonally flooded forests, wooded swamps on inorganic soils.
- Xp -- **Forested peatlands;** peat swamp forests.
- Y -- **Freshwater springs; oases.**
- Zg -- **Geothermal wetlands**
- Zk(b) – **Karst and other subterranean hydrological systems, inland**

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.

Human-made wetlands

- 1 -- **Aquaculture** (e.g., fish/shrimp) **ponds**
- 2 -- **Ponds;** includes farm ponds, stock ponds, small tanks; (generally below 8 ha).
- 3 -- **Irrigated land;** includes irrigation channels and rice fields.
- 4 -- **Seasonally flooded agricultural land** (including intensively managed or grazed wet meadow or pasture).
- 5 -- **Salt exploitation sites;** salt pans, salines, etc.
- 6 -- **Water storage areas;** reservoirs/barrages/dams/impoundments (generally over 8 ha).
- 7 -- **Excavations;** gravel/brick/clay pits; borrow pits, mining pools.
- 8 -- **Wastewater treatment areas;** sewage farms, settling ponds, oxidation basins, etc.
- 9 -- **Canals and drainage channels, ditches.**
- Zk(c) – **Karst and other subterranean hydrological systems, human-made**

Appendix B.

Glossary of terms used in the Strategic Framework

adverse conditions (Criterion 4) - ecological conditions unusually hostile to the survival of plant or animal species, such as occur during severe weather like prolonged drought, flooding, cold, etc.

appropriate (Criterion 1) - when applied to the term “biogeographic region” as here, this means the regionalisation which is determined by the Contracting Party to provide the most scientifically rigorous approach possible at the time.

biodisparity (Guidelines for Criteria 7 & 8) - the range of morphologies and reproductive styles in a community. The biodisparity of a wetland community is determined by the diversity and predictability of its habitats in time and space.

biogeographical population - several types of ‘populations’ are recognized:

- i. the entire population of a monotypic species;
- ii. the entire population of a recognized subspecies;
- iii. a discrete migratory population of a species or subspecies, i.e., a population which rarely if ever mixes with other populations of the same species or subspecies;
- iv. that ‘population’ of birds from one hemisphere which spend the non-breeding season in a relatively discrete portion of another hemisphere or region. In many cases, these ‘populations’ may mix extensively with other populations on the breeding grounds, or mix with sedentary populations of the same species during the migration seasons and/or on the non-breeding grounds;
- v. a regional group of sedentary, nomadic or dispersive birds with an apparently rather continuous distribution and no major gaps between breeding units sufficient to prohibit interchange of individuals during their normal nomadic wanderings and/or post-breeding dispersal.

Guidance on waterbird biogeographical populations (and, where data is available, suggested 1% thresholds for each population) is provided by Wetlands International, most recently in Rose & Scott (1997), with more detail for *Anatidae* populations in Africa and western Eurasia given in Scott & Rose (1996).

biogeographic region (Criteria 1 & 3) - a scientifically rigorous determination of regions as established using biological and physical parameters such as climate, soil type, vegetation cover, etc. Note that for non-island Contracting Parties, in many cases biogeographic regions will be transboundary in nature and will require collaboration between countries to establish representative, unique, etc., wetland types. In some cases, the term bioregion is used synonymously with biogeographic region. In some circumstances, the nature of biogeographic regionalization may differ between wetland types according to the nature of the parameters determining natural variation.

biological diversity (Criteria 3 & 7) – the variability among living organisms from all sources including, *inter alia*, terrestrial, marine and other aquatic ecosystems and the ecological complexes of which they are part; this includes diversity within species (genetic diversity), between species (species diversity), of ecosystems (ecosystem diversity), and of ecological processes. (This

definition is largely based on the one contained in Article 2 of the Convention on Biological Diversity.)

critically endangered (Criterion 2) - as used by the Species Survival Commission of IUCN. A taxon is Critically Endangered when it is facing an extremely high risk of extinction in the wild in the immediate future, as defined for animals by any of the criteria (A-E) of Annex 3 of the *1996 IUCN Red List of Threatened Animals* (Baillie & Groombridge 1996), or for plants by any of the criteria (A-E) of Appendix 1 of the *1997 IUCN Red List of Threatened Plants* (Walter & Gillett 1998). See also 'globally threatened species' below.

critical stage (Criterion 4) - meaning stage of the life cycle of wetland-dependent species. Critical stages being those activities (breeding, migration stopovers *etc.*) which if interrupted or prevented from occurring may threaten long-term conservation of the species. For some species (Anatidae for example), areas where moulting occurs are vitally important.

ecological communities (Criterion 2) - any naturally occurring group of species inhabiting a common environment, interacting with each other especially through food relationships and relatively independent of other groups. Ecological communities may be of varying sizes, and larger ones may contain smaller ones.

endangered (Criterion 2) - as used by the Species Survival Commission of IUCN. A taxon is Endangered when it is not Critically Endangered but is facing a very high risk of extinction in the wild in the near future, as defined for animals by any of the criteria (A-E) of Annex 3 of the *1996 IUCN Red List of Threatened Animals* (Baillie & Groombridge 1996), or for plants by any of the criteria (A-E) of Appendix 1 of the *1997 IUCN Red List of Threatened Plants* (Walter & Gillett 1998). See also 'globally threatened species' below.

endemic species (Guidelines for Criterion 7) - a species that is unique to one biogeographical region, i.e., it is found nowhere else in the world. A group of fishes may be indigenous to a subcontinent with some species endemic to a part of that subcontinent.

family (Criterion 7) - an assemblage of genera and species that have a common phylogenetic origin, e.g., pilchards, sardines and herrings in the family *Clupeidae*

fish (Criterion 7) - any finfish, including jawless fishes (hagfishes and lampreys), cartilaginous fishes (sharks, rays, skates and their allies, *Chondrichthyes*) and bony fishes (*Osteichthyes*) as well as certain shellfish or other aquatic invertebrates (see below).

fishes (Criterion 8) - "fishes" is used as the plural of "fish" when more than one species is involved.

Fish orders that typically inhabit wetlands (as defined by the Ramsar Convention) and which are indicative of wetland benefits, values, productivity or biological diversity, include:

- i) **Jawless fishes - *Agnatha***
 - hagfishes (*Myxiniiformes*)
 - lampreys (*Petromyzontiformes*)
- ii) **Cartilaginous fishes - *Chondrichthyes***
 - dogfishes, sharks and allies (*Squaliformes*)

- skates (*Rajiformes*)
 - stingrays and allies (*Myliobatiformes*)
- iii) **Bony fishes - *Osteichthyes***
- Australian lungfish (*Ceratodontiformes*)
 - South American and African lungfishes (*Lepidosireniformes*)
 - bichirs (*Polypteriformes*)
 - sturgeons and allies (*Acipenseriformes*)
 - gars (*Lepisosteiformes*)
 - bowfins (*Amiiformes*)
 - bonytongues, elephant fishes and allies (*Osteoglossiformes*)
 - tarpons, bonefishes and allies (*Elopiiformes*)
 - eels (*Anguilliformes*)
 - pilchards, sardines and herrings (*Clupeiformes*)
 - milkfishes (*Gonorhynchiformes*)
 - carps, minnows and allies (*Cypriniformes*)
 - characins and allies (*Characiformes*)
 - catfishes and knifefishes (*Siluriformes*)
 - pikes, smelts, salmon and allies (*Salmoniformes*)
 - mullets (*Mugiliformes*)
 - silversides (*Atheriniformes*)
 - halfbeaks (*Beloniformes*)
 - killifishes and allies (*Cyprinodontiformes*)
 - sticklebacks and allies (*Gasterosteiformes*)
 - pipefishes and allies (*Syngnathiformes*)
 - cichlids, perches and allies (*Perciformes*)
 - flatfishes (*Pleuronectiformes*)
- iv) **Several groups of shellfishes:**
- shrimps, lobsters, freshwater crayfishes, prawns and crabs (Crustacea)
 - mussels, oysters, pencil baits, razor shells, limpets, winkles, whelks, scallops, cockles, clams,
 - abalone, octopus, squid and cuttlefish (Mollusca)
- v) **Certain other aquatic invertebrates:**
- sponges (*Porifera*)
 - hard corals (*Cnidaria*)
 - lugworms and ragworms (*Annelida*)
 - sea urchins and sea cucumbers (*Echinodermata*)
 - sea squirts (*Ascidiacea*)

fish stock (Criterion 8) - the potentially exploitable component of a fish population.

flyway (Guideline for Criterion 2) - the concept developed to describe areas of the world used by migratory waterbirds and defined as the migration routes(s) and areas used by waterbird populations in moving between their breeding and wintering grounds. Each individual species

and population migrates in a different way and uses a different suite of breeding, migration staging and wintering sites. Hence a single flyway is composed of many overlapping migration systems of individual waterbird populations and species, each of which has different habitat preferences and migration strategies. From knowledge of these various migration systems it is possible to group the migration routes used by waterbirds into broad flyways, each of which is used by many species, often in a similar way, during their annual migrations. Recent research into the migrations of many wader or shorebird species, for example, indicates that the migrations of waders can broadly be grouped into eight flyways: the East Atlantic Flyway, the Mediterranean/Black Sea Flyway, the West Asia/Africa flyway, the Central Asia/Indian sub-continent Flyway, the East Asia/Australasia Flyway, and three flyways in the Americas and the Neotropics.

There are no clear separations between flyways, and their use is not intended to imply major biological significance; rather it is a valuable concept for permitting the biology and conservation of waterbirds, as with other migratory species, to be considered in broad geographical units into which the migrations of species and populations can be more or less readily grouped.

globally threatened species (Criteria 2, 5 & 6) - species or subspecies which are listed by IUCN Species Survival Commission's Specialist Groups or Red Data Books as either Critically Endangered, Endangered or Vulnerable. Note that, especially for invertebrate taxa, IUCN's Red Data listings may be both incomplete and dynamic, reflecting poor knowledge of the global status of many taxa. Interpretation of the terms "vulnerable", "endangered" or "critically endangered" species should thus always be undertaken at a national level in the light of the best available scientific knowledge of the status of the relevant taxa.

importance (long-term target for Criterion 2) - sites, the protection of which will enhance the local and thus global long-term viability of species or ecological communities.

indigenous species (Criterion 7) - a species that originates and occurs naturally in a particular country.

introduced (non-native) species - a species that does not originate or occur naturally in a particular country.

karst (section IV.1) - a landscape created on soluble rock with efficient underground drainage. Karst is characterised by caves, dolines, a lack of surface drainage and is mainly, but not exclusively, formed on limestone. The name derives from Kras - the Classical Karst from Slovenia. In this original, temperate, karst the dominant landforms are dolines, but contrasting landscapes are the pinnacle, cone, and tower karsts of the tropics, and the fluviokarst and glaciokarst of colder climates. The term "kras" originally denoted bare, stony ground in the Slovene language.

The following subsection of the Glossary is related to Karst.

Allogenic drainage: karst drainage that is derived from surface run-off that originates on adjacent impermeable, rocks. Also known as allochthonous drainage.

Aquiclude: relatively impermeable rock acting as the boundary to an aquifer.

Aquifer: a water-bearing horizon, sufficiently permeable to transmit groundwater and yield such water to wells and springs.

- Aquitard*: a bed of rock that retards, but does not totally inhibit, the movement of water into or out of an aquifer.
- Artesian flow*: flow through a confined aquifer where the entire aquifer is saturated and the flow is under hydrostatic pressure.
- Autogenic drainage*: karst drainage that is derived entirely by absorption of meteoric water into the karst rock surface. Also known as autochthonous drainage.
- Backflooding*: flooding due to backup of excess flow behind a constriction in a major conduit.
- Bedding plane*: a depositional lamination in sedimentary rocks.
- Bedding plane cave*: cave passages guided by bedding.
- Blind valley*: a valley that terminates where its stream sinks, or once sank, underground.
- Breakdown*: Synonym for the collapse of caves, or, in American usage, for the debris produced by collapse.
- Calcium carbonate*: naturally occurring compound with the chemical formula CaCO_3 , the major component of carbonate rocks including limestone and marble.
- Carbonate rock*: a rock consisting of one or more carbonate minerals.
- Cave*: A natural hole in the ground, large enough for human entry. This does not include hydrologically very significant, conduits or fissures. A cave may be a single, short length of accessible passage, or an extensive and complex network of tunnels as long as the hundreds of kilometers in the Flint Mammoth Cave System. Most caves are formed by dissolution in limestone but sandstone caves, lava caves, glacier caves and tectonic caves also occur. In some countries a cave is regarded as being a horizontal opening, as opposed to a pothole, or jama, which is a vertical opening, or natural vertical shaft.
- Cave lake*: any underground lake, it may be the entrance to a sump, in vadose caves formed by ponding behind banks of sediment or gour barriers.
- Chamber*: an enlargement in a cave passage or system. The largest chamber currently known, Sarawak Chamber in Sarawak, is over 700m long, up to 400m wide and 70m high.
- Classical Karst*: the region called Kras in Slovenia, which gave its name to the karst landscape.
- Conduit*: dissolutional voids, including enlarged fissures and tubular tunnels; in some usage the term is restricted to voids that are water-filled.
- Conduit flow*: underground water flow within conduits.
- Corrosion*: the erosion of rock by chemical activity that leads to dissolution.
- Doline*: a circular closed depression, saucershaped, conical or in some cases cylindrical. Dolines may form by dissolution, collapse, or a combination of these. They are ubiquitous features of limestone karst, but can form in or above any soluble rock; subsidence dolines are developed in insoluble sediment leached or collapsed into an underlying cavernous limestone. The largest dolines in Slovenia, Smrekova draga for instance, are more than 1 km long and over 100 m deep.
- Dry valley*: valley without a permanent surface stream. It became dry when underground drains formed or were re-opened.
- Entrenchment*: erosion by a freely flowing stream to form a canyon.
- Estavelle*: opening that acts as either a sinkhole or a spring, depending upon groundwater level.
- Floodwater zone*: the zone through which the level of the water table fluctuates, also epiphreatic zone.

Freshwater lens: fresh groundwater found beneath permeable limestone islands or peninsular land masses. It is limited by a water table above and below by a mixing zone between fresh and saline groundwater along the halocline.

Gour: pool formed by calcite deposition. Gours can grow into large dams many metres high and wide. Travertine, gours form in the open air.

Groundwater: a subsurface water that lies below the water table in the saturated or phreatic zone.

Gypsum: mineral or rock composed of the hydrated calcium sulphate, $\text{CaSO}_4 \cdot 2\text{H}_2\text{O}$.

Gypsum cave: gypsum is very soluble and vadose and phreatic caves can form in it. Largest caves are in the Podolie region of the Ukraine, where the Optimisticeskaja only has around 180 km of passage.

Halocline: the interface between fresh groundwater and saline groundwater.

Hydraulic gradient: the slope of the water table in an aquifer.

Ice cave: a cave in rock filled with permanent ice.

Input point: the start of underground drainage route or aquifer.

Limestone: sedimentary rock containing at least 50% calcium carbonate by weight.

Meteoric water: water that originates from any form of atmospheric precipitation.

Moonmilk: fine-grained mineral deposit of calcite, aragonite, formed largely by bacterial deposition.

Output point: a point where water exits from an underground drainage route or aquifer.

Passage: any negotiable part of a cave system, horizontal rather than vertical or sub-vertical sections. Cave passages vary in size and shape, the largest known is Deer Cave, which is up to 170m wide and 120m high, in the Mulu karst of Sarawak.

Percolation water: water moving slowly through the fissure network of a limestone. Usually percolation water enters the limestone through a soil cover. Percolation water accounts for most of the storage in a limestone aquifer, responds slowly to flooding in comparison to sinkhole water.

Permeability: the ability of a rock to transmit water. Permeability may be primary, due to the effects of interlinked porosity or open tectonic fractures, or secondary, due to the dissolutional enlargement of fissures developing conduit permeability.

Phreas: the zone of saturated rock below the water table, within which all conduits are water filled.

Phreatic cave: cave developed below the water table, where all voids are water filled within the phreas. Phreatic caves may include loops deep below the water table, karstic maturity encourages shallow phreatic development just below the water table.

Piezometric surface: the level to which a column of water ascends in an observation well (piezometric tube).

Pit: shaft or pothole from the surface or inside a cave, vertical segment of a gallery.

Pocket valley: a valley that begins abruptly and has no headwaters, having formed from and below the site of a karst spring.

Polje: large flat-floored closed karst depression, with commonly alluviated floor. Streams or springs drain into poljes and outflow is underground through ponors. Commonly the ponors cannot transmit flood flows, so many poljes turn into wet-season lakes. The form of some poljes is related to the geological structure, but others are purely the products of lateral dissolution and planation.

Ponor: also a sinkhole or swallowhole.

Pothole: a single shaft, or an entire cave system that is dominantly vertical.

Pseudokarst: a landscape containing karst-like features but not formed by bedrock dissolution.

Relict cave: inactive cave segment, left when the water is diverted elsewhere.

- Salt karst*: karst landforms developed upon halite or halite-rich rock.
- Shaft*: natural vertical, or steeply inclined, section of a cave passage, deepest known shaft is the entrance shaft on the Kanin plateau, Slovenia; it is 643 m deep, with no ledges.
- Sink*: a point where a stream or river disappears underground, through a choke, or may flow into an open horizontal cave or vertical shaft. The character of sink water, flowing directly and rapidly into an open cave, distinguishes it from percolation water. Sink water is also referred to as sub-surface runoff.
- Speleology*: Scientific study of caves, including aspects of sciences, such as geomorphology, geology, hydrology, chemistry and biology, and also the many techniques of cave exploration.
- Speleothem*: general term for all cave mineral deposits, embracing all stalactites, flowstone, flowers etc.
- Spring*: point where underground water emerges on to the surface, not exclusive to limestone, but generally larger in cavernous rocks. Among the world's largest is the Dumanli spring, Turkey, with a mean flow of over 50 cubic metres per second.
- Subcutaneous zone*: a zone of generally highly weathered rock that lies below the soil but above the main, relatively unweathered, rock mass of a karst aquifer.
- Sump*: a section of flooded passage, also siphon.
- Travertine*: calcareous mineral deposited by flowing water, where plants and algae cause the precipitation by extracting carbon dioxide from the water and give travertine its porous structure. Capillary forces, loss of head and aeration also influence travertine deposition.
- Troglobite*: a creature that lives permanently underground beyond the daylight zone of a cave. Many troglobitic species are adapted in some way to living in a totally dark environment.
- Troglophile*: an animal that enters beyond the daylight zone of a cave intentionally and habitually and generally spends part of its life in the underground environment.
- Trogloxene*: a creature that will enter a cave on occasions but does not use the cave either for temporary or permanent habitation.
- Vadose cave*: a cave that underwent most of its development above the water table within the vadose zone, where drainage is free-flowing under gravity. The gravitational control of vadose flow means that all vadose cave passages drain downslope, they exist in the upper part of a karst aquifer, and they ultimately drain into the phreatic zone or out to the surface.
- Vadose zone*: the zone of rock above the water table, with free downward drainage, only partially water-filled. Also known as unsaturated zone, and comprises the soil, a subcutaneous or epikarstic zone, and a free-draining percolation zone.
- Vauclisian rising*: a type of rising or spring where direct drainage from the phreatic flows up a flooded cave passage under pressure to emerge in daylight. Such risings are named after the Fontaine de Vaucluse in southern France with a mean flow of 26 cubic metres per second. It is vertical and 243m deep. Discharge fluctuates seasonally.
- Water table*: the top surface of a body of groundwater that fills the pore spaces within a rock mass. Above it lies the freely draining vadose zone, and below it lies the permanently saturated phreatic. Individual cave conduits may be above or below the water table, and therefore either vadose or phreatic, and the water table cannot normally be related to them. The water table slope (hydraulic gradient) is low in limestone due to the high permeability, and the level is controlled by outlet springs or local geological features. High flows create steeper hydraulic gradients and hence rises in the water level away from the spring. In France's Grotte de la Luire, the water level in the cave (and therefore the local water table) fluctuates by 450m.

Water tracing: underground drainage links through unexplored caves confirmed by labelling input water and identifying it at points downstream. The common labelling techniques involve the use of fluorescent dyes (uranine, fluorescein, rhodamine, leucophor, pyranine etc.), lycopodium spores, or chemicals such as common salt. The longest successful water trace was in Turkey over a distance of 130 km.

life-history stage (Criterion 7) - a stage in the development of a finfish or shellfish, e.g., egg, embryo, larva, leptocephalus, zoea, zooplankton stage, juvenile, adult, or post-adult.

migration path (Criterion 8) - the route along which fishes, such as salmon and eels, swim when moving to or from a spawning or feeding ground or nursery. Migration paths often cross international boundaries or boundaries between management zones within a country.

near natural (Criterion 1) - when used in Criterion 1 this means those wetlands which continue to function in what is considered an almost natural way. This clarification is provided in the Criteria to allow for the listing of sites which are not pristine, yet retain values making them internationally important.

nursery (Criterion 8) - that part of a wetland used by fishes for providing shelter, oxygen and food for the early developmental stages of their young. In some fishes, e.g., nest-guarding tilapias, the parent/s remain at the nursery to protect the young whereas in others the young are not protected by the parent/s except by virtue of the shelter provided by the habitat in which they are deposited, e.g., non-guarding catfishes. The ability of wetlands to act as nurseries depends on the extent to which their natural cycles of inundation, tidal exchange, water temperature fluctuation and/or nutrient pulses are retained. Welcomme (1979) showed that 92% of the variation in catch from a wetland-recruited fishery could be explained by the recent flood history of the wetland.

plants (Criteria 3 & 4) – meaning vascular plants, bryophytes, algae and fungi (including lichens).

population (Criterion 6) – in this case meaning the relevant biogeographic population.

population (Criterion 7) - in this case meaning a group of fishes comprising members of the same species.

populations (Criterion 3) - in this case meaning the population of a species within the specified biogeographical region.

provides refuge (Criterion 4) - refer also to definition for “critical stage” which is related. Critical stages are defined as being those activities (breeding, non-breeding, migration stopovers, etc.) which if interrupted or prevented from occurring may threaten long-term conservation of the species. Refuges should be interpreted to mean those locations where such critical stages gain some degree of protection during adverse condition such as drought.

regularly (Criteria 5 & 6) - as in supports regularly - a wetland regularly supports a population of a given size if:

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

- ii) the mean of the maxima of those seasons in which the site is internationally important, taken over at least five years, amounts to the required level (means based on three or four years may be quoted in provisional assessments only).

In establishing long-term ‘use’ of a site by birds, natural variability in population levels should be considered especially in relation to the ecological needs of the populations present. Thus in some situations (e.g., sites of importance as drought or cold weather refuges or temporary wetlands in semi-arid or arid areas – which may be quite variable in extent between years), the simple arithmetical average number of birds using a site over several years may not adequately reflect the true ecological importance of the site. In these instances, a site may be of crucial importance at certain times (‘ecological bottlenecks’), but hold lesser numbers at other times. In such situations, there is a need for interpretation of data from an appropriate time period in order to ensure that the importance of sites is accurately assessed.

In some instances, however, for species occurring in very remote areas or which are particularly rare, or where there are particular constraints on national capacity to undertake surveys, areas may be considered suitable on the basis of fewer counts. For some countries or sites where there is very little information, single counts can help establish the relative importance of the site for a species.

The International Waterbird Census data collated by Wetlands International is the key reference source.

representative (Criterion 1) - a wetland that is a typical example of a particular wetland type found in a region. Wetland types are defined in Appendix A.

significant proportion (Criterion 7) - for the fish Criteria - in polar biogeographical regions a “significant proportion” may be 3-8 subspecies, species, families, life-history stages or species interactions; in temperate zones 15-20 subspecies, species, families, etc.; and in tropical areas 40 or more subspecies, species, families, etc., but these figures will vary among regions. A “significant proportion” of species includes all species and is not limited to those of economic interest. Some wetlands with a “significant proportion” of species may be marginal habitats for fish and may only contain a few fish species, even in tropical areas, e.g. the backwaters of mangrove swamps, cave lakes, the highly saline marginal pools of the Dead Sea. The potential of a degraded wetland to support a “significant proportion” of species if it were to be restored also needs to be taken into account. In areas where fish diversity is naturally low, e.g., at high latitudes, in recently glaciated areas or in marginal fish habitats, genetically distinct infraspecific groups of fishes could also be counted.

spawning ground (Criterion 8) - that part of a wetland used by fishes for courting, mating, gamete release, gamete fertilization and/or the release of the fertilized eggs, e.g. herring, shad, flounder, cockles, and many fishes in freshwater wetlands. The spawning ground may be part of a river course, a stream bed, inshore or deep water zone of a lake, floodplain, mangrove, saltmarsh, reed bed, estuary or the shallow edge of the sea. The freshwater outflow from a river may provide suitable spawning conditions on the adjacent marine coast.

species (Criteria 2 & 4) - naturally occurring populations that interbreed, or are capable of interbreeding, in the wild. Under these (and other) Criteria, subspecies are also included.

species interaction (Criterion 7) - exchanges of information or energy between species that are of particular interest or significance, e.g., symbiosis, commensalism, mutual resource defence, communal brooding, cuckoo behaviour, advanced parental care, social hunting, unusual predator-prey relationships, parasitism and hyperparasitism. Species interactions occur in all ecosystems but are particularly developed in species-rich climax communities, such as coral reefs and ancient lakes, where they are an important component of biological diversity.

supports (Criteria 4, 5, 6 & 7) - provides habitat for; areas which can be shown to be important to a species or an assemblage of species for any period of time are said to support that species. Occupation of an area need not be continuous, but may be dependent on natural phenomena such as flooding or (local) drought conditions.

survival (long-term target for Criterion 2) - sites which contribute most to the survival of species or ecological communities locally and as a whole are those which enable its geographic range to be maintained on a long-term basis. The long-term persistence of species is most likely to occur where:

- i) population dynamics data on the species concerned indicate that it is self-sustaining on a long-term basis as a viable component of its natural habitats, and
- ii) the natural range of the species is neither being reduced nor is likely to be reduced for the foreseeable future, and
- iii) there is, and will probably continue to be, a sufficiently large habitat to maintain its populations on a long-term basis.

threatened ecological community - an ecological community which is likely to become extinct in nature if the circumstances and factors threatening its extent, survival or evolutionary development continue to operate.

Guidelines for a threatened ecological community are that the community is subject to current and continuing threats likely to lead to extinction as demonstrated by one or more of the following phenomena:

- i) Marked decrease in geographic distribution. A marked decrease in distribution is considered to be a measurable change whereby the distribution of the ecological community has contracted to less than 10% of its former range, or the total area of the ecological community is less than 10% of its former area, or where less than 10% of the area of the ecological community is in patches of a size sufficiently large for them to be likely to persist for more than 25 years. (The figure of 10% is indicative and for some communities, especially those which originally covered a relatively large area, it may be appropriate to use a different figure).
- ii) Marked alteration of community structure. Community structure includes the identity and number of component species that make up an ecological community, the relative and absolute abundance of those species and the number, type and strength of biotic and abiotic processes that operate within the community. A marked alteration of community structure is a measurable change whereby component species abundance, abiotic interactions, or biotic interactions are altered to the extent that rehabilitation of the ecological community is unlikely to occur within 25 years.

- iii) Loss or decline of native species that are believed to play a major role in the community. This guideline refers to species that are important structural components of a community or that are important in the processes that sustain or play a major role in the community, e.g., seagrass, termite nests, kelp, dominant tree species.
- iv) Restricted geographic distribution (determined at national level) such that the community could be lost rapidly by the action of a threatening process.
- v) Community processes being altered to the extent that a marked alteration of community structure will occur. Community processes can be abiotic (e.g., fire, flooding, altered hydrology, salinity, nutrient change) or biotic (e.g., pollinators, seed dispersers, soil disturbance by vertebrates which affect plant germination). This guideline recognizes that ecological processes are important to maintain an ecological community, e.g., fire regimes, flooding, cyclone damage; and that disruption to those processes can lead to the decline of the ecological community.

turnover (Criteria 5 & 6) – the throughput of waterbirds using a wetland during migration periods such that the cumulative total number using the site is greater than the peak count at any one time.

unique (Criterion 1) - the only one of its type within a specified biogeographic region. Wetland types are defined in Appendix A.

vulnerable (Criterion 2) - as used by the Species Survival Commission of IUCN. A taxon is Vulnerable when it is not either Critically Endangered or Endangered but is facing a high risk of extinction in the wild in the medium term future, as defined for animals by any of the criteria (A-D) of Annex 3 of the *1996 IUCN Red List of Threatened Animals* (Baillie & Groombridge 1996), or for plants by any of the criteria (A-E) of Appendix 1 of the *1997 IUCN Red List of Threatened Plants* (Walter & Gillett 1998). See also ‘globally threatened species’ above.

waterbirds (Criteria 5 & 6) - The Convention functionally defines waterfowl (a term which, for the purposes of these Criteria and Guidelines, is considered to be synonymous with “waterbirds”) as “birds ecologically dependent on wetlands” (Article 1.2). This definition thus includes any wetland bird species. However, at the broad level of taxonomic order, it includes especially:

- penguins: *Sphenisciformes*.
- divers: *Gaviiformes*;
- grebes: *Podicipediformes*;
- wetland related pelicans, cormorants, darters and allies: *Pelecaniformes*;
- herons, bitterns, storks, ibises and spoonbills: *Ciconiiformes*;
- flamingos: *Phoenicopteriformes*;
- screamers, swans, geese and ducks (wildfowl): *Anseriformes*;
- wetland related raptors: *Accipitriformes* and *Falconiformes*;
- wetland related cranes, rails and allies: *Gruiformes*;
- Hoatzin: *Opisthocomiformes*;

- wetland related jacanas, waders (or shorebirds), gulls, skimmers and terns: *Charadriiformes*;
- coucals: *Cuculiformes*; and
- wetland related owls: *Strigiformes*;

wetland benefits (Criterion 7) - the services that wetlands provide to people, e.g. flood control, surface water purification, supplies of potable water, fishes, plants, building materials and water for livestock, outdoor recreation and education. See also Resolution VI.1.

wetland types (Criterion 1) - as defined by the Ramsar Convention classification system, see Appendix A.

wetland values (Criterion 7) - the roles that wetlands play in natural ecosystem functioning, e.g. flood attenuation and control, maintenance of underground and surface water supplies, sediment trapping, erosion control, pollution abatement and provision of habitat.

Appendix C.

Information Sheet on Ramsar Wetlands

Categories approved by Recommendation 4.7 of the Conference of the Contracting Parties.

1. Date this sheet was completed/updated:

FOR OFFICE USE ONLY.

DD MM YY

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Designation date

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Site Reference Number

2. Country:

3. Name of wetland:

4. Geographical coordinates:

5. Elevation: (average and/or max. & min.)

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 Appendix A of the *Strategic Framework and guidelines for the Ramsar List*.)

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, next page.)

1 • 2 • 3 • 4 • 5 • 6 • 7 • 8

Please specify the most significant criterion applicable to the site: _____

10. Map of site included? Please tick *yes* or *-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, on previous page. (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)

Please return to: **Ramsar Convention Bureau, Rue Mauverney 28, CH-1196 GLAND, Switzerland**
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Explanatory Note and Guidelines
for the
Information Sheet on Ramsar Wetlands

Recommendation 4.7 of the Conference of Contracting Parties established that the “data sheet developed for the description of Ramsar sites . . . be used by Contracting Parties and the Bureau in presenting information for the Ramsar database”. The recommendation listed the information categories covered by the “data sheet”. Furthermore, Resolution 5.3 reaffirmed that a **completed** “Ramsar datasheet” and site map should be provided upon designation of a wetland to the Ramsar List. This was subsequently reiterated in Resolutions VI.13 and VI.16. The data sheet, which is formally entitled the ***Information Sheet on Ramsar Wetlands***, provides a standardized format for recording Ramsar site data. Resolution 5.3 underscored that information concerning **conservation measures**, the **functions and values** (hydrological, biophysical, floral, faunal, social and cultural) of the site, and **criteria for inclusion** (i.e., Ramsar criteria) were particularly important categories. This resolution also restated the value of using the Ramsar classification for wetland type when completing the data sheet.

In the case of a wetland which has been well-studied and well-documented, or which is the subject of special field investigations, far more information may be available than can be accommodated on the Information Sheet (including the maximum 10-page annex of additional attachment sheets). Whenever possible, copies of published papers or photocopied reports on the site should be appended to the Information Sheet. Slides or photographs of the wetland are also especially valuable. It is essential that the source providing any such additional information be noted.

In the case of very large and complex wetland systems, two levels of approach may be advisable: a broad approach for the system as a whole, and a more detailed approach for key localities within the system. Thus for a particularly large wetland complex it may be appropriate to complete an Information Sheet for the site as a whole and a series of Information Sheets for key areas within the complex.

Resolution VI.1 highlights the importance of monitoring of wetlands to help maintain their ecological character. The annex to the resolution notes that there is a need to increase the value of the information collected for describing and assessing ecological character of listed sites, and that emphasis must be given to:

- establishing a baseline by describing the functions, products and attributes of the site that give it benefits and values of international importance (necessary because the existing Ramsar criteria do not cover the full range of wetland benefits and values which should be considered when assessing the possible impact of changes at a site); sections 12, 14, 15, 16, 17, and 18 below apply.
- providing information on human-induced factors that have affected or could significantly affect the benefits and values of international importance; section 22 below applies.
- providing information on monitoring and survey methods in place (or planned) at the site; sections 23 and 24 below apply.

- providing information on the natural variability and amplitude of seasonal and/or long-term “natural” changes (e.g., vegetation succession, episodic/catastrophic ecological events such as hurricanes) that have affected or could affect the ecological character of the site. Sections 16 and 22 below apply.

The following notes relate to the individual sections of the Ramsar Information Sheet.

1. Date: The date on which the Information Sheet was completed (or updated).
2. Country: The name of the country.
3. Name of wetland: The name of the designated site in one of the 3 official languages (English, French or Spanish) of the Convention (alternative names should be given in brackets).
4. Geographical coordinates: The geographical coordinates (latitude and longitude) of the approximate centre of the wetland, expressed in degrees and minutes. If the site consists of two or more discrete units, the coordinates of the centres of each of these units should be given.
5. Elevation: The average and/or minimum and maximum elevation of the wetland in metres above mean sea level.
6. Area: The area of the designated site, in hectares.
7. Overview: A brief summary of the wetland (limited to not more than three sentences), mentioning principal physical and ecological features, and most significant values and benefits provided.
8. Wetland Type: Please first specify the position of the Ramsar site as a **Marine or coastal wetland** and/or an **Inland wetland**. Also note if the site includes or is a **Human-made wetland**. Circle the codes representing all of the wetland habitat types which are present within the site. Refer to the Ramsar Classification of “Wetland Type” in Appendix A. Then list the selected wetland types from the most to the least dominant. It is recognised that this may be difficult for large sites with a variety of habitats, but a general indication of dominance is important for properly managing information on the site.
9. Reasons for inclusion: Circle the Ramsar Criteria for identifying wetlands of international importance, as adopted by the Conference of the Parties, which are applicable to the site. Refer to the Ramsar Criteria and associated guidelines for their use. Note the criterion which most significantly characterizes the site’s international importance. (See also point 12 below).
10. Outline map of site: The most detailed and up-to-date map of the wetland available should be appended to the Information Sheet. Indicate whether or not a map accompanies the Information Sheet by ticking the appropriate *yes* or *no* box.

The “ideal” Ramsar site map will clearly show the boundaries of the Ramsar site, scale, latitude, longitude and compass bearing, administrative boundaries (e.g., province, district, etc.), and display basic topographical information, the distribution of the main wetland habitat types and notable hydrological features. It will also show major landmarks (towns, roads, etc.). Indications of land use activities are especially useful.

Experience has shown that even moderately-opaque hand-drawn site boundaries or cross-hatching (to indicate zonation) often obscure other map features. While coloured annotations may appear distinguishable from the underlying map features on the map on which they were applied, it is important to remember that most colours cannot be differentiated in black & white photocopies. These potential drawbacks to otherwise useful annotations should be avoided.

The optimum scale for a map depends on the actual area of the site depicted. Generally the map should have a 1:25,000 or 1:50,000 scale for areas up to 10,000 ha; 1:100,000 scale for larger areas up to 100,000 ha; 1:250,000 for areas exceeding 100,000 ha. In simplest terms, the site should be depicted in some detail. For moderate to larger sites, it is often difficult to show detail on an A4 or 8.5” x 11” sheet at the desired scale, so generally a sheet larger than this is more appropriate. While an original map is not absolutely necessary, a very clear image is highly desirable. A map exhibiting the above attributes will be easier to scan for computerization, should this aspiration prove feasible.

11. Name and address of compiler: The full name, address and institution/agency of the person who compiled the Information Sheet, together with any telephone, fax, telex and e-mail numbers.

Information on the categories listed on the following pages is to be supplied by attaching extra pages (please limit extra pages to no more than 10).

12. Justification of criteria: Criteria codes (point 9 above) alone do not convey information on the precise way in which the criteria apply to a given site. It is therefore imperative that detailed written text in support of the circled Ramsar criteria be supplied, in addition to the criteria codes.
13. General Location: A description of the general location of the wetland. This should include the site’s distance (in a straight line) and compass bearing from the nearest “provincial”, “district” or other significant administrative centre, town or city. The population of the listed centre and its administrative region should also be stated.
14. Physical features: A short description of the principal physical characteristics of the site, covering the following points where relevant:
 - geology and geomorphology
 - origins (natural or artificial)
 - hydrology (including seasonal water balance, inflow and outflow)
 - soil type and chemistry
 - water quality (physico-chemical characteristics)

- depth, fluctuations and permanence of water
 - tidal variations
 - catchment area
 - downstream area (especially in the case of wetlands that are important in flood control)
 - climate (only the most significant climatic features, e.g., annual rainfall and average temperature range, distinct seasons, and any other major factors affecting the wetland).
15. Hydrological values: A description of the principal hydrological values of the wetland, e.g., its role in the recharge and discharge of groundwater, flood control, sediment trapping, prevention of coastal erosion, and maintenance of water quality.
 16. Ecological features: A description of the main habitats and vegetation types, listing the dominant plant communities and species, and describing any zonation, seasonal variations and long-term changes. Mention plant species that have been introduced (accidentally or on purpose) and species which are invasive. Include a brief note on the native natural plant communities in adjacent areas, as well as the present plant communities (including cultivation) if different from the native vegetation. Information on food chains should be included in this section.
 17. Noteworthy flora: Information on any plant species or communities for which the wetland is particularly important (e.g., endemic species, threatened species or particularly good examples of native plant communities). **Be sure to specify *why* each species listed is noteworthy.**
 18. Noteworthy fauna: A general account of the noteworthy fauna of the wetland, with details of population sizes whenever possible. Particular emphasis should be given to endemic and threatened species, economically important species and species occurring in internationally significant numbers. **Be sure to specify *why* each species listed is noteworthy.** Lists of species and/or census data should not be quoted in full as part of the Information Sheet, but should be appended to this form when available.
 19. Social and cultural values: An account (more detail can be given in sections 25-27 below) of the principal social values (e.g., tourism, outdoor recreation, education and scientific research, agricultural production, grazing, water supply, fisheries production) and cultural values (e.g., historical associations and religious significance). Whenever possible, indicate which of these values are consistent with the maintenance of natural wetland processes and ecological character, and which values are derived from non-sustainable exploitation or which result in detrimental ecological changes.
 20. Land tenure/ownership: Details of ownership of the wetland and ownership of surrounding areas (e.g., state, provincial, private, etc). Explain terms which have a special meaning in the country or region concerned.
 21. Current land use: Principal human activities in (a) the Ramsar site itself and (b) in the surroundings and catchment. Give information on the human population in the area, with a description of the principal human activities and main forms of land use at the wetland, e.g., water supply for domestic and industrial use, irrigation, agriculture, livestock grazing,

forestry, fishing, aquaculture and hunting. Some indication of the relative importance of each form of land use should be given whenever possible. In section (b) summarize land use in the catchment which might have a direct bearing on the wetland, and land use in any downstream areas likely to be affected by the wetland.

22. Adverse factors affecting the ecological character of the site: This could include changes in activities, land uses and major development projects at the site or in the catchment or elsewhere which have had, are having, or may have a detrimental effect on the natural ecological character of the wetland (e.g., diversion of water supplies, siltation, drainage, reclamation, pollution, over-grazing, excessive human disturbance, and excessive hunting and fishing). When reporting on pollution, special notice should be taken of toxic chemical pollutants and their sources. These should include industrial and agricultural-based chemical effluents and other emissions. Natural events including vegetative succession which have had, are having or are likely to have an impact on the ecological character of the site should be detailed, so as to facilitate monitoring. Please distinguish between potential and existing adverse factors and where possible, between adverse factors occurring in the site and those external to, but (possibly) affecting, the site. List introduced exotic species and give information on why and how they were introduced. In all cases, where such data exist, supply measurable/quantifiable information to enable more precise monitoring of ecological character.
23. Conservation measures taken: Details of any protected areas established at or around the wetland, and any other conservation measures taken at the site, such as restrictions on development, management practices beneficial to wildlife, closures of hunting, etc. Include information on any monitoring and survey methods and regimens in place at the site. Describe any application of the Ramsar wise use guidelines (Recommendation 4.2) and additional guidance on wise use (Resolution 5.6) at the site. If a reserve has been established, please give the date of establishment and size of the protected area. State whether a management plan exists, if it is officially approved and whether it has been implemented. (The Conference of the Parties has called for the development of management plans for all Ramsar sites). Any application of “catchment” integrated site management principles, or in a coastal site, of integrated coastal zone management, should be noted. If only a part of the wetland is included within a protected area, the area of wetland habitat which is protected should be noted. An assessment of the enforcement of legislation and effectiveness of any protected areas should be given whenever possible. Involvement of local communities and indigenous people in the management of the site should also be described. Details of inclusion on the Montreux Record and/or visits under the Ramsar Management Guidance Procedure should be described.
24. Conservation measures proposed but not yet implemented: Details of any conservation measures which have been proposed for the site, including any proposals for legislation, protection and management. Summarize the history of any long-standing proposals which have not yet been implemented, and make a clear distinction between those proposals which have already been officially submitted to the appropriate government authorities, and those proposals which have not as yet received official government endorsement, e.g., recommendations in published reports and resolutions from specialist meetings. Also mention any management plan which exists (or is in preparation) but has not yet been implemented.

25. Current scientific research and facilities: Details of any current scientific research and information on any special facilities for research.
26. Current conservation education: Details of any existing programmes and facilities for conservation education and training and comments on the educational potential of the wetland.
27. Current recreation and tourism: Details of the present use of the wetland for recreation and tourism, with details of existing or planned facilities. Please state the annual number of tourists. Indicate if tourism is seasonal, and of what type.
28. Jurisdiction: The name of the government authority with a) *territorial jurisdiction* over the wetland, e.g., state, region or municipality, etc., **and** the name of the authority with b) *functional jurisdiction* for conservation purposes, e.g., Department of Environment, Department of Fisheries, etc.
29. Management authority: The name and address of the body responsible for the direct *local* conservation and management of the wetland.
30. References: A list of key references relevant to the wetland, including management plans, major scientific reports and bibliographies. When a large body of published material is available on the site, only the most important references need be cited, with priority being given to recent literature containing extensive bibliographies. Reprints or copies of the most important literature should be appended whenever possible.

Appendix D.

References

- Baillie, J. & Groombridge, B. (eds.) 1996. *1996 IUCN Red List of Threatened Animals*. IUCN, Gland. 378 pp.
- Bruton, M.N. & Merron, G.S. 1990. The proportion of different eco-ethological sections of reproductive guilds of fishes in some African inland waters. *Env. Biol. Fish* 28: 179-187.
- Green, A.J. 1996. Analysis of globally threatened Anatidae in relation to threats, distribution, migration patterns, and habitat use. *Conservation Biology* 10: 1435-1445.
- Rose, P.M. & Scott, D.A. 1997. *Waterfowl population estimates*. Second edition. Wetlands International Publication 44, Wageningen, The Netherlands.
- Scott, D.A. & Rose, P.M. 1996. *Atlas of Anatidae populations in Africa and Western Eurasia*. Wetlands International Publication 41, Wageningen, The Netherlands.
- Walter, K.S. & Gillett, H.J. (eds.) 1998. *1997 IUCN Red List of Threatened Plants*. IUCN, Gland. 862 pp.
- Welcomme, R.L. 1979. *Fisheries ecology of floodplain rivers*. Longman, London. 317 pp.