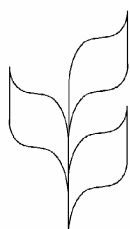




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SUBSIDIARY BODY ON SCIENTIFIC, TECHNICAL AND TECHNOLOGICAL ADVICE

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Item 5.1 of the provisional agenda*

INLAND WATER ECOSYSTEMS: REVIEW, FURTHER ELABORATION AND REFINEMENT OF THE PROGRAMME OF WORK

Provision of scientific advice and further guidance to assist in the national elaboration of Annex I of the Convention, as pertaining to inland water ecosystems: options for national elaboration of the indicative list of categories of components of inland water biological diversity important for its conservation and sustainable use

Note by the Executive Secretary

The Executive Secretary is circulating herewith, for the information of participants in the eighth meeting of the Subsidiary Body on Scientific, Technical and Technological Advice, the complete text of the document prepared in collaboration with the Ramsar Bureau and proposing options for a classification system for inland water ecosystems and further elaboration of criteria for identifying inland waters ecosystems or habitats important for the objectives of the Convention on Biological Diversity that Parties to the Convention can use to prepare their list of inland water ecosystems. A summary of the text (UNEP/CBD/SBSTTA/8/8/Add.4) has been circulated as a working document of the eighth meeting of the Subsidiary Body. Suggested recommendations regarding classification systems and criteria for the identification of important inland water biodiversity are included in the consolidated suggested recommendations under item 5.1 as contained in the note by the Executive Secretary on elements for the further elaboration and refinement of the programme of work (UNEP/CBD/SBSTTA/8/8/Add.2).

* UNEP/CBD/SBSTTA/8/1.

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INTRODUCTION

1. In paragraphs 9 (e) (iv) and 12 of the programme of work on biological diversity of inland water ecosystems annexed to its decision IV/4, the Conference of the Parties to the Convention on Biological Diversity advised Parties to prepare indicative lists of inland water ecosystems, using the criteria set out in annex I to the Convention. In paragraph 12, the Conference of the Parties requested the Executive Secretary to work closely with the Ramsar Convention Bureau, and directed the Subsidiary Body on Scientific, Technical and Technological Advice (SBSTTA) to cooperate with the Scientific and Technical Review Panel (STRP) of the Convention on Wetlands to achieve desirable convergence between approaches on criteria and classification of inland water ecosystems in the framework of the two conventions. In paragraph 13 of the same decision, Parties were requested to take into account IUCN recommendations and criteria for the assessment of threatened species and populations for application at the regional and national levels.

2. The Executive Secretary has prepared this note in collaboration with the Ramsar Bureau to propose options for a classification system (section II) and further elaboration of criteria (section III) that Parties to the Convention on Biological Diversity can use to prepare their list of inland water ecosystems as requested by the Conference of the Parties.

I. POSSIBLE CLASSIFICATION SYSTEMS FOR INLAND WATER ECOSYSTEMS IN THE FRAMEWORK OF THE CONVENTION ON BIOLOGICAL DIVERSITY

3. Unlike the Ramsar Convention, the Convention on Biological Diversity does not have a classification system ^{1/} for inland water ecosystems/habitats. ^{2/} Classifications are necessary *inter alia* for mapping and inventory purposes and for organizing ecosystems/habitats into systems that will aid decision-making about resource management. The Ramsar Convention's definition of "wetlands" includes categories of inland water ecosystems. Thus, various national, regional and international systems of wetlands classification ^{3/} can be used to classify inland water ecosystems/habitats.

A. *The Ramsar classification system for wetland type*

4. The Ramsar classification system for wetland type (reproduced in annex I below) was developed in response to the need for a simple global classification. It is a hierarchical listing of wetland habitats loosely based on the United States national wetland classification. ^{4/} It was adopted in 1990 after many years of negotiation through recommendation 4.7, on improved application of the Convention. It was subsequently amended in 1999 through resolution VI.5 to include subterranean karst or cave wetlands.

^{1/} For a general discussion on classification in the framework of the Convention on Biological Diversity, see section 3.2 of the note by the Secretariat on assessment of biological diversity and methodologies for future assessments prepared for the second meeting of SBSTTA (UNEP/CBD/SBSTTA/2/2).

^{2/} Article 2 of the Convention on Biological Diversity defines "ecosystem" as a dynamic complex of plant, animal and micro-organism communities and their non-living environment interacting as a functional unit; and "habitat" as the place or type of site where an organism or population naturally occurs.

^{3/} See for example the review "Classification and Inventory of the World's Wetlands" edited by C. Max Finlayson, and A.G. van der Valk, in *Advances in Vegetation Science* 16, *Reprinted from VEGETATIO* 118:1-2 (1995)

^{4/} Scott & Jones 1995; Ramsar Bureau 2000; and http://ramsar.org/key_ris_types.htm

5. The system is intended to provide the Contracting Parties to the Ramsar Convention ^{5/} with a simple basis for describing wetlands of international importance “on account of their international significance in terms of ecology, botany, zoology, limnology or hydrology” (Article 2.2 of the Ramsar Convention) and to enable them to formulate and implement their planning so as to promote in their respective territories the conservation and, as far as possible, the wise use of the wetlands included in the Ramsar List of Wetlands of International Importance (Article 3.1 of the Ramsar Convention). In addition, the system harmonizes classifications and inventories of transboundary ecosystems/habitats.

6. The Ramsar classification consists of three main wetland habitats, namely marine and coastal, inland, and human-made wetlands. These categories are further subdivided into a total of 42 wetland types (see annex I below).

B. Regional and national classification systems

7. A number of regional and national wetland classifications, such as those listed in annex II below, have been developed in response to different needs. They take into account the main biophysical features (generally vegetation, landform and water regime, sometimes also water chemistry such as salinity) and the variety and size of wetlands in the locality or region being considered.

8. Although the Ramsar classification system is a global system that was developed for wetlands of international importance, it is currently being used increasingly as a classification basis for national wetland inventories. ^{6/}

C. Options for a classification system for inland water ecosystems/habitats under the Convention on Biological Diversity

9. Consideration of a possible classification system of inland water ecosystems for the Convention on Biological Diversity that is, as requested by the Conference of the Parties, in harmony with the Ramsar classification system of wetland type should take into account that no single classification is likely to meet all needs of different wetland inventories at the country level. Flexibility should thus be an important feature of such classification system to be able to suit the purpose of various inventories.

10. For the development of a classification of inland water ecosystems that would be useful within the context of the implementation of Article 7 of the Convention on Biological Diversity, the following options can be considered:

(a) *Option E* Apply at the national level the Ramsar classification system for wetlands of international importance excluding the marine and coastal category which, in the context of the Convention on Biological Diversity, falls under the programme of work on marine and coastal biodiversity, noting, however, that there is not always a rigid dividing line between an inland aquatic and a marine habitat. As experience accrues, this classification can be adapted to integrate, according to local or national needs, biodiversity aspects at lower-level classes. The main advantage of this approach is the adoption and adaptation of a system that is widely in use. However, its usefulness for any specific wetland inventory should be carefully assessed and there may be a need to accommodate description of additional categories of habitats in the form and level of description that are now commonly included in many wetland/inland water ecosystem inventories;

^{5/} 133 Parties as of 1 November 2002.

^{6/} As noted in the Framework for Wetland Inventory adopted by the Conference of the Contracting Parties to the Convention on Wetlands at its eighth meeting (resolution VIII.6, annex).

(b) *Option II:* Adopt a classification consisting of the following categories: underground water, riverine, lagoonal, lacustrine, palustrine, estuarine, and human-made categories. An advantage of this system is that it can be further elaborated to lower hierarchical levels (see for example option III below) and it provides a possibility for an inventory at a higher and more flexible level than the current Ramsar classification system;

(c) *Option III:* Adopt option II with the different classes of the Ramsar classification system as the lower level i.e. for underground water systems: Y, Zg, and Zk(b); riverine systems: M and N; lagoonal systems: Q, R, Sp and Ss; lacustrine systems: O and P; palustrine systems: Tp, Ts, U, Va, Zf, Vt and W; estuarine systems: L and human-made systems (refer to annex I for the codes);.

(d) *Option IV:* Adopt one or a combination of the above options I-III also taking into account the proven classification systems listed in annex II below so as to respond better to local or national requirements. A drawback of this option is that multiple systems may be used within the same State or a given region; this might not facilitate the compilation of information for integrated planning activities, or the exchange of information and experiences.

II. PROPOSAL FOR NATIONAL ELABORATION OF ANNEX I OF THE CONVENTION, AS PERTAINING TO INLAND WATER ECOSYSTEMS

A. *Generalities on Annex I of the Convention on Biological Diversity and the Ramsar criteria and guidelines*

11. Inventorying inland water ecosystems is an appropriate step towards the development of strategies and priority programmes/projects for inland waters ecosystems. Another step is to identify those ecosystems/habitats that are important for the conservation and sustainable use of biodiversity. The Convention set out an indicative list of criteria to be used for this purpose. Bearing in mind that these criteria are rather general, there is a need to further elaborate them. In doing so, the Conference of the Parties requested that desirable convergence be achieved with the Ramsar criteria and guidelines for wetlands of international importance.

12. To assist the Conference of the Parties and SBSTTA in their consideration of Article 7 of the Convention on "Identification and monitoring", the Executive Secretary has prepared a number of notes addressing possible guidance for the elaboration of annex I of the Convention, on, in particular, identification, monitoring and assessments of components of biological diversity and processes which have adverse impacts (UNEP/CBD/SBSTTA/2/3), options for implementing Article 7 of the Convention (UNEP/CBD/COP/3/12), and methodologies for the assessment of biological diversity in inland water ecosystems (UNEP/CBD/SBSTTA/3/8). The following paragraph draw on those documents.

13. Article 2.2 of the Ramsar Convention states that wetlands should be selected for the List of Wetlands of International Importance on account of their international significance in terms of ecology, botany, zoology, limnology or hydrology. To facilitate the implementation of this provision, the Conference of the Parties to that Convention has developed criteria to assist in the identification of wetlands of international importance. The latest version of the criteria was adopted by the seventh meeting of the

Contracting Parties in 1999. In addition the Ramsar Convention developed guidelines for interpretation and application of the criteria. ^{7/}

14. With a view to achieving convergence between the Ramsar criteria and guidelines and the elaboration of the criteria listed in Annex I of the Convention on Biological Diversity, one can:

(a) Describe the scope of each of the criteria in Annex I of the Convention on Biological Diversity and assess whether the Ramsar criteria (reproduced in annex III below) and guidelines address the criteria under the Convention on Biological Diversity fully, partly or not at all (annex IV);

(b) Recommend, using the Ramsar criteria and guidelines for each criteria under the Convention on Biological Diversity that is fully addressed by the Ramsar criteria and guidelines, or that additional criteria and/or guidelines be developed for criteria for the Convention on Biological Diversity not addressed or only partly by the Ramsar criteria and guidelines.

B. Relevance of Ramsar criteria and guidelines to the indicative categories of important ecosystem, species and genes in Annex I of the Convention on Biological Diversity

Inland water ecosystems and habitats containing high diversity

15. As stated in the note by the Executive Secretary on options for implementing Article 7 of the Convention (UNEP/CBD/COP/3/12), prepared for the third meeting of the Conference of the Parties, diversity can be interpreted in a number of different ways. More complex ecological measures of diversity generally combine measures of richness, evenness of spread of components, and some indication of uniqueness or complementarity. One of the most straightforward ways to deal with diversity within ecosystems and habitats (as is implicit in this definition) is to consider species diversity, of which the simplest indication is some measure of species richness. Identifying high-diversity areas does not necessarily require the identification of all component species. Indicators of biodiversity can be used.

16. “High diversity” may be interpreted globally, regionally or nationally. At the global level, some high-latitude or very arid countries may have no high-diversity ecosystems. However, within each country some ecosystems will be much more diverse than others. The extent (scale) of the area under consideration can influence the level of species diversity observed.

17. Ramsar criteria 1, 2, 3 and, more particularly 7, and their related guidelines can be used to identify inland water ecosystems and habitats containing high diversity. Criterion 7, based on fish, and the guidelines for its application provide guidance for the identification of internationally important wetlands, those that support a significant proportion of indigenous fish subspecies, species or families, life-history stages, species interactions and/or populations. It is important to note that, bearing in mind that high biodiversity is not always desirable, the Ramsar guidelines provide that: (i) only indigenous (i.e., not introduced species, in particular invasive ones) should be taken into account; (ii) the different forms that diversity might take, including the number of subspecies, species and families, different life-history stages, species interactions, and the complexity of interactions between these taxa and the external environment, should be considered; (iii) the diversity of genetically similar intraspecific ecological units are also included; and (iv) the high proportion of indigenous fish subspecies, species or families and their interactions must be representative of wetland benefits and/or values and thereby contributes to global biological diversity.

^{7/} See chapter V of the “Strategic Framework and guidelines for the future development of the List of Wetlands of International Importance” in the annex to Resolution VII.11.

18. Ramsar criterion 7 is based on fish because they are the most abundant vertebrates associated with wetlands. ^{8/} However, in some inland water ecosystems, fish may not be the most abundant organisms or most representative of inland water benefits and/or value. Thus, in the framework of the Convention, it may be desirable to expand criterion 7 to include other taxa that will be identified on the basis of local considerations of the benefits and value of the given inland water ecosystem, including populations of taxonomic groups with wetland-dependent species such as amphibians.

Inland water ecosystems and habitats containing large numbers of endemic species

19. “Endemic species” are species that are unique to one region, often within one country or continent, and are found nowhere else. Many wetlands are characterized by the highly endemic nature of their fish fauna. Identification of endemic species requires detailed knowledge of the taxonomy and distribution of the groups examined. Many inland water ecosystems, particularly in the tropics, remain very inadequately known.

20. In general, areas or ecosystems that have been isolated from other similar areas or ecosystems for a significant period of time contain endemic species. The number of endemic species and the percentage of the biota which is endemic are dependent on a range of factors, the most important of which are the length of time the area has been isolated, the size of the area, and the nature of the organisms which have colonized that area or were present when it became isolated. Identification of endemic species requires that the complete distribution of the species in question be known.

21. The term “large numbers” is not defined within Annex I to the Convention on Biological Diversity and is open to a range of interpretations, dependent in large measure on the group or groups of organisms being considered. Thus, BirdLife International has carried out a global analysis of Endemic Bird Areas (EBAs) in which an EBA was defined as an area with at least two restricted-range bird species present, while IUCN classified a Centre of Plant Diversity (CPD) as any area with at least 100 endemic plant species.

22. The guidelines to the Ramsar criterion 2 suggest that a figure of 10 per cent endemism of the ichthyofauna should qualify a wetland or series of wetlands as being of international importance. In some wetlands, such as the African Great Lakes, Lake Baikal in Russia, Lake Titicaca, sinkholes and cave lakes in arid regions, and lakes on islands, endemism levels as high as 90-100 per cent may be reached, but 10 per cent is considered in the Ramsar Convention as a practical figure for worldwide application. The guidelines also note that in areas with no endemic fish species, the endemism of genetically-distinct infraspecific categories, such as geographical races, should be used.

23. Just like for the criterion relating to high diversity, the guidelines on endemism focus on fish. Extending the scope of the criterion to other biodiversity groups can provide a more appropriate criterion in the framework of the Convention on Biological Diversity. However, the minimum level of endemism needs to be defined for each other group.

Inland water ecosystems and habitats with large numbers of threatened species

24. Identification of threatened species requires that the status of that species has been assessed. However, even where the status of all species has not been individually assessed, it is possible to extrapolate from the known status of representative species.

^{8/} Worldwide, over 18,000 species of fish are resident for all or part of their life cycles in wetlands as defined by the Ramsar Convention.

25. IUCN has defined in its Red List categories and criteria designed for assessing the status of plants and animals at the global level. In paragraph 13 of its decision IV/4, the Conference of Parties to the Convention on Biological Diversity invited Parties to take note of the work of the IUCN in the development of the criteria relating to threatened species and populations in annex I of the Convention. The IUCN Red List categories include extinct, extinct in the wild, critically endangered, endangered, vulnerable and near threatened taxa.^{9/} The quantitative criteria used for classification within the threatened categories refer *inter alia* to the reduction in population size over a period of time, the geographic range in the form of extent of occurrence or area of occupancy, population size estimated in terms of mature individuals, and population structure and fluctuation.

26. Criterion 2 of the Ramsar Convention caters for vulnerable, endangered, critically endangered species and threatened ecological communities.

27. Although, the IUCN Red List categories and criteria are intended to be a system for classifying species at high risk of global extinction, many people are interested in applying them to subsets of global data, especially at regional, national or local levels. To do this it is important to refer to guidelines prepared by the Regional Applications Working Group of the Species Survival Commission.^{10/} When applied at national or regional levels it must be recognized that a global category may not be the same as a national or regional category for a particular taxon. For example, taxa classified as “least concern” globally might be “critically endangered” within a particular region where numbers are very small or declining, perhaps only because they are at the margins of their global range. Conversely, taxa classified as “vulnerable” on the basis of their global declines in numbers or range might be “least concern” within a particular region where their populations are stable.

Ecosystems or habitats containing wilderness

28. The concept of wilderness is that of an extensive area where human impact is minimal or non-existent. There are now probably no significant areas on Earth without human impact, at the very least from air- or water-borne pollutants and greenhouse gases, or from the past. Wilderness is often equated with naturalness, but this may often not be the case. Operational definitions can be used in terms of distance from human influence such as roads and settlements. Inland water ecosystems may therefore best be considered in terms of the extent to which they occur within wilderness areas, rather than contain wilderness.

29. Species and communities which are wild relatives of domesticated or cultivated species and, a number of species and communities which are important for research into the conservation and sustainable use of biological diversity, such as indicator species, are usually part of wilderness areas. Annex I of the Convention on Biological Diversity consider these categories as important for conservation and sustainable use.

30. Ramsar criterion 1 states that 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. The related guidelines provide some description of a natural and near-natural wetland type but make no reference to wild relatives of domesticated or cultivated species or to species or communities important for research into conservation and sustainable use of biodiversity.

^{9/} <http://www.iucn.org/themes/ssc/redlists/redlistcatsenglish.pdf>.

^{10/} See, for example, Gärdenfors, U., Hilton-Taylor, C., Mace, G. and Rodríguez, J.P. 2001. The application of IUCN Red List Criteria at regional levels. *Conservation Biology* 15: 1206–1212; and <http://www.iucn.org/themes/ssc/redlists/redlistcatsenglish.pdf>.

With regard to wild relatives, the *Biodiversity Data Sourcebook* published by the World Conservation Monitoring Centre can be used as a starting point for identifying priority wild relatives of domestic stock and crops. Ramsar criteria 5, 6 and 7 can also be applied.

Inland water ecosystems and habitats required by migratory species

31. Many inland water ecosystems and habitats are of great importance for migratory species. There are two major groups of these, with largely complementary habitat requirements:

(a) The first group is migratory waterfowl, mostly in the orders Anseriformes (the ducks, geese and screamers) and Ciconiformes.

(b) The second group is fish that spend part of their life cycle in freshwater and part in the marine environment.

32. The Ramsar criteria for wetlands which are internationally important for migratory species are those that

(a) Regularly support 20,000 waterfowl or substantial numbers of individuals from particular groups of waterfowl or 1 per cent of the individuals in a population of one species or subspecies of waterfowl. The presence of waterfowl should be indicative of wetland values, productivity or diversity. The spatial and temporal scale should be defined i.e. whether the wetland consists of one large area or a group of small wetlands forming an ecological unit, and whether waterfowl are counted at a given time or over a period of time;

(b) Are an important source of food for fish, spawning ground, nursery and/or migration path on which fish stocks, either within the wetland or elsewhere, depend.

33. Ramsar criteria 1, 2, 3, 4 and 6 can also be considered in identifying inland water ecosystems or habitats required by migratory species. In addition, the Ramsar Convention provides that a wetland could be considered of international importance under criteria 1, 2 or 3 if it conforms to additional guidelines developed at regional or national level. Elaboration of such regional or national guidelines may be especially appropriate: where particular groups of animals (other than waterfowl) or plants are considered more suitable as a basis for evaluation; or where waterfowl and other animals do not occur in large concentrations (particularly in northern latitudes); or where collection of data is difficult (particularly in very large countries).

34. Bearing in mind the scope of the Ramsar Convention, Ramsar sites could be considered as a starting point for identifying ecosystems required by migratory species. The appendices to the Convention on the Conservation of Migratory Species of Wild Animals (CMS) are the most suitable available starting point for lists of migratory species. Most non-aquatic migratory species are birds, a large proportion of which use wetlands at one or more stages of their migratory cycle. This would be particularly pertinent in light of the joint activities between the Convention on Biological Diversity and both the CMS and Ramsar Conventions (see UNEP/CBD/COP/6/INF/14 and 15).

Ecosystems and habitats of social, economic, cultural or scientific importance

35. Ecosystems of economic importance may be defined as those that provide goods and services of economic value to humankind. These may be ecosystems of which components are directly exploited through fisheries or other forms of consumptive harvest, such as medicinal plants and other worthy

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products (direct use value), or they may provide services (indirect values, e.g., watershed protection, carbon sequestration). The former are generally easier to quantify and characterize than the latter.

36. Many ecosystems and habitats of social and cultural importance are likely also to be of economic importance in the sense outlined above. Others, however, will not. Of particular note are areas of religious or sacred significance. Some of these are not only of great cultural importance, but they are often also important for the maintenance of threatened and endemic species. Elsewhere, ecosystems and habitats may be of considerable recreational importance, which may also be considered a form of economic importance. These are often parks or other protected areas.

37. Many ecosystems and habitats of scientific importance will be also of importance under one or more of the other criteria discussed here. That is, they are likely to be unique, or representative, or have important numbers of threatened or endemic species, or have high diversity. In addition, areas of ecosystem or habitat that have been the subject of long-term study are of great scientific value even if they do not necessarily meet the other criteria above. Such areas are capable of providing insights into ecosystem and habitat changes over time and are thus extremely important for monitoring and assessment.

38. However, the socio-economic importance of inland water ecosystems has often been deleterious for the ecosystems involved. Socio-economically, river systems and some lakes are generally regarded as being of major importance for transportation, disposal of effluence, generation of power, provision of water for a range of uses, as a source of food, and as areas for recreation. In contrast, shallow-water inland ecosystems ("wetlands" in the narrower sense) have traditionally been perceived as of little value. In both cases, however, the effects of mankind's use have generally been deleterious to biological diversity, as the value of the latter within these ecosystems has been largely neglected. In the former case, rivers have been channelled, impounded, polluted and overfished, and their waters have been abstracted. In the latter, wetlands have been drained and in-filled, and the land converted to other use.

39. Realisation of the true value to humans of different inland water ecosystems and habitats will require the adoption of more comprehensive and realistic means of evaluating these systems in economic, social and cultural terms (see UNEP/CBD/SBSTTA/8/8/Add.3). In particular this involves taking into account the less tangible values of ecosystem goods and services, including those provided by biological diversity. A recent attempt to ascribe a global value to ecosystems ^{11/} estimated mean values per hectare of major ecosystem types, taking as many of these factors as possible into account. Of non-marine ecosystems, wetlands (average value US\$ 14,785 per hectare) and lakes and rivers (average value US\$ 8,498 per hectare) were several times more valuable per unit area than terrestrial ecosystems such as forests (US\$ 969 per hectare) and grasslands or rangelands (US\$ 232 per hectare). Taken together, inland water ecosystems were estimated to contribute more to total global flow value (US\$ 6579 x 10⁹ per year) than all other non-marine ecosystems combined (US\$ 5740 x 10⁹ per year) despite their far lesser extent. This indicates that there may be a strong argument for considering all extant inland water ecosystems to be of social, economic or cultural significance.

40. As noted in the document prepared for the eighth meeting of the Conference of the Contracting Parties to the Convention on Wetlands, in November 2002, entitled "Issues and options concerning the further elaboration of the Ramsar criteria and guidelines for the future development of the List of Wetlands of International Importance" (COP8 DOC.31), Ramsar criteria and guidelines for identifying wetlands of international importance do not contain explicit criteria for designing wetlands of international importance on the basis of their socio-economic and cultural importance. This lack of criteria based on the socio-economic and cultural importance of wetlands has been a matter of past debate by the Scientific and

^{11/} Costanza *et al.*, 1997, *Nature* 387: 253-260.

Technical Review Panel (STRP) and Standing Committee of the Ramsar Convention, notably during the triennium 1996-1999. At that time, it was concluded that socio-economic and cultural issues should be incorporated in the guidelines on the application of the existing criteria and in the guidelines on management planning, but not as a criterion for designation. ^{12/}

41. In this context, the Guidelines for the application of Ramsar criteria 1 and 8 in the Strategic Framework include attention to elements of socio-economic importance.

(a) The guidelines for the application of criterion 1 include giving priority to the designation of sites that play a substantial hydrological role in the natural functioning of a major river basin or coastal system. This hydrological importance implies some major functions of wetlands including, *inter alia*, the natural control, amelioration or prevention of flooding; seasonal retention for wetlands or other areas of conservation importance downstream; the recharge of aquifers; part of karst or underground hydrological or spring systems that supply major surface wetlands; a major natural floodplain system; a major hydrological influence in the context of at least regional climate regulation; and maintenance of high water quality standards;

(b) In recognition of the importance of the role of inland and coastal wetlands in the life-cycles of fish, the guidelines for the application of this criterion 8 make reference to their not interfering with the regulation of fisheries, in implicit recognition of the socio-economic and cultural importance of such wetlands.

42. Ramsar criterion 7 states that “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”. However, the guidelines for the application of this criterion currently provide no guidance on its application in relation to the wetland benefits and/or values.

43. Hence the principle of designating Ramsar sites for socio-economic importance has already been established through the adoption by Contracting Parties of resolution VII.11 and the Strategic Framework annexed thereto. However, the criteria and their guidelines currently only address certain types of socio-economic importance, chiefly in relation to hydrological values and functions. An indicative list of goods and services provided by wetlands is presented in annex I of the above-mentioned Ramsar document COP8 DOC.31. These should be considered in the development of criteria and guidelines. In the context of biodiversity, guidelines shall include, *inter alia*, reference to species of medicinal and agricultural value and wild relatives of domesticated and cultivated species, and genomes and genes of social, scientific and economic importance.

44. The eight Ramsar criteria and related guidelines for their application do not currently include reference to the cultural importance of wetlands. At its eighth meeting, the Conference of the Contracting Parties to the Ramsar Convention took note with interest of “Guiding principles for identifying the cultural aspects of wetlands and incorporating them into the effective management of sites” (Ramsar resolution VIII.19, annex).

^{12/} The basis for this view was partly the fact that such a criterion could allow room for abuse of the intent of designating a wetland as internationally important, for instance through claiming that a development causing damage to the ecological character of a wetland made the wetland internationally important because of the income and employment of people which it would generate.

Ecosystems and habitats that are representative

45. The concept of representativeness depends implicitly on the development of a unified classification system so that representative samples of each unit in such a system can be chosen. As with other types of ecosystem, the question of scale is paramount—the more fine-grained a classification system, the greater the number of representative habitats or ecosystems there will be. Inland water ecosystems may be chosen as representative on the basis of a range of different criteria, of which the two most important are biogeographic and ecological. In the first instance, ecosystems may be chosen which contain representative fauna and flora of a given biogeographic region. In the second, they may be chosen because they represent a particular type of inland water system (e.g., deep tectonic oligotrophic lake, vernal pool, inland estuary).

46. Ramsar criterion 1 addresses representativity with a focus on those wetlands that are representative of natural or near natural wetland, characteristic of the appropriate biogeographical region; or common to more than one biogeographical region; or with a specific role in the natural functioning of a major river basin or coastal system. To some extent, criterion 7 also refers to representativity of benefits and value of wetland.

Ecosystems and habitats that are unique

47. In terms of physical characteristics, no two inland water ecosystems are exactly alike. In this very basic sense, therefore, each is unique. Clearly this does not provide much guidance as to how particularly important ecosystems may be chosen. In terms of their importance for biological diversity, it may well be that uniqueness is best defined in terms of the possession of outstanding attributes, such as high species diversity or a large number of threatened species. Presence of endemic species makes ecosystems *de facto* unique.

48. The identification of unique ecosystems or habitats requires careful considerations of scale. This is because the more detailed a classification system (i.e., the more fine-scaled), the more likely a given area of ecosystem or habitat is to be different from any other in its physical and biotic characteristics, and therefore to be classifiable as unique.

49. Ramsar criterion 1 directly addresses this feature, but also possession of outstanding attributes regarding the other criteria will qualify for uniqueness.

Ecosystems and habitats associated with key evolutionary or other biological processes

50. The association with key evolutionary processes is a very problematic concept. Far too little is known about the mechanisms of long-term evolution to enable particular ecosystems and habitats to be singled out with confidence as being of importance. Any attempts to identify such areas will by their nature take the form of essentially untestable hypotheses. Too little is currently known of the mechanics of evolution to be able to make this criterion easily operational. However, it is noteworthy that studies of tropical freshwater ecosystems, for example Lake Victoria, have indicated that these may well be sites of exceptional evolutionary activity. ^{13/} This makes such sites not only important under this criterion, but also makes them of great scientific importance.

^{13/} There are indications that the highly diverse cichlid species swarm in Lake Victoria has evolved over a far shorter time period (perhaps as little as 12,000 years) that has hitherto been thought likely or even possible.

51. Criterion 8 can be used to identify a wetland if it is an important source of food for fish, spawning ground, nursery and/or migration path on which fish stocks, either within the wetland or elsewhere, depend. Criterion 4 for wetlands internationally important because they support plant and/or animal species at a critical stage in their life cycles, or provide refuge during adverse conditions can also be used for identifying inland water ecosystems and habitats under this category. However, there are many other biological processes and functions that can be considered in the framework of biological diversity. For example, an inland water ecosystem or habitat can connect landscapes in a conservation corridor.

C. Some conclusions

52. There is a difference intended in the geographic context within which the Ramsar Convention and the Convention on Biological Diversity assess “importance”. The Ramsar context is explicitly “international”, using internationally agreed criteria applied nationally but with international expert peer-review. The context of the Convention on Biological Diversity is primarily national. It uses general assessment factors agreed internationally that can be elaborated nationally and applied nationally without peer-review. There would be benefit if the two sets of criteria could be made consistent by using the same sets of factors but setting higher threshold tests for international importance. This would need to take into account local differences.

53. The criteria used by the Ramsar Convention to determine “importance” are a combination of both explicit criteria with objective thresholds (e.g. 20,000 waterfowl) and, as it is for the list of categories in Annex I of the Convention on Biological Diversity, general factors to be considered using expert judgement. Without quantitative criteria, there are often disagreements about whether the criteria are met. Terms like “high diversity”, “large numbers” and “wilderness” need further elaboration.

54. In addition, little guidance is provided about choosing a consistent geographical scale at which the criteria should be applied. When hydrologically or ecologically linked waterbodies are clustered together, the “complexes” or “mosaics” formed tend to meet the criteria more often than individual biotopes.

55. Annex I of the Convention on Biological Diversity provides criteria at the species or community and gene or genome levels for the identification of components of biodiversity important for its conservation and sustainable use. Ramsar criteria do not address directly elements for the identification of biodiversity components at species or community and genetic levels, their purpose being the identification of wetland habitats or ecosystems of international importance. At the ecosystem and habitat levels, they cover most of the categories in Annex I of the Convention on Biological Diversity except for the social, economic and cultural aspects. In order to ensure that ecosystems and habitats important for their biodiversity are identified, it is necessary to expand the current Ramsar guidelines to include other taxa than fish and waterfowl.

Annex I

RAMSAR CLASSIFICATION SYSTEM FOR WETLAND TYPE 14/

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**.

^{14/} Strategic Framework and guidelines for the future development of the List of Wetlands of International Importance of the Convention on Wetlands (Ramsar, Iran, 1971), adopted by Ramsar Resolution VII.11 (http://www.ramsar.org/key_guide_list_e.htm)

- 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 floodplain¹⁵ 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 snow melt.
- 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**

Human-made wetlands

1 -- **Aquaculture** (e.g., fish/shrimp) **ponds**

2 -- **Ponds**; includes farm ponds, stock ponds, small tanks; (generally below 8 ha).

¹⁵ "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

- 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

**GENERALLY RECOGNIZED INLAND WATER SYSTEMS FOR THE PURPOSE OF THE
PROGRAMME OF WORK ON BIOLOGICAL DIVERSITY OF INLAND WATER
ECOSYSTEMS UNDER THE CONVENTION ON BIOLOGICAL DIVERSITY
AND THE RAMSAR INLAND WETLAND TYPES**

<i>Generally recognized inland water systems for the purpose of the programme of work on biological diversity of inland water ecosystems under the Convention on Biological Diversity</i>	<i>Ramsar inland wetland types</i>
Underground water systems	<ul style="list-style-type: none"> • Freshwater springs; oases (when the source of water is underground). • Geothermal wetlands. • Karst and other subterranean hydrological systems, inland
Riverine systems	<ul style="list-style-type: none"> • Permanent rivers/streams/creeks; includes waterfalls. • Seasonal/intermittent/irregular rivers/streams/creeks
Lagoonal systems	<ul style="list-style-type: none"> • Permanent saline/brackish/alkaline lakes. • Seasonal/intermittent saline/brackish/alkaline lakes and flats.* • Permanent saline/brackish/alkaline marshes/pools. • Seasonal/intermittent saline/brackish/alkaline marshes/pools.*
Lacustrine systems	<ul style="list-style-type: none"> • Permanent freshwater lakes (over 8 ha); includes large oxbow lakes. • Seasonal/intermittent freshwater lakes (over 8 ha); includes floodplain lakes
Palustrine systems	<ul style="list-style-type: none"> • 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. • Seasonal/intermittent freshwater marshes/pools*on inorganic soils; includes sloughs, potholes, seasonally flooded meadows, sedge marshes. • Non-forested peatlands; includes shrub or open bogs, swamps, fens. • Alpine wetlands; includes alpine meadows, temporary

* Floodplain wetlands are not listed as a specific wetland type in Ramsar classification. "Floodplain" is a broad term used to refer to one or more wetland types, which may include examples from the wetland types marked by * or other wetland types. Some examples of floodplain wetlands are seasonally inundated grassland (including natural wet meadows), shrublands, woodlands and forests.

<i>Generally recognized inland water systems for the purpose of the programme of work on biological diversity of inland water ecosystems under the Convention on Biological Diversity</i>	<i>Ramsar inland wetland types</i>
	waters from snowmelt.
Palustrine systems (continued)	<ul style="list-style-type: none"> • Freshwater, tree-dominated wetlands; includes freshwater swamp forests, seasonally flooded forests, wooded swamps on inorganic soils. • Tundra wetlands; includes tundra pools, temporary waters from snowmelt. • Shrub-dominated wetlands*; shrub swamp, shrub dominated freshwater marches, shrub carr, adler thicket on inorganic soils.
Estuarine systems	<ul style="list-style-type: none"> • Permanent inland deltas.
Man-made systems	<ul style="list-style-type: none"> • Aquaculture (e.g., fish/shrimp) ponds • Ponds; includes farm ponds, stock ponds, small tanks; (generally below 8 ha). • Water storage areas; reservoirs/barrages/dams/impoundments (generally over 8ha) • Excavations; gravel/brick/clay pits; borrow pits, mining pools. • Waste water treatment areas; sewage farms, settling ponds, oxidation basins, etc. • Canals and drainage channels, ditches. • Karst and other subterranean hydrological systems, human-made

Annex II

INDICATIVE NATIONAL AND REGIONAL WETLAND CLASSIFICATIONS ^{16/}

Name/title ^{17/}	Description	Reference
USA national wetland classification	Hierarchical classification containing 5 levels that describe the components of a wetland, namely, vegetative life form, substrate composition and texture, water regime, water chemistry and soil. It contains vegetated and non-vegetated habitats.	Cowardin, Carter, Golet & LaRoe 1979; Cowardin & Golet 1995 wetlands.fws.gov/Pubs/Reports/ClassManual/class_titlepg.htm and www.nwi.fws.gov/atx/atx.html
Hydrogeomorphic classification – Australia	Based on landforms and water regimes with further sub-divisions based on areal size, shape, water quality and vegetation features. A binary format for describing wetland habitats is provided	Semeniuk 1987; Semeniuk & Semeniuk 1997.
MedWet Mediterranean wetland classification	Hierarchical listing of wetland habitats loosely based on the USA national wetland classification with modifications made to reflect the range of wetland habitats around the Mediterranean. Software that accompanies the methodology enables other classifications commonly used in the region to be generated from the database.	Hecker, Costa, Farinha & Tomas Vives <i>et al</i> 1996 http://www.wetlands.org/pubs&/wetland_pub.html
Canadian wetland classification ^{18/}	Hierarchical listing of habitats based on broad physiognomy and hydrology, surface morphology and vegetation physiognomy. Further characterisation is based on the chemical features of the habitat.	National Wetlands Working Group 1997; Zoltai & Vitt 1995. www.fes.uwaterloo.ca/research/wetlands/Publications.html
South African wetland classification	Adaptation of the "Cowardin" wetland classification developed in the USA. Includes adaptations to reflect the functional aspects of wetlands based on geomorphic and hydrologic features. It is hierarchical and able to accommodate all wetland types in the region.	Dini & Cowan 2000 www.ccwr.ac.za/wetlands/inventory_classification.htm
Asian wetland classification	Based on landforms and water regimes. Classification can be derived from the core data fields and augmented with information on vegetation, areal size, and water quality.	Finlayson, Howes Begg & Tagi 2002 Finlayson, Howes van Dam, Begg & Tagi 2002

^{16/} Source: http://www.ramsar.org/cop8_dr_06_e.htm

^{17/} Listed in order of their date of publication

^{18/} This system classifies wetlands on the basis of their biotic and abiotic characteristics. This system recognizes five main wetland classes in Canada: bogs, fens, marshes, swamps, and shallow open waters. Each of these classes of wetland is further divided into wetland forms based upon surface morphology, landform drainage, and proximity to water bodies. Finally, each form is broken down into different wetland types based upon vegetation morphology (<http://www.aquatic.uoguelph.ca/wetlands/chclass.htm>)

Annex III

RAMSAR CRITERIA TO ASSIST IN THE IDENTIFICATION OF WETLANDS OF INTERNATIONAL IMPORTANCE ^{19/}

	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.
	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.
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.
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.
	Specific criteria based on waterbirds
Criterion 5	Criterion 5: A wetland should be considered internationally important if it regularly supports 20,000 or more waterbirds.
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.
	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.
Criterion 8	A wetland should be considered internationally important if it is an important source of food for fish, spawning ground, nursery

^{19/} This version of the Ramsar criteria was adopted by the seventh meeting of the Conference of the Contracting Parties in 1999.

	and/or migration path on which fish stocks, either within the wetland or elsewhere, depend.
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Annex IV

**CORRESPONDENCE BETWEEN THE COMPONENTS OF BIOLOGICAL DIVERSITY
UNDER THE CONVENTION ON BIOLOGICAL DIVERSITY AND THE RAMSAR
CRITERIA ^{20/}**

<i>Components of biological diversity under the Convention on Biological Diversity</i>	<i>Ramsar Criteria</i>
Ecosystems and habitats:	
Containing high diversity	Criteria 1, 2, 3, and 7
Containing large number of endemic or threatened species, or wilderness	Criteria 1*, 2, 5, 6, and 7
Required by migratory species	Criteria 1*, 2, 3, 4, 5*, 6, and 8
Of social, economic, cultural or scientific importance	Included, partially, in the Guidelines for the application of criteria 1, 7, and 8
Which are representative, unique or associated with key evolutionary or other biological processes	Criteria 1, 3, 4, 6, 7* and 8
Species or communities which are:	
Threatened	Criterion 2
Wild relatives of domesticated or cultivated species of medicinal, agricultural or other economic value	Criterion 7, partially
Of social, scientific or cultural importance	Included, partially, in the Guidelines for the application of criterion 3 and 7
Of importance for research into the conservation and sustainable use of biological diversity, such as indicator species	Criterion 4, partially
Described genomes and genes of social, scientific or economic importance	Criteria 6 and 7, partially

^{20/} Source: paragraph 17 of document Ramsar COP8 DOC. 31 entitled "Issues and options concerning the further elaboration of the Ramsar criteria and guidelines for the future development of the List of Wetlands of International Importance". Criteria with (*) were added to the original table in that document.