

**"Wetlands: water, life, and culture"
8th Meeting of the Conference of the Contracting Parties
to the Convention on Wetlands (Ramsar, Iran, 1971)
Valencia, Spain, 18-26 November 2002**

Resolution VIII.1¹

Guidelines for the allocation and management of water for maintaining the ecological functions of wetlands

1. AWARE of the Preamble to the Articles of the Convention, which recognizes the fundamental ecological functions of wetlands as regulators of water regimes and as habitats supporting a characteristic flora and fauna, especially waterfowl;
2. RECALLING Resolution VI.23, which identified reconciling water management and wetland conservation as a key challenge for the Convention in the 21st century;
3. ALSO RECALLING Resolution VII.18, which requested the Scientific and Technical Review Panel (STRP) to review the current state of knowledge in the area of allocation and management of water to maintain wetland ecosystem functions, and to report to COP8 on its findings, and if possible to provide guidance for the Contracting Parties on this subject;
4. NOTING Decision IV/4 of the Convention on Biological Diversity (CBD), which identified the Ramsar Convention as its lead partner for actions concerning the conservation and wise use of wetlands, and particularly inland water ecosystems, including actions concerning the allocation and management of water for the maintenance of inland waters biodiversity;
5. NOTING ALSO the development, under the CBD/Ramsar Joint Work Plan 2000-2002, of the River Basin Initiative (RBI), which is designed to provide improved exchange of information and experience in the incorporation of wetlands and biodiversity issues into river basin management, and which is establishing linkages between wetlands, biodiversity and water management bodies that promote integrated water resource management;
6. AWARE of the Report of the World Commission on Dams, which includes information on the evaluation and assessment of water allocations, and specifically on environmental flow releases from dams, in the decision-making process for large dams, and of Resolution VIII.2 on the same subject adopted by this meeting;
7. RECOGNIZING the vital contribution made by wetlands on many occasions to ensure the allocation of water required for human well-being, including food and water security, and in flood control and poverty alleviation; but ALSO AWARE of the increasing demands being placed upon freshwater resources in many parts of the world and the threat this poses for maintaining wetland ecosystem functions and their biodiversity;

¹ Turkey entered a reservation to the adoption by consensus of this Resolution. The text of the reservation appears in paragraph 83 of the COP8 Conference Report.

8. FURTHER AWARE of the importance placed on freshwater resources in the United Nations Special Session of the General Assembly to review and appraise the implementation of Agenda 21, and in the subsequent Commission on Sustainable Development meeting in May 1998, which as part of its report relating to Strategic Approaches to Fresh Water Management recommended support for the implementation, *inter alia*, of the Ramsar Convention;
9. RECOGNIZING that, in Technical Session 1, this meeting of the Conference of the Contracting Parties has considered and discussed the *Guidelines for allocation and management of water for maintaining the ecological functions of wetlands*;
10. NOTING that additional technical guidance, including case studies, on the use of tools and methodologies for the allocation and management of water for maintaining wetland ecosystem functions has been prepared by the STRP and was available to this meeting of the Conference as an information document (COP8 DOC. 9);
11. REALIZING that a number of related decisions have been adopted previously which provide guidance for the Contracting Parties on wetland policy formulation (Resolution VII.6), reviewing laws and institutions (Resolution VII.7), involving local communities and indigenous people in wetland management (Resolution VII.8), promoting communication, education and public awareness related to wetlands (Resolution VII.9), incentives (Resolution VII.15), impact assessment (Resolution VII.16), wetland restoration as part of national planning (Resolution VII.17), and international cooperation under the Ramsar Convention (Resolution VII.19), all of which are relevant to the process of the allocation and management of water for maintaining the ecological functions of wetlands;
12. REALIZING ALSO that this meeting of the Conference has adopted further guidance that is relevant to the allocation and management of water for maintaining the ecological functions of wetlands, notably the *New Guidelines for management planning for Ramsar sites and other wetlands* (Resolution VIII.14), *Principles and guidelines for wetland restoration* (Resolution VIII.16), impact assessment (Resolution VIII.9), *Agriculture, wetlands and water resource management* (Resolution VIII.34), *The impact of natural disasters, particularly drought, on wetland ecosystems* (Resolution VIII.35), and *Guidelines for rendering the use of groundwater compatible with the conservation of wetlands* (Resolution VIII.40); and
13. GRATEFUL to the Government of the United States of America for its financial contribution to the work of the STRP which allowed, *inter alia*, the preparation of the guidelines and background document on water allocation and management;

THE CONFERENCE OF THE CONTRACTING PARTIES

14. ADOPTS the *Guidelines for allocation and management of water for maintaining the ecological functions of wetlands*, as annexed to this Resolution, and URGES all Contracting Parties to give priority to their application, adapting them as necessary to suit national conditions and circumstances;
15. ALSO URGES all Contracting Parties to utilize the additional guidance on tools and methodologies for the allocation and management of water for maintaining ecological functions available as an information document for this meeting of the Conference (Ramsar COP8 DOC. 9), and to take into account the relevant guidance and information,

particularly on the environmental flow releases from dams, including information contained in the Report of the World Commission on Dams;

16. STRONGLY URGES all Contracting Parties to bring the *Guidelines for allocation and management of water for maintaining the ecological functions of wetlands* and the additional guidance on tools and methodologies to the attention of their national ministries and/or agencies (at different levels of territorial organization) responsible for water resource management, to encourage these bodies to apply the guidance in order to ensure appropriate allocation and management of water for maintaining the ecological functions of wetlands in their territory, and to ensure that the principles contained in the Ramsar Guidelines are incorporated into their national policies on water and on wetlands;
17. FURTHER URGES Contracting Parties to include representatives of national water management ministries and/or agencies in the membership of their National Ramsar/Wetland Committees;
18. ENCOURAGES Contracting Parties with wetlands lying in shared river basins to work cooperatively to apply the *Guidelines for allocation and management of water for maintaining the ecological functions of wetlands* within the context of the management of water allocations in transboundary basins, making use of the Ramsar *Guidelines for international cooperation under the Convention* (Resolution VII.19);
19. REQUESTS the Scientific and Technical Review Panel to review the role of wetlands in groundwater recharge and storage and of groundwater in maintaining the ecological character of wetlands, as well as the impacts of groundwater abstraction on wetlands, and to report to COP9 including, as appropriate, with guidelines for Contracting Parties on these matters;
20. DIRECTS the Ramsar Bureau, working with the secretariat of the Convention on Biological Diversity, to bring the *Guidelines for allocation and management of water for maintaining the ecological functions of wetlands* to the attention of other water management organizations, relevant regional institutions, river basin authorities and commissions, and other interested parties and organizations, using the partnership mechanisms established through the joint Ramsar/CBD River Basin Initiative (RBI) for this purpose;
21. REQUESTS the Ramsar Bureau to work with the secretariat of the Third World Water Forum (Japan, 2003) to ensure that the critical importance of the goods and services provided by wetlands for water management, and the *Guidelines for allocation and management of water for maintaining the ecological functions of wetlands*, are fully recognized and debated during the Third World Water Forum;
22. FURTHER REQUESTS the Ramsar Bureau to make available the guidance adopted by this Resolution to the subsidiary bodies and Contracting Parties of other multilateral environmental agreements (MEAs), and in particular to the CBD's Subsidiary Body for Scientific, Technical and Technological Advice (SBSTTA) with regard to the maintenance of the biodiversity of inland waters, and to the UN Convention to Combat Desertification's Committee on Science and Technology (CST) with regard to the critical issue of water management for wetlands in drylands;

23. URGES multilateral and bilateral donors to ensure that the allocation and management of water for maintaining the ecological functions and production potential of wetlands is fully addressed in the design, planning and implementation of river basin and water resource management projects, taking into account the special circumstances and constraints of the concerned countries; and
24. ENCOURAGES Contracting Parties and other interested organizations to develop projects and other activities that promote and demonstrate good practice in water allocation and management for maintaining the ecological functions of wetlands, to make such good practice examples available to others through the information exchange mechanisms of the Ramsar/CBD River Basin Initiative, and to report to COP9 on the successes achieved and lessons learned from these activities.

Annex

Guidelines for the allocation and management of water for maintaining the ecological functions of wetlands

Contents

Introduction

Principles

Operationalising the principles

The decision-making framework

The process for determining water allocations

Scientific tools and methods

Implementation

Conclusions

Introduction

1. Wetland ecosystems are adapted to the prevailing hydrological regime. The spatial and temporal variation in water depth, flow patterns and water quality, as well as the frequency and duration of inundation, are often the most important factors determining the ecological character of a wetland. Coastal and marine wetlands are often highly dependent on inputs of freshwater and associated nutrients and sediments from rivers.
2. Impacts on wetlands can be caused both by human activities within them and, because of the interconnectedness of the hydrological cycle, by activities that take place within the wider catchment. Human modification of the hydrological regime, by removing water (including groundwater) or altering fluxes, can have detrimental consequences for the integrity of wetland ecosystems. Insufficient water reaching wetlands, due to abstractions, storage and diversion of water for public supply, agriculture, industry and hydropower, is a major cause of wetland loss and degradation. A key requirement for wetland conservation and wise use is to ensure that adequate water of the right quality is allocated to wetlands at the right time.
3. Many river basin authorities and water agencies have insufficient appreciation of the socio-economic values and benefits provided by wetlands in terms of their productivity, e.g. fisheries and livestock grazing, and their social importance.
4. There is generally a lack of awareness of the wide variety of services that wetlands can provide, including flood reduction, resource management, and water quality improvement, and of the fact that they can be a very positive asset at the disposal of water managers. As a consequence, wetlands frequently do not receive due consideration in water allocation decisions. In contrast to this view, the Ramsar Convention on Wetlands promotes the principle that wetland ecosystems are an integral component of the global water cycle from which water resources are derived.

5. To maintain the natural ecological character¹ of a wetland, it is necessary to allocate water as closely as possible to the natural regime. The ecological character of many wetlands has adapted to past alterations of the water regime, yet they still provide important goods and services. A key step in any wetland conservation strategy is to define the desired ecological character of the most important wetlands. In any water allocation decision, it is then necessary to quantify the critical water needs of the wetlands, beyond which their ecological character will change in an unacceptable manner.
6. The following principles and guidelines aim to support improved allocation of water to wetlands so that they receive adequate water for maintaining the provision of their goods and services. The text is in two parts: 1) basic principles; and 2) guidelines for their operationalisation. The guidelines are further divided into four areas: a) decision-making, including policy and legislation; b) the process for determining water allocations; c) scientific tools and methods; and d) implementation.

Principles

7. Through the Dublin Principles adopted by the 1992 Dublin International Conference on Water and the Environment, the international community has, at the highest political level, affirmed the notion that water is an integral part of ecosystems, and that it is a social and economic good whose quantity and quality should determine the nature of its utilization.
8. In recent years the concept of integrated water resources management (IWRM) has come to the fore as a strategy to implement the Dublin Principles. IWRM is defined as “a process that promotes the coordinated development and management of water, land and related resources, in order to maximise the resultant economic and social welfare in an equitable manner, without compromising the sustainability of vital ecosystems”.² A key element of IWRM is that river basins (also referred to as catchments or watersheds) are usually the most appropriate physical entity on which to plan the management of water. Given the important hydrological and ecological functions of wetlands, it is essential that they be explicitly incorporated into river basin management.³
9. To ensure consistency with the international development agenda, the following seven guiding principles have been defined not only through analysis of previous policy documents of the Convention on Wetlands, but also by reference to principles developed by other international organizations and initiatives.
10. The principles are:

10.1 **Sustainability as a goal.** Adequate water has to be provided to wetlands to sustain the functioning of these ecosystems, respecting their natural dynamics for the benefit of future generations. Where water requirements are not known, or where the impact of

¹ The Conference of the Parties of the Ramsar Convention has defined *ecological character* as “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).

² Global Water Partnership 2000. *Towards water security: a framework for action*. GWP, Stockholm, Sweden.

³ See Ramsar Wise Use Handbook 4, *Integrating wetland conservation and wise use into river basin management*.

reducing water allocation to wetlands is unclear, the precautionary approach⁴ should be applied. The wetland ecosystem is the resource base from which water is derived. It should be managed to protect the resource base in order to provide goods and services in a sustainable manner. This requires sufficient water allocation to maintain wetland ecosystem structure and function. This is directly compatible with the “wise use” concept embodied in the Ramsar Convention, which has been defined by the Conference of the Parties as “the sustainable utilisation of wetlands for the benefit of mankind in a way compatible with the maintenance of the natural properties of the ecosystem”.

10.2 Clarity of process. The process by which decisions are made on the allocation of water should be clear to all stakeholders. Water allocation has often been a contentious issue and this is likely to increase in future as competing demands rise and available water resources may diminish due, *inter alia*, to climatic change. In many cases stakeholders have not understood why a particular allocation decision was made, leading to suspicion and mistrust of decision-makers. Whilst it will not be possible to please all stakeholders in any water allocation decision, by ensuring a transparent process in the decision-making the outcome can often be less contentious and more acceptable.

10.3 Equity in participation and decision-making factors. There should be equity for different stakeholders in their participation in water allocation decisions. There should also be equity in the factors that are considered in decision-making, including the functions, products and attributes of wetlands. Decision-making is often a complex process requiring consideration of many factors and competing demands. Some water users may feel that their requirements have been given less weight than others. Whilst weightings may be applied to different demands for legal or policy reasons, no demand should be ignored. In any decision, ecological and social issues should be considered equally with economic considerations.

10.4 Credibility of science. Scientific methods used to support water allocation decisions should be credible and supported by review from the scientific community. Science must be based on appropriate hydrological and ecological data, including adequate baseline ecosystem records. The best available knowledge and science should be employed, which should be updated as better knowledge becomes available from research and monitoring. However, lack of perfect knowledge should not be used as an excuse for inaction. The precautionary approach⁴ should be applied.

10.5 Transparency in implementation. Once procedures for water allocation decisions have been defined and agreed, it is important that they be seen to be implemented correctly. This requires a transparent implementation processes, so that all interested parties can follow the choices made at each step, have access to information on which they are based, and recognize agreed procedures.

10.6 Flexibility of management. Like many ecosystems, wetlands are characterized by complexity, changing conditions, and uncertainty. It is essential that an adaptive

⁴ The precautionary approach, as set out in Principle 15 of the 1992 Rio Declaration, states that: “In order to protect the environment, the precautionary approach shall be widely applied by States according to their capabilities. Where there are threats of serious or irreversible damage, lack of full scientific certainty shall not be used as a reason for postponing cost-effective measures to prevent environmental degradation.”

management strategy be adopted, which requires plans that can be changed as new information or understanding comes to light.

10.7 Accountability for decisions. Decision-makers should be accountable. If agreed procedures are not followed or subjective decisions can be shown to be contrary to the spirit of the above principles, decision-makers should provide a full explanation. Stakeholders should have recourse to an independent body if they feel that procedures have not been followed.

Operationalising the principles

11. The guidelines that follow provide for specific actions that should be undertaken to operationalise the seven guiding principles set out above. They are presented in four sections – a) the decision-making framework, including policy and legislation; b) the process for determining water allocations; c) scientific tools and methods; and d) implementation. Further supporting information can be found in the Ramsar Wise Use Handbooks.

The decision-making framework

12. In order to make decisions on water allocations for wetland ecosystems, an enabling policy environment is required⁵, supported by adequate and appropriate legal tools⁶, which clarify the legal status of water and water allocations, and by a framework for assessing the merits of different allocation options (Box A).
13. Economic valuation provides a potential decision-support framework, as indicated in Resolution VI.23 and Operational Objective 2 in Section II of the Convention's Strategic Plan 2003-2008⁷ (Box B). It should be noted, however, that there are various forms of economic valuation: the multi-criteria analysis is recommended for application to water allocation issues because it permits evaluation of ecological and social, as well as economic, criteria.
14. In addition, in order to ensure that water allocation issues are addressed within wetland policy development legislation and economic valuation frameworks, there is a need to build public awareness of the value of ecosystem services and ecosystem health⁸. In this way, policies, legislation, and decisions that support the allocation of water to wetlands will be better understood and more readily accepted.
15. A key element in water allocation is the involvement of stakeholders in the decision-making process. This involvement should include establishing a forum, such as a working group, to enable interaction and conflict resolution. The implementing agency needs to establish a multi-disciplinary team and to open an information centre that holds all reports and data with open access.

⁵ See Ramsar Wise Use Handbook 2, *Developing and implementing national wetland policies*.

⁶ See Ramsar Wise Use Handbook 3, *Reviewing laws and institutions to promote the conservation and wise use of wetlands*.

⁷ See also Barbier, E.B., Acreman, M.C., and Knowler, D. 1996. *Economic valuation of wetlands: a guide for policy makers and planners*. Ramsar Convention Bureau, Gland, Switzerland.

⁸ See Ramsar Wise Use Handbook 6, *Promoting the conservation and wise use of wetlands through communication, education and public awareness - the Outreach Programme of the Convention on Wetlands* and Resolution VIII.31 on this subject.

16. Through stakeholder participation the various water uses and users within the catchment should be defined along with the objectives for water allocation, which should include the desired ecological character of wetlands. Objectives for water allocations to wetlands may be primarily ecological or may be related to wise use practices, such as fishing or livestock grazing. Management problems should be phrased in quantifiable terms⁹.

Box A: Guidelines related to policy and legislation on water allocations for wetland ecosystems

Taking cognizance of the *Guidelines for developing and implementing National Wetlands Policies*, adopted by Resolution VII.6, the *Guidelines for reviewing laws and institutions to promote the conservation and wise use of wetlands*, adopted by Resolution VII.7, and the *Guidelines for establishing and strengthening local communities' and indigenous people's participation in the management of wetlands*, adopted by Resolution VII.8:

A1. Review water policy and legislation in order to establish clearly the legal status and priority of water allocations for wetland ecosystems in relation to water allocations for other uses.

A.2 Harmonize environmental and water policy and legislation to ensure consistency with regard to the principles and approach to determination of water allocations for wetland ecosystems.

A.3 Clearly identify, in policy and legislation, the responsibilities of different ministries and resource management agencies in the determination and implementation of water allocations for wetland ecosystems.

A.4 Research and document customary law and practices relating to water resource management in order to incorporate these, where appropriate, into formal decision-making processes for managing water allocations to wetland ecosystems.

A.5 Establish minimum standards to be applied to new and existing water infrastructure to minimise environmental impacts including, *inter alia*, capacity to release environmental water allocations, thermal pollution mitigation devices, and fish passage.

Box B: Guidelines related to valuation of wetland ecosystems

B.1 Create awareness about the values of the goods and services provided by wetland ecosystems, and incorporate the valuation of these goods and services into water resources planning.

B.2 Define a framework, such as multi-criteria analysis, that allows evaluation of all social, cultural and ecological values of wetlands, as well as economic values.

B.3 Develop economic tools to enable evaluation of the use of water to support wetland ecosystem services, for comparison with the value of alternative uses such as industrial and public supply, intensive irrigation and power generation.

The process for determining water allocations

⁹ See *New Guidelines for management planning for Ramsar sites and other wetlands*, Resolution VIII.14.

17. Once the frameworks related to policy, legislation and decision-making have been established, a process for determining water allocations should be defined, encompassing the concepts outlined in the guidance above.
18. Clearly stated and measurable goals and objectives should be defined, and explicit outcomes identified. All wetlands that may be affected by allocation decisions should be identified and the goods and services they provide should be determined, as part of the definition of their ecological character. Potential steps in this process are outlined in Box C.

Box C: A sample process for determining water allocation

- C.1 Establish roles and responsibilities of stakeholders.
- C.2 Set up an inter-disciplinary team.
- C.3 Create a forum for stakeholder interaction.
- C.4 Establish a forum for interaction and conflict resolution.
- C.5 Establish an information centre with open access to data.
- C.6 Define management objectives for water allocation, including the desired ecological character of wetlands.¹⁰
- C.7 Identify the wetlands that may be affected by allocation decisions and determine the goods and services they provide (which will be part of their ecological character).
- C.8 Establish wetland monitoring (if not already in place) and collect sufficient data.
- C.9 Define water needs of wetlands and evaluate the goods and services they provide.
- C.10 Make decisions supported by the knowledge of the benefits of water allocation to wetlands.
- C.11 Define water allocation, implement and monitor.

19. Tools should be developed to define the water needs of wetlands, the goods and services they provide, and to evaluate their benefits to society. Tools are only as good as the data upon which they are based, so it is essential to establish adequate monitoring of the hydrology and ecology of the wetlands, if this is not already in place.
20. When planning the water requirements of a wetland, historical patterns of flow, groundwater fluxes, and rainfall, and their inter-annual variability, should be examined closely to determine their role in sustaining native biota/habitats. This information is essential if wetlands are to be considered appropriately in water allocation decisions. Planning should also consider 'dry' periods when wetlands should naturally receive low or no water flows. The quality of water required to maintain the ecology of wetlands, including the appropriate temperature of water released from dams, should also be identified.
21. When the decisions have been made and implemented, wetlands should be monitored to record any decline or loss of goods and services. If such a decline or loss is detected, remedial measures should be taken, where feasible.
22. In catchments with existing dams, or where dams are planned, explicit consideration should be given to changes in the priority of water uses and the provision of environmental flow releases to meet specific downstream ecosystem and livelihood

¹⁰ See Ramsar Handbook 8.

requirements. In some cases “managed flood releases” designed to overtop river banks and supply floodplain wetlands and/or coastal deltas may be necessary.

Box D: Guidelines related to environmental flow assessment downstream of dams

D.1 Make use, as appropriate, of available guidelines and information (including information contained in the report of the World Commission on Dams) on incorporating social, environmental (including biological diversity), technical, economic, and financial issues in the processes of decision-making for water and energy development and management of water allocations for wetland ecosystems.

D.2 Encourage the determination of water allocations for wetland ecosystems as an integral part of the impact assessment process for water resource projects.¹¹

D.3 Encourage launching baseline ecosystem assessments for water resources where projects are currently in the planning phase in order to ensure that the necessary basic data will be available to support the environmental impact assessment process, the determination of water allocations for wetland ecosystems, and the development of effective mitigation measures when necessary.

Tools and methods

23. Three types of tools are required:

- a) tools to achieve stakeholder participation in the definition of the desired status of wetlands and their acceptance of the process for water allocation;
- b) physical-biological scientific tools capable of quantifying the goods and services provided by wetlands, as well as of predicting the impacts of changes in water availability on these goods and services; and
- c) tools to evaluate the benefits derived by societies from the goods and services provided by wetlands.

24. Whilst some generic tools may be available, these may need to be developed further or adapted to local requirements. A range of tools is likely to be needed to cope with different resolutions (temporal and spatial) and different levels of expectations.

25. For allocation issues where impacts are likely to be low, rapid and simple methods can be adopted. In addition, it may be acceptable to transfer knowledge from other wetlands, including water requirements of species. However, for contentious issues that need to stand up to detailed scrutiny (such as at a public inquiry) more detailed tools, such as hydro-ecological response models, may be required. This situation will also need more detailed data to be collected from the wetlands that may be impacted.

26. Each tool will need to be tested for its performance and applicability in a range of local case studies. The applications of tools to water allocation cases should also be monitored

¹¹ See also Resolution VIII.9, “*Guidelines for incorporating biodiversity-related issues into environmental impact assessment legislation and/or processes and in strategic environmental assessment*” adopted by the Convention on Biological Diversity (CBD), and their relevance to Ramsar.

in order to refine and improve the methods. In many cases, basic research will be necessary to establish the preferences and tolerances of local species.

Box E: Guidelines related to determination of water allocations for a particular wetland ecosystem

E.1 Undertake studies to identify the habitat preferences (hydraulic, physico-chemical and geomorphological) of representative indigenous species at key life stages, and their tolerances of changes in habitat.

E.2 Undertake baseline surveys in wetland ecosystems where water allocations are to be determined, in order to establish their ecological character, hydrological conditions (natural and present-day), water quality conditions (background and present-day), and geomorphological conditions.

E.3 Design and implement appropriate ecological and hydrological monitoring programmes to establish whether water allocations for wetland ecosystems are being delivered and whether they are having the desired ecological effects.

E.4 Identify wetland ecosystems which require a high level of protection (including those listed or proposed for listing as Wetlands of International Importance) or which are linked ecologically or hydrologically to Ramsar sites, and determine and implement water allocations for these ecosystems as a matter of priority.

E.5 Develop or adapt locally applicable tools and test their applicability.

E.6 Monitor application of tools and refine them as appropriate.

Implementation

27. A long-term strategy or plan should be established to manage water demand so as to achieve water allocations for ecosystems. Water allocations may be achieved in a variety of ways, including flow releases from reservoirs or restrictions to abstraction. In some cases, pumping from groundwater may also be used to augment stream flow. Groundwater extractions to supplement stream flows to wetlands should only be supported where such extraction does not significantly impact on other water-dependent ecosystems and their values.
28. Flows should normally follow the natural regime as closely as possible to maintain the natural ecology. This may be achieved by relating the magnitude, duration and timing of releases or abstractions to flows in nearby unregulated reference catchments, which will require real-time monitoring. Special abstraction/release rules should be defined for droughts, floods, and emergency situations. In cases where the dominant use of the wetland is farming (e.g., flood recession agriculture), flows may be tailored for specific requirements such as following the planting of rice on the floodplain.
29. Effective communication mechanisms should be established with all stakeholders for exchange of real-time information about releases and flow patterns.

30. Management of water quality also needs to follow natural processes and mechanisms as far as possible. Water quality varies naturally according to the source and anthropogenic impacts, such as discharges. Water released from a reservoir may be of different quality to that of the natural river (e.g., colder and lower in oxygen), so outlet structures should be designed to reduce such impacts.
31. It is important to monitor compliance with water allocations and to ensure appropriate actions and responses. Where necessary, management strategies should be adapted in the light of monitoring and evaluation.

Box F: Guidelines related to implementing water allocations to wetlands

F.1 Establish a long-term strategy or plan to manage water demand so as to achieve water allocations for wetland ecosystems.

F.2 Allocate water as closely as possible to the natural regime (of both wetter and drier periods), using natural cues from reference catchments or to meet specific use requirements.

F.3 Establish operating rules for droughts, floods, and emergency situations when rapid decisions may need to be made.

F.4 Establish how existing infrastructure can be modified so as to release appropriate water allocations and water of appropriate quality, and ensure that new infrastructure meets this requirement.

F.5 Disseminate real-time information about releases/flow patterns to stakeholders.

F.6 Monitor compliance with water allocations and ensure appropriate actions/responses.

F.7 Adapt management strategies in the light of monitoring and evaluation.

Conclusions

32. Wetland ecosystems are an integral component of the global water cycle from which water resources are derived. Allocating sufficient water to conserve wetlands provides important water resource benefits to people, including products (such as fisheries) and services (such as flood reduction).
33. To conserve wetlands, national policies, legal instruments, and a decision-making framework should be developed in order to promote the allocation of water to wetlands. Additionally, a decision-making process needs to be defined that establishes the desired ecological character of wetlands, which includes the goods and services they provide and the aspiration to conserve this character.
34. The following diagram summarizes the elements of the recommended overall process for the allocation and management of water for maintaining wetland ecosystem functions.

