

**The Ramsar Convention on Wetlands Resolution IX.4 Annex:
The Ramsar Convention and
Conservation, Production and Sustainable Use of Fisheries
Resources**

**From the 9th Meeting of the Conference of the Contracting Parties to
the Convention on Wetlands (Ramsar, Iran, 1971)
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To

Faculty Advisor Professor Robert Cook

Prepared by:

Aimee Barnes, Whitney Blake, Emily Capello,
Matthew Ebright, Emily Gaskin, Lauren Kell,
Flora Lee, Sean Mandel, Helen Morris,
Rebecca Smith, and Megan Stouffer



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Table of Contents

Acknowledgements	i
Executive Summary	1
Introduction	3
I. Wetland Services and Functions	3
II. The Environmental Problem Affecting Wetlands and the Science Behind It	4
A. Causes of Wetland Destruction.....	4
1. <i>Public Perception</i>	5
2. <i>Urban/Suburban Development</i>	6
3. <i>Agriculture</i>	6
4. <i>Aquaculture</i>	7
B. Implications of Wetland Degradation, Destruction, and Loss	8
1. <i>Decreased Fish and Waterfowl Populations</i>	8
2. <i>Loss of Storm Barrier Protection from Tropical Storms and Hurricanes</i>	8
3. <i>Loss of Pollutant Filtration Capabilities</i>	9
C. Why Action is Needed	10
III. International Response to Wetland Degradation and Destruction	11
A. The History of the Ramsar Convention	11
B. “Wetlands and water: supporting life, sustaining livelihoods”: COP 9	11
C. Resolution IX.4 Conservation, Production and Sustainable Use of Fisheries and Resources	12
IV. International Agreements and Ramsar in the United States	12
A. International Agreements vs. Legislation	12
B. Ramsar in the US.....	13
C. The International Response to Wetland Degradation and Destruction: Wise Use and Sustainable Fisheries.....	13
1. <i>The Concept Behind Wise Use</i>	13
2. <i>Wise Use and Resolution IX.4</i>	15
3. <i>Scientific Data and Resolution IX.4</i>	17
V. Scientific Issues or Controversies Related to the Problem or Solutions Addressed by The Ramsar Convention on Wetlands: Resolution IX. 4 Annex	19
A. Wetland Definitions	19
B. Mitigated Wetlands and Quality vs. Quantity	20
C. Cross-Border Resource Management.....	21
VI. Measuring the Program’s Success	21
Conclusion	23
REFERENCES	i
APPENDICES	
APPENDIX I. COP 9 Resolution IX.4 and Annex	I
APPENDIX II. Wetland functions, the associated economically valuable goods and services and the names of variables that capture the presence of these in the data.	XIII
APPENDIX III. Ramsar Sites in the United States	XIV
APPENDIX IV. A Sampling of Current US Federal Legislation Promoting the Conservation of Wetlands	XV
APPENDIX V. Abbreviations of Agency Names.	XVI

APPENDIX VI. The application of guidelines in the Ramsar "Toolkit" of Wise Use Handbooks, supported by Ramsar Technical Reports, to different intervention opportunities in the MA's Conceptual Framework.XVII

APPENDIX VII. Handbook 11.XVIII

APPENDIX VIII. U.S. National Ramsar Committee Strategic Plan 2006-07.....XX

Executive Summary

Wetland ecosystems both in the United States and worldwide have been threatened with destruction primarily through urban and suburban development, agriculture, and aquaculture. As populations grow, communities require larger footprints, land is drained to grow more crops, and delicate wetlands are used for fisheries. In the U.S. alone, wetlands have declined from 89 to 42 million hectares between 1780 and 1980, a loss of more than 50%.

Amid growing concern over the worldwide loss of wetlands, the Ramsar Convention on Wetlands, an intergovernmental treaty, was adopted in Ramsar, Iran on February 2, 1975. The first international treaty devoted to the conservation of a specific ecosystem type, the Ramsar Convention offers governments a framework for the wise, sustainable use and management of wetland resources. The U.S. adopted the treaty in 1986 and named the Izembek National Wildlife Refuge in Alaska as the first US Ramsar site of international importance. Today, there are 22 Ramsar sites in the U.S.

In November, 2005 in Kampala, Uganda, the ninth conference of member parties passed Resolution IX.4-Annex: Issues and Recommendations for Contracting Parties Concerning the Management of Sustainable Fisheries in Ramsar Sites and Other Wetlands (COP 9). This resolution addresses the sustainable management of wetland ecosystems for fisheries and the need for increased international cooperation and improvements to information on the status of fisheries in Ramsar sites.

Once regarded as wastelands, wetlands are now understood to be vital ecosystems that provide a range of important functions for humans, fish, and wildlife. Wetlands have high biological productivity, provide habitat for fish and wildlife, store storm and flood energy and water, and improve water quality by filtering pollutants. The economic value of these services is difficult to estimate due to the great variety of wetland types and specific functions, but in 1997, the Environmental Protection Agency (EPA) estimated that \$79 billion was generated from the harvesting of fish dependent on wetland habitat and in 2001, the US Fish & Wildlife Service estimated that \$108 billion was generated from ecotourism in wetland areas.

While the Ramsar Convention definition of a wetland includes over 42 types, such as bogs, marshes, coral reefs, and salt pans, the EPA definition is more rigid and does not offer protection under the Clean Water Act for wetlands not connected to navigable waterways. Though the U.S. has adopted a 'no net loss' management approach to wetlands and there are several pieces of legislation that do protect wetlands, controversies in wetland conservation remain. Primarily, there is not agreement on important definitions of terms, such as what constitutes a wetland, what constitutes wise and sustainable use, how the functions of mitigated wetlands compare to those of natural wetlands, and how to manage wetlands that span state and national borders.

COP 9 offers the U.S. several solutions for the management of wetlands, including using the Ramsar definition of "wise use" as a guiding management principle, increasing

cooperation with other Ramsar nations to conserve wetland resources, and greater understanding of existing wetland resources through research and monitoring.

Measuring the success of the implementation of COP 9 and of the Ramsar Convention on Wetlands in general in the U.S. should be done by using quantitative and qualitative indicators of the state of wetland ecosystems, including water-related measurements of nutrient concentrations and trends in biological oxygen demand, and taxon-related measurements of waterbird populations. Only once these indicators have been used to assess wetlands in the U.S. can an assessment of the overall effect of being a Ramsar member on domestic wetlands be evaluated.

Introduction

The Convention on Wetlands, herein the Ramsar Convention, adopted on February 2, 1971 in Ramsar, Iran is an intergovernmental treaty designed to conserve and promote wise use of wetlands. Originally designed to conserve wetlands in order to provide habitat for waterbirds, it has expanded its scope to include all aspects of wetland conservation and wise use. Ramsar currently has 152 contracting parties whose responsibilities include designating at least one wetland for the List of Wetlands of International Importance (the “Ramsar List”), promote the wise use of wetlands in their territory, establish nature reserves in wetlands, regardless of whether they are included in the Ramsar List or not, promote training in wetland research, management, and wardening, and finally consult with other Contracting Parties about the implementation of the Convention.

Representatives of the governments of the Contracting Parties meet every three years as the Conference of the Contracting Parties (COP) and review general trends in the implementation of the Convention as indicated by National Reports and adopt decisions to improve the Convention. COP 9, held in Kampala Uganda, between the 8th and the 15th of November 2005 adopted several resolutions. Resolution IX.4 The Ramsar Convention and Conservation, Production and Sustainable Use of Fisheries Resources identifies 11 key issues, and several solutions to each.

This paper identifies the main causes of degradation and destruction of wetlands, including the scientific reason for this, the primary solutions Resolution IX.4 proposes, controversies that arose from these solutions, and finally methods identified to measure the success of said solutions.

I. Wetland Services and Functions

Wetlands provide myriad services, they offer flood control, erosion control, improve water quality and availability, comprise fish and wildlife habitat, and can be a lucrative natural resource.

Figure 1 shows the intricacy and interconnectedness of wetland habitats, the multiple layers of interactions, and the self perpetuation of these services and values. It also highlights the external values, or services wetlands provide for humans. These services can be economically valuable through sale such as timber harvests or duck hunting, while others are intricate to our overall well being such as carbon sequestration and shoreline protection.

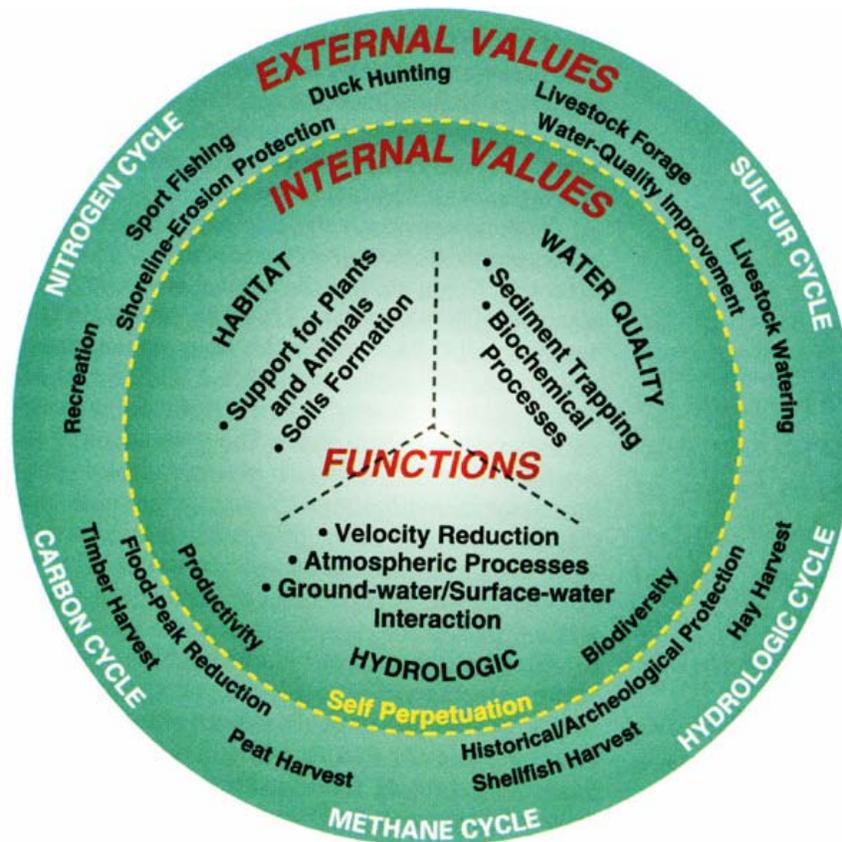


Figure 1 Functions, Internal Values and External Values of wetlands.
<http://www.samford.edu/schools/artsci/biology/wetlands/basics/importance.html>

The complex role that wetlands play in the conservation of fisheries is not entirely understood. Biologists determined that by providing food, protection and spawning ground wetlands are integral to fisheries worldwide. Almost 75% of the United State’s commercial fish and shellfish depend on estuaries at some stage in their development, and these estuaries depend on wetlands to maintain water quality and provide the basic structure for food chains. (NOAA, 2006) Fisheries account for over US\$55 billion in international trade. (Ramsar, 2006) Therefore, the impact of wetland destruction and degradation on such a lucrative business should be of great concern.

II. The Environmental Problem Affecting Wetlands and the Science Behind It

A. Causes of Wetland Destruction

According to the Ramsar Convention on COP 9 Resolution IX.4 Annex: The Ramsar Convention and Conservation, Production and Sustainable Use of Fisheries Resources, “fisheries yields are currently declining due to unsustainable harvest, habitat degradation, and loss of fisheries resources such as spawning and nursery grounds, as well as feeding and refuge areas.” (Ramsar, 2005) In addition, different fisheries techniques and related activities within and adjacent to wetlands, from catch to consumption, may negatively impact other wetland biota such as birds and turtles, which are important headline species

for the overall health of wetlands. (Ramsar, 2005) As proof of this, increasing numbers of aquatic species are being placed on the International Union for the Conservation of Nature and Natural Resources (IUCN) Red List¹. According to the 2000 IUCN Red List, a total of 2,265 aquatic species were listed as threatened. (IUCN, 2002) Mangroves and sea grass beds are also being destroyed, removing spawning grounds and habitats for a variety of fish species, as stated previously. (Ramsar, 2005) In addition, unsustainable aquaculture practices have had a variety of negative impacts on wetland health. (Ramsar, 2005) These problems can, in large part, be traced back to the drivers of degradation and destruction, including public perception, urban and suburban development, and unsustainable agriculture and aquaculture.

1. Public Perception

The past destruction and degradation of wetland habitat has been due, in large part, to differences and errors in public perception. Historically, wetlands were often seen as wasted land, and were often filled in, or “reclaimed,” for the purposes of agriculture, aquaculture, development, and to eradicate pests such as mosquitoes. (Casagrande, 1997) Matthews (1993) describes the “primordial fear of wetlands” by saying that:

“...since time immemorial people had viewed wetlands with apprehension. They were seen as trackless wastes in which the traveler could easily be lost and sucked into bottomless mires. To the superstitious they were the haunts of demons, imagined or made real as strange dancing lights. Dwellers on their margins lived in fear of devastating floods. They were considered to be disease ridden places, their “bad air” blamed for malaria.”
(Matthews, 1993)

It was not until the 1930s that attempts were made in the United States to educate the public on the important values and services that wetlands provide. By this time a great deal of destruction and degradation had already occurred (see Figures 2 and 3), and it took a number of decades before perceptions of wetlands in the U.S. turned around due to education and propaganda drives by the Fish and Wildlife Service. (Matthews, 1993)

¹ Catalogue devised by the IUCN (World Conservation Union) that identifies those species at risk of global extinction. (IUCN, 2006)

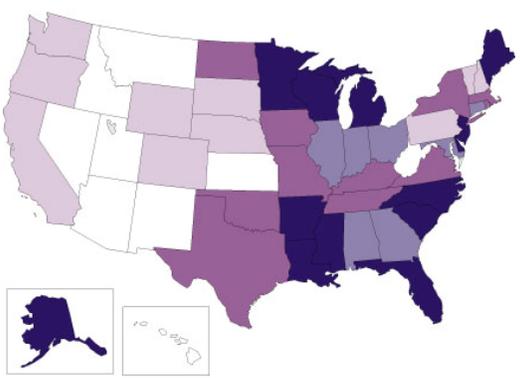
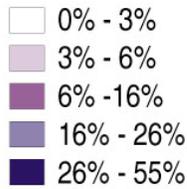


Figure 2. Surface-area percentage of wetlands in each state: 1780's. (Dahl 1990)

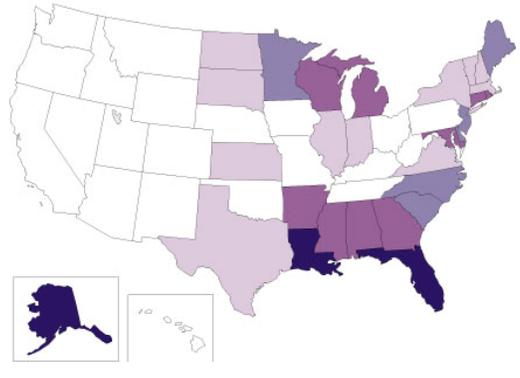
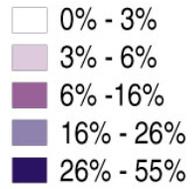


Figure 3. Surface-area percentage of wetlands in each state: 1980's. (Dahl 1990)

2. Urban/Suburban Development

Urban and suburban development has often led to the “reclamation” of land for development, in other words, the filling of wetlands for other uses. Reclamation has been the largest source of wetland loss in recent years: from 1998-2004 there was a 61% of total loss (U.S. Fish & Wildlife Service), with the most affected areas being the Gulf Coast, Chesapeake Bay, and the San Francisco Bay. Runoff from development into wetlands has also been an important problem. As urban/suburban development creeps closer to wetlands, this leads to encroachment on wetlands and more frequent human use of wetlands for recreation as well as more conflicting uses. (Pinter, 2005) Development causes habitat fragmentation and also results in the creation of barriers to redirect water from wetlands in order to provide water sources for humans. This may cause the quality of a wetland to change, or may potentially dry it out completely.

3. Agriculture

Historically (Heimlich, et al., 1999) the greatest drivers of wetland loss and degradation were: 1) conversion of wetlands for agricultural purposes, 2) diversion of water from wetlands for irrigation, and 3) pollution from pesticides, herbicides, fertilizers. Since 1954, 8.1 million acres of wetlands have been lost due to agriculture. (Heimlich, et al., 1999)

Habitat degradation of wetlands has also occurred because fertile soil makes wetlands attractive for conversion of land for agriculture, leading to diversions of water and/or draining wetlands for cultivation. (Heimlich, 1994) Agricultural uses accounted for approximately 87% of the 13.8 million wetland acres converted for human use between the 1950s-1970s, with an average loss of 458,000 wetland acres per year. (Heimlich, 1994; Frayer et al., 1983) This situation has improved substantially since the 1970s, as wetland conversion for agriculture has dropped to approximately 110,000 acres per year,

in large part due to protective policies and economic conditions. (Heimlich, 1994; USDA, 1992)

Because agriculture is often sited on or near wetlands, water sources that feed wetlands have historically been diverted for irrigation. Wetlands have been lost both by draining and direct conversion to agricultural land, as well as by water removal from rivers and streams for use in agricultural irrigation which has robbed wetlands of their inflow and caused them to dry up. (Lemly, 1994) In the early 1980's a new agriculture-related threat to wetlands emerged - subsurface irrigation drainage. This drainage water usually contains elevated concentrations of soil trace elements and other constituents, and has poisoned fish and wildlife populations at several wetland locations (Ohlendorf 1989, Presser *et al.* 1994, Lemly *et al.* 1993).

Pollution also occurs as a result of agriculture, for example, from pesticide, herbicide, and fertilizer runoff. The EPA 2000 *National Water Quality Inventory*, reported that agricultural non-point source (NPS) pollution is the second largest source of impairments to wetlands. (EPA, 2000) Agricultural activities that cause NPS pollution of wetlands include poorly located or managed animal feeding operations; overgrazing; plowing too often or at the wrong time; and improper, excessive, or poorly timed application of pesticides, irrigation water, and fertilizer. (EPA, 2000)

4. Aquaculture

Ecologically unsound aquaculture is also a huge cause of wetland degradation. Aquaculture leads to nutrient, hormone, and antibiotic loading of wetlands, and brings the introduction of alien species to wetland environments, which are often able to out-compete local species. Aquaculture is a \$9.8 million dollar industry in the U.S. (Heimlich, 1999)

The biggest environmental impacts of aquaculture have primarily been associated with high-input/high-output intensive systems, such as the cultivation of salmonids in raceways and cages. These intense forms of aquaculture lead to the discharge of suspended solids and nutrients causing a build-up of anoxic² sediments, changes in benthic³ communities as faunal and floral communities are impacted, and the eutrophication⁴ of wetlands. (UN, 2006) Large-scale shrimp culture has resulted in physical degradation of coastal wetland habitats, for example, through conversion of mangrove forests and wetland destruction, salinization of agricultural and drinking water supplies, and land subsidence due to groundwater abstraction. However, misapplication of husbandry and disease management chemicals, collection of seed from the wild, and use of fishery resources as feed inputs are also causing concern. (UN, 2006) Mollusk culture has been held responsible for local anoxia of bottom sediments and increased siltation. (UN, 2006)

² Oxygen depleted.

³ Relating to the ocean bottom.

⁴ The over-enrichment of a water body with nutrients, resulting in excessive growth of organisms and depletion of oxygen concentration.

Aquaculture is the principle reason for the introduction of freshwater fish and experience has shown that the introduced species will eventually enter the natural ecosystem, either through purposeful release or accidental escape. (UN, 2006) Thus, non-native species can adversely impact local resources through hybridization and loss of native stocks, predation and competition, transmission of disease, and changes in habitat by means of burrowing, plant removal, sediment mobilization and turbidity. (UN, 2006)

The pressure to use resources more efficiently in order to increase competitiveness and to respond to market forces results in trends toward intensification of aquaculture production in some areas. These are associated with more sophisticated farm management techniques, a shift to monoculture of high-value species, and the targeting of more affluent consumers. There is an increased risk that such trends of intensification will increase environmental impacts if associated with inappropriate planning and management, in particular, the inefficient use of resources and inputs such as equipment and chemicals. (UN, 2006)

B. Implications of Wetland Degradation, Destruction, and Loss

1. Decreased Fish and Waterfowl Populations

Loss of wetlands leads to reductions in native commercial and non-commercial fish and waterfowl populations. This is due to the fact that fish use wetlands as habitat, for reproduction, and as a refuge while infants and juveniles. On a global scale, a positive relationship has long been recognized between the extent of coastal wetlands and fishery landings (Turner 1977; in Minello 1991). On a smaller scale, such as in the case of the Southeast shelf of the United States coastal ecosystem, most fishery species spend part of their life cycle in estuaries, where there appears to be an important linkage between coastal wetlands and fishery productivity. (Minello, 1991) These patterns indicate that wetlands provide important nursery functions. Indeed, other research has shown that wetland habitats provide young fishery species with both an abundant source of food to support rapid growth and also protective cover to reduce mortality from predators (Boesch and Turner 1984; Kenworthy et al. 1988; Minello et al. 1989; Minello and Zimmerman 1991).

Because of the linkages between wetlands and fishery production, it is expected that dramatic declines in estuarine-dependent fisheries will occur as wetland based marsh habitats are lost. Continued wetland loss will overcome any short-term fisheries benefits of habitat degradation and result in future declines in fishery production dependent on these coastal wetlands. (Minello, 1991) In addition, waterfowl and fisheries transcend international boundaries. Therefore, degradation and loss of wetlands in other countries such as Canada and Mexico could potentially lead to decreased waterfowl and fish populations in the United States as well.

2. Loss of Storm Barrier Protection from Tropical Storms and Hurricanes

Loss of wetlands leads to losses in storm barrier protection from tropical storms and hurricanes. Wetlands decrease storm surge through friction and absorption. On average, one foot of storm surge can be absorbed for ever 1-2.7 miles of wetlands. (Van Heerden,

2004) In addition, wetlands store stormwater and subsequently use filtered stormwater to replenish groundwater. Wetlands also decrease wave heights by causing waves to touch the bottom earlier and break. Studies have concluded that more than half of normal wave energy is dissipated within the first 3 meters of encountering marsh vegetation such as cord-grass. (Van Heerden, 2004) In addition, wetlands decrease erosion by lowering water velocities and binding soils. Wetlands destruction and subsequent shoreline erosion have led to the degradation of these important services. Nowhere is the example of the implications of wetlands loss stronger than in Louisiana. Louisiana wetlands are being lost at rate of 20,000 to 25,000 acres per year, and whereas the Mississippi River's wetlands once stored 60 days of floodwater, they now only store 12 days of floodwater because most have been filled, levied, or drained. (Van Heerden, 2004) The disaster which resulted from Hurricanes Rita and Katrina in 2005 is a strong indicator of the impact that wetlands loss can have. Loss of storm barrier protection can also result in the destruction of fisheries infrastructure, such as fishing boats, transportation systems, and fishing equipment. Loss of wetlands, on a more minor level, can also lead to increased risk of flash floods.

3. Loss of Pollutant Filtration Capabilities

As mentioned above, a large amount of pollutants are released into wetlands through urban and suburban development, agriculture, and aquaculture. This accumulation of pollutants can cause wetlands to reach their carrying capacity to filter pollutants. (Ramsar, 2005) Excess nutrients from sewage, soaps and detergents, and agricultural runoff, primarily nitrogen (N), phosphorous (P), and potassium (K) can cause nutrient loading, which leads to eutrophication. (Elliott, 2002) Eutrophication occurs when a water body becomes overly-enriched with nutrients, resulting in excessive growth of algae and other microscopic plant organisms. Subsequent algal blooms result, and when the algae die their decay removes dissolved oxygen, eliminating aerobic organisms such as fish. This may also cause the accumulation of sulphides in the water. (Elliott, 2002)

Sediments from soil erosion can also build up in wetlands. Increased amounts of sediments from soil erosion leads to increased turbidity of a wetland, which results, in turn, in decreased light for photosynthesis and therefore, decreased oxygen availability and sea grasses. This ultimately results in declines in fish populations (see Figure 4). (Elliott, 2002)

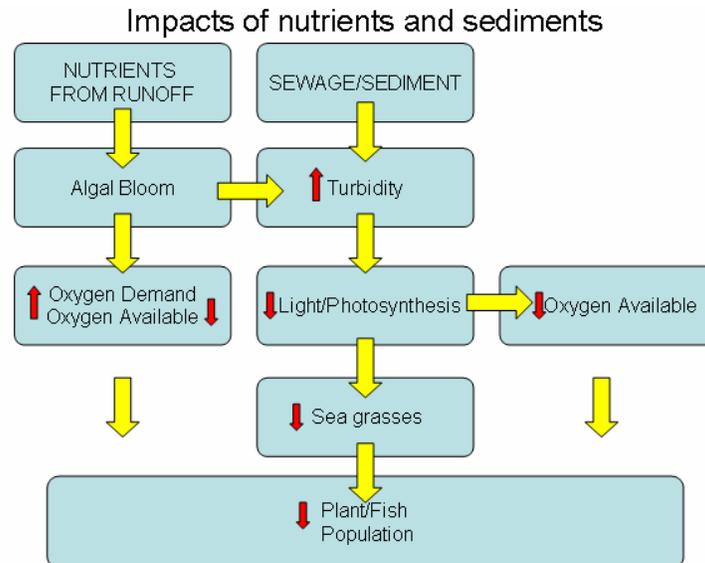


Figure 4. Sediment and nutrient impacts on wetlands.

High levels of toxins such as heavy metals and organic compounds like mercury and PCBs can also be loaded into wetlands via routes such as agriculture, aquaculture, and urban and suburban development, building up and reducing the ability of the wetland to effectively filter them. (EPA, 1993) These toxins can also enter the systems of wetland species via bioaccumulation, whereby accumulation of a toxin results from the consumption of species lower on the trophic level containing toxins in their tissue. This can have a great negative impact on fisheries species, since bioaccumulation of toxins can make species unfit for human consumption, and can also cause declines in fish populations. (EPA, 1993)

Wetlands often fill with trash. In which wetland species become tangled, or which they may ingest. In addition, wetland species may be disturbed by anthropogenic noise, which can interrupt feeding, mating, resting, and other necessary activities. (Ramsar, 2005) Overall, improperly managed wetlands cannot effectively filter pollutants, which leads to decreased water quality of wetlands. This, in turn, causes declines in native fish and waterfowl populations, and oftentimes, the eutrophication of water.

C. Why Action is Needed

The loss of biodiversity occurring as a result of wetlands degradation and destruction is potentially irreplaceable. The degradation of wetlands results in lost ecosystem services which are expensive to artificially recreate. In 1997 \$79 billion was generated from US fishing, \$108 billion was generated from US ecotourism in 2001, and the 1997 worldwide estimated value of wetlands was \$14.9 trillion. (Ramsar, 2001) In addition, the loss of storm barrier protection, shoreline erosion, and increased risk of flash floods will lead to more damage to human health and property if no action is taken. Furthermore, degradation of wetlands could have negative impacts for aquaculture and agriculture which depend on wetland sustainability.

III. International Response to Wetland Degradation and Destruction

A. The History of the Ramsar Convention

The Convention on Wetlands, named the Ramsar Convention after the Iranian town where it was signed in 1971, was the first modern multilateral treaty aimed at conserving a natural resource at a global level (Farrier and Tucker, 2000). As of 2006 there were a total of 152 Contracting Parties with over 1600 wetlands classified as “Wetlands of International Importance (Ramsar, 2006).” The Ramsar Convention has as its mission statement "the conservation and wise use of all wetlands through local, regional and national actions and international cooperation, as a contribution towards achieving sustainable development throughout the world". Emphasis is placed on both the wise use of wetlands and sustainable development as the goals in achieving conservation.

The Ramsar Convention uses a broad definition of the types of wetlands covered in its mission statement including “swamps and marshes, lakes and rivers, wet grasslands and peatlands, oases, estuaries, deltas and tidal flats, near-shore marine areas, mangroves and coral reefs, and human-made sites such as fish ponds, rice paddies, reservoirs, and salt pans.” (Ramsar, 2006)

Contracting Parties have several responsibilities. These include designating at least one wetland to the “List of Wetlands of International Important” and ensuring the ecological character of this site. Ramsar encourages the listing of as many sites as fit the criteria and in addition does not require legal status for the site listed. The Contracting Parties should conserve the site through the wise use approach. Other responsibilities are promoting wise use of wetlands including training in wetland research and management. Finally the Parties are expected to consult with other Parties over the implementation of the Convention especially for transfrontier wetlands. (Ramsar, 2006)

Every three years there is a Conference of the Contracting Parties, the most recent of which was held in 2005, which promotes policies and technical guidelines to enhance the effectiveness of the Convention. In addition the Convention collaborates with other environmental global and regional conventions and has Joint Work Plans or similar arrangements with The Framework Convention on Climate Change, the Conventions on Biological Diversity, Combating Desertification, Migratory Species, and World Heritage. It has formally recognized partnerships with Birdlife International, IUCN, Wetlands International, and the World Wide Fund for Nature (WWF.) Such partnerships will be of special note when considering the success of the program. (Ramsar, 2006)

B. “Wetlands and water: supporting life, sustaining livelihoods”: COP 9

The 9th Meeting of the Conference of the Contracting Parties to the Convention on Wetlands (COP 9) was held in Kampala, Uganda from the 8th to the 15th of November 2005. With nearly 1000 participants representing 120 Contracting Parties, COP9 adopted 25 resolutions on a variety of policy, program and budget matters, from additional scientific and technical guidance for the implementation of Ramsar’s wise use concept to

the emergence of avian flu. There were two technical sessions on the wise use of wetlands in integrated water management and culture, and in knowledge in wetland management. (IISD, 2005) The resolution under consideration is Resolution IX.4 The Ramsar Convention and conservation, production and sustainable use of fisheries resources.

C. Resolution IX.4 Conservation, Production and Sustainable Use of Fisheries and Resources

Although Resolution IX.4 contains eleven specific issues, ranging from aquaculture to the coverage of the Ramsar site network for fish, we will consider the sustainable management of wetland ecosystems for fisheries, specifically the “wise use” parameters of wetland use.

The Millennium Ecosystem Assessment (MA) has identified a general decline in the environmental health of most inland and coastal ecosystems cause by impacts of humans uses. Areas of major concern include “the withdrawal of water from inland systems that is affecting the functioning of rivers and the hydrological balance of lakes and coastal waters.” (Res. IX.4, 2005)

The environmental flow assessments of rivers and associated wetlands are threatened by flow-modifying activities and the impacts of this should include specific attention to fisheries resources. In addition, rehabilitation of damaged ecosystems should be explored and formal conservation of fisheries should be considered.

Keeping fisheries in consideration, the “wise use” solution will be considered further, along with the specific requirements for the effective use of this solution.

IV. International Agreements and Ramsar in the United States

A. International Agreements vs. Legislation

Key to an understanding of how Ramsar fits within the framework of the US approach to wetland management is an understanding of how the US defines and upholds international agreements. While the rule of law is easily understood in the United States, the role and function of international agreements can be less clear. Also, in many circumstances the terms treaty and international agreement are used interchangeably.

In the US, legislation passed by a state or federal governing body is law, and as such, it mandates enforceable behavior. Conversely, international agreements can be either prescriptive or binding. Prescriptive agreements suggest behavior while binding agreements mandate it. Under the Constitution, agreements or treaties signed by the executive branch of the federal government must be ratified by the Senate by a two thirds vote before they can be considered in force and binding. During this process, the Senate may also amend the agreement or adopt changes, which may lead to a renegotiation with other signatories. Treaties and agreements signed are not considered active if the Senate

does not ratify the treaty or if the President withdraws it from the Senate before a vote (United States Senate, Chap. 1, 2006).

Treaties that have received Senate consent can be considered the “supreme law of the land” by virtue of the Constitution’s supremacy clause (Article VI, clause 2), but this is only applicable to agreements considered compatible to the Constitution (United Nations, 1966). Furthermore, even though any treaty signed by countries or international bodies is considered under international law to be in force, agreements ratified by the US do not become binding unless there is supporting legislation (United States Senate, Chap. 4, 2006). The exception would be “self-executing” treaties that can operate without the need for complementary legislation.

B. Ramsar in the US

According to Article 9.2 of the Ramsar Convention on Wetlands (Ramsar, Iran, 1971), “Any member of the United Nations or of one of the Specialized Agencies or of the International Atomic Energy Agency or Party to the Statute of the International Court of Justice may become a Party to this Convention.” The Ramsar Convention on Wetlands was ratified by the US Senate on October 9, 1986 and entered into force on December 18, 1986 (US Cong. Senate, 1982). As a member party, the US was bound to nominate a wetland meeting the eight criteria of international importance for inclusion as Ramsar site, and it did so by nominating the Izembek National Wildlife Refuge in Alaska, which became the first US Ramsar site.

When the US became a member of the Ramsar Convention, there were already several existing state and national laws protecting wetland resources so once the agreement was ratified by the Senate, it was considering self-executing. For a list of some of the important wetland legislation in the US, please see Appendix IV.

C. The International Response to Wetland Degradation and Destruction: Wise Use and Sustainable Fisheries

1. The Concept Behind Wise Use

Ramsar identifies wise use of wetlands as one of its main objectives. This is in part because it considers both the ecological character of a wetland and because it integrates sustainable development into the solution to wetland degradation. In January and February 2006 90 members of the development, aid and conservation communities met in St. Lucia, South Africa. They identified sustainable and equitable management of wetlands, inland and coastal, as integral to continued dedication to poverty, hunger, nutrition, health, water and sanitation. (Wetlands International, 2006) The wide acknowledgement of wetlands as integral to development is addressed in the inclusion of wise use as a main concern to the Ramsar Convention.

The terms “wise-use” and “ecological character” were defined by RAMSAR following the adoption of said terms in COP 3 (1987) and COP 7 (1999) respectively. However, during COP 9 both terms underwent review by the Convention’s Scientific and Technical

Review Panel (STRP) to ensure their applicability and consistency with the objectives of sustainable development, in this case of fisheries.

The updated definition of "wise use" as a solution to wetland destruction, takes into consideration multiple variables: the Convention's mission statement, the MA's terminology and framework, the ecosystem approach used by the Convention on Biological Diversity, and lastly a definition of sustainable development adopted by the 1987 Brundtland Commission.⁵ The updated definition of "wise use" is: "the maintenance of their (wetlands) ecological character, achieved through the implementation of ecosystem approaches, within the context of sustainable development." (Annex IV)

In addition, the updated definition of ecological character is: "the combination of the ecosystem components, processes and benefits/services that characterize the wetland at a given point in time." Including the weight of the ecological character in the solution, allows for quality wetlands, not simply quantity. This can be problematic especially within the United States, as the US legislation on wetlands emphasizes no net wetland loss, rather than emphasizing the integrity of the wetland ecosystem. The updated definitions will be used when considering wise use and ecological integrity from herein.

To better implement the "wise-use" policy, the MA developed a Conceptual Framework. The expressed purpose for the framework was to maintain ecosystem services to improve human well-being and reduce poverty through a multi-scalar methodology designed to highlight how and where policy and management interventions would be beneficial. The MA framework draws a connection between "wise use" and the preservation of ecosystem benefits/services, including sustainable use of fisheries, with the ultimate goal of long term biodiversity.

While Figure 5 shows a direct interaction between the four components of the MA framework (Human Well-Being and Poverty Reduction, Ecosystem Services, Indirect Drivers of Change, and Direct Drivers of Change), it is worthy of note that there is no specific guidance for many of these interactions. However, as Kruczek notes, assessment is needed regarding the state of the ecosystem, before the implementation process of the wise use principles. (Kruczek, 2003)

⁵ The Brundtland Report set up the guidelines for sustainable development that are generally used today. The definition they use is as follows: «Sustainable development is development that meets the needs of the present without compromising the ability of future generations to meet their own needs. http://www.are.admin.ch/are/en/nachhaltig/international_uno/unterseite02330/

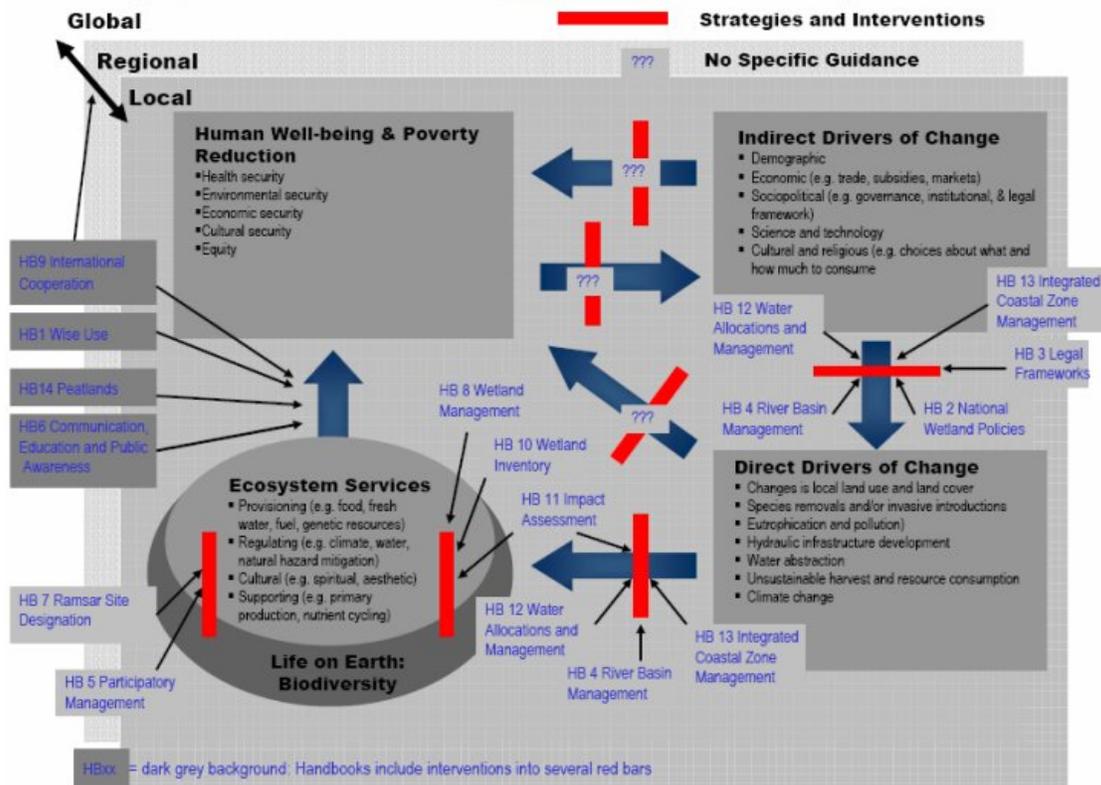


Figure 5. A Conceptual Framework for the Wise Use of Wetlands and the maintenance of their ecological character, and the application of the guidelines in the Ramsar 'toolkit' of Wise Use Handbooks 2nd edition (2004). (From the MA report to the Ramsar Convention: *Ecosystem Services and Human Well-Being: Wetlands & Water: Synthesis*. 2005. World Resources Institute, Washington D.C.)

2. Wise Use and Resolution IX.4

Resolution IX.4, Annex identifies eleven priority areas within sustainable fisheries. These are:

1. Aquaculture
2. Rice Cultivation
3. Management of fisheries
4. Management of the fisheries resources
5. Sustainable management of wetland ecosystems for fisheries
6. Conflicts and multi-purpose use
7. Increasing awareness of the importance of wetlands management for fisheries
8. Enhancing international cooperation
9. Applying existing international agreements
10. The status of fisheries in Ramsar sites
11. Coverage of the Ramsar site network for fish

For each priority area, Ramsar further identifies specific solutions. However, for the purposes of this document, the focus will be on the general themes addressed in the solutions.

Ramsar promotes participatory management at appropriate Ramsar sites. It further encourages this through revision of existing laws that exclude such management techniques. The proposed solutions support research for suitable management at a local, regional and national level. Furthermore, stakeholders should be included when deciding management policies.

Because of the extensive relationship between the health of a wetland and the health of the water source feeding the wetland, the environmental flow assessment of rivers and associated wetlands is encouraged. This would be useful in managing the water bodies and to assess the threats of modifying activities such as the construction of dams, levees, and water abstractions, and such assessment should include specific attention to fisheries resources. Mitigation strategies should be investigated to appease the negative impacts of such modifying activities, and where the impact uses have ceased, rehabilitation of the ecosystem should be considered.

Training programs should be included under the Convention's program on communication, education and public awareness (CEPA) to further understanding of the problems of the multiple sectors involved in wetland management and conservations, including fisheries. Self-motivated initiatives, for example, community outreach, wildlife monitoring, codes of conduct, certification, etc. should be promoted within fishing communities near to and that impact Ramsar sites.

Resolution IX.4 recognizes the number of international agreements and exiting guidance that can help ensure the sustainability of fisheries in or near Ramsar sites and other wetlands. Specifically they mention the *Code of Conduct for Responsible Fisheries* (FAO, 1995). The technical guidelines cover:

1. Fishing operations (1996)
2. Precautionary approach to capture fisheries and species introductions (1996)
3. Integration of fisheries into coastal area management (1996)
4. Fisheries management (1997)
5. Aquaculture development (1997) and supplement 1) Aquaculture development: good aquaculture feed manufacturing practice (2001)
6. Inland Fisheries (1997)
7. Indicators for sustainable development of marine capture fisheries. (1999)
8. Responsible fish utilization. (1998)
9. Implementation of the International Plan of Action to prevent, deter and eliminate illegal, unreported and unregulated fishing (2002)
10. The ecosystem-approach to fisheries. (Ramsar, 2005)

In addition, the information on most fisheries in or affecting Ramsar sites is limited and tends to be qualitative rather than quantitative. What information does exist reaffirms that fisheries are practiced in most Ramsar sites and in some of the larger wetland ecosystems in which Ramsar sites are located. Many Ramsar sites and their systems provide employment fishers, both commercial and subsistence. There is evidence that

fisheries have declined due to habitat modification, unsustainable harvests, and other human activities. To combat this, Ramsar promotes national and regional programs that systematically collect data specific to fisheries at Ramsar sites and associated areas. This data should at the minimum include weight and size of catch, numbers and efforts of fishermen and the social and economic aspects of fishing.

3. Scientific Data and Resolution IX.4

Resolution IX.4 recognizes both the loss of fisheries resources and the growing amount of aquatic species that are recognized in the IUCN Red List as threatened. Furthermore, the resolution takes stock of the role Ramsar sites can play in conservation of some of these endangered aquatic species. The majority of the proposed solutions in Resolution IX.4 consider international policies and management. They also address the lack of sound scientific data on many of the fisheries resources in a large number of wetlands. This lack of information is an integral area lacking for comprehensive management plans.

Resolution IX.4 calls for an assessment of the contribution of Ramsar sites and wetland to the maintenance of fisheries, including information that may be available from the MA along with other assessment programs. The ecological indicators are referred to as measurements of environmental properties that individually or in groups can give pertinent information as to the status or trends of the environment that can be useful scientifically or managerially (Yonder and Smith, 1999). A stated goal of this assessment was to contribute to the WSSD target of maintaining or restoring depleted fishery resources by 2015.

The importance of reliable information about the state of the wetlands and its fish stock for wise use management of these same resources cannot be emphasized enough. Although there are multiple methods the MA recognizes as useful assessment tools, for these purposes we will consider the existing definitions of wetland inventory, assessment and monitoring.

Ramsar has existing definition of inventory, assessment and monitoring that are incorporated into the *Framework for Wetland Inventory* (Resolution VIII.6). These are:

Wetland Inventory: the collection and/or collation of core information for wetland management, including the provision of an information base for specific assessment and monitoring activities.

Wetland Assessment: the identification of the status of, and threats to, wetlands as a basis for the collection of more specific information through monitoring activities.

Wetland Monitoring: the collection of specific information for management purposes in response to hypotheses derived from assessment activities, and the use of these monitoring results for implementing management. The collection of time-series information that is not hypothesis-driven from wetland assessment is here termed surveillance rather than monitoring (refer to Resolution VI.1).

They have also established existing standardized procedures and formats for collecting information on wetland inventory that can be adapted for data specific to fisheries. Figure X. shows the data collecting pyramid.

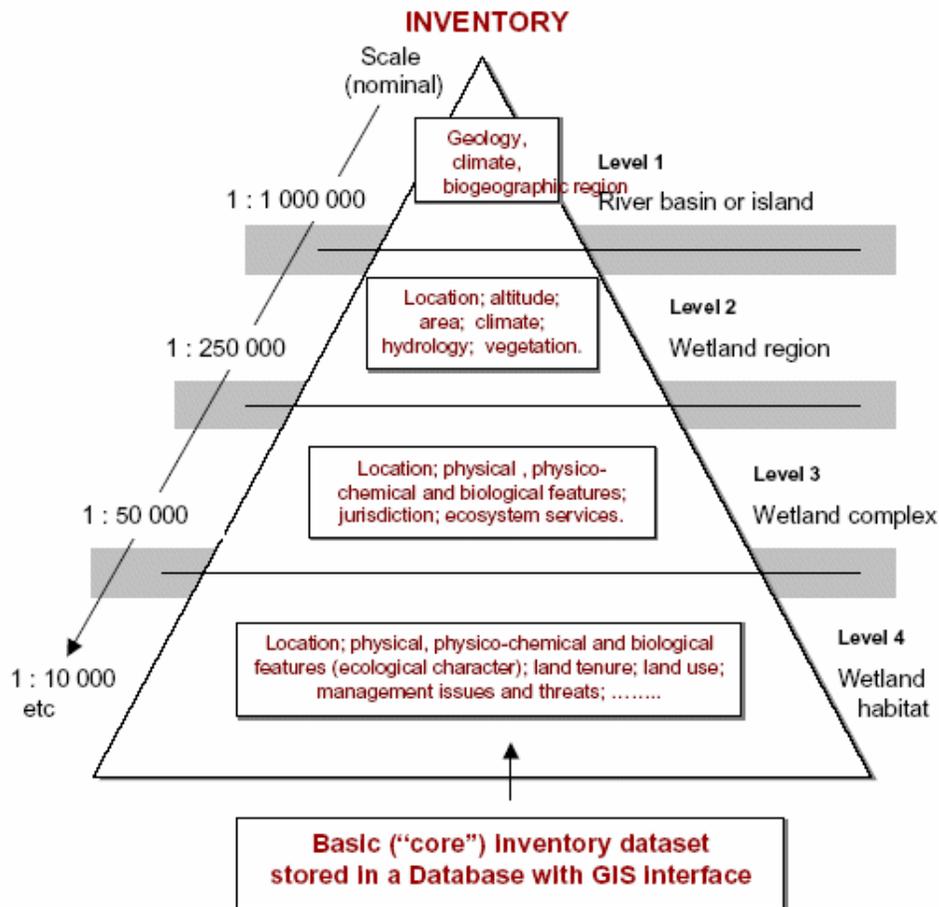


Figure 6. The Data Collection Pyramid.

By assessing and inventorying the wetland species, its location, the quality of the wetland resources, its fisheries, etc. any management decisions would be more appropriate for that particular site. Furthermore, following the pyramid structure above, the information from each micro-region would comprise a part of the greater wetland understanding and could be a part of the overall wetland database that Ramsar envisions. As wetlands are complex ecosystems, these databases of wetland species and their health might be a part of several already existing databases, such as Important Bird Areas, the Convention for Biological Diversity among others. Ramsar already encourages the collaboration with these other entities and could take advantage of their vast databases for better understanding of the Ramsar sites.

The United States has a highly comprehensive database of its wetlands and their resources. Recent updates in technology in remotely sensed imagery, computerized mapping techniques, and modernized data systems have allowed a more detailed and

timely understanding of the wetlands within the contiguous United States. (USGS, 2005) such improvement in data collection, was also able to track change in wetland status when current information is compared to other “collateral data” such as topographic maps, soils information, and historical imagery and studies. (USGS, 2005) The enhancement of the mapping of wetlands has facilitated the United States’ goal of no net loss in wetland status. However, it is important to note, that while it is possible to map wetland area, this does not per say incorporate wetland quality.

Further guidelines for assessment of biological data and quality exist in Handbook 11 of the Wise Use Tool Kit. This assessment quality, incorporates not only the assessment of the wetland ecology, but also places it within the context of an Environmental Impact Assessment procedure. (Ramsar, 2004) The EIA flowchart as highlighted in the Tool Kit, considered the public involvement at all stages of the process of assessment. Furthermore, local knowledge of wetland and their taxa has been acknowledge as a useful source of information and the public, and indeed, Resolution IX.4 Annex encourages the inclusion of community outreach, wildlife monitoring, codes of conduct, certification and educations within fishing communities that are within or adjacent to Ramsar sites. This is increasingly important as anthropogenic impacts on fisheries are ever increasing. (For further information on Handbook 11, see Appendix VII)

Resolution IX.4 Annex, calls for a variety of biological and scientific monitoring, and assessment procedures, along with an international cooperation to ensure efficiency within the management of sustainable fisheries. However, the solutions, as well as the threats to wetlands, are not without conflicts.

V. Scientific Issues or Controversies Related to the Problem or Solutions Addressed by The Ramsar Convention on Wetlands: Resolution IX. 4 Annex

There are currently no serious scientific disputes regarding the ecosystem services and values that wetlands provide in the United States. However, there are controversies surrounding important definitions of wetlands and wetland health, the degree of wetland degradation that must occur before ecosystem health and services are imperiled, the success of attempts at wetland mitigation, and how to manage wetlands and bodies of water that feed them and which cross state and international borders.

A. Wetland Definitions

Wetlands by nature are difficult to define, as they have a great variation in hydrological conditions, size, spatial location, and human influence.

Under the Clean Water Act (33 U.S.C., 1972), wetlands are defined by the EPA as:

“. . . areas that are inundated or saturated by surface or ground water at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in

saturated soil conditions. Wetlands generally include swamps, marshes, bogs, and similar areas.”

Alternately, under the text of the Convention (Article 1.1) (Ramsar, 2006), Ramsar defines wetlands as:

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

There are many similarities between the Ramsar definition of a wetland and the EPA definition, and both agree that wetlands are characterized by water, unique wetland soil, and the presence of plants adapted to saturated soils. However, the Ramsar definition goes on to explicitly include up to 42 different categories of wetlands, as well as areas where water may not be present year-round (Ramsar, 2006).

Defining a wetland is important because it offers a clear explanation of where a wetland begins and ends, thus defining the boundaries of federal protection and regulation. The Supreme Court recently ruled on a case that sought to define wetlands as places of continuous standing water and to limit protection under the Clean Water Act of 1972 to only those wetlands adjacent and connected to navigable waters (Egelko, 2006). This issue will continue to be contentious in the US as more people seek to develop wetlands.

Also controversial is the definition of the “wise use” of a resource. Ramsar defines wise use as, “. . . sustainable utilization for the benefit of humankind in a way compatible with the maintenance of the natural properties of the ecosystem” (Ramsar, 2006). Ramsar sites are expected to be managed in keeping with the goals of wise use, but wise use is defined with other terms without agreed upon definitions, such as ‘sustainability’. How one defines sustainability often depends on one’s goals, be they economic, environmental, or social. Ramsar defines ‘sustainable utilization’ as “Human use of a wetland so that it may yield the greatest continuous benefit to present generations while maintaining its potential to meet the needs and aspirations of future generations” (Ramsar, 2006). This is a broad definition that leaves room for interpretation on what constitutes ‘greatest continuous benefit’ and ‘potential.’

B. Mitigated Wetlands and Quality vs. Quantity

The US currently has a goal of no net loss of wetlands (Zedler, 2004), and in striving to meet this goal, many former wetland areas or currently beleaguered wetlands have undergone mitigation, or the replacement of wetland ecosystem functions, such as storm buffering, water purification, and wildlife habitat. While wetland mitigation can restore the functions of an impacted wetland, the process is expensive, the wetland can take many years to become stable enough to no longer necessitate management, and mitigated wetlands do not always represent the functions historically provided by the original

wetland. For example, a study done in the Kentucky Bottomland Forest wetland found that it can take up to forty-two years for mitigated wetlands to accumulate 95% of the carbon that is stored in natural wetlands (D'angelo, et al., 2005). This has raised questions among scientists, environmentalists, developers, and policymakers as to what constitutes a quality wetland or restoration of wetland functions. As with defining one's terms, a determination of quality often depends on a stakeholder's goals, and developers and environmentalists have not seen eye to eye on this issue. Indeed, there is controversy over whether the US goal of no net wetland loss has led to a myopic chase for quantity of wetlands at the expense of quality.

C. Cross-Border Resource Management

As mentioned above, wetlands can span great distances and cross both state and national borders. Currently, five of the twenty-two US Ramsar sites straddle state or international borders, and even more share rivers and watersheds that can cross multiple borders (see Appendix III). While many cross-border wetlands have been successfully managed by several diverse groups of stakeholders and agencies, there is a very real risk of fragmentation of management due to overlapping or unclear jurisdictions and different definitions, approaches, and goals. Such fragmentation can lead to radically different management plans for different parts of the same wetland or, worse, no management plan at all, and when one part of a wetland is mismanaged or developed, it affects the health of the entire wetland.

VI. Measuring the Program's Success

One outcome of Ramsar Convention COP 8 was the request for STRP to establish a series of indicators that would assess the effective implementation of the Strategic Plans that could be used in conjunction with the National Reports. This led to the establishment of Working Group 6, co-led by David Ritchard from Birdlife International (Ecological "outcome-oriented" indicators, 2005). One specific challenge these assessments would encounter was how to assess not only status and trends of the wetland, but that would give useful information as to the effectiveness of the Ramsar convention on the particular wetland.

The Working Group reviewed over 1000 potentially relevant indicators and were able to focus these into a set of 19 proposals for Ramsar. These were divided into categories of "state", "pressures", and "response." The group also identified existing indicators used by other organizations that could potentially be adopted or adapted by the Ramsar Convention. Some examples of these lists are the Red List Index, water quality indicators proposed by the United Nations Global Environment Monitoring System/Water Program (GEMS), among others. The reasoning was that using established assessment monitors would allow for a more comprehensive list and would provide an established baseline for assessment.

The myriad indicators were streamlined using five initial criteria points for selection. These included that the indicators be:

- a. simple and practical
- b. capable of distinguishing differences made by the Ramsar Convention
- c. whenever possible they should include multiple variables
- d. related to information that was readily available
- e. user friendly

It was also made clear that while some indicators would be designed for regional use, others would need to operate at an international level, and that even regional or national indicators should be integrated into global scales when possible.

A further consideration in designing the indicators was that they be applicable to the assessment progress of the targets established by the World Summit on Sustainable Development and the Convention of Biological Diversity to “achieve by 2010 a significant reduction of the current rate of biodiversity loss at the global, regional and national level as a contribution to poverty alleviation and to the benefit of all life on earth (CBD, 2006).” This is especially important as to the assessment indicator choice.

The eight indicators chose for implementation in this initial stage were:

- a. The overall conservation status of wetlands: how the area of a wetland changed through time, both quantitatively – measured in square kilometers or hectares as derived from mapping data; and qualitatively – as assessed through the consideration of the “state” of a wetland (how it is doing), the “pressures” (threats) acting on the wetland and the “responses” or actions taken to mitigate these pressures.
- b. The status of the ecological character of Ramsar sites – under development at completion of COP 9.
- c. Water-related indicators: trends in dissolved nitrogen concentration – reflecting both pollution and trophic change primarily from fertilizer run off and Biological Oxygen Demand (BOD) – indicating how levels of organic pollution in inland water are changing, were the two water indicators chosen at this time.
- d. The frequency of threats affecting Ramsar sites: to assess whether threats are reducing more for Ramsar sites than in undesignated sites (thus allowing them to assess the effectiveness of the Ramsar convention.)
- e. Wetland sites with successfully implemented conservation or wise-use management – under development at completion of COP 9.
- f. Overall population trends of wetland taxa: to quantify the global and regional/flyway status and change in status of waterbirds as “headline” and wetland-dependant taxon. This indicator would help identify areas with priority need for resources and policy interventions.

g. Changes in threat status of wetland taxa – under development at completion of COP 9.

h. The proportion of candidate Ramsar sites designated so far – designed to measure the extent to which a “coherent and comprehensive national and international network” or Ramsar sites has been established, as decreed in the Convention’s Strategic Framework.

As is evident, although eight indicators were chosen, only five have a defined purpose and method for implementation. What is also worthy of note, is that only indicator f. “Overall population trends of wetland status” identifies the cost and source of support, specifically calling on data from the International Waterbird Census funded by Wetlands International and from *Waterbird Populations Estimates* funded by a variety of donors. Multiple gaps in the assessment process exist; not only funding but in many cases future possible enhancements, actions steps for the implementation of the indicators, etc. remain undefined. Nonetheless, the integration of multiple existing databases was an attempt to streamline the assessment process.

Conclusion

February 2 2007 is officially dedicated as the “*World Wetlands Day 2007: Wetlands and Fisheries*”. One billion people rely on fish as their primary source of animal protein. (Ramsar, 2006) That being true, the fact that 75% of the world’s fisheries are currently either overfished or being fished at their biological limit poses a great problem for the future. Wetlands are known to be critical as spawning and nursery areas for the majority of currently fished species, and thus the effective management of wetland ecosystems is even more pressing. The adoption of Resolution IX.4 and its annex commits the 152 Contracting Parties to the Convention to curbing this unsustainable harvest and promote the wise use of wetlands.

Such commitment is an important step in the overall protection of the world’s wetland ecosystems. That said, there are difficulties with the adoption of this resolution as well. The Ramsar Convention, as a prescriptive agreement, does not bind its members but rather encourages behavior. The contentious nature of the destruction of wetlands, from development to pollution, including unsustainable fishing yields, makes the implementation of the resolution more problematic. Nonetheless, The Resolution IX.4 and its annex make an important step toward recognizing the role of wetlands in the sustainability of fisheries and the role of fishes in wetland ecology.

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APPENDICES



**9th Meeting of the Conference of the Parties to the
Convention on Wetlands (Ramsar, Iran, 1971)**

“Wetlands and water: supporting life, sustaining livelihoods”

Kampala, Uganda, 8-15 November 2005

Resolution IX.4

**The Ramsar Convention and conservation, production and
sustainable use of fisheries resources⁶**

1. RECOGNIZING the important role that inland, coastal and near-shore marine wetlands play in supporting aquatic species populations and fisheries resources;
2. CONSCIOUS that fishing is of great social, cultural and economic importance throughout the world;
3. RECOGNIZING that fisheries resources are a vital source of food and income for millions of people, which can assist in the further reduction of poverty, and CONCERNED that the Millennium Ecosystem Assessment (MA) has reported that fisheries yields in many parts of the world are declining due to unsustainable harvest, habitat degradation, and loss of fisheries resources spawning and nursery grounds, as well as feeding and refuge areas and NOTING that the different fisheries techniques and related activities within or adjacent to wetlands (from catch to consumption) may impact on other biota;
4. CONCERNED by the loss of fisheries resources and the increasing number of aquatic species recognized in the IUCN Red List as globally threatened, and AWARE of the important role that some Ramsar sites play in the conservation of endangered aquatic biota;
5. AWARE of the lack of sound scientific data on fisheries resources in many wetlands;
6. RECALLING the relevance of the guidance adopted by the Convention on integrating wetland conservation and wise use into river basin management (Resolution VII.18) and coastal zone management (Resolution VIII.4) to securing the integrated management of wetland ecosystems upon which fisheries resources depend;

⁶ “fisheries resources”: fish, crustaceans, mollusks and algae.

7. ALSO RECALLING that in Resolution VIII.2 the Conference of the Parties encouraged “Contracting Parties, wherever possible and appropriate, to take the necessary steps in order to maintain the migration access for indigenous [native] fish and other species past dams”;
8. COMMENDING those Parties that have taken actions to conserve or restore native aquatic species populations and their habitats, such as through habitat restoration, the provision of fish passages past in-stream infrastructure, the control of invasive alien species competitors, the control of unsustainable aquaculture practices and/or the reduction of water pollution impacts;
9. NOTING the comparative ecosystem benefits gained from supplying protein from sustainable fisheries, thereby alleviating agricultural pressure on land and in reducing water pollution;
10. ALSO NOTING the widespread growth in aquaculture, its potential benefits for increasing fish resources and reducing environmental costs, and the need for careful planning and management to avoid negative impacts upon native aquatic species and wetland ecosystems;
11. AWARE of the adoption by the UN Food and Agriculture Organisation (FAO) of the *Code of conduct for responsible fisheries* (1995) and its subsequent associated range of Technical Guidelines, and of the recognition that these give to the need to promote sustainable use of fisheries resources and to mitigate negative impacts of aquaculture practices;
12. ALSO AWARE of the ongoing work of the Comprehensive Assessment of Water Management in Agriculture (CA) led by the International Water Management Institute (IWMI) and its relevance to issues of wetlands, capture fisheries and aquaculture;
13. RECALLING that Action 1.2.6 of the Ramsar Strategic Plan 2003-2008 calls for an assessment of “the contribution of Ramsar sites and other wetlands to the maintenance of fisheries, including utilizing information available from the Millennium Ecosystem Assessment (MA) and other assessment programmes, and [recommendation of] sustainable management practices which can contribute to the WSSD target of, where possible by 2015, maintaining or restoring depleted fish [fisheries resources] stocks to levels that can produce the maximum sustainable yield” and ALSO RECALLING the Programmes of work of the Convention on Biological Diversity on inland waters and coastal and marine biodiversity;
14. RECOGNIZING that coral reefs are amongst the most complex, species-rich and productive of marine ecosystems, covering less than 1% of the ocean’s area yet home to one-third of all marine fish species, that coral reef fisheries are estimated to yield 6 million metric tons of fish catch annually, with one-quarter of the total worldwide fish production being in developing countries with coral reefs, and that they provide a habitat for a significant proportion of marine biodiversity;
15. RECOGNIZING that several environmental benefits/services are provided by mangrove ecosystems including coastal protection, nutrients and sediments retention and carbon dioxide sink, their special relevance as nurseries of various aquatic species, and their protective role to the existing associated ecosystems such as coral reefs and sea grass beds,

and HIGHLIGHTING the importance of mangrove ecosystems, including their associated tidal flats, and estuaries as a source of fisheries resources to several coastal communities;

16. AWARE that, according to the FAO World Mangrove Atlas, mangrove areas are being destroyed at a rate of 1% a year, despite their relevance to fisheries production;
17. ALSO AWARE that sea grass beds are vital as spawning grounds, habitat and refuge for many marine species at different stages in their life cycle;
18. RECALLING Resolution VIII.10 which recognized these ecosystems as being under-represented on the Ramsar List;
19. AWARE of the WSSD Plan of Implementation actions concerning the establishment of marine protected areas, the CBD COP7 Decision VII/5 on marine and coastal biological diversity, the CBD Programme of work on protected areas (Decision VII.28), and the recent work of the FAO Committee on Fisheries (CoFi) on the role of marine protected areas (MPAs) in fisheries management; and NOTING the urgent need to address the under-representation of protected areas in marine and coastal habitats and in inland waters through National Plans for Protected Areas;
20. NOTING with satisfaction the financial support provided by IUCN, WWF and the World Fish Centre in the implementation of Action 1.2.6 of the Ramsar Strategic Plan 2003-2008 and their role as advocates and technical advisors in relation to aquatic resources and sustainable fisheries, and FURTHER NOTING their collaboration with the Scientific and Technical Review Panel through the preparation of a 'Review of Ramsar Sites and Fisheries Maintenance', to be published as a *Ramsar Technical Report*, and the outline of issues and recommendations concerning wetlands and the conservation and sustainable use of fisheries resources annexed to this Resolution; and
21. ALSO NOTING that Wetlands International and IUCN-The World Conservation Union have established a Freshwater Fish Specialist Group that will provide advice on priority actions for freshwater fish conservation to Contracting Parties, river basin organizations and others;

THE CONFERENCE OF THE CONTRACTING PARTIES

22. CONFIRMS that this Resolution covers issues in inland, coastal and marine fisheries in wetlands within the scope of Article 1 and Ramsar sites within the scope of Article 2.1 of the Ramsar Convention;
23. URGES Contracting Parties to apply as appropriate the recommendations annexed to this Resolution when addressing issues of the sustainable use of fisheries resources in relation to the conservation and wise use of Ramsar sites and other wetlands;
24. URGES Contracting Parties to review their policy frameworks and institutional arrangements, in line with Resolutions VII.6 on National Wetland Policies and VII.7 on reviewing laws and legislation, so as to ensure that fisheries management authorities and those involved with conserving and/or managing aquatic biodiversity are aware of,

complement and support national, subnational and local efforts to implement the Convention;

25. REQUESTS fisheries authorities responsible for managing fisheries within, adjacent to, or associated with Ramsar sites to ensure that their activities support the maintenance of the ecological character of the Ramsar site (or sites);
26. URGES Contracting Parties and INVITES relevant organizations to use the habitat and species conservation provisions of the Convention to support the introduction and/or continuance of management measures that mitigate the environmental impacts of fishing, including the use of spatial management approaches as appropriate, and ALSO URGES the Ramsar Secretariat to work with other conventions, instruments and organizations concerned with the conservation of biodiversity and the management of natural resources (including FAO at an international and regional level), in order to promote the synergy and alignment of planning and management approaches that benefit the conservation and sustainable management of fisheries resources and recognition of the contribution this makes towards meeting CBD targets, WSSD goals, and Millennium Development Goals (MDGs);
27. ENCOURAGES Contracting Parties to liaise with relevant partners to undertake inventories, assessments and monitoring of fisheries resources which depend on wetlands;
28. REQUESTS those responsible for the management of Ramsar sites to incorporate into their management planning processes, in line with Resolution VIII.14 on management planning, measures to maintain the ecological benefits/services of wetlands including sustainable fisheries;
29. REQUESTS Contracting Parties to review and, where necessary, enhance national and regional programmes for the systematic collection of ecological and socio-economic data on fisheries, including artisanal fisheries, and data on aquaculture of relevance to Ramsar sites and associated areas;
30. URGES Contracting Parties to take the necessary steps within their frameworks for integrated river basin and coastal zone management to maintain or reinstate aquatic biota migration pathways, to reduce the impacts of point source and diffuse pollution in all its forms, to establish and implement environmental flow allocations supporting the conservation of aquatic biota, to protect critical spawning and nursery grounds, and to restore relevant habitats where these have become degraded, taking into account the guidance adopted in Resolutions VIII.1 on water allocation, VIII.4 on Integrated Coastal Zone Management, and VIII.32 on mangrove ecosystems;
31. URGES Contracting Parties carefully to control aquaculture (e.g. pond and cage culture) practices in Ramsar sites and in areas that are liable to impact on Ramsar sites and other wetlands so as to prevent adverse changes to the ecological character of wetlands, applying the provisions of the 1997 FAO Code of Conduct and its associated Technical Guidelines for Responsible Fisheries – Aquaculture Development and the 2000 Bangkok Declaration and Strategy for Aquaculture Development (Network of Aquaculture Centres in Asia-Pacific (NACA)/FAO));

32. STRONGLY URGES each Contracting Party to enforce existing policies and legislation to suspend any promotion, creation of new facilities, or expansion of unsustainable aquaculture activities harmful to wetlands, in line with Resolution VII.21 on intertidal wetlands;
33. ALSO STRONGLY URGES Contracting Parties with mangrove ecosystems in their territories, taking into account the provisions of Resolution VIII.32, to review and, as appropriate, to modify any of their national policies and strategies that have or could have harmful effects on these ecosystems, and to implement measures to protect and restore the benefits of these ecosystems for human populations, recognizing their rights, uses and traditional customs and the maintenance of biodiversity, and to cooperate at the international level to agree regional and global strategies for the maintenance of these ecosystems;
34. FURTHER STRONGLY URGES each Contracting Party, in order to maintain the ecological character of wetlands, to review its policies, laws and programmes for regulating the introduction of aquatic biota for aquaculture and the aquarium industry, to control the accidental movement of species for example through ballast water, to avoid introduction of invasive and/or alien species, and to undertake the necessary measures to prevent the introduction or spread of known alien and/or invasive aquatic biota (including invasive alien genes), in line with Resolution VIII.18;
35. URGES each Contracting Party with coral reef, sea grass beds and other associated ecosystems in their territories to implement national programs for the protection of these ecosystems through the establishment of effective protected areas, monitoring programs, awareness programmes and cooperation for innovative coral reef, sea grass beds and associated ecosystem restoration projects;
36. ALSO URGES each Contracting Party to take necessary steps within their policies and national systems of protected areas for establishment and recognition of inland, coastal and marine protected areas as a tool for biodiversity conservation and fisheries resources management;
37. REQUESTS each Contracting Party to take into account the provisions of Resolution VII.36. which highlights the importance of participatory management to be considered in policies, actions and programs for the conservation and sustainable use of fisheries resources;
38. REQUESTS the Ramsar Secretariat to draw attention to the important role of wetlands in fisheries resources conservation and sustainable use through its ongoing CEPA activities, in particular through future World Wetlands Day celebrations and events;
39. REQUESTS the Secretary General to pursue appropriate partnerships with expert bodies or organizations such as The WorldFish Center and FAO that are concerned with fisheries resources/resource conservation and sustainable use, in order for the Ramsar Convention to gain further advice and to fulfill its mandate;

40. REQUESTS the STRP to consider ways and means of elaborating the annex to this Resolution, taking into account the findings of the Millennium Ecosystem Assessment (MA), the Comprehensive Assessment of Water Management in Agriculture (CA), and other relevant assessments, in order to provide further guidance for Contracting Parties on wetlands and their relation to sustainable fisheries; and
41. ENCOURAGES Contracting Parties to assist fishers in gaining access to environmentally friendly technologies for fisheries and related activities.

Annex

Issues and recommendations for Contracting Parties concerning the management of sustainable fisheries in Ramsar sites and other wetlands

Note: these recommendations cover issues in both inland and coastal fisheries in wetlands within the scope of Article 1 and Ramsar sites within the scope of Article 2.1 of the Convention. .

Issue 1: Aquaculture

- Aquaculture is practiced in many Ramsar sites and in the waters adjacent to such sites and is sensitive to social, economic and technological changes that can impact on the nature of associated wetlands. Aquaculture also carries with it many risks to the environment and to native fisheries resources, and conversion of, for example, natural mangrove systems to aquaculture can greatly reduce the total value of the ecosystem benefits/services for people.

Aquaculture (e.g. pond and cage culture) practices in Ramsar sites or in areas that are liable to impact on Ramsar sites should be carefully controlled. Specifically, governments are encouraged to enforce relevant national legislation, apply the provisions of the FAO Technical Guidelines for Responsible Fisheries – Aquaculture Development (FAO 1997) (STRP to check whether guidelines or also the code), the Bangkok Declaration and Strategy for Aquaculture Development (NACA/FAO 2000).

Sustainable aquaculture may be facilitated through the use of native species and genomes where possible, and the minimization of the use of chemicals and the prioritization of new sustainable technologies for aquaculture

Issue 2: Rice cultivation

- Rice cultivation is sustainably practised at many Ramsar sites, and there are opportunities to improve the total yield of such areas by “rice-fish” systems in these and other wetlands cultivated for rice.

The significance of fisheries in sustainable rice cultivation within Ramsar sites should be further explored and documented and a more efficient combination of “rice-fish” management practices promoted.

Encouragement of the cultivation of native species of fish in association with rice and reducing as much as possible the use of chemicals may enhance the conservation of wetlands.

Issue 3: Management of fisheries

- In some countries, fisheries management based on central governmental control has generally failed to halt the degradation of fisheries resources stocks. A participatory approach is recommended for the inclusion of all stakeholders in the management process.

Participatory management in appropriate sites should be encouraged and facilitated by revising any existing laws and regulations that exclude it, supporting research, and establishing suitable management systems at international, national and basin levels.

- Co-management systems are frequently difficult to establish because of social traditions, land and water use practices, and legislation.

Fisheries legislation and regulations should promote the participation of stakeholders in the formulation of policies for the management of the resource.

- Growing numbers of people using a fishery can mean that the resource is increasingly overfished.

Measures should be adopted to control to the use of fisheries in Ramsar sites and other wetlands where these are not already in place.

- By-catch of globally-threatened and other wetland-dependent species in fishing gear (such as turtles and waterbirds in gill-nets) continues to threaten the survival of these species.

Measures should be put in place to minimize or prevent by-catch through the use of appropriate fishery techniques.

- Ecologically damaging fishing gear continues to be used in many fisheries.

Where ecologically damaging fishing practices or gear (which may include activities which significantly alter habitat structure, prevent movement of species, or otherwise alter ecological character), are affecting, or are likely to affect, a listed Ramsar wetland, appropriate action should be taken to address the threat of damage to that site caused by such use.

Issue 4: Management of the fisheries resources

- The introduction of alien and/or invasive species in natural fisheries areas poses a growing threat that puts at risk the survival of native species or genomes.

Many inland and coastal fisheries rely on regular stocking programmes: such stocking programmes should preferably use indigenous fish species or genomes.

Contracting Parties are encouraged to adopt effective legal tools and programmes to prevent and minimise the introduction of alien and/ or invasive species within wetlands.

A code similar to the ICES Code of Practice on the Introductions and Transfers of Marine Organisms and the GEF/UNDP/IMO International Convention for the Control and Management of Ships' Ballast Water and Sediments should be applied rigorously so that Ramsar sites are not placed at risk through unplanned introductions of aquatic species.

Reasonable practices should be adopted to reduce the risks from unregulated stocking programmes.

Issue 5: Sustainable management of wetland ecosystems for fisheries

- There is a general decline in the environmental health of most inland and coastal ecosystems caused by the impacts of human uses, declines found by the Millennium Ecosystem Assessment (MA) to be already more severe and to be occurring at faster rates in these ecosystems than in others. An area of major concern is the increasing withdrawal of water from inland systems that is affecting the functioning of rivers and the hydrological balance of lakes and coastal waters.

Environmental flow assessments in all rivers and associated wetlands that are threatened by flow-modifying activities such as the construction of dams, levee-ing of river channels, and water abstractions should include specific attention to fisheries resources and fisheries related aspects (see also Resolution VIII.1 and Resolution IX.1 Annex C).

Strategies for the mitigation of negative impacts on the environment from the activities of other users of the aquatic resource should be formulated. Where such impacting uses have ceased, the possibility of rehabilitation of damaged ecosystems should be explored (with reference to COP8 Resolution VIII.16).

The establishment of formal conservation and harvest reserves within selected sites of importance to fisheries should be considered.

Issue 6: Conflicts and multi-purpose use

- A number of human uses compete with fisheries for water and aquatic environmental resources, and these risk fisheries sustainability on Ramsar sites.

Local, national and international mechanisms should be established, as appropriate, whereby allocation of essential resources for the protection of aquatic resources and specifically fisheries resources are negotiated among all users of the resource. Similar mechanisms are needed for the resolution of conflicts between competing uses.

Issue 7: Increasing awareness of the importance of wetland management for fisheries

- There is an urgent need to ensure wider and better understanding of the importance of maintaining both coastal and inland wetlands for the benefit of fisheries maintenance.

Training programmes should be carried out under the Convention's programme on communication, education and public awareness (CEPA) to promote mutual understanding of the problems of the diverse sectors involved with wetland management and conservation including fisheries.

- Coastal and inland water fishers often operate at a small scale and need support.

Self-motivated initiatives such as community outreach, wildlife monitoring, codes of conduct, certification and education, and awareness-raising should be fostered within fishing communities that are fishing within, adjacent to or in ways which impact upon Ramsar sites.

Issue 8: Enhancing international cooperation

- Maintenance of fisheries in shared wetlands and seas needs the countries concerned to develop enhanced collaboration.

Countries sharing rivers, coastal lagoons, seas and lakes with significant fisheries should seek to establish common mechanisms for research, information sharing and management of their aquatic resources and specifically fisheries. If possible, such mechanisms should be incorporated into existing institutions, but where no such institutions exist measures should be taken to establish them.

Issue 9: Applying existing international agreements

- The application of a number of international agreements and existing guidance can help to ensure that fisheries in or affecting Ramsar sites and other wetlands are sustainable.

The *Code of Conduct for Responsible Fisheries* (FAO, 1995) and its various Technical Guidelines should be taken as the guiding principles in regulating marine and freshwater fisheries and aquaculture. Technical guidelines cover: 1. Fishing operations (1996); 2. Precautionary approach to capture fisheries and species introductions (1996); 3. Integration of fisheries into coastal area management (1996); 4. Fisheries management (1997); 5. Aquaculture development (1997); 5. (supplement 1) Aquaculture development: good aquaculture feed manufacturing practice (2001); 6. Inland Fisheries (1997); 7. Indicators for sustainable development of marine capture fisheries. (1999); 8. Responsible fish utilization. (1998); 9. Implementation of the International Plan of Action to prevent, deter and eliminate illegal, unreported and unregulated fishing (2002), and 10. the ecosystem-approach to fisheries.

Management strategies for the conservation of fisheries and aquatic biota especially in relation to Ramsar sites should take into account any endangered species listed in Appendix I of the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES), in accordance with the application of Criterion 2 of the Ramsar *Strategic Framework and guidelines for the future development of the List of Wetlands of International Importance* (Resolution VII.11), as amended by Resolution IX.1 Annex B.

Issue 10: The status of fisheries in Ramsar sites

- Information on most fisheries pursued in or affecting Ramsar sites, as supplied in Ramsar Information Sheets, is sparse and generally qualitative. However, the information which does exist confirms that fisheries are practised in many Ramsar sites or in the larger wetland ecosystems with which Ramsar sites are associated. It is clear that Ramsar sites and their associated systems also provide employment to many commercial fishers and subsistence fishers and collectors. Available evidence suggests that inland and small-scale coastal fisheries, including of the types that presently dominate in Ramsar sites, have declined due to habitat modification, overfishing and other human activities.⁷

National and regional programmes for the systematic collection of fisheries data at Ramsar sites and associated areas should be initiated or reinforced. As a minimum this should include data on weight and size of catch, numbers and effort of fishermen, and social and economic aspects of the fishery.

Issue 11: Coverage of the Ramsar site network for fish

- Since Criteria 7 and 8 for the designation of Ramsar sites for fish were adopted at the 6th meeting of the Conference of the Contracting Parties (1996), 264 Ramsar sites have been designated using these Criteria (as of 21 April 2005), although these occur in only 77 of the current 145 Contracting Parties (as of September 2005). It is clear that for fish the Ramsar site network is not yet the coherent and comprehensive national and international network envisaged by the 1999 *Strategic Framework*. Some systems lack representative sites to cover essential habitats for some important fish species.

Additional Ramsar sites should be designated, especially by those Contracting Parties that have not yet designated Ramsar sites under Criteria 7 and/or 8, to complete the global network of sites of international importance for their fish populations

⁷ A key finding of the Millennium Ecosystem Assessment (MA) is that: “The use of two ecosystem services - capture fisheries and freshwater - is now well beyond levels that can be sustained even at current demands, much less future ones. At least one quarter of important commercial fish stocks are overharvested (high certainty). Humans increased the capture of marine fish up until the 1980s by harvesting an ever-growing fraction of the available resource. Marine fish landings are now declining as a result of the overexploitation of this resource. Inland water fisheries, which are particularly important in providing high-quality diets for poor people, have also declined due to habitat modification, overfishing, and water withdrawals.” (MEA, 2005)

APPENDIX II. Wetland functions, the associated economically valuable goods and services and the names of variables that capture the presence of these in the data.

Function	Economically valuable good(s) and/or service(s) (variable names)	Technique(s) typically used to quantify the value of the service(s)
Recharge of ground water	Increased water quantity (quantity)	Net factor income or replacement cost
Discharge of ground water	Increased productivity of downstream fisheries (com.fish)	Net factor income, replacement cost or travel cost
Water quality control	Reduced costs of water purification (quality)	Net factor income or replacement cost
Retention, removal and transformation of nutrients	Reduced costs of water purification (quality)	Net factor income or replacement cost
Habitat for aquatic species	Improvements in commercial and/or recreational fisheries either on or offsite (com.fish and rec.fish). Nonuse appreciation of the species (habitat)	Net factor income, replacement cost, travel cost or contingent valuation
Habitat for terrestrial and avian species	Recreational observation and hunting of wildlife (birdwatch & birdhunt). Nonuse appreciation of the species (habitat)	Travel cost or contingent valuation
Biomass production and export (both plant and animal)	Production of valuable food and fiber for harvest (birdhunt & com. fish)	Net factor income
Flood control and storm buffering	Reduced damage due to flooding and severe storms (flood)	Net factor income or replacement cost
Stabilization of sediment	Erosion reduction (storm)	Net factor income or replacement cost
Overall environment	Amenity values provided by proximity to the environment (amenity)	Hedonic pricing

APPENDIX III. Ramsar Sites in the United States.



APPENDIX IV. A Sampling of Current US Federal Legislation Promoting the Conservation of Wetlands

Program or Act	Implementing agency	Effect of program
Comprehensive Environmental Response Compensation and Liability Act (Superfund) (P.L. 96-510) (1980)	AFA	Establishes liability of the U.S. Government for damages to natural resources over which the U.S. has sovereign rights. Requires the President to designate Federal officials to act as trustees for natural resources, and to conduct natural resource damage assessments.
Coastal Barriers Resources Act (P.L. 96-348) (1982)	NOAA	Designates various undeveloped coastal barrier islands for inclusion in the Coastal Barrier Resources System. Designated areas are ineligible for Federal financial assistance that may aid development.
Coastal Zone Management Act (P.L. 92-583) (1972)	NOAA	Provides Federal funding for wetlands programs in most coastal States, including the preparation of coastal zone management plans.
Estuary Protection Act	DOI	Authorized the study and inventory of estuaries, and the Great Lakes, and provided for management of designated estuaries between DOI and the States.
Federal Water Pollution Control (P.L. 92-500) (<i>Clean Water Act</i>) Section 404 (1972)	Corps, EPA, FWS, NMFS	Regulates many activities that involve the disposal of dredged and fill materials in waters of the United States, including many wetlands.
Federal Water Project Recreation Act (P.L. 89-72) (1965)	DOI, Corps	Recreation and fish and wildlife enhancement must be considered by Federal water projects. Authorizes Federal funds for acquiring land for waterfowl refuges.
Migratory Bird Conservation Act (45 Stat. 1222) (1929)	FWS	Established a commission to approve the acquisition of migratory bird habitat.
Wild and Scenic Rivers Act, (P.L. 90-542) (1968)	DOI, USDA	Protects designated river segments from damming and other alterations without a permit.
Coastal Wetland Planning, Protection and Restoration Act (P.L. 101-646) (1990)	Corps, FWS, EPA, NMFS	Provides for interagency wetlands restoration and conservation planning and acquisition in Louisiana, other coastal States, and the Trust Territories.
Transfer of Certain Real Property for Wildlife Conservation Purposes Act (62 Stat. 240) (1948)	GSA, DOI	Allows the GSA to transfer property to DOI, or States, for wildlife conservation.
Executive Order 11990, Protection of Wetlands (1977)	AFA	Requires Federal agencies to minimize impacts of Federal activities on wetlands.
Food, Agriculture, Conservation, and Trade Act of 1990 (P.L. 101-624)	NRCS	Wetland Reserve Program purchases perpetual non-development easements on farmed wetlands. Subsidizes restoration of croplands to wetlands.
Food Security Act of 1985 (Swampbuster) (P.L. 99-198)	ASCS, FWS	Swampbuster program suspends agricultural subsidies for farmers who convert wetlands to agriculture.

APPENDIX V. Abbreviations of Agency Names.

Abbreviation	Agency Full Name
AFA	All Federal Agencies
ASCS	Agricultural Stabilization and Conservation Service
Corps	U.S. Army Corps of Engineers
DOI	Department of the Interior
EPA	Environmental Protection Agency
FWS	U.S. Fish & Wildlife Service
GSA	General Services Administration
NMFS	National Marine Fisheries Service
NOAA	National Oceanic and Atmospheric Administration
NRCS	Department of Agriculture, Natural Resources Conservation Service
USDA	U.S. Department of Agriculture

APPENDIX VI. The application of guidelines in the Ramsar "Toolkit" of Wise Use Handbooks, supported by Ramsar Technical Reports, to different intervention opportunities in the MA's Conceptual Framework.

Intervention opportunity(ies)	Relevant Ramsar Wise Use Handbooks (2 nd edition), COP9 Resolutions and <i>Ramsar Technical Reports (RTR)</i>
Indirect drivers → Direct drivers	2. National Wetland Policies 3. Laws and Institutions 4. River Basin Management (some parts) 12. Water Allocation and Management (some parts) 13. Coastal Management (some parts) Resolution IX.1 Annex C. Water-related framework
Direct drivers → Wetland Ecosystems	4. River Basin Management 10. Wetland Inventory 11. Impact Assessment 12. Water Allocation and Management 13. Coastal Management Resolution IX.1 Annex C. Water-related framework Resolution IX.1 Annex C i. RBM "critical path" Resolution IX.1 Annex C ii. Groundwater RTR. Environmental water requirements RTR. Economic valuation of wetlands RTR. Vulnerability Assessment
Within Wetland Ecosystems	5. Participatory Management 7. Designating Ramsar Sites 8. Managing Wetlands 10. Wetland Inventory 11. Impact Assessment 12. Water Allocation and Management Resolution IX.1 Annex C i. RBM "critical path" Resolution IX.1 Annex C ii. Groundwater Resolution IX.1 Annex E. inventory/assessment /monitoring framework Resolution IX.1 Annex E i. Rapid assessment RTR. Vulnerability Assessment RTR. GIS for inventory, assessment & monitoring
Covers several types of intervention opportunities (Indirect drivers → Direct drivers, Direct drivers → Wetland Ecosystems, and within Wetland Ecosystems)	1. Wise Use of Wetlands 6. Wetland CEPA 9. International Cooperation 14. Peatlands Resolution IX.1 Annex D. Indicators of effectiveness

APPENDIX VII. Handbook 11.

Handbook 11 will be considered within the context of wise use and sustainable fisheries. The logic behind this, is that for wetland, the influx of water is vital and only through assessment of the wetland can the level of wise use be evaluated (Farrier and Tucker, 2000).

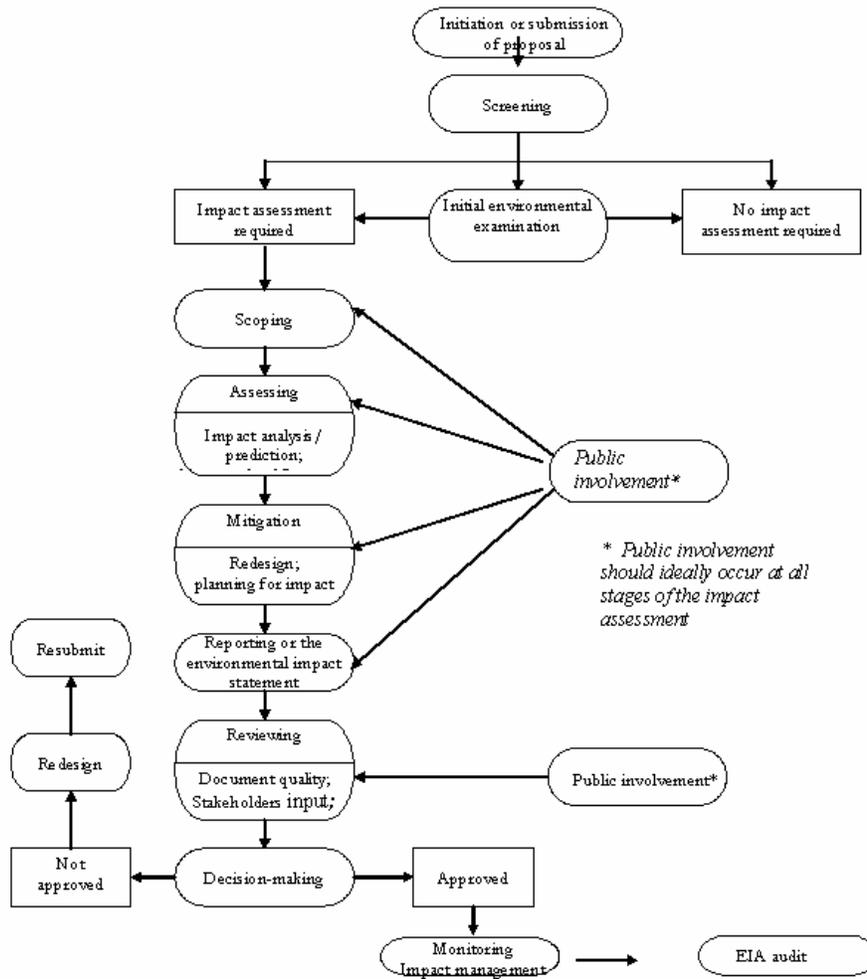
In 2002, the Convention on Biological Diversity's COP 6 formalized its *Guidelines for incorporating biodiversity-related issues into environmental impact assessment legislation and/or processes and in strategic environmental assessment* (Decision VI/7). Taking into consideration the Joint Work Plan existing between the CBD and Ramsar, the Scientific and Technical Review Panel (STRP) reviewed these guidelines and decided that they could be integrated into the wetland issues and proposed at Ramsar COP 8 that they be endorsed by the Ramsar Convention (Ramsar Handbook 11, 2005).

As early as 1996, David Pritchard of Birdlife International presented a paper during Ramsar COP 6 in Brisbane, Australia emphasizing the need for better environmental impact assessment in wetland policy, including a set of potential guidelines. The STRP was asked to examine these guidelines for their relevance to wetlands and to draft further EIA guidelines if necessary.

The following chart illustrates the flow that assessment should take within a community. It is worthy of note that public involvement should be included at all stages of the process, and indeed, local knowledge of wetlands and their taxa has been acknowledged as a useful source of information.

Ramsar, by considering wise use of wetlands within the Framework, is drawing a connection between indirect drivers of change, placed within a greater context of poverty and unsustainable practices, and direct drivers of change, considering specific pollution, over harvesting, water extraction, among others that result in a degraded wetland. To understand the proposed wise use solution to direct drivers of change, it is necessary to take a closer look at the specifics of the solutions. It encourages the participation of stakeholders at various levels, especially in formulation of policies for the management of the resources.

Flowchart of key steps in the environmental impact assessment procedure
(FROM UNEP /CBD/SBSTTA/7/13, NOVEMBER 2001)



Where environmental assessment is mandatory, specific guidelines have been identified. Handbook 11 illustrates a list of activities for which EIA could be required. At the genetic level, direct or indirect causes of local loss of plants or animals by introduced species should be identified. At the species level, whether protected species are affected by pollution or other disturbing activities, if they are suffering from reduced habitat or habitat alteration that may threaten the survival rate, if threats are affecting stop-over areas for migratory birds or breeding grounds for migratory fish need to be determined. And at the ecosystem level, is the environment a legally protected area, is it in the vicinity of legally protected areas, does it have an effect on legally protected areas by emissions into the region, diversion of surface water, extraction of groundwater, disturbance by noise, lights, or pollution?

The knowledge such assessment indicators would provide would lead to a comprehensive wise use policy including sustaining fisheries and fish populations. For wetland classification to be an effective tool for conservation and management, the factors controlling the wetland functions and processes need to be emphasized (Maltby, 1997).

APPENDIX VIII. U.S. National Ramsar Committee Strategic Plan 2006-07

USNRC Mission Statement:

To promote the goals and objectives of the Ramsar Convention on Wetlands within the United States and internationally, by providing support and advice to initiatives that promote the conservation and wise, sustainable use of domestic and international wetlands.

USNRC Goals and Actions:

Goal 1: Promote the designation of U.S. Ramsar sites

- 1.1 Provide general information to persons and organizations interested in learning more about Ramsar designation
 - 1.1.1 Maintain current designation criteria on web site
 - 1.1.2 Explain designation procedures and provide sample application documents on web site
 - 1.1.3 Identify with specificity benefits associated with Ramsar designation through survey of current U.S. Ramsar sites
- 1.2 Identify and recruit potential U.S. Ramsar sites
 - 1.2.1 Review and identify overlaps of the North American Waterfowl Management Plan, Important Bird Areas, Western Hemisphere Shorebird Reserve Network sites, and other biologically and culturally important wetland areas for candidate sites
 - 1.2.2 Contact owners or stewards of candidate sites and explain benefits of Ramsar designation
- 1.3 Provide recommendations to the U.S. Fish and Wildlife Service
 - 1.3.1 Visit candidate sites, where feasible
 - 1.3.2 Provide written comments to USFWS

Goal 2: Foster linkages among different sectors of the domestic and international wetland communities

- 2.1 Encourage exchanges of information between and among U.S. Ramsar sites
 - 2.1.1 Send bimonthly email updates on site news
 - 2.1.2 Support Migratory Bird and Wetlands NewsLink

- 2.2 Encourage linkages between U.S. and other Ramsar sites
 - 2.2.1 Explore collaborations between U.S. and Canadian sites (with Stephen Virc, National Protected Areas Coordinator, Canadian Wildlife Service) and between U.S. and Mexican sites (e.g., joint presentations at conferences; webcasts on issues of common interest)
 - 2.2.2 Explore opportunities for experts affiliated with U.S. Ramsar sites to participate in training programs run by Ramsar's Regional Office in Panama (CREHO)
 - 2.2.3 Encourage participation in Ramsar Secretariat listserv, Wetlands Forum
- 2.3 Promote linkages between U.S. Ramsar sites and Ramsar Secretariat
 - 2.3.1 Encourage experts affiliated with U.S. Ramsar sites to work with revised Scientific and Technical Review Panel (STRP)
 - 2.3.2 Provide U.S. sites with updates on Ramsar activities (e.g., reports on Ramsar Conferences of the Parties)
 - 2.3.3 Support US Ramsar sites by offering the services of the Committee; using the diverse professional backgrounds of the members as an additional resource.
 - 2.3.4 Assist current U.S. Ramsar sites with reporting requirements (e.g., providing first drafts of Ramsar Information Sheets to site managers)
- 2.4 Participate in the Western Hemisphere Migratory Species Initiative
- 2.5 Participate in the National Fish Habitat Initiative
- 2.6 Serve as a U.S. representative to Wetlands International

Goal 3: Support wetland education and public awareness of wetlands

- 3.1 Help coordinate World Wetlands Day (February 2) and American Wetlands Month (May) activities
- 3.2 Work with the American Bar Association Water Quality and Wetlands Committee and other groups to establish a Ramsar Speakers Bureau, with the goal of linking speakers about wetland issues with schools for programs associated with World Wetlands Day, American Wetlands Month, and other events
- 3.3 Hold USNRC meetings at or near U.S. Ramsar sites and seek participation from local Ramsar site representatives

- 3.4 Encourage USFWS to hold its Ramsar-related meetings at or near U.S. Ramsar sites to facilitate site visits and meetings with site representatives (e.g., upcoming trilateral meeting in San Diego in May 2006)
- 3.5 Assist USFWS in coordinating visits to U.S. Ramsar sites by foreign delegations
- 3.6 Publish articles related to the Ramsar Convention and Ramsar sites in wetland and environmental journals and newsletters