Convention on Wetlands

TECHNICAL NOTE

Global Wetland Outlook: Technical Note to Introduction

The Introduction section of the Global Wetland Outlook (GWO) provides the overall context for the report, explaining the Ramsar Convention's role in promoting wetland conservation and wise use. This Technical Note provides further information on:

- the importance of decision and policy makers properly appreciating the full range of benefits that wetlands provide people;
- the Ramsar wetland classification system, Ramsar Site designation criteria, and scope of their application;
- the percentage of wetlands globally designated as Ramsar Sites;
- the main conclusions regarding wetlands from previous analyses, such as the Millennium Ecosystem Assessment, The Economics of Ecosystems and Biodiversity, the Global Biodiversity Outlook, the Global Land Outlook, and the IPBES Land Degradation and Restoration Assessment;
- other biodiversity-related multilateral environmental agreements (MEAs), and the challenges and opportunities of synergies among these MEAs.

Background

The GWO, which is the Ramsar Convention's flagship publication, reports on the status and trends of the world's wetlands. The Contracting Parties requested the GWO in Ramsar Resolution XII.5, which called upon the Convention's Scientific and Technical Review Panel (STRP) to update and expand upon Ramsar Briefing Note 7, *State of the World's Wetlands and their Services to People: A compilation of recent analyses*. The Standing Committee subsequently identified this task as among the STRP's highest priorities.

Purpose

The technical notes are complementary to the GWO, consisting of supplemental details and references. They also may provide technical information to explain the analysis or methodology supporting findings published in the GWO.

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Understanding the full value of wetlands

Wetlands contribute to human wellbeing in multiple ways (Table 1). Although "wetland management and mismanagement affect all sectors of society…, the values which people assign to wetlands and the impacts of wetland management decisions are not always adequately considered in development planning and other decision-making" (Kumar et al. 2017). Consequently, poorly informed decision-making results in the loss and degradation of wetlands and their services to people (McInnes & Everard 2017).

Table 1. **Examples of values of wetlands and their contributions to people**

		Focus of value	Example
Values of wetlands' contributions to people	Material contributions	**Food and fibre**	Wetlands as source of fish and rice.
		Water	Wetlands as source of freshwater for human and ecological use.
		Medicinal, biochemical and genetic resources	Materials derived from wetlands for use as medicine and biotechnology.
	Non-material contributions	**Learning and inspiration**	Wetlands as an avenue for research and education on aquatic ecosystems.
		Physical and psychological experiences	Wetlands as source of recreation and tourism.
		Supporting identities	Wetlands providing a sense of place and connectedness to communities.
		Maintenance of options	Capacity of wetlands to support current and future climate change adaptation.
	Regulating contributions	**Habitat creation and maintenance**	Wetlands as habitats for migratory birds within flyway.
		Climate regulation	Role of wetlands as carbon sinks.
		Regulation of freshwater quantity, flow and timings	Role of wetlands in moderating floods and droughts.
		Regulation of water quality	Role of wetlands in water purification.
		Regulation of hazards and extreme events	Role of wetlands in moderating storm surges.
		Regulation of pests	Dragonflies and insectivorous birds controlling population of pest species such as mosquitoes.
Intrinsic values of wetlands	Ecosystem properties	**Biota**	Species diversity.
		Species assemblages	Population and communities of wetland species.
		Ecosystem processes	Energy – nutrient dynamics.

Source: Kumar et al. 2017.

The failure to fully recognize the ecosystem services provided by wetlands occurs "across different socioeconomic and geographical environments" (McInnes 2013). Russi et al. (2013) provided a stark example of the failure to properly consider the range of wetland values in the context of converting mangroves to shrimp farms (Fig. 1). The economic benefits of shrimp farming do not outweigh the ecosystem services of conserving the mangroves, especially when storm protection is taken into account.

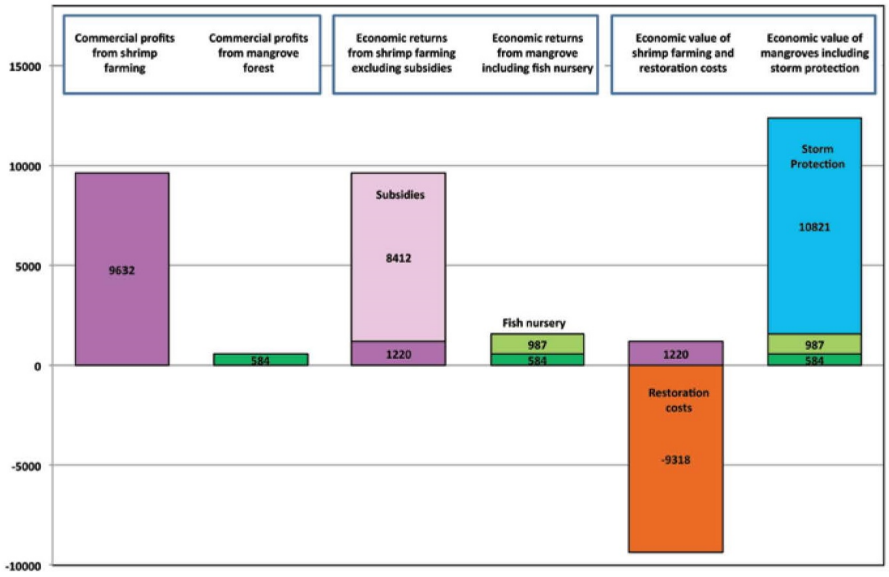


Figure 1. The benefits (in US$/ha) provided by mangroves and shrimp farms in southern Thailand before and after subsidies are taken into account (Russi et al. 2013).

Narayan et al. (2017) further demonstrated the importance of considering wetland ecosystem services. They quantified the storm protection benefits of coastal marshes in the United States after Hurricane Sandy (Fig. 2), finding that marshes prevented US$625 million in direct flood damages.

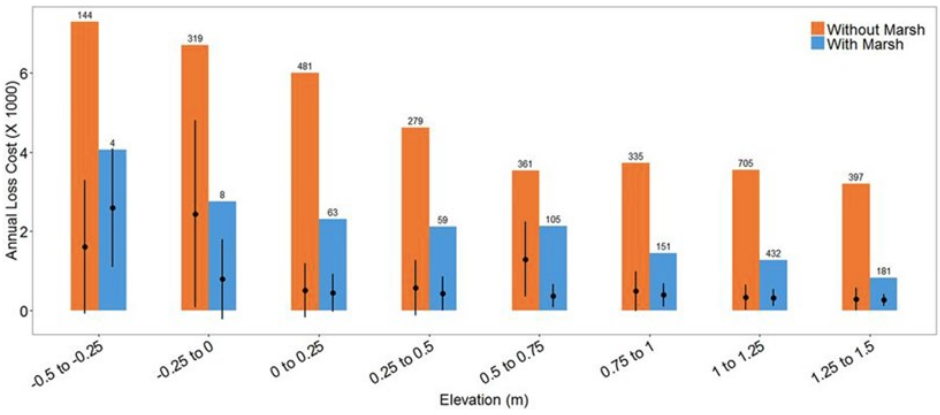


Figure 2. Annual loss costs from flooding for properties with and without marshes, by elevation class, in the Northeastern United States. Annual loss costs are shown for properties with marshes and without marshes, from −0.5 to +1.5 m above the NAVD88 sea-level datum. Coloured bars show the range of loss costs for each class. Black dots represent the mean loss costs and black bars represent one standard deviation from the mean. Numbers on top of each bar give the number of properties assessed (Narayan et al. 2017).



Classification

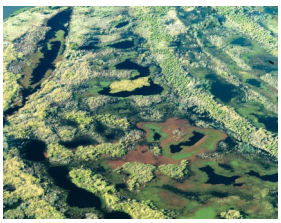
The classification of wetlands is a "necessary step for their systematic management and conservation," but can be difficult in part "due to the complexity of gradients present (especially where land meets streams, rivers, lakes, and estuaries but also within 'wet' lands)" (Gerbeaux et al. 2018). The Ramsar Convention's classification system was adopted in 1990 along with Ramsar Information Sheets, documents that describe the ecological character of Ramsar Sites (Finlayson 2016). The current Ramsar classification (Table 2) recognizes 42 types of wetlands within three broad groups of wetlands: marine and coastal (12 types); inland (20 types); and human-made (10 types).

While the Ramsar classification system has been useful in providing a simple and uniform standard at the international level, it has been criticized for being non-systemic and including habitats not typically viewed as wetlands (e.g., caves and rocky shores) (Gerbeaux et al. 2018). Accordingly, a number of other classification schemes have been developed over many years for use in different countries. Examples include those developed in the USA (Wilen & Golet 2018), Brazil (Junk et al. 2018), and South Africa (Ollis et al. 2018).

Table 2 Ramsar typology of wetlands

Wetland category	Code	Wetland type
Marine/ coastal	A	Permanent shallow marine waters in most cases less than 6 m deep at low tide; includes sea bays and straits
	B	Marine subtidal aquatic beds; includes kelp beds, seagrass beds, tropical marine meadows
	C	Coral reefs
	D	Rocky marine shores; includes rocky offshore islands, sea cliffs
	E	Sand, shingle, or pebble shores; includes sand bars, spits, and sandy islets; includes dune systems and humid dune slacks
	F	Estuarine waters; permanent water of estuaries and estuarine systems of deltas. Intertidal mud, sand, or salt flats
	G	Intertidal marshes; includes salt marshes, salt meadows, saltings, raised salt marshes; includes tidal brackish and freshwater marshes
	H	Intertidal forested wetlands; includes mangrove swamps, nipah swamps, and tidal freshwater swamp forests
	I	Coastal brackish/saline lagoons; brackish to saline lagoons with at least one relatively narrow connection to the sea
	J	Coastal brackish/saline lagoons; brackish to saline lagoons with at least one relatively narrow connection to the sea
	K	Coastal brackish/saline lagoons; brackish to saline lagoons with at least one relatively narrow connection to the sea
	Zk(a)	Karst and other subterranean hydrological systems, marine/coastal

Inland	L	Permanent inland deltas
	M	Permanent rivers/streams/creeks; includes waterfalls
	N	Seasonal/intermittent/irregular rivers/streams/creeks
	O	Permanent freshwater lakes (over 8 ha); includes large oxbow lakes
	P	Seasonal/intermittent freshwater lakes (over 8 ha); includes floodplain lakes
	Q	Permanent saline/brackish/alkaline lakes
	R	Seasonal/intermittent saline/brackish/alkaline lakes and flats
	Sp	Permanent saline/brackish/alkaline marshes/pools
	Ss	Seasonal/intermittent saline/brackish/alkaline marshes/pools
	Tp	Permanent freshwater marshes/pools; ponds (below 8 ha), marshes, and swamps on inorganic soils; with emergent vegetation water-logged for at least most of the growing season
	Ts	Seasonal/intermittent freshwater marshes/pools on inorganic soils; includes sloughs, potholes, seasonally flooded meadows, sedge marshes
	U	Non-forested peatlands; includes shrub or open bogs, swamps, fens
	Va	Alpine wetlands; includes alpine meadows, temporary waters from snowmelt
	Vt	Tundra wetlands; includes tundra pools, temporary waters from snowmelt
	W	Shrub-dominated wetlands; shrub swamps, shrub-dominated freshwater marshes, shrub carr, alder thicket on inorganic soils
Wetland category	Code	Wetland type
	Xf	Freshwater, tree-dominated wetlands; includes freshwater swamp forests, seasonally flooded forests, wooded swamps on inorganic soils
	Xp	Forested peatlands; peatswamp forests
	Y	Freshwater springs; oases
	Zg	Geothermal wetlands
	Zk(b)	Karst and other subterranean hydrological systems, inland
Human-made	1	Aquaculture (e.g., fish/shrimp) ponds
	2	Ponds; includes farm ponds, stock ponds, small tanks; (generally below 8 ha)
	3	Irrigated land; includes irrigation channels and rice fields
	4	Seasonally flooded agricultural land (including intensively managed or grazed wet meadow or pasture)
	5	Salt exploitation sites; salt pans, salines, etc.
	6	Water storage areas; reservoirs/barrages/dams/impoundments (generally over 8 ha)
	7	Excavations; gravel/brick/clay pits; borrow pits, mining pools
	8	Wastewater treatment areas; sewage farms, settling ponds, oxidation basins, etc.
	9	Canals and drainage channels, ditches
	Zk(c)	Karst and other subterranean hydrological systems, human-made



Source: Finlayson 2018.

Ramsar Site designation criteria and scope of their application

A wetland must satisfy at least one of the criteria below to be designated as a Wetland of International Importance and added to the list of Ramsar Sites. Criterion 2 (supporting vulnerable, endangered, or critically endangered species or threatened ecological communities) has been relied upon most frequently with more than 1,800 designations, which is approximately 78% of all Ramsar Sites. Only 12 sites have been reported to satisfy all nine criteria (RSIS). An overview of the process for listing Ramsar Sites has been provided by Stroud (2018).

Criteria for the designation of Wetlands of International Importance		
Group A of the Criteria Sites containing representative, rare or unique wetland types		**Criterion 1** *(approximately 69% of all Ramsar Sites are reported to satisfy this criterion)*: A wetland should be considered internationally important if it contains a representative, rare, or unique example of a natural or near-natural wetland type found within the appropriate biogeographic region.
Group B of the Criteria Sites of international importance for conserving biodiversity	**Criteria based on species and ecological communities**	**Criterion 2** *(approximately 78% of all Ramsar Sites are reported to satisfy this criterion)*: A wetland should be considered internationally important if it supports vulnerable, endangered, or critically endangered species or threatened ecological communities.
		Criterion 3 *(approximately 64% of all Ramsar Sites are reported to satisfy this criterion)*: A wetland should be considered internationally important if it supports populations of plant and/or animal species important for maintaining the biological diversity of a particular biogeographic region.
		Criterion 4 *(approximately 60% of all Ramsar Sites are reported to satisfy this criterion)*: A wetland should be considered internationally important if it supports plant and/or animal species at a critical stage in their life cycles, or provides refuge during adverse conditions.
	Specific criteria based on waterbirds	**Criterion 5** *(approximately 30% of all Ramsar Sites are reported to satisfy this criterion)*: A wetland should be considered internationally important if it regularly supports 20,000 or more waterbirds.
		Criterion 6 *(approximately 36% of all Ramsar Sites are reported to satisfy this criterion)*: A wetland should be considered internationally important if it regularly supports 1% of the individuals in a population of one species or subspecies of waterbird.
	Specific criteria based on fish	**Criterion 7** *(approximately 18% of all Ramsar Sites are reported to satisfy this criterion)*: A wetland should be considered internationally important if it supports a significant proportion of indigenous fish subspecies, species or families, life-history stages, species interactions and/or populations that are representative of wetland benefits and/or values and thereby contributes to global biological diversity.
		Criterion 8 *(approximately 27% of all Ramsar Sites are reported to satisfy this criterion)*: A wetland should be considered internationally important if it is an important source of food for fishes, spawning ground, nursery and/or migration path on which fish stocks, either within the wetland or elsewhere, depend.
	Specific criteria based on other taxa	**Criterion 9** *(approximately 2% of all Ramsar Sites are reported to satisfy this criterion)*: A wetland should be considered internationally important if it regularly supports 1% of the individuals in a population of one species or subspecies of wetland-dependent non-avian animal species.

Adapted from Ramsar.org. Data from the Ramsar Sites Information Service.

As noted in the GWO, Ramsar Sites likely cover 13-18% of the global area of terrestrial and coastal wetlands. It is difficult to provide a precise figure for several reasons: some Ramsar Sites include non-wetland areas (e.g., in catchment areas), and many gaps exist in the knowledge about the extent and distribution of all wetland types (Davidson & Finlayson 2018).

The context for the GWO: Recent analyses examining wetlands

As the GWO notes, it builds on the analyses below. Each tells a similar story. As Ramsar Briefing Note 7 (*State of the World's Wetlands and their Services to People: a compilation of recent analyses*) concluded, "study after study demonstrates that wetland area and quality continue to decline in most regions of the world. Consequently, the ecosystem services that wetlands provide to people are compromised" (Gardner et al. 2015). This raises questions about the effectiveness of national implementation of the Convention (Finlayson 2012), although the situation would be worse except for the initiatives and guidance provided through the Convention (Finlayson et al. 2011).

Millennium Ecosystem Assessment

The Millennium Ecosystem Assessment, which was initiated in 2001 after a call by the UN Secretary General, involved more than 1,360 experts. It assessed the state of world's ecosystems and the services they provide to people. A primary objective of the project was to strengthen the role of scientific knowledge in decision-making.

A 2005 report on Wetlands and Water, which was the key product for the Ramsar Convention, synthesized findings on inland, coastal, and near-shore marine wetlands (MEA 2005). The assessment found that the loss and degradation of wetlands were more rapid than that of other ecosystems. Both freshwater and coastal wetland species were also found to be declining faster than those of other ecosystems. The report identified the primary indirect drivers of wetland loss and degradation to be population growth and increasing economic development. The primary direct drivers included "infrastructure development, land conversion, water withdrawal, eutrophication and pollution, overharvesting and overexploitation, and the introduction of invasive alien species."

The Economics of Ecosystems and Biodiversity

The Economics of Ecosystems and Biodiversity (TEEB), a global initiative that arose from a proposal of environment ministers from the G8+5 countries in 2007, seeks "to mainstream the values of biodiversity and ecosystem services into decision-making at all levels."

At the initiation of the Ramsar Secretariat, a report on TEEB for Water and Wetlands was published with the goal of encouraging improved decision-making related to wetlands (Russi et al. 2013). The report noted that, in spite of their value, wetlands were "being degraded at an alarming pace." This wetland loss and degradation resulted in "an enormous social and economic impact (e.g. increased risk of floods, decreased water quality – in addition to impacts on health, cultural identity, and on livelihoods)." TEEB for Water and Wetlands encouraged decision-makers to take into account the "full value of water and wetlands" and offered examples of how a range of values could be integrated into the decision-making process.

Global Biodiversity Outlook

The Global Biodiversity Outlook (GBO) is the Convention on Biological Diversity's flagship publication. It periodically reports on the status and trends of biodiversity, based on data from national reports, scientific literature, the Biodiversity Indicators Partnership, and additional studies. The most recent report, the GBO-4, provided a mid-term assessment of progress towards the Aichi Biodiversity Targets (Secretariat of the Convention on Biological Diversity 2014).

Of particular relevance to the Ramsar Convention are Aichi Target 5, which calls for reducing habitat degradation and fragmentation, and Aichi Target 14, which calls for restoring and safeguarding ecosystems that provide essential services, including those related to water. The GBO-4 found that wetlands, including river systems, continued to be fragmented and degraded. It emphasized that ecosystems particularly important for services, such as coral reefs, were still declining.

The technical report to GBO-4 (Leadley et al. 2014) acknowledged the limitations of providing definitive statements on wetland extent and losses, emphasizing that "there is currently no agreed global map of these wetland ecosystems." Nevertheless, the GBO-4 technical report noted that "the majority of studies that have measured wetland extent change suggest high rates of global wetland area decreases," perhaps as much as 1.5% annually.

Global Land Outlook

The United Nations Convention to Combat Desertification published the Global Land Outlook (GLO) in September 2017, to which the Ramsar Convention was a contributing partner (UNCCD 2017). Emphasizing "the central importance of land quality to human well-being," the GLO examined "current trends in land conversion, degradation and loss." It reported that, despite efforts to conserve and wisely use wetlands, between 64 and 71% have been lost since 1900 (in areas where assessments have been done), and many others have been degraded by pollution, flow disruptions, over-harvesting, and invasive species. Wetland loss is continuing at a more rapid rate than for other ecosystems along with a disproportionate loss in ecosystem services. Between 1970 and 2008, the extent of natural wetlands declined globally on average by about 30%, where data were available.

Thematic Assessment of Land Degradation and Restoration

Established in 2012, the Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services (IPBES) is an independent intergovernmental body that conducts assessments to inform policy makers about the state of biodiversity, nature's contributions to people, and response actions to protect and sustainably use biodiversity. Of particular note to the Ramsar Convention is the 2018 Land Degradation and Restoration Assessment. Its Summary for Policymakers stated that "[d]espite comprising a small fraction of the global land area, wetlands provide a disproportionately large amount of critical ecosystem services, particularly those associated with the filtration and supply of fresh water and coastal protection" (IPBES 2018). It noted that "[w]etlands also have high biodiversity importance, including being critical habitat for many migratory species." The assessment found that "[t]reating wetlands as natural infrastructure can help meet a wide range of policy objectives, such as water and food security, as well as climate change mitigation and adaptation."

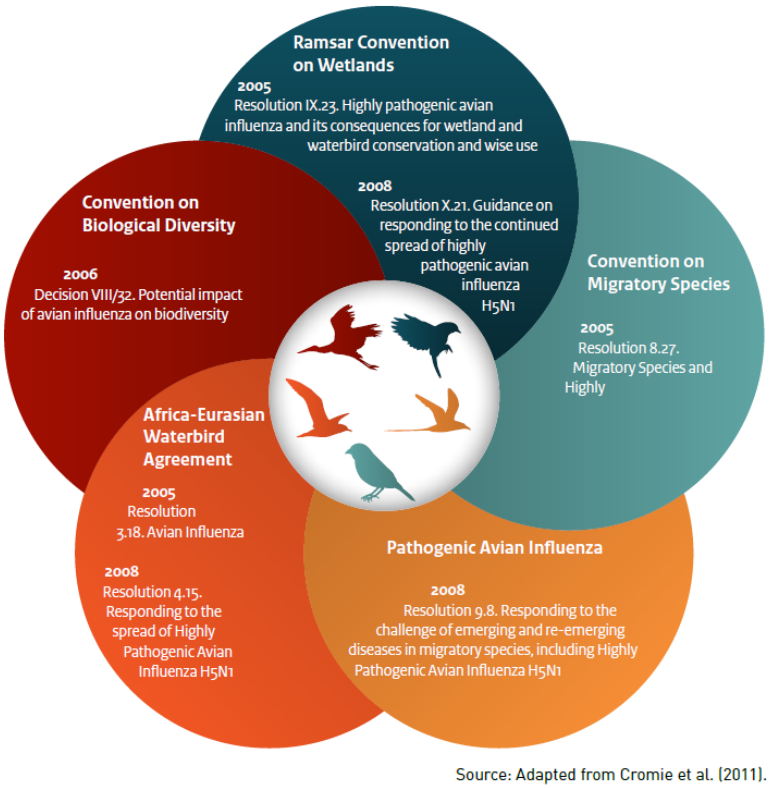
Other biodiversity and water-related multilateral environmental agreements

The Biodiversity Liaison Group, through which Secretariat-level collaboration among the biodiversity-related MEAs occurs, includes: the Convention on Biological Diversity (CBD); the Convention on the Conservation of Migratory Species of Wild Animals (CMS); the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES); the International Treaty on Plant Genetic Resources for Food and Agriculture (ITPGRFA); the International Plant Protection Convention (IPPC); and the World Heritage Convention (WHC).

Ramsar also cooperates with the Joint Liaison Group of the three Rio Conventions, which consists of the CBD, the UN Framework Convention on Climate Change, and the UN Convention on Combatting Desertification. In addition, Ramsar also collaborates with two other global water Conventions: the UN Convention on the Law of the Non-navigational Uses of International Watercourses (the New York Convention), which governs shared freshwater resources, and the UNECE Convention on the Protection and Use of Transboundary Watercourses and International Lakes (the Helsinki Convention), which relates to cooperation regarding transboundary surface waters and groundwaters.

There are multiple opportunities for synergies across these agreements. Guidance on highly pathogenic avian influenza provides an excellent example where scientific bodies worked efficiently in a coordinated fashion (Cromie et al. 2011) (Fig. 3).

Continuing synergistic relationships among the biodiversity-related MEAs requires the commitment of time, funds, and administrative resources. For example, the Chairs of the Scientific Advisory Bodies (CSAB) of the biodiversity-related MEAs is a good mechanism to identify and develop joint products. However, CSAB has not met since 2013 in Italy. A planned meeting in the margins of CBD's Subsidiary Body on Scientific, Technical and Technological Advice in Canada in 2014 did not occur, and the group has remained inactive ever since (Gardner & Grobicki 2016). If cooperative and coordinated actions are to provide synergistic benefits, additional support is required.



Source: Adapted from Cromie et al. (2011).

Figure 3. Formal multilateral environmental agreement resolutions and decision concerning HPAI H5N1 in wild birds (2005-2008) (Gardner & Grobicki 2016).

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