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**Institute for Land,  
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# Requirements and the practicalities of considering climate change when implementing the Ramsar Convention

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# The 4th Strategic Plan 2016 – 2024



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## The Convention on Wetlands of International Importance

### The Mission of the Ramsar Convention

**Conservation and wise use of all wetlands through local and national actions and international cooperation, as a contribution towards achieving sustainable development throughout the world.**

**To achieve this Mission it is essential that vital ecosystem functions and the ecosystem services they provide to people and nature are fully recognized, maintained, restored and wisely used.**

# Ecological Character?

**The Ramsar Convention text adopted in 1971 introduced the concept of the “ecological character” of wetlands in its Article 3.2, which required Contracting Parties to**

**“...arrange to be informed at the earliest possible time if the ecological character of any wetland in its territory and included in the List has changed, is changing or is likely to change as the result of technological developments, pollution or other human interference.”**

**“The List” refers to the List of Wetlands of International Importance, usually known as Ramsar sites.**

# Definition of Ecological Character



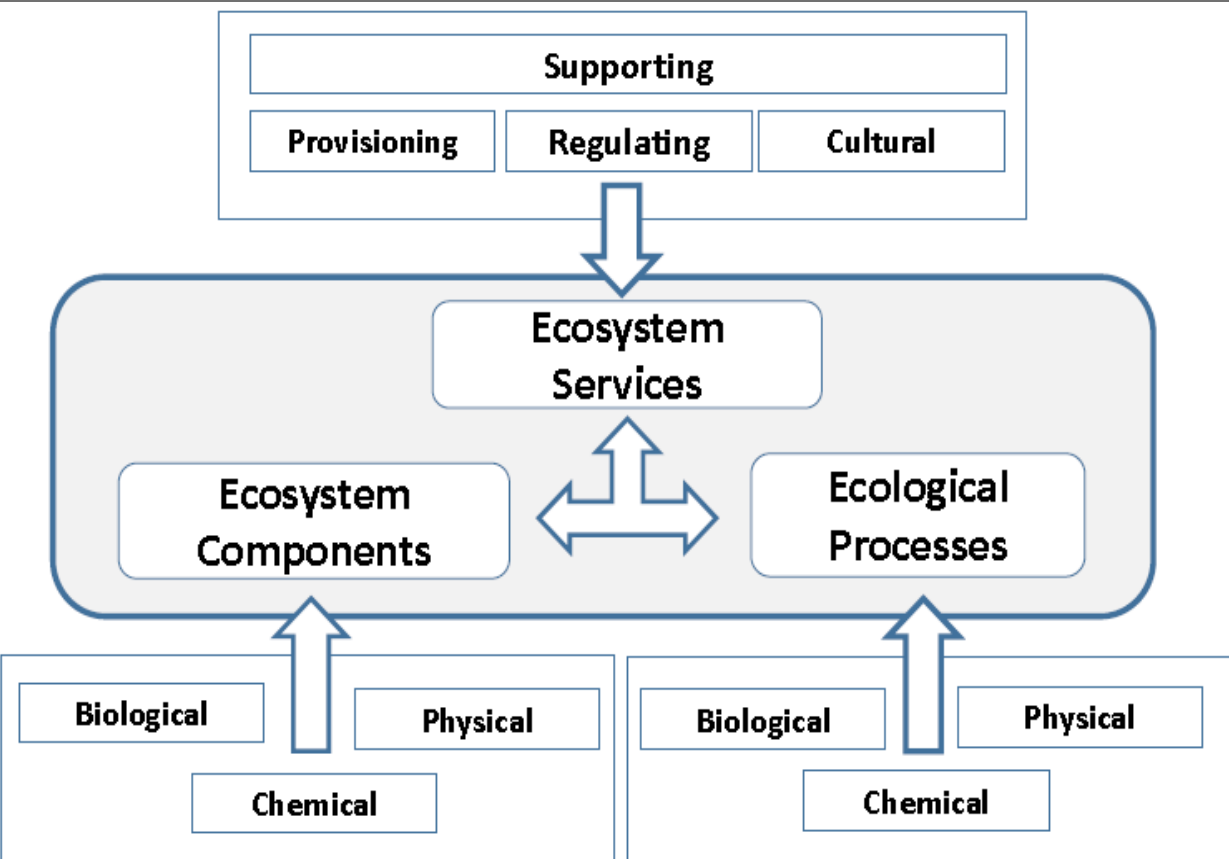
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Ecological character is the combination of the ecosystem components, processes and benefits/services that characterise the wetland at a given point in time (Ramsar Convention 2005).

*Ecological Character =  $\Sigma$  (Ecosystem Components + Ecological Processes + Ecosystem Services)*

Big difference from previous considerations was the inclusion of ecosystem services within the character of the wetland, not just something derived from the wetland – a social-ecological concept

# Pictorial presentation of Ecological Character

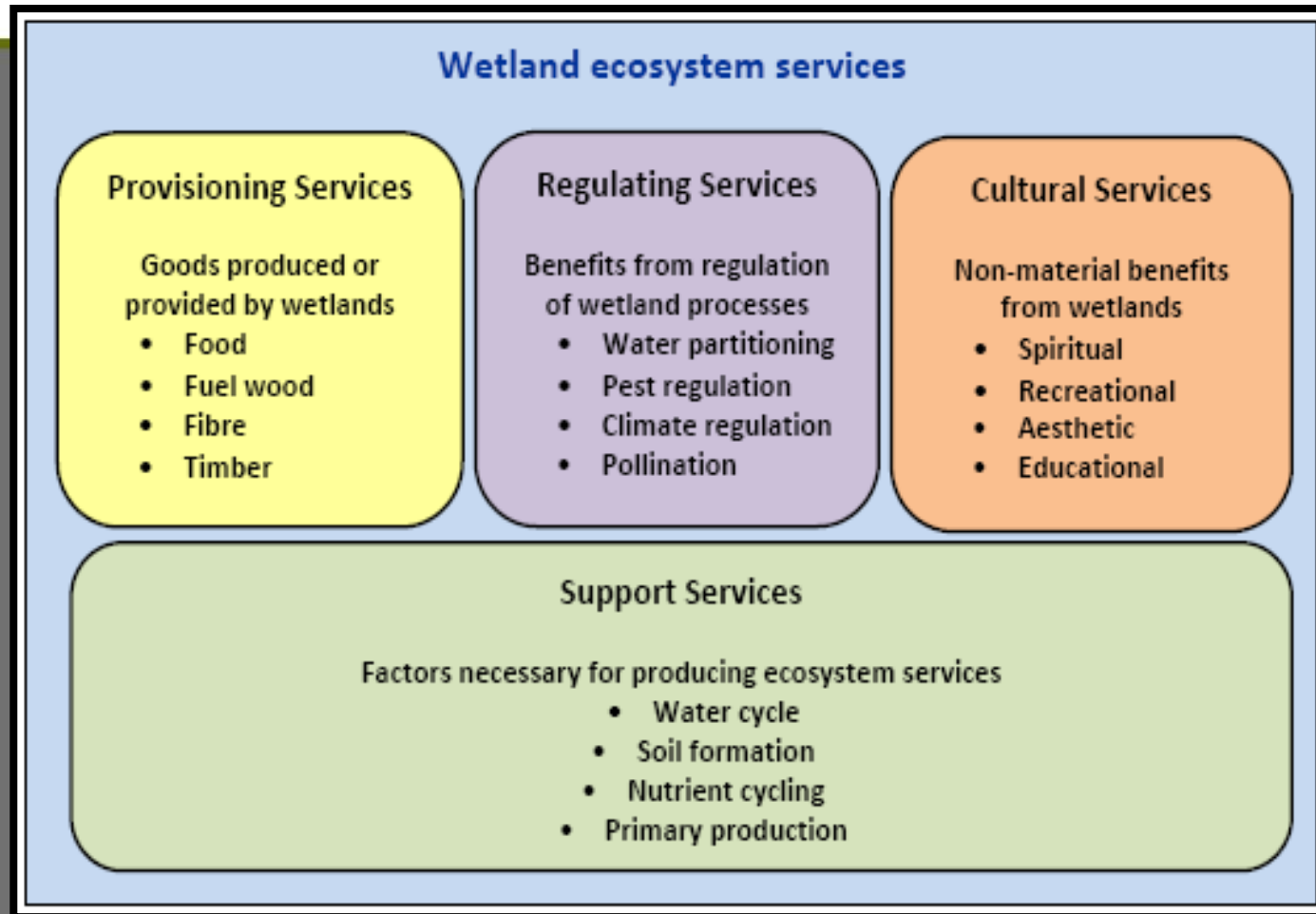


**For any wetland it is the sum of and interactions between**

- **ecosystem components**
- **ecological processes**
- **ecosystem services**

**and their sub-categories**

# Ecosystem services – different classifications exist



## Consolidated list of wetland ecosystem services

Relative importance of ecosystem services derived from different types of wetland ecosystems (based on expert opinion and from the Millennium Ecosystem Assessment 2005). The information represents a global average; there will be local and regional differences in importance, and further services could be added as considered important and where adequate information is available.

**H** High  
**M** Medium  
**L** Low  
**?** Not known  
**na** Not applicable

Wetland types / Services	Inland wetlands					Coastal / marine wetlands							Human-made wetlands					
	River Stream	Lake	Peatland	Marsh Swamp	Underground	Salt Marsh	Mangrove	Seagrass	Coral Reef	Shellfish Reef	Lagoon	Kelp	Reservoir	Rice Paddy	Wet Grass	Waste Ponds	Salinas	Aqua Ponds
<b>Provisioning services</b>																		
Food	H	H	H	H	na	H	H	M	M	M	M	L	M	H	H	L	H	H
Fresh water	H	H	L	M	H	L	na	na	na	na	L	na	M	na	na	L	na	Na
Fibre & fuel	M	M	H	H	na	L	H	na	na	na	M	na	L	na	na	L	na	L
Biochemical products	L	?	?	L	?	L	L	?	L	?	?	L	?	na	?	?	L	?
Genetic materials	L	L	?	?	?	L	L	?	L	?	?	?	L	L	?	?	L	L
<b>Regulating services</b>																		
Climate	L	H	H	H	L	H	H	H	M	L	L	na	M	L	L	na	L	na
Hydrological	H	H	M	M	L	M	H	na	na	na	M	na	H	M	L	na	na	na
Pollution control	H	M	M	H	M	H	H	L	L	na	M	?	L	L	H		na	na
Erosion protection	M	M	M	M	H	M	H	L	M	M	L	L	L	M	M		M	na
Natural hazards	M	H	M	H	na	H	H	M	H	M	M	L	L	L	L	na	M	na
<b>Cultural services</b>																		
Spiritual & inspirational	M	H	M	M	L	?	L	?	H	na	M	na	M	L	L	na	M	na
Recreational	H	H	L	M	L	?	?	?	H	na	M		H	L	L	na	L	na
Aesthetic	M	M	L	M	L	M	M	na	H	na	M	na	H	M	M	na	M	na
Educational	H	H	M	M	L	L	L	L	L	L	L	L	H	L	L	L	M	L
<b>Supporting services</b>																		
Biodiversity	H	H	H	H	H	M	M	L	H	M	M	L	M	M	M	L	M	L
Soil formation	H	L	H	H	na	M	M	na	Na	na	na	na	L	M	L	L	L	na
Nutrient cycling	H	L	H	H	L	M	M	L	M	na	M	L	L	M	L	H	L	L
Pollination	L	L	L	L	na	L	M	M	Na	na	?	?	L	L	M	L	L	na



# Wise use of all wetlands



The term **“wise use of wetlands”** originates in the text of the Ramsar Convention in 1971. Initially it was not defined but it was made clear that it expressed an aim to **combine conservation and sustainable use of resources**.

A formal definition of “wise use” was adopted in 1987, and modified in 2005 with an emphasis on the **“maintenance of wetland ecological character”** as the central tenet.

A quantity of guidance material has been published to support the implementation of wise use for all wetlands.



# Definition of Wise Use

**“... the maintenance of their ecological character, achieved through the implementation of ecosystem approaches, within the context of sustainable development.”**

**While “use” and “conservation” had previously been seen as different things, to be reconciled by a “balancing” notion of sustainability but is now primarily about maintaining the capability for use, rather than using, subject to a sustainability caveat. Doubt that this has been understood let alone operationalised.**

# Vulnerability to climate change

**Wetlands are highly vulnerable to anthropogenic climate change and this is likely to have significant consequences for their ecological character – negative v positive or indeterminate?**

**Climate change can affect the ecological character of wetlands directly (via the effects of warming) and indirectly (through interaction with other pressures and adaptation measures)**

**This has been formally recognised as occurring in Australia at Muir-Byenup Ramsar site – dying conditions impacting on peat areas. Also impacting on mangroves?**

# Climate change already impacting on wetlands



**Muir-Byenup Ramsar site,  
Western Australia**



**?Mangrove dieback – Gulf of Carpentaria**

1. Risk Assessment – establish present status and recent trends by characterising the present biophysical and social systems and the past/present drivers of change and determine the risk of particular hazards having an adverse impact on the ecological character of the wetland.

Excellent Good Poor

2. Risk Perception – assess the sensitivity and adaptive capacity of the wetland based on the risk of particular hazards; develop plausible scenarios for drivers of change.

Sensitivity

Low

Moderate

High

Adaptive capacity

High

Moderate to Low

3. Risk Minimisation/Management – develop responses to minimise the risk of large or abrupt changes in the ecological character of the wetland; trade-offs may be needed between responses and to overcome constraints.

Not vulnerable  
- no responses

Vulnerable - develop responses  
and address constraints

Underpinned by adaptive management - monitoring & learning

Vulnerability assessment framework (from Gray et al. 2011)

Sensitivity	Adaptive capacity		
	High	Medium	Low
High			Highly vulnerable
Medium		Vulnerable	
Low	Not vulnerable		

Vulnerability assessment as a function of sensitivity and adaptive capacity (from et al. 2011)

# Vulnerability assessment – understanding ecological change in wetlands

## Risk and vulnerability assessment of key features of the wetlands in Sydney Olympic Park wetlands

Wetlands	Risk from existing threats [Rating: H- High; M- Medium; L- Low]		Vulnerability to climate change		
	Risk Factor	Risk Rating	Sensitivity	Coping Capacity	Vulnerability
Newington Nature Reserve	Grey Mangrove colonises Coastal Saltmarsh and open mudflats	H	H	M	Highly Vulnerable
	Terrestrial weeds invade upper areas of Coastal Saltmarsh	H	H	H	Vulnerable
	The texture and elasticity of mudflat sediment in the Main Lagoon deteriorates and wading birds usage decline	H	H	M	Highly Vulnerable
	Coastal Saltmarsh expands into open mudflat areas	H	H	M	Highly Vulnerable
	Swamp Oak forest retreats due to expansion by Coastal Saltmarsh	H	H	M	Highly Vulnerable
	Sediment and landslide cause physical damage to Coastal Saltmarsh, Swamp Oak and Grey Mangrove beds	H	H	H	Vulnerable
	Rumple and channels silt-up and create extended pools and habitats for pest mosquito breeding and hatching, with potential for Ross River Virus infestation	H	H	H	Vulnerable
	Higher tides (height and frequency) due to sea level rise and storm events affect Saltmarsh, Mangrove and Swamp Oak	H	H	M	Highly Vulnerable
	Higher tides (height and frequency) due to sea level rise and storm events affect pathways and other assets	H	H	M	Highly Vulnerable
Badu mangroves & Lake Belvedere	Grey Mangrove colonise on Coastal Saltmarsh areas and open mudflats particularly in the Waterbird Refuge and the constructed tidal channels	H	H	M	Highly Vulnerable
	Terrestrial weeds invade upper areas of Coastal Saltmarsh	H	H	H	Vulnerable
	Rumple and channels silt-up and create extended pools and habitats for pest mosquito breeding and hatching, with potential for Ross River Virus infestation	H	H	M	Highly Vulnerable
	Toxic Blue-green algae outbreak persists in Lake Belvedere	H	H	H	Vulnerable
	The texture and elasticity of mudflat sediment in the Waterbird Refuge deteriorate and wading birds usage decline	H	H	M	Highly Vulnerable
	Higher tides (height and frequency) due to sea level rise and storm events affect Saltmarsh, Mangrove and Swamp Oak	H	H	M	Highly Vulnerable
	Higher tides (height and frequency) due to sea level rise and storm events affect pathways and other assets	H	H	M	Highly Vulnerable

# **The huff, puff and bluff**

**Presentation at Society of Wetland Scientists annual meeting, Denver (USA), June 2018**

**Referring to the negotiation processes within the Ramsar Convention on Wetlands from 2002-2015.**

**4 formal resolutions negotiated at the Convention's Conference of Parties (formal decision making – 170 countries, observers, and advisors including bewildered scientists).**

**My general impression as a technical advisor to the negotiations – the delegates have failed to get there despite ample opportunity**

**- Country delegates not technical advisors who make the decisions; observers / advisors contribute only where invited, and the latter redraft the negotiating text overnight.**

## Implications for policy

**Ramifications for existing policy and management for maintaining the ecological character of wetlands – wetlands are under pressure and this likely to increase**

**Managers require guidance on how to assess and respond to the consequences of climate change given the obligation under the Convention to report any adverse changes in Ramsar sites and the ongoing degradation of wetlands globally**

# Principles for wetland policy under climate change

**Key principles to inform wetland conservation and management policy within the context of climate change:**

**1. Objectives and targets for wetland management should look mainly (but not exclusively) to accommodate and compensate for climate change, rather than accept or avoid impacts**

**2. Objectives for wetland management under climate change should include ecological, social and economic targets across multiple scales and consider issues such as representativeness, connectivity, refugial values etc**



## Principles continued ....

**3. Flexible, governance and adaptive co-management frameworks across multiple scales and sectors are essential to managing wetlands under climate change – its not just about what conservationists want on their local wetland**

**4. Easily reversed, no-regret or low-regret adaptation options with multiple, cross-sectoral benefits should be implemented in the initial phases of adapting wetland management**

**Adaptation measures being considered are pretty much the same as the complementary measures being proposed – Baumgartner et al 2019**

## Principles continued

**5. Long-term management strategies should identify triggers for new actions including novel/high risk adaptation options (e.g. species translocations) and plan for these**

**6. Scientific monitoring and evaluation of management strategies are needed – hypothesis-based to prove the outcome not just general sampling and checking every now and then if something is happening; conceptual models and scenario analyses of change in ecological character would help identify critical parameters**

**What information is needed for managing wetlands under climate change and how do we use and share that information to inform best management practices?**

**Thank you**

