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# Overview of wetlands and their importance for biodiversity and ecosystem services provision

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**NERC** SCIENCE OF THE  
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# Structure of presentation

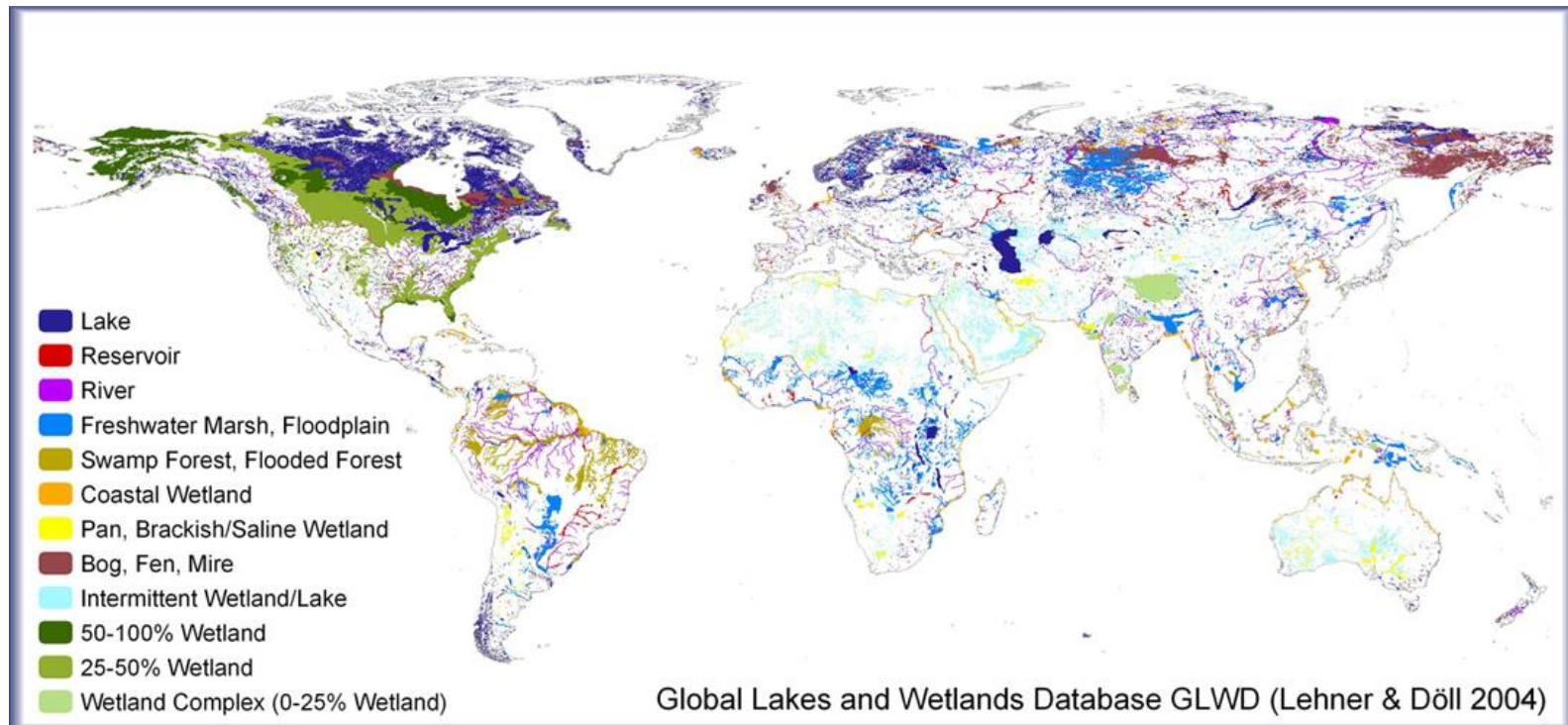
- Introduction
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# Introduction

# Definition of a wetland

A wetland is a place where the land is covered by water, either salt, fresh or somewhere in between. Marshes and ponds, the edge of a lake or ocean, the delta at the mouth of a river, low-lying areas that frequently flood - all of these are wetlands.

# Global distribution of wetlands



# Global extent of wetlands

Table 2.1 Recent estimates of global wetland area (adapted from Fluet-Chouinard et al., 2015).

Source	Size	Lakes (10 <sup>3</sup> km <sup>2</sup> )	Reservoirs (10 <sup>3</sup> km <sup>2</sup> )	Rivers (10 <sup>3</sup> km <sup>2</sup> )	Freshwater wetlands <sup>h</sup> (10 <sup>3</sup> km <sup>2</sup> )
Lehner and Döll 2004	≥10 ha	2,428 <sup>a</sup>	251	360	6,764–8,664
Lehner et al., 2011	≥1 ha	3,169 <sup>ab</sup>	295.3 <sup>bd</sup>		
	≥0.1 ha		301.8 <sup>bd</sup>		
	≥0.01 ha		305.7 <sup>bd</sup>		
Downing et al., 2006	≥1 ha	3,507 <sup>bc</sup>	258.6 <sup>b</sup>		
	≥0.1 ha	4,200 <sup>bc</sup>	76.8 <sup>e</sup>		
	Small <sup>e</sup>				
Downing et al., 2012				485–662	
Lewis, 2011	≥0.1 ha	3,100–4,200 <sup>bc</sup>			
McDonald et al., 2012	≥0.1 ha	3,786 <sup>bf</sup>			
Raymond et al., 2013	≥0.1 ha	2,740 <sup>bc</sup>	260 <sup>b</sup>	624	
Verpoorter et al., 2014	≥1 ha	4,760 <sup>g</sup>			
	≥0.2 ha	5,000 <sup>g</sup>			
Messenger et al., 2016	≥10 ha	2,677 <sup>ci</sup>	250		
	≥1 ha	3,232 <sup>bci</sup>			



# Global diversity of wetlands

- Highly diverse
- e.g. 32 common names for freshwater wetlands alone
- Highly dynamic
- Highly productive

Table 2.2 (continued)

Slough	A swamp or shallow lake system in the northern and midwestern United States. A slowly flowing shallow swamp or marsh in southeastern United States.
Swale	Elongated depression between dunes or coastal ridges roughly parallel to the coast.
Swamp	Wetlands dominated by trees or shrubs. In Europe forested fens and areas dominated by reeds ( <i>Phragmites</i> ) are also called swamps.
Tarn	Small lake in the mountains, often with no significant tributaries.
Tidal freshwater marsh	Marshes along rivers and estuaries close enough to the coastline to experience significant tides by non-saline water.
Turlough	Shallow depressions in a Carboniferous karst landscape subject to periodic flooding mainly from groundwater.
Vernal pool	Shallow temporary pools with seasonal flooding.
Vlei	Southern-African term for a shallow, seasonal or intermittently flooded lake.
Wet meadow	Waterlogged grassland but without standing water for most of the year.
Wet prairie	Similar to a marsh but with water levels usually intermediate between a marsh and a wet meadow.

Table 2.2 Some common names for freshwater wetlands in English (taken largely from information contained in Finlayson and van der Valk, 1995b and Mitsch and Gosselink, 2015).

Billabong	Australian term that is loosely used to describe lagoons in cut off meanders and remnant pools in stream channels.
Bog	A peat-accumulating wetland that has no significant inflows or outflows and supports acidophilic mosses, particularly sphagnum. Includes domed and blanket bogs.
Bottomland	Lowlands, usually forested, along streams and rivers, usually on alluvial floodplains that are periodically flooded.
Carr	Wetland dominated by woody vegetation.
Delta	Fan-shaped accumulation of alluvial sediments usually at the mouth of a river. Inland deltas also occur.
Fen	A peat-accumulating wetland that receives some drainage from surrounding mineral soil and usually supports marsh vegetation.
Lark	Permanently or temporarily flooded depression containing sparse peat forming vegetation in peatlands.
Lagg	Marginal stream or swamp fringing a domed bog.
Lake	Large body of standing water surrounded by land.
Lagoon	Term frequently used to denote deep-water enclosed or partially opened aquatic system, especially in coastal regions.
Loch/Lough	Irish and Scottish term for a lake or sea inlet. A lochan is a small loch.
Marsh	A frequently or continually inundated wetland with emergent herbaceous vegetation in a mineral soil substrate.
Mire	Synonymous with any actively peat-accumulating wetland.
Moor	Synonymous with any peatland. A 'highmoor' is a raised bog, while a 'lowmoor' is a peatland in a basin that is not elevated above its perimeter.
Muskeg	North-American term for large expanses of peatlands or bogs.
Peatland	A generic term for a wetland with a naturally accumulated layer of partly decayed plant matter greater than 30 cm deep under permanent water saturation.
Playa	Flat-bottomed depression in arid or semi-arid regions with distinct wet-dry seasons.
Polje	Flat-floored enclosed depressions with karstic drainage which may be dry or occur as seasonally flooded wetland or permanent lakes.
Pond	Small pool of standing water.
Pothole	Shallow marsh-like ponds, particularly in the USA and Canadian prairie provinces.
Reed swamp	Marsh dominated by <i>Phragmites</i> (common reed); term used particularly in Europe.
Riparian system	Ecosystems with a high water table because of proximity to an aquatic system, usually along a stream or river.

# Global extent of 'Salt/brackish marsh'

- 'Salt/brackish marsh' is the rarest wetland type and comprises only approx. 0.5% of global wetland surface area

Table 2.3 Estimates of area of wetland types globally (adapted from Finlayson et al., 2016 using information from multiple sources).

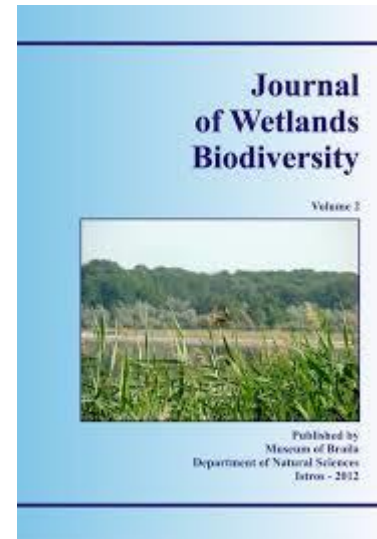
Wetland type	Area km <sup>2</sup>	Reference
Peatlands	4,000,000	Multiple sources compiled by Joosten 2010.
Tropical freshwater swamps (mineral soil)	1,460,000	Multiple sources summarised by Giessen 2016.
Tropical peat swamps	441,025	Page et al., 2011.
Seasonal rice fields	1,628,200	IRRI, 2016.
Freshwater lakes	2.7–5,000,000	Multiple sources, refer to Table 1.
Reservoirs > 10 ha	284,700	Lehner et al., 2011.
Salt/brackish marsh	67,580	From Schuyt and Brander, 2004 and reported by Tiner 2013.



# Importance for biodiversity

# Wetlands support extremely high biodiversity

- Comprise very diverse, dynamic and productive habitats
- Amongst the most complex ecosystems on the globe
- The variety of organisms which has adapted to these diverse wetland habitats is extremely high and includes all major groups of plants and animals



Bacon (1997)

# Ecosystem services provision

# Wetlands contribute to human well-being through ...

- **Provisioning ecosystem services** (e.g. water, timber, fibre)
- **Regulating ecosystem services** (e.g. air quality regulation, climate regulation, water purification, disease regulation, pest regulation, pollination, natural hazard regulation)
- **Cultural ecosystem services** (e.g. spiritual enrichment, recreation, ecotourism, aesthetics, education, inspiration, cultural heritage)
- **Supporting ecosystem services** (e.g. nutrient cycling and primary productivity that underpin the above services)



# Summary

- Wetlands are highly diverse, dynamic and productive
- 'Salt/brackish marsh' is the rarest wetland type
- The variety of organisms which has adapted to wetland habitats is extremely high and includes all major groups of plants and animals
- Wetlands contribute to human well-being through a diverse array of provisioning, regulating, cultural and supporting ecosystem services