Wetlands: Definition, Types, Importance, World's Top 10 Wetlands

Wetlands are areas where water covers the soil, or is present either at or near the surface of the soil all year or for varying periods of time during the year. This includes swamps, marshes, bogs, and similar areas. Wetlands play a critical role in supporting biodiversity, filtering water, storing carbon, and regulating water flows.

Definition of Wetland

The Ramsar Convention 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." In simple words, wetlands are transition zones where the flow of water, the cycling of nutrients, and the energy of the sun meet to produce a unique ecosystem characterized by hydrology, soils, and vegetation making the area distinct from adjoining lands. Study of Wetlands is called *Paludology*.

World's Top 10 Wetlands

World's largest wetland is Pantanal, which is spread in Brazil, Bolivia and Paraguay. Here is a table of the 10 largest wetlands in the world, ranked by their approximate size:

Rank	Name of Wetland	Location	Approximate Size (km²)
1	Pantanal	Brazil, Bolivia, Paraguay	140,000 – 220,000
2	Río Negro	Brazil	120,000
3	Ngiri-Tumba-Maindombe	Democratic Republic of the Congo	66,000
4	Queen Maud Gulf	Canada	62,780
5	Grands affluents	Congo	60,000
6	Sudd	South Sudan	57,000
7	Okavango Delta	Botswana	55,300
8	Gueltas et Oasis de l'Aïr	Niger	49,200
9	Plaines d'inondation des Bahr Aouk et Salamat	Chad	49,200
10	Esteros del Iberá	Argentina	12,000 (45,000 in the Iberá macrosystem)

Types of Wetlands

There are many types of wetlands, characterized by factors like water type (fresh, salt, or brackish), flow of water (flowing or stagnant), and composition of the soil. Major types of wetlands include:

- **Marshes:** Dominated by soft-stemmed vegetation adapted to saturated soil conditions.
- **Swamps:** Dominated by woody plants and best developed in relatively flat, nutrient-rich areas.

- **Bogs:** Acidic wetlands with a high peat content and mosses forming a thick mat overlying poor nutrient supply and anoxic conditions.
- **Fens:** Peat-forming wetlands fed by nutrient-rich surface water or groundwater seepage.
- **Mangroves:** Tropical and subtropical coastal wetlands dominated by mangrove trees and shrubs.

Importance of Wetlands

Wetlands are among the most productive ecosystems in the world. Here are some of the major reasons wetlands are so important:

Mitigating Climate Change

Wetlands act as carbon sinks, long-term storage reservoirs of carbon fixed through photosynthesis. Thanks to water-logged, low oxygen conditions, dead plant material decomposes very slowly and builds up as peat. This sequesters atmospheric carbon and mitigates greenhouse gas emissions driving climate change.

Storing and Regulating Water Flows

The saturated soils and plants of wetlands slow down and store large amounts of water during peak flows, like monsoons or snowmelts. This reduces floods downstream and regulates baseflows during dry periods. Coastal wetlands also act as buffers to protect shorelines against storms and wave damage.

Supporting Biodiversity

Wetlands support extraordinarily rich biodiversity both in water and on land. Up to 40 percent of global species rely directly or indirectly on wetlands for survival including important populations of amphibians, water birds, fish, mammals, reptiles, and invertebrates. Many species use wetlands to breed, nest, forage and take shelter – especially migratory waterfowl that travel vast distances annually between nesting and wintering habitats.

Filtering Water

The microbes living on wetland plant roots and soil particles convert nutrients and pollutants like fertilizers, pesticides, or heavy metals to less harmful forms. Sediment and pathogens also get trapped as water moves slowly through wetland areas. This filtering improves downstream water quality and health of connected water bodies and habitats.

Threats to Wetlands

Unfortunately, wetlands around the world have been widely destroyed or degraded through human activity in the past century. Here are some major factors threatening wetlands globally:

Drainage and Land Conversion

The biggest cause of wetland loss is drainage so the land can be used for agriculture, real estate, or other development. Over 50 percent of wetlands in North America, Europe, and Asia were lost during the 20th century after being drained.

Pollution

Fertilizer, chemical pesticide, and pathogenic bacteria runoff leads to damaging levels of nutrient loading and toxicity in many wetlands. Oil spills and the dumping of other hazardous wastes also introduce pollution.

Overexploitation

Excessive water withdrawals for irrigation or drinking water lower water tables critical for maintaining wetland health. Overgrazing, destructive fishing methods like dynamite also damage fragile wetland ecosystems.

Invasive Species

Invasive plants, fish, or invertebrates outcompete native species for resources and habitat. They displace endangered endemic species and alter ecosystem functioning.

Climate Change

Changing weather patterns and extreme events like prolonged droughts or severe floods destroy wetland vegetation and organisms adapted to specific conditions. Sea level rise also threatens coastal and estuarine wetlands.

Preserving Wetlands

Reversing global wetland loss is crucial for regulating climate, securing clean water supply, controlling floods, and protecting biodiversity. International agreements like the Ramsar Convention protect wetlands of international importance. But grassroots wetland restoration and stronger national policies are equally critical. Creating an extensive network of protected wetlands also offers a nature-based solution to address environmental issues.