

Reservoirs of biodiversity



Wildebeest and Lesser Flamingos form part of the rich array of wildlife that abound on and around seasonal wetlands in Ngorongoro Conservation Area in the Crater Highlands area of Tanzania, Africa. Photo © David Rogers

Biological diversity – or biodiversity – is the term given to the variety of plant and animal species found in a particular area, whether the whole Earth, a country, a single forest or a back-yard pond. The biodiversity we see today results from billions of years of evolution, shaped by natural processes and, increasingly, by the influence of humans.

Each ecosystem type – be it forests, wetlands, deserts or oceans – contributes uniquely to the planet’s overall biodiversity by supporting plants and animals specially adapted to living in particular conditions.

Wetlands cover a relatively small area of the Earth’s surface compared to some other ecosystems. However, many wetlands are extremely rich in biodiversity and many species of plants and animals are completely wetland dependent – they cannot survive without wetlands. Indeed, coastal wetlands, such as mangroves, coral reefs, estuaries, and seagrass beds, contain some of the most biologically diverse and productive communities in the world.

Australia’s Great Barrier Reef, for example, supports 1,500 species of fish and up to 8,000 molluscs, not to mention countless species from other groups. Intertidal mudflats, on the other hand, often have relatively low species diversity, but are immensely productive. The vast numbers of invertebrates such as worms and small shellfish contained in the mud provide food for internationally important populations of migratory waterbirds. Mudflats, saltmarshes, mangroves and seagrass beds are also important nursery areas for many commercial fish stocks.

The Amazon basin contains the largest number of freshwater fish species in the world – more than 3,000, many of which are important dispersers of tree seeds. The Piramutaba catfish *Brachyplatystoma vaillantii* is thought to migrate more than 3,300 km from its nursery grounds near the mouth of the Amazon to spawning grounds in Andean tributaries some 400 m above sea level.

Altogether, about 100,000 different species of animals have so far been identified from the world’s freshwater wetlands alone. Of these, about half are insects and some 20,000 are vertebrates. New discoveries are continually being made: around 200 species of freshwater fish are still being discovered every year, for example.

In brief...

- ◆ **Ecosystem & species richness** – the many different types of wetlands around the world support a vast array of plants and animal species.
- ◆ **Species abundance** – species from some groups of animals, such as fish, invertebrates and waterbirds, may occur in huge concentrations in wetlands.
- ◆ **Uniqueness** – some species are endemic to particular wetlands, meaning they are found nowhere else on Earth.
- ◆ **Genetic variation** – safeguarding the variety of life in different types of wetlands in different parts of the world is a vital part of humanity’s insurance policy for a sustainable future.
- ◆ **Economic value** – wetland plants and animals provide people with countless products, that are harvested, bought, sold and bartered all over the world, from fish, to building materials, to medicines.
- ◆ **Under threat** – wetland species are declining faster than those from other ecosystems, as a result of land conversion and excessive water abstraction.

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In late 2008, WWF, the conservation organization, launched a report detailing how over a thousand new species had been discovered in the Mekong River Basin of Southeast Asia during the preceding decade, among them a large number of species dependent on wetlands.

An important feature of the biodiversity of some wetlands is the high proportion of endemic species – animals and plants that are found nowhere else in the world. Examples include lakes that have been physically isolated from other water bodies for long periods of time, enabling new, uniquely adapted, species to evolve. Such is the case for Russia's Lake Baikal and the Rift Valley Lakes of East Africa. In Slovenia, extensive subterranean wetlands have developed their own unique fauna in a world of total darkness.

“There is increasing evidence of a rapid and continuing widespread decline in many populations of wetland-dependent species.”

Millennium Ecosystem Assessment

The rich biodiversity of wetlands also translates into hard monetary value. The fishery of the Lower Mekong basin (shared by Cambodia, Laos and Vietnam) is vitally important to the livelihoods of the basin's 55 million people, many of whom derive an income from catching, processing or selling fish, which constitutes the main source of animal protein in the region.

Wildlife is also an important draw for recreation and tourism; for example, in Florida the total economic value of wildlife watching was estimated at US\$ 1.6 billion in 2001.

Mangroves have been used to produce traditional remedies in areas of the world as widely separated as the Caribbean and Australia. Modern medical research has proven that the Red Mangrove *Rhizophora mangle* has antibacterial, wound-healing and anti-ulcer effects and strong antioxidant properties.

Alarmingly, the role of wetlands as reservoirs of biodiversity is under siege. The Millennium Ecosystem Assessment found that damage to and loss of wetlands is more rapid than that of other ecosystems. As a result, species dependent on both freshwater and coastal wetland are declining faster than those reliant on other ecosystem types.

Recent assessments of the global status of wetland species have put the percentage of species that are considered threatened among the various animal groups at 17% of wetland birds, 38% of freshwater-dependent mammals, 33% of freshwater fish, 26% of freshwater amphibians, 72% of freshwater turtles, 86% of marine turtles, 43% of crocodilians and 27% of coral reef-building species.

The underlying drivers behind the loss of wetland biodiversity include habitat change (such as drainage and infilling for agriculture or construction), climate change, pollution, the spread of invasive 'alien' (non-native) species and over-exploitation of resources (e.g. overfishing).

The introduction of invasive alien species has caused local extinctions of native freshwater species. Two-thirds of the freshwater species introduced in the tropics and more than half of those introduced to temperate regions of the world have established thriving populations. In the absence of natural predators and diseases, these may rapidly overwhelm native plants and animals, as is the case with Water Hyacinth *Eichhornia crassipes* in many African wetlands, or Purple Loosestrife *Lythrum salicaria*, a Eurasian plant of freshwater marshes that has run rampant across North American wetlands.



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