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The world's wetlands are under threat. Half of them may have been destroyed in the past 100 years alone. Our current over-use of fresh water resources and projected future increases pose serious threats - not only to the continued maintenance and functioning of wetland ecosystems and their biological diversity, but to the essence of human well-being.

Fresh water is a limited and finite resource: the uneven distribution of fresh water has long been a source of concern. Only 2.5 per cent of the total water volume on Earth is fresh water: the rest is saline.

Wetland habitats are among the most heavily impacted and degraded of all ecological systems, worldwide. What is perhaps even more important is the fact that the only factor to which this degradation can be attributed is human interference and mismanagement of what is, essentially, one of the most important elements for life on Earth.

We cannot live without fresh water. It's as simple as that. In the coming decades, problems associated with the lack of fresh water or access to safe, unpolluted, waters are set to reach global proportions. The solution is not to be found in a

single response. It requires a concerted, multifaceted approach to managing natural resources with stakeholders at all levels, from isolated village communities to global industries and world leaders. In order to meet today's and tomorrow's demands for safe, fresh water, we must work together to find an acceptable compromise to what is otherwise destined to be a problem of global scale.

Wetlands in Retreat

The term "wetlands" refers to a broad collection of water-based ecosystems, but more than 50 definitions of wetlands are used worldwide. Wetlands vary enormously in size - from tiny village ponds to lakes, bogs, marshes, rivers, and the largest inland delta in the world, the Okavango Delta in Botswana - and character.

The world's wetlands are shrinking. Conversion of swamps, marshes, lakes and floodplains for agriculture, housing and industrial schemes has led to dramatic alterations of landscapes and ecosystem functioning. The United States has already lost some 87 million hectares (54 per cent) of its original wetlands, mainly to agriculture. In the late 19th century, drainage of the Pinsk marshes in Russia destroyed 1.5 million hectares of wetlands. In Europe, Italy has lost about 94 per cent of its wetlands, while Ireland has lost an equivalent amount of its peat bogs. Similar examples can be found around the world. With 47 per cent of the world's inhabited land

being in river valleys, it is not surprising that impacts of this nature occur. What is alarming, however, is that the consequences of this action are still unclear, as well as the rate at which this process is advancing. The abuse of wetlands – their unwise use – reduces their ability to perform useful functions such as water retention and flood control, to supply services and, in many cases, valuable products. Replacing these goods and services – where it is possible – incurs heavy financial and environmental costs.

Industries with a Thirst

Agriculture has been one of the main reasons for the dramatic rate at which wetlands have disappeared. Persistent agricultural subsidies and surpluses are responsible for the transformation of hundreds of thousands of hectares of wetlands in the developed world.

Globally, agriculture accounts for 65 per cent of the total water withdrawal on Earth. Different parts of the world rely on water for agriculture to different extents. Agriculture represents 69 per cent of total water withdrawal in Africa, with the industrial sector accounting for just 5 per cent, while in North America, the industrial sector claims 47 per cent of total water use, with 39 per cent going to agriculture. Large-scale irrigated agriculture supplied by underground waters or by diversions from rivers can be extremely wasteful and have long term environmental impacts. The amount of water used in irrigation has increased 10 times in the past 100 years: 235

million hectares of land are currently irrigated worldwide. Plans are set for further expansions.

Natural fresh water wetlands cover at least 570 million hectares. There are, however, major problems with estimating the global wetland area with any degree of certainty: different countries define wetlands in different ways, the methods used to measure the extent of these areas vary considerably, and some countries have far better records than others do. Thus, in addition to not knowing the global coverage of these ecosystems, we also do not know how much is being lost each year.

Other industries, while perhaps not so demanding on fresh water, pose additional problems to wetland ecosystems. Light industries such as paper making, brewing and those that use water for cooling return much of the water used, but this is often of a lower quality than when it entered the factory. Much water is also lost or wasted, whether in public water supply systems or through inefficient use and lack of recycling in industries, all of which leads to greater demands on less water resources in wetlands and reservoirs.

Muscling in on Native Species

Alien invasive species are important agents of biodiversity loss and represent a global threat to freshwater habitats and biodiversity. At least 140 alien species exist in the Great Lakes of North America, 10 per cent of which are known to have had significant impact on the local aquatic flora

and fauna. One of the most notorious of these is the zebra mussel, a species inadvertently introduced by ships trading between Europe and North America, where the ecological conditions are quite similar. In less than two decades, zebra mussels have not only outcompeted native mussel species and changed freshwater ecosystems in central and the eastern United States, but also cause expensive fouling problems on boats, docks and power plant intakes.

The introduction of the Nile perch to Lake Victoria equally demonstrates the devastating effect a single invasive species can exact. Lake Victoria originally had a high diversity of fish species, dominated by more than 300 cichlid species, 99 per cent of which were endemic – occurring nowhere else in the world. Twenty years after the introduction of the Nile perch to the lake – in a bid to provide larger fish for consumption – the ecological balance has been completely transformed. The Nile perch and two other species now dominate the fish fauna; as many as 60 per cent of the lake’s endemic cichlids are feared extinct.

Between 300 and 400 million people live close to – and depend on – wetlands. These complex habitats act as giant sponges, absorbing rainfall and slowly releasing this over time. Wetlands also help purify water, control floods and are essential sources of food for countless people worldwide.

Native to the Amazon basin, the water hyacinth

was introduced to many tropical and sub-tropical countries as an ornamental plant. Demonstrating an extraordinary ability to adapt to local conditions - a feature typical of "successful" invading species - the water hyacinth has invaded rivers, lakes and lagoons in numerous countries, causing enormous change and considerable problems. Forming dense mats of floating vegetation, the water hyacinth blocks out sunlight and changes water chemistry and oxygen levels. Indigenous plant and animal communities, especially fish, are affected, while navigation is disrupted and local communities experience reduced fish catches. African countries alone spend an estimated US\$60 million on the control of aquatic invasives.

Poisoned Waters

Pollution in wetlands is a growing concern, affecting drinking water sources and biological diversity. Drainage and run-off from fertilized crops introduce high concentrations of nitrogen and phosphorous nutrients to water bodies. Pesticides applied to cotton crops alone account for 25 per cent of the global insecticide market, but the area of cotton grown is just 2.4 per cent of the world's arable land.

The accumulation of toxic chemicals in the fatty tissue of animals can lead to reproductive failures, suppression of immune systems, genetic damage and death. Mercury used to separate gold from silt in illegal mining operations has a similar effect on organisms in the food chain, which goes far beyond the aquatic milieu. Toxic

pollutants such as pesticides are likely to be one of the most serious threats to biological diversity and human well-being in the 21st century. Non-point source pollutants are among the most difficult to monitor as their sources cannot usually be traced to a single location. Wetlands thus act as a reservoir for a range of pollutants, some of which are passed up and down through the complex food chains of these ecosystems, while others are transported to other wetlands and, eventually, the oceans.

But water pollution is not only linked to chemicals. High levels of sediment - often derived from the removal of vegetation cover in catchment areas - are equally detrimental to aquatic species, particularly fish, insects and filter feeding organisms. Turbidity also prevents sunlight from filtering through the water column, hampering the growth of aquatic plants and algae, important sources of oxygen for other organisms.

Taming the Waters

Few environmental debates are as contentious as those concerning dams. Since the first mud and stone dam was built on the Nile some 5,000 years ago, the actual size of dams as well as the areas of impounded water has increased dramatically. Worldwide, there are now more than 40,000 dams higher than 15m which, combined, hold water reservoirs that cover some 384,138km², an area larger than Belgium and Germany together.

Such dams are constructed for many purposes.

Almost 50 per cent of the world's dams are built for irrigation and another 20 per cent for electricity. With current water shortages and a growing unpredictability of water availability, dams are also now increasingly being built to guarantee domestic water and urban requirements.

Many concerns have been expressed over these structures. Every artificial water storage scheme will interrupt the natural flow of a river. The extent of any damage on the surrounding ecosystems will depend on the location and size of the scheme. On the other hand, many countries link economic development with the potential to develop hydroelectric power. Building a dam may contribute to economic and social destruction, or loss of biodiversity. Mechanisms need to be developed so that a country choosing not to build a dam in the interest of world heritage conservation, is duly compensated for this decision.

Save Wetlands for Future Generations and Life
Every indication points towards a declining quality and overall area of wetland ecosystems. Water shortages are expected to become severe in at least 60 countries by the year 2050. Concerns are mounting in relation to global security over wetlands and fresh water resources.

There is no single solution to these threats. The solutions involve much more than addressing

individual sites or specific ecosystems as fresh water is the natural resource that underpins much of life on Earth and is an integral part of almost every living creature. Wetland ecosystems are shared by many countries - there are over 300 transboundary river systems - and it is from this international level that action must be forthcoming if wetlands are not to be further compromised. Key to this will be actions that focus on bringing conservation and management requirements more in line with development activities, and vice versa, so that the two can focus on mutually obtainable goals.

Huge amounts of money are poured down the drain each year in inappropriate subsidies that contribute to wetland degradation and loss. Involving local communities in wetland management is proving to be an effective means of meeting local needs in terms of subsistence with conservation goals. Sustainable approaches such as these are slowly gaining recognition but, in the long-term, it is likely that these will have the most to offer - as long as there are still enough wetlands to go around.

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Pantanal

Each year, following heavy rainfall, hundreds of tributaries, lakes and swamps overflow their banks, spilling over onto the massive alluvial plain

of the Mato Grosso, transforming the entire region into the world's largest expanse of freshwater - the Pantanal which spans Brazil, Bolivia and Paraguay.

Everglades

The Florida Everglades have faced human pressure since the late 1800s. Draining the lakes, swamps and marshes, and altering the flow of water, resulted in the permanent loss of over half the original Everglades.

Coto Doñana

One of the largest and best-known wetlands in Europe, Coto Doñana National Park in Spain is particularly remarkable for the large breeding colonies of many bird species. Recent threats included the proposed construction of a holiday resort on its borders, and pollution from toxic mine tailings when an impoundment reservoir 40 miles north of the park broke and the waste entered the Guadiamar River.

Crater Lakes

Evolving in isolation from predatory species, endemic species of Tilapia in the Crater Lakes of Cameroon may be threatened by introduced species of fishes.

Mekong

Decisions regarding ambitious water diversion schemes could affect the lives and livelihoods of millions of people in the lower reaches of the Mekong River in China.

Sitio Web (URL):

<http://assets.panda.org/downloads/WETTHREATSEI>