



## The Importance of Wetlands

Wetlands include a wide range of ecosystems both in terms of their physical characteristics and their geographical distribution. This Factsheet focuses on their importance, which is often underestimated, and the causes of their degradation and loss - a major concern.

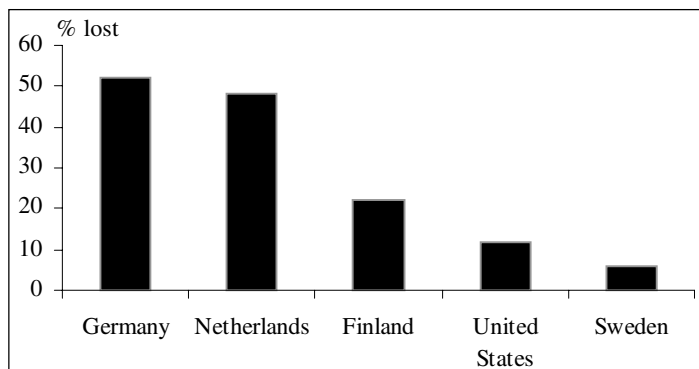
### What are wetlands?

The term "wetland" covers a diverse range of ecosystems such as lakes, rivers and lagoons.

The **Ramsar Convention** (named after the city in Iran where the convention was held in 1971) definition of a wetland states that wetlands are "areas of marsh, fen, peatland or water, whether natural or artificial, permanent or temporary, with water that is static or flowing".

It is thought that wetlands account for roughly 6% of the earth's land area although due to rapid rates of destruction and differing definitions this may now be an overestimate. Wetlands are probably the most threatened ecosystems in the world. In the USA, 22 states have lost more than 50% of their wetlands whilst in Europe two thirds of the wetlands that existed at the start of the twentieth century have now gone (Fig 1).

Fig 1. Wetland lost 1950 - 80



During the 1980s the first significant efforts at restoring wetlands began in MEDCs but now wetland conservation is a major business and about 50,000 hectares of wetlands were restored between 1987 & 1990.

The people living around the wetlands (thought to number between 300 & 400 million) need to be involved in wetland management so that wetlands can be managed sustainably for the future. In the marsh areas in Iraq are one such community.

### Why are wetlands so important ?

Wetlands are important and valued environments for many ecological, hydrological, climatic and human reasons. The value of a wetland depends on a number of different factors such as its age, size, depth, water chemistry, nutrient levels and geographical location.

#### Ecological reasons

- Wetlands are highly productive ecosystems, supporting complex food chains, many habitats and a high species diversity.
- Many wetlands provide nursery areas for fish and breeding grounds for birds, particularly water birds eg Malltraeth Marshes in Anglesey (see Case Study 2)
- Wetlands provide refuge for migratory waterbirds resting on their trips across the world to breed eg Le Marqueterie in the Bay of the Somme, Northern France.
- They provide important refuges for wildlife in drought - for instance De Hoop Vlei, a lake in South Africa (see Case Study 1)
- Wetlands provide vital habitats for threatened species such as the magnificent Bengal Tiger in the Mangrove Forests of the Sundarbans on the Indian Subcontinent, and the Western Swamp Tortoise which is only found in Western Australia and lives in only two wetland areas, the Twin Swamps & The Ellen Brook Nature Reserve.

#### Hydrological Reasons

- Wetlands provide flood protection through providing an area where flood water can spill over (these are often called washlands) thus protecting adjacent and downstream properties from potential flood damage. eg in the Ouse washes in Cambridgeshire
- Often the water table in wetland areas is close to or at the surface and wetlands act as reservoirs for the drainage basin by releasing the water they retain into other surface water stores, such as streams, as well as recharging ground water stores where they lie on aquifers.
- The quality of water in the drainage basin is maintained because wetlands filter out pollutants such as sediment, nutrients, organic and inorganic matter as runoff and surface water pass through them.
- Wetlands located at the margin of lakes protect shorelines and stream banks against erosion. Wetland plants hold the soil in place with their roots, absorb wave energy and reduce the velocity of rivers.

#### Climatic Reasons

- Wetlands create a more humid microclimate for the locality and this can have an important impact on flora and fauna, ways of life and economic activity.
- Plants, which absorb carbon dioxide whilst growing thus removing it from the atmosphere, then decay and under some circumstances develop into peat bogs. This process of **carbon sequestration** is thought to be an important process in reducing the enhanced greenhouse effect and the threat of global warming.

#### Defintitions

- **Artificial wetland** (or constructed wetland) – wetlands intentionally created from non wetland sites due to human activities. e.g irrigation.
- **Degradation** - The deterioration of a wetland area for instance in terms of water quantity and/or quality, wildlife or scenic quality as a result of human activity.
- **Destructional wetland**- A natural area of wetland which has been destroyed or lost.
- **Ramsar Site** – Over 1000 wetland sites worldwide have been recorded as Ramsar Sites and 170 countries have signed their commitment towards the international conservation of wetlands.
- **Restoration** – The re-establishment of wetland conditions to an area where wetland previously existed.
- **Washlands**- areas of the floodplain that are regularly covered by water during flood conditions.

**Human Reasons**

- Some wetlands provide fresh water supply for human consumption and other needs such as agriculture and industry.
- Many wetlands are of cultural significance such as gnamma holes in Western Australia which are an important aboriginal landscape feature
- They support the livelihoods of communities living around them through fishing or reeds for building and roofing such as at Illubabor, an area in the Oromia Region in the South West Highlands of Ethiopia with a variety of different wetland types (Table 1).
- Tourism is now an important source of income in some wetland areas such as the Okavango Delta of Botswana. In the USA it is estimated that \$59.5 billion is spent annually by adults hiking, fishing & boating.
- Wetlands have an intrinsic natural beauty and often provide areas of tranquillity giving inspiration for art. Examples include Monet's Water Lily series of paintings and literature such as Wordsworth's Prelude or the contemporary novel "Waterland" by Graham Swift set in the Fens of East Anglia.
- They provide opportunities for recreational activities such as boating, birdwatching, swimming and fishing such as at Lake Windermere in the Lake District of North West England.
- Places such as Wicken Fen in Cambridgeshire and the London Wetland Centre provide a valuable educational resource enabling people to learn more about the importance of wetlands.
- Wetlands may form natural political boundaries, which can sometimes be disputed as rivers migrate and lakes become infilled.

**Table 1. The uses of wetlands by the people of Illubabor, Ethiopia**

Wetland use	% of Illubabor population who benefit
Social/ceremonial use of sedges	100% (including urban dwellers)
Thatching reeds	85% ( most rural households)
Crop guarding hut construction	30%
Dry season grazing	Most cattle owners (30% of population)
Water for livestock	Most cattle owners (30% of population)
Cultivation	25%
Domestic water from springs	50-100%
Craft materials (palms & sedges)	5%
Medicinal plants	100%

**Causes of wetland loss & degradation**

More wetland loss over the last 100 years has occurred in MEDCs rather than LEDCs although in LEDCs the rate of loss has increased since the 1950s.

**Natural causes**

- The process of plant succession in wetlands naturally results in the gradual formation of dry land.

**Agricultural causes**

- Drainage for agriculture is the main cause of loss of wetlands worldwide, in the past in MEDCs but more recently in LEDCs
- Fertiliser use in the catchments of wetlands such as fertiliser can cause nutrient enrichment (eutrophication) resulting in the growth of algal blooms which may be harmful to some fish and water birds. Use of pesticides as well as accidental chemical/oil spills can often have a devastating impact on wildlife.
- Salinisation, due to the agricultural practise of inundation of crops by irrigation, can degrade wetlands. This results in a rise in the water table bringing with it to the surface dissolved salts that have accumulated in the soil. This can cause a reduction in water quality, alteration of invertebrate communities and the death of wetland plants that cannot tolerate high levels of salt.
- Over-exploitation of wetland products, such as fish or sedges, can disturb the ecological balance of a wetland. The use of peat bogs for peat extraction can devastate areas such as Hatfield Moor in Yorkshire.

**Alteration of natural water regimes**

- Dam building can result in the control of river flows and the supply of water to washlands and wetlands downstream of the dam are likely to be reduced. This can cause serious wetland degradation.
- River diversion can isolate wetlands from their former supply of water and result in the rapid drying up of wetlands eg the rivers Amu Darya & Syr Darya which have been diverted for irrigation purposes resulting in a shrinking of the Aral Sea in Central Asia.
- Loss of vegetation around wetlands can result in more rapid overland flow which then produces a change in natural river regimes which in their turn affect the wetlands.

**Direct Human Action**

- Drainage of land for housing, industry,(such as at Seal Sands, Teeside, North East England) transport or mining can result in the loss of extensive areas of wetland
- Introduction of invasive new species such as the water hyacinth, regarded as a weed in Egypt, creates competition for resources with native plant species, gradually upsetting the natural balance of the ecosystem.
- Sea level rises due to global warming can cause the inundation of freshwater wetlands by salt water, resulting in a change in their characteristics.
- In MEDCs there is great pressure on coastal wetlands, in particular for developments such as marinas and other recreational facilities such as the Port du Crouesty in Southern Brittany.

**Case Study 1- The Vlei at De Hoop Nature Reserve, Cape Province, South Africa**

*De Hoop Vlei is a narrow, shallow lake of brackish water (located in a limestone gorge) which lies 2.5 km from the coast. The vlei ( or lake) is one of 16 wetlands in South Africa that are recognised by the Ramsar Convention as being of international importance. The vlei is a highly productive wetland and 75 wetland dependent bird species have been recorded there.*

*The De Hoop Vlei has no visible outlet to the sea. The Sout River, which drains grain farming areas, is the main feeder stream for the vlei which is also fed by several springs in its northern half. Small fish and other aquatic species are able to survive droughts in the mint-fringed freshwater pools at the springs.*

<b>Vlei at De Hoop</b>			
<b>Location:</b>	<b>De Hoop Nature Reserve</b> (created 1976) 260 km east of Cape Town	<b>Flooded :</b>	1906, 1957
<b>Climate:</b>	Mediterranean, mild winter, warm summer, av temp. 17.5°C	<b>Almost dry :</b>	1903, 1945, 1975, 1980, 1984, 1992
<b>Average rainfall:</b>	380 mm (annual) during winter	<b>Maximum depth :</b>	7.7m
<b>Dimensions:</b>	16km long, 0.5 km wide (on average) stretches from Die Mond (SE) to Windhoek (NW)	<b>Surface area when full:</b>	750 hectares
		<b>Average pH:</b>	8.5 (alkaline)
		<b>Salinity:</b>	3 to 60 parts per thousand

**Vlei at De Hoop**

Near Windhoek at the northern end of the vlei, a large cave represents one of the most important habitats for bats in the Western Cape and is used as a roost by 5 species of insectivorous bat such as the Cape hairy bat. Feeding mainly on moths and mosquitoes the bats act as a very effective biological insecticide

Beds of aquatic vegetation such as fonteingras (*potamogeton pectinatur*), a submerged macrophyte, grow in the shallows & provide food for waterfowl & other animals such as Cape terrapin which feed off the insects, crustaceans and small mammals living in the vegetation.

Swallows arrive to nest in spring, feeding off the swarms of lake flies which hatch in the vlei.

Water contains large numbers of microscopic organisms and crustaceans, insect larvae, water bugs, beetles & various kinds of tadpoles.

Fish such as the indigenous Cape kurper and the introduced Mozambique tilapia, as well as frogs, provide a source of food for kingfishers, herons & other birds.

Patches of undisturbed riverine bush exist on the north eastern banks including milkwood trees through the branches of which boomslang snakes wind their way. Birds: riverine bush, forktailed drongos, cape bulbuls and fierynecked nightjars

Several pairs of African Fish Eagles (at the top of the food chain) nest in the milkwood trees & prey largely on waterbirds such as coot, as well as fish.

Sedges, reeds & bulrushes grow at Tierhoek, where an important freshwater spring enters the vlei.

Clawless otters, water mongoose and eland. Large groups of baboons and small mammals such as porcupines and mice inhabit the surrounds.

**History**

The vlei is now landlocked but the occurrence of estuarine organisms in its waters suggests that it was formerly connected to the sea which now lies 2.5 km from its southern end.

Environmental conditions such as water temperature, salinity and alkalinity affect the plant and animal life. The summer months see the lowest water levels and the vlei then becomes a safe shelter for the largely nomadic species of water birds such as Cape shovellers which moult at this time of year and therefore cannot fly for a certain period. When the water level drops the mud flats are exposed and white winged terns visit to feed and build up reserves for the long return flight (13000km) to the northern hemisphere. The vlei has dried up almost completely at times, water being lost both through evaporation and underground seepage. During dry periods it is an important area for local wildlife seeking water, such as the pink flocks of greater flamingo.

The great flood of 1957 attracted large numbers of birds to the area and resulted in the first breeding record of greater flamingos in South Africa.

**Human uses**

**Agriculture** - In 1984 most of the catchment of the streams flowing into the vlei were used for pasturelands for sheep and cattle as well as growing wheat. Rough grazing occurs on the rocky limestone hills at the upper end of the lake. Pesticide use, fertiliser use (causing eutrophication) and siltation due to increased soil erosion may threaten the lake.

**Tourism** - There is a small camping ground together with ten self catering cottages adjacent to the lake. Increased visitor numbers and use of the vlei eg for kayaking, needs to be managed carefully so as not to threaten the ecology. Increased demands on water from boreholes, sewage and waste disposal from visitors also needs to be controlled so as not to affect groundwater levels or cause pollution to the vlei itself.

**Threats** - Climate change causing increased occurrence of drought could result in pressure from increased bird numbers being attracted to the vlei because of water shortages elsewhere. More frequent flooding could cause changes in the salinity of the vlei, which would have an impact on the plants being able to grow there, thus affecting the rest of the food chain.

**Management** - The Western Cape Nature Conservation Board (WCNCB) is responsible for the management of all of the De Hoop Nature Reserve of which the vlei forms a part. At present, visitor numbers to the reserve are low partly because there is relatively little accommodation available. Since April 2000 revenue earned from tourism has been spent, for example, on improving sewerage to the cottages and building a new ablution block for the campsite. The reserve tries to manage the accommodation in a sustainable manner, for example they operate a daily collection scheme from the cottages for food waste which is then composted. Three walking trails exist around the vlei but fishing there is not allowed at all at present. Very limited kayaking on the vlei does happen but only with a guide from the WCNCB. There is one bird hide but additional hides may be constructed in the future.

**Malltraeth Marshes Wetland, Anglesey – Case Study of a freshwater wetland creation project**

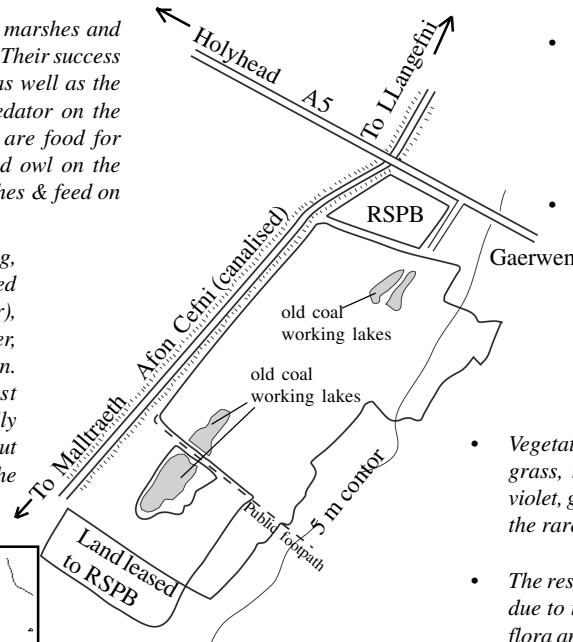
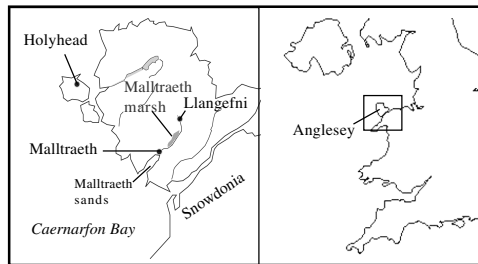
Malltraeth Marshes are a freshwater wetland in the process of being created by the RSPB with the intention of attracting the bittern, an endangered bird, as well as wading birds, lapwing and curlew. The marshes are not at present a wetland area open to the public and access is via public footpaths only.

**Location**

The Malltraeth Marshes are situated in the south west of the Isle of Anglesey, North Wales, between the town of Llangefni and the village of Malltraeth. They comprise 1220 hectares of fresh water wetland of which 209 hectares were bought by the Royal Society for the Protection of Birds (RSPB) in 1994.

**Malltraeth Marshes Wetland, Anglesey**

- A large population of water vole live in the marshes and feed off the vegetation in the pools & ditches. Their success has been attributed to the wetland habitat as well as the absence of mink - the main water vole predator on the mainland of the UK. However water vole are food for heron, bittern, buzzard, barn & short eared owl on the marshes. Otters also move around the marshes & feed on the fish population.
- Birds living on the reserve include lapwing, curlew, reed bunting and warblers (such as reed warbler, sedge warbler & grasshopper warbler), tufted duck, mallard, gadwall, teal, shoveler, garganey, coot, moorhen, grey geese & heron. Buzzards are common overhead whilst peregrines and marsh harriers are occasionally seen. Bitterns visit the marshes in the winter but there is no evidence of them breeding in the area as yet.



- Many species of insects live on the reserve including the rare hairy dragonfly, the variable damselfly and some particularly rare aquatic beetles which feed off algae.
- Fish such as eel (omnivorous fish which also feed off detritus & scavenge other fish) and stickleback live in the wetlands along with amphibians such as frogs. Eels of about 3-4 years in age are preferred by bittern.
- Vegetation includes grasses such as canary grass, the uncommon flowering rush, water violet, greater spearwort, lesser spearwort and the rare pillwort & marsh stitchwort.
- The reserve (part of the wider SSSI) is special due to its breeding bird communities and the flora and fauna of the ditches and damp areas of the old river bed of the Afon Cefni.
- The soils in the reserve have a higher clay content and drain less freely than fields further to the south in the valley.

**History**

At the end of the eighteenth century the marshes were part of a more or less continuous area of estuarine salt water that separated the larger north of Anglesey from the smaller southern portion of the island.

After an Act of Parliament at the beginning of the nineteenth century, the area was slowly drained, a sea wall (The Cob) was constructed across the estuary at Malltraeth village and the river (Afon Cefni), which had previously meandered across the lowlands, was canalised resulting in a landscape of abandoned meander loops. Landowners subsequently installed an extensive network of drainage channels across the area. Limited coal mining took place at this time but constant flooding of the mines soon brought it to an end. It is thought that mining resulted in the creation of two small lakes, the Llyniau Gwaith-glo, at the south western end of the RSPB reserve which, are now an important part of the marsh topography.

The 1957 marshes had been notified as a Site of Special Scientific Interest (SSSI) and subsequently renotified in 1992. The reserve is part of the Heritage Lottery Funded Wetlands of Wales Project & should benefit from funding from this project to manage the marshes.

The author would like to thank Dave Rees, warden of Malltraeth Marshes RSPB, for his help.

**Management of the RSPB Reserve at Malltraeth**

The aim is to attract bitterns to breed by:

1. The water level in the reserve area is currently being actively raised to flood more land and create a freshwater wetland environment. This is being achieved by a combination of building water-retaining banks to keep water inside the reserve and by using sluices to control the flow of water between areas.
2. Planting reed (*Phragmites australis*) to provide cover for the bittern in low land. The slightly higher ground is managed as grassland for breeding lapwing and curlew, and is grazed by cattle, sheep and some horses. Some fields are cut for rush which is used for animal bedding and roofing material.
4. The former coal working lakes are being maintained as an important open water area for wintering migrant wildfowl (including 1000 Teal, 400 mallard & 150 shoveler)

**Threats to the reserve**

1. Drainage of freshwater from the marshes would decrease animal and plant diversity in number and so ultimately the bittern would also be adversely affected.
2. Flooding of the marshes by saltwater from the sea to the west or the Afon Cefni, which flows along the northern edge of the reserve, would greatly upset the balance of the ecosystem.

**Wise use of wetlands and sustainable utilisation of wetlands**

The Ramsar Convention called upon its member countries to conserve their wetlands by wise use. This is defined as sustainable utilisation for the benefit of human kind in a way compatible with the maintenance of the natural properties of the ecosystem. However being on a Ramsar list does not guarantee its future.

**Web sites**

[www.capenature.org.za/ctf/dehoopplan.htm](http://www.capenature.org.za/ctf/dehoopplan.htm)  
[www.rspb.org.uk/policy/waterwetlands](http://www.rspb.org.uk/policy/waterwetlands)  
[www.wetlands.org/rdb.htm](http://www.wetlands.org/rdb.htm)

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