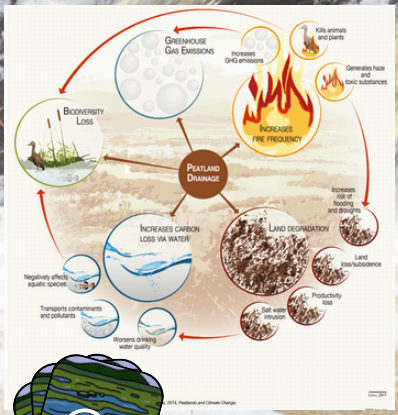
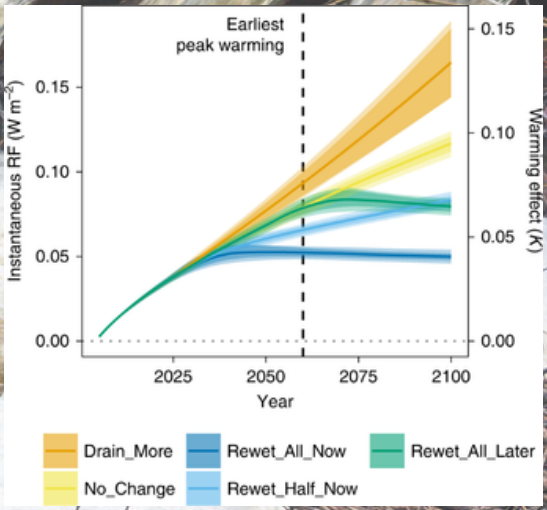
Peatland

A water-saturated environment characterized by the presence, or formation, of a soil composed of peat, or very little decomposed organic matter.

Peat contains around 95 % water by volume, making it rich in flora and fauna

Human impacts





Many human activities in peatlands such as drainage or cultivation cause changes in ecological processes, ecosystem structure and species composition. These result in land loss from subsidence, fires and their associated haze, reduced water quality, loss of unique biodiversity, loss of the potential for the sustainable use of peatlands (paludiculture), as well as a contribution to global warming caused by loss of peat carbon stocks

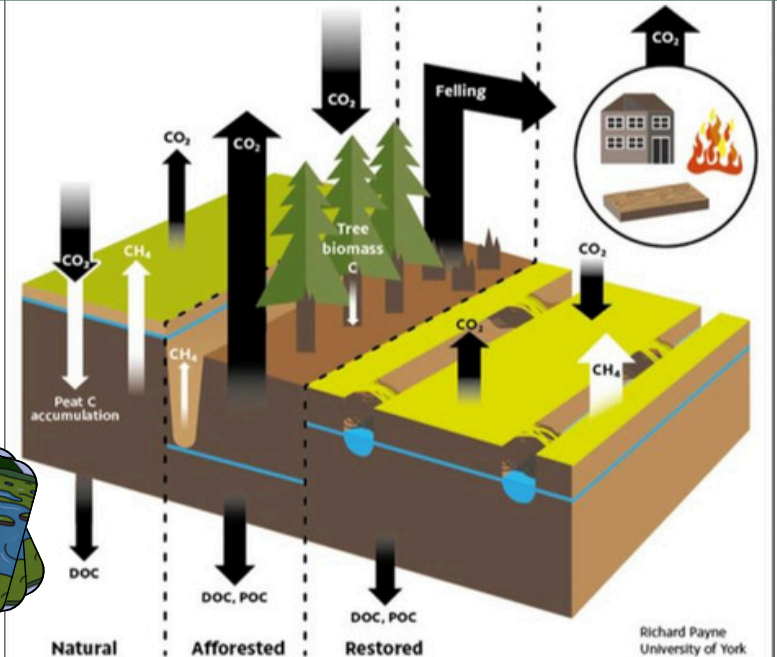
Carbon dioxide emissions from peatland drainage, fires and exploitation are estimated to currently be at least 3000 million tonnes a year equivalent to more than 10 % of the global fossil fuel emissions.

Biodiversity

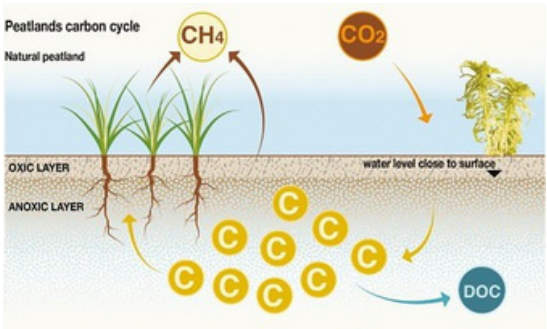
Peatlands play a special role in maintaining biodiversity at the genetic level due to habitat isolation and habitat heterogeneity, and at the ecosystem level due to their ability to self-regulate and adapt to different physical conditions. They are important temporary habitats for numerous 'dryland' species and animals (birds, reptiles) during droughts and frosts, providing food, shelter and breeding grounds.

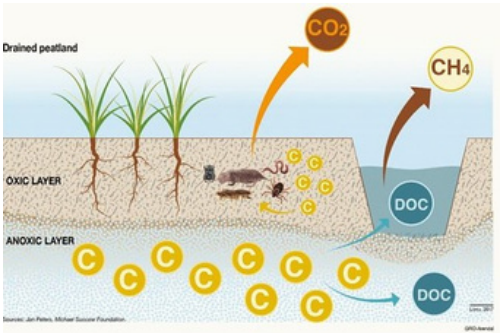
Peat deposits preserve the remains of plants and animals living in the peatland, providing an archive of biodiversity information from previous epochs. (Ex: willow segment dating from 3900 BC discovered in the peat bogs of Exmoor, England)

Peatlands carbon cycle



Impact of drainage on peatlands' carbon cycle
Drained peatlands release CO2 stored for thousands of years





DOC: Dissolved Organic carbon ; POC: Particulate Organic Carbon

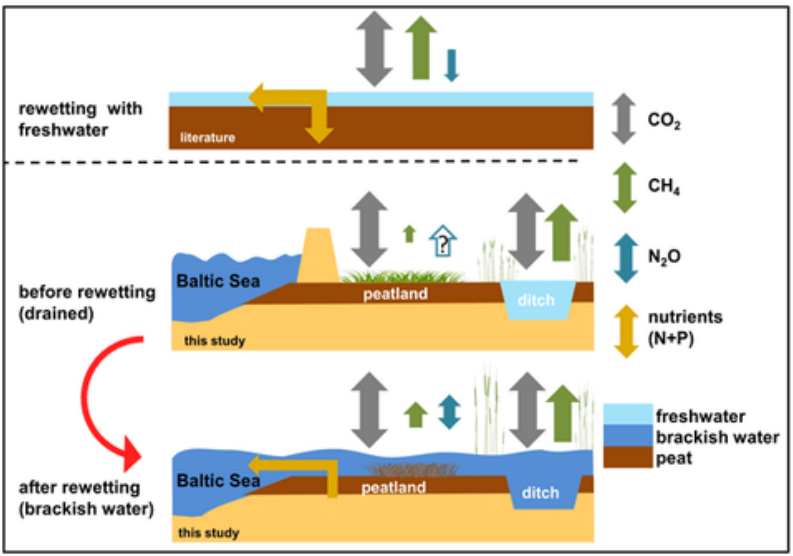
Best long term carbon storage ; peatlands contain at least 550 Gt of carbon which is the equivalent of 30 % of all global soil carbon, 75 % of all atmospheric carbon.

Peat’s Transformation

The accumulated organic matter, mainly plant residues, undergoes a transformation process and begins to solidify to form what is known as peat.

Most of the peat layers currently being excavated at high latitudes around the world were formed 9,000 years ago, after the end of the last ice age and the retreat of the ice northwards. Peat layers form very slowly, sometimes as little as 1mm per year.

Peatland Water balance



Peatland water balance and Water Table Level (WTL) are driven by climatic forcing and site-specific factors including vegetation characteristics, soil properties and topography, as well as artificial drainage and changes in land-use and management. A continuously maintained tree cover with significant evapotranspiration capacity could enable optimizing WTL from both tree growth and environmental perspectives.

The main mode of recharge in peat wetlands is rainfall, which accounts for 60 per cent of the total recharge, and the main mode of outflow is ditch drainage, with the highest percentage of drainage reaching 53 per cent, followed by submersible evaporation, with an outflow percentage of 26 per cent.

Climate change impacts

Climate change scenarios suggest major changes in temperature, precipitation and other phenomena that will have significant impacts on the peatland carbon store, greenhouse gas flux and biodiversity. Many weather events like important rainfalls variability, fires, storms, sea level rises or the dessication of peat surfaces are likely to increase peatlands erosion, so their degradation. Climate change also disturbs the hydrological regime (community and soil chemical composition) and the carbon cycling in peatlands.

Peatlands reduce atmospheric warming by reflecting more incoming solar radiation than forested dryland regions

Remediation of peatlands

Peatland restoration

No planting on deep peat

Planting of crops only on shallow peat.

Canal blocking

Artificial canals in peatland are blocked reducing drainage and fire risk

Tree planting

Reforestation of the deep peat zone can support livelihoods through timber and non-timber forest products

Habitat protection

Establishment of conservation area in deep peat (deeper than 3m)

Carbon sequestration

Raised water table - leading to net carbon sequestration and reduced fire risk

Livelihood support

Agricultural options that are sustainable

Raising awareness is the first step for the beginning of peatlands' restoration

Peatlands are worldwide