PRACTICALITIES

WETLANDS IN SOUTH-WESTERN AUSTRALIA AND THEIR ORGANIC MATERIAL – TO BURN OR NOT TO BURN?

by Pierre Horwitz

IF you live in the wetter areas of the south-west, you may have a peat swamp on your property. Peat swamps are comparatively rare in WA, because their formation depends on accumulation of organic material under cool, wet, and usually stagnant conditions. The water becomes anoxic (no oxygen left) near the sediment, so the breakdown of plant material is dramatically slowed, and peat accumulates. These unusual sites support specialised communities of plants and animals which are rare elsewhere. The peat itself is a record of the plants which grew in or alongside the wetland swamp for thousands of years. A careful examination might tell you what grew on your block 4-5000 years ago!

Why are peatlands special and how should they be managed?

A swamp, lake or peatland is an area where water accumulates faster than its runs off. It may be seasonally dry or permanently wet but, because the water does not flow away, the remains of plants and animals accumulate as organic carbon. If the carbon is in a dissolved form it stains the water like tannin stains tea. Otherwise, it accumulates as partly decomposed material in the soil.

Wetlands vary in the amount of organic material they contain, from those with very little, for example a pool of water in a mobile sand dune, to a peatland with darkly-stained acidic water and deep, organic-rich soils. Together with other attributes such as the amount of other nutrients (including nitrogen and phosphorous), the amount of salt, the type of mineral soil present, the vegetation, and so on, this gives each wetland its individual character.

Since organic material is predominantly carbon, and carbon burns, fire is an environmental factor which must be considered. If we ask the question "Can fire influence the ecological functioning of a wetland?" the answer is "Yes", because it can change the nature of the wetland by altering the nature of the carbon in it.

If fire occurs in or near a wetland, the plant material (ie organic matter) produced since the area was last burnt will be lost to the atmosphere, mainly as carbon dioxide or as particulates of carbon. But, in addition, if the peat soil dries out, especially under warm temperatures, it decomposes more rapidly. Finally, if dry peat comes into contact with fire it will burn and, left alone, the fire could smoulder for months and remove structural soil in the process. After the next rain, a pond would form. Undoubtedly, this process has occurred throughout WA's geological history. However nowadays, when we are trying to preserve the remaining peat swamp communities in our fragmented landscape, we need to take care this does not happen.

There are four axioms for fire management in wetlands:

- organic-rich wetlands should be constantly gaining carbon, not losing it
- organic-rich wetlands should only rarely, or never, become dry because then they would cease to accumulate organic material
- fire should be prevented from entering habitats with organic-rich soils
- wet habitats should be less susceptible to burning anyway.

In short, give your wetland every opportunity to resist fire by mulching!

In WA the climatic region in which these types of soils develop is in the south-western corner, where it is cool and relatively wet and where the rainfall and/or soil moisture levels are least seasonal. Organic-rich soils can develop in coastal ecosystems and in forested ecosystems. Wetlands are very much a part of these ecosystems: along the Swan Coastal Plain from Bunbury to north of Perth; extensive swamp systems from Augusta to Albany; and numerous wetlands dotted throughout forested landscapes. These areas are susceptible to climate change, like increasing temperatures and decreasing rainfall, and also to management fires designed to remove plant material in order to reduce fire hazard.

In some other countries peat fires are a serious concern The major fires in Indonesia in 1998 burnt peat soils in forests, putting vast amounts of smoke into the atmosphere and creating haze problems for surrounding countries. In the past, peat fires have drawn on management resources in Scandinavia, South Africa, Alaska and Russia, to name just a few parts of the world where peatlands occur.

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The inappropriate use of fire which burns peat releases carbon into the atmosphere and this can negate governments' current efforts to minimise the "Greenhouse Effect" by creating carbon "sinks". For whatever reason, it seems much more appropriate to design management strategies which will enable organic carbon to remain and build up in wetlands.

Fire management and your wetland

The key is to keep your wetland accumulating organic material in the soil in its customary fashion. Essentially, if you have an organic-rich wetland, fire suppression is critical. You should give your wetland every opportunity to resist a wildfire by making sure it stays moist during the drier months of the year. One option is to "mulch" your wetland by allowing plant material to accumulate in and around the wetlands, and by not burning to remove this plant material.

If burning is necessary for fire hazard reduction, then only small areas of vegetation should be burnt at any one time, and only when the soil is wet or very damp.

For the full story, read: *"Catastrophic loss of organic carbon from a management fire in a peatland in southwestern Australia"*. 1999. Horwitz, P., Pemberton, M. & Ryder, D. **IN** "Wetlands for the Future" Eds McComb, AJ & Davis JA. Gleneagles Press, Adelaide.

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