

The diversity and importance of wetlands

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Wetlands conjure up thoughts of wet, dark, dank places with creepy insects, even snakes and crocodiles – let your imagination run wild! However if you look closely at the wetlands in your district, they are diverse places full of colour and texture, with beautiful, small intricate animals and plants. The 2nd of February was set aside to celebrate the importance and uniqueness of wetlands around the world, including New Zealand. How many of you took time on that day to explore bogs on Swampy or wander around the numerous estuaries on the Dunedin coastline? Here are some interesting facts about wetlands which you may not have known – read on!

What is a wetland?

Wetland or Mire is a broad term that covers many types of wetlands from bogs through to mangrove swamps. Differences between classification of wetland types is based on water level, acidity (pH), levels of nutrients and the quantity of accumulated peat. Bogs, such as the Borland Bog, are at one extreme end of the wetland spectrum. They are highly acidic with a pH range of 3-4 (vinegar has a pH close to 3), have very few nutrients (they receive all their nutrients from rain water) and accumulate enormous amounts of peat (a depth of 6-14 m of peat in some bogs). Swamps, such as the Sinclair Wetlands, are at the other extreme of the wetland spectrum. They generally have high water and nutrient levels (i.e. more productive systems than bogs), have a relatively high pH of 6-7 and don't accumulate peat.

Why are wetlands important?

Wetlands are important ecosystems that house a weird and wonderful array of plants and animals, some of which are only found in wetlands! Wetlands, particularly bogs, are the 'book keepers' of social and biological history and they are important components of water catchments, regulating water clarity and rate of water drainage.

Plants and animals of wetlands

Most of you will have come across pitcher plants and venus fly-traps - those neat plants which catch all those unwanted flies inside your house and can be entertainment for hours! Pitcher plants (*Sarracenia* spp. and *Darlingtonia californica*) come from North and South American bogs and Venus fly-traps (*Dionaea* sp.) are found only in bogs between North and South Carolina. These pitcher plants should not be mistaken with pitcher plant *vines* (*Nepenthes* spp.) that come from places such as South-east Asia, Madagascar and Australia. As you will recall bogs have very few nutrients so these plants have evolved a way of catching extra nutrients in the form of insects and even frogs! In New Zealand bogs there are similar 'insect catching' plants called sundews (*Drosera* spp.). These plants are usually identified as small red or green rosette plants with numerous sticky hairs. At the tip of each hair there is sticky droplet of digestive juice that helps to entrap and slowly digest small insects. Next time you happen to be wandering in a mossy damp area up on Swampy, have a closer look at the ground, as

you may see these small red glistening plants in amongst the mosses. Other wetlands, such as carrs and marshes⁶ are important habitats for some of New Zealand's endemic fish species and freshwater crayfish. Eels and freshwater crayfish lurk under banks and in pools. Native fishes, such as *Galaxias* (most commonly known by the juvenile form, white bait) swim in small creeks and mountain pools where the introduced trout and salmon are unable to reach. Some rare mudfish (*Neochanna* species) are only found in wetlands. A diverse range of moths, spiders, lizards and birds also inhabit or visit wetlands.

The 'book keepers' of history

Bogs accumulate peat over ten of thousands of years, at a rate of about 1-2 cm of peat per year. Radiocarbon dates of peat cores indicate that some bogs in the Waikato and in the South Island are extremely old. Some of these bogs were present at the end of the last glaciation in New Zealand, that is ~ 12000 years ago! As peat accumulates, pollen from plants, or dead animals such as moa are trapped in the layers of peat. The pollen and animal remains are preserved in the peat layers due to high acidity and low oxygen levels. In many cases only skin and hair of animals are preserved as the bones are eaten away by the acid within the peat. Pollen diagrams taken from peat cores can reveal what trees grew in a particular area and can indicate their disappearance due to climate change. Pollen from exotic grasses (e.g. *Agrostis capillaris* and *Anthoxanthum odoratum*) and trees (e.g. *Pinus radiata* and *Cupressus macrocarpa*), and increased levels of charcoal in peat cores also give some indication of when humans arrived in New Zealand. Other disturbances of bogs such as ploughing and drainage have also revealed numerous animal remains. Several species of the extinct moa, all with their skin and feathers intact, have been found trapped in peatlands in Canterbury. These peatlands have been re-flooded to help preserve the some of the moa remains. Many overseas examples of peat preservation have revealed some gruesome facts of European history. Tollund man and other 'bog' people that have been excavated from bogs are thought, in many cases, to have been subjects of hangings and executions, as some of the people had rope nooses around their necks or had bound hands.

The 'water filter' ecosystems

Wetlands are vital parts of water catchments, helping maintain water clarity and possibly reducing the potential of flood damage. Water run-off from surrounding land is filtered by wetland plants such as rushes, reeds and mosses which take out particles of soil and other debris that flow through them. Wetland sediments bind metals and some organic toxins, and thus remove them, or slow their circulation in the waterways. Wetlands can be a useful, natural solution to sewage waste systems, if created properly. Wetland plants also minimise soil erosion around creeks and small streams by forming thick vegetation cover and may help to slow the process of flooding, by slowing the velocity of water and soaking up water like a sponge.

⁶ Carrs and Marshes are wetlands that generally have creeks of slow flowing water and pools within them, are relatively nutrient rich in comparison to bogs, and often have plants such as flax (*Phormium tenax*), manuka (*Leptospermum scoparium*), Raupo (*Typha orientalis*), *Juncus* and *Carex* spp.

Respecting and appreciating your wetlands

Very few wetlands are left in New Zealand, less than 10% of the original area of wetlands that existed in New Zealand before people arrived. They are fragile ecosystems that have complex foodwebs and hydrology. We should respect and enjoy the wetlands we have left and stop further loss or damage. Take the time to celebrate the diversity of wetlands and their wildlife by taking a walk around some of the wetlands in your district.

If you want to find out more about wetlands, look up these recommended resources:

New Zealand Wetlands: www.doc.govt.nz/conservation/wetlands/index.asp

RAMSAR convention of wetlands: www.ramsar.org

Bodies of bogs: www.archaeology.org/online/features/bog/index.html

Wetland Plants in New Zealand, Peter N. Johnson and Pat A. Brooke. 1989.
DSIR publishing, Wellington.

Reports

The BSO/Botany BBQ

- Allison Knight

Brainchild of David Orlovich, the BBQ to welcome Botany students and new BSO members went off with a bang. Balloons popping in trees, flowers (optional) in the salad, sausages skilfully sizzled by Paul Guy, new Head of the Botany Department, and generous lashings of sauces and sunshine all combined to make it a serendipitously successful occasion. Wonderful to see botanists young and old chatting together so enthusiastically and harmoniously. Well done, David and Paul!

Field Trip Report

Botanizing up and over Mt Watkin/ Hikororoa, Mar. 15. - Monica Peters

Mt Watkin/ Hikororoa (616m) lies inland, marked by an unassuming road sign just before Cherry Farm some 40 km north of the city. It is described by Neville Peat (Wild Dunedin, 1995) as "... an oddity – a volcanic hill standing alone amidst a schist landscape..."

Led by Robyn Bridges and Allison Knight we (Frances Anderson, Mignon Pickwell, Rosalind Andrews, Pascale Michel, Chuck Landis, Scott Dunavan, Ian & Eve Radford, Nola Walker, John McBurney, Judy Russell and Monica Peters) set off at a pace that can only be described as leisurely - as is befitting of a group of people for whom the minute vegetative details of the landscape are of prime importance. Mt. Watkin provides a brief but valuable glimpse into the past, feeling much like a remnant part of a landscape substantially modified through farming.

Several species of *Aciphylla*, *A. subflabellata*, *A. glaucescens* and *A. aurea*, - some with last year's weather-bleached inflorescences, are scattered throughout the reserve. Waist high tussock, *Chionochoa rigida*, and *Poa cita* (previously *P. laevis*) are similarly distributed. In the grazed paddock that surrounds the reserve, a small handful of