



Ephemeral clay-based wetlands of the South West

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Background



Ephemeral clay-based wetlands of south-west Western Australia were once widespread but it is estimated that more than 90 per cent of them have been cleared for the high nutrient soils on which they occur. While the wetlands occur across the south-west, except for the high rainfall areas along the south coast, they are most common on the alluvial soils of the Swan Coastal Plain, where they have been cleared for agriculture as well as for urban expansion.

These wetlands fill in winter primarily from rainfall and local inflow and are characterised by the flowering of different suites of species as the wetlands dry. By summer they have dried to hard, impervious pans. This pattern is very similar to that found in wetlands from other regions with Mediterranean climates, the most well known of which are the vernal pools of California. Like the Californian vernal pools, our ephemeral clay-based wetlands are repositories of biodiversity with concentrations of threatened and priority species and restricted communities. DEC has undertaken a series of regional surveys to better understand the flora, vegetation and distribution of this type of wetland (Gibson *et al.* 1994, Lyons *et al.* 2004).

Findings

A combined analysis of 69 ephemeral claypan plots from DEC's Swan Coastal Plain and Wheatbelt surveys found that 609 taxa occur in these wetlands, 16 of which are restricted to the claypans and a further 20 with their distributions centred on the claypans (Gibson *et al.* 2005). Six different claypan communities were recognised. Interestingly, while climate and soil nutrient status accounted for 23 per cent of the variance in the dataset, 77 per cent remain unexplained and are probably related to micro-topographical or hydrological differences.

The flora of Western Australia's ephemeral claybased wetlands is much richer (609 vs 196) and has a higher proportion of geophytes than recorded in California's vernal pools. It also has fewer taxa that are largely restricted to this habitat type than recorded in California (36 in WA vs 100 in California). These differences seem to be related to the regional floras



from which the wetland taxa were recruited. In Western Australia this is a highly diverse mixture of shrublands and woodlands while in California it is largely grasslands.

Management Implications

The recognition that these wetlands have very significant biodiversity values and that more than 90 per cent of them have been cleared has resulted in two communities being listed as 'Vulnerable' on DEC's threatened communities database, with another community type listed as a Priority 2 community, implying further assessment of its conservation status is needed.

As a result of the listing of these communities, it has been possible to purchase several areas to increase their reservation status. A block of land was recently acquired adjacent to Meelon Nature Reserve on the coastal plain between Pinjarra and Dwellingup. This acquisition has allowed better management of the reserve which faces significant threats from weed invasion, particularly by South African bulbs which have evolved under similar climates and soils. A further three large pristine claypans have been purchased on a second block of land near Wannamal.

The other major challenge into the future for the survival of these wetlands is to ensure the hydrology of the systems is maintained such that the wetlands continue to fill and dry at appropriate times of the year. Given the very complicated nature of the hydrology of many of these systems, and the reality that many of those in the Perth metropolitan region are now isolated remnants within a sea of urbanisation, the management of the hydrological regimes will continue to be a challenge. Despite these management challenges, the ephemeral clay-based wetlands of south-western Western Australia remain one of the biodiversity jewels in one of the world's biodiversity hotspots.



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