Fauna of the unflooded saline wetland floors of the WA wheatbelt

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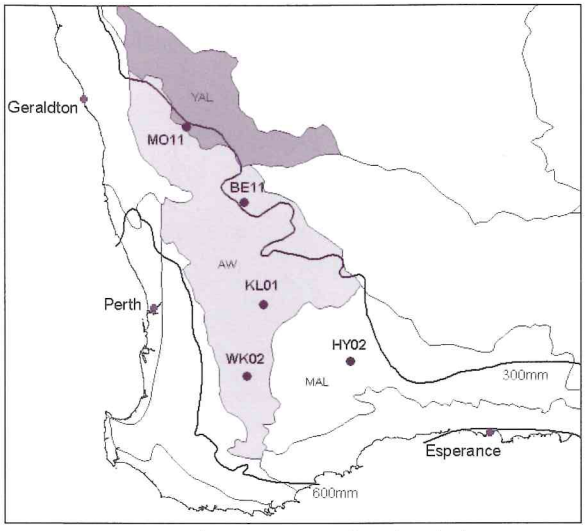

Figure 1) Location of survey sites in the wheatbelt region between 300 and 600mm isohyets: showing IBRA regions; Yal-Yalgoo, AW-Avon Wheatbelt, Mal-Mallee (Thackway and Cresswell, 1985).

The WA wheatbelt is drained by a system of chains of naturally occurring salt lakes and wetlands that follow the courses of ancient palaeo-rivers.

These salt lakes may range in area from large playas of tens of square kilometres to mosaics of small pans and interconnected braided channels. Most of these lakes and wetlands partially fill most winters, although those in semi-arid areas fill more episodically.

Variation in the surrounding soil types and geology and the elevation above groundwater of the different systems provides different habitat conditions for plant and animal communities. The main vegetation communities around salt lakes are fringing chenopod (saltbush and bluebush) communities; *Melaleuca* and *Acacia* dominated shrublands; and, at higher elevations, *Eucalyptus* woodlands.

Terrestrial invertebrate communities occurring at dry saline wetlands are composed of widespread, regionally restricted and localised endemic species.

There has been considerable research into the aquatic invertebrates and bird life present at these lakes when they contain water. However, little is known about the terrestrial invertebrates associated with them when they are dry. There is evidence indicating that small, less mobile terrestrial species living on salt lakes can be restricted to individual or regional groups of lakes. Recent wide-scale surveys have shown that species composition differs between the vegetated saline areas and surrounding non-saline areas.

A survey identified and documented the invertebrates associated with, or restricted to, the lake floor and fringing samphire (inundation zone) and adjacent healthy (undisturbed by salinity) woodland habitats of five saline wetlands across the wheatbelt (Figure 1). These wetlands represent the main types of saline lakes present in the region. They potentially contain much of the known regional invertebrate endemism from the vicinity of saline wetland areas recorded by the Wheatbelt Biological Survey. Pitfall traps were installed in the three habitats at all five sites in October (mid-spring) 2002, then removed in March (early autumn) 2003 before the first heavy rains.

The differences in invertebrate community structure at different wetlands reflect the differences in the geographic areas of the Western Australian wheatbelt.

A total of 355 species were recorded for the five saline wetlands surveyed, including 123 spiders, 173 beetles, 45 ants, six scorpions, four earwigs and four isopod species. Results of the survey indicate that terrestrial invertebrate communities associated with the five saline wetlands comprise a mixture of widespread, regionally restricted and apparent short-range endemic species in all three habitats sampled. The inundation zone (lake-floor and samphire habitats) fauna varied between wetlands and was shown to be a distinct community rather than a subset of the adjacent woodland community to each wetland. Assemblage richness and structure differed between wetlands, with 63 per cent of spiders, 78 per cent of beetles and 66 per cent of all species occurring at only one site, reflecting recorded levels of regional diversity. Further analysis of the data identified differences in faunal composition between habitats and between geographic areas, although woodland habitats were more closely related to each other than to either lake floor or samphire habitats from the same wetland.

The predictability and extent to which these lakes are naturally flooded depends on the climatic regime: flooding is not rare although it is sporadic. Those species living in the inundation zone must have strategies that enable them to cope with flood events. Human-induced changes, for example groundwater drainage and groundwater pumping from agricultural land into saline wetlands, that are a response to the problem of secondary salinity, may alter the flooding and salinity regimes of the wetlands. Changes to flooding regimes, particularly permanent inundation, are likely to have a severe impact on the fauna.

The impact may be minimised if a buffer zone of unflooded lakebed is left between the water's edge and the samphire. However, permanent water in the centre of the lake may still affect dispersal across what would normally be a dry lake. More information on the ecology and regional distribution of the fauna is required before it will be possible to quantify the impact of permanent flooding and how many are truly restricted to the inundation zone or are 'tourist' species. In addition, the effects of prolonged flooding need to be examined to determine the answers to important questions such as; Do changes in community structure occur towards the lake centre? How does altered soil chemistry associated with increasing salinity affect the burrowing fauna? To what extent does permanent inundation influence the samphire around the lake?