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Water Balance Analysis of an Australian Alley Farming Trial, Toolibin Lake

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Managing the continued spread of salinity relies on a compromise between agricultural industry, environmental protection and remediation. At this stage it is very difficult to predict the extent of saline areas once a new hydrological equilibrium is reached. More sustainable agricultural practices need to be adopted in order to allow continued farming whilst ensuring protection of native ecosystems. Rainfall reductions in south-west WA are also making the traditional agricultural industry less profitable in many areas, hence new crops are being experimented with. These rainfall reductions can also counteract rising groundwater levels and streamflows. Hence the reduction in recharge required to achieve a more benign hydrological balance may be attained by re-establishing native species back into the landscape. However the style and density of re-vegetation required to reduce impacts to acceptable levels has been the topic of intense debate.

The Toolibin Alley Farming Trial (TAFT) established in 1995, aimed to further our knowledge of the potential for mitigation, of negative hydrological impacts, by revegetation. The purpose of the trial was investigating the potential of alley farming (sequence of tree belts and agricultural alleys) as a sustainable alterative to broad acre agriculture. TAFT consists of a number of different treatments, i.e. varying species, belt and alley widths ultimately aimed at investigating the optimal planting density and strategies. Native eucalyptus species are the preferred option for remediation seeing that many species are opportunistic water users that can withstand the stresses in a semi-arid environment. Many species currently being used in re-vegetation have also

been investigated as potential crops i.e. oil mallees.

A piezometer transect through each of the treatments has been monitoring over the past 12 years. However, due to a reduction in the frequency of data collection and inadequacies in the original datasets collected, it is not sufficiently clear as to which of the treatment options is the most successful, hence an expansion of data collected was required. Higher frequency bore dipping, seasonal soil moisture content monitoring, slug/aquifer testing and soil mapping have all been completed to allow a volumetric water balance analysis of each of the treatments for both 1995 and 2007 is being undertaken to help determine the optimal treatment style to lower the water table while maintaining acceptable crop yields.