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Groundwater Supplementation in Western Australia Using Managed Aquifer Recharge of Treated Wastewater

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The southwest of Western Australia has had a significant reduction in rainfall for the last twenty years due to a noticeable change in climate. Perth, the capital of Western Australia has a population of greater than one million and is experiencing one of the fastest population growth rates in Australia. Perth has traditionally relied on a mixture of surface water dams and groundwater for its potable water supplies with traditionally approximately 60% of the potable water supply coming from the surface water supplies. With the downturn in rainfall however, a greater reliance is now being placed on the groundwater supplies. This increased reliance on groundwater for potable supplies in combination with a reduction in recharge due to decreasing rainfall and pine plantations mound and unregulated extraction of groundwater for horticultural irrigation has led to a significant decrease in groundwater levels of more than 500 GL in the last 25 years (Figure 1).

At the same time, Perth currently discharges more than 100 GL of treated wastewater out to sea every year. In response to the declines in rainfall and groundwater levels, investigations are being undertaken to improve the water efficiency of Perth and surrounding regions. A major part of the water efficiency initiatives is the recycling of the treated effluent that is currently being discharged out to sea. As Perth sits on a coastal sand plain the use of managed aquifer recharge of recycled water to the surficial aquifer is considered to be a major mechanism for water reuse in the Perth region. The recharged water will be used for a variety of uses ranging from groundwater supplementation, horticultural irrigation through to potentially indirect potable reuse. This presentation will outline the science and the progress to implementing MAR as part of the total water cycle to relieve pressure on the Perth groundwater system.

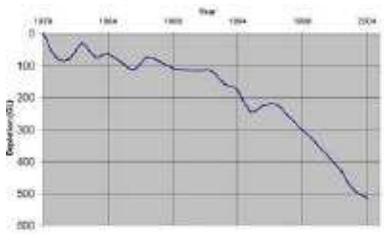

Figure 1: Decrease in groundwater levels on the Gnangara mound over time