



Unconfined Aquifer Condition and Extraction Limits in the Tintinara Coonalpyn Prescribed Wells Area (PWA)

How much water can we extract?

The unconfined aquifer is the upper rain-fed aquifer of the two main aquifer systems of the South East. The sustainable volume of water that could be extracted from the unconfined aquifer is defined as the volume of water that could be extracted on an annual basis in a certain Management Area (MA) without causing significant water level or water quality impacts.

It is proposed under the revised WAP that the sum of all water taking and water holding allocations, plus an allowance for unlicensed stock water use and domestic water use (S & D water use), must be managed within a Target Management Level (TML). The TMLs for each Management Area have been calculated in the following manner:

Tintinara MA: the TML is a new sustainable level based on updated scientific information, and will require reductions to allocations in this Management Area to meet the TML.

Boothby MA: The same sustainable volume as set in the 2003 WAP.

Sherwood MA: The same sustainable volume as set in the 2003 WAP

Coonalpyn MA: The same sustainable volume as set in the 2003 WAP.

Review of Groundwater Resources Conditions

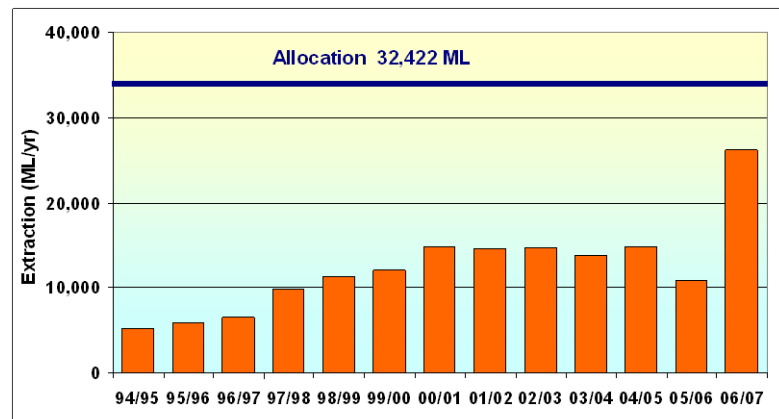
A review of the condition of the groundwater resources was carried out by the Department of Water, Land and Biodiversity Conservation (now Department for Water) in 2007. The review utilised groundwater depth and salinity monitoring, volumetric extraction figures and rainfall trends to determine the TMLs for the Tintinara Coonalpyn PWA.

What did the review of the resource condition find?

Tintinara MA

Groundwater extraction has generally stabilised from 2000 to 2005, as shown below in Figure 1. In 2005/06 and 2006/07 there were large variations in extraction rates due to changes in rainfall patterns. Groundwater monitoring in the Tintinara MA over the past five years is showing a consistent declining trend in response to below average rainfall and irrigation extraction. Figure 2 shows the cumulative deviation from average rainfall (dark blue line) and water levels in several different monitoring bores.

Figure 1- Groundwater extraction in the Tintinara MA



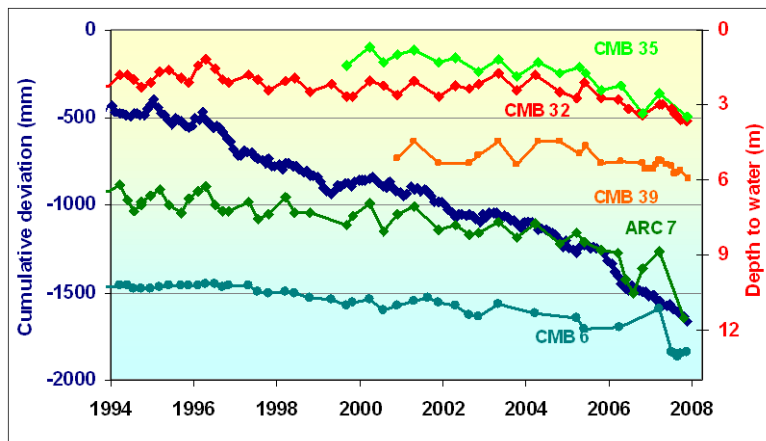
Salinity monitoring in the Tintinara MA is showing that the rises previously seen in salinity levels have stabilised with minor decreases in some wells. The changes in salinity trends are most likely due to increased irrigation efficiency and below average rainfall which have reduced the flushing of salt to the aquifer.

The water level resource condition trigger of a net change of 0.1m/yr (measured over the preceding 5 years to 2007) was exceeded in all 18 observation wells in the Tintinara MA, with an average rate of decline of



0.23m/yr. The salinity resource condition trigger of a mean arithmetic increase of 2% per year (measured over the preceding 5 years to 2007) was exceeded in only 4 of 26 irrigation wells with regular sampling, with the overall average indicating a 0.75% increase per annum.

Figure 2- Depth to groundwater trends Tintinara MA



Coonalpyn MA

Groundwater extraction in the Coonalpyn MA (figure 3) has been relatively stable until the 2006/07 drought. Extraction remains below the total allocation. Groundwater monitoring in the Coonalpyn MA (Figure 4) shows a slight declining trend in groundwater levels over the past few years due to below average rainfall (dark blue line). The water level resource condition trigger of 0.1m/yr decrease (measured over the preceding 5 years to 2007) has been exceeded in 2 of the 7 observation wells. The two wells in which the trigger level was exceeded are both located close to the boundary with the Tintinara MA and are affected by extractions from that MA.

Figure 3- Groundwater extraction in Coonalpyn MA

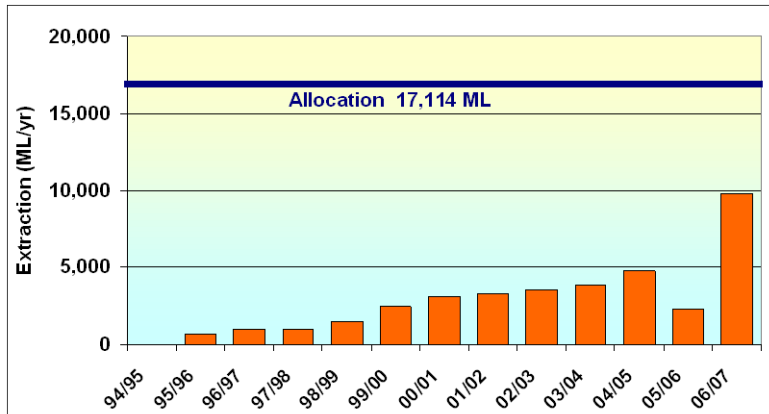
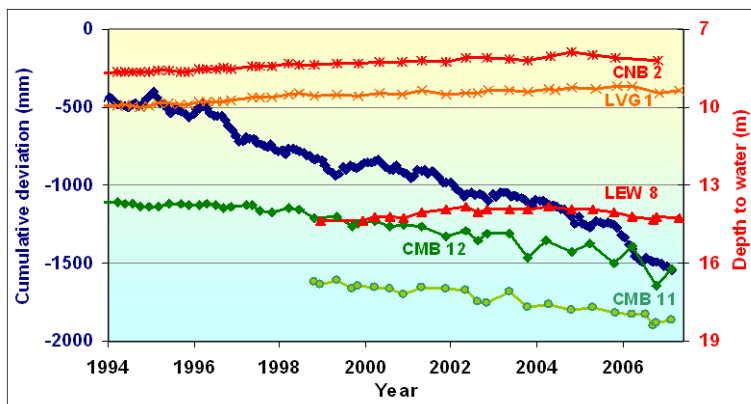


Figure 4- Depth to groundwater trends Coonalpyn MA

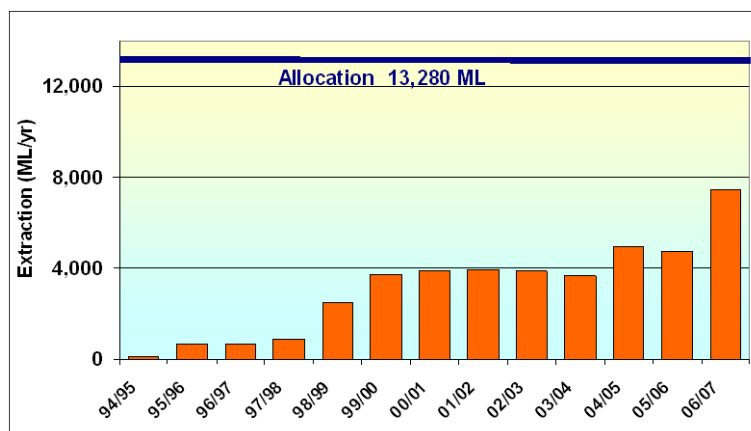


Sherwood MA

Extraction from the unconfined aquifer in the Sherwood MA had remained relatively stable until the 2006/07 drought which triggered a significant increase in extraction. Nevertheless, groundwater extraction is presently well below the total allocation as shown in Figure 5.

Groundwater monitoring in the Sherwood MA (Figure 6) shows a relatively stable trend in areas away from the impacts of irrigation.

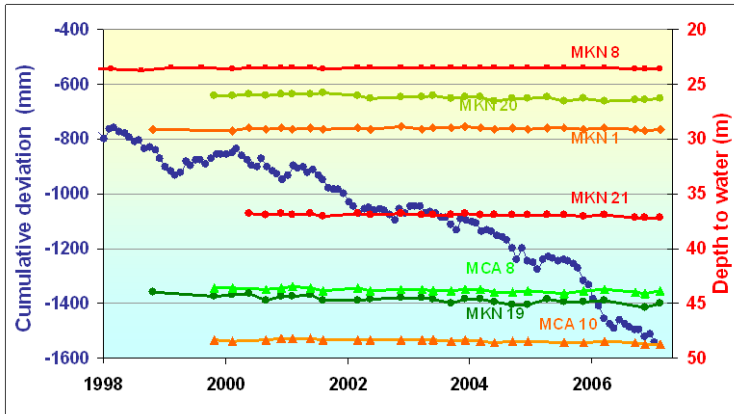
Figure 5- Groundwater extraction Sherwood MA



The water level resource condition trigger of 0.1m/yr decrease (measured over the preceding 5 years to 2007) has not been exceeded in any of the 12 observation wells in the MA, while the salinity resource condition trigger of a mean arithmetic increase of 1% per year was exceeded in 2 of 5 observation wells. These latter two wells have shown a decreasing trend

over the past 23 years, and a more regular sampling regime over the next 5 years will enable a better interpretation of results.

Figure 6- Depth to groundwater trends Sherwood MA



What risks do the results pose?

Groundwater monitoring over the past 5 years has shown some concerning trends. The decline in unconfined water levels can be attributed to below average rainfall and irrigation extraction. If rainfall continues to be below average as predicted, the groundwater resources in the Tintinara Coonalpyn PWA could be placed under considerable pressure. There is a large gap between extraction levels and total allocation and if extraction was to increase along with below average rainfall, the groundwater resource could be at even greater risk.

The *Natural Resources Management Act 2004* requires that water resources be sustainably managed, particularly

where a water resource is potentially or actually under significant risk. In addition, the National Water Commission, as the administrator of the National Water Initiative has a firm expectation that water plans will set a path to reduce any over-allocation.

Proposed management responses

Setting new Target Management Levels

In Tintinara Coonalpyn, allocations in each Management Area have been reviewed using the data collected over the past 5 years (see Table 1). In Management Areas which are over-allocated, it is proposed that allocations be reduced. The sum of all allocations and an allowance for S & D water use must be managed within the new TML.

Once licensed volumes are brought back within the TML (minus S & D water use) in the Tintinara MA, the licensing condition limiting irrigation to a maximum area can be removed.

Excess/Unallocated Water

It is proposed that no further allocations will be granted from the unconfined aquifer for the life of the WAP, other than in the Boothby MA where there is 20,000ML available for allocation.

Table 1- Target Management Levels for unconfined aquifer Management Areas

Management Area	Current PAV (ML)	Current licensed allocations (ML)	Target Management Level (ML)	% Reduction required to bring allocations back within TML (minus S & D water use)
Coonalpyn	19,650	17,114	19,650	0%
Boothby	20,000	0	20,000	0%
Tintinara	38,500	32,835	26,500	3.4%
Sherwood	16,350	13,279	16,350	0%

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