

TINTINARA-COONALPYN MODEL 2006

Purpose

As described in Yan and Barnett (2002), the purpose of the modelling exercise was to provide:

- a hydrogeological understanding of the model area
- simulation of the groundwater level changes caused by historic and current demands for groundwater from the confined aquifer
- estimation of the impacts on groundwater level due to the likely future demands from the confined aquifer
- an assessment of the adequacy of the current groundwater monitoring network in the area and recommendations for any additional monitoring.

Background

From Yan and Barnett (2002), to fulfil the requirements of the Water Allocation Plan for the Tintinara-Coonalpyn Prescribed Wells Area (TCPWA) an assessment of the groundwater resource capacity was carried out. As part of this process the TCPWA was divided into several management areas based on hydrogeological criteria (Barnett, 2002). Groundwater modelling of the confined aquifer within one of these management areas, the Tauragat Management Area (TMA) (Zone 3), was subsequently carried out by Yan and Barnett (2002).

At the time of model development, the management issues in the TMA involved extractions dominated by olive irrigation from two properties approximately 15 km east of Coonalpyn. The main management issues to be addressed in the modelling study were the impact of regional drawdown on other users and the possibility of drawing in more saline groundwater from the west in the confined aquifer.

In 2006, the model was verified using new monitoring and pumping data. The model then be used to run management scenarios. The model results were published in Barnett (2008).

The model was built with Visual MODFLOW.

Location

The TMA is located around 150 km south-east of Adelaide (Figure 1).



Figure 1. Tintinara-Coonalpyn model domain (red)

Model structure

Model domain and grid size

The model domain simulates an area 45 km (east to west) by 37.5 km (north to south). The bounding coordinates are E 388382 N 6035840 (southwest) and E 525000 N 6265000 (northeast) (GDA 1994, Zone 54).

The rectangular model grid is divided into 137 rows and 138 columns. The minimum grid size is 225 x 188 m in the area around production wells. Elsewhere, the grid size is 450 x 375 m.

Model layers

Vertically, the four aquifers and three confining layers were conceptualised in the model as seven discrete layers, as described in Table 1 and Figure 2.

Table 1. Model layers

Layer	Hydrogeological unit	Aquifer/Aquitard
1	Unconfined limestone aquifer (Murray Group Limestone)	Aquifer
2	Confining layer	Aquitard
3	Upper confined aquifer (Buccleuch Formation)	Aquifer
4	Confining layer	Aquitard
5	Middle confined aquifer (Ettrick Formation)	Aquifer
6	Confining layer	Aquitard
7	Lower confined aquifer (Renmark Group)	Aquifer

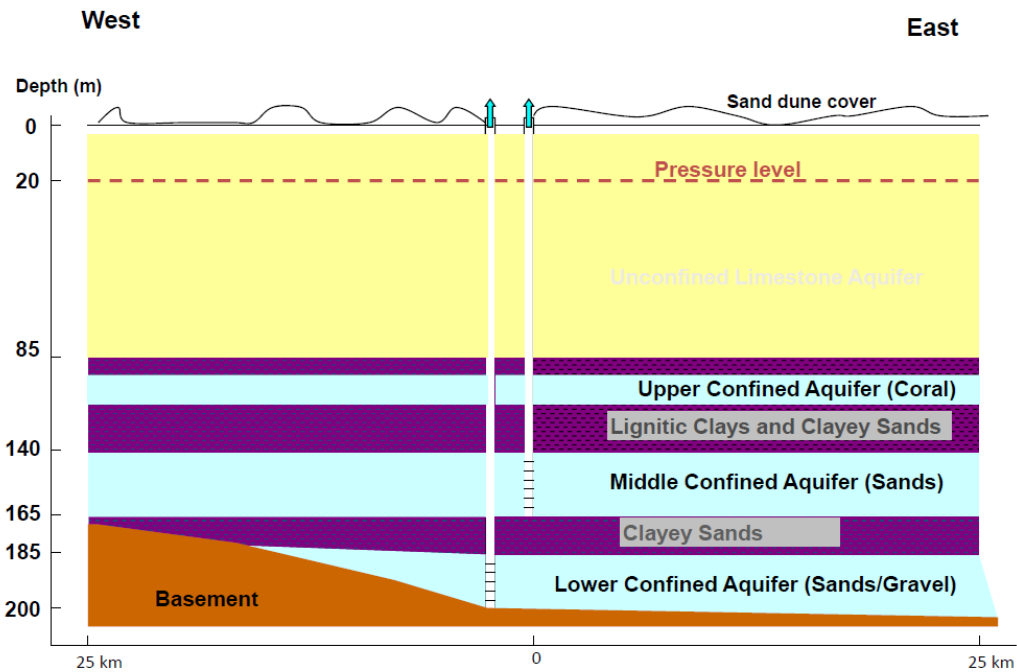


Figure 2. Cross-section

Reports

Barnett S, 2002, *Water resource assessment of the Tintinara – Coonalpyn Prescribed Wells Area*, Report DWLBC 2002/20, Department of Water, Land and Biodiversity Conservation, Adelaide

Yan W and Barnett S, 2002, *Groundwater modelling of the confined aquifers in the Tauragat Management Area, Tintinara Coonalpyn PWA*, Report DWLBC, Department of Water, Land and Biodiversity Conservation, Adelaide (None Published)

Barnett S, 2008. *Hydrogeological Review of the Tintinara–Coonalpyn PWA Water Allocation Plan*. South Australia, Department of Water, Land and Biodiversity Conservation, DWLBC Report 2008/09.