

TINTINARA MODEL 2004

Purpose

As described in Osei-bonsu, Barnett and Davies (2004), the groundwater model is used to predict the impacts of the salt flux on groundwater salinity in the Tintinara Highlands and to assist in formulating management strategies to minimise the impacts.

Background

From Osei-bonsu, Barnett and Davies (2004), previous field investigations in the Tintinara Highlands have confirmed that groundwater salinisation will result from increased drainage following the clearing of native vegetation. The increased drainage results in subsequent leaching of saline water in the unsaturated zone downwards towards fresher groundwater. A lag time of approximately fifty to hundreds of years is expected before there will be observed increases in groundwater salinity.

As part of the South Australian Salinity Mapping and Management Support Project funded by the National Action Plan for Salinity and Water Quality, spatial coverages were developed of the relevant parameters in the salinisation model to estimate recharge and salt flux to the aquifer over time using data collected by an airborne EM survey and drill core. The Tintinara groundwater model is constructed to predict the impacts of the salt flux on groundwater salinity.

The model covers the period from 1960 to 2100. Modelling of predictive scenarios starts from September 2004.

The model was developed in 2004 with Groundwater Modelling System (GMS).

Location

The location of the model domain is shown in Figure 1.

Model structure

Model domain and grid size

The model extends 200 km east to west and 200 km north to south. The bounding co-ordinates of the model domain are 336433E, 5942682N (south-west) and 536433E, 6142682N (north-east) (GDA 1994, MGA Zone 54).

The model consists of 109 rows and 128 columns. Cell spacing varies from 600 m to 2000 m, with finer discretisation in the survey area.

Model layers

The regional aquifer system is conceptualised as five layers, including three aquifer layers and two aquitard layers (Table 1 and Figure 2).

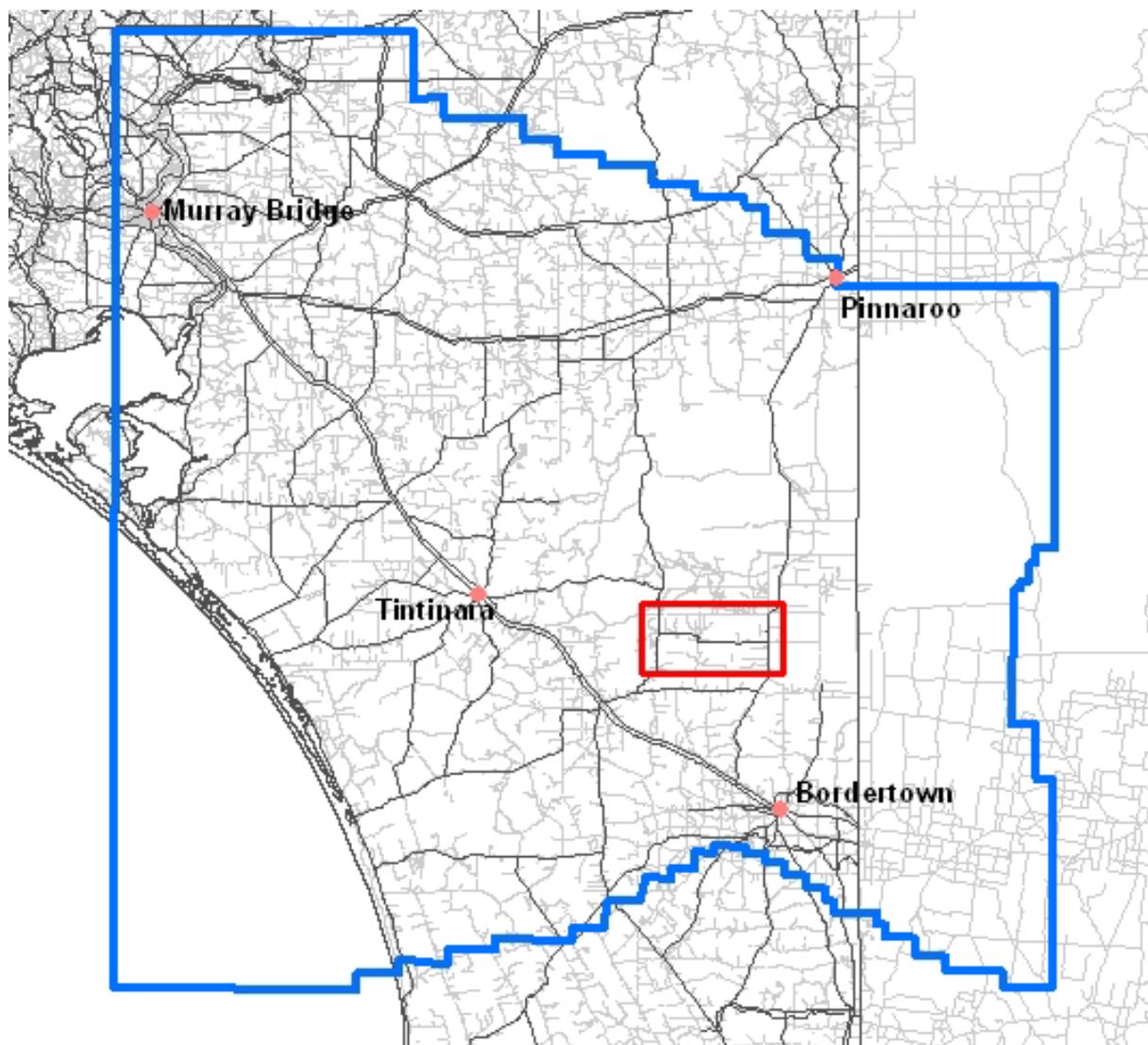


Figure 1. Tintinara model domain (blue) and the aerial survey area (red)

Table 1. Model layers

Layer	Hydrogeological unit	Aquifer/Aquitard	MODFLOW layer
1	Pliocene Sands	Aquifer	Type-1
2	Bookpurnong Beds	Aquitard	Type-3
3	Murray Group Limestone	Aquifer	Type-3
4	Ettrick Formation	Aquitard	Type-0
5	Renmark Group	Aquifer	Type-0

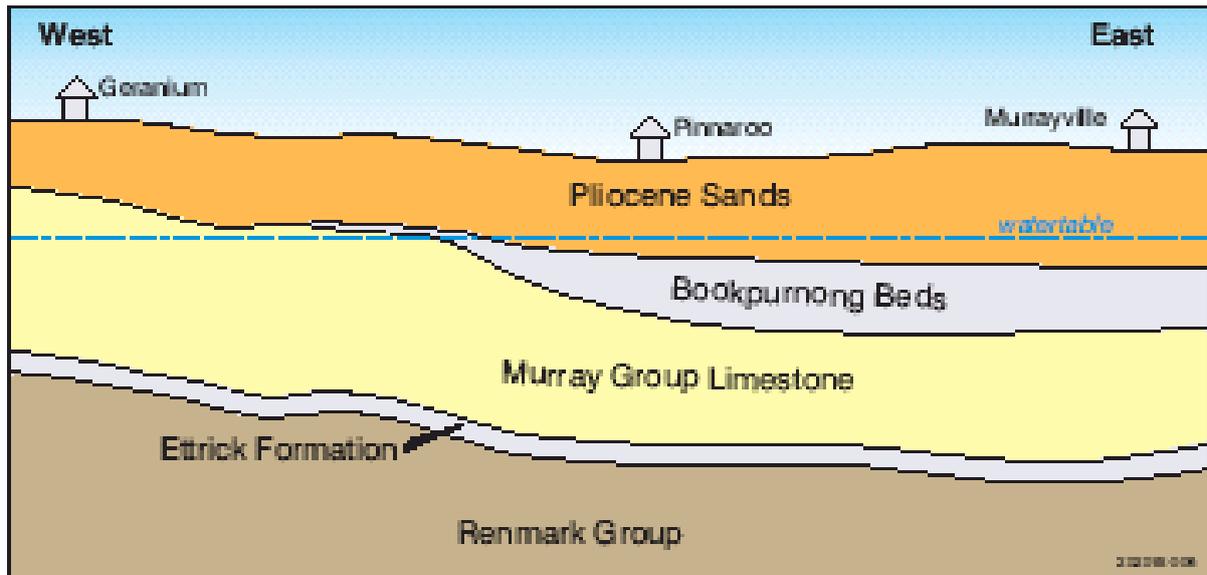


Figure 2. Cross-section

Report

Osei-bonsu K, Barnett S and Davies P, 2004, *Modelling Groundwater Salinisation in the Tintinara Highlands area of SA*, Report DWLBC 2004/44, Department of Water, Land and Biodiversity Conservation, Adelaide