MURRAY BASIN SA MODEL (NOORA) 2007

Purpose

The purpose of the groundwater model, as described in Hodgkin et al. (2007), is to predict the changes to groundwater levels within the aquifer systems beneath and surrounding the Noora Disposal Basin under several disposal scenarios.

Background

From Hodgkin et al. (2007), the Noora Basin occupies an extensive low-lying groundwater discharge area about 20 km east of Loxton in the Riverland and is one of two major schemes used by South Australia to dispose of water from irrigation drainage and salt interception schemes. So as to inform the long term design, operation and management of the Noora Basin, both surface and groundwater models were developed by the Department of Water, Land and Biodiversity Conservation (DWLBC) in 2006–07 (Heneker 2007; Hodgkin et al. 2007). Outputs from the surface water modelling (the inundated basin extent, pond levels and basin water salinity) were key inputs into the groundwater model.

The model domain covers larger area due to initially the model was build for different purpose. The model was selected for the project because the model covers more than 50 km into the Victoria side.

The model was built with Visual MODFLOW version 4.1.

Location

The location of the study area is shown in Figure 1.

Model structure

Model domain and grid size

The model domain simulates an area 200 km (east to west) by 200 km (north to south). The bounding coordinates of the model domain are 340000E, 6060000N (south-west) and 540000E, 6260000N (north-east) (GDA 1994, MGA Zone 54).

The model grid comprises 459 rows x 475 columns. The minimum grid size is 125 m x 125 m in the Noora basin area with a maximum grid size of 500 m x 500 m in the outer parts of the model domain.

Model layers

The regional groundwater system has been represented in a five layer model with four aquifer layers and one aquitard layer, which are summarised in Table 1 and shown in Figure 2.
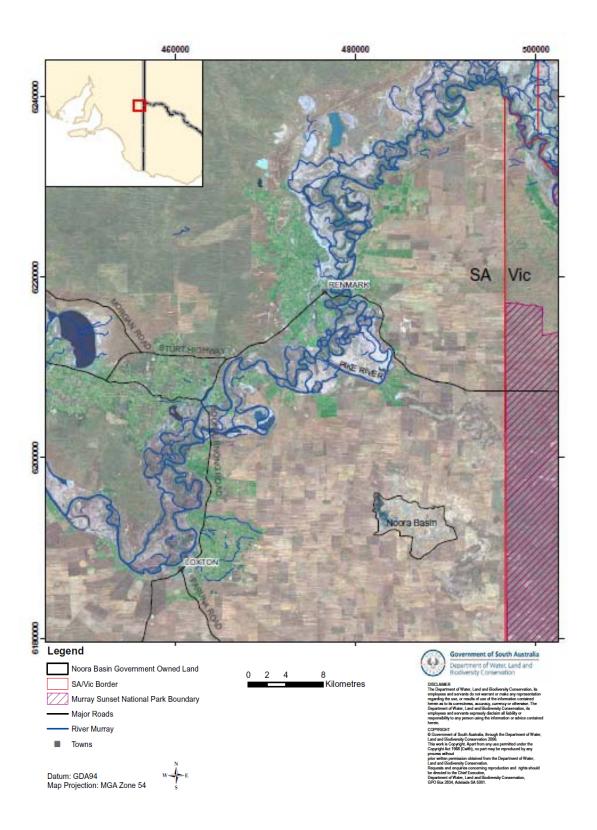
Legend

- ⬛ Noora Basin Government Owned Land
- 🟥 SA/Vic Border
- ▨ Murray Sunset National Park Boundary
- — Major Roads
- — River Murray
- ◼ Towns

Datum: GDA94
Map Projection: MGA Zone 54

Government of South Australia
Department of Water, Land and Biodiversity Conservation

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Figure 1.   Site Map

Table 1.   Model layers

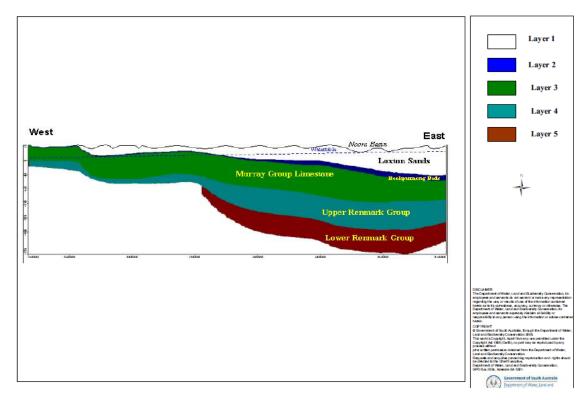| Layer	Hydrogeological unit	Aquifer/aquitard	MODFLOW layer
1	Loxton Sands, Monoman Formation	Unconfined aquifer	Type-1
2	Lower Loxton Clay and Bookpurnong Formation	Aquitard	Type-3
3	Murray Group Limestone	Unconfined/confined aquifer	Type-3
-	Ettrick Formation	Aquitard	Simulated as leakage
4	Upper Renmark Group	Confined aquifer	Type-0
5	Lower Renmark group	Confined aquifer	Type-0

Figure 2.   Cross-section

Reports

Heneker T, 2007, *Noora Drainage Disposal basin: Surface Water Investigation*, Report DWLBC 2007/17, Department of Water, Land and Biodiversity Conservation, Adelaide

Hodgkin T, Yan W, Stadter M and Clarke D, 2007, *Noora Basin Numerical Groundwater Model 2007*, Report DWLBC 2007/25, Department of Water, Land and Biodiversity Conservation, Adelaide