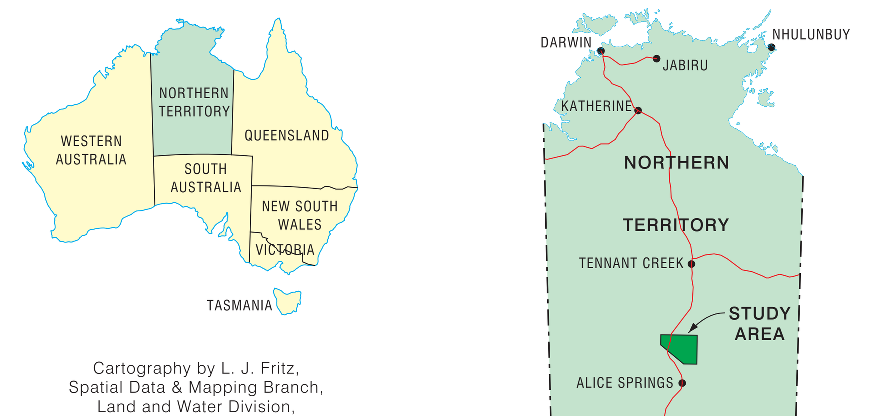
The TI-TREE BASIN AQUIFER

Northern Territory Government
Department of Natural Resources, Environment and the Arts

MAP LOCALITY



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Land and Water Division,
Department of Natural Resources, Environment
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Design File: Ti-Tree-Basin_GWater_m53
Plot File: Ti-Tree-Basin_Groundwater_250k

Data Source;

Cadastre - Department of Planning & Infrastructure,
Northern Territory of Australia.

Topography - GEODATA TOPO 250K
Geoscience Australia, Canberra, ACT.

Prepared and produced by the
Department of Natural Resources, Environment
and the Arts, Northern Territory of Australia,
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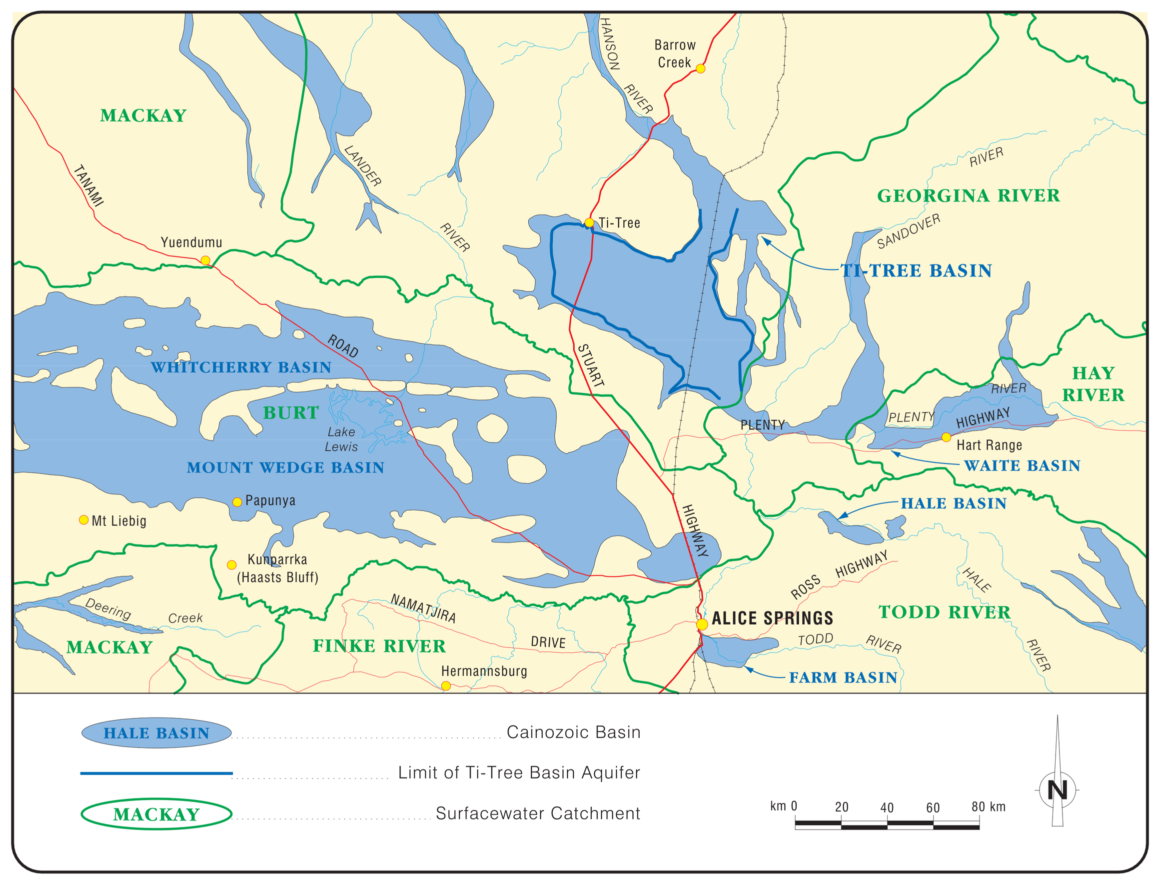
REGIONAL SETTING

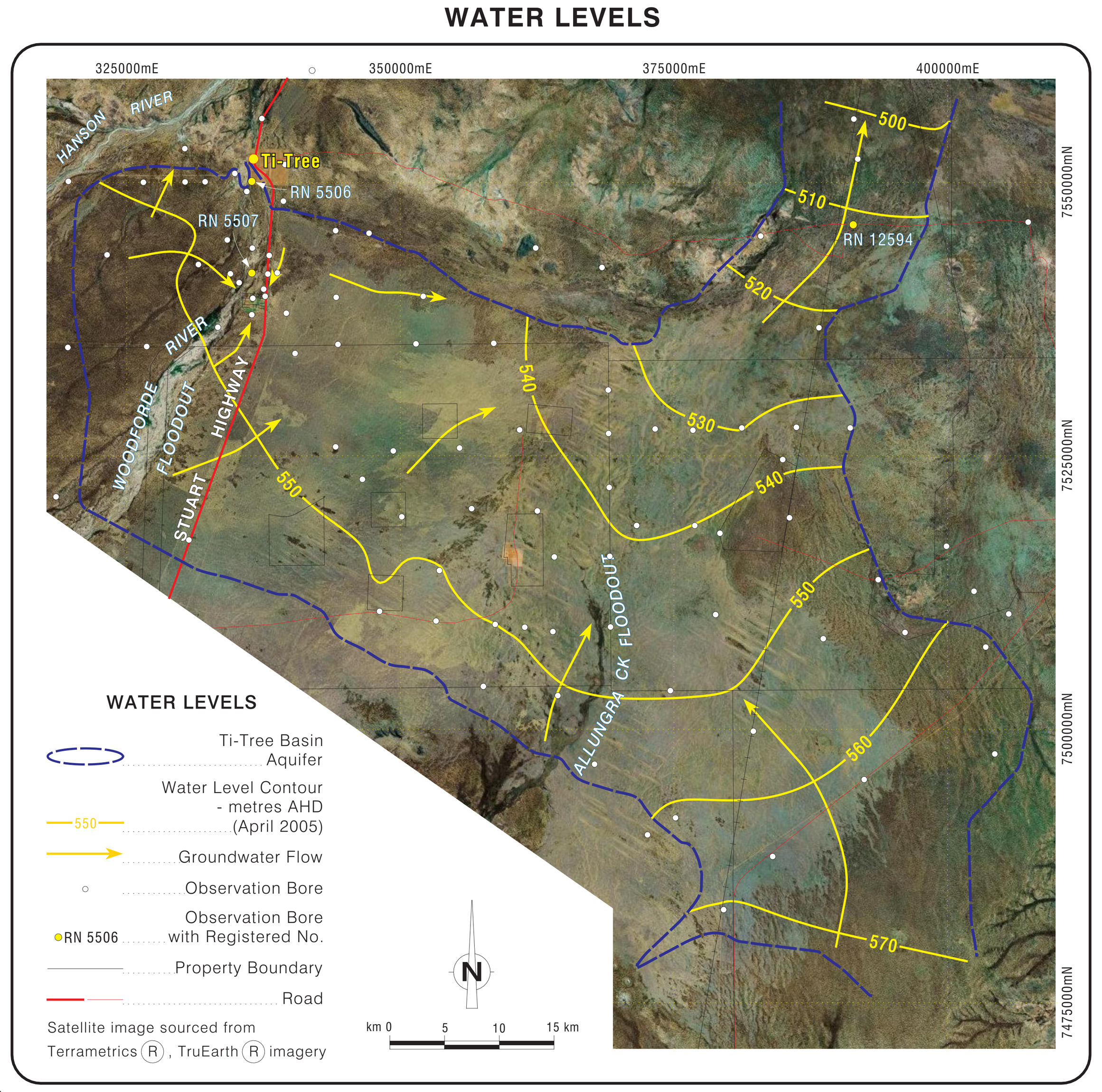
The **TI-TREE BASIN** is one of many small sedimentary basins found across Central Australia. It started to form around 65 millions years ago when lakes and swamps occupied a depression in the landscape. Initially clay and peat began to fill the basin but later, rivers carried sand, silt and clay, forming the upper portion of the basins fill.

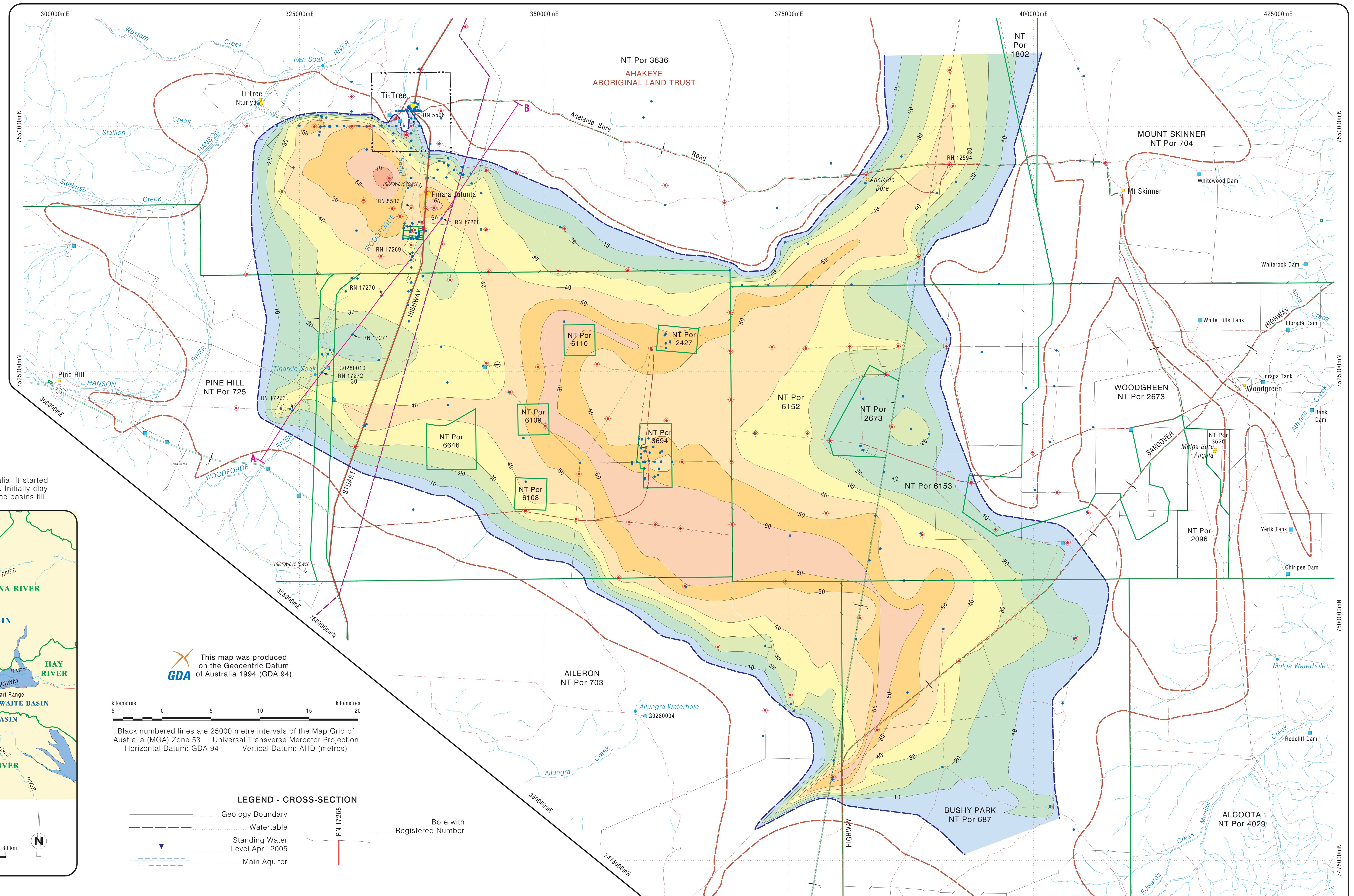


Once in the aquifer, **GROUNDWATER MOVES** horizontally under the action of gravity. The directions that the water moves can be deduced from the watertable map below. It moves from where the watertable is high to where it is low. Recharge areas tend to be in the high watertable zones and discharge from the aquifer tends to occur where the watertable is lower. Groundwater flows relatively slowly (centimetres to metres per year) due to the low hydraulic gradients that drive the process and the resistance of having to pass through the minute pores between sand grains.

The dominant pattern of flow is from south to north. The groundwater that is not used by evapotranspiration is funnelled into the narrow outlet on the basins north east side.

WATER LEVELS





This map was produced on the Geocentric Datum of Australia 1994 (GDA 94)

kilometres 5 0 5 10 15 20 kilometres

Black numbered lines are 25000 metre intervals of the Map Grid of Australia (MGA) Zone 53 Universal Transverse Mercator Projection
Horizontal Datum: GDA 94 Vertical Datum: AHD (metres)

AQUIFER THICKNESS

metres

0 10 20 30 40 50 60 70 80

Limit of Ti-Tree Basin Aquifer	Family Outstation (Angula)
Limit of Ti-Tree Basin	Station Homestead (Woodgreen)
Water Bore	Principal Road - Sealed
Current Monitoring Bores	Minor Road - Sealed / Unsealed
Gauging station (G0280010)	Track
Line of Cross-section (A–B)	Railway
Property Boundary	Gas Pipeline
Town Boundary	Excavated Tank or Dam
Town (Ti-Tree)	Fenceline
Major Community (Nturiya)	

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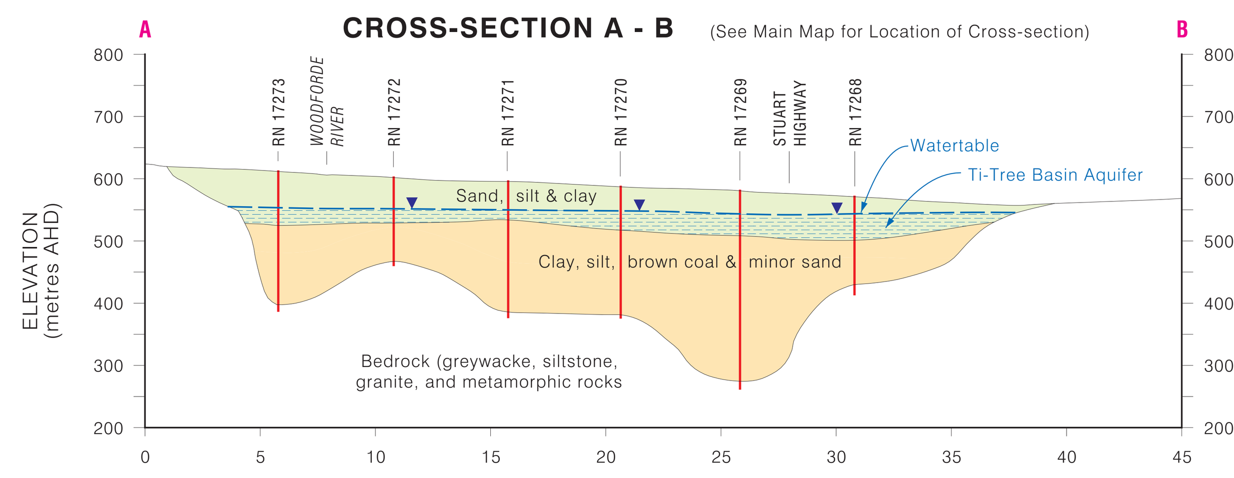
LEGEND - CROSS-SECTION

Geology Boundary
Watertable
Standing Water Level April 2005
Main Aquifer
RN 17268 Bore with Registered Number

CROSS-SECTION A - B (See Main Map for Location of Cross-section)



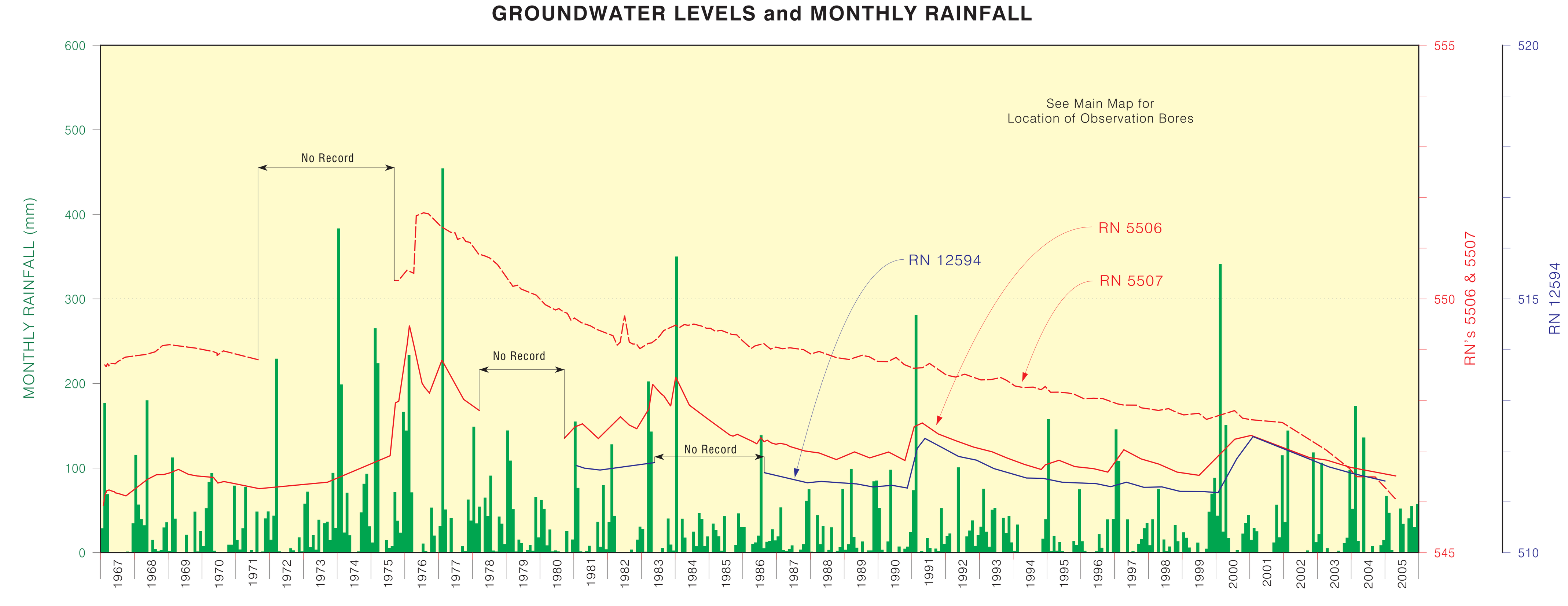
The main Ti-Tree Basin **AQUIFER** (water bearing formation) is developed in the old river sands. It is located as shallow as 10 metres to over 60 metres below the ground. In places moderately high yields (5 to 15 L/second) can be extracted from bores. Variations in thickness of the aquifer and in the amount of silt and clay mixed with the sand make for considerable variability in bore yield. Aquifers occur beneath the main aquifer but they are generally limited in extent and thickness.

The cross-section above shows the location of the main aquifer in relation to the two main geological layers.

Groundwater **RECHARGE** is the process where water seeps down into the aquifer. Due to the low average rainfall (318 mm/year) and its sporadic nature, the aquifer does not receive recharge every year. The abrupt rises in groundwater levels seen on the graph to the right, record recharge events, typically associated with heavy rainfalls. An exceptionally large event occurred in the mid to late 1970's. Groundwater levels have still not fallen to pre-1970's levels over much of the basin. The long term average recharge is estimated at 2 mm/year, a relatively small amount.

Recharge is not evenly distributed across the area but is thought to be concentrated in flood-outs. These are features where rivers enter the basin from adjoining hills and then fan out across the plains into numerous channels. During the rare times that the rivers flood, most of the water soaks into the sandy soils of the flood-outs and the flood-waters only reach a limited distance from the hills. The Allungra Creek and Woodforde River flood-outs are the most important recharge areas in the basin.

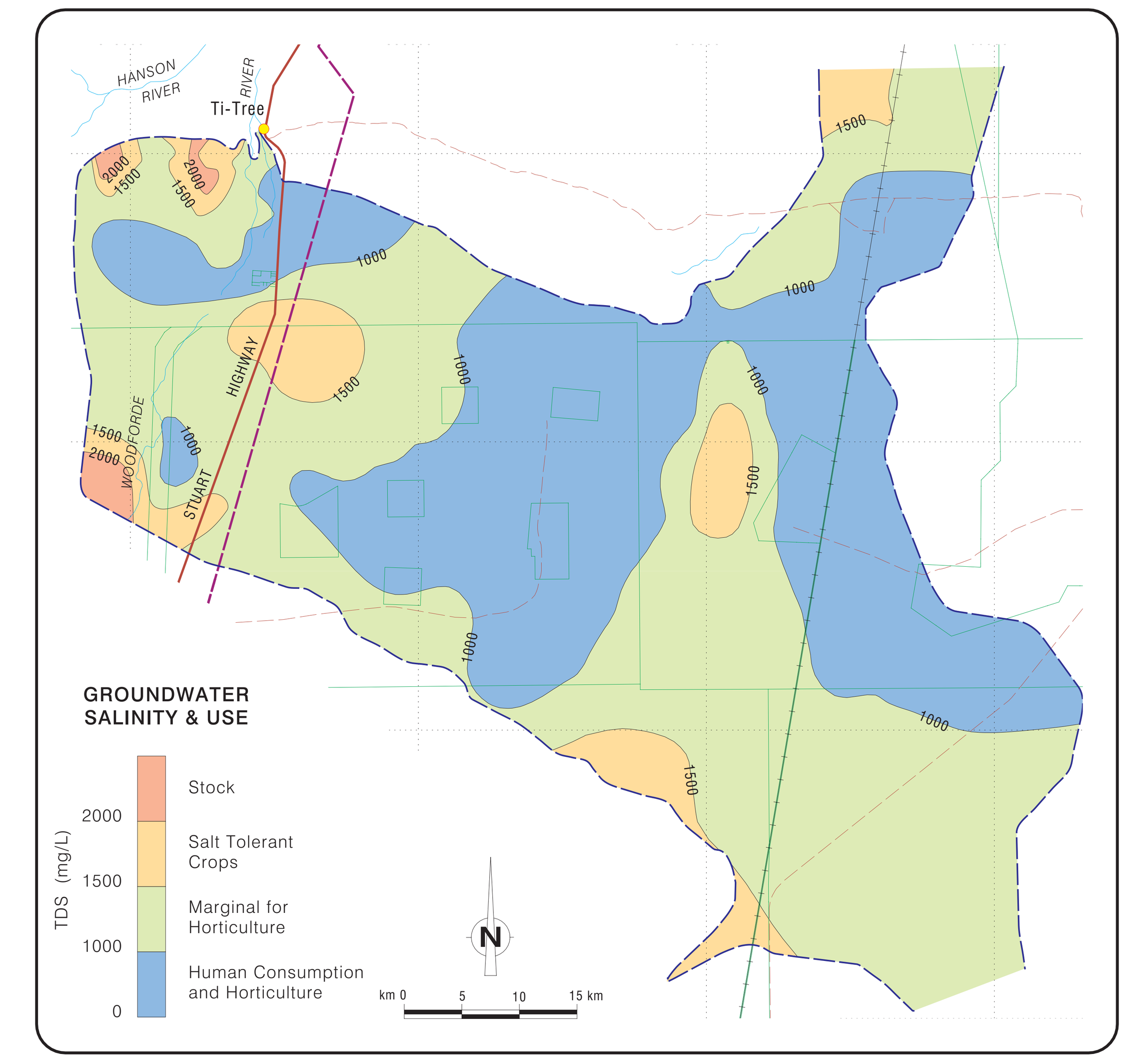
GROUNDWATER LEVELS and MONTHLY RAINFALL



SALINITY As with most arid zone groundwaters, those in the basin contain moderate amounts of salt (predominantly common salt, sodium chloride). Salinity, expressed as Total Dissolved Solids on the map below varies across the basin. The salinity is related to how easily water can get into the aquifer. Where recharge is high, salinities are lower but where recharge is low salt becomes concentrated in the soil and sub-soil by evapotranspiration and this is eventually flushed into the groundwater. In places, higher salinities may limit the use of the water.

The nitrate content of the groundwater also limits its use for human consumption over much of the basin. It is natural in origin and is produced by nitrogen fixing vegetation and termites.

GROUNDWATER SALINITY



What goes in must eventually come out! **DISCHARGE** usually occurs at low points in the landscape. In the map area there are no springs or swamps that could discharge groundwater. Stirling Swamp located near Wilora, 60 km north of the basin is thought to be a discharge point for groundwater that leaves the basin via the narrow outlet on its northeast side.

Within the basin the main mechanism of discharge is evaporatranspiration. The acacia shrubland that covers the area is capable of tapping the watertable where it is shallow enough. The map below indicates the depth below ground level of the water table.

DEPTH TO WATER