

## 4 New monitoring bores

Six new groundwater monitoring bores have been installed. These have been strategically placed to help fill the information gaps in the area. The majority of the current monitoring bores occur as clusters around salinity discharge areas on the slopes of the Black Range at Wiseman's Hill and around the Timor West township.

Almost 12 months of recorded data has been collected from the newly installed bores, and while this does indicate a fall in groundwater level in all of these bores, there is still limited data from which to determine any long-term groundwater trend. It will be interesting to see how the bores respond to a wet winter-spring period.

The new bores also indicate that groundwater salinities increase towards the north of the targeted area, where groundwater movement is more subdued. Bore 60247 (Table 2) located at the base of Mount Hooghly (Figure 4) has the highest groundwater salinity reading (more than 20 000 EC). This bore is located near a discharge site associated with Mount Hooghly. Watertable responses are much more subdued in the landscapes around Mount Hooghly due to extensively developed clayey sub-soils and weathered material with low permeability. These areas characteristically have shallow perched watertables, surface waterlogging and excess runoff which can lead to salinity and erosion.

Currently a new study is being conducted that measures the total salt loads leaving the Timor West targeted area. This project is in its infancy and the information is not yet available.

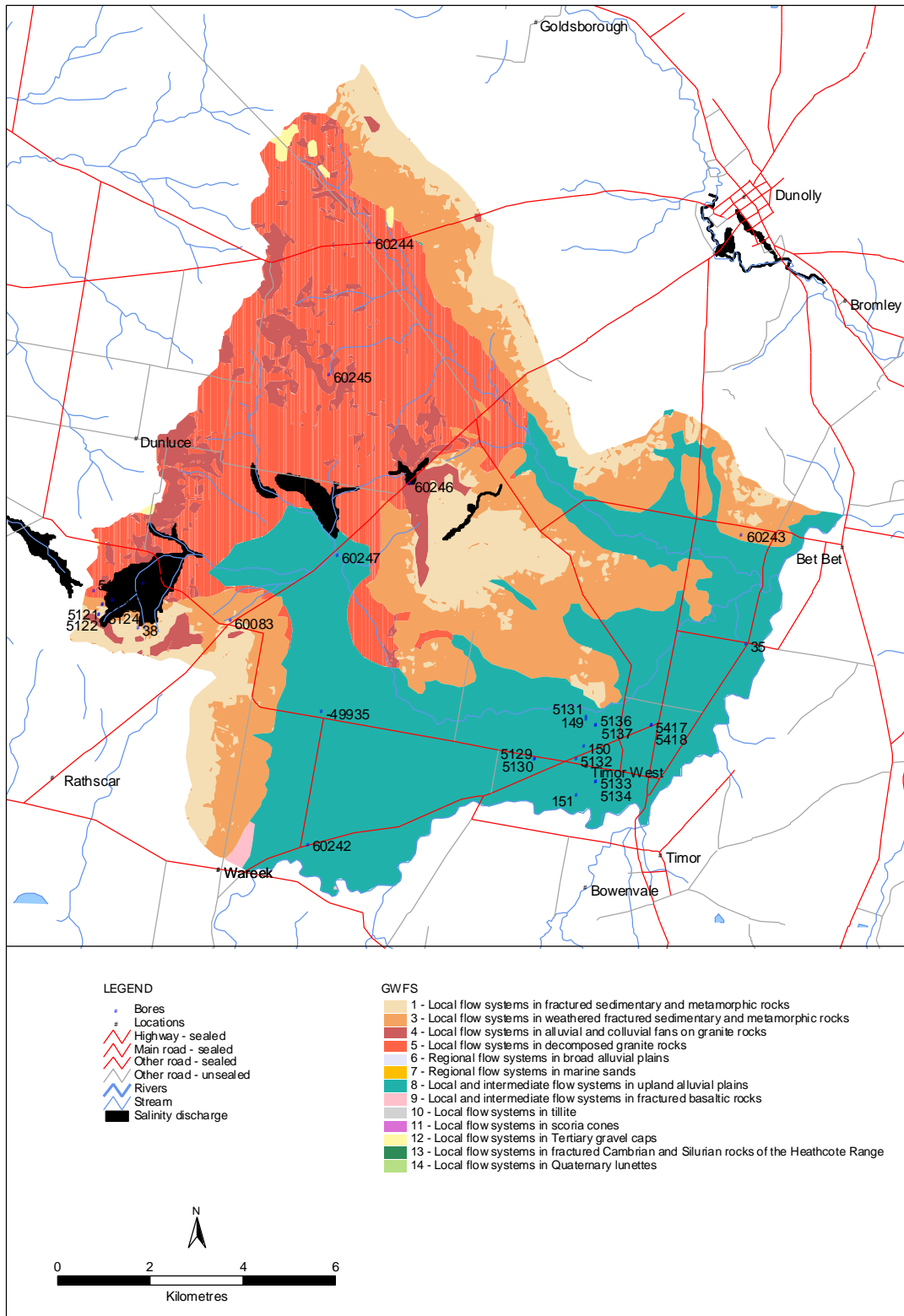


Figure 4 Map of groundwater flow systems in Timor West

Department of Primary Industries

**Table 2.** Bore information for new bores drilled in Timor West targeted area

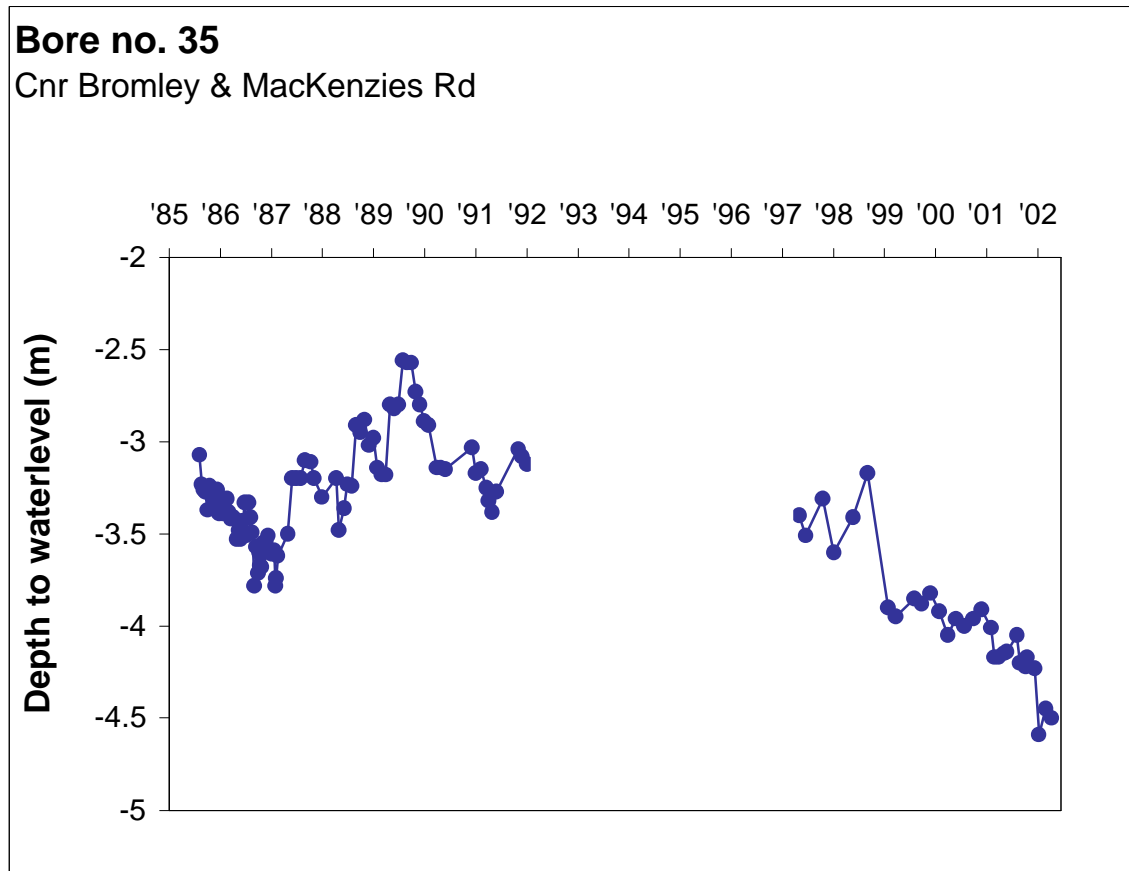
Bore no.	Bore depth (m)	Depth to watertable (m) (May 2003)	EC ( $\mu\text{S}/\text{cm}$ )
60242	12.0	9.70	1800
60243	11.5	6.60	3000
60244	20.5	14.65	13 000
60245	30.0	Dry bore	-
60246	12.0	8.03	3100
60247	17.0	13.54	>20 000

## References

- Coram JE, Dyson PR and Evans WR (2001) An evaluation framework for dryland salinity. National Land and Water Resources Audit Dryland Salinity Project, Bureau of Rural Sciences, Canberra.
- Day C (1985) A study of the geomorphic, soil and geohydrological conditions of the Timor West/Black Ranges area. Land Protection Service, Conservation Forests and Lands.
- Perry R (2003) Timor West targeted salinity project brochure. Department of Primary Industries, Victoria



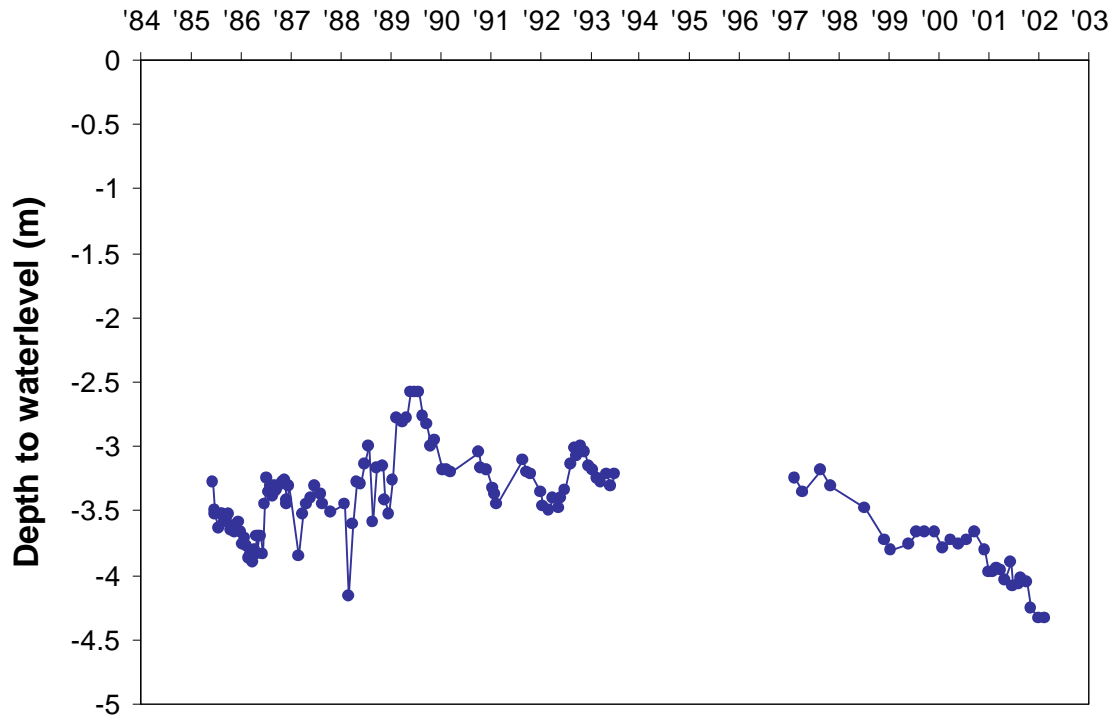
## Appendix 1 Hydrographs of Timor West monitoring bores



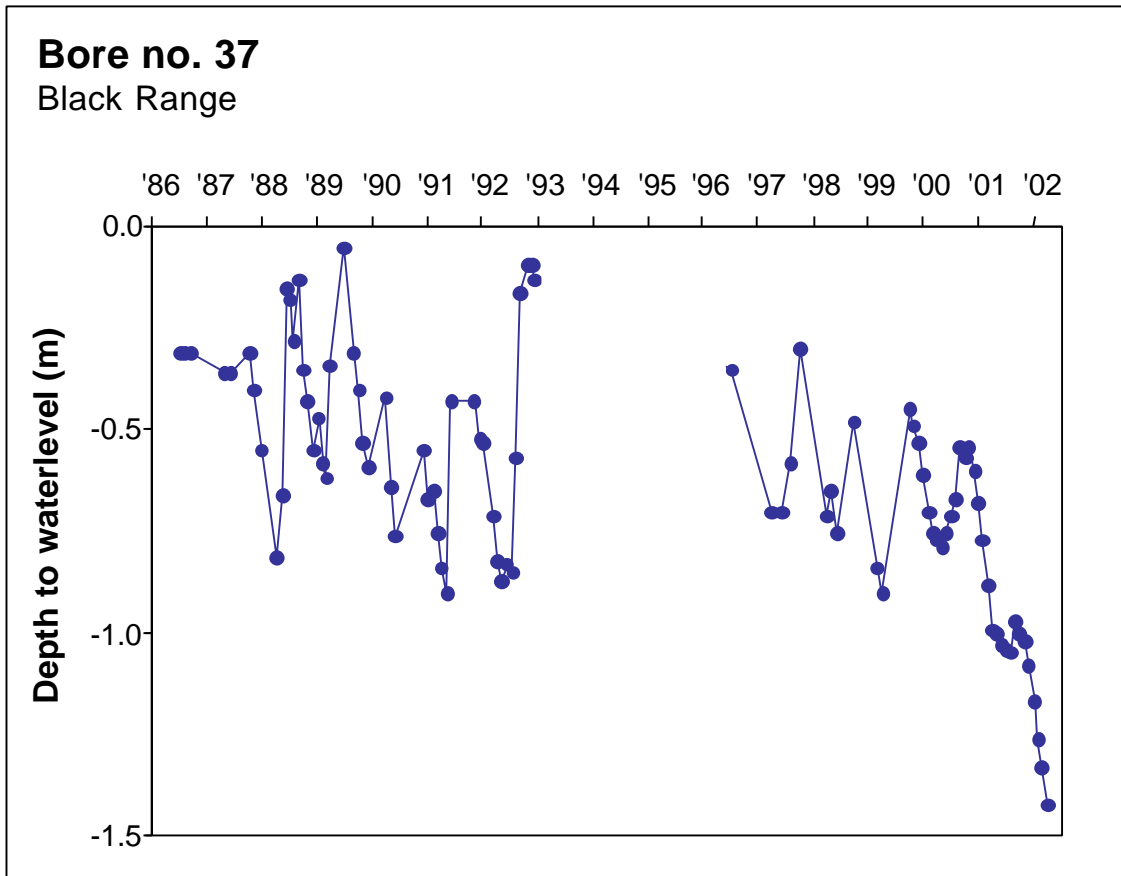
CLPR No:	35	Bore monitor:	DPI
Locality description:	Corner of Bromley and McKenzies Roads Located in Bet Bet Deep Lead Bore located on plain, flat landscape		
Geological description:	Shepparton Formation Fluvial clay, silt, sand and gravel		
Bore depth (m):	60	Average rainfall (mm/yr):	449
Current water depth 2003 (m):	4.5	Salinity (EC) ( $\mu\text{S}/\text{cm}$ ):	2700
Groundwater trend:	Responsive to seasonal climatic variation with an overall falling groundwater trend.		

**Bore no. 36**

Betley

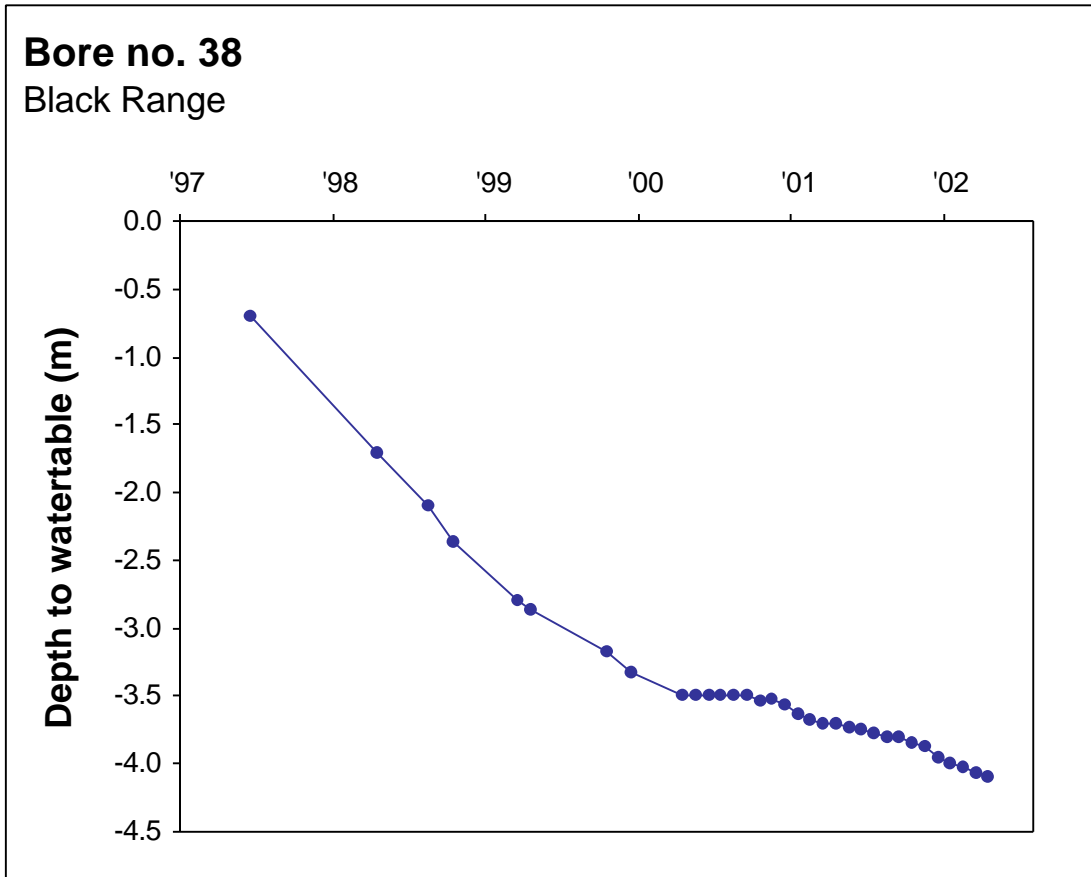


CLPR No:	36	Bore monitor:	DPI
Locality Description:	Betley Bet Bet Deep Lead Bore located in plain, flat landscape		
Geological description:	Shepparton Formation Fluvial clay, silt, sand and gravel		
Bore depth (m):	90	Average rainfall (mm/yr):	449
Current water depth 2003 (m):	4.3	Salinity (EC) (µS/cm):	—
Groundwater trend:	Even groundwater trend, slight fall in waterlevel since 2002.		

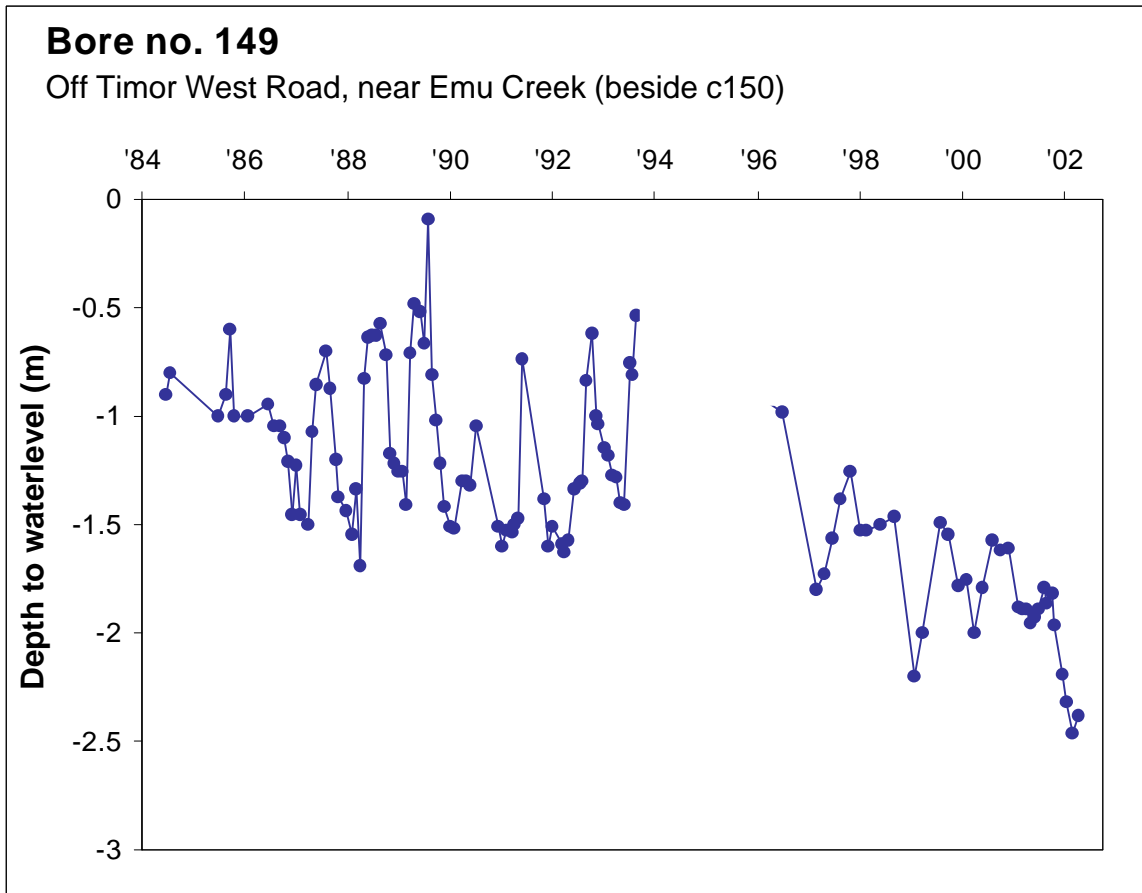


CLPR No:	37	Bore monitor:	Alex Wiseman
Locality description:	Black Range Bore located mid-slope		
Geological description:	Devonian granite and associated metamorphic rocks Clay, sand overlying hard, fresh, granite/metamorphic rock		
Bore depth (m):	18	Average rainfall (mm/yr):	449
Current water depth 2003 (m):	1.8	Salinity (EC) (µS/cm):	—
Groundwater trend:	Very responsive to seasonal rainfall variation, falling trend overall, prominent since 1996		

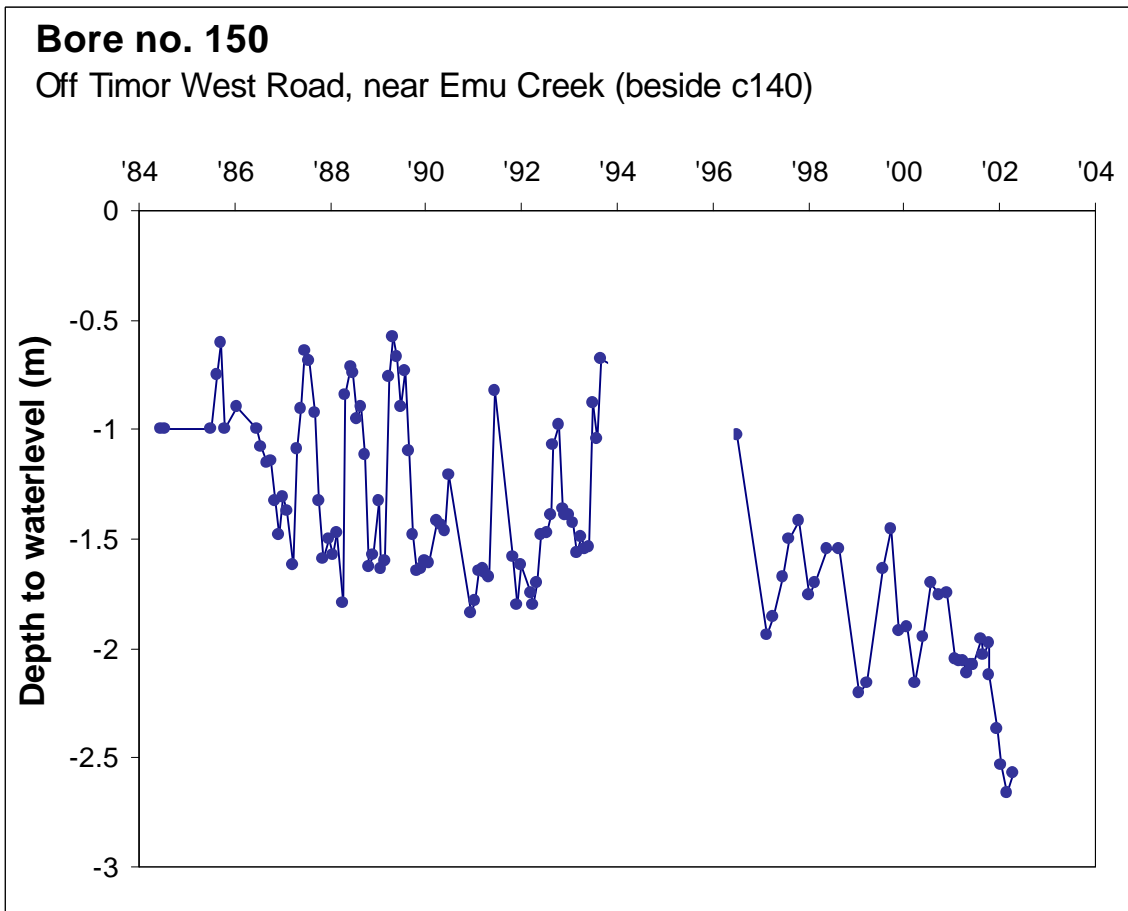




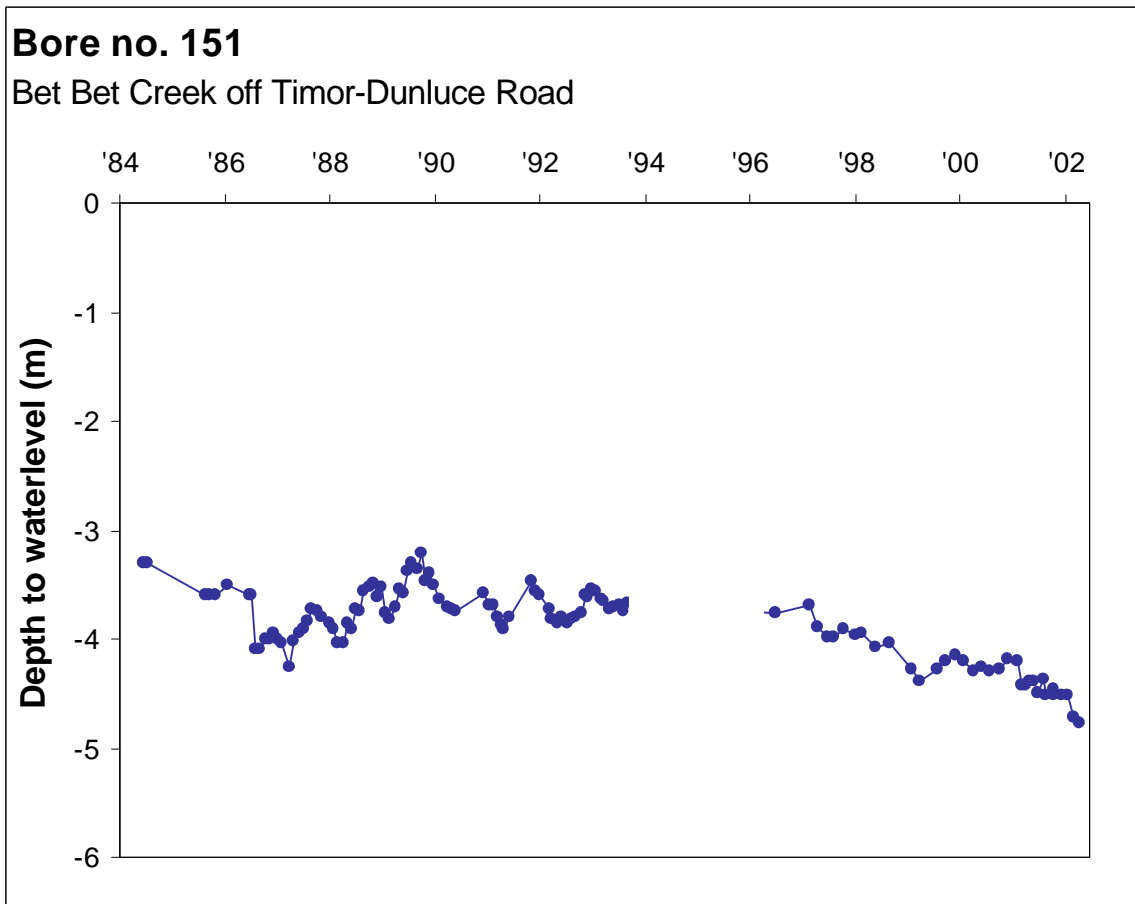
CLPR No:	38	Bore monitor:	Alex Wiseman
Locality description:	Black Range Bore located in plain, flat landscape		
Geological description:	Devonian Granite and associated metamorphic rocks Clay, sand overlying hard, fresh, granite/metamorphic rock		
Bore depth (m):	27	Average rainfall (mm/yr):	449
Current water depth 2003 (m):	4.0	Salinity (EC) (µS/cm):	—
Groundwater trend:	Strong falling trend. Located beside 5121-22. Representative of the last six years.		



CLPR No:	149	Bore monitor:	DPI
Locality description:	Timor West Rd, Timor West Bore located on lower slope, river flat landscape		
Geological description:	Shepparton Formation Fluvial clay, silt, sand and gravel		
Bore depth (m):	15	Average rainfall (mm/yr):	449
Current water depth 2003 (m):	2.5	Salinity (EC) (µS/cm):	—
Groundwater trend:	Strong response to seasonal climatic variation, overall falling trend, steeper falling trend since 1998.		



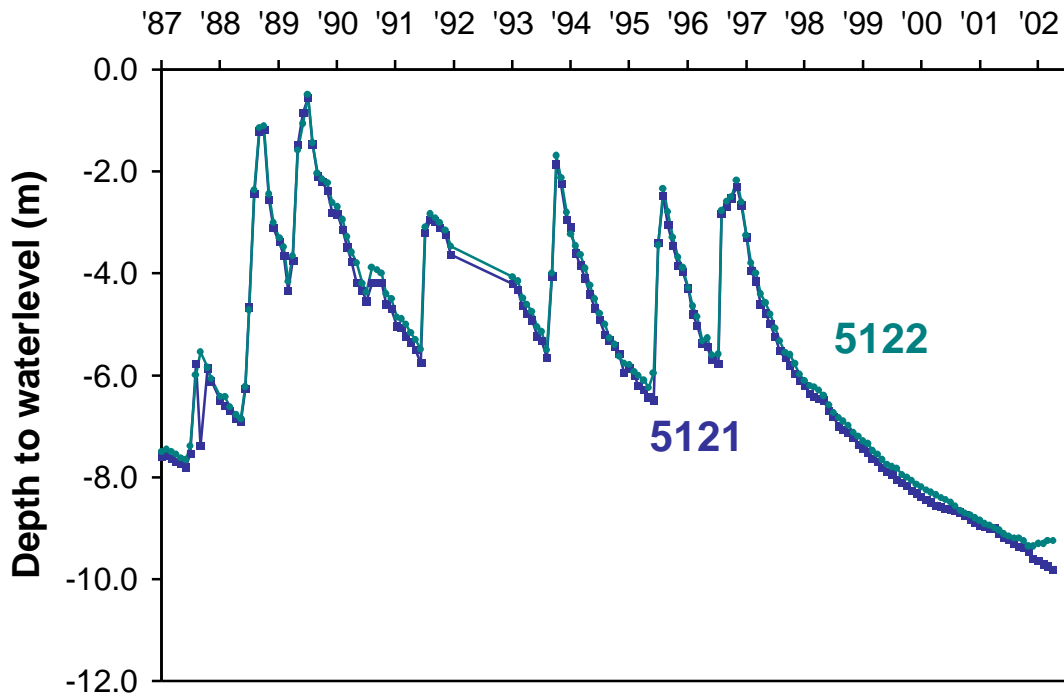
CLPR No:	150	Bore monitor:	DPI
Locality description:	Timor West Rd, Timor West Bore located on lower slope, riverflat landscape.		
Geological description:	Shepparton Formation Fluvial clay, silts, sand and gravel.		
Bore depth (m):	30.7	Average rainfall (mm/yr):	449
Current water depth 2003 (m):	2.5	Salinity (EC) (µS/cm):	—
Groundwater trend:	Strong response to seasonal rainfall. Overall long-term falling trend, falling steeper since 1996.		



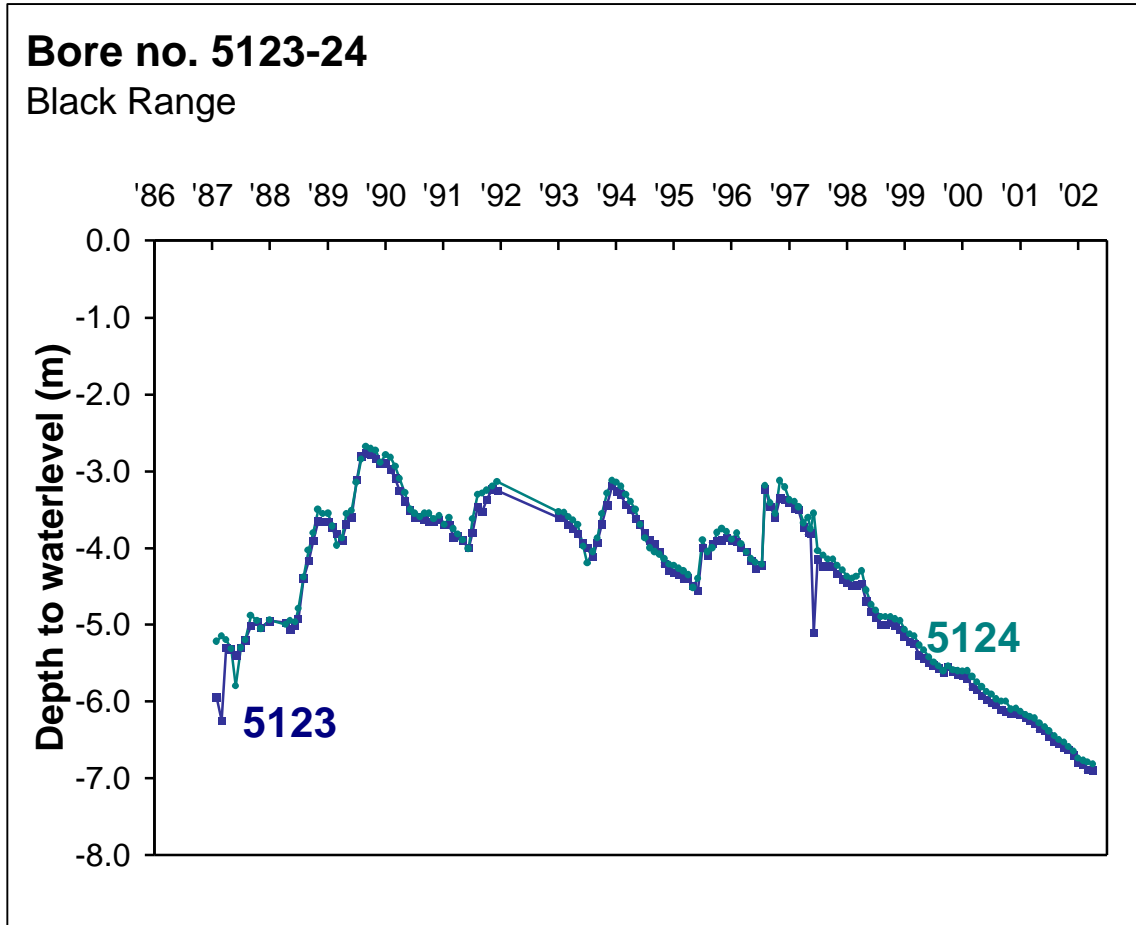
CLPR No:	151	Bore monitor:	DPI
Locality description:	Bet Bet Creek Bet Bet Deep Lead Bore located on lower slope, riverflat landscape.		
Geological description:	Shepparton Formation (fluvial clay, silt, sand and gravel) overlying deep lead deposits of coarse sand gravel overlying Tertiary deep lead sediments.		
Bore depth (m):	72	Average rainfall (mm/yr):	449
Current water depth 2003 (m):	4.5	Salinity (EC) (µS/cm):	14 000
Groundwater trend:	Even trend. Some response to climatic variation. Slight falling trend since 1998.		

### Bore no. 5121-22

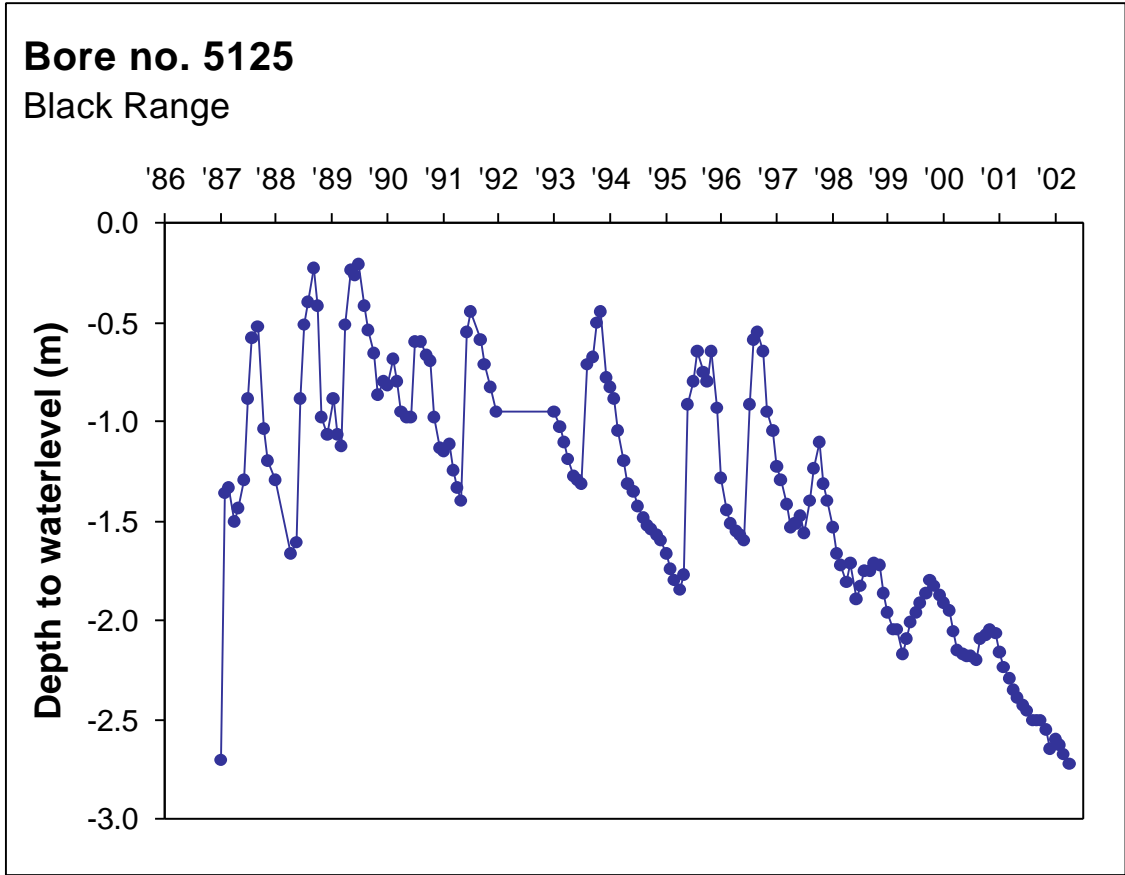
Black Range



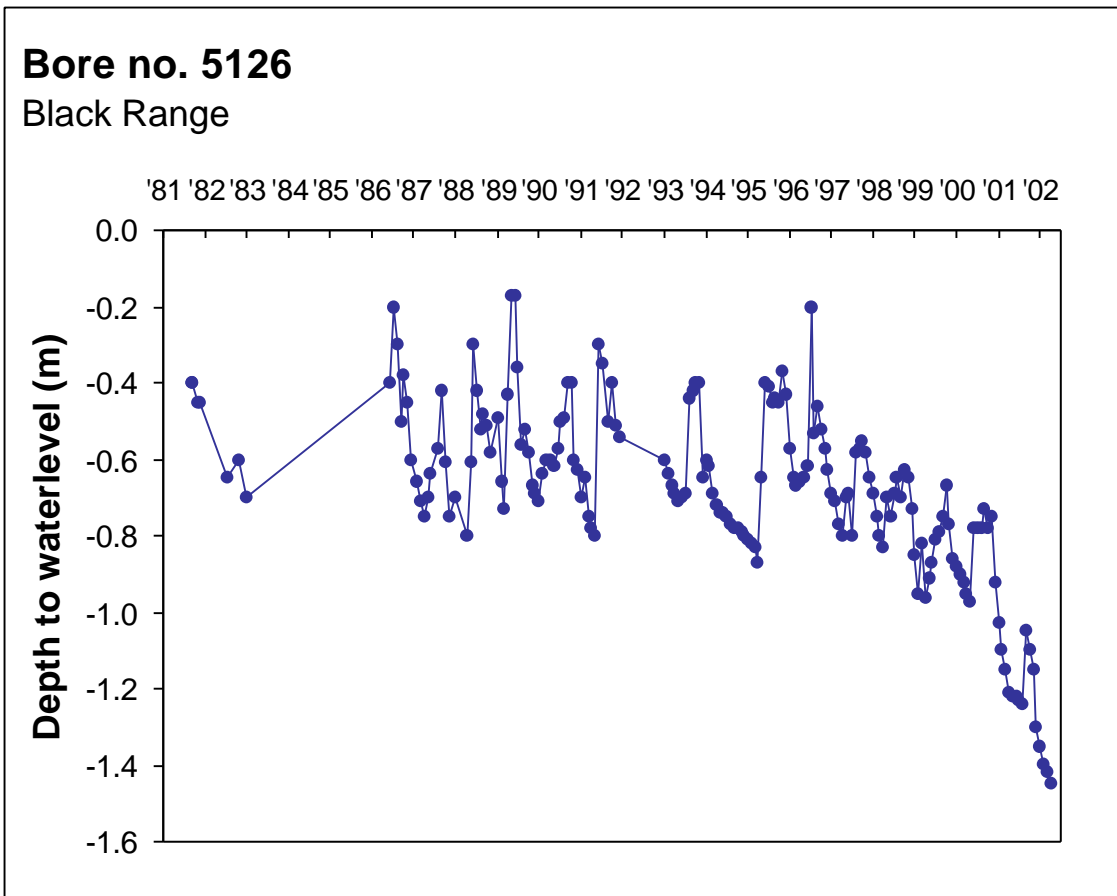
CLPR No:	5121, 5122	Bore monitor:	Alex Wiseman
Locality description:	Black Range Bore located mid-slope		
Geological description:	Devonian granite and associated metamorphic rocks Clay, sand overlying hard, fresh, granite/metamorphic rock		
Bore depth (m):	5121 = 18.5 5122 = 10.0	Average rainfall (mm/yr):	449
Current water depth 2003 (m):	5121 = 9.8 5122 = 9.6	Salinity (EC) (µS/cm):	—
Groundwater trend:	Strong response to seasonal rainfall variation until mid 1997, very strong falling trend since late 1996.		



CLPR No:	5123, 5124	Bore monitor:	Alex Wiseman
Locality description:	Black Range Bore located lower slope		
Geological description:	Devonian granite and associated metamorphic rocks Clay, sand overlying hard, fresh, granite/metamorphic rock		
Bore depth (m):	5123 = 18.5 5124 = 10.0	Average rainfall (mm/yr):	449
Current water depth 2003 (m):	5123 = 8.0 5124 = 8.0	Salinity (EC) (µS/cm):	5123 = 7930 5124 = 4370
Groundwater trend:	Strong response to seasonal rainfall variation until mid 1997, very strong falling trend since late 1996.		

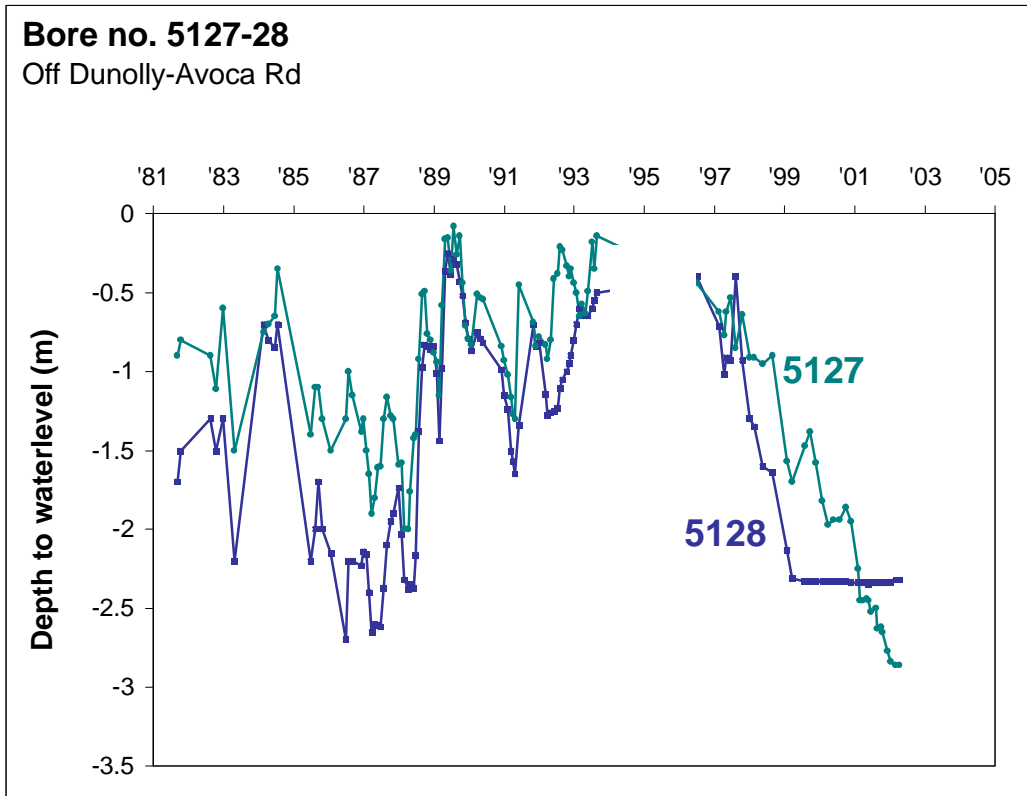


CLPR No:	5125	Bore monitor:	Alex Wiseman
Locality description:	Black Range Bore located in low-lying point, in discharge site		
Geological description:	Devonian granite and associated metamorphic rocks Clay, sand overlying hard, fresh, granite/metamorphic rock		
Bore depth (m):	6.0	Average rainfall (mm/yr):	449
Current water depth 2003 (m):	2.7	Salinity (EC) (µS/cm):	5200
Groundwater trend:	Strong response to seasonal rainfall variation until mid 1997, very strong falling trend since late 1996.		

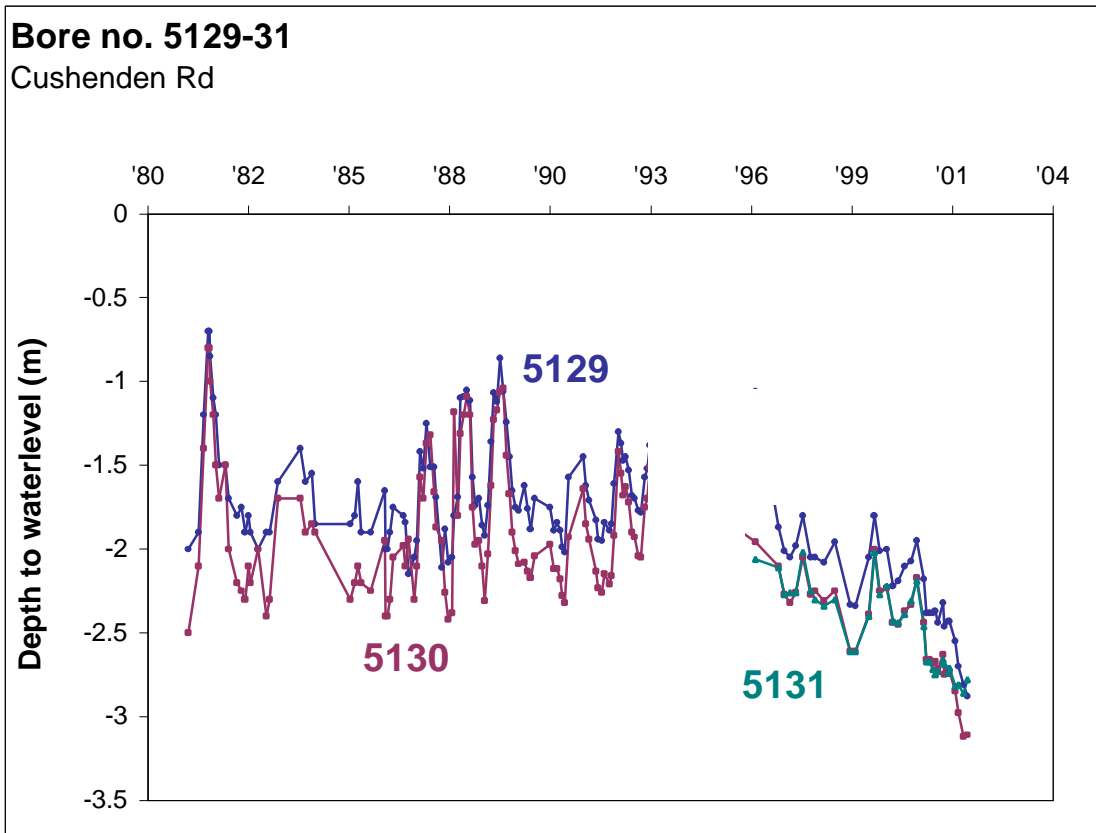


CLPR No:	5126	Bore monitor:	Alex Wiseman
Locality description:	Black Range		
Geological description:	Devonian granite and associated metamorphic rocks Clay, sand overlying hard, fresh, granite/metamorphic rock		
Bore depth (m):	6.0	Average rainfall (mm/yr):	449
Current water depth 2003 (m):	1.4	Salinity (EC) (µS/cm):	14 020
Groundwater trend:	Strong response to seasonal climatic variation. Even trend until 1996, when there is a strong fall in the hydrograph.		

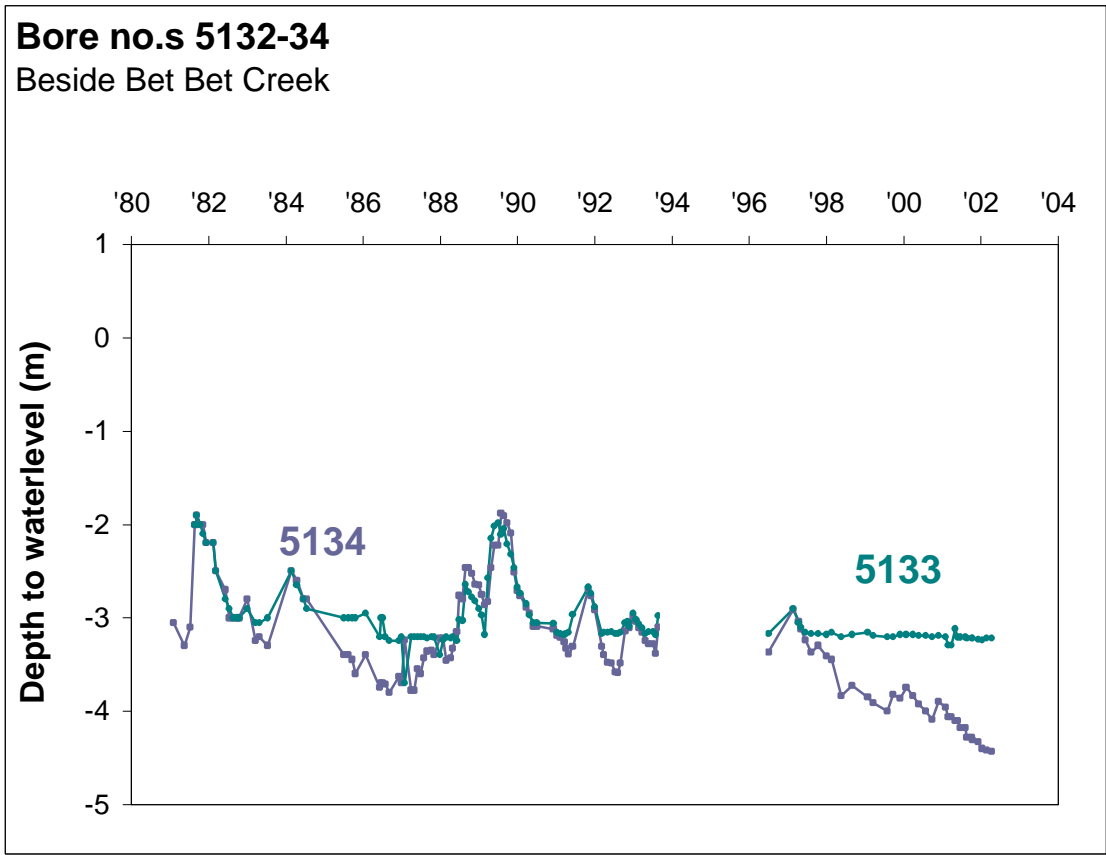




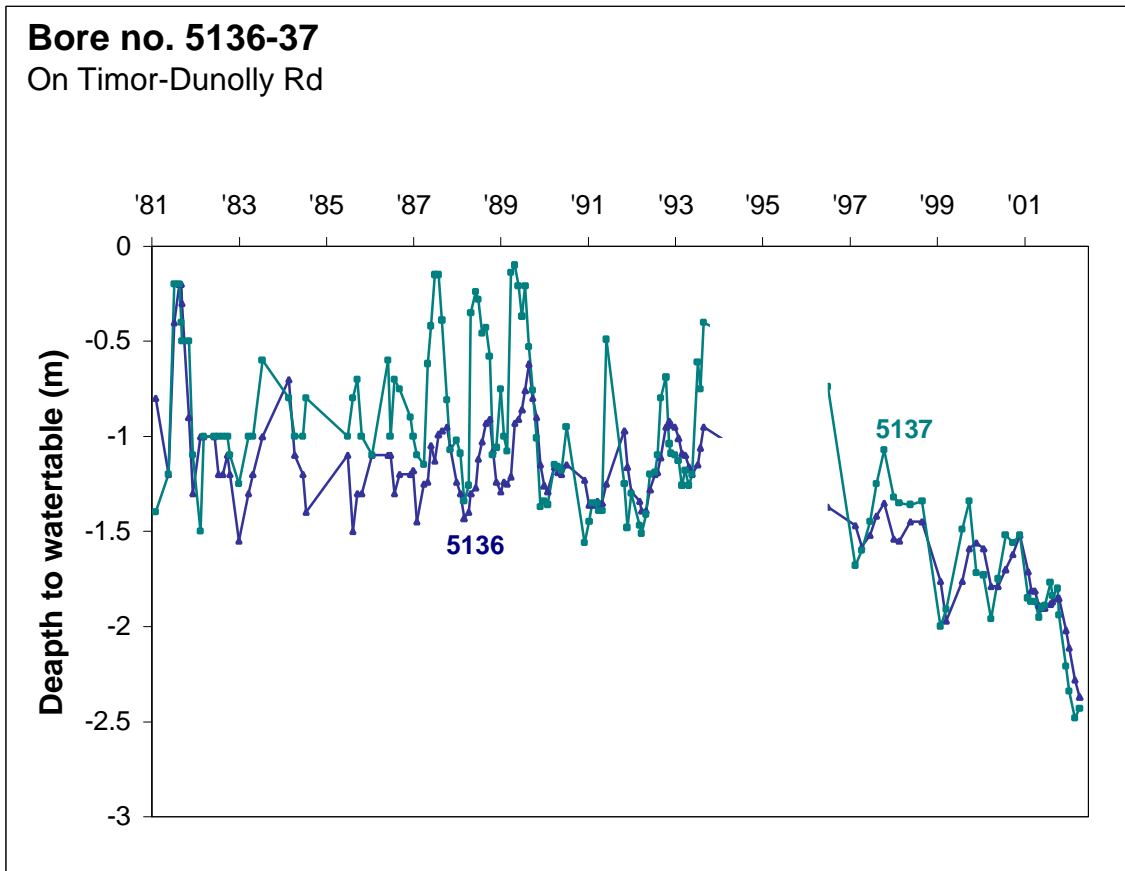
CLPR No:	5127, 5128	Bore monitor:	CLPR
Locality description:	Dunolly–Avoca Road Black Range		
Geological description:	Devonian granite and associated metamorphic rocks Clay, sand overlying hard, fresh, granite/metamorphic rock		
Bore depth (m):	5127 = 2.9 5128 = 2.3	Average rainfall (mm/yr):	449
Current water depth 2003 (m):	5127 = 2.9 5128 = 2.3	Salinity (EC) (µS/cm):	5127 = 15 840 5128 = 6160
Groundwater trend:	Strong response to local climatic variation obvious in the hydrograph. In both bores the watertable has fallen below the bottom of each bore.		



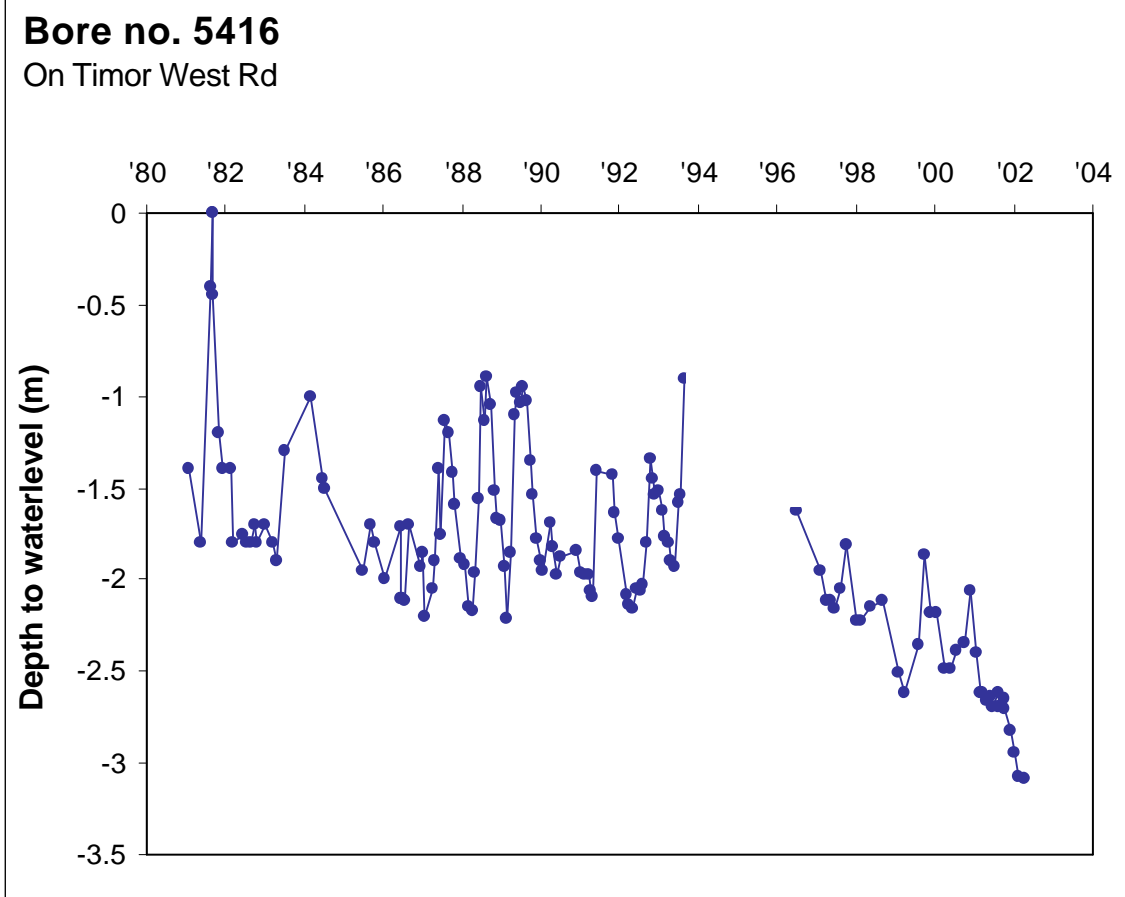
CLPR No:	5129, 5130, 5131	Bore monitor:	CLPR
Locality description:	Cushenden Road Timor		
Geological description:	Shepparton Formation (fluvial clay, silt, sand and gravel) overlying subsurface basalt flow (Quaternary olivine volcanics) overlying Ordovician sedimentary bedrock		
Bore depth (m):	5129 = 16.5 5130 = 6.7 5131 = 3.0	Average rainfall (mm/yr):	449
Current water depth 2003 (m):	5129 = 3.2 5130 = 3.2 5131 = 2.7	Salinity (EC) ( $\mu\text{S}/\text{cm}$ ):	—
Groundwater trend:	Strong response to local climatic variation with a strong overall falling trend observed since late 1996.		



CLPR No:	5132, 5133, 5134	Bore monitor:	CLPR
Locality description:	Beside Bet Bet Creek		
Geological description:	Shepparton Formation (fluvial clay, silt, sand and gravel) overlying subsurface basalt flow (Quaternary olivine volcanics) overlying Ordovician sedimentary bedrock		
Bore depth (m):	5133 = 5.0 5134 = 3.0	Average rainfall (mm/yr):	449
Current water depth 2003 (m):	5133 = 3.0 5134 = 4.0	Salinity (EC) (µS/cm):	5133 = 5150 5134 = —
Groundwater trend:	Varied response to local climatic variation. Relatively even trend. 5132 shows that the watertable has fallen below the bore depth, 5133 shows a slight falling trend since 1998 and 5134 shows a possible data error.		



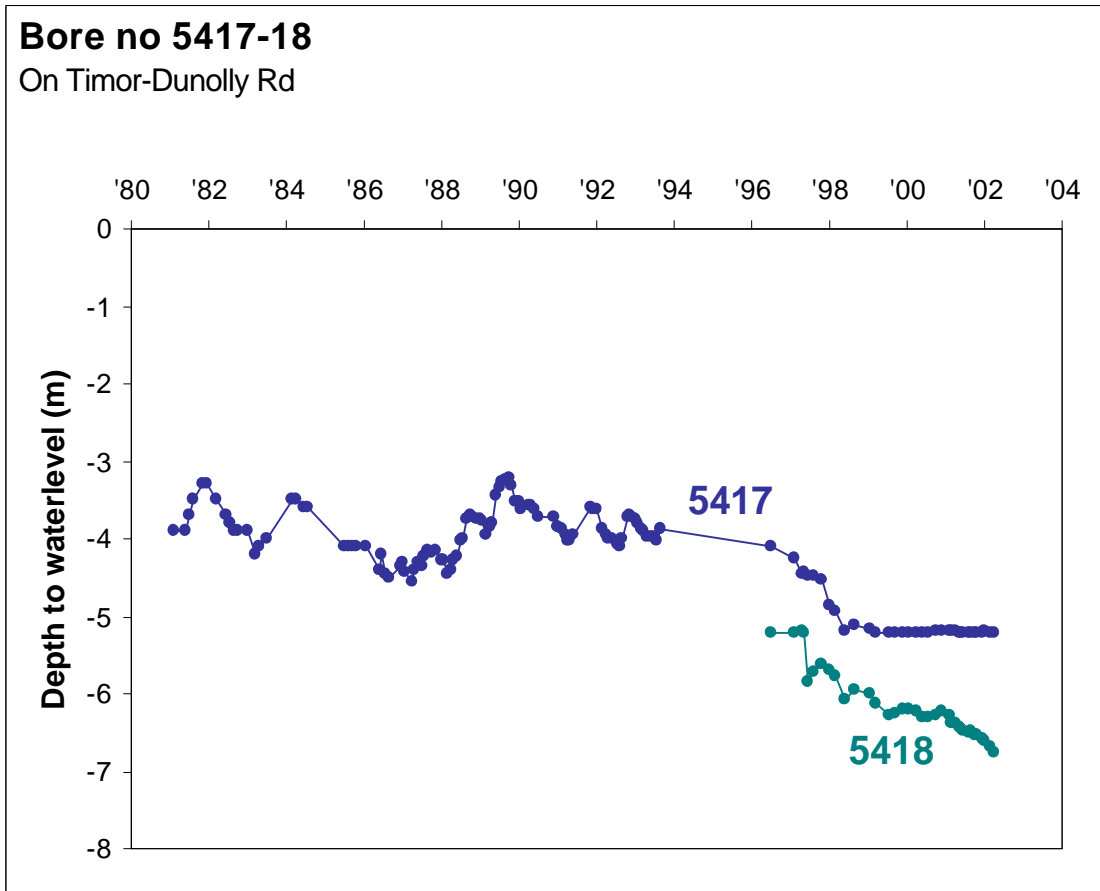
CLPR No:	5136, 5137	Bore monitor:	CLPR
Locality description:	Timor–Dunolly Road		
Geological description:	Shepparton Formation (fluvial clay, silt, sand and gravel) overlying subsurface basalt flow (Quaternary olivine volcanics) overlying Ordovician sedimentary bedrock		
Bore depth (m):	5136 = 20 5137 = 3	Average rainfall (mm/yr):	449
Current water depth 2003 (m):	5136 = 2.5 5137 = 2.5	Salinity (EC) (µS/cm):	—
Groundwater trend:	Strong response to local climatic variation. Strong fall in overall trend since 1996, even trend until 1996.		



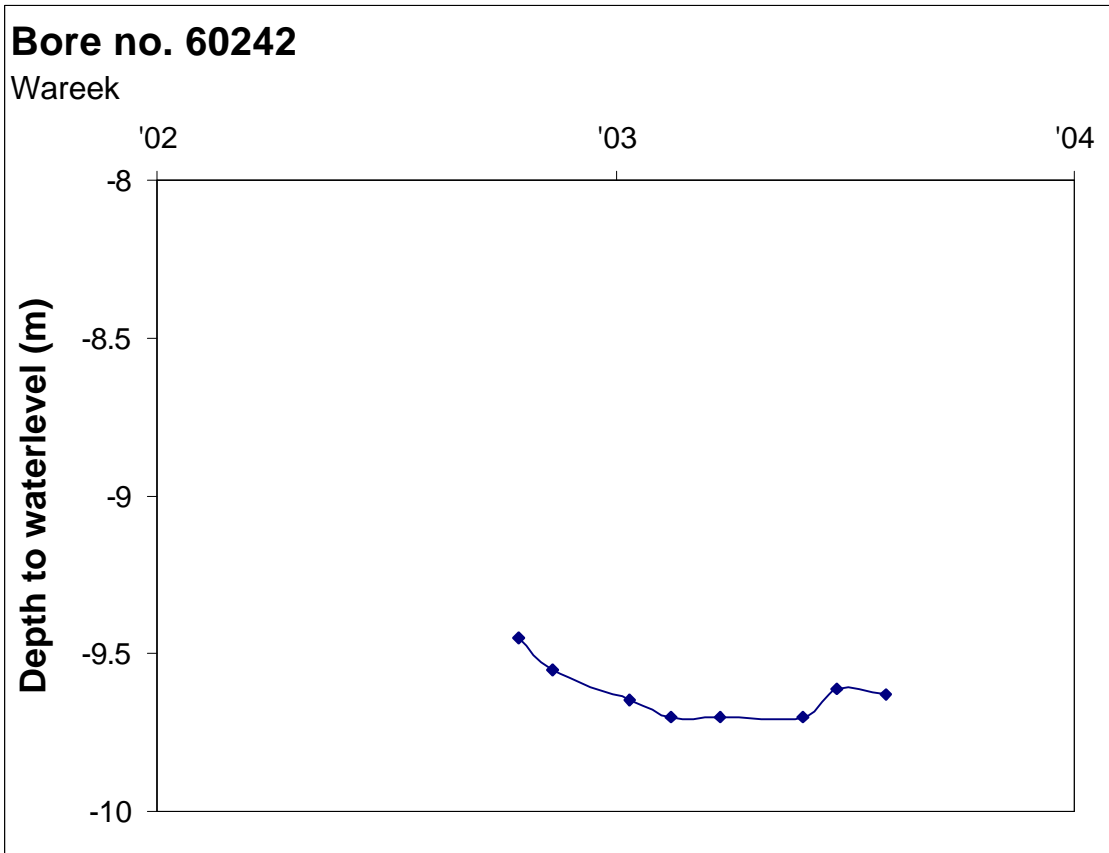
CLPR No:	5416	Bore monitor:	CLPR
Locality description:	Timor West Road Timor West		
Geological description:	Shepparton Formation (fluvial clay, silt, sand and gravel) overlying subsurface basalt flow (Quaternary olivine volcanics) overlying Ordovician sedimentary bedrock		
Bore depth (m):	4.41	Average rainfall (mm/yr):	449
Current water depth 2003 (m):	3.1	Salinity (EC) (µS/cm):	3950
Groundwater trend:	Overall falling groundwater trend. Strong response to local climatic variation. Steeper fall in overall trend since 1996.		

### Bore no 5417-18

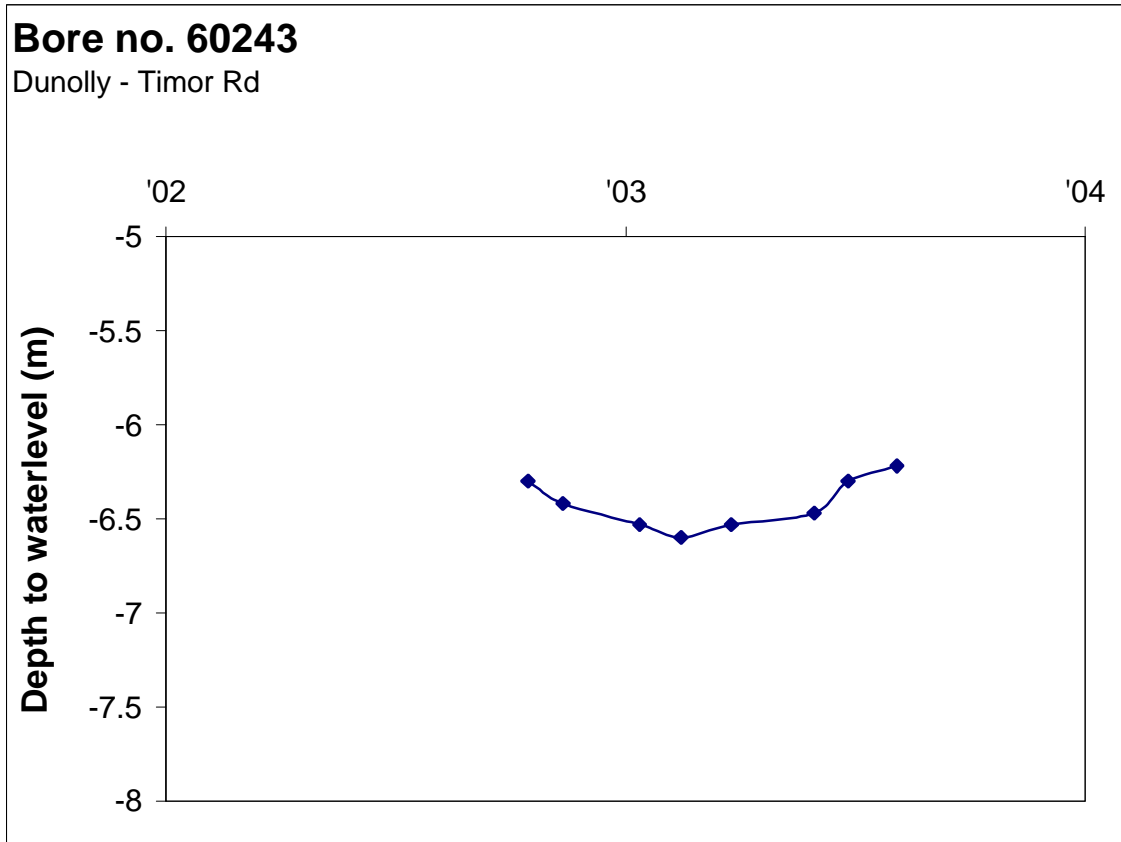
On Timor-Dunolly Rd



CLPR No:	5417, 5418	Bore monitor:	CLPR
Locality description:	Timor–Dunolly Road Timor		
Geological description:	Shepparton Formation (fluvial clay, silt, sand and gravel) overlying subsurface basalt flow (Quaternary olivine volcanics) overlying Ordovician sedimentary bedrock		
Bore depth (m):	5417 = 5.22 5418 = 17.1	Average rainfall (mm/yr):	449
Current water depth 2003 (m):	5417 = 5.22 5418 = 6.8	Salinity (EC) (µS/cm):	5417 = 13 600 5418 = 8510
Groundwater trend:	Even groundwater trend with a slight response to local climate. Falling steeply since 1996. 5417, waterlevel has fallen below bore depth.		

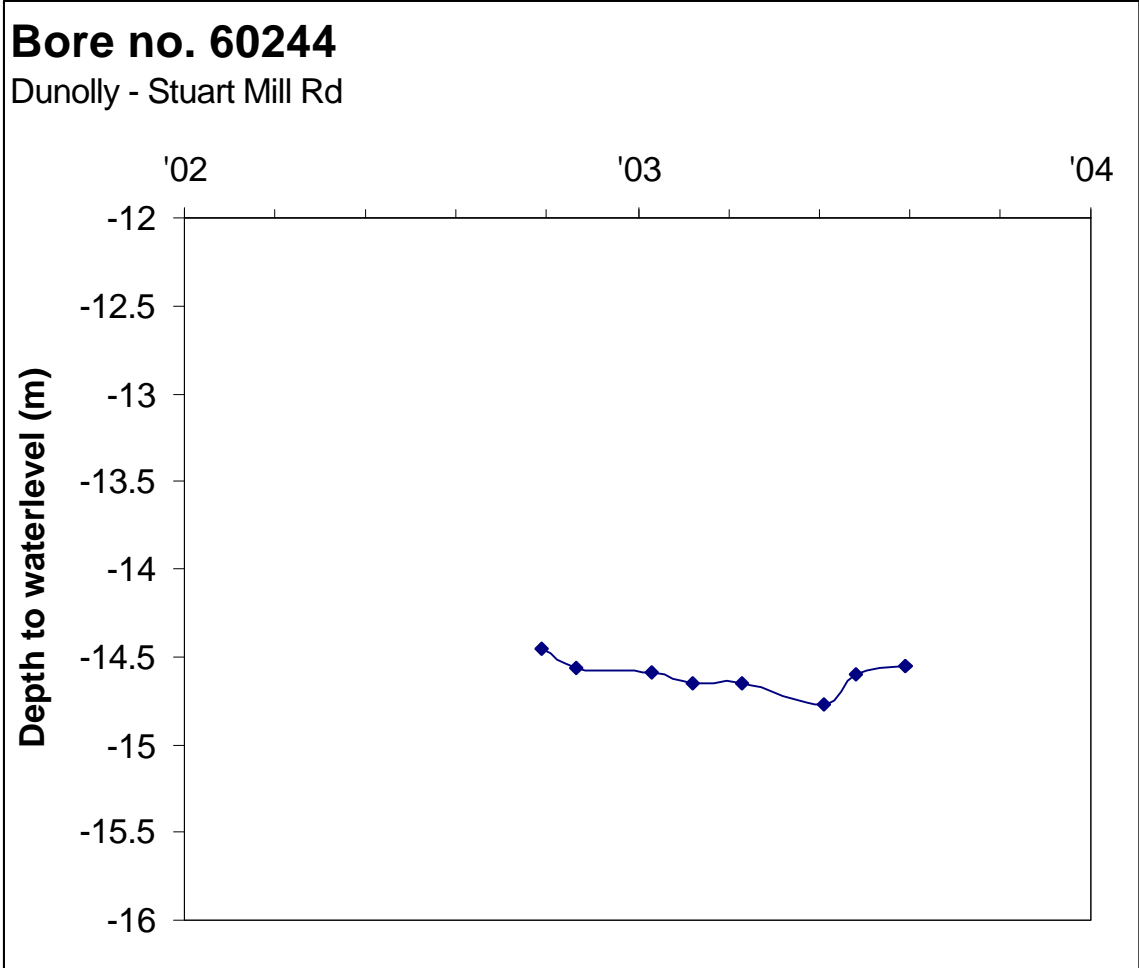


CLPR No:	60242	Bore monitor:	David Schuppan
Locality description:	Wareek Bore located in lower slope		
Geological description:	Shepparton Formation Fluvial clay, silt, sand and gravel		
Bore depth (m):	12	Average rainfall (mm/yr):	449
Current water depth 2003 (m):	9.6	Salinity (EC) (µS/cm):	1800
Groundwater trend:	New bore. Shows a falling groundwater trend		

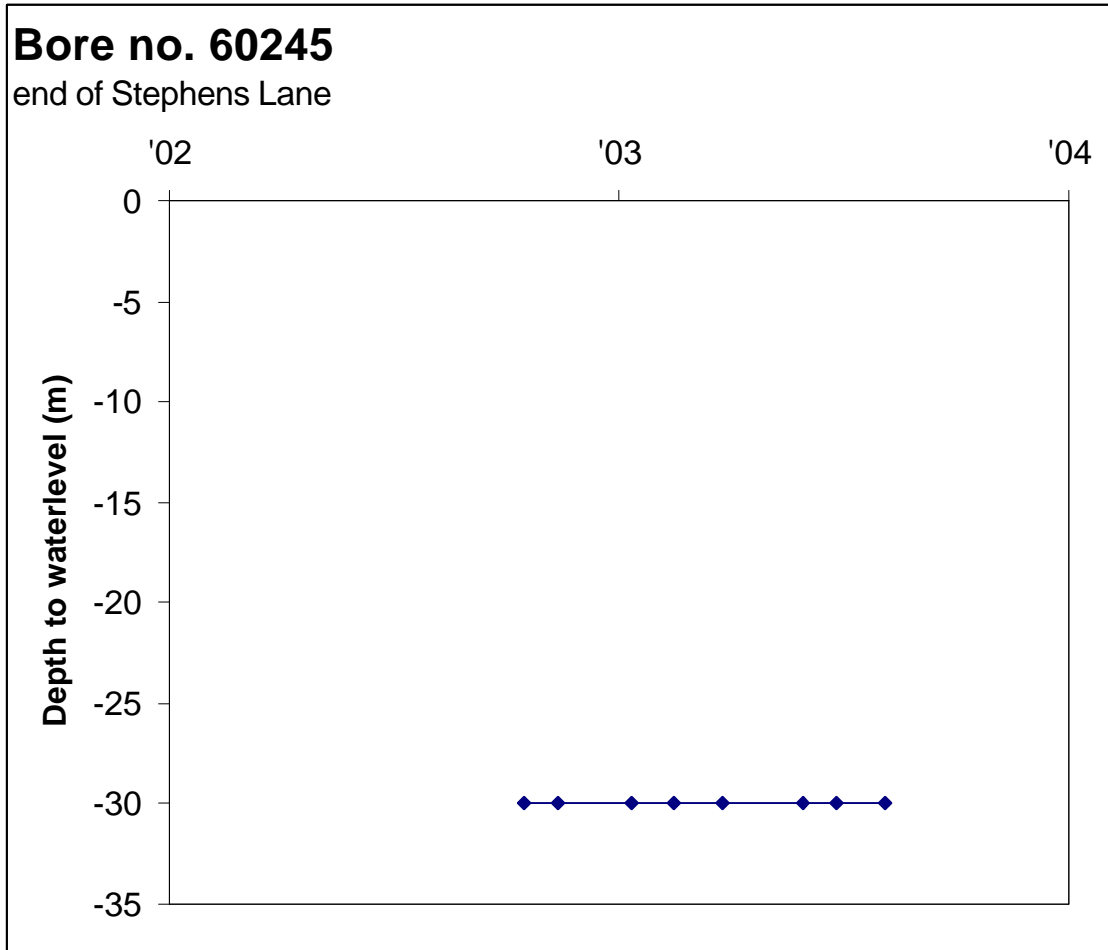


CLPR No:	60243	Bore monitor:	David Schuppan
Locality description:	Timor- Dunolly Road		
Geological description:	Shepparton Formation Fluvial clay, silt, sand and gravel		
Bore depth (m):	11.5	Average rainfall (mm/yr):	449
Current water depth 2003 (m):	6.2	Salinity (EC) (µS/cm):	3000
Groundwater trend:	New bore. Shows an even groundwater trend. Waterlevel has risen in response to recent rainfall.		

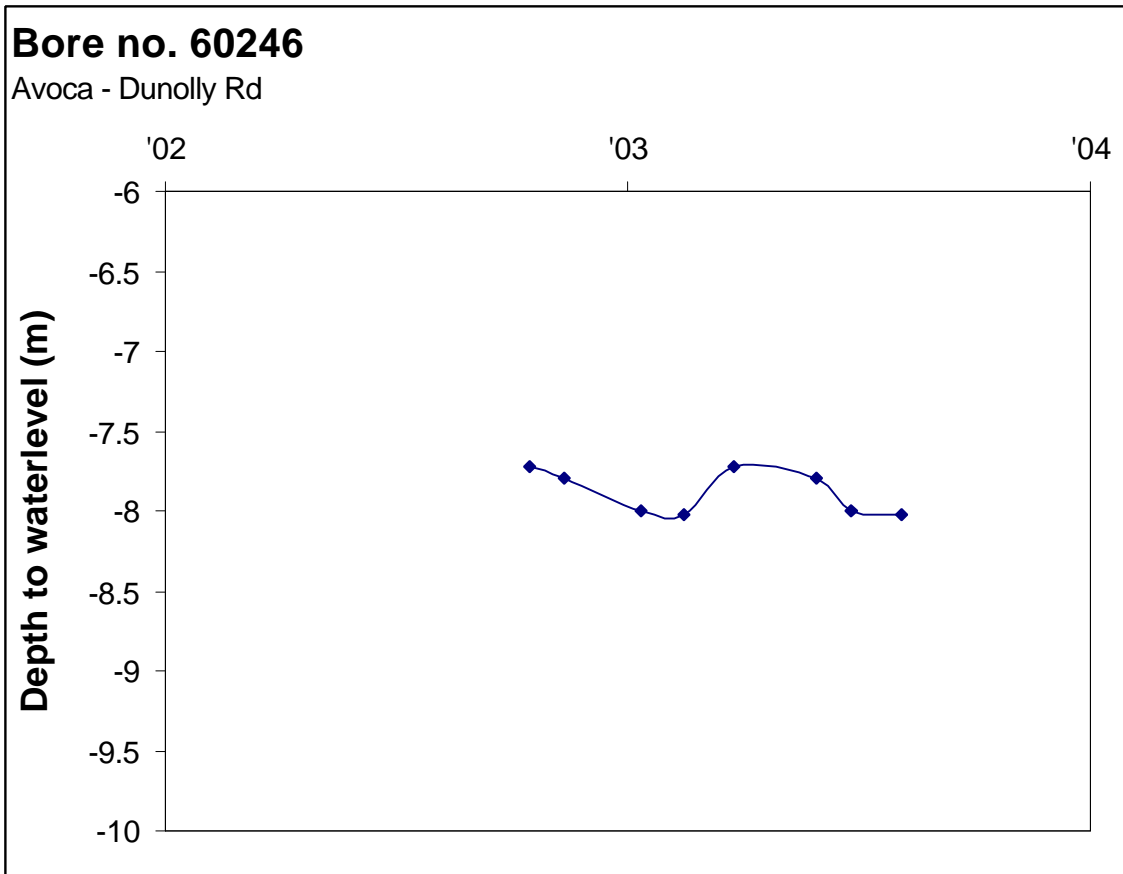




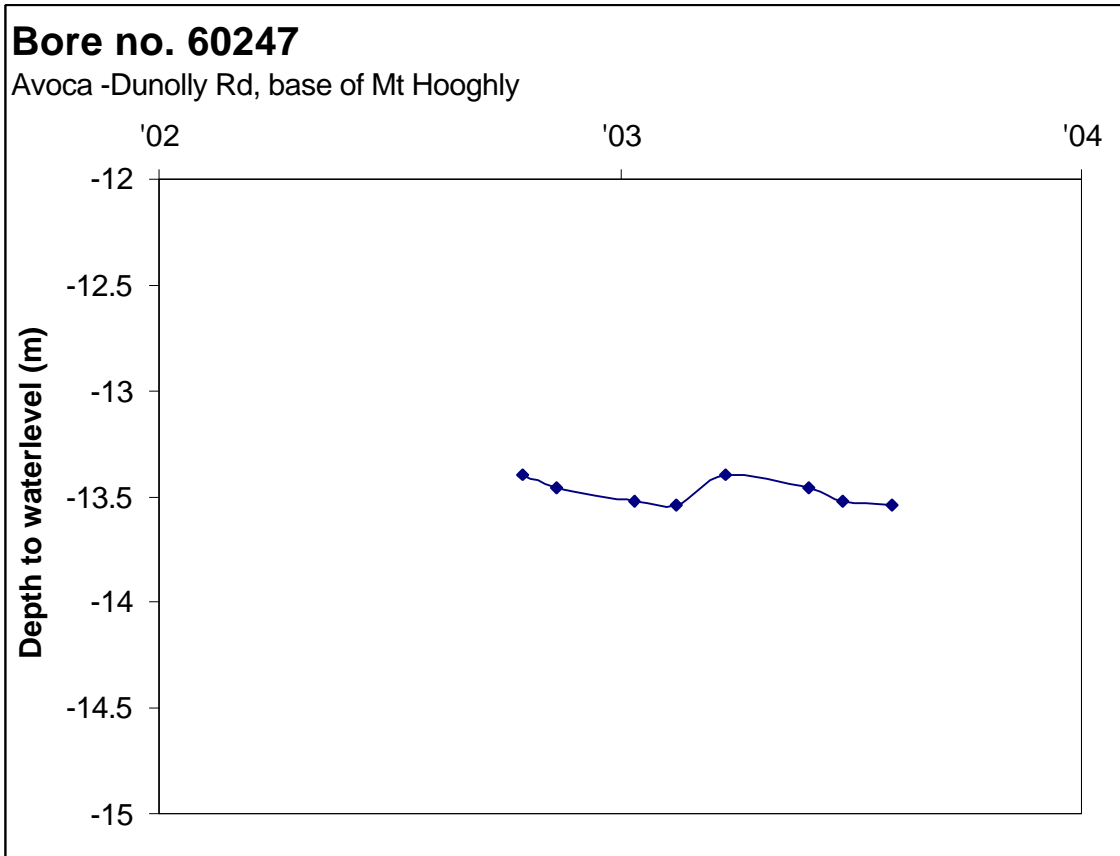
CLPR No:	60244	Bore monitor:	David Schuppan
Locality description:	Dunolly–Stuart Mill Rd Bore located in flat, plain landscape		
Geological description:	Shepparton Formation Fluvial clay, silt, sand deposits		
Bore depth (m):	20.5	Average rainfall (mm/yr):	449
Current water depth 2003 (m):	4.6	Salinity (EC) (µS/cm):	13000
Groundwater trend:	New bore. Shows an even groundwater trend. Waterlevel has risen in response to recent rainfall.		



CLPR No:	60245	Bore monitor:	David Schuppan
Locality description:	North-west of Mr Hooghly. Bore located in mid slope, end of Stephens Rd		
Geological description:	Devonian granite and associated metamorphic rocks Clay, sand overlying hard, fresh, granite/metamorphic rock		
Bore depth (m):	30	Average rainfall (mm/yr):	449
Current water depth 2003 (m):	Dry bore	Salinity (EC) (µS/cm):	Dry bore
Groundwater trend:	Dry bore. Watertable deeper than depth of bore.		



CLPR No:	60246	Bore monitor:	David Schuppan
Locality description:	Dunolly–Avoca Rd. Bore located mid slope.		
Geological description:	Devonian granite and associated metamorphic rocks Clay, sand overlying hard, fresh, granite/metamorphic rock		
Bore depth (m):	12	Average rainfall (mm/yr):	449
Current water depth 2003 (m):	8.0	Salinity (EC) (µS/cm):	3100
Groundwater trend:	New bore. Shows a falling groundwater trend		



CLPR No:	60247	Bore monitor:	David Schuppan
Locality description:	Avoca–Dunolly Rd Bore located in lower, river flat		
Geological description:	Shepparton Formation Fluvial clay, silt, sand and gravel		
Bore depth (m):	17	Average rainfall (mm/yr):	449
Current water depth 2003 (m):	9.6	Salinity (EC) (µS/cm):	>20 000
Groundwater trend:	New bore. Shows a falling groundwater trend and responsive to local climatic variation.		