

GROUNDWATER MONITORING FOR SALINITY: UPPER MARIBYRNONG AREA

Groundwater monitoring as part of the salinity investigation program in the Upper Maribyrnong region was established in the early to mid 1990s. Approximately 30 NRE bores are monitored in the Upper Maribyrnong, mostly concentrated in the Darraweit Guim, Fenton Hills, Riddells Creek and Lancefield areas.

The fundamental purpose of long term groundwater monitoring is to recognise trends in waterlevels and to understand how these are impacted upon by land use. This includes assessing the response of the watertable to salinity control measures.

GROUNDWATER PROCESSES

Local to intermediate scale groundwater systems appear to be dominant in the salinity affected areas of the Upper Maribyrnong area. Well developed groundwater flow systems, fed by high recharge in the upper landscape, typify the Western Highland Hills and Greenstone LMUs. In contrast, flat terrain and low permeability soils lend themselves to seasonal waterlogging on the Basalt Plains, with only slow leakage into the underlying groundwater system. Groundwater flow in basalt generally has a component of regional scale flow (i.e. recharge may occur many tens of kilometres from discharge).

Characteristically, much of the groundwater discharge in the Upper Maribyrnong area occurs as direct inflow into the steeply incised stream system (e.g. Deep Ck). In addition, break of slope salinity occurs on the flanks of the Mt William Range and the eastern foothills of the Macedon Ranges.

CURRENT GROUNDWATER TRENDS

A general observation in groundwater monitoring across western Victoria is the tendency for declining watertables. This is quite clearly a response to lower than average rainfall in most years since the mid-1990s (see further).

This declining trend is replicated in the Upper Maribyrnong. Groundwater levels have fallen up to 2 m since 1992 (e.g. Bore no. 7301 north of Darraweit Guim), though falls are generally in the 0.5-1.5 m range.

IMPACT OF CLIMATIC VARIATION ON TRENDS

An important factor in groundwater trend interpretation is rainfall variation. The general falling trend observed in the Upper Maribyrnong hydrographs can be directly related to a larger than normal number of dry years since the mid 1990s. Observation of the annual rainfall data at Gisborne and Riddells Creek clearly indicates a very dry 1994, and continuous dry years from 1997. Groundwater hydrographs generally peaked in 1992-93 and 1996 in response to wetter years, but overall, hydrographs have fallen as a consequence of the dry conditions.

In addition, even in higher than average rainfall years over this period, the *effective* or winter-spring component of rainfall has often been deficient. It is this effective rainfall component that is important for recharge. For instance, in 1995 despite high annual rainfall, the hydrograph peak is not particularly significant due to less than expected rainfall in the winter-spring period.

MORE SALINITY, BUT DECLINING TRENDS ?

There are several reasons for the lack of rising groundwater trends, yet perceived increases in salinity:

1. Long term rising hydrograph patterns are currently overwhelmed by shorter term climatic extremes.
2. Increasing salinity in the landscape occurs for reasons in other than simply rising watertables e.g. perched water, waterlogging, excess runoff.
3. Monitoring occurs where salinity treatments are locally reducing watertables.
4. There is a greater awareness of salinity.

A combination of 1, 2 and 4 is most likely, with the largest impact being that of an "abnormal" climatic period as discussed.

An important comment is that the current scale of catchment salinity treatment is clearly insufficient to be influencing catchment-wide groundwater levels. However, especially where localised groundwater systems are operating in the Western Highland Hills and Greenstone LMUs, local treatments will tend to produce significant local impacts.

FURTHER INFORMATION

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Salinity information can be viewed on NRE website
<http://www.nre.vic.gov.au/catchmnt/salinity/dryland>

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