Groundwater interactions in the Stokes Inlet

John Simons April 2007

Introduction

The groundwater interaction in the Stokes Inlet is relatively unknown. There are no recent records of groundwater levels within close proximity to the Stokes Inlet to confirm the existence of any aquifers that maybe significantly interacting with the estuary water body.

Description / Background

Both Sanders (1968) and Thom et al (1977) suggest that both fresh and saline groundwater aquifers occur in the coastal areas where the Stokes Inlet is located. Hodgkin & Clark (1989) stated that "seepage of low salinity water from the coastal dunes…contribute a small unknown input,…" However Hodgkin & Clark (1989) also suggest that stokes inlet is located along a probable fault structure. These fault structures are known to be able to transmit significant quantities of groundwater along their lengths. Drilling at Lake Gore confirmed the existence of large saline groundwater system in the coastal area and a similar system may exist beneath the Stokes Inlet.

The Aquabase database has records of several bores within close proximity to the inlet, however most of these were drilled in the 1950's and 1960's and only three have records of static water level. The closest bore (WIN site ID: 20074679) was drilled in 1957 and intercepted groundwater at 16.65 mAHD, another bore (20074683), drilled at the same time, adjacent to the Young River, just south of the highway, intercepted groundwater at -8.30 mAHD.

Issues

Q: What are the groundwater-estuary interactions?

A: Unknown, however the seepage from localised aquifers observed by Hodgkin & Clark could be continuing and the deeper groundwater system intercepted in 1957 may have risen and could now be closer to the ground surface. Elsewhere in the sandplain; groundwater levels are either shallow and fluctuate seasonally or are deep and rising linearly.

Q: What are the nutrient and salinity contributions to the Inlet from groundwater?

The salt and nutrient loads from streamflow have been previously calculated; however the contribution from groundwater is difficult to separate and has never been determined.

Groundwater salinity and nutrient contributions to the inlet predominantly occur through groundwater discharge into the waterways that then flow into the inlet.

Baseflow generated by groundwater discharge as a direct result of rising watertables is currently occurring along some of the tributaries and the main channel of the Lort and Young Rivers. Recent Flowtube modelling suggests that within the next fifty years, shallow watertables will develop along the upper tributaries (Simons 2001) and it is likely that baseflow along the waterways will increase and so will the contribution of salts and nutrients from groundwater.

Current project activities

The 'Land condition and water quality monitoring' sub-program of the Southern Prospects 2004–2009; the South Coast Regional Strategy for Natural Resource Management is planning to monitor streamflow and nutrient loads in paired sub-catchments (treated and untreated) of the Young River to determine the effect of management actions on streamflow nutrient levels.

As part of the National Action Plan for Salinity and Water Quality (NAPSWQ) a resource condition monitoring project has been commissioned to further develop the land salinity surveillance monitoring network. This project is planning to install a transect of bore sites in the Young River Catchment to monitor groundwater levels in the Young Soil-landscape System. If possible this transect will be co-located within the sub-catchments where streamflow and nutrient gauging is proposed, and groundwater from these bores will be analysed for nutrients to determine the contribution to the streamflow nutrient loads.

Suggested actions for Draft Management Plan

A groundwater monitoring site could be installed within close proximity to the inlet to characterise the groundwater systems and their interactions with the inlet.

References

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Contact details:

John Simons, Department of Agriculture and Food Western Australia, Esperance District Office, PMB 50, Esperance WA 6450