Losing Streams and Groundwater in Northwest NSW

Peta-Joanne Derham[1], D. Berhane[2], M. Nies1, C. Lee[1] and D. Mitchell[3]

[1] Tamworth Agricultural Institute, TAMWORTH NSW 2340
[2] NSW DNR Gunnedah Resource Centre Gunnedah NSW 2380
[3] Orange Agricultural Institute, Forest Road ORANGE NSW 2800

Background

Losing streams contribute to groundwater recharge and are episodic. The occurrence of these streams and awareness is limited, but they may have a significant impact on local hydrological regimes.

Investigation

An investigation into land management impact on the hydrological regime within the Duri Key Site, northwest NSW, indicates that the ephemeral Timbumburi Creek is in places a losing stream. The measured groundwater data suggests that a groundwater mound underlies the stream line and is recharged by the stream bed.

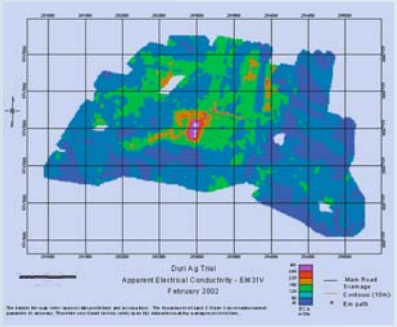

Figure 1: EM 31 survey map

This mechanism may be a significant component of the local groundwater balance particularly in prolonged dry periods (6 years of below average rainfall).

Initially it was perceived that the creek was a discharge point for the local groundwater system, however bore monitoring indicates that there are groundwater mounds under the creek bed and in high relief. A sink with elevated groundwater electrical conductivity was observed mid slope. The elevation of the groundwater suggests that the direction of groundwater flow was away from the stream. It is hypothesised that the groundwater is being recharged from the stream, gaining fresher water and forcing salt horizontally away from the recharge area.

Implications

The hydrological implications of losing streams on local groundwater systems are currently under investigation. The role of this recharge mechanism on areas along the creek that are groundwater discharge is a focus of the current project. Additionally the project will attempt to identify appropriate land use management for these areas.

Research at the Duri Key Site is ongoing and a shift into a wetter or more normal rainfall regime may alter the conceptual models yet again

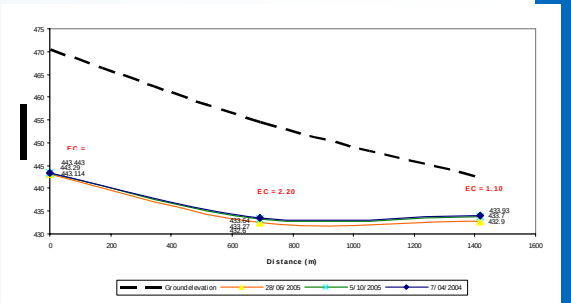

Figure 2: Groundwater levels at the Duri key Site

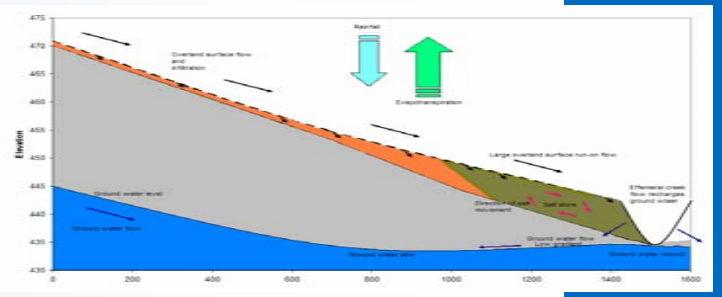

Figure 3: Physical Conceptual Model for the Duri Key Site

Acknowledgements

The project team would like to acknowledge the land holders for access to their properties. This research has been undertaken for the Key Sites project which is funded by NSW DPI NSW DNR NSW Salinity Strategy and the National Action Plan for Salinity and Water Quality

NSW DEPARTMENT OF PRIMARY INDUSTRIES

NSW Government
DEPARTMENT OF NATURAL RESOURCES

action Salinity & Water AUSTRALIA