RAPID ASSESSMENT OF GROUNDWATER SALINITY AND SEAWATER INTRUSION HAZARD IN THE KEEP RIVER FLOODPLAIN, NORTHERN TERRITORY, AUSTRALIA

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The Australian Government's White Paper on Developing Northern Australia recognised that expanding the size of the Ord irrigation area in the Kimberley Region, northwest Australia offers the potential to significantly enhance both the profitability and economic resilience of the region. This paper reports on the preliminary results of hydrogeological investigations in the Ord Stage 3 development area, a 14,500 ha area of black soil plains in the Keep River floodplain, Northern Territory.

Previous investigations in the Keep River floodplain identified potential for groundwater salinity, soil salinity and seawater intrusion (SWI) hazards. These earlier studies recognised that more comprehensive investigations were required to fully assess the risks of large-scale development of irrigated agriculture on groundwater quality and quantity. The Keep River Salinity Mapping Project has been established to provide baseline data on the groundwater system in the Keep River floodplain including aquifer and aquitard distribution and properties, and potential salinity hazards. Specifically, the main aims of the project are to: (1) map the 3D architecture and hydraulic properties of the soil, sub-soils and underlying paleovalley system; (2) map the SWI interface and variations in groundwater salinity; (3) identify potential surface water inundation risks; (4) identify groundwater-dependent ecosystems; and (5) carry out a hydrogeological assessment. Investigations include a programme of airborne electromagnetics (AEM), ground geophysics (ground magnetic resonance (GMR), passive seismic and microgravity), drilling and borehole geophysics, hydrogeological and hydrochemical investigations, and regional soils, geological and morphotectonic mapping. Products generated in this project will be used to parameterise a numerical groundwater model.