

Baroota Creek Near-Surface Geophysics Investigation

2024-2025

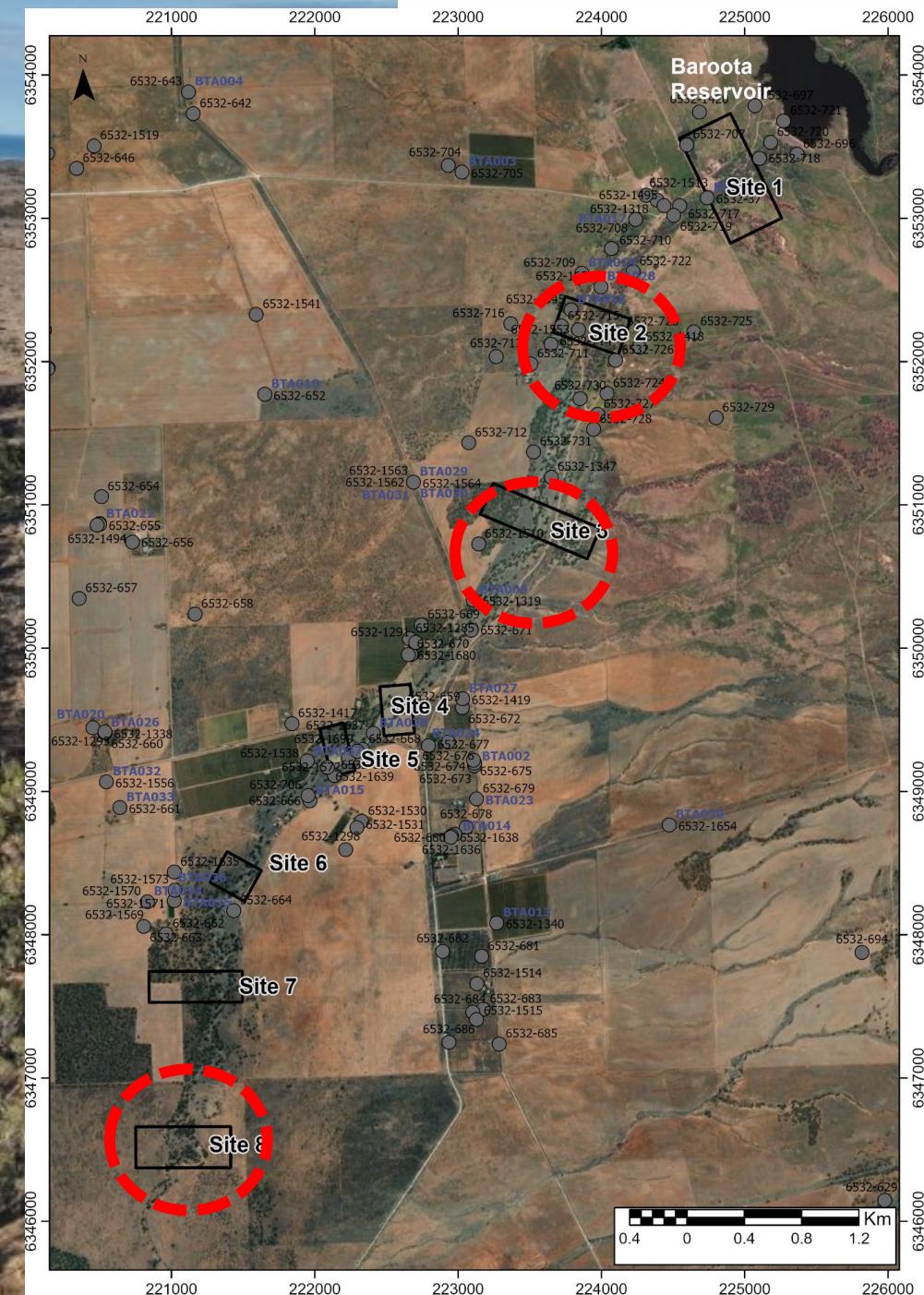
NYLB Environmental and Cultural Flows project

Eddie Banks and Margaret Shanafield
College of Science and Engineering & NCGRT, Flinders University
Community meeting, Port Germein, 7 Nov. 2025

Study sites

Eight sites selected along the length of Baroota Creek in 2022 for near-surface geophysics surveys

3 sites selected for continued monitoring in 2024-2025 prior to and after the Baroota reservoir water release

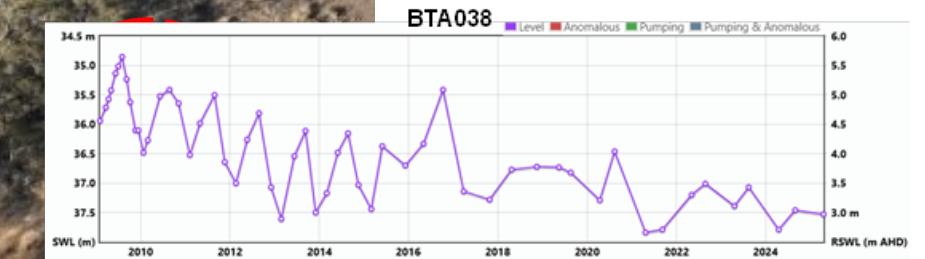
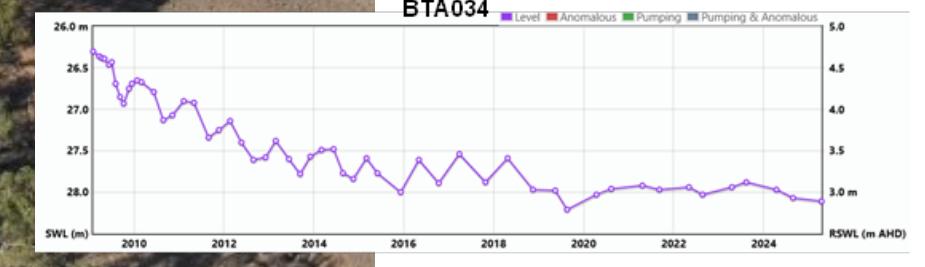
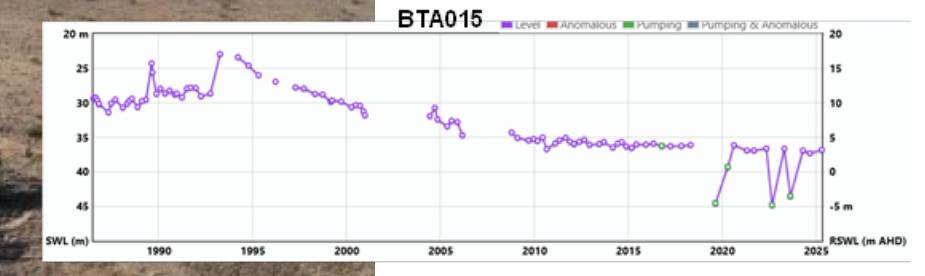
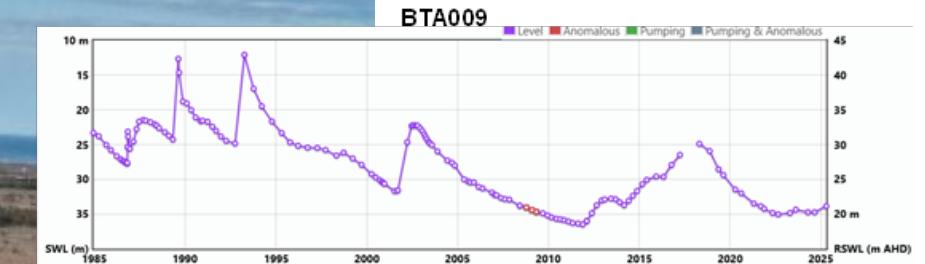
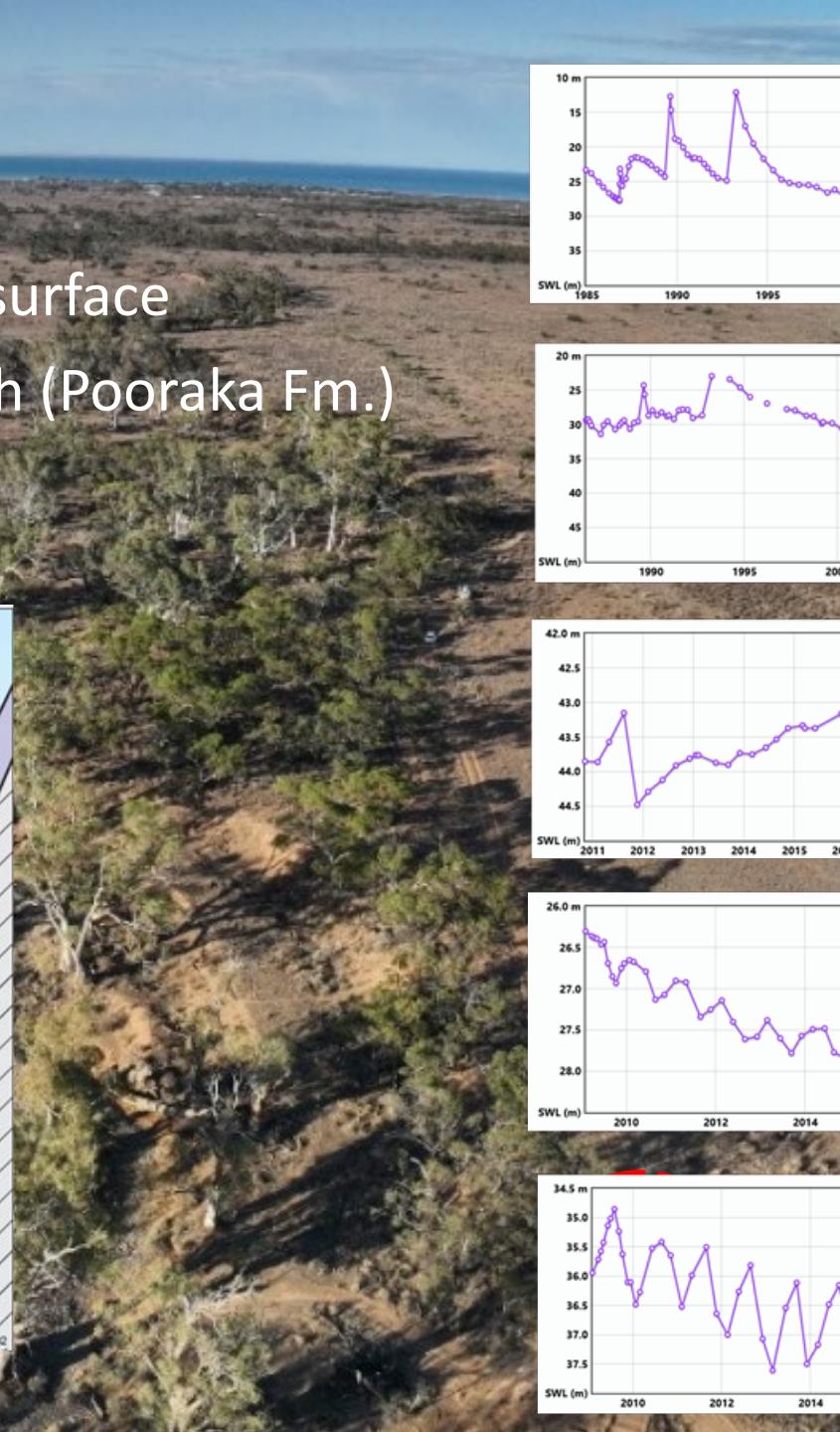
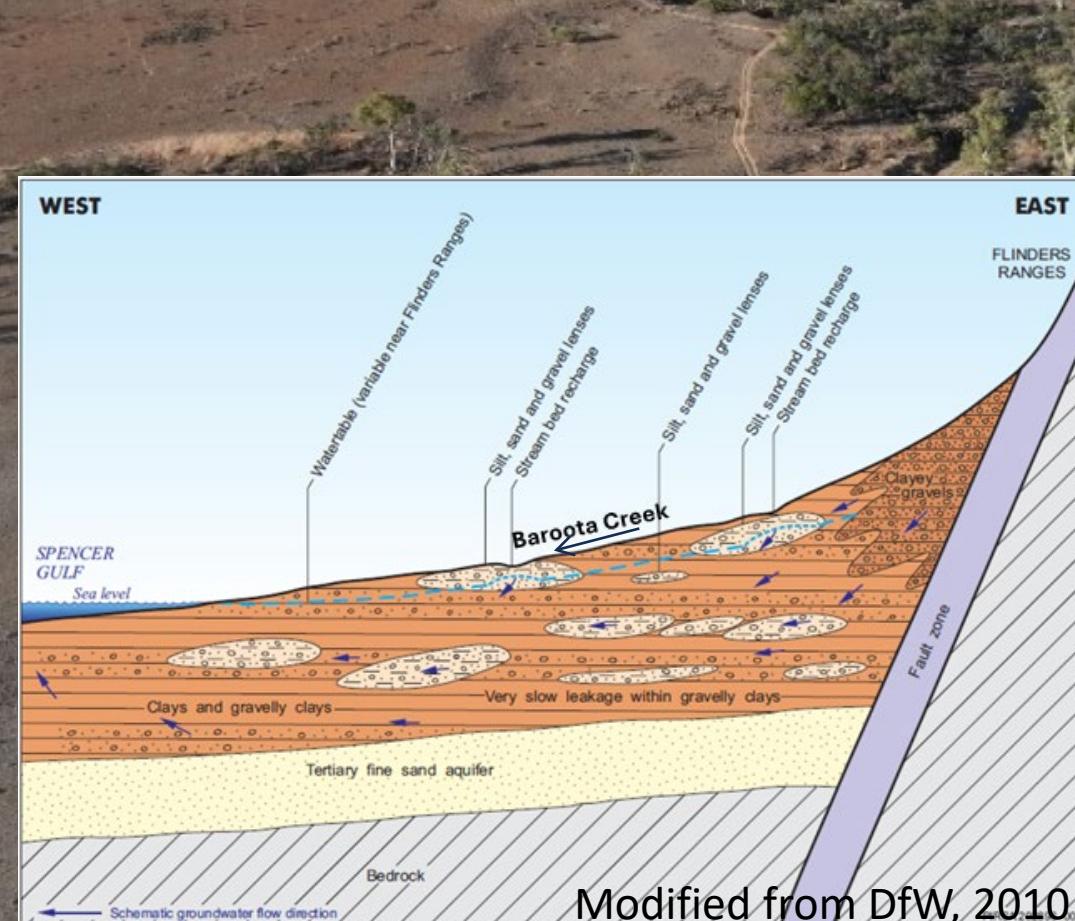


Hydrogeology

Deep depth to watertable >25 m

Alluvial and fluvial sediments in near surface

Coarse gravel, sands and clays beneath (Pooraka Fm.)



Geophysics and Hydrogeophysics

What is geophysics?

- Natural or induced response of earth material that is measured at or near the surface
- Provides information about the physical properties and characteristics of the subsurface material
- Need a contrast between materials to “see” something geophysically
- Valuable tool in geology and hydrogeology



Advantages

- Unobtrusive
- Large spatial coverage and rapid
- Low cost compared to drilling
- Various different methods

Disadvantages

- Non-uniqueness of interpretation
- Interference caused by human made structures

Some rules of thumb in hydrogeophysics

- Sand is resistive (unless its pores are filled with saline water).
- Clay is conductive (unless it is very dry).
- Water may be **conductive** or resistive – depending on its quality (e.g., salinity).
- Hard to tell difference between sand that contains salty water and clay; especially if the clay has salt water in it too.

This emphasises the need to have a conceptual model and understanding of an area and some prior knowledge!

-First Nations and Western knowledge and sciences

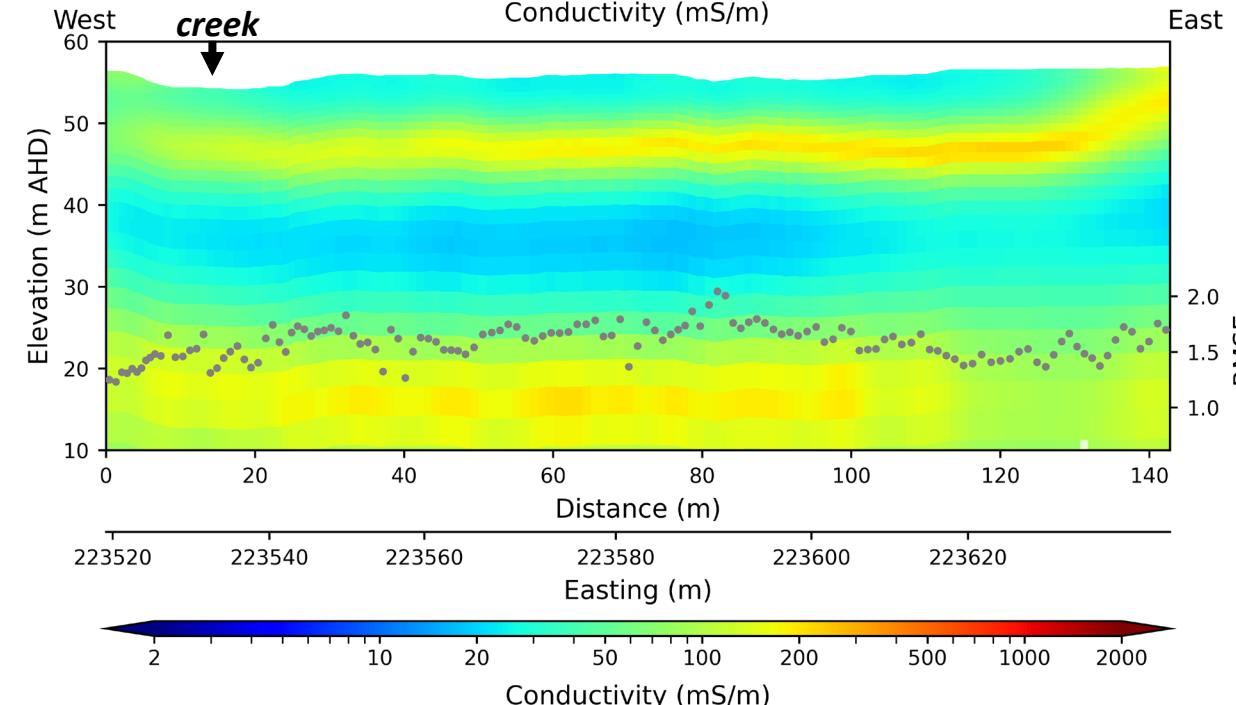
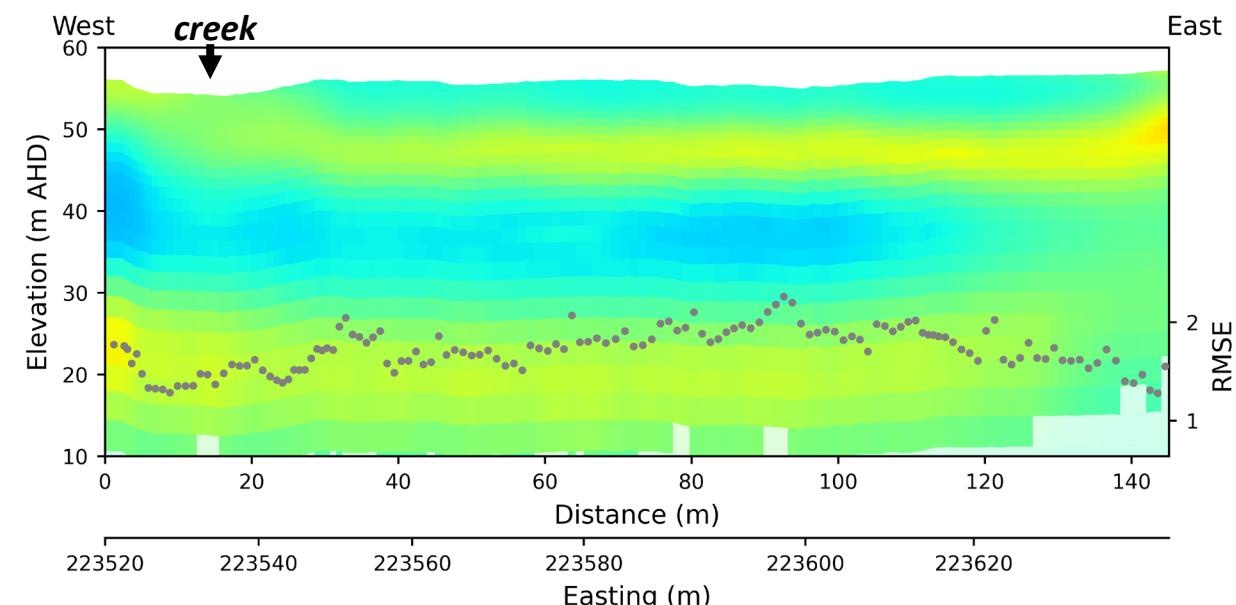
Surveys

Site 3

May 2024



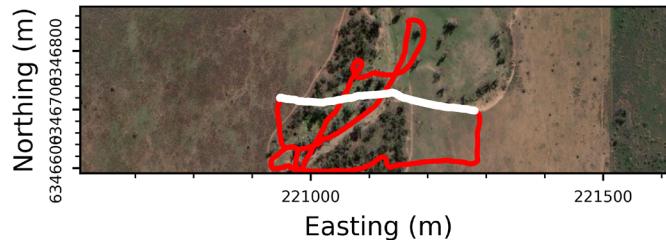
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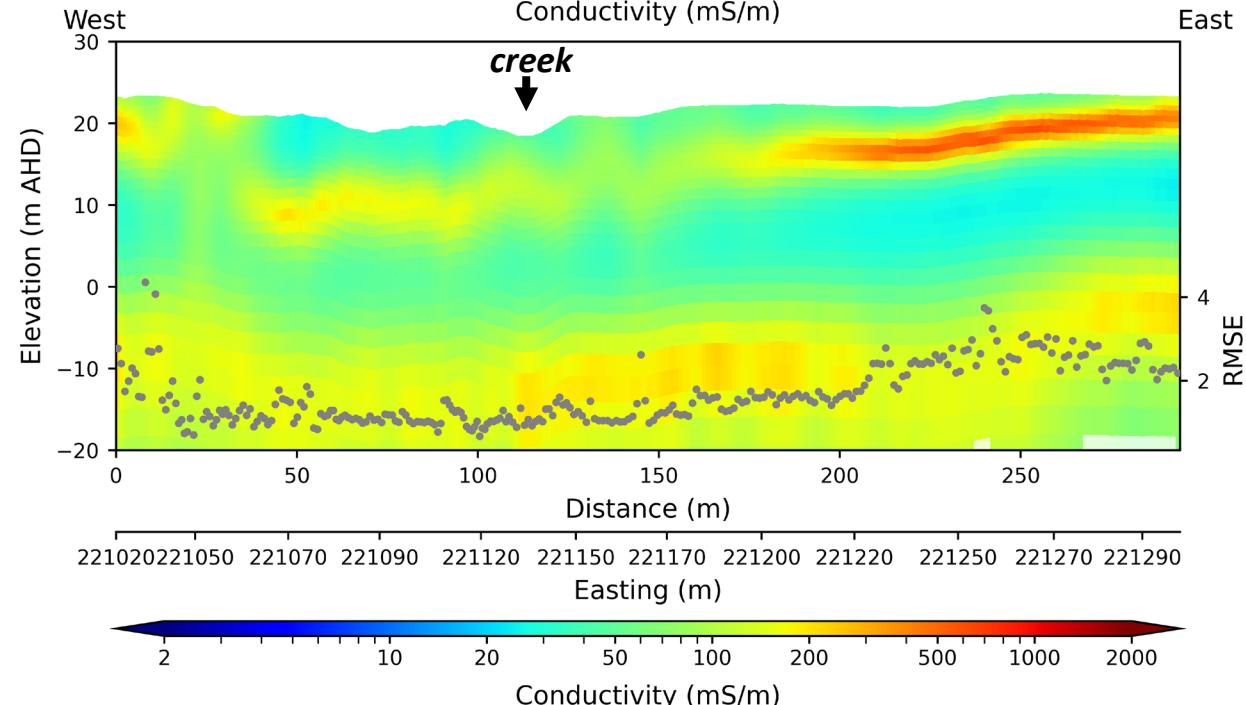
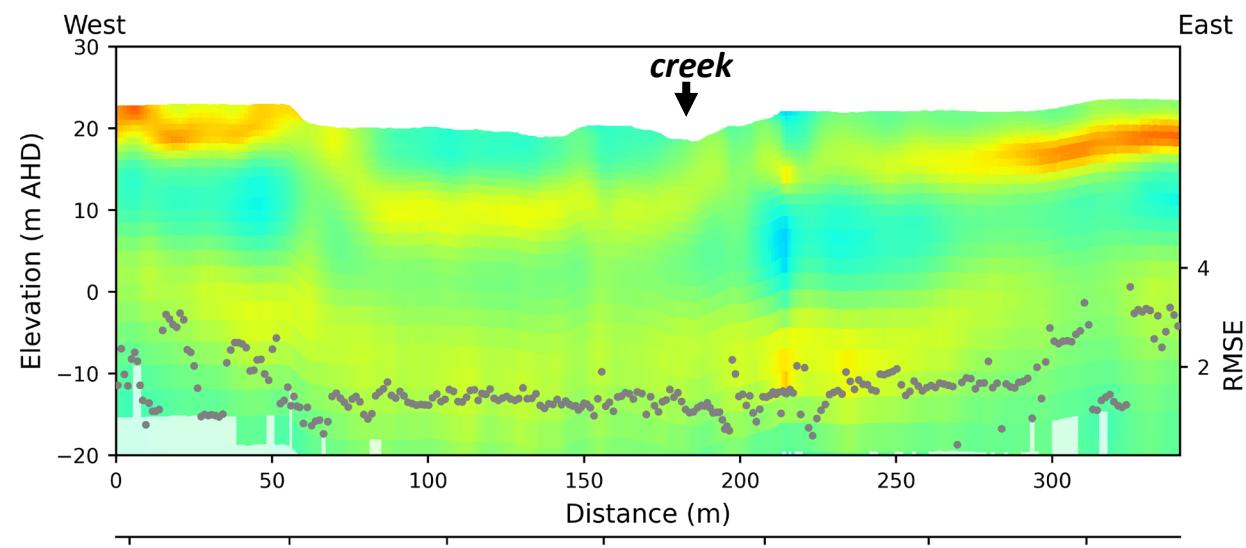
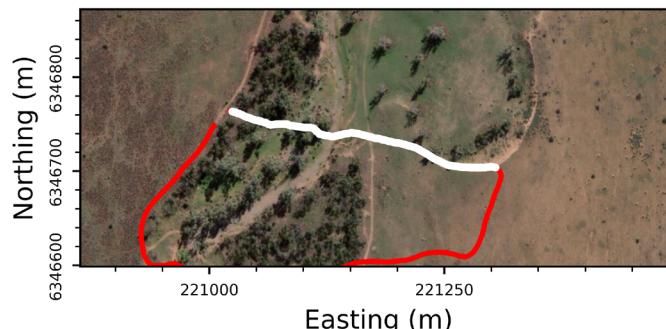
Surveys

Site 8

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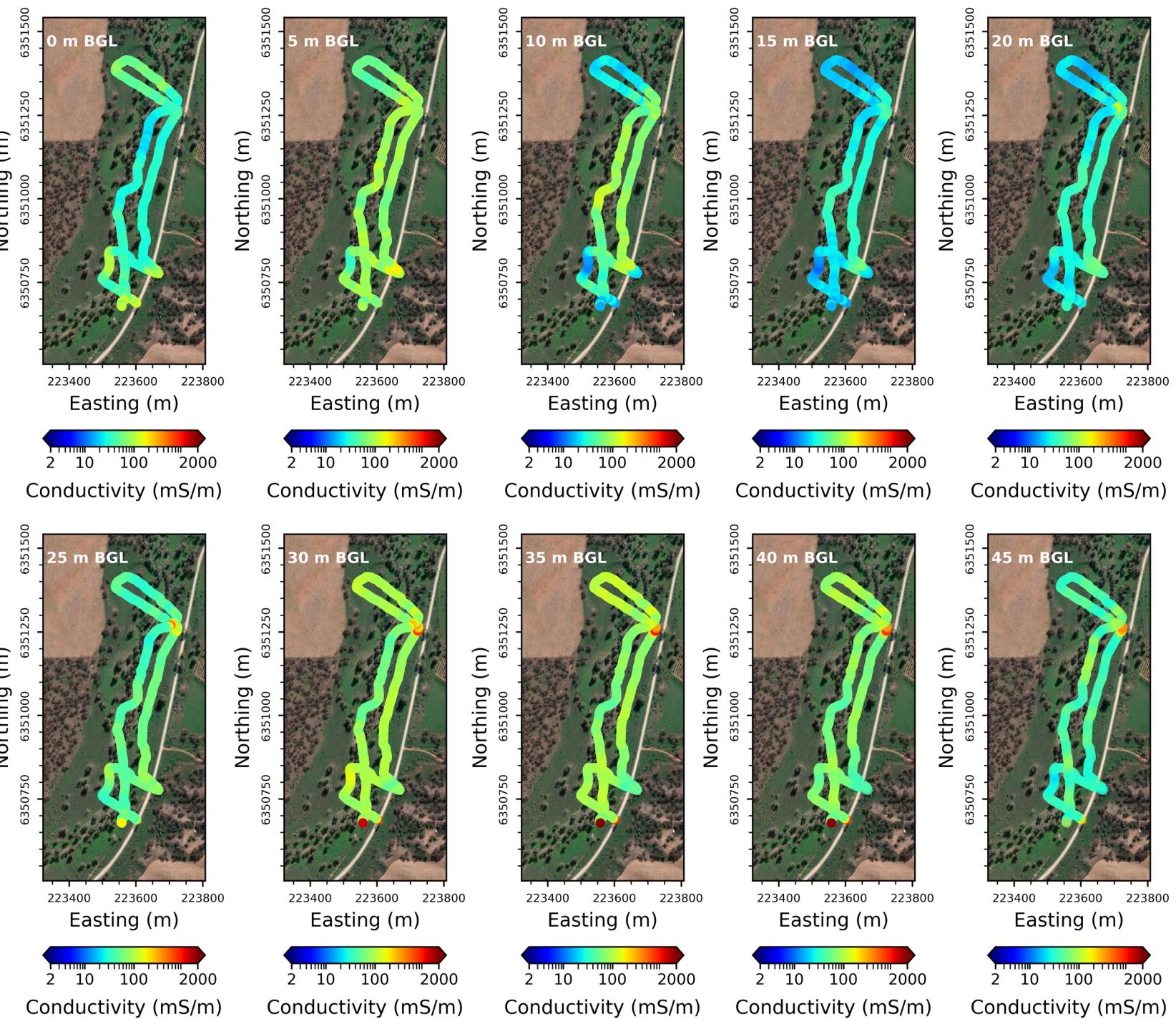


April 2025



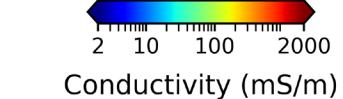
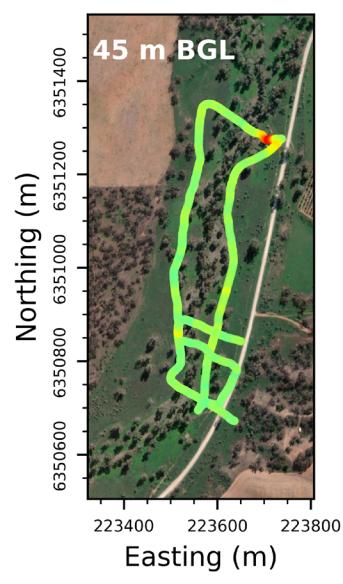
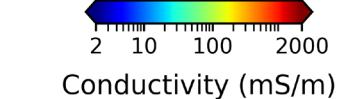
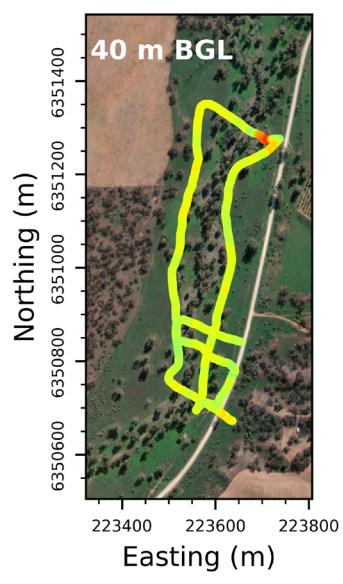
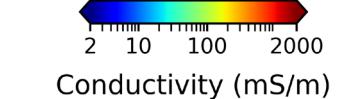
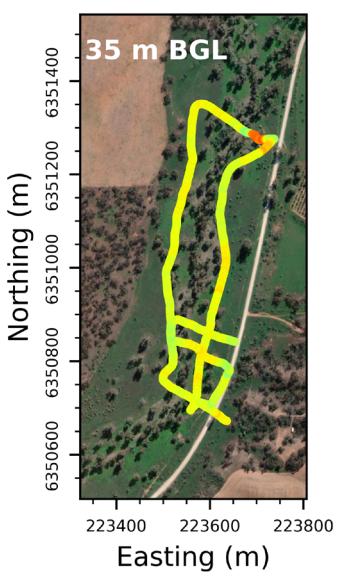
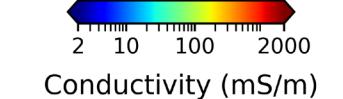
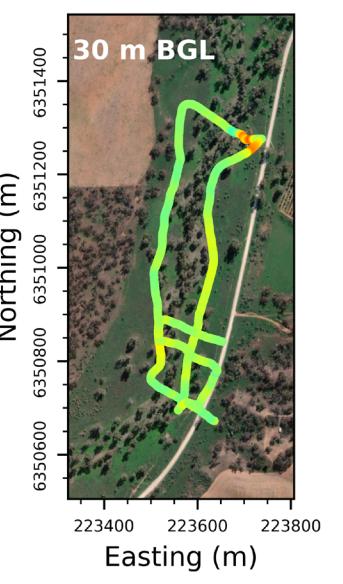
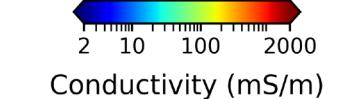
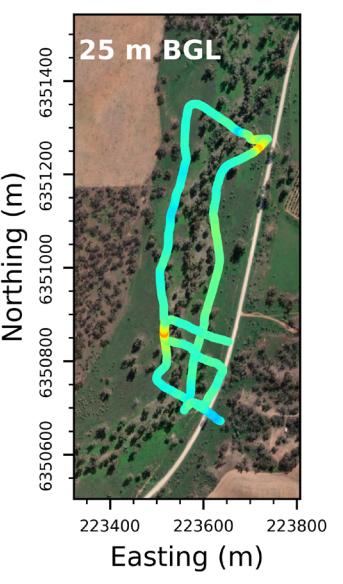
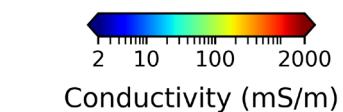
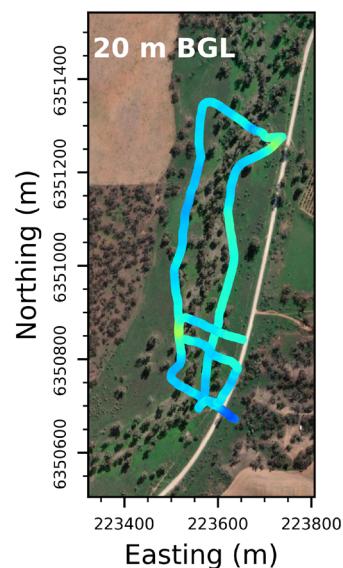
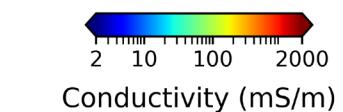
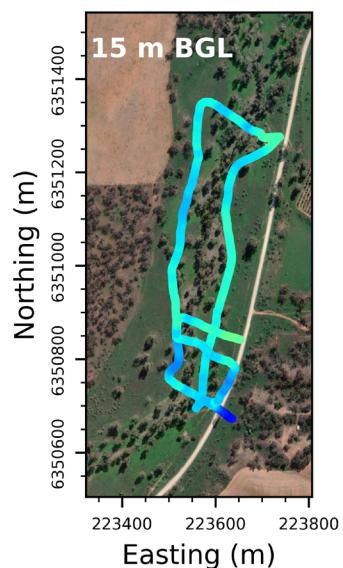
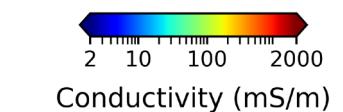
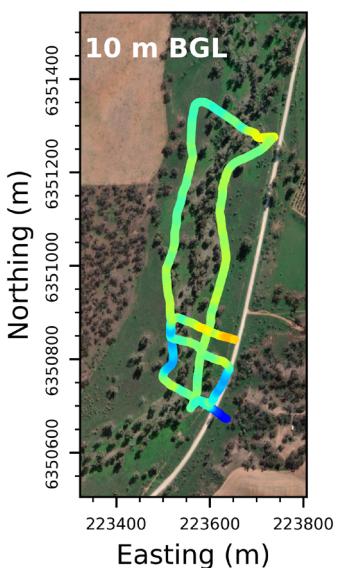
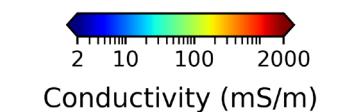
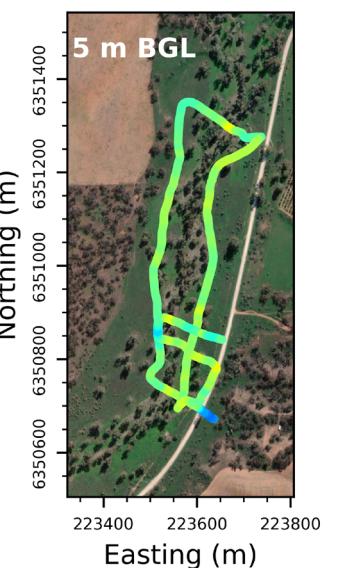
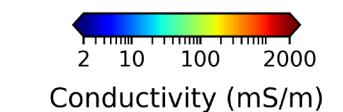
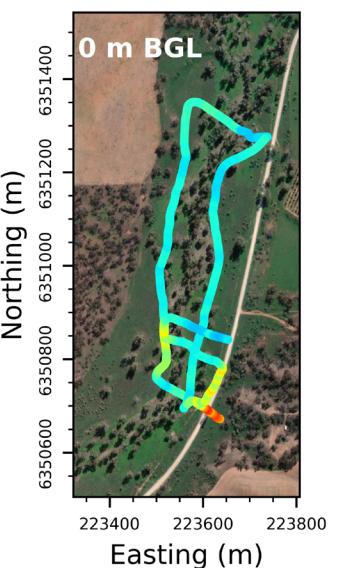
Surveys

Site 3 May 2024



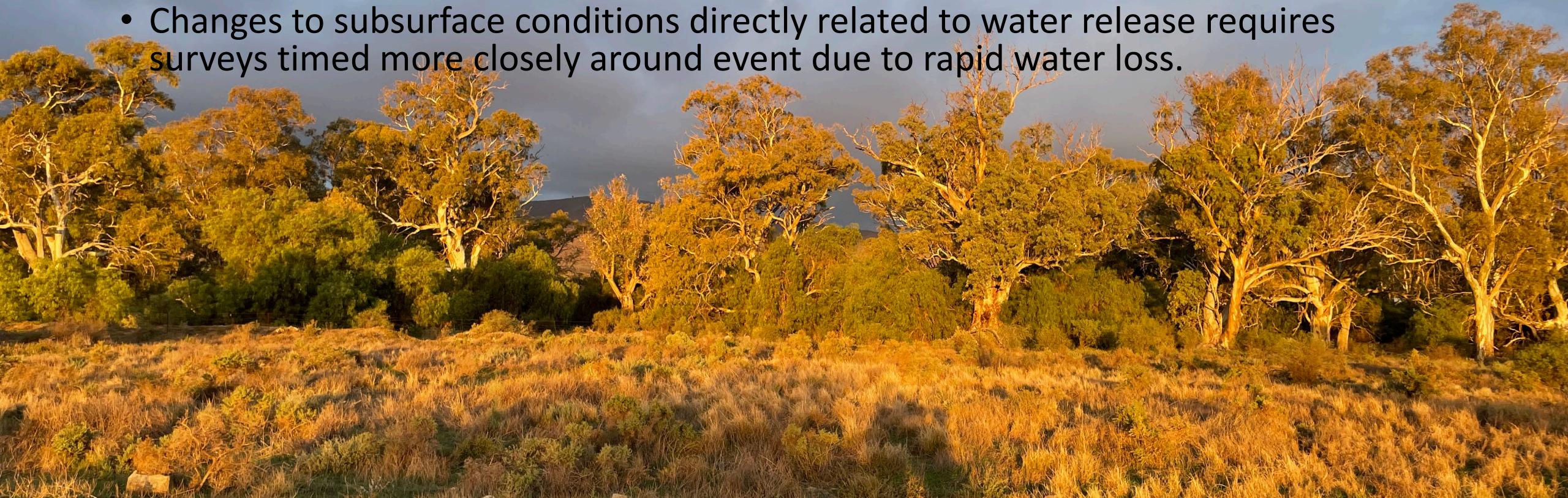
Surveys

Site 3 April 2025



Summary to date

- Two surveys completed: May 2024, ***prior to*** Environmental Flow Event (August 2024) and ***follow up*** survey in April 2025.
- Repeat TEM surveys show subtle changes in the subsurface indicating changes to soil moisture conditions- seasonal patterns due to rainfall. More pronounced conductivity features due to poor winter 2024 rainfall in the near surface.
- Changes to subsurface conditions directly related to water release requires surveys timed more closely around event due to rapid water loss.



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