The Power of Three - Understanding An Anastamosing Floodplain

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Abstract: Water must penetrate the geomorphologically complex floodplain at the Cooper Creek/Wilson River confluence, in South-West Queensland, to reach RAMSAR-protected wetlands, and, in a good flood year, Lake Eyre. Remote, with few monitoring stations, the hydrology is poorly understood. Exploitation of water resources, including by agriculture, geothermal power, and mining, requires sound inputs for management. The project will integrate quantitative technical data and qualitative information from interviews (including indigenous participants) to develop a model that could be used to predict scenario responses. This progress report is structured by identified triples of project features, hence its title.

Introduction

- **Dryland rivers are important yet capricious water resource across the globe.** Typically remote, highly variable and reliant on episodic floods; & subject to climate and development pressures. Anastomosed systems are extreme example of complicated flows.
- **Tradeoffs: spatial vs temporal vs spectral resolution.** Existing detailed models have difficulty reflecting highly variable flows.

Study Area

- **Lower floodplain in Windorah Reach of Cooper Creek, near Queensland/South Australia border (Fig 1).** Culturally, economically, & ecologically significant ; geomorphologically complex.

Methodology

- **Hydrological, geomorphological/geological, & satellite/digital elevation data integrated with interview information to study inflows, outflows, & interactions** in a complicated floodplain for a range of flow magnitudes.

Issues

- **Different spatial/temporal/spectral scale,resolution,coverage, and quality** of data-sets to be integrated.
- **Ground access is difficult**, especially in wet periods, to check image ground truths.
- **Interview arrangements for general & indigenous people timeconsuming:** remoteness, availability, ethics approvals.

Results To Date

- **1. First field trip undertaken June 2013 (Fig 3).** Water data loggers installed, took winter sediment/ vegetation/spectral observations.
- **2a. Ribbon Plot method prototyped in MATLAB (Fig 2)**, for flows Dec 2003-Jun 2005.
- **2b. New water/vegetation/soil 3-way index (combination of NDWI and NDVI) in train .**
- **3a.Ethics Approval for General Interviews obtained.** Pastoralists/local residents and resource company staff interviews arranged.
- **3b. Ethics Approval for Indigenous Interviews in train**. Wangkumara and Yandruwandha interview subjects recruited.

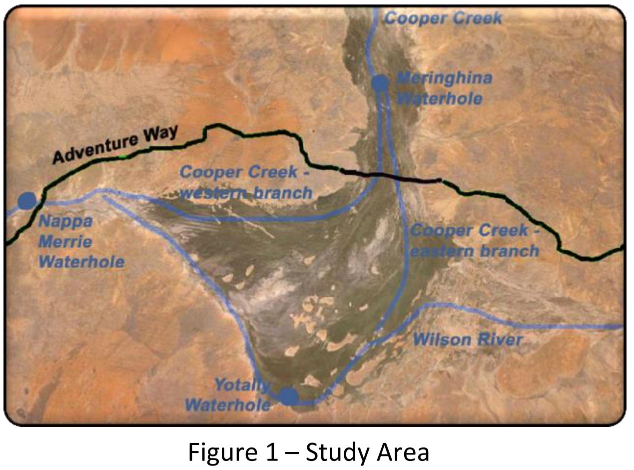

Figure 1 – Study Area

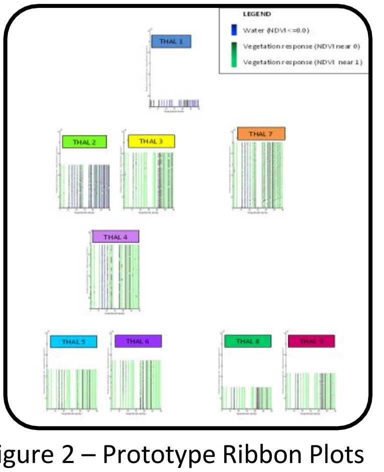

Figure 2 – Prototype Ribbon Plots

Figure 3 – In The Field

2013 Infrastructure Engineering Postgraduate Conference