

Urban Water Security Research Alliance



Implications of using Purified Recycled Water as an adjunct to groundwater resources for irrigation in the Lockyer Valley

aka

Purified Recycled Water in the Lockyer Valley: Issues and Research

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PROJECT BACKGROUND – THE SEQ WATER GRID

→ LOCKYER VALLEY

The Western Corridor Recycled Water Project could potentially provide 25 GL/a to the Lockyer Valley for irrigation of agricultural land.

This project will investigate the implications of this application on water table levels, mobilisation of salts stored in the soils and their possible discharge to the Brisbane River.



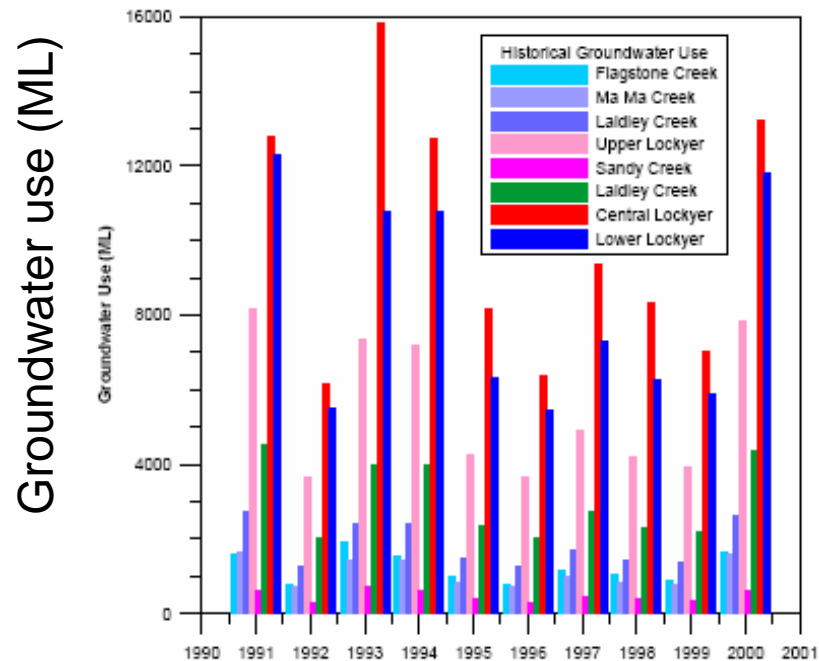
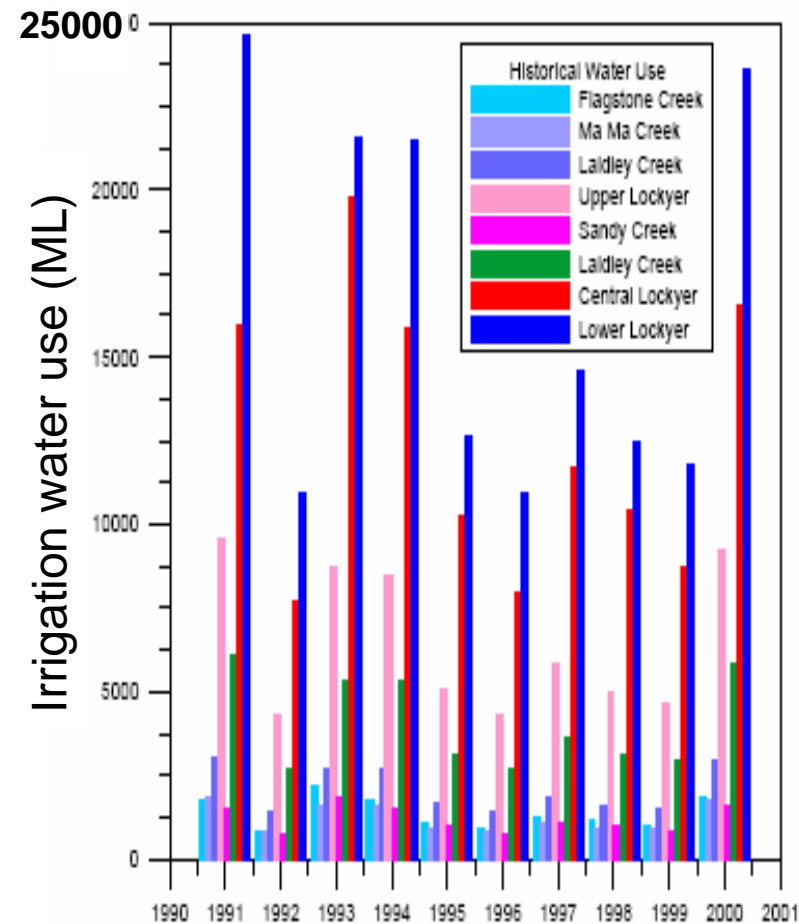
RESEARCH AIM

Provide management options related to the distribution of purified recycled water (PRW) to the Lockyer Valley

→ Understand processes

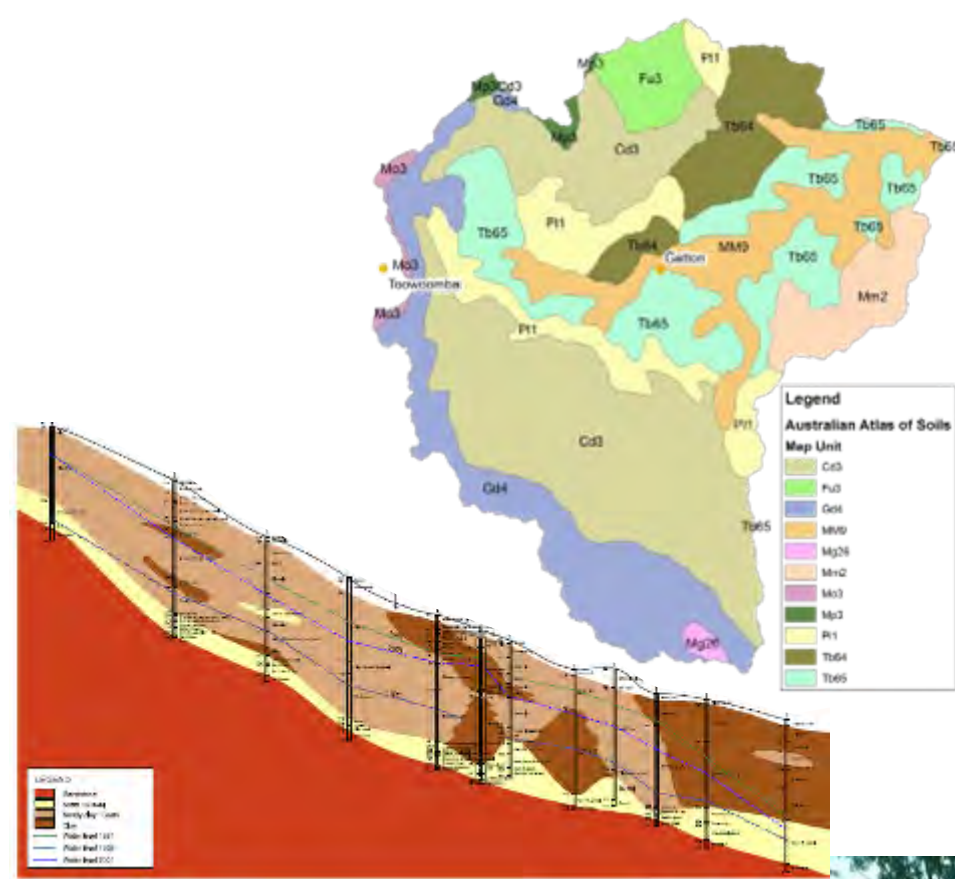
→ Develop and implement specific models:

- hydrological
- hydrogeological
- visualisation-animation



RESEARCH ISSUES

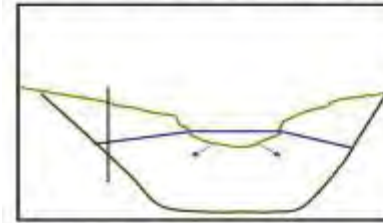
1. How does recharge occur and where?
2. How does water move across and through the landscape and how does this vary through the year and between years?
3. How do irrigation water and solutes infiltrate and affect the soils?
4. Will there be groundwater mounding and mobilisation of salts to the Brisbane River?
5. Can we store PRW?
6. What happens when 25GL/a PRW is added to the Lockyer Valley



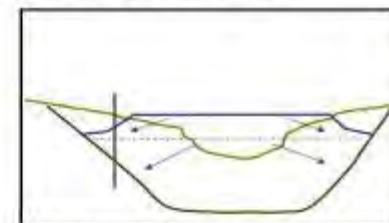
RESEARCH OBJECTIVES

1. Understand and quantify recharge mechanisms in the catchment
2. Conceptualise and visualise surface and groundwater processes in the region (including climate)
3. Quantify unsaturated zone water and solute transport, deep drainage and recharge
4. Quantify groundwater and solute transport, including the effects of PRW application
5. Evaluate the potential for MAR
6. Evaluate "What if?" scenarios with future application of 25GL/a PRW to the Lockyer Valley

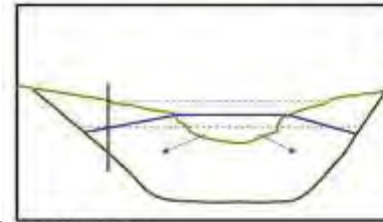
Relationship between alluvial groundwater and stream flow



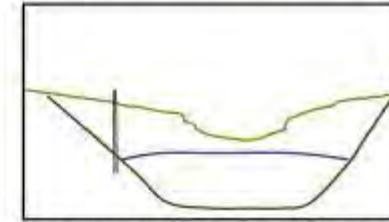
1. Typical summer streamflow



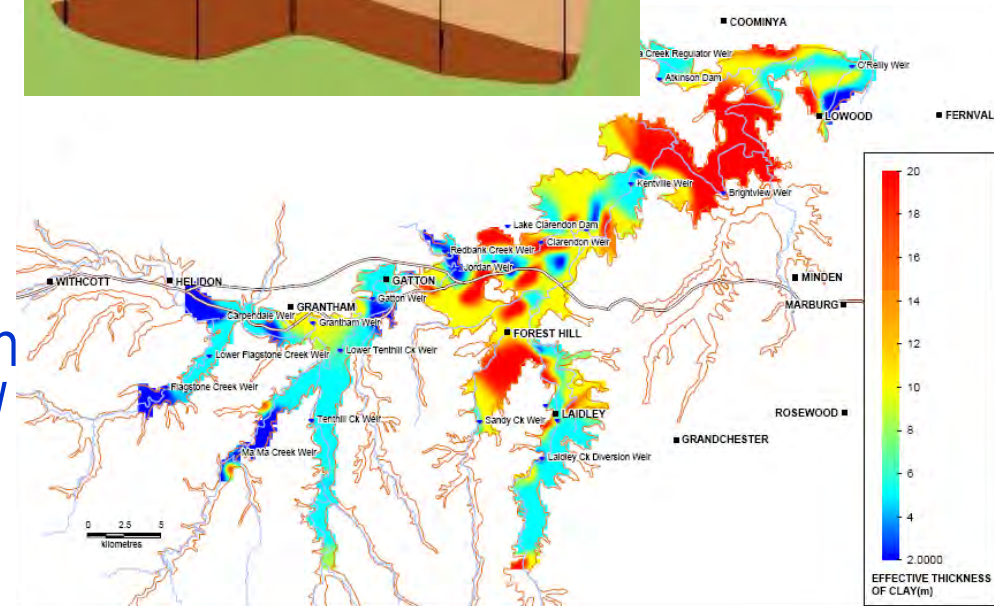
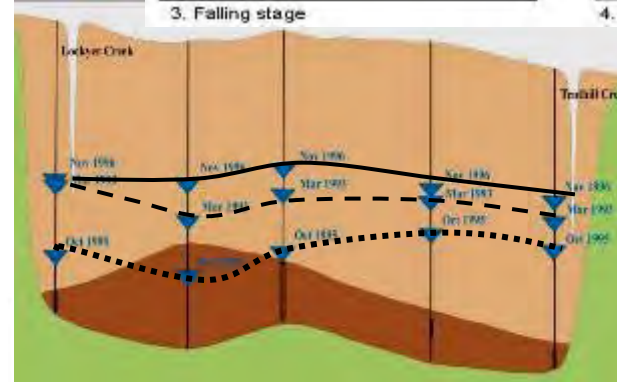
2. After summer storm event; rising stage



3. Falling stage

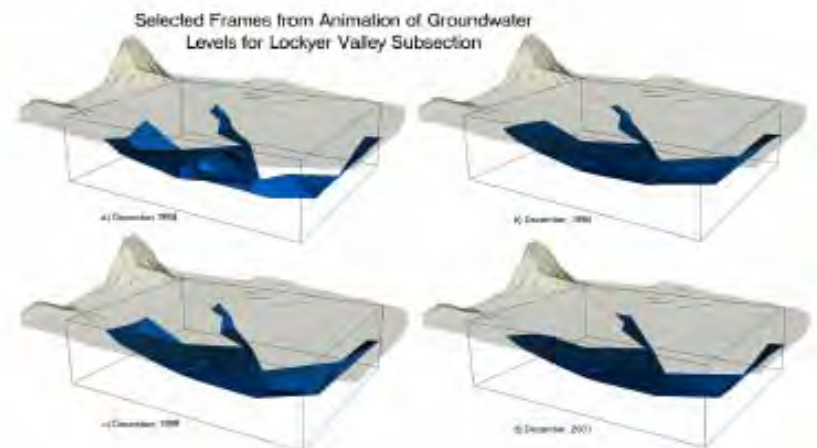
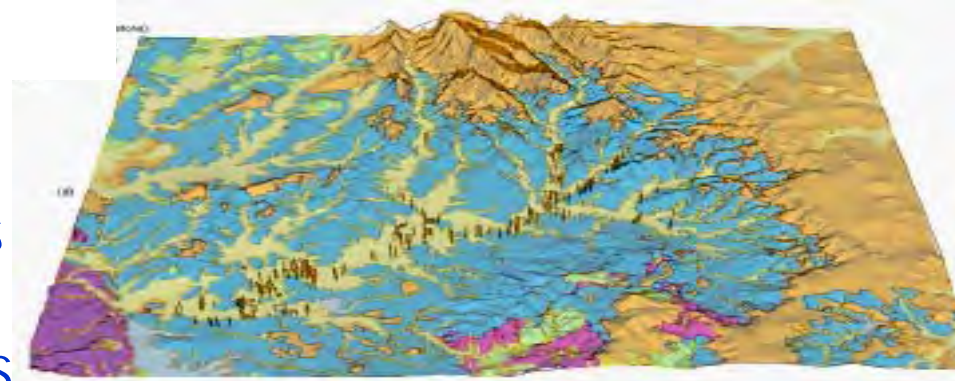
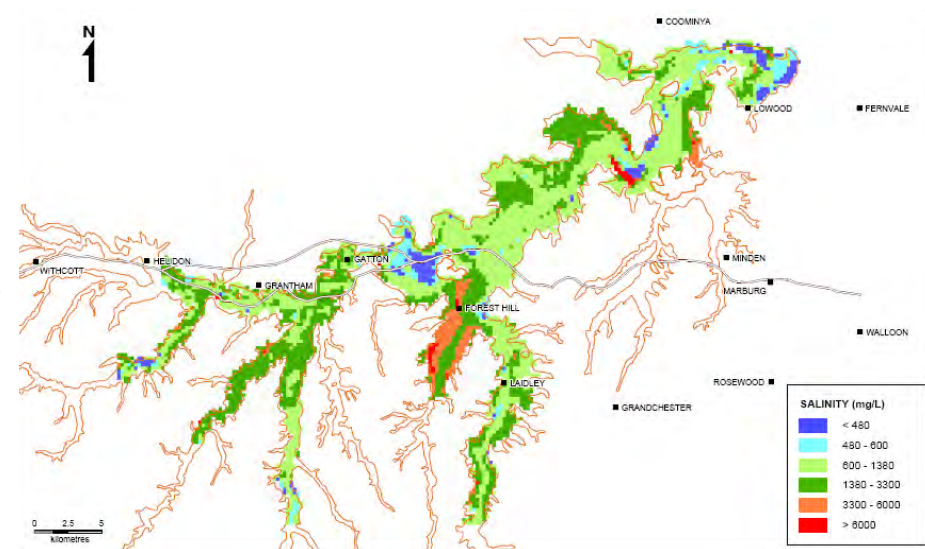


4. Return to low rainfall with extraction



RESEARCH TASKS

1. Review models, carry out sensitivity analysis
2. Develop new models as required
3. Compile and aggregate all hydrological data using 3D architecture
4. Compile and evaluate all previous hydro-dynamic studies and assess "fit-for-purpose"
5. Generate new data to fill data gaps where required
6. Integrate conceptualisations, visualisations and modelling of the hydrologic cycle
7. Run "what if?" scenarios for PRW in the Lockyer

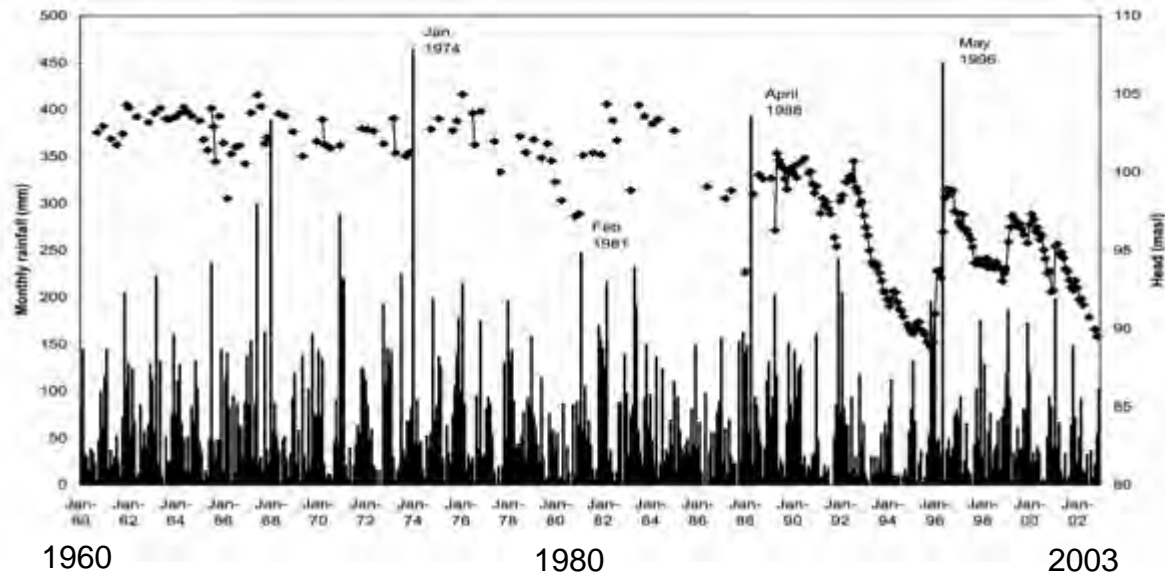


RESEARCH CHALLENGES

- Short time frame for generation of new data
- Which “What if?” scenarios to use

(next slide)

- Climate change implications
- Public perception and expectations



"WHAT IF?" SCENARIOS

"What if? variables	parameters	priority
Seasonality of supply	time series	?
Spatial distribution of supply	location	?
Intensity/variability of supply	release program	?
Seasonality of application	time series	?
Spatial distribution application	location	?
Intensity/variability application	release program	?
Method of application	furrow vs overhead vs drip	?
Climate scenario	wet \leftrightarrow dry	?
Climate series	scale \leftrightarrow model	?
Crop types/land use change	grains : veg : pasture	?
Groundwater use	conjunctive vs consumptive	?
Dam supply	storage	?

Urban Water Security Research Alliance



THANK YOU

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