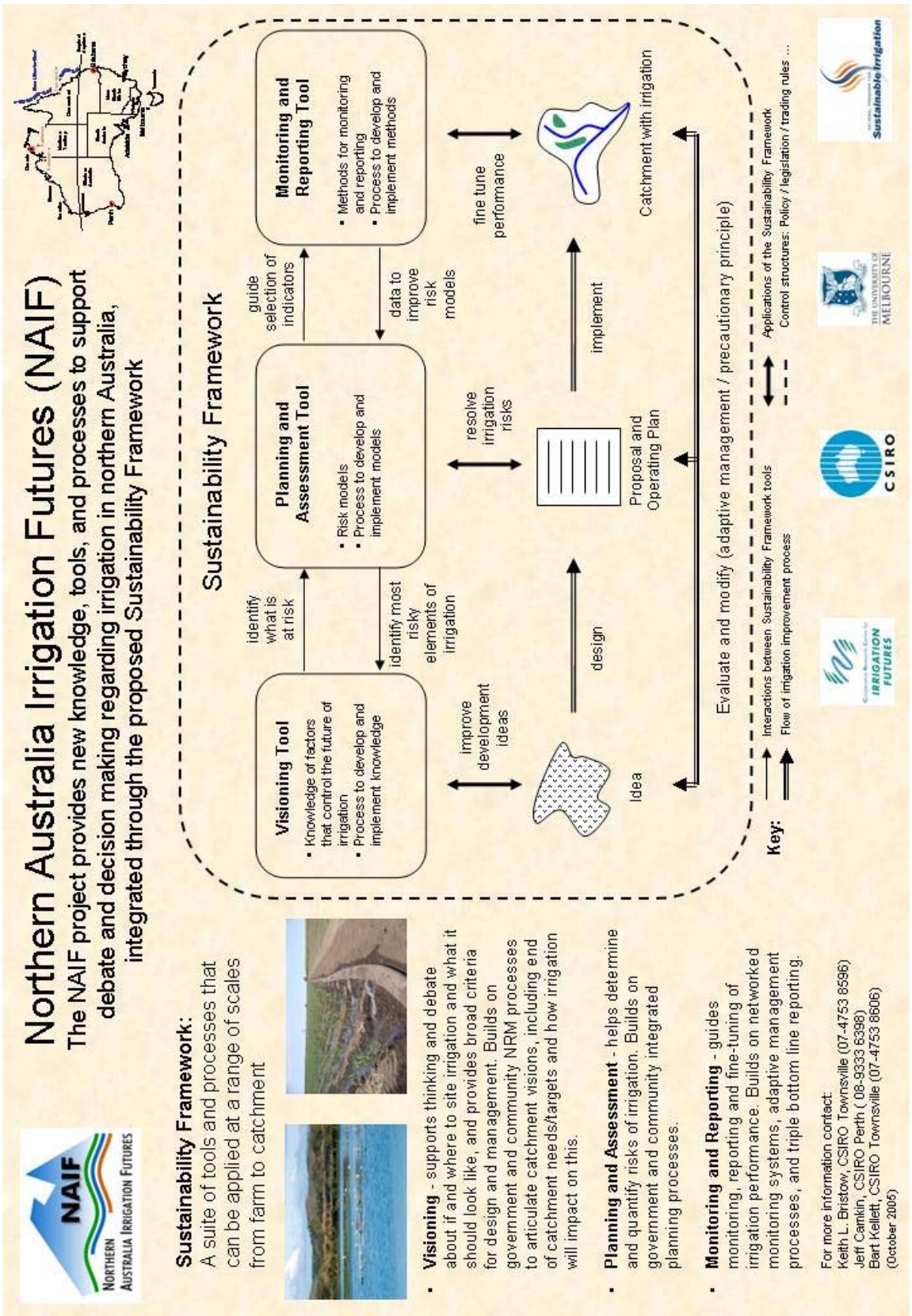
NAIF POSTERS PRESENTED AT THE NPSI INVESTORS FORUM, 23 OCTOBER 2005, MILDURA



Northern Australia Irrigation Futures

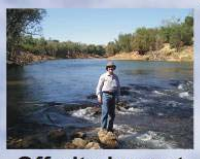
Groundwater flow systems: The neglected component in irrigation siting and design

A change to the water and solute balance of an underlying groundwater system can lead to unwanted on-site and/or off-site impacts

On-site impact

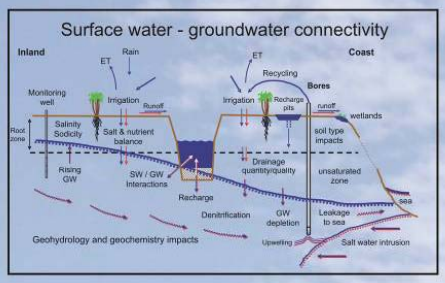
Irrigation induced salinity can occur when the volume of recharge in a given area exceeds the quantity of groundwater discharged through lateral flow. Lateral flow is in part a function of the hydraulic gradient and the transmissivity of the groundwater system

There is increasing recognition that groundwater and surface water systems are connected. A change in groundwater level or groundwater quality may take many years/decades to be observed in connected surface water bodies because of the time lags associated with lateral groundwater flow processes. Groundwater and surface water systems should be treated as connected unless proven otherwise



Off-site impact

Often there are temporal lags associated with these impacts



The temporal lag and spatial extent of the unwanted impacts associated with irrigation will in part be a function of the characteristics of the underlying groundwater system.

Groundwater provinces - based on broad uniformity of hydrogeological and geological conditions. As defined by the Australian Water Resources Council.

Groundwater flow system characterisation will ensure that groundwater flow processes are captured and highlighted in the decision making framework

Key groundwater features to be captured by characterisation include:

- **sustainable yield (quality and quantity)**
- **potential for degradation of aquifer**
- **surface water - groundwater connectivity**
- **potential for enhanced aquifer storage**
- **ecohydrology (i.e. relative importance of quantity and quality of baseflow).**

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Accounting for groundwater flow processes is of critical importance in siting irrigation

(October 2005)

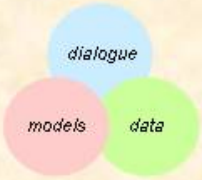
Northern Australia Irrigation Futures:
Risk and Resilience for Adaptive Irrigation Planning

Developing and testing a risk and resilience assessment framework for irrigation planning

Community of Practice

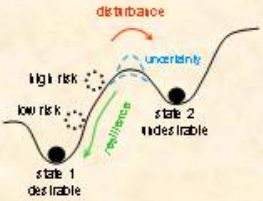
Findings:
- Communities of practice are for learning
- Irrigation areas have several communities of practice, so linking with or building on existing communities of practice is a good idea
- Communities of practice act as a hub from which ideas and information can flow to build new and adaptive planning
- Communities of practice shifts focus from one client (e.g. water service provider) to the community

Articulate Planning Problem



Findings:
- Irrigation industry members can feel threatened when researchers implicitly prioritise values
- Incorporating a range of ecological, social and economic values builds transparency
- Explicit value prioritization and negotiation at this stage can help reduce conflict that can occur when decisions are made at later stages
- Knowledge diversity, including models, dialogue, and data, can offer different perspectives on problems—different perspectives are required for addressing complexity and improving transparency

Assess Risk and Resilience



Findings:
- Semi-quantitative risk assessment is an opportunity for politically driven risk quantification
- Mistrust is cultivated by determining risks prior to engagement with community
- When risk assessment channels effort and knowledge into producing single number outputs, assumptions and bias are easy to hide
- Risk assessment is part of a reactive management cycle whereas resilience assessment encourages a proactive approach
- Resilience assessment can build on risk assessment to deliver outputs that better describe thresholds, spatial and temporal effects, and significance of relationships between different kinds of systems (e.g. water trading system and river)

Build Adaptive Planning

Findings:
- Planning needs to be adaptive at farm, district, scheme, catchment, region and state levels, because change is continuous and uncertainty is always present
- Adaptive planning stems from assessments that are issue driven and assessments that are not decision making documents, but flexible practices of individuals and organisations
- Together risk and resilience make assessment more flexible and able to deal with complexity

Case studies underway in the Lower Burdekin include:
1) groundwater nitrate, and 2) wetlands

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