

Securing Adequate Safe Water for Regional Australia

Draft Collaborative Research Proposal

Rationale and Purposes

Current and potential development areas to the west of the Great Dividing Range in Queensland (**Map 1**) are largely dependent on poorly understood surface and ground water resources. In this context, primary industry based economic activity in these regional areas can be severely imperilled by extreme weather and changing climatic conditions and these factors can also impact on the provision of domestic water supplies. Ground water resources are also problematic for domestic supplies due to iron, manganese, hardness and salinity. As well, there is the potential for the presence of bacteria and pathogenic organisms such as *Naegleria fowleri* which can cause primary amoebic meningoencephalitis (PAM), a rare but severe brain illness, which is usually fatal.

Over the past decade, water has emerged as consistent theme from a range of conference presentations and in particular the 2013, 2014 and 2015-16 **SEGRA Challenges**. Strong arguments have been made that the provision of secure and safe domestic water supplies hinges on four essential variables. Namely:

- the reliability and quality of the resource being used
- the statutory and governance regimes for water resource management in the specific jurisdiction
- the commitment of providers to ensuring that environment and population health of the communities using the water is protected
- the infrastructure and technology used to deliver domestic supplies is appropriate to the particular situation and cost effective.

Australia wide, each of the aforementioned variables differs greatly due to geographic and demographic realities and this makes it difficult to either generalise or draw valid comparisons between jurisdictions and regions.

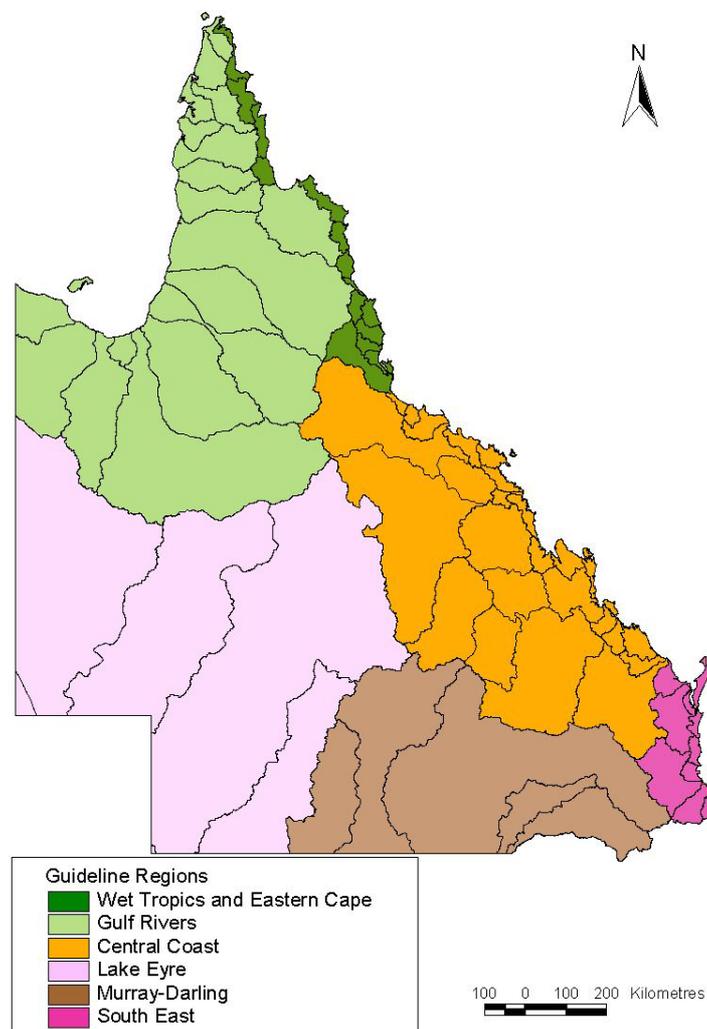
Arguably, it requires a collage of jurisdictional case examples and local 'snap-shots' to build a national perspective on how secure and safe domestic water is currently being provided. This information is essential for informing 'best practice' for the provision of secure and safe domestic water supplies in rural and remote regions. To this end, the purposes of this proposal for a collaborative research initiative are to:

- raise Local Government and community awareness of the population and environmental health dimensions of the need to secure adequate safe domestic water supplies for communities and isolated properties in rural and remote catchment regions
- develop and demonstrate a methodology that can be tailored to geographic and governance realities for systematically gathering information on ambient water quality, current water treatment practices and patterns of consumption
- survey the water quality and level of safe water provision in selected rural and remote catchment regions in Queensland
- determine the key impediments being faced by Local Government for the provision of adequate supplies of healthy domestic water to small communities and isolated properties
- suggest a pathway way for building a national picture on the quality of water being sourced, treated and used in rural and remote regional Australia

Proposed Project Study Areas

Two major catchment basin areas have been identified for initiating this project. They are: the catchments draining into the Gulf of Carpentaria (the Gulf Rivers Region); and the Darling catchments of the Murray-Darling Basin (MDB), north of the Queensland-NSW border. These areas are delineated on **Map 1** and together they provide a geographic context for linking three areas of issue raised at recent SEGRA conferences, namely:

- meeting population health imperatives by ensuring domestic water supplies in rural and remote regional areas are adequate and safe
- understanding the role of adequate and safe domestic water supplies in the economic and social development of North Australia and the Murray-Darling Basin (MDB)
- using integrated water management (IWM) to achieve balanced water resources allocation for the MDB in the face of changing climatic conditions



Map 1: Regions Adopted for the Queensland Water Quality Guidelines
Source DEHP (2009)

Role and Responsibilities of Local Government

Across Queensland, the quantity and quality of water in towns and communities is a major challenge for LGAs who have the statutory responsibility for providing domestic supplies. State and territory governments are responsible for the provision of water supply services in rural and areas of the other jurisdictions. Albeit often in collaboration with Local Government. Addressing the provision of secure and safe water is vexed area of issue for regional LGAs in Queensland. Specifically, they have been given the responsibility for domestic water services but in most cases are under resourced to adequately meet either statutory requirements or community expectations and needs.

A community water planning (CWP) approach could be used for LGAs in the Gulf Rivers Region and the Upper Darling (**Map 1**). This would follow the NHMRC 2011 *Australian Drinking Water Guidelines - Community Water Planner: A tool for small communities to develop drinking water management plans*. The Community Water Planner (the Tool) is a web-based tool developed collaboratively by NHMRC and the National Water Commission to assist managers of remote community water supplies in managing microbiological, physical, chemical and radiological water quality risks.

Australia wide, farming and pastoral properties are expected to meet their own household requirements and ensure that the water is not a health risk. And this is done in the absence of any regulatory requirements. LGAs often provide water using water tankers to rural properties when supplies run out in times of prolonged drought. This situation currently applies to areas in the proposed subject catchments (**Map 1**).

Aim and Objectives of the Project

The overarching aim of the project could be to: *support the sustainable provision of adequate safe domestic water supplies for people in rural and remote regional Queensland.*

The objectives to be achieved to attain the aim are as follows.

- Document community attitudes, understanding and behaviour with respect to the provision of adequate secure and safe domestic water supplies.
- Provide broad quantitative and qualitative information on water quality conditions and levels of water treatment being used by LGAs to meet statutory water planning and services requirements.
- Document the status of water quality conditions and water treatment provisions for remote settlements and isolated properties in the subject catchment areas.
- Propose long term measures to ensure that domestic water supplies for communities and individual homesteads are adequate and safe.

Approach, Phases and Timelines

The problems being confronting the sustainable provision of adequate secure and safe domestic water are long standing and it will require a carefully staged program to identify, test and evaluate solutions. An integrated adaptive assessment and management (IAA&M) approach that embeds CWP policies and practices will be followed under an overarching framework of Integrated Water Resources Management (IWRM). By following this approach, knowledge and experience will increase iteratively and a practical pathway towards sustainable adequate and safe domestic water supply solutions can be developed.

In this context, **Stage 1** could be a four phased project commencing April and to be completed by December 2016. The phases and key tasks are as follows.

Phase I: Scoping and Project Inception (April-June)

- Confirm project partners and responsibilities
- Agree priority inputs and outputs from each partner and deadlines
- Finalise survey instruments
- Confirm water quality parameters to be measured and sampling protocols
- Collate and review existing surface and groundwater monitoring data (eg as through <http://www.qld.gov.au/environment/water/quality/monitoring/>)
- Develop and initiate community engagement and awareness strategy
- Pilot the conditions survey in the Gulf Rivers Region and water quality data collection in Etheridge Shire
- Evaluate input material from survey and data collection
- As necessary, recast engagement, communications and data collection to fit with resource realities

Phase II: Project Implementation (July-September)

- Extend community engagement and awareness strategy to cover the subject catchments
- Roll-out the conditions survey and water quality sampling in the Upper Darling Catchments and the Gulf Rivers Region.
- Review effectiveness of methodology and re-cast approach if appropriate

Phase III: Information Consolidation and Interim Reporting (October)

- Collate material from community engagement and awareness activities
- conditions survey
- water quality survey
- Review effectiveness of methodological approach, identify information gaps and remediate if appropriate
- Synthesise material and draft interim report

Phase IV: Project Evaluation, Reporting and Re-planning (November-December)

- Evaluate and document effectiveness of community engagement and awareness activities
- Document and review water service provision, water quality and patterns of use
- Assess and document sustainability technology requirements to ensure domestic water is adequate and safe
- Prepare a consolidated project report and provide a recommended path forward to:
 - meet the requirements of the Lake Eyre draining catchments (**Map 1**)
 - address concerns arising from community engagement activities and water quality conditions work
 - propose and rationalise future stages

Potential Partners and Resources

Collaborating scientists and engineers as well as strategic advice and in-kind support could come from (for example):

- University sector
 - Institute for Land, Water and Society (ILWS), Charles Sturt University
 - School of Earth, Environmental and Biological Sciences, Faculty of Science and Engineering, Queensland University of Technology
 - School of Science and Engineering, Faculty of Science, Health, Education and Engineering, University of the Sunshine Coast
 - Institute for Agriculture and the Environment, University of Southern Queensland

- Queensland State Government regulatory bodies,
 - Queensland Health,
 - Department of Local Government
 - Department of Energy and Water Supply
 - Department of Natural Resources and Mines
 - Department of Environment and Heritage Management

- Community organisation sector
 - Gulf Local Government Association Queensland (LGAQ)
 - Murry-Darling Association (MDA)
 - SEGRA Foundation
 - Northern Resource Management Group

- Water industry sector
 - Water Engineers Sustainable Solutions (WESS) Pty Ltd
 - Aeramix Pty Ltd

Etheridge Shire Council (ESC) would be the pilot location for pilot scale community awareness activities and information collection and collation and initial water quality scanning.

The level of funding and the commitment and in-kind contribution of collaborating partners is unknown. Budget planning and human resources to be committed will be determined when:

- the level of research funding from CSU has been confirmed
- the project governance and contribution of collaborating partners has been negotiated
- the deliverables of individual researchers is agreed
- the information dissemination pathways have been identified

Measurable Output and Outcomes

Product from the collaborative integrated research could include:

- documentation of the effectiveness of engagement, communications and information dissemination methods and techniques used
- hard data on what are the domestic water supply conditions in the subject catchments

- identification and evaluation of sustainable supply and treatment systems suited to drought stressed rural and remote locations
- peer reviewed papers and innovative communications and awareness materials

Outcomes seen as indicators of the success of **Stage 1** of the project could include the following.

- Measureable improvement in the quality of water being used for domestic purposes.
- Better informed community conversations on domestic water supply provision as measured by articles in the media, complaints to local authorities and letters in local papers.
- Reduced presentations to primary health care providers and hospital of people with sickness resulting from the consumption of unsafe water.
- Timely positive changes in governance to ensure that LGAs are better resourced to meet their statutory requirements in the provision of domestic water supplies.
- Measured increases in the level of investment in sustainability technology to ensure that domestic water supplies are safe.