

## Research update

Issue 3, December 2014

### Message from the Director

The New Year is fast approaching but before we look towards what 2015 will bring, I'd like to take stock of the last six months of 2014.



Throughout the many presentations, workshops, briefings, forums and conferences that I've attended, the one key theme that keeps coming up is communication! The need for timely, accessible and effective communication of the research and research results is critical to evidence-based decision making.

Communities around Australia want trusted information about coal seam and shale gas, the techniques used in the extraction processes, the environmental risks and social and economic impacts associated with these developments.

GISERA is inclusive in its science communication and engagement with advocates and opponents of CSG and shale gas development. Its communication program is based on providing trusted, accessible and effective communication in situations where the community has little to no shared values and high uncertainty about desirable outcomes.

GISERA's extensive communication program has prepared the foundation upon which research results will be positively received. GISERA's communication has focused on establishing and maintaining trust, gaining endorsement of our goals and methods and demonstrating transparency. These positive and hard-won attributes underpin the value of the investment in research. All GISERA research and outcomes are publicly available on [our website](#).

### News and Events

#### New research projects

Three new research projects were approved during the last six months. The first was a [Surface and groundwater project](#), the aim of which is to review and assess the presence of organic compounds in groundwater found in the Surat and Bowen basins using existing open source and company held data. The other two projects were for the Terrestrial biodiversity portfolio.

#### Special science briefing

The CSIRO and the University of Queensland provided a special lunch time briefing *Onshore gas - the role of science* to Queensland parliamentarians on 29 October 2014. The event was sponsored by the Honourable Andrew Cripps, Minister for Natural Resources and Mines and provided ministers and invited guests an overview of the world class onshore gas research that is taking place in Queensland.

The continued demand for information and advice from GISERA shows that GISERA is meeting the needs of a range of stakeholders and that it is seen as a source of trusted information.

Some of our key communication highlights over the last six months include:

- Production of two short animations, [unearthing coal seam gas](#) and [unearthing shale gas](#) that provides an overview of the extraction process; from drilling the well to what happens with the extracted gas and water. Also explained are some potential impacts of development.
- Developing [Shale gas in Australia](#) information
- Running a series of community information sessions for Traditional Owners in the Carnarvon Basin (WA) about shale gas
- Raising awareness of GISERA's social and economic research portfolio via profiling the [community wellbeing and functioning survey](#) on radio, print media and online.
- Hosting the community Social and economic CSG research forum in Chinchilla.

GISERA intends to host more CSG research forums in 2015, the next two will focus on the research in our Surface and groundwater and Agricultural land management portfolios.

I look forward to sharing more research updates with you in the New Year. Wishing you all a great and safe festive season.

Cheers,

Damian Barrett, Director GISERA and CSIRO Research Director, Unconventional Gas

## Project Updates



### Surface and groundwater

GISERA and The National Centre for Groundwater Research and Training (NCGRT) hosted a workshop in October 2014 that covered the design of injection wells, geochemical issues, clogging and its management, water treatment methods, and synthesis of results from laboratory and field situations using models.

There were 30 participants from CSG developers, Queensland Department of Natural Resources and Mines, NSW Office of Water, NSW Environment Protection Authority, University of Queensland's Centre for Coal Seam Gas and University of NSW's Water Research Laboratory. Feedback received from participants were positive and reflected the practical application of research work:

- *"It was a good combination of theory and case study. A good amount of discussion time."*

- “A good cross-section from industry and academia, with good emphasis on real-world problems.”

There are already a couple of [journal articles](#) publicly available on clogging and groundwater modelling. A report on research investigating geochemical responses to re-injection of treated CSG water is expected in the first quarter of 2015.



### Greenhouse gas footprint

In July 2014, CSIRO scientists were out in the field testing a new airborne sensor at pilot sites to measure methane emissions in south-west Queensland. [Watch the new methane seeps video](#) to hear the various methods used to determine the amount of methane emissions that naturally occur from the ground and identify the source of methane emissions. A report on the application of these methods and establishing monitoring systems is expected early 2015.

Findings from this research will provide a methane emissions data set that can be used to compare against changes in methane emission as coal seam gas production in the Surat Basin increases. [CSIRO has completed a pilot study](#), funded by the federal Department of Environment, to measure emissions from a range of production facilities in Queensland and New South Wales. Further [fugitive methane emissions study](#), funded by the NSW Environment Protection Authority, is underway.

Results from both methane seepage and fugitive emissions investigation will add to the bigger picture of assessing the coal seam gas industry's whole of life cycle greenhouse gas emission footprint.



### Agricultural land management

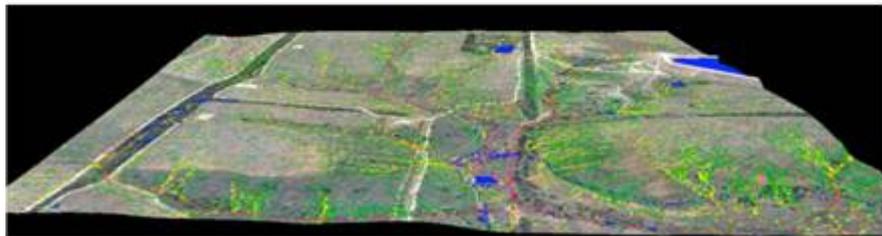
Data acquired using soil and crop samples, GPS, satellite and aerial imagery and modelling collected over the last six or so months are now being crunched, processed and analysed. The information collected will evaluate new techniques to monitor interactions between access tracks and water flow, understand where erosion is likely to happen and inform CSG access track design.

Initial results show the accuracy of high resolution aerial survey techniques to produce water flow maps (see image below) that can be used in understanding erosion threats and farm planning. Reports for several projects in this portfolio are expected to be available mid-2015.

RGB image overlying Digital Elevation Model



As above + water flow model



Visit the [website](#) for more information about other projects in this portfolio.



## Terrestrial biodiversity

Two new projects are underway for this portfolio. The objective of one of the projects is to provide best practice guidelines for [translocation of a rare daisy](#) called *Rutidosia lantana*. The guidelines will help to minimise biological limits to reproductive success and maximise population viability of the daisy.

The other project assesses the range of impacts from CSG development in south-west Queensland on the [Golden-tailed gecko and Glossy black-cockatoo](#) habitats to provide management options that ensure their long-term endurance.

A stakeholder engagement workshop was held on 15-17 October 2014 for the [Threat identification](#) project. The goal of the workshop was to harness stakeholders' expertise in threatened species and the practical, economic and social factors affecting the management of threatened species in the Brigalow Belt region. The wide cross section of participants from Queensland universities, CSG developers, Queensland Murray-Darling Committee, Queensland Herbarium, Natural Resource Management groups, WWF, consultants and Queensland Department of Environment and Heritage Protection enabled robust and passionate discussions about managing threats to the biodiversity of the Brigalow region.

Outcomes from the workshop in conjunction with analysis of available information will be used to identify the key threats and management actions to minimise the impact of those threats and improve the

persistence of biodiversity. The end result will be a cost-efficiency analysis to determine the best management strategies for a range of budgets.

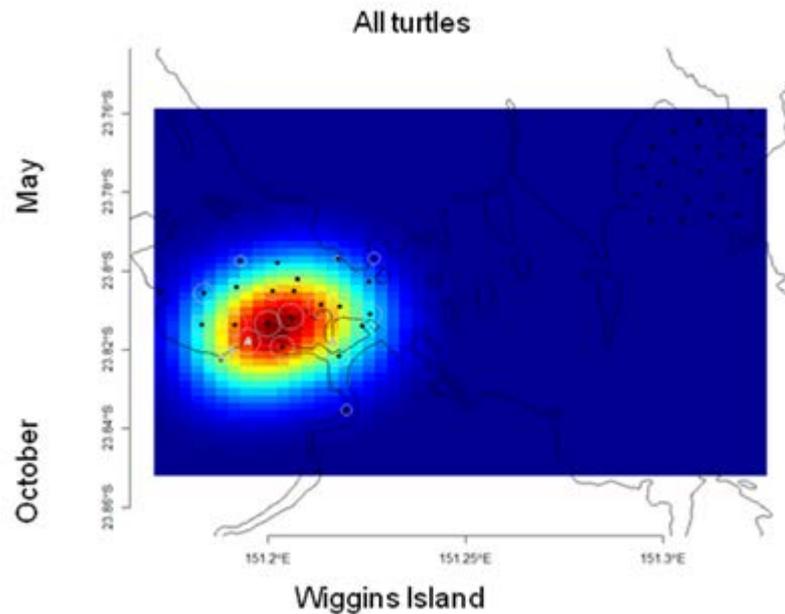


Robust discussions at the stakeholder workshop, October 2014.



## Marine environment

Initial results collected from both the [acoustic and satellite tagging systems of turtles](#) around Gladstone Harbour show that the majority of the tagged population stay close to the tagging area (see image below). There is greater use of channels at low tides, during mid to high tide they use intertidal flats and seagrass beds, and even mangrove channels in some areas. Such habitat information will be useful for fisheries, industry, community groups, management, government agencies and statutory bodies to better manage turtle interactions in Port Curtis.



In addition to tracking turtles the [marine environment research](#) also aims to better understand and predict water quality and ecosystem processes in Port Curtis. The GISERA water quality, optical and ecosystem modelling proved vital in supporting the [Gladstone Healthy Harbours Partnership](#) report card process. The modelling will also make a key contribution to predicting and improving water management in Gladstone Harbour and the Great Barrier Reef region. A report for this project is expected early next year.



## Social and economic

Earlier this year a telephone survey on community wellbeing for people living in the Western Downs area was conducted. The [report](#) for this survey was released in September 2014 and was well received by community groups, CSG industry and government departments and services. Several presentations were provided to various stakeholders in the Surat Basin region. For a quick summary of the report [read the article](#) published in The Conversation.

GISERA hosted a community forum in Chinchilla on 12 November 2014 to talk about the initial results from over 18 months of social and economic research in CSG impacted regions. This was also a great opportunity for people to talk and ask questions to the researchers about the research and what the new information means. Attendees included representatives from government departments, Council, service providers, local businesses, and community groups.

The Bureau of Resources and Energy Economics' (BREE) 2014 Gas Market report drew strongly on GISERA research, in particular the research on [employment effects, household income and demographic change](#). Three GISERA publication outputs were specifically cited. The report also recognises the need for more detailed analysis of cumulative economic



impacts as well as the distributional effects. This demand reinforces the need for further primary economic research.

