GISERA Gas Industry Social & Environmental Research Alliance

# Research update

Issue 4, December 2015

## Message from the Director

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

GISERA continues to play an important role in providing trusted information about the challenges and opportunities associated with coal seam and shale gas industries.

Significant progress has been made towards the completion of research projects started in 2011/2012 as we move toward the last twelve months of the original GISERA agreement. We have also utilised stakeholder survey feedback to understand how best to establish remaining research priorities under the current GISERA agreement. An update on new research approved as well as a detailed overview of our key research progress to date is included for you in this issue.

Due to the ongoing completion of key research projects, this year has seen an increase in scientific communication and engagement activity through GISERA. We have successfully hosted a series of CSG Research Community Forums for industry, local and state government departments, landowners, farmers, communities living in gas development regions and community groups in relation to GISERA's research topics. These activities are set to continue well into next year.

It has been encouraging to hear positive feedback from stakeholders following our recent community forums. There has been a genuine appreciation for the level of information shared by researchers as well as the usefulness of open dialogue sessions shared between researchers and

## News and Events

### Annual workshop held

GISERA recently provided a one-day workshop to overview the extensive research work that has occurred over the last 12 months. Held in Brisbane, participants heard from lead researchers from each of the six program areas. Open session displays were also set-up where participants could talk with researchers directly and learn more about the work done.

### GISERA sponsored ATSE Unconventional Gas Conference

GISERA sponsored the Australian Academy of Technological Sciences and Engineering (ATSE) Unconventional Gas Conference which was held in Sydney on 22-23 September 2015. The ATSE Conference was a significant success and provided a considered and balanced viewpoint on what the science and research is telling us about the real risks (and also benefits) of unconventional gas development in Australia. A communiqué will be released shortly describing the ATSE findings from the conference, stating very clearly the Academy's position. This is an important statement coming from such a respected organisation.

communities. The below feedback was received during our August marine community forum in Gladstone:

*"The presentation was an open view of CSIRO's activities in Gladstone."*

*"The researchers were open to community comments and questions without any hesitation."*

*"Just seeing the outputs of the study and hearing the limitations of their applications has been useful."*

*"It was useful to learn about new modelling techniques that have come as a result of this research."*

Your thoughts and comments in relation to this Issue are always welcomed. Please contact us via the GISERA website contact page at any time. I look forward to sharing more research updates with you in the future and trust you will enjoy this Issue.

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

## Project Updates

### Surface and groundwater

The research projects in this portfolio look at maximising the amount of treated coal seam gas water that can be re-injected into aquifers. Initial results have identified clay mobilisation as a significant source of reinjection clogging, a process that reduces the volume of water that can be reinjected.

The Geochemical response to re-injection project focuses on the interpretation of field data collected during a series of injection experiments at field site in Reedy Creek and Condabri. The project aims to understand and quantify the geochemical response to re-injection of (treated) CSG waters. Funding has been approved for an additional scope of work that will include a series of additional sorption and respirometry test experiments, accompanied by the development of reactive transport models that interpret these data and underpin field-scale predictions of anticipated geochemical impacts.

A number of projects have come to finalisation, including the high performance groundwater modelling project. The completed report for this project and others can be found on the GISERA website

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### Greenhouse gas footprint

It is not clear how much methane seeps out of the ground under natural circumstances. This has been identified by scientists, general public and the natural gas industry as an important knowledge gap. The current project in the Greenhouse gas footprint portfolio addresses this gap.

"The research aims to do three things, the first is to determine and refine the best method to detect and measure methane seeping from

underground in the Surat Basin; the second is to identify background sources of methane and finally, to provide a methane emissions data set from soils, rivers and agriculture on a regional scale," says Dr Stuart Day, from CSIRO, who is leading this research project.

The methane emissions data set can be used to compare against changes in methane emission as coal seam gas production in the Surat Basin increases.

The final report for Phase 2 of the project, including the remote sensing and ground detection components, is now completed and available on the GISERA website. Phase 3, delivery of a remote sensing baseline study and a ground detection baseline study, will be extended to a completion date of November 2017.

CSIRO is also investigating fugitive methane emissions from coal seam gas production facilities in NSW and Queensland. Results from both investigations will add to the bigger picture of assessing the coal seam gas industry's whole of life cycle greenhouse gas emission footprint.

A CSG forum on methane seeps and agricultural land management was held in Chinchilla in April and attracted approximately 50 stakeholders from government departments, industry, Council, service providers, research organisations, landowners and community groups.

A fact sheet on Characteristics of methane seeps is now available on the website.

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## Agricultural land management

The five research projects underway in this portfolio are examining the practical implications and opportunities for farmers when operating their existing farming or grazing business alongside the coal seam gas (CSG) industry. Key questions being investigated include how much land will be affected by CSG development, the impacts on farm production and productivity, the impact of surface infrastructure on farm operations, and the long term impacts on farm productivity and soil quality.

"The initial input from producers at workshops held in Dalby, Chinchilla and Roma has helped to identify the key concerns and shape these research projects. For example, the issues of dust, light and noise from gas industry activity have highlighted the importance of proper farm design and planning for roads and traffic", said CSIRO farming systems expert, Dr Neil Huth, who is heading up these projects.

During August, a joint research forum on *Agriculture and Coal Seam Gas* was held in Roma. The forum included representatives from the Centre for Coal Seam Gas, AgForce, the Department of Agriculture and Fisheries as well as GISERA. Presentations overviewing the results of GISERA's recent research were also given.

A fact sheet on Monitoring erosion and surface water impacts of coal seam gas access tracks as well as the final report for the Without a Trace

project are now available for viewing on the GISERA website. The website also includes a paper overviewing Farmer's perceptions of coexistence between agriculture and large scale coal seam gas development.

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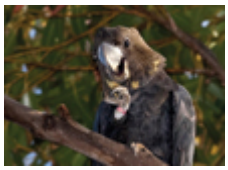

## Terrestrial biodiversity

The terrestrial biodiversity research, including four projects, aims to understand and minimise coal seam gas (CSG) development impacts on the function of regional ecosystems.

The recently completed Priority threat identification and management project aimed to document potential threats to biodiversity and cost-effective responses across the development region. A booklet summarising the research outcomes has been developed and highlights a priority set of strategies to take for the region to maintain threatened species in the medium to long-term. This booklet will be available for viewing online in December 2015.

The Fire ecology of grassy woodlands project examines the extent that biodiversity might be impacted by any change in fire regimes due to coal seam gas activities. The development of a manuscript on the importance of fire as a factor in influencing tree populations is also in the process of being completed.

Fieldwork for the Habitat selection by two focal species project is currently underway. Field assessments for the glossy black-cockatoo were completed in August and assessments for the golden-tailed gecko will be completed during November. The fieldwork results will assist in the development of management prescriptions to ensure the long-term persistence of the two species within the CSG development region.

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## Marine environment

The final report for the Marine Environment project An Integrated Study of the Gladstone Marine System has been completed and can be viewed on the GISERA website. Insights from this research are also relevant to many other areas of Coastal QLD.

The research led to the development of computer simulation models for water quality and seagrass beds in Gladstone Harbour. These models can be used to better understand long term trends in the harbour and assist in future planning. By improving the scientific knowledge base needed to anticipate and mitigate impacts, the research will help:

· assist agencies in evaluating and refining environmental trigger levels for water quality parameters and seagrass
· examine options for management of iconic fauna, such as turtles
· increase the level of confidence around environmental decision making processes in Port Curtis

· enable a more accurate assessment of the risks to turtles posed by commercial vessel movements

GISERA hosted a *CSG Marine Research Industry Forum* in Brisbane in August as well as a separate community forum in Gladstone. Approximately 60 stakeholders participated in the forums with positive feedback received in relation to the final report.

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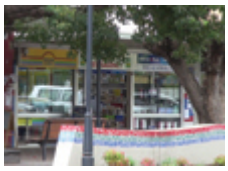

## Social and economic

During July, three of the four socio-economic research projects were finalised.

The *Community functioning and wellbeing project* gathered important baseline data on community wellbeing and responses to change in the Western Downs region. The research identified key drivers of wellbeing and important actions in relation to changes in communities. The project also identified issues that are important for a community in relation to CSG developments. An opportunity to continue the monitoring of wellbeing in the community will continue through the development of a repeat survey to be conducted in February 2016 that will draw on community industry and government responses to all the previous social research that have been conducted by GISERA.

The *understanding community* aspirations project has also delivered a visual perspective booklet. Using images, the booklet demonstrates the aspirations of a rural community in the Western Downs.

During May, research commenced for a new project relating to the economic assessment and forecasting of future impacts on regional economies and how local businesses can respond. This project utilises the initial economic results from the *Monitoring Regional Transition* project and builds on an understanding of how small to medium enterprises are experiencing and responding to the changes from construction to operations of CSG-LNG developments across various industry sectors. One of the deliverables for this project was the preparation of an Overview and synthesis of regional economic effects of the CSG industry during the construction phase.