



GROUND AND SURFACE WATERS

GISERA | Gas Industry Social and Environmental Research Alliance

Sources and mobility of gas in formations below the Walloon Coal Measures in Queensland

CSIRO scientists will collate existing data on the prevalence of gas in water supplies and water monitoring bores in aquifers underlying the Walloon Coal Measures, and will investigate the sources of gas to determine if they will be affected by coal seam gas (CSG) activities.

Key points

- The Walloon Coal Measures in the Surat Basin in southeast Queensland are the target resource for Australia's largest CSG development.
- There is community concern that gas may be entering water supply bores that extract water from aquifer formations.
- This CSIRO project will build on our existing understanding of the groundwater system in these aquifers.
- Project outcomes will support a framework for future monitoring to validate whether the presence of gas in groundwater bores is increasing, as well as establishing sources of gas and contributing factors.

This project, conducted through CSIRO's Gas Industry Social and Environmental Research Alliance (GISERA), will provide an evidence base to allow for the prediction of likely gas concentrations in water bores across the Surat Basin, and how that 'gassiness' may change over time – including as a result of CSG development.

There is already a significant body of research focused on groundwater aquifers within the Surat Basin and the potential impacts of CSG development on groundwater resources. Researchers will collate existing data on the prevalence of gas in water monitoring bores and water supplies (including stock, agricultural and town supplies) to determine the current state of the system.

Researchers will then investigate the sources of gas within them, and how they may be affected by non-CSG water extraction and CSG activities.

The outcomes will allow for the establishment of a framework for future monitoring to validate whether the presence of gas in groundwater bores is increasing, what the source of any such gas is, and whether CSG activities are a contributing factor.

A natural spring in an outcrop of Precipice Sandstone in the Surat Basin.



CSG in southeast Queensland

The Bowen and Surat basins in Southern Queensland host the largest CSG producing fields in Australia, with production commencing in the Bowen Basin in the 1990s and in the overlying Surat Basin in 2006.

Approximately 80 per cent of current CSG production in Queensland is derived from coals within the Walloon Coal Measures of the Surat Basin. These account for the majority of CSG produced in Australia.

Addressing community concern

The production of CSG requires the extraction of groundwater to reduce pressure within the coal seams and allow the release of the gas. The depressurisation caused by this process extends laterally, and creates a pressure difference between the target coal seams and the surrounding layers.

These pressure variations have the potential to cause changes to groundwater systems, including reduced groundwater availability, and the migration of gas to water bores. If this happens, it can affect other groundwater users, including local communities and the agricultural sector.

There is concern among communities in southeast Queensland that increasing amounts of gas may be entering water supply bores that extract water from aquifer formations below the Walloon Coal Measures.

Gas has been observed in these formations before CSG development commenced, but it is important to establish whether CSG activities are impacting the deeper groundwater systems and potentially causing mobilisation of gas.

There is a regulatory framework in place in Queensland to manage potential impacts on water bores, and that includes a requirement to 'make good' any impairment of affected water supply bores.

Project methods and objectives

The overall aim of the project is to improve understanding of the groundwater systems of the Surat Basin, and to investigate how these may be impacted by water extraction and CSG activities.

To achieve this, researchers will work through four distinct project phases.

Discovery phase: GISERA will liaise with the Centre for Natural Gas at the University of Queensland (UQ), the Office of Groundwater Impact Assessment (OGIA), Qld Department of Natural Resources and Mines, Manufacturing and Regional and Rural Development, and other and CSG stakeholders to access existing data on geology, hydrogeology and groundwater systems that has been gathered through previous studies.

Conceptual modelling phase: based on observations from the discovery phase, researchers will establish conceptual models of the Surat Basin's groundwater system and conceptual models for interaction and connectivity between formations.

Modelling phase: petroleum system modelling will be conducted to explore potential timings and quantities of hydrocarbons generated and expelled from the coals, and assess the volumes entrapped in permeable sandstones, including those dissolved in groundwater. Outputs from the petroleum systems model can be coupled with hydrogeological models. Numerical modelling will explore a range of scenarios developed in the earlier conceptual modelling phase – including the interaction between water bores and CSG extraction activities.

Analysis phase: researchers will analyse the validity of their conceptual models, and examine how future monitoring could further our understanding of how CSG activities impact deep aquifers.

On completion of the project, a range of reporting and communication activities will take place to allow stakeholders to engage with and understand the outcomes.



Taking water samples from an agricultural bore in the Surat Basin.

More information

Find out more [about this project](#).

Learn about other [GISERA studies in Queensland](#).

Further information | 1300 363 400 | gisera@csiro.au | gisera.csiro.au

GISERA is a collaboration between CSIRO, Commonwealth and state governments and industry established to undertake publicly-reported independent research. The purpose of GISERA is to provide quality assured scientific research and information to communities living in gas development regions focusing on social and environmental topics including: groundwater and surface water, greenhouse gas emissions, biodiversity, land management, the marine environment, and socio-economic impacts. The governance structure for GISERA is designed to provide for and protect research independence and transparency of research.