

Summary of research projects

May 2012



GISERA is conducting research that addresses the social and environmental impacts and opportunities arising from coal seam gas - liquefied natural gas (CSG-LNG) developments.

GISERA's integrated research program and regional focus ensures that its research identifies cumulative impacts from CSG-LNG developments and informs coordinated responses across industry, community and government.

The first annual group of research projects⁺ explores five topics: surface and groundwater, agricultural land management, socio-economic impacts, biodiversity, and the marine environment. The broad goal in each of these areas is:

- **Surface and groundwater:** improve the understanding of regional groundwater flows and management of groundwater impacts
- **Agricultural land management:** identify landscape/development configurations that minimise costs and maximise opportunities for agricultural production
- **Terrestrial biodiversity:** understand and minimise development impacts on the function of regional ecosystems*
- **Marine environment:** improve understanding of the vulnerable components of the marine ecosystem to minimise impacts from LNG developments around Gladstone Harbour
- **Social and economic:** inform and support change to enhance regional areas and communities.

⁺Details for each research project is available on the GISERA website.

*Biodiversity projects are currently in the approval process.

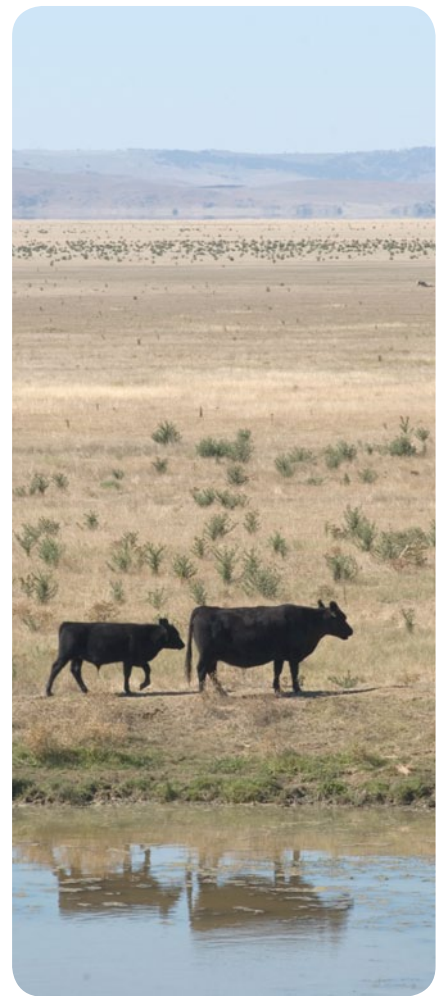


Image credit: CSIRO.



Coal seam gas developments are associated with a range of social, economic and environmental impacts.

Image credit: Australia Pacific LNG.

Surface and groundwater

Geochemical responses to re-injection

SCOPE: understand and quantify aquifer reactions occurring due to re-injection of CSG water, and their impacts on water quality.

OUTCOMES: methods for predicting water quality changes resulting from CSG water re-injection.

Re-injection of CSG water

SCOPE: understand, quantify and manage clogging of injection wells during re-injection of CSG water permeates, brines and blends.

OUTCOMES: strategies to manage clogging of re-injection wells to maximise re-injection volumes.

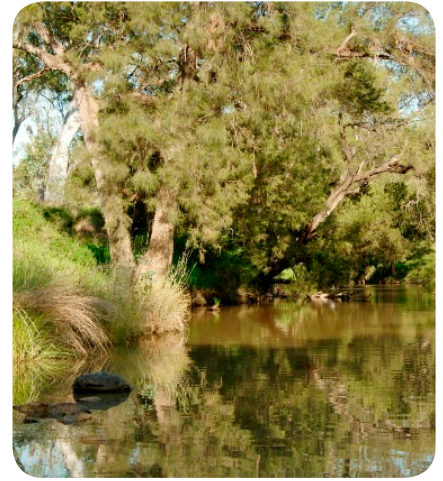
High performance groundwater modelling

SCOPE: determine the feasibility of large scale re-injection schemes.

OUTCOMES: models that assess the feasibility of large re-injection schemes and predict how re-injection may reduce impacts from CSG development.

Isotope and geochemical groundwater baseline study

SCOPE: characterise the baseline geochemistry of groundwater and formation water prior to and during initial stages of development to understand groundwater age and origin.



Research to improve management of groundwater impacts and understanding of regional groundwater flows.

Image credit: Australia Pacific LNG.

OUTCOMES: baseline measures of groundwater quality and protocols for monitoring changes in groundwater quality, during and after development.

Agricultural land management

Preserving agricultural productivity

SCOPE: assist in the preservation of agricultural productivity during land use change.

OUTCOMES: developing methods for most equitably and/or cost-effectively preserving agricultural productivity.

Shared space

SCOPE: understand how farmers from a range of production systems (extensive grazing to intensive cropping) perceive and value CSG developments on their and others' farms.

OUTCOMES: information that assists farmers and developers to negotiate means of co-existence that maximise benefits and minimise social and economic costs.

Gas farm design

SCOPE: understand how to design farms for a new mixed land use.

OUTCOMES: design principles and practices that optimise farm and gas infrastructure and operations, minimising negative impacts and maximising benefits.



Making tracks, treading carefully

SCOPE: understand the direct and indirect impacts of tracks and traffic on invasive species and erosion in agricultural landscapes.

OUTCOMES: guidelines for quantifying, monitoring and managing weed and erosion threats.

Without a trace

SCOPE: identify the nature and likely extent of damage to agricultural soils, and methods for avoiding and improving soils.

OUTCOMES: methods for installing and operating gas infrastructure that avoids soil damage, and novel methods for rehabilitating damage that does occur.

Research to minimise costs and maximise opportunities for agricultural production.

Image credit: CSIRO.

Marine environment



Research to minimise impacts on the marine ecosystem.
Image credit: CSIRO.

Sustaining turtles, dugongs and their habitat - an integrated marine observation system

SCOPE: establish baseline data on distribution and abundance of seagrass within Port Curtis and understand the movement and feeding habits of turtles and dugongs in Port Curtis and environs.

OUTCOMES: quantifying the risks to turtle and dugong populations from dredging and increased boat traffic.

Integrated modelling

SCOPE: understand the local and cumulative effects of discharges and dredging on water quality and seagrass ecosystems in Port Curtis.

OUTCOMES: establish a fine-scale model for Port Curtis that predicts local impacts of discharge and dredging on seagrass ecosystems.

Social and economic

Monitoring regional transition

SCOPE: synthesise existing knowledge on the nature of rural socio-economic transitions occurring as a result of resource developments, and track the social impacts of regional economic change.

OUTCOMES: identify ways to help local communities in responding to resource development in order to maximise social benefit.

Community functioning and well-being

SCOPE: identify principal indicators of community function and well-being, the resources and strategies necessary for enabling and enhancing community responses, and how communities respond to major developments in their region.

OUTCOMES: inform strategic investments that will help maintain or enhance community function and well-being.

Planning for socially sustainable communities

SCOPE: predict requirements for social services and infrastructure based on population movement at local, regional and state-wide scales.

OUTCOMES: models, analysis and advice to inform coordinated planning for sustainable communities.

Understanding community aspirations

SCOPE: identify community aspirations and their overlaps and/or disparities with existing resources, industry, and policy trajectories. Specifically, to understand how different community segments see the future of the region and how these reflect the economic and policy avenues for the region.

OUTCOMES: help inform sound industry and policy activities to satisfy the social licence to operate.



Integrated research that informs and supports change to enhance regional communities.
Image credit: Australia Pacific LNG.

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