



## GROUND AND SURFACE WATERS

**GISERA** | Gas Industry Social and Environmental Research Alliance

# Assessing the risk of forest fragmentation from coal seam gas activities for species and ecosystems in the Pilliga Forest, NSW

This project will improve our understanding of the environmental impacts of forest fragmentation from the Narrabri Gas Project on species and ecosystems in the Pilliga Forest, in New South Wales (NSW).

### Key points

- The Narrabri Gas Project (NGP) will result in up to 850 gas wells on 425 well pads, and the clearance of 1,000ha of vegetation in the Pilliga Forest, in northern NSW.
- Communities and landholders have concerns about the negative environmental impacts from this development.
- This study aims to address knowledge gaps in our understanding of the environmental impact of forest fragmentation, including detrimental edge effects, vegetation clearance, declines of species at risk of extinction, and the loss of ecosystem functioning.
- This study will assess current fragmentation, analyse how fragmentation affects threatened species, predict the impact of the NGP on species based on their habitat needs, and propose a monitoring framework.
- Project outcomes will help drive a better understanding of the potential environmental risks of the NGP.

Community and landholder groups have expressed concerns about the potential negative environmental impacts from the Narrabri Gas Project (NGP) in NSW.

CSIRO's Gas Industry Social and Environmental Research Alliance (GISERA) will undertake a study bringing together knowledge about the forest fragmentation in the Pilliga Forest, and the potential negative impacts of the NGP on animals, plants and mycorrhizal fungi.

### Research objectives

This research project aims to improve the understanding of potential environmental impacts from the NGP.

More scientific research is needed to determine how the forest fragmentation from the NGP will add to the existing impacts (from prior land use fragmentation) on the Pilliga Forest's biodiversity, especially on threatened species.

The study will synthesise and summarise the findings in a report that is accessible, and easy to understand.

The Pilliga Forest region in NSW is fragmented by other land uses, particularly timber harvesting and unsealed access roads.



## The Pilliga Forest and the Narrabri Gas Project

The Pilliga Forest covers approximately 535,000 ha and is the single largest area of inland plains forest and woodland in Australia.

The NGP will result in up to 850 gas wells, and the clearance of 1,000 ha of vegetation in part of the Pilliga Forest. (Approximately two-thirds of the NGP area is located with the Pilliga State Forest.)

Community and landholder groups have expressed concerns about the potential negative environmental impacts from the project.

The region is already fragmented from other land uses, particularly timber harvesting for forestry and by a major road network.

Understanding potential environmental risks associated with land clearance requires a detailed knowledge of current forest fragmentation and habitat requirements of species, especially threatened animals and plants.

### The importance of forest connectivity

Fragmentation describes the degree to which habitats, like forests, form large contiguous blocks or smaller isolated patches. The fragmentation of forest is a major threat to biodiversity worldwide. Fragmentation is a process that involves both habitat loss and a change in the configuration of the remaining habitat.

Habitat fragmentation can lead to changes in the persistence of species: for instance, species that are sensitive to humidity, such as amphibians, may be eliminated from new fragments.

There are costs and benefits from the fragmentation caused by the establishment of roads, tracks and fire trails. Habitat fragmentation can threaten the persistence of some animal and plant species. But it can also facilitate management actions that reduce the threats faced by native species, for instance by preventing fires from spreading.

To date, no research has been undertaken to describe the pattern and extent of forest fragmentation in the Pilliga Forest, or to assess the potential impacts of fragmentation on biodiversity in the region.



The Pilliga Forest includes ancient sandstone caves.

### Project methods and outcomes

This study will:

- Use remote sensed imagery to quantify the existing level of fragmentation across landscapes with differing land uses (forestry versus conservation).
- Assess how fragmentation influences the occupancy of sites by threatened plants and animals and mycorrhizal fungi, like the squirrel glider and the coolabah bertya tree. Data will be collected through targeted on-ground surveys.
- Assess structural attributes of habitat currently occupied by specific threatened species, using LiDAR scanning and 3D modelling of habitats. This will help predict whether habitat suitability will be impacted by fragmentation from the NGP.
- Develop a framework for remote monitoring of habitat condition (including fragmentation and connectivity) during the life of the NGP.

GISERA researchers will use remote sensing and surveys of threatened species to gather this information. Researchers will undertake threatened plant surveys, collect soil samples and samples of mycorrhizal fungi, which will be identified using a DNA-based approach.

The vast majority of plant species in the Pilliga Forest, including threatened species, rely on specific associations with fungi called mycorrhiza.

All results will be publicly available on CSIRO's GISERA web site.

### More information

Find out more about the [Narrabri biodiversity project](#).

Read about other [GISERA projects based in NSW](#).

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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.