The La Grange Agriculture Opportunities project was established in 2012 to investigate opportunities for irrigated agriculture development in the La Grange area, south of Broome, Western Australia.

The project aimed to define industry and culturally appropriate land and water resource development options, to support the expansion of irrigated agriculture in the region.

The Department of Agriculture and Food, Western Australia (DAFWA) has completed a comprehensive assessment of the Broome Sandstone aquifer — the source of groundwater for irrigated agriculture within La Grange.

### Groundwater assessment tasks

From 2012–2016, DAFWA assessed the groundwater of the La Grange area, installed an extensive bore network for long-term groundwater monitoring, and established environmental benchmarks to ensure future development is sustainable.

The groundwater assessment will help government and industry manage water resources, and provides greater security and confidence to all water users.

### Did you know?

- The Broome Sandstone aquifer is made up of porous sands and gravel, allowing extraction rates from bores of up to 10 million litres a day.

- The aquifer covers about 30 000 square kilometres — roughly four times the size of the Perth metropolitan area.

- The salinity level of the 200 metre thick sandstone aquifer is mostly below 500 milligrams per litre, making it similar or better quality than Perth’s drinking water.

- The La Grange water allocation plan allows for 50 gigalitres of water per year for consumption across the region. This volume of water could irrigate up to 5000 hectares of crops if 10 megalitres per hectare was used per year.

- The water is a mix of ‘modern’ rainfall, and ‘old’ rainfall up to 20 000 years old!

- DAFWA created a three-dimensional model of the Broome Sandstone aquifer.
Figure 1. Airborne electromagnetic survey results and location of monitoring bores installed by DAFWA.
How we assessed groundwater resources

DAFWA’s groundwater assessment team used a range of technology to learn more about how the aquifer works; its relationship with rainfall; surface and saltwater within the system; and the region’s suitability for sustainable irrigation development.

• The team located more than 330 bores in the region using GPS surveys. Groundwater levels were recorded at each site.
• Water samples were collected from 150 of the bores to determine water quality for irrigation and stock use.
• Airborne Electromagnetic (AEM) technology was used to provide images of the aquifer at depths of more than 250m. We could then determine the size and depth of the aquifer, identify salt and fresh water, and assess variability in the aquifer. The AEM survey was also used to select the best locations to install the monitoring bores.
• 49 new bores at 24 sites were drilled at three different depths: watertable, production zone and base of the aquifer, which provided information about its properties and identified sampling points. The bores also helped to calibrate the AEM data and aquifer model.
• Groundwater dependent wetlands were mapped across the region so future impacts could be assessed.
• Geochemical sampling of the aquifer was used to determine water quality, age and sources; and helped calculate aquifer recharge from rainfall, and the rate at which water moves through the aquifer.
• Construction and calibration of a water balance model to assess potential impacts of an irrigation development. This is a valuable tool to assist current and future irrigators, while also protecting the cultural and environmental assets of the aquifer.

Assessment results

The groundwater assessment results were combined with soils data and existing infrastructure in the region, to create a map of the most suitable areas for irrigated agriculture in the La Grange area.

The assessment has also provided:

• a detailed understanding of the Broome Sandstone aquifer including, how deep it is; where the coastal and inland saltwater occurs; where the water is moving, is recharged, and how much and how often this occurs
• baseline data so future impacts of irrigation can be accurately assessed
• a process to identify the most suitable locations, layout and scale for future irrigated agricultural development
• a legacy of information and tools for water users for the future.

New tool for water users

DAFWA has produced an interactive groundwater map of the La Grange groundwater area, which allows users to explore the estimated depth to groundwater as well as freshwater thickness within the La Grange area.

The online map is designed to assist pastoralists, horticulturalists and traditional owners in planning and constructing groundwater bores which access the Broome Sandstone aquifer. This information is also important for irrigators applying to have their licence allocation increased and for potential new irrigators applying for a licence to pump.

To access the interactive map, visit www.agric.wa.gov.au/assessment-agricultural-expansion/la-grange-western-australia-groundwater-map
Planning, working and learning together

Engagement and consultation with the region’s landholders and stakeholders was extremely important to the success of the project. DAFWA worked closely with Department of Water and other partner agencies, pastoralists, horticultural businesses and Yawuru, Nyangumarta and Karajarri traditional owners to determine guiding principles for the resource investigations.

Find out more

The La Grange Agriculture Opportunities project is a component of the Regional Economic Development Water Opportunities project.

Visit: www.agric.wa.gov.au/r4r/la-grange-agriculture-opportunities

Important disclaimer

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