

Water for Food

Midlands Groundwater and Land Assessment Project – Irwin

At a glance

- The Irwin focus area's potential for irrigated agriculture expansion was assessed through groundwater investigations, a soil assessment and land capability study, coupled with climate and crop suitability studies
- Over half of the soils in the Irwin focus area have at least moderate capability for irrigated agriculture
- Aside from small, niche opportunities, the required water quality and quantity for extensive irrigated agriculture development is not generally available in the Irwin focus area

Project overview

The Midlands Groundwater and Land Assessment project was established in 2015 to investigate the potential for irrigated agriculture expansion in the Midlands region.

The \$4.7 million project was coordinated by the Department of Primary Industries and Regional Development's (DPIRD) Water for Food program in collaboration with the Department of Water and Environmental Regulation (DWER).

The project aimed to provide information on water availability and land suitability for irrigated horticultural activity. The objective was to identify precincts of 2 000 to 3 000 hectares suitable for intensive horticulture in the coastal mid-west of Western Australia.

Covering roughly 17 000km², the land assessment area is located 120km north of Perth, stretching along the coast from Dongara to Lancelin, and inland to Mingenew and Moora.

The focus areas

The selection criterion for the chosen focus areas was determined by a community reference group. Requirements included groundwater; soil and landscape types; and planning and infrastructure. From this criteria, two focus areas were identified; Irwin in the north and Dinner Hill in the south.

Located within the Shire of Irwin, the Irwin focus area is roughly 15km east of Dongara. The area is aligned with the Irwin River valley's alluvial soils, straddling the Twin Hills, Allanooka and Eneabba Plains.



Water investigation

Groundwater investigations by DWER assessed quantity, quality and demand from selected aquifers in the focus area.

Aside from small, niche opportunities, the required water quality and quantity for extensive irrigated agriculture development is not generally available in the Irwin focus area.

Irrigation water quality is dependent on the amount and type of dissolved salts present in the water, normally referred to as total dissolved solids (TDS). Soil investigations conducted by DPIRD revealed that the target soils of the focus area required very fresh groundwater with a salinity of less than 500 mg/L TDS (preferably less than 300 mg/L TDS) for sustainable irrigation practices.

Exploratory drilling in the Irwin focus area found groundwater contains salinity levels of over 1500mg/L TDS. This quality of water generally exceeds the tolerances of commercial horticulture crops. The current broadacre agricultural activities currently performed in the area are suited to the existing water and soil conditions.

Geophysical analysis also revealed the aquifer contains significant bound water along with aquifer conditions that are likely to produce only moderate yielding bores.

Further drilling and groundwater analysis confirmed the presence of lower salinity

groundwater south of the focus area, with analysis results of 460 mg/L and 600 mg/L TDS in two separate bore locations.

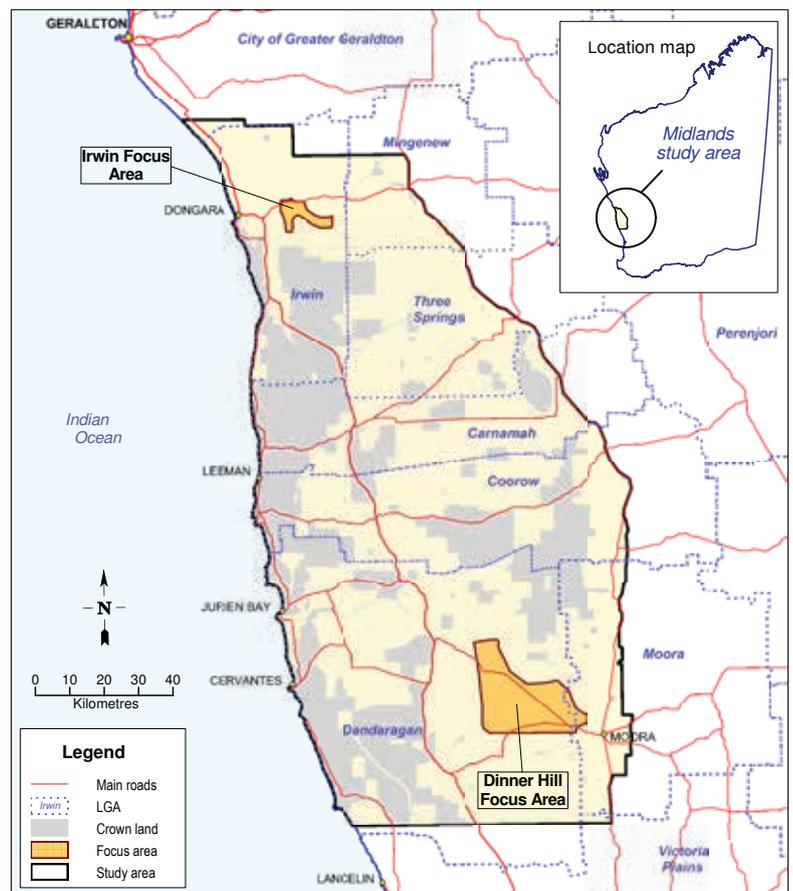


Figure 1 Midlands Groundwater and Land Assessment project study area



Groundwater-dependent environments

Groundwater-dependent ecosystems within the focus area are largely associated with:

- the Irwin river and its associated channels and springs; and
- a landscape depression at the base of the Gingin scarp, where wetlands and groundwater dependent vegetation are found.

The Yarragadee aquifer is the most prospective resource for larger volume groundwater licenses, and supports the study area's groundwater-dependent ecosystems. Commercial use of surface water within the focus area remains unlicensed.

The *Groundwater-dependent environmental values of the Dinner Hill and Irwin focus areas* report and associated mapping may be used by advocates in proposals to take groundwater, through identifying and avoiding drawdown at high value groundwater-dependent sites.

Within the Irwin study area, shallow groundwater occurs primarily near the Irwin River and its streams, and has been developed primarily for stock water through construction of shallow bores and soaks.

The focus area spans three groundwater subareas; the Allanooka subarea, north of the Irwin River; the Twin Hills subarea, south of the Irwin River; and the Eneabba Plains subarea, west of both the Allanooka and Twin Hills subareas.

Infrastructure investigation

DPIRD conducted a high-level infrastructure investigation focusing on power and energy, transport, telecommunications, labour, processing and packaging facilities, and weather stations.

The findings are in the *Midlands Regional and localised infrastructure assessment* report.

Land and soil investigation

The DPIRD *Irwin focus area soil capability* report revealed that over half of the soils in the Irwin focus area have at least moderate capability for irrigated agriculture. These are mainly the sandy slopes and lighter alluvial soils.

The clay soils showed a deep salt store and low permeability, and combined with the relatively flat topography on the alluvial plains, irrigation of these flats is expected to lead to further build-up of salts, especially with the brackish water quality in the Yarragadee aquifer.

Poor quality irrigation water is likely to lead to long term structural degradation, waterlogging and irrigation salinity in the clay soils.

While many of the sandy soils surrounding the flats are suited for irrigation, the use of poorer quality water can also be problematic, potentially resulting in subsoil salt build-up and irrigation salinity.

The sandplain areas also need careful management to control wind erosion.

Hydrological hazard investigation

The DPIRD *Hydrological hazard assessment for irrigated agriculture in the Irwin focus area* report found there is a salt store at about 3m below ground in the Yardarino Flats area. As groundwater is not rising in this area west of the Gingin Scarp it is not a hazard for dryland agriculture. If the area is irrigated the large salt store will potentially become a hazard.

The investigation also showed that on alluvial plains east of the Gingin Scarp, there is a moderate to high risk of dryland salinity due to rising groundwater. Irrigation in this area will increase the risk.

Whilst analysis found that intensive horticulture is not supported within the Irwin focus area due to groundwater quality and quantity, the combination of climate, water quality and soil type supports well-managed broadacre agricultural activities. The highly productive Yardarino Flats is an excellent example of where dryland cropping takes advantage of the conditions found in the area.



Summary

The land use within the Irwin area is largely dominated by broadacre agriculture; mainly cereal cropping and pasture for sheep and cattle, with smaller areas of annual and perennial horticulture, and some irrigated pasture.

Where irrigated pastures and horticultural activities occur, sound planning and management practices are essential, particularly when using water of less

than optimal quality. Problems caused by the use of low-quality irrigation water can vary greatly in type as well as severity depending on soil type, climate, crop and irrigation techniques.

The analysis found that intensive horticulture is not supported within the Irwin focus area given groundwater quality and quantity. The combination of climate and soil type does support well-managed broadacre agricultural activities.

Find out more

Please visit the Department of Primary Industries and Regional Development website for more information on the Midlands Groundwater and Land Investigations including the reports referenced in this brochure.

 Visit: www.agric.wa.gov.au/waterforfood/midlands-groundwater-and-land-assessment

Contact DPIRD, or email enquiries@dpird.wa.gov.au

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Please visit the Department of Water and Environmental Regulation website for more information on water allocations.

 Visit: www.dwer.wa.gov.au/water

Contact the Department of Water and Environmental Regulation Mid-West Office for up-to-date water availability statistics, or to discuss opportunities for obtaining water by trading or from alternative sources

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