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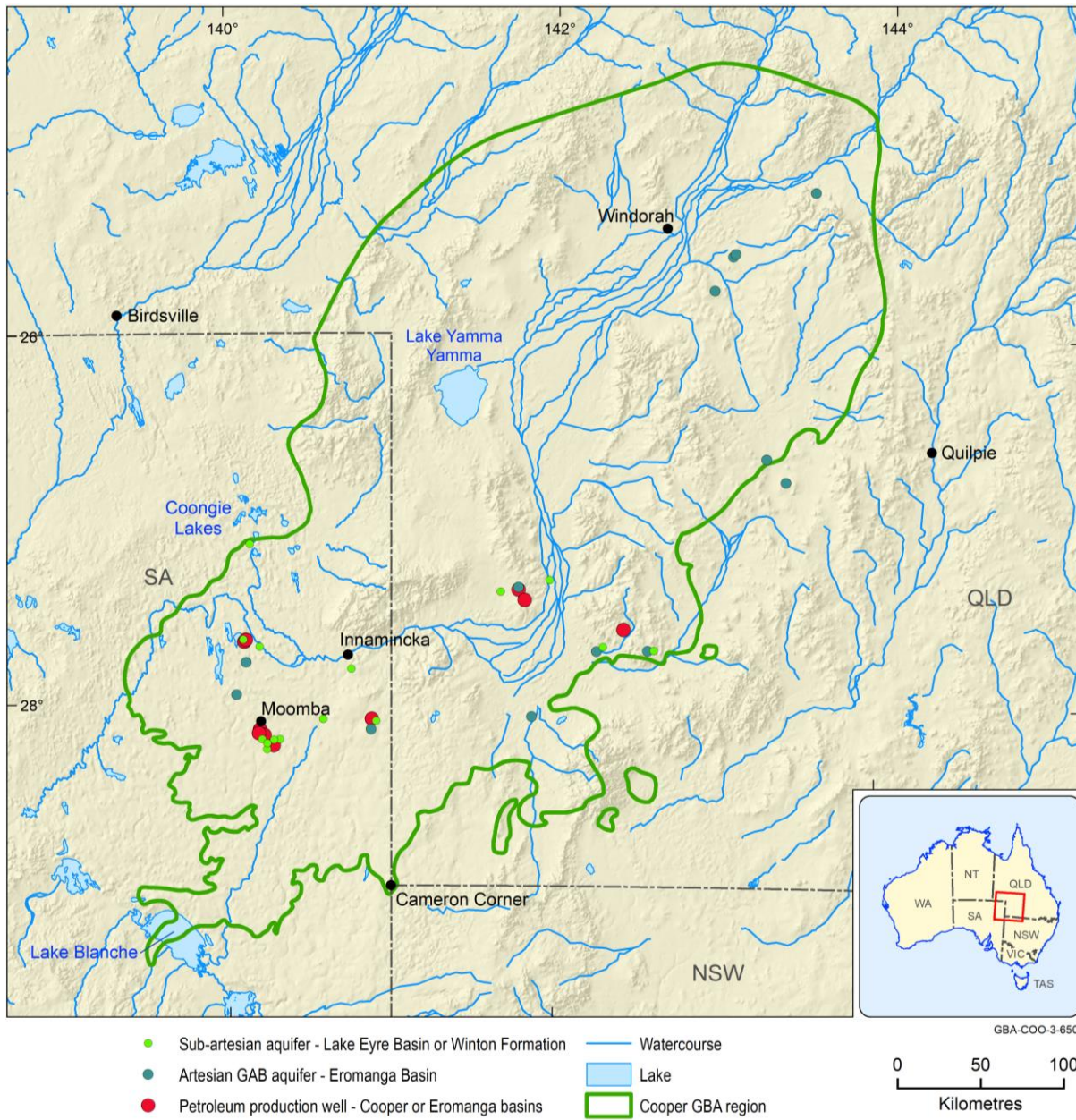
Geological and Bioregional Assessment Program

Fact sheet 10

Groundwater sampling in the Cooper, Eromanga and Lake Eyre basins

Groundwater samples were collected from a range of hydrogeological settings from the Cooper, Eromanga (part of the Great Artesian Basin) and Lake Eyre geological basins (Geological and Bioregional Assessment Program, 2020, 2021a) (Figure 1). Two sets of samples were collected from bores that access aquifers in the Eromanga Basin and overlying Lake Eyre Basin and another set from petroleum production wells in the Cooper and Eromanga basins by petroleum companies. Where possible, the samples were geographically clustered to provide hydrochemical information at different depths.

Figure 1 Location of bores sampled for hydrochemistry



The full sample dataset (Geological and Bioregional Assessment Program, 2021b) comprises:

- 14 samples from shallow sub-artesian aquifers in either the Winton Formation or the Cenozoic Lake Eyre Basin (sample depths less than 100 m below surface)
- 13 samples from deep artesian aquifers in the Eromanga Basin (sample depths from 1100 to 2070 m)
- 10 samples from petroleum wells producing from deep hydrocarbon reservoirs in the Cooper and Eromanga basins.

Hydrochemical analyses include field parameters, major and minor ions, dissolved hydrocarbons, as well as environmental tracers. The latter include: strontium isotopes (^{87}Sr , ^{86}Sr), noble gases including helium (^4He), stable isotopes of water ($\delta^{18}\text{O}$ and $\delta^2\text{H}$), stable isotopes from methane (^{12}C , ^{13}C , ^2H , ^1H), chlorofluorocarbons (CFC), as well as radioactive tracers – tritium (^3H), carbon 14 (^{14}C) and chlorine 36 (^{36}Cl)

These data provide detailed baseline hydrochemistry and water quality data for various aquifers and hydrocarbon reservoirs in the Cooper GBA region. They can be used to investigate other systems and processes, such as groundwater residence time in aquifers, aquifer recharge processes, groundwater flow rates, aquifer connectivity and surface water – groundwater interactions. Such improved understanding can assist in determining future groundwater management approaches and, consequently, improve water security.

The results have been used to inform other investigations in the Cooper GBA region, including those described in Fact sheet 7 (Characterising the connectivity between permanent waterholes and shallow sub-artesian aquifers) and Fact sheet 21 (Characterising the connectivity between the Cooper Basin, Great Artesian Basin and shallow aquifers).

The GBA Program

The \$35.4 million Geological and Bioregional Assessment (GBA) Program is assessing the potential impacts of shale and tight gas development on water and the environment to inform regulatory frameworks and appropriate management approaches. The geological and environmental knowledge, data and tools produced by the GBA Program will assist governments, industry, land users and the community by informing decision-making and enabling the coordinated management of potential impacts.

How to cite

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Find out more

Datasets that support this work are available at data.gov.au:

- Geological and Bioregional Assessment Program (2020) [Cooper Basin groundwater sampling Field data and fieldwork summary report](#). Report to CSIRO on October 2020 fieldwork for the Cooper GBA project.
- Geological and Bioregional Assessment Program (2021a) [Location of bores and production wells from which groundwater samples were taken – Cooper GBA project dataset](#) [ArcGIS shapefiles].
- Geological and Bioregional Assessment Program (2021b) [Hydrogeochemistry and environmental tracers of Cooper Basin, GAB and shallow groundwater](#) [data].

More information is available at bioregionalassessments.gov.au/gba.