

Broken Hill Managed Aquifer Recharge Project

A multi-disciplinary Geoscience Australia team have commenced the second phase of the Broken Hill Managed Aquifer Recharge (MAR) Project, in western New South Wales (figure 1). The project aims to map and characterise the groundwater aquifer (or underground storage) systems in the Darling Floodplain, and identify suitable targets to develop a managed aquifer recharge (MAR) borefield. This project is part of the Australian Government's commitment to invest up to \$400 million to reduce evaporation and improve water efficiency at Menindee Lakes in western New South Wales. This will help secure Broken Hill's water supply and allow for significant amounts of water currently stored at Menindee Lakes to be returned to the environment. The project is managed through the Australian Government Department of the Environment, Water, Heritage and the Arts.

Following on from the initial scoping study and Phase 1 studies, the second phase of the Broken Hill MAR Project involves the

acquisition of new data including:

- a light detection and ranging (LiDAR) survey
- an airborne electro-magnetic (AEM) survey of the region
- a seismic reflection survey
- drilling and pump tests
- surface and groundwater characterisation
- a program of borehole geophysics (electromagnetic and gamma logging)
- petrophysics and laboratory analysis including groundwater characterisation.

If the next phase determines the use of groundwater resources is sustainable and an aquifer storage system is practicable, a detailed engineering assessment will be undertaken to fully test this new approach. This option has the potential to contribute significantly to the delivery of the Australian Government's Menindee Lakes commitment.

The AEM survey is being conducted using the SkyTEM time domain system operated by Geoforce Pty Ltd, and involves acquiring 31 834 line kilometres of data at a line spacing of between 200 and 300 metres.

The drilling program will involve drilling up to 50 boreholes to assist with calibration and validation of the AEM survey, and to collect samples for geological and hydrogeochemical analysis. A limited program of pump tests will be carried out to assist with aquifer

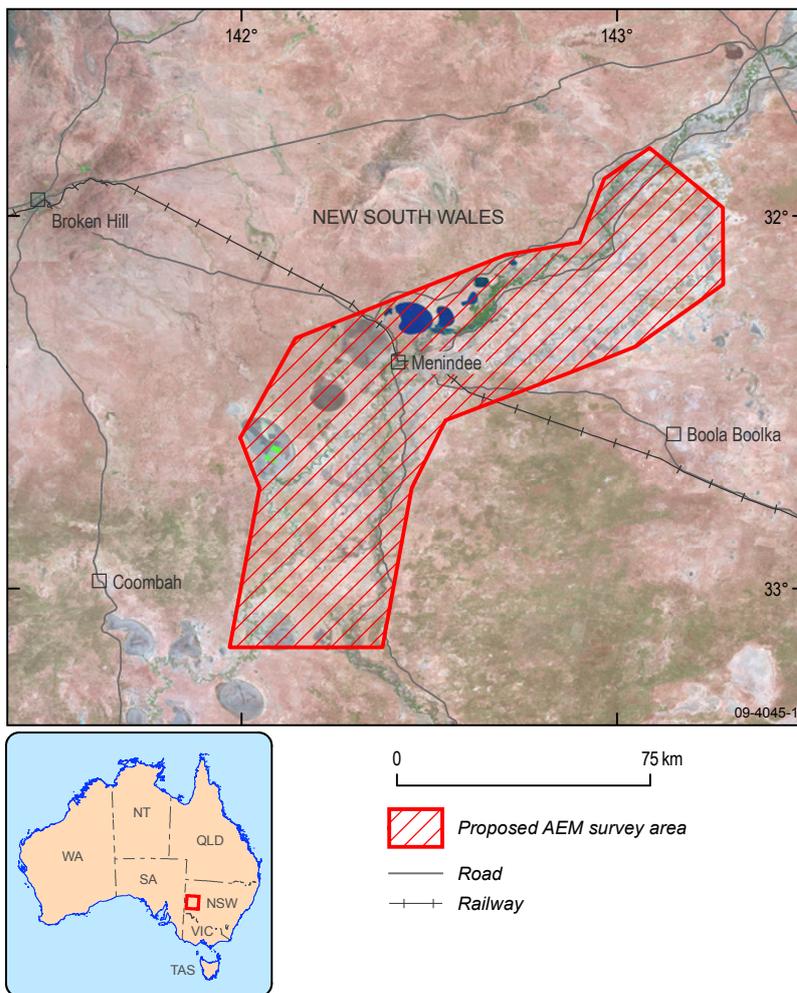


Figure 1. The survey area for mapping of groundwater resources and ground water quality, Menindee Lakes, western New South Wales.

characterisation, and the boreholes will be completed as piezometers to establish a baseline monitoring network.

The project will also obtain up to 40 kilometres of high resolution shallow seismic reflection data to assist with borefield delineation. These datasets will be integrated using a holistic 4D systems-based approach to quantify groundwater resources and identify suitable targets to develop a MAR borefield. Regular project updates will be available through Geoscience Australia's website.

For more information

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Related websites

Broken Hill Managed Aquifer Recharge Project

www.ga.gov.au/groundwater/broken-hill-survey/broken-hill-survey.jsp

Department of the Environment, Water, Heritage and the Arts, Groundwater website (including the Menindee Lakes initial scoping study)

www.environment.gov.au/water/environmental/groundwater/index.html

Testing the On-Site Inspection regime in Kazakhstan

The Comprehensive Nuclear-Test-Ban Treaty is a cornerstone of the international regime for the non-proliferation of nuclear weapons and is an essential foundation for the pursuit of nuclear disarmament. The Treaty's total ban on any nuclear explosion will constrain the development and quantitative improvement of nuclear weapons.

After adoption by the United Nations General Assembly, the Treaty was opened for signature in New York on 24 September 1996. Since then it has achieved strong worldwide support with 181 out of 195 member countries signing the Treaty, of which 148 have since ratified

it. The key countries yet to ratify the Treaty are China, the Democratic People's Republic of Korea, Egypt, India, Indonesia, Iran, Israel, Pakistan and the United States of America. The Treaty will not come into force before these countries ratify it.

In order to monitor compliance with the Treaty, a global verification regime is being established. An International Monitoring System (IMS) coupled with an International Data Centre (IDC) are monitoring for evidence of nuclear explosions in the atmosphere, oceans or underground. Once the Treaty has entered into force, if a suspected nuclear explosion is detected by the IMS and IDC, an On-Site Inspection could be called. Consequently, a team of 40 inspectors would investigate



Figure 1. Aerial view of the IFE08 Base Camp with part of the former Soviet Union nuclear test site near Semipalatinsk, Kazakhstan, in the background.



in brief

the location in question to verify whether a nuclear explosion has indeed been conducted in violation of the Treaty.

During a five-week period between late August and early October 2008, an Integrated Field Exercise (IFE08) was conducted at the former Soviet nuclear test site near Semipalatinsk in Kazakhstan. The exercise was the most extensive On-Site Inspection field exercise conducted to date and included a full simulation of a possible investigation scenario. This allowed the current state of readiness of the inspection regime to be tested.

During part of the exercise, Dr. Matthew Purss of Geoscience Australia's Nuclear Monitoring Project, participated as an inspector. Dr Purss worked with an international team of geophysicists to conduct magnetic, electrical and electromagnetic field measurements over areas of interest to the scenario. Some of these areas included sites where underground nuclear tests had been conducted at Semipalatinsk by the former Soviet Union.

The exercise provided a wealth of information that will help bring the Treaty's verification system closer to a state of readiness. Work is now underway by the Comprehensive Nuclear-Test-Ban Treaty

Organization to implement lessons learned during the exercise that will further develop the inspection component of the verification regime for when the Treaty enters into force.

For more information

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Related websites

Comprehensive Nuclear-Test-Ban
Treaty Organization
www.ctbto.org

**OpenDay
2009**
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**SCIENCE TALKS
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www.ga.gov.au/openday

Location: Cnr Jerrabomberra Ave and Hindmarsh Drive, Symonston ACT | contact: (02) 6249 9111

Australian Government
Geoscience Australia