

Update - Menindee Groundwater Investigations

February 2016

Progress to date

A range of water security measures have secured Broken Hill's water supply until at least 2020.

One of these initiatives, the Broken Hill Managed Aquifer Recharge (BHMAR) project, conducted by Geoscience Australia, has identified a number of areas with potentially low salinity groundwater. The two most prospective areas were beneath Lake Menindee and an area extending over a length of about 10 kilometres on the eastern side of the Darling River flood plain, approximately 7 kilometres south of Menindee known as Talyawalka.

WaterNSW have constructed a number of production bores at these two locations and are presently completing analysis of their suitability as an emergency water supply. Early results are promising.

Lake Menindee bore field

WaterNSW has constructed 11 production bores on the bed of Lake Menindee (see **Figure 1**). These bores target a shallow, low salinity sand aquifer (Calivil Formation) under the northern part of the lake bed.

The majority of the lake bed is underlain by a clay layer which prevents the leakage of water from the lake. In the northern area, the BHMAR project found areas where it was absent. The absence of the clay permits leakage of lake water into the underlying sand layer creating a fresh groundwater resource.

WaterNSW constructed 11 production bores to depths of between 28 and 63 metres, with the groundwater level generally being about 3.5m below the lake bed.

Pumping tests were conducted on each bore to assess their potential supply and to assist in the analysis of the potential volume that could be obtained from a bore field on the lake bed. The tests were conducted for 2 days at pumping rates of about 30 L/s.

Initial yield analysis of the bore field has identified that it could supply 16 ML/day for a period of 2 years. The recovery of groundwater levels will depend on the timing of the lake refilling and the properties of the lake bed. It is estimated that it will take 2 years for the groundwater levels to fully recover once the lake refills.

Further work will be required to satisfy regulatory obligations before approval can be granted by DPI Water to move the bore field from a test to a production mode.

Talyawalka bore field

WaterNSW has constructed 13 production bores in the Talyawalka bore field (see **Figure 1**). These bores target a low salinity sand aquifer that underlies the Darling River floodplain.

It is the same aquifer (Calivil Formation) as targeted in the Lake Menindee bore field. At this location the aquifer is deeper and the low salinity groundwater area is more extensive. The aquifer underlies, and is adjacent to, the floodplain sediments.

The BHMAR project findings indicate that Darling River bed leakage under high flow events rather than inundation of the floodplain is probably the primary source of the low salinity groundwater.

WaterNSW constructed 13 production bores to depths between 56 and 81 metres, with the groundwater level generally being between 10.6 and 12.75 metres below ground level.

Pumping tests were conducted on each bore to assess their potential supply and to assist in the analysis of the potential volume that could be obtained from a bore field. The tests were conducted for 2 days at rates of between 30 and 40 L/s for 9 of the bores and between 14 and 20 L/s for the remaining four.

Initial yield analysis of the bore field has identified that it could supply up to 24 ML/day for a period of up to 5 years.

Further detailed groundwater modelling analysis is presently being conducted to further investigate potential aquifer recharge mechanisms and rates, and ensure that information about sustainability as a water supply source for Broken Hill is provided to satisfy DPI Water's regulatory requirements.

The Talyawalka bore field is also being assessed for suitability as a possible long-term back-up supply option for Broken Hill during periods of surface water shortage. This assessment includes detailed modelling analysis of the supply requirements, the likely frequency and duration of use, and the long term reliability of the groundwater resource.

Water treatment

Raw water from these bores, as with any surface or groundwater source proposed to be used for a reticulated potable supply, **must** be treated to meet the drinking water standards, as set out in the current *Australian Drinking Water Guidelines*.

Water samples from each bore site are being collected during the pump tests and sent for analysis by NSW Health. These samples are to be comprehensively tested at two independent laboratories to inform the design of appropriate water treatment requirements.

What environmental assessment and cultural heritage process occurred?

The groundwater investigation was undertaken under the *State Environmental Planning Policy (Infrastructure)* legislation. The potential environmental and cultural heritage impacts associated with the bore drilling program were assessed in a Review of Environmental Factors (REF) to satisfy WaterNSW's obligations as a Determining Authority under Part 5 of the *Environmental Planning and Assessment Act 1979*.

The REF addressed matters for consideration listed under Clause 228 of the *NSW Environmental Planning and Assessment Regulation 2000* and provided an assessment of environmental and cultural impacts. It suggested mitigation measures to minimise impacts during bore construction and operation.

Aboriginal monitors from the local community were also engaged to oversee the initial disturbance of construction sites during the investigation.

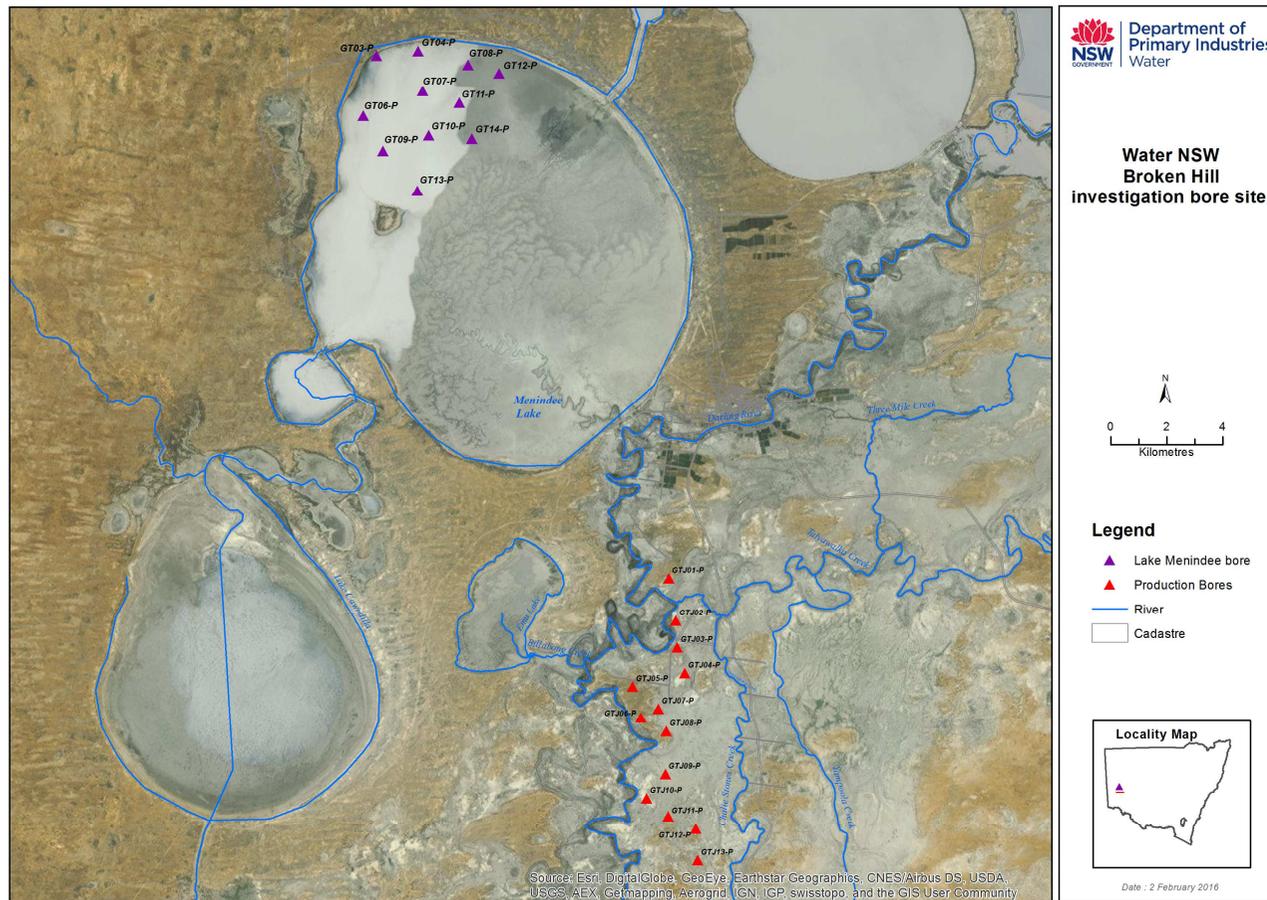
Additional environmental approvals will be obtained to enable the commissioning of the preferred option if and when that becomes necessary.

What's next?

Assessment of the Talyawalka bore field is presently being completed. Once this is completed a preferred groundwater supply, either Menindee Lake bed or Talyawalka bore field, to meet Broken Hill's immediate water supply requirements will be selected, should it be required.

WaterNSW will undertake the required environmental and cultural heritage impact assessments prior to the construction and commissioning of the preferred emergency groundwater supply.

Figure 1: Location of drilling sites included in the REF



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