

Submission
No 27

INQUIRY INTO WATER AUGMENTATION

Organisation: International Association of Hydrogeologists
Date received: 30 July 2016



Submission by International Association of Hydrogeologists

To: NSW Legislative Council General Purpose Standing Committee No. 5

On: Inquiry into the augmentation of water supply for rural and regional New South Wales

Date: 30 July 2016

Specific Terms of Reference addressed in this submission (1f i. & 1b):

1 f) examine social, economic and environmental aspects of water management practices in New South Wales and international jurisdictions, including the following case studies:

i. Broken Hill town water supply/Menindee Lakes system

and

1 b) examine the suitability of existing New South Wales water storages and any future schemes for augmentation of water supply for New South Wales, including the potential for aquifer recharge;

The submitting organisation

The International Association of Hydrogeologists is the international peak scientific professional organisation engaged in groundwater resources management. It has a global membership of more than 4000 hydrogeologists, groundwater scientists and engineers, and one of its largest national chapters is the Australian Chapter, with more than 500 members. This submission has been assembled by the Australian Chapter together with the IAH Commission on Managing Aquifer Recharge which is a specialist international group with expertise in advancing safe and reliable intentional augmentation of groundwater resources. The signatories to this submission are Lange Jorstad, Vice-President of the Australian National Chapter and Peter Dillon, Co-chair of the Commission on Managing Aquifer Recharge.

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Submission

1 f i... Broken Hill Water Supply Options

Recent media reports say that NSW government intends connecting Broken Hill to the River Murray with a 270km pipeline to supply 10 GL/yr water at a capital cost of \$500M.

Geoscience Australia and CSIRO explored options to use the existing Menindee water supply infrastructure, together with significant fresh groundwater reserves near the Darling River in the vicinity of Menindee and groundwater replenishment during high flow years to provide a higher reliability and quality of supply at less than half this cost. This significant work was published as a series of Geoscience Australia reports, summarised in Lawrie *et al* (2012) and was presented in several special sessions during the IAH 40th International Congress in Perth in 2013.

Recent media statements said that Broken Hill residents found a groundwater option unattractive. It is understood that the quality of emergency groundwater supplies previously experienced by Broken Hill residents is quite different to the fresh groundwater in the Darling River alluvium identified in the Geoscience Australia report.

IAH observes that fresh groundwater resources are generally preferred over surface water for drinking water supplies particularly where rivers are turbid, variable in quality or suffer from algal blooms. Groundwater is filtered in natural aquifer materials providing a stable water quality and mitigating labile organic matter that produces unwanted disinfection by-products in drinking water supplies. Aquifer storages are large and protected from evaporation so give resilient supplies through multiple dry years. Groundwater replenishment was proposed to ensure drought-resilience, protect ecosystems from being impacted by increased withdrawal, and by topping up the aquifer with high water quality in occasional high flow years.

It is understood that for less than half the capital cost of the River Murray connection the NSW Government could cover;

- a public information program in Broken Hill allowing taste testing of the new groundwater supply,
- establishment of the groundwater supply and recharge infrastructure adjacent the Darling River at Menindee and connecting it to the existing water supply, and
- research and investigations to refine and optimise the operating strategies for groundwater extraction and aquifer recharge. This will ensure supplies of better quantity, quality and reliability for Broken Hill with acceptable environmental impacts and transparent and reliable accounting for entitlements and surface water-groundwater interactions.

Operating costs for the groundwater option are also likely to be considerably lower than for the River Murray connection.

IAH members have a broad range of scientific and technical capacity to assist NSW Government in all these elements to enable the best value investment possible.

As a separate issue, water supply from the River Murray or from a renewable groundwater resource adjacent the Darling River near Menindee would create the same opportunities for operating the Menindee Lakes storages to produce water savings from reduced evaporation.

While these opportunities are significant, under the Murray Darling Basin Plan they could be realised through water credits for verified savings in evaporation to benefit the Menindee community,

through transfers to productive uses or environmental flows downstream or else be retained for local environmental benefit. This would also be an opportunity to holistically address historical upstream diversions from the Darling River. These have a similar historical context to increased water storages in the Menindee Lakes, which originally filled only during big floods, but since the Main Weir forming Lake Wetherell was completed in the 1960s, has diverted significant flows to the lakes.

In short, it is conceivable that all participants could benefit from a groundwater supply and replenishment scheme at Menindee at a cost less than half that of a pipeline from the Murray to Broken Hill.

Precedent for a similar water supply scheme exists in Perth, where the Water Corporation have undertaken a trial and adopted a groundwater replenishment option at a significantly lower cost than the conventional alternative drinking water supply (Vanderzalm *et al* 2015).

1b Groundwater Recharge

Much of the best quality groundwater, including at Menindee, seeped into the subsurface naturally from rivers and streams. However, deliberate large-scale topping up of our natural underground dams during wet periods is a significant missing link. This is known as Managed Aquifer Recharge (MAR).

IAH notes, regarding item 1b, NSW is trailing all Australian states and mainland territories in implementing managed aquifer recharge (Dillon 2015). NSW has experienced significant water shortages in the last decade. There are opportunities to better use NSW's relative abundance of natural surface water, stormwater and recycled water sources to replenish aquifers to deliver benefits across the state. The Broken Hill water supply media announcement suggests the opportunities in managing aquifer recharge are not fully appreciated. IAH members can assist with decision making frameworks that enable evaluation of groundwater and managing aquifer recharge schemes to enable like-for-like comparisons with other surface water solutions.

Our offer

IAH is aware of the magnitude of the investment and of the potential savings to be made by using groundwater and managed aquifer recharge. The IAH Australian Chapter and IAH Commission on Managing Aquifer Recharge is willing to offer key specialists in these fields meet with the NSW Government to discuss and address the opportunity groundwater and MAR can provide to Broken Hill. IAH specialists can assist with policy and institutional matters that may impede opportunities for managed aquifer recharge in NSW, including for Broken Hill's water supply.

References:

Dillon, P.J. (2015). Australian progress in managed aquifer recharge and the water banking frontier. *Aust. Water Assoc. J. Water.* 42 (6) 53-57, Sept 2015

Lawrie, K.C., Brodie, R.S., Dillon, P., Tan, K.P., Gibson, D., Magee, J., Clarke, J.D.A., Somerville, P., Gow, L., Halas, L., Apps, H.E, Page, D., Vanderzalm, J., Hostetler, S., Christensen, N.B., Miotlinski, K., Brodie, R.C., Smith, M. and Schöning, G. (2012). Assessment of Conjunctive Water Supply Options to Enhance the Drought Security of Broken Hill, Regional Communities and Industries. Summary Report. Record 2012/15 Geocat # 73823, Report 5 of 5 Final Report July 2012. www.ga.gov.au/corporate_data/73823/Rec2012_015.pdf

Vanderzalm, J.L., Dillon, P.J., Tapsuwan, S., Pickering, P., Arold, N., Bekele, E.B., Barry, K.E., Donn, M.J., Hepburn, P. and McFarlane, D. (2015). Economics and experiences of managed aquifer recharge (MAR) with recycled water in Australia, Australian Water Recycling Centre of Excellence Report. <http://www.australianwaterrecycling.com.au/research-publications.html>