

Submission  
No 46

## INQUIRY INTO WATER AUGMENTATION

**Organisation:** Lock the Gate Alliance

**Date received:** 12 August 2016

---

8 August 2016

## **Submission: NSW water inquiry**

Thank you for the opportunity to make a submission to the inquiry into the performance or effectiveness of the NSW government agencies that are responsible for the augmentation of water supply for rural and regional New South Wales.

Lock the Gate Alliance is a network of community groups and individuals concerned about the impacts of inappropriate coal and gas mining.

Our interest in this inquiry stems from our observation of the disruption and interference with regional water resources by mining companies and major mining projects.

## **Modelling future water balance in regional areas**

The first sub-point of the inquiry's terms of reference tasks the Committee with investigating the requirement for a water equation (demand and supply out to the middle of this century. It is our observation that this is highly important research that must be undertaken.

In 2014, Infrastructure commissioned hydrological and economic modelling of changing water demand and use in the Upper Hunter as the primary use of water shifted from agricultural to mining use. The result of this work was the Upper Hunter water security evaluation (Phase 2) (October 2014). Modelling indicated that water scarcity was an economic risk for the Upper Hunter. Lock the Gate has undertaken research that also reflects Infrastructure NSW's findings, which "observed changes in water demand patterns, with high security water entitlements transferring to mining from agricultural holdings that, as a result, now rely on general security supply, leaving this sector very vulnerable to drought."<sup>1</sup>

The need for a water equation has long been acknowledged by the community, however certain mining interests have seen this as a risk to their operations and have sought to undercut or restrict such work. The Namoi Catchment Water Study is a cautionary tale in what can go wrong.

In 2009, the Liverpool Plains Community successfully pushed State and Federal Governments to fund and develop the Namoi Catchment Water Study which modelled a number of scenarios of the cumulative impacts of coal and gas mining in the region. The 2012 Final Report showed that there

---

<sup>1</sup> Infrastructure NSW. *2014 State Infrastructure Strategy Update*. Chapter 6 Water.  
[http://www.infrastructure.nsw.gov.au/media/42957/inf\\_j14\\_871\\_sis\\_report\\_ch06\\_web\\_new.pdf](http://www.infrastructure.nsw.gov.au/media/42957/inf_j14_871_sis_report_ch06_web_new.pdf)

were significant risks from mining activities on groundwater with Schlumberger water modelling predicting greater than 5 meter drawdown in large areas:

*Groundwater levels in four locations are determined to be at high risk from coal and gas developments: Upper Namoi Alluvium Zones 7 and 11, the Gunnedah Basin and parts of the Oxley Basin Management Areas. Confidence in the predictions for the most heavily utilised areas can be considered high (Upper Namoi Alluvium Zones 2, 3 and 4 and the Lower Namoi Alluvium) or moderate (Upper Namoi Alluvium Zones 5 and 8).<sup>2</sup>*

This was important work for a community heavily dependent on irrigated agriculture and followed the deep reductions in irrigation allocations across the entire catchment as a result of the Namoi Valley Water Sharing Plan implemented in 2004.<sup>3</sup> Despite having significant budgeted funds still available, the Study did not address key items on the Terms of Reference, namely an assessment of the potential impacts to *surface* water quantity and the risks to *surface and groundwater quality*, both of which impact on the water balance.

Two important reports from the study were withheld from the public, namely the Scenario 7 modelling which modelled intensive coal development in the region and the Peer Review of the Namoi Catchment Water Study. The study was successful in collecting vast amounts of data, developing complex water models and undertaking extensive community consultation, the failure to fully address the Terms of Reference and publish the Peer Review by the then Mining Minister damaged the credibility of the study.

Undaunted, the community took heart that the study was always intended to be a living document and that the missing components of the Namoi Catchment Water Study would be delivered when the data, computer model and reports were turned over to the Namoi Catchment Management Authority. The plan was for the Study to be ongoing, with the models being updated and gaps addressed as more data was captured by the community and the mining industry.

Unfortunately, and to its great shame, the new State Government disbanded all Catchment Management Authorities in 2013 leaving the Namoi Catchment Water Study without ongoing support giving rise to concerns by community members that there is no commitment to ensuring water use sustainability in the Namoi Catchment.

### **Aquifer recharge**

Lock the Gate Alliance believes natural aquifer rainfall recharge rates need to be studied and understood to enable NSW to properly and sustainably manage aquifer exploitation. In the Hunter region, a study was undertaken in 2015 to inform the development of a water sharing plan for the porous rock aquifers of the region which found that rainfall recharge was far lower than had previously been thought. This finding had dramatic implications for the development of the water sharing plan. Similarly a recent paper examining recharge rates for the Great Artesian Basin found highly variable recharge and highlighted the crucial importance of the formation known as the Pilliga Sandstone, given the high recharge rate observed there compared to most other areas of the Basin. Only 2.1% of the area of the Basin receives 5-30mm per year recharge and area with recharge

---

<sup>2</sup> Schlumberger Water Services (Australia), 2012 *Namoi Catchment Water Study: Independent Expert Final Study Report*. [http://archive.ils.nsw.gov.au/\\_\\_data/assets/pdf\\_file/0006/526353/archive\\_NCWS\\_Phase-4-Final-report.pdf](http://archive.ils.nsw.gov.au/__data/assets/pdf_file/0006/526353/archive_NCWS_Phase-4-Final-report.pdf)

<sup>3</sup> A Guide to the Water Sharing Plan for the Upper Namoi and Lower Namoi Regulated River Water Sources, 2004 [http://www.water.nsw.gov.au/\\_\\_data/assets/pdf\\_file/0011/548813/namoi-reg-guide.pdf](http://www.water.nsw.gov.au/__data/assets/pdf_file/0011/548813/namoi-reg-guide.pdf)

greater than 30mm per year is even smaller, just 0.2% of the GAB. In NSW, the recharge areas of higher than 5mm per year and >30 mm are almost entirely contained within the east Pilliga area<sup>4</sup>. The report warned that “dewatering of aquifers under the GAB where proven connectivity exists can ultimately reduce pressure heads in the critical recharge areas of the GAB and reduce or halt water flow at its numerous bores and springs.”<sup>5</sup> Plans are being considered to allow extensive drilling for coal seam gas that would penetrate the Pilliga Sandstone and dewater the coal seam that underlies it and it is our belief that little to no consideration has been given to the effect this might have on GAB recharge.

At the current time, NSW DPI Water is exploring options for artificial aquifer recharge, the reinjection of water into dewatered aquifers. The Government has also raised the possibility that mining companies that undertake this practice may be able to get “credits” for doing so against their requirement to hold water entitlements under the *Water Management Act 2000*.

This is an alarming development and we do not support it.

In other countries, reinjection of aquifers has been strongly associated with increased seismic activity and earthquakes. It is not a practice to be entered into lightly. A paper prepared for the NSW Chief Scientist’s review of coal seam gas summarises the research that was available at the time that hydraulic fracturing itself creates increased seismic activity, but that the much greater risk came from reinjection of water into rock formations. The researchers concluded that “There is evidence that typical wastewater disposal depths will contain sections of faults that are capable of contributing to a moderate sized earthquake (Keranen et al., 2013), and that such earthquakes may occur many years after reinjection commences.”<sup>6</sup>

In addition, the notion of “credits” for water entitlements returned to the ground runs counter to the framework and objects established by the *Water Management Act 2000*. Irrigation also returns water to the ground, and the rivers, but the notion that this means a lawful entitlement to use that water should not be necessary undermines the legal framework that is designed to ensure sustainable use of water across New South Wales. All water use needs to be accounted for from year to year.

## **Flooding**

The inquiry tasks the Committee with examining the 50 year flood history in New South Wales, particularly in northern coastal New South Wales, including the financial and human cost of floods. We urge the Committee to take a longer view, and to consider the interaction of flood and storm risk with expected changes in New South Wales’ climate as a result of global warming.

The landmark study *Climate Change Risks to Australia’s Coasts* (2009) found that:

With a mid range sea-level rise of 0.5 metres in the 21st century, events that now happen every 10 years would happen about every 10 days in 2100. The current 1-in-100 year event could occur several times a year. For illustration, a current 1-in-100 year event is equivalent to the intensity of storms along the New South Wales central coast in June 2007 when more than

---

<sup>4</sup> Soil Futures Consulting. March 2015. Great Artesian Basin Recharge Systems and Extent of Petroleum and Gas Leases – Second Edition with response to Ministerial Review.

<sup>5</sup> *ibid*

<sup>6</sup> Gibson and Sandiford [http://www.chiefscientist.nsw.gov.au/\\_\\_\\_data/assets/pdf\\_file/0017/31616/Seismicity-and-induced-earthquakes\\_Gibson-and-Sandiford.pdf](http://www.chiefscientist.nsw.gov.au/___data/assets/pdf_file/0017/31616/Seismicity-and-induced-earthquakes_Gibson-and-Sandiford.pdf)

200,000 homes lost power, thousands of people were forced to evacuate their properties, and insured losses exceeded \$1.3 billion.<sup>7</sup>

This forecast has profound implications for New South Wales and yet it does not appear that the State Government has acted to mitigate and adapt to this risk.

### **Management of the water market**

Lock the Gate is strongly supportive of the *Water Management Act 2000* and its framework for ensuring that water is managed according to the principles of ecologically sustainable development, protecting the interests of urban and rural communities, industries and the environment.

The Act provides for water planning and review, and public reporting of water trading and usage, all of which we support.

One significant gap that we have observed is the failure so far to bring Section 91F of the *Water Management Act 2000* into force, which makes it an offense to carry out an “aquifer interference activity” without an aquifer interference approval: such activities include penetration of an aquifer, interference with water in an aquifer, obstruction of the flow of water in an aquifer, taking water from an aquifer in the course of carrying out mining and disposing water taken from an aquifer as a result of mining.

Extensive open cut coal mining in the Hunter Valley has already and continues to profoundly affect alluvial aquifers in the region, and the draw down caused by these mines is also now known to be drawing from surface water as well. A recent study of groundwater in the central part of the Valley, where mining is concentrated found that there is an area of 977km<sup>2</sup> of the Hunter Valley likely to be affected by more than 2m drawdown as a result of open cut mining. There are 123 km<sup>2</sup> of alluvial water sources, 68km of the Hunter River and 31km of the Wollombi Brook overlying this >2m drawdown impact zone.<sup>8</sup> The study did not consider how the cumulative effect of multiple pits in close proximity might intensify this impact, but found that using broad measures, the effect on the Hunter River, Wollombi Brook and Goulburn River could be resulting in 4.4GL of river water leaking to the coal pits annually.

Switching on Aquifer Interference Approvals would give DPI Water greater input into the planning and approval of these coal mines and give statutory force to the toothless Aquifer Interference Policy.

We would welcome the opportunity to appear at a public hearing of this inquiry if the Committee sought further clarification of the matters raised in our submission, and thank the Committee for inquiring into these important matters.

---

<sup>7</sup> Australian Government. Department of Climate Change 2009. *Climate Change Risks to Australia's Coast*. <https://www.environment.gov.au/system/files/resources/fa553e97-2ead-47bb-ac80-c12adffea944/files/cc-risks-full-report.pdf>

<sup>8</sup> NSW Office of Water. January 2015. *Mid-Hunter Groundwater Study*. [http://www.water.nsw.gov.au/\\_data/assets/pdf\\_file/0009/660393/mid-hunter-groundwater-study.pdf](http://www.water.nsw.gov.au/_data/assets/pdf_file/0009/660393/mid-hunter-groundwater-study.pdf)