

**Submission
No 89**

INQUIRY INTO WATER AUGMENTATION

Name: Ms Barbara Webster

Date received: 10 August 2016

Barbara Webster ✓

Attⁿ the Hon. Mick Veitch MLC,
Deputy Chair
General Purpose Standing Committee No. 5,
Inquiry Into the Augmentation of Water Supply For Rural
And Regional New South Wales.

Submission by Barbara Webster, long term resident
of Broken Hill and Menindee, NSW.

The original purpose of requesting this inquiry was to address the Darling River disaster. I encourage you in this committee, to ensure the tribulation of the Darling River, from Bourke through the Menindee Lake system, to Wentworth with all its people, townships, and wildlife it supports, is classified as priority by you, as no doubt you will be encumbered by a quagmire of submissions from the more ~~populated~~ heavily populated areas.

Quote from Stan Dineen:- "The demand on the Darling River and its tributaries for water has exceeded nature's ability to supply the required rainfall required to meet those demands and more water needs to be returned from the tributaries to the Darling River."

1a)
The 1st point I feel obliged to make in this submission is a long-winded description of an uncommonly considered variable ~~that~~ likely to have a negative impact on water availability to catchment areas throughout the Barwon Darling Basin, hence affect

any water equation and also groundwater storages.

Introduction:- The continuity of surface water to ground water and back to surface water through any Australian geological layers is accepted in current science, and explained on govt. websites (as all layers leak water, just variable how much, so aquifers leak a lot of water, and aquatards dont leak much)

Supposition:- Anything to cause changes enne masse to this complex system may irreversibly affect loss of springs, ground water pressure, groundwater+/- surface water quality, the ability of groundwater to feed into some rivers, and possibly negatively affecting root systems of agricultural crops or native flora.

Background:-

"To produce shale gas" (and csa) "we drill wells deep underground into the shale. These wells are surrounded by steel and concrete to ensure they are separate from other underground layers, such as water aquifers" - Santos website. Similar casings are used for coal seam gas, other types of natural gas mining, (and I expect offshore gas/petroleum wells)

Q. What happens to these concrete and steel casings when concrete and steel corroding bacteria from the gas fields deep beneath the earths surface discover this great food source?

We know that methane in coal seams, and shale or petroleum deposits, is formed by a group of symbiotic bacteria, species, including sulphate reducing bacteria.

Given that these bacteria species deep in the earth have caused challenges to the gas field operators for decades due to their combined side effects of producing hydrogen sulfide (rotten egg gas) to 'sour' the final gas product, and corrosive effects on steel and concrete casings of the gas wells;

And given that the natural gas mining companies use products in their mining solutions to kill (currently thought to only stun) these bacterial colonies on a regular basis ("continuous injection or batch treatment") as the bacteria continue to rear their heads in the mining process;

And given that all concrete degrades over a relatively short time frame, enhanced by particular bacteria, and also iron or steel degradation within the concrete;

"... In the presence of sulphate (sulfate) reducing bacteria in particular environments that support proliferation of the sulphate reducing bacteria, which once present in sufficient numbers, can profoundly affect metal corrosion... corrosion may proceed 70-90 times faster"¹

Q. Why should we, as the public, not show our concern that many, if not all of the casings used in gas wells (CSA, shale, petroleum) whether capped with concrete or not, will in the relatively short term (with regards to 1 human life expectancy) become very porous channels between the coal/shale/petroleum layers to the surface, with either vertical or horizontal spread of groundwater, depending on the local geographical strata, resulting in :-

- hydrodynamic changes affecting groundwater pressure heads
- bacterial colonies and their byproducts exchange
- gaseous exchange from deep in the earth - possibly including rotten egg gas, radioactive gases, methane

Q. Given that each porous hole would undoubtedly be a means to even out any local pressure head, what would be the net effect of dozens, hundreds, and thousands of such porous holes in relative proximity to each other with respect to changing the water head pressure from hills or mountains, to the springs at the beginnings of streams, along river beds (of the catchment of the Darling River) and the wells for bore water in the distance?, especially as the vast majority of the catchment of the Darling River overlies the Great Artesian Basin. Much of the catchment of the Darwin-Darling River system also seems to be overlying rich coal seam gas deposits in the eastern borders, some which are claimed to be major pressure-heads for the Great Artesian Basin. (eg Pillega).

Q. Who measures and documents the levels and effects of these sulphate reducing, iron reducing and acid producing bacteria in aged and abandoned, both capped and not capped gas or petroleum based wells, and nearby ground water sources?

Q. Is there any research by independent scientists on the risk these bacteria have on water systems if their food is widely available in a particular-

Soil or rock type (adjacent to the wells at any level) hence is it likely they can contaminate local groundwater for domestic or stock use and affect root systems of native or agricultural plants, especially deep rooted plants of the desert?

The expansion of the gas fields in the corner country where SA, NSW, and Qld meet, is expanding into very deep shale-gas deposits with layers of Great Artesian Basin aquifers above, and fracturing below. Will this practice result in the destruction of the available water resource in this region due to leaky holes in the near future, allowing salty waters or bacterial infected waters spread into fresh waters?

Buying time? :-

An Australian-based company, "Global Future Solutions", developed an eco-friendly water-based product using a 'good' bacteria commonly found in grasses and hay, into 'Bacillus subtilis broth'. It is a product designed to treat fracturing and drilling and packer fluids (whatever they are), whilst protecting wells and casings from the sulfate-reducing, iron reducing, and acid producing bacteria. It was a winner of the Australian Clean Tech Awards 2013.

This product is not allowed to be used in Australia. Although travellers no doubt have brought this species of bacteria into Australia on their shoes and clothes, it is American, stopped at our border. This product also needs to be used each 30 days down active wells, as it needs a decent oxygen supply to survive and proliferate. It is not the permanent answer to abandoned wells. However, as this bacillus subtilis has very close, if

not same, cousins in Australia, our government could support Global Future Solutions research into developing a similar product to assist a better, less toxic outcome in our gasfields (if we insist on expanding the gas fields) If used, spent gas fields had a product such as this available to be injected down ^{wells} each 3, 6, 12 or 24 months, it may buy more time for the integrity of the wells. Obviously the wells couldn't be too contaminated by currently used antibiotics for this to have effect.

- see "Breaking Bad CSA's Toxic Stigma" - Qld Mining and Energy Bulletin, Spring 2014

appendix 1 "Corrosion of Iron by Sulfate-Reducing Bacteria: New Views of an Old Problem" - scroll down to "EMIC v/s CMIC - Emerging Theories in SRB - induced corrosion" - 1st paragraph in "Applied and Environmental Microbiology" Feb 2014 Vol. 80 No. 4

Ground Surface Contours:-

Another variable that may cause progressive loss of low to moderate flows to the Barwon-Darling catchments is the changes in contours of the ground's surface due to both the expansion of broadacre agricultural practices and the laying of pipes or vehicle tracks with low, long, elevated embankments.

Forty or so years ago traditional owners made observations of losing small run-offs and creeks through the act of clearing and leveling vast ~~acres~~ ^{acres} for broadacre cotton farms.² It appears some loss of these small rain events to the tributaries of the Barwon-Darling River were considered insignificant, which would be true if the expansion of the cotton

Note ² Uncle William Riley,

Industry wasn't so massive.

Another interruption to flow from surface contours is from low lying embankments from various activities such as laying large pipelines (gas or water), raising or protecting small roads or tracks, or embankments to entrap floodwaters in "flood plain harvesting".

Once again, in isolation for small regions these would be deemed insignificant. However, with no authority to regulate these practices, en masse they will no doubt continue to reduce the small and medium flows by causing pooling of small rain events rather than reaching creeks and rivers.

Suggestions:-

- 1) Regulate future cropping in the Barwon-Darling and its tributary regions to land that has previously been cleared and prepared.
- 2) Be alert and rein in either intended or incidental construction of long stretches of embankments in the catchments of the Barwon-Darling River and its tributaries, even if of low height.
- 3) Ensure the proposed new flood plain harvesting applications do not impair low to medium rain events from reaching the rivers.
- 4) Investigate reports of 'wind breaks' which are said to be directed across the channel country (of the Cooper creek), which may impair flow of floodwater to the Paroo and hence to the Darling River just above Wilcannia. All embankments (such as these) should be disallowed in any states' Darling River catchment areas, if found to impair flow to the Barwon-Darling River.

1f) Social, economic + environmental aspects of water management practices in NSW :- BROKEN HILL + MENINDEE LAKES. 8)

I'm sending this submission off before its complete, as time is rather urgent.

What has caused the delay is the immense sadness, grief, soul destroying long term lamenting for this iconic river that links the outback through the desert from far into Qld, down to the Murray River in the Sunraysia district. The Darling River - the Barwon, the continuation of the Barwon River and tributaries from the northern $\frac{1}{2}$ of NSW, west of the Great Divide, and ~~at~~ ^{much} of ~~the~~ southern Qld, east to west (west of the Great Dividing Range).

Whenever I think of how to portray what this river means to the people of Broken Hill, Wilcannia, Menindee, other townships, graziers and the significance of the Menindee Lake system, I am at a loss for words.

How does one portray the deep meaning of priceless to a finance-based mindset of an industrial nation? When I look in retrospect as an aging Caucasian Australian, I acknowledge us Caucasians have a deep mindset, a deep belief system when the questions of

"How do we make money out of that? ... How can that be advantage to us - now and short term? ... are not answered adequately, with sufficient \$, the word "PRICELESS" is easily confused with "WORTHLESS".

How does one portray the meaning of a refuge for drought and breeding ground for untold millions of birds and other wildlife to the people from the east who enjoy regular rainfalls, green pastures most years and have no concept of waiting for 3 months or more for some fresh flow in the Darling River from a decent rain event in one of the distant catchments, only

9

to see it diverted to towns, reservoirs, dams, and what really hurts is irrigators of low security crops on its long winding route to the Darling River below Bourke?

How does one have any confidence of relating the importance of each and every one of these tributaries, and the importance of the Darling River to its communities when one knows the traditional owners have been talking to the governments for 40 years or so, without being heard, or understood, or had any substantially good outcome because the cost benefit to the government is easier to obtain further upstream?

The Barkandji People are the traditional owners of the Darling River, from Bourke in the north to Wentworth on the Murray in the south. It is these people, (and descendants of convicts of early settlers on the river), who have generational knowledge, long term memories, of what works and what doesn't concerning the river. The Barkandji should be employed by the DPI for their innate wisdom in decision-making for water matters concerning the Darling River.

By all means a good equation for water flow is required, but the Barkandji should have this as a guide only for their decisions on river management for the Darling River, all of its catchments, and when, how much + how fast water should be released from the Menindee lake system. Obviously they would need to consult with other upstream traditional owners, + users. Management needs to begin from the river's end, and work its way up, with rainfall run-off upstream ^{tributaries} regulated by downstream river health.

For many years Broken Hill people have been lobbying for water down the Darling River, using Town water supply and recreational activities as an excuse to keep water in the river and maintain some water in some of the lakes.

Now the govt has determined we will get a pipeline from the Murray, we are devastated, because we know this will be the final knoll for the Darling River except in the large flood events, every 7 to 10 years. Governments and upstream irrigators don't know the difference between priceless and worthless.

River health is priority Number 1, including Menindee Lakes. It will survive climate change if allowed to flow.

It can't survive excessive extractions, or too rapid drawdown. Over the past 40,000 years, the Barkandji have proved themselves to be the only caretakers of the Darling River who were capable of leaving a good inheritance to their descendants. Give it back to their management, the Native Title holders.

Help the Native Title Holders, the Barkandji, to manage their river system, rather than pretending to get them to help the govt via "consultations" that only are authorities stating what the ~~the~~ outcomes will be.

This will guarantee river + lakes health, towns + local economies health, and rein in some of those who have abused the system for their own needs, or have caused environmental disaster in the name of environmental flows.

Concerned resident Barbara Webster.