Some Comments on the Risks of Coal Seam Gas Extraction in Sydney's Drinking Water Catchment

Water is the most important resource in NSW. Sydney's drinking water catchment provides water for more than 60% of the population of NSW, more than 4.5 million people, yet it encompasses just 2% of the land of NSW.

Coal seam gas extraction will add a significant burden to catchment area that has already suffered coal mining impacts - the Sydney Catchment Authority expects 90% of the Special Areas will have been undermined for coal by 2030. This small yet vital area should not be further compromised for the limited and short term royalty revenues and the very small number of jobs offered by industrial coal seam gas extraction.

Commercial gas extraction in the 'tight' coal seams beneath Sydney's catchment is likely to require hydraulic fracturing (fraccing) with multi-seam and multi-directional horizontal drilling.

Consequences and risks arising from commercial gas extraction in the catchment then include:

- Water table 'drawdown' and associated loss of surface waters as coal seams are dewatered in multiple directions.
- Blowout and/or spillage of highly saline and toxic 'produced' water in a highly sensitive catchment area.
- Land clearing, including clearing of Upland Swamps - which enhance the quality and quantity of Sydney's water.
- Well grouting and casing failure and consequential inter-mixing of otherwise confined aquifers resulting in a reduction in quality of the better aquifers.
- Fugitive methane emissions from well-head, grout and casing leaks and from existing subsurface natural fracture networks.
- Surface and aquifer contamination by fraccing chemicals, lowering stream and reservoir quality.
- Reactivation or exacerbation of longwall subsidence - increasing water loss and quality loss with renewed release of metal salts from 'ferruginous springs' and methane release.
- Methane leakage in a bushfire prone area.

The Coastal Upland Swamps of the Sydney Bioregion are an important component of Sydney's drinking water catchment. Adding to their importance, the swamps harbour biodiversity pools of international standing and were listed as an endangered ecological community under the NSW Threatened Species Conservation (TSC) Act by the NSW Scientific Committee in March 2012. The Committee describes the impacts of CSG mining as similar to that of longwall mining, which was listed as a Key Threatening Process under the TSC Act in 2005. The swamps have recently been included on the IUCN Red List of ecosystems threatened with extinction and are expected to be listed under the Commonwealth EPBC Act in the near future.

Attached are some photographs of mining impacts in the Schedule 1 Special Areas of Sydney's drinking water catchment. Included are photographs showing the impact of a coal seam water spill into Lizard Creek Swamp 1 that occurred in 2004. Nearly a decade later the swamp is struggling to recover, with perhaps 20 to 30% of the impact area showing re-vegetation. These photographs demonstrate some of the risks posed by coal seam gas. Drinking water is too important to be put at risk.

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2010 photo of 2004 coal seam water spill on Lizard Creek Swamp in the Metropolitan Special Area

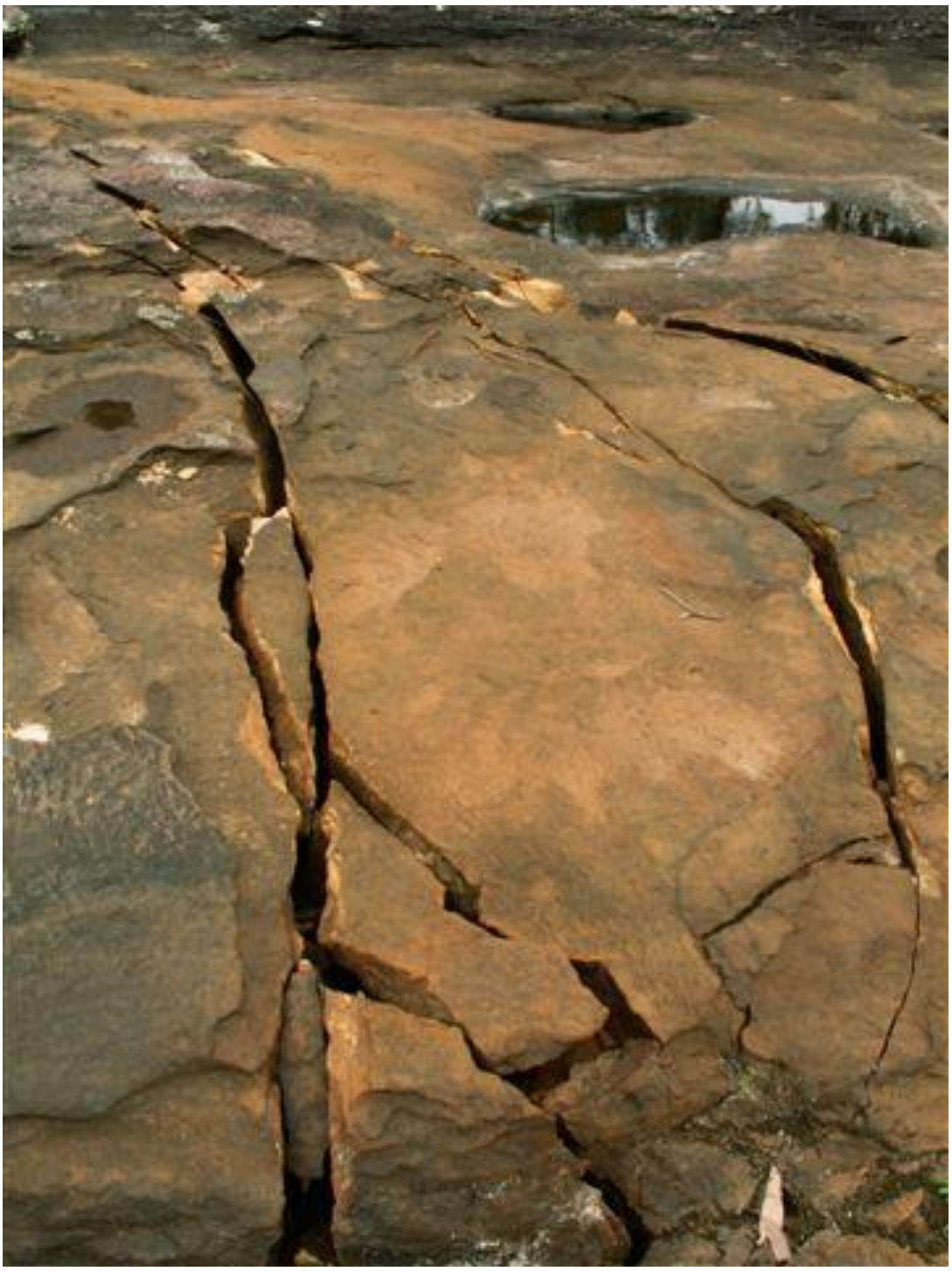
2013 photo of the same swamp - partial recovery since 2004

2013 Waratah Rivulet photograph showing water green with iron and manganese and lined with iron oxidising bacteria colonies. Mining subsidence results in cracks that exposes fresh rock to water that dissolves minerals to form 'ferruginous springs' that may continue contaminating water for decades.

Waratah Rivulet supplies 30% of the inflow to Woronora Reservoir during periods of good rainfall and up to 50% during comparatively dry periods. It supplies more water than the Woronora River because of nearby swamps that trap, filter and slowly release rainwater. The swamps moderate runoff and enhance water quality.

Coal mining impacts occur across the Special Areas and the Sydney Catchment Authority expects 91% of the Special Areas to be undermined by 2030.

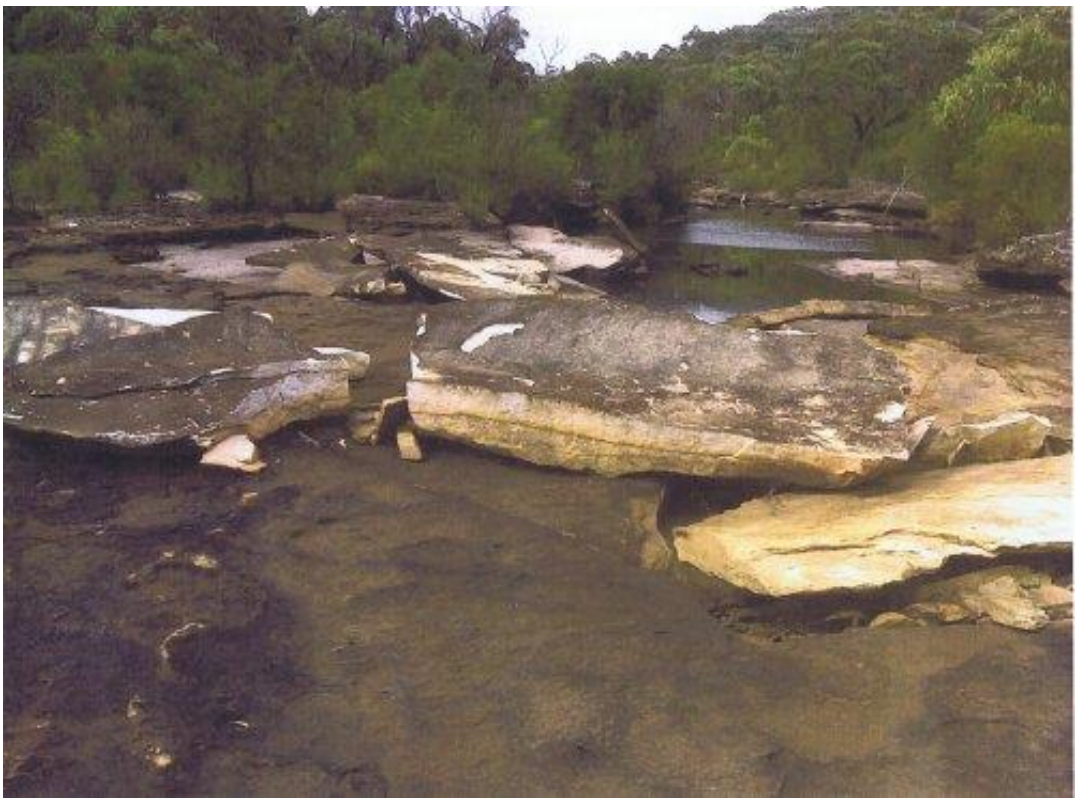
Subsidence generated iron oxide ‘foam’ floating downstream on Waratah Rivulet



Waratah Rivulet bedrock cracking and loss of surface water

Upsidence effect in a cracked and drained section of Waratah Rivulet

Large displaced river-bed fragments in Waratah Rivulet



Methane release from cracked river bed of Waratah Rivulet

Cracked bedrock at an Upland Swamp