

Further Information:

In August 2024, SOMR hosted a public information forum, presented by Professor Scott Johnson of Southern Cross University (SCU) with information from Professor Sue Wilson of University of New England (UNE) who have been studying the concentrations and movement of antimony and arsenic in the Macleay River environment. Information in this 'Notice' is based their findings from SCU's 7 years monitoring data and UNE's research over the last 20 years.

Findings mostly from SCU analysis include:

Arsenic:

- The greatest threat to public health from arsenic originates from contaminated groundwater. Inorganic arsenic is naturally present at high concentrations in the geology and groundwater here.
- Arsenic tends to be carried as sediment particles with less 'in solution'.
- Generally a larger mass of sediment arsenic than antimony export occurs mainly during floods, though dilution reduces concentrations.
- Significantly higher concentrations occur in solution with warmer temperatures and low flows; related to geochemical processes in the stream-bed sediments and with less flow dilution.

- Iron fixing bacteria (rust-coloured floc) in the streambed absorbs arsenic in high concentrations.

Antimony:

- Has clear short-term peaks in concentrations, this is related to flow where rain occurs in the catchment (*appearing inconsistent in graphs*) & has a wider range of concentrations than arsenic.
- Antimony tends to be carried more 'in solution' than as sediment particles.
- Has higher concentrations with 'moderate' flows than low or high flows.
- It is less influenced by temperature but can exceed drinking water guideline values (3 ppb)

(Source mostly: Presentation by Prof Scott Johnson, SCU August 2024 + World Health

There is ongoing research into transfer and absorption into plants by UNE, but this is more rehabilitation oriented, rather than absorption into edible crops.

Further Action? Should the residents/community decide; SOMR is willing to facilitate a community meeting to discuss any next courses of action.

For further detailed information on the studies, background information and weblinks used to develop this Notice: Please go to the Save Our Macleay River website: saveourmacleayriver.com/ or enquire via email.

We invite you to become a member by contacting the Secretary or visit the website

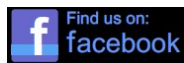
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'Notice to Residents' about the safer use of water downstream from Mungay Mines

By Save Our Macleay River Inc. - SOMR



Why this Notice?

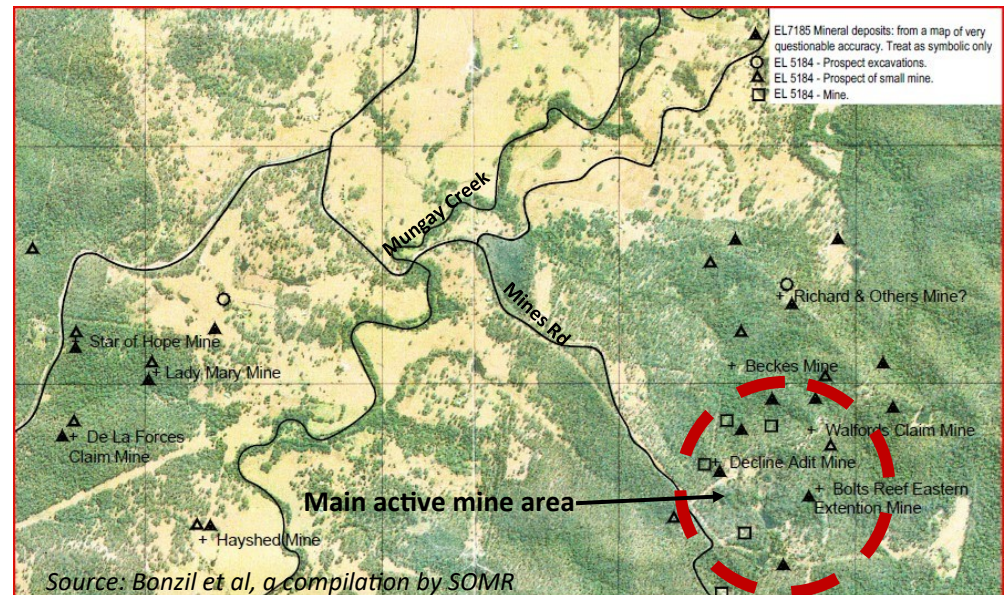
The old Mungay Creek antimony mine, located near Earth First Road off Mines Road closed in 1972, with minimal rehabilitation or safety management on decommissioning. It has since been leaching antimony and arsenic into Deep & Mungay Creeks and downstream, which increases health risks. (*More on that later, read on!*)

In 2016 the NSW then Derelict Mines Dept. were going to reduce the antimony and

arsenic with managed sediment dams, but changed their priorities and did nothing.

Mid North Coast Local District Health and later Kempsey Shire Council, were requested by SOMR to develop a 'Notice to Residents' about the safer use of water downstream from the Mungay Mine. Both declined. So, SOMR now provides it!

Where are the old mine are-



The main Mungay mine area spans the Earth First Road ridge, with mine and waste run-off flowing both ways into Deep Creek and Mungay Creek catchments.

Note: While this notice focuses on the Mungay Mine area high risk run-off - it applies to the general area at a lower risk level, as arsenic & antimony are natural in the soils & geology.

Suggestions for safer use of creek, dam & bore water.

This suggested advice is primarily for those downstream from the old Mungay Creek Antimony Mine as arsenic and antimony are present at elevated concentrations and health risk levels there.

Generally: Do not use creek (dam or bore) water for drinking or 'potable' purposes. - Use rainwater from roof water tanks or equal.

To avoid high concentration arsenic levels:

- Use water from creek and dams in high flow and low temperature (winter) periods only. - This can be pumped to storage for use in drier and warmer (summer) times and recommended for garden and non-potable uses only.
- Ensure your pump intake is well above the bottom of the creek/dam. – High concentrations are in sediment.
- Do not take water or allow stock to this water source if there is Iron floc (a rusty, red-coloured algal-type bloom, image below) in the base of the creek/dam; – The floc absorbs and concentrates arsenic at high levels and there have been reported cattle deaths from this.



Image: Iron floc in a creek bed.

To avoid high concentration antimony levels:

- It is likely, the safest time to take the water is at high or low flows as it is more 'in solution' (less in sediment) in the water. *

Do not take water from creeks during floods, when erosion produces high sediment loads carrying both antimony and arsenic etc.

As stated below-right, some medicines contain antimony. These may elevate concentrations and health impacts of antimony in the creek water and naturally present in the area. Please check with your health expert.

* This based on studies at Bellbrook on the Macleay but may vary here due to site differences.

(Source for above summary: World Health Organisation, DEECCW and National Library of Medicine and Prof Scott Johnson's presentation of 7 year findings)

Deep Creek antimony and arsenic test results: 2015

Sample Id	Location	Antimony mg/kg	Arsenic mg/kg
Baseline concentration Stage 1 (GHD 2015)			
		1.2	12.5
	ANZECC ISQG low trigger values	2	20
	ANZECC ISQG higher trigger values	25	70
MC_SD01	Down catchment of mine site below water dam near former adit on Deep Creek, which runs through site.	307	16
MC_SD02	Approximately 330 m down catchment of Mungay Ck 1 on Deep Creek	83	72
MC_SD03	Approximately 1.67 km down catchment of Mungay Ck 2, on Deep Creek	<5	16

(Source: p 157 | GHD | Report for NSW Department of Primary Industries - Derelict Mines - Macleay Catchment, 2016)

Health risks and effects of arsenic and antimony.

Both arsenic and antimony build up in the body (human or stock) over time, mostly impacting the gastrointestinal system. Both are carried in sediment and in solution; arsenic more in solution and antimony more in sediment. - Hence advice differences.

Arsenic: is the most significant chemical contaminant in drinking-water globally. Inorganic arsenic compounds, such as those found in water, are highly toxic. It can also occur in an organic form.

- Inorganic arsenic is a confirmed (cancer causing) carcinogen.
- Immediate symptoms of acute arsenic poisoning include gastrointestinal impacts of vomiting, abdominal pain and diarrhoea. Unlike antimony, these are followed by numbness/tingling of the extremities, muscle cramping and in the extreme death.
- Early symptoms of long-term exposure to high levels of inorganic arsenic (e.g. in drinking-water and food) are also usually observed in the skin; including pigmentation changes, skin lesions and hard patches on the palms and soles of the feet (*hyperkeratosis*). These occur after a minimum exposure of approximately five years and may be a precursor to skin cancer and may also cause bladder and lung cancers. Long-term ingestion of inorganic arsenic includes developmental effects, diabetes, pulmonary disease and cardiovascular disease.

Symptoms of long-term elevated exposure to inorganic arsenic differ between individuals, population groups and geographical areas.

Thus, there is no 'definitive' of this disease being caused by arsenic, and complicates the assessment of arsenic on the latter health matter.

(Source: World Health Organisation)

Antimony: is a naturally occurring element that exists in many forms in the environment.

- Ingesting significant amounts mainly affect the gastrointestinal system, like arsenic. Concentrations as low as 0.529 mg/kg can result in vomiting and can cause heart and lung problems, stomach pain, diarrhoea, and stomach ulcers.
- Exposure to high levels of antimony can result in various adverse health effects including pancreatitis, some forms of cancers, reproductive miscarriages and menstruation problems; dermal/skin spots especially near sweaty areas.

Also, breathing high levels for a long time can irritate eyes and lungs. This is more relevant to breathing dust from earthworks and mining etc. - not so much the water!

If you are on therapeutic medicines used for the treatment of two parasitic diseases 'schistosomiasis' and 'leishmaniasis, these medicines also contain antimony, which may elevate concentrations and impacts of antimony naturally

(Source: DEECCW and National Library of Medicine)