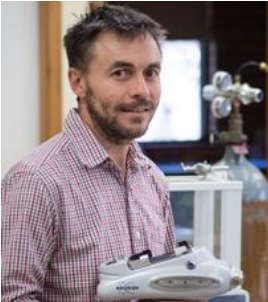


# The team at University of New England



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The University of New England acknowledges that the research was conducted on the country of traditional peoples, who are the custodians of the land. We also pay our respect to Elders past, present and emerging

# Updates from UNE (2019 onwards)

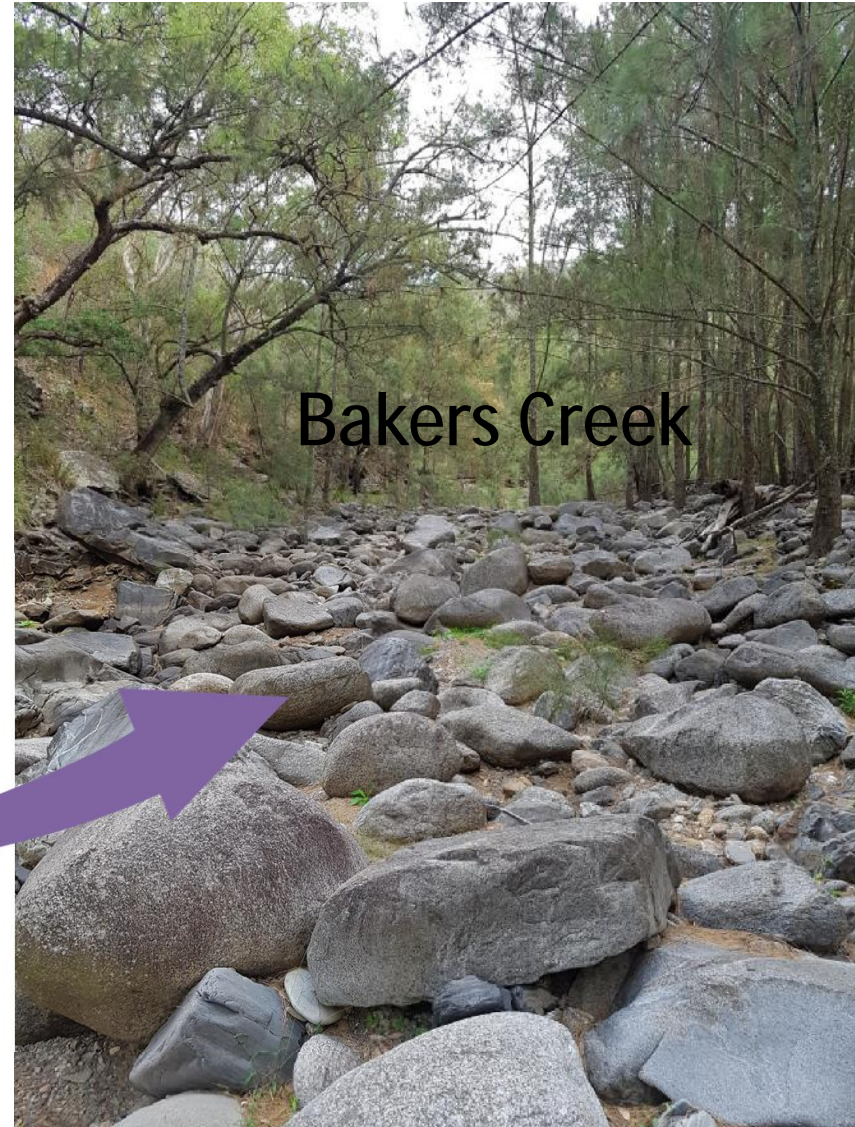
- New Hillgrove Mine owners 2023 – Larvotto Resources who are supporting continuation of UNE research activities
- Project completed for NSW Legacy Mines to map point and diffuse sources of metalloid contamination in the Bakers Creek sub-catchment
- Steven successful with his PhD thesis on the Macleay River system. “Speciation, associations, and geochemical transformations of antimony and arsenic in a mine-contaminated freshwater system”
- New publications on the thesis results (copies available) – presented to international conference (ICOBTE 2023) to inform the science
- Successful grants with Prof Ed Burton SCU to understand immobilisation and release mechanisms for As/Sb from the Macleay River sediments.
- (Provided comment on Oven Mountain Pumped Hydro Scheme)

## Focus of Research 2019 – to date

What are the primary mechanisms of sediment As & Sb mobilisation and sequestration?

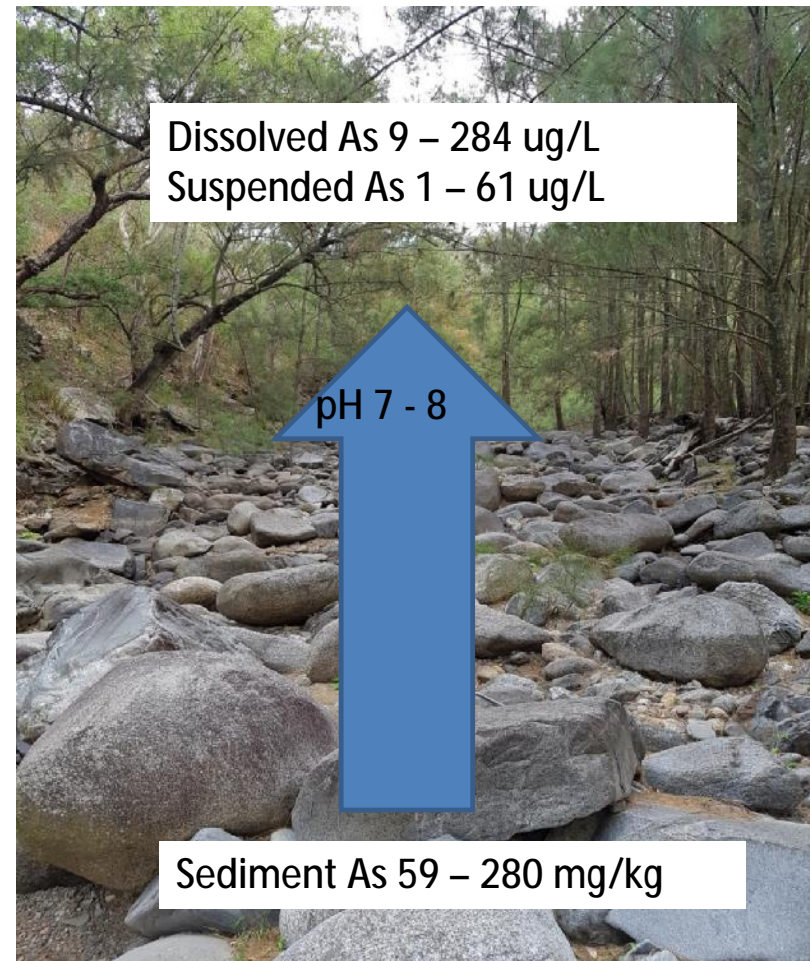
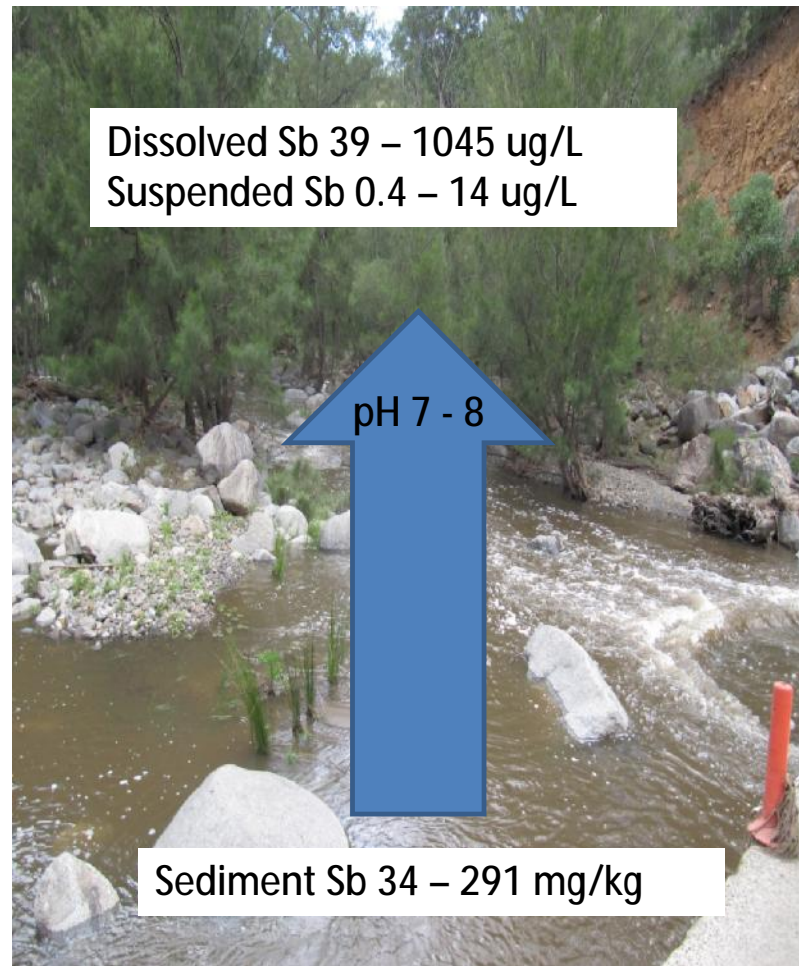
Answers inform on the level of risk.....and help to explain water and biota data

Stibnite ore in the creek





## Surface water and mobilization



# Snapshot of the results .....in the publications

- Hillgrove Mine Field represents the primary source area for the Sb contamination, and much of the As contamination in the river system
- Primary arsenopyrite mineral is the main As source in Bakers Creek. As released is strongly associated with Fe oxyhydroxides which facilitates down catchment enrichment and bioavailability
- Stibnite ore oxidation products are the main source of Sb to the system – but Sb is rapidly attenuated in secondary minerals
- Arsenic and Sb disperse and behave differently in the sediments
- Bioavailability in sediment is low (< 8%) but greater in the lower catchment
- Arsenic is more responsive to redox chemistry and drought conditions
- Arsenic presents the greater risk in this system especially under the warmer conditions predicted with climate change

A new paradigm - global climate change alters contaminant impacts in this system



Armidale Oct 2019



Bellbrook Nov 2019



Georges Junction April 2020



Kempsey March 2021



Kempsey March 2022

## New work

Understanding how global climate change is influencing metal(loid)s in the system.

Do the higher temperatures, fires, and changed water flow change our current understanding of mobility, bioavailability and toxicity?

Questions to Sue at [swilso24@une.edu.au](mailto:swilso24@une.edu.au)