

# **SAMMS: Sub-Arctic Metal Mobility Study**

**GWF Pillar I (2017-2020)**

## Research Team

- PIs: Brent Wolfe (WLU), Jason Venkiteswaran (WLU)
- Co-PIs: Mike English (WLU), Roland Hall (UW), Jim McGeer (WLU), Kevin Stevens (WLU), Sherry Schiff (UW), Scott Smith (WLU), Colin Whitfield (USask)
- Co-Is: Jules Blais (UOttawa), Raoul-Marie Couture (Norwegian Institute for Water Research)

## Partners

- Department of Environment and Natural Resources, GNWT
- Giant Mine Oversight Board
- Indigenous and Northern Affairs Canada
- North Slave Métis Alliance
- Tłı̨chǫ Government
- Wek'èezhìi Land and Water Board
- Yellowknives Dene First Nation



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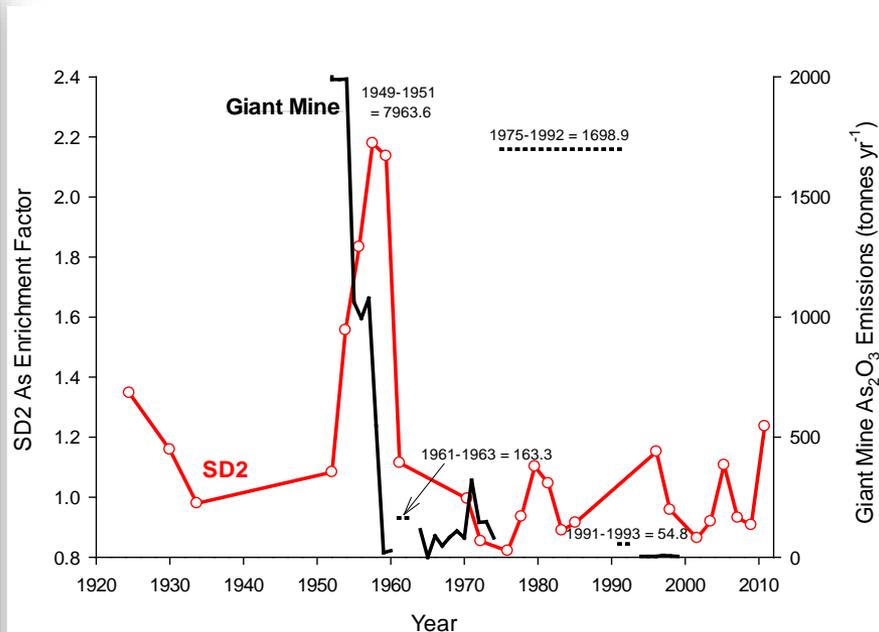
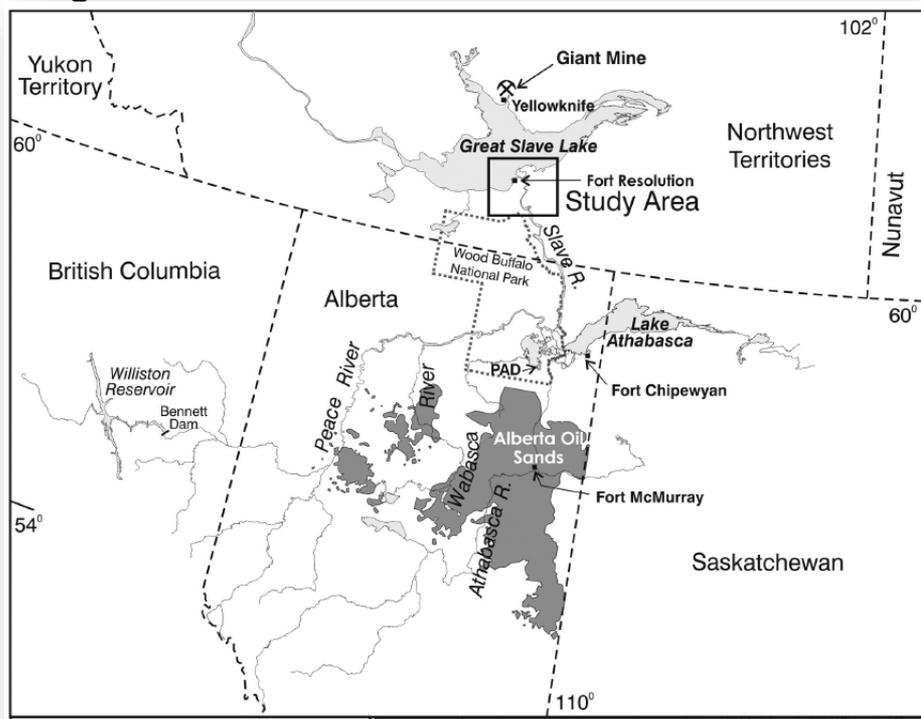
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*Solutions to Water Threats in an Era of Global Change*

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## GWF Pillar I (2017-2020)

Origin...



[modified from MacDonald et al. 2016 *Science of the Total Environment*]



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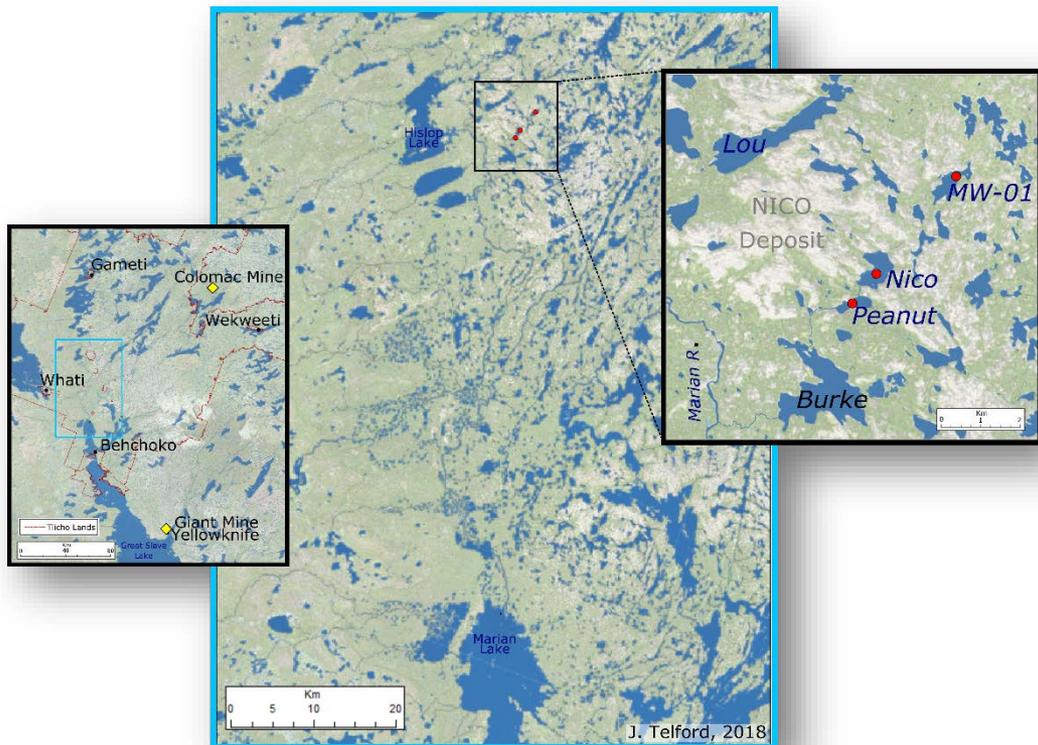
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### Marian Watershed Stewardship Program

MWSP aims to establish baseline data that can serve as reference points for detecting effects of ongoing climate change and potential mining, such as Fortune Minerals proposed NICO mine.



[James Telford, MSc in progress]



SAMMS



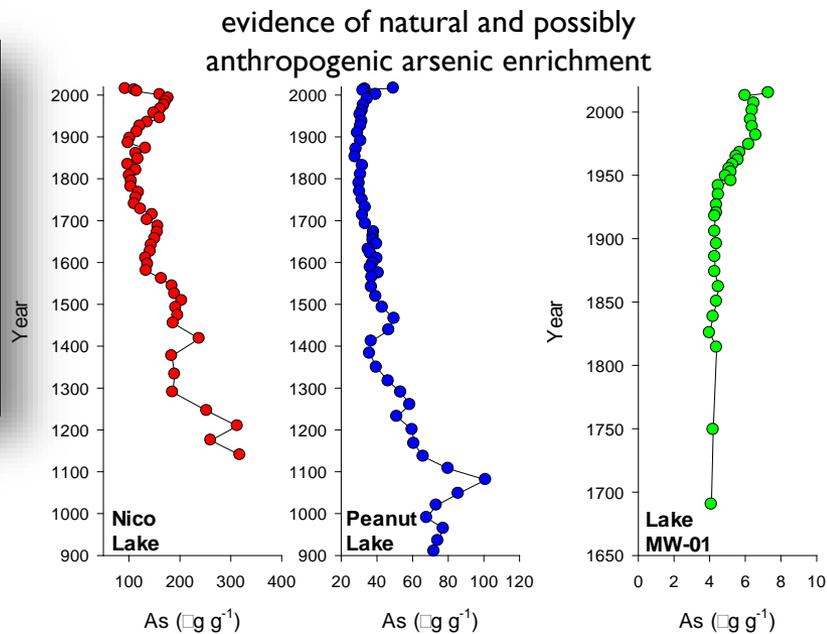
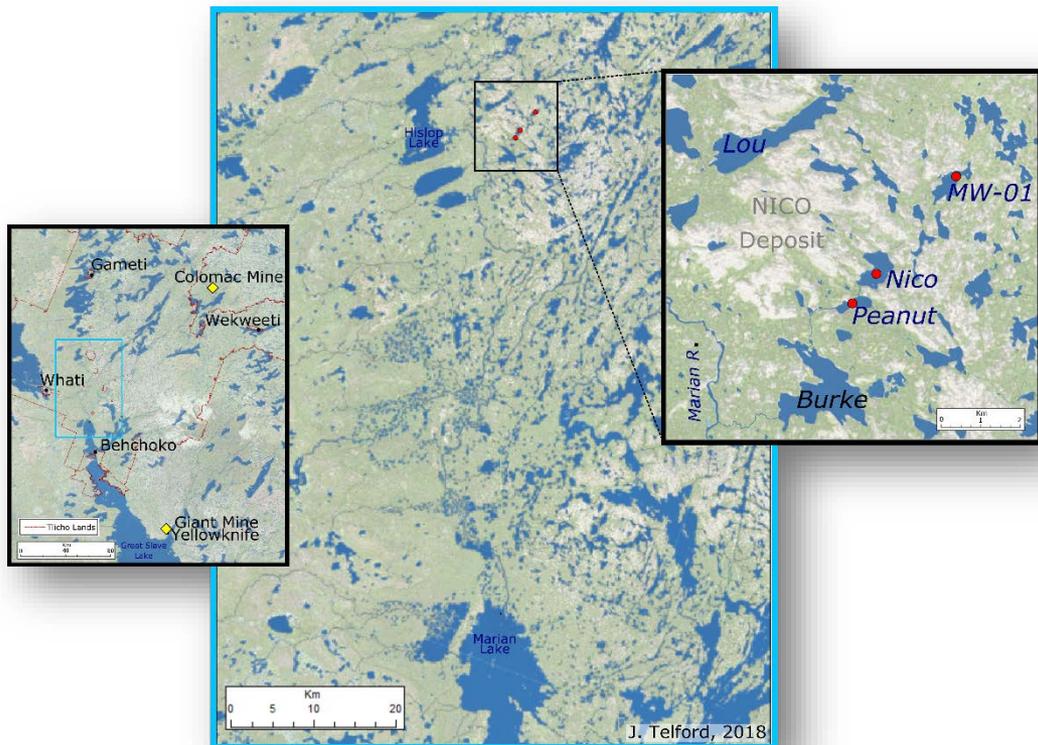
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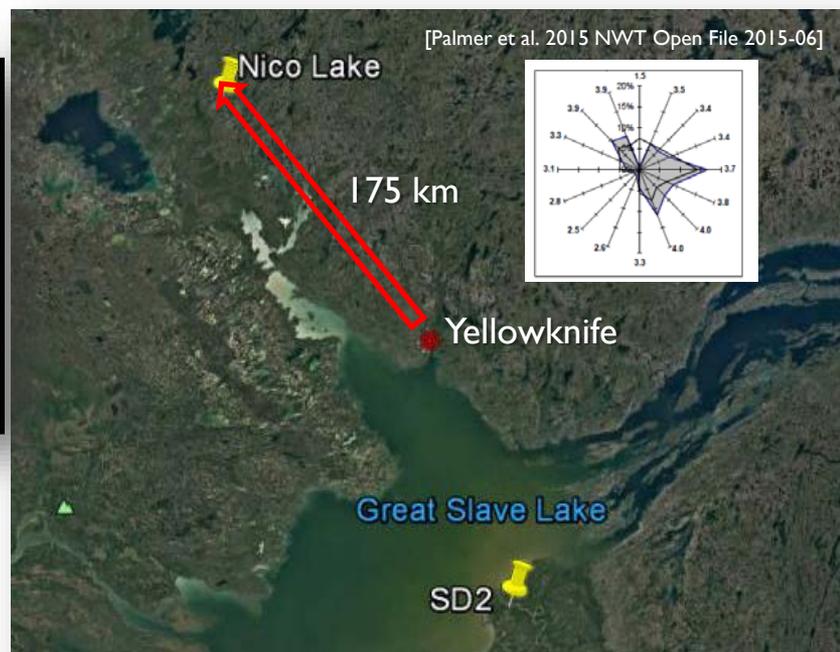
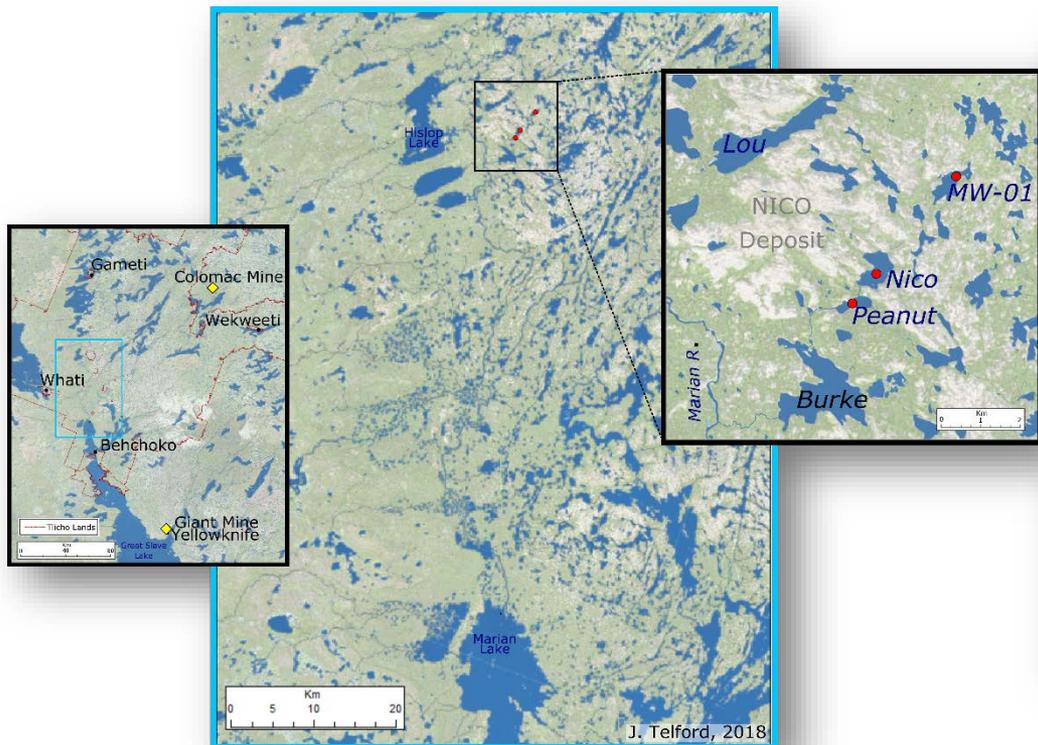
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**WP1**  
terrestrial stores of metal deposition  
transport via streams and lakes

**WP2**  
DOM binds and transports metals  
DOM controls toxicology

**WP3**  
DOM in cold regions

**WP4**  
sediment cores  
history of emissions

**WP5**  
paleo-ecotoxicology

**WP6**  
climate change  
permafrost thaw

**WP1-6:** Multiple catchments with distance from mine source

SAMMS will undertake an array of field, laboratory, and modelling studies. Research is grouped under six 'work plans (WPs)'.

WP1: Terrestrial stores of historical metal deposition and transport to aquatic ecosystems

WP2: DOM quantity and quality, metal binding, and toxicology

WP3: Modelling of DOM quantity and quality in cold regions

WP4: Metal depositional history, pathways, and processes in lake sediments

WP5: Paleo-ecotoxicology and ecosystem structure

WP6: Climate change effects including permafrost thaw

**SAMMS** will identify, quantify, and predict mobility of natural source and legacy mine-source metals in soil, wetlands, and lake sediments that extend from former, present, and planned mine sites currently and as climate change alters the quantity and quality of DOM produced and exported from vast organic stores in subarctic NWT watersheds.



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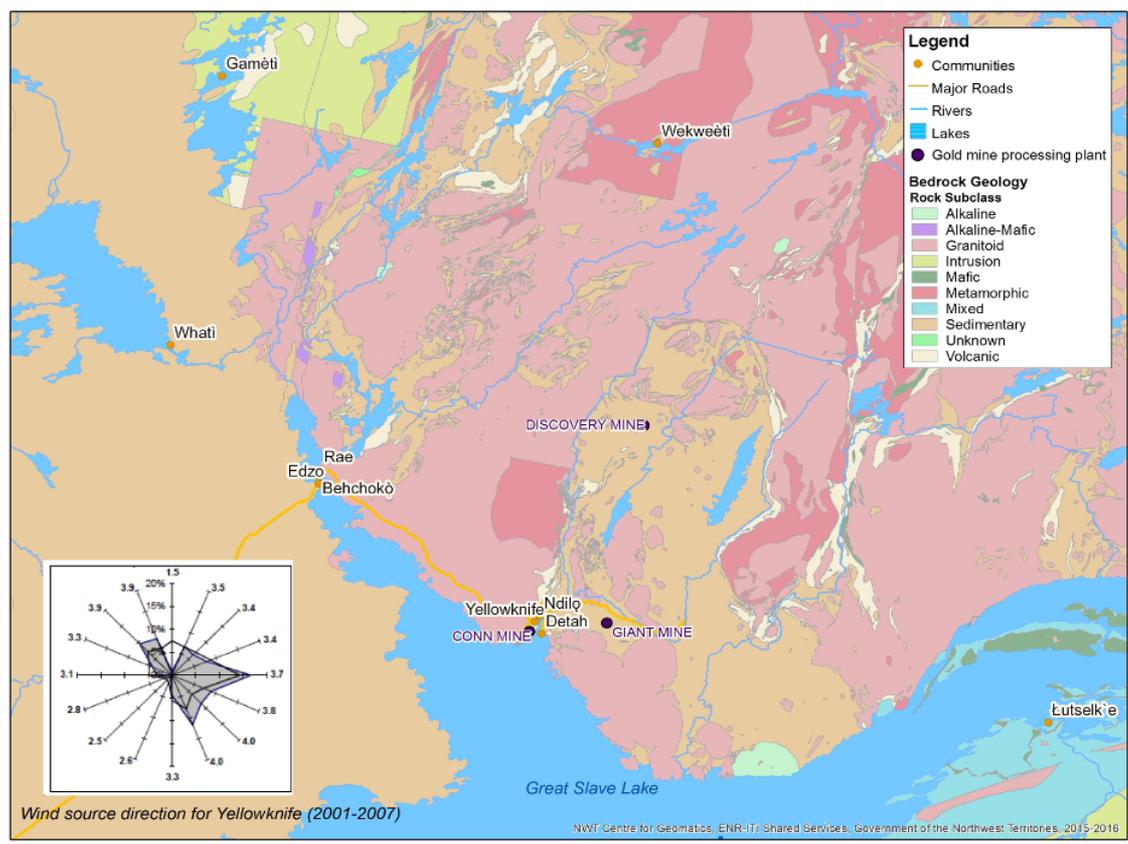


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During the first three years of **SAMMS**, we will quantify the current and future mobility of legacy atmospheric-source contaminants, above naturally occurring levels, from the Giant Mine along a 200 km airshed transect to the northwest of Yellowknife.



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### Progress...

December 2017 – January 2018:

- SAMMS was announced on the Laurier website (12 December 2017)
- Held initial coordination meeting with SAMMS researchers (19 December 2017)
- Leadership team met weekly to plan summer 2018 fieldwork  
→ will launch WP4 in May 2018, WP1 in August 2018 (applied to PCSP to request logistical support)
- Recruited 2 new MSc students (Izabela Jasiak – UW; Mackenzie Schultz – WLU)
- Developed SAMMS newsletter for Partners with assistance of Andrew Spring (WLU – GWF KM Research Associate)  
→ to be distributed by end of January / early February
- Developed SAMMS logo, twitter account [<https://twitter.com/sammsgwf>], facebook account [<https://www.facebook.com/samms.gwf>], website development is in progress



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