Item 8.3.1

Uncovering long-term impacts of historical gold mining practices in modern HRM lakes through sediment analyses

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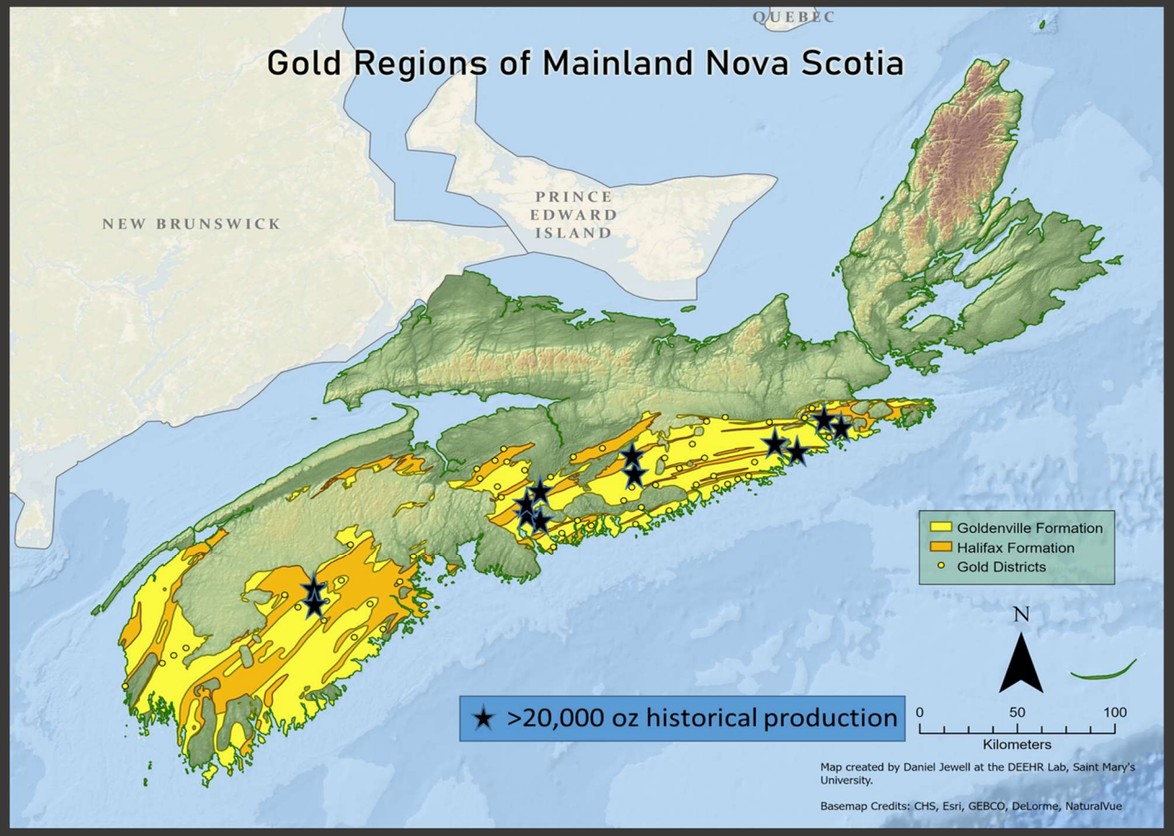
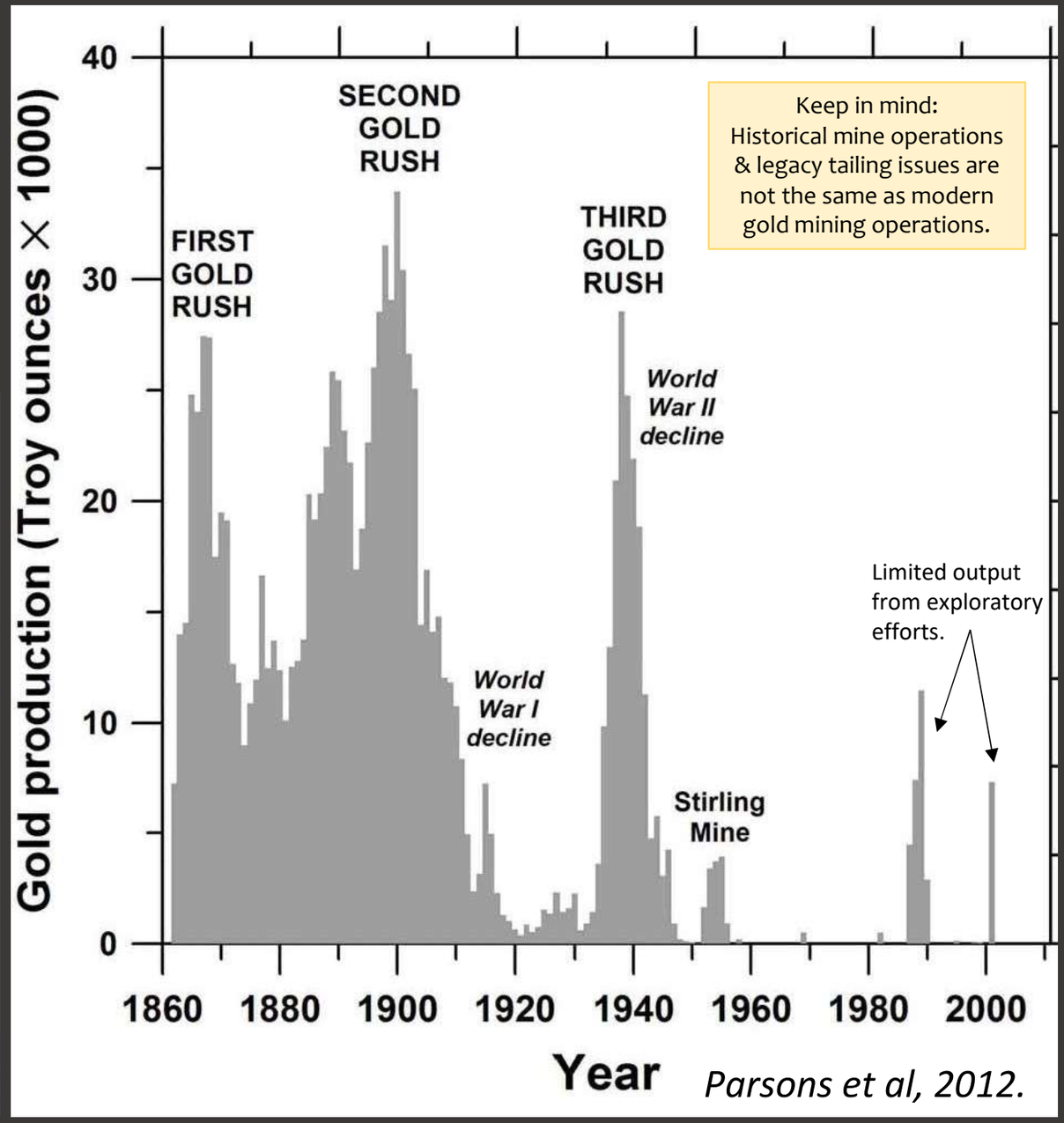
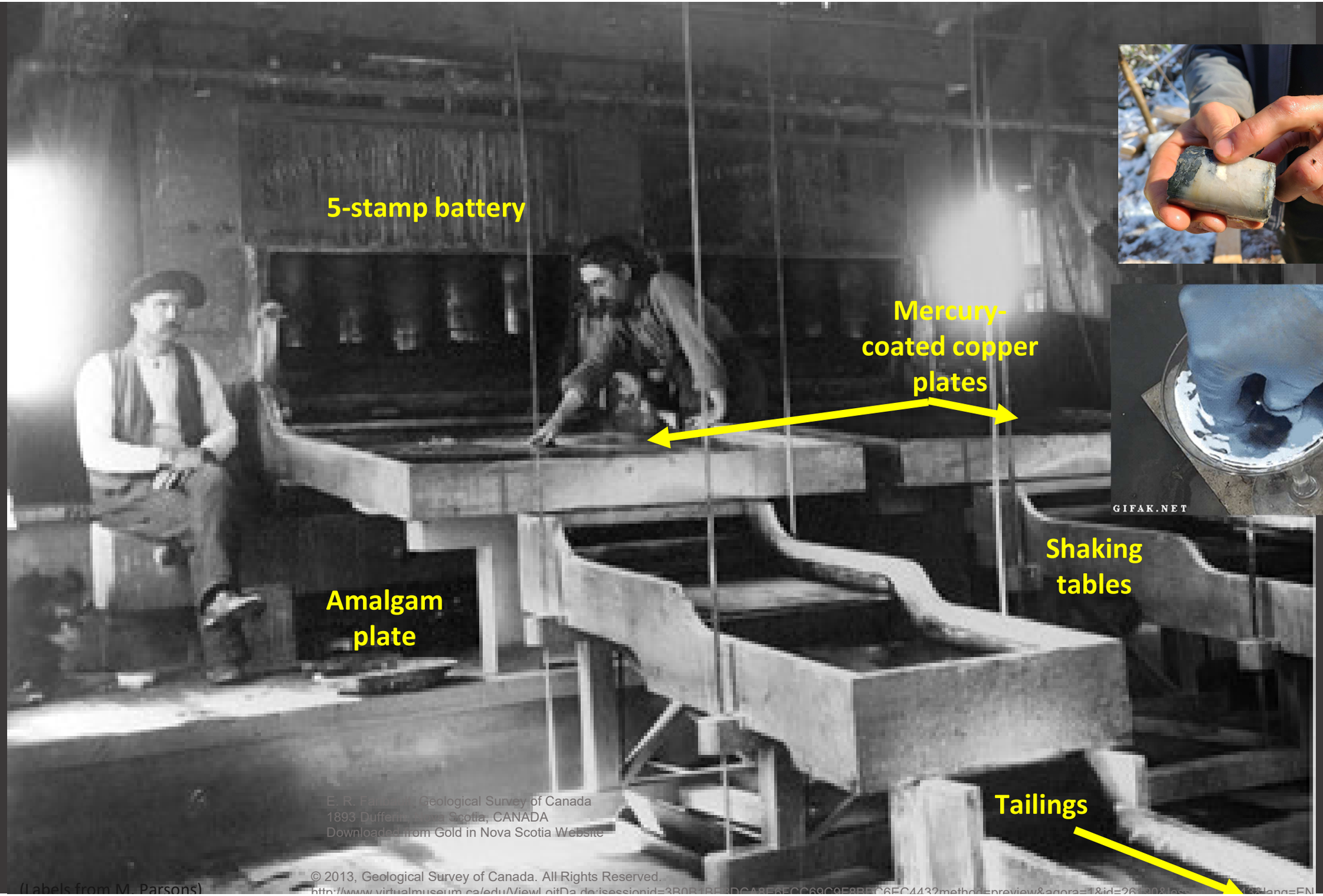
http://www.ap.smu.ca/~lcampbel/Gold.html
https://www.ecablab.com/media

Gold rush history in Nova Scotia by the numbers

- 3 historical Gold Rushes in Nova Scotia.
- 64 Gold mining districts, >360 mines counted to date.
- *Reported* 1.2 million troy ounces of gold from 3 million tonnes of crushed rock.







(Labels from M. Parsons)

Historical gold mine tailing sites & wetlands go together.

Stamp mill engine house and shaft house, Mooseland Gold Mining Co., 1897.
Historical Photograph by E. R. Faribault. Geological Survey of Canada Photo #5297.

The problem of legacy tailings in Nova Scotia wetlands today

Over **300 wetland areas** in 64 abandoned gold mining districts potentially impacted.

- many of these with **extremely elevated sediment concentrations of Hg and As** .
- Very limited data available on impacts.

Knowledge gaps:

- *Where are the tailings? Need delineation data (area/depth/volume)*
- *Characterization of human health/ecological risks.*
- *Is this legacy contamination impacting wetland functions?*
- *Are impacted wetland areas sources of contaminants in downstream environments?*
- *What wetlands should be prioritized for risk management and how should this be done?*

(Clark et al, 2021)

Historic Gold Mine Districts in the Shubenacadie Watershed

N

Kilometers

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Upper Stewiacke Gold District

Gays River Gold District

East Rawdon Gold District

Renfrew Gold District

Elmsdale Gold District

Mount Uniacke Gold District

South Uniacke Gold District

Oldham Gold District

Waverley Gold District

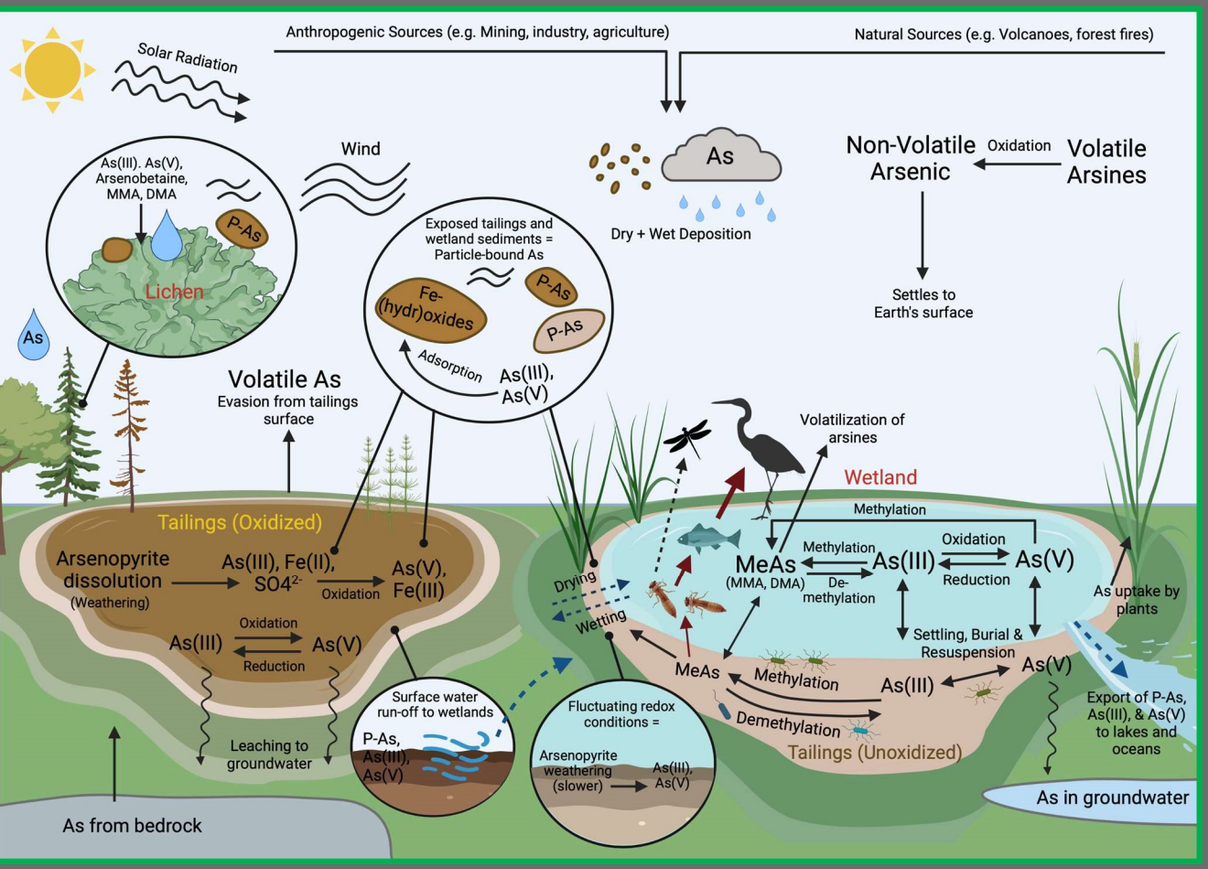
Montague Gold District

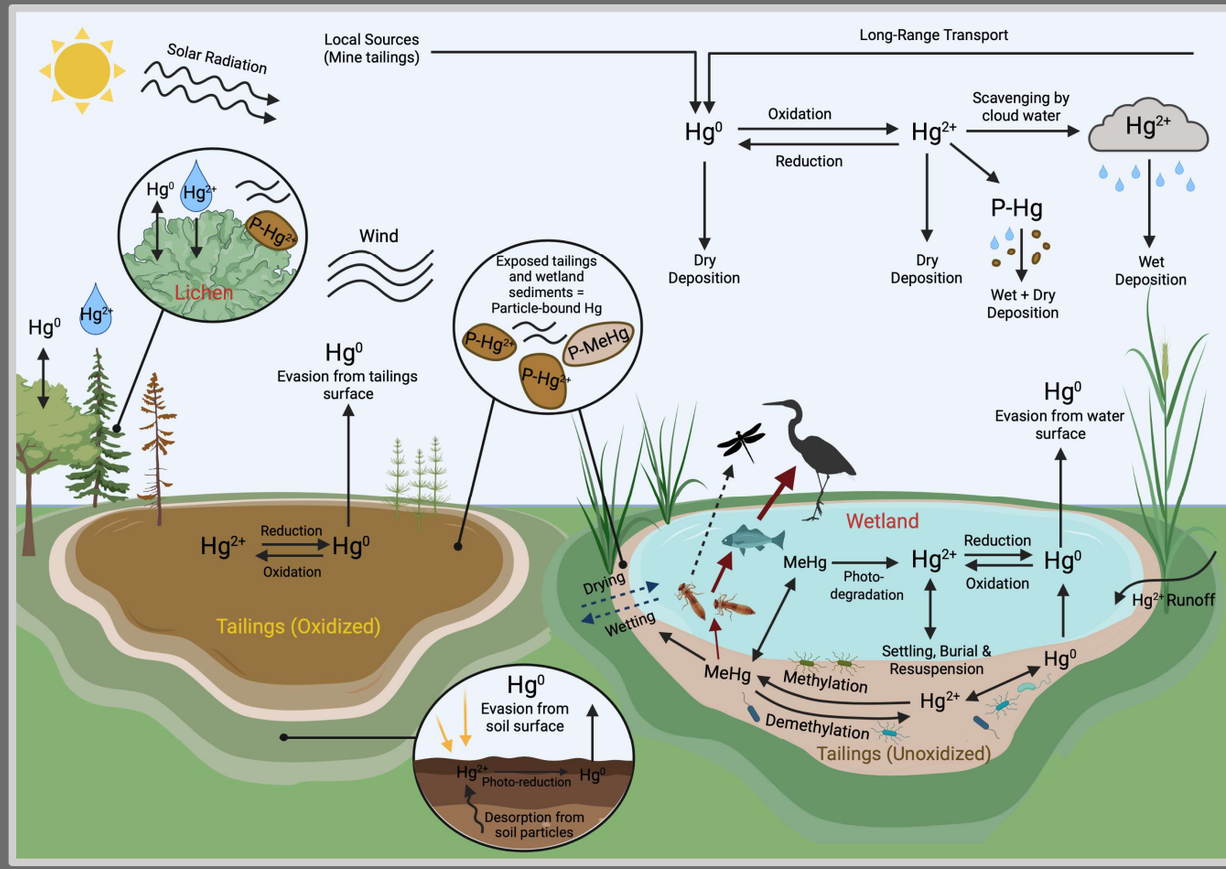
tribution:

ne districts: Smith, P.K. and Goodwin, T.A. 2009:
storical gold mining maps, Nova Scotia DNR
ova Scotia Topographic Database: NS Open
overnment License

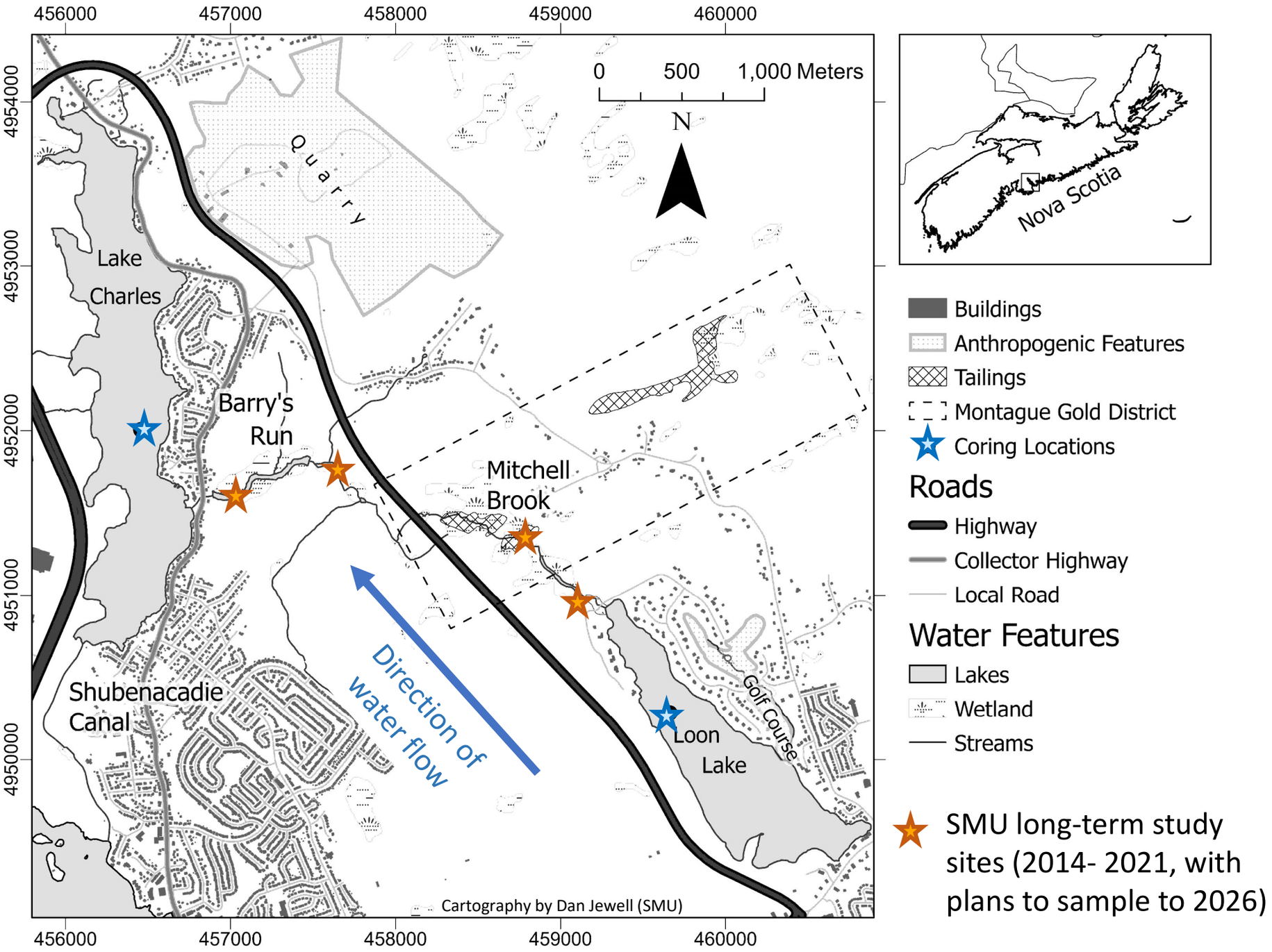
semap: CHS, Esri, DeLorme, NaturalVue

Arsenic and mercury have very different environmental chemistry & ecotoxicology.





Figures designed by Michael Smith (SMU)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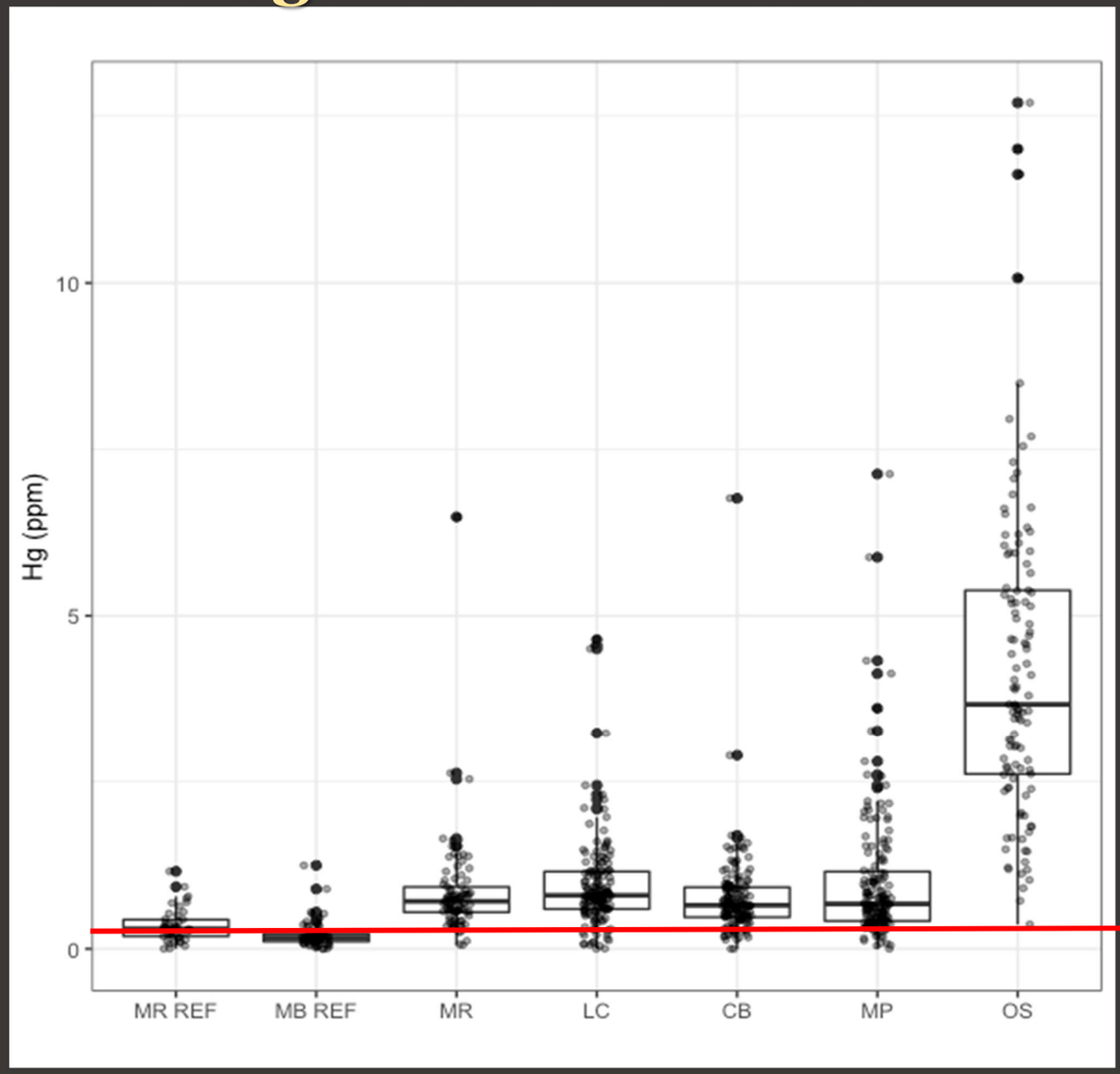
Golf Course
Cartography by Dan Jewell (SMU)
Nova Scotia
Buildings
Anthropogenic Features
Tailings
Montague Gold District
Coring Locations
Roads
Highway
Collector Highway
Local Road
Water Features
Lakes
Wetland
Streams
SMU long-term study sites (2014- 2021, with plans to sample to 2026)

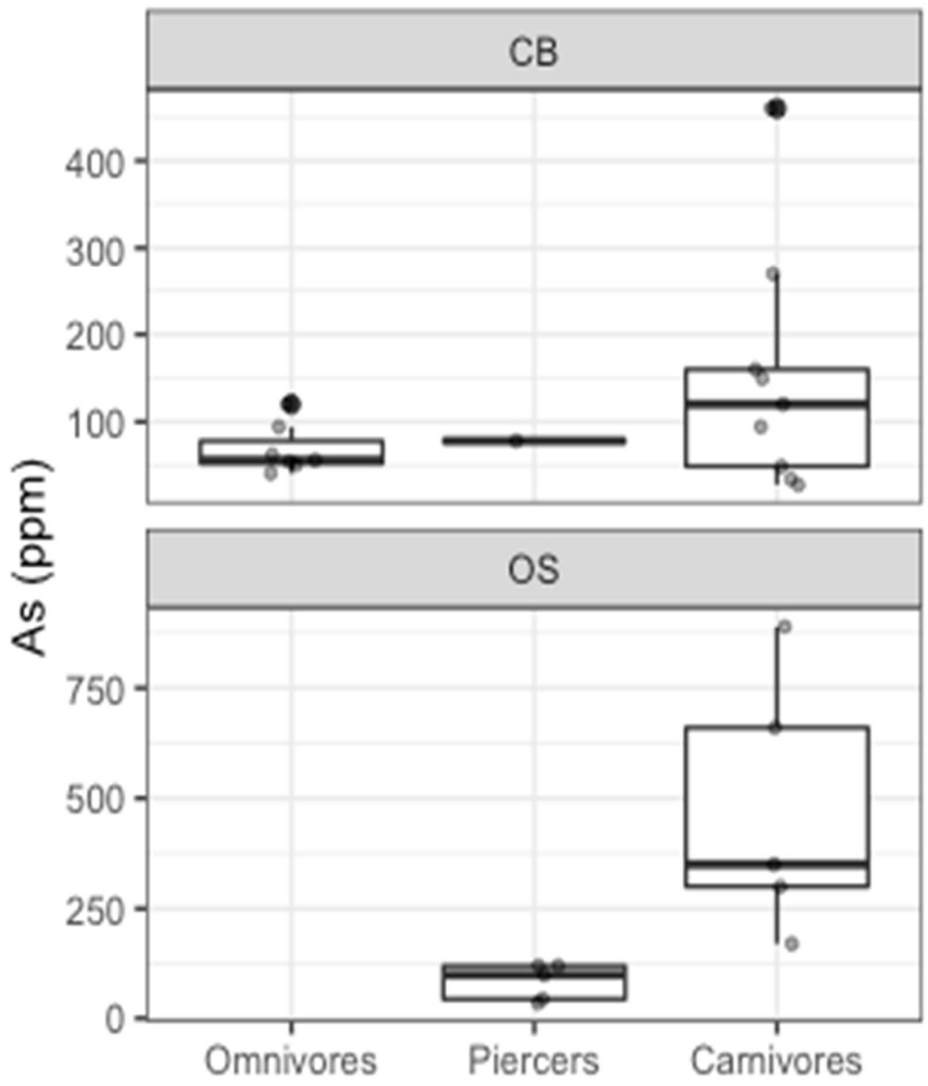
Macroinvertebrates are good biomonitors

THg Analysis



Health Canada / Canadian Food Inspection Agency
Retail fish & seafood "action level" Hg limit

https://www.inspection.gc.ca/food/archived-food-guidance/fish-and-seafood/manuals/standards-and-methods/eng/1348608971859/1348609209602?chap=7#s20c7

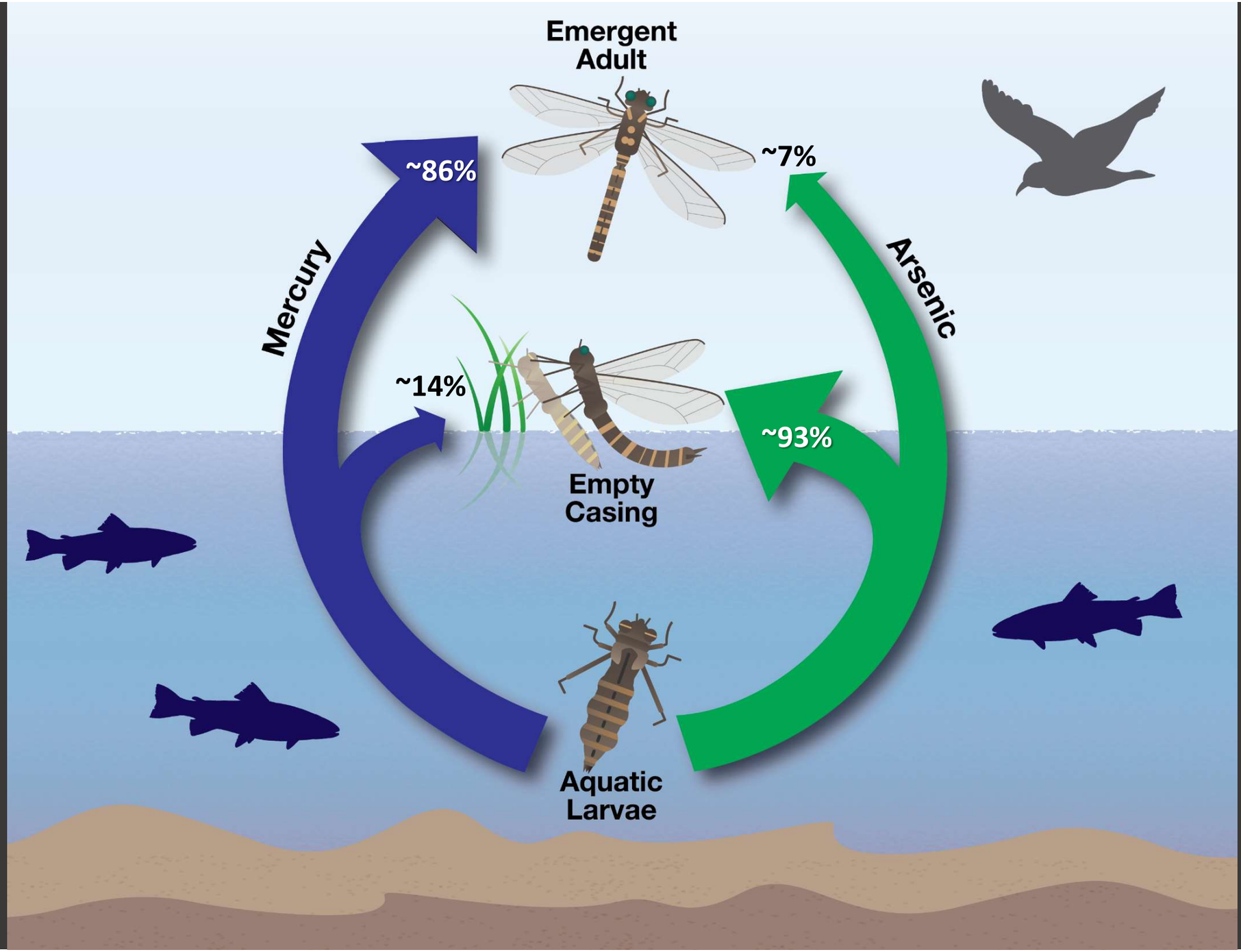


Health Canada / Canadian Food Inspection Agency retail fish & seafood As "action level" limit:

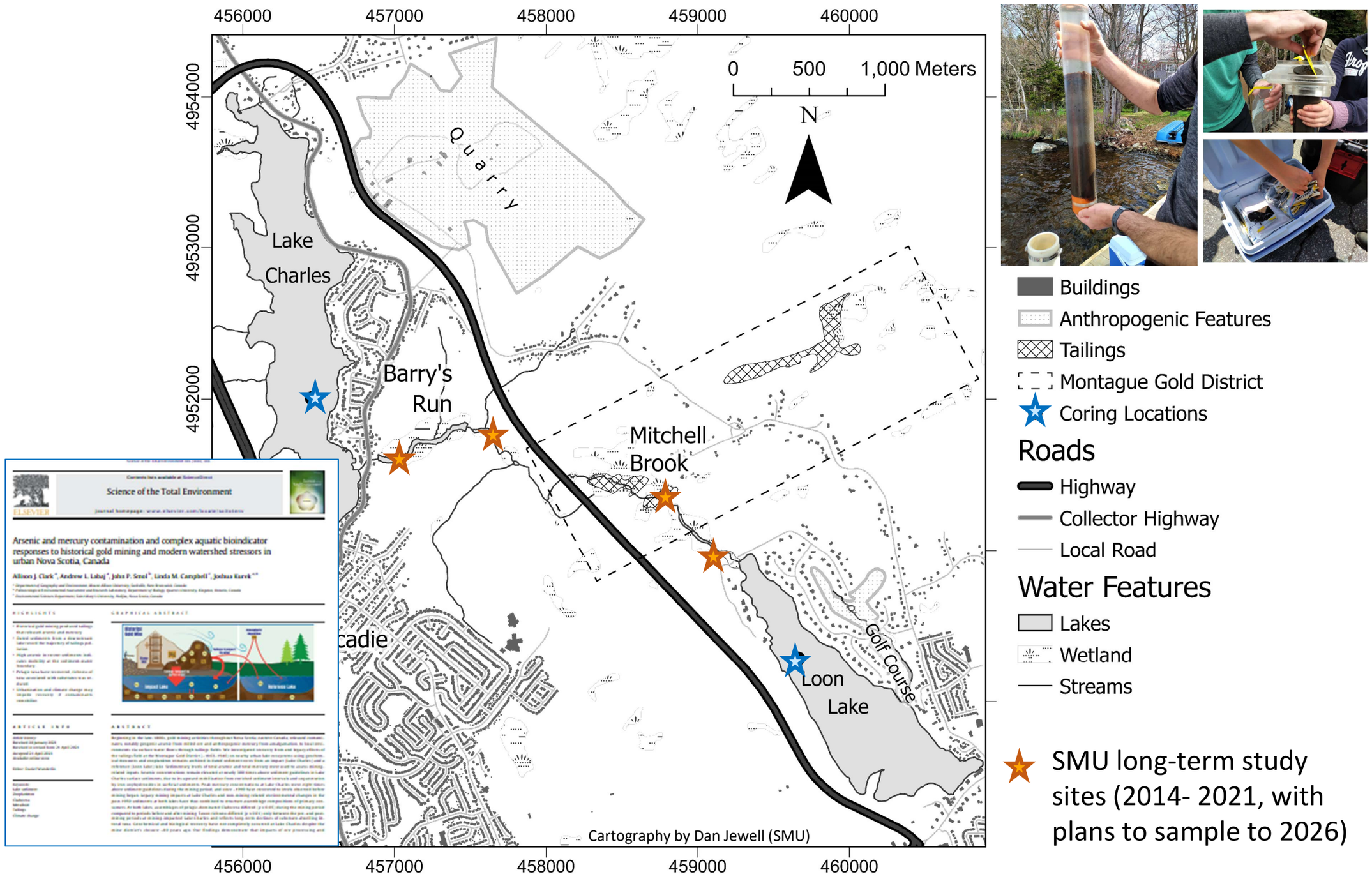
3.5 ppm

https://www.inspection.gc.ca/food/archived-food-guidance/fish-and-seafood/manuals/standards-and-methods/eng/1348608971859/1348609209602?chap=7#s20c7

Can emergent insects transfer Hg and As out of aquatic ecosystems?



Molly LeBlanc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Science of the Total Environment
Arsenic and mercury contamination and complex aquatic bioindicator responses to historical gold mining and modern watershed stressors in urban Nova Scotia, Canada