

However, burying the tailings under soil may trigger dissolution of the As-bearing minerals and lead to accelerated release of As to local streams and groundwater. Other conventional tailings remediation designs such as flooding, removal or fencing are also problematic because of the high solubility of some As minerals, dust hazards, expenses associated with removal, and community desire to maintain site access. The present study uses laboratory experiments and field tests to investigate the biogeochemical stability of different tailings types to design the best plan to protect downstream surface water and groundwater and reduce risks to human health. This research will provide experimentally tested recommendations applicable to many of the thousands of active and abandoned mine sites across Canada.

**Assessing and reducing risks from high-arsenic
gold mine tailings in Nova Scotia**

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Gold mines frequently have high natural arsenic (As) concentrations in tailings and nearby streams and groundwater. Previous research at historical gold mines in Nova Scotia has shown that As is present in mine wastes at concentrations hundreds to thousands of times the Canadian soil quality guideline, which may pose a risk to both ecosystem and human health. In 2005, the Province of Nova Scotia established the Historic Gold Mines Advisory Committee to examine these risks in more detail (<http://www.gov.ns.ca/nse/contaminatedsites/goldmines.asp>). Since that time, detailed studies have been carried out to examine the concentration, solid-phase speciation and bioaccessibility of As in tailings, airborne particulates and forest soils near these sites to clarify the spatial extent of mine tailings, the mineral hosts for As, and the fate of windblown tailings dusts. Environmental assessments have also been completed at two mines where dusty, high-As tailings are located close to residential areas and are frequently used for recreational activities (e.g., off-road vehicle racing).

Remediation strategies for mine wastes at publicly accessible sites like those in Nova Scotia typically employ clean soil covers to reduce human exposure and dust generation.