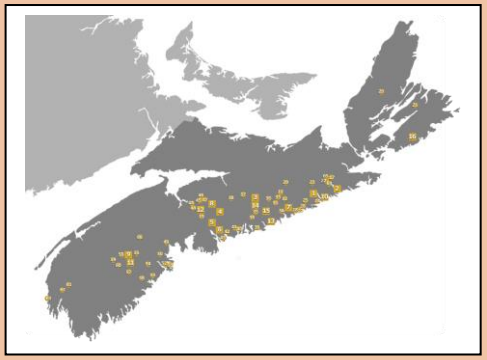
Origin of Source Rock?

Meguma Terrane: Halifax and Goldenville Formation. This combination of metasandstone, greywacke, and metamudstone rocks produces grey tailings when unoxidized.

Goldenville Formation Rock. This is one of the rock types that contained the auriferous quartz veins which often contained gold. Those rocks were chopped out, the resulting ore crushed and then processed through a stamp mill where they were pulverized to recover gold. Sunglasses for scale.

Where are the Tailings?



There are 64 historical gold districts in Nova Scotia many of which have a significant amount of tailings (map from novascotiagold.ca).

Dynamic Environment & Ecosystem Health Research Group (DEEHR), Saint Mary's University

Members of the DEEHR research group conducts research and assessment of both aquatic and contaminated ecosystems across Canada and world-wide.

The DEEHR research group's ultimate goal is to improve our understanding of the fate and effects of anthropogenic and natural toxicants in aquatic ecosystems and the way humans interact with aquatic environments.

For more information on Legacy Gold Mine Tailings and more important research, please visit our website at:
www.ap.smu.ca/~lcampbel/index.html

Further research & monitoring can help develop multi-approach remediation strategy to develop healthy wetland environments.

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All modern photography by DEEHR Group.
Historical photography from the Geological Survey of Canada.

Gold extraction process using mercury to form an amalgam on copper plates.

Trench dug to extract ore containing auriferous veins at Montague.

Legacy Gold Mine Tailings

Legacy Gold Mine Tailings from 1865 -1940 in Nova Scotia

What Are The Historical Legacy Tailings?

The historical legacy tailings are the "leftovers" of the mining operation (processed ore). They contain harmful contaminants due to naturally occurring elements and processing additives.

The majority of the tailings are pulverized ore rock. The particle size can be as large as sand grains and range to small as 1/5 of the width of a human hair.

Sediment core of tailings from an impacted wetland. The grey color at the top of the core (right hand side) indicates the presence of unoxidized tailings, while the lower part of the core is more rusty in colour.

What to Do?

Stay off the Tailings!

Arsenic is an abundant and naturally occurring geological components of rocks across Nova Scotia. Ore that was milled and processed to extract the gold. Arsenic most commonly occurs in the mineral arsenopyrite.

Mercury can be found in high concentrations at many legacy gold mine tailing sites. Mercury was used to extract the gold by forming an amalgam on copper plates. Unfortunately, 10 – 25% of the mercury used in historical mining practices was lost to the tailings and atmosphere. The legacy of elevated mercury at those sites remain with us today.

Typical tailings. Depending on level of oxidation, unoxidized tailings can also exhibit metallic luster from the arsenopyrite present. Shovel for scale.

Why not to Disturb Tailings?

It is important to understand that tailings contain harmful and carcinogenic compounds that are relatively stable under reducing conditions. It is important not to disturb and subject the unoxidized tailings to weathering processes.

Weathering processes not only break down primary minerals such as Arsenopyrite that contain the Arsenic, but can produce secondary minerals. Depending on environmental conditions this can later on result in contaminants leaching out and transforming to harmful compounds. Next, arsenic and mercury can enter waterways and precipitate out elsewhere, making it difficult to track and monitor contaminants.

"It is important not to disturb and subject the unoxidized tailings to weathering processes."