

Nova Scotia

N.S. plans to close 2 sites contaminated by old gold mines



High arsenic and mercury levels have been found at former Montague and Goldenville mines

[Frances Willick](#) · CBC News · Posted: Oct 13, 2018 6:00 AM AT | Last Updated: October 13, 2018



The site of the former Montague gold mine is one of two locations the province plans to close. (Frances Willick/CBC)

The province has embarked on what could become a multimillion-dollar project to close two sites that were heavily contaminated with arsenic and mercury by gold mining as far back as the 1860s.

Nova Scotia Lands, the provincial environmental cleanup agency, [issued a request for proposals last month](#) on how to close the former gold mining sites in Montague Gold Mines, near Dartmouth, N.S., and Goldenville, near Sherbrooke.

"Appropriate closure of these two sites is desired to reduce residual or ongoing risks to either human or ecological health," the tender notes.

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The first phase of the project will involve collecting data on contamination, conducting human health and ecological risk assessments and developing the plan, said Donnie Burke, the executive director of environmental assessment and remediation for Nova Scotia Lands.

The closure plan could involve simply covering the sites with soil and seed or capping them with liners to prevent water from penetrating the soil, Burke said.



Signs at the former Montague gold mine warn visitors of contaminants. (Craig Paisley/CBC)

Both properties are now owned by the province, and although the contaminated material is on both Crown and private land, the current project only includes Crown land.

While the cost of closing the two sites could range from "a couple of million to more," Burke said, that could just be the starting point. Burke said the plan for Montague and Goldenville will be a template for closing other former mining sites in the future.

Gold rushes

People from all over the world flocked to Nova Scotia to hunt for precious flecks of gold and try to strike it rich during gold rushes in the 1860s, 1880s and 1930s.

The miners used liquid mercury to separate the gold particles from the crushed rock, and the leftover material, called tailings, was usually dumped in nearby lakes and streams.

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At some locations in the province, tailings can be several metres deep and cover up to one square kilometre. Tailings have been found in waterways more than two kilometres away from main tailing sites.

Montague Gold Mines and Goldenville were among those mining [hotspots throughout the province](#), and the ghosts of that time remain to this day.



The Goldenville gold mine site in 1911. (Nova Scotia Archives)

The province's soil quality guidelines call for no more than 31 milligrams per kilogram of arsenic.

But in Goldenville, the maximum level found in the tailings was 209,000 milligrams per kilogram, and the average was 19,181 milligrams per kilogram, according to [a 2015 report from the Department of Natural Resources](#). At Montague, the maximum was 41,299 milligrams per kilogram and the average was 13,651 milligrams per kilogram.

The levels of mercury, nickel, lead and antimony have also been found at excessive levels at some tailings sites.



The Montague gold mine as seen in 1911. (Nova Scotia Archives)

Arsenic occurs naturally in rocks, but gold mining can disturb and mobilize it.

In 1976, a man in Waverley — a former gold-producing area near Montague Gold Mines — suffered chronic arsenic intoxication after drinking from a dug well with levels that were 500 times the current limit. [A resulting provincial task force](#) found some wells near gold mining sites had high arsenic levels and some people had clinical symptoms that could be related to arsenic poisoning.

Ingesting arsenic in moderate levels over a lifetime can cause cancer, [according to the provincial government](#), while ingesting high concentrations over a short period of time can cause sickness. Daily exposure to dust from tailings can also cause health effects.

Today, Nova Scotians are unlikely to be affected by mercury from gold mine tailings because their exposure is low, [the province says](#), but long-term exposure at low levels can cause some minor health effects, and people are advised to avoid tailings.



Someone built a ramp out of the tailings at the site of the former Montague gold mine. (Frances Willick/CBC)

The province has taken steps in the past to limit human exposure to the contaminants at the sites.

A popular annual four-by-four vehicle rally that took place on the tailings in Goldenville was shut down in 2006, and signs are posted at both sites to warn visitors of the contamination. However, evidence of recent vehicle use remains at the Montague site, including a ramp and tire tracks.

New research

Linda Campbell, the director of the school of environment at Saint Mary's University and a professor of environmental science, has been studying the effects of historic gold mine tailings on aquatic systems in the old Montague gold district for the past four years.





Linda Campbell is the director of the school of environment at Saint Mary's University and a professor of environmental science. (Craig Paisley/CBC)

After a short walk from a parking area through the woods, the landscape opens into a broad expanse of grey.

"It should be forested right here, and it's not," said Campbell. "The arsenic is too high in the area."

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Beneath her feet is very fine, sand-like material.

"It almost looks like a big playground in the middle of the forest, a sandbox," she said. "There's no beach here, so where did it come from? How would there be sand in the middle of the forest? It doesn't make geological sense."





The ground at the site of the historic gold mine near Dartmouth appears to be covered with sand, but the material is the tailings from the mine, or what is left of the rock after it is crushed to extract gold. (Craig Paisley/CBC)

What she's standing on is the tailings from the old Montague gold mine.

They're responsible for the high mercury and arsenic levels that have been showing up in the creatures Campbell has been studying, including dragonflies, damselflies, mayflies, larvae, beetles, spiders, water striders and scuds — small invertebrates that look like shrimp.

- [**Citizens' group wary of government's 'cozy relationship' with mining sector**](#)

While the Canadian Council of Ministers of the Environment doesn't set acceptable mercury levels for invertebrates, it does for fish. The invertebrates are easily exceeding those levels, with dragonfly nymphs — which feed on "pretty much everything in the lakes" — surpassing the limits by two to 10 times.

"That made us concerned," Campbell said. "If it's accumulating in invertebrates and other things are eating those invertebrates, it could bioaccumulate in the food chain."



Campbell's group has not studied frogs in the gold mine tailings area, as that would require a special permit. But she has found that invertebrates have high levels of mercury and arsenic. (Craig Paisley/CBC)

For comparison, Campbell also studied an area downstream that is not impacted by tailings, and mercury levels there were very low.

Campbell said people should avoid the area on dry, dusty days, and should wash their shoes off if they come into contact with tailings.

"I can say that the risks to humans are high," she said. "You're not going to die the moment that you come into this area, but if you do have continued exposure to the dust and the water from this area, then ... you would need to be concerned about the possibilities of cancer, skin issues and organ failure down the road."



The grey tailings at the former Montague gold mine site are easily spotted from above. (Google Street View)

As the province moves toward closing this area, Campbell questions whether it can truly be cleaned up.

"I don't think we can get rid of the contaminants. I think they're here to stay," she said. "But what we can do is we can look at ways to reduce the toxicity of the contaminants and how to minimize the mobilization of those contaminants so they are more stable."

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