



Summary of Results of the Human Health Risk Assessment of Sediment, Surface Water, and Fish from Barry's Run, Halifax Regional Municipality

In 2019, Halifax Regional Municipality (HRM) commissioned an Environmental Site Assessment (ESA) of municipally-owned property known as Barry's Run, located in Port Wallace, Dartmouth. This area includes a watercourse, which starts upstream of Barry's Run as Mitchell's Brook, and a marshy area, known as a fen, along the sides of the watercourse. Upstream of Barry's Run, on provincially-owned lands, is the former Montague Mines site that ceased operations in 1940, and which is currently undergoing assessment for the purposes of developing a final closure plan. Mitchell's Brook runs alongside the former mine site, travels through Barry's Run, and exits into Lake Charles.

The ESA included sediment and surface water sampling and determined that elevated concentrations of metals, most notably arsenic, were present in sediments within the main channel of the brook and the run. As a result of this study, and the use of the lands for recreational activities such as swimming and fishing, HRM issued a Risk Advisory for Barry's Run (<https://www.halifax.ca/about-halifax/energy-environment/lakes-rivers/barrys-run-risk-advisory>). The advisory notifies site users that high levels of arsenic have been found in the sediments, and that further studies were underway to better understand this issue and determine next steps. Residents were warned to avoid disturbing the sediments or eating fish from Barry's Run until further notice.

In response to these findings and the risk advisory announcement, a new study was commissioned by Nova Scotia Lands Inc (NS Lands), with HRM's permission. NS Lands is leading the mine closure project, on behalf of the Department of Lands and Forestry, for the historical mine site at Montague Mines. This study involved more sediment, surface water and fish tissue sampling and chemistry analysis, as well as a human health risk assessment (HHRA) to assess the potential for health effects in people using Barry's Run for recreational activities such as swimming, hiking or fishing. The focus of the assessment was on arsenic and mercury. Although mercury was not identified as a concern in earlier studies, it was also included in this risk assessment out of an abundance of caution, as it is associated with historic mining activities.

The HHRA used a series of assumptions related to how and when people use the area for various activities, such as hiking along the fen, paddle boarding, kayaking, swimming and wading. These activities could result in people coming into contact with sediments with elevated concentrations of arsenic or mercury, or arsenic in surface waters. In addition, people were assumed to fish in Barry's Run and frequently consume the fish.

The results of the assessment were as follows:

- Exposures to mercury from swimming, contact with sediment and fen soil, or recreational fish consumption are estimated to be so low that any risks are considered to be negligible or insignificant;
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- Exposures to arsenic from surface water contact and incidental ingestion (during infrequent swimming), and walking on fen soils infrequently in bare feet are also so low that any risks are considered to be negligible or insignificant;
 - Some elevated risks related to arsenic exposures were predicted from:
 - Frequent or prolonged sediment contact during recreational activities (e.g., wading; playing in sediments with bare feet and legs)
 - Recreational fish consumption (assuming all fish consumed come from Barry's Run)
 - Frequent walking on fen soils in bare feet
 - While these risks are considered to be low, they are above Provincially accepted levels.

Risk management is currently being implemented through public health warning signage, which instructs people to avoid disturbing the sediments, swimming, or consuming fish, until further notice. It is recommended that input from the community be obtained to ensure that the assumptions used in the HHRA accurately reflect the ways people use Barry's Run for recreational activities. Based on the results of this assessment, there is no need for additional risk management at this time, and the existing risk management approach (signage) should remain in place, in order to minimize exposure potential and reduce the potential for sediment disturbance and mobilization downstream while a final closure plan for Montague Mines is being completed. The need for additional measures will be evaluated following completion of additional closure studies, and consultation with the community.

The final closure project currently underway for the Montague Mines site is expected to further reduce concentrations of arsenic (and mercury) in surface waters, and suspended sediment deposition in Barry's Run.

Based on what we understand now, Barry's Run appears to act as a sink for sediments from upstream areas. This means that sediments tend to get trapped in Barry's Run. NS Lands will be conducting a study to better understand this process. Additional storm water contributions to this area will require careful evaluation. Disturbance of the sediments by public land users (through ATV usage in upgradient stream areas or dirt biking on exposed tailings at the Montague Mines site) has the potential to mobilize sediments in these areas and transport them further downstream, if not properly managed. Previously installed health warning signage will be updated on the exposed tailings areas to alert and remind the public that these areas should be avoided and not disturbed until the final closure and reclamation of the Montague Mines site is completed.
