Ecology Action Centre

tel. 902.429.2202 2705 Fern Lane,
fax. 902.405.3716 Halifax, NS, B3K 4L3

Ecology Action Centre's Comments on the Fifteen Mile Stream Gold Project

The following submission in response to the Fifteen Mile Stream Gold Project Environmental Impact Statement is on behalf of the Ecology Action Centre. The Ecology Action Centre is a member-based environmental charity in Nova Scotia; we are the province's oldest and largest environmental NGO. Since 1971, the Ecology Action Centre has been working at the local, regional, national and international level to build a healthier and more sustainable world.

The Ecology Action Centre does not support the proposed gold mine. Below we have outlined our concerns regarding the project. In our comments, we include requests for additional information and questions that we ask the proponent to address.

Seloam Brook Realignment

2.2.1.9 Seloam Brook Realignment

The proponent is proposing to realign Seloam Brook around the open pit. Seloam Brook will be realigned through the construction of a 1.6 km raised perimeter berm through an approximate 800m constructed realignment channel.

Please discuss relevant Nova Scotia policy and regulations regarding the alterations of watercourses that are consistent with the proposal to realign Seloam Brook.

Please provide a discussion around the risks of failure of the Seloam Brook realignment in terms of scope and magnitude. What actions will the proponent take should the realignment fail? Given that the realignment proposed to be a permanent change, how will the integrity and success of the berm and realignment channel be monitored in the years and decades after the mine has closed?

Please provide information regarding how the success of the realignment will be measured. Draw upon studies and research that demonstrate the success of watercourse realignment for the purposes of open-pit mining. How, and for how long, will the fish and fish habitat be monitored after the realignment?

Please provide information regarding the impacts of the Seloam Brook realignment on the local water cycle. What direct and indirect impacts will the realignment have on groundwater, wetlands and other watercourses in the nearby area?

2.4.1.1.2 Management of historic waste rock and tailings

The proponent writes that "there is elevated arsenic and potentially mercury within this development area documented in surface water and sediment."

tel. 902.429.2202 2705 Fern Lane,
fax. 902.405.3716 Halifax, NS, B3K 4L3

Please clarify the levels of arsenic and mercury documented in the area's surface water and sediment. Given these elevated levels, how does proponent plan to ensure the health and safety for the local ecosystem and human populations?

In addition, "a modular effluent treatment plant for water will be available during construction if required to manage water quality issues should they arise."

Please explain what issues regarding water quality are being referred to in this section. What are the risks and how could they have an impact on groundwater, wetlands and other watercourses in the nearby area?

2.4.6 Summary of Changes to Project Activities

The proponent states that "several design iterations of the Seloam Brook Realignment have been considered to minimize impact to the local watersheds, surface water linear features, wetland habitat, and fish and fish habitat. These design iterations have also been considered in order to provide improvements to fish and fish habitat within and downstream of the realignment as part of Project offsetting measures."

Please provide information regarding how impacts to local watersheds, surface water linear features, wetland habitat, and fish and fish habitat will be minimized. Specifically, please discuss what methods will be used to mitigate harms, and how success of harm mitigation will be determined.

Please provide more details around the improvements to fish and fish habitat within and downstream of the realignment that are planned. How will the success of these improvements be measured?

2.6.16.1 VCs Potentially Affected

In this section, the proponent states "the key VCs potentially affected by the Seloam Brook Realignment at the FMS Mine Site include surface water quality and quantity, groundwater quality and quantity, wetlands, species at risk, and fish and fish habitat."

Please provide additional information for how surface water quality and quantity, groundwater quality and quantity, wetlands, species at risk, and fish and fish habitat may be affected by the Seloam Brook Realignment and the level of risk of these impacts. Please include discussion of both direct and indirect impacts.

Haul Road

2.4.2.1.13 Fuel Supply, Storage and Distribution

The proponent estimates that 6 million liters of diesel per year will be needed to operate the trucks for the Fifteen Mile Stream project. This diesel, as well as the needed gasoline and propane, will be delivered by tanker

tel. 902.429.2202 2705 Fern Lane,
fax. 902.405.3716 Halifax, NS, B3K 4L3

trucks and stored on site. We are concerned that are several ways in which the haul road will negatively impact the local environment and contribute to climate change that have not been properly considered in the EIS. The trucks transporting the contaminated ore to the Touquoy mine would drive past schools, churches, local businesses and hundreds of homes and cottages.

Please provide in-depth consideration around the relationship between climate change and trucking activities, the use of public roads, and the haul road that proponent is proposing to build. In this consideration, please include discussions about emissions from the trucking activities, the risks of transporting contaminated ore, the impacts from dust and noise, and the use of water from washing the trucks and the subsequent risks from the wastewater.

Please discuss the risks and impacts, both direct and indirect, that the trucking activities will have on the local community and on the local biodiversity. In this discussion, please include consideration for the schools, churches, local businesses and hundreds of homes and cottages that the trucks will drive past.

Wetlands

Globally, over 64% of wetlands have been lost due to human activity since 1900[1], and as we lose wetlands, we also lose their incredible benefits and services that they provide to both humans and the natural environment. A GPI Atlantic study (2000), on NS's water resource values wetlands provide an estimated $7.9 billion worth of benefits in ecosystem services to Nova Scotians annually[2]. Given the value over the long term, we have concerns about the direct and indirect impacts of the mining activities and how they will contribute to the continued loss and destruction of natural wetlands. The loss or destruction of wetlands can result in: degradation, fragmentation and loss of wetland habitat and local biodiversity, deterioration of water quality from lack of natural water purification, increased sedimentation and soil erosion, changes in natural hydraulic systems and disruption to the local watershed, reduction in water supply and water storage, higher threat of flooding, and reduction in groundwater recharge and higher vulnerability to droughts. Given that the estimates for the operating phase of the FMS is 7 years, we do not believe that the direct impact of mining activities on 690,817.164 m2 of wetland, and additional indirect impacts, are appropriate or justified.

Like other freshwater sources across Canada and the world, Nova Scotia's wetlands are threatened by climate change. Climate change is adding to and exacerbating existing threats to freshwater, caused by pollution and acid rain, overuse and development, habitat loss and fragmentation, alteration of flow, extreme weather events (e.g., hurricanes), and invasive species.

More consideration is needed regarding: 1) how mining activities might contribute to climate change 2) how the protection of the natural wetlands can help mitigate the increasing impacts of climate change and, 3) how the alteration of the area's natural wetlands might exacerbate impacts of climate change on the local ecosystems.

Ecology Action Centre

tel. 902.429.2202 2705 Fern Lane,
fax. 902.405.3716 Halifax, NS, B3K 4L3

6.7.3.2 Wetlands of Special Significance

In Table 6.7-5, the proponent has highlighted wetlands with observed SAR and indicates whether the wetlands will be partially or completely altered. The SAR observed include: blue felt lichen, mainland moose, olive-sided flycatcher, evening grosbeak, eastern wood-pewee, rusty blackbird, Canada warbler, and common nighthawk. With the exception of four of the wetlands with observed SAR, these wetlands have not been identified as WSS for various reasons. While the migratory species are not enough to consider a wetland a WSS, we believe that special consideration should still be given to wetlands where these SAR have been observed.

We are concerned that the alteration of these wetlands will have negative impacts on the observed SAR.

Please provide more information to address the concern that the alteration may result in impacts greater than the immediate distributed area.

In addition, the proponent considers each wetland individually, but does not take an appropriate consideration of the ecosystem(s) as a whole. Even if other suitable habitat exists in the proposed site and in the surrounding area, there is concern that the destruction of wetlands, and the subsequent infrastructure that will be built and human activity that will take place at these sites, will have direct and/or indirect impacts on the observed SAR and deter these species from occupying the nearby wetlands.

Please provide information regarding the direct and indirect impacts of the altering of wetlands on SAR and the ecosystem as a whole in the surrounding area. Please use examples from existing mine sites.

6.7.6.1.1.1 Direct Wetland Impacts within the FMS Study Area

The proponent writes that "infrastructure has already been planned to avoid wetland impacts wherever practicable."

Please describe the process of how infrastructure is being planned to avoid wetland impacts. Please explain how practicality is conceptualized in this context.

6.7.6.1.1.1.1 Direct Impacts to Wetlands of Special Significance

This section states that four wetlands have been identified as Wetlands of Special Significance (WSS) and that "two wetlands are proposed to be partially (WL27) or completely (WL159) altered to support Project infrastructure." In section *6.7.6.4. Wetland Avoidance* it is stated "three WSS are proposed for partial or complete alteration as the result of the Project. The location of the TMF and associated impacts to WL27 and WL65 are unavoidable." It is explained that blue felt lichen are contained in the Eastern lobe of WL65, and only the Western lobe will undergo alteration.

tel. 902.429.2202 2705 Fern Lane,
fax. 902.405.3716 Halifax, NS, B3K 4L3

It is our opinion that a WSS should not be considered in fragments, but rather each wetland needs to be examined in its entirety. Therefore, wetland WL65 and its proposed alteration should be given consideration in section 6.7.6.1.1.1.1.

Please provide information and case studies to support the fragmentation of a WSS. This should include information to support the assumption that the effects will only be limited to a fragment of the WSS.

The Nova Scotia Wetlands Conservation Policy states "Government will not support or approve alterations proposed for a WSS or any alterations that pose a substantial risk to a WSS, except 1) alterations that are required to maintain, restore, or enhance a WSS; 2) alterations deemed to provide necessary public function, based on an Environmental Assessment (if required) with public review or other approvals (e.g., Wetland Alteration Approval) as appropriate."

The proponent states that the avoidance of the alternation WL27 (a WSS that contains blue felt lichen) is not practical. WL159, which will be altered completely, also contains blue felt lichen. The proponent suggests the translocation of the blue felt lichen.

Because this project does not appear to align with the exceptions outlined in the Nova Scotia Wetlands Conservation Policy, these wetlands cannot be altered by the proponent.

Please explain how practicality is conceptualized in this context.

Please explain the process of translocation, and how the success of the of the translocation process will be monitored, and for how long.

Please explain what actions the proponent will take should the translocation not be successful. Draw upon studies and research that demonstrate the success of the translocation of blue felt lichen.

6.7.6.1.1.1.3 Groundwater Drawdown

We are concerned about the impacts on wetlands by groundwater drawdown near the open pit and around the surrounding area that is expected to occur.

Please clarify the impacts on wetlands should the water table lower by 13.0 m; please provide examples from other mine sites.

There is also concern about the monitoring of wetlands. The proponent writes that "of the 12 wetlands with potential indirect impacts from groundwater drawdown in the pit ROI, only wetland 11 is expected to have a direct interaction with groundwater," and thus only wetland 11 will be monitored.

tel. 902.429.2202 2705 Fern Lane,
fax. 902.405.3716 Halifax, NS, B3K 4L3

We believe the monitoring of only the wetlands with expected direct interaction with groundwater is not adequate; the potential of impacts from groundwater drawdown are reason enough to warrant careful monitoring.

It is also stated that "MEL used a reasonable worst-case scenario to estimate potential indirect impacts to wetland 11 from groundwater drawdown (0.46 ha)".

Please explain how a "reasonable worst-case scenario" was determined and what this entails.

Please provide additional information regarding post-closure monitoring of indirect impacts to wetlands due to groundwater drawdown.

6.7.6.1.1.2 Direct and Potential Indirect Wetland Impact Summary

The proponent states, "design of suitable hydrological connectivity structures (e.g., culverts), the implementation of a Project EMS Framework document (Appendix L.1), and erosion prevention and sediment control methods will be employed to ensure that avoidable indirect impacts to upstream or downstream wetlands will not occur as a result of the activities associated with the Project."

Please reference case studies and other relevant research that discuss the successes and failures of the methods proposed, specifically in relation to other mining sites.

The proponent also writes "The maximum potential indirect impacts of the project on wetlands, considering groundwater drawdown, Seloam Brook Realignment flooding, and surface flow reduction, is 10.78 hectares. This represents 5.1% of delineated wetlands within the FMS Study Area, and 0.8% of wetlands within the LAA. The magnitude of this effect is considered low.... this estimate represents the reasonable worst-case scenario of indirect impacts to wetlands."

Please provide clarity on the methodology used by the proponent to determine the low status of the magnitude of effects. Provide addition information on what constitutes a low, medium and high magnitude.

Please provide evidence from case studies regarding the success of the mitigation measures proposed. In addition, explain how a "reasonable worst-case scenario" was determined in this context and what this entails.

6.7.6.4 Wetland Avoidance

Best management practices for wetland management adopt a three- stage sequence for wetland losses: avoidance, mitigation, and as a last resort, compensation. The proponent states that "the extent to which the proposed Project can be manipulated to avoid impact to wetland habitat is limited" and that "efforts will be made during the final design process to avoid, and reduce impact to, as much wetland habitat as possible."

tel. 902.429.2202 2705 Fern Lane,
fax. 902.405.3716 Halifax, NS, B3K 4L3

Please provide more indication on what actions will be taken to reduce the impacts to wetlands. Specifically, please discuss what methods will be used to avoid wetlands, and, if wetlands are not avoided, how the harms against the wetlands will be mitigated. Please provide alternative scenarios and explain the reasoning for why others are not considered.

It is also stated that "infrastructure that may offer more flexibility in this regard includes the detailed design of the site roads, settling ponds, and stockpile areas."

Please clarify if the EIS, including Table 6.7-16 and the discussions around indirect impacts to wetlands, incorporate the estimated direct and indirect impacts on wetlands by all the site roads, settling ponds, and stockpile areas that are planned.

Please describe to what extent there is flexibility in this regard. Please provide examples to support the description.

There is also concern about the alterations of wetlands due to the construction of the haul road. The proponent sites more than 15 wetlands in Table 6.7-16 that will be partially or completely altered due to the haul road. However, there is no further discussion about the impacts of the haul road on the wetlands, including indirect impacts.

Please provide further discussion about the impacts of the haul road and trucking activities on the wetlands, including both direct and indirect impacts.

Tailings Dam Failure Avoidance

Given the environmental sensitivity of the area the Fifteen Mile Stream Gold Project will occupy, it is curious and disappointing that Section 3.0 Alternative Means of Carrying out the Project in the submitted document Environmental Impact Statement Summary – February 2021 does not include alternatives to the proposed Tailings Management Facilities (TSF) conventional earth-filled water dam with all its inherent environmental and ecological risks. Alternatives to the proposed TSF with less risk should be studied and reported to the IAAC/AEIC with the alternative which poses the least amount of risk to the environment, the ecology and the affected communities required to be implemented. In fact, this approach should be an agency requirement for all environmentally sensitive projects.

Failure statistics of Tailings Storage Facilities employing conventional earth-filled water dams are well known (approximately a 1-in-600 chance of a tailings dam failure in any given year[3]). This translates into an expected catastrophic failure of one in every 5 years for every 20 such dams, regardless of year built. The "Report on Mount Polley Tailings Storage Facility Breach," published on January 30, 2015, following the August 2014 TSF tailings dam failure at the Mount Polley Mine, concluded that: "the future requires not only an improved adoption of Best Applicable Practices (BAP), but also a migration to Best Available Technology (BAT).

tel. 902.429.2202 2705 Fern Lane,
fax. 902.405.3716 Halifax, NS, B3K 4L3

Examples of BAT are filtered, unsaturated, compacted tailings and reduction in the use of water covers in a closure setting".

As the inventory of active dams in Nova Scotia increases due to an increase in the number of active mines, including gold mines, we can expect a failure in the "not too distant future", unless we adopt a more risk-adverse TSF technology. The implication of this to Nova Scotia and its environment suggests strongly that we cannot accept "business as usual", nor can we accept the "least cost" approach. Specific recommendations are made in the body of the report referenced above point to how this risk can be significantly reduced: filtered tailings providing unsaturated, compacted tailings and significant reduction in water behind the dam, as well as design that includes rigorous safety controls.

The following sections from the "Report on Mount Polley Tailings Storage Facility Breach," Section 9.2 GETTING TO ZERO should be examined and responded to by the proponent:

"In risk-based dam safety practice for conventional water dams, some particular level of tolerable risk is often specified that, in turn, implies some tolerable failure rate. The Panel does not accept the concept of a tolerable failure rate for tailings dams. To do so, no matter how small, would institutionalize failure. First Nations will not accept this, the public will not permit it, government will not allow it, and the mining industry will not survive it."

"Clearly, improvements to current practice provide an essential starting point on the path to zero failures. But the Panel's evaluation of portfolio risk shows that incremental changes will not be sufficient to achieve this objective."

"Conclusion: The path to zero needs an added dimension, and that dimension is technology."

"Tailings dams are complex systems that have evolved over the years. They are also unforgiving systems, in terms of the number of things that have to go right. Their reliability is contingent on consistently flawless execution in planning, in subsurface investigation, in analysis and design, in construction quality, in operational diligence, in monitoring, in regulatory actions, and in risk management at every level. All of these activities are subject to human error."

"Human error is often, if not always, found to play a key role in technological failures. And human error will always be with us, as much as we might wish it to be otherwise. This is why failures invariably bring about improvements in technology that help compensate for human error. In perhaps the most notorious containment failure, double-hulled tankers were mandated after the Exxon Valdez oil spill. Similarly, improvements to rail tank cars are being adopted in the wake of the Lac-Mégantic tragedy. But tailings dams have no such redundancies. Without exception, dam breaches produce tailings releases. This is why best practices can only go so far in improving the safety of tailings technology that has not fundamentally changed in the past hundred

tel. 902.429.2202 2705 Fern Lane,
fax. 902.405.3716 Halifax, NS, B3K 4L3

years."

"Improving technology to ensure against failures requires eliminating water both on and in the tailings [my emphasis]: water on the surface, and water contained in the interparticle voids. Only this can provide the kind of failsafe redundancy that prevents releases no matter what. In terms of portfolio risk, Appendix I shows that this works by reducing the inventory of active tailings dams subject to failure in the first place. Simply put, dam failures are reduced by reducing the number of dams that can fail.

"Thus, the path to zero leads to best practices, then continues on to best technology.

"Conclusion: Failures invariably bring about improvements in technology that help compensate for human error."

From Section 9.3 BEST AVAILABLE TAILINGS TECHNOLOGY of the above referenced report:

"9.3.1 BAT PRINCIPLES
While best practices focus on the performance of the tailings dam, best available technology (BAT) concerns the tailings deposit itself. The goal of BAT for tailings management is to assure physical stability of the tailings deposit. This is achieved by preventing release of impoundment contents, independent of the integrity of any containment structures. In accomplishing this objective, BAT has three components that derive from first principles of soil mechanics:

1. Eliminate surface water from the impoundment.
2. Promote unsaturated conditions in the tailings with drainage provisions.
3. Achieve dilatant conditions throughout the tailings deposit by compaction."

"The first of these, eliminating surface water, not only precludes release of water itself, but also eliminates fluvial tailings transport mechanisms like those illustrated in Appendix C during the Mount Polley breach. The second, promoting unsaturated conditions by drainage, reduces the possibility for, and the quantity of, high-mobility flowslide release of tailings. And the third, achieving dilatant conditions by compaction, further reduces flowslide potential by improving the properties of the tailings mass. Thus, underpinning these principles are multiple redundancies that provide defence in depth."

"The Panel recognizes that eliminating water from the tailings deposit will not eliminate the need for storage of mine and processing water elsewhere. But Mount Polley has shown the intrinsic hazards associated with dual-purpose impoundments storing both water and tailings. The Panel considers that security can be more readily assured for conventional water dams that are designed and constructed for their own purpose and that preventing tailings release is the overriding imperative."

tel. 902.429.2202 2705 Fern Lane,
fax. 902.405.3716 Halifax, NS, B3K 4L3

"9.3.2 BAT METHODS
The overarching goal of BAT is to reduce the number of tailings dams subject to failure [Eliminate the water]. This can be achieved most directly by storing the majority of the tailings below ground—in mined-out pits for surface mining operations or as backfill for underground mines. Both methods require integrating tailings planning into mine planning. This has not been common practice in the industry to date, as the Mount Polley case has shown, and the synergies to be achieved are mostly unexplored. Apart from this, surface storage using filtered tailings technology is a prime candidate for BAT."

Full consideration of BAT as it relates to the TSF for the Fifteen Mile Stream Gold Project has not been carried out and should have been carried out and reported in the Project Description Summary. The key comment put forth here is that an appropriate evaluation of ALL BAT for the TSF should be carried out and reported before the Environmental Impact Statement Summary can be accepted, with serious technical consideration to filtered tailings providing unsaturated, compacted tailings and significant reduction in water behind the dam (perhaps even its elimination), as well as design that includes rigorous safety controls. Moreover, the IAAC/AEIC should require that the most appropriate and risk adverse technology be implemented for the Fifteen Mile Stream Gold Project regardless of the cost implications or the impact on the economics of the Project. This should apply, moving forward, to all mining projects that might consider employing conventional earth-filled water dams to store their tailings. It should be the rule, not the exception. It's the only way of getting to ZERO DAM FAILURES.

Wildlife

The Wildlife Act of Nova Scotia applies to nests and eggs, specifically bird nests and eggs and turtle eggs. The EIS does not describe the direct impact to bird eggs that would occur when partially or completely destroying wetlands. Multiple bird species were found in wetlands, during nesting season. The historic tailings and other parts of the site that have gravel or sand may be suitable nesting habitat for turtles.

Please describe what actions will be taken to avoid destroying bird eggs in wetlands. The proponent should describe how locations with suitable habitat for turtle nesting will be surveyed, and how the destruction of turtle eggs during site construction and during use of the site for mining will be avoided.

Birds

Eighty-nine species of migratory birds were observed at the site. Of these, 16 species use intact interior forest, which is found at the site.

The proponent should describe the peer-reviewed literature on the impacts of noise, and of light pollution, to forest bird species, at each life stage (including migration).

tel. 902.429.2202 2705 Fern Lane,
fax. 902.405.3716 Halifax, NS, B3K 4L3

Migratory birds are protected under the federal *Migratory Bird Convention Act*. Resident (non-migratory) birds are protected under the provincial Wildlife Act. The project proposes that resident birds would be killed at the site.

Please describe how the killing of birds (including through clearing sections of the site, and through operation) interacts with the Wildlife Act. Alternatives to projects activities should be proposed that eliminates the killing of resident birds.

The proponent states that with their mitigation strategies in place, there will be no significant adverse effect on birds.

Please explain why the proponent views direct mortality as not a significant adverse effect for bird species found at the site for which there are national or provincial recovery strategies.

The project's Residual effects on birds and bird habitat are deemed "not significant" (see Table 6.11-11), but the rationale behind this is unclear. The rationale provided states "*A significant adverse effect from the Project on avifauna is defined as an effect that is likely to cause a permanent, unmitigated, alteration to habitat that supports avian species distribution. An adverse effect that does not cause a permanent alteration in distribution of any bird species is considered to be not significant.*" However, the proponent states that the project will permanent remove 275 ha that is currently used by birds. Won't this alter breeding birds' distributions at the site and beyond?

The proponent should provide better rationale for why they deem residual effects on birds and bird habitat "not significant."

The proponent could describe habitat restoration offsets they could complete in response to the birds habitat being cleared.

6.11.6.1.3 Direct Mortality

The proponent states "Migratory birds may be indirectly impacted as a result of the surface water quality in the pit lakes and the TMF constructed to support the Project, and Touquoy Mine Site open pit, which will store tailings from the Project. These water features may appear to be resting places for migratory birds, however, mitigation measures such as bird deterrents are currently in place at Touquoy Mine Site, and will be applied to reduce the potential environmental impacts of the Project on migratory birds at the FMS Study Area as per existing approvals."

Please provide evidence that the bird deterrents and other mitigation measures that are currently in place at Touquoy Mine Site are successful in preventing negative impacts on birds. Please include research on the effectiveness of theses mitigation measures to support claims.

Moose

The EIS uses an outdated estimate for the Mainland Moose population in the Nova Scotia.

tel. 902.429.2202 2705 Fern Lane,
fax. 902.405.3716 Halifax, NS, B3K 4L3

Please seek the updated estimate from Department of Lands & Forestry.

The proponent states they will "endeavor" to avoid moose shelter patches at the FMS site, the locations of which were confirmed by DLF. Because there is an absence of core habitat designated for moose under the NS Endangered Species Act, the proponent should commit to completely avoiding all alteration of all of the moose shelter patches. This is the minimum the proponent can do at this site, given the best information available, to reduce significant adverse effect on this Endangered species for which habitat loss is a major known cause of decline and threat.

The presence of Mainland Moose has been monitored at the Touquoy site, and results provided to DLF. Please provide all of these results in the FMS document; this should be accompanied by an analysis by DLF regarding whether there was a reduction in moose observations around the Touquoy site. The proponent should also discuss the literature on the sensitivity of moose to noise (there is research out there).

Lichens

Nine species of lichen of conservation interest were found at the site. However, the mitigation action of translocation was only proposed for one species.

Please describe and commit to mitigation actions for the other 8 lichen SOCI.

The proponent proposes to eliminate impacts to the Blue Felt Lichen at the site by 1) claiming that one wetland in which Blue Felt Lichen is found can be considered in two fragments (with impacts to only "one side," avoiding the site with Blue Felt Lichen), and 2) claiming that potentially impacted Blue Felt Lichen can be translocated within the site or off-site.

Please describe the scientific basis for dividing a continuous wetland into two "lobes," and provide evidence that impacts to one "lobe" do not impact another "lobe."

Please provide evidence that translocating Blue Felt Lichen has already been successful (I.e., the lichen thallus that was translocated has been documented as thriving for years after the move) at another site in Nova Scotia before claiming it is a viable mitigation-reduction action at Fifteen Mile Stream. The proponent should provide references to peer-reviewed literature on this matter.

Blue Felt Lichen was also found at Touquoy during surveys before the project was commenced.

Please return to the sites where Blue Felt Lichen was found in 2004 and 2005 and assess the health of these lichen in order to compare the impacts at Touquoy to those proposed at Fifteen Mile Stream. Methods for assessing health of individual lichens are available from the lichen experts in the province.

The provincial Special Management Practices for At Risk Lichen should be followed at this site, as a minimum.

tel. 902.429.2202 2705 Fern Lane,
fax. 902.405.3716 Halifax, NS, B3K 4L3

Location of tailings pile

Please include the factors that were used in the process for considering and selecting the candidate locations for the tailings pile. In this discussion, the proponent should also include the distance to protected areas for each of the candidate locations.

Noise

Noise pollution is the exposure of people or animals to levels of sound that are annoying, stressful, disruptive, or damaging to the ears. Noise greater than 65 to 70 decibels (dBs) is considered the benchmark of 'annoying' – above this, people are likely to be bothered enough to do something about their discomfort.[4] The magnitude of noise pollution can be *partly* estimated based on measurements of sound intensity and frequency, but is also dependent on the emotional status of the affected persons. For example, the sound of an ambulance siren, although annoying, may be considered tolerable, since the ambulance is likely saving someone's life. A ticking clock can have a low sound intensity, but be considered highly disturbing by the person hearing it if they especially don't like that noise.

Noise pollution is known to decrease quality of life by increasing stress, causing sleeplessness, and disrupting routine tasks. Multiple studies, especially those done on school children, have demonstrated that increased noise pollution decreases quality of life, especially mental health.[5] [6] [7] In an Austrian group of school children exposed to high levels of environmental noise children self-reported having a poorer quality of life, and their teachers reported poorer performance in school, than those in a quieter part of town.[8] Continual or repeated exposure to noise, even at relatively low levels (such as 85 dBs) can lead to hearing loss.

Major sources of noise pollution include airplanes and traffic. In the United States military flyovers are so common, and have caused such public frustration, that legislation has been enacted to control aircraft noise. Lawsuits have been launched against the U.S. government for loss of hearing, and loss of land value as a result of continual exposure to loud aircraft noise below military training flightpaths. The Aircraft Noise Abatement Act aims to limits environmental noise levels to 55 dBs during the day, 45 dBs at night (and special considerations for especially sensitive facilities, such as hospitals). The Noise Control Act of 1972 gave the Environmental Protection Agency the power to set noise standards for vehicles and railroads, but funding for this initiative was cut in 1981. In Canada there are no national standards regarding noise pollution, despite the fact that Health Canada identified noise pollution as a "real and present danger to people's health" in a 1980's report.[9] The federal government does regulate noise levels on certain consumer products, vehicles, and over interprovincial roads, railways, and waterways. Generally, it is municipal bylaws that have the teeth to respond to local complaints.

Unfortunately, noise pollution is yet another way in which we are adversely affecting wildlife. Ships, submarines, and oil and gas extraction towers all create noise underwater – at frequencies that whales and fish can perceive.[10] [11] Research has shown that human-created underwater noise can alter the behaviour and communication of orcas and belugas.[12] [13] Marine mammals may even get a double-dose of irritation by

tel. 902.429.2202 2705 Fern Lane,
fax. 902.405.3716 Halifax, NS, B3K 4L3

exposure to planes and helicopters flying over as they surface[14]. Back on land, we are disrupting the lives of birds, their mating calls "masked" by traffic noise.[15] [16] In England, a bat colony was repeatedly observed emerging later in the evening due to a nearby outdoor music festival.[17] In fact, the seriousness of the impact of human-created noise is recognized by the U.S. National Parks Overflights Act, passed over 20 years ago. This law limits the altitude at which aircrafts can pass over a park, due to the negative effect on park visitors' experience, and the possible detrimental effect on wildlife.

Noise pollution is on the rise. Developing areas such as Kuwait, Turkey, and India have already identified increased noise pollution in urban areas due to construction and traffic.[18] [19] [20] In Europe, it is estimated that the proportion of the population exposed to "loud" (greater than 65 dBs) noise increased by 16% from 1986 to 1996.[21] There are non-profit groups devoted to raising awareness about noise pollution, and reducing the din.[22]

In Halifax, bylaw N-200 restricts activities that "unreasonably disturb the peace and tranquility of the neighbourhood."[23] The penalty is $300 or more for the first offence, increasing for each subsequent offence. The bylaw lists prohibited times, for example no operation of construction equipment is allowed before 8 am or after 7 pm on a Saturday. But any infraction that is substantially disruptive at any time of day or night could be superseded by the overall intent of the bylaw.

Noise-induced hearing loss is irreversible, and affects 1 out of 10 Americans.[24] The effects of noise pollution on wildlife on land, in the air, and in the sea we are only beginning to understand, yet it is already become clear that these impacts are substantial and significant.

The proponent should include more baseline noise monitoring locations. Specifically, there should be more monitoring locations to the southeast, including in the nearby Wilderness Areas. A monitoring location should be included in each of the two Wilderness Areas to the southeast at spots where visitors enter these Wilderness Areas.

The proponent should address why noise generated from trucks moving tailings to the tailings pile isn't considered a source of noise. It would be a source of noise, and could potentially negatively impact receptors to the southeast, including in the Wilderness Areas there.

The proponent should describe the potential noise impacts of trucks hauling ore along the proposed haul route. This should include data on the noise level that these trucks produce, modelled noise level for receptors like homes and schools along the route, and mitigation measures that will be put in place to reduce noise from trucks.

[1] https://www.ramsar.org/sites/default/files/documents/library/factsheet3_global_disappearing_act_0.pdf
[2] http://www.gpiatlantic.org/publications/abstracts/waterquality-ab.htm
[3] Report on Mount Polley Tailings Storage Facility Breach, Sec. 9.1.

tel. 902.429.2202 2705 Fern Lane,
fax. 902.405.3716 Halifax, NS, B3K 4L3

[4] Pepper, C. B., Nascarella, M. A., & Kendall, R. J. (2003). A review of the effects of aircraft noise on wildlife and humans, current control mechanisms, and the need for further study. *Environmental Management, 32*(4), 418-432.
[5] Pepper, C. B., Nascarella, M. A., & Kendall, R. J. (2003). A review of the effects of aircraft noise on wildlife and humans, current control mechanisms, and the need for further study. *Environmental Management, 32*(4), 418-432.
[6] Lercher, P., Evans, G. W., Meis, M., & Kofler, W. W. (2002). Ambient neighbourhood noise and children's mental health. *Occupational and Environmental Medicine, 59*(6), 380-386.
[7] Singh, N., & Davar, S. C. (2004). Noise pollution- sources, effects and control. *Journal of Human Ecology, 16*(3), 181-187.
[8] Lercher, P., Evans, G. W., Meis, M., & Kofler, W. W. (2002). Ambient neighbourhood noise and children's mental health. *Occupational and Environmental Medicine, 59*(6), 380-386.
[9] CBC Marketplace. (2001). *How loud is your house? A look at the dangers of 'noise'* [Television broadcast]. Summary available: http://www.cbc.ca/consumers/market/files/home/noise/index.html [2005, November 6].
[10] Croll, D. A., Clark, C. W., Calambokidis, J., Ellison, W. T., & Tershy, B. R. (2001). Effect of anthropogenic low-frequency noise on the foraging ecology of balaenoptera whales. *Animal Conservation, 4*(1), 13-27.
[11] Popper, A. N. (2003). Effects of anthropogenic sounds on fishes. *Fisheries (Bethesda), 28*(10), 24-31.
[12] Erbe, C. (2002). Underwater noise of whale-watching boats and potential effects on killer whales (orcinus orca), based on an acoustic impact model. *Marine Mammal Science, 18*(2), 394-418.
[13] Scheifele, P. M., Andrew, S., Cooper, R. A., Darre, M., Musiek, F. E., & Max, L. (2005). Indication of a lombard vocal response in the st. lawrence river beluga. *Journal of the Acoustical Society of America, 117*(3, Part 1), 1486-1492.
[14] Patenaude, N. J., Richardson, W. J., Smultea, M. A., Koski, W. R., Miller, G. W., & Wursig, B. et al. (2002). Aircraft sound and disturbance to bowhead and beluga whales during spring migration in the alaskan beaufort sea. *Marine Mammal Science, 18*(2), 309-335.
[15] Il'ichev, V. D., Kamenskii, I. I., & Silaeva, O. L. (1995). Ecological and industrial factors of noise pollution in natural bird habitats. *Ekologiya (Moscow),* (5), 373-376.
[16] Rheindt, F. E. (2003). The impact of roads on birds: Does song frequency play a role in determining susceptibility to noise pollution? *Journal Fuer Ornithologie, 144*(3), 295-306.
[17] Shirley, M. D. F., Armitage, V. L., Barden, T. L., Gough, M., Lurz, P. W. W., & Oatway, D. E. et al. (2001). Assessing the impact of a music festival on the emergence behaviour of a breeding colony of daubenton's bats (myotis daubentonii). *Journal of Zoology (London), 254*(3), 367-373.
[18] Singh, N., & Davar, S. C. (2004). Noise pollution- sources, effects and control. *Journal of Human Ecology, 16*(3), 181-187.
[19] Koushki, P. A., Kartam, N., & Al Mutairi, N. (2003). Urban development and construction noise: A study in metropolitan kuwait. *Kuwait Journal of Science and Engineering, 30*(2), 119-138.
[20] Yilmaz, H., & Ozer, S. (2005). Evaluation and analysis of environmental noise pollution in the city of erzurum, turkey. *International Journal of Environment and Pollution, 23*(4), 438-448.
[21] Lercher, P. (1996). Environmental noise and health: An integrated research perspective. *Environment International, 22*(1), 117-129.
[22] Noise Pollution Clearinghouse. (No date). *Noise Pollution Clearinghouse, quieting noise pollution* [Online]. Available: http://www.nonoise.org/ [2005, November 6].
[23] Halifax Regional Municipality. (1999). *Noise By-law* [Online]. Available: http://www.halifax.ca/legislation/bylaws/hrm/documents/By-lawN-200_000.pdf [2005, November 6].
[24] American Academy of Otolaryngology – Head and Neck Surgery. (2005). *Noise & Hearing Protection* [Online]. Available: http://www.entnet.org/healthinfo/hearing/noise_hearing.cfm [2005, November 6].