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Beaver Dam Mine - Environmental Impact Statement Response – Dec. 17, 2021

The Eastern Shore Forest Watch Association is a community organization founded in 1998 to address forestry practices and environmental issues that affect the health of the forests, wildlife, and human inhabitants of Nova Scotia's Eastern Shore. We have been engaged with environmental assessments of Atlantic Gold projects since 2007.

Atlantic Mining Nova Scotia (AMNS) does not adequately acknowledge ecosystem and natural resource values and focuses on financial gain for shareholders and some very limited and short-term economic activity. The unacceptable assessment of cumulative impacts on the Eastern Shore region requires, in our opinion, someone to speak up for the environment and call for regulators to give full consideration to long-term sustainable development with strong environmental protection as defined by the United Nations and adopted by the Federal and Nova Scotia Governments.

GENERAL COMMENTS REGARDING GOLD MINING IN THE EASTERN SHORE REGION

In our opinion, Atlantic Mining Nova Scotia (AMNS) is manipulating the permitting system. AMNS asserts that small mines have less impacts. It is a divide and conquer approach. We believe the area is essentially one large project with multiple parts. The success of new projects depends on the Touquoy mine site. Without the Touquoy mill and facilities, the smaller mines would be far less economically viable. Section 2.10.5.1.2 regarding the Beaver Dam Mine states, *"Alternatives to processing ore at the Touquoy Mine Site are cost prohibitive and environmentally inferior."* We fail to see how AMNS can continue to focus on separate mines in environmental assessments, but focus on the region as a financial and development strategy.

There are many examples of this strategy. AMNS's predecessor, Atlantic Gold, issued a Press Release through the Australian Stock Exchange's Company Announcements Office on Feb. 16, 2006 regarding an upgraded resource estimate on the Touquoy Mine Project but also included a statement about regional exploration to build its resource base. *"In addition to developing the Touquoy Gold Project ATV is undertaking extensive exploration, both regional and near-mine, to* build its resource base. The Company believes the area is highly prospective for additional Touquoy style deposits. Most recently ATV has identified four strong bedrock anomalies distributed over 8km strike length on the Caribou Joint Venture property 9km north of Touquoy, and to which further drilling is to be applied. Apart from the 50:50 Caribou JV, ATV maintains, or may acquire, 100% interest in all its other exploration ground in Nova Scotia". This clearly shows an early intention to mine as many deposits as possible through a path of least resistance – by convincing government regulators that isolated small mines with one large processing facility have less impacts than assessing all the connected areas as one large mining project.

The St. Barbara (Parent of Atlantic Mining NS) website states, "Further to the currently operational open pit, there is planned expansion of three additional projects nearby at Beaver Dam, Fifteen Mile Stream and Cochrane Hill, with a combined estimated mine life for the operation to 2030. In addition to developing our existing project pipeline, we are exploring in the Moose River Corridor and elsewhere in Nova Scotia." (Accessed 2021.12.09)

In the Beaver Dam EIS, corporate presentations, media releases and technical/economic reports, Atlantic Mining constantly discusses the Eastern Shore as a prospective region. In the KPMG Nov. 2020 Economic Assessment (Appendix O.1), KPMG state that *"The Beaver Dam is not a standalone project and it will be carried out in conjunction with the Touquoy mine."* and *"Atlantic Gold is currently focused on the development of its portfolio of advanced gold development properties located in Nova Scotia. The company currently holds four gold development projects in the province (Touquoy, Beaver Dam, Cochrane Hill and Fifteen Mile Stream)."*

What is not included, is an assessment of cumulative effects and benefits over the entire Eastern shore area. The Eastern Shore is unique in its *wildness*, Protected Areas, Significant Habitats, wildlife, waterways, offshore islands, natural history, and way of life. Given the number and distribution of mines to be developed in the near term and with consideration of deposits being evaluated for long-term development in AMNS's 'project pipeline', it appears the divide and conquer approach softens the cumulative impacts. What appears to be an effort to reduce individual mine site footprint, actually creates a network of impacts over a larger area where individual impacts *seem* less. The individual mines are nodes of impacts connected by human activities, like roads to transport mined materials which impact non-human activities such habitat and ecosystem functioning which are connected by steams and rivers throughout the Eastern Shore area. It is not one or two mine sites to worry about, but three or four and maybe five or more mines. The Eastern Shore has essentially become one large 'gold district'.

The Touquoy Mine and AMNS's three additional proposed mines (Beaver Dam, Fifteen Mile Stream and Cochrane Hill) and the potential mines at Caribou Mines and Harrigan Cove are shown in Figure 1. The green shaded areas on the map show the Eastern Shore's Protected

Areas, Provincial Parks, Significant Habitats and Parks. The golden areas are Atlantic Mining's claims and Exploration Licences. The large red arrows show the pathway of treated effluent from each mine site.

With the adoption of Bill C-69, and the move from 'Environmental Impact Assessment' under CEAA to 'Impact Assessment' under IAAC, we understand this new legislation is broader in scope and places more emphasis on sustainability. A close look at stated socio-economic impacts of the Beaver Dam project is warranted, due to the nature of the project and the known and publicly stated *intent* of AMNS. In the preceding paragraphs we outlined that meaningful and transparent impact assessment of this project requires looking at the big picture, as social and environmental 'cumulative regional impacts' cannot truly be assessed if mines that are related geologically, spatially and functionally are assessed independently of each other. Just because AMNS considers each mine to be a separate project does not mean that it is an accurate picture of what is actually happening. To rephrase our opening comment, we believe AMNS has found loopholes in the regulatory system. We recognize that EIS's are assessed according to applicable legislation. Our concern is that AMNS is self-defining the nature of impacts on the Eastern Shore as associated with individual projects, however the natural area is not defined in the same way. We feel all gold mining on the Eastern Shore needs to assess impacts and cumulative impacts at a regional scale. Our rationale is that the current Beaver Dam Mine is only one of four mines in the development phase. As stated, two additional mines are being evaluated (Cochrane Hill and Fifteen Mile Stream). Furthermore, other companies are also looking to develop mines at Tangier, Goldboro, Goldenville, and Forest Hill. Figure 2 shows mineral exploration claims, proposed, and potential gold mines along the Eastern Shore. We feel it is appropriate to establish guidelines NOW regarding regional impact assessment.

Environmental and social impacts will not be felt by shareholders. These impacts are out of sight and mind. And AMNS has undertaken expensive and extraordinarily detailed studies to convince the public and regulators that there is really nothing to worry about. A lot is at stake for investors and company officials who will reap the lion's share of the benefits if projects move forward. In comparison, the region will receive minor very short-term and short-sighted socio-economic benefits while the environment and its communities assume the lion's share of the risks and long-term effects. Few sustainable benefits will be realized by communities along the Eastern Shore. We think there needs to be more balance between environmental and social equity and perceived economic benefits.

As an example, the potential for growing sustainable experiential-based tourism is significant, especially as baby boomers set to retire and look for unique experiences. These and other sustainable initiatives may have less chance of success if gold mining at every potential site becomes reality. The potential network of regional gold mining discussed here is concerning to some people and frightening to others.

SOCIO-ECONOMIC BENEFITS CLAIMS IN THE EIS

Section 1.3 - Purpose of the Project: "The implementation of the Project will provide additional ore to the existing Touquoy Mine processing plant. This will extend the life of the Touquoy Mine Site to continue to provide economic and social benefits with minimal additional infrastructure. Completing the Project with safe production, environmental stewardship and community engagement is key for the Proponent to ensure that the Province, the community, and the Mi'kmaq of Nova Scotia receive optimum benefit." Define what is meant by "optimum benefit": What criteria was used and who developed the criteria?

Section 6.16 - Socio-economic Conditions goes to great lengths to set the scene for the existing conditions. Statements about impacts to other business such as tourism are discussed again in isolation. For example, *"Tourism is not significant within the communities directly adjacent to the proposed Beaver Dam Mine Site."* This is not an accurate depiction of tourism in NS. Tourists are not generally travelling to the Beaver Dam Mine site or any of the other mine sites. However, they will travel roads, waterways, and natural areas that will be impacted by mine development or mining activities. <u>Statements of this type are dismissive and not accurate in our opinion.</u>

Section - 6.16.4.13 Natural Resource Use states that "Natural resources include forestry, mining, and water." This statement perhaps best illustrates AMNS's complete ignorance of the value of ecosystem/natural resources services and illustrates their sole focus is financial gain. It also explains why these projects are so contentious.

One five-lines paragraph is an abysmal treatment of this topic. A search of 'ecosystem services' in the EIS results in only one mention of the term, which is actually the name of a protocol. This clearly shows a lack of appreciation for values other than financial gain. A GPI Atlantic study (July 27, 2000) on NS's water resource values estimates that wetlands provide \$7.9 billion worth of benefits in ecosystem services to Nova Scotians annually. The report states that "the GDP and other market statistics send the wrong message to policy-makers and the public about the health of our environment, because they count the depletion of natural capital as economic gain. The more trees, water and fish we consume, the faster the economy grows. The more pollution we have and the more we spend on clean-up, the more the GDP will grow. By contrast, the GPI [Genuine Progress Index] shows that our natural resources provide enormous value to society and the economy, and that we have to use them responsibly if we want to benefit the economy and future generations."

(http://www.gpiatlantic.org/publications/abstracts/waterquality-ab.htm).

A full assessment of socio-economic impacts should be required to assess and explain the trade offs of short-term gains (mainly by the company) vs. long-term economic sustainability. The

combined mine life of the Beaver Dam, Fifteen Mile Stream and Cochrane Hill mines is about 8-10 years (end of mine life is stated to be 2030).

Section 6.16.5 - Themes and Topic Areas discusses jobs and workforce development. AMNS is creating jobs for the near term. There is no socio-economic discussion regarding how the stated economic benefits will actually translate into long term stability for the region. Gold mining has always been and remains a boom-and-bust activity where companies make fortunes and communities become ghost towns. AMNS is not investing in the future. It is our opinion that the area will revert back to its pre-mining socio-economic conditions fairly quickly, but the environmental conditions will take many decades to return to some level of sustainable conditions. Ecosystem services value will be lost for decades as well. We feel the discussion on socio-economic benefits is completely inadequate to fully understand the values associated with ecosystem services and natural area values and should be rewritten to cover these gaps.

A responsible approach for AMNS would be to become knowledgeable about global guidelines on sustainability and social responsibility and develop effective strategies and initiatives to address the fundamental gaps in their treatment of social and environmental issues in their EIS. This would be a minimal step in a move towards sustainability. <u>We feel this is an appropriate</u> <u>request.</u>

In the Updated EIS, AMNS discusses the socio-economic benefits referenced in Economic Impact Assessment of the Moose River Consolidated (MRC) Project by KPMG International. It finds that socio-economic benefits will stem primarily from the construction and operation phases of the Project. It is unclear to us why AMNS is using the KPMG 2015 Economic Impact Assessment for the Moose River Consolidated (MRC) Project in some sections of the Updated Beaver Dam Mine EIS (i.e., Section 6.16.1.1), or the KPMG Nov. 2020 Economic Assessment (Appendix O.1) in other areas. This should be clarified to help the average person follow the claims by AMNS.

PUBLIC ENGAGEMENT (SECTION 3)

It is abundantly clear that the engagement strategy is designed to respond to concerns in a way that ensures that the Beaver Dam Mine goes ahead. AMNS uses terms like "meaningful, two-way relationships with communities most impacted" yet they have never considered allowing the broader 'community and stakeholders' to define themselves. IN using St. Barbara's guiding principles, AMNS has pre-defined what community and stakeholders means to the Eastern Shore residents.

AMNS strategy is heavily biased towards engaging residents and organizations that will benefit economically as the Community Liaison Committee (CLC) make-up has shown. Secondary

stakeholders like the ESFWA are asked to participate separately. It is a divide and conquer strategy. Economic factors are separated from environmental and social factors in a convenient fashion.

ANMS has now found yet another way to sidestep the real issues. They talk about listening and learning through "adaptive management," but environmental interests Like the ESFWA have been pleading for more than a decade to be heard. Now that governments *are* listening and AMNS wants to 'do better' (to use St. Barbara's guiding words of wisdom), they are trying to figure out how to deal with environmental and social stakeholders, without really dealing with them. According to the Beaver Dam Mine Project 2021 EIS Update, Version 3, page 3-8, "AMNS plans to integrate the adaptive management approach into their other mine projects, including Fifteen Mile Stream Gold and Cochrane Hill Gold projects".

This approach <u>still</u> flagrantly ignores a fundamental issue of environmental and social groups which is the lack of recognition of collective or 'regional' impacts on the Eastern Shore *gold mining district*. The satellite mines in the development pipeline are spatially separated which is very convenient for AMNS because it supports the divide and conquer, minimal perceived impact strategy they use.

Interestingly, AMNS and their predecessor did the opposite when constructing the CLC. There are local residents on the committee, but AMNS looked far and wide to find support from economic interests, while failing to do the same with respect to environmental and social interest groups. At best this shows a poor understanding of the principles of public engagement and the use of a CLC; at worst it is a systematic, divide and conquer technique that shows little respect of community stakeholders with environmental and social interests.

Transparency within the EIS and EA Frameworks

Public companies often report their operational performance in terms of their sustainability efforts. St Barbara is one of them, yet does not seem to actually address citizens' environmental concerns. The disconnect between what is posted on the St Barbara website and what happens on the ground is remarkable. This is evident in the fact that representatives from organizations like ESFW have never been asked to sit on the CLC. AMNS has repeatedly found ways to ignore certain groups' input and focus on supporters benefiting from mining. There is a profound mistrust of AMNS based on their environmental, social and issues management performance and past performance. There is no attempt to bridge this gap. AMNS approach is to identify environmental effects, develop standard mitigation measures which are described as leading best management practices although they are simply the ones that are the most financially advantageous for the company. There are no discussions on alternatives to what has been conveyed in the EIS.

We know from simple internet searches that companies are using innovative tools and techniques to protect the environment. We are not surprised that these more costly innovations are included as alternatives, what we are surprised at is that there is no discussion of alternatives whatsoever. To the average person it appears that there is no better way of doing the project, while in reality AMNS doesn't want to consider <u>anything</u> that will impact the financial bottom line. This is a disingenuous approach.

CUMULATIVE EFFECTS

AMNS claims in the EIS, and quotes consultant reports, that they are actually creating environmental benefits through mining and reclamation. (Section 2.11, p. 2-92). Yes, a small site may benefit from removal of historical tailings but that is only part of the picture. A study of environmental and human health hazards associated with 14 former gold mining sites in Nova Scotia (Parsons et al., 2012) documents mining impacts more than 2 km downstream of the sites and shows that stream sediments near former mine sites had significantly elevated concentrations of Mercury and Arsenic above Canadian guidelines.

This study illustrates that contamination has migrated off site and far downstream. We are genuinely concerned that the combination of storm frequency and intensity in association with mining and other land uses may mobilize these metals and contaminate new areas downstream. These potential impacts are not included in the impact assessment and is another reason to consider all of the mines as connected and to assess their cumulative impact.

HABITAT FRAGMENTATION

AMNS claims in their Conclusions that the Beaver Dam project will correct past practices associated with mining and forestry. They state, "The current condition at the Beaver Dam Mine Site is disturbed, and fragmented habitat based on significant timber harvesting, associated road building and yarding areas and historic exploration/mining activity." (Section 2.11, p. 2-92).

They go on to discuss the Beaver Dam area as being disturbed and having considerable fragmented habitat and that the level of new fragmentation will be moderate. Yet, the removal of forest cover is known to increase runoff and with the uncertainty of storm events this could result in significant impacts at the mine site and along the Haul Road.

Interestingly, in the impact assessment, the potential for combined or intensified impacts of forestry *and* mining is completely ignored - because the company does not have to consider the combined land use impacts, just the ones they are responsible for. The natural environment does not work this way, but the assessment is undertaken in isolation of other land uses. <u>We believe that other land uses that may have an influence on a mining effect or worst, have a</u>

multiplier effect must be taken into consideration to fully assess predicted effects and the effectiveness of mitigation measures.

CLIMATE CHANGE

Two main issues associated with Climate Change are greenhouse gas (GHG) management and unpredictable climate-related events.

Section 6.4 - GHG. There is no plan to offset CO2 emissions, as an absolute bare minimum environmental mitigation strategy. <u>There should be details on GHG management designed to meet current and predicted offset requirements.</u>

Section 7 - Effects of the Environment on the Beaver Dam Mine Project With respect to managing unexpected climate events (section 7.2.3), less than five pages are dedicated to perhaps the greatest unknown influence of climate change on this project. We are extremely concerned that there is insufficient discussion on such a potentially important aspect of this project.

To demonstrate the difficulty in managing unplanned events, 'significant rainfall events' caused siltation issues at the Touquoy and other exploration sites. On Jan 26, 2021, Dustin O'Leary (spokesperson for AMNS) stated in an email response to CBC News that "*The main incidents raised by the NSE relate to instances where significant rainfall events have caused water, containing silty road materials, to run-off secondary access driveways and overwhelm the existing storm water management system.*" This is a prime example where the projected impacts and the designed management measures failed, and speaks to the way in which environmental issues are handled by AMNS. <u>We request a technical report on potential impacts climate change may have on the Beaver Dam Mine Project.</u>

TOUQUOY MINE – DISPOSAL OF BEAVER DAM TIALINGS

The Beaver Dam Mine Project Environmental Impact Statement Summary (October 2021) says that "The approved Touquoy Environmental Assessment stated that the pit would be allowed to fill naturally with water over a period of time through precipitation, surface flow and groundwater in-flow. No change to this method is planned following the deposition of Beaver Dam tails, except that the time frame for refilling will be shorter given the decrease in available volume taken by the tailings" (p. 2-25).

The fact is that the deposition of tailings in the Touquoy open pit <u>has not been permitted or</u> <u>approved</u>. The deposition of mine tailings containing a large variety of elements and chemical compounds is fundamentally different from letting the pit simply fill with just meteoric, surface and ground water over time. Even if the tailings are eventually covered by water, this water will be contaminated by diffusion and dissolution of the chemicals in the tailings. The fact is that

disposal of tailings in the open pit has critical environmental impacts, has a high potential to become a major pollution problem for decades after mine closure, and is a big threat to the ecological integrity of the Ship Harbour Long Lake Wilderness Area and the communities downstream from the mine. AMNS seems to go out of its way to ignore this reality.

Seepage of tailings chemicals into surrounding groundwater and water bodies

The original Touquoy Gold Project 2007 Focus Report and Environmental Assessment Registration Document (EARD) asserted that the best tailing management and storage was (1) in a pond lined with impermeable clays to avoid seepage to ground water, (2) that would be capped with clays and revegetated at closure to avoid surface water contamination and (3) where metal-rich slurry precipitated in the polishing pond would be buried in "cells" lined with impermeable clay, again to avoid contact with meteoric water. None of these precautions will be taken in the tailings-filled open pit. The metal-rich precipitates will be mixed with the tailings, interacting with the pore water, and through diffusion and advection, with the supernatant 'lake' water.

The potential contamination of surrounding ground and surface water by tailings chemicals is a major concern. This issue has been addressed by modelling only (Appendix F.6). The model is very complex and requires the input of many parameters that are assumed or estimated, rather than measured. For example, *"Porosity for each geologic material is based on the mid-range of expected values from the literature."* (Appendix F.6, p.5.9). When asked to provide some porosity measurement (IR CEAA-2-42) AMNS simply gives one 40-years old text book reference and argues that *"Under a steady-state condition, the extent and concentration of simulated contaminants of concern (COCs) is insensitive to the porosity value."* It may be so but porosity will influence the rate at which contaminants can spread into bedrock, weathered bedrock and overburden sediments, and how quickly the concentration reaches steady-state (Figure 5-13, Appendix F.6).

Another example is that estimates of hydraulic conductivity are very tentative given the Presence of faults, cracks due to blasting and inhomogeneity of the surrounding rocks.

The data on hydraulic conductivity is scant to non-existent for the competent fractured bedrock at depths below 10 m (Figure 3.1, Appendix F.6) and its values were assumed. Moreover, faults have been mapped in the area of the open pit. These should appear in Figure 2.4 of Appendix F.6, but the figure is missing. However, *"Faults in the bedrock were not specifically tested to assess the hydraulic conductivity at the Touquoy Mine Site"* (p. 3.2, Appendix F.6), which means that hydraulic conductivity values used in the model are only estimates. Assumptions were also made about the fracturing of the bedrock due to blasting. This makes the model tentative and predictions very uncertain.

IR CEAA2-43 states "increasing the hydraulic conductivity of the faults by an order of magnitude

increases the predicted concentrations in Moose River. The addition of higher permeability faults indicates that solute transport may proceed more quickly to Moose River than simulated in the case without higher permeability faults. The development of management, mitigation and contingency plans should consider the potential for higher permeability faulting, such as the grouting of high permeability faults, should observed concentrations exceed predictions during the post-closure period." This is an acknowledgement that the model may not accurately predict the seepage of chemicals into water bodies and ground water. We wonder how 'grouting of permeable faults' can be done at the post-closure stage when all the pit walls are buried in tailings.

Even though AMNS commits to an ongoing monitoring program of ground water chemistry at Touquoy, there will be no possibility to stop the contamination of ground water by the tailings pore water: once tailings are deposited in the open pit, it is too late to grout more or put another type of barrier, the seepage cannot be collected and treated, and settled tailings can hardly be resuspended to be chemically treated. No amount of monitoring is going the stop the contamination.

Spatial Boundaries

Regarding seepage and ground water discharge from the open pit tailings, most of the focus in on Moose River (Appendix F.6 and the EIS). But the mine is located at the head of the Fish River Watershed, which means that mine operations will affect all the water bodies downstream of its location, including the ground water which flows downhill as well as surface water, albeit slower. Ground water feeds water courses through the rivers and lake beds and as such is an integral part of the watershed. This seems to be ignored in the choice of the study area, (Fig. 1.1) used in the Model (appendix F.6). The study area extends well uphill from the mine site, where no effect is expected for ground and surface waters. However, it is very limited downstream, not even encompassing fully water bodies that are receiving mine effluent such as Scraggy Lake, even if the mine has the potential to affect the entirety of the Fish River-Lake Charlotte Watershed (IEL-5).

Tailings chemistry

The EIS states: "The majority of the residual cyanide reagents introduced to the tailings during ore processing will be passively degraded and hydrolyzed to carbon dioxide and ammonium during storage in the tailings pond. Similarly, this will be expected to occur for the tailings being stored in the Open Pit" (section 6.7.8.4.2, p. 6-306). Degradation of the residual cyanide should not be simply "expected", but proven to happen. The original EARD states that UV degradation of cyanide by sunlight is an integral part of cyanide destruction. In the open pit the deposition will be subaqueous thus limiting the amount of sunlight and oxygen available to breakdown cyanide and cyanate.

The probable chemistry of the tailings water is mentioned only in the Appendix F.6 which refers to Lorax (2018) a document which has not been provided with the present revised EIS as a supporting document or appendix. We found it in a submission to the Impact Assessment Agency of Canada. The Lorax (2018) document summarizes the complex chemical reactions that will take place after the closure of the mine: (p. 3.5)

"Following cessation of the tailing discharge, post-depositional processes will become increasingly important over time in the saturated tailings. Depending on the mineralogy of the tailings materials and the aqueous regime, these post-depositional processes may attenuate or release contaminants within the TMF pore water. The basis for the potential release relates to the chemical instability of solid phases in the saturated portions of the TMF in the long-term in response to contrasting redox conditions in the mill (basic pH, oxidizing redox potentials) and TMF environments (circum-neutral pH, low redox potential). In this regard, both redox- and pHdependent mechanisms can promote the dissolution of tailings phases. It can also be expected that various attenuation mechanisms will take place within the saturated pore spaces and as the water exits the TMF along groundwater pathways. For example, the gradual decay of residual cyanide species and ammonia is expected in inactive tailings ponds due to these species being unstable under atmospheric conditions (Devuyst et al., 1989)".

The Lorax (2018) 'Source Term Concentrations' are based on a duplicate test using <u>one run-of-the-mill sample</u> from the Touquoy tailings pond for barely six months in 2018. This is woefully inadequate and not statistically significant to predict geochemistry of tailings of ore from other mines deposited over decades. Indeed Lorax (2018) concludes by stressing the *"uncertainties with respect to the long-term behaviour of these materials"* and recommends more studies to better characterize the geochemical behaviour of the tailings over time. To date, almost 3 years have passed since the first test and much more data and long-term tests should be available, considering that AMNS claims to keep monitoring over time to acquire more data.

The chemical treatment of the tailings is hardly mentioned and does not go beyond pH control.: "At the cessation of tailings deposition to the Touquoy open pit, the open pit will fill with water. During this period, there may be an opportunity to treat the pit lake as a batch reactor with the objective of adjusting the pH to precipitate metals" (Section 2.9.2.3.3, p. 2-69).

This is hardly addressing a very complex system. For example, in reducing conditions (lack of oxygen) many metals are more soluble, regardless of pH and a lack of oxygen will preserve more cyanide and cyanate in the tailings. Eventually, the pore water chemistry of the tailings will evolve toward a steady state which may be very different from initial conditions. for example, sulfide minerals are likely to dissolve over time, acidify the pore water and the acid will leach precipitated metals back into solution.

<u>There is no discussion of the initial and future geochemistry of the tailings</u> to be dumped in the open pit, including sulfide minerals content and reagents nature and amounts used to treat the tailings (such as copper sulfate for example). pH and redox diagrams (Eh/pH diagrams) for each element should be used to show what minerals and solute concentration levels can be expected for the likely range of pH and oxidation level and over time.

<u>AMNS does not provide information on the 'batch reactor":</u> Water treatment implies good mixing. In such a large batch as the open pit water supernatant, inhomogeneity can be expected. How will mixing be achieved in such a large pit? How and where will the water chemistry be monitored to adjust treatment?

Surface water

In the present operation, tailings water effluent from the TMF is treated in a polishing pond using iron oxide coprecipitation to remove heavy metals and other contaminants from the water. This water is further treated in geotubes and an engineered wetland before being released into Scraggy Lake. Despite all these precautions water quality monitoring undertaken by Eastern Shore Forest Watch has detected increasing Arsenic concentrations in Scraggy Lake. Moreover, Appendix G.5a states that "Elevated concentrations of some metals (i.e., aluminum, arsenic and iron) are predicted to exceed the CCME FAL criteria" and predicts unionized ammonia in excess of the CCME FAL of 0.019 mg/L in the receiving environment.

None of the same precautions (polishing pond, geotubes, engineered wetland) are considered for the outflow of the pit into Moose River: there is simply a spill way and reliance on dilution of the pit water by the Moose River waters (the 100 m mixing zone). In fact, Appendix G.2 (p. 27) states that *"the parameters in the effluent identified by Stantec (2021b; Appendix F.8 in AMNS 2021b) as being in exceedance of regulatory limits included aluminium, arsenic, WAD and Total cyanide, cobalt, copper, and nitrite"*, which demonstrate that water treatment will be necessary. Yet, water treatment of the open pit water is very vague and contradictory. Appendix F.7 states *"An effluent treatment plant is planned to be located at the Touquoy open pit spillway to treat the pit lake water until MDMER discharge limits are met."* (p. 29), whereas the next page says: *"Should water treatment still be necessary, effluent from the pit will be pumped for treatment to the existing effluent treatment plant and discharged to the downstream polishing pond facilities and Scraggy Lake receiving environment."* <u>Which one is it,</u> and what does the plant located at the spillway consist of?

The pit water quality is only discussed in term of chemical of concern concentrations. However, it should be analyzed in an ecological way as the water quality will be controlled in large part by the diffusion of tailings pore water into a relatively shallow 'lake'. Will this lake be acidic, or maybe anoxic because of oxidation of the tailings? Will a lot of eutrophication take place because of the high concentration of dissolved nitrogen species? Will it be warm, significantly

more than the Moose River? These characteristics will strongly influence the viability of fish, invertebrate and other aquatic life in the receiving Moose River and beyond, potentially causing algal blooms, anoxic conditions, water too acidic for fish survival and reproduction, or a temperature barrier for fish migration in Moose River at the spillway location. <u>Chronic low level contamination effects should be also considered, as well as potentially toxic conditions in the lake.</u>

Monitoring

"Once water quality meets discharge criteria (i.e., representing closure conditions), surplus water in the Open Pit will spill to a channel and discharge to Moose River. Discharge water quality will continue to be monitored against discharge criteria to identify if the pit should continue to be pumped and treated at the effluent treatment plant prior to discharge to the Moose River" (Appendix F.7, p. 30).

<u>AMNS does not give any indication of the frequency of monitoring.</u> Most data presented is monthly average concentration but within a month the concentration can fluctuate significantly and exceed the MDMER limits for shorter time intervals. A better approach would be to have continuous monitoring of some indicator parameters such as water pH, conductivity and/or oxygen level which would alert to possible exceedances quickly.

A spill way is in no way capable of dampening these fluctuations while an artificial wetland might be. This would be a more ecological way to connect the pit to the Moose River, considering that, in effect, the pit becomes part of the Moose River watershed. A well constructed wetland buffer would be instrumental in protecting Moose River from mine contaminants well after closure.

Conclusion

This EARD is sketchy, based on modelling with many assumptions and scant data. It ignores the possibility of high pollutants concentration by averaging measurements and reporting only monthly or yearly averages and using those averages in the models. The post-closure monitoring and mitigation is not described but merely mentioned, even if water treatment is projected to be necessary for 19 years (Appendix F.7), or 28 years in a more recent version of Stantec 's Touquoy Integrated Water and Tailings Management Plan (July 2, 2021)

In its present form the proposal does not demonstrate due diligence and a precautionary approach from the company. Disposing of tailings in the open pit is very likely to result in contamination and environmental degradation that Nova Scotians will have to contend with for decades, that will prove expensive to mitigate and will more than offset any perceived benefit to Nova Scotian through job creation. The project is in direct contradiction with the province objectives laid out in the Sustainable Development Goals Act:

(https://nslegislature.ca/sites/default/files/legc/PDFs/annual%20statutes/2019%20Fall/c026.p df_and the Climate Change Plan for Clean Growth (<u>https://cleanfuture.ca/wp-</u> content/uploads/2021/05/SDGA-and-Climate-Change-Plan-Clean-Growth-Discussion-Paper-English-1.pdf).

The Touquoy gold mine and the three proposed satellites cannot be considered a sustainable development as the mine life time is short. Its operation increases the CO₂ emissions of Nova Scotia and degrades the surrounding land and water resources and habitats, to say nothing of a devastated footprint that will not regrow into a forest, a lake and a recreation area for many generations, despite what the company claims. Such a project is difficult to justify considering that Gold is not on Canada's list of critical minerals (<u>https://www.nrcan.gc.ca/our-natural-resources/minerals-mining/critical-minerals/23414</u>).

FISH AND FISH HABITAT

The following comments cover

- Section 6.9 EIS Summary, Fish and Fish Habitat
- Section 6.13 Species of Conservation Interest and Species at Risk (fish)
- Appendix J.3 Draft Fish Habitat Offset Plan, May 2021 (Wood Environmental and Infrastructure Solutions), completed for the 2021 Beaver Dam Mine EIS

Overview

The EIS pertaining to fish and fish habitat has improved markedly in terms of research information from the initial Atlantic Mining NS submission. This has been as a result of the EIS review process. The assessment has benefited greatly from the input from the public, conservation stewardship organizations groups and, latterly, regulatory agencies, Nova Scotia Environment and Climate Change and the federal Department of Fisheries and Oceans, as well as the IAAC itself.

Initially, AMNS was not aware of, or responsive to, the existence or significance of an extensive and important habitat restoration project on the Killag River in close proximity to their proposed mine despite efforts by members of the public and conservation stewardship organizations.

Subsequently, a more extensive field program to detect the presence of fish and to assess existing fish habitat was carried out in 2019-2020 identifying 7 species of fish not detected in earlier baseline studies: American eel, creek chub, brook trout, banded killifish, golden shiner,

white sucker and yellow perch. Studies on the Killag River below the mine site but outside the Project Area, confirmed the presence of Atlantic salmon parr.

The AMNS studies estimated direct impacts on 5 watercourses and 3 wetlands within the mine site and that 39,443 m² (or about 39 hectares) of fish habitat would be affected, requiring a federal Fisheries Act Authorization from DFO.

The AMNS report concludes there will be no direct impacts to Atlantic salmon from the project.

They estimate that the project, including the haul road to the Touquoy mine where the ore from the Beaver Dam Mine will be processed, will affect 29 watercourse crossings, 22 existing, 7 new, but with no anticipated impacts to fish or fish habitat. Three bridges will be replaced, also with no impacts to fish. Nineteen culvert crossings will be affected, 5 with fish passage, and upgrades or replacement of 14 currently limiting fish passage. They conclude that this will result in a net improvement in fish passage and therefore a reduction in the loss of fish habitat.

The report concludes there will be no anticipated effects to surface water quality although 77,288m² (0.8 hectare) could potentially be altered due to low water flows outside the company's control. Still, they conclude there is low ecological risk to fish in the Cameron Flowage, a water body directly adjacent to the mine site and flowing directly into the Killag River.

The report further concludes that, "Touquoy processing of Beaver Dam Mine ore and tailings management will not alter the footprint [of Touquoy] or involve further impacts to fish and fish habitat." This statement may be technically correct but it certainly needs to be questioned given the impact of the 2.1 million tonnes of incremental ore that will be processed annually at a Touquoy mine reconfigured to accommodate ore and ore processing from the Beaver Dam mine which AMNS characterizes as a "satellite surface mine".

Species of Conservation Interest and Species at Risk

The Southern Upland Population of Atlantic Salmon has been assessed by COSEWIC, the Committee on the Status of Endangered Wildlife in Canada as "endangered".

The AMNS consultants identify no aquatic Species at Risk in the Project Area. They acknowledge the presence of Atlantic salmon in the Killag River but determine that the area of impact is outside the Project Area boundary. This conclusion is in contrast to estimates by experts in conservation organizations who assert that the Killag River, below the lime doser, has 50% of the Atlantic salmon habitat in the watershed and is the reason why terrestrial liming by helicopter has been carried out there on Crown land. Further, the NS Salmon Association (NSSA) has identified Atlantic salmon up-steam from the project site via eDNA studies. The AMNS report does identify 4 priority fish species within in 5 km of the Project Area: Atlantic salmon, American eel, alewife and brook trout. American eel and brook trout were identified within the Project Area in baseline studies.

Assessment

The Beaver Dam Mine project poses a serious, <u>existential threat</u> to the Atlantic salmon restoration efforts in the West River Sheet Harbour (WRSH) Watershed, the Killag River in particular, as well as coastal habitat for Atlantic salmon along the Eastern Shore. The location of the Project Area for the mine is immediately adjacent to the West River Sheet Harbour lime doser, just 500 metres from the Killag River and downstream from Cameron Flowage which the receives the runoff and treated effluent of the mine.

Tertiary watersheds, including Kent and Paul Brooks, which are part of the aerial spraying component of the WRSH research and restoration project, will also be vulnerable to mishaps from mining operations.

The **West River Acid Rain Mitigation Project** is a major research and restoration project that has attracted considerable investment and support from the Atlantic Salmon Association, federal and provincial partners (DNR, DFA, DFO, Northern Pulp) as well as other conservation stewardship organizations and university researchers. The project has attracted national and international attention for its innovative approach to aquatic habitat restoration. The project is unique because it is not just a population-based approach to Atlantic salmon population health, it is a rare on-the-ground ecosystem-based approach. Conservation efforts being undertaken in addition to the lime doser and aerial spraying include: physical habitat restoration; experiments with innovative restoration techniques; alterations to physical structures to reduce water temperature; and innovative monitoring methodologies of future interest to regulators and conservationists alike.

Further, the WRSH project has also become the model for an additional NSSA project, acronym WATER, "Watershed Assessment Towards Ecosystem Recovery" dealing with Species at Risk/Species of Conservation Concern within Nova Scotia involving 8 watersheds, 4 on the Eastern Shore (the Musquodoboit, West River Sheet Harbour, Moser and St. Mary's River Watersheds), all involving Southern Uplands Atlantic salmon.

These projects are more than pet project of sport fishermen. With its rich, long-term data and practical as well as scientific applications, it has the promise of becoming seminal research in the area of habitat restoration.

The Acid Rain Mitigation Project has been operating on the West River Sheet Harbour since 2005. From the outset of the environmental assessment process, Atlantic Mining Nova Scotia has <u>underestimated and undervalued the significance of these Atlantic salmon restoration</u> <u>efforts.</u>

The Killag is a major freshwater tributary of the West River Sheet Harbour (RSH) which flows southward to the ocean at Sheet Harbour. The lime doser on the Killag, installed in 2017, is a key component of the West River Acid Rain Mitigation Project. The doser adds powdered lime year-round to the flowing river altering the pH to a level favorable to Atlantic salmon at this stage of their life cycle. Terrestrial liming on adjacent Crown land by helicopter is also undertaken to repair soil health, and restore water quality in feeder brooks of the Killag which hosts 50% of the salmon habitat in the river system.

<u>Despite AMNS's proposed mitigation and monitoring efforts, significant risk to this research and</u> <u>restoration project remains.</u> The level of due diligence required to implement mitigation efforts properly and at required frequencies in order to manage this risk is one that this company has failed at times to demonstrate in their operations at their main Touquoy facility (see regulatory compliance section, below). From the outset of the project the company has had a deaf ear to public concerns about fish and fish habitat in relation to this proposed mine.

One mishap at the mine, government-required mitigation and emergency measures notwithstanding, would at best, disrupt long term research findings and, depending on its severity, could destroy this unique and innovative experimental research project.

Harmful Alteration, Disruption or Destruction of Fish and Fish Habitat (Federal Fisheries Act): Avoidance, Mitigation, Offseting/Compensation

The federal Fisheries Act recently amended in 2019, together with updated policy direction, sets out instructions for project developers working near water bodies on how to design projects in compliance with the provisions of the Act and regulations. If fish and fish habitat destruction alteration or disruption cannot be avoided, it must be mitigated or compensated for in habitat creation efforts in other ways and areas.

The AMNS submission contains a detailed outline of possible ways for the company to achieve a situation of no net loss of fish habitat, possible means for complying with provincial wetlands protection legislation and compliance with the requirements of the federal Metal and Diamond Mining Regulations.

It is difficult for a lay member of the public to assess the future effectiveness of the compensatory measures proposed or the adequacy of the monitoring, monitoring frequencies and other measures to manage or compensate for these impacts. DFO habitat biologists and provincial wetland specialists will be assessing and approving these proposed measures in the course of developing Industrial Permits and Habitat Authorizations for the mine. The most recent EIS expert review resulted in over 200 additional requests for specific information by provincial and federal officials.

Nonetheless, it continues to be worthwhile to register environmental concerns at this juncture in the EA process because details of the various mitigation and compensation measures will be accorded legal status in the context of licencing agreements between the company and regulatory agencies.

Despite the difficulty in assessing these proposals due to their technical complexity, there was one preliminary offset measure proposed for the Musquodoboit River as compensation for impacts due to the Beaver Dam Mine. The company has met with farmers and land owners along the Musquodoboit River to discuss interest in possible habitat restoration efforts which would be sponsored by the company in return for habitat destruction or alteration credits.

Although there are Atlantic salmon in the Musquodoboit River, and the Musquodoboit is one of 8 priority watersheds and focus areas included in the WATER project of the NSSA, <u>this salmon habitat should not be seen as an equivalent substitute for habitat areas in the vicinity of the BDM</u>. Atlantic salmon in the Killag - West River Sheet Harbour system return, as do all salmon, to their <u>natal rivers</u> to spawn. Because of this, the salmon in the WRSH and Killag restoration project are more significant than even the salmon in the Musquodoboit because they are part of this important longitudinal habitat restoration study. <u>Although these salmon are part of the Southern Upland Designable Unit Population of Atlantic salmon, they are not equivalent or biologically substitutable.</u>

Regulatory Compliance not Made Public for Private Sector Projects

Environment assessments do not provide much detailed information on what will be required of project operators <u>after</u> government approval in terms of the details of mitigation and compensation efforts and other protections. However, the nature of questions posed by expert reviewers (government officials) does provide some indication of their concerns. Specific information requirements will be articulated in NS Environment and Climate Change, Environment and Climate Change Canada and DFO permits which are not available in detail to the public after they have been issued. It is difficult for the interested public to determine if the required monitoring program is being carried out or if the compensation projects required to offset environmental damage are implemented as such information is not available to the public.

The 2019 amendments to the federal Fisheries Act improved compliance reporting and at least a degree of transparency with the establishment of the Fisheries Act Registry. However, the Registry does not report on authorizations for private sector projects, only for government projects. Once the project has been approved and authorizations and permits issued, all requirements to mitigate or compensate for habitat destruction, alteration etc., become very difficult, if not impossible, to track outside government.

A number of important questions arise: will the company follow through on these requirements and to what extent? These projects are on private lands not accessible by the public. Will compliance be monitored sufficiently given limited government inspection resources? Will the company closely monitor their contractors who will carry out the work on the ground to ensure they respect regulations and guideline? To what degree does the compliance regime rely on company monitoring? The draft mitigation and compensation plans set out in the EIS are detailed and have been developed by reputable environmental consultants. Will they be fully implemented by the company? Will the company and government inspectors respond in a timely manner to monitoring results and mishaps to prevent environmental damage? Will enforcement action be undertaken in a timely manner when necessary?

The 2019 audit report of the federal Commissioner of the Environment and Sustainable Development is not encouraging when it comes to follow-up implementation of these plans. The report focused on efforts to protect fish and fish habitat under the federal Fisheries Act, Metal Mining Effluent Regulations (now the Metal and Diamond Mine regulations) and Habitat Protection provisions of the federal Fisheries Act. The overall message from this report was that DFO needed to improve its monitoring of its compensation plans to ensure they were carried out.

Further, <u>the compliance record of the AMNS does not inspire confidence</u>. In 2020, the company was charged with 32 violations under the NS Environment Act related to their operations at the Touquoy and Fifteen Mile Stream (an additional, proposed surface satellite mine) sites. These charges were followed by 3 charges by DFO under the Fisheries Act and Metal and Diamond Mining Effluent regulations.

Of further and residual concern, is the issue of <u>the actual effectiveness on-the-ground</u> of these remediation and compensation measures once undertaken. This adds an additional level of uncertainty around the element of risk to fish and fish habitat associated with these projects. These questions can only be answered through evaluation of actual projects by qualified fish and fish habitat biologists.

WETLANDS

Historically, wetlands have been regarded as wastelands of little value, and maligned as breeding grounds for insects and vermin. Wetlands are often dumping grounds for waste, considered cheap land for infilling, and either destroyed or stressed by an accumulation of land uses such as agriculture, forest management, mining, commercial and residential development. Current perceptions are changing as we become more aware of the natural attributes of wetlands such as: biodiversity, critical habitat, water storage and management, and filtration. We are more aware of how wetland landscapes provide resilience to anticipated impacts of climate change and their critical role in carbon sequestration and storage. Nova Scotia has a Wetland Conservation policy fostering 'no-net loss' of wetland. Nevertheless, we still face development requests for resources, roads and buildings that require the permanent destruction of wetlands. Unfortunately, despite recent policy responses to wetland loss, the remaining balance of Nova Scotia's wetland environments continues to be drawn down. The Touquoy-Beaver Dam-Fifteen Miles Stream gold mining projects lying within active forest management areas are demonstrative of why the natural balance of wetlands is diminishing.

As Nova Scotia's economy still relies on resource-based projects, the environment costs continue. To some Nova Scotians, perhaps economic growth is more important to their needs, and less regulatory scrutiny is favoured in the belief that less regulation will attract more jobs and economic wealth. To others, the cost to the environment is an escalating tragedy but they recognize that a regulatory system can provide a better life with more sustainable balance to environmental health and integrity. This perspective is more holistic, longer term and integrenerational. While Nova Scotia has a regulatory framework, it only extends to a subset of economic activity that can create environmental risks. Perhaps this represents acceptable middle-ground between advocates of a non-regulatory system and those in favor of regulations.

Within the spectrum of land-use types in Nova Scotia there is disparity of economic activities requiring assessment under the Environment Act. For example, forest management, road construction, residential and commercial development may have some environmental review process but less robust and comprehensive than the Act's requirements for environmental assessments and public consultation. For example, the Bayers Lake Community Outpatient Centre, the province's largest health-care project, has devastated the natural environment by stripping all vegetation and blasting to provide space for roads, buildings and parking. It is not clear whether this project was assessed for environmental effects. In this instance, benefits for human health comes at the cost of environmental health. The construction of large buildings often requires the extraction of soil and bedrock amounting to small to mid-sized quarries. On the other hand, the regulatory system properly identifies mining as a Class 1 undertaking, which enables careful scrutiny of risks to environmental health and allows public input.

While it is positive that the public, NGOs and government entities can comment on EA's, the process is onerous due to the sheer volume of material to research in short time frames. This alone reduces the level of input by the public and agencies. It is left to those who are highly motivated and concerned about achieving a healthy balance of environmental sustainability to tackle these EA documents and respond.

1.1 Climate Change and Wetlands

Given that:

- Climate change is the most critical existential environmental issue on Earth and it is likely that we are heading into a positive feedback loop continually fed by increasing levels of greenhouse gases.
- Wetlands provide substantial capacity to sequester and store carbon, and thus wetland protection must play significant role in solutions to reduce and adapt to climate change.
- There is a relentless change in land cover and fragmentation and loss of wetland habitat and biodiversity.
- Federal and Provincial environmental regulations are based on environmentally sustainable development principles such as the precautionary principle.
- Nova Scotia's Environmental legislation fosters the protection of ecological value, maintenance and restoration of essential ecological processes and prevention of biological diversity loss.
- The Province of Nova Scotia has a 'no-net loss' policy for wetlands owing to their rich ecosystems, and natural values.

Noting that:

- The proponent does not adequately address climate change issues and how and to what extent the project will contribute to GHGs
- The EIS does not address the issue of decreased capability of carbon storage and sequestration due to the permanent loss of wetland and surrounding biota.
- The EIS does not address how the project could actively sequester and store carbon.

It is recommended that:

- The proponent be required to provide a comprehensive assessment of how all their gold mining interests in Halifax and Guysborough counties will affect climate change.
- The proponent determines how and to what extent the loss and perturbation to wetland areas will affect the capacity for water storage and carbon sequestration.
- The proponent investigates if carbon sequestration and storage can be created from mining residuals.

1.2 Cumulative effects and wetlands

Given that:

• St Barbara Limited, the parent company of AMNS, is actively promoting potential future investment in Nova Scotia gold to its shareholders. This raises the prospect of several

gold mine operations and related infrastructure located within Halifax County and possibly Guysborough County.

- The proponent's plan is to move ore for processing by truck from the Beaver Dam Mine to the Touquoy Mine located over 30 km away, which increases the project area footprint substantially.
- A significant percentage of wetland ecosystems have already been lost in Nova Scotia due to agriculture, residential development, road building and resource development activity.
- A cumulative effects assessment done by the proponent within the LAA and RAA, (which considered residual effects on mainland moose, snapping turtle and 2 migratory bird species) is inadequate: although some field work was done, it appears most of the assessment was desk-top based. Conclusions reached were unclear, perhaps due to the proponent finding limitations to available data.
- "Wetlands were selected as a valued component due to their ecological value in providing habitat for aquatic species and rare plants, the importance of wetlands in the daily lives of terrestrial species, their capacity to store water, managing downstream flooding, improving water quality, and the recharge/discharge of groundwater aquifers." (Section 6.8.2, p. 6-319)
- Wetlands are protected under Nova Scotia's Environment Act and the Wetland Conservation Policy.
- The Province of Nova Scotia passed the Environmental Goals and Climate Change Reduction Act in November 2021. The Act contains the goal of modernizing the Environmental Assessment Regulations with the additional requirement for cumulative effects analyses. This recognizes how the variety of land uses, including mineral exploration and mining, forestry, road building, off-road vehicle use, contribute together to a gradual reduction of ecological integrity, function and value.

Noting that:

- "The whole is greater than the sum of its parts" is an appropriate phrase in environmental management based upon holistic perspectives. The EA process necessarily requires that each project is assessed separately, which tends to partition environmental parameters away from its wider ecological systems.
- The proposed 31 km haul road corridor runs through numerous wetland, groundwater and surface water features. Increasing distress to ecosystems from mining projects combined with existing land use factors, such as roads, forest management and greater access for ATV use will raise levels of residual and cumulative environmental effects.

• Once the Touquoy and Beaver Dam deposits are exhausted, and despite planned attention to reclamation, we anticipate that the land will be left with permanent damage and reduced essential ecological values to remaining species and habitat.

It is recommended that:

- The proponent be required to provide a more robust and comprehensive cumulative assessment analysis of wetlands and surface waters for all secondary watersheds that contain any and all parts of the proposed project.
- The proponent should also consider and report on the cumulative effects pertaining to the Touquoy Project and any other gold mining interest planned for investment and development.
- The assessment factor in other land uses and activities that contribute to and expand upon the cumulative residual effects caused by mining activity.

1.3 Protection of Lands

Given that:

- The Province of Nova Scotia passed the Environmental Goals and Climate Change Reduction Act in November 2021, with a goal to protect at least 20% of Nova Scotia's land base.
- The Touquoy Gold Mine EA was accepted by the Province in 2008 after a Focus Report was prepared. One of the conditions for release was to produce a land acquisition plan to procure land for protection within 4 years: *"Within four years of the date of this Approval, the Proponent shall develop and implement a plan for procuring conservation land with valued protected areas attributes in the vicinity of the Undertaking for statutory protection by the province. The plan shall be developed in consultation with NSEL, NSDNR, the Community Liaison Committee, and any other parties identified by NSEL. The plan must be approved by the Minister prior to implementation."*

• After nearly 14 years this condition for the <u>protection of lands</u> remains unfulfilled.

- Noting that:
 - The proponent has been unable to meet specific conditions issued by the Minister of NS Environment that enabled the Touquoy Mine project to proceed.
 - The location of the undertaking is in a region of wetland habitat suitable for vulnerable species (i.e., species at risk, threatened and endangered). This includes Nova Scotia's largest animal, the endangered mainland moose, plus resident and migrant bird species, various aquatic species, fish habitat and water management attributes.

- The mine site and new additions to the haul road corridor will permanently change the land. Mining at Beaver Dam will leave a 200-m deep pit which will fill with water to existing groundwater levels.
- We cannot assume an effort will be made to re-establish wetland conditions because a reclamation plan is not available.

It is recommended that:

- The proponent be required to fulfil the Touquoy Land Protection condition <u>prior to</u> the Minister's decision for the Beaver Dam project.
- The proponent be required to develop and implement a plan for procuring conservation land with valued protected areas attributes in the vicinity of the Beaver Dam Gold Mine for statutory protection by the province. We suggest that a part of the criteria for land selection and procurement include suitable wetland habitat for mainland moose.

1.4 Wetlands of Special Significance

Given that:

- The primary objective in Nova Scotia's wetlands conservation policy is to: "manage human activity in or near wetlands, with the goal of no loss in Wetlands of Special Significance and the goal of preventing net loss in area and function for other wetlands."
- One of the criteria considered for designating Wetlands of Special Significance (WSS) is: *"known capability for wetlands to support at-risk species as designated under the federal Species At Risk Act or the Nova Scotia Endangered Species Act."*

Noting that:

- The proponent carried out surveys and assessments for the EIS document and provided analyses of wetlands with high functional significance and determined if areas qualify as WSS.
- The proponent appears to discount areas of suitable capability as WSS if no species were observed during their field surveys. This conclusion does not support the policy's criteria which requires the wetland to have the capability to support at-risk species. Failing to observe species should not be used to discount a WSS. For example, wetland 64 is identified as a potential WSS by NSE due to the historical presence of Canada warbler and observations have been made of the olive-sided flycatcher and rusty blackbird. *"Although suitable breeding habitat for the olive-sided flycatcher is present within Wetland 64, neither this species nor rusty blackbird or Canada warbler were observed during the breeding bird surveys... As a result, Wetland 64 was not determined a WSS" (p. 6-636).*

- Most of the analysis relating to WSS identification appears to be desk-top and a small number of field surveys in the summer season.
- In another example concerning W-59 a nesting snapping turtle was observed, but a WSS designation was not declared. Presumably, W-59 will be completely lost due to the operations plan and without a WSS identification it will not be counted in a wetland compensation plan.

• Relying on proponents to identify areas as WSS is a flawed process. The proponent is not motivated to identify WSS because it could lead to operational costs and limitations.

It is recommended that:

- The regulator requires the proponent to reinvestigate all wetland areas to determine if habitat suitability for at-risk species warrants a WSS designation.
- The province require that the proponent accept the existing WSS data layers as uncontestable as a precautionary measure until government programs for WSS verification is updated.

1.5 Wetland compensation

Given that:

 In the event of a loss of any wetland of special significance the Nova Scotia Wetland Conservation Policy requires the proponent to compensate for the loss at a minimum ratio of 2:1 by area, with careful consideration of replacement of lost function, and calls for the proponent to produce a wetland compensation plan.

Noting that:

- The proponent recognizes this requirement and prepared a preliminary Wetland compensation Plan (Appendix H.3 Preliminary Wetland Compensation Plan April 2021).
- Our research found that the process of wetland compensation is becoming increasingly limited in terms of finding suitable land in the vicinity of the project. To fulfil compensation requirements for the Beaver Dam Gold Mine could require a search for suitable lands located further away from the destroyed wetlands.
- The proponent has apparently suggested that funds could be substituted for wetland compensation.
- The Eastern Shore Forest Watch has been named as one of the NGO's to be engaged in the wetland restoration process.

It is recommended that:

- The proponent should be held to the requirement of wetland compensation at the minimum 2:1 ratio with a first preference for areas with suitable habitat for at-risk species within the affected watershed.
- The proponent should be required to produce a finalized wetland compensation plan early in the project's life to identify and prioritize functionally valuable wetland restoration projects.
- If valuable wetland restoration opportunities do not exist within the affected watersheds it is recommended that part of the process of identifying alternative areas should include consultation with NSE's Protected Areas Branch to look at connectivity options adjacent to existing Wilderness Areas and/or Nature Reserves.

1.6 Monitoring of Wetland Health and Integrity

Given that:

• To ensure continuing health and integrity of natural areas and reduce the risk of environmental damage to water, air, land and biota the proponent is required to conduct a systematic monitoring program.

Noting that:

• The methodology and rigour of wetland monitoring is not adequate. We are not assured that enough data will be gathered to make necessary determinations and corrections.

It is recommended that:

 The regulator requires the proponent to provide a more rigorous, systematic wetland monitoring program with a supporting budget for implementation throughout the life of the mine and post-reclamation until all wetlands and surface waters have returned to stable and healthy conditions.

1.7 Analysis of indirect effects on wetlands

Given that:

- The project spans over a dozen tertiary watersheds with numerous wetland and surface water courses.
- The lateral extent of the project area for the haul road is narrow.
- Wetland analysis is limited to the proponent's delineation of project area boundaries.
- The rationale for establishing the boundary lines for the narrow haul road corridor was not found.

Noting that:

- This narrow haul road corridor crosses many water courses and captures only small fragments of larger adjacent wetlands.
- Indirect effects on wetlands are likely to occur in areas adjacent to the project area and wetlands lying outside the haul road boundary must have a risk factor for perturbation similar to the wetland fragments lying within the boundary.

It is recommended that:

• the proponent widens the boundary of the haul road corridor to analyze indirect effects to wetlands and surface water courses. The width of the PA boundary should be drawn around each of the outer edges of wetlands intersected by the haul road.

1.8 Wetland Values and Environmental Services

Given that:

• Wetlands are now widely recognized as places of rich biodiversity and for their capability to provide valuable environmental services, such as flood control, water storage and filtration.

Noting that:

• The proponent provides insufficient detail of the extent of loss to wetland values and natural services. For example, no discussion and assessment were found in the EIS document describing water storage capacities and carbon sequestration.

It is recommended that:

• The proponent provides a comprehensive assessment of wetland values and environmental services including water storage capacity, flood control and carbon storage and sequestration.

1.9 Constructed wetland for site drainage

Given that:

- Healthy, functional wetlands can be constructed and designed to provide excellent filters for drainage systems.
- Constructed wetlands are used in many road and development projects to reduce siltation and increase filtration.

Noting that:

• A constructed wetland is being used on the Touquoy site for the TMF effluent to Scraggy Lake.

• Constructed wetlands are used in reclamation planning and design to ensure all remaining site drainage can filter through a natural system before entering surface waters.

It is recommended that:

 Constructed wetlands be designed and established on-site at Beaver Dam to supplement other site drainage techniques during the construction and mining phase of the operation. A constructed wetland should also be constructed handle the effluent of the open pit into Moose River.

1.10 Construction Activity involving Wetlands

Given that:

• The proponent has indicated the use of machines in wetland areas as part of the construction and operational work. limiting machinery in wetland.

Noting that:

- The province of Nova Scotia has a wetlands conservation policy with a prime objective of avoiding harm to and loss of all remaining wetlands.
- No person is permitted to use an off-highway vehicle in a wetland, watercourse, dune, barren or other sensitive area (S12A (1) *Off-highway Vehicles Act. R.S., c. 323, s. 1*).

It is recommended that:

- The proponent be required to avoid using machines within wetland areas.
- If avoidance precludes significant operational aspects, then the regulator could be asked to permit machines in wetlands as a last resort. In this case the regulator should require the proponent to submit a plan to the Department of Environment with reasons why it can't be avoided, purpose, methodology and budget for restoring any damage caused by machines to wetlands.

1.11 Precautionary Principle and Risk Analysis

Given that:

- *Nova Scotia's Environment Act* refers to the precautionary principle as a fundamental principle of sustainable development.
- Canada's Environmental Protection Act states: "the government's actions to protect the environment and health are guided by the precautionary principle, which states that "where there are threats of serious or irreversible damage, lack of full scientific certainty

shall not be used as a reason for postponing cost-effective measures to prevent environmental degradation."

• Risk assessments incorporate the precautionary principle and a weight of evidence approach in helping identify sources of pollution that pose the greatest risk to the environment and human health.

Noting that:

- the proponent refers to precautionary approach only in the context of accidents and malfunctions.
- Section 6.18.7.3.4 (Mobile Equipment Accident Risk Assessment) and Table 6.18-13 acknowledge that the consequential risk of fuel spillage along the haul road is high, but the likelihood is low based on driver training, competency, and vehicle maintenance.
- Potential driver training is not described, and proposed vehicle maintenance regime is unknown.
- The speed for trucks along the haul road is to be limited to 70 km/h, but there is no mention of how this will be enforced. Speed is likely the greatest cause of accidents on rural roads, especially in freezing conditions and inclement weather.

It is recommended that:

- The proponent be required to demonstrate applications of the precautionary approach and that risk assessment is applied to all aspects of the project that pose risks to the environment, residents and workers.
- The haul road speed limit is adequately enforced and monitored with speed radar and cameras.

EIS PROCESS EQUITY

While the review process is not under review, we feel we need to state again that the process is inequitable for the general public in terms of the difficulty in understanding technical documents, funding of technical assistance and the amount of time given to respond. AMNS had years to have experts collect information and compile technical reports. They had access to a large budget to complete the EIS. Given the sheer amount of material for anyone (even an expert) to begin to scratch the surface, digest and respond appropriately is near impossible in 30 days and inequitable. With respect to projects of this nature, we feel companies should fund independent third-party expert reviewers on behalf of communities, environmental interests and the general public.

In summary, we feel there three main equity issues that are of concern to us:

Process Inequity - the process to respond in 30 days to thousands of pages is unfair and inequitable to communities and stakeholders.

Socio-economic Inequity - the benefits are short lived and targeted to benefit a few community members through employment and service access. The VAST MAJORITY benefits will flow to shareholders. add while potential contamination flows through communities to Canada's Ocean Playground. The mining companies privatize the profits and socialize the risk, and the legacy of waste. This model is not sustainable under any definition and there is no strategy to even attempt to increase sustainably through significant investment and support in training or educating employees for sustainable careers when mining ends.

Environmental inequity - there is no recognition of values other than financial. The EIS does not contain an assessment of environmental values so residents and regulators can effectively judge what the true impacts and benefits are. Outright dismissal of other values illustrates a complete lack of understanding of what sustainable development actually means.

REFERENCE

Parsons, M., LeBlanc, K, Hall, G., Sangster, A, Vaive, J., Pelchat, P. (2012). Environmental geochemistry of tailings, sediments and surface waters collected from 14 historical gold mining districts in Nova Scotia. Open File 7150, Bulletin of the Geological Survey of Canada. <u>https://doi.org/10.4095/291923</u>







Figure 2 - Mineral exploration claims and proposed or potential gold mines