James Bay Lithium Mine Project
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November 9, 2022

To whom it may concern,

Enclosed past this covering letter is a report for consideration by the Impact Assessment Agency of Canada with regard to the Draft Environmental Assessment Report for the James Bay Lithium Mine Project (henceforth 'the Project').

These recommendations were prepared by graduate students as part of coursework for the class *ENVI5001 Environmental Assessment* at Dalhousie University. All the authors have been trained in the governance, substantive components, and procedural components of federal impact assessment. We bring post-graduate degrees in environmental studies and sciences and cumulative decades of work experience in environmental consulting, research, and management, and lived experience in the resource industry and frontier communities. We have analyzed Valued Components and procedural elements associated with the EIS and Draft Environmental Assessment Report and raise concerns with the quality and scope of data collection and the feasibility and adequacy of proposed mitigation measures. We present in this covering letter a summary of our recommendations with a full analytical report to follow.

Summary of recommendations

Forest fires and cumulative forest fire effects

This section evaluates the James Bay Lithium Mines (JBLM) inclusion of forest fires within its environmental impact statement (EIS). JBLM conducted a detailed inclusion of forest fire impacts on various valued components. This includes positive and negative impacts on habitat, species, and the Eastmain Cree community. Furthermore, JBLM outlined hazards and mitigation strategies to be developed in the event of a wildfire. We make four recommendations regarding forest fire inclusion in the EIS.

- Forest Fire information consolidation into a single chapter to support the development of forest fire ERP for the final EPP.
- Fire brigade expectations: fire brigade is expected to respond to wildfires, structural fires, petroleum fires, and nuclear fires which require different training standards. JBLM must ensure first responders' realistic training and emphasize evacuation strategies to ensure staff safety.

- 35m fire break perimeter insufficient in extreme fire conditions. The Impact Assessment Agency of Canada (IAAC) should require JBLM to come up with more robust strategies for fire management that go beyond training staff and relying on fire break infrastructure.
- JBLM does not include peatland fire impacts within their forest fire review. The IAAC should request more detailed information from JBLM on the predictions, impacts, and risks associated with peatland fires.

Surface water quantity and quality

- Surface water quality and quantity is an issue in open-pit mines, but the proponent does not put enough emphasis on these valued components and does not properly address effective methods to mitigate acid rock drainage and metal leaching. The proponent could refer to literature and employ new methods that are more efficient in mitigating acid rock drainage and metal leaching.
- The project struggles in projecting true impacts of mine effluents on the surface and groundwater quality of the surrounding areas of the mine and the Eastmain River watershed in general.
- Some recommendations would be to provide raw data for better understanding of the conditions and impacts, accumulated impacts of the James Bay Lithium Mine and the Rose Lithium-Tantalum Mining Project.

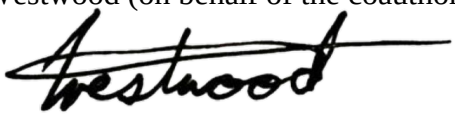
The remainder of the document reports on valued components and procedural aspects the EIS, each analysis, recommendations, and supporting citations. The full document may be cited as:

Westwood, A., Innocent, S., MacKellar, A. 2022. Submission on concerns and recommendations related to the proposed James Bay Lithium Mine project east of James Bay, Quebec. Prepared for the Impact Assessment Agency of Canada. 17pp.

All coauthors consent to the public release of our work. Dr. A. Westwood, as the principal investigator and course instructor, certifies the technical soundness of the analysis and recommendations herein.

Thank you for your consideration, and we hope our recommendations can support a project and impact assessment (IA) process which is more technically sound, just, and supports long-term environmental and economic prosperity in Quebec and for the Cree Nation Government.

Dr. Alana Westwood (on behalf of the coauthors),



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Submission on concerns and recommendations related to the proposed James Bay Lithium Mine project east of James Bay, Quebec

Prepared by
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November 9, 2022

Contents

1. Overview

Galaxy Lithium (Canada) Inc. has proposed the construction of an open pit lithium mine called the James Bay Lithium Mine (‘the Project) in the administrative region of Nord-du-Québec, in the Eeyou Istchee James Bay territory, and in the traditional lands of the Cree Nation of Eastmain. The Project will operate for 23 years at a production rate of 321 kilotonnes of spodumene concentrate per year (from which lithium would be extracted).

At this time, the joint assessment by the Impact Assessment Agency of Canada (IAAC) and the Cree Nation Government is in the ‘environmental assessment’ phase under the Canadian Environmental Assessment Act of 2012 (CEAA, 2012). The committee has prepared the Draft Environmental Assessment Report and Draft Conditions of Decision, with a public comment period invited until November 10, 2022. We examine these documents, as well as the proponent’s Environmental Impact Statement (EIS), with particular attention to valued components (VCs) for which we deemed there to be insufficient baseline data, an underestimation of impacts, or inadequate proposed mitigation and/or monitoring measures.

2. Forest fires and cumulative forest fire effects

2.1 Background

This component evaluation focuses on forest fires and their effects on various valued components (VCs) identified by James Bay Lithium Mine (JBLM) in their Environmental Impact Statement (EIS). I reference various JBLM EIS chapters that are cited as:

- EIS example: EIS, Chapter: 6, Page number: 22 (EIS 6, 22)
- Draft EA by IAAC example: IAAC, Year, Page number: 35 (IAAC, 2022, 35)

Forest fires have broad historical impacts in the James Bay area. The JBLM local study area (LSA) covers 36.9km2 and is situated in a boreal peatland and forests (IAAC, 2022, 66 & 161). The LSA is comprised of 79% peatland and 17% terrestrial habitat (IAAC, 2022, 8). The construction of the JBLM is expected to result in a loss of 304 hectares (ha) of wetlands (IAAC, 2022, 8). Moreover, the region has experienced major impacts from forest fires in the past 15 years (EIS 9, 19) (see appendix 1 for map).

Canadian peatlands make up a quarter of the world’s northern peatlands (Harris et al., 2022). James Bay peatlands are ~2-4m deep and have grown over hundreds of years (Hattori & Hamilton, 2008; Posa et al., 2011). Peatlands are important ecosystems that maintain biological diversity, soil stability, and hydrological integrity in their environments (Posa et al., 2011; Rein et al., 2008). Furthermore, peatlands ecosystems are critical for combatting climate change given their carbon sequestration capacity (Davidson & Janssens, 2006; Harris et al., 2022; Hirano et al., 2007; Posa et al., 2011; Rein et al., 2008). However, peatlands only retain carbon when undisturbed; both human and natural impacts (e.g., forest fires) reverse peat carbon storage resulting in a massive release of greenhouse-gas emissions (GHGE) (Davidson & Janssens, 2006; Hayasaka et al., 2014; Hirano et al., 2007; Posa et al., 2011; Toriyama et al., 2014). Thus, predicted climate change

modeling suggests that forest fire occurrence in Canada is likely to result in the loss of boreal peatlands and the release of GHGE (Erni et al., 2017; Lin et al., 2021).

Boreal ecosystems have adapted to forest fires which have played a natural role in sustaining ecosystem health (Brandt et al., 2013). Fire recurrence rates in the James Bay region estimate that around 2.1% of the land burns annually (Erni et al., 2017). The JBLM EIS identified 68 fires from 1986-2016 within a 110km radius of the LSA (EIS 8, 25). Lightning is the primary cause of the fires that have affected local wildlife and wildlife habitat (IAAC, 2022, 164), air quality (EIS 6, 63), and surrounding communities (IAAC, 2022, 121). In 2013, a mega-fire occurred that burnt 2,196,455 Ha of forest and was Quebec's largest fire ever (EIS 8, 25). During this fire, the Eastmain Cree Community evacuated 250 people and the km 381 truck stop caught fire both of which are nearby the JBLM LSA (EIS 8, 25). Though fires are naturally occurring, changing wildfire regimes are resulting in increased fire size, intensity, and duration due to climate change, land use, and human influences causing novel impacts on fire-evolved ecosystems (Rogers et al., 2020).

2.2 Evaluation

James Bay Lithium Mine (JBLM) has included a detailed investigation of forest fires within their EIS. The JBLM conducted research on the fire history in the region, corroborated evidence with academic literature, industry knowledge holders (e.g., the Quebec Ministère des Forêts, de la Faune et des Parcs (MFFP), the société de protection des forêts contre le feu (SOPFEU), & the traditional knowledge of Cree users of Eastmain territory) and considered the relationship and impacts of forest fires on several valued components.

Fire impacts on wildlife

The JBLM focused on forest fire impacts on birds, bats (IAAC, 2022, 71), small mammals (EIS 6, 201), and large mammals (IAAC, 2022, 87, 116, 120). JBLM reported on the habitat loss of woodland caribou due to the 2013 fire meaning they are unlikely to return to the LSA (IAAC, 2022, 87). These findings were supported by Cree knowledge holders, the MFFP (IAAC 2022, 87), and literature (Palm et al., 2022). Moreover, The JBLM EIS reported negative impacts from fires on nesting birds due to habitat loss (EIS 8, 29). However, the EIS also noted positive impacts on some birds, such as those that prefer open habitats like olive-sided flycatchers and common nighthawks (EIS 8, 34; EIS 7, 78). Current literature on olive-sided flycatchers indicates they prefer small-scale forest clearing; thus, the large-scale 2013 fires likely did not produce desirable habitat (Norris et al., 2021). In contrast, the common nighthawk is associated with burned boreal forests, and therefore, as the JBLM suggests, the species may benefit from the recent burns (Foley, 2018). The EIS also identified that forest fires have resulted in habitat loss and fragmentation for bat species, likely limiting their presence in the LSA (IAAC, 2022, 164). While this may be true, a recent study on little brown bats found that they did not experience negative impacts from fires and burns may improve access to prey species (Blakey et al., 2019). Overall, while the outlined impacts of forest fires on various wildlife VCs by JBLM were not completely in line with all literature, their assessment of fire impacts on wildlife VCs was thorough.

Fire impacts on Eastmain Cree First Nations

JBLM EIS identified that the Cree Nation of Eastmain's traditional practices has been influenced by forest fires since the 1980s (EIS 8, 36). This is misleading because boreal forests are a fire-adapted landscape that the Cree have lived in since time immemorial, meaning impacts on traditional practices from fires have occurred for a long time (Royer, 2016). That said, increased drought and heat associated with climate change are altering the fire regimes in the region (Royer, 2016). In particular, the 2013 fire destroyed large swaths of Eastmain Cree's land and infrastructure resulting in evacuations and more than half of their traplines being destroyed (EIS 8, 36). The Eastmain Cree have since lamented these impacts and brought forth concerns over the cumulative impact that the mine will bring on valued species (IAAC, 2022, 166). Specifically, only recently have important species of Eastmain Cree returned to the LSA including partridges, ptarmigans, muskrats, and beavers (IAAC, 2022, 102). Thus, Eastmain Cree are concerned that the JBLM may further impact these species (IAAC, 2022, 102). The JBLM also identified the positive impacts of fires on the Eastmain Cree. Specifically, forest fires cause succession in promoting plant diversity (Royer 2016). Boreal fires provide conditions for certain plants, mushrooms, and berries to grow that are used by the Eastmain Cree food and medicine (Royer, 2016). While the JBLM noted positive and negative impacts on the Eastmain Cree, they did not identify a solution for the displacement of species that may be caused by the mine.

Impacts and mitigation strategies of fires on mine infrastructure, staff, and communities

The JBLM EIS states that a forest fire occurrence is highly probable with impacts being contingent on forest fire type (EIA 9, 42). Forest fire types outlined in the EIS include crown fires (severe), ground fires (burns in peat), and surface fires (least severe) (EIA 9, 42). These fire types are commonly reported in wildfire literature (BC Government, 2022). Given the likelihood of a fire, the JBLM identified risks and solutions to protect mine infrastructure, staff, and nearby communities from fires.

The JBLM intends to build fire-conscious infrastructure. Specifically, JBLM plans to build their mine with a 50m buffer strip and a 35m fire protective radius around all infrastructure (EIA 7, 59). Given the fire risks associated with mining including ore processing (EIA 9, 22), petroleum products (EIA 9, 27-28), propane tanks (EIA 9, 32), and explosives (EIA 9, 27) the JBLM identified the possibility that an onsite fire could spread into nearby forests. To mitigate this, JBLM has proposed: separate explosives warehouse storage (EIA 9, 34), the implementation of WorkSafe training programs that follows national protocols to reduce the likelihood of accidents (EIA 9, 32), the implementation of a thermally controlled sprinkler system (EIA 9, 27), and the installation of fire fighting systems (EIA 9, 22).

The JBLM also outlined the safety risk that forest fires pose to staff and nearby communities. Currently, IAAC requires that JBLM creates an Emergency Preparedness Plan (EPP) outlining emergency procedures for incidents and accidents. As part of the EPP, JBLM must develop a fire prevention and response strategy known as an emergency response plan (ERP) and engage in fire consultation with SOPFEU (IAAC, 2002, 152 & EIS 9, 22, 42). This ERP must include an evacuation strategy that is readily available for staff, and a communication strategy with the Eastmain Cree and km381 truck stop (IAAC, 2022, 147). The JBLM has committed to creating a fire brigade of certified staff trained in fighting forest fires as part of the ERP (EIS 9, 23 & 42). Ultimately, the final EPP must be completed before project construction (IAAC, 2022, 147).

Overall, the JBLM is engaging in the necessary process to take forest fire safety and impacts seriously.

2.3 Recommendations

I was impressed with JBLM's highly detailed investigation of forest fire impacts. I have four recommendations for future proposed developments in this area as well as suggestions that can be used to improve the final EPP and ERP.

Recommendation 1: Forest Fire Information Consolidation.
Reviewing the JBLM EIS documentation on forest fires was arduous given this topic spanned 7 EIS Chapters. Therefore, consolidating forest fire information into a succinct section would benefit readers and may help JBLM develop the forest fire ERP for the final EPP.

Recommendation 2: Clarifying realistic staff training for Fire Brigade
JBLM has committed to creating a fire brigade of trained staff to respond to fires. This includes acting as first responders in the event of a nuclear gauge break (EIS 9, 23), a petroleum fire (EIS 9, 27-28), and forest fires (EIS 9, 42). Fire suppression strategies vary for different types of fire. For example, most forest firefighters have little training in structural fire suppression and vice versa. Thus, having first responders suppress wildfires, structural fires, petroleum fires, and nuclear fires, which require different training, is unrealistic. While my understanding of training specifics for structural fires, petroleum fires, and nuclear fires is limited, all staff should be trained in basic S-100 forest fire suppression. JBLM must clarify the role of the fire brigade to ensure first responders have adequate and realistic training and expertise to manage different types of fire. Furthermore, emphasis on evacuation strategies may be prudent to ensure first responders avoid situations they are inadequately trained for.

Recommendation 3: Fire Break Perimeter may be insufficient
The 35m radius firebreak around infrastructure proposed by JBLM will only protect infrastructure from certain types of forest fires. The 2016 Fort McMurry fire that occurred in boreal forest ecosystems and resulted in the evacuation of 88,000 people, jumped ~300m across the Athabasca River (Ha, 2016). Relying on the 35m fire break may be inadequate. I believe that the Impact Assessment Agency of Canada (IAAC) should require JBLM to come up with more robust strategies for fire management that go beyond training staff and relying on fire break infrastructure. In the final project EPP, JBLM must outline a detailed, effective, and tested evacuation plan to IAAC that can get employees offsite quickly in the case of aggressive fire conditions.

Recommendation 4: Identification of the unique impact of peatland forest fires
JBLM references forest fires but provides little information on the unique impacts of peatland fires. This is an oversite given peatland is widespread across the LSA. Peatland fires are dangerous given they are known for causing zombie fires, a fire that lies dormant, smoldering in peat throughout the winter that pops early in the following spring (McCarty et al., 2020). The IAAC should request more detailed information from JBLM on the predictions, impacts, and risks associated with peatland fires in areas adjacent to the JBLM site.

3. Surface water quantity and quality

3.1 Background

Water quality and quantity is being chosen as a valued component (VC) for the James Bay Lithium project because of its importance to the Cree Nation and the biological and ecological reliance on the waterbodies. Construction of the James Bay mine is proposed by Galaxy Lithium (Canada) Inc. The proponent proposes the construction of an open-pit Lithium mine in the James Bay territory of the Nord-du-Québec region, on the traditional grounds of the Cree Nation of Eastmain. The mine site is proposed to be located approximately ten kilometres south of the Eastmain River and hundred kilometres east of the Cree nation of Eastmain and of James Bay (Impact Assessment Agency of Canada, 2022, pp.14; Galaxy Lithium (Canada) Inc., 2018).

The Impact Statement prepared by the proponent does not identify water quality and quantity as a separate valued component. However, the proponent identifies the need for water quality and quantity monitoring thus those VCs have been mentioned under various topics such as section 5.1 for Fish and Fish Habitat (Impact Assessment Agency of Canada, 2022, pp.42).

The proponent identifies a local study area (LSA) to assess the project's effects on fish and its habitats and various other values like water quality and quantity (Appendix 2). The LSA is located in the Eastmain River watershed with an area of 36.9 square kilometres while the watershed itself is approximately 46,000 square kilometres. The watershed contains many waterbodies of which include Lac Asiyan Akwakwatipusich, Lac Asini Kasachipet, and Lac Kapisikama. The proponent has established six streams that flow to different rivers which are, CE1, CE2, and CE6 that flow west towards Miskimatao river and eventually join the Eastmain River and streams CE3, CE4, and CE5 that flow east towards the Eastmain River. These rivers and the local watershed host many different fish species such as White Sucker, Lake Chub, Northern Pike, Yellow Perch, Brook Trout, Brook Stickleback, and Troutperch. When the proponent surveyed the LSA to measure the Project's effects on fish and its habitat, no fish species were observed in stream CE4, locals indicated the importance of streams CE2 and CE5 as important fishing areas. The proponent is of the belief that the fish habitat survival is dependent on the quality and the quantity of the water and modification to the streamflow and water quantity due to pit dewatering along with alteration to water quality due to mine effluent can be critical to fish habitat and fish mortality (IAAC, 2022, pp.42).

Table 4 in the 5.1.1 section outlines the anticipated effects of the project on the waterbodies of the LSA. The source of these effects on the various waterbodies is generally due to groundwater dewatering, reduction of the size of watershed, and reduction of the natural flow over the watershed. However, since water quality and quantity itself aren't VCs the effects are measured by their impact on the fish (IAAC, 2022, pp.45; Galaxy Lithium (Canada) Inc., 2018b). In the EIS, the IAAC decided to have a subsection on the alteration of surface water and groundwater quality due to its importance to the Cree Nations. This subsection covers the baseline information for the sampling of streams CE1 to CE5. The proponent found that the surface water for these streams is clear, has low alkalinity, and contains little suspended particulate matter (SPM). The proponent carried out the sampling of groundwater to determine the metal content naturally present.

According to the results, certain natural concentrations exceed the water quality criteria set by the Canadian Council of Ministers of the Environment and the Ministère de l'Environment et de la Lutte contre les changements climatiques (MELCC). The metals of concern were silver, barium, copper, manganese, and zinc (IAAC, 2022, pp.49). The proponent will also pump out groundwater so that the extraction could be done in dry conditions. Due to this, there will be a drop in the groundwater table and such occurrence could cause a decrease in the supply of water in the surrounding wells (IAAC, 2022, pp.118).

3.2 Evaluation

Water quality

The presence of aforementioned metals in the water naturally means that the discharge of metals in any quantity by the proponent could result in increased negative effect on the water quality. Literature has proven that metal mining-activities has caused reduction in abundance, number of taxa, and biodiversity across the world (Kiffney and Clements, 2003; Hirst et al., 2002; Amisah and Cowx, 2000; Watanabe et al., 2000; Gray, 1998; Willis, 1985).

The proponent carried out a geochemical characterization where they found that the waste rock and tailing are potentially leachable in metals such as arsenic, iron, silver, barium, copper, mercury, manganese, nickel, lead, and zinc. Even though the proponent notes a significant reduction of metals after 12 weeks, there may be effects on the water quality that can cause ecological and biological harm to the surrounding ecosystem. Further analysis on the ore and diabase show that they will be leaching certain metals in the short term and mercury will be leaching even after 25 weeks (IAAC, 2022, pp.50). To this, the proponent suggested stockpiling the waste rock and tailings in co-disposal. However, ECCC found that the proponent's argument is not backed up by sufficient demonstration and more testing needs to be done with more realistic conditions (IAAC, 2022, pp.50). One more concern is the absence of raw data from the proponent (Galaxy Lithium (Canada) Inc., 2018). Compared to the Whabouchi Mining Project, James Bay Lithium project lacks the availability of raw numbers for various factors such as metal and chemical concentrations, anticipated decline in water level, fish habitat loss, and the size of each stream and river that the project is going to be impacting (CEAA, 2015, pp. 48-49).

Cumulative effects on water

James Bay Lithium project is located on the Eastmain River watershed which is in the vicinity of other mining projects which are, the Rose Lithium-Tantalum Mining Project and the Whabouchi Mining Project. Since these are all open-pit mines, the process of their projects is fairly similar. Just like the James Bay Lithium Project, the other two projects also dewater lakes which lowers the groundwater table and renders the waterbody that was drained to be irremediable and be permanently dry or turn into a different ecosystem (IAAC, 2022, pp.48). This practice has a significant effect on the locals of the area which rely on the water for sustenance. Throughout all three projects, the possibility of water being contaminated due to metal leaching has been adjudged to be low risk and the acid mine drainage should have no impact on the overall water quality. However, research shows that abandoned metal mines after decades still have a significant impact on the water quality and the concentrations of metals are above the safe guideline values (Nieva and García, 2018). The proponent also believes that the mine activity will cause movement of

metal-containing particles in the air which could deposit on the surface of water within a five-kilometre radius of the mining infrastructure. However, the proponent claims that the water consumed by the workers will be taken from the truck stop thus it does not warrant a toxicology report of the streams however, they ended up conducting a toxicological risk assessment to estimate the health risks of being in direct contact with the water. The proponent conservatively estimated metal concentration in water based on available atmospheric deposition rates however, the study fails to account for the mine effluent contaminating the water quality and having negative environmental impacts because of it (IAAC, 2022, pp.120).

3.3 Recommendations

Considering the EA report, the proponent does an adequate job in mentioning the issues related to water quality and quantity such as pit dewatering, baseline concentrations of metal in the surface water, and lowering of the groundwater table. However, one major issue with this report has been the lack of clarity surrounding the facts provided by the proponent. The proponent lacks in presenting raw data for the various claims of abiding by the guidelines or being just over or under the criteria. This ambiguity does not translate well when trying to manage impacts of a huge project like such. The absence of water quality and quantity as its own VC after mentioning the dewatering of a lake which will never be back to its true form downplays the severity and the magnitude of the change proposed. Therefore, for future similar projects, the proponent should include water quality and quantity as its own VC so that the regulator and the public can clearly and robustly evaluate the baseline information and projected effects.

The James Bay Lithium Mine is in the Eastmain watershed where there is another mine project going on which is the Rose Lithium-Tantalum Mining Project. The effects of these combined mines on the same watershed are unknown because of the lack of information provided by the proponent. There is a small section acknowledging the presence of both mines in the same watershed, but it fails to address true impact of water quality and quantity with raw data and only mentions the destruction of fish habitat that could potentially happen. This could be improved by going through the total impact of both mines on the quality and quantity of water and present raw data that could be easy to interpret. Since this current project is developed at a later date than the other project, the proponent should have the burden to provide an assessment for the cumulated effects of both of these mines on the Eastmain watershed.

The management of waste rock and tailing has been below par, according to the ECCC thus, it would be good practice to accept the review given by ECCC and implement a more rigorous process (IAAC, 2022, pp. 50). Along with that, using the literature to test out better ways would be advisable in an industry that is ever growing, new technology can be implemented especially in projects where the proposed impact is so great. One of the studies suggests using ideal blending configuration of potentially acid generating and non-acid generating components of waste rock to mitigate the potential for acid rock drainage and metal leaching (Day, 2021).

4. Author Information

Dr. Alana Westwood (she/her) is an Assistant Professor at the School for Resource and Environmental Studies at Dalhousie University and based in K'jipuktuk (Halifax). She studies the science-policy interface to understand how management decisions are made, and the impacts of forestry and mining to supply evidence to maintain biodiversity. Prior to becoming a professor, she worked as a private consultant on impact assessments for major projects including hydroelectric dams and right ways, for Natural Resources Canada in their Environmental Assessment Office, and with the Yellowstone to Yukon Conservation Initiative leading the participation of a group of academics in the development of impact assessment law and policy. She has been teaching Environmental Assessment at the graduate level at Dalhousie since 2020.

Shawn Innocent (he/him) is a current Master of Resource and Environmental Management student at Dalhousie University in Halifax, Nova Scotia. He previously finished a Bachelor of Environmental Science (Honours) degree at Carleton University. Shawn has experience in fieldwork, literature review, laboratory research, interdisciplinary approach towards environmental problem solving are a few examples. Shawn worked for the Ontario Ministry of Environment, Conservation and Parks over the summer where he gained valuable field experience and learned how provincial government works. He also did an honour's thesis and published a paper in his undergraduate along with outdoor volunteer work and presenting to peers and locals educating them on various environmental topics.

Ali MacKellar (they/he) is a first-year student studying a Master of Environmental Studies at the School of Resources and Environmental Sciences in K'jipuktuk, Mi'kma'ki. In his early 20s, theys spent four years working as a Forest Fire Fighter out of Kootenay Lake Initial Attack base in the settler community of Nelson, BC. Concurrently, theys attended Quest University Canada. While at Quest, Ali conducted several projects focused on wildfire management, for example: writing a report on the impacts of wildfire on tropical peatlands; writing a policy brief for the wildfire management branch on proactive measures for wildfire-urban interface areas and outlining the negative impacts of wildfire suppression on wildfire succession ecological communities across British Columbia. Ali has a continued interest in the impacts caused by wildfire given the increased risk of wildfires in their home community of Squamish, BC.

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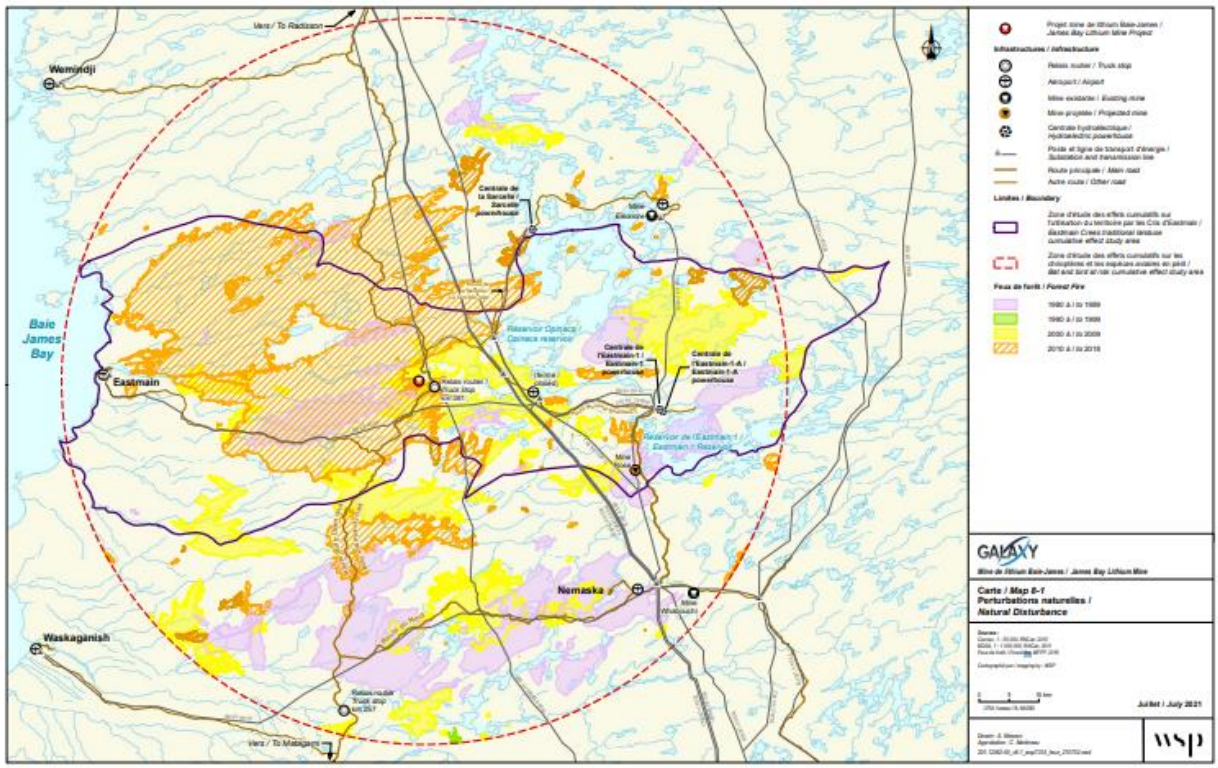
6. Appendices

Appendix 1. This image shows the fire impacts over the past 40 years. The broad, irregular polygons represent historical fires matrixes across various decades. Purple: fires from 1980-1989, Green: fires from 1990-1999, yellow: fires from 2000-2009, and orange: fires from 2010-2018. The red-dotted polygon represents the zone of cumulative effects. The small red circle near the center of the map represents the JBLM project site. Reprinted from "James Bay Lithium Mine Environmental Impact Assessment Chapter 8: Assessment of Cumulative Effects" by A. Masson, 2021, https://guides.himmelfarb.gwu.edu/APA/image-figure, 13. Copyright 2022 by James Bay Lithium Mine.



Appendix 2: Map of the local study area (LSA) to assess the project's effects on fish and its habitats and various other values like water quality and quantity (reproduced from Galaxy Lithium (Canada Inc.))