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Kugluktuk

Kelli Gillard
Manager Project Monitoring
Nunavut Impact Review Board
P.O. Box 1360
Cambridge Bay, NU
X0B 0C0

Bathurst Inlet
Kingaok

May 21st, 2020

Bay Chimo
Umingmaktok

**Re: Review of Sabina's 2019 Annual report for Back River Project
Certificate NIRB No. 007.**

Dear Kelli Gillard, the KIA has reviewed Sabina's 2019 Annual Report for the Back River Project Certificate NIRB No. 007.

Cambridge Bay
Ikaluktutiak

1) Compliance Monitoring:

Gjoa Haven
Okhoktok

The KIA's Framework Agreement (FA) and Inuit Impact and Benefits Agreement (IIBA) with Sabina Gold & Silver Corp. cover terms and conditions of NIRB Project Certificate 007.

Taloyoak

The Framework Agreement is a confidential agreement between KIA and Sabina that supersedes and replaces all previous contractual arrangements between both parties. Section 3.1 of the FA covers Terms and conditions of land use license and reporting.

Kugaaruk

Appendix A of Section 3.1 of the Framework Agreement specifies the details of annual reporting by Sabina to the KIA, which is summarized as follows:

Sabina is to provide an annual report to KIA providing details of its operations under any land use License, Advanced Exploration Lease and/or Commercial Lease covering the location and operations area of lands affected, and the nature of facilities and equipment at these sites. In addition, Sabina is to provide details of progressive reclamation or closure activities undertaken during the year and details of all permits, licenses, and authorizations from other regulatory bodies or agencies that are required for operations.

This annual report is to provide information on:

- Ground disturbances including land use activities for camps, infrastructure, equipment, winter roads and trails.
- Fuel and Chemical storage including Chemicals of Potential Concern inventory (COPC), fuel and chemical usage, and spill records.
- Drilling programs, locations, and methods.
- Water use and effects on water.



- Wildlife interaction, data logs, and summaries.
- Waste disposal, waste management practices, inventory of waste on site, and inventory of hazardous materials or non-combustible waste removed from site.
- Closure and reclamation progress associated with waste management, drilling, and ground disturbance along with associated costs.
- General information on annual inspection activities by staff and other agencies and their results, community consultations, future exploration work plans, submissions to NIRB, NWB, or NPC or other regulators related to mining activity, archaeological sites and burial grounds, and any incidents of storage or possession of alcohol and drugs on site.

Sabina has provided the KIA with the **Back River Project 2019 Annual Report for KIA Framework Agreement** in accordance with Appendix A to Schedule 3.1 of the Framework Agreement. This report is separate from the **Back River Project 2019 Annual Report for Project Certificate No. 007**, which was submitted, to NIRB and the NWB.

The socio-economic impact of the project on affected communities of Nunavut is covered by the IIBA, which is summarized here.

Inuit Impact and Benefits Agreement (IIBA) – Summary.

On April 20, 2018, the Kitikmeot Inuit Association (KIA) and Sabina Gold & Silver Corp. entered into a comprehensive Framework Agreement for the development of the Back River Project area, which includes the Marine Laydown Area (MLA), Winter Road, and the Goose Lake advanced exploration camp, among other exploration and development targets. The Agreement is intended to provide long-term benefit and certainty to Inuit beneficiaries, long-term development, and tenure certainty to Sabina.

One of the major features of this comprehensive agreement is a publicly available Inuit Impact and Benefit Agreement (IIBA) for activities in the Back River Project area, which addresses socio-economic interests of Inuit in the region, including employment, contracting, and training.

The purpose of the IIBA is to satisfy requirements under article 26 of the NLCA with respect to Back River Project area. It is intended by the IIBA to provide benefits to Inuit arising from Sabina's operations that may fall below the threshold of a Major Development Project.

Under the IIBA, Sabina has a commitment to inform the KIA on a regular basis on both the socio-economic and ecosystem effects of their operations in the Kitikmeot



region. Socio-economic effects is be reported on a regular and timely basis through the IIBA Implementation Committee, Sabina Liaison, and the IIBA Manager. Ecosystem effects is be reported through the Inuit Environmental Advisory Committee (IEAC) once established.

The KIA and Sabina Gold & Silver Corp. agreed in the spring of 2019 to defer the formation of the IIBA IC until both parties deem it necessary or a production decision has been made by Sabina.

KIA and Sabina meet in Edmonton in September 2019 to discuss the partial implementation of the IIBA IC and IEAC and its potential benefits. Upon KIA's request, Sabina drafted a proposed plan for the partial implementation of the IIBA IC and IEAC which was provided in October 2019 and discussed at the Presidents' meeting in March 2020. No decision has been made about partial implementation of the IIBA IC and IEAC.

Inspection of Back River Project

The KIA had a site visit of the MLA, WIR, and Goose Lake Camp in May 2019. The KIA inspected the WIR by vehicle, driving along its route from the MLA to Goose Camp. The road was in good condition at the time of the inspection and began the next day to deteriorate rapidly due to warming conditions. Given that winter road equipment is stationed at both the MLA and Goose Camp, the KIA is confident that Sabina can re-construct and operate the WIR more efficiently and within the permitted time period for construction and operation. Caribou were observed by KIA staff to be crossing the WIR unhindered.

The KIA conducted a formal inspection of the Back River Project in July 2019. Both the MLA and Goose Camp were inspected and were found to be in good condition, neat and organized. Minor issues of concern were discussed with Sabina at the time of inspection.

Internal Report on Back River Project – July 24, 2019

Summary

The inspection of the Marine Laydown Area (MLA), Goose Lake Camp site and facilities was conducted on July 24 as per established inspection schedule. Merle Keefe of Sabina Gold & Silver Corp. accompanied Coral Newman and me on the inspection. Forty-seven site components out of 47 components were inspected in accordance with the established schedule.



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The Helipads are lined and the surface looks good. The Heli-Shack Pad and Building looks ok.

Hazardous waste has sump, berm is lined. Hazardous waste is always backhauled, sump water is tested. Waste is stacked in preparation for Backhaul in winter 2020. Core Storage is organized no bird nests minor slumping but in order.

Fuel Laydown area used for storage of construction material and fuel containers. Sump water is expected to evaporate. Fuel Storage Tanks are stable, Fuel Pad is double walled. Enviro-Tanks have some debris around. Tanks are level, one is empty. All are double walled.

Generator Shacks aren't in use, but will be when more people are on site. Core Shack was neat and organized. Has its own water tank to cool off the Core cutting saws. Warehouse is clean and organized. Heated by waste oil. Tool room & Gym are clean and organized. Oil storage shack for generators is clean and organized, also double walled.

Office Complex was built in 2012. (Conference Room, Geologist Room, Logistics) Old Office Complex still partially used. All office spaces are clean and organized. As well as the kitchen.

Washrooms/toilets are clean and organized. Water tanks are filled daily and UV is used to kill Bacteria, Daily Water usage water system is tested weekly.

Water intake is good. It is located on land because it's a small program. The water intake is also connected to the fire shack in case of fire emergency although the fire gear is located elsewhere due to low number of People onsite.

The incinerator is in use and is a double chamber, all ash is backhauled. Old incinerator not in use, and is outside.

Cutting sump is not in use. It's currently filled with water but is expected to evaporate no discharging needed.

Trenching areas have been re-excavated and pressure washed to characterize and record the rock-face.



Compliance Status

In 2019, Sabina Gold & Silver completed several activities such as:

- The construction and operation of the Winter Ice Road (WIR);
- The delivery of equipment, supplies, and other goods to the Goose Property necessary for the construction of the Back River Project;
- Completion of minor earthworks at the MLA;
- Completion of a cargo sealift;
- Preliminary construction of a bulk fuel storage tank at the MLA; and
- Continued gold exploration and resource definition at the Goose Property.

Sabina had trouble last year with the construction of the WIR due to the delayed arrival of equipment and winter weather and snow conditions along the planned WIR route in 2019. The completion of the WIR took longer than anticipated and operated past its planned April closure date closing instead in May. In KIA's opinion, Sabina has strived to comply with its project certificate, water license, and permits while experiencing these difficulties and is only partially compliant.

2) Effects of Monitoring:

a) Whether the conclusions reached by Sabina in the 2019 Annual Report Are Valid.

KIA's consultants in the areas of wildlife reviewed the 2019 Annual Report for Back River Project Certificate NIRB no, 007, 4.5 Performance on Ecosystemic Terms and Conditions, 1 through 65.

Our consultants also reviewed the following documents:

- Appendix C. 2019 Vegetation Monitoring Program (Technical Memorandum)
- Appendix D. 2019 Pre-Construction Wildlife Mitigation and Monitoring Program Report
- Appendix E. SOP: Marine Shipping Wildlife Mitigation and Monitoring (Version 2.0)
- Appendix G. Rascal Stream East and Rascal Stream West – Supplemental Fish Habitat Assessment, Summer 2019
- Appendix H. Back River Project Air Quality Monitoring and Management Plan (July 2019)



Overall, our consultants find Sabina's conclusions in the 2019 Annual Report are valid.

- b) **Any areas of significance requiring further supporting information or changes to the monitoring program, which may be required.**

1.0 Back River 2019 Annual Report

1.1 KIA-NIRB-01

Review Comment Number	KIA-NIRB-01
Subject/Topic	References to 2018 and 2019 Wildlife Mitigation and Monitoring Program Report
References	<p>Back River Project 2019 Annual Report (March 31, 2020)</p> <ul style="list-style-type: none"> • Project Certificate Condition No. 39, 46, 49, 50, 59 • Project Certificate Condition No. 53, 54, 60, 63, 65 <p>Appendix D. Back River Project 2019 Pre-Construction Wildlife Mitigation and Monitoring Program Report</p>
Summary	The Back River Annual Reports and Sabina's responses to reviewer comments have referred to the WMMP Report by multiple titles. Accurate and consistent referencing is needed to avoid confusion. Sabina also states that 2019 is the first year of monitoring but they submitted a 2018 Pre-Construction WMMP Report.
Detailed Review Comment	<p>There is inconsistent naming of Back River project documents that caused confusion during the KIA's reviews in 2019. These inconsistencies remain in the 2019 Annual Report and should be rectified in the future to avoid misunderstandings. The document in Appendix D is officially titled, "2019 Pre-Construction Wildlife Mitigation and Monitoring Program Report". However, two other titles are referenced within Sabina's performance reporting on Project Certificate Terms and Conditions:</p> <ul style="list-style-type: none"> • PC No. 39, 46, 49, 50, 59 refer to the "2019 Pre-Construction Wildlife Effects Monitoring Report" • PC No. 53, 54, 60, 63, 65 refer to the "Pre-



	<p>Construction Wildlife Monitoring Report”</p> <p>Please ensure that those documents are consistently named, even within Sabina’s responses to reviewer comments. Other large development projects may have a Wildlife Effects Monitoring Plan/Program separate from the WMMP and it was unclear whether Sabina would be providing a separate WEMP report with different information.</p> <p>In their performance reporting for PC No. 49 and 50, Sabina also states that Trends are not applicable as “this is the first year of monitoring.” However, since Sabina submitted a 2018 Pre-Construction WMMP Report to the NIRB, 2018 should have been the first year of monitoring, and inter-annual trends (if not quantitative then at least qualitative or semi-qualitative) could be investigated.</p>
Recommendation/Request	<p>The KIA requests/recommends the following:</p> <ul style="list-style-type: none"> • Ensure that references to the WMMP Report in the Back River Annual Report and other Sabina responses are accurately and consistently named. • Review the results of 2018 and 2019 wildlife monitoring to identify any trends.
Importance of Issue	Moderate

2.0 Appendix D. 2019 Pre-Construction Wildlife Mitigation and Monitoring Program Report

2.1 KIA-NIRB-02

Review Comment Number	KIA-NIRB-02
Subject/Topic	Aircraft pilot incidental sightings reports
References	<p>Back River Project, 2019 Pre-Construction Wildlife Mitigation and Monitoring Program Report</p> <ul style="list-style-type: none"> • Section 5.1.1 • Section 5.1.2 • Section 5.6
Summary	Fixed wing pilots and helicopter pilots are instructed to



	report all incidental wildlife sightings. Throughout all flights in 2019, there were zero reported incidental wildlife sightings by fixed wing or helicopter pilots.
Detailed Review Comment	<p>Fixed wing pilots and helicopter pilots are instructed to report all incidental wildlife sightings. Throughout all 140 flights in 2019, there were zero reported incidental wildlife sightings (including terrestrial mammals, caribou, and birds) by fixed wing or helicopter pilots.</p> <p>Incidental observation reports of terrestrial mammals in 2019 by on-site personnel in 2019 yielded 39 individual observations of 9 different terrestrial mammal species (excluding caribou), 36 individual observations of 14,979 caribou, and 2 incidental observations of birds.</p> <p>These results prompt us to highlight that there may be a pilot incidental wildlife reporting issue rather than an absence of wildlife.</p>
Recommendation/Request	<p>The KIA recommends the following:</p> <ul style="list-style-type: none"> • Ensure that pilot wildlife reporting training is thorough and that pilots are reminded often of their reporting duties, while emphasizing the value of incidental wildlife report data to properly assist in the project's compliance to monitor wildlife in the project area. • Work to identify any potential obstacles to pilot reporting. • Look at testing monitoring reporting compliance by cross-referencing recorded flight paths with caribou collar data or with large numbers of incidental observations made by ground crews within areas that are flown over.
Importance of Issue	Moderate

2.2 KIA-NIRB-03

Review Comment Number	KIA-NIRB-03
Subject/Topic	Habitat suitability mapping and habitat loss comparisons for caribou



References	<p>Back River Project 2019 Pre-Construction Wildlife Mitigation and Monitoring Program Report</p> <ul style="list-style-type: none"> • Section 3.1 • Section 5.6.1, Table 5.6-2
Summary	<p>Predicted vs. actual habitat loss for caribou was only analyzed for summer and fall. It is unclear why Sabina did not compare loss of suitable winter and spring habitat, especially because the majority of incidental caribou observations made in 2018 and 2019 occurred during the winter.</p>
Detailed Review Comment	<p>Section 3 of the 2019 Pre-Construction WMMP Report compares the FEIS predicted habitat loss with the area of habitat loss due to pre-construction activities in 2018, as well as habitat loss due to exploration activities prior to 2018. The methods described in Section 3.1 include GIS analysis of the existing footprint compared to habitat suitability mapping for caribou (summer and fall). It is unclear why habitat suitability mapping for winter and spring were not analyzed.</p> <p>Table 5.6-2 of this report summarizes the incidental observations of caribou by season in 2019. The number of winter (November 1, 2018 – April 14, 2019) observations (n=4) as well as the total number of individuals observed (n=252) indicate that caribou are present in the area during winter. In the 2018 WMMP Report, winter observations (n=14), as well as the total number of individuals observed (n=1,603), were highest in the winter (November 1, 2017 – April 14, 2018).</p> <p>Since caribou are known to occur in the area during the winter, the reason(s) why habitat suitability mapping for this season has not been completed, and reasons why losses due to the project are not being enumerated, should be provided. Is it possible to map suitable winter habitat using DEM and predicted snowpack, along with underlying vegetation? Subsequent WMMP reports should include a comparison between predicted vs. actual suitable habitat loss for caribou in all seasons where they may interact with the project.</p>
Recommendation/Request	<p>The KIA requests the following:</p>



	<ul style="list-style-type: none"> • Clarification for why the 2019 Pre-Construction WMMP Report does not report suitable winter habitat loss for caribou. • The KIA requests that Sabina complete winter habitat suitability mapping for caribou, if possible, and if this has not yet been done. We would think that an analysis of landscape features modifying snow depth and underlying vegetation (high percentage of ground cover of suitable lichen and herbaceous forage, proximity to frozen rivers and lakes) may be key factors in winter suitability maps.
Importance of Issue	High

2.3 KIA-NIRB-04

Review Comment Number	KIA-NIRB-04
Subject/Topic	Enforcement of speed limits
References	<p>Back River Project 2018 Pre-Construction Wildlife Mitigation and Monitoring Program Report</p> <ul style="list-style-type: none"> • Section 5.2.1 <p>Back River Project 2019 Pre-Construction Wildlife Mitigation and Monitoring Program Report</p> <ul style="list-style-type: none"> • Section 5.2.1 <p>Back River Project Wildlife Mitigation and Monitoring Program Plan (Version 10)</p> <ul style="list-style-type: none"> • Sections 7.1.4, 7.1.7, 8.1.2, 8.1.5, 9.1.2, 11.1.2, 12.1.2
Summary	No speeding violations were reported in 2019. The Back River WMMP explains that speed limits will be monitored and enforced to mitigate project impacts on habitat loss and direct mortality/injury; however, there are no details about traffic monitoring methods or locations to infer whether traffic/speed violations are not occurring or simply missed.
Detailed Review Comment	The Back River WMMP explains that speed limits will be monitored and enforced to mitigate direct mortality and injury of caribou and muskox; as well as to manage dust generation that would contribute to habitat loss for caribou, muskox, grizzly bear and wolverine, water



	<p>birds, and upland birds.</p> <p>However, there are no additional details in the WMMP, or the 2019 Pre-Construction WMMP Report about how vehicle speed will be/was monitored and enforced, such as monitoring method (e.g., remote camera, traffic monitoring), locations, timing, etc. Without this information, the KIA cannot interpret whether there were no speeding violations in 2019 because all project staff obeyed the 60 km/hr. speed limit, or whether there was inadequate monitoring and enforcement.</p>
Recommendation/Request	<p>The KIA recommends the following:</p> <ul style="list-style-type: none"> • Please provide more details about how the 60 km/hr. speed limit on all on-site roads and the winter ice road is being monitored and enforced, such as monitoring methods, locations, timing, etc. If speed limit monitoring has not yet been implemented due to the minimal amount of road use to date (preliminary and late use of winter ice road), please provide information on proposed methods going forward. • Were any lessons learned during the 2018-2019 late winter ice road opening/use (for transportation of approximately 60 loads of equipment or fuel) about potential hazardous areas (areas with higher chances of large groups of caribou crossing, low visibility issues, etc.) or issues with driving conditions within certain road segments that can be brought forward in determining the best locations and methods to use for speed enforcement during the construction phase?
Importance of Issue	Moderate

2.4 KIA-NIRB-05

Review Comment Number	KIA-NIRB-05
Subject/Topic	Back River Winter Ice Road Caribou Crossing Analysis
References	Back River Project, 2019 Pre-Construction Wildlife Mitigation and Monitoring Program Report



	<ul style="list-style-type: none"> • Section 5.3.4 • Appendix 5C <p>Back River Project, 2019 Annual Report for Project Certificate No. 007</p>
Summary	<p>The WMMP Plan indicates that the winter ice road is to close after April 15th, prior to caribou spring migration. Upon operating the winter ice road after April 15th, a Caribou Road Crossing Study was conducted.</p>
Detailed Review Comment	<p>The Back River Project includes two centres of activity, the Marine Laydown Area on Bathurst Inlet and the Goose Site, 160 km to the south. Between mid-December 2018 and mid-April, 2019 the two sites were connected by a winter ice road. The WMMP Plan indicates that the winter ice road is designed to close after April 15th, prior to caribou spring migration. Upon operating the winter ice road after April 15th (between April 19 and May 10), where approximately 60 loads of equipment and fuel were transported using A-train trucks, and additional ancillary maintenance equipment and wildlife observation vehicle activity ran, a Caribou Road Crossing Study was conducted to investigate if there were detectable impacts on caribou migration and behaviour.</p> <p>Through two qualitative methods and two statistical model methods, caribou movement was analyzed for avoidance, hesitation, and detectable response. Caribou collar data from the years 2008 – 2019 (Bathurst herd) and 2012 – 2019 (Beverly/Ahiak herd) were analyzed. Prior to 2017, caribou were not within a 20 km distance of the project area (including the planned area for the winter ice road). Between 2016 and 2017 a shift in migratory route occurred, and caribou movement routes shifted into the project area. Consequently, only data from 2017 and onwards was used in the analysis. For the analyses conducted, 2017 and 2018 were considered control years and 2019 was considered the treatment year. The statistical analyses showed that no significant change in caribou movement behaviour was detected between the control years and treatment year.</p>



	<p>There were several observations of caribou slowing down prior to crossing the road, and then speeding up during crossing; however, this result was interpreted to not be due to human activity because the same pattern was observed in 2017 and 2018 (no winter ice road) as compared to 2019 when the winter ice road was present. Sabina speculates that there may be an impact of the corridor itself (area within which the road was built) on movement patterns. This logic may be particularly faulty if there were impacts being experienced along the corridor in both “control” and “impact” years. This may be possible due to a large number of activities occurring in 2018 that would affect the averaged patterns of movement in the proposed control years in 2017 and 2018.</p> <p>In 2018, the following pre-development activities were conducted:</p> <ul style="list-style-type: none"> • Vegetation Monitoring for the winter ice road between July 11th and 16th. • Assessment of Archaeological and Heritage Resources, where 30 km of winter ice road were assessed. • Completion of earthworks and initial commissioning of the MLA. • Completion of two cargo sealifts. • Ongoing geotechnical drilling in key infrastructure sites. • Detailed surveying of the winter ice road route for better refinement. • Procurement of construction equipment, bulk fuel storage, and other infrastructure. • Commencement of earthworks at Goose site, including quarry expansion, heavy equipment upgrades, and initial road and bridge construction. • Helicopter use along the corridor. <p>The year 2018 may not be suitable to use as a pre-human activity year where caribou movement and behaviour would be unaltered alongside the</p>
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	aforementioned activities. The proponent also mentioned that the statistical power of the analysis is not high due to the small sample size, and that further years of movement analysis may improve the power conducted. Due to the reported issue with low statistical power of these analyses, they should not be used to conclude that the winter ice road does not affect the movements of caribou migrating through the area.
Recommendation/Request	<p>The KIA recommends the following:</p> <ul style="list-style-type: none"> • Please carefully consider the validity of lumping caribou collar data from 2018 with 2017 data (into a control group), as considerable activity was underway in 2018, and it may be more appropriately classified as an impact year. • Consider re-evaluating the conclusion of the caribou crossing analysis by grouping 2018 and 2019 together as potential impact years, with 2017 as the control year, or via analyzing each year separately. • Please provide details of the power analysis conducted, and the statistical power achieved for each test. The report states that the power is low, but values are not provided. • Given the large number of animals observed moving through the area during spring migration, it is of greater importance that the proponent aim to complete use of the winter ice road in future years prior to the April 15th cut-off date.
Importance of Issue	High

2.5 KIA-NIRB-06

Review Comment Number	KIA-NIRB-06
Subject/Topic	Back River Winter Ice Road additional caribou mitigation
References	<p>Back River Project, 2019 Pre-Construction Wildlife Mitigation and Monitoring Program Report</p> <ul style="list-style-type: none"> • Section 5.3
Summary	The WMMP Report states that during the period from



	April 15 th to May 10 th , the winter ice road was open beyond its intended use date (of April 15). This extended period of winter road use triggered additional mitigation.
Detailed Review Comment	Back River Project includes a winter ice road that connects the Marine Laydown Area on Bathurst Inlet to the Goose Site, 160 km to the South. The winter ice road is designed to be closed by April 15 th . Operation of the winter ice road extended beyond the intended closure date, and its use was extended until May 10 th . The WMMP Report states that during this road use extension period (April 15 th to May 10 th); additional mitigation for caribou protection was implemented. The additional mitigation activities were to be included in the 2019 Pre-Construction Wildlife Mitigation and Monitoring Program Report under Section 5.3.1.3. No such Section exists in the WMMP Report document, however.
Recommendation/Request	The KIA requests the following: <ul style="list-style-type: none"> • Please indicate the additional mitigation actions implemented for caribou protection conducted in the period between April 15th and May 10th, which is missing from the WMMP Report
Importance of Issue	Moderate-High

2.6 KIA-NIRB-07

Review Comment Number	KIA-NIRB-07
Subject/Topic	Photographs to show camp cleanliness
References	Back River Project 2019 Pre-Construction Wildlife Mitigation and Monitoring Program Report <ul style="list-style-type: none"> • Sections 5.5.1.1, 5.5-3
Summary	The photograph of Forward camp (Photo 5.5-3) is inadequate to illustrate how wildlife attractants were mitigated at this camp.
Detailed Review Comment	Section 5.5.1.1 explains that the Goose and Marine Laydown Area (MLA) camps were kept clean and free of attractants for wildlife, but it does not mention Forward camp. Photograph 5.5-3 shows Forward camp from an aerial photograph, which makes it difficult to assess the



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	how well Sabina mitigated attractants. The photograph of MLA camp (5.5-2) is more appropriate.
Recommendation/Request	The KIA recommends the following: <ul style="list-style-type: none"> • Please include more appropriate photographs for the intended purpose in subsequent WMMP reports.
Importance of Issue	Low

2.7 KIA-NIRB-08

Review Comment Number	KIA-NIRB-08
Subject/Topic	Shipping Management
References	Back River Project, 2019 Pre-Construction Wildlife Mitigation and Monitoring Program Report <ul style="list-style-type: none"> • Section 1.2 Back River Project, 2019 Annual Report for Project Certificate No. 007 <ul style="list-style-type: none"> • Project Certificate Condition No. 52
Summary	The proponent is required to manage caribou interactions with the project. In “fall of 2018”, a sea-lift of equipment was delivered to the MLA.
Detailed Review Comment	<p>In Section 1.2, 2019 Project Activities, it is stated that: “During the fall of 2018, the first sea-lift of equipment and fuel for the Goose site was delivered to the MLA.”</p> <p>In the 2018 annual report, Project Certificate Condition No. 52 states that: <i>“The Proponent shall, in collaboration with the Government of Nunavut, the Government of the Northwest Territories, the Kitikmeot Inuit Association and other relevant parties, thoroughly evaluate the potential impacts to caribou from planned mineral exploration within its mineral tenures and outside the approved project development area. The Proponent must demonstrate that the potential for adverse effects to caribou populations can be prevented prior to exploration occurring.”</i></p> <p>The Government of Nunavut & Government of</p>



	<p>Northwest Territories (2018) assessed threats to the Dolphin and Union caribou herd and categorized shipping lanes (marine traffic/ice breaking) as a high threat with serious severity to the population. The report also noted that shipping during summer (June to August) had a negligible effect on the Dolphin and Union caribou herd. After arriving at staging areas in southern Victoria Island in October, the Dolphin and Union caribou herd wait for sea ice to freeze before migrating south. These migration routes are spatially and temporally sensitive.</p> <p>We encourage shipping deliveries to the MLA during periods of least potential impact to caribou wherever possible, and such that shipping avoids impacts to the integrity of ice formation along the migratory routes of the Dolphin-Union Caribou Herd.</p>
Recommendation/Request	<p>The KIA requests/recommends the following:</p> <ul style="list-style-type: none"> • The KIA understands that Sabina has committed to not using ice breaking ships after freeze-up for deliveries. However, it would be helpful to cite the specific shipping dates and link those dates to the mitigation plan commitments for shipping management (e.g., cut-off dates/conditions) during the spring and fall shoulder seasons. • Please note dates when shipping occurred, the shipping cut off dates, cut off ice thicknesses, etc., and an explanation of how shipping management avoided impacting ice formation along Dolphin Union caribou migration routes. • It would be helpful to also include any zones of avoidance around staging areas along the south shore of Victoria Island, if relevant.
Importance of Issue	Moderate

2.8 KIA-NIRB-09

Review Comment Number	KIA-NIRB-09
Subject/Topic	Shipping Mitigation and Monitoring
References	Back River Project, 2019 Pre-Construction Wildlife



	<p>Mitigation and Monitoring Program Report</p> <ul style="list-style-type: none"> Section 7.1
Summary	<p>The proponent is required to follow Project Certificate (PC) Condition No. 58 for mitigation of impacts and disturbances to sea-ducks and waterfowl. It is unclear whether shipping in 2019 obeyed with the prescribed 500 m setback because these details were not included in the 2019 Pre-Construction WMMP Report.</p>
Detailed Review Comment	<p>Section 7.1 states that Sabina is required to meet the PC Condition No. 58 for mitigating impacts to seaducks and waterfowl. The Condition states:</p> <p><i>“The Proponent shall include measures within the Wildlife Mitigation and Monitoring Program Plan to ensure that, subject only to vessel safety requirements, a setback distance of at least 500 metres is maintained from colonies and moulting aggregations of seaducks and waterfowl during Project shipping transiting through Bathurst/Elu Inlet, Lambert Channel, and Eastern Lancaster Sound.”</i></p> <p>There is no mention in the WMMP Report of spatial setbacks from identified bird habitat areas; therefore, it is unclear whether shipping operators obeyed the setbacks outlined in PC Condition No. 58 as well as Sabina’s WMMP Plan v.10.</p>
Recommendation/Request	<p>The KIA requests the following:</p> <ul style="list-style-type: none"> Please clarify and update Section 7.1, Marine Shipping and Management, to follow PC Condition No. 58 for mitigation setbacks for migratory bird areas that fall along the shipping route.
Importance of Issue	Moderate

2.9 KIA-NIRB-10

Review Comment Number	KIA-NIRB-10
Subject/Topic	MV Kelly Ouayuak did not conduct marine shipping wildlife monitoring



References	<p>Back River Project 2019 Pre-Construction Wildlife Mitigation and Monitoring Program Report</p> <ul style="list-style-type: none"> Section 7.1.1, Figures 7.1-1 <p>Appendix E. SOP: Marine Shipping Wildlife Mitigation and Monitoring (Version 2.0, September 30, 2019)</p> <p>Back River Project 2019 Annual Report (March 31, 2020)</p> <ul style="list-style-type: none"> Project Certificate Condition No. 63, 65
Summary	<p>The MV Kelly Ouayuak conducted one sailing in August of 2019; however, it did not conduct marine wildlife or seabird monitoring as per Sabina's Marine Shipping Wildlife Mitigation and Monitoring SOP.</p>
Detailed Review Comment	<p>Section 7.1.1 of the 2019 Pre-Construction WMMP Report indicates that the sailing of MV Kelly Ouayuak travelled between Tuktoyaktuk and the MLA between August 25 and September 1, and between the MLA and Hay River between September 4 and 14. However, despite Sabina providing an SOP to the shipping contractor describing management and monitoring requirements, it is stated that no surveys were conducted during the sailing of the MV Kelly Ouayuak. It is unclear why MV Kelly Ouayuak did not follow Sabina's required wildlife monitoring to be conducted.</p> <p>The KIA brought a similar situation to attention in their review of the 2018 Pre-Construction WMMP Report (submitted in Dec 2019), where no shipping surveys was conducted by the MV MITIQ that year despite being one of two sailings in 2018.</p> <p>We note that, in the Results sections of Sabina's performance reporting related to marine mammal monitoring (PC No. 63, 65), information from 2018 project activities is included. This information should be removed in the 2019 Annual Report as no marine mammal surveys were conducted during shipping in 2019.</p>
Recommendation/Request	<p>The KIA requests the following:</p> <ul style="list-style-type: none"> Provide an explanation for why the MV Kelly Ouayuak did not conduct marine wildlife monitoring as per the Back River Marine



	<p>Shipping Wildlife Mitigation and Monitoring SOP.</p> <ul style="list-style-type: none"> • Remove the 2018 marine mammal monitoring results from the performance reporting for PC No. 63 and 65 in the 2019 Annual Report. • Please provide lessons learned about whether or not Sabina may need to provide personnel to complete wildlife monitoring during shipping (e., if shipping companies simply do not have personnel redundancy to undertake this task), or whether issues with shipping companies not monitoring can be corrected.
Importance of Issue	High

2.10 KIA-NIRB-11

Review Comment Number	KIA-NIRB-11
Subject/Topic	Remote camera and human activity data for 2018 and 2019
References	<p>Back River Project 2019 Pre-Construction Wildlife Mitigation and Monitoring Program Report</p> <ul style="list-style-type: none"> • Section 5.5.1, Page 5-11 • Appendix 2A – Overview of Wildlife Mitigation and Monitoring Programs during Phases of the Back River Project <p>Back River Project Wildlife Mitigation and Monitoring Program Plan (Version 10)</p> <ul style="list-style-type: none"> • Section 6.2, Table 6.2-1 Overview of Wildlife Monitoring Programs that Trigger Management Actions
Summary	The WMMP Plan v.10 indicates that on-site camera monitoring and human activity monitoring are part of Sabina's baseline/pre-construction wildlife monitoring program; however, no data/results for remote cameras or illegal hunting and fishing on the Project site are shown in the 2019 Pre-Construction WMMP Report.
Detailed Review Comment	Table 6.2-1 of the WMMP Plan v.10 shows an overview of wildlife monitoring programs for each phase of the project, including Baseline/Pre-Construction. In addition to incidental wildlife reporting, on-site camera monitoring is supposed to be ongoing during the pre-



	<p>construction phase for caribou, muskox, grizzly bear, and wolverine. Furthermore, human activity monitoring (to report hunting and fishing on the project site) is supposed to be ongoing as part of the caribou monitoring program during pre-construction.</p> <p>A partial copy of Table 6.2-1 from the WMMP Plan v.10 has been included as Appendix 2A of the 2019 Pre-Construction WMMP Report. However, Appendix 2A only shows the first page of this table; the remaining wildlife monitoring programs for other wildlife VECs aside from caribou have been cut off.</p> <p>The KIA commented on this missing information in our previous review of the 2018 Pre-Construction WMMP Report.</p>
Recommendation/Request	<p>The KIA requests/recommends the following:</p> <ul style="list-style-type: none"> • Please provide the results of on-site remote camera monitoring and human activity monitoring for 2019. • Please copy WMMP Plan v.10 Table 6.2-1 in full to be included in Appendix 2A of the 2019 Pre-Construction WMMP Report.
Importance of Issue	High

2.11 KIA-NIRB-12

Review Comment Number	KIA-NIRB-12
Subject/Topic	Additional recommendations from bear safety audit
References	<p>Back River Project 2018 Pre-Construction Wildlife Mitigation and Monitoring Program Report</p> <ul style="list-style-type: none"> • Appendix 5A – Bear Safety Site Audit Report, 2018 <p>Back River Project 2019 Pre-Construction Wildlife Mitigation and Monitoring Program Report</p> <ul style="list-style-type: none"> • Appendix 5D – Back River Project: Standard Operating Procedure 0008 – Waste Management
Summary	BEARWISE made several key recommendations during the 2018 bear safety audit. Sabina took direct action to



	<p>address some recommendations and developed SOP-0008 to document their waste management procedures. However, as was pointed out in the KIA's review of the 2018 WMMP Report (submitted in Dec 2019), some outstanding recommendations from the BEARWISE report remain to be addressed.</p>
Detailed Review Comment	<p>In the Bear Safety Site Audit Report, 2018, BEARWISE made several key recommendations, which Sabina developed into SOP-008 to document waste management procedures. In the KIA's previous review of the 2018 Pre-Construction WMMP Report (submitted in Dec 2019) it was noted that some outstanding BEARWISE recommendations remain to be addressed. These further management actions were not found in Rev 0 of SOP-0008; including suggestions from camp manager Gordon, which Sabina can follow to further reduce wildlife attractants on site.</p> <p>BEARWISE recommended that the MLA site have a dedicated incinerator operator (as Sabina has done at Goose and George Lake camps). It would be beneficial to explicitly list this person's roles and responsibilities in Section 4 of the SOP. Camp manager Gordon proposed solutions to the problems associated with outside storage of food garbage and assigned these as responsibilities of the incinerator operator; however, these solutions were not incorporated in the SOP:</p> <ul style="list-style-type: none"> • Garbage from the kitchen would be picked up by the incinerator operator twice daily, after the cleanup of breakfast and dinner, then taken directly to the incinerator and immediately place inside. • Only the incinerator operator would be allowed to take garbage to the incinerator area. • The incinerator operator would need to be informed of any plans to deliver non-food related waste (cardboard, plastic etc.) to the incinerator site. <p>BEARWISE's key recommendation No. 8 is to <i>"secure the lids of the chest freezers located on the back steps of the kitchen in a way that provides easy access by kitchen staff</i></p>



	<p><i>but prevents bears from gaining access”). The SOP does not mention securing the lids of chest freezers, although this could be due to the prohibition that “no food will be stored outdoors” (Section 5.3.3) – Sabina should clarify is this is the case.</i></p> <p>Section 5.4 regarding food waste needs to be amended with the following BEARWISE and camp manager Gordon’s recommendations:</p> <ul style="list-style-type: none"> • <i>Part of Incinerator Recommendation No. 2: No food waste should be stored outside anywhere on site.</i> • <i>Part of Incinerator Recommendation No. 2: Any non-food related disposal bins and containers are labelled clearly as to what is allowed to be placed inside. These bins and containers must be labelled “No Food Wastes” as well.</i> • <i>Segregation and Diversion of Waste Recommendation No. 3: If recyclables and returnables are to be collected, do so with care; do not allow them to become wildlife attractants.</i> • <i>Cooking Grease Recommendation No. 2: Regularly inspect the walls around cooking grill’s exhaust hood for grease accumulation, clean walls and exhaust hoods regularly.</i> • <i>All food-related garbage storage would be stored inside the kitchen storage area until it is picked up.</i> • <i>Garbage from the kitchen would be picked up by the incinerator operator twice daily, after the cleanup of breakfast and dinner, then taken directly to the incinerator and immediately placed inside. (KIA also mentioned this mitigation measure above.)</i> <p>Finally, Gordon suggested using a skid to transport garbage to the incinerator; however, this approach was not incorporated into SOP-0008 Section 5.6. If Sabina proceeds with this mitigation measure, Gordon recommended:</p> <ul style="list-style-type: none"> • <i>A large skid would have a shallow wooden box built on it and the inside of the box would be</i>
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	lined with a material that could be easily cleaned. The skid would be kept at the incinerator area when not in immediate use. Note that the KIA commented on the outstanding recommendations in our previous review of the 2018 Pre-Construction WMMP Report (submitted in Dec 2019).
Recommendation/Request	The KIA recommends the following: <ul style="list-style-type: none"> • Please revise SOP-0008 and implement the outstanding recommendations made by BEARWISE and camp manager Gordon. • Where recommendations of the camp manager are not integrated into the SOP, please provide an explanation as to why they have not been, what is being done in lieu of the recommendation, and how alternative arrangements are working.
Importance of Issue	Moderate

2.12 KIA-NIRB-13

Review Comment Number	KIA-NIRB-13
Subject/Topic	Clear and comprehensive information about waste management
References	Back River Project 2019 Pre-Construction Wildlife Mitigation and Monitoring Program Report <ul style="list-style-type: none"> • Appendix 5D – Back River Project: Standard Operating Procedure 0008 – Waste Management
Summary	Revision 0 of SOP-0008 (Waste Management) could be improved by including a table clearly showing how various waste types expected at the project sites should be handled and disposed, including wastes compatible for incineration. Additional signage should be posted project staff.
Detailed Review Comment	Section 5.1.1 of SOP-0008 states that all solid, non-hazardous wastes (Domestic Waste) will be separated from hazardous wastes by category and provides a very brief list that includes both non-hazardous and hazardous waste. Section 5.7 through 5.9 subsequently



	<p>describes items that can be incinerated, cannot be incinerated, or can be incinerated with special precautions. It would be much clearer and practical for regular use by project staff if Sabina presented waste management information in a table with the following information:</p> <ul style="list-style-type: none"> • Waste material (e.g., absorbents) • Waste type (e.g., petroleum) • Classification (e.g., hazardous) • General management method (e.g., collects in Quatrex bags or open top drums. Keep in hazardous waste storage areas until final disposal.) • Final disposal (e.g., off-site disposal) <p>This table, or a simplified version, can be posted at waste collection areas. If the Incinerator Operator finds unauthorized substances in the clear garbage bags (Section 5.6.4), Sabina should take corrective actions with camp staff – further training and/or signage may be required to ensure that waste management at project sites comply with all applicable environmental regulations.</p> <p>Note that the KIA also commented on this issue in our previous review of the 2018 Pre-Construction WMMP Report (submitted in Dec 2019).</p>
Recommendation/Request	<p>The KIA recommends the following:</p> <ul style="list-style-type: none"> • Please revise SOP-0008 to include a table that shows proper waste handling and disposal for various waste types. • Post additional signage at waste collection sites to ensure that incompatible wastes are not sent for incineration.
Importance of Issue	Moderate



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2.13 KIA-NIRB-14

Review Comment Number	KIA-NIRB-14
Subject/Topic	SOP for wildlife (carnivore) interactions and deterrents
References	<p>Back River Project 2018 Pre-Construction Wildlife Mitigation and Monitoring Program Report</p> <ul style="list-style-type: none"> Appendix 5C – Back River Project: Standard Operating Procedure 0011 – Wildlife Interactions and Deterrents
Summary	The Back River Project 2019 Pre-Construction Wildlife Mitigation and Monitoring Program Report does not include SOP-0011 for Wildlife Interaction and Deterrents (which was appended to the 2018 WMMP Report), despite SOP-0011 being followed in the incident of a grizzly sow and two cubs being observed near the MLA quarry and camp.
Detailed Review Comment	<p>During the incident of a grizzly sow and two cubs being observed near the MLA quarry and camp, the SOP for wildlife (carnivore) interactions and deterrents (SOP-0011) was followed for deterring the bears away from the area using bear bangers. The bears returned an hour later and were deterred away again a final time.</p> <p>The Back River Project 2019 Pre-Construction Wildlife Mitigation and Monitoring Program Report do not include the SOP for Wildlife Interaction and Deterrents. It would be helpful if all applicable SOPs and other relevant documents were appended to the WMMP Report such that a comprehensive review of Project staff compliance to Sabina's policies and procedures can be completed.</p>
Recommendation/Request	<p>The KIA requests the following:</p> <ul style="list-style-type: none"> Please include the SOP for wildlife (carnivore) interactions and deterrents in further WMMP reports.
Importance of Issue	Moderate



3.0 Appendix E. SOP: Marine Shipping Wildlife Mitigation and Monitoring (Version 2.0)

3.1 KIA-NIRB-15

Review Comment Number	KIA-NIRB-15
Subject/Topic	Sources and rationale for marine mammal and seabird sensitive habitats along the Project shipping route
References	<p>Appendix E. SOP: Marine Shipping Wildlife Mitigation and Monitoring (Version 2.0, September 30, 2019):</p> <ul style="list-style-type: none"> Section 2, Figure 2.1-1, Figure 2.1-2, Table 3.5-1 <p>Back River Project, 2019 Pre-Construction Wildlife Mitigation and Monitoring Program Report</p> <ul style="list-style-type: none"> Section 7.1
Summary	Figures 2.1-1 and 2.1-2 of the SOP show the sensitive habitat for seabirds/seaducks and marine mammals along the shipping route, respectively. References to data sources for marine mammals and further information about sensitive habitat vs. key marine habitat designations for seabirds/seaducks would allow for a more comprehensive review.
Detailed Review Comment	<p>In response to the KIA's technical comments on Version 1.0 of the Marine Shipping Wildlife Mitigation Monitoring SOP as part of the Back River 2018 Annual Report review (KIA-12 to KIA-18), Sabina provided Version 2.0 of the SOP for review in October 2019. At that time, the KIA noted outstanding issues with Version 2.0 of the SOP that remain to be addressed.</p> <p>In response to our previous review comment KIA-13, Sabina has updated Figure 2.1-1 (sensitive habitat for seabirds/seaducks) to reflect key habitat boundaries shown in the ECCC report, <i>Key Habitat Sites for Migratory Birds in the Nunavut Settlement Area</i> (ECCC, 2016). However, this figure still excludes Eastern Jones Sound as Sensitive Habitat for marine birds, which needs to be added. In Figure 2.1-1, Eastern Jones Sound is a "key marine habitat site" (presumably less sensitive, though this is unclear). According to ECCC (2016), both areas are "highly risk intolerant"; therefore, both should be indicated as sensitive habitat, and appropriate</p>



	<p>mitigation should be applied. Sabina does not provide an explanation for how their labelling of Sensitive Habitat vs. Key Marine Habitat Site correlates to ECCC's highly vs. moderately risk intolerant sites.</p> <p>In Version 2.0 of the SOP, there are still no data sources for Figure 2.1-2 (sensitive habitat for marine mammals); the "Service Layer Credits/References" field in the legend is blank. Table 3.5-1 states that any group of marine mammals observed on the ocean surface, especially in the sensitive habitat areas identified in Figure 2.1-2, will trigger mitigation response(s) at the discretion of the ship's operator. Since mitigation responses will more likely be triggered within sensitive habitat, it is important to accurately and conservatively identify these sensitive areas. Sabina does not reference the data sources that were used to identify and map sensitive habitat for these wildlife groups.</p> <p>Further, in the 2019 WMMP Report, Marine Shipping Mitigation and Monitoring section, the shipping route between Hay River and the Marine Laydown Area is shown in Figure 7.1-1. Several key migratory bird habitat sites in Nunavut as defined by ECCC (2016), and in Northwest Territories (NT) as defined by Latour <i>et al.</i> (2008), exist along this route and bird areas from NT are missing from the shipping route map (Figure 7.1-1.). Though these areas are not specified in PC Condition No. 58, they are still considered sensitive migratory bird areas by government regulators (ECCC/CWS). This includes the following key locations:</p> <ul style="list-style-type: none"> • Cape Parry (NT) • McKinley Bay – Phillips Island (NT) • Kukjutkuk and Hutchinson Bays (NT) • Lower Mackenzie River Islands (NT) • Middle Mackenzie River Islands (NT) • Mills Lake (NT) <p>The KIA requests that these additional sensitive migratory bird areas be included in the WMMP Plan and held to the appropriate mitigation setbacks, the Marine Shipping Wildlife Mitigation and Monitoring SOP, and</p>
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	the 2019 shipping route map (Figure 7.1-1) of the WMMP Report to increase transparency in Sabina's activities and reporting. Consider including these sensitive migratory bird habitats in the Shipping Management Plan as well.
Recommendation/Request	<p>The KIA requests/recommends the following:</p> <ul style="list-style-type: none"> • Please provide the above noted missing information and supporting text to enable a more comprehensive review of mitigation alongside sensitive habitats for marine mammals, whale migration routes, and points of concentration. • Include the additional sensitive migratory bird areas in the Northwest Territories into the WMMP Plan, as these locations fall along the Project shipping route, and hold these to the appropriate mitigation setbacks. • Include these additional sensitive bird areas in the Marine Shipping Wildlife Mitigation and Monitoring SOP. • Overlay these sensitive areas on the 2019 shipping route map (Figure 7.1-1) of the WMMP Report to increase transparency in Sabina's activities and reporting. • Consider including these sensitive migratory bird habitats in the Shipping Management Plan for consistency amongst related management plans, SOPs, and other Project documents.
Importance of Issue	Moderate

3.2 KIA-NIRB-16

Review Comment Number	KIA-NIRB-16
Subject/Topic	Reporting timeline requirements for ship strikes of marine mammals or seabirds
References	<p>Appendix E. SOP: Marine Shipping Wildlife Mitigation and Monitoring (Version 2.0, September 30, 2019):</p> <ul style="list-style-type: none"> • Section 3.7
Summary	Reporting frequency requirements, as specified in Project Conditions No. 64 and 65, have been removed from the Reporting Process section of the SOP, Version



	2.0.
Detailed Review Comment	<p>In response to the KIA's technical comments on Version 1.0 of the Marine Shipping Wildlife Mitigation Monitoring SOP as part of the Back River 2018 Annual Report review (KIA-12 to KIA-18), Sabina provided Version 2.0 of the SOP for review in October 2019. At that time, the KIA noted outstanding issues with Version 2.0 of the SOP that remain to be addressed.</p> <p>In response to our previous review comment KIA-14, Sabina has now included the reporting requirements for ship strikes as specified by the Marine Mammal Regulations, s.39, as well as DFO contact info in Inuvik and Iqaluit. However, we note that Section 3.7, Reporting Process, is now missing the reporting timeline specified in PC Conditions No. 64 and 65: <i>"Initially report annually, then every 2 years once contracts have been set up."</i></p>
Recommendation/Request	<p>The KIA requests the following:</p> <ul style="list-style-type: none"> • Please reinstate the requirement to <i>"initially report annually, then every 2 years once contracts have been set up"</i> or explain why the sentence was removed and how they can still meet the Conditions without reporting frequency information.
Importance of Issue	Low-Moderate

3.3 KIA-NIRB-17

Review Comment Number	KIA-NIRB-17
Subject/Topic	Shipping setback distances and locations for seabirds and species at risk
References	<p>Appendix E. SOP: Marine Shipping Wildlife Mitigation and Monitoring (Version 2.0, September 30, 2019):</p> <ul style="list-style-type: none"> • Section 2.2, Table 3.2-1, Table 3.5-1 <p>Back River Project Wildlife Mitigation and Monitoring Program Plan (Version 10, October 2019):</p> <ul style="list-style-type: none"> • Section 13.1.3.3
Summary	The SOP describes two shipping setback distances: 30



	<p>km from Prince Leopold Island and 500 m from large groups or colonies of seabirds in Bathurst Inlet/Elu Inlet and Lambert Channel. It is unclear why Eastern Lancaster Sound is not explicitly mentioned as sensitive habitat where mitigation should be applied.</p> <p>Furthermore, since the endangered Ivory Gull is one of the “most likely observed” species along shipping routes, an additional setback of 2 km from Ivory Gull breeding colonies needs to be included in the SOP.</p> <p>Adaptive management and mitigation should be applied if additional seabird colonies are observed.</p>
Detailed Review Comment	<p>In response to the KIA’s technical comments on Version 1.0 of the Marine Shipping Wildlife Mitigation Monitoring SOP as part of the Back River 2018 Annual Report review (KIA-12 to KIA-18), Sabina provided Version 2.0 of the SOP for review in October 2019. At that time, the KIA noted outstanding issues with Version 2.0 of the SOP that remain to be addressed.</p> <p>The concerns in our previous review comment KIA-15 have not been addressed. Sabina has not updated the Marine Shipping Wildlife Mitigation and Monitoring SOP (nor the WMMP v.10) to include Eastern Lancaster Sound (identified as sensitive habitat in SOP Figure 2.1-1) and Eastern Jones Sound (identified as a highly risk intolerant, key habitat site by ECCC (2016); see KIA-NIRB-15 above) in the list of areas where a 500 m setback will be applied for observed bird colonies, nor have they explained their rationale for these omissions.</p> <p>Sabina’s argument in their July 19, 2019 response that “asking the vessel’s crew to identify additional breeding colonies on shore is impractical” is inconsistent with the data expected to be collected on the Marine Mammal and Seabird Sightings Form, which includes species, number of individuals, and behaviour (including “resting on land”). For ease of interpretation, large numbers of marine birds observed on land during the nesting season (e.g., May-Sep) could be interpreted as breeding colonies. At minimum, Sabina should commit to the mitigation for the now-Critically-Imperiled (as per updated Table 4.1-1 of WMMP Plan v.10) Ivory Gull</p>



	to maintain in compliance with the federal <i>Species at Risk Act</i> . The Ivory Gull is physically distinct and should be identifiable such that a 2-km setback can be applied if colonies (large and obvious aggregations) are observed.
Recommendation/Request	<p>The KIA requests/recommends the following:</p> <ul style="list-style-type: none"> • Please revise Section 2.2 of the SOP and Section 13.1.3.3 of the WMMP to include the 500 m buffer distance for large colonies of seabirds on land and large groups of seabirds on the ocean surface within the entire sensitive habitat areas identified: Bathurst/Elu Inlets, Lambert Channel, Eastern Lancaster Sound, and Eastern Jones Sound. • Please include a 2 km buffer distance from Ivory Gull colonies in the SOP and WMMP; in particular, Eastern Lancaster Sound is likely to be identified as Critical Habitat for this species. • Undertake adaptive management and application of ECCC-recommended buffer distances if additional seabird colonies are observed by bridge staff.
Importance of Issue	High

3.4 KIA-NIRB-18

Review Comment Number	KIA-NIRB-18
Subject/Topic	Marine shipping wildlife monitoring staff and procedures
References	<p>Appendix E. SOP: Marine Shipping Wildlife Mitigation and Monitoring (Version 2.0, September 30, 2019):</p> <ul style="list-style-type: none"> • Sections 3.2, 3.4; Figure 3.4-1; Marine Mammal and Seabird Sightings Record
Summary	Version 2.0 of the Marine Shipping Wildlife Mitigation and Monitoring SOP has been revised to follow ECCC/CWS protocols more closely for bird monitoring. However, the SOP and the Marine Mammal and Seabird Sightings Record would benefit from further revisions to improve clarity and the types/amount of data collected for better interpretation of wildlife sightings. A



	contingency plan may be needed if it is not feasible for regular bridge staff to dedicate 4 hours a day to wildlife monitoring.
Detailed Review Comment	<p>In response to the KIA's technical comments on Version 1.0 of the Marine Shipping Wildlife Mitigation Monitoring SOP as part of the Back River 2018 Annual Report review (KIA-12 to KIA-18), Sabina provided Version 2.0 of the SOP for review in October 2019. At that time, the KIA noted outstanding issues with Version 2.0 of the SOP that remain to be addressed.</p> <p>In response to our previous review comment KIA-16, Sabina has modified Section 3.4 to have different monitoring procedures for marine mammals and birds (the latter follows the Gjerdrum <i>et al.</i> (2012) moving platform protocol). There are some unclear statements amongst the revisions that require clarifications within the SOP. We have also made a few suggestions for improvements to the SOP and forms, noted in the bullet points below.</p> <ul style="list-style-type: none"> • The SOP states that observations for seabirds will be conducted on "either port or starboard side". Please note whether staff will be surveying both sides simultaneously (i.e., one person per side), or whether the location will be staggered between the four, 30-min periods dedicated to seabird observations? • Sabina has now appended their Marine Mammal and Seabird Sightings Record to the SOP. Under Environmental Information, we recommend including sea state, wave height, cloud cover/fog, precipitation, glare, and ice – these factors will influence the visibility of animals. Gjerdrum <i>et al.</i> (2012) has codes in Appendices II-IV that would support precise observations; however, even broader, qualitative descriptions would allow for better interpretation of wildlife sightings (or lack thereof). Furthermore, a field for "Disturbance (e.g., other large vessels, fishing activities, foghorn sounding)" would be useful, as cumulative effects may affect wildlife presence and behaviours.



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	<ul style="list-style-type: none"> • Under Observation Information, we recommend that seabird observers indicate whether they are surveying from the ship's starboard or port side (as per Section 3.4, Monitoring Procedure). It may also be useful to list species codes in Tables 3.2-1 and 3.2-2, or in a separate Appendix, as the space for writing is minimal and mixed flocks of seabirds may be encountered. Please also update the footnote at the bottom of the form to include Table 3.2-2. • Sabina indicated in their Jul 19, 2019 response that they committed to using the vessels' bridge crew to conduct monitoring rather than a separate marine monitor. They did not clarify which or how many bridge staff would be tasked with monitoring. A total of 4 hr. of survey effort per day (as per revised Section 3.4) is a lot of time for bridge staff to undertake as part of other routine duties. How will Sabina ensure that 4 hr. of monitoring can and will be completed? Will Sabina consider hiring a separate monitor if initial feedback from vessel crew indicates that the plan is not feasible? It appears that implementation of monitoring by bridge staff has not been occurring to date.
Recommendation/Request	<p>The KIA recommends the following:</p> <ul style="list-style-type: none"> • Please determine whether the marine shipping wildlife monitoring procedures, with respect to staff requirements and observation schedule, are feasible and to make modifications as needed, such as hiring a dedicated monitor. • Please revise the Marine Mammal and Seabird Sightings Record with our suggested changes (described in the Detailed Review Comment) to the Environmental Information and Observation Information sections.
Importance of Issue	Low



3.5 KIA-NIRB-19

Review Comment Number	KIA-NIRB-19
Subject/Topic	Marine mammal and seabird species most likely observed along shipping routes, including species at risk
References	Appendix E. SOP: Marine Shipping Wildlife Mitigation and Monitoring (Version 2.0, September 30, 2019): <ul style="list-style-type: none"> • Tables 3.2-1, 3.2-2
Summary	In the Marine Shipping Wildlife Mitigation and Monitoring SOP, which bridge staff (monitors) are expected to review, it would be beneficial for Tables 3.2-1 and 3.2-2 (marine mammals and seabirds most likely observed along shipping routes, respectively) to highlight the species of conservation concern.
Detailed Review Comment	<p>In response to the KIA's technical comments on Version 1.0 of the Marine Shipping Wildlife Mitigation Monitoring SOP as part of the Back River 2018 Annual Report review (KIA-12 to KIA-18), Sabina provided Version 2.0 of the SOP for review in October 2019. At that time, the KIA noted outstanding issues with Version 2.0 of the SOP that remain to be addressed.</p> <p>In response to our previous review comment KIA-17, Sabina has provided a much-expanded bird list in Table 3.2-2 with reference to project baseline info and Gjerdrum <i>et al.</i> (2012). Sabina also updated their bird field guide in the reference list in Section 3.8 to a 2016 Sibley Field Guide. However, the following items still require more information:</p> <ul style="list-style-type: none"> • Sabina did not address our request for Species at Risk/Species of Conservation Concern (SAR/SCC) to be identified (e.g., with asterisks) in the species lists. Although there is a table of SCC in the WMMP, it would be useful to identify these species in the SOP as well, especially if extra mitigation for SAR is planned (e.g., for Ivory Gull, see KIA-NIRB-17). • Sabina has now included bearded seal in the list of marine mammals in Table 3.2-1, but still does not reference their data sources used to compile the marine mammal information.



Recommendation/Request	<p>The KIA recommends the following:</p> <ul style="list-style-type: none"> Revise Table 3.2-1 and Table 3.2-2 to clearly identify species of conservation concern, such that bridge staff, if able to undertake the monitoring, would be more cognizant of observing and mitigating potential impacts to these species.
Importance of Issue	Low

3.6 KIA-NIRB-20

Review Comment Number	KIA-NIRB-20
Subject/Topic	Mitigation responses for marine mammals, including speed reduction
References	<p>Appendix E. SOP: Marine Shipping Wildlife Mitigation and Monitoring (Version 2.0, September 30, 2019):</p> <ul style="list-style-type: none"> Table 3.5-1
Summary	<p>The SOP would be more protective of marine mammals if the wording of mitigation responses was stronger and clearer, and if more details could be provided about slowing down vessels when marine mammals are observed.</p>
Detailed Review Comment	<p>In response to the KIA's technical comments on Version 1.0 of the Marine Shipping Wildlife Mitigation Monitoring SOP as part of the Back River 2018 Annual Report review (KIA-12 to KIA-18), Sabina provided Version 2.0 of the SOP for review in October 2019. At that time, the KIA noted outstanding issues with Version 2.0 of the SOP that remain to be addressed.</p> <p>In response to our previous review comment KIA-18, Sabina has now included the 100 m setback as per Marine Mammal Regulations s.7(3) as management response #1 in Table 3.5-1. In their July 19 response, Sabina argued that a decision tree of management options would make the SOP impractical for regular use. We have found that inclusion of an easy to follow diagram in mitigation plans makes it easier for regular use.</p>



	<p>Sabina's management response #2 about slowing the vessel to avoid ship strikes with marine mammals would benefit from further clarification and justification. For example, what is the recommended slow-down speed when travelling through sensitive habitat areas, and what is the scientific rationale behind this speed? At what distance from the animal will vessels begin to reduce speed?</p> <p>In Version 2.0 of the SOP, Sabina has removed the statement that they will "<i>consider adaptively managing ship speed to reduce noise disturbance</i>" from their table of recommended shipping mitigation responses for marine mammals. Keeping ship speed modification in the SOP is important as ship speed is known to modify underwater sound, and cumulative noise impacts to marine mammals and fish are known to be occurring and impacting these species in the Arctic. Decreased contributions to these cumulative effects should be attempted whenever possible.</p>
Recommendation/Request	<p>The KIA requests/recommends the following:</p> <ul style="list-style-type: none"> • Please provide further clarification and justification about slowing down vessels for marine mammals in Table 3.5-1 of the SOP. • Please reinstate modifying ship speed as a mitigation response to reduce cumulative noise impacts to marine mammal and fish.
Importance of Issue	Moderate

4.0 Appendix C. 2019 Vegetation Monitoring Program (Technical Memorandum)

4.1 KIA-NIRB-21

Review Comment Number	KIA-NIRB-21
Subject/Topic	Number and allocation of vegetation monitoring plots
References	<p>Appendix C. 2019 Vegetation Monitoring Program (Technical Memorandum dated 18 February 20120)</p> <ul style="list-style-type: none"> • Section 2.0 • Section 4.0, Table 1



	<p>Rescan 2013. Back River Project: 2012 Ecosystems and Vegetation Baseline Report.</p> <ul style="list-style-type: none"> Table 3.3-1 <p>Back River Vegetation Monitoring Plan, January 2020</p> <ul style="list-style-type: none"> Section 5.5
Summary	<p>It is unclear how Sabina decided to allocate vegetation monitoring plots for WIR monitoring in 2019. The numbers are not proportional to the percentage area covered by each vegetation association in the LSA. Further rationale and relevant background information are needed to understand the methodology.</p>
Detailed Review Comment	<p>Table 1 of the 2019 Vegetation Monitoring Program technical memo presents the number of plots by Project Component (WIR, Goose Property, and MLA). Is the number of monitoring plots proportional to the area covered by each vegetation association in the study area? On page 1, Section 2.0 (Study Area and Monitoring Locations), the report states that that mesic dwarf-shrub tundra (TL), dry sparse tundra (TH), and shrubby tundra (TS) associations comprise >50% of the LSA, yet 18 plots are allocated to each of TH and TL, but only 2 plots are assigned to TS. Table 3.3-1 in the Back River 2012 Ecosystems and Vegetation Baseline Report shows that TL, TH, and TS make up 28.5%, 16.0%, and 8.4% of the LSA, respectively. Therefore, vegetation monitoring plot allocation is not proportional to the areas described in the baseline report.</p> <p>However, Sabina's Vegetation Monitoring Plan (VMP) (Jan 2020) states that for Winter Ice Road Monitoring (Section 5.5), <i>"the most common vegetation associations sampled along the WIR alignment are Dry Sparse Tundra, Mesic Dwarf Tundra, and Raised Bog Complex. The target vegetation association ... is expected to reflect the dominant habitat types present within the WIR..."</i> Indeed, raised bog complex (WB) was assigned 4 plots for the 2019 monitoring program (the largest sample size after TH and TL).</p> <p>It would be helpful if Sabina can provide rationale for their monitoring plot locations. Without scientifically</p>



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	justified rationale for plot allocation and sample sizes, it is difficult for the KIA to determine whether Sabina's vegetation monitoring program methodology is appropriate to meet the objectives. The ecosystems and vegetation baseline report does not provide separate summaries of vegetated ecosystems for each Project Component (sub-areas of the LSA). Since the Back River Vegetation Monitoring Plan is comprised of five different monitoring programs (footprint monitoring, vegetation monitoring, non-native plant monitoring, lichen monitoring, WIR monitoring), it would be more useful to present the most relevant background information for each program to enable better understanding of Sabina's monitoring methodology.
Recommendation/Request	The KIA requests/recommends the following: <ul style="list-style-type: none"> • Please provide further rationale for vegetation monitoring plot allocation. • Please present relevant background information for each vegetation monitoring program component – in this case, relevant study area and vegetation association information for WIR monitoring.
Importance of Issue	Moderate

4.2 KIA-NIRB-22

Review Comment Number	KIA-NIRB-22
Subject/Topic	Vegetation monitoring plots in 2019 compared to 2018
References	Appendix C. 2019 Vegetation Monitoring Program (Technical Memorandum dated 18 February 20120) <ul style="list-style-type: none"> • Section 4.0, Table 1, Table 2
Summary	The 2018 vegetation monitoring program assigned 72 plots (36 experimental, 36 reference) along the WIR. The 2019 program, however, consisted of only 46 paired experimental/reference plots along the WIR, meaning a 33% decrease in the sample size. Although the actual WIR alignment and, thus, the location of monitoring plots needed to change, the number of plots should be kept consistent for sufficient coverage of the study area.



Detailed Review Comment	<p>Section 4.0 (Methods) of the 2019 Vegetation Monitoring Program technical memo indicates that, for the 2018 monitoring program, 72 baseline vegetation monitoring plots were established (36 reference and 36 experimental). Due to “several small route optimizations” for the inaugural WIR in 2019, “a portion of the experimental plots [fell] outside of the current footprint” and a total of 15 experimental plots were relocated to “provide sufficient experimental plot coverage on the WIR footprint”. Tables 1 and 2 then show that a total of 56 vegetation monitoring plots (46 paired experimental/reference along WIR, 10 standalone experimental within Goose Property and MLA).</p> <p>This means that 26 plots along the WIR (amounting to 36%) have been removed between the 2018 and 2019 vegetation monitoring programs. This is a substantial change in sample size and it is unclear how experimental plot coverage can still be sufficient, unless the 2018 program involved much oversampling. The total length of the WIR has presumably not changed; therefore, a better study design would be to fully replace all plots that needed to move and to maintain a target of 72 plots for the WIR monitoring program. Without scientifically justified rationale for plot allocation and sample sizes, it is difficult for the KIA to determine whether Sabina’s vegetation monitoring program methods are appropriate to meet the objectives.</p>
Recommendation/Request	<p>The KIA requests/recommends the following:</p> <ul style="list-style-type: none"> • Please provide rationale for reducing the number of paired monitoring plots along the WIR by 33% between 2018 and 2019. • Please assign more replacement plots for the next year of vegetation monitoring such that the overall monitoring targets and goals can be sustained and met.
Importance of Issue	High



4.3 KIA-NIRB-23

Review Comment Number	KIA-NIRB-23
Subject/Topic	Timing of vegetation monitoring program data collection
References	Appendix C. 2019 Vegetation Monitoring Program (Technical Memorandum dated 18 February 20120) <ul style="list-style-type: none"> Section 4.0
Summary	The timing of field data collection for the Back River vegetation monitoring program is not fully consistent with Sabina/Golder's rationale. Climate change effects may also need to be considered for Arctic plant phenology.
Detailed Review Comment	<p>Section 4.0 (Methods) of the 2019 Vegetation Monitoring Program technical memo explains that 2018 data collection was completed from July 11 to 16, 2018 and that 2019 data collection was completed from July 24 to 31, 2019. The rationale for timing is presented on page 6 of the technical memo, which states that <i>"sampling was conducted during the peak flowering period for most species when fruiting structures were likely to be present... in early summer (i.e., early July)."</i> The KIA notes that the 2019 field data collection period would not be considered early July. Would vegetation identification have been compromised at this later time of year in 2019? It is important that data collection for the vegetation monitoring program be conducted at the most appropriate time for vegetation identification, since assessments of species richness will depend on accurate identification.</p> <p>It is also important to consider the effects of climate change on Arctic plant phenology during subsequent years of vegetation monitoring for the Back River project. Panchen and Gorelick (2017) found that flowering times and seed dispersal times were most strongly correlated with June and July temperatures, respectively. The authors also noted that seed dispersal times have advanced over the past 120 years, likely as a result of increasing late-summer temperatures in Nunavut. Determining the optimal period(s) for</p>



	vegetation data collection may require adaptive management and should integrate local knowledge and observations.
Recommendation/Request	<p>The KIA requests/recommends the following:</p> <ul style="list-style-type: none"> • Please provide an explanation for why the 2019 vegetation data collection was later than what was specified in their rationale. Was 2019 an abnormally cold year with much delayed phenology? If field data collection cannot be performed during the optimal survey period, acknowledgment of limitations/caveats should be provided in the monitoring report/memo. • Please review and revise the optimal timing for vegetation data collection for subsequent years of monitoring, as appropriate, based on scientific and local knowledge.
Importance of Issue	Low

4.4 KIA-NIRB-24

Review Comment Number	KIA-NIRB-24
Subject/Topic	Inconsistent number of non-vascular plant species identified in 2019
References	<p>Appendix C. 2019 Vegetation Monitoring Program (Technical Memorandum dated 18 February 20120)</p> <ul style="list-style-type: none"> • Section 5.0, Page 9; Tables 8 and 9 • Appendix C <p>Back River Vegetation Monitoring Plan, January 2020</p> <ul style="list-style-type: none"> • Section 5.5, Table 5.5-1
Summary	There are discrepancies in the number of non-vascular plant species presented within the Results and between the Results and Appendix C (species list). Inaccuracies may have implications for comparisons of species richness by vegetation associations and between experimental and reference plots.
Detailed Review Comment	Section 5.0 (Results) of the 2019 Vegetation Monitoring Program technical memo begins with a summary of the number of vegetation species identified. A total of 36 non-vascular plants was reported; however, the



	<p>numbers in brackets (18 bryophytes and 16 lichens) do not add up to 36 (adds to 34), and Appendix C only lists 12 bryophyte species rather than 16. Please ensure that the correct results are presented in this technical memo, as these numbers will have implications for the comparisons of species richness by vegetation association and between experimental and reference plots in Tables 8 and 9. One of the measurable parameters for the WIR Monitoring Program is “quantitative assessment of plant species richness (diversity)” (Table 5.5-1, Back River VMP [Jan 2020]), and accurate monitoring data (e.g., species identification and enumeration) are needed to produce accurate analyses of potential project impacts and the effectiveness of mitigation measures. Presentation of inaccurate monitoring results may also suggest inadequate QA/QC procedures for the Vegetation Monitoring Program.</p>
Recommendation/Request	<p>The KIA requests/recommends the following:</p> <ul style="list-style-type: none"> • that Sabina review the 2019 vegetation monitoring data collected and make corrections to all applicable sections of the monitoring report/memo, as there appear to be several errors. • If additional QA/QC measures are needed for the program to ensure accuracy, Sabina should document these measures in the next revision to the VMP and ensure that they are implemented.
Importance of Issue	High

4.5 KIA-NIRB-25

Review Comment Number	KIA-NIRB-25
Subject/Topic	Additional vegetation species of conservation concern
References	<p>Appendix C. 2019 Vegetation Monitoring Program (Technical Memorandum dated 18 February 20120)</p> <ul style="list-style-type: none"> • Section 5.0, Page 9 <p>Back River Vegetation Monitoring Plan, January 2020</p> <ul style="list-style-type: none"> • Section 5.2.2 <p>Back River Project Wildlife Mitigation and Monitoring</p>



	<p>Program Plan (Version 10, October 2019):</p> <ul style="list-style-type: none"> Section 4.1, Table 4.1-1 <p>Rescan 2013. Back River Project: 2012 Ecosystems and Vegetation Baseline Report.</p> <ul style="list-style-type: none"> Sections 2.7.1, 3.10.1
Summary	<p>There is additional vegetation species of conservation concern aside from those listed as Endangered, Threatened, or Special under the federal <i>Species at Risk Act</i> that should be noted during data collection for the Vegetation Monitoring Program. While Sabina considers territorial status for wildlife species, they do not give the same considerations to vascular and non-vascular plant species.</p>
Detailed Review Comment	<p>The first paragraph of Section 5.0 (Results) of the 2019 Vegetation Monitoring Program technical memo states that no invasive species or federally listed plant species were observed during field surveys. The Back River VMP (Jan 2020) focuses only on rare plants “defined as vascular and non-vascular species listed under SARA Schedule 1 and species with “Endangered”, “Threatened”, or “Special Concern” status” (presumably including those listed under Schedule 3, although this is unclear). The KIA requests that Sabina consider the territorial status for vegetation (which Sabina does for wildlife; see Table 4.1-1 of WMMP Plan v.10). In the Canadian Endangered Species Conservation Council’s (CESCC) Wild Species 2015 Report, there are 461 vascular plant, bryophyte, and microlichen species listed as S1, S2, or S3 (Critically Imperiled, Imperiled, or Vulnerable, respectively) in Nunavut (CESCC, 2016). Although not all of these species will be applicable to the Back River project, those that may be present in and around the study area should be identified and protected, even if they are not officially on Schedule 1 of the federal SARA. A more comprehensive consideration of rare plants and vegetation species at risk would demonstrate due diligence and Sabina’s commitment to protect species that are considered Critically Imperiled, Imperiled, and Vulnerable in Nunavut, particularly as these species may be added to Schedule 1 of the federal SARA in the future.</p>



	Neither the VMP (Jan 2020) nor the 2019 Vegetation Monitoring Program technical memo provides a list of the federal SARA-listed plant species to be aware of, which would be informative for the reviewer. To date, there is one plant species with its range in Nunavut listed under SARA Schedule 1 (Porsild's Bryum), and several plant and lichen species listed under SARA Schedule 3 as Special Concern. The KIA notes that the Back River Ecosystems and Vegetation Baseline Report found a total of 90 rare species in the LSA and reference areas, including 41 vascular plants, 31 lichens, and 18 mosses. The baseline report acknowledged that none of these rare species were listed under SARA or by COSEWIC at the time. In addition, at the time of the 2012 rare plant surveys, there was no S-rank system for Nunavut plants and, thus, Table 3.10-4 (Summary of Rare Species Found in the LSA) had many "N/A" entries. However, the CESCC has since implemented an S-rank system for Nunavut and a revised summary list may reveal that the project could impact a number of rare and at-risk species.
Recommendation/Request	The KIA requests/recommends the following: <ul style="list-style-type: none"> • Please identify S1, S2, and S3 vascular and non-vascular plant species that are known or potentially occurring at the Back River Project. • Please include and list both federal and territorial vegetation species of concern in the Back River Vegetation Monitoring Plan, with regular review and revision as needed.
Importance of Issue	Moderate

4.6 KIA-NIRB-26

Review Comment Number	KIA-NIRB-26
Subject/Topic	Lack of statistical analyses and comparisons against vegetation monitoring criteria to trigger adaptive management and mitigation
References	Appendix C. 2019 Vegetation Monitoring Program (Technical Memorandum dated 18 February 20120) <ul style="list-style-type: none"> • Section 5.0



	<p>Back River Vegetation Monitoring Plan, January 2020</p> <ul style="list-style-type: none"> • Section 5.5, Table 5.5-1 • Section 6, Page 22 • Section 8 <p>Back River Project 2019 Annual Report (March 31, 2020)</p> <ul style="list-style-type: none"> • Section 4.5.9, Project Certificate Condition No. 34
Summary	<p>The 2019 Vegetation Monitoring Program technical memo does not include any statistical analyses and provides very little discussion on the results and data interpretation. There are no formal comparisons against the WIR monitoring criteria specified in the Back River Vegetation Monitoring Plan. However, the results presented in this memo suggest that these criteria may be exceeded, which should trigger adaptive management and additional mitigation measures to reduce the project's impact on vegetation.</p>
Detailed Review Comment	<p>The 2019 Vegetation Monitoring Program technical memo does not provide any statistical analyses comparing vegetation heights (Tables 4 and 5), surface substrate percentages (Tables 6 and 7), or species richness (Tables 8 and 9). Discussion of the results is extremely limited, and where the report did acknowledge apparent differences, there were no statistical analyses to support interpretations. This does not comply with Section 5.5, page 19 of the Back River VMP (Jan 2020), which states that <i>"data analysis will focus on evaluating trends and determining if there are statistical differences in plant species composition and abundance between impacted WIR and control plots."</i></p> <p>The following are examples of results that would benefit from statistical comparisons and further discussion:</p> <ul style="list-style-type: none"> • Vegetation height: there appear to be marked differences between the heights of forbs in cottongrass sedge fen (WC) and mesic dwarf tundra (TL), heights of bryophytes in tundra seepage (TS), and heights of graminoids in undifferentiated tundra (TU) in impacted/disturbed experimental versus reference plots (Table 5). • Surface substrate: there was less vegetation



	<p>cover and more bare ground and litter on impacted experimental plots in raised box complex (WB) and dry sparse tundra (TH) than on the reference plots (Table 7). There was also more litter on impacted experimental TS and TU plots than on reference plots. The KIA assumes that litter is a proxy for plant community health, although a definition of litter for the purposes of vegetation monitoring was not provided in this technical memo or the VMP.</p> <ul style="list-style-type: none"> • Species richness: Within TL, there was lower species richness in impacted experimental plots compared to both non-impacted experimental plots and reference plots (Table 8). Table 9 shows that this difference is mostly due to 50% fewer lichen species in the impacted experimental plot. The brief results discussion does not mention the potential loss of lichen in visibly disturbed areas along the WIR. <p>In addition to the lack of statistical comparisons between experimental and reference plots for the 2019 vegetation monitoring program, there was no evaluation of trends between data collected in 2018 versus 2019. As discussed in KIA-NIRB-22, the Methods section explained that “a portion” of the experimental plots needed to be relocated. This wording implies that a number of plots were still useful for WIR monitoring and inter-annual comparisons of these plots could have been made. However, Table 2 shows that only 17 pre-existing plot locations (16 reference, 1 experimental) were retained for the 2019 program (meaning that 76% of the original 72 plots established in 2018 were not re-sampled). It is unclear whether the other 40 plots (minus the 15 plots that were adjusted in 2019) also fell outside the re-aligned WIR footprint. If these plots were useable and had been kept for the 2019 program, Sabina would have vegetation monitoring data before and after construction of the inaugural WIR in 2019, which may have provided further insight into project impacts on vegetation.</p>
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	<p>Furthermore, the 2019 Vegetation Monitoring Program technical memo does not evaluate the monitoring results against the WIR Monitoring criteria, which are described as follows: <i>"It is anticipated that shrubby and woody plants will be damaged by winter ice road usage, but that overall vegetation ground cover will not be reduced (i.e. that ice road usage will not result in increase of exposed soils at the ground surface"</i> (Table 5.5-1 of the VMP [Jan 2020]). Monitoring criteria are meant to inform project mitigation and adaptive management; page 22 of the VMP states that <i>"indications of the need for corrective actions and additional control measures may include: If vegetation monitoring criteria are exceeded."</i> As shown in the 2019 Vegetation Monitoring Program technical memo, the largest difference in species richness between impacted and reference plots was the shrub layer (Table 9 and discussion on p. 16), and there was an increase in bare ground for two vegetation associations (Table 7 and discussion on p. 13). These results suggest that the vegetation monitoring criteria may have been exceeded (although statistical analyses would be more informative) and that adaptive management is needed for the WIR.</p> <p>It is unclear whether Golder was not tasked with results interpretation, in which case the KIA would expect Sabina to append Golder's technical memo with further discussion about the monitoring results in relation to the WIR monitoring program as a whole. Section 8 (Environmental Reporting) of the VMP (Jan 2020) states that an annual Vegetation Monitoring Summary Report will be completed and submitted with the annual report to the NIRB, which will <i>"provide the methodology, results, as well as a comparison to impact predictions or historical results."</i> As detailed in this review comment, a comparison to impact predictions or historical results has not been provided. The Back River Project 2019 Annual Report (March 31, 2020) does not provide any additional information on vegetation monitoring aside from this technical memo.</p>
Recommendation/Request	<p>The KIA requests the following:</p> <ul style="list-style-type: none"> • Please complete statistical analyses and a



	<p>fulsome discussion of vegetation monitoring results, as outlined in the Back River Vegetation Monitoring Plan (Jan 2020).</p> <ul style="list-style-type: none"> • Please complete a comparison of vegetation monitoring data against WIR monitoring criteria to determine whether adaptive management and additional mitigation should be applied. • Please provide further information on why only a certain percentage of pre-existing plots was retained for the 2019 vegetation monitoring program, as this information could have provided valuable vegetation data pre- and post-construction of the inaugural WIR.
Importance of Issue	High

4.7 KIA-NIRB-27

Review Comment Number	KIA-NIRB-27
Subject/Topic	Missing information – specified as part of monitoring methods but not presented in results
References	<p>Appendix C. 2019 Vegetation Monitoring Program (Technical Memorandum dated 18 February 20120)</p> <ul style="list-style-type: none"> • Section 4.0, Pages 6-7 • Section 3.0 <p>Back River Vegetation Monitoring Plan, January 2020</p> <ul style="list-style-type: none"> • Section 5.5, Table 5.5-1
Summary	<p>The vegetation monitoring program methods describe collection of several parameters, including plant vigour, moisture regime, and nutrient regime, that are necessary for meeting the program objectives. However, these parameters were not presented in the results of the monitoring report/memo. For some types of information, such as wildlife use and decayed wood, it is not clear whether none was observed, if the methodology changed, or if the results were not presented for another reason. Additional details about disturbance classes would improve understanding of the report/memo and may aid in meeting the objectives of the vegetation monitoring program.</p>



<p>Detailed Review Comment</p>	<p>The 2019 Vegetation Monitoring Program technical memo includes parameters to record as part of the program methodology; however, not all of these parameters are presented in the Results section. Pages 6-7 of Section 4.0 (Methods) list the information that was collected at each site as part of detailed plot assessments, including (but not limited to):</p> <ul style="list-style-type: none"> • Vigour class or overall plant health of vascular plant species, using qualitative analytical approaches following the Ecological Land Survey Site Description Manual (AEP 1994); • Dominant structural stage, moisture regime, and nutrient regime; and, • Wildlife sign (e.g., fecal pellets, browsing/grazing, beds, digging) observations, if present. <p>As shown in Table 5.5-1 of the Back River VMP (Jan 2020), Vegetation Vigour is the monitoring indicator for the WIR Monitoring Program, and the measurable parameters include quantitative and qualitative (photographic) assessment of vegetation vigour. This parameter is, therefore, a crucial part of the vegetation monitoring program but is missing from the monitoring results. Without collecting and/or presenting the results of critical parameters for the WIR Monitoring Program, Sabina is not complying with their VMP and it is unclear how they will meet their monitoring objectives.</p> <p>While dominant structural stages are presented in Table 3, moisture regime and nutrient regime are not discussed further. Page 6 of the memo explains that <i>“moisture and nutrient regimes signify the relative moisture and nutrient supply available to vegetation and are limiting factors in vegetation growth.”</i> Changes in moisture and nutrient regimes would enable a better understanding of indirect effects of the WIR on plant communities, may help identify unanticipated effects of the project, and may provide an early warning of undesirable change to the environment and to inform adaptive management strategies – these are three of the objectives outlined in Section 3.0 of the 2019 Vegetation</p>
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	<p>Monitoring Program technical memo.</p> <p>Regarding wildlife sign, percent cover of animal pellets was one type of information collected for surface substrate materials; however, there was no reporting of other wildlife sign in the monitoring plots. There was also no explanation of how the percent cover of animal pellets would be interpreted – do more pellets indicate higher quality habitat and better overall plant health (because this area has preferred forage), or are more pellets indicative of increased browsing and plant damage?</p> <p>Furthermore, there is an inadequate explanation about disturbance classes (page 7) – is this assessment solely for human disturbance (i.e., WIR construction and operation) or does plant damage include wildlife use? The photographs in Appendix B are not of high enough resolution to be able to determine the type(s) of disturbance. Without separating/identifying the causes of disturbance (such as on the four plots assessed to have High and Very High levels of disturbance; Table 10), it would be difficult to measure and attribute direct loss and indirect effects to plant communities due to the WIR, and there would also be confounding factors when trying to monitor and evaluate the effectiveness of mitigation measures (objectives as stated in Section 3.0).</p> <p>Finally, decayed wood was one category of information to record for percent cover of surface substrate materials. Decayed wood was not presented in Tables 6 and 7 – was this because none was found, or was decayed wood combined with another category (e.g., litter), or was it omitted completely? Decaying wood seems like an odd ground cover category to include in Arctic environments, and the reviewer wonders if this method was borrowed from a more southern site where decaying wood in the form of CWD is often measured.</p>
<p>Recommendation/Request</p>	<p>The KIA requests the following:</p> <ul style="list-style-type: none"> • Please provide the monitoring results for plant vigour, moisture regime, and nutrient regime, as



	<p>well as any observations of wildlife sign and decayed wood. These data are crucial for meeting the monitoring program objectives.</p> <ul style="list-style-type: none"> Please provide additional details about the vegetation monitoring methods and data collected, including the purpose of collecting surface substrate information such as litter and animal pellets (i.e., how will these data be interpreted?), and whether disturbance classes consider both human and wildlife damage to vegetation.
Importance of Issue	High

5.0 Appendix G. Rascal Stream East and Rascal Stream West – Supplemental Fish Habitat Assessment, Summer 2019

5.1 KIA-NIRB-28

Review Comment Number	KIA-NIRB-28
Subject/Topic	Conclusion of the Rascal Stream East and Rascal Stream West – Supplemental Fish Habitat Assessment, Summer 2019
References	Appendix G. Rascal Stream East and Rascal Stream West – Supplemental Fish Habitat Assessment, Summer 2019
Summary	The Rascal Stream Fish Habitat Assessment lays out conditions for environmental data collection, and a primary task of surveying the fish habitat conditions during spring flows at the newly constructed bridge crossing; however, it is lacking in conclusory remarks to summarize the assessment.
Detailed Review Comment	The Rascal Stream Fish Habitat Assessment introduces the assessment with conditions for the environmental data collection, and a primary task of surveying the fish habitat conditions for Arctic Grayling during spring flows at the newly constructed bridge crossing, but is lacking in concise and clear conclusory remarks to summarize the assessment. This makes reading the assessment and gathering information from it difficult.
Recommendation/Request	<p>The KIA suggests the following:</p> <ul style="list-style-type: none"> Include a designated conclusion Section



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	summarizing the results along with concluding remarks on the tasks and conditions set out in Section C-1.0 Introduction.
Importance of Issue	Low

5.2 KIA-NIRB-29

Review Comment Number	KIA-NIRB-29
Subject/Topic	Rascal Stream West reach 1 – Turbidity Measurements
References	Appendix G. Rascal Stream East and Rascal Stream West – Supplemental Fish Habitat Assessment, Summer 2019
Summary	Turbidity measurements of Goose Lake Downstream are either lacking or duplicate data are presented.
Detailed Review Comment	In Section C-2.0, Table C-1, turbidity measurements for the different locations of Rascal Stream West Reach 1 are presented along with UTM Coordinates for each sampling location. The sampling locations for the three Goose Lake Downstream samples all share the same UTM Coordinates. Is the replicate sampling intentional (i.e., 3 replicate measurements taken at one location), or did the correct UTM coordinates not get included?
Recommendation/Request	<p>The KIA requests the following:</p> <ul style="list-style-type: none"> Please provide clarification about the three samples collected downstream of Goose Lake. Please clarify if there are meant to be three replicate measurements for a single average measurement at one location (n=1, derived from 3 replicate measures), or whether the UTM coordinates are incorrect and should be three separate locations (n=3, with information on measurement replication requiring clarification).
Importance of Issue	Low



6.0 Appendix H. Back River Project Air Quality Monitoring and Management Plan (July 2019)

6.1 KIA-NIRB-30

Review Comment Number	KIA-NIRB-30
Subject/Topic	Nunavut Environmental Guidelines related to air quality
References	<p>Appendix H. Back River Project Air Quality Monitoring and Management Plan (July 2019)</p> <ul style="list-style-type: none"> • Section 6.1.2 • Section 6.1.3 • References
Summary	<p>The AQMMP makes reference to an old version of the Nunavut Environmental Guidelines for Dust Suppression, and possibly an old version of the Nunavut guidelines/standards for incinerators. Sabina should ensure that the most up-to-date guidelines are adhered to.</p>
Detailed Review Comment	<p>Section 6.1.2 of the AQMMP concerns Sabina's Fugitive Dust Reduction Plan. The Plan makes several references to the GN's 2002 <i>Environmental Guideline for Dust Suppression</i>:</p> <ul style="list-style-type: none"> • "Dust suppression methods should be approved by the Government of Nunavut as outlined in the Nunavut Environmental Guideline for Dust Suppression (GN 2002a)." • "As prescribed in the Nunavut Environmental Guideline for Dust Suppression (GN 2002a), application rate will follow the manufacturer's specifications and will be limited to the road surface." • "If a product not currently approved for use in Nunavut will be used, an application for approval will be made to the GN following the requirements for new product approval which are outlined in the Nunavut Guideline for Dust Suppression (GN 2002a)." <p>The GN released an update of this guideline in April 2014, now entitled <i>Environmental Guideline for Dust</i></p>



	<p><i>Suppression on Unpaved Roads</i> (GN, 2014). If any of the guidelines that Sabina proposes to follow have changed, then the AQMMP would need to be updated and the new information communicated to relevant Project staff. References to the most updated guideline should be made, regardless.</p> <p>In Section 6.1.3 (Incinerator Management Plan) of the AQMMP, Sabina states that incinerators installed for the project would comply with “Nunavut standards (GN 2002b)”, which refers to the Nunavut <i>Environmental Guideline for Air Quality – Sulphur Dioxide and Suspended Particulates</i>. This document no longer appears to be available; the GN has released a 2011 <i>Environmental Guideline for Ambient Air Quality</i>, which includes standards for sulphur dioxide and total suspended particulates in Table 1 (GN, 2011). Regardless, the AQMMP’s reference to this guideline seems incorrect as it does not have specifications for incinerators. A more appropriate reference would be to the GN’s 2012 <i>Environmental Guideline for the Burning and Incineration of Solid Waste</i>, which includes air emission standards for solid waste incinerators in Section 2.4.1 (GN, 2012). The GN’s 2012 guidelines are not currently referenced in the AQMMP (but they are noted in the Back River Incinerator Management Plan). Sabina should endeavour to present consistent information within related management plans and other Project documents.</p>
Recommendation/Request	<p>The KIA recommends the following:</p> <ul style="list-style-type: none"> • Review the most up-to-date Government of Nunavut Environmental Guidelines and integrate any new standards or guidelines into the AQMMP, as needed. • Ensure that related management plans have the same (and the most up-to-date) information by undertaking concurrent revisions.
Importance of Issue	Moderate



6.2 KIA-NIRB-31

Review Comment Number	KIA-NIRB-31
Subject/Topic	Mitigation schedule for emissions management
References	Appendix H. Back River Project Air Quality Monitoring and Management Plan (July 2019) <ul style="list-style-type: none"> Section 6.2, Table 6.2-1
Summary	In the section of the AQMMP on emissions management, the summary mitigation schedule does not include the Project phases for which the Incineration Management Plan will be required/applied.
Detailed Review Comment	Section 6 of the AQMMP focuses on emissions management and describes three relevant project plans: Emissions and GHG Reduction Plan, Fugitive Dust Reduction Plan, and Incineration Management Plan (IMP). However, in the summary table of the various Project phases and relevant emissions management plans (Table 6.2-1), the IMP is not included. Although the KIA understands that there is also a standalone IMP, it would be useful to present a more complete summary table that includes all points discussed in the previous subsections.
Recommendation/Request	The KIA recommends the following: <ul style="list-style-type: none"> Include the Incineration Management Plan in the summary table in Section 6.2, which will allow the reader to quickly understand the Project phases for which the IMP and other emissions management plans will be required and implemented.
Importance of Issue	Low

6.3 KIA-NIRB-32

Review Comment Number	KIA-NIRB-32
Subject/Topic	Adaptive management during extreme and abnormal weather conditions
References	Appendix H. Back River Project Air Quality Monitoring and Management Plan (July 2019) <ul style="list-style-type: none"> Section 7.4



	<ul style="list-style-type: none"> Section 8 <p>Back River Project 2019 Annual Report (March 31, 2020)</p> <ul style="list-style-type: none"> Section 4.5.2, Project Certificate Condition No. 8
Summary	Sabina's performance reporting for PC No. 23 states that the AQMMP includes a meteorological monitoring program to monitor local weather and adaptively manage potential impacts from extreme and abnormal weather conditions; however, no details about adaptive management for extreme conditions are presented in the AQMMP.
Detailed Review Comment	<p>The objective of PC Condition No. 23 is "to monitor local weather and adaptively manage potential impacts from extreme or abnormal weather conditions." Sabina's performance reporting in the 2019 Annual Report for PC Condition No. 23, "Methods", indicates that their AQMMP includes a meteorological monitoring program to accomplish this objective. However, there is no discussion of extreme or abnormal weather conditions in either Section 7.4 (Meteorological Monitoring Program) nor Section 8 (Mitigation and Adaptive Management) of the AQMMP.</p> <p>To ensure compliance with PC Condition No. 23, it would be helpful if Sabina outlined criteria or thresholds regarding what constitutes "extreme or abnormal weather conditions", clearly explained how these conditions may exacerbate known/anticipated project impacts, and provide specific mitigation measures in case these weather conditions arise (e.g., temporary shutdown of activities). Although the first paragraph of Section 8 includes a statement that "the need for any corrective actions to on-site emission management or installation of additional control measures will be determined on a case-by-case basis", Sabina should have planned mitigation measures for various scenarios in place prior to experiencing unusual situations.</p>
Recommendation/Request	<p>The KIA recommends the following:</p> <ul style="list-style-type: none"> Provide a description of extreme and abnormal weather conditions that may require adaptive



	<p>management for potential impacts.</p> <ul style="list-style-type: none"> • Develop and include in the AQMMP specific mitigation or control measures that would be applied in the case of extreme or abnormal weather conditions.
Importance of Issue	Moderate

7.0 Appendix I. Back River Project Incineration Management Plan (July 2019)

7.1 KIA-NIRB-33

Review Comment Number	KIA-NIRB-33
Subject/Topic	Operation of incinerator
References	<p>Appendix I. Back River Project Incineration Management Plan (July 2019)</p> <ul style="list-style-type: none"> • Section 6.0 • Section 6.2 • Appendix A. Ketek CY-100-CA Incinerator Manual, Section 6
Summary	<p>During each cycle of burning in the incinerator, the start of the burn cycle is to be observed by the operator for a defined amount of time. Although the burn cycle is automated, observation is required to confirm correct initial function and safety. Within the document, there are contradictory statements about the observation time for burns in the incinerator.</p>
Detailed Review Comment	<p>In Section 6.0 Operation and Maintenance, the following is stated:</p> <p>“The operator will observe the start of the burn cycle for at least 15 minutes to ensure the incinerators are operating correctly.”</p> <p>In Section 6.2 Incinerator Operation, the following is stated:</p> <p>“The complete system is automated from start to finish, however, after loading the waste, the operator is required to remain present to supervise the beginning of the process (start-up), generally the first hour of the burn.”</p>



	<p>These contradictory statements for observation time of the starting cycle of the burn process need to be addressed. Improper instructions to the incinerator operator may lead to confusion and could become a safety issue, as well as the burning process not functioning properly or burning at incorrect temperature ranges, which could manifest in environmental impacts.</p> <p>Further, in Section 6 (Operation and Maintenance) of the CY-100-CA Manual, the following is stated: “After about 2-3 hours into the burning process, open the door and check the status of the waste and rake if necessary.” And further, “After about approximately 1 hour after the rake, check the waste status again, if not burned then rake it and close the door.”</p> <p>Please include these steps of the burning cycle into the Incineration Management Plan to ensure proper incineration of waste material. Improper burning of waste materials can lead to unwanted environmental ramifications.</p>
Recommendation/Request	<p>The KIA requests the following:</p> <ul style="list-style-type: none"> • Please address the inconsistencies in the duties of the incinerator operators and the required observation period during burn start-up. • Include raking procedure as dictated in Section 6, Operation and Maintenance, of the CY-100-CA Manual into the Incineration Management Plan.
Importance of Issue	Moderate

7.2 KIA-NIRB-34

Review Comment Number	KIA-NIRB-34
Subject/Topic	Environmental Reporting
References	<p>Appendix I. Back River Project Incineration Management Plan (July 2019)</p> <ul style="list-style-type: none"> • Section 10



Thank you

John Roesch, P.Eng.

Cc Geoff Clark, Director, KIA, Department of Lands and Environment