



BMC MINERALS (NO.1) LTD

KUDZ ZE KAYAH PROJECT

RESPONSE TO LFN INFORMATION REQUEST KZK PROJECT PROPOSAL

May 2020

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LIST OF ACRONYMS AND ABBREVIATIONS

Acronym	Definition
BMC	BMC Minerals (No 1.) Ltd.
FCH	Finlayson Caribou Herd
IR	Information Request
km	kilometre
KZK	Kudz Ze Kayah
LAWS	Liard Aboriginal Women's Society
LFN	Liard First Nation
RRDC	Ross River Dena Council
YESAB	Yukon Environmental and Socio-economic Assessment Board
YOR	Yukon Online Registry

1. INTRODUCTION

BMC Minerals (No.1) LTD (BMC) submitted the Kudz Ze Kayah (KZK) Project Proposal to the Yukon Environmental and Socio-economic Assessment Board (YESAB) for a Screening level assessment in March 2017 (BMC, 2017a).

In November 2019 YESAB prepared the Draft Screening Report (YESAB, 2019a) and made it available for public comment. The Rules for Screenings Conducted by the Executive Committee (YESAB, 2005) allow for a 30 day comment period but YESAB can extend the comment period by an additional 30 days. For this assessment the entire 60 day period was provided for public comment rather than extending the 30 day period after the initial 30 days had passed. Despite the Rules for Screening by the Executive Committee, on February 14th, 2020 YESAB extended the public comment period until May 31, 2020. The public comment period was extended at the request of Liard First Nation (LFN), Liard Aboriginal Women’s Society (LAWS) and Canadian Northern Economic Development Agency. The date of extension was based on LFN’s revised schedule to conduct their review of the 2017 Project Proposal. It is noted that the funding agreement between LFN and BMC for the LFN review states that the review would be completed in December 2019. YESAB’s extended public comment period was based on LFN’s revised scheduled of a May 31, 2020 completion date.

Given the unprecedented length of the public comment period, YESAB issued BMC an information request prior to the public comment period ending (Information Request #5) (YESAB, 2020a). The information request was based on their review of the public comments that had been received as of March 13, 2020. BMC responded to this information request on April 27, 2020 (BMC, 2020). On May 19, 2020 BMC received correspondence from YESAB that stated, “*Executive Committee has reviewed the supplementary information received regarding the Kudz Ze Kayah Project and has determined that BMC’s response is sufficient*” (YESAB, 2020b). On May 19 and May 21, 2020 letters from Liard First Nation (LFN) and Liard Aboriginal Woman’s Society (LAWs) were posted on YESAB’s Online Registry (YOR) relating to their views on the sufficiency of BMC’s response to YESAB’s Information Request #5. Table 1-1 lists these documents and the associated YOR document number. Although YESAB has deemed BMC’s responses to these information requests sufficient, BMC is providing this additional information in response to LFN’s and LAWS’ views for YESAB’s consideration.

Table 1-1: Comments Received by YESAB From Liard First Nation

Party	Document Description	YOR Document #
Liard Aboriginal Women’s Society	YESAB – LAWS – BMC Response #5	#2017-0083-5216
Liard First Nation	Liard First Nation IR5 Letter	#2017-0083-6888
Liard First Nation	2020-05-19 Memo KCIPR Air Health	#2017-0083-7908

Party	Document Description	YOR Document #
Liard First Nation	2020-05-19 KCIPR Memo IR#5 LFN Review	#2017-0083-7908

BMC has conducted a thorough review of each of the comments within the documents listed in Table 1-1. BMC's response to Liard First Nation's submission YOR#2017-0083-6888 has largely been prepared as a separate submission to YESAB. Therefore, the focus of this report is in response to the LAWS letter YOR #2017-0083-5216 and the Liard First Nation's Memorandums (YOR#2017-0083-7908). In addition, a detailed response to Liard First Nation's submission (YOR#2017-0083-6888) with respect to the Finlayson Caribou Herd is included in this response. BMC's intention with responding to these comments is that the additional information/context will assist YESAB in drafting the final Screening Report.

2. Liard Aboriginal Women's Society (YOR#2017-0083-5216)

As a preliminary comment, BMC interprets that LAWS views are that the proposed solutions by BMC and recommended mitigation measures (from YESAB) are not sufficient. BMC has therefore reached out to LAWS in order to identify the specific deficiencies and work collaboratively on solutions beyond what has already been proposed by BMC and recommended by YESAB. Since the Draft Screening Report was issued, BMC has written 3 letters to LAWS, sent emails and has left voice mails regarding our desire for direct engagement. To date there has been no response. BMC remains hopeful that LAWS will be willing to discuss its interests and issues of concern with BMC directly. In the meantime, and as a next-best solution to direct engagement, BMC has prepared the following written responses below to certain key items raised by LAWS.

Page 1 of 2: *"Liard Aboriginal Women's Society (LAWS) finds that BMC's response #5 fails to adequately respond to Kaska First Nation concerns and concerns of Kaska communities".*

Response Report #5 was specifically designed to respond to YESAB's Information Request #5 which was based on the public comments that they had received on the Draft Screening Report. The purpose was not to address specific concerns of Kaska communities and groups. BMC's Project Proposal has been substantially modified in direct response to Kaska First Nations suggestions and concerns over the last 3 years. Additional matters can be addressed throughout the subsequent permitting process and thence over the life of the Project using existing and agreed mechanisms. BMC's and Kaska's commitment to a collaborative approach in respect to Project operation is outlined in the existing Socio-economic Participation Agreement between BMC and Kaska and is demonstrated by the processes adopted to date. In 2019 BMC and Ross River Dena Council (RRDC) as lead community for Kaska Nations (for the KZK Project) signed a non-binding letter of intent to modify and modernize the Socio-economic Participation Agreement and BMC anticipates that addressing any outstanding matters will be dealt with during that process.

Page 1 of 2: *"BMC has not acknowledged impacts of the proposed Kudz Ze Kayah mine, cumulative social impacts of previous mines, nor indicated viable solutions for working with Kaska communities to ensure well being of individuals, families, workers and the community."*

It is not clear whether the comment is based on the LAWS' review of the BMC's response to YESAB's Information Request #5 or the Project Proposal and all associated Response Reports (#1 through #5); however,

1. Impacts of the proposed Project are acknowledged in the initial Project Proposal and subsequent responses to YESAB's information requests throughout the environmental and socio-economic assessment process. YESAB has been assessing these acknowledged impacts since receipt of the Project Proposal in 2017.

2. A detailed assessment of the impacts of previous mines (including environmental and socio-economic impacts) and a risk assessment of the potential for these impacts to occur at KZK are presented in Response Report #4B (BMC, 2019). This assessment was in response to YESAB's R4-5 which required BMC to: "Provide information on the past and current environmental and socio-economic effects of previous mine closures (planned or unplanned closures) on the Liard First Nation, Ross River Dena Council, and the residents of Ross River and Watson Lake to the extent that effects are unique to the community". YESAB deemed this response sufficient on July 22, 2019 (YESAB, 2019b). For ease of review, this response is included in **Appendix A** of this report.
3. A number of viable solutions for working with Kaska communities to ensure the well-being of individuals, families, workers and the community have been presented by BMC not only through the Project Proposal and various Response Reports, but also through community meetings and discussions with the Ross River Dena Council Elders Oversight Committee. In addition, YESAB's Draft Screening Report (YESAB, 2019a) contains 7 recommended mitigation measures directly related to ensuring the well being of individuals, families, workers and the community. As indicated above, BMC looks forward to LAWS responding and stands ready to constructively discuss this and any other issue that LAWS would like to raise with us in relation to the proposed Project.

Page 1 of 2: *"BMC relies on community trust which it hasn't necessarily earned. For example, BMC lists LAWS as a resource (p.40) while they have not offered to have discussions or support for LAWS to aid in priority setting or service provision."*

BMC has worked directly with the Ross River community on a number of programs since we acquired the KZK Project in 2015 and we continue to participate in Kaska community activities on a regular basis. In our experience, mutual trust develops best from mutual engagement. Based on recommendations in the Draft Screening Report and the LAWS letter to YESAB regarding socio-economic effects, BMC reached out to LAWS expressing our keen interest to discuss the proposed mitigations and viable solutions:

- January 8, 2020 – Letter to LAWS
- January 17, 2020 – Letter to LAWS
- January 22, 2020 – Left voice mail with Executive Director of LAWS
- January 27, 2020 – Left voice mail with Executive Director of LAWS
- May 27, 2020 – Letter to LAWS (included as **Appendix B** to this report)

Although to date there has been no response, BMC is committed to continue seek engagement with all parties interested in the Project, including LAWS.

BMC's disagrees with the LAWS statement that the Project Proposal relies on trust rather than firm commitments to eliminating or mitigating negative effects and maximizing positive effects. BMC believes trust is earned by delivering on our commitments and we stand by our record in the community. We do not expect any community to trust us on how we say we are going to manage the Project without our having first established a credible reputation for such management. Over the past 5 years we believe we have established a credible reputation both on the environmental and socio-economic aspects of our activities in the territory. Many of these aspects are described in the annual Socio-economic Participation Agreement Reports. An example of our commitment to environmental management is described in response to comments made on page 2 of 2 (below).

Page 1 of 2: *"Various agencies are listed as BMC supports when the community level experience is a lack of sufficient programs and services even prior to the impact the KZK mine might influence (p.42, 43). This is unreasonable and unfounded."*

The specific information request from YESAB was for BMC (in part) to describe the off-site mental health supports specifically available to workers and their families. The request was not for BMC to review and critique the sufficiency of the currently available programs and services in the communities.

However, based on BMC's consultation activities in Ross River and Watson Lake, we acknowledge the community view that there is currently a lack of sufficient programs and services. Note that this issue was not raised by the applicable territorial departments during our preliminary discussions with them. It would not be appropriate, in our view, for a proponent to critique these programs in this forum. It is the responsibility of governments (including the territorial, federal and First Nations governments) to ensure the existing programs and services run by them are sufficient. Notwithstanding the above, BMC does have a role with respect to ensuring that the Project effects (including cumulative effects) are minimized and has therefore proposed a suite of mitigation measures which we have described in detail in the Project Proposal and various Response Reports. They are also summarized in Table 6-2 (Summary of Proposed Mitigation and Enhancement Measures for Socio-economic Valued Components) of Response Report #5 (BMC, 2020).

Page 1 of 2: *"BMC's suggestion of an Employee Assistance Program is not grounded in the reality of having actually chosen one to commit to, and does not ensure additional provision of Kaska oriented and gender-specific supports in the work place."*

BMC will not contractually engage service providers for any aspect of the proposed Project until it has received the applicable permits to allow the Project to proceed and BMC Directors have formally resolved to commence construction. All the mines developed and operated by BMC's senior management team in the last 20 years have had some form of Employee Assistance Program. The KZK mine will have an Employee Assistance Program; it is only the specific provider of that program which remains to be selected.

The Employee Assistance Program will have gender-specific supports while Kaska oriented supports will be available through the Mentor program. Further, many of the recommendations in the Draft Screening Report require BMC to work with, consult or seek input from LFN, RRDC and other parties (as applicable) in order to develop and tailor the policies, programs and supports. BMC commends YESAB for these unprecedented recommendations. BMC believes through such collaborations the measures to mitigate potential socio-economic impacts will be effective.

Page 1 of 2: *“it is not clear how eligible dependants, who may be circumstances such as domestic violence, will be aware of supports to safely access services. It is suggested that counselling is available upon initiation by the employee or their spouse but it is not clear how 24 hour support is to be offered”.*

There are several ways that spouses can discreetly obtain information about the supports, these include (but are not limited to):

- Spouses can approach BMC’s Kaska Mentors on a confidential basis;
- Spouses can simply phone one of the Company offices and anonymously request the contact details of the Employee Assistance Program provider;
- Community newsletters will contain the Employee Assistance Program provider details;
- Information pamphlets which will be publicly available;
- Word of mouth in the communities or from friends/extended family that may work at KZK and will be familiar with the program, as inductions will be mandatory for every person employed by the Project and will include information about the Employee Assistance Program and other programs. Inductees will be provided with information documents related to the Project and will be encouraged to share these documents with their immediate families; and
- Telephone or in person discussions with BMC’s community liaisons (at our offices in Watson Lake or Ross River or at a more private location pending on the individual’s preference). Staff in our Whitehorse office will also be able to disseminate the information.

The 24 hour support would be available via: phone; internet (i.e. skype, facetime etc.); and if available, in the community via in person counselling sessions. Access to the support can be facilitated by company representatives listed above including Community Liaisons and Mentors; however, it is as simple as a requesting party picking up the phone and calling the toll free number.

Page 2 of 2: *“BMC says it want to minimize negative effects on the natural environment and enhance beneficial effects on the socioeconomic environment, but has not established credibility or community trust.”*

When BMC acquired the KZK Project in 2015 the site had operated as an exploration site for over 20 years. When we took possession of the KZK claims we immediately instituted a reclamation program over historic exploration sites in the area. Over a period of approximately 12 months we progressively reclaimed all existing drill sites and revegetated them. We continue to do this progressive reclamation with all our ongoing drilling and other activities on the Project. The high quality of the environmental management and the dedication that our team has brought to our progressive reclamation at KZK was recognized in 2016 with BMC being awarded the Robert E Leckie Award for “Responsible and Innovative Exploration and Mining Practices”. This prestigious Yukon award recognizes mining companies and operators that utilize modern operations and reclamation practices and who show outstanding social responsibility. This is one just one example of how BMC has demonstrated by our actions our commitment in relation to responsible environmental management.

Page 2 of 2: *“BMC is not taking responsibility for the range of impacts to Kaska life, means to minimize these impacts or mitigate in the event of closure other than to restrict public access on the mine road through use of security stations and gates as required to ensure that only authorized vehicles will be allowed on the road and locking in winter (p. 23). This does not address other road issues such as hunting access, traffic safety for people and wildlife etc. These concerns were discussed at the Kaska community meetings and will be elaborated on in LAWS final report.”*

This statement is incorrect. BMC has proposed a range of mitigation measures in relation to the impacts of the proposed Project. The focus of BMC’s IR#5 response was to address the specific question asked by YESAB in R5-3, with respect to managing access in the Active and Post-Closure phases of the Project. The response outlined that we shall reclaim the road at the end of the Project life such that there will be no mine road to use for accessing the area. These reclamation measures are a requirement of the Tote Road lease and were developed (in part) with consultation between Cominco, Yukon Government and RRDC. At the request of RRDC at the time of the lease being granted, hunting access is not available via the existing Tote Road. Hunting access has always been available via use of traditional access routes with ongoing and necessary restrictions to use of weapons in the immediate vicinity of exploration activities due to safety concerns.

BMC notes that it was not provided the opportunity to articulate the proposed mitigation measures outlined in the Project Proposal and various Response Reports during the meetings hosted by LAWS in Watson Lake and Ross River.

3. Liard First Nation (YOR #2017-0083-7908)

3.1 AIR QUALITY

Although the LFN's commentary with respect to BMC's response to R5-6 (regarding air quality modelling), has no specific question that requires a response, BMC would like to re-iterate that BMC's Project Proposal and various Response Reports have stated that with the proposed mitigation measures in place no significant adverse effects to human health are predicted. Further, YESAB has also come to the same conclusion as per their assessment, which is presented in the Draft Screening Report (YESAB, 2019a). In order to verify the conclusions of the assessment, BMC has committed to monitoring the air quality at the site over the life of the Project. In addition, as described in response to R5-7: *"Specific adaptive management thresholds for air quality indicators will be developed as part of the Monitoring and Adaptive Management Plan for the Project. This is a requirement for the Quartz Mining Licence application. These adaptive management thresholds will be below the 2020 Canadian Ambient Air Quality Standards as it would be inappropriate to wait for exceedances prior to investigating or implementing additional mitigation measures to protect human health"* (BMC, 2020). The monitoring and adaptive management plan will become a schedule to the Quartz Mining Licence and therefore likely a licence requirement. The monitoring and adaptive management plan will ensure the protection of human health.

3.2 HUMAN HEALTH

As a preliminary comment, most of the LFN points with respect to human health are the same as those presented in the LAWS letter which BMC has responded to in Chapter 2 of this report. Therefore, the responses below are largely a repeat of the responses previously provided in Chapter 2. Further, LFN's comments focus on an evaluation of BMC's response to YESAB's Information Request #5, without considering the extensive information BMC has provided to YESAB in the Project Proposal and various Response Reports. Therefore, blanket statements regarding the adequacy of BMC's proposed mitigation measures are not accurate. As LFN's review only included the review of BMC's responses to two specific information requests BMC has provided a complete list summarized in Table 6-2 (Summary of Proposed Mitigation and Enhancement Measures for Socio-economic Valued Components) of Response Report #5 (BMC, 2020).

Page 2 of 5: *"This section on human health does not address concerns previously raised and identified in IR4 Response Insufficient document, in particular R4-5, which itself falls short regarding social and environmental health impacts of not only mine closure but also all mine development phases from exploration, construction, operation, reclamation and closure."*

The comment above references BMC's initial response to R4-5 which YESAB deemed insufficient. BMC subsequently provided (Response Report #4B) a detailed assessment of the impacts of previous mines (including environmental and socio-economic impacts) and a risk assessment of the potential

for these impacts to occur at KZK (BMC, 2019). YESAB deemed this response sufficient on July 22, 2019 (YESAB, 2019b). For ease of review this response is included as **Appendix A** of this Report.

Page 2 and 3 of 5: *“BMC is relying on the trust of the community and the government and other organizations, including Liard Aboriginal Women’s Society (LAWS), to cover the actual supports needed. In addition, there is no precise articulation of the needs or the nature of services that may be required. The underlying assumption is that there will be little investment by BMC and it will rely on services funded by governments and through non-government agencies.”*

BMC’s disagrees with the statement that BMC is relying on trust rather than firm commitments to eliminate or mitigate negative effects and maximize positive effects and the assumption that LFN has expressed is incorrect and unwarranted.

BMC’s response to Information Request R5-8 did not state and should not be interpreted to mean that BMC is looking for LAWS to cover the supports of the Project. The IR requested BMC to list the currently existing off site supports that would be available in the communities. BMC therefore correctly noted that Yukon Government is currently funding a number of programs in the communities as part of their Mental Wellness Strategy. It appears that LAWS has been funded by Yukon Government as part of this Strategy (as per Yukon Governments web site). BMC understands that Yukon’s Mental Wellness Strategy programs are available to all Yukoners regardless of where their place of employment is.

Precise articulation of the needs or nature of services that may be required will be developed (in part) as per YESAB’s recommendations in the Draft Screening Report which are as follows:

Recommendation #12.) The Proponent shall modify their proposed Mentor program for First Nations employees to:

- ensure that women have access to a mentor or supervisor who regularly checks in to address any negative experiences related to the male-dominated work environment, and who pays special attention to potential cases of abuse; and*
- develop a formal feedback process to ensure that enquiries are regularly made to First Nations employees to ensure that they are able to voice concerns and have addressed any negative experiences.*

Recommendation #13.) The Proponent shall, in consultation with a qualified expert and both LFN and RRDC, develop gender appropriate and gender- and sexuality-specific policies and processes which promote a safe, respectful and inclusive environment for women and sexual minorities.

Recommendation #14.) The Proponent shall develop, with a qualified expert, an Anti-Harassment and Bullying Policy that outlines processes and actions to address any harassment or bullying which may take place within the Project’s scope.

Recommendation #15.) The Proponent shall work with RRDC, the community of Ross River,

LFN, the Town of Watson Lake, and the Government of Yukon to provide resources to women in need in communities impacted by the Project.

Recommendation #16.) To address and mitigate impacts to employees who are or become victims of domestic abuse, the Proponent must create a policy that:

- o outlines clear procedures for the workplace to work with affected employees and provide appropriate resources and support;*
- o plans for and addresses safety concerns that affected employees may have while at work to ensure all workers are safe from threats of domestic violence; and*
- o includes a personal safety plan for employees suffering from domestic violence.*

The commitments that BMC has made in the Project Proposal and Response Reports (which are summarized in Table 6-2 of Response Report #5) and the recommendations in the Draft Screening Report will require significant investment by BMC.

Page 3 of 5: *"BMC p. 42 – Section 5.1.2 SUPPORT PROVIDED BY YUKON GOVERNMENT'S DEPARTMENT OF SOCIAL SERVICES; and BMC p. 43 – Section 5.1.3 SUPPORT PROVIDED BY CANADIAN MENTAL HEALTH ASSOCIATION (YUKON) - These two sections do not offer how collaboration with various agencies will be facilitated or supported by BMC. LAWS is even listed as a suggested support for youth culture and safety. Watson Lake and Ross River have very limited staff resources from any agencies. Assumptions that other agencies will fill in the gaps are not helpful. BMC is not accepting responsibility or committing to any financial or partnership investment."*

LFN has drawn erroneous conclusions in relation to BMC's statements on this matter. YESAB's recommendations in the Draft Screening Report (see previous response) require BMC to collaborate with various agencies, communities, and First Nations. Following receipt of the Draft Screening Report BMC initiated discussions with Yukon Government's Women's Directorate, Yukon Government's Department of Health and Social Services, the Canadian Mental Health Association (Yukon) and Ross River Dena Council. BMC also reached out to LAWS to have a similar introductory discussion; however, no response has been received. How this collaboration will occur is largely up to those organizations.

BMC's response to Information Request R5-8 did not state and should not be interpreted to mean that BMC is looking for LAWS to cover the supports of the Project. The specific information request was for BMC to list off site supports that are currently available in the communities. BMC noted that Yukon Government is currently funding several programs in the communities as part of their Mental Wellness Strategy. It appears that LAWS has been funded by Yukon Government as part of this Strategy (as per Yukon Governments web site). BMC understands that Yukon's Mental Wellness Strategy programs are available to all Yukoners regardless of where their place of employment is.

BMC's commitments to any financial or partnership investments will be based on the outcomes of the discussion with the various organizations.

Page 3 of 5: *“Information Request: In collaboration with LFN, please provide a plan that details how BMC will provide direct services, supports and work with LFN, LAWS, and in coordinated ways with the noted mental health and other service providers to identify the needs of Kaska citizens and broader community members, ensure program and funding capacity is available, and how BMC will support the necessary programs in Kaska communities and at the mine.”*

This information request is largely a duplication of Recommendations (12 through 16) in YESAB's Draft Screening Report (YESAB, 2019a). BMC has fully described a number of programs and strategies that we are currently using and has proposed additional programs to be implemented once a Project development decision is made. We remain committed to continue seek engagement with all parties interested in the Project, including LFN and LAWS.

Page 3 of 5: *“BMC p. 40 – “BMC has not yet selected the health insurance provider for the Project; however, it has to date reviewed the Employee Assistance Programs offered from 5 different health insurance providers. The programs typically consist of access to the following counselling services and online programs:” - Programs vary widely as to what is actually offered, and company commitment to on-the-ground support is critical to Employee Assistant Program success. Listing potential programs does not ensure provision, especially in the context of First Nation, Kaska-specific and gender supported response to work place challenges. The EAP provider services are limited and will need to be augmented by on site services that are appropriate to gender diverse and First Nation individuals and families.”*

BMC will not contractually engage service providers for any aspect of the proposed Project until it has received the applicable permits to allow the Project to proceed and BMC Directors have formally decided to commence construction. All the mines developed and operated by BMC's senior management team in the last 20 years have had some form of Employee Assistance Program. The KZK mine will have an Employee Assistance Program; it is only the specific provider of that program which remains to be selected.

The Employee Assistance Program will have gender-specific supports while Kaska oriented supports will be available through the Mentor program. Further, many of the recommendations in the Draft Screening Report (listed above) require BMC to work with or consult with LFN and RRDC and other parties to develop and tailor the policies, programs and supports. BMC commends YESAB for these unprecedented recommendations. BMC believes through such collaborations the measures to mitigate potential socio-economic impacts will be effective and we will routinely review them to ensure they are.

Page 3 of 5: *“Information Request: The selection of a health insurance provider for the Project has potentially very important ramifications for First Nation, Kaska-specific, and gender-related concerns. How will the experiences that Kaska communities have had with mining companies be assembled and used to inform identification of risks and potential problems as well as solutions? Please provide a plan that describes how BMC will work with LFN to factor in these experiences when choosing an Employee Assistance Program and developing additional needed services.”*

[See previous responses.](#)

Page 4 of 5: *“There is no plan for ensuring eligible dependents, who may be in circumstances such as domestic violence, will be aware of- and supported to safely access services. It is suggested that counselling is available upon initiation by the employee or their spouse but there is no mechanism defined for this round-the-clock support offered. In addition, unresolved workplace conflicts, if unmanaged, can exacerbate family and community conflict and feed violence. There needs to be a comprehensive approach to prevention and early intervention”.*

There are several ways that spouses can discreetly obtain information about the supports, these include (but are not limited to):

- Spouses can approach BMC’s Kaska Mentors;
- Spouses can simply anonymously phone the project office and request the contact details for the Employee Assistance Program provider;
- Community newsletters;
- Information pamphlets which will be publicly available will list easy contact options for accessing the service provider;
- Word of mouth in the communities or from friends/extended family that may work at KZK and will be familiar with the program, as inductions will be mandatory for every person employed by the Project and will include information about the Employee Assistance Program and other programs. Inductees will be provided with information documents related to the Project and will be encouraged to share these documents with their immediate families; and
- Telephone or in person discussions with BMC’s community liaisons (at our offices in Watson Lake or Ross River or at a more private location pending on the individual’s preference). Staff in our Whitehorse office will also be able to disseminate the information.

The 24 hour support would be available via: phone; internet (i.e. skype, facetime etc.); and if available, in the community via in person counselling sessions. 24 hour support is the service that is offered from the Employee Assistance Programs. Access to the support can also be facilitated by company representatives listed above including Community Liaisons and Mentors.

Resolution of workplace conflicts is an issue that is not unique to any one workplace or industry. Resolution processes are well understood with conflict resolution normally achieved via the chain of command supplemented by BMC’s existing Mentor program but where this is insufficient external counselling is also available. This is provided by use of an Employee Assistance Program.

Page 4 of 5: *“Information Request: How will the company design and implement workplace policies and practices to prevent violence, respond to conflict and reduce the impact of factors including substance misuse, contributing to violence in the workplace and families impacted by the workplace?”*

This information request is largely a duplication of Recommendation #16 in YESAB’s Draft Screening Report (YESAB, 2019a):

Recommendation #16. To address and mitigate impacts to employees who are or become victims of domestic abuse, the Proponent must create a policy that:

- outlines clear procedures for the workplace to work with affected employees and provide appropriate resources and support;*
- plans for and addresses safety concerns that affected employees may have while at work to ensure all workers are safe from threats of domestic violence; and*
- includes a personal safety plan for employees suffering from domestic violence.*

Page 4 of 5: *How will BMC provide direct services and work with partners to provide prevention, intervention, and follow-up services to individuals and families involved in violence?*

Precise articulation of the needs or nature of services and how BMC will work with partners has been responded to in several responses above.

In collaboration with LFN prepare a monitoring and research strategy that will retrieve information and data that will enable BMC and LFN to understand the efficacy of these measures and how they will be adapted based upon that research and monitoring.”

BMC notes that all of its policies and support programs will have a monitoring component, which will be reviewed regularly to understand the efficacy of the programs and these programs will be adapted as required. BMC’s and Kaska’s commitment to a collaborative approach in respect to Project operation (including resolution of areas of mutual concern) is enshrined in the existing agreements between the parties. As part of this, BMC has repeatedly reached out to LFN and LAWS with offers to work with them on any matters that they might wish to discuss. BMC repeats its offer to meet with and meaningfully discuss any ideas that LFN may wish to put to the company on this matter.

Page 4 of 5: *“Kaska and gender specificity is lacking. Approaches to conflict must be specific in the commitment to address racism, sexism, stereotyping and bias in the workplace. Options for conflict management need to include culturally appropriate methods. Placing well-educated, experienced, and diverse individuals in supervisory roles will assist in building robust capacity to address issues that are predictable. Kaska people have had success in being recruited to mining jobs, however, very limited success in experiencing the safety and inclusion necessary for long-term retention and advancement.”*

Responses with respect to “Kaska and gender specificity and conflict management” are provided above.

BMC currently employs post secondary educated, experienced and diverse Kaska individuals in technical and supervisory roles and will continue to do so. BMC is also committed to ensuring Kaska employees are well educated, experienced, have the opportunity to have management roles, and feel safe and included. This commitment is evidenced through our existing BMC-Kaska Scholarship Program (which includes vocational and graduate training), historical and current training programs, on-site training, cultural awareness training, Kaska mentorship program etc. These programs currently exist and will continue through Construction and Operations. These programs, the additional supports that BMC has proposed, and recommendations from YESAB (12 through 16) will be contributing factors to long-term retention and advancement of Kaska at KZK.

Page 4 of 5: *“Information Request: The following questions about LFN citizens are to be answered in collaboration with LFN. How will LFN be involved in the development and implementation of Human Resources policy and practices that fully support Kaska recruitment, retention, health and safety? How will LFN citizens be provided opportunities for advancement? How will the company develop capacity to respond to diversity in positive ways and effectively deal with problems impacting long term retention of LFN employees who may also express other characteristics of diversity?”*

This information request is largely a duplication of Recommendations (12 through 16) in YESAB’s Draft Screening Report (YESAB, 2019a). BMC is an equal opportunity employer and has specific policies in place that speak to the above. BMC is also committed to continue to seek engagement with all parties interested in the Project, including LFN. BMC notes that over the last 4 years through its BMC-Kaska Scholarship Program developed in collaboration with RRDC, it has supported over 100 Kaska Nations citizens in secondary and post secondary education and training which includes graduate training programs. LFN citizens have been well represented in this program and LFN citizens are current employees of BMC.

Page 5 of 5: *“BMC p. 42 – “Employee Assistance Program will be complementary with BMC’s existing and successful mentoring program that was developed in consultation with Ross River Dena Council.”*

Kaska and gender specificity is lacking. LFN is not mentioned. Details of mentoring are insufficient as previously commented by LFN. Mentoring approaches need to be inclusive, appropriate and formalized to ensure accountability.”

The Employee Assistance Program will have gender-specific supports while Kaska oriented supports are already available through the highly successful Mentor program. Further, many of the recommendations in the Draft Screening Report require BMC to work with or consult with other parties including RRDC and LFN to develop and tailor the policies, programs and supports. BMC commends YESAB for these unprecedented recommendations. BMC believes through such collaborations the measures to mitigate potential socio-economic impacts will be effective.

Page 5 of 5: *“BMC p. 23 - “BMC realizes that there are other natural resources in the area and that the Access Road could potentially be used to access and exploit these, and that there may be some First Nation’s interest in maintaining the existence of the road for access to the region. However, under the current lease the lessee is obliged to return the land to Yukon in a condition that is satisfactory to Yukon.*

The final decision on whether the lease could be relinquished with the access road un-reclaimed will be made by the Yukon Government. BMC does not have any position on this matter except that we will comply with whatever decision is made by the Government.”

BMC is not taking responsibility for the range of impacts to Kaska life, means to minimize these impacts, or mitigate in the event of closure other than to restrict public access on the mine road through use of security stations and gates as required to ensure that only authorized vehicles will be allowed on the road and locking in winter (p. 23). This does not address other road issues such as hunting access, traffic safety for people and wildlife etc.”

This statement is incorrect. BMC has proposed a range of mitigation measures in relation to the impacts of the proposed Project. The focus of BMC’s IR#5 response was to address the specific question asked by YESAB in R5-3, with respect to managing access in the Active and Post-Closure phases of the Project. The response outlined that we shall reclaim the road at the end of the Project life such that there will be no mine road to use for accessing the area. These reclamation measures are a requirement of the current Tote Road lease and were developed (in part) after consultation between Cominco, Yukon Government and RRDC. At the request of RRDC at the time of the lease being granted, hunting access is not available via the existing Tote Road. Hunting access has always been available via use of traditional access routes with ongoing and necessary restrictions to use of weapons in the immediate vicinity of exploration activities due to safety concerns.

3.3 FINLAYSON CARIBOU HERD

LFN’s comments with respect to the Finlayson Caribou Herd (FCH) focus on an evaluation of BMC’s response to YESAB’s Information Request #5, without considering the extensive information BMC has provided to YESAB in the Project Proposal and various Response Reports. YESAB has deemed BMC’s responses to Information Request #5 sufficient (YESAB, 2020b) and YESAB’s assessment of the potential effects on the FCH have been assessed as not significant (with the mitigation measures in place (YESAB, 2019a). However, BMC provides this additional information in response to LFN’s views, for YESAB’s consideration.

In R5-1 YESAB requested BMC to provide any newly available caribou survey data in order to have more confidence in the effects predictions and characterization. BMC provided the most recent data to YESAB that is currently available. The information provided to YESAB was consistent with the level of detail that was provided in the initial Wildlife Baseline report and is consistent with the level of detail requested in the various Response Reports. BMC’s biologists, YG’s biologists, YESAB’s biologists and RRDC’s biologists have determined that the level of detail provided is sufficient to assess the potential effects on the Finlayson Caribou Herd. In addition, the survey methods were developed in collaboration with Yukon Government and Ross River Dena Council. Both parties participate every year in the surveys (when Yukon Government has staff available). The methods for each survey have been consistent with the methods presented in the Wildlife Baseline Report (Appendix E-8) (BMC, 2017a).

BMC is of the view that continuing to provide the additional detail as requested by LFN, with respect to the surveys will not provide any additional confidence in the conclusion of the effects assessment. Further, the comments received from LFN seem to confuse comments on Response Report #5 with conclusions of the assessment.

BMC did not provide the 2019/2020 data to YESAB as the report is not yet final. However, our wildlife permit for the wildlife surveys requires BMC to provide Yukon Government with a data report, this report is typically provided to Yukon Government prior to our baseline being finalized. Under BMC's data sharing agreement with Yukon Government we are not able to share this data set directly with LFN; however, the data report may be available to LFN via a request to Yukon Government. It is noted that as part of RRDC's authorization for BMC to conduct the wildlife surveys in their Traditional Territory, BMC is required to provide the final report to them as well as present the results to the schoolchildren in Ross River. BMC can also provide the report to LFN and can extend the school presentation to include Watson Lake, once the report is finalized.

Many of LFN's data requests are related to site specific data that BMC cannot provide in a public forum due to BMC's confidentiality agreement with Yukon Government. The purpose for this confidentiality agreement is to mitigate the potential for hunters and guide outfitters to use the data to facilitate their hunting of the herd. BMC understands that LFN may apply to Yukon Government for access to this data, but BMC is not permitted to provide it to them directly.

Throughout the environmental assessment process, YESAB and their highly experienced and reputable specialist consultants have provided a thorough evaluation of BMC's baseline data set, habitat suitability models, mitigation measures and assessment of potential effects. **Appendix C** presents the extensive list of YESAB's information requests related to the Finlayson Caribou Herd (including socio-economic effects). Many of these requests overlap or duplicate LFN's comments. BMC's responses to these information requests have been deemed sufficient by YESAB after careful review. The environmental assessment carried out by YESAB and their consultants to date has been thorough and has already rigorously examined those issues raised by LFN. Further, duplication of work (both by YESAB and BMC) would be contrary to the environmental and socio-economic assessment process and the *Yukon Environmental and Socio-economic Assessment Act*.

The following responses deal with LFN's specific comments.

Page 4 and 5 of 11: *"Newly available data provided by the Proponent in response to IR5-1 are incomplete or lacking sufficient detail.*

Flight lines and survey conditions for the 2015 – 2019 late winter surveys and the 2015 – 2018 post-calving surveys have not been provided.

In their response to IR5, BMC did not provide sufficient detail on the survey methods, flight lines and conditions for 2015 – 2019 late winter surveys and 2015 – 2018 post-calving surveys. Without this information it is impossible to assess what proportion of the range and study area was surveyed or

understand the limitations of reported results. This lack of information constrains our ability to make an informed evaluation of caribou habitat use and distribution in the Project area.

Information Request: For the late winter and post-calving surveys from 2015-2019, please provide a map of the survey flight lines, including 5, 10, and 15 km buffers around the Project footprint and the Finlayson Lake airstrip. Please include a summary of: a) the total area surveyed; b) the proportion of the study area surveyed; and c) the proportion of the total FCH range represented in these surveys. Please include a written summary of survey methods and conditions, including the average speed of the aircraft, the weather conditions and any data on sightability for survey by year and season.”

The methods of the FCH surveys, including survey areas, conditions, speed of aircraft, sightability etc. are provided in Appendix E-8 of the Project Proposal (BMC, 2017a). Updated results have been provided to YESAB in Response Report #5 (BMC, 2020). As stated in Response Report #5, the methods of the recent surveys are consistent with methods presented in Appendix E-8 and the methodology was developed in conjunction with Yukon Government’s specialists and highly experienced biologists in accordance with normal practise.

The late winter flight lines in each year followed essentially the same ones as presented in EDI’s 2015 late winter survey that were presented in Appendix E-8 of the Project Proposal (BMC, 2017a). The area covered each year was the extent of GMS 10-07 which covers the Project area including the Finlayson Lake airstrip. Details on area surveyed each year were provided in Table 2-1 Response Report #5 (BMC, 2020).

The post-calving surveys covered the same survey blocks systematically flying the contour lines as was completed by Environment Yukon from 1982 to 1986. This was documented in Appendix E-8 of the Project Proposal (BMC, 2017a). Post-calving survey details each year were provided in Table 2-2 in the Response Report #5 (BMC, 2020).

Page 5 of 11: *“Data from the most recent 2019 post-calving surveys have not been provided.*

In their response to IR5, BMC provides data on post-calving surveys conducted in the vicinity of the KZK mine from 2015-2018. No data have been provided on the 2019 post-calving surveys. Direct or indirect impacts to post-calving areas could have substantial implications for the viability of the FCH. Cows and calves that are forced to use unfamiliar habitats as a result of avoidance may experience reduced calf survival due to predation, insect harassment, or other factors (Environment Yukon, 2016). Calf survival in a given year can have important consequences for the dynamics of caribou populations (Environment Yukon, 2016). Because of high predation pressure (>6 wolves / 1,000 km²) and a declining population, factors that affect calf survival are of high concern for the FCH. Any additional information on the distribution of caribou from recent surveys in 2019 is therefore important for evaluating caribou use in the Project area and potential interactions during this sensitive period.

Information Request: Please provide the most recent 2019 post-calving survey results, including a map of the survey flight lines, as well as a summary of survey methods and conditions. Please provide a map of caribou observations from the 2019 post-calving surveys, showing the distribution and number of caribou documented relative to the Project footprint and Finlayson Lake airstrip."

As stated in Response Report #5 (BMC, 2020) the requested report has not yet been finalized. However, the data will be provided to Yukon Government and the 2020 Wildlife Baseline Report will be provided to Ross River Dena Council. This report can also be provided to Liard First Nation once it is finalized. BMC questions the scientific basis for the requirement of an additional year of data as clearly any conclusions from this data will not materially affect those reached with the data already made available.

The distribution of movement by the herd has been studied since the 1980's and the results of BMC's studies have confirmed the results of the previous 35 plus years of studies. Figure 13-8 of Response Report #2 (BMC, 2017b) shows the distribution of the FCH from the post-calving surveys over the past 4 decades. This figure shows that during the post-calving period the caribou are generally south of the proposed Project footprint. Figure 2-2 of Response Report #5 (BMC, 2020) presents a summary of the locations of the caribou over the past 4 years of surveys and the 2019 survey results are consistent with the previous studies. The Tote Road and Finlayson Lake airstrip do not cross post-calving habitat. The results are also consistent with the habitat suitability maps presented in the Project Proposal and updated in response to R2-88 (BMC, 2017b).

Project effects and interactions with the FCH during the post-calving period have been assessed based on the results of 4 decades of survey data, this has been described in the Project Proposal and various Response Reports. There is clearly no scientific basis for the request for an additional year of data as it will have no bearing on the proposed mitigation measures or on the conclusions of the effects assessment that has been conducted by YESAB (YESAB, 2019a).

Page 5 of 11: *"Data from the most recent 2019 rut surveys have not been provided.*

In their response to IR5, BMC provides information on rut surveys conducted in the vicinity of the KZK mine from 2015-2018. No data have been provided on the 2019 rut surveys. Northern Mountain caribou aggregate during the rut at high elevation habitats in breeding areas that are often used year after year (Environment Yukon, 2016). Disturbance to these habitats during the rut may disrupt breeding with potential consequences to FCH reproduction (Environment Yukon, 2016). Any additional information on the distribution of caribou from recent surveys in 2019 is critical for evaluating caribou use in the Project area, and potential interactions during this period.

Information Request: Please provide the most recent 2019 rut survey results, including a map of the survey flight lines, as well as a summary of survey methods and conditions. Please provide a map of caribou observations from the 2019 rut surveys, showing the distribution and number of caribou documented relative to the Project area, including the Finlayson Lake airstrip."

As stated in Response Report #5 (BMC, 2020) the requested report has not yet been finalized. However, the data will be provided to Yukon Government and the 2020 Wildlife Baseline Report will be provided to Ross River Dena Council. This report can also be provided to Liard First Nation, once it is finalized. BMC questions the scientific basis for the requirement of an extra year of proponent funded baseline studies to support an effects assessment. The distribution of movement by the herd has been studied since the 1980's and the results of BMC's studies have confirmed the results of the previous 30 plus years of studies. Figure 13-9 of Response Report #2 (BMC, 2017b) shows the distribution of the FCH from rut surveys over the past 4 decades. This figure shows that during the rut period the caribou overlap with proposed Project footprint with presence varying by year to year in an east west direction. Data from the past 4 years (of the BMC funded studies) is consistent with the historical data and the 2019 survey is also consistent with the previous studies.

The Tote Road and Finlayson Lake Airstrip do not overlap with caribou rut habitat.

The disturbance of these habitats has been assessed in the Project Proposal and further evaluated in various Response Reports. It is clear that a further year of data will have no bearing on the proposed mitigation measures or on the conclusions of the effects assessment that has been conducted by YESAB (YESAB, 2019a).

Page 5 of 11: *“Location data for caribou documented in the 2015-2018 rut surveys have not been provided in sufficient detail.*

In their response to IR5, BMC provides information on rut survey results summarized within 5 km, 10 km, and 15 km buffer areas around the mine footprint, with no information on their directional distribution relative to the Project. The Proponent notes in their response that Yukon Environment requires that the caribou rut location information not be made public, as per the data sharing agreement between Yukon Environment and BMC. It is unclear whether the data sharing agreement would allow for other common approaches, such as buffering the exact location of observation points. Such an approach would provide valuable information about the relative distribution of caribou in the Project area, while maintaining the confidentiality of specific observation locations. If alternative approaches to public data sharing are not considered appropriate, it will be important to establish a data sharing agreement with LFN for this information moving forward.”

Information Request: Please provide additional information on the spatial distribution of caribou observations from the 2015-2018 rut surveys. If additional detail cannot be provided about the locations of these observations relative to the Project, please identify a commitment to establish data sharing agreements for rut survey results with LFN.”

As per BMC's response to R202d (BMC, 2017c) and R2-9 (BMC, 2017b), due to the potential detriment to caribou by providing location data during hunting season, Yukon Government (under the data sharing agreement between BMC and Yukon Government) has mandated that BMC not make public to any third party the caribou rut location information. Instead, the caribou distribution data

is presented in terms of relative distance from the Project without providing direction. In addition, Figure 13-9 of Response Report #2 (BMC, 2017b) shows the relative distribution of the FCH from rut surveys over the past 4 decades. Should Liard First Nation wish access to the data then it will need to enter into a data sharing agreement with Yukon Government directly who would then provide the data independent of BMC.

Page 6 of 11: *“Incidental observation data have not been included.*

No information on incidental caribou observations has been provided in BMC’s response to IR5. The Proponent has collected incidental observations of caribou throughout KZK exploration field seasons and wildlife surveys (AEG, 2016). For example, there were 76 and 104 separate caribou records totalling 354 and 416 individuals counted in the KZK camp wildlife log during the 2015 and 2016 exploration field seasons, respectively. Additional caribou observations were also made during the post rut moose survey that occurred from November 18-21, 2015, while caribou were beginning to make their migration towards their wintering grounds. This incidental information provides valuable data about the distribution of caribou in the Project area, particularly for periods that were not targeted by the caribou surveys.”

Information Request: Please provide information on incidental caribou observations from 2015-2019, including dates, locations, and the number of caribou observed. Please include a map of the location and number of caribou documented in incidental observations. Please include a map of study areas for other wildlife surveys in which caribou observations were documented.”

Table 2-1 provides a summary of the incidental caribou observations from 2015 to 2019. **Appendix D** provides the details recorded from the incidental observations. It is noted that most of the incidental observations are recorded by the exploration crews as a requirement of BMC’s exploration licence. The incidental observations are provided to Yukon Government on an annual basis. The exploration crews don’t typically record the exact location and therefore a map cannot be produced.

Table 1-2: Incidental Caribou Observations from Exploration Wildlife Log (2015 to 2019)

Year	Exploration Field Season	Date Range of Wildlife Observations	Number of Caribou Records	Number of Individual Caribou Counted
2015	July 7 – December 10	July 23 – November 16	75	394
2016	April 1 – October 7	April 3 – October 1	105	416
2017	June 16 – November 11	June 4 – November 6	53	651
2018	March 13 – October 7	March 14 – October 3	58	276
2019	July 11 – August 10	May 27 – August 3	7	13

A map of the study areas for the other wildlife surveys in which caribou incidental observations were documented is presented in the Wildlife Baseline Report (Figure 2-3 of Appendix E-8 of the Project Proposal) (BMC, 2017a).

Page 6 and 7 of 11: *“Demographic information has not been provided.*

Demographic information is crucial for understanding caribou herd health and informing management decisions. A stable population growth rate, for example, generally requires sufficient sex ratios of bulls to cows, as well as sufficient recruitment ratios of calves to adult cows (Environment Yukon, 2016). Understanding differences in how bulls and cows or cow- calf pairs utilize the landscape is also critical for assessing potential effects associated with the Project. Caribou sex and age class information has been collected by the Proponent but has not been shared in BMC’s response to IR5.

Information Request: Please provide all raw data for caribou survey results and incidental observations, including the location of observations, number of caribou observed, and sex/age class information.”

[The survey results presented in the Wildlife Baseline Report \(Appendix E-8 of the Project Proposal\) \(BMC, 2017a\) and in the responses to information requests have included sex data, sex ratios, and calves to cows ratios.](#)

Page 7 of 11: *“No additional data on calving sites has been provided.*

No data on calving sites have been provided by the Proponent. In their response, BMC notes that calving surveys for mining projects are typically not permitted by the Yukon Government as it causes disturbance to sensitive calving caribou and because the ability to sight them is low. It does not appear that BMC has considered any alternative sources of information, such as a full and properly conducted Indigenous knowledge study with LFN knowledge holders, analysis of telemetry data, or evaluation of rut and post-calving habitat distribution. Given the distribution of high value rut habitat and post-calving in the Project area, it is highly likely that females in the FCH calve in areas near the Project. Telemetry data from the neighbouring Nahanni Caribou Herd, for example, indicate that high fidelity for rutting areas is a continuation of cow fidelity to calving sites. A total of 24 cows were tracked between 1995 and 1997; during this time only two cows rutted in a different mountain block than where they calved in one year, in contrast to 43 paired calving and rutting locations. These paired locations indicate that cows remained within the mountain block where they calved (Gunn et al, 2002).

Information request: Please describe how alternative sources of information for specific calving sites have been considered in this assessment, including LFN knowledge of calving sites. For telemetry data used in the habitat suitability model, please provide a summary of data collected during the calving period, including the locations in which caribou were detected. In the absence of information on specific fidelity calving sites, please provide a description of likely calving areas based on rutting and post-calving habitat in the vicinity of the proposed Project.

[BMC has been consistent since 2015 in our desire to have Traditional Kaska Knowledge included in the KZK environmental assessment and in the permitting and development of the Project. To that end, BMC signed a Traditional Knowledge protocol with RRDC in 2017. We proposed a Traditional Knowledge protocol with LFN in 2017, as the Project entered the assessment process. These](#)

discussions continued into 2018, and BMC accepted several changes suggested by LFN before submitting what we thought LFN had agreed was a final draft protocol in August of 2018. Eventually, as per LFN's wishes, the 2019 Kaska Centric Independent Peer Review (i.e. LFN's review of the Project Proposal - KCIPR) agreement took precedent and became the guiding document. As per the KCIPR agreement LFN was to provide all deliverables related to their review to BMC by December 31, 2019 and has yet to do so. We await the conclusion of the LFN's review and the summary of Traditional Knowledge that is gathered through that process. Currently it is unknown if LFN's review will include LFN knowledge of calving sites. BMC's Traditional Knowledge Reports that have been submitted to YESAB did not have specific site information.

BMC has no record that the telemetry survey was conducted during calving. BMC's habitat suitability model is for post-calving.

Calving areas are dispersed and likely located between the late winter habitat in the Pelly lowlands and the post-calving habitat in the Pelly Mountains and mountains to the north. Calving site fidelity was discussed in response to Information Request R5-2 (BMC, 2020). BMC did not provide additional data on calving sites in Response Report #5 because we do not have additional data to provide. BMC provided a rationale for this in the Response Report #5.

BMC's baseline studies, habitat modelling, and effects assessment on FCH were led by Rick Farnell (an acknowledged and well-respected Yukon expert on the FCH). Mr. Farnell was Environment Yukon's caribou biologist from 1978 to 2006 and authored many publications on caribou including the 2009 publication, *Three Decades of Caribou Recovery Programs in Yukon: A Paradigm Shift in Wildlife Management*.

In April 2018 Mr. Farnell prepared a presentation for LFN on the proposed Project's effects on the FCH. His slides with respect FCH calving stated:

- The calving period for the FCH is from May 7 to June 8 with a peak of calving from May 16 to 20;
- Finlayson caribou disperse into the mountains where they seek out solitary calving sites that spaces them away from predators; and
- These anti-predation tactics make it impossible for biologists to measure their sensitivities during calving.

BMC agrees that one way to get definitive data on the calving sites would be to radio collar them; however, Ross River Dena Council has said that they are not supportive of collaring wildlife and BMC is therefore not proposing this activity.

PAGE 8 OF 11: *“The Proponent’s description of potential for sensory disturbance is insufficient to describe potential project interactions with calving habitat.*

IR5-2 also requested that BMC provide a description of potential sensory disturbance resulting from the project, relative to calving areas. While BMC acknowledges that “there is likely to be some sensory disturbance of calving from the Project” (BMC, 2020, p. 21), the proponent fails to provide any additional information on the magnitude, timing, duration, source, or area affected relative to potential calving sites. This is particularly concerning given that caribou are most sensitive to disturbance during the calving season (Weir et al, 2009). BMC concludes that it is likely that caribou will adapt and redistribute within calving habitat away from Project disturbance. No supporting evidence is provided for this assumption.

Information Request: Please provide a description of calving habitat distribution and distance around the mine site and a description of potential sensory disturbance resulting from the project during the calving period. Please provide evidence to support the conclusion that the FCH is likely to adapt, including a summary of potential consequences associated with redistribution away from Project disturbance.”

LFN’s comments appear to be a result of LFN only reviewing Response Report #5 and have not considered the extensive sensory disturbance information that BMC has provided in the Project Proposal and Response Reports. BMC notes, that YESAB has deemed our response to IR5-2 sufficient; however, in order to assist YESAB in their review of LFN’s comments and in order to avoid duplication, BMC has summarized where the information related (in part) to the assessment of sensory disturbance and calving/post-calving is presented:

- Project Proposal (Sections 13.4.1.1, 13.4.1.12, 13.4.2.2, 13.4.3.1, 13.5.1.1 and 13.5.3) (BMC, 2017a);
- Response Report #1 (Response to R183d, R183de, R186, R188b, c, R-191);
- Response Report #2 (Response to R2-85, R2-86, R2-88b, R2-88c, R2-91, R2-94); and
- Response Report #2 (Appendix R2-L).

Further, please see the previous response regarding Mr. Farnell’s conclusions regarding FCH calving.

4. LIARD FIRST NATION’S SUBMISSION (YOR#2017-0083-6888)

4.1 FINLAYSON CARIBOU HERD

Page 3 and 4 of 7: There is strong evidence of the ongoing decline of the Finlayson caribou. Yukon Environment has carried out six late-winter population censuses of the herd. The 1990 census estimated the herd size at 5,950, but 17 years later, the population had declined to 3,077. The 2017 census showed a further 12 percent decline, to a new low of only 2,712. In this context, additional direct or indirect impacts on Finlayson caribou and their habitat could be a catastrophe for an already vulnerable population, further weakening the herd’s ability to recover and become self-sustaining.

BMC would like to clarify the context for the population numbers over the last few decades since the above interpretation of the population trends without this context is misleading. We encourage YESAB and LFN to review the Wildlife Baseline Report in Section 3.2 of Appendix E-8 of the Project Proposal (BMC, 2017a) and subsequent responses to information requests. The 1990 census high of 5,950 +/-17.7% was a direct result of the wolf cull from 1983 to 1989 as was shown in Figure 3-2 of Appendix E-8 and is repeated here as Figure 1. Cow to calf ratio’s show the same trend (Figure 3-4 of Appendix E-8 and repeated here as Figure 2.

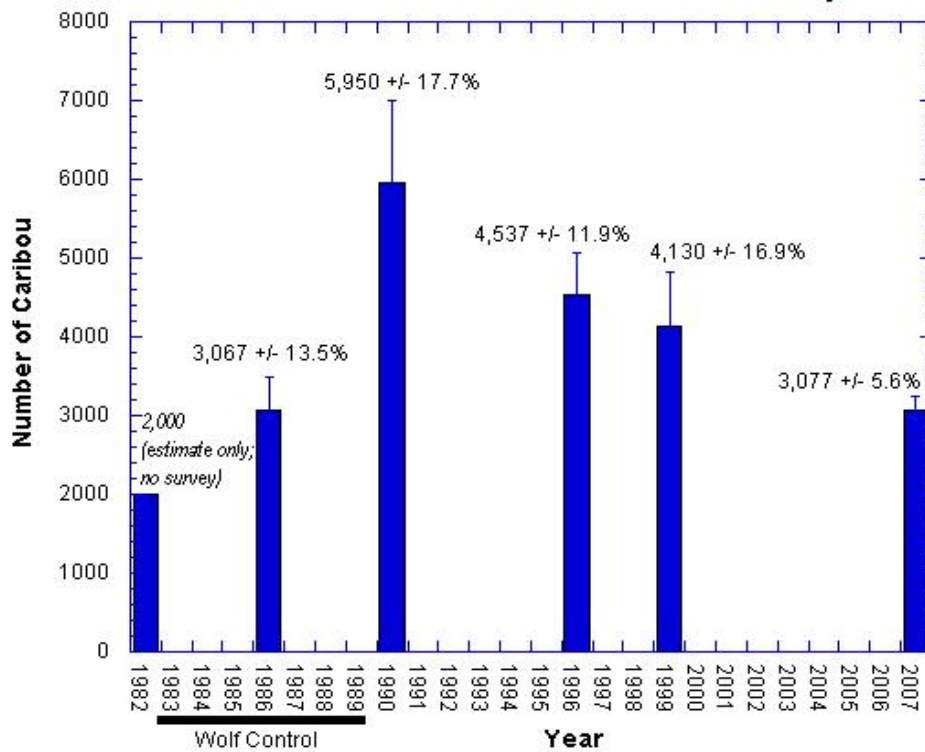


Figure 1: Estimated Population Size of FCH from March Surveys, 1982 to 2007 (Farnell, 2009)

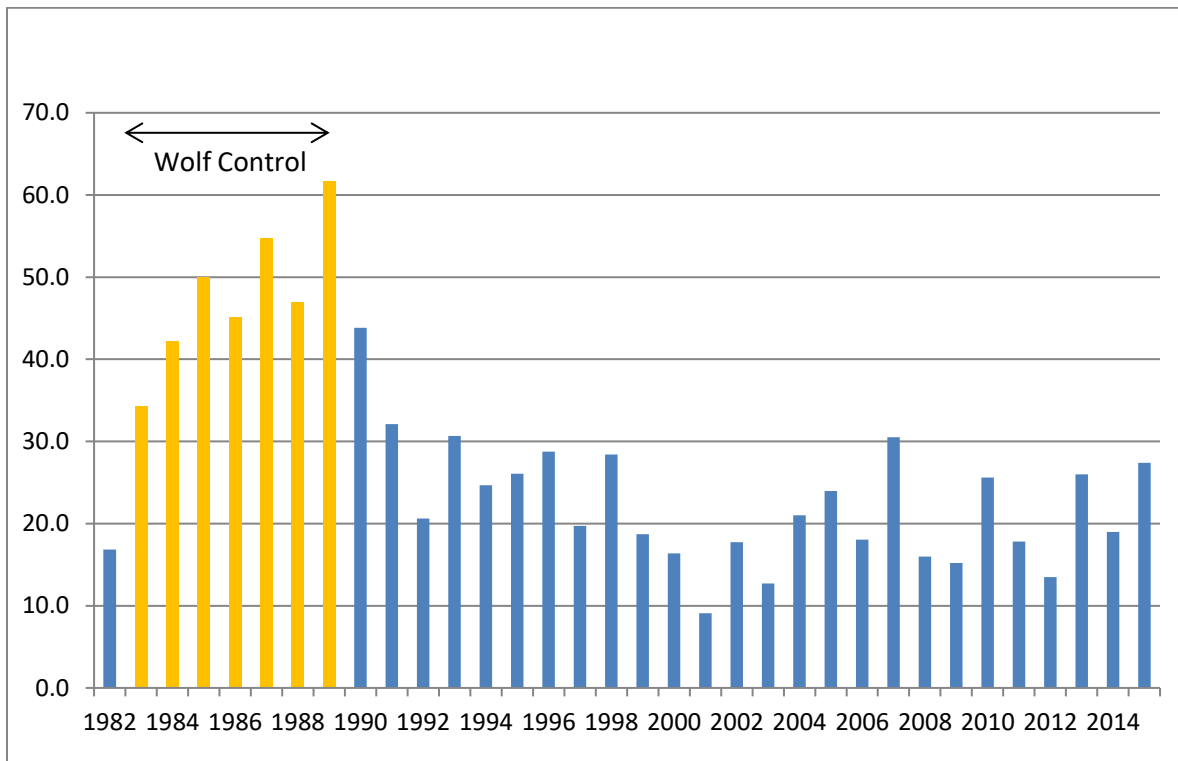


Figure 2: Ratio of Calves per 100 Cows in the FCH from 1982-2015

As is clear from this data, the population size and sustainability are known to be limited predominantly by predation pressure on the herd. This also indicates that the FCH population is not currently limited by available habitat, based on historical and current information collected by Environment Yukon and BMC. As such, the KZK Project will not affect the main limiting factors on the FCH population and would not be the cause of a catastrophic effect on the herd.

Page 4 of 7: Information newly provided by the Proponent is incomplete or lacking in detail. Flight lines and survey conditions for the 2015-2019 late winter surveys and the 2015-2018 post-calving surveys have not been included. Data from the most recent 2019 post-calving and rut surveys are likewise missing. Location data from the 2015-2018 rut surveys have not been provided in enough detail. Demographics information has not been provided. There is no assessment of the impacts of the airstrip use on the caribou.

BMC encourages YESAB and LFN to review all information submitted during the environmental and socio-economic effects assessment in its entirety. All information mentioned in the concern has been provided and includes an assessment of effects on caribou from the Finlayson Lake airstrip use. Mitigations measures to manage these impacts are all presented in the detailed Wildlife Protection Plan presented in Appendix R2-J of Response Report #2 (BMC, 2017b).

Page 4 of 7: *The Proponent's response lacks information on calving sites and the potential for sensory disturbance resulting from the Project. No additional data on calving sites have been provided. The Proponent's description of potential for sensory disturbance is insufficient to describe potential project interactions with calving habitat, and the Proponent has not provided a thorough assessment of caribou movement from late winter habitat to calving and post-calving habitat.*

BMC encourages YESAB and LFN to review all information submitted during the environmental and socio-economic assessment in its entirety. All information mentioned in the concern above has been provided where available, including an assessment of impacts of sensory disturbance on caribou. As mentioned in the previous responses, calving cannot be surveyed since the cows are dispersed in forests, Environment Yukon does not permit surveys during calving, RRDC does not support further collaring work, and no specific Traditional Knowledge regarding calving locations has been made available. Therefore, circumstantial evidence has been used to understand calving areas including: historical studies; Yukon Government's caribou expert knowledge; incidental observations; aerial surveys (during November early winter, March late winter, July post-calving, and October rut); and historical collaring data.

Page 4 of 7: *BMC has concluded that the effects on caribou will not be significant because habitat loss resulting from the Project will affect a relatively small proportion of suitable habitat in the Finlayson caribou range. LFN believes there are several reasons to be wary of this conclusion:*

- 1. Direct and indirect effects on seasonal habitat and movement corridors were assessed in a manner that was inappropriate, insufficient, or not in accordance with best practices based on scientific knowledge.*
- 2. Habitat loss and avoidance will likely extend further out from the Project footprint than is currently accounted for in the assessment.*
- 3. BMC's assessment fails to consider the apparently disproportionate importance of the habitat that will be lost, based on available census data for the herd.*
- 4. The Project overlaps with key areas of high-value winter and summer range in core FCH habitat and potential impacts on migratory routes could contribute substantially to habitat loss.*
- 5. The Project would occur where the Kaska, including Kaska from LFN, have hunted since before contact with Europeans, and during the historical period to the present day.*

BMC appreciates LFN's viewpoint and opinion on the significance of effects on the caribou. BMC encourages YESAB and LFN to review all information submitted during the environmental and socio-economic assessment in its entirety. BMC maintains that it has completed baseline studies and the

effects assessment on the FCH caribou to a professional standard and has presented a fair, unbiased assessment based on best available scientific knowledge.

5. REFERENCES

- Alexco Environmental Group (AEG), 2016. *Wildlife Baseline Report Kudz Ze Kayah Project*. December 2016.
- BMC, 2017a. *Kudz Ze Kayah Project Proposal to YESAB Executive Committee*. March 2017.
- BMC, 2017b. *Kudz Ze Kayah Project, Response Report #2 to YESAB Executive Committee Adequacy Review of KZK Project Proposal*. November 2017.
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APPENDIX A.
BMC Response to YESAB Information Request R4-5

4. R4-5

4.1 INITIAL YESAB QUESTION

Provide information on the past and current environmental and socio-economic effects of previous mine closures (planned or unplanned closures) on the Liard First Nation, Ross River Dena Council, and the residents of Ross River and Watson Lake to the extent that effects are unique to the community.

4.2 INITIAL BMC RESPONSE

Section 5.7 of the Project Proposal describes how the Cumulative Effects Assessments were undertaken for both the environmental and socio-economic Valued Components. This assessment not only included previous mine closures, it included all past, present and reasonably foreseeable projects and activities (including: exploration projects; guide outfitting; access; trapping; etc.). In this way all potential cumulative effects were evaluated (including those of past mines) following standard EA methods. The cumulative effects assessments for the environmental and socio-economic valued components are presented in Chapters 6 through 15 (Sections 6.5, 7.5, 8.5, 9.5, 10.5, 11.5, 12.5, 13.5, 14.5 and 15.11). At the request of YESAB, this information from the Project Proposal has been extracted and is included as Appendix A to this Response Report. The only change to the Cumulative Effects Assessment from the Project Proposal in this Response Report is that potential effects to Liard First Nation, Ross River Dena Council and Residents of Ross River and Watson Lake to the extent that effects are unique to these community have been identified (where possible).

4.3 YESAB DEFICIENCY

The response refers to the project proposal, specifically, data amalgamated in Appendix A of the response to IR-4. Appendix A indicates that there will be effects to land users and that it is “*unknown*” if there will be unique effects to any one grouping of land users. The response 3 focuses on a cumulative effects approach, while the question is attempting to derive greater certainty of predicted project effects based on previous experiences.

4.4 YESAB RATIONALE FOR REQUIREMENT

The Executive Committee is aware of numerous previous mine closures in south-east Yukon. Affected First Nations have informed the Executive Committee that those closures have had adverse effects on their communities and citizens. The Executive Committee needs to better understand how those mine closures have affected local communities that may be affected by the closure of the Project. The Executive Committee requires information on the effects of mine closure, not only to understand cumulative effects, but to have greater confidence in predicting the direct effects of the proposed project, specifically in relation to scheduled or unscheduled closure.

4.5 BMC SUPPLEMENTARY RESPONSE

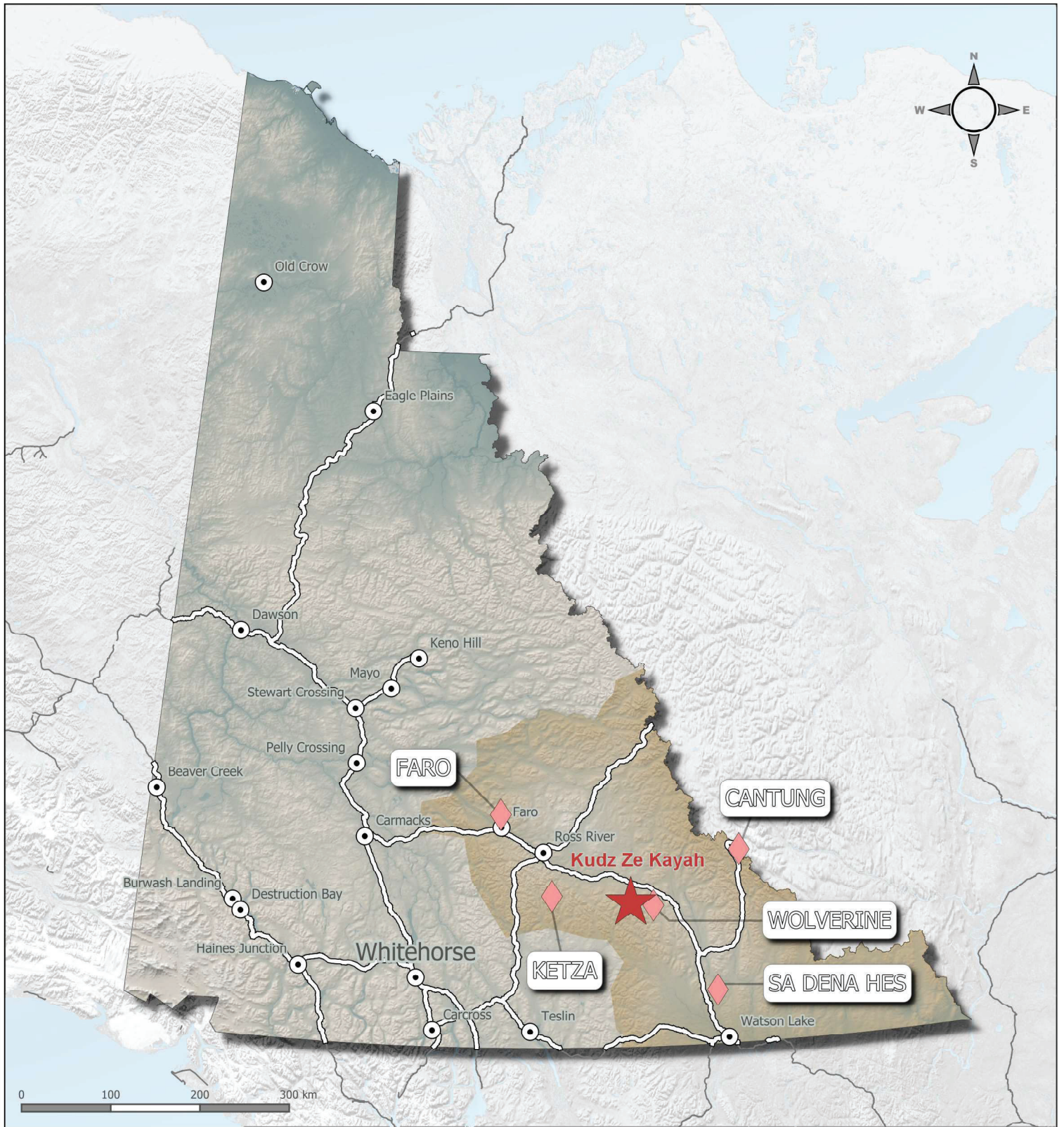
There have been five operating mines in Kaska Territory within the Yukon that have closed in the past 57 years. (Faro, Cantung, Ketza, Wolverine, and Sa Dena Hes) (Figure 4-1). In order to better understand the social and environmental effects these closures had on the local communities, it is important to understand the broader historical context in which these mines operated and closed, including:

- each mine's technical and economic assessments and corporate financial position (i.e. financial viability of both the mine and the company) in the context of a global commodity market;
- the historical environmental and regulatory regimes under which each mine was constructed, operated and closed;
- the historical corporate and societal expectations and responsibilities in the era during which each mine was constructed, operated and closed; and
- the accuracy and context of anecdotal evidence against demonstrated outcomes and perceptions.

Once the context in which these mine closures occurred is considered, an Effects Analysis and Risk Level Determination can then be conducted to determine the risk of similar social and environmental effects on local communities when BMC closes the proposed KZK mine.

To that end, this Response provides:

1. A summary of the effects of closure of the previous five mines that have operated in Kaska Territory in the Yukon. It includes not only the social and environmental effects the closure had on the local communities, but also the broader historical context within which the mines were constructed, operated and closed.
2. An evaluation of the Stats Canada and Yukon Statistics for the local communities.
3. The results of a community based survey undertaken with local businesses, community members (including LFN and RRDC) and community leaders.
4. The context in which the proposed Project will be constructed, operated and closed (including mitigation measures that BMC will put in place).
5. An Effects Analysis and Risk Level Determination for similar effects that could conceivably arise from closing the proposed KZK mine.



KUDZ ZE KAYAH PROJECT
FIGURE 4-1

 KASKA DENA FIRST NATION TRADITIONAL TERRITORY

 CLOSED MINES IN KASKA TRADITIONAL TERRITORY

LOCATIONS OF MINES THAT HAVE CLOSED IN KASKA DENA FIRST NATION TRADITIONAL TERRITORY (ROSS RIVER DENA COUNCIL AND LIARD FIRST NATION)

The data on this map is a compilation obtained from various sources including the © Government of Yukon 2018 and The Yukon Geological Survey. Contains information licensed under the Open Government Licence - Canada.

4.5.1 SUMMARY OF PREVIOUS MINES

4.5.1.1 FARO MINE

Faro Mine History

In 1953 Al Kulan and Kaska prospectors Jack Ladue, Robert Etzel, Joe Etzel, Art John and Jack Sterriah staked the claim that would eventually become the Faro mine (History of Faro, n.d.). The claim was located 48 km downstream of the community of Ross River. At the time, the deposit was considered too small and remote to be mined. However, it led to discovery of the Faro ore deposit some ten years later (YG, 2013). In 1969, full-scale mining of the Faro deposit by the Anvil Mining Corporation began at the newly developed Faro Mine. Reorganised into the Cyprus Anvil Mining Corporation in 1975, the company quickly became the largest private sector employer in the Territory. It also represented well over a third of the economy of Yukon, and by the mid 1970's was the largest lead/zinc mine in Canada. At one point, for a brief period, it was the largest operating open-pit lead/zinc mine in the world (Town of Faro, n.d.).

According to Yukon Government (YG) (YG, 2013) the mine processed between 5,000 and 9,300 tonnes per day (tpd) of ore while other sources indicate processing rates of up to 15,000 tpd (Horte, 2018). The variable throughput rates roughly correspond to the different phases of mining operations with the higher rate associated with Anvil Range Mining in the 1990's. Operations continued under various owners including Cyprus Anvil Mining Corporation, Curragh Resources Inc., and Anvil Range Mining Corporation until 1982. In 1988, a second mining area called the Vangorda Plateau was developed. Vangorda Plateau, consisting of two deposits, Vangorda and Grum, went into production in 1990. Mining continued intermittently until 1998 when Anvil Range Mining Corporation declared bankruptcy and sought protection under the federal *Companies' Creditors Arrangement Act* (YG, 2013). Figure 4-2 below summarises the Faro Mine timeline.

Each phase of mining commenced at a time of elevated commodity prices (Figure 4-3). The initial closure of Faro in 1982 was due to falling metal prices, low productivity, high operating costs and the added burden of the debt load brought about by a mine expansion. The subsequent closure in 1993 followed the same cycle in terms of commodity prices and debt, except this time with Curragh the debt was associated with both the Faro mine and their coal operations. The final phase of mining during 1995-98, by Anvil Range Mining Corporation, commenced at the start of a relatively short-lived rise in commodity prices, but the return to low commodity prices and high corporate debt levels led to closure. Sensitivity to base metal prices combined with the high capital expenditure involved with open cut mine pre-stripping overwhelmed the operations ability to produce enough immediate revenue to make the project profitable.

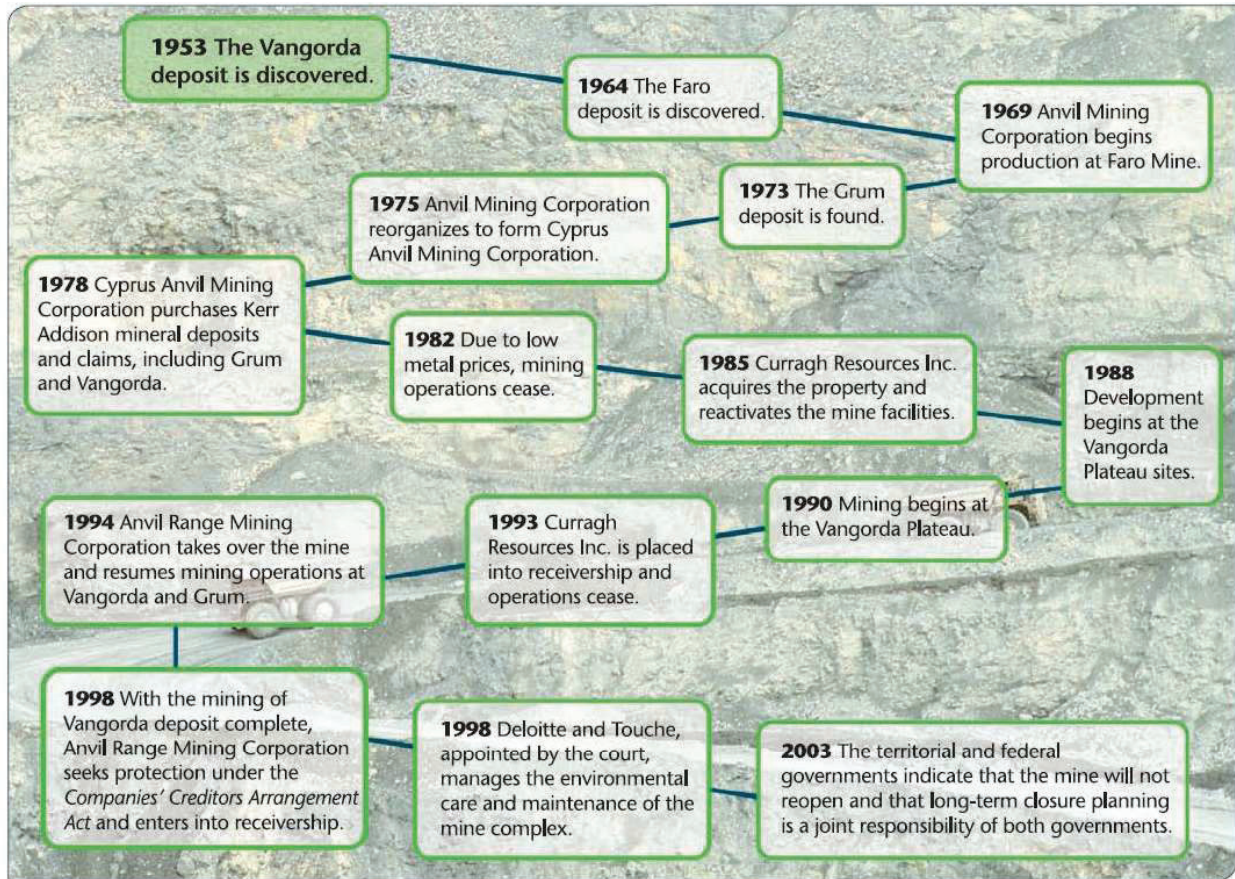


Figure 4-2: Faro Mine Timeline (Source: YG, 2013).

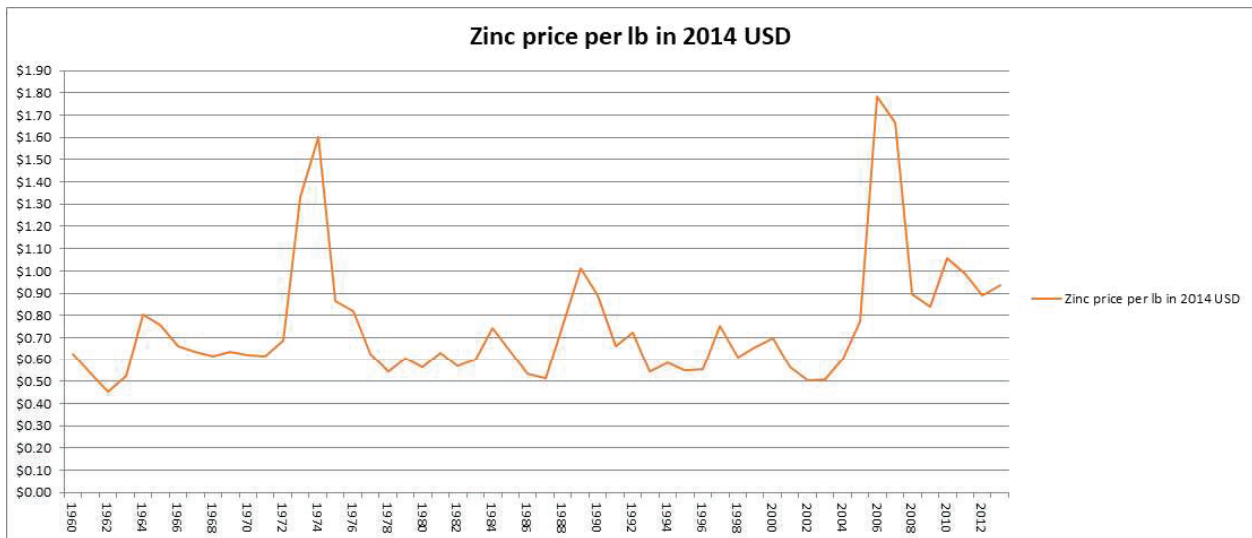


Figure 4-3: Zinc price per lb in 2014 US Dollars

The Government of Canada (Aboriginal Affairs and Northern Development) is currently responsible for the reclamation of the Faro mine and have reported that “since 2009, after many years of research, extensive review and consultation a remediation approach was selected” (Government of Canada, 2019). Parsons Inc. is responsible for managing the immediate projects at the site and ensuring First Nation and Yukon hires and subcontractors have priority. The Kaska Faro Secretariat was established in 2016 and coordinates the Kaska Nation’s (RRDC, LFN and Kaska Dena Council) participation and interests in the remediation project. It is understood that both LFN and RRDC citizens have been and are employed with the project and that capacity funding has been provided for RRDC’s and LFN’s external reviews of the remediation plans as well as reviewing the project proposal for the remediation project, which will require an assessment through YESAB. In January 2019 CBC News reported that Pelly Construction was awarded the contract to remediate the mine and has partnered with RRDC to undertake the work and RRDC will see economic benefits from the Project (CBC News, 2019a). The Faro mine remediation is estimated to cost more than \$500 million over the next 15 to 20 years.

Regulatory Regime Timelines

Water

Over the last 40 years, Yukon regulatory regimes in relation to water have undergone substantial changes partly in response to changing community expectations. The Faro mine operation coincided with many of these changes and indeed may have been the catalyst or one of the catalysts for these changes. The broad timeline is summarised as follows:

- In the Yukon, prior to 1974, water related issues were regulated under the federal *Fisheries Act*, federal *Yukon Placer Mining Act* (YG, 2014).
- In 1974 the Department of Indian and Northern Affairs, Government of Canada, enacted the federal *Northern Inland Waters Act*. A licence was now required for water use and the deposit of waste into water. The federal *Northern Inland Waters Act* provided for the establishment of the Yukon Territory Water Board and along with a process to license water use and waste disposal projects (YG, 2014).
- In 1993 the federal *Yukon Waters Act* came into force when the Government of Canada’s Yukon Waters Regulations were developed. This act replaced the federal *Northern Inland Waters Act*. The goal of the new act was to streamline the licensing process.
- In 2003 devolution occurred, resulting in YG gaining direct control over the management of its public lands and mineral resources in the form of a territorial *Yukon Act*. At this time, a territorial *Waters Act* replaced the federal *Yukon Waters Act*. The new act had no major changes (YG, 2014; Government of Canada).

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- The Umbrella Final Agreement (1990) and Section 14.8.1 of each Final Agreement with settled First Nations includes the following provision: “a Yukon First Nation has the right to have Water which is on or flowing through or adjacent to its Settlement Land remain substantially unaltered as to quantity, quality and rate of flow, including seasonal rate of flow” (Yukon Water Board, 2018a). Although neither RRDC nor LFN ultimately signed UFA-based Final Agreements, these provisions are enshrined in the permitting process.
 - The federal Metal Mining Effluent Regulations were enacted in 2002 and amended in 2018 to Metal and Diamond Mining Effluent Regulations under the federal *Fisheries Act*. The regulations include the requirement for Environmental Effects Monitoring which incorporates sublethal toxicity testing, fish tissue testing for mercury, benthic invertebrate studies, and fish studies (Government of Canada, 2017).
 - The federal *Fisheries Act* was amended in 2012 to include new Fisheries Protection Provisions, including the requirement for a federal *Fisheries Act* Authorization if the project has the potential to impact sustainability or productivity of fish or fish habitat that support aboriginal, commercial or recreation fisheries (Government of Canada, 2016).
 - The Canadian Water Quality Guidelines for the Protection of Aquatic Life were established in 1987 by the Council of Resource and Environment Ministers (CCME, 2008). While these guidelines are not legislation, they are considered to be the main reference when developing water quality guidelines, in consideration of the long-term health of aquatic life.

Land and the Environment Assessment Process in the Yukon

Much like Yukon regulatory regimes in relation to water have undergone substantial changes over the years, so has the Land and Environmental Assessment Processes. The Faro mine operation coincided with many of these changes and the broad timeline is summarised as follows:

- In 1973, the federal Environmental Assessment and Review Process was developed, but it was not formalised until 1984 as the Environmental Assessment and Review Process Guidelines Order. Following this, the federal government began to develop environmental assessment legislation. This legislation was introduced to Parliament in 1990, and the federal *Canadian Environmental Assessment Act* (CEAA) was passed in 1995. This was followed by amendments to CEAA in 2003, and again in 2010 (Powell, 2014). The old CEAA was repealed and replaced in 2012. Because YESAA is UFA and Final Agreement-derived legislation, the Kaska continue to express concern about the Yukon’s assessment regime. However, it is the prevailing legislation and all projects are required to be assessed through the YESAA process.
- The federal *Yukon Act* came into effect in 1898 and was the main legislation regarding land-use decisions. The federal *Yukon Quartz Mining Act* was enacted in 1985 and updated following devolution in 2003. Under the *Yukon Quartz Mining Act*, a Quartz Mining Licence

(QML) is required for quartz mining operations above thresholds set forth in the regulations. Provisions for financial security were included in the 1985 *Yukon Quartz Mining Act*, and a formalised Security Regulation was appended to the territorial *Yukon Quartz Mining Act* in 2007. There is a section under the act that considers land use and reclamation practices. Other Yukon legislation (*Occupational Health and Safety Act, Heritage Act, Environment Act*) that has come into effect since devolution makes specific considerations to wildlife and Traditional Land Use.

- The Umbrella Final Agreement was reached in 1988 and finalised in 1990. Sections of the Umbrella Final Agreement include land use planning and wildlife. Legislation that has come out of this agreement includes the federal *Yukon Environmental and Socio-economic Assessment Act* (YESAA) in 2003. YESAA's purpose is to protect and maintain environmental quality, heritage resources and the well-being of the Yukon First Nations (YESAB, 2018b). As noted above, the Kaska have rejected the UFA-based agreement process and continue to express concern over the application of various laws and regulations in their traditional territory. However, because so many elements of those agreements are enshrined in federal and territorial legislation, projects are significantly affected by these developments in the Land Claims area.

Environmental and Socio-economic Effects of Closure

The Faro Mine obtained its first water licence in 1974 (water licence Y2L3-0005) (Couch et al. 1981), at a time when there was no environmental assessment legislation and therefore no statutory requirement around environmental risk mitigation (other than the requirements of the licence). Although environmental assessment legislation was later introduced during the course of Faro's long operational history, most of the mine activities were not subjected to environmental assessment. According to Cornett, 2018, a minimalistic effects-assessment (by modern standards) was conducted on the Grum and Vangorda deposits; with recommendations including segregation of high sulfide waste material. Faro closed prior to the introduction of YESAA, which today considers both socio-economic and environmental effects. Due to the lack of assessment and minimal to no requirements to manage the environmental and socio-economic impacts of the mine, its operation resulted in a number of enduring, negative environmental and socio-economic impacts after closure. Further exacerbating the environmental effects was the innate geoenvironmental risk often associated with sedimentary exhalative massive sulphide deposits, and a relative lack of understanding of these risks at the time leading to what would today be considered inappropriate management strategies and processes. Finally, the historic regulatory process was not sophisticated enough to deal with the challenges and risks posed by the project. The following subsections summarise the environmental and socio-economic effects of the project, with some discussion and explanation of the legislative, political, and physical contributors to these effects.

Environmental Effects of Closure

Environmental effects are normally measured by comparison with pre-project conditions, as indicated by environmental baseline studies. Although the project was licenced by the Yukon Water Board (in 1974) and a significant body of environmental monitoring data was subsequently collected, there was no pre-project benchmark data collected for comparison. For example, conditions of water licence Y2L3-0005 required compliance with effluent discharge standards and requirements to monitor water quality and conduct bioassays on tailings pond decant and the seepage. In 1990, the water licence for Vangorda Plateau Development included additional requirements for water quality, fisheries and aquatic resources monitoring in the receiving environment. However, no baseline data had been collected prior to the commencement of operations and monitoring requirements came late into the life of the mine after effects were already underway.

The detail around the environmental effects to Rose Creek and Vangorda Creek are somewhat challenging to quantify given the lack of baseline data. The three-year rolling average Water Quality Index score for Rose Creek above Anvil Creek improved from Fair in 2009-2011 to Good in 2010-2012 (YG, 2017). However, metal concentrations exceeded water quality objectives as recently as 2009 (YG, 2017). An obvious effect of the project on fisheries values is observed in the construction and subsequent destruction of an artificial lake as a water supply reservoir created on Rose Creek above the tailings area in the 1970's. This lake became a valued fishery that was later destroyed in the 2000s as part of the mine reclamation process (Vainio, 2019).

The major costs and outstanding liabilities associated with the Faro Mine site are primarily due to acid rock drainage and metal leaching from the exposed waste rock and tailings, interaction of these elements with the environment, and the impacts on down-gradient ground and surface water (especially Rose Creek). These environmental liabilities have resulted from the lack of a coherent waste management strategy, stemming from a limited understanding of the impact of acid rock drainage and release of metals on the environment, and therefore a reactive rather than proactive management approach. This reactive approach is apparent in historical water licence documents that frequently refer (and defer) to the Controller of Water Rights (under the federal *Northern Inland Waters Act*) to determine the course of action in the event of unexpected environmental performance. This contrasts with modern legislation that places the burden on the mine proponent/owner to proactively plan for and manage unexpected environmental performance (YG, 2006).

Other environmental aspects (such as terrestrial mine impacts) have not been as extensively documented as the water-related effects, due to the lack of past regulation, assessment, and management requirements of these environmental aspects. For example, under the federal *Northern Inland Waters Act* and prior to the introduction of the *Quartz Mining Act*, there were few or no requirements placed on mine proponents in regard to the involvement of other environmental disciplines in pre-mining assessment and operational processes (e.g. wildlife, meteorology, air quality, noise, vegetation, hydrology, groundwater, and etc.).

Overall, the water licence required and contained very little detailed information and limited conditions prior to mining. There was no requirement for an "*abandonment plan*" (now referred to

as a Reclamation and Closure Plan) until licence IN89-002 was issued for Vangorda and Grum in 1990. The licence required the provision of an abandonment plan in 1994, the assessment of the effectiveness of mitigative measures in 1998 and the operation of a water treatment plant in perpetuity at closure. The IN89-002 Decision Document indicated that the decision to require the company to carry out perpetual water treatment was based on “*potential for acid mine drainage over the long term...*” and “*the use of covers and seals for long term control of acid generation represents emerging technology which has not been proven over time*”.

There were also some challenges with enforcement of licence conditions and “*loopholes*” in the licence. For example, according to Holmes (2018), although later versions of the water licence required the development of an Abandonment Plan, the licence lacked any provision requiring the implementation of the plan.

Another challenge for regulators was built into the federal *Northern Inland Waters Act* limiting security to no more than 10% of the capital cost of the undertaking. Environmental and water related liabilities became more apparent during later phases of the Faro mine life. During the licence renewal for water licence IN89-002, the federal Minister responsible (for the Department of Indian and Northern Affairs) pressured Curragh to post additional security above 10% of the capital cost of the undertaking prior to signing the water licence. This led to a lawsuit in which the Minister prevailed, not long before Curragh went into bankruptcy (Holmes, 2018).

In conclusion, the environmental effects that resulted from the Faro mine were the product of:

- (1) mineralization with intrinsic geo-environmental risk when disturbed;
- (2) a lack of understanding of the full scope of environmental issues and a lack of a sophisticated technologies available for mitigation;
- (3) the lack of a modern sophisticated effects assessment process;
- (4) the lack of a modern sophisticated mining regulatory system; and
- (5) uncontrolled closures that were without the protection of a modern financial security system.

Socio-economic Effects of Closure

In 1969, the first families moved into the new town of Faro. At first, the company owned nearly all the housing in the community and built the recreation centre; and the town of Faro was quickly incorporated in December of 1970. Through the 1970s, the population of Faro increased as the mine was profitable and wages were high, with the added allure of heavily subsidised housing. The town of Faro Reports that in 1981 the population was just under 2000 inhabitants ((Town of Faro, n.d.). During the boom times at the Faro mine, (1970s) the influx of young mine workers and relatively

high available cash resulted in increasing issues with drug and alcohol abuse and crime (Taggart, 2016, Vainio, 2019).

A temporary shutdown was announced in June of 1982 and a waste rock stripping operation, heavily subsidised by government, provided work for approximately one third of the mine's workforce from mid-1983 to October of 1984 when the company locked out its remaining workers. In May 1985, the company announced it was closing the mine (Taggart, 1990). Severance pay was awarded to the locked-out workers following the announcement of Permanent Closure. By July 1985, Faro's population was less than 100 (Taggart, 1990).

In 1985, the mine was purchased from Dome by Curragh Resources Inc., (Curragh) and by the spring of 1986, the Faro mine and processing facility were re-opened. Mining moved from the Faro ore body to the Vangorda deposit in 1990. However, Curragh went bankrupt in 1992 due to financial difficulties and its heavy debt load (Taggart, 1990). The Faro mine was shut down once again in April 1993. No major waste stripping program was conducted to provide ongoing employment and the town's population again decreased dramatically (Taggart, 1990).

The property was subsequently purchased in 1994 by Anvil Range Mining Corporation and a waste stripping program and mill rehabilitation work were conducted. In August of 1995, mining resumed at the Vangorda deposit and expanded to the Grum deposit. The mine was in full commercial production by November 1995 (Taggart, 1990). The community of Faro recovered and many were optimistic as the new company had little debt and owned no other properties with liabilities (Taggart, 1990). However, Anvil Range announced a Temporary Closure of the mine in November 1996 citing depressed metal prices and a high Canadian dollar as the main causes. The mill continued to operate until March 1997 using stockpiles of ore. Anvil Range declared bankruptcy in April 1998, leaving the property in the hands of a receiver (Taggart, 1990).

The Faro mine has played a large role in the Yukon economy since it opened in 1969 (Taggart, 1990). *"Since its inception, the mine at Faro has been the single largest private employer in the Yukon. Between 1974 and 1980, the mine directly employed, on average, 15% of the Yukon's workforce. At its peak in 1981, the mine accounted, directly and indirectly, for 20.1% of total wages and salaries paid in the Yukon"* (Taggart, 1990). Although financial benefits were enjoyed during Faro's operation, the bankruptcy and closure of the mine were particularly difficult for Faro's residents. According to McLachlan, 2012, *"in that one fell swoop, lives, businesses, housing prices, family plans, school enrollment etc. all took one hard hit"*. Taggart (1990) stated the following *"People who had planned on staying and making a career in Faro left; property values plummeted, businesses closed (or went bankrupt), services diminished as the lack of population to support the above situations all fell sharply. Houses and streets fell into disrepair. Everyone predicted that Faro would become a ghost town"*. According to DesBrisay (1994), the Temporary Closure of Faro *"depressed the entire Yukon economy, reduced government revenues, and triggered an out-migration"* (Bone, 1992).

Although the Faro mine was a major economic driver on Yukon, especially during the boom years, these economic benefits were not significantly enjoyed by the local Kaska Dena and the community of Ross River. The only meaningful attempt at economic inclusion by the mine operators appears to have been a “*hire local*” policy instituted in the 1980s which stipulated that Cyprus Anvil were to hire 25% of their workforce from Ross River (Horte, 2018). However, due to lack of training, support, structure and lack of accommodation for local culture and needs, it had limited success with local First Nations (Horte, 2018) and many workers moved to Faro from elsewhere in Yukon and outside of the Territory (Vainio, 2019).

Exacerbating the impact was the fact that the Faro town site ultimately developed into a municipality, which meant significant public funds were invested in that community, rather than Ross River. The infrastructure that was developed for the town, such as piped water and sewer, lighting, roadwork and other similar investments ultimately received (and continues to receive to this day) Yukon Government financial support. That ongoing dynamic has led to significant resentment of the Faro community for RRDC members.

Al Kulan is frequently given credit for the original discovery of the Faro deposit; however, the initial discovery was made by Kaska local Jack Sterriah and his son Jack Jr. while hunting in the Vangorda Creek area several years earlier (Town of Faro, n.d.). According to Tom Law, son of Bert Law, who was also party to the 1953 staking of the original claims, all of the party members including the Kaska prospectors staked mineral claims and received some compensation and stock options as part of the mine development. However, the payout of the compensation was not in keeping with the agreements, and unscrupulous lawyers are thought to have swindled the original staking party out of their fair share of the royalties and/or compensation (Law, 2018).

For context, Yukon Indian people (First Nations) were not given the right to vote until granted by Prime Minister Diefenbaker in 1960. First Nations were not considered by government or private corporations or the general public with respect to the obligation for the Faro mine to acquire a “*social licence to operate*” (McIntyre 2018). Because the Ross River Dena have not settled under the Umbrella Final Agreement, they consider their right and title to their traditional territory to be unsurrendered (Thomson, 2016). However, within the historical context of the Faro mine, the Kaska Dena did not have meaningful involvement in the planning of or economic benefits generated by the mine.

An economic benefit agreement was made in 1995 between Anvil Range Mining Corporation and Ross River Dena, which included a \$1.4 million dollar agreements and effected trappers would be paid annual compensation (Windspeaker, 1995). During the Anvil Range Mining mining phase it was reported that 14 RRDC citizens were employed at the mine. In addition, RRDC’s fuel company was supplying the mine with 1 million litres of fuel per month.

Although RRDC appears to have had some economic benefits (based on the above) from Faro in the late 1990’s, the negative environmental effects resulted in socio-economic adversity, for example a loss of traditional hunting and fishing areas upon which subsistence hunters depend.

The Faro mine damaged or destroyed a significant animal habit area upon which the local First Nations used for subsistence hunting (Beckett, 2017). The Faro area was traditionally the “breadbasket” used by the Kaska to hunt sheep, moose, and caribou (Thomson, 2016). The mine operation has resulted in a significant loss in prime animal habitat upon which many Kaska rely on for subsistence, for which there has been little or no compensation. This negative socio-economic effect is exacerbated by hunting pressure from outside hunters within the Ross River Dena Council’s traditional territory (Thomson, 2016).

Conclusions

The Faro mine generated wealth and formed a major part of Yukon’s economy for several decades.

However, Faro’s fundamental metrics as a world class scale-deposit and the reactive nature of the sedimentary exhalative massive sulphide ore type carried a significant intrinsic environmental risk. This risk was not initially considered by the company or the federal and territorial governments due to less sophisticated state of environmental science and nascent environmental assessment process and regulatory tools at the time the project was initially constructed and operated. Although major pieces of the current legislative system were developed during Faro’s operations, mitigations put in place were too little and too late to prevent significant negative environmental and socio-economic effects.

Local First Nations (especially RRDC) do not appear to have been significant beneficiaries of the economic benefits of the Faro mine operations when it was active, despite the significant and ongoing negative socio-economic and environmental impacts of the mine. Recognising this legacy, for RRDC and LFN from the Faro mining operation, it appears that the Federal Government is ensuring that they do see benefits from the Faro mine remediation project through participation with the Kaska Faro Secretariat, direct employment, preferred contracting opportunities and capacity funding to review project plans and project proposals) (Government of Canada, 2019 and CBC News, 2019a).

Current legislation, assessment and regulatory processes have been shaped by the Faro mine’s legacy to prevent negative mine-related environmental and socio-economic effects.

4.5.1.2 CANTUNG MINE

Cantung Mine History

The Cantung mine is located along the Yukon and North West Territory (NWT) border (Figure 4-1). Although it is located in NWT, it is accessed from the Yukon and thus has greater economic and logistical ties with Yukon than with NWT. Combined, the deposits of Mactung (also along the border of NWT and Yukon) and Cantung hold about 15% of the world’s known tungsten resources. The Cantung mine is currently in Care and Maintenance.

The Cantung mine has a long history, with the deposit initially discovered in 1954 by prospectors exploring for copper. The mine operated over several intervals, including from 1962 to 1986, from 2002 to 2003, and from 2005 to 2015 with production suspended for a year in 2009-2010. The mine's latest closure, in October 2015, resulted from the mine owners, North American Tungsten Corporation Ltd. (NATCL), applying for creditor protection through the British Columbia Supreme Court under the federal *Companies' Creditors Arrangement Act* in June of 2015. The Cantung Mine was abandoned by NATCL through the orderly process under the *Companies' Creditors Arrangement Act* proceedings and the Government of Canada assumed the responsibility of the mine (NWT, 2015). Although the mine is currently in Care and Maintenance, recent media reports suggest that the NWT is attempting to sell the property with the associated NATCL deposit, Mactung (CBC News, 2019b).

When in operation the Cantung mine was the largest producer of tungsten in North America, this was more due to the limited number of other tungsten producers rather than due to the size of the Cantung mine. The worldwide demand for tungsten is physically small, so when one or more of the larger mines ramps up production supply can quickly exceed global market demand and impact negatively on the tungsten price. The majority of world tungsten production is currently concentrated in China and as such the tungsten price is largely driven by Chinese production. As a result, the tungsten price can be volatile and the various Cantung mine closures coincided largely with lower market prices for tungsten.

Project Development and First Production 1961 to 1965

The town site that would eventually be named "Tungsten" was constructed in the summer of 1961 to accommodate workers, and a few families for the soon to be developed Cantung mine. Initial supplies and materials for the project were transported by "Cat trains" over a temporary winter road and via a 1,200 m airstrip which was large enough to handle DC-3s. Construction of the 300 km road from Watson Lake to Cantung was commenced in 1961 and completed in 1963.

During the summer of 1962 open pit mining was commenced with ore stockpiled prior to the completion of the construction of the mill in October 1962. Concentrate production commenced however operations ceased in August 1963 due to a combination of factors including low metallurgical recoveries and a drop in the worldwide price of tungsten.

Operations resumed a year later in July 1964 with milling commencing in September. By mid-1965 mill recoveries had been improved and commercial production was achieved.

Operations 1965 to 1986

The first full year of commercial production was in 1966 with production reaching near capacity and increased recoveries and grades. However, in late December the processing plant burned down and concentrate production ceased until the plant was rebuilt in November 1967.

Mining production during the period 1962 to 1973 was by open pit methods and, due to the climatic challenges posed by the location, mining was only undertaken during the warmest months (June through October) with ore stockpiled to maintain processing plant feed throughout the year.

In 1973 open pit operations ceased and production commenced from the recently developed underground mine. Without the climatic restrictions the underground operations were able to function year round and thus supported a more stable workforce on site.

The 1970's and 1980's saw upgrades, and improvements in the processing plant, power station and town site during various stages to bring the daily throughput up to 1200 tpd. During these years there were several strikes by the employees, notably 1977, 1980 and 1981 as well as several periods of lowered production due to lower tungsten prices on the world market, 1975 and 1982 and in 1983 the mine was temporarily shut down for most of the year. A labor dispute halted production in May 1986. In August of that year operations were suspended indefinitely due to low tungsten prices.

On January 21, 2002, Cantung re-opened. In January 2003, the company reported that its tungsten production was 33% higher than anticipated by its mine plan. In December 2003, Cantung closure was announced and the property went on a care and maintenance schedule.

In 2005, due to a world shortage of tungsten the price rose significantly. Kaska Minerals Corp. agreed to invest \$2.97 million in North American Tungsten Corporation Ltd. (NATCL) and Cantung reopened in September 2005. Cantung mine suspended operations in October 2009 due to low metal prices. Production resumed one year later, on October 8, 2010. The Cantung mill shut down October 26, 2015 and the mine transitioned to a Care and Maintenance status. The Government of Canada took over responsibility for the environmental care and maintenance activities in late November 2015 (NATC website News Releases) while, Alvarez & Marsal Canada Inc. is the court-ordered monitor (the Monitor) of care and maintenance operations at the Cantung mine.

Since 2015, the Company, the Monitor and the Department of Indian Affairs and Northern Development have continued to receive enquiries from potential investors and other interested parties regarding opportunities with respect to Cantung including the possibilities of restarting mining and processing operations, re-processing the tailings and/or performing the long term remediation of the mine site (Alvarze and Marsal, 2018).

Statutory and Regulatory History

NATC's predecessor was granted the project's first water licence as per the new rules and regulations concerning water and land use in the Northwest Territories in 1975. This licence was renewed in 1978, 1983, 1986, 1988 and 1995. In early 2002 Tungsten applied to the Mackenzie Valley Land and Water Board (MVLWB) for a renewal of its 1995 licence. The board held that the application was not exempt from part 5 of the NWT's *Mackenzie Valley Resource Management Act*, which "grandfathered in" existing licences, and would require an environmental assessment and environmental impact review. NATC sought a judicial review of this decision by the Supreme Court of the North West

Territories, lost and then appealed to the Northwest Territories Court of Appeal where they won. NATC’s water licence was renewed at the end of 2003, after the mine had closed.

In January 2009 the company received notification from the MVLWB of the renewal of the Company’s Type A water licence. This licence was approved for a period of five years expiring January 2014.

An amended Type A water licence for North American Tungsten Corporation Limited’s mining and milling operations at the Cantung Mine site was issued on April 4, 2014. This was one of the first 2 amended water licences issued after devolution came into effect on April 1, 2014. This licence expires in 2024.

In the past, there have been a number of mine abandonment and reclamation plans prepared for the Cantung site. Mine closure cost estimates were included in all reclamation submissions. Additional mine closure cost estimates have been prepared for NATCL, the MVLWB and Indian and Northern Affairs Canada. The range of closure cost estimates between 2001 and 2010 are presented in Table 4-1 (NATC, 2011).

Table 4-1 Reclamation Cost Estimates – Cantung Mine (2001 to 2010)

Prepared by	Date Prepared	for	Closure Cost Estimate (\$millions)
EBA	Nov 2001	NATC	2.3
EBA	Oct 2002	NATC	2.5 to 3
Brodie Consulting	Oct 2002	MVLWB	34.5
NATC	July 2003	NATC	1.9
MVLWB Security	Dec 2003	MVLWB	7.9
NATC	Nov 2007	NATC	3.8
Brodie Consulting	June 2008	INAC	13.1
NATC	Mar 2009	NATC	4.2
NATC	Mar 2010	NATC	4.3

The MVLWB selected the reclamation security of \$13.1 million for the 2009 licence based upon the third party estimates up to June 2008.

The Cantung mine currently holds a Type A water licence (MV2015L2-0003) which expires in 2024. Upon issuance of this Licence, the Licensee was required to post and maintain a security deposit of \$27,950,000 and a minimum of ninety (90) days prior to the construction of Tailings Storage Facility 6, the Licensee is required to post and maintain an additional security deposit of \$1,900,000 to maintain a total security deposit of \$30,950,000. No documents in the public domain were available regarding whether or not the security requirements have been increased to \$30,950,000.

Environmental and Socio-economic Effects of Closure

Environmental Effects of Closure

In 2011 NATL reported *“The Cantung Mine is in compliance on all surveillance networks monitoring and reporting and is working very closely with Regulators to schedule required research and associated reports”* (NATC, 2011).

Since November 2015, the Government of Canada (represented by Indigenous and Northern Affairs Canada, which was formerly the Department of Indigenous and Northern Affairs Canada and before that it was the Department of Indian Affairs and North Development) has been funding the care and maintenance program at Cantung. BMC understands that Alvarze & Marsal Canada Inc is the appointed *“Monitor”* who (in part):

- a. Manages the care and maintenance of the Cantung mine site;
- b. Attends to environmental and regulatory matters including regular reporting to the MVLWB and Environment and Climate Change Canada; and
- c. Communicates with key stakeholders in Department of Indian Affairs and Northern Development and representatives of affected First Nations (Alvarze and Marsal, 2018).

Alvarex and Marsal (2018) reported that:

“In May 2017, the Company engaged Tetra Tech Canada Inc. (Tetra Tech) to perform environmental and geotechnical investigations of the Cantung mine site in order to understand the potential remediation options and related cost estimates. Tetra Tech has completed the majority of its field work which has included the following:

- a. *Human health and ecological risk assessments;*
- b. *Geochemistry assessment and tailings cover design;*
- c. *Tailings geotechnical assessments;*
- d. *Underground and open pit stability assessments;*
- e. *Borrow source assessments; and*
- f. *Remedial options analysis and preliminary liability estimates.*

The work is expected to continue through mid-2019 and will be expanded to include:

- a. *Contracting and supervising drilling contractors;*

- b. Gathering and interpreting data on the stability of the tailings ponds;*
- c. engaging and consulting with affected First Nations regarding potential remedial options;*
- d. preparing a preliminary design for the preferred remedial options selected;*
- e. preparing long-term monitoring plans and related cost estimates; and conducting an archaeological study of the Cantung mine site.*

The Company is continuing to submit regular reports to ECCC under the Metal Mining Effluent Regulations and the Environmental Effects Monitoring Program and to MVLWB as required under the Companies water licence. The Company met with MVLWB and ECCC in November 2018 to provide an overview of the potential future options for the Cantung mine site.

The Company's Engagement Work Plan and Engagement Plan, as approved by the MVLWB, provides for engagement and regular communication and consultation with various stakeholders including First Nations. The Company held community working group calls in April 2018 and arranged for a site visit with affected First Nations in September of 2018 to provide an overview of the current care and maintenance activities, site conditions and planned future remediation options. The Company has worked closely with Department of Indian Affairs and Northern Development on its consultation and engagement efforts. A further community working group call is scheduled for December 4, 2018."

The purpose of the environmental studies currently being conducted at Cantung are to understand the existing environmental risks and to identify the potential remediation options and related cost estimates. The Tetra Tech reports from the site investigations conducted in 2017 do not appear to be publicly available and therefore it is challenging for BMC to provide YESAB the information that they have requested: *"the past and current environmental effects of mine closure"* for the Cantung mine. ReSDA (2016) reported that *"Environmental concerns have stemmed from the proximity of Cantung's acidic waste rock tailing ponds to the Flat River. This represents a potential threat to Nahanni's aquatic systems. Dust from the mine and mill are also toxic. Contamination from the mine has been found 15 km from the site"*. Given that the detailed care and maintenance reports are also not publicly available, it is not known if these environmental concerns have been addressed through the care and maintenance activities. BMC conducted a review of NATCL's 2017 annual water licence report (MV2015L2-0003) (NATC, 2018); however, this report did not identify effects from closure. Indigenous and Northern Affairs Canada inspected the site on January 10th, 2019 to ensure that the site was in compliance with the terms and conditions of the water licence and the various land use permits and was *"satisfied with the overall condition of the site as there were no concerns noted during the inspection"* (INAC, 2019). Non compliance was reported by INAC during their inspection in 2016 which was related to sediment and erosion control issues (INAC 2016). NATC took immediate action to rectify the some of the contraventions and prepared an action plan to address all other deficiencies in a timely manner (NATC, 2016).

The environmental effects of Permanent Closure will only be able to be assessed once the mine goes in to this stage and the reclamation activities are underway and/or complete.

Socio-economic Effects of Closure

Employment and Tungsten Town-site

The nature and origins of the workforce were intimately connected to the style of accommodation supplied at Cantung.

Prior to the restart in 2002, all employees, and families, were housed in the town of Tungsten. As such the employees were all, technically at least, residents of the NWT. The population of Tungsten varied greatly with approximately 120 permanent residents in the 1960's (160, in the summer months) and 450 in 1982. About 100 children were enrolled in the school (Kindergarten to grade 9) in 1982. By 1986, it was estimated that only 280 people were living at Tungsten. There does not appear to be any record of where this population originated but it is assumed to be similar to many small resource towns with some locals moving there and other residents coming from further afield. It has been reported that when the mine closed in 1986 many of the families living in Tungsten moved to British Columbia (Garrison, 2016). The loss of jobs in 1986 would likely have had an effect on the employees living in Tungsten and the town itself, rather than specific effects to the communities of Watson Lake, Ross River or Liard First Nation or Ross River Dena Council.

With the restart in 2002 the strategy had changed. The town site remained largely vacant and the employees were instead housed in bunkhouses. The total workforce early in 2002 was approximately 140, 50% of which were northerners, and of that, 35% were Aboriginal. The company also estimated that 20 direct contract jobs were created by company mining operations. In May and June, direct employment at the mine site was increased to 164 employees (Silke, 2009). These jobs were rotational rather than a standard 5 day week, though some of them were seasonal. A concerted effort to hire locally was made by NATCL and there was varying success in Watson Lake and the surrounding communities but with minimal results in the NWT (NATCL, 2001).

The last 10 years of the mine (2005 to 2015) were operated as fly in-fly out (or drive in, drive out) with rotations of 3 weeks in and 3 weeks off site. NATCL chartered private aircraft from Vancouver to Prince George and/or Smithers to transport the majority of the workforce. From Whitehorse, employees were transported by vehicle to the mine. NATCL vehicles picked up and transported northern employees from Whitehorse, Watson Lake and other eastern Yukon communities to the mine site (NATCL, 2014). It is understood that some of these employees were RRDC and LFN citizens. However, this change in operational strategy decreased the amount of local hire described by NATCL, in the above.

In 2013 Yukon News published an article on the Cantung mine and Mactung deposit which included the following:

“Liard First Nation Chief Liard McMillan said that while there have been some jobs for Liard First Nation citizens, there have also been a lot of issues with the mine and the company refusing to include the First Nation in negotiations”.

There are currently twelve full time people on alternating three week schedules whose activities include, among other things, performing regular water sampling and reports, regular inspection of and repairs to site buildings and infrastructure, and maintaining mobile and other equipment as well as access to the mine site by way of the Nahanni Range road, site roads and the airstrip (Alvarze and Marsal, 2018).

Infrastructure

The Cantung mine’s development was responsible for the preliminary development of the first section of the road that would eventually be connected to Carmacks and named the Robert Campbell Highway (Highway 4). The Nahanni Range road (Highway 10) was likewise a result of the development of the Cantung Mine and over the mine’s 50 year life the owners of the project were responsible for the maintenance and upkeep of this access road from km134 to the mine site. The combined travel distance between the mine site and Watson Lake, the nearest town by road is 310 km and takes between 4 and 5 hours depending on road conditions.

These roads allow easier access to areas that had previously only been accessible by non-motorised methods. Both highways were additions to Yukon’s limited infrastructure and have assisted with other projects that have added to the economic wellbeing of the local communities and Yukon as a whole. These resource projects include Wolverine, 3 Aces, logging, and tourism.

Highway 4 has also aided the connection between Watson Lake and Ross River with the travel time between the communities being about 5 hours compared with 10 hours or more travelling by road via Whitehorse. This provides easier access for the residents of Ross River to the facilities and people of Watson Lake. The roads also provide Kaska with easier access to areas where Traditional Land Use and resource gathering may be carried out.

Supplies

Although the mine is situated in the Northwest Territories, Watson Lake was the staging area for trucking the tungsten concentrates and for supplying the mine site, due to the town being the closest to the mine site by road. There is little historical information on the amount of supplies sourced from Watson Lake. However, the supply chain included trucking firms located in Watson Lake and the same companies transported tungsten concentrate from Cantung to Watson Lake prior to movement to points further south.

It is noted that of the total amount creditors were owed at the time of NATC’s *Companies’ Creditors Arrangement Act* process in June 2015, \$79,515,664.93 owed to 237 creditors, there was exactly \$111.30 owed to all the creditors using Watson Lake as their address (CCAA, 2015).

Conclusions

During its operation the Cantung Mine, owned and operated by NATC, was the largest tungsten producer in North America. The mine opened in 1962 and its latest closure was in 2015. There were several periods during this more than fifty year period when the project was temporarily closed with the commonly stated cause being low market prices of tungsten. The mine's open pit and underground operations extracted tungsten containing ore at a rate of 1,350 tpd.

The mine is now being operated on a care and maintenance basis by the Canadian federal government, with taxpayer funding, and this will continue until the site is reclaimed or sold. The current posted security is \$27.95 to \$30.95 million. Existing environmental effects are unclear as the most recent environmental site assessments do not appear to be publicly available. With older site investigations that are publicly available, there is no publicly available follow-up information that indicates the recommendations presented in those reports have been implemented to mitigate or eliminate the existing effects and risks. Consultation on the care and maintenance program is being conducted (in part) with the Liard First Nation and Kaska Dena Council.

Cantung and the old town site of Tungsten are located on the NWT-Yukon border in the Mackenzie Mountains. Although the mine is within the boundary of the NWT, the property is historically tied to the economic and social interests of Yukon. The mines operations provided local direct and indirect jobs to the region; however, due to the intermittent nature of the operation, particularly in the 21st Century, the resultant fly in fly out (and drive in, drive out) nature of the economic benefits were likely less or at least very differently spread than when the staff were housed at Tungsten.

4.5.1.3 KETZA RIVER MINE

Ketza River Mine History

The Ketza River Mine is an abandoned gold and silver mine located 85 km south of the community of Ross River, Yukon (Figure 4-1). The mine produced gold and silver through underground and open pit operations primarily from 1988 to 1990 (Assessment of Abandoned Mines, 2016).

The former mine is located within the traditional territory of RRDC, LFN and Teslin Tlingit Council. The site is situated along the headwaters of the Cache Creek drainage basin; which flows into the Ketza River and then the Pelly River approximately 12 km upstream of the community of Ross River (Harpley et al, 1991). The place is of cultural significance to the Kaska First Nation; it is known as “Dena Nezziddi” or “people standing on top of the mountain” (Smith, 2019).

Mineralization in the Ketza River area was first discovered in 1947 by prospectors from the Hudson Bay Mining and Smelting Company Limited who had found lead-silver veins. Gold mineralization was discovered on the property by Conwest Exploration Company Limited (Conwest) in 1954 (SRK Consulting, 2008). In 1974, the main claims were surveyed and leased (Gartner Lee, 2002). “In 1983, Pacific Trans Ocean Resources Ltd. optioned the property from Conwest and carried out limited geochemical and geological surveys before entering a joint venture with Canamax Resources Inc. (Canamax) in 1984.” (SRK Consulting, 2008). By 1989, Canamax was the sole owner of the mine (Gartner Lee, 2002).

From 1984 to 1990, Canamax conducted geotechnical surveys, drilling, and mapping. Construction of the mill began in 1987, followed by commercial production in April 1988 (Gartner Lee, 2002). “Approximately 342,395 tonnes of ore were processed using a conventional carbon-in-pulp process at a nominal rate of 364 tonnes per day to produce approximately 3.1 million grams of gold and approximately 342,000 tonnes of tailings” (Gartner Lee, 2002). At the time, Canamax had been mining oxide ore bodies; however, due to low oxide ore reserves, mining and milling operations ceased in November 1990 (Department of Indian Affairs and Northern Development, 1991). The lower-than-anticipated reserves was caused by a miscalculation of the bulk density of the oxide ore during the feasibility phase. This mistake, along with higher than anticipated underground operating costs made the project no longer economically feasible.

Wheaton River Minerals Ltd. purchased the Ketza River mine from Canamax in 1992, subsequently selling it to their wholly-owned subsidiary, Ketza River Holdings Ltd. In 1994, YGC Resources Ltd. purchased Ketza River Holdings Ltd., thereby becoming the new owner of the Ketza River Mine (Gartner Lee, 2002). YGC continued conducting exploration programs in the Ketza River property (i.e. drilling and mapping) until 2007. In 2007, YGC merged with Queenstake Resources Ltd., forming Yukon-Nevada Gold Corp. (SRK Consulting, 2008).

In 2011, Ketza River Holdings (owned by Yukon-Nevada Gold Corp) submitted a mine proposal to YESAB; the proposal was to mine 49.5 million tonnes of material over a five-year period (YESAB, 2011-2012). YESAB’s Executive Committee came to a consensus that Ketza River Holdings Ltd. had sufficient consultation with the RRDC, LFN and Teslin Tlingit Council and the inhabitants of Ross River (YESAB, 2011-2012). However, in February 2012 the Executive Committee found that more

information was required: *"The Executive Committee found the Ketzka River Mine proposal to be deficient of necessary baseline information, analysis and interpretation of baseline information, detailed project description, characterization of project effects and description of appropriate detailed mitigations"* (YESAB, 2011-2012).

On October 2, 2012 Yukon-Nevada Gold Corp changed its name to Veris Gold Corp. (Newsfile, 2012). Veris Gold Corp. filed for creditor protection in June 2014, maintaining the project until September 2014 (Assessment of Abandoned Mines, 2016). On April 10, 2015 the company abandoned the mine and YG took over the responsibility for care and maintenance (Assessment of Abandoned Mines, 2016) and (CBC News, 2015b). In 2015, YG used approximately \$1.1 million of the mine's \$3.1 million security to pay for maintenance concerns at the mine site. *"Water leaving the site untreated had to be collected and pumped back to an arsenic treatment plant, and work had to be done to ensure surface water wasn't going to flow into the tailings pond during spring runoff"* (CBC News, 2015b). In 2019, Yukon Conservation Society estimated that the final liability for the project cleanup would approach \$25 million (Yukon Conservation Society, 2019). In March 2019, BMC contacted YG's Department of Energy Mines and Resources (EMR) to determine what their estimated costs are to reclaim the Ketzka mine site are. EMR indicated that *"cost estimate and closure planning is still being developed and at a conceptual level"*.

Statutory and Regulatory History

In 1985 the proposed Ketzka Mine Project was referred to the Regional Environmental Committee for review.

In 1986 Land Use and quarry permits were issued.

In January 1987 Canamax submitted a water licence application to the Yukon Water Board. The licence hearing was held in March of that year and water licence Y-IN87-06L was issued on May 1, 1987. The mine began operating in March of 1988.

The water licence was subsequently amended August 2, 1989 and which required the submission of an Abandonment Plan on or before March 31, 1990. A Conceptual Abandonment Plan formed part of subsequent 1990 application by Canamax for and amendment to the water licence. However, the application was withdrawn in March 1992 at the company's request. In November 1992 the licence was transferred to Wheaton River Minerals Ltd. (Wheaton) who thereby assumed responsibility of meeting all of the terms of the licence including the submission of an Abandonment Plan. In 1993 Wheaton submitted to the Yukon Water Board and Regional Environmental Committee a draft Abandonment Plan. This Draft Abandonment was found to be deficient by the Water Board and/or the Regional Environmental Committee. Wheaton then transferred the Ketzka Mine to Ketzka River Holdings and who submitted a new Abandonment Plan for review in February 1994. It is understood that the water licence expired on December 31, 1998 and the Abandonment Plan was never approved.

In August 2004, YG (Water Resources Department) informed Ketzra River Holdings that they would require a water licence for the impoundment of water on site. A Type A water licence (QZ04-063) was issued to Ketzra River Holdings in 2007 and expired December 31, 2009. This licence required a Final Reclamation and Closure Plan to be submitted for review and approval and was submitted to the Yukon Water Board in December of 2009. This Final Reclamation and Closure Plan indicated that a Separate Final Reclamation and Decommissioning Plan was also submitted to EMR in December of 2007 as part of the Mining Land Use Approval LQ00156. Although the Type A water licence expired in 2009, it appears that Ketzra River Holding continued to monitor the site through 2010 as per the requirements of the expired water licence (Ketzra River Holdings, 2011a).

A search of the Yukon Water Board's Waterline website for "Ketzra" showed no active water licence for the project. The previous licences have expired or applications were withdrawn.

The Mining Land Use Approval (LQ00156) fell under the category of a Class 4 Exploration Program. It is understood that the Approval has expired. The security required for the Mining Land Use Approval for the exploration project was \$229,000. This is in addition to the \$3.1 million, which was required under the Type A water licence.

Environmental and Socio-economic Effects of Closure

Environmental Effects of Closure

Between 2004 and 2011, Ketzra River Holdings conducted a care and maintenance program at the Site (Ketzra River Holdings, 2011b). This program included an environmental monitoring program with a number of monitoring stations at the site to measure water quality and water quantity.

Ketzra River Holdings also completed an environmental cleanup and reclamation program of the wastes and un-used products that remained on the site from the Canamax commercial operation. This included:

- Removal of approximately 800 empty or full barrels containing acid, waste oil, sodium hydroxide, and unknown caustic substances;
- Removal of approximately 70 truck loads of general waste, including un-used mill buildings and scrap metal. Barrels and other materials were removed and disposed of in accordance with applicable regulations;
- A former barrel storage area near the Canamax tailings storage facility and a solid waste dump were decommissioned, reclaimed and revegetated; and
- Exploration sites in the area, where there are no future plans for additional mining, have been reclaimed and revegetated as well.

YG Department of Environment, Environmental Programs Branch determined that the Ketzra River Property is not a Designated Contaminated Site pursuant to the territorial Contaminated Sites Regulation (Yukon *Environment Act*); however, the Branch does have information regarding some contamination on the property (File 4202-20-124) (Ketzra River Holdings, 2011b).

Since the abandonment of the mine in 2015, the YG has been monitoring the site and performing care and maintenance as needed. When YG began care and maintenance, “*water leaving the site untreated had to be collected and pumped back to the arsenic treatment plant, and work had to be done to ensure surface water wasn’t going to flow into the tailings pond during spring runoff*” (CBC News, 2015b). As of March 2019, EMR has indicated that “*cost estimate and closure planning is still being developed and at a conceptual level*”. Therefore, although the mine has gone into Permanent Closure potential remediation options and related cost estimates have not yet been determined.

Existing environmental effects are largely uncertain as there are no publicly available reports past 2011. While some older site investigations (i.e. past effects) are publicly available, there is no reliable technical sources of publicly available follow-up information. This creates some uncertainty in understanding whether the recommendations presented in those earlier reports have been implemented to mitigate or eliminate the effects and risk. BMC therefore believes it inappropriate to speculate on this matter.

Socio-economic Effects of Closure

Employment Benefits for Local Communities

In the 1980s and 1990s, when Canamax owned the Ketzka mine they hired many RRDC Kaska for positions such as a Kaska liaison, cooks, and mill workers (pers comm, confidential). During the mine’s operating period (1988 to 1990) the average number of employees that worked there was 129 (ReSDA, 2016). However, the percentage of employees from local communities and what percentage of those employees were First Nations is not publicly available.

During the operating period a Memorandum of Understanding was in place with the Kaska Nation; however, any benefits gained through the Memorandum of Understanding are not in the public domain.

Information provided by a RRDC member, [pers comm, confidential] indicates that as of 2019, two Kaska First Nation members are contracted to maintain the access road to the Ketzka River Mine.

Socio-economic Participation Agreements

In 2012, Yukon-Nevada Gold Corp signed a Socio-economic Participation Agreement (SEPA) with all five Kaska First Nations from Northern British Columbia and Yukon Territory including, RRDC and LFN (Yukon-Nevada Gold Corp, 2012). Yukon-Nevada Gold Corp offered training and employment opportunities, and annual scholarship funds for eligible citizens (Yukon-Nevada Gold Corp, 2012). Actual economic benefits gained through the SEPA are not in the public domain.

First Nations Land Use Effects

In 1992, a study was completed with members of the RRDC to document their experiences with the Ketzka River Mine, and to record the mine’s impacts on indigenous people (Mike Morrell, 1992). RRDC members that were familiar with the project location had concerns about fish contamination from mine toxicants, game animal population declines, access to clean water and air, wildlife habitat

features (e.g., mineral lick concerns), increased beaver populations and contamination of vegetation (Mike Morrell, 1992).

Prior to the Ketzka River Mine activity, many of the RRDC respondents hunted moose and sheep, trapped fur-bearing animals, and fished salmon along the Ketzka River watershed (Mike Morrell, 1992). *"In 13 of the 19 interviews, interviewees reported fishing in the Ketzka drainage in the past. In contrast none of our respondents has fished there in 1991.... In six of these cases, people explicitly stated that they had stopped eating Ketzka fish because of their concerns that the fish are contaminated by the mine effluent and represent a health hazard"* (Mike Morrell, 1992). Over 25 years later (present time), the inhabitants of Ross River continue to avoid fishing in the Ketzka River due to the concern of contaminants (Smith, 2019). Studies conducted in 1981 and 1984, prior to the construction of the Ketzka mine, indicate that slimy sculpin and Arctic grayling in Ketzka River were elevated in metals, when compared to the concentrations found in the Pelly River (Ketzka River Holding, 2011b). Fish tissue monitoring was not conducted during the mine operations nor was it conducted to support Ketzka River Holding's Project Proposal to re-develop the mine in 2011. Therefore, the quality of the fish in the Ketzka River and how the mine may have impacted them is not in the public domain.

The community members of Ross River rely on water delivery from their bulk water station for their primary water use. However, many residents continue to collect their drinking water from streams and creeks within their traditional territory. The Ketzka River was one of these water sources, until the mine began production (Mike Morrell, 1992) and (Smith, 2019).

In the summer of 1988, a pre-existing tote road was upgraded to a 49 km-long, high quality loose-surface road in order to service the Ketzka River Mine (Mike Morrell, 1992) & (Gartner Lee, 2002). This improved road made their traditional hunting territory more accessible for other hunters (Mike Morrell, 1992). Before the mine was abandoned, the property owner(s) controlled who had access past their gates. Only Kaska hunters were given access to the old exploration trails past the mine site, protecting part of their traditional territory from a high influx of hunters (Smith, 2019).

BMC have been advised by RRDC members that some RRDC Elders currently use the Ketzka River Mine access road to access berry and traditional medicine picking areas (pers comm, confidential).

According to the Department of Indian Affairs and Northern Development (1991), *"The access road to the Ketzka River mine from the Campbell Highway to the Canamax mine site is a public road, although it is presently being maintained by Canamax. Once the mine is decommissioned, Canamax does not intend to maintain the road."* In other words, Canamax had no intention to regulate hunter access past the site once the mine was decommissioned.

Conclusions

The Ketzka River Mine provided economic benefits to Yukon and the Ross River area in the form of direct and indirect jobs, and the purchase of supplies and services, mainly from Whitehorse (Department of Indian Affairs and Northern Development, 1991). The Kaska Nation has received some economic benefits through the Ketzka River Project over the life of the project including, direct employment of Kaska citizens and other benefits (e.g. scholarships for students) as part of the SEPA with Yukon-Nevada Gold Corp (Yukon-Nevada Gold Corp, 2012). However, there are considerable

knowledge gaps in terms of quantifying local economic benefits (and losses) from the mine closure and the total number of employed Kaska members from RRDC and LFN. Currently, there are 2 Kaska (RRDC) members employed by the YG contractor to provide care and maintenance at the Ketz River mine site (Nyland, 2019).

Environmental liability to complete site cleanup and remediation remains and is being borne by Yukon and Canadian taxpayers. Traditional uses of the Ketz River area have declined due to mining activities that have hindered access, additional hunting pressure on the area due to the maintained public access roads, and concerns about the potential for contaminants.

In addition, the legacy of the Ketz River Mine has tarnished the local First Nation's opinion of mineral exploration and mining projects. This is directed at both YG and mining companies, for their inability to ensure that mining projects provide economic benefit to the local First Nation's, that the project can mitigate and limit environmental impacts, and that the project can be closed in a responsible way and not be abandoned, as were the Ketz and Faro projects.

In BMC's review of the permitting and regulatory process for the Ketz Mine, there appears to be data gaps in the mine's requirements for Temporary Closure and care and maintenance activities. Although it is understood that some care and maintenance activities were conducted between 2004 and 2011 (Ketz River Holdings, 2011), there doesn't appear to have been many statutory requirements.

4.5.1.4 WOLVERINE MINE

The Wolverine mine is an underground zinc-silver mine currently in Temporary Closure (EMR, 2019). The mine was constructed to process up to 1,700 tpd of massive sulphide ores into zinc, copper and lead concentrates which also contained precious metal credits. The mine is located within the Finlayson District of southeastern Yukon approximately 280 km east of Whitehorse, 190 km northwest of Watson Lake and 135 km southeast of Ross River (Figure 4-1).

Wolverine Mine History

Mineralization has been known in the area for generations (pers comm, confidential, 2017). The first indication of economic mineralization through modern exploration efforts was uncovered in the late 1970's to early 1980's when an exploration syndicate managed by Archer Cathro & Associates Limited conducted exploration in the area. In 1974 two small diameter core holes intersected low grade copper and zinc values; however, the overall low tenor of the mineralization and the poor ground conditions led the syndicate to abandon the claims.

Interest in the district was renewed in the early to mid-1990's after a Targeted Geoscience Initiative conducted by the Yukon Geological Survey indicated the area was underlain by more volcano-sedimentary rocks than previously recognised thus implying many of the base metal geochemical anomalies could be related to occurrences of Volcanogenic Massive Sulphide deposits. On the back of this re-interpretation, Equity Engineering Ltd. conducted targeting exercises that indicated several high priority geochemical anomalies in and around the Wolverine Mine area. These targets were sold to Atna Resources Limited who contracted Equity Engineering Ltd. to stake claims and conduct follow

up work in the area. In 1995 Westmin Resources optioned the property from Atna and funded a diamond drilling campaign which intersected 8.4 m of massive sulphide mineralization in the first hole drilled.

After an attempt by Expatriate Resources Ltd to jointly develop the ABM and Wolverine deposits in 2000, the project went into a dormant phase. In 2004 Yukon Zinc Corp. (Yukon Zinc - formerly Expatriate Resources) commenced the development of the Wolverine underground mine as a stand-alone operation.

The proposed Wolverine mine underwent an environmental assessment pursuant to the federal *Canadian Environmental Assessment Act* between 2004 and 2006. In addition, Yukon Zinc applied for a Type A water licence and Quartz Mining Licence in November 2004. The Responsible Authorities for the environmental assessment completed their review in 2006 and determined that the proposed Wolverine mine was “*not likely to cause significant adverse environmental effects*”. Yukon Zinc received a Quartz Mining Licence (QML-006) in December of 2006 for processing 1,500 tpd and Type A water licence (QZ04-065) was issued in October of 2007.

In July 2008, Jinduicheng Molybdenum Group Ltd. and Northwest Non-Ferrous International Investment Company Ltd. acquired all outstanding shares of Yukon Zinc, and took the company private.

Yukon Zinc completed major site construction throughout 2009 and 2010. Start-up was delayed due to two fatalities on site during construction and the on-going accident investigations and remediation requirements stemming from those investigations (Yukon Zinc, 2010a). This delay caused the company significant unplanned expense and impacted negatively on the economic viability of the project.

Process plant commissioning commenced in 2011 and commercial production, of 1,020 tpd or 60% of process rate capacity over a 30-day period, was achieved on March 1, 2012. Production first achieved 1,700 tpd in January 2013; however, production was subsequently reduced to 1,400 tpd mid 2013 “due to poor metal values” (Yukon Zinc, 2015). The process plant at Wolverine was designed to process 600,000 tonnes per year; however, as can be seen in the production data contained in Table 4-2, the tonnages processed never consistently achieved planned production capacity around which the economic viability of the project had been assessed. This is attributable to two factors;

- 1) The drastic difference between the competency of the ore and the host rocks resulted in the need to increase ground control measures and reduce blasting round length from the designed 3.5 m down to 2.0 m (Yugo and Shin, 2015). These two measures likely contributed to the reduced production rate.
- 2) The limited production of paste required for underground backfill (Table 4-2) would have significantly impacted productivity of the mining method selected for extraction of the underground ore, thereby contributing to the inability for tonnes of ore milled to match the design capacity of the processing facility.

Table 4-2: Mining and Milling Activities Summary

Year	Mined Ore	Milled Ore	Concentrate (t)	Paste (t)	Tailings (t)
2010	26,826	0	0	0	0
2011	142,315	153,352	26,723	0	126,629
2012	441,095	428,955	82,486	86,506	259,963
2013	505,942	419,625	112,629	146,903	260,093
2014	443,867	413,879	100,952	134,502	196,425
2015	35,207	19,594	6,095	2,927	10,572
Total	1,595,253	1,553,405	328,885	370,838	853,682

From: Yukon Zinc, 2016

On January 27, 2015, Yukon Zinc announced that it was temporarily shutting down operations at the Wolverine mine, reportedly due to unfavourable market conditions; putting the site in Temporary Closure. A notice of change of operations was submitted to YG to that effect. Most employees and contractors were laid off at this time and the mine was put into Care and Maintenance (Yukon Zinc, 2015). The Temporary Closure was unplanned.

On January 11, 2019 it was reported that Yukon Zinc had sold the company to Phoenix Global Investment Inc. in November 2018 (Yukon News, 2019).

Statutory and Regulatory History

Yukon Zinc’s submission of a Quartz Mining Licence and Type A water licence applications in 2004 predates assessments under the federal *Yukon Environment and Socio-economic Assessment Act* which came into effect late 2005. However, the licences could not be issued without an Environmental Assessment first being completed pursuant to the federal CEAA. The nominal throughput of less than 3,000 tpd triggered a screening level of assessment under the CEAA. Throughputs greater than 3,000 tpd would have been subject to a Comprehensive Study.

YG confirmed its involvement in this screening by identifying two Responsible Authorities: the Executive Council Office for the water use licence and EMR for the Quartz Mining Licence. The Development Assessment Branch of the Executive Council Office took the lead in coordinating the screening on behalf of both Responsible Authorities. On November 3, 2004 Executive Council Office undertook an exercise to identify other potential Responsible Authorities and expert authorities within Yukon and Federal Governments. Yukon departments of Environment and Community Services, Highways and Public Works and the federal departments of Environment, Natural Resources Canada and Fisheries and Oceans identified themselves as expert authorities who could contribute specialised advice to the Responsible Authorities undertaking this screening. Fisheries and Oceans Habitat and Enhancement Branch had tentatively declared themselves as Responsible Authority for the proposed Wolverine mine due to the potential requirement for a Fisheries Authorization but soon withdrew after determining that a Fisheries Authorization would not be required for the project to be undertaken. No other federal or Yukon agencies declared themselves as Reasonable Authorities for this project (Yukon Executive Council Office, 2006).

The *Yukon Environmental and Socio-economic Assessment Act* (YESAA) did not apply to this project due to the fact that all relevant regulatory applications required to undertake the project were submitted to Yukon regulators prior to the effective date of part II of the YESAA legislation on November 13, 2004.

Yukon Zinc submitted a Project Description report with their regulatory authorization applications. Based on a broad consultation on the Project Description, the Responsible Authorities issued detailed environmental assessment information guidelines to Yukon Zinc Corporation in March of 2005. These guidelines provided the proponent with the basis of information required for a detailed environmental assessment report that was necessary in order to allow for the completion of the screening report.

Yukon Zinc submitted their Environmental Assessment Report at the end of October of 2005. The Responsible Authorities referred it to a broad consultation. Community meetings were held in Ross River and Watson Lake in January of 2006 and in Ross River in May of 2006 to specifically solicit the views of the Kaska (RRDC and LFN), many of whom place considerable cultural and economic importance in traditional subsistence activities within the area. A focus of the screening was to ensure traditional activities could continue and where there was a disturbance, it would be reversible through the decommissioning and reclamation of the mine and associated infrastructure. Yukon Zinc submitted a further response to the regulatory review of their Environmental Assessment Report, mainly to respond to water management issues requiring further clarification. The Responsible Authorities worked through all remaining issues with Yukon Zinc through June of 2006.

In September of 2006 the Development Assessment Branch issued its Screening Report with the following CEAA determination (Yukon Executive Council Office, 2006):

“16(1)a

subject to subparagraph (c)(iii), where, taking into account the implementation of any mitigation measures that the responsible authority considers appropriate, the project is not likely to cause significant adverse environmental effects, the responsible authority may exercise any power or perform any duty of function that would permit the project to be carried out and shall ensure that any mitigation measures that the responsible authority considers appropriate are implemented”

As described above, once the environmental assessment was complete the QML and water licence were issued. The mine operated from March 2012 to January 2015 (at which time it went in to Temporary Closure).

At the time the Wolverine mine went in to Temporary Closure Yukon Zinc was \$3 million behind on payment of an approximately \$10 million security requirement to be held by YG (CBC, 2015). This failure to lodge the required financial security eventually led to two charges in the territorial court to which Yukon Zinc plead guilty and was fined \$10,000. The sentence was given in recognition of Yukon Zinc paying the balance the month before the court appearance. The value of the security required is typically based on a combination of the value estimated in updated Reclamation and Closure Plans submitted by the mine operators every two years and an estimate completed by Energy Mines and Resources. The security itself may be pursuant to the territorial *Waters Act*, the territorial *Quartz Mining Act* or both.

On July 16, 2015 Yukon Zinc submitted an updated Reclamation and Closure Plan, which was approved by YG on December 23, 2015. A subsequent updated Reclamation and Closure Plan was submitted in December 2016. Upon request for an extension from three to five years of Temporary Closure Yukon Zinc submitted an updated Reclamation and Closure Plan in December of 2017 (Yukon Zinc, 2017a). Based on a review of this plan, EMR extended the Temporary Closure period from three to five years, the QML is currently valid until January 15, 2020.

In June 2018 the total reclamation security required by YG was \$35,548,650; however, as of January 22, 2019 the value of security held by YG is \$9,596,966 (EMR, 2018). The implied shortfall between environmental security held by YG and reclamation cost is approximately \$25.9 million.

In 2017 Yukon Zinc applied to the Yukon Water Board for an amendment to their Type A water licence to extend the Temporary Closure period by an additional two years. The original Type A water licence permitted Temporary Closure from January 21, 2015 to January 21, 2018 after which the mine would go in to Permanent Closure. Yukon Zinc had requested an extension to January 2020. However, during the Water Board's deliberations for the extension (which occurred between January 10, 2018 and February 28, 2018), the deadline (of January 21, 2018) for the project to go into Permanent Closure was surpassed. The Water Board deemed the project to be in Permanent Closure and denied the application for extension of the Temporary Closure period (Yukon Water Board, 2018b).

Currently the Yukon Water Board considers the Wolverine mine in Permanent Closure while the QML under EMR indicates that the mine is in Temporary Closure. The repercussions of this discrepancy are uncertain.

Environmental and Socio-economic Effects of Closure

Environmental Effects of Closure

The Wolverine Project is a polymetallic massive sulphide deposit, with the commensurate potential for acid rock generation. A considerable focus of the environmental assessment for the project was ensuring that the mine was developed and decommissioned with a strong emphasis on the mitigation of acid rock generation (Yukon Executive Council Office, 2006).

The proposed environmental mitigation for the Wolverine mine evolved through the Environmental Assessment process as Yukon Zinc responded to the concerns being raised. For example, the tailings dam design criteria were modified to withstand a 1:10,000 year hydraulic event whereas the original proposal was for a 1:1,000 year design. Additionally, financial security was required to ensure that mitigation measures would be implemented.

The Environmental Assessment pursuant to the CEAA was considered a modern, robust, open and transparent assessment process. The Assessment considered seven Valued Ecosystem and Cultural Components that included:

1. Ambient Air Quality
2. Terrain, surficial geology and soils
3. Water and Aquatic Resources

4. Vegetation
5. Wildlife
6. Heritage Resources
7. Socio-economic Conditions

Mitigation strategies for adverse effects on the Valued Ecosystem and Cultural Components were developed in collaboration with the Responsible Authorities and public consultation. These included mitigations for both operations and during Temporary and Permanent Closure.

In addition to requiring mitigation measures to protect values within the project locale, follow-up programs were specified in the screening report as a means of assessing, reporting and adapting mitigation measures to mine conditions during all phases of the project. Requirements for maintaining the site in Temporary Closure were stipulated should it be necessary to suspend operations before the exhaustion of metal reserves. Criteria for final decommissioning and reclamation plans and spill response were also specified.

Additional mitigation and management strategies during Temporary and Permanent Closure are contained in the mine's Reclamation and Closure Plan most recently updated in December of 2017. The Reclamation and Closure Plan is a living document, which is required to be updated every two years, and works in conjunction with the site's adaptive management plan to ensure the long term physical and chemical stability of the site.

Yukon Zinc's most recent Reclamation and Closure Plan outlines monthly and quarterly surface and groundwater monitoring, vegetation and wildlife monitoring. The plan also calls for periodic thorough inspections of the tailing storage facility as well as annual geotechnical inspections. A large portion of the closure plan is also dedicated to ongoing studies to facilitate more effective remediation (Yukon Zinc, 2017a).

The most recent annual report for the Wolverine Project on the EMR website is from 2017 (Yukon Zinc, 2018). It was reported that in June 2017, the water level in the flooding underground mine reached the surface of the adit. Pumping infrastructure was immediately installed and surplus water from the underground mine was pumped to the TSF from June through to the end of December (Yukon Zinc, 2018). The quality of the groundwater is not suitable for direct discharge to the receiving environment. All other water collected at the site (i.e., contact water) was also pumped or trucked to the tailings storage facility for storage (Yukon Zinc, 2018). Water has not been discharged from the tailings storage facility as the planned water treatment plant has not been constructed.

The tailings storage facility at Wolverine has capacity to store water for another couple of years. However, the water in the pond will require treatment prior to discharge to the receiving environment; therefore, YG is planning to construct a water treatment plant at the site in 2019 (CBC News, 2019c). CBC News (2019c) also reported that Yukon Zinc had not been conducting the required environmental monitoring.

Based on BMC's review of the effects of Temporary Closure of the Wolverine mine, potential water quality effects appear to be the highest risk factor.

Socio-economic Effects of Closure

A SEPA was ratified by Yukon Zinc and the Kaska Nation in 2005. The agreement provides for Kaska participation in the economic and social aspects of the development and operation of the Wolverine Mine (Yukon Zinc, 2019). The SEPA also stipulated Kaska scholarships to which at least \$100,000 was used to support at least 54 Kaska members for education and skills development to date (Canadian Mining & Energy, March 12, 2019). RRDC also received income from joint ventures with preferred suppliers. However, the overall economic benefits gained through the SEPA to date are not available in the public domain.

The Wolverine mine was a significant contributor to the Yukon economy with over \$170 million in goods and services procured in Yukon over the course of 11 years of development and operation. Employment numbers, reported by Yukon Zinc, during construction and operation were up to 700 people during construction and annual personnel tallies of 366 to 594 during operations; however, other sources state more than 200 people were laid off when the mine went in to Temporary Closure (Whitehorse Star, 2015). In 2013 it was reported that there were 365-plus staff employed at the Wolverine Mine (with Yukon Zinc employees and contractors) and nearly 25 per cent of those were from Yukon and 18 per cent were First Nations (Canadian Mining and Energy, 2013). Other sources provide absolute numbers for local employment with 145 from Yukon including 45 Kaska First Nation People (ReSDA, 2016) and 30 to 50 people from Watson Lake directly or indirectly employed by the mine (CBC News, 2015a).

As a part of the annual reporting requirements, Yukon Zinc was required to report on the number of Yukoners and non-Yukoners employed on site as well as the value of goods and services procured in Watson Lake and Ross River. These reports indicate that, over the eleven years of reporting, a total of approximately \$4 million was spent on goods and services in Watson Lake and \$2.5 million in Ross River, with average annual values of \$445,000 and \$317,000 respectively (Yukon Zinc, 2007, 2008, 2009, 2010b, 2011, 2012, 2013, 2014, 2015, 2016, 2017b and 2018). Employment numbers for each community were not made public.

The sudden and unplanned closure of the mine was followed by Yukon Zinc's application for creditor protection.

Ultimately, creditors voted to accept a plan whereby unsecured creditors owed \$5,000 or less would be paid in full and creditors owed greater than \$5,000 could elect to reduce their claim to \$5,000 or receive 11.5 cents on the dollar. In total there were 273 unsecured creditors representing over \$20 million in claims. Of these 52 were Yukon based companies owed a total of \$4.2 million with 28 claims of \$5,000 or less, five owed between \$5,000 and \$10,000, eleven owed between \$10,000 and \$100,000, five owed between \$100,000 and \$500,000 and three companies owed more than \$500,000 (Whitehorse Daily Star, 2015). However, it is understood that the total amounts that were owed to 131 former employees were paid out in full and that all moneys owed to RRDC (\$170,000) were also paid in full (Yukon News, 2015).

Conclusions

The Wolverine mine provided economic benefits to Yukon and the Ross River area in the form of direct and indirect jobs, the purchase of supplies and services and provided Kaska with benefits

through the SEPA. It was developed and permitted under a modern, open and transparent regulatory regime. However, there were and are challenges with the company providing the required security. In addition, the mine abruptly went in to Temporary Closure with little planning or notice to the regulatory authorities or the community. Although RRDC and employees were paid the money's owed, many contractors received cents on the dollar. The major existing environmental liability appears to be the management of water at the site, which, although falling into the hands of YG, would be mitigated if the required bond was provided. The Wolverine mine has further tarnished RRDC's opinion of mineral exploration and mining projects with respect to how government regulates, and companies operate.

4.5.1.5 SA DENA HES MINE

Sa Dena Hes Mine History

The Sa Dena Hes mine is located in southeast Yukon within the traditional territory of the Kaska First Nation (Figure 4-1). The two closest Yukon communities are Ross River and Watson Lake. The property is accessible via a 25 km access road from km 47 of the Robert Campbell Highway and is approximately 70 km by road from the community of Watson Lake.

Potential for economic mineralization was initially identified in 1962 and subsequently explored by various companies under the name Mount Hundere property until it was acquired by Hillsborough Resources and optioned to Curragh Resources in 1989. Extensive diamond drilling in 1989 to 1990 (YG Mineral Properties update, 2008) resulted in the delineation of 5.6 million tonnes grading 12.7% zinc, 4.7% lead and 65 gram per tonne silver in four ore bodies.

The decision to develop the mine was made once Sa Dena Hes was given conditional approval to commence construction upon completion of the Federal Environmental Assessment and Review Process in 1990 (INAC, 1991). Shortly after the completion of the Federal Review, the project was awarded a Type A water licence (IN90-002) in January of 1991 pursuant to the federal *Inland Waters Act*. This was quickly followed by extensive development including the construction of 3,000 tpd process plant, tailings impoundment, haul road and “*completion*” of environmental studies.

In early 1991 a socio-economic agreement was signed by the Mt Hundere Joint Venture, Kaska Nation, Town of Watson Lake and YG that included the following: ensured business and employment opportunities to local residents on a preferred basis. An additional agreement between the Mt Hundere Joint Venture and Kaska included:

1. Kaska have an option to acquire a 5 per cent equity position in Sä Dena Hes project;
2. The Kaska have preferential rights to training, employment and spin-off business opportunities;
3. A jointly funded scholarship fund was established for post-secondary education of Kaska members;

4. Minimum employment and apprenticeship targets were set for Kaska members;
5. Compensation was arranged for trappers;
6. A cooperative environmental review process was developed involving Kaska and Curragh Resources;
7. Kaska Inc. was given an advisory position on the Sä Dena Hes management committee; and
8. Curragh Resources agreed to establish an office on Kaska land. (Jean Gleason, Kaska Dena Council, Forum for Aboriginal Involvement in British Columbia's Industry, November 26, 1991) (Notzke, 1994).

Effectiveness and implementation of the agreements are not publicly documented.

The mine operated for 16 months between August 1991 and December 1992. In December of 1992 the mine was put into Temporary Closure or Care and Maintenance. Operations ceased due to low zinc prices. Infrastructure remaining on site at the time included the underground mine, ore handling facilities, the mill, tailing facilities, camp and support facilities, the access road and a 6.2 megawatt power plant.

In March of 1994 Sa Dena Hes Operating Corporation purchased the Sa Dena Hes Mine (Teck, 2013) but by September of 1994 the Sa Dena Hes Operating Corporation went into receivership and was subsequently purchased in December of that year by Teck (25%) Cominco (25%), Korea Zinc (40%), and Samsung (10%). Teck planned to re-start the mine in the second quarter of 1998 (Northern Miner, 1997) and in anticipation of this, negotiated a Socio Economic Participation Agreement with Liard First Nation in October of 1997 (Teck, 2013). However, the restart was cancelled in December 1997 due to poor market conditions. Prior to cancelling the restart Teck completed rehabilitation of the underground mine and select infrastructure upgrades.

On January 26, 2012, Teck informed YG of intention to move the project to Permanent Closure and commenced with implementation of the Reclamation Plan on January 29, 2013. In general, the plans included decommissioning all buildings and other infrastructure on the site; draining and capping the tailings ponds; breaching the South and Reclaim dams; sealing portals; re-contouring waste rock dumps and re-sloping pit walls; as well as remediation and natural revegetation. The decommissioning, closure and reclamation activities to permanently close the Sa Dena Hes mine were conducted from 2013 to 2015 in accordance with the licensed and approved Detailed Decommissioning and Reclamation Plan (with the exception of decommissioning of the Main Access Road) (Access, 2016).

The Sa Dena Hes mine decommissioning and reclamation project is the first major reclamation project of its kind to be carried out in Yukon by a mining company rather than being completed by the territorial government (Jeffrey et al, 2015).

Statutory and Regulatory History

The following is from the 2013 Update to the Detailed Decommissioning and Reclamation Plan (Teck, 2013):

“The Sa Dena Hes mine was constructed in 1991 and operated for a 16-month period between 1991 and December 1992, under Water Use Licence IN90-002. The Sa Dean Hes Operating Corporation purchased the property from Curragh Resources Inc. in March 1994 and the water Use Licence was subsequently assigned in April 1994. Teck presently manages the property on behalf of the Sa Dena Has Mining Corporation.

Water Use Licence IN90-002 was amended by Sa Dean Hes Operating Corporation in August 1997 to address submission of a decommissioning plan for the site. Amended Water Use Licence (QZ97-025) was issued in March 1998 and required the licensee to submit a Detailed Decommissioning and Reclamation Plan for the Site The licence expiry date remained September 15, 2000.

The company submitted a final Detailed Decommissioning and Reclamation Plan in February 2000 after extensive consultation with various interested parties. A Water Use Licence renewal application was also filed (QZ99-045) in February 2000 to renew and extend the existing licence and this application triggered an environmental assessment pursuant to the Canadian Environmental Assessment Act (CEAA). Two further amendment requests (QZ00-047 and QZ00-048) were made to the Water Board to request and extension to the licence expiry date to ensure completion of the CEAA review.

An extensive CEAA screening was completed in June 2001 while the property was still under Temporary Closure and included an assessment of the June 2001 Detailed Decommissioning and Reclamation Plan. The CEAA screening enabled the issuance of both the Water Use Licence (QZ99-045 and Quartz Mine Production Licence (QML-0004) with specific terms and conditions relating to Temporary Closure and maintenance on site.”

Updates were made to the Detailed Decommissioning and Reclamation Plan in 2006, 2010, 2012 and 2103 as per the permit requirements (Teck, 2013).

The initial QML (QML-0004) and Type A water use licence (QZ99-045) predated YESAB; however, prior to expiry of those licences on December 31, 2015 Teck applied for renewal and amendment through YESAB district Office to allow for Post Closure activities.

The amended QML is for the proposed 25-year post-reclamation phase. During the 25-year post-reclamation phase, Teck proposes:

- to continue to discharge neutral mine drainage;
- to decommission the Main Access Road and Site Access Road; and,
- to undertake post-reclamation monitoring and adaptive management, inspections and maintenance of constructed/engineered structures.

The current authorizations to conduct Post Closure activities are governed by Quartz Mining Licence QML-004 and a Type B water licence QZ16-051 (expiry date December 31, 2040).

Environmental and Socio-economic Effects of Closure

Environmental Effects of Closure

In 2012 Teck conducted site assessments and studies in order to refine the Detailed Decommissioning and Reclamation Plan. In addition, Teck provided funds for LFN to retain an environmental consultant to provide for an independent review of the draft Detailed Decommissioning and Reclamation Plan. LFN chose to use their Joint Venture consultant Keyah Nejehe Golder. Golder Associates undertook the review on behalf of Keyah Nejehe Golder. The funds provided by Teck required that LFN members participate in the review process and provide updates to LFN leadership. The updated 2013 Detailed Decommissioning and Reclamation Plan incorporated the recommendations and studies which were undertaken by Teck based on the comments raised by LFN. Key items raised from the LFN review included comments regarding (but not limited to): on going LFN engagement and input; water management and quality; vegetation and wildlife; employment; and, communications. These comments and how Teck addressed them and/or incorporated the recommendations are further described in the Detailed Decommissioning and Reclamation Plan that was updated in 2015 (Teck, 2015).

Teck also provided funding to LFN to undertake Traditional Knowledge studies in which LFN gathered knowledge from the elders to identify trails, traditional uses of the area, including use of plants and animals, and potential end land uses for the mine site. The information gathered was important for completing the human health and ecological risk assessment studies which were undertaken to guide the overall remediation of the mine site (Amec Foster Wheeler, 2016).

The human health and risk assessment and ecological risk assessments commissioned by Teck played a key role in guiding closure and reclamation planning. A comprehensive, collaborative approach to development of the risk assessments was taken, involving Teck and their technical consultants, LFN and several YG departments/branches, and their third-party reviewers (Teck, 2016). For the human health risk assessment samples of soil, water, berries and key plants used as traditional medicines (caribou weed and Labrador tea) were collected from the various areas of the mine site. LFN citizens assisted in sample collection and elders were consulted to identify plants and animals that might be used from the site as country foods or traditional medicines. The samples were analyzed for metal concentrations. In addition, there were a series of meetings and site visits with LFN elders who advised Teck how they might use the site after the reclamation activities were complete (Teck, 2015).

The site assessments and risk assessment, for the reclamation planning, found that areas undisturbed by the Sa Dena Hes mine were naturally elevated in base metal concentrations and that mining was a minor contributor to elevated metal concentrations on site (Baker et al., 2016).

Following the site assessments and human health and risk assessment and ecological risk assessments the decommissioning and reclamation commenced, which in general included: decommissioning all building and other infrastructure on the site; draining and capping the tailings

ponds; breaching the South and Reclaim dams; sealing portals; re-contouring waste rock dumps and re-sloping pit wall as well as remediation and revegetation. Upon completion of the decommissioning and reclamation works, the Post Closure environmental monitoring began in order to identify and manage any potential adverse environmental effects through the Post Closure phase of the Sa Dena Hes mine.

Post-reclamation environmental monitoring, physical/geotechnical inspections, and maintenance of constructed/engineered structures are regularly undertaken at the site during the Post Closure period. The comprehensive environmental monitoring includes: surface water quality (bi-monthly), groundwater (quarterly), and aquatic resources (every two years). Inspection of relevant mine components are conducted annually until 2026 and then in 2031, 2036, and 2040.

In addition to Post Closure site monitoring Teck has implemented an Adaptive Management Plan (Access, 2016). The purpose of the Adaptive Management Plan is to address uncertainty and conditions beyond those anticipated in post-reclamation. The plan sets out a series of specific performance thresholds based on the results from prescribed site monitoring activities. Exceedances of any these thresholds triggers specific response implementation and the entire process, including monitoring results is documented in quarterly and annual reports to both YG Department of Energy Mines and Resources as well as the Water Board.

In 2017, samples from all of the required water quality monitoring stations met the standards in licences QZ16-080 (expired March 31, 2017) and QZ16-051 for all water quality parameters (SRK Consulting, 2018). Furthermore, no Adaptive Management Plan specific thresholds were triggered in 2017. Work at Sa Dena Hes in 2017 included:

- The annual geotechnical inspection and associated earthworks monitoring, which did not uncover any unusual circumstances;
- One rainbow trout bioassay, which all had 100% survival rates;
- Road maintenance included removing debris from the road culverts and replacing the main culvert at 13.6 km with a portable 100 tonne bridge; and
- Review and update of spill contingency plan.

A review of the quarterly water monitoring reports for 2018 also show that the standards in the licence are being met (Alexco, 2018a, 2018b, 2018c, and 2018d).

In general, the environmental impact Post Closure is low. Results of the monitoring program have shown no significant effects or contamination of areas surrounding the operations. Continued monitoring and adherence to the Adaptive Management Plan will ensure any potential deviation from stable conditions will be managed appropriately. Teck's success in the final closure and reclamation of the Sa Dena Hes mine is an example of modern closure and reclamation by an environmentally responsible mining company.

Socio-economic Effects of Closure

The Sa Dena Hes mine had forecast employment of 140 people for a period of 8 to 10 years, with concentrate to be trucked to Skagway (INAC, 1990). ReSDA (2016) reported that the average number

of employees during operations was 110. LFN's website indicates "*Sa Dena Hes a lead -zinc mine opened in 1991 and employed First Nations people until the closure in 1993. At the present time the mine is currently employing a small number of people.*" (LFN, 2019) Additional details of the number of employees from local communities and how many were First Nations is not in the public domain.

A 1990 evaluation of the Traditional Land Uses in the area of Sa Dena Hes found that primary use included hunting, fishing and trapping. No spiritual or special places were found (Teck, 2013). The study hypothesised that the impact of the project would not necessarily come from the mine itself, but rather the increased pressure of hunting from both First Nations and non-First Nations along the access road.

The following is from the 2013 Update to the Detailed Decommissioning and Reclamation Plan (Teck, 2013):

"Teck has been working with the Liard First Nation (LFN) leadership to ensure the Sa Dena Hes Mine Decommissioning and Reclamation Project is able to provide benefits to the local communities, with a specific focus on the Liard First Nation and other members of the Kaska Collaboration Agreement.

Teck is focused on establishing a strong working relationship with the LFN leadership by engaging with the LFN community regarding the Project.

The Kaska have formal internal agreement (protocols) articulating the agreed upon approach and the Nation selection as to who will lead proponent engagement for the various areas in Yukon and Northern BC. Under this agreement, the LFN are the designated lead First Nation for the aforementioned project.

More recently, Teck met with Chief McMillan of the LFN to discuss Teck's desire to re-initiate the working relationship with the Nation for the Project".

Following this meeting Teck and LFN proceeded to refine the 1997 *Sa Dena Hes Socio-economic Participation Agreement* to reflect the change in mining focus from development to that of decommissioning (Teck, 2013). The updated agreement was finalised on September 14, 2012. Following this agreement there was several meetings and discussions with Teck and LFN regarding the decommissioning project and Teck secure permission to initiate direct communications with RRDC.

Teck retained Amec Foster Wheeler Environment & Infrastructure (Amec Foster Wheeler) to implement the closure plan for the site and mandated that engagement of local First Nations was a project priority and a key metric for gauging the successful execution of the reclamation program (Amec Foster Wheeler, 2016). To ensure maximum First Nations engagement was achieved, tender documents indicated that favourable consideration would be given to tenders containing "*meaningful*" First Nations content. Bidders were encouraged to provide employment opportunities for local First Nations equipment and resources. In their bid submissions, contractors were required to supply plans demonstrating their efforts to fill positions with First Nations personnel, indicating

the types and quantities of such resources they would use and explaining how they intended to use these resources in the execution of the work, and to provide documentation supporting these commitments. In the tender documents, it was stated that letters of recommendation from local First Nations leadership would be given additional consideration. Upon award, the contractor would be required to provide confirmation of the use of the resources outlined in the bid by providing the names of personnel and the types of equipment required (Amec Foster Wheeler, 2016).

Another key component to successfully engaging First Nations personnel was the decision to leave some of the site works out of the scope of the larger contracts (Amec Foster Wheeler, 2016). These works were strategically selected based on the understanding of available local and First Nations resources. It was reported that members of the Liard First Nation carried out first-aid attendant/site security services for the duration of the 2013 program. The 2014 on-site work activities set aside for direct award included road maintenance, concrete breaking at the mill site, mill site capping and shaping, removal of pipeline, landfill maintenance, decommissioning of monitoring wells, installation of erosion protection materials, construction of helipads for future monitoring, demolition of site exploration camp infrastructure and other small shacks, reclamation of a dyke, and general site clean-up. In 2014, Teck also hired Liard First Nation personnel to act as environmental monitors (managed through LFN's environmental monitoring consultant Dena Cho Environmental). The 2015 reclamation season all activities were directly awarded to the local First Nations, with the exception of tendered activities associated with waste rock dump capping which required use of large rock trucks.

In addition, Amec Foster Wheeler, working with the First Nations contractors, assembled a workforce from the Watson Lake and Lower Post areas who were then orientated to the site, provided PPE and tools, and participated in the revegetation program at various locations throughout the mine site. The tree planting was directed by Laberge Environmental Services of Whitehorse to train workers on correct methods for planting the trees and oversaw the daily operation.

Overall, First Nations personnel worked 55% of all total workforce hours (36,560 out of 66,260 total workforce hours) on the Teck-contracted aspects during closure and reclamation activities up to the end of 2015 (AMEC, Foster, Wheeler, 2016). Based on the above it would seem that the economic benefit to the local community of Watson Lake and LFN and its citizens through the three years of reclamation activity at Sa Dena Hes could have outweighed the benefits during the 16 months of operations. However, the full socio-economic effects of the project during operations and reclamation are unclear without detailed knowledge of the various SEPAs signed and reporting associated with SEPAs.

Upon notification of the intent to put the Sa Dena Hes on Permanent Closure the Department of Energy Mines and Resources determined a financial security of \$15,912,000 would be required to cover all reasonable closure costs (Yukon Government, 2012). This estimate was later revised upward by Teck to \$25.2 million with a 5% contingency. It is then reasonable to assume that this would be the minimum spent on reclamation at Sa Dena Hes (Steve Jan, 2014).

The estimated Post Closure costs for the Sa Dena Hes site is \$4,025,000 (Teck, 2016). At this time it is unclear if the Main Access Road will be required to be decommissioned or if it is considered a public road. As such, the estimated cost to decommission the Main Access Road is not included within the cost estimate table. However, if the road were to be decommissioned, the additional estimated cost is \$3,850,000 (Teck, 2016).

In summary, the relatively short mine life is unlikely to have resulted in as large a positive impact on the community as the past 21 years of closure and reclamation activities. The continued monitoring of the site will provide several jobs and contract opportunities for at least an additional 20 years. The mine closure has therefore provided positive economic benefits for a generation of local people.

Conclusions

The Sa Dena Hes mine was a zinc, lead, and silver mine that operated for 16 months between August 1991 and December 1992. It went in to Temporary Closure due to low zinc prices and remained in temporary closure until 2012 when the final decommissioning and reclamation phase was initiated. This phase was completed in 2015 and the mine is now in the Post Closure Phase. Teck worked closely with the Liard First Nation to ensure that they participated in the planning and execution of the decommissioning and reclamation phase. Environmental issues and concerns raised by LFN were considered and addressed and this included consideration of LFN specific land use of the area Post Closure. In addition, LFN benefited from the contracts and jobs during the reclamation program. The Sa Dena Hes mine decommissioning and reclamation was the first major modern reclamation project of its kind to be carried out in Yukon by a mining company rather than completed by the territorial government. The environmental monitoring results during the Post Closure phase have met the requirements of the water licence and monitoring will continue until 2040 to ensure that the reclamation works at the site is stable and that there are no remaining environmental concerns.

4.5.2 COMMUNITY STATISTICS

The socio-economic baseline (Chapter 15 of the Project Proposal) relied almost entirely on published primary and secondary data. Sources of data included:

- Statistics Canada 2006 and 2011 National Household Survey;
- Yukon Bureau of Statistics data on population, some economic variables, and societal data;
- Canada Revenue Agency for data on income and GST; and,
- Town of Watson Lake and various YG departments and other agencies.

BMC reviewed these data sources in an attempt evaluate trends from when the first of the five mines opened (1962) to the last one closed (2015). Unfortunately, the data was not robust enough for such an assessment and in some cases, there were discrepancies in the federal data vs the territorial data for Ross River and Watson Lake (e.g. inconsistent population estimates). Given the small populations of these communities such discrepancies make a big difference. In addition, much of the data from the 2011 National Household Survey is of poor quality or unavailable due to the voluntary nature of the survey and so trends from 2011 onwards could not be evaluated using this survey. This is a challenge given that the Wolverine mine went in to Temporary Closure in 2015 and Sa Dena Hes employed many people from Watson Lake and LFN in 2013 through 2015.

Given the challenges that BMC had with the review of the government statistics, BMC contacted a professional Yukon-based economist to conduct the trend evaluation for the communities of Ross River and Watson Lake. The response was that he had attempted such evaluations in the past and had come to the same conclusions as BMC (i.e. the data was not robust enough and/or the n values for many of the indicators were too small to be able to conduct a meaningful year to year comparison).

In this context, BMC is unfortunately unable to utilise community statistics to support a response in regard to “*how mine closures have effected local communities*”. BMC therefore undertook a community survey to (in part) evaluate how the closures have affected the local communities (Section 4.5.3).

4.5.3 COMMUNITY SURVEY

4.5.3.1 METHODOLOGY AND REPORTING

Over the course of February 10 to March 8, BMC conducted a phone and in-person survey. The survey was designed to obtain opinions based on personal experience related to economic, social and environmental impacts directly or indirectly attributable to temporary and permanent mine closures. The survey questions are included in **Appendix D**.

Overall, more than 30 calls and attempts at communication were made in the course of conducting the survey. Efforts focused on contacting businesses, First Nation-related entities, government agencies, Non Government Organizations and health providers. Survey responses were received from individual businesses, First Nation-related entities, industry groups, medical services, municipal representatives, and environmental organizations. The preponderance of responses were received from Watson Lake, though Ross River-based groups are also represented in the survey.

Multiple people expressed significant concern that their responses would be made public or that the answers provided would lead to the identification of the individuals being interviewed. For some people, this concern led to non-response. In other cases, these concerns were mitigated by commitments from BMC that we would summarise the results of all of the surveys and provide the summary to YESAB, rather than provide the results of the individual surveys.

The following sections summarise the survey results.

4.5.3.2 SUMMARY OF COMMUNITY SURVEY RESULTS

All respondents identified a clear effect from temporary or permanent closure, though there was major variation in perception of those effects. While there was universal agreement that closures led to loss of employment and business revenues, there was less concurrence on the scale and scope of those effects.

All respondents felt that closures were inevitable and that those who planned for the eventuality were better placed to endure the downturn.

In terms of environmental effects related to closures, the vast majority of respondents were unable to identify effects directly or indirectly attributable to the closure, though a few respondents did point to risks that arise from reduced staffing and oversight on site.

In terms of social effect, respondents were not able to identify sustained negative effects from closures. All respondents identified job losses as a major short-term effect, and some indicated that families were forced to relocate to find employment and stability. However, there was also a sense that those effects were limited to individuals employed directly on site or to people who were used to the cycle.

In general, responses on all aspects of the survey can be expressed as points on a continuum between resilience and resignation. The communities understand mining comes with cycles and they understand those cycles have human effects. While no respondent suggested that the community would be better off without mining, most respondents also indicated that companies had not done well preparing communities for eventual closures.

Environmental Effects

Respondents struggled to link closures to environmental effect. Many respondents indicated that they could link mine activity, overall, to environmental effect, but that making the tie to closure was difficult.

Some respondents did point to risks to water and other on-site monitoring programs due to a lack of staffing and capacity during closures. They suggested that reduced staffing and oversight increased risks that operators would be slower to discover any issues and as a result, minor issues could balloon into more significant problems.

No respondent was able to provide an example of an operator taking steps that mitigated closure-related environmental effects. Suggestions around steps that could be taken were limited to better planning, so that remediation was an ongoing activity that would continue even in closure.

Economic Effects

Economic effects of closure were the most readily identified for respondents. Virtually every respondent had felt a direct economic effect or knew of one or more people who had been affected.

There was broad consensus that one area that mining companies could improve on was in communicating closures well in advance, to provide individuals and businesses with the time required to adjust and prepare. Multiple respondents also stated that mining companies need to ensure that local companies are fully paid for goods and services.

One business did indicate that it had changed its model to ensure that any work lost due to closure could be mitigated by obtaining work related to care and maintenance.

There was some consensus around the fact that mining was the outlier and that the state of the economy during closure was the norm. This comment lined up with multiple respondents who stated that anyone working for a mine needs to be prepared for the eventual closure.

Even so, there was a clear sentiment that companies had not done enough to reduce effects at the community level. Communication was one area that multiple respondents were critical of operators. There was some consensus that the community would be better placed to weather a closure, if businesses and individuals were given longer lead time on any impending closures.

More than one business pointed to a lack of local sourcing for materials as one reason closures had less effect today than in years past. Whereas food, construction materials and other items used to be sourced out of local businesses, mines increasingly look to Whitehorse or larger communities for these materials. For clarity, this approach to sourcing of materials from further afield was not viewed as positive, overall – only that it reduced effect of closure.

Social Effects

Responses on this set of questions varied the most with limited consensus on the nature and scope of social effects arising from closure.

One medical practitioner indicated that there is no change in approach, budget or services, regardless of economic activity in the town. Others provided anecdotal comments about reduced drinking due to less money available, while others pointed to the sustained negative affects of unemployment.

One area of strong consensus was that neither government nor operators had done anything noteworthy in preparing for or responding to social effects of closure. Suggestions were largely limited to operators improving communications, so that individuals had time to prepare.

More than one respondent referred to their community as largely “*forgotten*” in referencing government support during closures.

One area that was highlighted as a possible mitigation for social effect was training and education, so that mine employees were better prepared to gain employment in other industries post-closure.

4.5.4 SUMMARY

Table 4-3 provides a summary of the context in which the previous five mines in Kaska Territory in Yukon operated with respect to:

- The years each mine operated, closed and the current stage of each mine;
- each mine's technical and economic assessments and corporate debt (i.e. financial viability);
- the environmental and regulatory regimes at the time in which each mine was constructed, operated and closed; and
- the corporate-social responsibility era in which each mine was constructed, operated and closed.

Table 4-3: Context in Which the Previous Five Mines in Kaska Territory in Yukon Operated and Closed

Mine	Years of Operations*	Closure Status	Reclamation Status	Technical and Economic Assessments	Environmental & Regulatory	Corporate Social Responsibility
Faro	1969 to 1982 1988 to 1993 1995 to 1998	2003 - was the year it went from Temporary Closure to Permanent Closure	In progress (Federal Government)	- Economic viability was partly tied to zinc prices but also the company was not able to overcome their debt from other less economical projects that they owned	- Was constructed prior to any regulatory oversight and effects to the environment and mitigations were not considered, although this gradually changed over the mine's life - Regulatory requirements for financial security evolved of the life of the mine but the amounts were not sufficient to cover mine reclamation and closure liability	- Was constructed in an era where community impacts both positive and negative were not considered, although this gradually changed over the mine's life - Was built as a company town
Cantung	1962 to 1986 2002 to 2003 2005 to 2015 (was temporarily closed Oct 2009 to Oct 2010)	2015 - currently in Temporary Closure/Care and Maintenance	In Care and Maintenance	- Economic viability was tied to global tungsten markets	- Was constructed prior to any regulatory oversight and effects to the environment and thus mitigations were not considered, although this gradually changed over the mine's life - Currently the posted security is \$27,95	- Was constructed in an era where community impacts both positive and negative were not considered, although this gradually changed over the mine's life - Was initially built as a company town
Ketza	1988 to 1990	2015 - was the year it went in to Permanent Closure	In progress (Territorial Government)	- Error in the technical assessment resulted in the mine not being economic	- An environmental assessment was conducted, and the project obtained appropriate licences, but it was in the early days of assessment and permitting and the requirements were not as robust as they are today - The security at the time of closure was \$3,1 million, this was insufficient to cover the reclamation activities	- Was constructed in an era where community impacts both positive and negative were starting to be considered by companies - This is evidenced through the company negotiating an MOU with Kaska and local employment of RRDC citizens and Ross River residents during operations
Wolverine	2011 to 2015	2015 - was the year it went in to Temporary Closure	In Care and Maintenance	- Economic viability was partly tied to zinc prices but also the company was not able to get the predicted tonnages mined (due to challenging ground conditions and low paste-fill production) that were needed for the project's economic viability - The deaths during construction caused unplanned delays and unplanned expense at a time when the company was at maximum debt drawdown prior to production cashflows commencing	- An environmental assessment was conducted, and the project obtained appropriate licences - Although the environment assessment pre-dated YESAB the project was fully assessed under a robust environmental and socio-economic assessment process - The security at the time of closure was \$10 million and the company was \$3 million behind on its payments. In June 2018 the security was raised to approximately \$35.5 million, as of January 2019 the security help by YG was approximately \$9.5 million	- Was constructed in an era where community impacts both positive and negative impacts and benefits to local communities were considered and were a main component of the project obtaining its "social licence to operate"
Sa Dena Hes	1991 to 1992	2012 - was the year it went from Temporary Closure to Permanent Closure	Reclamation complete and Post Closure monitoring in progress (Teck Resources)	Economic viability tied to zinc prices	- An environmental assessment was conducted, and the project obtained appropriate licences, but it was in the early days of assessment and permitting and the requirements were not as robust as they are today - Upon going into Permanent Closure YG estimated the security required would be approximately \$16 million, Teck revised this estimate to be \$25.2 million with a 5% contingency	- - Was constructed in an era where community impacts both positive and negative were starting to be considered by companies - This is evidenced by the socio-economic agreements with the local community and Kaska - Closure and reclamation was undertaken with full involvement of the Liard First Nation

*none of the closures were planned.

4.5.5 KUDZ ZE KAYAH CONTEXT

The following sections provide a summary of the context in which the proposed Kudz Ze Kayah mine will operate and close; with respect to:

- Technical feasibility;
- Financial feasibility;
- Regulatory and environmental considerations; and
- Socio-economic considerations.

4.5.5.1 TECHNICAL

The Kudz Ze Kayah Project was purchased from Teck Resources Ltd (Teck) in January 2015. Teck acquired ownership of the project through their takeover of Cominco in July 2001.

The Kudz Ze Kayah Project is relatively unique in that over a period of approximately 20 years it has had two successful prefeasibility studies carried out by two experienced, separate and independent owners where both studies made a compelling economic case for the development of the Project. Concurrently, over a cumulative period of approximately 25 years independent environmental and technical assessments of the project have been undertaken to support the granting of permits and licences to mine. This means that in this latest application to YESAB (BMC, 2017), BMC is not so much applying to start a new mine as applying for the existing assessments and permits to be reinstated for a mine that for all intents and purposes (in relation to environmental footprint at least) is the same as the proposed mine that was previously permitted in 1998.

Through the period from discovery until 2001, Cominco carried out numerous detailed technical studies on the project. A full list of these studies to date is contained in **Appendix E**. In 1995, Cominco completed a Prefeasibility Study for mining the ABM Deposit at KZK and in 1996 commenced several years of optimisation work on areas such as geotechnical assessments, mine design, tailings storage facilities, metallurgical performance and concentrate quality. Cominco also prepared, submitted and was granted a Type A water licence by the Yukon Water Board (granted in 1998, QZ97-026) which expired in 2018. At that time, the Type A water licence was the licence that allowed proponents to construct and operate a mine. Since that time, the Yukon regulatory system has evolved, and mine development requires as a minimum a Quartz Mining Licence and a Type A water licence in addition to a myriad of other approvals and licences.

Between 2001 and 2015, Teck continued to assess the Project with a number of exploration programs including a bulk test mining program to confirm the preferred mineral processing route for the upper section of the ABM orebody. Teck also continued to carry out routine water monitoring and other

environmental programs in accordance with the work commenced by Cominco and their obligations under the Type A water Licence.

The Prefeasibility Study completed by Cominco in 1996 was as a result of nearly 5 years of ongoing technical studies. The positive economic outcomes from this Prefeasibility Study formed the basis for an application to the Yukon Water Board for a Type A water licence to commence mining construction and operation. This was granted in 1998 however, due to competing corporate strategic factors (including the discovery and development of the world class Red Dog mine in Alaska) Cominco elected to defer development. In 2001 Teck acquired Cominco and the project was then not considered to be of sufficient scale to warrant development by the much larger corporate entity.

In 2015, upon acquiring the project from Teck, BMC commenced comprehensive confirmatory studies on all facets of the project designed to:

- in the first instance to validate the significant work carried out by Cominco and Teck over a nearly 20 year period; and
- in the second instance to provide the basis for a modern feasibility study to underpin financing decisions around the development of the ABM Mine and to underpin an application to YG in relation to re-permitting the project for mining.

The work programs carried out by BMC over the last four years include approximately \$50 million spent on technical programs on the following;

- Relogging all available drill core drilled throughout the history of the Project;
- Confirmation of existing and generation of new geological models;
- Drilling and recovering approximately 75,000 m of diamond core over 4 years for exploration, metallurgical and geotechnical purposes;
- Test work programs designed as the basis for re-estimation and remodelling of groundwater;
- Reclamation of over 11 hectares of historic drill holes and disturbed areas (in the process being awarded in 2016 the Leckie award by YG for environmental excellence);
- A full suite of metallurgical studies to reconfirm and where possible to improve upon the metallurgical performance using a conventional froth flotation process;
- A full optimisation and redesign of the mine in order to extract the ore reserves via the ABM pit and the Krakatoa underground;

- In addition to historical work, a comprehensive 3 year test work program to assess the potential for short term acid generation in various rock types for the proposed mine;
- Additional, comprehensive work over nearly 3 years to model the results of the hydrogeological assessment;
- Leading to the completion in 2016 of a Prefeasibility Study that confirmed that the Kudz Ze Kayah Project would sustain a viable mine on the ABM Deposit; and
- Further work on various environmental baseline studies (climate, flora, fauna, noise, water, geochemical etc.) as well as surface and groundwater modelling required to complete the Prefeasibility Study and then prepare the full environmental and socio-economic assessment; and
- In 2017 and 2018, subsequent substantial technical work to prepare a Definitive Feasibility Study and to update various water and other models to answer questions from both YESAB and from RRDC Environmental Consultant Dena Cho on behalf of RRDC and Kaska Nation.

A full list of these studies to date is contained in **Appendix E**. The principal purpose of this significant and comprehensive body of technical and economic work has been to identify and mitigate risks in relation to technical, financial, social and environmental aspects of the proposed mining project so as to ensure that a robust and sustainable mining and processing operation can be developed. The body of work carried out on the Kudz Ze Kayah Project in the 25 years prior to submission of a mining proposal to YESAB and indeed during the current assessment is unprecedented in Yukon. No other single project in Yukon has undergone the sustained and detailed assessment that has been carried out on this Project.

4.5.5.2 ECONOMIC

The following text was provided previously to YESAB in Response Report #2 (BMC, 2017c) and is re-presented here to support BMC's response to this additional Information Request.

In preparing the prefeasibility economic assessment of the Project, BMC utilised financial analyst consensus long term metal prices of US\$1.07/pound (lb) zinc, US\$0.94/lb lead, US\$2.95/lb copper, US\$1,292/ ounce (oz) gold and US\$19.31/oz silver. As of the date of preparing this response (November 13, 2017) current metal prices are in general notably higher than that used in the Prefeasibility Study; namely US\$1.49/lb zinc, US\$1.15/lb lead, US\$3.08/lb copper, US\$1,278/oz gold and US\$16.92/oz silver, indicating a degree of flexibility from that used for the economic assessment (prices were obtained from the following source: <http://www.indexmundi.com/commodities/>).

In the event that metal prices were to fall below that adopted for Prefeasibility Study economic analysis, a considerable margin exists before the operating viability of the Project would be called into question. Annual operating costs are projected to be in the order of US\$120 million per year. Metal prices would need to fall by an average of 50% from that considered in the Prefeasibility Study

before the average annual operating costs would no longer be covered by revenue generated from concentrate sales. This equates to metal prices of US\$0.54/lb zinc, US\$0.47/lb lead, US\$1.48/lb copper, US\$646/oz gold and US\$9.65/oz silver. A comparison to historical metal prices over the last ten years as shown in Figure 4-4 to Figure 4-8, demonstrates that metal prices would need to fall significantly below their long term averages before the average annual operating costs could no longer be covered by regular operations and hence the long term economic viability of the Project could possibly be placed in doubt.

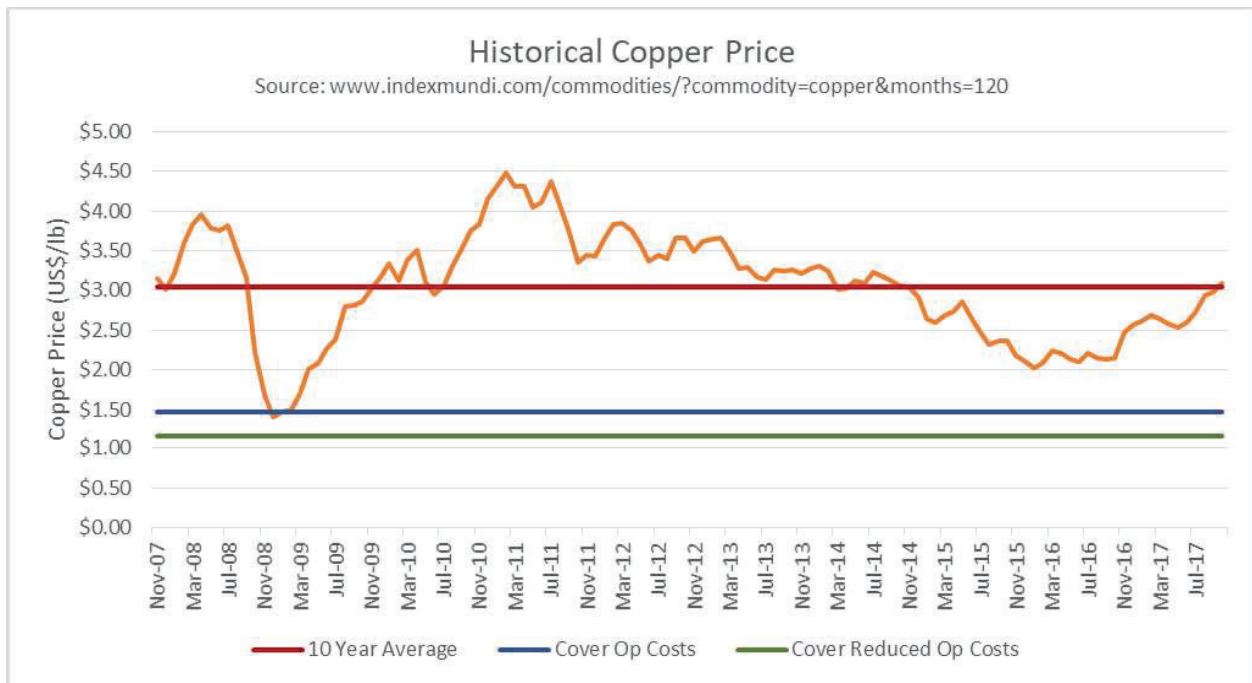


Figure 4-4: Historical Copper Price Compared to Operating Costs and Reduced Operating Costs

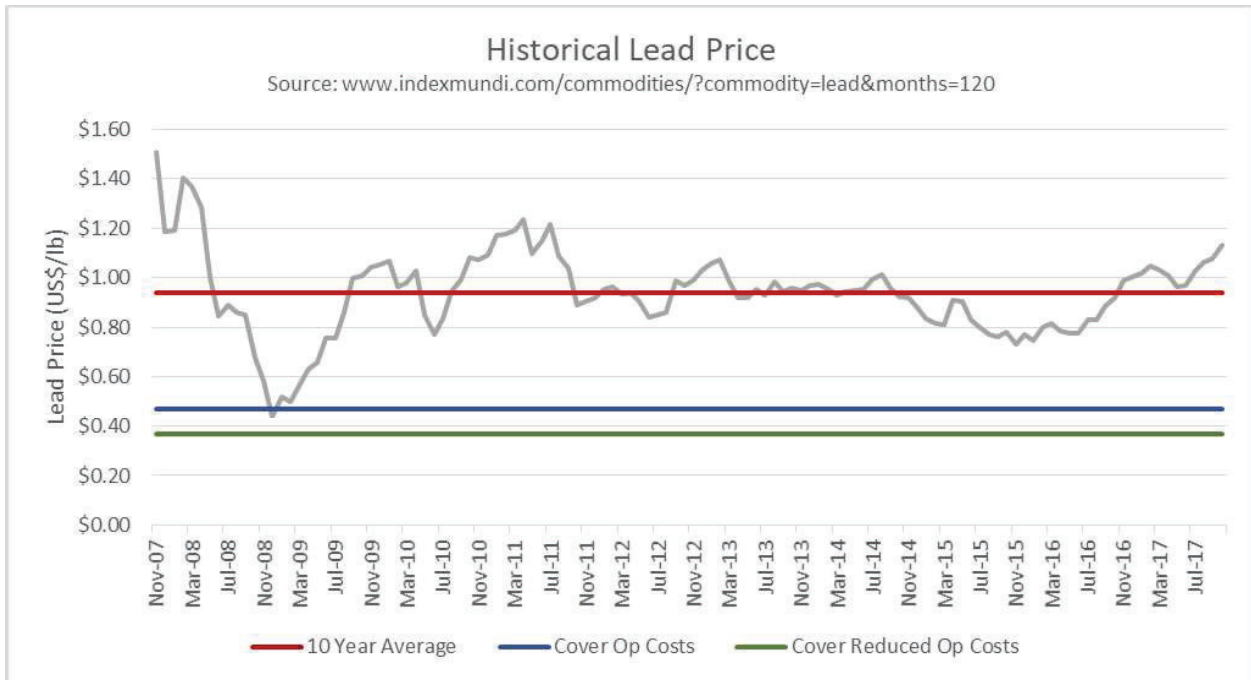


Figure 4-5: Historical Lead Price Compared to Operating Costs and Reduced Operating Costs

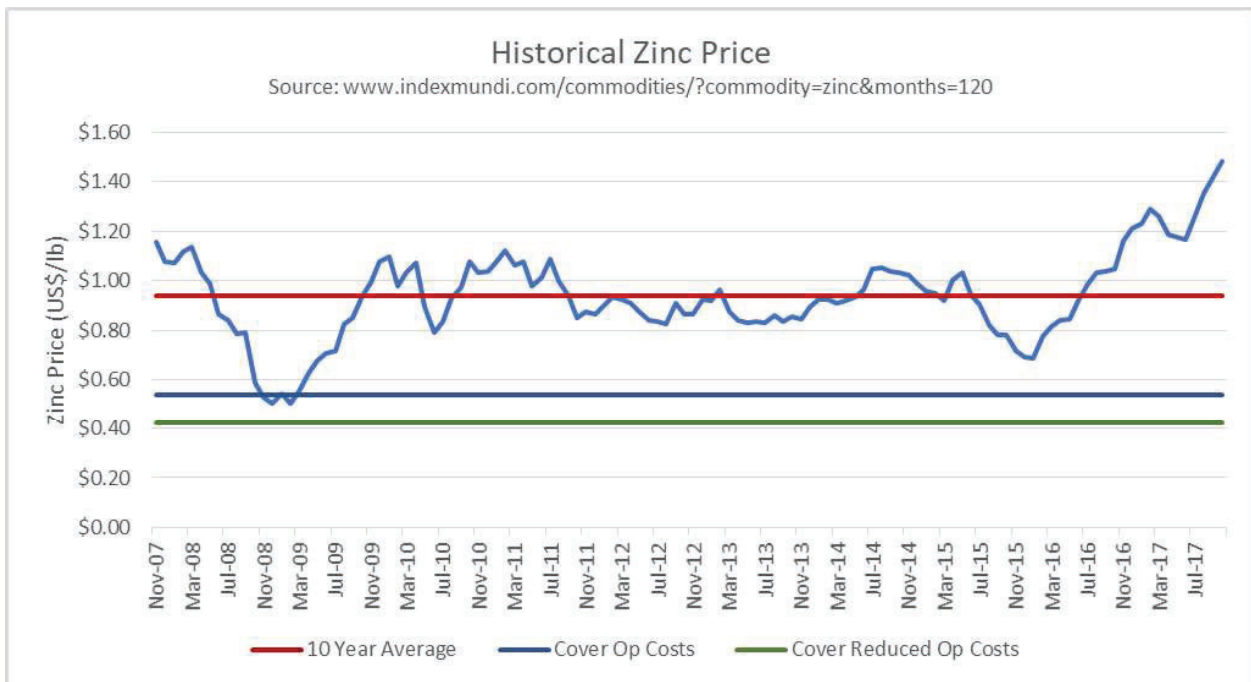


Figure 4-6: Historical Zinc Price Compared to Operating Costs and Reduced Operating Costs

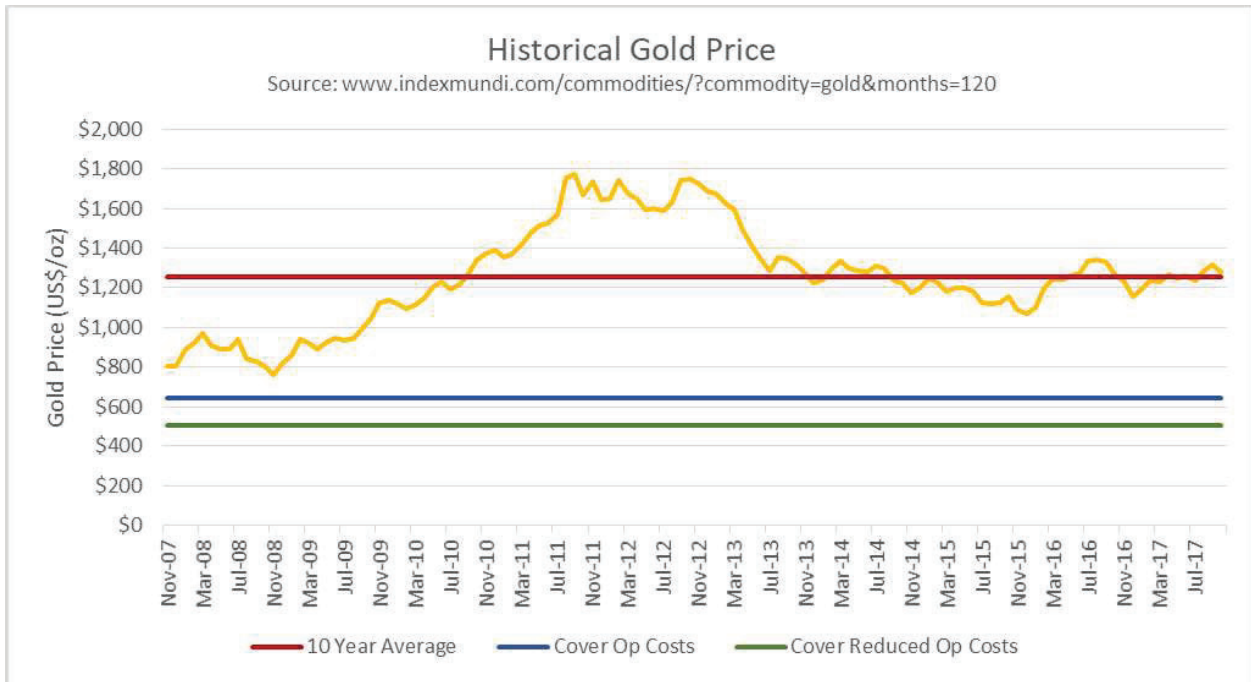


Figure 4-7: Historical Gold Price Compared to Operating Costs and Reduced Operating Costs



Figure 4-8: Historical Silver Price Compared to Operating Costs and Reduced Operating Costs

In addition to the financial strength of the Project noted above, should a sustained period of low metal prices be experienced, BMC would review its operating expenditures and make appropriate short

term reductions to defer the need to place the operation in a Temporary Closure phase. This could include cessation or reduction of open pit waste stripping to focus on mining of previously exposed ore and ore that has a lower waste to ore stripping ratio. Typically, the open pit mine would have between one and six months supply of ore exposed within the open pit available for blasting and haulage to the processing plant. This ensures that a reliable supply of ore can be maintained to the processing plant and that blending and scheduling requirements can be adequately managed. However, should it be necessary to temporarily cease mining of open pit waste, operating costs would be reduced by approximately 45% of that of regular operations, allowing metal prices to reduce to US\$0.42/lb zinc, US\$0.37/lb lead, US\$1.15/lb copper, US\$505/oz gold and US\$7.50/oz silver before operating costs could no longer be covered by day to day operations. These metal prices are also detailed in Figure 4-4 to Figure 4-8. Clearly, as a polymetallic mining project the mix of metals, by their very nature, provide a natural hedging effect. It would be unlikely that all metals would be reduced or at a cyclical low at the same time and so while the above metal prices are theoretically possible at the same time there is no sensible scenario that makes them likely.

Should low metal prices persist, the company will also have stockpiled ore on the ROM Pad to draw from to continue to feed the processing plant, without the need of incurring additional mining costs. Stockpile levels vary by month according to the mine plan but are typically in the order of three to four months of processing plant requirements.

In summary, the Kudz Ze Kayah Project has been demonstrated to be a robust economic Project, able to withstand a significant reduction (50%) in metal prices before operating costs would no longer be covered and the ongoing viability of the operation could be called into question. In the unlikely event that this were to occur, the company has additional operating strategies to reduce ongoing operating costs to ensure that the operation can continue as a going concern until metal prices recover to long term historical fundamentals. This is common practice in the international mining industry.

4.5.5.3 ENVIRONMENTAL

The Kudz Ze Kayah mine proposal that BMC submitted to YESAB in March 2017 contained a full, modern assessment of the closure costs for the Project. These closure costs were assessed by the independent professional personnel at Alexco Environmental Group, a successful and respected Yukon company. Alexco Environmental Group consultants are highly experienced with the company having over 20 years of experience in environmental management and mine reclamation in the north of Canada, and Yukon in particular.

The use of financial security for mines in Yukon is a relatively recent phenomenon. Yukon has lagged the rest of the world somewhat in the use of financial security and the obligations on mine owners and operators to reclaim and rehabilitate closed mines. For example, in Yukon this obligation has not yet been in place much more than 20 years. In many other parts of the world where mining activity occurs, the obligation to reclaim mines and rehabilitate mined areas with commensurate financial security to cover that reclamation has existed for over twice that period.

The reclamation plans and the estimated reclamation costs submitted and calculated by Alexco Environmental Group for the Project are based on the liability that exists at the time that the mine closes (after approximately 10 years of operation). These are and will continue to be reviewed and assessed by the licensing bodies over the next few years until the mine is permitted for construction and operation. At the time of licensing, YG licensing bodies will impose financial security requirements and performance obligations on the project and BMC as a condition of that licensing.

BMC has reviewed five previous mines that have operated in Southeast Yukon over the last 57 years (Faro, Sa Dena Hes, Cantung, Ketza and Wolverine). Of these five mines used as comparison to Kudz Ze Kayah, four out of the five were licensed and operated in a previous era where reclamation obligations and standards and financial security provisions were viewed quite differently to today. The fifth (Wolverine) is a special case and will be discussed separately.

The closure planning carried out by Cantung, Ketza, Faro and Sa Dena Hes prior to commencement of construction and operation can be described as notional at best. Little, if any consideration to closure planning appears to have been carried out by the proponent or assessed by the regulator prior to licences being issued. Financial security placed against those projects was either non-existent or was not intended to cover the reclamation of the mining project to meet society's standards of the day let alone the standards of 2019.

In the case of the Wolverine mine, whilst environmental assessments were carried out and closure plans prepared, the current YESAB and QML processes that are being used to assess the BMC, Kudz Ze Kayah Project proposal were not in place. In addition to this, it is clear upon review of the publicly available documents that over the period of time that Wolverine mine operated, the requisite financial security under the licensing conditions were not provided by the mine's operators to the regulator and provision of this financial security was not enforced in any meaningful manner.

The current estimate of the closure costs for the Wolverine mine is circa \$35,000,000. By comparison, the closure costs estimated and presented in the Project Proposal (Appendix H) that were independently generated by Alexco Environmental Group for Kudz Ze Kayah were circa \$90,500,000. Following BMC's responses to YESAB's IR2-17c "*An updated closure liability estimate including costs for temporary closure, permanent closure, and care and maintenance costs in perpetuity. Costing should include periodic*" as well as additional costs for the more robust design cover for the Class B Storage Facility, the current estimate is circa \$115,000,000 (BMC, 2017c). These are the estimated costs of reclamation at closure of the Project in approximately 2032. BMC expects that as the proponent and operator of the Kudz Ze Kayah mine, as a condition of licensing, it will be required to put in place financial security for the mine reclamation. This security will be progressive in nature and as the mine life progresses, the financial security obligation provided by BMC will eventually reach the sum of circa \$115,000,000. This obligation has been fully costed in the Project economic models used by BMC to assess the economic viability of the Project.

In the event of early mine closure due to whatever cause, the financial security that will have been provided to YG will be available to fund reclamation activity. This activity will continue for two decades Post Closure of the mine. Employment of local people will be prioritised, and this will ensure that negative economic outcomes due to the mine closure are mitigated.

4.5.5.4 SOCIO-ECONOMIC

The following text was provided previously to YESAB in Response Report #2 (BMC, 2017c) and is re-presented here to support BMC's response to this additional Information Request.

There are a number of tried and successfully executed methods for the orderly closure of mining projects. The following outlines one that is common and that the proponents have utilised before. The key to successful mine closure is for clarity, and communication with, the workforce so that the Project phases are well understood as early as possible. In this way the company and its current and potential employees can and will make decisions on employment in full knowledge of both the risks and consequences.

During the last one to two years of the operational phase of the Project, mining activity will reduce steadily as follows;

- In the underground mine, mine development will reduce and then cease and only production stoping will continue. During this period, a number of personnel will naturally cease working for the company of their own accord and take up positions elsewhere. This is typical in the last year or two of both mining and non-mining industries. The company will regularly assess its employment needs and as underground mine development reduces, mine development personnel will be redeployed into the mine production crews (where their skills are readily transferrable) to fill ongoing vacancies. During this period, the company shall commence removal of fixed equipment from mined out areas and this will be undertaken by former development personnel. The company acknowledges that at times it will be slightly over or understaffed and has accommodated this in its schedules and financial calculations.
- In the open pit, as the pit gets deeper and work areas become restricted, the mining (drill/blast/excavate) sequence will be modified, waste to ore strip ratios will be reduced and activity in the pit will gradually reduce. At the same time, reclamation activity on the mining waste rock storage areas will be increased and when mining activity is low in the open pit, personnel will be redeployed to carrying out the reclamation earthworks. In this way it is expected that overall activity for mining personnel will be kept relatively constant.
- At the end of the open pit mining period, specialist drill and blast personnel will be offered employment termination packages (see below). Most other mine earthmoving personnel will move to fulltime roles in reclamation. This work shall continue for 1 to 2 years.
- From a mineral processing perspective, the company will continue at full processing production until late in the final year of operations at which point the company will most

likely transition to an operating cycle that fits with the remnant production capacity of the mine. In the company's experience, it is likely that personnel will commence to find other permanent roles from approximately 12 months prior to this period. The company will therefore need to adopt a strategy to deal with a steadily reducing workforce during this period. The company may need to modify its processing activity slightly earlier than expected if employee numbers dictate. In any event, this will not appreciably impact the company's financial models and will be easily accommodated.

- Once the Project has processed all the available ore stockpiles, the processing team will commence closure operations which will ensure employment continuity for the majority of the operators. The remainder will be offered termination packages (see below).
- At some point during the Active Closure period the company will offer voluntary redundancy packages to general employees. Employees with critical skills that are required for the Active, Transitional and Passive Closure periods will not be offered termination packages. In this way the company expects to reduce employees on site to those number required for the next stage (i.e. Transitional or Passive) of closure.
- Given that the Transitional and Passive Closure period runs for 23 years past this point (i.e. starting in approximately 13 to 14 years from now) any prediction past that point will have limited accuracy. In addition, the company estimates that the natural attrition of employees leaving employment during that time will largely balance the declining need for personnel hence whilst at some point a number of redundancy packages may be offered it is likely these will be limited.
- Throughout the steps above, the company will consider the unique circumstances of every employee and will give retention preference to locally based employees. This will not preclude locally based employees from requesting a termination package if they wish to take advantage of another employment opportunity elsewhere.
- Redundancy packages typically include the following elements:
 - Relocation/transfers into other roles within the company (for example into exploration or environmental monitoring roles).
 - Retention bonus so that employees finish their employment at a time that suits the company's operational needs.
 - Retraining allowances to help the employees upskill to fit their future desired roles;
 - Employment outsourcing support, where the company pays for third party support for new employment roles. The degree of this support will vary depending upon the level of employment activity that is prevalent in Yukon and Canada at the time but typically these packages are provided for 3- to 12 months. Outsourcing support typically includes assistance with preparing resumes, letters of application, career

counselling and advice, sourcing of opportunities and coaching for interviews. It can be as comprehensive as the employee needs;

- References will be provided for all employees;
- Termination redundancy payments will vary depending upon circumstances but typically these payments will vary from 1 to 6 months of the average annual wage of the employee; and
- Employee Assistance Programs to provide counselling and emotional support on an as required basis for both employees and their immediate family members for a period of 3-6 months after closure of the Project.

4.5.5.5 SUMMARY

Table 4-4 provides a summary of the context in which the Kudz Ze Kayah mine will operate and close compared with the previous five mines that have operated and closed in southeast Yukon.

Table 4-4: Context in Which the Kudz Ze Kayah Project Will Operate and Close

Technical Assessments	Economic Assessments	Environmental & Regulatory	Corporate Social Responsibility
<p>- Technical studies have been carried out for 25 years and have included 3rd party independent reviews</p> <p>- No other single project in Yukon has undergone the sustained and detailed assessment that has been carried out on this Project.</p>	<p>- Economic viability is based on long term metal prices of several metals where as some of the mines the economic viability was based on the price of just one metal. This provides a natural hedge against negative metal price changes</p> <p>- Economic viability has been verified via a 3rd party independent reviewer of BMC's economic models</p>	<p>- Is currently being assessed under a more rigorous environmental assessment regime than the previous mines in the district</p> <p>- BMC has provided a realistic cost estimate for closure and reclamation and the financial security will be based (in part) on that estimate</p>	<p>- A plan for Temporary Closure and Permanent Closure has been proposed and will minimise socio-economic impacts whereas the other mines in the district closed abruptly and had no plan</p>

4.5.6 EFFECTS ANALYSIS AND RISK LEVEL DETERMINATION

BMC conducted a review of the previous five mines that have operated and closed in southeast Yukon. In conducting this review, the context to which caused the mines to close and the subsequent effects to the local communities (i.e. Liard First Nation, Ross River Dena Council, Watson Lake and Ross River) were identified (to the extent possible). Following this, BMC described the context in which the Kudz Ze Kayah mine will operate and closure. Through this exercise it has become apparent that BMC's proposed Project, with respect to context, is very different than the previous mines in Yukon,

such that the adverse effects to the environment and communities that occurred from previous mines are not likely to occur at Kudz Ze Kayah. For clarity and understanding the scenarios and potential effects have been assessed in a formal Effects Analysis and Risk Level Determination.

4.5.5.6 METHODS

For each of the identified scenarios, risk is derived from the product of probability (i.e., likelihood of occurrence) and consequence (i.e., severity of occurrence). The likelihood rating is based on probability of occurrence and is derived from the level of design information available for the Project, review of historic or current events, and professional judgement. The consequence rating is determined based on the severity of the scenario and is derived from spatial and temporal effects. The likelihood and consequence ratings are described in Table 4-5.

Table 4-5: Likelihood and Consequence Classifications

Likelihood		Environmental Consequence		Economic and Social Consequence	
Rating	Description	Rating	Description	Rating	Description
Very unlikely	The event is not expected to occur	Very low	Potential effects are localised and are readily reversible	Very low	Very high degree of community resilience to type of change
Unlikely	The event is not likely to occur	Low	Potential effects are within the Project area and are reversible in the short term (i.e., 1 to 5 years)	Low	High degree of community resilience to type of change
Likely	The event is probable	Medium	Potential effects are within the Project extend beyond the Project area and are readily reversible/reversible in the short term	Medium	Moderate degree of community resilience to type of change
Very likely	The event is expected to occur	High	Potential effects extend beyond the Project area and are not reversible	High	Low to very low degree of community resilience to type of change

The risk level for each scenario is determined through combination of likelihood and consequence ratings, as shown in Table 4-6. Risk grades range from low (i.e., negligible risk) to unacceptable. Scenarios ranked from low to moderate risk are considered not significant. Risk grades high and unacceptable are considered to have serious potential effects. The risk level classifications are shown in Table 4-6.

Table 4-6: Risk Level Classifications

Likelihood	Consequence			
	<i>Very Low</i>	<i>Low</i>	<i>Medium</i>	<i>High</i>
<i>Very unlikely</i>	Low	Low	Low	Moderate
<i>Unlikely</i>	Low	Moderate	Moderate	High
<i>Likely</i>	Low	Moderate	High	Unacceptable
<i>Very likely</i>	Moderate	High	Unacceptable	Unacceptable

4.5.5.7 RESULTS

Table 4-7 presents the results of the Effects Analysis and Risk Level Determination. The scenarios assessed are classified as low.

Table 4-7: Effects Analysis and Risk Level Determination of Previous Mine Closure Scenarios

Scenario	Likelihood	Environmental Consequence	Economic and Social Consequence	Risk Level Classification
KZK is not technically viable which results in the mine not being economically viable and goes into unplanned Temporary or Permanent Closure	This scenario is Very Unlikely to occur given the extensive technical studies that have been conducted and all closures (Temporary or Permanent) will be planned	Given that the KZK Project has been designed for closure, progressive reclamation will be undertaken and the extensive environmental mitigation, management and monitoring measures that will be undertaken, this consequence is Low In addition, given that BMC has prepared a realistic cost estimate for closure and reclamation, the security will be in place if YG ends up responsible for the clean-up. Aside from long term post closure monitoring the reclamation would take less than 3 years and any environmental effects during this time would be limited to the mine site so this consequence is Low	Given that there will be a Temporary and Permanent Closure plan which includes early communications and numerous measures to alleviate the impacts to employees, contractors and suppliers and the community appears to have a high degree of resilience to this type of change the consequence is Low	Low
KZK is not economically viable due to a downturn in global metal markets and goes into unplanned Temporary or Permanent Closure	This scenario is Very Unlikely to occur given the economic assessments that have been conducted for the five economic metals at KZK and all Temporary or Permanent Closures will be planned	Given that the KZK Project has been designed for closure, progressive reclamation will be undertaken and the extensive environmental mitigation, management and monitoring measures that will be undertaken, this consequence is Low Given that BMC has prepared a realistic cost estimate for closure and reclamation, the security will be in place if YG ends up responsible for the clean-up. Aside from long term Post Closure monitoring the reclamation would take less than 3 years and any environmental effects during this time would be limited to the mine site so this consequence is Low	Given that there will be a Temporary and Permanent Closure plan which includes early communications and numerous measures to alleviate the impacts to employees, contractors and suppliers and the community appears to have a high degree of resilience to this type of change the consequence is Low	Low

APPENDIX B.
BMC May 2020 Letter to Liard Aboriginal Women's Society

Ann Maje Raider,
Executive Director

Liard Aboriginal Women's Society
Box3, Watson Lake
Yukon Y0A1C0

May 28, 2020

Dear Ms Raider,

Re: LAWS May 19, 2020 Letter to YESAB

It was with interest that I read your recent letter to the Yukon Environmental and Socio-economic Assessment Board (YESAB) regarding Liard Aboriginal Women's Society's (LAWS) views on BMC's Response Report #5. BMC respects and welcomes LAWS' input into our Kudz Ze Kayah project. Given that the letter was not addressed to BMC, we will be responding to your comments directly to YESAB.

However, we feel compelled to respond to you regarding the comment that states "*BMC lists LAWS as a resource (p40) while they not offered to have discussions or support for LAWS to aid in priority setting or service provision*".

BMC has sent LAWS two letters and has left voice mails on your personal phone. In those letters and messages BMC invited you to meet with us so we could fully understand and appreciate your position on the issues that you raised with YESAB in your letter of 19th December 2019. We also invited you to discuss how we can work together over the life of the project to ensure that it makes a positive difference in the lives of all Kaska and non-Kaska citizens. I would like to reiterate that the invitation remains open and that we stand ready to discuss any matters that you may wish. To be clear, we welcome your constructive input and look forward to receiving it.

Best regards,



Kelli Bergh, Environmental Manager

C: Scott Donaldson, CEO BMC
C: Allan Nixon, VP External BMC
C: LFN Chief and Council

BMC MINERALS (NO.1) LTD

C: RRDC Chief and Council

C: Hon Jeanie Dendys, Minister Responsible for Women's Directorate

C: Mary Maje, YESAA Coordinator Ross River Dena Council

APPENDIX C.
Summary of Information Requests Related to the Finlayson Caribou Herd

Appendix C. Summary of Information Requests Related to the Finlayson Herd

IR#	Information Request	BMC Response Report #	Date Deemed Sufficient by YESAB	Per YESAB Document
R1	Provide an updated effects assessment to understand how project activities may effect outfitters, tourism operators and trapline concession holders and possible mitigation measures and alternatives	Initial Response Report - June 2017	9-Jan-18	YESAB - Project Proposal and Consultation Deemed Adequate
R183	<p>Provide additional information on project interactions and effects with caribou in the context of each of the following parameters:</p> <ul style="list-style-type: none"> a. Migration b. Predator/prey dynamics c. Predator efficiency d. Displacement e. Calving habitat and neonatal calf mortality f. Snow patches g. Influence of fidelity to seasonally used areas h. Population decline and caribou distribution i. 'Range rotation' and increase in Finlayson Lake use during some seasons <p>For topics a) through d) listed above, consider also the indirect effects of the Project. For topics e) through i) listed above, provide information that will help determine how significant this geographic area is with respect to caribou population dynamics, rather than just to habitat suitability.</p>	Initial Response Report - June 2017	9-Jan-18	YESAB - Project Proposal and Consultation Deemed Adequate
R184	Provide a late winter habitat suitability index (HSI) model to assess direct and indirect effects on late winter caribou habitat.	Initial Response Report - June 2017	9-Jan-18	YESAB - Project Proposal and Consultation Deemed Adequate

IR#	Information Request	BMC Response Report #	Date Deemed Sufficient by YESAB	Per YESAB Document
R185	<p>Revise the caribou effects assessment, taking into consideration the significance of factors outlined below. Focus on caribou habitat and use related to proposed activities.</p> <ul style="list-style-type: none"> a. Rutting areas b. Traditional use of post-calving areas c. Snow patch use during post-calving d. Calving success in the project area vs. the overall range e. Stressors outside of post-calving season 	Initial Response Report - June 2017	9-Jan-18	YESAB - Project Proposal and Consultation Deemed Adequate
R186	Stress effects on health: What are the "stressors" identified in section 13.4.1.1 Project Interactions of the proposal, regarding health effects that occur outside of just the post-calving season?	Initial Response Report - June 2017	9-Jan-18	YESAB - Project Proposal and Consultation Deemed Adequate
R187	Traffic effects on other caribou herds: What are the potential effects of increased hauling traffic on other Yukon caribou populations along the haul route between the mine and the boundary with B.C. (Little Rancheria and Horseranch herds)?	Initial Response Report - June 2017	9-Jan-18	YESAB - Project Proposal and Consultation Deemed Adequate
R188	<p>Provide further detail on the parameters used in developing the model (elevation, vegetation cover, slope, and aspect.) In addition, provide the following information regarding the caribou habitat suitability model:</p> <ul style="list-style-type: none"> a. Sex/age classes: How many data points are in each age/sex class for each of the development and evaluation phases of the caribou HSI model? b. Calving success and habitat alteration: Why has calving success not been used as part of the model for post-calving? Does the model take into account habitat alteration? c. Expert opinion: Who provided expert opinion and for what aspects of the model? d. Predictive Ecosystems Map: What is the accuracy of the PEM used? e. Model equation: What model equation was used? 	Initial Response Report - June 2017	9-Jan-18	YESAB - Project Proposal and Consultation Deemed Adequate

IR#	Information Request	BMC Response Report #	Date Deemed Sufficient by YESAB	Per YESAB Document
R189	<p>Provide clarity on the inconsistencies detailed below.</p> <p>a. Model methods and metrics inconsistency: The methods say that "observation density" was used to evaluate the model (p. 18) but the Results section (p.19) reports relationships between suitability classes and the number of occurrences (rather than the density). Clarify what metric was used to evaluate the model.</p> <p>b. Aspect class clarification: Clarify what the aspect class ≤ 0 is. In what situation would an aspect be < 0 degrees?</p> <p>c. Measure of availability not included: It is useful to look at use, and use in relation to availability, when assessing value of a habitat category. What is the availability of each of the aspect and vegetation cover classes in relation to caribou use?</p> <p>To allow the Executive Committee to understand baseline conditions in relation to providing clarity on methods used in the model to evaluate its use and assist in interpreting model outputs.</p>	Initial Response Report - June 2017	9-Jan-18	YESAB - Project Proposal and Consultation Deemed Adequate
R190	What is the Assessment Endpoint/Threshold Criteria for Health condition for caribou?	Initial Response Report - June 2017	9-Jan-18	YESAB - Project Proposal and Consultation Deemed Adequate
R191	Provide additional discussion on the additive effect of all residual effects of the project to caribou	Initial Response Report - June 2017	9-Jan-18	YESAB - Project Proposal and Consultation Deemed Adequate
R192	Provide rationale for the use of a 10% threshold, considering other information is available. Clarify how the boreal caribou habitat relationship is applicable to assessing effects on seasonal ranges/habitats for northern mountain caribou. Consider the differences in the use of range and natural disturbances.	Initial Response Report - June 2017	9-Jan-18	YESAB - Project Proposal and Consultation Deemed Adequate
R193	Clarify if exploration activities were occurring during surveys and, if so, detail the extent. Discuss how exploration activities may have influenced caribou distribution during these surveys and how this impacts interpretations of survey data.	Initial Response Report - June 2017	9-Jan-18	YESAB - Project Proposal and Consultation Deemed Adequate

IR#	Information Request	BMC Response Report #	Date Deemed Sufficient by YESAB	Per YESAB Document
R194	Discuss the implications of the use of the area around Finlayson Lake during the late winter surveys of 2007 and 2016. Particular focus should be given to the displacement effects of increased traffic on the Robert Campbell Highway and the Finlayson air strip.	Initial Response Report - June 2017	9-Jan-18	YESAB - Project Proposal and Consultation Deemed Adequate
R195	What are the implications of the low calf:100 cow ratios during the post-calving surveys in 2015 and 2016? Provide a more thorough discussion about calf survival, including neonatal mortality, substantiated with references.	Initial Response Report - June 2017	9-Jan-18	YESAB - Project Proposal and Consultation Deemed Adequate
R196	Discuss the geographical importance of the project area to caribou considering their continued use of the area despite population decline.	Initial Response Report - June 2017	9-Jan-18	YESAB - Project Proposal and Consultation Deemed Adequate
R197	Range boundaries inconsistency: Why does the Finlayson Caribou Herd (FCH) range boundary shown in Figure 13-1 (Chapter 13) and Figure 3-1 (Appendix E-8) differ from Yukon Government's FCH herd boundary (Hegel and Russell 2013)? How does this difference in boundaries affect the effects assessment and the selection of projects identified for the cumulative effects assessment?"	Initial Response Report - June 2017	9-Jan-18	YESAB - Project Proposal and Consultation Deemed Adequate
R198	Rut survey interpretation: What is the density of individuals (individuals/km ²), and density of groups (groups/km ²) for each 5-km concentric ring? Revise the discussion of use of the area surrounding the proposed Project by caribou as a function of distance category to reflect these densities.	Initial Response Report - June 2017	9-Jan-18	YESAB - Project Proposal and Consultation Deemed Adequate
R199	Spring migration timing conclusion: Are there any other data to substantiate the timing of spring migration other than those presented in Appendix E-8, Section 3.4.5? If so, please provide.	Initial Response Report - June 2017	9-Jan-18	YESAB - Project Proposal and Consultation Deemed Adequate
R200	Recruitment rates vs calf:100 cow ratios: Revise the discussion: calf-cow ratios during postcalving surveys should be discussed as calf:cow ratios, not recruitment rates, for clarity and consistency with other studies	Initial Response Report - June 2017	9-Jan-18	YESAB - Project Proposal and Consultation Deemed Adequate
R201	Calf:cow ratio sustainability inconsistency: Statements in sections 3.5.3 and 3.5.5 describe the "sustainability" of 27 calves per 100 cows. Provide more information on the basis of this threshold.	Initial Response Report - June 2017	9-Jan-18	YESAB - Project Proposal and Consultation Deemed Adequate

IR#	Information Request	BMC Response Report #	Date Deemed Sufficient by YESAB	Per YESAB Document
R202	<p>Provide additional information on baseline surveys and maps as detailed below.</p> <p>a. Use of historical post-calving surveys: Are locations from historical post-calving surveys, available? If so, provide a map that displays these for the whole range of the herd.</p> <p>b. Air survey methodology clarifications: How was the low number of caribou seen during the 2015 late winter survey influenced by the type of aircraft used (i.e. fixed-wing)? What type of aircraft was used for the early winter surveys described in section 3.3.1?</p> <p>c. Improvement in post-calving information: Display locations for 2015 and 2016 in different colours on Figure 3-8 and comment on consistency in area use between the two years.</p> <p>d. Methodology clarification for caribou distribution analysis: What do the categories in the "Radius from project" represent in Table 3-4? The actual radius, or radius categories? Revise interpretations if necessary.</p> <p>e. Further information on early winter surveys: Provide a map showing caribou locations for 2015 and 2016 early winter surveys.</p> <p>f. Results of 2016 rut survey missing: Provide the results of the 2016 rut survey.</p> <p>To ensure sufficient baseline information is available for assessing and monitoring effects.</p>	Initial Response Report - June 2017	9-Jan-18	YESAB - Project Proposal and Consultation Deemed Adequate

IR#	Information Request	BMC Response Report #	Date Deemed Sufficient by YESAB	Per YESAB Document
R244	<p>Provide information on mitigation measures and their implementation through the Wildlife Protection Plan, including:</p> <p>a. Equipment laydown areas: What distance will equipment laydown areas be from known wildlife trails or wildlife road crossings?</p> <p>b. Guidelines for wildlife encounters: Provide guidelines to understand how this measure will be applied and to assess how effective it will be. The guidelines should include, for example, the distance an animal is from activity for it to be to be considered "encountered" and to have "left the area", and how wildlife encounters with different species might be managed.</p> <p>c. Avoidance of caribou calving grounds: Where are calving grounds located and what is the seasonal period for post-calving?</p> <p>d. Revegetation in relation to vehicle access and predator efficiency: What measures will be taken once reclamation of the Tote Road has been completed to ensure that vegetation can re-establish to prevent motorized vehicle access and reduce predator efficiency?</p> <p>e. Provide details on how effectiveness monitoring will be included in the Wildlife Protection Plan and the metrics that will be used to measure effectiveness.</p> <p>f. Sensitive periods: The identification of sensitive periods during which mitigation measures will be applied is important information for assessing adequacy of these mitigation measures. What is the basis for the sensitive periods identified in Table 18-8? Please provide references.</p> <p>g. Species coverage: Provide information as to how the WPP will be updated to include measures to protect other species, including denning animals and breeding raptors.</p> <p>h. Traffic on the Robert Campbell Highway: Please incorporate mitigation for potential effects on wildlife of increased traffic on the Robert Campbell Highway into the relevant management plans.</p> <p>The lack of information on monitoring and assessment of effectiveness of mitigation makes it difficult to assess how adaptive management will be implemented as the Project develops.</p>	Initial Response Report - June 2017	9-Jan-18	YESAB - Project Proposal and Consultation Deemed Adequate

IR#	Information Request	BMC Response Report #	Date Deemed Sufficient by YESAB	Per YESAB Document
R251	<p>Were exploration activities occurring during any surveys? a. If so, which ones, and how extensive? b. Explain how exploration activities may have influenced caribou distribution during the affected surveys and subsequent interpretations of the survey data. To allow the Executive Committee to understand all relevant baseline conditions in relation to caribou distribution during surveys.</p>	Initial Response Report - June 2017	9-Jan-18	YESAB - Project Proposal and Consultation Deemed Adequate
R254	<p>Why is potential loss of moderate-suitability habitat excluded from the assessment for caribou, moose and grizzly bear?</p>	Initial Response Report - June 2017	9-Jan-18	YESAB - Project Proposal and Consultation Deemed Adequate
R267	<p>“Provide a preliminary quantitative Human Health Risk Assessment for each stage of the project. This assessment should be informed by Health Canada’s Part I: Guidance on Human Health Preliminary Quantitative Risk Assessment (PQRA) Version 2.0 (2012). At minimum this assessment will address the following: a. risks associated with human use of the area (e.g. the cabins at the project boundary or for traditional activities such as hunting, trapping, harvesting) potentially impacted by the project; b. risks associated with consumption of country foods (e.g., fish, caribou, migratory birds, and other animals exposed to environmental contaminants from the project in the air, water, or soil) harvested through traditional hunting, fishing, and gathering activities; and c. risks associated with consumption of surface and ground well water used for drinking potentially impacted by the project.</p>	Initial Response Report	9-Jan-18	YESAB - Project Proposal and Consultation Deemed Adequate

IR#	Information Request	BMC Response Report #	Date Deemed Sufficient by YESAB	Per YESAB Document
R2-85	<p>Provide additional information on project interactions and effects with caribou in the context of each of the following parameters:</p> <ul style="list-style-type: none"> a. Migration b. Predator/prey dynamics c. Predator efficiency d. Displacement e. Calving habitat and neonatal calf mortality f. Snow patches g. Influence of fidelity to seasonally used areas h. Population decline and caribou distribution i. 'Range rotation' and increase in Finlayson Lake use during some seasons <p>For topics a) through d) listed above, consider also the indirect effects of the Project. For topics e) through i) listed above, provide information that will help determine how significant this geographic area is with respect to caribou population dynamics, rather than just to habitat suitability.</p>	Response Report #2 - November 2017	9-Jan-18	YESAB - Project Proposal and Consultation Deemed Adequate
R2-86	<p>Revise the caribou effects assessment, taking into consideration the significance of factors outlined below. Focus on caribou habitat and use related to proposed activities.</p> <ul style="list-style-type: none"> a. Rutting areas b. Traditional use of post-calving areas c. Snow patch use during post-calving d. Calving success in the project area vs. the overall range e. Stressors outside of post-calving season 	Response Report #2 - November 2017	9-Jan-18	YESAB - Project Proposal and Consultation Deemed Adequate
R2-87	<p>Traffic effects on other caribou herds: What are the potential effects of increased hauling traffic on other Yukon caribou populations along the haul route between the mine and the boundary with B.C. (Little Rancheria and Horseranch herds)?</p>	Response Report #2 - November 2017	9-Jan-18	YESAB - Project Proposal and Consultation Deemed Adequate

IR#	Information Request	BMC Response Report #	Date Deemed Sufficient by YESAB	Per YESAB Document
R2-88	<p>Provide further detail on the parameters used in developing the model (elevation, vegetation cover, slope, and aspect.) In addition, provide the following information regarding the caribou habitat suitability model:</p> <p>a. Sex/age classes: How many data points are in each age/sex class for each of the development and evaluation phases of the caribou HSI model?</p> <p>b. Calving success and habitat alteration: Why has calving success not been used as part of the model for post-calving? Does the model take into account habitat alteration?</p> <p>c. Expert opinion: Who provided expert opinion and for what aspects of the model?</p> <p>d. Predictive Ecosystems Map: What is the accuracy of the PEM used?</p> <p>e. Model equation: What model equation was used?</p>	Response Report #2 - November 2017	9-Jan-18	YESAB - Project Proposal and Consultation Deemed Adequate
R2-89	<p>Provide clarity on the inconsistency detailed below.</p> <p>a. Measure of availability not included: It is useful to look at use, and use in relation to availability, when assessing value of a habitat category. What is the availability of each of the aspect and vegetation cover classes in relation to caribou use?</p>	Response Report #2 - November 2017	9-Jan-18	YESAB - Project Proposal and Consultation Deemed Adequate
R2-90	Provide details about the methodology for the proposed qualitative assessment of no observable deterioration in physical condition for caribou, moose, grizzly bear, grey wolf, wolverine, and collared pika.	Response Report #2 - November 2017	9-Jan-18	YESAB - Project Proposal and Consultation Deemed Adequate
R2-91	Provide additional discussion on the additive effect of all residual effects of the project to caribou	Response Report #2 - November 2017	9-Jan-18	YESAB - Project Proposal and Consultation Deemed Adequate
R2-92	Provide information that has been used to come to the conclusion that "there was no discernible change from historical distributions.	Response Report #2 - November 2017	9-Jan-18	YESAB - Project Proposal and Consultation Deemed Adequate
R2-93	Discuss the implications of the use of the area around Finlayson Lake during the late winter surveys of 2007 and 2016. Particular focus should be given to the displacement effects of increased traffic on the Robert Campbell Highway and the Finlayson air strip.	Response Report #2 - November 2017	9-Jan-18	YESAB - Project Proposal and Consultation Deemed Adequate

IR#	Information Request	BMC Response Report #	Date Deemed Sufficient by YESAB	Per YESAB Document
R2-94	What are the implications of the low calf:100 cow ratios during the post-calving surveys in 2015 and 2016? Provide a more thorough discussion about calf survival, including neonatal mortality, substantiated with references.	Response Report #2 - November 2017	9-Jan-18	YESAB - Project Proposal and Consultation Deemed Adequate
R2-95	Discuss the geographical importance of the project area to caribou considering their continued use of the area despite population decline.	Response Report #2 - November 2017	9-Jan-18	YESAB - Project Proposal and Consultation Deemed Adequate
R2-96	Rut survey interpretation: What is the density of individuals (individuals/km ²), and density of groups (groups/km ²) for each 5-km concentric ring? Revise the discussion of use of the area surrounding the proposed Project by caribou as a function of distance category to reflect these densities.	Response Report #2 - November 2017	9-Jan-18	YESAB - Project Proposal and Consultation Deemed Adequate
R2-97	<p>Provide additional information on baseline surveys and maps as detailed below.</p> <p>a. Use of historical post-calving surveys: Are locations from historical post-calving surveys, available? If so, provide a map that displays these for the whole range of the herd.</p> <p>b. Air survey methodology clarifications: How was the low number of caribou seen during the 2015 late winter survey influenced by the type of aircraft used (i.e. fixed-wing)? What type of aircraft was used for the early winter surveys described in section 3.3.1?</p> <p>c. Improvement in post-calving information: Display locations for 2015 and 2016 in different colours on Figure 3-8 and comment on consistency in area use between the two years.</p> <p>d. Methodology clarification for caribou distribution analysis: What do the categories in the "Radius from project" represent in Table 3-4? The actual radius, or radius categories? Revise interpretations if necessary.</p> <p>e. Further information on early winter surveys: Provide a map showing caribou locations for 2015 and 2016 early winter surveys.</p> <p>f. Results of 2016 rut survey missing: Provide the results of the 2016 rut survey.</p> <p>To ensure sufficient baseline information is available for assessing and monitoring effects.</p>	Response Report #2 - November 2017	9-Jan-18	YESAB - Project Proposal and Consultation Deemed Adequate

IR#	Information Request	BMC Response Report #	Date Deemed Sufficient by YESAB	Per YESAB Document
R3-8	Provide available triggers and corresponding actions related to any adaptive management plans for wildlife to be considered in this assessment.	Response Report #3A - June 2018	27-Nov-18	YESAB - Screening – Satisfactory Response to Information Request #3
R3-27	Provide human health based target levels or screening levels and rationale explaining why these levels are appropriate in respect to the potential for adverse human health effects.	Response Report #3A - June 2018	27-Nov-18	YESAB - Screening – Satisfactory Response to Information Request #3
R4-2	Demonstrate how traditional land use information has been incorporated into the consideration of effects and how traditional land uses may be impacted by the Project.	Response Report #4A - December 2018	22-Jul-19	YESAB - Screening – Sufficient Information to Prepare Draft Screening Report
R4-8	Thoroughly demonstrate how traditional knowledge and traditional land use have been incorporated into the consideration of effects to water in the proposal or the identification of mitigations.	Response Report #4A - December 2018	22-Jul-19	YESAB - Screening – Sufficient Information to Prepare Draft Screening Report

IR#	Information Request	BMC Response Report #	Date Deemed Sufficient by YESAB	Per YESAB Document
R4-9	<p>Further to the collection of the above requested information:</p> <p>a) Confirm current VESECs used in the project proposal and include any new or additional VESECs identified through engaging Liard First Nation (LFN) and Ross River Dena Council (RRDC);</p> <p>b) Demonstrate how traditional land use information has been applied to the determination of VESECs and identification of mitigations.</p> <p>c) Provide a comprehensive effects assessment that:</p> <p>i. Is informed by information collected in response to questions R4-1 through R4-6 and through meaningful engagement with LFN and RRDC;</p> <p>ii. Considers how proposed project activities may impact the VESECs that are relevant to LFN and RRDC;</p> <p>iii. Considers potential mitigation measures ensuring that they are culturally relevant where possible; and</p> <p>iv. Where there may be new VESECs, update the sections of the proposal to reflect the effects assessment of those new VESECs.</p>	Response Report #4A – December 2018	22-Jul-19	YESAB - Screening – Sufficient Information to Prepare Draft Screening Report
R5-1	To increase confidence in the effects prediction and characterization for caribou, if there is any newly available caribou survey data relevant to the project, please provide it.	Response Report #5 - April 2020	19-May-20	YESAB - Information Request No.5 Response Sufficient
R5-2	If there are any known nearby sites where calving caribou show site fidelity, provide the distance to the mine site and describe the location and the potential for sensory disturbance resulting from the project.	Response Report #5 - April 2020	19-May-20	YESAB - Information Request No.5 Response Sufficient

APPENDIX D.
Summary of Incidental Caribou Observations (2015 to 2019)

Appendix D. Incidental Finlayson Caribou Observations from the Exploration Wildlife Log

2015 Finlayson Caribou Observations

DATE	TIME	OBS	WEATHER			SPECIES	NO. ANIMALS					LOCATION	WILDLIFE ACTIVITY ⁴	HABITAT	OTHER COMMENTS
			TEMP (°C)	PRECIP	WIN D		TOTAL	F	M	UNK	JUV				
29-Jul-15	20:20	Kevin Duff				caribou	1		1			repeater	laying down		
31-Jul-15	12:10	Kevin Duff				caribou	2	1			1	4 miles east of camp	sleeping		
2-Aug-15	8:30	Kevin Duff				caribou	5	2	2		1	1 Mile SW of camp	laying down	side of hill	
2-Aug-15	9:20	Kevin Duff				caribou	3	1			2	1.25 Miles SW of Camp	feeding		
5-Aug-15	10:35	Kevin Duff				caribou	1	1				north lake	walking	brushy shoreline	
5-Aug-15	8:40	Kevin Duff				caribou	1		1			2.5 miles south of camp	cruising	alpine	
8-Aug-15		Robert Dick				caribou	1			1		on road	running		
10-Aug-15	15:00	Keifer Sterriah		overcast		caribou	8	2	6			east of km 25 (Tote road)		alpine, ridge.	
10-Aug-15	3:00	Andrei Lebel				caribou	"a few"					On ridge across the way			
12-Aug-15	12:45	Keifer Sterriah				caribou	1			1		6815000, 413500			
13-Aug-15	10:30	Kevin Duff				caribou	2	1			1	top of GP4F	walking	side slope	5000 ft
15-Aug-15	8:20	Kevin Duff				caribou	2		2			4 miles SE of camp		5000 ft	
15-Aug-15	17:20	Trevor Rabb				caribou	3		3			61.4595, -130.53234	roaming		
16-Aug-15	13:35	Kevin Duff				caribou	1		1			3.5 miles SE of camp	walking		
16-Aug-15	18:30	Kelli Bergh				caribou	2		2			hillside between GP4F and A13M	running	slopes	
16-Aug-15	9:00	Kevin Duff				caribou	3		2		1	4.1 SE of camp	resting		
17-Aug-15	7:45	Kevin Duff				caribou	2		2		2	3.2. Miles SE of Camp	feeding		
18-Aug-15	17:30	Kevin Duff		rain		caribou	1				1	2.1 Miles SE of camp	running		
20-Aug-15	23:20	Kevin Duff				caribou	3		1		2	3.5 Miles SE of camp		alpine	

DATE	TIME	OBS	WEATHER			SPECIES	NO. ANIMALS					LOCATION	WILDLIFE ACTIVITY ⁴	HABITAT	OTHER COMMENTS
			TEMP (°C)	PRECIP	WIN D		TOTAL	F	M	UNK	JUV				
21-Aug-15	9:40	Kevin Duff		cold		caribou	4		3	1		1.6 miles SW of camp	feeding	alpine	
22-Aug-15	9:30	Kevin Duff				caribou	4	3			1	1.6 miles SW of camp	feeding		
24-Aug-15	Am	Nicole Etzel				caribou	5	M				60 m SW of weather Station	curious		
24-Aug-15	9:00	Heiko M				caribou	9	5	2	2			feeding		
24-Aug-15	17:04	Monty Oatman	10			caribou	3			3		4 miles south of camp			
25-Aug-15		Nicole Etzel				caribou	3					north of weather station			
26-Aug-15		Darryl Epp				caribou	Several males and females					hill of GP4F			
26-Aug-15	8:06	Monty Oatman				caribou	4			4		4 miles SW of Camp	grazing		
26-Aug-15	10:00	Catherine				caribou						met station			
26-Aug-15	13:00	Robin Black				caribou	4	3	1				watching		
26-Aug-15	11:40	Trent Newkirk				caribou	2		2			4212437, 6814982	feeding	alpine	
26-Aug-15	16:00	Heiko M				caribou	1		1				wandering		
26-Aug-15	11:30	Heiko M		light rain		caribou	1	1				Rhyolite mtn uplands	Feeding/ passing through		
27-Aug-15	12:00	Greg Keating		Light rain		caribou	4	2	2			On hill next to camp	eating		
27-Aug-15	8:24	Monty Oatman	4	rain		caribou						½ mile SW of camp	grazing		
27-Aug-15	16:45	David Rissanen				caribou	2		2				feeding		
2-Aug-15	12:00	Grace Johnny		raining		caribou	4		4			camp	feeding	mountain	
29-Aug-15	14:00	Chuck Sheasman				caribou	1	1				km 22 tote rd			
29-Aug-15	0:00	Murray Joney	10			caribou	1		1			lake south of new culvert	moving across valley		
30-Aug-15	9:15	Andre				caribou	6								
30-Aug-15	15:00	Andre				caribou	8								

DATE	TIME	OBS	WEATHER			SPECIES	NO. ANIMALS					LOCATION	WILDLIFE ACTIVITY ⁴	HABITAT	OTHER COMMENTS
			TEMP (°C)	PRECIP	WIN D		TOTAL	F	M	UNK	JUV				
1-Sep-15	14:00	Andre Lebel				caribou	3					GP4F on slope			
5-Sep-15	9:00	Andre Lebel				caribou	7	4	3				standing		
7-Sep-15	17:10	Kevin Duff	7			caribou	10	8	2			3.4 Miles SE of camp	feeding	alpine	
8-Sep-15	14:00	Andre Lelod				caribou	3			3		GP4F			
8-Sep-15	11:00	Andre Lebel				caribou	7	6							
8-Sep-15	9:05	Kevin Duff	10			caribou	1	1				GP4F	standing	brushy slope	red antlers, velvet shed
9-Sep-15	12:00	Nathan Conroy	10C	LR		caribou	1			1		6814500, 416582			
11-Sep-15	8:15	Kevin Duff				caribou	5	4	1			3.6 Miles south of camp	resting	alpine	
11-Sep-15	10:20	Kevin Duff			windy	caribou	8			8		repeater	resting	snow pack	
13-Sep-15	17:40	Kevin Duff	4			caribou	8	5	3			3.4 miles south of camp	resting	alpine	
14-Sep-15	9:30	Kevin Duff	0			caribou	7	1	7			3.6 miles SW of camp	resting	Sideslope alpine	
15-Sep-15	8:00	Kevin Duff	1			caribou	2	1	1			2.2km east of rd	courting	Valley bottom	
20-Sep-15	7:20	Kevin Duff	2			caribou	2	2				3.4 miles south of camp	feeding	alpine	
21-Sep-15	10:20	Kevin Duff	0			caribou	5	1	4			2.7 miles SE of camp	feeding	alpine	
22-Sep-15	13:10	Kevin Duff	4			caribou	5	1	4			2 miles SE of camp	running	saddle	
22-Sep-15	7:20	Darrel Epn				caribou	1					21 km tote rd			
24-Sep-15	8:10	Kevin Duff	-2			caribou	2	1	1			1.2 miles south of camp	rutting	trees	
25-Sep-15	17:50	Kevin Duff	0	sunny		caribou	14	3	11			2.4 miles east of camp	feeding	alpine	
25-Sep-15	17:55	Kevin Duff	-1	sunny		caribou	20	4	16 (cows/calves)			4.6miles east of camp	feeding	alpine	
29-Sep-15	13:30	Kevin Duff	7	windy		caribou	1	1				3.6 miles SE of camp	looking for cows	alpine	
30-Sep-15	16:05	Kevin Duff	6	windy		caribou	8	2	6 (cows/calves)			2.4 miles east of camp	feeding	alpine	
5-Oct-15	13:20	Kevin Duff				caribou	9	6	1		2	2.4 miles SE of camp	feeding	sub-alpine	

DATE	TIME	OBS	WEATHER			SPECIES	NO. ANIMALS					LOCATION	WILDLIFE ACTIVITY ⁴	HABITAT	OTHER COMMENTS
			TEMP (°C)	PRECIP	WIN D		TOTAL	F	M	UNK	JUV				
6-Oct-15	8:00	Kevin Duff	-5			caribou	1		1			3.9 miles S of camp	walking	alpine	
6-Oct-15	8:00	Andre Lebel				caribou						GP4F	standing around		
10-Oct-15	16:20	Kevin Duff	3			caribou	1		1			2.4 miles SE of camp	searching for cows		nose to ground
11-Oct-15	8:10	Kevin Duff	1			caribou	1		1			2.3 miles E of camp	feeding	alpine	
12-Oct-15	10:15	Kevin Duff	1			caribou	3	1	1		1	3.4 miles SE of camp	Feeding	tree line	
13-Oct-15	9:30	Kevin Duff	1			caribou	60			x		4.6 miles E of camp	feeding	alpine	
14-Oct-15	13:20	Kevin Duff	3			caribou	8	5	1		2	3 miles S of camp		alpine	
14-Oct-15	17:30	Kevin Duff	1			caribou	2		2			GP4F lake	walking	valley bottom	
17-Oct-15	14:55	Kevin Duff	6			caribou	17			17		1.4 miles SW of camp	feeding		
18-Oct-15	15:30	Chrissy Vandentillaart	4			caribou				x		weather station			
10-Nov-15	13:30	Tom Michaluck	-10	clear windy		caribou	40					summit of mountain	docile	alpine	(groups of 4 to 10 within 200-300 m of each other)
16-Nov-15	16:30	Kelli Bergh	-15	over cast		caribou	3					approx 300 m north west of core land		slope	

TOTAL

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2016 Finlayson Caribou Observations

DATE	TIME	OBS	WEATHER			SPECIES	NO. ANIMALS					LOCATION	WILDLIFE ACTIVITY	HABITAT	OTHER COMMENTS
			TEMP (°C)	PRECIP	WIND		TOTAL	F	M	UNK	JUV				
28-Apr-16		Terry Ollie				caribou	6					22km slope	feeding		
2-May-16		Jerome de Pasquale				caribou	4					Ridge West of Krakatoa			
11-May-16		Rudi Kern				caribou	1					km 20.5 tote road	feeding		
11-May-16		William Davis				caribou	1					km 20.5 tote road		in the willows	travelling west
11-May-16		Jody Inkster				caribou	1					south of camp	walking	mountain slope	
12-May-16		Abraham Tutcho				caribou	1					km 5 tote road	running on side of road		
15-May-16		Terry Ollie				caribou	1					seen from camp	running		
17-May-16		Terry Ollie				caribou	2						walking		
4-Jun-16		Doris John				caribou	1					skyline above camp			
4-Jun-16		Sheila Johnny				caribou	1								
4-Jun-16		Grace Johnny				caribou	1						feeding		
8-Jun-16		Jody Inkster				caribou	11					weather station	chilling out	alpine	about 1.5 kms SE from station
8-Jun-16		Doris John				caribou	4					mountain slope above camp		sub-alpine	
8-Jun-16		Kellin Friesen				caribou	6					above camp on skyline			
8-Jun-16		Sheila Johnny				caribou							feeding		
8-Jun-16		Roger H				caribou	6					ridge SE of camp	feeding		
23-Jun-16		Tim Bennett				caribou	1					ice above ABM	feeding		
1-Jul-16		Kevin Duff				caribou	2					3.2 mi SE of camp	resting on snow	snow patch	
2-Jul-16		Kevin Duff				caribou	1					3.4mi SE of camp	resting	tree line	
2-Jul-16		Rafe Etzel				caribou	1					GP4F	laying down		

DATE	TIME	OBS	WEATHER			SPECIES	NO. ANIMALS					LOCATION	WILDLIFE ACTIVITY	HABITAT	OTHER COMMENTS
			TEMP (°C)	PRECIP	WIND		TOTAL	F	M	UNK	JUV				
2-Jul-16		Dennis Menacho				caribou	1					GP4F	laying down		
2-Jul-16		Kevin Duff				caribou	1		1			2.6 mi SE of camp	walking	saddle	immature bull
3-Jul-16		Kevin Duff				caribou	1		1			3.3 mi SE of camp	resting	snow patch	mature bull
4-Jul-16		Ron Voordouw				caribou	1					near GP4F	lying in snow	alpine slope	
4-Jul-16		Kevin Duff				caribou	1		1			3.5 mi SE of camp	laying down	snow patch	mature bull
4-Jul-16		Rafe Etzel				caribou	1						laying in snow	hillside	
4-Jul-16		Dennis Menacho				caribou	1						laying in snow	hillside	
9-Jul-16		Kevin Duff				caribou	3					4.1 km S of camp	grazing	alpine	
9-Jul-16		Kevin Duff				caribou	1					2.8 m E of camp	feeding	alpine	
9-Jul-16		Kevin Duff				caribou	2					3.6m S of camp	breeding	saddle	
10-Jul-16		Rafe Etzel				caribou	1					above the deposit	feeding	hillside	
11-Jul-16		Kevin Duff				caribou	1					3 miles S of camp	feeding	alpine	
11-Jul-16		Kevin Duff				caribou	2					1 mi S of camp	feeding	bushy Slope	
13-Jul-16		Rafe Etzel				caribou	1					east of Genoa Creek	feeding	mountain slope	
14-Jul-16		Dennis Menacho				caribou	1					east of Genoa Creek	resting	hillside	
15-Jul-16		Kevin Duff				caribou	1					2.5 mil S of camp	resting	alpine	
15-Jul-16		Rory Goebel				caribou	1					km 21		road	
15-Jul-16		Trent Newkirk				caribou	1					upper east bam	feeding	buck brush	
17-Jul-16		Oscar Neilson				caribou	1					Fault Creek	walking		
18-Jul-16		Terry Ollie				caribou	1					camp	drinking water		
26-Jul-16		Rafe Etzel				caribou	1					core land	resting	brush	
27-Jul-16		Tara Ollie				caribou	1					km 23.75	feeding	brushy	
27-Jul-16		Jason Smith				caribou	1						feeding	hill slope	
27-Jul-16		Daniel Menacho				caribou						core land			
27-Jul-16		Doris John				caribou	1					south of camp	feeding	ridge	

DATE	TIME	OBS	WEATHER			SPECIES	NO. ANIMALS					LOCATION	WILDLIFE ACTIVITY	HABITAT	OTHER COMMENTS
			TEMP (°C)	PRECIP	WIND		TOTAL	F	M	UNK	JUV				
27-Jul-16		Kevin Duff				caribou	1					Rhyolite Peak	resting		
28-Jul-16		Jody Inkster				caribou	1		1			N61 27.393, W13032.494	grazing	alpine ridge	bull
30-Jul-16		Glen Wadsworth				caribou	1						walking	hill top	
30-Jul-16		Rafe Etzel				caribou	2					500m south of camp	feeding	slopes	
31-Jul-16		Glen Wadsworth				caribou	1					N61 27.393, W13032.494	walking	alpine	
31-Jul-16		Glen Wadsworth				caribou	1					N61 27.393, W13032.494	walking	alpine	
1-Aug-16		Russ Geist				caribou	1					Weather station	running		
2-Aug-16		Kellin Friesen				caribou	1					ridge S of camp			
2-Aug-16		Oscar Neilson				caribou	1					61 26' 49.2, 130 31'43.2	resting	alpine	
3-Aug-16		Glen Wadsworth				caribou	1						walking	high slopes	
						caribou						ridge S of camp			
4-Aug-16		Jody Inkster				caribou	1		1			km 21	feeding	alpine	
5-Aug-16		Abraham Tutcho				caribou	1		1			km 21			bull
6-Aug-16		Jody Inkster				caribou	1		1			km 20.7	running/feeding	shrubs	crossing road, bull
7-Aug-16		Jody Inkster				caribou	1					pond	walking on road	subalpine	
13-Aug-16		Rene Darveau				caribou	1					drill pad DHK	feeding	shore of pond	
13-Aug-16		Rene Darveau				caribou	1					west of deposit	running	slope	
14-Aug-16		Rene Darveau				caribou	2					Rhyolite peak	feeding		
14-Aug-16		Kevin Duff				caribou	2					back of Rhyolite Peak	walking	alpine	
15-Aug-16		Kevin Duff				caribou	12					above ABM east	feeding	alpine	
16-Aug-16		Kevin Duff				caribou	5					3.4mi S of camp	feeding	alpine	
17-Aug-16		Kevin Duff				caribou	1		1			22km	feeding	alpine	1 immature bull
18-Aug-16		Kevin Duff				caribou	1		1			Rhyolite peak	walking	brushy slope	mature bull
18-Aug-16		Kevin Duff				caribou	1		1			Rhyolite Peak	walking	alpine	mature bull
19-Aug-16		Kevin Duff				caribou	1		1			3.6mi S of camp	feeding	alpine	immature bull

DATE	TIME	OBS	WEATHER			SPECIES	NO. ANIMALS					LOCATION	WILDLIFE ACTIVITY	HABITAT	OTHER COMMENTS
			TEMP (°C)	PRECIP	WIND		TOTAL	F	M	UNK	JUV				
19-Aug-16		Kevin Duff				caribou	4		4			3.2mi S of camp	feeding	alpine	mature bulls
19-Aug-16		Kevin Duff				caribou	3	1			2		feeding	alpine	2 cows and a calf
19-Aug-16		Kevin Duff				caribou	1		1			Rhyolite Peak	resting	alpine	immature bull
19-Aug-16		Rene Darveau				caribou	2					3.4mi SE of camp	watching	slope	
20-Aug-16		Kevin Duff				caribou	1		1			3.1mi SE of camp	resting	alpine	bull
20-Aug-16		Jody Inkster				caribou	13					Rhyolite peak	feeding and resting	alpine	
21-Aug-16		Kevin Duff				caribou	1		1			Weather station	feeding	alpine	immature bull
21-Aug-16		Kevin Duff				caribou	1		1			Rhyolite peak	feeding	subalpine	mature bull
22-Aug-16		Kevin Duff				caribou	11	4	2	3	2	Rhyolite peak	feeding	alpine	bull, immature bull, 4 cows, 2 calves
22-Aug-16		Kevin Duff				caribou	1		1			above ABM east	feeding	valley bottom	mature bull
27-Aug-16		Kevin Duff				caribou	2		2			Rhyolite peak	feeding	alpine	mature and immature
27-Aug-16		Kevin Duff				caribou	13					Rhyolite Peak	resting		
27-Aug-16		Harold John				caribou	14					Rhyolite peak			
28-Aug-16		Harold John				caribou	17					Rhyolite peak			
29-Aug-16		Kevin Duff				caribou	4		4			5km SW of camp	feeding	alpine	immature bulls
29-Aug-16		Jody Inkster				caribou	13					4 km SW of camp	resting	alpine	
29-Aug-16		Jody Inkster				caribou	4					south of Fault Cr	resting		
31-Aug-16		Jody Inkster				caribou	11					Rhyolite peak	feeding/resting	slope	
2-Sep-16		Kevin Duff				caribou	12				12	SE end of property	feeding	alpine	cows and calves
2-Sep-16		Kevin Duff				caribou	20		10	10		3.4mi SE of camp	feeding	alpine	10 bulls, 10 cows/calves
3-Sep-16		Kevin Duff				caribou	3					Rhyolite peak	feeding	alpine	2 cows and a calf
5-Sep-16		Kevin Duff				caribou	22					Rhyolite peak	feeding	alpine	
8-Sep-16		Kevin Duff				caribou	12					on mountain	feeding	alpine	
9-Sep-16		Scott MacNeil				caribou	1		1			Rhyolite peak	resting	reclaimed drill pad	resting bull
9-Sep-16		Kevin Duff				caribou	30					Rhyolite peak	feeding	alpine	

DATE	TIME	OBS	WEATHER			SPECIES	NO. ANIMALS					LOCATION	WILDLIFE ACTIVITY	HABITAT	OTHER COMMENTS
			TEMP (°C)	PRECIP	WIND		TOTAL	F	M	UNK	JUV				
11-Sep-16		Kevin Duff				caribou	18					center road on drill pad km 21	resting	alpine	
11-Sep-16		Rene Darveau				caribou	18					Rhyolite Peak	feeding	alpine	herd
11-Sep-16		Rene Darveau				caribou	18					Rhyolite Peak	feeding	slope	
11-Sep-16		Jamie McLennan				caribou	1					RC hlgway finlaysin crossing	walking	Taiga	
12-Sep-16		Rene Darveau				caribou	4					Rhyolite Peak S	feeding	alpine	
12-Sep-16		Sheila Johnny				caribou	5					mountain	walking	alpine	
12-Sep-16		Sheila Johnny				caribou	5					mountain	walking	alpine	
12-Sep-16		Rene Darveau				caribou	4					south of Rhyolite Peak	feeding	slope	
14-Sep-16		Kevin Duff				caribou	1					1 km sw 25 km	feeding	alpine	
		Richard Andrew				caribou	1					km 21	walking, grazing	shrubs	

TOTAL

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2017 Finlayson Caribou Observations

DATE	TIME	OBS	WEATHER			SPECIES	NO. ANIMALS					LOCATION	WILDLIFE ACTIVITY	HABITAT	OTHER COMMENTS
			TEMP (°C)	PRECIP	WIND		TOTAL	F	M	UNK	JUV				
06-Jun-17	14:00	Rene Darvea		sunny		caribou	2	1	1			repeater #6	feeding		
12-Jul-17	17:45	Doreen		sunny		caribou	8					mountain	feeding		
13-Jul-17	11:00	Rene Darveau		variable		caribou	2					DH17-J	funning		
21-Jul-17	18:00	Mackenzie Heff				caribou	5					15 KM W KZK	feeding		
21-Jul-17	7:45	Matt Brickenden				caribou	4					15 KM W KZK	funning		
23-Jul-17	19:00	Dillon Hume				caribou	3					Rhyolite Peak	grazing		
28-Jul-17	17:00	Mackenzie Heff		overcast		caribou	1					soil grid	feeding		
30-Jul-17		Darcy Baker				caribou	3					D7 grid, east side	looking and eating		
31-Jul-17	12:30	Mark Baknes	8			caribou	1			1		high alpine			
01-Aug-17	19:30	Jennifer Burgess	15	sunny		caribou	1		1			km 21.5	walking along road	roadside	possibly feeding along edges
03-Aug-17	17:10	John Bell		sunny		caribou	1		1			km 22.5	trotting down the road	Subalpine	
06-Aug-17	12:00	Will Shawcross		clear		caribou	1		1			km 21.5 to 22	running	roadside/subalpine	
07-Aug-17	11:00	Jordan Ruether		sunny		caribou	1		1			Geona Creek	roaming	hillside/creek	
12-Aug-17	9:30	Matt Manor		clear, light wind		caribou	1		1			409900E, 6810800N	feeding, relaxing	valley	watched us work in the valley, didn't care we were there
18-Aug-17	11:00	Spencer Postman	20	sunny		caribou	1		1			Rhyolite Peak	grazing		
26-Aug-17	15:00	Sheila Johnny		rain		caribou	Herd					chopper ride	On the mountain feeding and running		
02-Sep-17	10:45	Rene Darveau		clear		caribou	1					399474, 6812316	running		

DATE	TIME	OBS	WEATHER			SPECIES	NO. ANIMALS					LOCATION	WILDLIFE ACTIVITY	HABITAT	OTHER COMMENTS
			TEMP (°C)	PRECIP	WIND		TOTAL	F	M	UNK	JUV				
04-Sep-17	9:20	Darrin D.		overcast		caribou	2					deposit	bedded	slope	
17-Sep-17	14:00	T. Newkirk	10	clear		caribou	6	4	2			416500, 6814500	feeding		
20-Sep-17	7:45	H. John	0	clear		caribou	2		2			km 22.5	rutting/fighting	west side up from road	
20-Sep-17	15:20	J. Burgess	2	sun and clouds		caribou	13	7	6		3	411925, 6814030	feeding / laying	mountain slope	one very white Male
20-Sep-17	18:00	J. Burgess	4	sun and clouds		caribou	3	2	1			412150, 6817750	feeding	hilltop/plateau	
20-Sep-17	16:30	J. Burgess	2	sun and clouds		caribou	5	2	3		1?	412245, 6815194	feeding	hilltop	ran towards us, then ran away when it could smell us
20-Sep-17	7:30	R. Bob	0	clear		caribou	2	1	1			413600, 6819500	chasing each other	hill top	
	14:00	T. Smith		overcast		caribou	2		2			413315, 6813485	sitting	slope	
12-Oct-17	11:00	Jake Jacobs	-8	overcast		caribou	6			6		Repeater hill	feeding	sub alpine	seen from millsite
13-Oct-17	15:00	Rene Darveau	-2	snowing		caribou	2			2		Repeater hill	feeding		
16-Oct-17	10:00	Sheila Johnny	-2	mixed sun / cloud		caribou	4			4		415800, 6818300	lying down & feeding	slope	
17-Oct-17	15:40	Shirley Ladue	-8	cloudy	light	caribou	3			3		413550, 6819300	feeding, lying down	hill	
17-Oct-17	10:00	Yvonne Ollie	-10	cloudy		caribou	12			12		415800, 6818300	feeding, lying down	slope	
17-Oct-17	9:00	Sheila Johnny		sunny		caribou	20			~20		415800, 6818300	feeding		see them all day
19-Oct-17	17:20	Shirley Ladue	-5	light snow		caribou	30			>30		416880, 6817470	feeding	mountain top	
20-Oct-17	14:10	Jennifer Burgess	-3	overcast	windy	caribou	12			>12		416300, 6821400	feeding	mountain top	seen from km 14
20-Oct-17	15:45	Jessican Galavan	-2	clear		caribou	large herd					416950, 6817200	running	mountain top	seen from millsite
22-Oct-17	9:30	Jennifer Burgess	-6	light snow		caribou	3		3			415900, 6815000	feeding	mountain top	seen from paste plant
21-Oct-17	15:00	Trevor Smith	-15	clear		caribou	2		2			416650, 6817350	feeding	mountain top	

DATE	TIME	OBS	WEATHER			SPECIES	NO. ANIMALS					LOCATION	WILDLIFE ACTIVITY	HABITAT	OTHER COMMENTS
			TEMP (°C)	PRECIP	WIND		TOTAL	F	M	UNK	JUV				
21-Oct-17	15:00	Trevor Smith	-15	clear		caribou	21			21		415500, 6815350	feeding	mountain top	hanging out all day
22-Oct-17	16:20	Jennifer Burgess	-2	mixed sun / cloud		caribou	100			>100		416100, 6817500	laying down (70%)	slope near tree line	wandered down from mtn top, feeding
22-Oct-17	14:30	Jennifer Burgess	-2	mixed sun / cloud	windy - S	caribou	50			50+		417050, 6817300	feeding	mountain top	more over ridge?
23-Oct-17	10:15	Jennifer Burgess	-3	sunny		caribou	20			20		415450, 6815325	feeding	slope	
23-Oct-17	10:20	Jennifer Burgess	-3	sunny		caribou	3			3		416550, 6813900	feeding	mountain top	may be more over ridge
23-Oct-17	11:45	Doreen Ladue		cloudy		caribou	15			15		416300, 6817525	feeding	slope	
23-Oct-17	all day	Caitlin Gugins	-2	cloudy		caribou	100			~100		415250, 6817450	walking & feeding	mtn top & valley	
24-Oct-17	15:30	Jennifer Burgess	-2	sunny		caribou	20			~20		416985, 6817268	feeding	mountain top	more over ridge?
24-Oct-17	13:40	Mike Lamothe	-2	sunny		caribou	20			~20		415900, 6815450	walking / grazing	slope	
24-Oct-17	17:10	Doreen Ladue	-4	cloudy		caribou	dozens			dozens		on mountain	feeding	slopes	
24-Oct-17	10:30	Jennifer Burgess	-6	clear		caribou	10		3	~7		416525, 6813975	laying down	mountain top	big racks on 3rd male
25-Oct-17	10:10	Jennifer Burgess	-10	sunny	windy, S	caribou	20			20+		417200, 6817450	laying down, feeding	mountain top	may be more over ridge
25-Oct-17	15:10	Jennifer Burgess	-2	mixed sun / cloud	windy, S	caribou	50			~50		415700, 6821350	feeding	slope	seen from km 15
25-Oct-17	16:19	Randy Shannon	-5	overcast		caribou						on hill top		on hill top	seen from km 21
26-Oct-17	17:00	Russel Bob				caribou	15			~15		km 21	crossing road		heading west
28-Oct-17	13:45	Tony Reid	0	sunny		caribou	12			12		km 20	crossing road		heading west
01-Nov-17	17:34	Jennifer Burgess	-10	clear		caribou	30			~30		416050, 6821450	feeding	slope	seen from km 14

TOTAL

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2018 Finlayson Caribou Observations

DATE	TIME	OBS	WEATHER			SPECIES	NO. ANIMALS					LOCATION	WILDLIFE ACTIVITY	HABITAT	OTHER COMMENTS
			TEMP (°C)	PRECIP	WIND		TOTAL	F	M	UNK	JUV				
23-May-18	10:30	Jody Inkster		mostly sunny		caribou	3	1		2		near kz-6	eating		
9-Jun-18	9:00	Nathan Conroy	6	1015 hpa		caribou	5			5		2 km northeast of weather station	walking	alpine	
11-Jun-18	8:30	Chris Sobolfwsri				caribou	4			4		km 25			
11-Jun-18	10:00	Paul Abday		clear		caribou	5	3	2			mountain top west of km 25	feeding		moved when they saw people
12-Jun-18	16:00	Paul Abday	10	clear		caribou	1		1			west slope at south end of claims	feeding	slope	
12-Jun-18	17:00	Chris Sobolfwsri				caribou	4			4		km 25	eating		
13-Jun-18	11:56	David Jimmy		clear		caribou	3			3		on mountain	feeding	slope	
14-Jun-18	10:00	Mason Gray	18			caribou	3		3			top of mountain	feeding		curious
30-Jun-18	14:50	Crey Ackerson	15			caribou	1				1	E414085, N6812598	feeding	slopes	
7-Jul-18	11:00	Hannah Warrington		sunny		caribou	3			3		500 east of cayley	grazing	on ground	
7-Jul-18	9:30	Derek Saxton		foggy		caribou	1			1		alpine west of gp4f		alpine	
12-Jul-18	16:00	Hannah Warrington		rainy, cool		caribou	6			6		alpine slopes	feeding	1 km east of cayley	
13-Jul-18	10:00	Hannah Warrington		sun, clouds		caribou	2			2		800 m northwest of rhyolite peak	grazing, walking	alpine slope	
13-Jul-18	11:30	Hannah Warrington		cool, cloudy, sunny		caribou	2			2		300 m northwest of lassen	feeding	alpine slope	
14-Jul-18	8:10	Kevin Duff		sunny		caribou	2		2			3.3 miles south of camp	resting	snow patch	
14-Jul-18	8:15	Kevin Duff		sunny		caribou	6	6				2.5 miles south of camp	resting	snow patch	
14-Jul-18	11:50	Ty Magee				caribou	3			3		wolf block claim mapping		touring the hills	

DATE	TIME	OBS	WEATHER			SPECIES	NO. ANIMALS					LOCATION	WILDLIFE ACTIVITY	HABITAT	OTHER COMMENTS
			TEMP (°C)	PRECIP	WIND		TOTAL	F	M	UNK	JUV				
17-Jul-18	11:30	Charles Louvel		sunny		caribou	3			3		tsa da gliza	feeding	mountain	
20-Jul-18		Kevin Duff		sunny		caribou	2	1			1	4.2 miles south of camp	resting on snowpack	snowpack	
20-Jul-18		Kevin Duff		sunny		caribou	5	5				4 miles south of camp	feeding	alpine	
22-Jul-18	8:00	Kevin Duff		sunny		caribou	1		1			1 mile south of camp	standing	brush	
26-Jul-18	22:04	Freda Sterriah				caribou	1			1					
26-Jul-18	10:04	Sheila Johnny		sunny		caribou	1			1		km 21	walking		
30-Jul-18	8:00	Kevin Duff		sunny		caribou	1		1			4 miles south of camp	feeding	bottom of valley	
31-Jul-18		Hannah Warrington		sunny, light wind		caribou	4			4		south of jefferson loop and south of rhyolite peak	foraging	alpine	
2-Aug-18	9:30	Dennis Menacho		partly cloudy		caribou	2			2		south of kzk en route to wolf			
3-Aug-18	19:45	Jody Inkster	20	partly cloudy		caribou	1		1			top of repeater mountain	feeding	alpine	was curious about me
4-Aug-18		Kevin Duff		cloudy		caribou	2			2		grassy lake			
4-Aug-18		Kevin Duff		cloudy		caribou	1		1			rhyolite peak	foraging	alpine	
4-Aug-18		Matt Manor		cloudy		caribou	1		1			near south ponds	walking	subalpine	walking through buckbrush
14-Jul-18	11:50	Ty Magee				caribou	3			3		wolf block claim mapping		touring the hills	
17-Jul-18	11:30	Charles Louvel		sunny		caribou	3			3		tsa da gliza	feeding	mountain	
20-Jul-18		Kevin Duff		sunny		caribou	2	1			1	4.2 miles south of camp	resting on snowpack	snowpack	
20-Jul-18		Kevin Duff		sun ny		caribou	5	5				4 miles south of camp	feeding	alpine	
22-Jul-18	8:00	Kevin Duff		sunny		caribou	1		1			1 mile south of camp	standing	brush	
26-Jul-18	22:04	Freda Sterriah				caribou	1			1					

DATE	TIME	OBS	WEATHER			SPECIES	NO. ANIMALS					LOCATION	WILDLIFE ACTIVITY	HABITAT	OTHER COMMENTS
			TEMP (°C)	PRECIP	WIND		TOTAL	F	M	UNK	JUV				
26-Jul-18	10:04	Sheila Johnny		sunny		caribou	1			1		km 21	walking		
30-Jul-18	8:00	Kevin Duff		sunny		caribou	1		1			4 miles south of camp	feeding	bottom of valley	
31-Jul-18		Hannah Warrington		sunny, light wind		caribou	4			4		south of jefferson loop and south of rhyolite peak	foraging	alpine	
2-Aug-18	9:30	Dennis Menacho		partly cloudy		caribou	2			2		south of kzk en route to wolf			
3-Aug-18	19:45	Jody Inkster	20	partly cloudy		caribou	1		1			top of repeater mountain	feeding	alpine	was curious about me
4-Aug-18		Kevin Duff		cloudy		caribou	2			2		grassy lake			
4-Aug-18		Kevin Duff		cloudy		caribou	1		1			rhyolite peak	foraging	alpine	
4-Aug-18		Matt Manor		cloudy		caribou	1		1			near south ponds	walking	subalpine	walking through buckbrush
8-Aug-18	17:55	Rene Darveau		mostly cloudy, windy		caribou	2		2			north side of fault creek	feeding	alpine	
12-Aug-18	10:04	Rene Darveau		sunny		caribou	3			3		E414606, N6812694	feeding	slopes	
12-Aug-18	15:20	Rene Darveau		sunny		caribou	2			2		E413202, N6812758	feeding	slopes	
12-Aug-18	8:09	Rene Darveau		sunny		caribou	3	1	2			E413402, N6812250	feeding	slopes	
13-Aug-18		Jody Inkster				caribou	3			3		E376059, N6802348			
18-Aug-18	8:45	Cassia Jakesta	7 degrees	cloudy		caribou	2	1	1			near k18-q	feeding	alpine slope	
26-Aug-18	8:00	Cassia Jakesta		foggy, wet		caribou	1			1		km 20	walking across road	forest	
29-Aug-18		Kevin Duff		overcast		caribou	3	2	1			fault creek headwaters			south of drill

DATE	TIME	OBS	WEATHER			SPECIES	NO. ANIMALS					LOCATION	WILDLIFE ACTIVITY	HABITAT	OTHER COMMENTS
			TEMP (°C)	PRECIP	WIND		TOTAL	F	M	UNK	JUV				
30-Aug-18	8:00	Kevin Duff		sunny		caribou	5		4		1	half a mile from fault creek	feeding	southside	
30-Aug-18		Harold John		overcast		caribou	1			1					
31-Aug-18		Jody Inkster		mostly cloudy		caribou	3	2		1		deposit	running	tote road	
1-Sep-18		Kevin Duff		sunny		caribou	10			10		west side of rhyolite	feeding	alpine	
2-Sep-18		Jody Inkster		light snow		caribou	4	1		3		weather station	feeding	alpine	
3-Sep-18		Harold John		cloudy		caribou	16		2	14		rhyolite peak		alpine	
4-Sep-18	10:00	Jody Inkster		cloudy		caribou	25	2	1	22		mountain east of deposit		alpine	resting, bulls, cows, and juveniles present
4-Sep-18		Morgan Hendrie		cloudy		caribou	20			20		rhyolite peak		alpine	
5-Sep-18		Jody Inkster		cloudy		caribou	6			6		rhyolite peak	feeding	subalpine	
7-Sep-18		Jody Inkster		overcast		caribou	4	2	1	1		south of san003	feeding	alpine	fyre lake
7-Sep-18		Jody Inkster		overcast		caribou	2		2			rhyolite peak	feeding	alpine	pelly
8-Sep-18		Dennis Menacho		partly cloudy		caribou	20			20		near rp001		alpine	
8-Sep-18		Kevin Duff		partly cloudy		caribou	29			29		rhyolite peak area		alpine	
9-Sep-18		Robby Dick		sunny		caribou	2			2		west of rp004b		alpine	
10-Sep-18		Morgan Hendrie		sunny		caribou	8			8		near k18-r	rutting	alpine	
10-Sep-18		Morgan Hendrie		cloudy		caribou	8			8		near K18-r			
23-Sep-18		Morgan Hendrie				caribou	5			5		deposit/wolf			alpine
28-Sep-18		Jody Inkster		sunny		caribou	6			6		south of weather station	running		alpine

TOTAL

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2019 Finlayson Caribou Observations

DATE	TIME	OBS	WEATHER			SPECIES	NO. ANIMALS					LOCATION	WILDLIFE ACTIVITY	HABITAT	OTHER COMMENTS
			TEMP (°C)	PRECIP	WIND		TOTAL	F	M	UNK	JUV				
29-May-19	n/a	Jl/CH				caribou	1			1		south of fault creek on mountain top/alpine	foraging	alpine	
30-May-19	n/a	CJ/SM				caribou	1			1		between gatehouse and finlayson Lake turn off	standing on the road and then runs into the forest	boreal cordillera	
22-Jul-19	16:00	RB				caribou	1	1				utm 413670,6811800	walking	alpine	
24-Jul-19	9:30	DH				caribou	7		1	6			Looking curiously	alpine	creek
24-Jul-19	16:35	DD/CH/DC/CJ				caribou	1	1				km 24	eating vegetation	alpine	on skyline
27-Jul-19	17:20	DB				caribou	1			1		south of outfitter creek		alpine	
28-Jul-19	10:00	RB				caribou	1						observing	alpine	caribou close by
29-May-19	n/a	Jl/CH				caribou	1			1		south of fault creek on mountain top/alpine	foraging	alpine	

TOTAL

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