



March 2018 Environmental Update for SLEMA Board

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March 31, 2018

Outline

1. Mine Update
2. Inspection Update
3. Regulators' Update
4. Aboriginal Update
5. Stakeholders' Update
6. SLEMA Reviews
7. Paper Argues Caribou Decline a Result of Impacts from Mineral Exploration



Acronyms

- AEMP – Aquatic Effects Monitoring Program
- ARD – Acid Rock Drainage
- DFO – Fisheries and Oceans Canada
- ECCC – Environment and Climate Change Canada
- ECM – Extended Care and Maintenance
- ENR – Department of Environment and Natural Resources, GNWT
- EQC – Effluent Quality Criterion
- GNWT – Government of the Northwest Territories
- INAC – Indigenous and Northern Affairs Canada (formerly Aboriginal Affairs and Northern Development Canada [AANDC])
- MVEIRB – Mackenzie Valley Environmental Impact Review Board
- MVLWB – Mackenzie Valley Land and Water Board
- PK – Processed Kimberlite
- SLEMA – Snap Lake Environmental Monitoring Agency
- SNP – Surveillance Network Program
- SSWQO – Site-Specific Water Quality Objective
- TDS – Total Dissolved Solids
- WEMP – Wildlife Effects Monitoring Program
- WTP – Water Treatment Plant
- WMP – Water Management Pond



1.1 Mine Update – February 2018

- The Snap Lake Mine remained in suspended operations (Extended Care and Maintenance)
 - 217 m³ of water withdrawn from Snap Lake
 - No treated water discharged into Snap Lake
- One reportable spill
 - Sewage Spill 18-034: the spill volume was 1 cubic meter, near the Water Management Pond
- Water sampled in 3 monitoring stations
 - 02-14, 02-15, and 02-16j



1.2 Request to Amend the Land Use Permit MV2017D0032

- Submitted on March 12, 2018, and requested that
 - The Board amend condition 52 of the water license to align with requirements in the Storage tank systems for Petroleum Products and Allied Petroleum Products Regulations
 - The submission of an internal closure and reclamation plan not be required and be replaced by a Final Closure Plan to be submitted the same date as a submission for renewal of a new water license be submitted



1.3 Wildlife and Wildlife Habitat Protection Plan 2017 Annual Report

➤ Submitted on March 19, 2018

- Reported wildlife monitoring occurring at and immediately adjacent to the Mine in 2017
- Included a full analysis of monitoring data gathered from 1999 to 2017



1.4 Wildlife Effects Monitoring Program 2017 Annual Report

- Submitted on March 19, 2018
 - Reported wildlife monitoring occurring at spatial scales beyond the Mine footprint
 - Included a full analysis of monitoring data gathered from 1999 to 2017



1.5 Resubmission of Environmental Agreement 2016 Annual Report

- Updated 2016 EAAR following reviewer comments
 - Submitted on March 19, 2018



2. Inspection Update

- Inspector – Tracy Covey
- Water Licence Inspections
 - Inspected on March 9, 2018 and reported on March 14



2.1 Water Licence Inspection on March 9, 2018

➤ Reported on March 14, 2018

- North Pile, Sumps and ditches, Waste Transfer Area, Dam 1, all active fuel tanks, Water Treatment Plant (preparation for the installation of Reverse Osmosis Unit), and site of sewage spill (Spill #18-034) inspected
- No environmental risks noted, but actions are required for a few issues
 - SNP queries (SNP 02-02, 02-11, 02-12 and 02-14) remained outstanding
 - Approved method/plan for handling the brine waste by-product resulting from the new Reverse Osmosis Water Treatment Plant?



ICRP Submission

- Land Use Permit MV2017D0032 established a due date for an updated ICRP of January 30, 2018. on December 14, 2017, De Beers requested to be release from the requirement to file an ICRP by the January deadline. As the MVLWB can't approve a Plan which contradicts existing conditions, it has "deferred its decision on the request to not file ICRP v.4 (pending approval of amendment of two Conditions (52 and 71) of LUP MV2017D0032".
- Given that situation, the Inspector has given De Beers an unacceptable rating (it has not met the condition), but will not be taking enforcement action (at this time), the Board rejects the amendment application (if that happens)



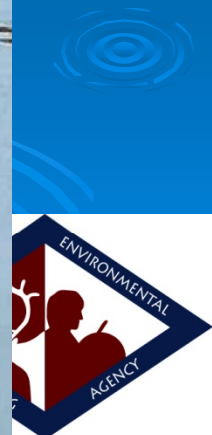
Care and Maintenance Sewage Treatment Plant (CMSTP)



Chemical Storage for the CMSTP



Sewage Treatment Plant (STP2) was decommissioned on February 5, 2018



Lightly Used Landfill



A loader had recently broken through ice to the bottom of Sump 5, to facilitate future insertion if a de-watering intake hose



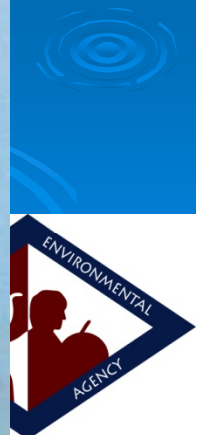
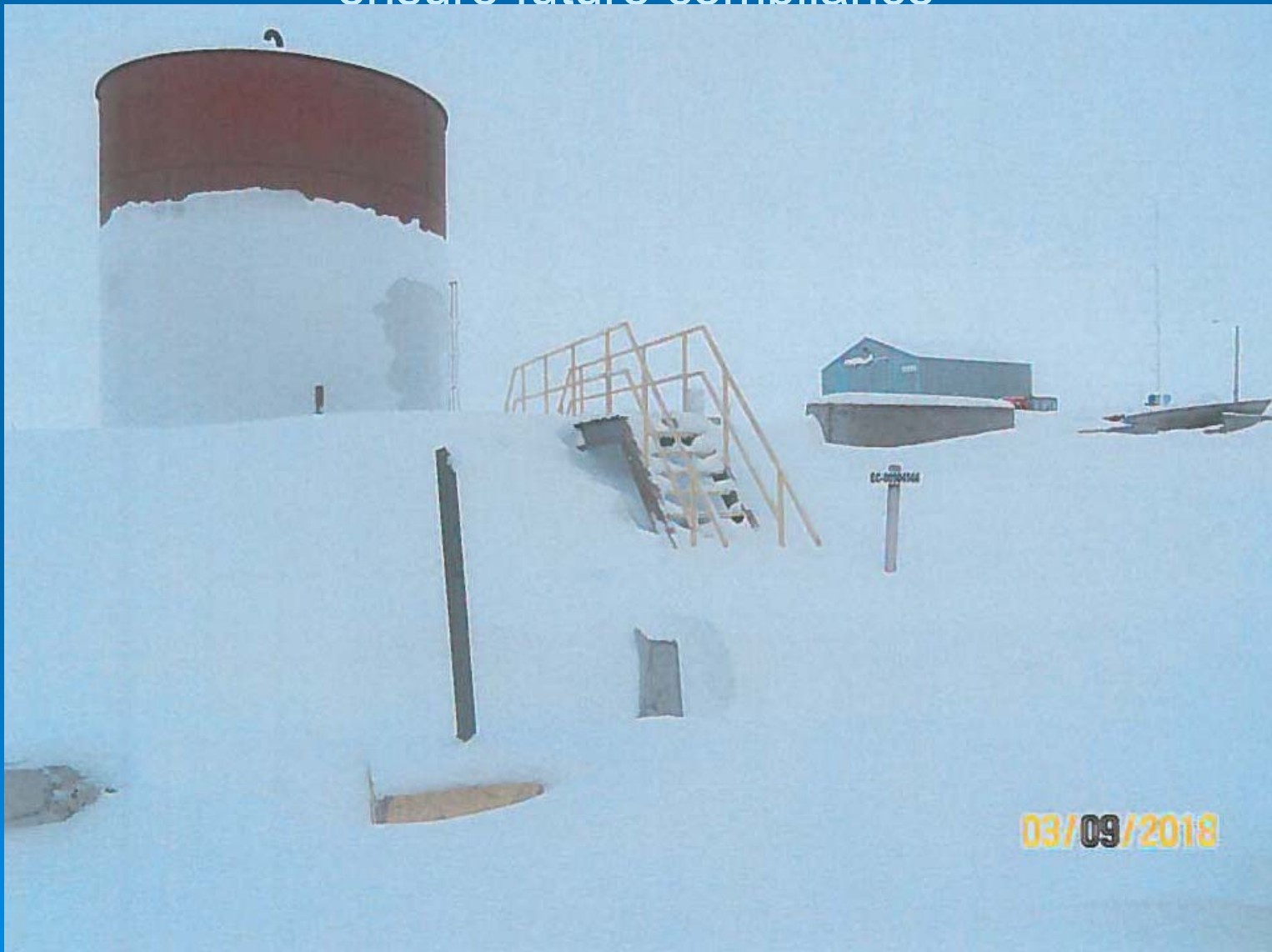
The frost line indicate that the tank still contains approximately 4 million litres of diesel



Tanks contain various amounts of diesels (note the frost lines) in the 333,00 L Diesel Tank Farm



Fuel storage tanks must be inspected daily for leaks and repaired immediately as per Land Use Permit conditions. Snow removal at this tank facility remains insufficient to ensure future compliance



3. Regulators' Update

- No decisions made in March 2018



4. Aboriginal Update

- No comments received in March 2018



5. Stakeholders' Update

- ENR commented the Financial Security Estimate – RECLAIM Update on March 6, 2018



5.1 ENR Comments on the Financial Security Estimate – RECLAIM Update (I)

- GNWT-ENR will continue to credit the Security Deposit up to \$47,000,000
- ENR holds security for obligations under the Agreement, such as wildlife and air quality monitoring, and that we believe that those items should be removed from RECLAIM to avoid double bonding



5.1 ENR Comments on the Financial Security Estimate – RECLAIM Update (II)

- The Updated Financial Security Estimate notes on page A-19, that the Wildlife Effects Monitoring Program (WEMP) will be reduced to monitoring on a five year cycle following the end of mining. There is no mention of the Wildlife and Wildlife Habitat Protection Monitoring Program (WWHPP) that is currently undertaken by De Beers
 - Please clarify De Beers' proposed monitoring schedule for the WWHPP



5.1 ENR Comments on the Financial Security Estimate – RECLAIM Update (III)

- Wildlife effects monitoring would be better reflected as a single line item separated from that of aquatics in order to assess what costs are being assigned to wildlife effects monitoring. More information, such as which valued components are being monitored and the frequency and method of monitoring, are required in order to assess whether De Beers' cost estimates for wildlife effects monitoring is accurate.



5.1 ENR Comments on the Financial Security Estimate – RECLAIM Update (IV)

- The GNWT would welcome a meeting between De Beers and SLEMA to discuss the closure and post-closure air and wildlife monitoring requirements under the Agreement. Until an agreement between De Beers, GNWT and SLEMA is reached on the closure and post-closure air and wildlife monitoring frequency it is difficult to assess whether the cost estimates put forward by De Beers in the RECLAIM estimate are accurate



5.1 ENR Comments on the Financial Security Estimate – RECLAIM Update (V)

- It is recommended that changes to air quality monitoring, that would be considered a departure from the Agreement, have evidence of support and sign-off by all parties. Can greater clarity on the monitoring (eg. TSP) be provided at this time? Until the parameters and frequency of the closure and post-closure air monitoring is agreed to by the GNWT and SLEMA, as required by the Agreement, it is difficult to assess whether the cost estimates put forward by De Beers in the RECLAIM estimate are accurate



5.1 ENR Comments on the Financial Security Estimate – RECLAIM Update (VI)

- ENR notes that the current estimate is based upon assumptions made prior to the decision to proceed with the closure of the Snap Lake Mine. As such, information remains outstanding regarding several important closure components such as updated water quality models, updated thermal monitoring and predicted time for the North Pile to freeze, approved closure criteria for seepage and runoff ,reclamation research, etc.
 - ENR recommends that a thorough review of the security be undertaken with submission of the Closure Plan



5.1 ENR Comments on the Financial Security Estimate – RECLAIM Update (VII)

- ENR recommends that De Beers provide any reports available of hydrogeological assessments and stratification modelling to support the plan to pump surface water and/or process residuals underground. Any restrictions should be described, such as pumping rates, the volume that can be disposed of annually, as well as how many years this could be relied upon if required.



5.1 ENR Comments on the Financial Security Estimate – RECLAIM Update (VIII)

- ENR recommends that the security estimate be adjusted to assume a minimum of five years of water treatment will be required: two years during ICM, two years during active closure, and one year following active closure. Based on the annual cost presented in the security estimate, this would result in an increase in direct costs of \$1,283,858
- ENR recommends that future updates to the security estimate should link the duration of water treatment to water quality predictions based on updated water quality models



5.1 ENR Comments on the Financial Security Estimate – RECLAIM Update (IX)

- ENR recommends that a detailed breakdown of costs for water treatment be provided. Costs should be based on known costs of operating the existing water treatment system, and estimates of the microfiltration and RO units. Costs should include: labour, power, all chemicals, supplies, analytical testing, and maintenance costs. The security estimate should be revised accordingly. ENR notes that this information is requested for most mines operating in the NWT



5.1 ENR Comments on the Financial Security Estimate – RECLAIM Update (X)

- ENR recommends that further evaluation of the proposed semi-passive water treatment system and associated costs be carried out with submission of a Final Closure and Reclamation Plan. If not approved, the security estimate should be updated to reflect longer term active water treatment



5.1 ENR Comments on the Financial Security Estimate – RECLAIM Update (XI)

- ENR recommends that the closure costs for the North Pile be further evaluated upon submission of the Final CRP
- ENR recommends that the Post-Closure Monitoring and Maintenance costs be further evaluated upon submission of the Final CRP



6. SLEMA Reviews

- Wildlife and Wildlife Habitat Protection Plan 2017 Annual Report
- Wildlife Effects Monitoring Program 2017 Annual Report



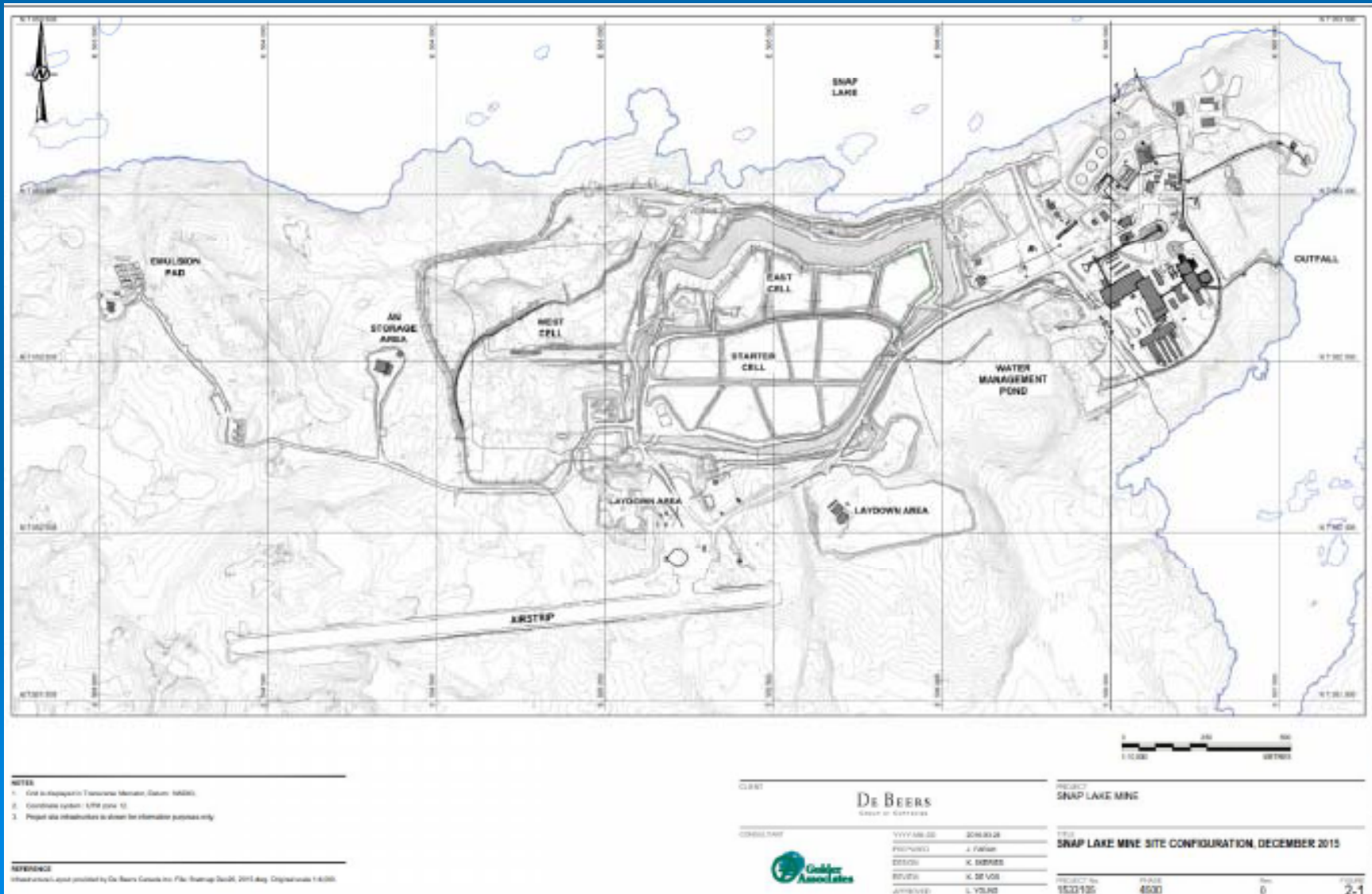
6.1 Wildlife and Wildlife Habitat Protection Plan 2017 Annual Report

➤ Submitted on March 19, 2018

- Reported wildlife monitoring occurring at and immediately adjacent to the Mine in 2017
- Included a full analysis of monitoring data gathered from 1999 to 2017



Wildlife and Wildlife Habitat Protection Plan Study Area (Local Study Area)



Vegetation Loss

- The Mine is now near the maximum predicted extent, and no further changes are expected
 - Total disturbed area within the Local Study Area (LSA) is 196.6 ha, around 13.7% of the LSA

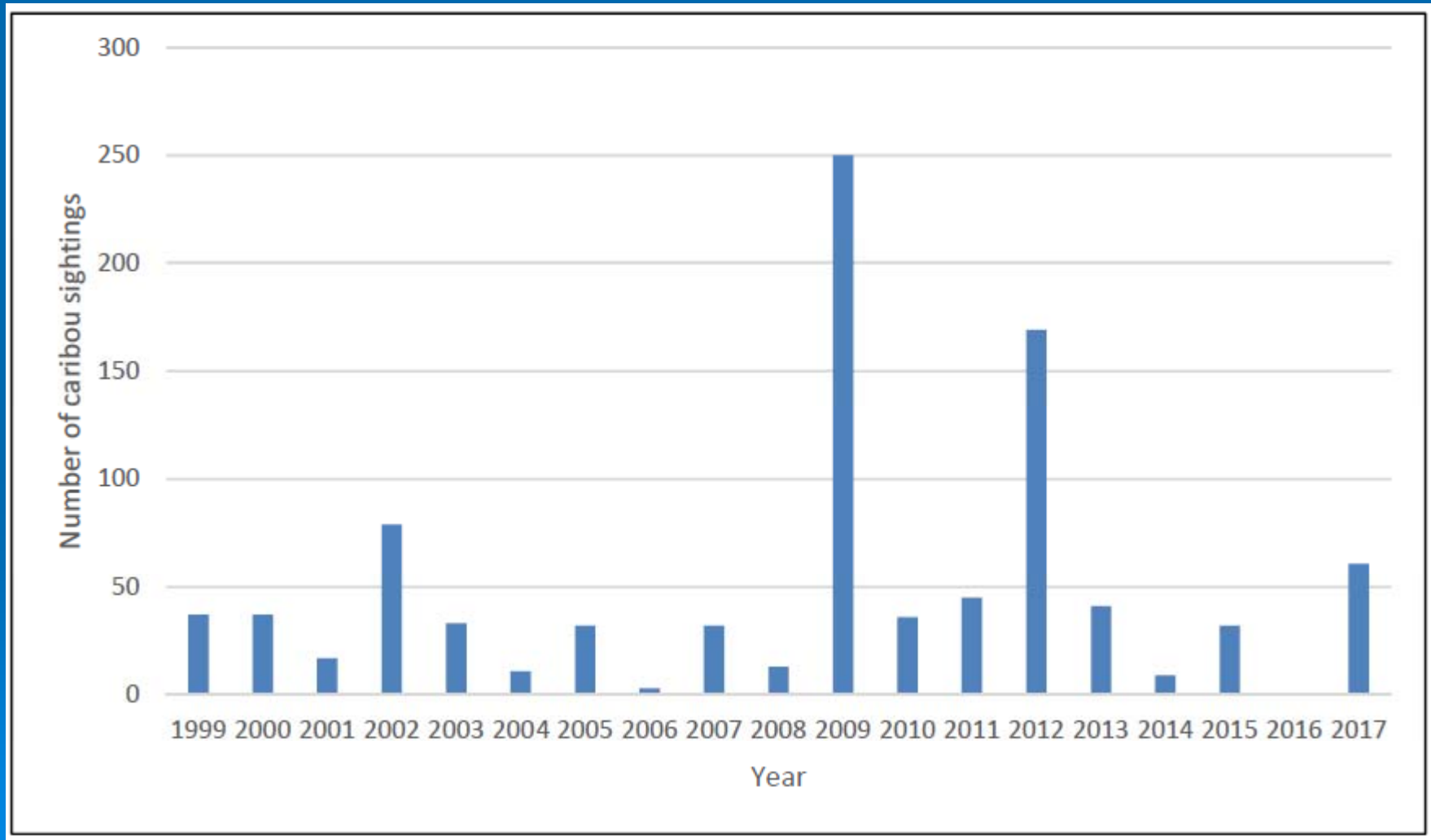


Wildlife Log Summary

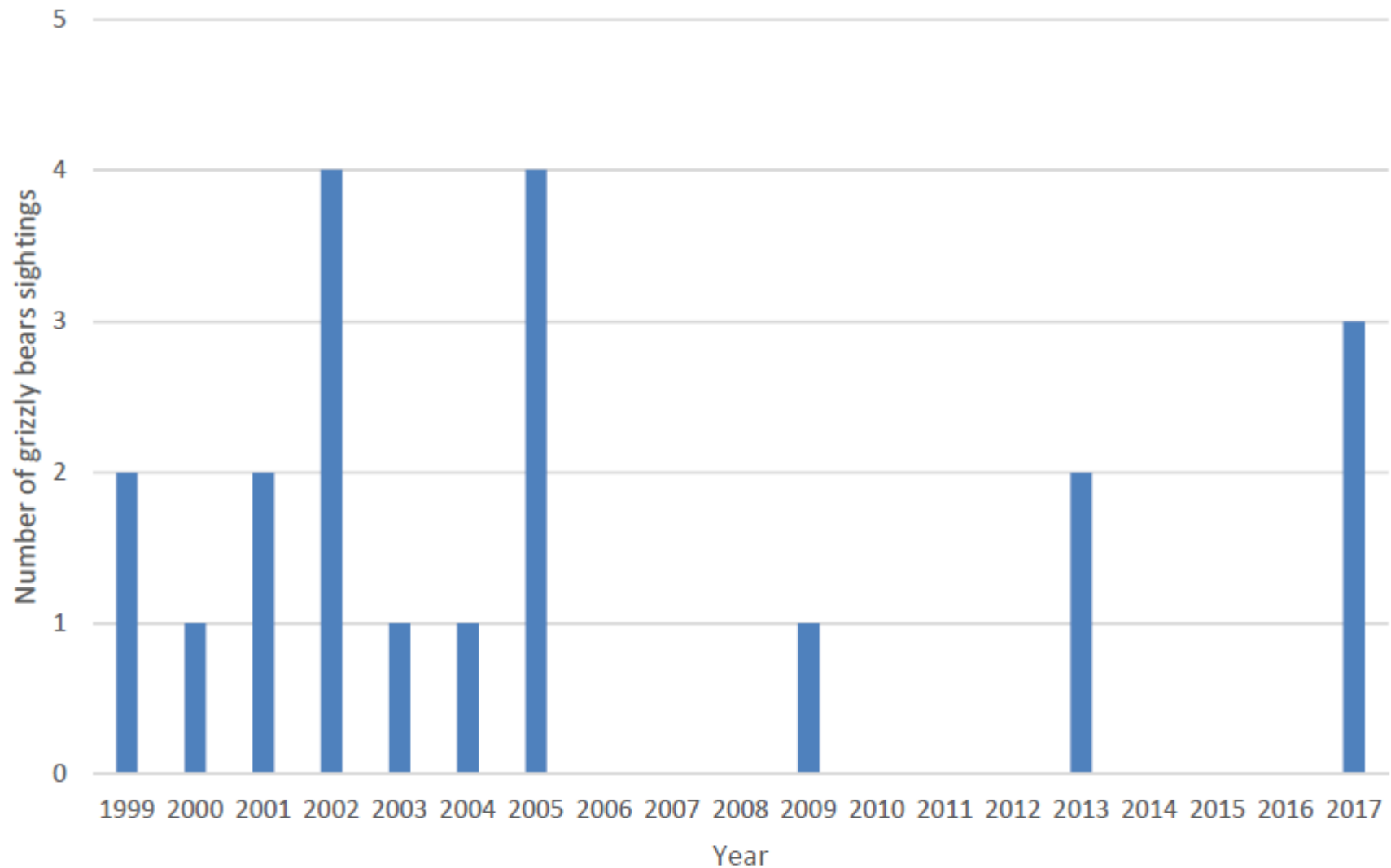
- Environment staff at site maintain an annual log of wildlife observed around the Mine by employees and contractors
 - Observations of species that may be considered uncommon or infrequent at the Mine were caribou, grizzly and moose in 2017
 - In 2017 there were 61 reported caribou sightings. Caribou were seen at Portage 1, between Portage 2 & 3, between Portage 3 & 4, Portage 4 and Portage 9



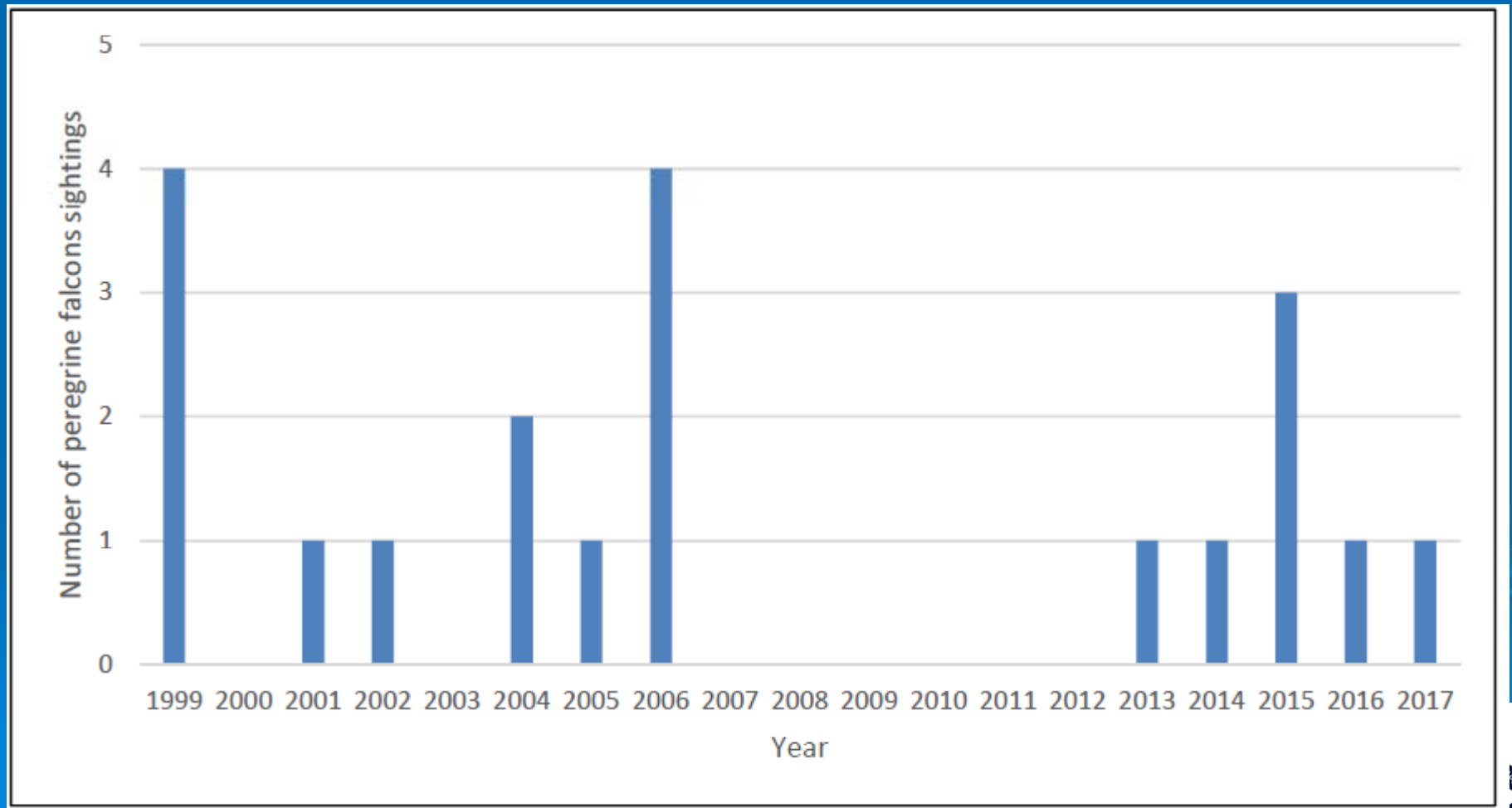
Number of caribou sightings at the Mine from 1999 to 2017



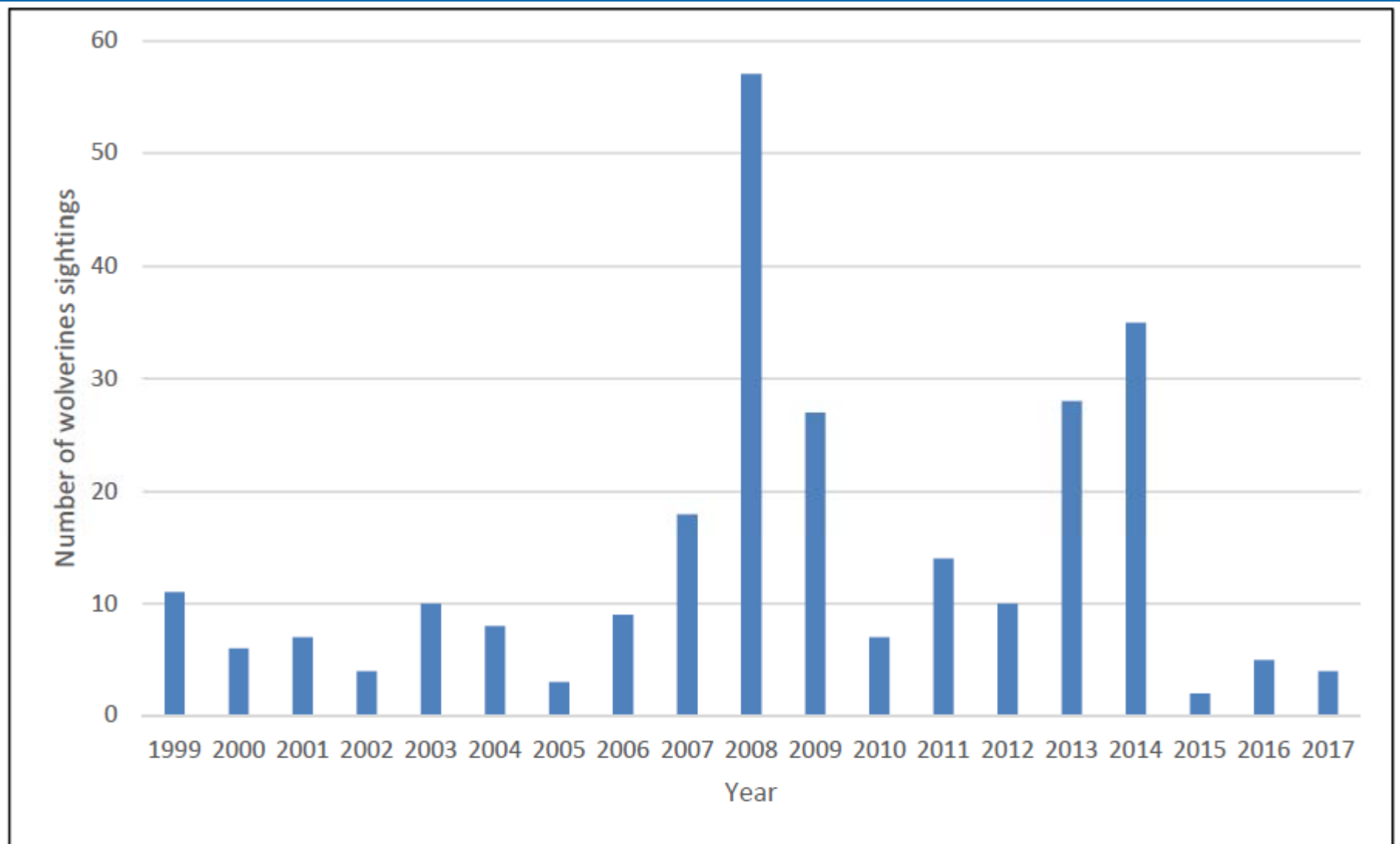
Number of grizzly bear sightings at the Mine from 1999 to 2017



Number of peregrine falcon sightings at the Mine from 1999 to 2017



Number of wolverine sightings at the Mine from 1999 to 2017

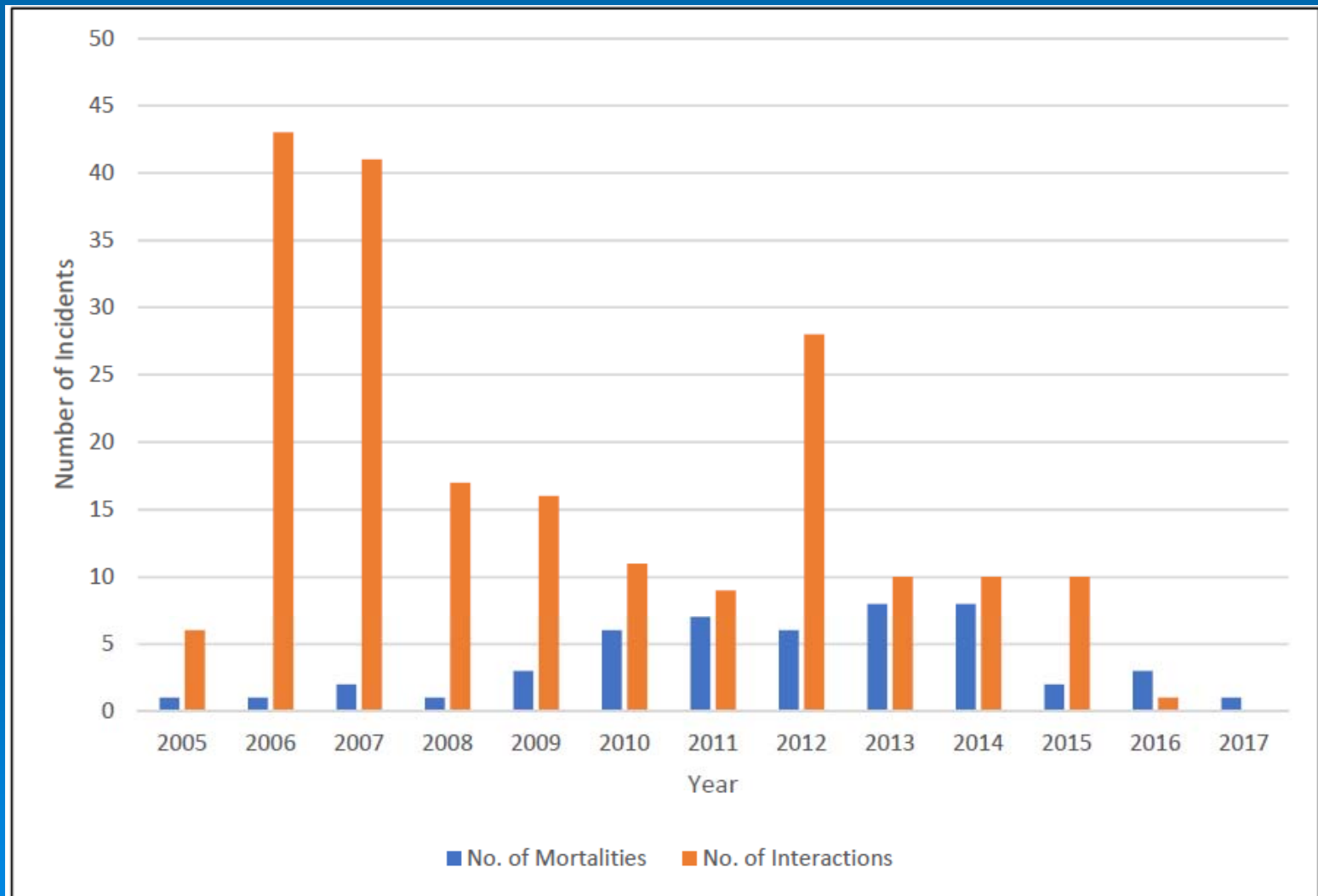


Wildlife Incidents

- Incidents are defined as any wildlife interaction that requires a response by Mine personnel and may include simple deterrent actions or the injury or death of an animal
 - On March 13, a barn swallow was found dead in the Processing Plant at the Airport Terminal
 - ENR was contacted regarding the incident.
 - The mechanism of death is unknown. There was no apparent cause of death
 - In 2017 there were no interactions that occurred which involved a deterrent



Number of mortalities and interactions at the Mine from 2005 to 2017



Note: The Wildlife Effects Monitoring Program was developed in 2004. Reporting of incidents and mortalities was not recorded prior to 2005.



Wildlife Site Surveillance Monitoring

- The presence of wildlife within the Mine site is monitored through regular inspections of the accommodation complex, airstrip, emulsion plant, North Pile, power plant and water treatment plant and waste management areas
 - The most frequently observed wildlife during the site surveillance monitoring surveys were foxes, ravens and hares (rabbits).
Wildlife sign observations included unspecified tracks and scat
- There were no reports of wildlife-vehicle collisions in 2017, nor was there evidence of wildlife-vehicle collisions detected during surveys of the Mine winter access road



Conclusion

- Measurements of wildlife habitat loss indicated that the current Mine footprint is less than the 15% total disturbed area predicted in the Environmental Assessment Report
- Mitigation designed to protect wildlife present at the Mine is effective as Mine-related wildlife mortality remains low
- The wildlife surveillance data suggest that wildlife VECs continue to be present and active in the Mine area, and no concerns were identified in 2017
- Regular surveys from 2013 to 2017 indicated that the presence of food waste in these areas is generally low and that the waste management system appears to be effective
- Surveillance data of the winter access road detected wildlife presence but did not observe evidence of mortality due to collisions with traffic or harvest



Comments from the Environmental Analyst

- No concerns are raised



6.2 Wildlife Effects Monitoring Program 2017 Annual Report

- Submitted on March 19, 2018
 - Reported wildlife monitoring occurring at spatial scales beyond the Mine footprint
 - Included a full analysis of monitoring data gathered from 1999 to 2017



Wildlife Effects Monitoring Program Study Area (Regional Study Area)



Species at Risk Observed or Expected in the Regional Study Area

Common Name	Scientific Name	COSEWIC Status ^a	SARA Status ^b	Species at Risk (NWT) Status ^c	NWT SARC Assessment Schedule 2015 to 2020 ^d
Caribou (Barren-ground population)	<i>Rangifer tarandus groenlandicus</i>	Threatened	No status	Threatened	April 2017
Grizzly bear (northwestern population)	<i>Ursus arctos</i>	Special Concern	No status	Special Concern	April 2017
Wolverine (western population)	<i>Gulo gulo</i>	Special Concern	No status	Not at risk	N/A
Peregrine falcon (anatum-tundrius complex)	<i>Falco peregrines anatum-tundrius</i>	Special Concern	No status	Not assessed	N/A
Short-eared owl	<i>Asio flammeus</i>	Special Concern	Schedule 1	Not assessed	N/A
Rusty blackbird	<i>Euphagus carolinus</i>	Special Concern	Schedule 1	Not assessed	N/A

a) Committee on the Status of Endangered Wildlife in Canada (COSEWIC, 2018).

b) Federal Species at Risk Act (SARA; Species at Risk Public Registry, 2018).

c) Source:(NWT SAR, 2018).

d) Northwest Territories Species at Risk Committee (NWT SARC, 2018).

NWT = Northwest Territories; N/A = not applicable, already assessed.

Monitoring Results (I)

- Limited Regional wildlife studies were completed in the regional study area (RSA) in 2017
- Through 2017, the effects of the Mine to wildlife have been within the range predicted in the Environmental Assessment Report



Monitoring Results (II)

➤ Caribou

- In 2017, the monitoring of caribou by means of collar data indicated low levels of interaction with the Mine by these species
- In 2017, aerial surveys of caribou were not completed due to an insufficient number of caribou observations needed to trigger the program



Monitoring Results (III)

➤ Grizzly Bear

- There was no Grizzly bear monitoring at the Mine in 2017
- In 2013 and 2014, De Beers (on behalf of the Mine and the Gahcho Kué Project) participated in a regional grizzly bear program in collaboration with Dominion Diamond Ekati Corporation and Diavik Diamond Mines Inc. that will help the GNWT monitor and assess cumulative effects
- This study did not extend into 2015, 2016 or 2017



Monitoring Results (IV)

➤ Wolverine

- The use of snow-track surveys to monitor wolverines was discontinued after 2012, as the Mine has opted to participate in a regional and standardized wolverine hair snagging program that will support management and conservation of wolverines by GNWT



Monitoring Results (IV)

➤ North American Peregrine Falcon

- During multi stakeholder meetings in 2009 and 2010 it was determined that mines could contribute nest monitoring data to ENR for regional monitoring purposes, or to the North American Peregrine Falcon survey, which occur every five years. In 2015 such a raptor nest survey was conducted to provide in kind raptor nest use and productivity data to the North American Peregrine Falcon survey. The next survey is scheduled for 2020.



Comments from the Environmental Analyst

- No concerns are raised

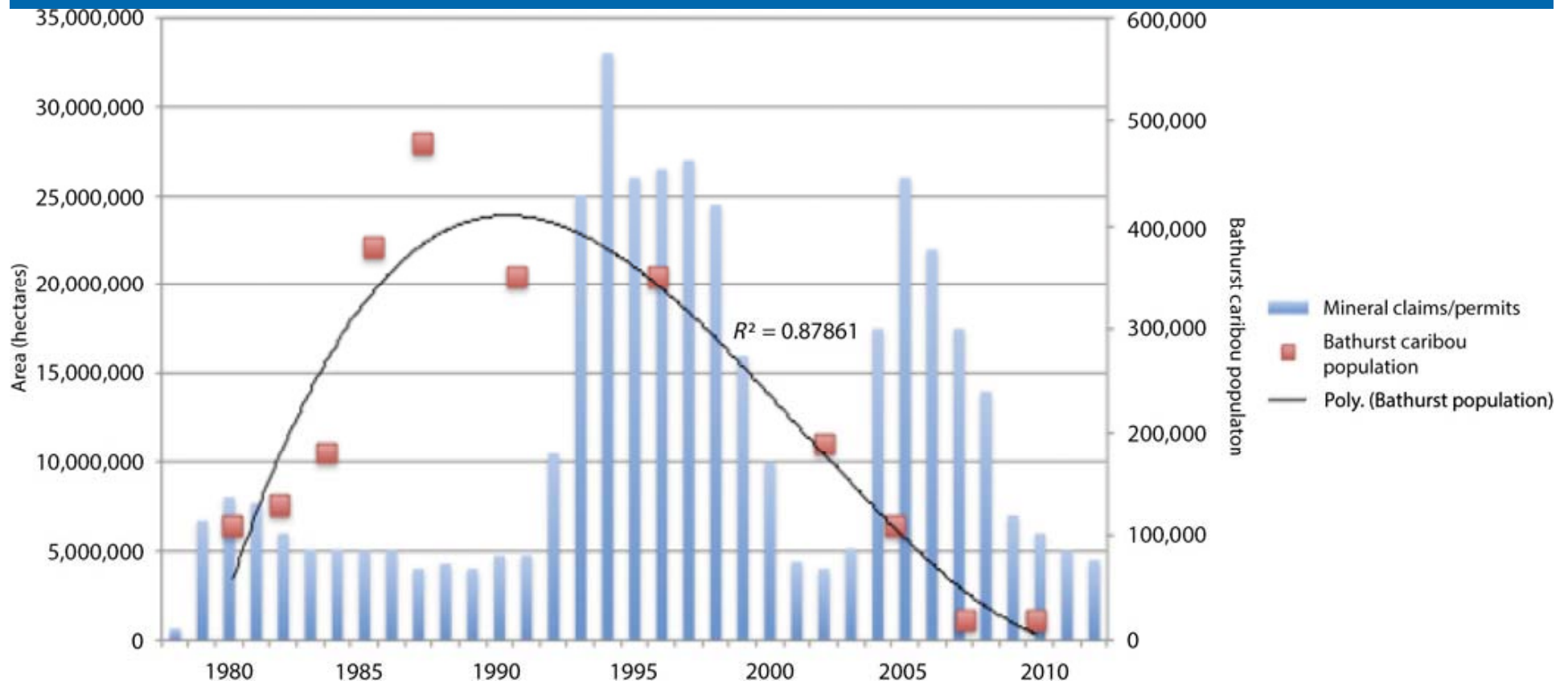


7. Paper Argues Caribou Decline a Result of Impacts from Mineral Exploration

- A new report by Canadian researchers suggest that the dramatic declines of barren-ground caribou herds is due to open access mining in Northern Canada, not, as authorities have assumed, traditional hunting by Indigenous people in the North
 - Undermining subsistence: Barren-ground caribou in a “tragedy of open access” by Brenda L. Parlee, John Sandlos and David C. Natcher in Science Advances in February 2018
 - <http://advances.sciencemag.org/content/4/2/e1701611.full>



Trends in mining exploration and development activity in the Northwest Territories



Mineral resource development in the Bathurst caribou range

