

APPENDIX 23A: WILDLIFE MITIGATION AND MONITORING PLAN

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CASINO PROJECT

Wildlife Mitigation and Monitoring Plan

28 November 2013

REVISION SUMMARY

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ABBREVIATIONS

BACI	Pairwise Before-After-Control-Impact
CMC	Casino Mining Corporation
COSEWIC	Committee on the Status of Endangered Species in Canada
COPC	Constituents of Potential Concern
GPS	Global Positioning System
EPP	Environmental Protection Plan
KI	Key Indicator
LSA	Local Study Area
LSCFN	Little Salmon Carmacks First Nation
Project	The Casino Project
PDA	Potential Disturbance Area
RRC	Renewable Resource Council
RSA	Regional Study Area
SARA	<i>Species at Risk Act</i>
TMF	Tailings Management Facility
TBD	To be decided
VC	Valued Component
WMMP	Wildlife Mitigation and Monitoring Plan
WMWG	Wildlife Management Working Group
YESAB	Yukon Environmental and Socio-economic Assessment Board
YG	Yukon Government
ZOI	Zone of Influence

1 – INTRODUCTION

Casino Mining Corporation (CMC) is proposing to develop the Casino Project (the Project), a copper-molybdenum-gold mine at their Casino Mine property located at latitude 62°44' N and longitude 138°50' W, approximately 300 km northwest of Whitehorse, Yukon. The proposed Project will have a mine life of 33 years comprised of four phases: construction (3 years), operation (22 years), closure and decommissioning (3 years), and post closure (5 years). The Project includes the following primary components:

- Mine site — includes open pit; stockpiles for low grade ore, gold ore, topsoil and topsoil/overburden; a plant site; heap leach facility;
- Tailings management facility;
- Extension and upgrade of the Freegold Road (previously referred to as the Casino Trail) — the Freegold Road will be upgraded and extended to connect the Casino mine site to Carmacks, Yukon. The existing 70 km of the Freegold Road will require upgrading and route adjustments to meet design standards. The final road will be approximately 200 km long and maintained as an all-season gravel road suitable for ore and fuel transport;
- Construction and operation of a new airstrip; and
- Access road and water pipeline to the Yukon River.

Project components and activities will interact with and potentially affect wildlife primarily by:

- Removing available habitat by land clearing and reducing adjacent habitat effectiveness because of sensory disturbances;
- Creating filters (semi-permeable barrier) or barriers to wildlife movement because of sensory disturbance or physical barriers created by mine infrastructure;
- Increasing mortality risk due to vehicle collisions, or increased harvest, or death as a result of defence of life or property; and
- Reducing quality of health of individual animals that may be attracted to the tailings management facility during operations or at closure.

The purpose of the Wildlife Mitigation and Monitoring Plan (WMMP) is to minimize effects to wildlife and wildlife habitat, monitor the results of mitigation to ensure effectiveness, and adaptively manage for any unanticipated effects given the final Project footprint and description as provided to the Yukon Environmental and Socio-economic Assessment Board (YESAB) for review. The plan is intended to ensure that wildlife continue to use habitat in areas adjacent to the Project footprint and within the broader area, as well as reduce potential Project-related injury or mortality, while accounting for operational requirements and human health and safety requirements. The WMMP provides guidance to protect and limit disturbances to wildlife and wildlife habitat from Project activities.

Mitigation of Project effects on wildlife and avoidance of key habitat features were considered in the Project design and in preparation of the Project description and effects assessment. Wildlife management, monitoring, and/or protection plans from similar mining projects in the Yukon (e.g. Eagle Gold Project, Wolverine Mine, Minto Mine, Bellekeno Mine) were reviewed to provide details on mitigations and monitoring that has been implemented in the Yukon and the effectiveness of those actions. This document does not provide detailed methods (i.e., study designs), cost estimates, or schedule. It is anticipated that further details will be developed in continued discussion post-approval with the management agencies, Renewable Resource Councils (RRCs), working groups established to monitor Project effects, and other interested parties.

1.1 REGULATORY AND MANAGEMENT CONTEXT

The following legislation and regulations related to the protection of wildlife applies in the Project area, and in some circumstances may supersede the commitments made in this plan:

Territorial legislation:

- *Yukon Environment and Socio-economic Assessment Act*
- *Yukon Wildlife Act*
- Yukon Hunting Regulations

Federal legislation:

- *Species at Risk Act*
- *Migratory Birds Convention Act*
- Convention on Biological Diversity

Self-governing First Nation final agreements:

- Selkirk First Nation Final Agreement
- Little Salmon/Carmacks First Nation (LSCFN) Final Agreement

Management plans and strategies:

- Community-Based Fish and Wildlife Work Plan for the Little Salmon/Carmacks First Nation Traditional Territory 2012–2017 (Little Salmon/Carmacks Fish and Wildlife Planning Team 2011)
- Management Plan for the Northern Mountain Population of Woodland Caribou (*Rangifer tarandus caribou*) in Canada (Environment Canada 2012)

The WMMP should also be considered in association with the following Project-specific environmental management plans:

- **Waste Management Plan** — may include details on handling kitchen waste that, if mishandled, could attract problem wildlife to the site.
- **Air Quality Management Plan** — may include guidelines related to reducing noise, dust, and emission levels that would ultimately reduce the Project's zone of influence (ZOI) on adjacent habitat use by wildlife.
- **Air Quality and Fugitive Dust Deposition Monitoring Program** — provides a link to fugitive dust and potential effects on wildlife forage.
- **Road Use Plan** — may include details about road management, access controls, monitoring of use, etc.
- **Progressive Reclamation Effectiveness Monitoring Program** — provides a link to Project footprint reclamation and wildlife habitat.

2 – WMMP REPORTING

CMC will report annually on Project mitigation and monitoring activities, which will generally include the following key pieces of information:

- A summary of annual Project activities;
- Description of updates to relevant wildlife and bird baseline information – either collected by CMC or other inventories/research known to CMC;
- A review of annual monitoring results relative to levels of natural variability in the region (as described in the baseline report and new knowledge gained through successive annual reporting);
- A presentation of the analyses of wildlife distribution and abundance in relation to Project facilities;
- A description of stakeholder involvement (e.g., First Nations, governments, etc.);
- Summary of key monitoring initiatives, as deemed necessary; and
- A discussion of proposed changes to mitigation and monitoring plans as necessary.

CMC will review the results of annual monitoring every three to five years and include in a detailed report the following information:

- An examination of trends in variability of wildlife distribution and abundance relative to natural trends;
- An analysis of measured wildlife responses to Project-related disturbances, including habitat use and measures of barriers/filters to wildlife movement;
- A description of how Project effects monitoring contributes to cumulative effects monitoring in the region;
- Detailed analyses of other variables as identified in individual monitoring programs as the Project evolves; and
- Description of changes to monitoring programs, statistical procedures, and proposed changes to mitigation activities to adaptively manage for unforeseen effects.

2.1 ADAPTIVE MANAGEMENT AND PLAN UPDATES

The WMMP will be updated periodically to include management reviews, incident investigations, regulatory changes, or other Project-related changes. The WMMP will also be updated as new methods or technologies become available. Mitigation and monitoring strategies for Species at Risk will be updated to maintain consistency with status reports, recovery strategies, action plans, or management plans that may become available during the life of the Project. The wildlife mitigation and monitoring measures will likely evolve during the life of the Project as a result of new resource discoveries, a better understanding of local wildlife behaviours, improved scientific techniques, stakeholder values, and to adapt to natural variability in wildlife distribution and abundance.

To address environmental and Project changes through time, an adaptive management approach is adopted for this mitigation and monitoring plan. It is anticipated that the plan will evolve and be adjusted to incorporate practical and workable solutions to minimize Project effects on wildlife and support regional wildlife research and management initiatives. The changes may be a result of inadequacies in the sampling methods or from increased awareness of environmental personnel, regulators, First Nations, or other public concerns. An adaptive approach means that increasing monitoring or changes to the monitoring program can occur if unanticipated adverse effects are detected, to further understand effects, or to change mitigation practices. Concomitantly, if no effects are detected over a reasonable time period, some mitigation and monitoring tasks may be removed from the program. To facilitate adaptive management and react to changing environmental and Project conditions, a process needs

to be established to ensure regular review of the WMMP that includes regular and transparent reporting (Figure 2.1).

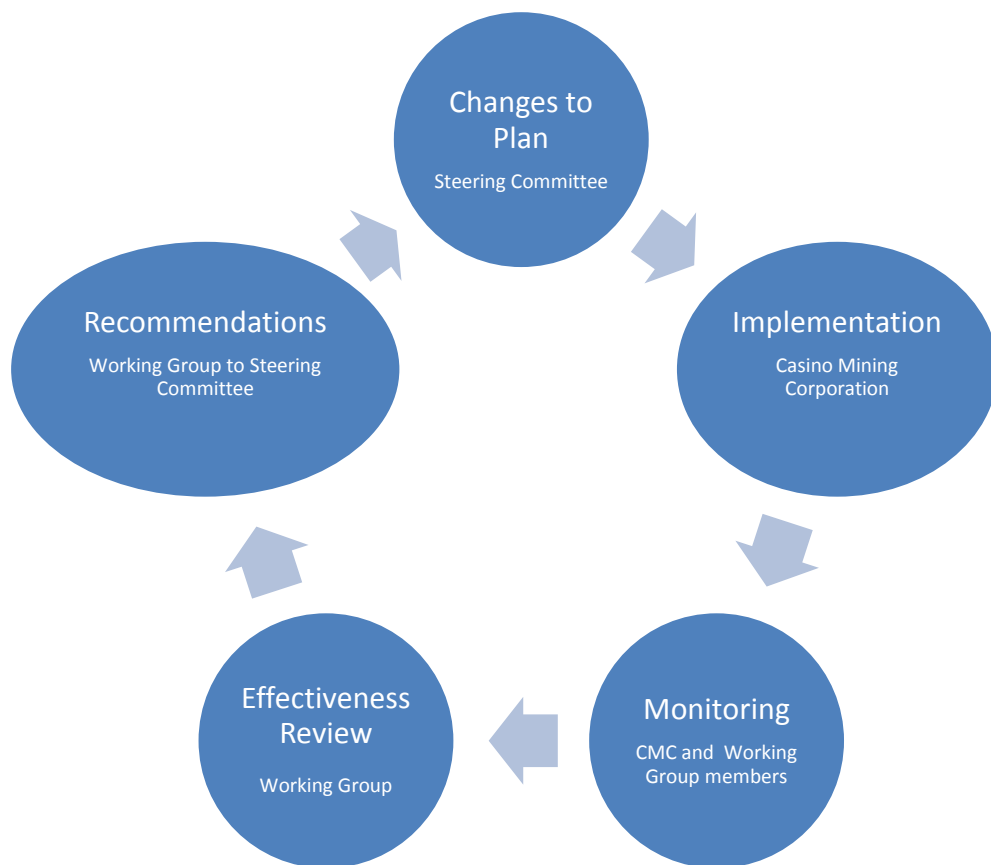


Figure 2.1 Schematic of the Adaptive Wildlife Management Process

3 – CASINO MINING CORPORATION'S COMMITMENTS

CMC is committed to working with governments and stakeholders to ensure that wildlife populations remain healthy and can successfully coexist with the Project through construction, operation and closure phases of the mine. The WMMP is the primary management tool to achieve this. CMC will provide the necessary human, material, and financial resources to implement and maintain the WMMP. CMC has the capacity and authority to implement mitigation and monitoring actions and plans; however, CMC will not make decisions regarding wildlife management (e.g. harvest levels). Nonetheless, CMC is committed to actively supporting regional wildlife management initiatives.

3.1 WILDLIFE MANAGEMENT WORKING GROUP

CMC will establish a Wildlife Management Working Group (WMWG; the working group) — the role of which is to act as an advisory body to support ongoing cooperation and communication, as well as to review and provide advice on all aspects of the WMMP, including:

- Develop and finalize the WMMP Program;
- Implement the WMMP Program;
- Monitor reports and results;
- Assess potential Project impacts and effects predictions for wildlife;
- Assess effectiveness of mitigation measures; and
- Develop action plans for implementation of appropriate mitigation measures.

The working group may make recommendations to CMC and government agencies with wildlife management responsibilities on any aspects of the WMMP program or for the adoption of mitigation measures which are technically and economically feasible. It is expected that the working group would consist of a number of members including members from affected First Nations (particularly Selkirk First Nation and Little Salmon Carmacks First Nation), CMC, Yukon Government, and Environment Canada. Other members can be considered as appropriate or necessary. The role of the working group is not intended to either duplicate or affect the regulator authorities or stakeholder responsibilities for wildlife management of participating members.

3.2 WILDLIFE SPECIALISTS

The monitoring program established by CMC requires the input of specialists to carry out many of the wildlife surveys and studies required to monitor Project effects. Throughout the life of the Project, CMC will endeavor to hire qualified personnel to conduct these studies. As much as possible, CMC will insist on inclusion/participation of local experts/individuals in the execution of these surveys and studies.

3.3 INCORPORATION OF TRADITIONAL KNOWLEDGE

The monitoring program established by CMC requires the input and knowledge of First Nation hunters, trappers, and land users to design, conduct and review results of some of the surveys and studies required for monitoring. Throughout the life of the Project, CMC will endeavor to consult with knowledgeable individuals to conduct these studies. As much as possible, CMC will include participation of local experts/individuals in the conduct of the surveys and studies.

4 – MITIGATION FRAMEWORK

CMC recognizes that there will be disturbances and effects on wildlife and wildlife habitat as a result of the construction, operation, and closure of the Project. To reduce or eliminate potential Project effects on wildlife and wildlife habitat, CMC commits to a number of mitigation actions, some of which are general and apply to all Project phases, some that are specific to specific Project phases, some that are temporal and apply only certain times of years or in certain years when wildlife are present, and some that are specific to identified sensitive areas, such as mineral licks, nest, or dens. CMC expects that some of the mitigation actions will be modified through the life of the Project as more information becomes available about the effectiveness of the mitigation and wildlife and habitat/vegetation response to Project-related disturbances. To inform CMC, Project regulators, and stakeholders about mitigation effectiveness and Project effects, the mitigation framework is supported by a Project effects monitoring framework described in Section 5.

Mitigation actions that are more general in nature and are applicable to the Project design phase or during all Project phases, throughout the year, are described in Section 4.1 (Project Design and General Mitigation). Mitigation actions that are most relevant to reducing the effects of construction activities (Section 4.2), operations (Section 4.3), and closure and post-closure (Section 4.4) are described in the appropriate sections. Species-specific mitigation is mentioned separately where warranted.

4.1 PROJECT DESIGN AND GENERAL MITIGATION

The construction footprint of the Project will have residual effects on wildlife and wildlife habitat because habitat will be removed long-term, and sensory stimuli during the construction, operation, and closure and decommissioning phases will disturb wildlife. There are several elements that were considered in the Project design that will help to mitigate some of those effects, which are described below.

4.1.1 *Minimize Project Footprint and Sensory Disturbance*

To minimize loss of habitat, the Project footprint (~23.5 km²) is designed to be as small as possible. Examples of considerations made to minimize the Project footprint are further described in the Project description (Volume II, Section 4).

- To minimize disturbance to wildlife and wildlife habitat where Project design allows, Project infrastructure will be constructed outside of identified sensitive wildlife areas (e.g., mineral licks, den sites, raptor nests) and areas with sensitive vegetation (e.g., rare plant locations).
 - o The number of gravel pits/borrow pits in Klaza caribou winter habitat will be minimized to the extent possible;
 - o Visual and auditory construction disturbances near animals will be minimized to the extent possible;
 - o Mineral licks will be avoided (two mineral licks were identified during baseline studies that are outside of the PDA); and
 - o CMC recognizes that a section of the Freegold Road extension will be built in sensitive late-winter habitat for the Klaza Caribou Herd. Further species-specific mitigation measures will be incorporated to accommodate the potential disturbances associated with the road footprint and sensory disturbances.

4.1.2 *Minimize Barriers and/or Filters to Wildlife Movement*

- CMC will design and build roads with a low profile embankment that will reduce the potential for the road to filter, or act as a barrier to wildlife movement;
- CMC will construct the water pipeline so that it does not impede wildlife movement.
 - Design considerations will include the following components:
 - Raised sections of the pipeline will allow for wildlife movement under the pipeline. Using moose as a precedent, pipeline clearance (i.e., distance from ground to bottom of pipeline) will be a minimum of 180 cm every 400 to 700 m (depending on terrain; Dunne and Quinn 2009) for minimum section lengths of 10 m (i.e., 10 m long section of the pipeline will be raised);
 - Pipeline crossing structures (made of vegetated fill or soil) may be constructed in high density crossing/movement areas or areas where the pipeline cannot be raised or buried completely; and
 - CMC commits to further baseline studies to determine high probability wildlife crossing areas (e.g., trail surveys, snow track surveys, camera surveys) along the proposed pipeline route prior to construction.
- Equipment laydown will not be placed in an area of known wildlife movement or areas of wildlife concentration (e.g., mineral licks);
 - No-clearing buffer zones will be established around riparian areas (e.g., rivers, creeks) to minimize disturbance to movement corridors.
- Access roads will be designed to avoid blind spots and reduce potential for wildlife collisions;
 - Signage will be posted in high collision risk areas (e.g., blind or obstructed turns or hills, water crossings); and
 - Where embankments may pose a barrier or filter to wildlife movement, (e.g., > 2 m high and steep slope in areas of known wildlife movement), wildlife crossings will be constructed with the following characteristics:
 - 10 to 100 m in length;
 - The embankment has a gradual grade (e.g., 5 horizontal to 1 vertical, compared to a standard 2:1 or 3:1);
 - Surface will be a finer fill to replicate natural trail conditions — surfaces will be relatively smooth, compacted, and constructed of finer fill material (crushed rock minus 100 mm) to prevent leg entrapment;
 - Crossing areas will be placed in areas of greater wildlife movement based on observational data and caribou collar data; and
 - Truck operators will be made aware of all high-use wildlife crossing areas and will be required to report any wildlife observations.

4.1.3 *Minimize Wildlife Incidents and Mortality Risk*

- CMC will design mine buildings to discourage use by animals:
 - Skirt all buildings and stair landings to the ground.
- CMC will design mine buildings to prevent human-wildlife conflicts:
 - Avoid blind spots where possible around buildings; and
 - Provide windows where practical on all exits.

- CMC will design roads with clear lines of sight in areas of high wildlife interaction potential; and
- CMC will support YG Environment and affected First Nations wildlife harvest management initiatives in the Project area.

4.1.4 *Wildlife Awareness and Sensitivity Training*

Project personnel (employee and contractor) awareness programs will help to mitigate potential effects on wildlife by increasing personnel awareness of CMC's commitment to wildlife and habitat protection in the Project area. Personnel will receive an orientation on basic wildlife ecology relevant to the Project. Those personnel that are road users will receive training specifically focused on wildlife use of the road corridor, potential wildlife mortality risks, and road and traffic operation procedures that are established to mitigate effects on wildlife. Project personnel will be expected to comply with the direction provided by mine management and there will be enforcement of Project-specific wildlife provisions.

- CMC commits to incorporating a wildlife awareness component to the on-site employee orientation program. The wildlife awareness component will include a presentation on the importance of wildlife protection around the Project and in the region. Training components will include:
 - o CMC's wildlife have the right-of-way policy;
 - o Bear awareness, garbage management;
 - o No feeding or harassing wildlife policy;
 - o Wildlife encounter directives;
 - o Awareness training regarding the importance of avoiding known and reporting new mineral licks, nest sites, and other sensitive areas;
 - o Road driving directives: speed limits, driving at winter, expected areas of wildlife occurrences;
 - o Wildlife reporting requirements; and
 - o Notification of enforcement measures (e.g., tracking truck speeds through sensitive areas).

4.2 CONSTRUCTION MITIGATION

Construction is likely the most disturbing Project phase for wildlife and wildlife habitat. Wildlife habitat is actively removed (e.g. mine, temporary camps, road, and borrow site construction), more humans will be present in the area, and large, noisy equipment will be required to construct and haul Project infrastructure — a level of activity that will be unprecedented in the area. Construction mitigation actions aim to reduce or remove potential effects to wildlife and wildlife habitat during this time.

- CMC will not put construction camps inside identified Klaza caribou late-winter range;
- CMC will, whenever practical and not causing a human safety issue, implement a stop work policy when wildlife in the area may be endangered (i.e., risk of physical injury or death) by the work being carried out;
- CMC will avoid construction in sensitive areas during sensitive times, which will include:
 - o Avoiding new clearing during the breeding bird nesting season (1 May to 31 July in Yukon), or conducting nest surveys immediately prior to clearing activities;
 - o Late-winter (1 February to 30 April) is considered the most sensitive time for caribou and moose. For caribou, this generally means avoiding the initiation of new construction activities during this period between km 98 and km 130 on the Freegold Road extension;
 - o Undiscovered site-specific features (e.g., mineral licks, raptor nests, den sites) will be addressed on a case-by-case basis during construction;
 - o Avoiding blasting within 500 m of site-specific wildlife features (e.g., mineral licks, raptor nests, den sites) when wildlife are likely to be present, which will include:

- Bear dens, where they are known to occur, will be avoided from November through to mid-April;
 - Mineral licks — two mineral licks were identified during baseline studies that will be considered in construction monitoring (locations are not available for public distribution); and
 - Raptor nests - any known raptor nests within the PDA will be avoided where possible, and nest management plans may be developed for specific nests.
- If clearing must occur during the nesting season, CMC commits to conducting active migratory bird nest surveys prior to clearing;
 - Survey methods will follow best practices implemented to date for other Yukon projects. Some aspects of those surveys included:
 - Survey teams are led by qualified individuals;
 - A 10-metre no-disturbance buffer around active nests is established until chicks have fledged or the nests has been determined to have been predated or abandoned;
 - A 7-day window for clearing activities to be completed once the survey is conducted (if no nests are found);
 - Communication of survey results and overview of protected nests with clearing contractors or on-site construction supervisor; and
 - Updates provided as part of the annual reporting to the WMMWG.

Sensory disturbances that affect habitat effectiveness within a Zone of Influence (ZOI) can only be partially mitigated. Caribou, moose, bears, and other wildlife will find some Project activities disturbing, and the degree to which animals will adapt or habituate to those disturbances is not known. Mitigation measures that will minimize the likelihood of reduced habitat effectiveness for wildlife include:

- CMC will limit sensory disturbances where possible throughout the year. This will be realized by developing a blasting program to minimize effects on wildlife including, but not limited to, the restriction of blasting when caribou or other sensitive wildlife (e.g. nesting raptors) may be present.

4.3 OPERATION MITIGATION

The operations phase is the longest Project phase, with regular mining activities occurring throughout the life of the Project.

- To avoid unnecessary disturbances to wildlife, there will be no stopping or loitering in sensitive wildlife areas or during sensitive wildlife periods:
 - No stopping areas will have signs posted along Project roads (similar to “No Stopping, Avalanche Zone” road signs). These signs will be posted along road sections identified in the Project EA, or as deemed appropriate by a wildlife working group where sensitive wildlife areas have been identified; and
 - Identification of and the reasons for no stopping zones as part of the employee education program (Section 4.1).
- To reduce the Project-related effects on mortality risk, wildlife near misses and collisions will be investigated to determine the root cause and identify corrective actions:
 - Near misses are when wildlife mortality could have occurred if immediate corrective actions were not taken;

- o Investigations will follow a standard procedure of employee interviews, scene investigation, recording time, date, incident details; and
 - o Corrective actions will be identified and are specific to the situation (e.g., reduce speed, improved lighting, roadside vegetation clearing).
- CMC will minimize fugitive dust dispersal by using dust suppression methods, and thereby minimizing the Project's zone of influence;
- CMC acknowledges the potential for an increase in the number of predators as a result of human activity in the area. To minimize the potential for increasing densities of bird nest predators (e.g., foxes, gulls), CMC will:
 - o Implement strict waste management procedures as outlined in the Waste Management Plan. As required by CMC's EHS Management System, audits will be carried out periodically to assess the effectiveness of waste management practices; and
 - o Conduct regular surveillance of Project facilities and waste disposal sites to ensure that predator control measures are effective.
- Incorporating Best Management Practices for food, waste and fuel management into the design on the Project. These practices may include:
 - o Storing and incinerating garbage in an enclosed area surrounded by electric fencing. The gate will remain closed at all times;
 - o Installing a stack scrubber in all kitchen vents to reduce food odour during cooking;
 - o Storing all food and waste inside buildings or within an enclosed, bear proof area, unless field crews are working remotely. Field crew lunches will be sealed in airtight containers and all garbage will be pack out and properly disposed of;
 - o Burning all food and kitchen waste in an incinerator;
 - o Adding lime and dirt to latrines on a regular basis to reduce odour;
 - o Storing all fuel in airtight containers in areas inaccessible to bears (i.e., fuel shed or fenced enclosure); and
 - o Training all workers in wildlife management protocols, including garbage management, bear encounter protocols, etc.

4.3.1 *Road Operations and Access Management*

CMC is aware that public access to the road may lead to unanticipated indirect effects on wildlife from collisions and harvest. To address that concern, CMC has developed a Road Use Plan, the key elements with respect to mitigating effects on wildlife, include:

- No public access (access by permit only);
 - o Chartered air craft transportation to and from the Project site will be provided for Project staff;
- Controlled, gated, manned access (located at the new bridge over Big Creek — or as otherwise agreed).

Key elements of the Road Use Plan for wildlife include the following commitments – details of which are discussed elsewhere in this document:

- “No Hunting” in game management zones along access road (continuation of existing hunting ban in some areas, extended to include entire length of access corridor);
- Special management provisions for Klaza caribou that include long-term and increased active monitoring (currently underway), and other measures as agreed (Discussed in Section 5); and

- Identification of 'wildlife crossing' areas along route, that may include active monitoring (discussed in Section 4.1.2), snow clearing berm management in late-winter, travel speed reductions and restrictions as defined and agreed in the management plan.

To mitigate the Project's direct effects on wildlife as a result of road operations by Project personnel, CMC commits to the following actions:

- CMC will implement a "Wildlife have the Right-of-Way" policy to avoid potential collision or unnecessary disturbances to wildlife:
 - Vehicle operators will be vigilant and watch for wildlife near roads, and take all reasonable actions to avoid wildlife collisions;
 - Traffic will stop when wildlife are observed on the road; and
 - To allow small groups (<10) or individual wildlife standing on the road to move off the road unalarmed, trucks will stop for 15 minutes, then proceed slowly (<20 km/hr) if wildlife have not moved within that 15 minute period.
- CMC will implement compulsory speed limits through late winter caribou habitat to reduce the potential for wildlife collision and to reduce sensory disturbances along the road:
 - The speed limit will be established based on safe stopping distances and line of sight in areas of potential caribou encounters.
- CMC will direct operators to include wildlife reports in their radio communications:
 - Truck-to-truck communication reporting wildlife presence by kilometer (e.g. "*two caribou north of road at kilometer 97*") will keep operators informed of potential hazard areas.
- CMC will manage snow clearing so that caribou and other wildlife can easily cross the road without being deterred by steep and high snow banks:
 - Snow banks will be kept less than 1 metre high.
- If wildlife mortality were to occur as a direct result of Project-related collisions, increased traffic controls will be implemented. Timing and duration of increased controls is dependent on wildlife presence;
- CMC will have a wildlife monitor patrolling the road when there is a high likelihood of wildlife encounters and there is a risk of collision:
 - High likelihood of encounters can be based on increasing frequency of wildlife sightings; and
 - During years of high interaction with the road, caribou numbers in the vicinity of the road will be re-evaluated on an every second day basis using light vehicles, aerial surveys, collar data, or other technologies available for the monitoring effort.
- Removal of carcasses from transportation corridors to discourage further collisions (e.g., scavengers on road).

An operational decision tree matrix for drivers dealing with wildlife sightings near roads is provided in Figure 4.1.

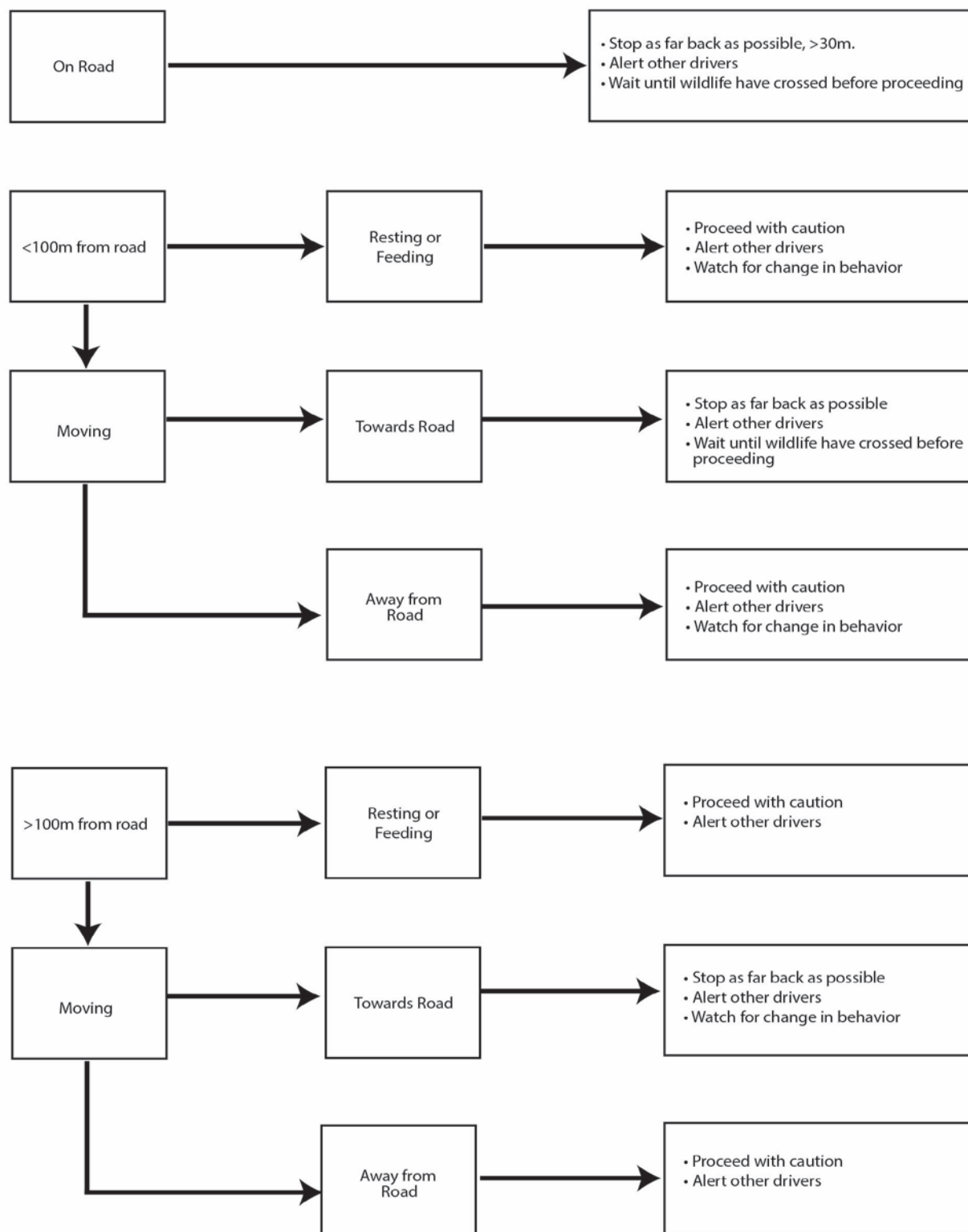


Figure 4.1 Wildlife and Road Operation Decision Matrix

4.3.2 Problem Wildlife Management

The goal of problem wildlife management is to reduce the potential for wildlife-human interaction at Project facilities. A problem wildlife protocol will help to ensure employee safety and minimize potential mortality due to threats to life or property.

- CMC will implement a problem wildlife protocol that includes the following elements:
 - o Employees will be required to report wildlife sightings near Project facilities;
 - o Warning signs will be posted in areas of frequent wildlife encounters on a seasonal basis or otherwise as required;
 - o Area closures will be used until proper control measures are in place or have been activated;
 - o If wildlife becomes a concern, Yukon Conservation Officer Services will be contacted for advise on appropriate actions;
 - o With prior approval of local Conservation Officer(s), adverse conditioning actions will be applied to problem wildlife to reverse habituation behaviours; and
 - o CMC will identify appropriate personnel to monitor, manage and evaluate human-wildlife conflicts.

The decision matrix for managing CMC's response to problem wildlife is presented in Table 4.1.

Table 4-1. Problem Wildlife Encounter Management Matrix

Type of interaction	CMC Management Response					
	Monitor	Post warning	Area closure	Contact Conservations Officer Services	Hazing actions	Relocate
Animal sighting reported	•					
Animal showing normal feeding behaviour	•	•				
Animal reacting defensively	•	•	•			
Animal tolerates human disturbance and ignores people and facilities	•	•	•			
Animal shows repeated interest in people and facilities that will likely lead to habituation	•	•	•		•	
Animal is clearly habituated to humans and facility	•	•	•	•	•	•
Animal displays aggressive behaviour and is an immediate threat to human safety			•	•		•

4.3.3 TMF Wildlife Management

CMC expects that there will be some waterfowl and wildlife exposure to water in the Tailings Management Facility (TMF) during the Project's operation phase. It is not economically feasible, nor is it necessarily desirable to restrict all wildlife access to the TMF area when risks to animal health and mortality are relatively low — depending on constituents of potential concern (COPCs), ingestion rates, animal residency times, individual health conditions, etc. There is little evidence to predict what level of effect that exposure to water in the TMF may have on wildlife, or the ultimate result of that exposure. Therefore, depending on animal responses to the TMF, the following mitigation options may be considered to control wildlife presence at the TMF if deemed by CMC and/or regulators to be necessary:

- CMC will use wildlife deterrence measures in portions of the TMF that are identified as high risk areas to wildlife health.
 - Deterrence measures can include wildlife fencing to keep wildlife out, scare crows, cannons, or any other proven methods at the time the risk is identified.

4.3.4 *Cliff-nesting Raptor Mitigation*

The Project area has cliff-nesting raptors that are known to breed in the PDA, and although the assessment concluded that the Project will have no population-level impacts, the potential to disturb and disrupt individuals is possible and proper mitigation procedures will be implemented to minimize unforeseen effects. General mitigation measures applied in all areas of the Project footprint will mitigate effects to cliff-nesting raptors. Additionally, nest-specific management plans will be developed for any cliff nests identified within 500 m of the Potential Development Area (PDA). Where possible, a site-specific no-disturbance or no stopping buffer (of approximately 500 m) will be used for both Project personnel and equipment around the nests during the nesting period (1 April to 31 August for raptors).

4.4 CLOSURE AND POST CLOSURE

CMC expects that after Project operations are complete and mine facilities are decommissioned that mitigation for wildlife will be passive.

4.4.1 *Road Closure Management Considerations for Wildlife*

- As directed in the Road Use Plan, the Freegold Road extension will be decommissioned such that passage of vehicles will not be possible. Following decommissioning, no further mitigation activities for wildlife are expected to be implemented.

4.4.2 *TMF Management for Wildlife*

As detailed in the closure plan, the TMF will include the construction of a wetland, creating a large littoral zone and wetland habitat where no wetlands currently exist. It is expected that wetland-associated wildlife will be attracted to and use the area after the mine has closed and the wetland has become established. There are no toxicological effects expected from use of the wetland and no further mitigation for wildlife is expected; however, if water quality monitoring results exceed acceptable standards, wildlife monitoring in the vicinity of TMF will be conducted.

5 – MONITORING FRAMEWORK

Monitoring effects on wildlife must be relevant to the Project and to the possible effects which the Project will have on the environment. The Casino Project's monitoring framework will inform adaptive management measures that can be effectively applied. The objectives of the monitoring framework are to:

- Develop a comprehensive and integrated environmental monitoring program;
- Incorporate an ecosystem-based approach for monitoring and management of Project related environmental effects;
- Integrate traditional knowledge, when possible and available, into the development and implementation of the environmental monitoring programs;
- Include the meaningful participation of stakeholders in all aspects of the environmental monitoring program in all phases of the development, including the decommissioning and reclamation; and
- Report in an effective and timely manner on the environmental monitoring program and its results in ways that are meaningful to stakeholders.

Monitoring efforts will focus on a variety of spatial and temporal scales, depending on the focal species. Most local monitoring efforts will focus studies at the scale of the Project footprint (e.g. wildlife mortality monitoring), while others will focus on larger scales to adequately quantify and/or qualify effects (e.g. wildlife distribution).

5.1 MONITORING PRINCIPLES

The monitoring framework is based on the following principles:

- Monitor and verify potential effects related to the Project;
- Ensure monitoring efforts are able to detect natural and Project-related changes to the environment;
- Monitor and evaluate the effectiveness of mitigation measures;
- Identify unanticipated effects;
- Monitor effects where predictions were based on weak data;
- Provide an early warning of undesirable change in the environment; and
- Inform adaptive management measures.

5.2 MONITORING FRAMEWORK OVERVIEW

There are three categories of study related to monitoring and follow-up of Project-related effects (adapted from Voisy's Bay EEM 2006):

1. **Baseline Research** — background studies intended to establish need for, or parameters of, an environmental effects management program. Research studies could address issues such as natural variability of a measurable parameter or monitoring target, or examine the nature, extent, or duration of a potential Project – Key Indicator interaction.
2. **Surveillance** — programs to produce information about the pattern of occurrence of key indicators.
3. **Monitoring** — programs to address and quantify effects mechanisms between Project activities and components of the receiving environment.

Table 5.1 defines the key considerations for each monitoring plan component. Monitoring is focused on measureable parameters of Key Indicators. Monitoring will occur on and in areas adjacent to the Project footprint

(Facilities Monitoring), and focal species monitoring will occur within the Regional Study Area (Focal Species Monitoring). If stakeholders are interested or concerned about broader regional-level wildlife issues, a collaborative approach and participation by CMC can be considered for monitoring outside of the RSA.

Table 5-1. Monitoring Framework Overview

VC	Valued Component (e.g., Wildlife, Birds, Vegetation)
Key indicator	The species or relevant feature selected to represent the VC (e.g., caribou)
Monitoring category	One of three categories – Research, Surveillance, Monitoring
Design	e.g., Before-After-Control-Impact (BACI), Opportunistic, etc.
Measurable parameter	A quantifiable feature used to assess potential effects on an indicator (e.g., movement)
Key project interactions	Identification of key project features that result in residual effects on the Indicator and Measurable Parameter (e.g., Freegold Road extension as a filter to caribou (Indicator) movement (Measurable Parameter)).
Goal	Statement of the expected residual effect of the Project (e.g., the Project will have a not significant effect on caribou movements across Project infrastructure).
Objective	Evaluate a potential response specific to the mine and operations (e.g., evaluate movement patterns of caribou as they approach or cross the road).
Threshold	Early warning indicator (note: usually about an order of magnitude lower than the significance criteria used in the effects assessment)
Scope of monitoring work	<p>Brief overview of key components of a monitoring program including note of temporal and spatial scale, frequency, duration. It will also indicate if the monitoring is to occur in relation to direct project effects relative to day-to-day operations (facility-specific), or is intended to address broader-scale effects on a focal species:</p> <p>PDA/Facility-specific monitoring will be a regularly occurring task for the on-site environmental staff focusing on wildlife interactions with Project infrastructure and facilities.</p> <p>Focal species monitoring generally will occur at a broader scale with an emphasis on focal species abundance and distribution within the broader Project area, including monitoring of wildlife response to Project-related disturbances and predicted impacts and wildlife distribution in a broader Regional Study Area.</p>
Agency/partner participation	Identification of agencies or key partners in the monitoring programs (e.g., YG Environment, RRCs, etc.).
Mitigation measures	A list of measures used to reduce or remove project related effects (e.g., project design elements, adjustments to operations)
Project Terms and Conditions	Indicates the Project Terms and Conditions (to be determined) that are being addressed by this monitoring plan component

5.3 PDA/FACILITY-SPECIFIC MONITORING

Project facilities, structures, and the Freegold Road extension (facilities within the PDA) pose potential risks to wildlife and obstacles to wildlife movement. The Project facilities will be monitored on a frequent basis to determine whether effects are occurring and if mitigation is adequate. Project components that will be monitored for wildlife effects include the following:

- The Freegold Road extension and other site roads for road traffic interaction and snow bank management;
- Traffic volume on all Project roads will be monitored annually to determine if volumes are exceeding expected levels;
- Access to the Freegold Road extension will be monitored annually to determine how many non-Project-related, but permitted people are accessing the road (e.g. First Nations, placer miners, trappers, etc.);
- The Yukon River water pipeline to determine if it is acting as a barrier to wildlife movement and effectiveness of mitigation actions;
- The Tailings Management Facility (TMF) to determine wildlife attraction, an assessment of the risks if wildlife are using it, and need for deterrence measures (if required);
- Project building as a potential haven for nest predators and problem wildlife; and
- Waste management facilities as a potential attractant of problem wildlife.

PDA/Facility-specific monitoring will be conducted by CMC's on-site environmental management staff, wildlife monitors, and specialists as required. The on-site will be familiar with the Project effect's assessment and Project conditions related to wildlife, commitments made to mitigate effects on wildlife, and an understanding of the adaptive management process used to manage for varying responses to mitigation actions.

Results of PDA/Facility monitoring will be reported annually within the WMMP monitoring report. Successive reports will include a review of previous years' data to detect trends in wildlife occurrences and results of mitigation actions. Key features of the annual PDA/Facility monitoring report will include the following activities (Table 5.2):

- Project footprint monitoring — measures of the area(s) physically disturbed for construction and operations. Comparisons will be made between the planned footprint in the Project description and the actual footprint mapped using a GPS;
- Project activity — a summary of human presence (e.g., man days), general traffic statistics, construction activities, blasting activities, etc.;
- Summary of a wildlife sightings log as an indication of wildlife presence in the immediate Project area. Data includes location, date, time, species, activity, etc.;
- Summary of wildlife mitigation activities, including results of active migratory bird nest surveys (if required), deterrence actions, problem wildlife kills, etc.;
- Summary of vehicle/wildlife collisions and results of investigations and corrective actions taken;
- Summary of non-Project related activities in the Project area (e.g., other land users, placer miners, etc.); and
- Summary of regulator consultation for dealing with on-site wildlife issues.

There are no toxicological effects expected from use of the wetland and no further mitigation for wildlife is expected; however, if water quality monitoring results exceed acceptable standards, wildlife monitoring in the vicinity of TMF will be triggered.

Table 5-2 Summary of PDA/Facility-Specific Monitoring Programs by Project Phase

PDA/Facility Monitoring	Construction	Operations	Closure/ Post-closure
Footprint assessment — measure the evolving Project footprint and compare the area prediction in the Project description		Annual	As needed to monitor reclamation
Building assessment — observe use of buildings for use by nest predators, nesting structures, or as a haven for potential problem wildlife.		Monthly	n/a
Road monitoring — Reported observations of wildlife along the road, report on mitigations required. Report on follow-up investigations to wildlife-vehicle collisions and management actions. Report on traffic volumes and public access.		Ongoing	Ongoing to decommissioning of road
Nest monitoring			
Raptor nests adjacent to PDA	As required when adjacent nest sites are occupied	As required when adjacent nest sites are occupied	
Active migratory bird nest surveys – survey areas that must be cleared 01 May to 31 July	As required prior to disturbance	n/a	n/a
Incidental human activity reporting — record of non-Project-related human activity in project area that may have interacted with wildlife. Data includes location, date, time, type of activity, number of people.	Ongoing	Ongoing	Ongoing
Incidental wildlife reporting — Observation sheets placed throughout Project facilities encouraging personnel to record wildlife sightings. Data includes location, date, time, species, activity, etc.	Ongoing	Ongoing	Ongoing
Waste area monitoring — Observations of wildlife use and mitigation actions taken to deter wildlife use.	Weekly	Weekly	Weekly
Exotic invasive plant species — Monitor methods used to reduce potential, and observations within PDA through life of Project.	Monitor washing of trucks and equipment prior to entering RSA	Annual botany surveys in PDA	As needed to monitor reclamation success

5.4 FOCAL SPECIES MONITORING

Focal species monitoring will continue to be conducted to enhance baseline information, as a surveillance of occurrence in the Project area, and as ongoing monitoring efforts to validate Project effects predictions. The following species will be included in focal species monitoring (Sections 5.4.2 to 5.4.7):

- Metals in plant tissue — an indicator of potential effects on animal health;
- Cliff-nesting raptors — occupancy and productivity;
- Klaza caribou herd — distribution and habitat use in the Project area (10 km radius of mine and road);
- Moose — distribution and habitat use in the Project area (10 km radius of mine and road);
- Grizzly bear, black bear, and wolf dens — activities relative to distance from the PDA; and
- Collared pika — continued presence in the Project area.

Table summaries of suggested monitoring programs are provided in the following sections.

5.4.1 All Wildlife Species

To ensure that Project effects on all wildlife species are minimized, CMC will monitor and annually review the amount of direct habitat loss resulting from the Project footprint (Table 5-3). CMC will also track incidental observations of wildlife made by truck drivers and all Project personnel within and adjacent to the Project footprint, as well as all Project-related mortalities (Table 5-4 and Table 5-5).

Table 5-3 Wildlife Monitoring: Direct Habitat Loss

Indicator	All species
Monitoring category	Surveillance
Design type	Footprint survey
Measurable parameter	Project footprint
Key project interactions	Direct habitat loss within the footprint of the Project (either temporary or permanent)
Objective	Quantify direct habitat loss in the Project footprint
Threshold	Habitat loss limited to the amount identified in the Project description
Scope of monitoring work	<u>Local monitoring</u> : Measure area of Project disturbance on an annual basis using a GPS and GIS.
Agency/partner participation	None required
Project terms and conditions	TBD

Table 5-4 Wildlife Monitoring: Incidental Observations

Indicator	All species
Monitoring category	Surveillance
Design type	Opportunistic
Measurable parameter	Wildlife presence in the Project area
Key project interactions	Wildlife using habitat adjacent to or within Project infrastructure
Objective	Track wildlife observations within and adjacent to the Project footprint
Threshold	None
Scope of monitoring work	<u>Local monitoring</u> : Log of wildlife observations within the RSA.
Agency/partner participation	None required
Project terms and conditions	TBD

Table 5-5 Wildlife Monitoring: Project-Related Mortality

Indicator	All species
Monitoring category	Surveillance
Design type	Opportunistic
Measurable parameter	Wildlife mortality
Key project interactions	Wildlife mortality due to Project activities or infrastructure
Objective	Track Project-related mortality within and adjacent to the Project footprint
Threshold	Project-related caribou or moose mortalities will be reviewed to determine if further action is needed. Other species dealt with on a species-by-species basis.
Scope of monitoring work	<u>Local monitoring</u> : Record of near misses, collisions, and all other observed wildlife mortalities within the RSA.
Agency/partner participation	None required
Project terms and conditions	TBD

5.4.2 Vegetation

Vegetation will be monitored during Project construction, operation, and closure. Monitoring will occur every five years and will focus on invasive species and vegetation health in the vicinity of the Project and at control sites within the RSA for comparison.

Invasive species monitoring will occur within the Project footprint and adjacent habitats to ensure that no invasive species are introduced to the environment by the Project. Surveys for invasive plants will be conducted every five years, and additional surveys may be triggered by observations of plant invasive species. If any invasive species are found, these will be destroyed and, if the pathway of entry can be determined, changes will be made to reduce the possibility of further introduction of invasive species. See Table 5-6 for more details on invasive species monitoring.

Vegetation health monitoring will be conducted through permanent monitoring plots in a variety of habitat types (minimum two plots per habitat type) near Project infrastructure and in control areas within the RSA. Plots in the vicinity of the Project infrastructure will be situated at varying distances from infrastructure to determine the extent of air quality impacts (the exact distance will be determined by the air quality monitoring program). Within each of the plots, species composition will be documented, and the percent cover of each species will be estimated. Lichen and willow samples will be collected adjacent to the plots and sent to accredited laboratories for chemical analysis (Table 5-7).

Table 5-6 Vegetation Monitoring: Invasive Species

Indicator	Plant invasive species
Monitoring category	Surveillance
Design type	Footprint and adjacent habitat surveys
Measurable parameter	Occurrence of plant invasive species
Key project interactions	Introduction of plant invasive species (unnatural forage)
Goal	The Project will not introduce invasive plant species to the RSA
Objective	To quantify the occurrence of plant invasive species
Threshold	No introduction of plant invasive species as a result of Project activities
Scope of monitoring work	<u>Local monitoring</u> : Surveillance of Project footprint and adjacent habitat, at minimum, surveys to be conducted every 5 years or triggered by observations of plant invasive species
Agency/partner participation	None required
Project terms and conditions	TBD

Table 5-7 Vegetation Monitoring: Vegetation Health

Indicator	Vegetation Health
Monitoring category	Surveillance and Monitoring
Design type	Before-After-Control-Impact (BACI)
Measurable parameter	Vegetation class composition, biomass, and contaminant levels in lichen and willows
Key project interactions	Effluent, dust, and air emissions released into the environment have the potential to impact vegetation health. Dust and other contaminants may affect the survival of plant species (leading to changes in plant composition and biomass) and if contaminants are absorbed by plants then they may be ingested by wildlife or humans, which may have an effect on the health of individuals.
Goal	The Project will have a not significant effect on metal uptake in vegetation
Objective	Quantify through continued monitoring throughout the duration of the Project: - metals levels in lichen (caribou forage) - metals levels in willow (moose forage)
Threshold	Project activities resulting in >10% change in vegetation accumulation of contaminants in lichen beyond acceptable threshold levels for wildlife and human health
Scope of monitoring work	<u>Regional monitoring</u> : Assess baseline vegetation class composition and contaminant levels in lichen and willow and re-assess every 5 years. Air quality monitoring program led by CMC.
Agency/partner participation	None required
Project terms and conditions	TBD

5.4.3 Birds

One monitoring program for birds will be implemented by CMC over the course of the construction, operation, closure, and post-closure phases to increase the available baseline data, to detect possible changes to cliff-nesting raptors in the RSA, to assess the magnitude of these changes, and to determine whether these changes are naturally occurring variations or Project-related impacts.

Monitoring of cliff-nesting raptors (peregrine falcon, gyrfalcon, and golden eagle) will occur on an annual basis within the RSA to quantify occupancy and ensure that the Project is having a not significant effect on cliff-nesting raptors. This may involve up to four aerial surveys annually — one early in the nesting period, and one just before fledging for each species. Survey results for nests in close proximity to the PDA will be compared with results from other portions of the RSA and with baseline findings to determine whether the Project is affecting cliff-nesting species (Table 5-8).

Table 5-8 Cliff-nesting Raptors: Occupancy and Productivity

Indicator	Cliff-nesting raptors
Monitoring category	Baseline Research and Surveillance
Design type	Baseline research; Before-After-Control-Impact (BACI)
Measurable parameter	Occupancy and productivity
Key project interactions	Sensory disturbances generated from various Project activities
Goal	The Project will have a not significant effect on cliff-nesting raptor occupancy and productivity
Objective	To quantify cliff nesting raptor occupancy and productivity within the RSA
Threshold	Less than a 10% difference in near-site and far-site occupancy and productivity averaged over three consecutive years
Scope of monitoring work	<u>Local monitoring</u> : Annual territory surveys to determine occupancy and productivity of cliff-nesting raptors (total of four surveys – early and late season occupancy and early and late season productivity).
Agency/partner participation	<u>Local monitoring</u> : CMC, YG Environment
Project terms and conditions	TBD

5.4.4 Klaza Caribou Herd

The Project interacts with the Klaza caribou herd, and most importantly with late-winter habitat, an increased risk of mortality (direct and indirect), and facilities may act as a barrier or filter to caribou movement. Project-related mortality on caribou will be tracked along with other wildlife species as part of the general wildlife monitoring (Table 5-5).

Monitoring of caribou habitat use will involve two monitoring objectives: the first assessing indirect habitat loss (resulting from sensory disturbances) and the second looking at caribou distribution within the RSA. Monitoring of both indirect habitat loss and habitat use during the late-winter season will occur at the local level by tracking incidental observations of caribou by Project employees, and at the regional level through aerial surveys. Long-term distribution patterns will also be identified by a YG-sponsored caribou satellite collaring program(s), but

collared caribou do not represent the distribution of the entire Klaza caribou herd. Table 5-9 provides further details on the monitoring of indirect habitat loss and habitat use during the late-winter season. Monitoring will focus on aerial surveys during construction and initial years of operation to document occurrence, while local monitoring will continue throughout the life of the Project. Collar data from the YG-sponsored caribou satellite collaring program will inform regional late-winter distribution patterns. Additionally, periodic consultation will be conducted with local RRCs to provide information on the relative abundance of caribou in and around the RSA.

Table 5-9 Caribou Monitoring: Indirect Habitat Loss and Habitat Use During Late-Winter

Indicator	Caribou
Monitoring category	Baseline Research, Monitoring, and Surveillance
Design type	Observational (aerial surveys) and opportunistic
Measurable parameter	Distribution within RSA and late-winter habitat use
Key project interactions	Indirect habitat loss from Project activities that create sensory disturbances and/or temporarily reduce the effectiveness (usefulness) of habitats adjacent to the Project footprint, resulting in changed distribution.
Goal	The Project will have a not significant effect on distribution of caribou in the late winter (Caribou to use late winter habitat as was observed in baseline studies)
Objective	Evaluate trends in moose distribution in the ZOI and within late-winter habitat
Threshold	Caribou occurrence within the ZOI equivalent to the prediction made in the Project impact assessment
Scope of monitoring work	<p><u>Local monitoring:</u> Continuous log of caribou observations from CMC personnel to document occurrence near Project facilities.</p> <p><u>Regional monitoring:</u> An annual aerial survey within a 10 km radius of Project infrastructure (as per 2013 late-winter survey; Figure 4.1, Appendix 12-A) will be implemented to document relative abundance and distribution of caribou relative to Project infrastructure. These surveys will be conducted during the first 3–5 years of road operation. Long-term distribution patterns as identified by a YG-sponsored caribou satellite collaring program. Collar data will inform regional late-winter habitat distribution.</p>
Agency/partner participation	<p><u>Local monitoring:</u> CMC, RRCs</p> <p><u>Regional monitoring:</u> CMC, YG Environment</p>
Project terms and conditions	TBD

Caribou monitoring will include a program looking at Project effects on caribou movement within the Zone of Influence (ZOI). Specifically, the program will monitor the effects of road infrastructure and operations on caribou movements through seasonal track surveys for the first 3–5 years of operation in key late-winter habitat, and remote motion-sensing cameras set up at select trails that cross or approach the road. If it is deemed necessary, additional monitoring of caribou movements could involve having wildlife monitors visit sections of the road that interact with caribou late-winter habitat on a regular basis (e.g., twice weekly) to document recent use (the focus of this work would be to determine if caribou are crossing the transportation infrastructure), and/or having wildlife monitors drive Project roads once a month to count the number of caribou in the area.

Table 5-10 Caribou Monitoring: Movement

Indicator	Caribou
Monitoring category	Baseline research and Surveillance
Design type	Observational
Measurable parameter	Movement in the ZOI
Key project interactions	Freegold Road structure and operations may be a filter of or barrier to movement of caribou through the RSA
Goal	The Project will have a not significant effect on caribou movements across Project infrastructure
Objective	Evaluate movement patterns of caribou as they approach or cross the road and other Project infrastructure
Threshold	Less than 10% deflection of approaches to road and infrastructure
Scope of monitoring work	<p><u>Local monitoring:</u> Seasonal caribou track surveys in key movement areas where existing trails were detected within the ZOI. These can be ground-based (snow machine) to observe movement during late winter. These surveys will be conducted during the first 3–5 years of road operation. Trail monitoring using remote motion-sensing cameras and documenting fresh tracks at select trails that cross or approach the road.</p> <p><u>Regional monitoring:</u> Long-term movement patterns as identified by a YG-sponsored caribou satellite collaring program. This is a longer-term approach that requires analyses at a regional scale. These analyses are expected to be conducted by YG Environment.</p>
Agency/partner participation	<p><u>Local monitoring:</u> CMC</p> <p><u>Regional monitoring:</u> YG Environment</p>
Project terms and conditions	TBD

5.4.5 Moose

The Project interacts with moose, most importantly with late-winter habitat, an increased risk of mortality (direct and indirect), and facilities may act as a barrier or filter to moose movement. Project-related mortality on caribou will be tracked along with other wildlife species as part of the general wildlife monitoring (Table 5-5).

Monitoring of moose habitat use will involve two monitoring objectives: the first assessing indirect habitat loss (resulting from sensory disturbances) and the second looking at moose distribution within the RSA. Monitoring of both indirect habitat loss and habitat use during the late-winter season will occur at the local level by tracking incidental observations of moose by Project employees, and at the regional level through aerial surveys. See Table 5-11 for further details on the monitoring of indirect habitat loss and habitat use during the late-winter season. Monitoring will focus on aerial surveys during construction and initial years of operation to document occurrence, while local monitoring will continue throughout the life of the Project. Additionally, periodic consultation will be conducted with local RRCs to provide information on the relative abundance of moose in and around the RSA.

Table 5-11 Moose Monitoring: Indirect Habitat Loss and Habitat Use During Late-Winter

Indicator	Moose
Monitoring category	Baseline Research, Monitoring, and Surveillance
Design type	Observational (aerial surveys) and opportunistic
Measurable parameter	Distribution within RSA and late-winter habitat use
Key project interactions	Indirect habitat loss from Project activities that create sensory disturbances and/or temporarily reduce the effectiveness (usefulness) of habitats adjacent to the Project footprint, resulting in changed distribution.
Goal	The Project will have a not significant effect on distribution of moose in the late winter (Moose to use late winter habitat as was observed in baseline studies)
Objective	Evaluate trends in moose distribution in the ZOI and within late-winter habitat
Threshold	Moose occurrence within the ZOI equivalent to the prediction made in the Project impact assessment (50% fewer within 300 m of PDA)
Scope of monitoring work	<u>Local monitoring:</u> Continuous log of moose observations from CMC personnel to document occurrence near Project facilities. <u>Regional monitoring:</u> An annual aerial survey within a 10 km radius of Project infrastructure (as per 2013 late-winter survey, including near the mineral licks; Figure 4.1, Appendix 12-A) will be implemented to document relative abundance and distribution of moose relative to Project infrastructure. These surveys will be conducted during the first 3–5 years of road operation.
Agency/partner participation	<u>Local monitoring:</u> CMC personnel, RRCs <u>Regional monitoring:</u> CMC, YG Environment
Project terms and conditions	TBD

Table 5-12 Moose Monitoring: Movement

Indicator	Moose
Monitoring category	Baseline research and Surveillance
Design type	Observational
Measurable parameter	Movement in the ZOI
Key project interactions	Freegold Road structure and operations may be a filter of or barrier to moose movement through the Regional Study Area
Goal	The Project will have a not significant effect on moose movements across Project infrastructure
Objective	Evaluate movement patterns of moose as they approach or cross the road and other Project infrastructure
Threshold	Less than 10% deflection of approaches to road and infrastructure
Scope of monitoring work	<u>Local monitoring</u> : Seasonal moose track surveys in key movement areas where existing trails were detected within the ZOI. These can be ground-based (snow machine) to observe movement during late winter. These surveys will be conducted during the first 3–5 years of road operation. Trail monitoring using remote motion-sensing cameras and documenting fresh tracks at select trails that cross or approach the road.
Agency/partner participation	<u>Local monitoring</u> : CMC
Project terms and conditions	TBD

5.4.6 Den Sites

Dens are sensitive features that warrant monitoring. Although bears only re-use dens occasionally, they more often re-use denning areas. Wolves are known to re-use dens and denning areas for generations. Consequently, monitoring efforts will aim to identify and maintain these areas throughout the life of the Project.

Table 5-13 Den Monitoring: Habitat and Use

Indicator	Grizzly bear, black bear, and wolves
Monitoring category	Baseline research and Surveillance
Design type	Observational (aerial surveys) and opportunistic
Measurable parameter	Dens within 5 km of PDA
Key project interactions	Project footprint in known denning habitats
Goal	The Project will have a not significant effect on den sites
Objective	Allow bears and wolves to den undisturbed within the RSA
Threshold	Not a quantifiable threshold
Scope of monitoring work	<u>Local monitoring:</u> Aerial surveys of known den sites within a 5 km radius of the PDA, opportunistic documentation of other den sites. These surveys will be conducted during the first 3–5 years of operation. <u>Regional monitoring:</u> Maintain/add to long-term regional den site database in cooperation with YG Environment and support any regional programs targeting bears or wolves.
Agency/partner participation	<u>Local monitoring:</u> CMC, RRCs, YG Environment <u>Regional monitoring:</u> YG Environment
Project terms and conditions	TBD

5.4.7 Collared Pika

Collared pika are present within the Project area — primarily located near the mine site in alpine felsenmeer habitats. The Project interacts with suitable pika habitat near the proposed mine site. Monitoring of pika will involve one monitoring objective: to assess pika presence within 1 km of the PDA. Monitoring will occur at the local level by conducting presence/ not detected surveys for the first 3–5 years of operation.

Table 5-14 Collared Pika Monitoring: Presence

Indicator	Collared pika
Monitoring category	Baseline Research and Surveillance
Design type	Observational (ground-based surveys) and opportunistic
Measurable parameter	Pika presence within 1 km of PDA
Key project interactions	Project footprint in suitable pika habitats
Goal	The Project will have a not significant effect on pika presence
Objective	Allow pika to use suitable habitat undisturbed
Threshold	Not a quantifiable threshold
Scope of monitoring work	<u>Local monitoring:</u> Ground-based surveys of suitable habitat within a 1 km radius of the PDA, opportunistic documentation of other sightings. These surveys will be conducted during the first 3–5 years of operation.
Agency/partner participation	<u>Local monitoring:</u> CMC
Project terms and conditions	TBD

6 – WILDLIFE RESEARCH SUPPORT

CMC recognizes that there are information and knowledge gaps about wildlife, vegetation, habitat, and industrial disturbance that are not addressed by the Project-specific mitigation actions and monitoring program identified in this document. There may be broader wildlife and terrestrial environment science needs to help improvement mining mitigation, First Nations knowledge, or general regional knowledge gaps. Although the information may not specific to the Casino Project, CMC recognizes the need to develop partnerships to improve regional ecological knowledge that will help to improve understanding and future decision making

7 – REFERENCES

7.1 LITERATURE CITED

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