Memorandum

Date: August 4, 2017

To: KGHM Ajax Mining (KAM)

From: ERM

Subject: **Ajax Project – Revised Wildlife Management and Monitoring Plan**

The following document is a revised Wildlife Management and Monitoring Plan for the Ajax Project. This document is intended to supercede previous versions of the plan, including the *0217_KAM_Ajax Revised WMMP* version, Appendix 1 from the supplemental memorandum *0720_KAM_Mitigation Hierarchy and Offsetting* and Section 11.27 Wildlife and Vegetation Monitoring Plan within the original Application/EIS. It has not been renamed to Vegetation and Wildlife Management and Monitoring Plan as it is only the appendices which contain committments relevant to vegetation.

Revisions to the plan have been undertaken in response to edits on the February 2017 version from SLR on behalf of the City of Kamloops. This has included but is not limited to the following:

- Including an index of abbreviations;
- Clarifying the need for qualified professional biologists with relevant species experience;
- Renumbering of appendix sections;
- Expansion of raptor sensitive period;
- Additional monitoring commitments such as monitoring the use of any culverts installed to facilitate amphibian dispersal; and
- Clarification of monitoring frequency.

AJAX PROJECT

Wildlife Management and Monitoring Plan

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ABBREVIATIONS

Terminology used in this document is defined where it is first used. The following list will assist readers who may choose to review only portions of the document.

BMP	Best Management Practices
CAPA	Corrective Actions/Preventive Actions
EAC	Environmental Assessment Certificate
EHS	Environmental Health and Safety
EIS	Environmental Impact Statement
ECCC	Environment and Climate Change Canada
KAM	KGHM Ajax Mining Inc.
LSA	Local Study Area
MEM	Ministry of Energy and Mines
MFLNRO	Ministry of Forests, Lands, Natural Resource Operations and Rural Development
MRSF	Mine Rock Storage Facility
MoE	Ministry of Environment
RISC	Resources Information Standards Committee
SOP	Standard Operating Procedures
SSN	Stk'emlupsemc Te Secwepemc Nation
TSF	Tailing Storage Facility
TRU	Thompson Rivers University
UWR	Ungulate Winter Ranges
VC	Valued Components
WMMP	Wildlife Management and Monitoring Plan

1. PURPOSE

The purpose of the KGHM Ajax Mining Inc. (KAM) Wildlife Management and Monitoring Plan (WMMP) is to avoid and minimize the potential effects on wildlife and wildlife habitat from the Project during the Construction, Operations, Closure, and Post-Closure phases, while taking into account operational requirements and the safety of Project personnel. The Plan considers relevant provincial and federal legislation for wildlife and wildlife habitat, current best management practices (BMPs), and stakeholder concerns and input.

The WMMP targets wildlife and habitat identified as Valued Components (VCs) in the Application for an Environmental Assessment Certificate / Environmental Impact Statement (Application/EIS), including:

- amphibians;
- reptiles;
- migratory birds, including waterfowl;
- non-migratory game birds (e.g., sharp-tailed grouse (*Tympanuchus phasianellus*));
- raptors;
- bats; and,
- American badgers (*Taxidea taxus*).

The WMMP focuses on avoiding and/or reducing the risk of direct and indirect wildlife mortality, mitigating the potential for human-wildlife conflicts, and minimizing the level of disturbance to wildlife and wildlife habitat as a result of Project activities and/or infrastructure. Staged management measures will be used to minimize disturbance and reduce impacts to sensitive areas and/or during sensitive time periods. Additional mitigation related to wildlife is also included in the Wetland Compensation Plan and the Grassland Restoration Plan. However, since activities related to those plans will occur primarily on KAM and Sugarloaf Ranch lands outside of the Infrastructure Development Area and are related to compensation/offsetting programs, they are not included in this Plan.

2. SCOPE

The WMMP applies to the permitted active disturbance boundary of the Project. The permitted active disturbance boundary is defined as the surficial area that will undergo changes as a result of the Project and for which applicable permits have been granted. The WMMP applies to the Construction, Operations, Closure, and Post-Closure phases of the Project.

The WMMP applies to KAM and all individuals working for or on behalf of KAM, including employees and contractors. Each individual has a role in complying and being accountable for the development, implementation and/or maintenance of this Plan.

3. PLANNING

3.1 ORGANIZATIONAL ROLES, RESPONSIBILITIES, AND AUTHORITIES

All persons working for or on behalf of KAM, including employees and contractors, have a role in the successful implementation and maintenance of the WMMP. Table 3-1 outlines roles and responsibilities for WMMP activities:

Table 3-1. Roles and Responsibilities for Activities related to the Wildlife Management and Monitoring Plan

Role	Responsibility / Authority
Construction Manager	• Direct the site preparation activities during the Construction phase of the Project. • Collaborate with the Environment Manager to plan pre-clearing and other site mitigation activities.
Environment Manager	• Collaborate with the Construction Manager and Site Manager to plan and direct site preparation and clearing activities. • Collaborate with the Construction Manager and Site Manager regarding the monitoring, reporting, and management of wildlife incidents and mortality. • Identify, document, track and maintain up-to-date compliance obligations related to habitat and wildlife monitoring. • Communicate compliance obligations and provide training to employees and contractors regarding wildlife activity around site and the monitoring and mitigations outlined in the WMMP. • Distribute compliance reports to regulatory agencies as directed by the Environment Certificate and permits.
Qualified Environment Technicians/ Qualified Professional Biologist	• Carry-out site inspections and provide guidance and training to employees and contractors as necessary. • Conduct pre-clearing surveys for important wildlife features. • Maintain wildlife habitat enhancement structures (e.g., bat boxes) • Investigate and report wildlife incidents and mortalities • Manage data and report to Environment Manager.
Mine Personnel	• Report all incidental wildlife observations, including incidents and mortalities, to the Environment Technician and/or Environment Manager. • Comply with all site rules and policies regarding the prevention of harm to wildlife.
Contractors	• Report all incidental wildlife observations, including incidents and mortalities, to the Environment Technician and/or Environment Manager. • Comply with all site rules and policies regarding the prevention of harm to wildlife.

3.1.1 Compliance Obligations

Compliance obligations related to the WMMP are identified, documented, tracked and communicated to persons working for or on behalf of KAM, including employees and contractors, in accordance with the KAM Environmental Health and Safety (EHS) Management System (Standard X.0 Determination of Compliance Obligations).

These obligations are documented and tracked as part of the KAM Compliance Obligation Register, which lists applicable legislation and regulations, along with authorizations and original permit applications, to ensure compliance obligations are met, understood, accessible, remain valid and are enforced.

The WMMP is developed and implemented to comply with applicable legislative, regulatory, permit and other relevant obligations, including:

3.1.2 Legislation and Regulations

- Kamloops Land and Resource Management Plan (Kamloops Interagency Management Committee 1995);
- Nicola Thompson Fraser Sustainable Forest Management Plan (SFMP Working Group 2016);
- *Canadian Environmental Assessment Act, 2012* (2012a);
- *Species at Risk Act* (SARA; 2002c);
- BC *Environmental Management Act* (2003);
- BC *Mines Act* (1996a);
- BC *Wildlife Act* (1996b);
- *Forest and Range Practices Act* (2002b);
- BC *Environmental Assessment Act* (2002a); and
- *Migratory Birds Convention Act*, 1994 (MBCA; 1994).

3.1.3 Permit Requirements

- To be inserted once available.

3.1.4 EAO/CEAA Certificate Conditions

- To be inserted once available.

3.1.5 Guidelines and Practices

Examples of guidelines and best management practises that were considered when developing this document are listed below.

- Accounts and Measures for Managing Identified Wildlife: Southern Interior Forest Region (BC MWLAP 2004);
- Wetland Ways: Interim Guidelines for Wetland Protection and Conservation in British Columbia (Cox and Cullington 2009);
- Develop with Care: Environmental Guidelines for Urban and Rural Land Development in British Columbia (BC MOE 2014);

- Guidelines for Amphibians and Reptile Conservation during Urban and Rural Land Development in British Columbia (MFLNRO 2014b);
- Best Management Practices for Amphibian and Reptile Salvages in British Columbia (MFLNRO 2016);
- Guidelines for Raptor Conservation during Urban and Rural Land Development in British Columbia (MFLNRO 2013);
- A Compendium of Wildlife Guidelines for Industrial Development Project in the North Area, British Columbia (MFLNRO 2014a);
- Recovery Strategy for the Great Basin Spadefoot (*Spea intermontana*) in British Columbia (British Columbia Southern Interior Reptile and Amphibian Recovery Team 2008);
- Management Plan for the Western Toad (*Anaxyrus boreas*) in British Columbia (Provincial Western Toad Working Group 2014);
- Environment and Climate Change Standard Guidance for Environmental Assessments: Western Toad (*Anaxyrus boreas*). (ECCC-CWS 2016/02/17 draft);
- Recovery Strategy for the Common Nighthawk (*Chordeiles minor*) in Canada (Environment Canada 2016a);
- Recovery Strategy for the Olive-sided Flycatcher (*Contopus cooperi*) in Canada (Environment Canada 2016c);
- Management Plan for the Peregrine Falcon *anatum/tundrius* (*Falco peregrinus anatum/tundrius*) in Canada (Proposed) (Environment Canada 2015a);
- Recovery Strategy for the Badger (*Taxidea taxus*) in British Columbia (*jeffersonii* Badger Recovery Team 2008);
- Management Plan for the Lewis's Woodpecker (*Melanerpes lewis*) in Canada (Environment Canada 2014);
- Recovery Strategy for the Lewis's Woodpecker (*Melanerpes lewis*) in Canada (Environment Canada 2016b);
- Recovery Strategy for the Western Screech-Owl, *macfarlanei* subspecies (*Megascops kennicottii macfarlanei*) in British Columbia (Western Screech-Owl, *macfarlanei* subspecies Recovery Team 2008); and
- Recovery Strategy for Little Brown Myotis (*Myotis lucifugus*), Northern Myotis (*Myotis septentrionalis*), and Tri-colored Bat (*Perimyotis subflavus*) in Canada (Environment Canada 2015b).

3.1.6 Performance Objectives

As part of the KAM's approach to environmental management, it sets, implements and maintains documented environmental performance objectives that consider the Project's environmental risks and compliance obligations. These performance objectives are aligned with KAM's Environmental Policy and are communicated to employees, contractors, and interested parties. Performance objectives are regularly monitored, and updated as appropriate.

KAM's overarching environmental objective is to avert adverse effects, where technologically and economically feasible, and mitigate adverse effects that are unavoidable.

In support of KAM's overarching environmental objective and to provide a basis for continual improvement of environmental performance, KAM has established the following performance objectives for the management and monitoring of wildlife that considers the Project's significant risks and compliance obligations:

- avoid potential adverse effects through design mitigation;
- monitor and verify the predictions of residual effects related to the Project;
- monitor and evaluate the effectiveness of mitigation measures;
- design monitoring efforts with the objective of having the ability to detect natural and Project-related changes to the environment and wildlife;
- identify unanticipated effects related to the project;
- provide an early warning of undesirable change in the environment;
- inform and implement adaptive management measures;
- meet legislation requirements with regard to:
  - active bird nests, leks, hibernacula, or mammal dens disturbed or destroyed during clearing for the Construction phase, incremental growth of the Project during the Operation phase, and general Project activities;
  - active or inactive raptor nests disturbed or destroyed during Construction and Operation; and,
  - mortality of animals directly attributable to the Project, particularly species of conservation concern and migratory birds.
- minimize loss of moderate to high-quality habitat (effective habitat) as identified by habitat suitability modelling; and
- minimize the disruption to wildlife movement.

4. SUPPORT

The WMMP development and implementation will rely on consultation with Federal and Provincial government agencies, Aboriginal groups, the public and other stakeholders. KAM will invite the participation of local experts, Aboriginal groups and stakeholders in the execution of this WMMP. Management measures will be reviewed annually and updated based upon initial outcomes and on current Best Management Practices (BMPs).

4.1 COMPETENCE, TRAINING, AND AWARENESS

KAM requires that persons working under its control, including employees and contractors, have the knowledge, understanding, skills and abilities to complete work in a manner that safeguards the environment, which is managed in accordance with the KAM EHS Management System (Standard X.0 Competence, Training and Awareness).

An education program for all individuals working for or on behalf of KAM, including employees and contractors will be developed to promote stewardship and limit human conflicts with wildlife. This program will be supported by standard operating procedures (SOPs), standard reporting forms, information sheets, posters, and signage. The education program will include an emphasis on:

- personnel awareness of wildlife sensitive times of year;
- waste management/wildlife attractant protocols;
- not feeding, or intentionally attracting, wild animals;
- policies banning firearms and hunting;
- legal obligations and corporate commitments concerning working near sensitive vegetation/ ecosystems, wildlife, Ungulate Winter Ranges (UWRs) and bird nests;
- operating protocols for roads; and
- wildlife reporting and response procedures.

The effectiveness of the education program training will be reviewed every year during Construction and every two years during Operations and amended as required.

4.2 INTERNAL AND EXTERNAL COMMUNICATION

The significant environmental risks, performance, and relevant compliance obligations related to wildlife will be communicated to all persons working under KAM control, including employees and contractors. Internal communication of this information among the different levels and functions of the Project will be conducted in accordance with the KAM EHS Management System (Standard X.0 Internal and External Communication). More specifically, communication of information related to wildlife will be achieved through:

- employee and contractor training and awareness activities; and
- internal meetings, as required.

External communication activities will also be established, including:

- receiving, documenting and responding to communication from external interested parties, including complaints;
- communications with authorities, regulators and First Nations, such as:
  - technical/specialized planning and execution of activities;
  - operational issues requiring approval and/or inspections by government authorities; and
  - general maintenance of the relationships with government agencies and agency personnel with authority over the activities of the company, i.e., permits, letters of approval, inspection reports, meeting minutes;
- maintaining general environmental awareness requirements for occasional visitors to the site; and
- contractors, suppliers and regular visitors will undergo training prior to working on site.

4.3 SUPPORTING DOCUMENTATION

The following documentation will be used to support effective implementation and operation of the WMMP:

- Construction Environmental Management Plan;
- Air Quality Management Plan;
- Water Management Plan;
- Traffic Plan;
- Noise and Vibration Management Plan;
- Groundwater and Surface Water Quality Monitoring Plan; and
- Reclamation and Closure Plan.

5. IMPLEMENTATION

5.1 GENERAL APPROACH

The potential Project effects on wildlife could include:

- habitat loss and alteration;
- sensory disturbance;
- disruption of wildlife movement patterns;
- direct mortality;
- indirect mortality;
- attraction to the Project due to attractants; and
- health effects due to chemical hazards.

Mitigation measures to address these potential effects are outlined in the following sections.

A set of detailed environmental sensitivity maps will be produced that will outline environmental sensitivity features for wildlife. The maps will include a summary of mitigation activities from relevant management plans. These maps will be produced prior to construction with sufficient time for review by Ministry of Forests, Lands, Natural Resource Operations and Rural Development (MFLNRO), Ministry of Energy and Mines (MEM), Ministry of Environment (MoE), Stk'emlupsemc Te Secwepemc Nation (SSN). The Environmental Manager, and construction and maintenance supervisors for implementation. The completion of mitigation activities will be noted by the responsible person(s) within the KAM organizational chart and summarized in the compliance reporting delivered to appropriate regulators.

The following Project considerations have been or will be integrated into the Project during the planning and construction phases. Many of these measures have been identified in response to comments from regulators, First Nations and the public, while others are current best management practices:

- the Project's surface footprint is designed to minimize habitat disturbance;
- important wildlife habitats will be avoided during construction where practicable alternatives are available;
- all clearing dimensions will be minimized during construction to prioritize:
  - protection of undisturbed habitats, and
  - coordination with other management plans.
- designing the power line to follow established guidelines for bird protection (Avian Power Line Interaction Committee 2012); and
- ensuring the Ajax Mine Access Road upgrades do not overlap any known raptor nest sites or sharp-tailed grouse lek sites.

These design considerations will serve to minimize the effects of habitat loss, sensory disturbance, and direct mortality on wildlife.

5.2 AVOIDANCE OF WILDLIFE SENSITIVE FEATURES AND PERIODS

The primary mitigation strategies to minimize the effects of habitat loss and alteration, sensory disturbance, disruption of movement, and direct mortality on wildlife due to Project activities is avoidance of sensitive features for wildlife, wherever possible. The sensitive features identified for wildlife that will be avoided, wherever possible, include:

- Nests of migratory birds and raptors, which are legally protected under the BC *Wildlife Act* (1996b) and the *Migratory Birds Convention Act* (1994);
- Mature trees that may offer nesting habitat for cavity nesting birds and/or roosting habitat for bats;
- Breeding ponds for amphibians including temporary/ephemeral wetlands;
- Hibernacula for snakes;
- Burrows/dens for badgers;
- Maternity and day roosts and hibernacula for bats; and
- Winter range areas for mule deer (*Odocoileus hemionus*; as identified in the Kamloops LRMP and by the BC MOE).

If sensitive features cannot be avoided entirely, potential effects to the sensitive feature can be minimized by not conducting construction activities during the period when wildlife is using the feature (i.e. sensitive periods; Table 5-1). If Project activities occur near a sensitive feature during a sensitive period, then pre-construction surveys will be conducted and appropriate buffers will be set up surrounding any sensitive wildlife features. In many cases, Environmental Technicians, reporting to the Environmental Manager, will be employed on site to carry out pre-clearing surveys and implement appropriate measures to minimize potential adverse effects to these areas; some pre-clearing surveys will be carried out by a qualified professional biologist. Pre-clearing protocols, including relevant buffers, are described in further detail in Section 5.2.7. A pre-clearing approval process will be implemented to confirm that all required permits and authorizations are in place and that all required actions have been completed before clearing starts. On some occasions the relocation of wildlife may be required to avoid direct mortality (e.g., western toad juveniles dispersing across active roads). The instances where relocation activities will be required are described for the applicable wildlife species in Section 5.2.7.

There are limited interactions predicted between the Project and mule deer (KAM 2016). Deer winter range (as identified in the Kamloops LRMP and by the BC MOE) will be avoided whenever practical. Construction activities in deer winter range will not occur during the fall, whenever practical, to reduce impacts of habitat removal on reproducing individuals.

There are limited interactions expected between the Project and indicator species of invertebrates (e.g. monarch butterfly (*Danaus plexippus*)). The primary mitigation for invertebrates for the Project will be to conduct construction activities in areas with showy milkweed (*Asclepias speciose*) during the winter (non-breeding season) to remove any possibility of direct mortality on monarchs.

Table 5-1. Wildlife Sensitive Features and Periods Applicable to the Project

Species	Sensitive Period	Season / Life Requisite / Habitat Feature		Relevant Legislation and Guiding Documents
Reptiles	August to October (juvenile dispersal) Winter (overwintering)	Hibernacula	Vegetation clearing, grubbing and additional ground surface preparation near snake hibernacula will be scheduled outside of sensitive periods, wherever possible. Pre-clearing surveys will be conducted if work proceeds during sensitive period.	MFLNRO (2014b)
Amphibians	April to September	Breeding ponds/toadlet dispersal	Vegetation clearing, grubbing and additional ground surface preparation near suitable amphibian breeding waterbodies will be scheduled outside of sensitive periods, wherever possible. Pre-clearing surveys will be conducted if work proceeds during sensitive period. Breeding areas will be protected by 50 m buffer.	SARA (2002c) MFLNRO (2014b) Provincial Western Toad Working Group (2014) Environment and Climate Change Canada (2016c)
Migratory Birds	April 1 to Aug 15	Nesting/fledging	Vegetation clearing, grubbing and additional ground surface preparation will be scheduled outside of sensitive periods, wherever possible. Point count surveys will be conducted if work proceeds during sensitive period. Nest sites will be protected by species specific buffers using guidance from Environment and Climate Change Canada (2016), with a minimum of a 30 m buffer.	MBCA (1994) BC *Wildlife Act* (1996b) BC MOE (2014) Environment and Climate Change Canada (2016b)
Raptors	Jan 5 to Sept 5	Nesting/fledging	Vegetation clearing, grubbing and additional ground surface preparation will be scheduled outside of sensitive periods in areas where raptor nests have been previously detected, wherever possible. Pre-clearing surveys will be conducted if work proceeds during sensitive period. Nest sites will be protected by 200 to 500 m buffer, depending on species.	BC *Wildlife Act* (1996b) MFLNRO (2013)

(continued)

Table 5-1. Wildlife Sensitive Features and Periods Applicable to the Project (completed)

Species	Sensitive Period	Season / Life Requisite / Habitat Feature		Relevant Legislation and Guiding Documents
Game Birds	April 1 to May 31	Breeding/rearing	Vegetation clearing, grubbing and additional ground surface preparation will be scheduled outside of sensitive periods in areas where active leks were identified during baseline surveys, wherever possible. Pre-clearing surveys will be conducted if work proceeds during sensitive period. Lek sites will be protected by 400 m buffer.	BC *Wildlife Act* (1996b) BC MOE (2014)
Mammals (Badgers)	April 1 to Aug 15	Breeding/dens	Vegetation clearing, grubbing and additional ground surface preparation will be scheduled outside of sensitive periods in areas where American badger dens were previously detected and in high and moderate classified suitable habitat, wherever possible. Pre-clearing surveys will be conducted if work proceeds during sensitive period. Badger dens will be protected by 50 m buffer. If active maternal dens are found within disturbance areas, access will be restricted to these areas by establishing 200 m buffers around active maternal dens for the duration of the maternal period from May 1 to August 15 or until young have left the den as confirmed by a Qualified Professional Biologist with specialized knowledge of badgers.	SARA (2002c) BC *Wildlife Act* (1996b) BC MOE (2014)
Mammals (Bats)	May 15 to Sept 30 Oct 1 to May 31	Breeding/maternity roosts Hibernation/hibernacula	Vegetation clearing, grubbing and additional ground surface preparation will be scheduled outside of sensitive periods in forested areas that are potential maternal roosting habitat and in potential hibernacula areas, wherever possible. Pre-clearing surveys will be conducted if work proceeds during sensitive period. Active maternity roosts will be protected by a 50 to 125 m buffer, depending on species.	BC *Wildlife Act* (1996) BC MOE (2014) Environment and Climate Change Canada 2016a
Mammals (Mule Deer)	September and October	Rut/Reproducing Winter Range	Schedule vegetation clearing activities outside of fall period to reduce impacts of habitat removal on reproducing individuals, wherever possible. Deer winter range planning cells will be avoided whenever practical.	Kamloops Interagency Management Committee (1995)

5.3 NOISE MITIGATION FOR WILDLIFE

Mitigation measures to minimize disturbance to wildlife as a result of Project noise are primarily addressed within the Noise and Vibration Management Plan and include the following:

- considering noise ratings when selecting equipment;
- adjusting blasting configurations to minimise simultaneous blasting effects;
- optimizing the operation of equipment to minimize noise (e.g., reduced speed limits);
- optimizing the site layout to minimize noise impact (e.g., through use of natural screens such as buildings, facing away from relevant receptors; minimizing the need for mobile equipment to use their backup alarms);
- traffic noise will minimized by providing a vehicle parking lot for staff offsite, and shuttling mine personnel from this site to the mine; and
- noise dampening measures will be applied where possible, including conducting loud procedures indoors, where practical.

Additional mitigation to reduce the potential for sensory disturbance of wildlife, KAM proposes the following blast timing windows:

- **April 1st through July 31st / when the blasting safety radius extends into Jacko Lake**: Blasting may occur between 4 hours after sunrise to 10:00 AM and from 2:00 PM to sunset.
  - The blasting restriction from sunrise to 4 hours after sunrise is to mitigate effects to migratory birds and non-migratory gamebirds during the breeding season (May 1st to July 31st) and sensitive periods (April 1st to May 30th) respectively.
- **April 1st through July 31st / when the blasting safety radius <u>does not</u> extend into Jacko Lake**: Blasting may occur during the window of 4 hours after sunrise to sunset.
  - The blasting restriction from sunrise to 4 hours after sunrise is to mitigate effects to migratory birds and non-migratory gamebirds during the breeding season (May 1st to July 31st) and sensitive periods (April 1st to May 30th) respectively.
- **August 1st through October 31st / when the blasting safety radius <u>does not</u> extend into Jacko Lake**: Blasting may occur from sunrise to sunset.
- **November 1st to March 30th:** Blasting may occur between sunrise and sunset.

5.4 ROAD AND TRAFFIC MANAGEMENT

Mitigation measures to minimize sensory disturbance, disruption of movement, and mortality to wildlife due to Project roads and associated traffic are primarily addressed within the Traffic Plan. The Road and Traffic Plan includes mitigation with regards to speed limits and signage to be employed along Project roads as well as minimizing traffic along roads by providing a vehicle parking lot for staff, and mine personnel will be shuttled from this site to the mine.

Additional strategies to minimize potential effects of direct mortality to wildlife due to Project roads and associated traffic include:

- Vehicles will yield to wildlife observed along Project roads and communicate these observations to the environmental manager;
- Any encounter with wildlife (including observations or interactions) will also be required to be recorded and reported to the Environmental Manager. Radios will be used to alert other operators when there is wildlife in the area and to travel with caution. These records will provide a basis for identifying locations of higher risk for wildlife-vehicle collisions, and for developing appropriate mitigation strategies for those areas;
- If a large number of wildlife are present on or adjacent to the road (e.g. high density of migrating juvenile amphibians), a reduced speed limit or temporary road closure may be instigated at the discretion of the Environmental Manager in consultation with the Mine Manager;
- The height of roadside vegetation will be minimized to improve drivers' sight lines;
- Habitat near roads to be modified to decrease suitability for wildlife (e.g., badgers, deer);
- Implementation of a Wildlife-Vehicle Interaction Monitoring Program (Section 7.1.5) to gather information of wildlife presence and wildlife-vehicle interactions along Project roads and implement adaptive management wherever necessary;
- Installation of drift fences and culverts in locations where pre-construction surveys indicate they are needed;
- Drivers will be required to record and report wildlife collisions/mortalities along the Mine Site roads and offsite roads. It will be mandatory to record and report the following information to the Environmental Manager: The location along the road; and Species; and
- Wildlife collision data will be reviewed and summarized monthly to identify conflict "hot-spots," which may then be used as part of adaptive management to further mitigate conflicts between road users and wildlife (e.g., through increased signage, further driver education, and enforcement of speed limits).

5.5 WILDLIFE ATTRACTANT MANAGEMENT

As the Project is situated near the City of Kamloops limits, KAM will follow procedures consistent with Kamloops Bear Smart Community plan and guidelines used for industry in western Canada. This will include worker education, management of waste (storage and removal), site hardening to prevent attractants from vegetation reclamation, or fluids and substances associated with equipment.

A number of potential wildlife attractants were assessed in the Application/EIS (KAM 2016), such as solid and chemical wastes (e.g., food waste, sewage, garbage, and stored chemicals), Project lighting, and Project infrastructure (e.g., buildings, water and tailings storage facilities). Mitigation and management strategies for Project wastes, lighting, and other infrastructure that may attract wildlife, including contact water which may pose a chemical hazard to wildlife, are addressed in a number of environmental management plans developed for the Project, including:

- Construction Waste Management Plan;
- Metal Leaching and Acid Rock Drainage Management and Monitoring Plan;
- Water Management Plan;
- Hazardous Material and Waste Management Plan;
- Mine Emergency Response Plan; and
- Groundwater and Surface Water Monitoring Plan.

Additional strategies to specifically minimize wildlife attractants, including those that might be a chemical hazard to wildlife, at the Project include:

- With the exception of vegetation required to stabilize slopes and control dust, removal of tall vegetation and other wildlife attractants from around the Tailing Storage Facility (TSF) and Mine Rock Storage Facilities (MRSFs), to discourage nesting and use of the area by water-associated birds and by breeding amphibians;
- Any roadkill detected will be removed promptly by KAM staff to avoid attracting scavenging raptors and other wildlife;
- Avoid the creation of shallow roadside pools that may attract wildlife (e.g., amphibians);
- Creation of artificial 'diversion pools' placed in areas adjacent to the TSF and MRSFs to provide suitable habitat (e.g. hydroperiod is long enough for metamorphosis) that amphibians will preferentially select, thus keeping them away from contaminated water sources; and
- Implementation of an Infrastructure Monitoring Plan (Section 7.1.1) to monitor for wildlife attraction to the Project (e.g., waste management facilities, TSF) and implementation of adaptive management wherever necessary.

5.6 RECOVERY AND MANAGEMENT PLANNING FOR SPECIES AT RISK

As there are species at risk and critical habitat or draft critical habitat identified within the Project boundary, additional mitigation measures that are identified in recovery planning and/or management planning will be incorporated into wildlife mitigation measures as needed through adaptive management. 'Recovery planning' is a process to identify and facilitate the implementation of priority actions to ensure the survival and recovery of species at risk. The goal of recovery planning is to help arrest or reverse the decline of a species, and/or reduce or remove the threats to its long-term persistence in the wild. Recovery strategies are prepared for federally threatened species and management plans are produced for species of concern (Table 5-2). General approaches to recovery include habitat securement/protection, habitat management/stewardship, and research on population demographics.

Table 5-2. SARA Species within Project with a Recovery Plan or Management Plan

Species	Provincial Listing	SARA Schedule	Plan
Great Basin Spadefoot (*Spea intermontana*)*	Blue	1-T	British Columbia Southern Interior Reptile and Amphibian Recovery Team 2008 Federal Recovery Strategy expected in 2017
Western Toad	Blue	1-SC	Provincial Western Toad Working Group 2014*
Common Nighthawk	Yellow	1-T	Environment Canada 2016a
Olive-sided Flycatcher	Blue	1-T	Environment Canada 2016c
Peregrine Falcon	Red	1-SC	Environment Canada 2015a*
American Badger**	Red	1-E	*jeffersonii* Badger Recovery Team 2008 Federal Recovery Strategy expected in 2017
Lewis's Woodpecker	Blue	1-T	Environment Canada 2014* Environment Canada 2016b
Western Screech Owl (*macfarlanei* subspecies)	Red	1-E	Western Screech-Owl, *macfarlanei* subspecies Recovery Team 2008 Federal Recovery Strategy expected in 2017
Little Brown Myotis	Yellow	1-E	Environment Canada 2015b
Gopher Snake (*Pituophis catenifer*)	Blue	1-T	Federal Recovery Strategy expected in 2017
Western Rattlesnake (*Crotalus oreganus*)	Blue	1-T	Federal Recovery Strategy expected in 2017

** Management Plans. The management plan for peregrine falcon is a proposed plan.*
***Provincially identified wildlife (BC MWLAP 2004)*
T – Threatened
SC – Special Concern
E – Endangered

5.7 WILDLIFE SPECIES SPECIFIC MITIGATION

5.7.1 Amphibians

Pre-construction surveys will be performed by a qualified and experienced professional biologist, who will collect additional data on the wetlands used by great basin spadefoot and locations of potential amphibian migration corridors. See Appendix A for further details.

5.7.1.1 Pre-Construction Phase

Additional field work (Appendix A) will occur at the temporary and permanent wetlands and waterbodies anticipated to be lost to the Infrastructure Footprint prior to construction to provide additional data regarding the presence and relative abundance of the great basin spadefoot. This will contribute to quantification of wildlife functions at wetlands that will be compensated for (Environment Canada 1991; Hanson, Swanson et al. 2008). Wetlands will be avoided along the waterline and powerline. See Appendix A for additional details.

- KAM will use known amphibian breeding sites as inputs during the final design and Construction phase. Where feasible, Project facilities will be located to avoid direct impacts to these habitats.
- KAM will design roads and power lines to minimize the number of water crossings and to avoid running parallel to watercourses.
- Culverts (crossing structures) will installed under roads to facilitate amphibian movement between Jacko Lake and Inks Lake as informed by the results of pre-construction surveys.
- KAM will create and maintain a spatial database and maps of known breeding sites in the vicinity of Project facilities to avoid impacts during Operations and maintenance activities. The database will be actively updated as new information becomes available.

Prior to Construction, Standard Operating Procedures (SOPs) will be developed that include procedural guidance in the event that amphibian breeding or mass dispersal is identified. This will include:

- Guidance on buffer distances from identified breeding sites;
- Salvage or relocation requirements;
- Techniques in the event work must be undertaken at breeding sites;
- An action plan to manage and mitigate effects of mass dispersal events on Project roads, including procedures in event road closing or detouring roads is not practical (i.e., crossing structures and/or fencing will be installed to funnel/direct the frogs and toads to specific locations). Workers and volunteers could then transport the toads ('bucket brigade') from these locations to areas of suitable habitat; and
- Best management practices for the application of magnesium chloride on Project gravel road surfaces (British Columbia Southern Interior Reptile and Amphibian Recovery Team 2008).

5.7.1.2 Construction and Operations Phases

The following mitigation measures will avoid, minimize, or compensate for potential effects to amphibians:

- KAM will create exclusion areas at all known breeding sites and temporary diversion ponds located adjacent to Construction and Operation areas. These areas will be clearly flagged to discourage accidental encroachment with machines. Signage will be added where necessary to indicate the boundaries of the exclusion area;
- KAM construction personnel will attend a field-based orientation session where the exclusion areas will be explained, and the importance of avoiding disturbance within them will be stressed;
- Vegetation clearing activities will not be conducted in areas adjacent to high-quality amphibian breeding habitat including ephemeral/temporary wetlands during the breeding/

dispersal period from April through September, wherever possible. Amphibian breeding sites (i.e., wetlands) will be avoided whenever practical;

- Where avoidance is not possible, before activities commence that will remove large areas of habitat, pre-clearing surveys will be conducted by a qualified professional biologist with expertise in amphibian biology, and in accordance with best management practices for amphibians (MFLNRO 2016), at wetlands and ponds for amphibian breeding prior to construction activity. If any amphibians are present, they will be translocated to closest area of suitable habitat outside of the Infrastructure Development Area (Infrastructure Disturbance Area; RECON Environmental, Inc. 2010). To maximize the likelihood of success, translocations should be conducted in the late summer, in preparation for clearing in the fall after juveniles have dispersed;
- Pre-clearing surveys will be conducted and a buffer zone of at least 50 m will be established between construction activities and identified active breeding habitat in accordance with best management practices (MFLNRO 2014b; BC MOE 2014) and guidance from Environment and Climate Change Canada (Environment and Climate Change Canada 2016c);
- KAM will use erosion prevention and bank stabilization techniques to minimize potential for secondary loss of trees after initial clearing efforts;
- Amphibian observations and incidents will be reported, including mass movements near access roads. A reduced speed limit, temporary road closure, or incidental salvaging (MFLNRO 2016) may be instigated at the discretion of the Environmental Manager in consultation with the Mine Manager;
- Amphibian salvage and relocation procedures will be implemented as required (See below; (Environment and Climate Change Canada 2016c; MFLNRO 2016));
- Shallow standing water in roadside ditches of access roads will be minimized and ditches will be monitored for use as breeding sites for amphibians. If breeding occurs, tadpoles will be translocated to more suitable habitat if warranted and exclusion fencing (i.e., buried silt fencing) will be installed to prevent future use as breeding location(s);
- Emergent vegetation will be removed in any areas with contact water (e.g., TSF, MRSF) to make the habitat less attractive for amphibians;
- Drift fences and culverts will be installed in locations where pre-construction surveys have identified migration corridors (Appendix A) or substantial road mortality is observed; and
- KAM will avoid use of herbicide sprays within 200 m of amphibian breeding sites, and limit such use to direct application rather than broadcast sprays (except when required for invasive species control); and
- A wetland habitat compensation program of at least 28.7 ha (pending pre-construction survey results) will be initiated during project Construction to conserve and enhance wetland function within the RSA. Some key considerations include: creation of ponds with and without vegetation that is attractive to waterfowl to decrease the incidence of egg or tadpole predation; enhancing existing wetlands, providing habitat features for breeding amphibians; using small woody debris to provide initial egg attachment sites until proper aquatic vegetation develops; including non-breeding habitat areas with bunchgrasses or relatively open grass sites, with

minimum soil depths of 15 cm for burrowing; and control introduced invasive species (bullfrogs, non-native fish species) and prevent new introductions.

If amphibians are observed within the Project footprint, salvaging (MFLNRO 2016) will occur at discrete times corresponding to each incremental increase in the footprint during operation and will include the following:

- All age classes of amphibians (including egg masses/strings, tadpoles, metamorphs and/or adults) will be translocated to the closest unaffected suitable wetland;
- Candidate relocation wetlands will be identified prior to the commencement of construction activities; and
- Diversion pools with appropriate hydroperiods will be situated outside of the Infrastructure Disturbance Area boundary in areas with suitable habitat. As wetland reclamation will not occur during Construction and Operation phases, 'diversion pools' will be created to attract amphibians away from mining activity. At least two diversion pools will be created in relative proximity to where confirmed amphibian breeding habitat is anticipated to be lost within the Infrastructure Footprint. Water levels will be maintained in these pools during the amphibian breeding season and fencing will be installed to exclude livestock.

5.7.2 Reptiles

Pre-construction surveys for snake dens and identification of migration corridors will be conducted by a Qualified Professional Biologist to identify important habitat and inform location specific mitigation measures. See Appendix A for more details.

The following mitigation measures will to avoid, minimize or compensate for potential effects to reptiles:

- Vegetation clearing activities near snake hibernacula will be not be conducted during the sensitive periods for reptiles; August – October (juvenile dispersal to hibernacula) and winter (Table 5-1) and will include working within timing windows (Table 5-3) as required wherever possible;
- If limiting clearing/grubbing and earthworks activities to specific windows is deemed not practical, then a qualified professional biologist with expertise with reptiles will conduct an assessment of the area prior to any activities. If hibernacula or snakes are identified in the area, appropriate measures to relocate the wildlife to nearby suitable habitat outside of the Infrastructure Disturbance Area will take place;
- A Standard Operating Procedure will be developed for translocation of snakes and western painted turtles. Reptiles will be relocated to nearby suitable habitat on lands outside of the Infrastructure Disturbance Area boundary;
- Sensitive sites (e.g., rock outcrops, talus slopes) close to infrastructure areas will be appropriately buffered during construction so that they remain intact;

- Construction of artificial snake dens, as determined by a qualified and experienced professional biologist will be completed to replace potentially lost hibernacula due to Project construction as informed by pre-construction survey results; and
- Habitat and suitable den sites will be restored through reclamation and revegetation activities. A diversity of habitat features such as coarse woody debris, rocky outcrops, talus and areas used for burrowing will be restored. Artificial structures (rock or brush piles) to provide shelter, overwintering sites or nesting sites for reptiles will also be constructed.

Table 5-3. Winter Months When Snakes in Hibernacula

Species	Winter Period
Great Basin Gopher Snake	November to March
North American Racer	November to March
Northern Rubber Boa	November to February
Western Rattlesnake	October to February

5.7.3 Migratory Birds

5.7.3.1 Pre-Construction Phase

- Additional field work will be conducted to augment baseline data and inform location specific mitigation measures. See Appendix A for details;
- Additional baseline surveys will occur at wetlands anticipated to be lost to Project Infrastructure Footprints and at potential compensation wetlands within the Local Study Area. These will include point counts and waterfowl/shorebirds surveys for migratory birds and will follow appropriate Resources Information Standards Committee (RISC) guidelines. These surveys will be conducted in order to further develop the wetland compensation plan;
- A pre-demolition survey for barn swallow nesting activity will be employed prior to removal of any anthropogenic structures (such as heritage sites or more modern buildings) to avoid destruction of active nesting sites;
- Pre-construction surveys will occur along the powerline in order to identify and avoid any sensitive habitat features such as wetlands that swallows and swifts may use as foraging habitats; large trees that could be used for nesting by Lewis's woodpecker;
- All known wetland locations will be provided as inputs during the final design phase so further reductions and avoidances are incorporated;
- Roads and power lines will be designed to minimize the number of water crossings and to avoid running parallel to watercourses;
- Power line poles will avoid wetlands and KAM will design the powerline to follow established guidelines for bird protection (Avian Power Line Interaction Committee 2012); and
- KAM will use directed/focused lighting rather than broad area lighting and by shielding lights to minimize stray light. Lighting, where possible, will be limited to within the

footprints, and will not be directed outside of the footprints. Lighting will be focused and not widespread when working near the edge of the footprints. Any illumination occurring outside the footprints will be directed away from suitable (grassland, wetland) habitat, particularly during migration periods (March/April and late summer or fall). Lighting in non-essential areas will only be used when necessary.

5.7.3.2 Construction and Operations Phases

The following mitigation measures will avoid, minimize or compensate for potential effects to migratory birds:

- All known wetland locations will be provided as inputs during the final design phase so further reductions and avoidance is incorporated;
- Vegetation clearing will be scheduled outside of the breeding/nesting period (April 1 to August 15; Table 5-1), wherever possible. If clearing occurs during the breeding/nesting period, point count surveys will be conducted to identify locations of active breeding and nests and any active nest will be protected by a species specific buffer using guidance from Environment and Climate Change Canada (2016b); nest sites will be protected by a minimum of a 30 m vegetated disturbance-free buffer and monitored until the nest is inactive. Vegetation will be removed once nests are confirmed unoccupied. Point count survey and nest search protocols will be developed in consultation with Canadian Wildlife Service and BC MFLNRO;
- Construction and maintenance activities in and around watercourses and aquatic habitats will follow the Standards and Best Practices for Instream Works (BC Ministry of Water, Land and Air Protection 2004) and the Land Development Guidelines for the Protection of Aquatic Habitat (Chilibeck, Chislett, and Norris 1993), which are designed to reduce sedimentation and avoid introduction of deleterious substances to aquatic environments. This is covered in greater detail under the Erosion and Sediment Control Plan;
- Erosion prevention and bank stabilization techniques will be used to minimize potential for secondary loss of trees after initial clearing efforts;
- If work is required immediately adjacent to any wetlands during sensitive breeding periods then appropriate exclusion and signage will be added so as to instruct construction personnel to avoid these sites. Habitat will be cleared in the approved footprint areas only and construction will be monitored to prevent any unnecessary clearing;
- Construction personnel will attend a field-based orientation session where the exclusion areas will be explained, and the importance of avoiding disturbance within them will be stressed;
- Grasslands near Inks Lake will be fenced off to avoid disturbance (particularly livestock grazing) during sensitive times (April 1 to August 15);
- KAM will install nest boxes during construction and operations in appropriate habitats on KAM and Sugarloaf Ranch lands to facilitate nesting for species such as swallows,

woodpeckers, cavity-nesting waterfowl and owls. The number of nest boxes installed will be informed by the results of pre-construction surveys;

- When possible, subject to lease agreements with ranchers, cattle will be excluded from areas enhanced for migratory birds during the sensitive breeding and nesting period (April 1 to August 15);
- Wetland reclamation will re-create at least 28.7 ha of lost wetland/water features. These features will be revegetated to support nesting and foraging of waterfowl, great blue heron (*Ardea herodias*) and sandhill crane (*Grus canadensis*);
- Fish habitat offsetting works to expand Jacko Lake will also create suitable habitat for waterfowl and shorebirds. The additional shoreline and installation of nest boxes will provide nesting habitat;
- Mitigation measures to reduce the interaction between hazardous chemicals and Great-blue Heron, Sandhill Crane and Waterfowl include:
  - removal of vegetation and other wildlife attractants from around any water features on the TSF and MRSFs, to discourage nesting and use of the area by water associated birds (waterfowl, Great Blue Heron and Sandhill Crane);
  - monitoring and adaptive management of use of the tailings storage facility by migratory birds; and
  - safe conveyance, handling, and storage of contact and non-contact water.
- Grassland restoration treatments will occur on lands outside of Infrastructure Footprints to improve grassland extent and condition to mitigate grassland losses prior to reclamation of areas disturbed during Project activities. The treatment types include: reduction of forest encroachment on grasslands, treatment of invasive plant species, fencing of riparian areas to exclude use by livestock, and thinning sagebrush dominated areas. The total area identified as potentially suitable for restoration treatments is 2,093 ha. This grassland restoration will be beneficial to a host of species including grassland associated migratory songbirds. Mitigation and compensation for grasslands is detailed in Appendix B; and
- During reclamation, shrub/grassland habitat will be created on waste rock or stockpile areas that will provide feeding and nesting habitat for Long-billed Curlew and Common Nighthawk.

5.7.4 Raptors

The BC *Wildlife Act* (1996b) protects raptors, their eggs and active nests from possession, molestation or destruction, and protects the nests of eagles, ospreys, falcons and other raptors year-round. Work will be conducted in compliance with the *Wildlife Act*. Active raptor nests will not be destroyed during Construction and Operation. Inactive raptor nests or nests found outside of the breeding season will also be maintained or relocated under an approved permit and in consultation with appropriate regulators (*Wildlife Act* 1996b; MFLNRO 2013).

Pre-construction surveys will occur for western screech owl in draft critical habitat areas in the IDA and linear corridors. See Appendix A for further details.

The following mitigation measures will avoid, minimize, or compensate for potential effects to raptors:

- All known nest locations will be provided to Construction and Operation personnel to reduce or avoid impacts to these sites;
- Clearing trees will be scheduled outside of the raptor breeding period from January 5 to September 5 in areas where raptor nests have been previously detected, wherever possible;
- Sensitive nesting sites (e.g., large diameter trees and snags) and known nest locations will be avoided whenever practical;
- Known active nests that cannot be avoided will be relocated under an approved permit, with nest habitat site creation a secondary option;
- To mitigate for potential loss of raptor nesting habitat, ten artificial nesting structures will be installed on KAM and Sugarloaf Ranch lands outside of the area of Project direct and indirect disturbance (i.e. sensory disturbance from noise and blasting);
- If clearing cannot be scheduled outside of the breeding period, the following will occur:
  - Pre-clearing surveys will be conducted to locate active and inactive nests in the Infrastructure Disturbance Area;
  - All known nest locations will be provided to KAM Construction and Operation personnel to reduce or avoid impacts to these sites;
  - If raptor nests are encountered, species-specific buffers (200 m to 500 m) will be established around the nest. Buffer distances will be site and species-dependent; distances will be established in consultation with BC MFLNRO. The objective will be to follow the recommended best management practices (MFLNRO 2013; Table 5-4) but the buffer distance may be altered after consultation with BC MFLNRO in conjunction with other mitigation activities. For instance, buffers may be smaller for activities that have a low potential for disturb raptors;
- Appropriate regulators will be consulted regarding potential relocation of nests. Mitigation actions and adaptive management will be reported to BC MFLNRO;
- Active nests will be monitored until the young have fledged (anticipated to be mid-July or earlier in most instances) or the nest has failed, at which time the buffer will be lifted;
- Clearing will be limited to the fewest occurrences during sensitive raptor breeding periods (i.e., courtship, egg laying, and early incubation – February through June);
- Exclusion areas will be created at all known raptor nests located adjacent to construction and operation areas. These areas will be clearly marked to prevent accidental encroachment by machines. Signage will be added where necessary to indicate the boundaries of the exclusion area;
- Discussions with the provincial government will be initiated in an effort to develop Wildlife Habitat Areas (WHAs) for raptors on KAM or Sugarloaf Ranch lands for western screech owl if the species is detected during pre-construction surveys and additional mitigation to nest boxes is warranted; and

- Grassland restoration treatments on KAM and Sugarloaf Ranch lands will be undertaken to improve grassland extent and condition and to address temporal losses of grasslands prior to reclamation of areas disturbed during Project activities. The treatment types include: reduction of forest encroachment on grasslands, treatment of invasive plant species, fencing of riparian areas to exclude use by livestock, and thinning sagebrush dominated areas. The total area identified as potentially suitable for restoration treatments is 2,093 ha. Grassland restoration will be beneficial to a host of species including raptors that nest and forage in grassland habitat. Mitigation and compensation for grasslands is detailed in Appendix B.

In addition, wildlife habitat objectives are integrated into the Closure and Reclamation Plan; there are several objectives in relation to restoration of feeding, nesting, and security habitat for raptors.

Table 5-4. Suggested Nest Buffers for Raptor Species

Species	Active Nest Buffer Distance (m)
Bald Eagle (*Haliaeetus leucocephalus*)	200
Burrowing Owl (*Athene cunicularia*)	500
Flammulated Owl (*Psiloscops flammeolus*)	500
Great Gray Owl (*Strix nebulosi*)	500
Short-eared Owl (*Asio flammeus*)	500
Swainson's Hawk (*Buteo swainsoni*)	200
Western Screech Owl	500

5.7.5 Non-migratory Game Birds

The following mitigation measures will avoid, minimize, or compensate for potential effects to non-migratory gamebirds.

5.7.5.1 Pre-Construction

- KAM will ensure the Ajax Mine Access Road alignment does not overlap any Sharp-tailed Grouse lek sites.

5.7.5.2 Construction and Operations

- Vegetation clearing will be scheduled outside of the breeding/lekking period in areas where active leks have been identified (outside of April 1 to May 31; Table 5.1-1);
- All known lek locations will be provided to KAM Construction and Operation personnel to avoid and limit impacts to these sites. If clearing occurs during the breeding/lekking period, pre-clearing surveys will be conducted to identify locations of active leks; active leks will be protected by a 400 m vegetated disturbance-free buffer. Lek search protocols will be developed in consultation with Canadian Wildlife Service and BC MFLNRO;
- KAM will create two potential lek sites to mitigate every lek site lost (destroyed or abandoned) during Construction and disturbance during Operation. These sites will be on

gentle hummocks raised slightly above the surrounding land surface and seeded with bunchgrass (Aspen Park Consulting 2013). These sites will also have dense grass cover for nesting and riparian areas nearby (BC MWLAP 2004). Lost leks will be replaced on KAM or Sugarloaf Ranch land during construction, operation and/or during reclamation. Male decoys, female decoys in the precopulatory position, and recorded grouse vocalizations may be used to induce grouse to attend replacement leks (Baydack 1986). Construction of replacement lek sites will be dependent upon when impacts are anticipated and when Construction and/or Operation activities will cease, to prevent site rejection;

- KAM will avoid the creation of roadside pools that have the potential to attract birds and increase risk of vehicle strikes; and
- KAM will undertake grassland restoration work to improve grassland extent and condition and to address temporal losses of grasslands prior to reclamation of areas disturbed during Project activities. The treatment types include: reduction of forest encroachment on grasslands, treatment of invasive plant species, fencing of riparian areas to exclude use by livestock, and thinning sagebrush dominated areas. The total area identified as potentially suitable for restoration treatments is 2,093 ha. These grassland restoration treatments will be beneficial to a host of species including sharp-tailed grouse.

In addition, wildlife habitat objectives are integrated into the Reclamation and Closure Plan for the Project; there are several objectives in relation to restoration of feeding, security, and winter habitat for non-migratory game birds (Aspen Park Consulting 2013).

5.7.6 American Badger

The following mitigation measures will avoid or minimize potential effects to American badger:

- A DNA hair sample study will be initiated prior to construction. See Appendix A for further details;
- KAM will provide training and education programs to inform staff of sensitive sites, such as badger burrows, to ensure they avoid accidental destruction of key areas;
- Grassland habitat known to be used by badgers will be fenced off and livestock grazing will be controlled/minimized within KAM owned lands in selected areas with active badger dens during sensitive times (birthing and rearing; April through August);
- Vegetation clearing will be scheduled outside of the breeding and kit rearing period in areas where American badger dens were previously detected and in high and moderate classified suitable habitat (April 1 to August 15; Table 5.1-1). If clearing cannot be scheduled outside of this period, a pre-clearing burrow survey will be conducted by a qualified professional biologist with recognized expertise in badger biology prior to the start of ground clearing or grading activity between 1 and 2 weeks during the spring/summer No grading will occur within 50 m of an active American badger burrow identified through pre-clearing surveys. If active maternal dens are found within disturbance areas, access will be restricted to these areas by establishing 200 m buffers around active maternal dens for the duration of the

maternal period from May 1 to 15 August or until young have left the den as confirmed by a qualified professional biologist;

- Construction activities outside of the breeding period and between August 16 and March 31 will comply with the following measures to avoid mortality of adult and/or young badgers:
  - A qualified professional biologist with recognized expertise in badger biology will survey for American badger burrows within the project area between 2 and 4 weeks prior to the start of ground clearing or grading activity. Surveys will be completed prior to snow fall in areas planned to be cleared during the winter. The survey will cover the Project area, but will focus on the areas where suitable American badger habitat occurs. A fiber optic scope or other non-invasive means would be used to assess the presence of badgers within burrows that are too long to see to the end. Inactive burrows, identified by the qualified professional biologist with badger expertise, will be collapsed by hand with a shovel to prevent badgers from re-using them during Construction.
- Construction activities outside of the breeding period and between August 16 and March 31 will comply with the following measures to avoid mortality of adult and/or young badgers:
  - Prior to grading, badgers will be discouraged from using currently active dens by partially blocking the entrance of the burrow with sticks, debris and soil for 3 to 5 days. Access to the den will be incrementally blocked to a greater degree over this period. This will cause the badger to abandon the burrow site and move elsewhere. After badgers have stopped using active burrows within the project area, the burrows will be hand-excavated with a shovel and collapsed to prevent reuse. A qualified professional biologist will be present during the initial ground-disturbing activity. If badger burrows are found, all work would cease until the biologist can safely close the badger burrow. Once the badger burrows have been closed, work in the area will resume. If badgers continue to be active in the proposed work area, options to capture and translocate badgers will be discussed with MFLNRO;
- Grassland restoration treatments on KAM and Sugarloaf Ranch lands will be undertaken to improve grassland extent and condition and to address temporal losses of grasslands prior to reclamation of areas disturbed during Project activities. The treatment types include: reduction of forest encroachment on grasslands, treatment of invasive plant species, fencing of riparian areas to exclude use by livestock, and thinning sagebrush dominated areas. The total area identified as potentially suitable for restoration treatments is 2,093 ha. These grassland restoration treatments be beneficial to a host of species including American badger and will mitigate and compensate for impacts to draft critical habitat. Mitigation and compensation for grasslands is detailed in Appendix B;
- Once Environment and Climate Change Canada (ECCC) has finalized critical habitat determination for the local study area and made the information publically available, KAM will work with the jeffersonii Badger Recovery Team to identify and potentially fund effective mitigation to reduce highway mortality in the region and thereby contribute to the conservation of the regional population; and

5.7.7 Bats

The following mitigation measures will avoid, minimize, or compensate potential effects to bats.

5.7.7.1 Pre-construction

More refined modelling of suitable hibernacula habitat will be conducted to inform pre-construction field surveys. See Appendix A for more details on pre-construction surveys. Modelling will include maps based on a comprehensive literature review, vegetation and geological features as well as anthropogenic structures.

5.7.7.2 Construction

- Sensitive sites (e.g., large veteran trees) close to infrastructure areas will be appropriately buffered during construction so that they remain intact;
- Habitat compensation will be undertaken to mitigate for the loss of suitable maternal roosting habitat for bats due to the Project. Compensation will take the form of installation of bat boxes near foraging sites (BC Community Bat Program 2015; Holroyd and Craig 2016). Bat boxes will be installed outside of the area potentially influenced by the Project due to noise and blasting disturbance. Bat boxes will be installed on free-standing poles or on facility walls where their presence will not interfere with facility operations. They will be situated where they will get at least ten hours of sun in summer to provide warm conditions for maternity roosts. Bat boxes will be installed at other locations away from the mine site, and as an enhancement feature at conservation sites elsewhere in region such as the Lac du Bois Grasslands;
- Vegetation clearing will be scheduled outside of the breeding and pup rearing period in forested areas that are potential maternal roosting habitat (June 1 to August 31; Table 5.1-1). If clearing cannot be scheduled outside of this period, a pre-clearing survey will be conducted by qualified professional biologist to identify active maternity roosts that may exist within appropriate habitat in the Project footprint areas. Surveys will only be conducted if there are known roosting sites in the area, as noted during the collection of baseline environment data, and will focus on suitable maternal roosting structures such as large diameter trees. Pre-clearing surveys will include buildings that may be demolished or altered;
- If active maternity roosts are identified that belong to the provincially blue-listed northern long-eared myotis (*Myotis septentrionalis*) or the federally listed little brown myotis, a 125 m radius buffer will be established and maintained, or BC MFLNRO (or the applicable agency) will be consulted for alternative mitigation options if low-impact activities are planned. If the active maternity roost consists of other bat species (e.g., western long-eared myotis (*Myotis evotis*), silver-haired bat (*Lasionycteris noctivagans*)), a buffer distance of up to 50 m radius will be maintained, or BC MFLNRO (or the applicable agency) will be consulted for alternative mitigation options. The intent is to avoid construction within this buffer. Retention patches will include high-quality bat habitat (e.g., foraging habitat, corridor to foraging habitat, large diameter trees, cliffs/caves), if available nearby;
- Objects (e.g., rocks, cones, nets) will be placed on top of any large, smooth materials, allowing bats to differentiate between a smooth surface and one with foreign objects on it;

- A wetland habitat compensation program of at least 28.7 ha will be initiated during project Construction with the aim to conserve and enhance wetland function within the RSA. This will benefit bats through the restoration, enhancement and/or compensation of foraging wetland habitat; and
- If water quality monitoring indicates that levels of specific elements known to have a detrimental effect on bats are found to be of concern the addition of duckweed, or other foreign objects (e.g., buoys, nets), to the TSF may dissuade bats from identifying it as a waterbody (i.e., if the surface water is not placid, then bat echolocation may not result in it being recognized as water), thereby reducing the potential interaction with supernatant. Nets have been used to dissuade some species from using contaminated sites, and may also be a mitigation measure that is effective, providing the netting is maintained.

6. EMERGENCY PREPAREDNESS AND RESPONSE

Emergency preparedness and response measures applicable to wildlife will be implemented in accordance with the KAM EHS Management System (Emergency Preparedness and Response).

7. MONITORING, EVALUATION, AND REPORTING

7.1 MONITORING, MEASUREMENT, ANALYSIS AND EVALUATION

The purpose of the wildlife monitoring program is to evaluate and document if the WMMP successfully achieves its performance objectives (Section 3.3). In general, the monitoring programs will follow these guiding principles:

- monitoring will verify the predictions of the residual effects related to the Project, evaluate the effectiveness of mitigation measures, and inform adaptive management measures;
- onsite bird, mammal, and amphibian monitoring will be conducted on an ongoing basis, and include documenting incidental observations, evidence of breeding, mortality events and/or interactions with Project infrastructure;
- monitoring programs will include suitable treatment (i.e., close to the Project) and control sites (i.e., away from potential impacts due to the Project) that will be monitored using provincial Resources Information Standards Committee (RISC) methods, or other approved methods;
- data collected during monitoring programs will be assessed for statistical power to detect changes in treatment sites as compared to control sites;
- all monitoring data, including wildlife incidents, and associated analyses will be presented in an annual monitoring report; and
- adaptive management will be implemented in a timely manner if:
  - wildlife incidents or mortalities are recorded at a frequency that is greater than what would normally be expected, or
  - if local-area effects due to the Project are found for a wildlife species, or
  - if the monitoring report shows a negative effect at treatment sites due to the Project relative to control sites.

7.2 INFRASTRUCTURE MONITORING

Infrastructure Monitoring will be carried out to ensure that Project wastes are properly managed to limit the attractiveness of the Project to wildlife and to ensure that wildlife are not accessing Project infrastructure for nesting/denning/resting/roosting purposes for both worker and wildlife safety. In addition, monitoring will be carried out at the TSF and Mine Rock Storage Facilities (MRSF) to ensure that wildlife are not accessing or using these areas that may post a chemical hazard to wildlife.

Personnel will also be encouraged to report incidental observations of issues related to infrastructure or waste management. Incidental observations will be reported and recorded continuously, while periodic monitoring of infrastructure will begin during construction and conducted regularly until structures are decommissioned, with a planned period of at least every 2 weeks. Frequency may decline with time if no wildlife encounters are recorded, but frequency will not be less than seasonal inspections.

7.2.1 Infrastructure and Waste Handling Monitoring

Environmental staff will monitor Project infrastructure and waste handling and management, as follows.

- Visual inspections of the outside of Project infrastructure, including underground components, for observations of wildlife interacting with buildings or evidence of use (e.g., bird nesting materials in vents, scratching or chewing of building materials, bat activities and evidence of roosting, evidence of digging beneath buildings or skirting) and adaptively managed if necessary (e.g., improve building skirting, install bird spikes to deter bird nesting).
  - In the event that wildlife are accessing Project infrastructure where BMPs to prevent access have already been implemented, a response plan to limit access by the wildlife species will be developed. This could involve measures such as improvements to building skirting or installation of deterrents (e.g., bird spikes), depending on the species accessing the infrastructure.
- Visual inspections will be completed of waste handling and management practices at camps (e.g., kitchen and domestic wastes) and waste storage facilities (i.e., incinerator and burn pits) to check for compliance with the Waste Management Plan.

If wastes or other wildlife attractants are found to be misdirected or mismanaged, the Environmental Technician will immediately inform the Environmental Manager or designate and the wastes/attractants will be moved to an appropriate secure location as soon as possible to prevent attraction of wildlife.

If wildlife are observed attempting to access or are successful in accessing waste storage facilities, alternative methods to secure wastes and wildlife attractants will be evaluated and then applied as appropriate.

7.2.2 Habituated or Problem Wildlife

Any incidents where wildlife have been observed to interact directly with waste or observations of habituated wildlife will be reported to KAM environment staff who may notify appropriate regulatory agencies and authorities, if required. Problem wildlife may be evaluated by KAM environment staff and corrective measures implemented in consultation with the Ministry of Environment, BC Conservation Officer Service, as appropriate. If smaller problem wildlife require trapping and relocation, BC MFLNRO will be contacted for direction and the required permits.

7.2.3 Tailings Storage Facility and Mine Rock Storage Facility Monitoring

As detailed in Section 5.2.5, wildlife, specifically water-associated birds (e.g., waterfowl, shorebirds) bats, and amphibians, may be attracted to the TSF and MRSFs for breeding and/or foraging purposes. Mitigation measures will be implemented to limit the attractiveness of these sites through removal of vegetation, as well as creation of deep artificial 'diversion pools' for amphibians to divert amphibians from using the TSF and MRSFs for breeding purposes. Monitoring will be carried out at the TSF and MRSFs to assess the effectiveness of these mitigation measures and to implement adaptive management if wildlife are accessing the TSF and MRSFs and the water may pose a threat to the wildlife.

7.2.4 Incidental Wildlife and Wildlife Incident Monitoring

Wildlife observations made by environmental staff and other mine personnel will be recorded in a general wildlife log.

Objectives for keeping this log include:

- recording wildlife occurrence and activity in the Project area;
- identifying unexpected conflicts or potential conflicts posed by existing Project facilities to wildlife; and
- identifying needs for adaptive management if a new risk to wildlife is identified.

Personnel will be educated about the need to report observations of wildlife species interacting with Project facilities to KAM environmental staff. Wildlife observations may also be reported to security or dispatch, or an observation sheet may be posted in the dry areas where personnel can enter their sightings. KAM environmental staff will collect these sheets, and communicate with security or dispatch to compile sightings.

When wildlife is observed, the following information will be requested to be recorded:

- location, date, and time;
- type of interaction (e.g., attraction, nesting);
- species, number of animals, age, and sex (if possible);
- behaviour (e.g., feeding, resting);
- condition (e.g., limping, wounded, salivating); and
- any damage to or interaction with mine property.

Wildlife in poor condition, that may be diseased, or that may have been harmed by mine structures or processes, will be reported to KAM environmental staff. The Environmental Manager will report these observations to regulatory authorities.

7.3 WILDLIFE MONITORING

7.3.1 Amphibians

Potential breeding sites near infrastructure will be monitored annually to determine if they are being used for amphibian breeding, including monitoring noise levels at breeding sites during the amphibian active period within the Infrastructure Disturbance Area. This monitoring program will help with information needs for adaptive management.

- Effects of anthropogenic noise on amphibian behaviour are poorly understood, amphibian breeding locations where Project noise that exceeds 45 dB will be monitored to determine if calling amphibians are being affected;

- If effects due to sensory disturbance are found the following mitigation will be implemented upon agreement with other stakeholders:
  - Noise reductions measures as technically feasible and if not successful in minimizing the effect;
  - Additional wetland compensation.
- Ongoing monitoring to determine if exclusion fencing (a measure to keep individuals off roads) is necessary and surveys to determine if mass dispersal events are occurring, will also take place. Appropriate measures such as temporary road closures or incidental salvaging (MFLNRO 2016) will be taken if a mass dispersal is observed;
- Ongoing monitoring to determine the effectiveness of artificial diversion ponds as breeding sites will be undertaken;
- Ongoing monitoring of any culverts installed to facilitate migration as informed by the results of pre-construction surveys;
- KAM will implement an amphibian monitoring program to determine if certain elements are bioaccumulating in the various frog and toad species in the Local Study Area; and
- Monitoring amphibian breeding sites at wetland compensation sites to ensure habitat use and local population persistence.

7.3.2 Reptiles

Known and potential hibernacula sites near infrastructure and created hibernacula will be monitored annually during Construction and every 3 years for up to 15 years into Operation. Should adverse effects be observed, such as mortality, adaptive measures will be taken, including snake relocation during favourably warm times of the year.

7.3.3 Raptors and Migratory Birds

Active nests identified through pre-clearing surveys conducted for migratory birds and raptors will be monitored until the young have fledged (anticipated to be mid-July or earlier in most instances with the exception of osprey to Sept 5th) or the nest has failed, at which time the nest buffer will be lifted.

The TSF will be monitored for use by migratory birds and additional mitigation such as deterrents will be implemented if evidence of use is found and water quality monitoring indicates exceedences.

7.3.4 Non-Migratory Game Birds

Annual monitoring of known and replacement sharp-tailed grouse leks will be conducted to determine their use; monitoring will follow RIC standards (1997) and be done in coordination with the BC MFLNRO. Monitoring of disturbance effects for known remaining leks during the breeding season (April 1 to May 31) will be done during Construction and Operation.

Lek sites located within areas where noise contours are expected to range between 40 to 120 db will be monitored to determine if additional mitigation is required should effects differ from the

predictions outlined in the effects assessment. If effects are found then noise reductions measures as technically feasible will be implemented followed by additional compensation if needed.

Any leks found to be abandoned based on the results of monitoring efforts will be replaced at a ratio of two replacement lek sites to every lost lek site. The timeframe for construction of replacement lek sites for those that are abandoned will be determined based on the results of monitoring surveys in conjunction with the BC MFLNRO.

7.3.5 Mammals

7.3.5.1 American Badger

A DNA hair snagging program (RISC 2007) will be implemented during Construction to determine where individuals are located across the landscape, the composition of the badger population in the Local Study Area, and to track their distribution. See Appendix A for further details. Badger monitoring will also continue through incidental observations (Section 7.1.2) through Operations.

7.3.5.2 Bats

Approximately ten bat roost and maternity boxes will be installed in areas outside of direct and indirect (i.e. noise) disturbance areas to provide roosting structures for tree roosting bats (BC Community Bat Program 2015), in order to mitigate and compensate for roosting habitat lost during Project construction. In order to assess the effectiveness of this mitigation for bats, boxes will be monitored for use by bats through the first 10 years of Operation (RIC 1998). If monitoring indicates they are not being used then the boxes will either be moved to a different area or a different box design will be used. Monitoring of bat activity around the TSF will be undertaken, and mitigation measures to exclude bats implemented on the basis of monitoring results for water quality and bat presence.

7.4 WORK PLANNING AND SCHEDULE

The management measures will be implemented to minimize and avoid adverse effects on wildlife, wildlife habitat and ecosystem function and will occur throughout the various Project phases, as shown in Table 7-1.

7.5 ROAD AND TRAFFIC MONITORING

Drivers will be required to record and report wildlife collisions/mortalities along the Ajax Mine Access Road, onsite and offsite roads. It will be a requirement to record and report the location of collision and species/type of animal involved to the Environmental Manager.

Wildlife collision data will be reviewed and summarized monthly to identify conflict “hot-spots,” which will then be used as part of adaptive management to further mitigate conflicts between road users and wildlife (e.g., through increased signage, further driver education, enforcement of speed limits, and constructed wildlife crossings).

Any encounter with wildlife (including observations or interactions) will also be required to be recorded and reported to the Environmental Manager. Radios will be used to alert other operators when there is wildlife in the area and to travel with caution. These records will provide a basis for identifying locations of higher risk for wildlife-vehicle collisions, and for developing appropriate mitigation strategies for those areas. If a large number of wildlife are present on or adjacent to the road, a reduced speed limit or temporary road closure will be instigated at the discretion of the Environmental Manager in consultation with the Mine Manager.

Table 7-1. Frequency of Monitoring Activities for the Wildlife Management Plan

Type of Monitoring Activity	Focal Species	Monitoring	Frequency
Site Monitoring	All wildlife	Incidental observations	Daily
		Infrastructure Monitoring - Infrastructure and Waste Handling Monitoring	At least every 2 weeks*
		Infrastructure Monitoring – TSF and MRSF Monitoring	At least every 2 weeks*
		Road and Traffic Monitoring	Daily, as required**
Mortality	All wildlife	Incidents and mortality events	Daily, as required**
Amphibians	Western Toad and Great Basin Spadefoot Toad	Breeding evidence in or near infrastructure	Annually***
		Noise monitoring near breeding sites during the amphibian active period	First 5 years
Reptiles	Snakes	Hibernacula monitoring	Every 3 years
Bird/Raptor Nests	Multiple	Nest monitoring	Annually***
Game birds	Sharp-tailed Grouse	Lek monitoring	Annually, in conjunction with MFLNRO
Mammals	Bats	Bat box monitoring	Annually First 10 years
Mammals	American Badger	Population monitoring	Annually

** Frequency may decline with time if no wildlife encounters are recorded, but frequency will not be less than seasonal inspections.*
***Recorded and evaluated on a case by case basis.*
**** Monitoring frequency is annually or prior to disturbing new areas already approved in the certificate.*

Performance monitoring to reduce wildlife-vehicle interactions includes the following.

- A reporting system for wildlife-vehicle interactions and wildlife-road structure interactions will be created;
- The reporting system will allow personnel to raise concerns anonymously or report observed non-compliance;
- Location, species, date, and type of wildlife-vehicle interactions will be reviewed monthly to identify any areas with higher frequencies of interactions;

- Personnel will be trained on reporting procedures for wildlife observations and interactions through the personnel education and training program; and
- Completion of an incident report form if an incident is observed or occurs, and follow up by Health and Safety working with the environmental staff, for the safety of Project personnel and wildlife. Incidents will be reviewed and mitigation measures adapted as necessary to reduce the incidence of wildlife-vehicle interactions (e.g., through increased signage, further driver education, enforcement of speed limits).

7.6 NONCONFORMITY AND CORRECTIVE ACTION

7.6.1 Incident Identification

KAM will identify and correct incidents in a timely manner, including non-compliance with relevant compliance obligations and KAM EHS Management System non-conformance events associated with wildlife management activities, with appropriate and ongoing measures aimed to prevent reoccurrence and/or similar occurrences. The KAM EHS Management System (Standard X.0 Nonconformity and Corrective Action) provides the process to:

- report near-misses in a formal manner;
- formally report and investigate incidents, including non-conformance and non-compliance events;
- define the requirements for reporting, investigating, and developing corrective and preventive actions (CAPA); and
- describe the process to assess the effectiveness of corrective and/or preventive actions taken and to share lessons across the company.

Corrective actions will be assigned as appropriate or as directed by a regulatory authority if the non-compliance relates to permitting or a legislative non-compliance; these actions include the prevention of their reoccurrence. Corrective actions will vary according to the results of incident investigation and in consideration of other incidents related to wildlife.

7.7 REPORTING AND RECORDKEEPING

7.7.1 Reporting

7.7.1.1 Compliance Reporting

Compliance reporting will be subject to Environmental Assessment Certificate and *Land Act* and *Mines Act* as well as other relevant permit conditions.

7.7.1.2 Internal Reporting

Personnel are required to report wildlife observations made anywhere within the Project to the Environmental Manager or their designate.

7.7.1.3 Incident Reporting

Incident reporting will include vehicle collisions with wildlife, encounters with wildlife, and wildlife interactions with Project infrastructure and waste handling systems. In addition, any mortality and/or encounters during vegetation clearing surveys, or other mortality events, will be reported to the Environmental Manager or their designate.

7.7.1.4 Monitoring Results

All monitoring data, including wildlife incidents, and associated analyses will be presented in an annual monitoring report. KAM will keep wildlife related records / data. Data will be entered in a format and program that allows for comparison between years.

7.7.2 Recordkeeping

Records that are generated from WMMP activities are maintained, retained and stored in accordance with the KAM EHS Management System (Standard X.0 Document and Record Control). Records associated with wildlife monitoring activities include:

- records of legal compliance;
- training and competency records such as training logs, copies of certifications, and education (as required);
- contractor/supplier communications regarding wildlife management;
- incident reports;
- formal communications records (particularly for regulatory communications);
- monitoring data and records as identified in the WMMP; and
- non-conformities, corrective and preventive actions related to wildlife.

Records are stored in either hardcopy and/or electronic formats and maintained in such a way that they are readily retrievable and protected against damage, deterioration, or loss.

7.8 ASSURANCE (EMS AUDIT AND COMPLIANCE AUDIT)

The management and activities associated with the WVMP are subject to the KAM EHS Management System (Standard X.0 EHS Assurance Program), which ensures the activities outlined in the WMMP are performing:

- in compliance with applicable environmental compliance obligations; and
- in conformance with its EMS requirements and the KGHM International Environmental Policy.

8. CONTINUAL IMPROVEMENT

8.1 MANAGEMENT REVIEW

KAM is committed to the continual improvement of its environmental management and performance. As part of the KAM EMS Management Review process (KAM EHS Management System Standard X.0 Management Review), it will continually assess and verify the implementation of the WMMP and ensure its continuing suitability, adequacy, and effectiveness on an annual basis. The review will identify elements of this WMMP in need of revision, and evaluate performance against established performance objectives and targets.

8.2 RESEARCH INITIATIVES AND COLLABORATIONS WITH EXTERNAL STAKEHOLDERS

KAM recognizes that the state of knowledge about species and habitat in the Project area will change over the course of the Project duration. Research collaborations and partnerships will be an important aspect of continuing to ensure the mitigation and compensation measures being employed are appropriate. KAM will work with interested stakeholders in supporting local and regional research and conservation initiatives.

- KAM and Thompson Rivers University (TRU) are currently involved in a successful amphibian research partnership on a field scale Master's project. KAM will continue to work with TRU to complete research, which may include many areas of interest and many factors are involved in selection of research topics, including current research underway and capacity. KAM notes that amphibian movements and dispersal patterns are an area in which priority should be given in research discussions with TRU and there is potential to leverage current research work underway with others. Observations of western toad migration have been collected in the Project area and will continue to occur prior to development.
- KAM will collaborate with government, landowners, forest industry, farmers, and Aboriginal Groups to mitigate additional threats to migratory bird habitat. Awareness and education programs for common nighthawk, long-billed curlew, and olive-sided flycatcher will be supported.

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Appendix A

Preconstruction Surveys for Species at Risk and Migratory Birds

AJAX PROJECT

Wildlife Management and Monitoring Plan - Appendices

APPENDIX A. PRECONSTRUCTION SURVEYS FOR SPECIES AT RISK AND MIGRATORY BIRDS

A.1 Pre-Construction Surveys

KAM has committed to conducting pre-construction surveys for species at risk, migratory birds, and wetland function. These surveys will include:

- Surveys for rare plants including alkaline wing-nerved moss (memo *0720_KAM_Mitigation Hierarchy and Offsetting*).
- Surveys for little brown myotis hibernacula based on results of additional habitat modelling (memo *0708_KAM_CriticalHabitat*);
- Surveys to inform the wetland compensation program (memo *0725_KAM_Federal Policy on Wetlands)*:
  - Quantification of wetland wildlife habitat, and functions including hydrologic flux, water storage, and biological productivity (richness, vegetation attributes, etc.);
  - Surveys for great basin spadefoot at wetlands in the Project footprint;
  - Surveys for migratory birds at wetlands in the Project footprint;
- Surveys for sensitive wildlife features to inform the final routing of the powerline (memo *0708_KAM_CriticalHabitat*) and avoidance of identified features such as;
  - Wetlands;
  - Occurrences of alkaline wing-nerved moss;
  - Badger dens;
  - Mature trees used for cavity nesting birds including Lewis's woodpecker and/or bat roosting habitat; and
  - Rock outcrops potentially used as hibernacula for snakes or bats.

Additional pre-construction surveys, described below, will occur with the objectives to:

- confirm presence of mapped posted and draft critical habitat features (i.e. biophysical attributes);
- determine the presence of species at risk, with posted or draft critical habitat, not previously detected;
- conduct survey protocols for migratory birds that were not previously used e.g. swallows and shorebirds;
- collect data from locations previously sampled during baseline surveys;
- conduct surveys for Valued Component (VC) and indicator species along the linear corridors;

- identify additional mitigation, if needed, for new species or sensitive habitat features that are detected; and
- collect additional data to inform mitigation and compensation measures as well as future monitoring.

A.2 Species at Risk and Critical Habitat

CEAA has requested that a follow up program be conducted to verify the accuracy of the EA predictions related to effects to species listed on Schedule 1 of the Species at Risk Act (SARA) and their critical habitat. These were presented in the memo *0708_KAM_CriticalHabitat.* KAM is therefore prioritizing the species for which critical habitat is publically available via recovery strategy and overlaps the RSA, species for which draft critical habitat and/or biophysical attributes descriptions have been provided by ECCC, and species for which critical habitat may be identified in a recovery strategy expected in 2017 and were an indicator species in the assessment (Table 1.1-1).

Only species listed as threatened or endangered on Schedule 1 of SARA have critical habitat identified for them in recovery strategies. Critical habitat is not identified for species listed as special concern; however management plans are required for species of special concern per Section 65 of SARA. As such, species suggested by CEAA but listed as special concern will not be targeted for additional surveys with the exception of those species that are also migratory birds i.e. long-billed curlew (Table 1.1-1).

Table 1.1-1. SARA Schedule 1 and Critical Habitat Status

Species	SARA Schedule 1 Status	Federal Recovery Strategy	Posted Critical Habitat	Location of Critical Habitat	Draft Critical Habitat in RSA	Biophysical Attribute Description Available	Target Species for Pre-Construction Surveys
Band-tailed Pigeon	Special Concern	NA	NA	NA	NA	NA	No Breeding range outside of RSA (Davidson et al. 2015; Environment and Climate Change Canada 2016)
Flammulated Owl	Special Concern	NA	NA	NA	NA	NA	No
Long-billed Curlew	Special Concern	NA	NA	NA	NA	NA	Yes (see Section 1.2)
Rubber Boa	Special Concern	NA	NA	NA	NA	NA	No
Rusty Blackbird	Special Concern	NA	NA	NA	NA	NA	Yes (see Section 1.2)

Species	SARA Schedule 1 Status	Federal Recovery Strategy	Posted Critical Habitat	Location of Critical Habitat	Draft Critical Habitat in RSA	Biophysical Attribute Description Available	Target Species for Pre-Construction Surveys
Sage Thrasher	Endangered	Yes; (Environment Canada 2014)	Yes	Outside of RSA	No	Yes	No Breeding range outside of RSA (Environment Canada 2014; Davidson et al. 2015)
Short-eared Owl	Special Concern	NA	NA	NA	NA	NA	No
Western Painted Turtle	Special Concern	NA	NA	NA	NA	NA	No
Western Yellow-bellied Racer	Special Concern	NA	NA	NA	NA	NA	No
Alkaline Wing-nerved moss	Threatened	Pending in 2017	No	NA	No	Yes	Yes
Great Basin Spadefoot	Threatened	Pending in 2017	No	NA	Yes	Yes	Yes
Gopher Snake	Threatened	Pending in 2017	No	NA	No	No	Yes
Lewis's Woodpecker	Threatened	(Environment Canada 2016)	Yes	LSA	NA	Yes	Yes
Northern Pacific Rattlesnake	Threatened	Pending in 2017	No	NA	No	No	Yes
Western Screech Owl	Threatened	Pending in 2017	No	NA	Yes	Yes	Yes
American Badger	Endangered	Pending in 2017	No	NA	Yes	Yes	Yes
Burrowing Owl	Endangered	(Environment Canada 2012)	Yes	Outside of RSA	No	No	No
Little Brown Myotis	Endangered	(Environment Canada 2015)	Yes	Outside of RSA	No	Yes	Yes

NA = not applicable

A.2.1 Wetlands

Pre-construction surveys at wetlands for species at risk will target great basin spadefoot, alkaline wing-nerved moss and migratory birds.

A.2.1.1 Great Basin Spadefoot

Surveys for great basin spadefoot will be conducted in the following areas:

- Where great basin spadefoot have been previously detected by visual or auditory survey;
- where mapping has identified ephemeral wetlands (memo *0707_KAM_EphemeralWetlands)*;
- in suitable wetlands in the linear corridors and those previously surveyed during baseline studies but had non-detections;
- in suitable wetlands on KAM and Sugarloaf Ranch lands outside the infrastructure development zone; and
- In wetlands associated with Jacko Lake and fish compensation activities.

Surveys will follow RIC standards for auditory surveys with a minimum of three visits per site during the breeding season (RIC 1998d). Systematic pond surveys (RIC 1998d) will be conducted at sites where great basin spadefoots were detected during acoustic surveys to confirm if reproduction occurred and estimate the number of tadpoles. Road surveys (RIC 1998d) will also be conducted during the period when tadpoles metamorphose into terrestrial juveniles so that amphibian migration corridors can be identified. Surveys will also determine the presence of the appropriate biophysical attributes for draft critical habitat. Results of the surveys will inform the wetland compensation program and identify suitable wetlands for any great basin spadefoots that are translocated.

A.2.1.2 Alkaline Wing-nerved Moss

Surveys for alkaline wing-nerved moss will be conducted in the following areas:

- in suitable habitat along transects previously surveyed for rare plants;
- where mapping has identified the potential for draft critical habitat biophysical attributes (memo *0708_KAM_CriticalHabitat);* and
- in suitable habitat in the linear corridors.

Surveys will also determine the presence of the appropriate biophysical attributes for draft critical habitat. Results of the surveys will inform the final citing of the powerline poles, exclusion zones during construction, locations where translocation may be needed, and suitable destination habitat for any translocated plants.

A.2.1.3 Migratory Birds

Surveys for migratory birds will occur at wetlands within the Infrastructure Development and along the linear corridors. Surveys will occur during spring and fall migration and breeding periods. Surveys will be conducted according to the following RIC standards:

- Point counts for forest and grassland songbirds including migratory insectivorous birds and migratory non gamebirds (RIC 1999a);
- Unlimited radius point count and active nest counts for swallows (RIC 1998f);
- Call playback surveys for American bittern (RIC 1998b); and
- Observations stations at waterbodies for waterfowl and allied species (RIC 1999b).

Results of the surveys at the wetlands in the Project footprint will inform the wetland compensation program.

A.2.2 Mature Forest

Pre-construction surveys in mature forest areas for species at risk will target bat roosting habitat, Lewis's woodpecker, western screech owl and migratory birds.

A.2.2.1 Bat Roosting Habitat

Surveys for bat roosting habitat will be conducted in the following areas:

- locations previously surveyed during baseline surveys;
- suitable habitat in the linear corridors;
- suitable habitat where noise disturbance is a concern (i.e. ≥150 db); and
- suitable habitat in grassland restoration areas.

Surveys will estimate the number of bat roosting trees located within the Project footprint to inform the number, capacity and locations of bat boxes that will be implemented as compensation in proposed grassland restoration areas. Surveys will follow RIC standards for acoustic detections (RIC 1998a) and tree and building roost assessments for detection of potential roost habitat (Hundt 2012).

A.2.2.2 Lewis's Woodpecker

Surveys for Lewis's woodpecker will be conducted in locations previously surveyed during baseline surveys and where mapping has identified the potential for critical habitat biophysical attributes including in the linear corridors (memo *0708_KAM_CriticalHabitat)*. Surveys will follow the RIC standard for woodpecker tree/sign surveys (RIC 1999c) followed by stand watches at potential nesting trees (COSEWIC 2010). Surveys will also determine the presence of the appropriate biophysical attributes provided by critical habitat. Surveys will inform any habitat areas meeting the critical habitat descriptions that will be avoided during construction of the linear corridors as well as

whether additional compensation will be needed, in the form of nest boxes, if avoidance of the habitat is not possible.

A.2.2.3 Western Screech Owl

Surveys for western screech owl will be conducted in areas where mapping has identified the potential for draft critical habitat biophysical attributes (memo *0708_KAM_CriticalHabitat)* without an elevational constraint of 700 m. Surveys will also occur in proposed grassland restoration areas to identify suitable locations for nest boxes if needed. Surveys will also determine the presence of the appropriate biophysical attributes for draft critical habitat. Surveys will follow the RIC standard for western screech owl (RIC 2006). KAM will also explore the possibility of using autonomous recording devices for an additional method of detecting this species. If a desktop analysis indicates that this methodology would increase the potential of detecting this species, it will also be used. Results of the surveys will inform whether additional mitigation, such as altering the dates for the sensitive time period for raptors, and compensation in the form of nest boxes, will be required.

A.2.2.4 Migratory Birds

Surveys for migratory birds in mature forest areas will be conducted at locations previously surveyed and along the linear corridors. Surveys will occur during spring and fall migration and breeding periods. Surveys will be conducted according to the following RIC standards for point counts for forest and grassland songbirds including migratory insectivorous birds and migratory non gamebirds (RIC 1999a).

A.2.3 Grasslands

A.2.3.1 American Badger

A passive hair snag DNA study will be conducted in both the Project footprint area as well as the grassland restoration area on Sugarloaf Ranch lands. This study will be used to determine the relative abundance and distribution of badgers within the Local Study Area (LSA (RIC 2007). It will also be used to determine if American badgers are currently present within proposed grassland restoration areas and to estimate the number of badgers using this area. This will serve as a benchmark to determine if the local number of badgers increased as grassland habitat is enhanced. Cameras will be installed at burrows with signs of activity to determine how many badgers are using them i.e. lone male, partners or family group and whether they are maternal dens. The RIC standard for ground-based burrow searches (RIC 2007) will be followed in the linear corridors. Results of these surveys will inform where mitigation will be implemented and will serve as benchmark metrics for the grassland restoration program and compensation for loss of badger habitat.

A.2.3.2 Migratory Birds

Surveys for migratory birds in grassland habitat areas will be conducted at locations previously surveyed and along the linear corridors. Surveys will occur during spring and fall migration and breeding periods. Surveys will be conducted according to the following RIC standards:

- Point counts for forest and grassland songbirds including migratory insectivorous birds and migratory non gamebirds (RIC 1999a);
- Ground transects for shorebirds and migratory gamebirds, e.g. sandhill cranes, (RIC 1997) as roads are not located in all areas requiring surveys i.e. powerline corridor; and
- Call playback surveys for common nighthawk (RIC 1998c).

A.2.4 Rock Outcrops

Pre-construction surveys at rock outcrops for species at risk will target bat and snake hibernacula.

A.2.4.1 Bat Hibernacula

Surveys for bat hibernacula will be conducted in the following areas:

- locations previously surveyed during baseline surveys;
- suitable habitat identified through modelling in the linear corridors; and
- suitable habitat identified through modelling where noise disturbance is a concern (i.e. ≥150 db).

Surveys will follow RIC standards for acoustic detections (RIC 1998a) to determine bat activity at potential hibernacula locations and species presence. Results will inform areas that will be avoided if possible and if not, discussions regarding additional compensation in the form of protection, enhancement and/or creation of hibernacula will be undertaken.

A.2.4.2 Snake Hibernacula

Surveys for snakes will be conducted in the following areas:

- hibernacula sites that were previously surveyed during baseline surveys;
- suitable den habitat within the linear corridors; and
- suitable locations on KAM and Sugarloaf Ranch lands outside the Project infrastructure development area.

RIC standards for presence/not detected will be followed at the den sites and roadside surveys will be conducted during the spring and fall dispersal periods to identify potential movement corridors (RIC 1998e). Surveys on KAM and Sugarloaf Ranch lands will identify suitable habitat for locating translocated individuals if needed.

A.2.4.3 Migratory Birds

Surveys for migratory birds in grassland habitat areas will be conducted at locations previously surveyed and along the linear corridors. Surveys will occur during spring and fall migration and breeding periods. Surveys will be conducted according to the following RIC standards for call playback surveys for common nighthawk (RIC 1998c).

A.3 Additional Mitigation and Adaptive Management

Pre-construction survey results will:

- determine if additional mitigation is required for species identified in the Project area to date;
- identify if additional species not previously observed occur in the Project area and may be affected by Project activities;
- confirm the presence of critical habitat biophysical attributes (posted or draft); and/or,
- identify new sensitive wildlife features.

If additional mitigation is required based on the pre-construction surveys it will take the following forms:

- Avoidance of additional locations of either species at risk, posted or draft critical habitat, or sensitive wildlife features when finalizing the Project design;
- Identification of movement corridors for amphibian and/or snakes that will require additional or alternative mitigation to that already proposed; and
- Additional locations of species at risk, critical habitat, or sensitive wildlife features that will require compensation if avoidance is not possible.

Table 2-1 lists additional mitigation measures that KAM will implement based on pre-construction surveys. Any additional mitigation measure will be discussed with BC MFLNRO and other stakeholders prior to implementation. Results of the pre-construction surveys will be submitted to BC EAO and CEAA in the form of a report.

Table 2-1. Additional Mitigation Associated with Species or Sensitive Wildlife Features Not Previously Detected

Species or Sensitive Habitat Feature	Additional Mitigation	References	Implementation Phase
Western Screech Owl	Avoidance of draft critical habitat during final Project design phase as much as possible	NA	Pre-construction
	Nest boxes in proposed grassland restoration areas	(Cannings and Angell 2001; Hobbs 2002; Arlettaz et al. 2010; Zingg, Arlettaz, and Schaub 2010)	Construction
Lewis's Woodpecker	Avoidance of critical habitat during final Project design phase as much as possible	NA	Pre-construction
	Nest boxes in proposed grassland restoration areas	(Kook and Moodie 2009; Environment Canada 2016)	Construction
Little Brown Myotis Hibernacula	Avoidance of active hibernacula during final Project design phase	NA	Pre-construction
	Protection, enhancement and/or creation of hibernacula	NA	Construction
Amphibian movement corridor	Tunnel/culvert appropriate for amphibian movement	(Lesbarrères, Lodé, and Merilä 2004; Association of Wetland Stewards for Clayoquot and Barkley Sounds 2013)	Construction
Reptile movement corridor	Tunnel/culvert appropriate for reptile movement	NA	Construction
Snake hibernacula for species at risk	Avoidance of active hibernacula during final Project design phase	NA	Pre-construction
	Protection, enhancement and/or creation of hibernacula	NA	Construction

Appendix B

Mitigation for Non-Wildlife Terrestrial Valued Components

AJAX PROJECT

Wildlife Management and Monitoring Plan - Appendices

APPENDIX B. MITIGATION FOR NON-WILDLIFE TERRESTRIAL VALUED COMPONENTS

B.1 Grasslands

The following mitigation measures will avoid, minimize, or compensate for potential effects to grasslands.

B.1.1 Pre-Construction

- KAM will conduct a grassland condition assessment within the additional 2,093 ha area identified for grassland restoration on KAM and Sugarloaf Ranch lands. This assessment will serve as a baseline for determining priority areas and actions for grassland restoration and enhancement and also serve as a benchmark for comparison to quantify improvements. The Delesalle et al. 2009 methodology is proposed as a potential approach for the grassland condition assessment although KAM is willing to discuss the best method to use with all interested parties. KAM will conduct this assessment prior to construction and conduct follow-up monitoring on a 5 year basis.

B.1.2 Construction and Operations

- KAM will create exclusion areas to preserve grassland areas outside of the Project Infrastructure Footprint located adjacent to Construction and Operation areas. These areas will be clearly flagged to discourage accidental encroachment with machines. Signage will be added where necessary to indicate the boundaries of the exclusion area.
- KAM construction personnel will attend a field-based orientation session where the exclusion areas will be explained. Avoidance of these areas will be mandatory.
- Grassland restoration treatments will occur on KAM and Sugarloaf Ranch lands to improve grassland extent and condition and to address temporal losses of grasslands prior to reclamation of areas disturbed during Project activities. The treatment types include: reduction of forest encroachment on grasslands, treatment of invasive plant species, fencing of riparian areas to exclude use by livestock, and thinning sagebrush dominated areas. The total area identified as potentially suitable for restoration treatments is 2,093 ha.
- The Grassland Monitoring Manual (Delesalle et al. 2009) will be used to improve the function of grasslands outside the Project Infrastructure Footprint during operation. Measures to improve greatly altered sites include lighter stocking, longer and more effective rest periods, and improved rotational grazing. Monitoring will occur during operation and post-closure to determine the success of reclamation.
- The invasive species management plan will manage for the priority species throughout the Project area. A site-specific plan based on the current existing plan will be developed by the Project's Environmental Manager through discussion (as needed) with the Invasive Plant Council, environmental scientists, and local governing agencies. The plan will draw upon

the Invasive Alien Plant Program: Reference Guide (BC MOFR 2010) and Invasive Plant Pest Management Plan for the Southern Interior of British Columbia (BC Ministry of Forests and Range 2010), which outline an Integrated Pest Management approach for invasive alien plants, under the authority of several partnering ministries.

- KAM will partner with the City of Kamloops, the Grasslands Conservation Council of BC, local landowners, tenure holders and Aboriginal Groups to discuss measures to improve the function of grasslands.

B.1.3 Progressive Reclamation

- Grassland habitat will be restored through reclamation and revegetation processes. Grassland habitats will be recreated to approximate the range of natural variation (i.e., slope, aspect) and species composition (bluebunch wheatgrass, rough fescue). Reclamation and revegetation will occur progressively throughout operations, closure, and post closure.
- KAM will use appropriate seed mixes will be used for grassland restoration and reclamation. Reclamation experience at the nearby New Afton Mine indicates success with a custom-blended natural seed-mix. The actual seed mix and other restoration methods such as plugs and planting will be determined as part of the detailed Closure and Reclamation Planning required for the *Mines Act* permit application in consultation with the SSN, BC MFLNRO and other stakeholders such as the Grasslands Conservation Council. Furthermore, it is expected that the detailed Closure and Reclamation will be refined during project operations from data provided from progressive reclamation efforts as well as reclamation research undertaken by KAM and others. KAM will engage in research test plots and monitoring to determine the best grassland restoration methods to apply. KAM has developed additional grassland restoration options that will be tested on KAM lands during mining operations to better understand the best restoration/reclamation techniques for the Project site. KAM has proposed to establish a monitoring program to assess success of the various treatment prescriptions.
- The species that will be used to reclaim native grasslands in order of percent species composition, include Sandberg bluegrass, rough fescue, Rocky Mountain fescue, junegrass, bluebunch wheatgrass, annual ryegrass, and fall rye. Crested wheatgrass is considered a minor invasive plant species and will not be used during reclamation of native grasslands. Its use in pastureland will be re-considered.
- Success of progressive reclamation and associated research programs will be monitored during Operation phase and reported in Annual Reclamation Reports as required under the *Mines Act*. Monitoring during the Closure phase will be carried out to demonstrate that reclamation and environmental protection objectives are being achieved. If objectives are not achieved additional reclamation activities based on monitoring results and reclamation research will be undertaken.
- KAM is committed to working with relevant agencies and stakeholders to ensure restoration goals are met. In 2014, KAM entered into Collaborative Research Agreement with Thompson Rivers University for a NSERC Industrial Postgraduate Scholarships Grant. The NSERC scholarship award was granted for a project entitled "Use of soil amendments to increase

reclamation success of a closed mine tailings site in the Southern Interior of BC". KAM has contributed cash and in-kind donation to this research that was conducted at the Afton Tailings Storage Facility that was owned and monitored by KAM. This project is an example of the type of research KAM has and will continue to undertake to understand alternative restoration techniques that will be most appropriate to reach reclamation objectives.

- KAM is committed to restoring grasslands until they reach a stage of development that provides a high probability of continued, ecologically sustainable presence and self-maintenance. The program will be conducted annually for the first five (5) years after closure, every second year for Post-Closure years 7 through 11, and then at five-year intervals until all revegetated areas are deemed as having met end land use objectives.

B.2 Rare Plants

The following mitigation measures will avoid, minimize, or compensate for potential effects to rare plants.

B.2.1 Pre-construction

- Additional desktop analyses and field surveys prior to construction to ensure sufficient efforts are undertaken to identify occurrences of rare plants including alkaline wing-nerved moss within the LOCAL STUDY AREA, including the waterline and powerline corridors and additional rare plant surveys throughout the RSA. See Appendix A for details regarding surveys for alkaline wing-nerved moss;
- Disturbance due to construction of the powerline will be limited to areas where poles are placed. Pole placement will be selected to avoid known rare plant habitat and potential suitable habitat such as alkaline temporary wetlands;
- Known rare plant occurrences will be used as inputs during the final design and Construction phase. Where feasible, Project Infrastructure Footprint will be placed so as to avoid direct impacts to these occurrences;
- Where feasible, infrastructure will be relocated to avoid known alkaline wing-nerved moss locations (e.g., pullback of the East Mine Rock Storage Facility will be reviewed and development of water control structures will be designed to mitigate potential effects to this alkaline wing-nerved moss location);
- The design of the East Water Management Pond Dam will be altered to avoid Stegonia moss occurrence;
- Maps and a spatial database of known rare plant locations in the vicinity of Project facilities will be maintained and consulted to avoid impacts during Operations and maintenance activities. Ongoing monitoring will be conducted by a Qualified Environmental Professional or KAM Environmental Manager. The rare plant database will be actively updated as new information becomes available;

- Roads and power lines will be designed to minimize the number of water crossings and to avoid running parallel to watercourses. They will also be designed to minimize the removal of known rare plant occurrences; and
- Prior to construction, a thorough inventory of invasive plants will be conducted in areas that will be disturbed by Project activities. This will be used to identify invasive species control measures and monitoring priorities.

B.2.2 Construction

- Exclusion areas will be created at all known rare plant occurrences located adjacent to construction and operation areas. These areas will be clearly flagged to discourage accidental encroachment by machines. Signage will be added where necessary to indicate the boundaries of the exclusion area;
- Construction personnel will attend a field-based orientation session where the exclusion areas will be explained and avoidance of these areas will be mandatory;
- Clearly marked no-work-zones (50 m buffers) will be established around known alkaline wing-nerved moss locations and its suitable habitats, to avoid direct disturbance and to minimize effects related to fugitive dust transport, weed invasion, vehicular traffic, accidental chemical spills or trampling by cattle;
- To provide protection from traffic (e.g., ATVs, motorcycles, etc.) and from trampling by cattle, public and livestock access to the areas know occurrences of alkaline wing-nerved moss will be restricted/controlled on KAM and Sugarloaf Ranch lands;
- For those rare plant occurrences that cannot be avoided, transplantation of these rare plants will be considered based upon the guiding principles laid out in the BMP: Guidelines for Translocation of Plant Species at Risk in British Columbia;
- Herbicide use will be avoided within 200 m of known alkaline wing-nerved moss populations;
- Erosion prevention and bank stabilization techniques per best management practices described in the Land Development Guidelines of the protection of aquatic habitat (Chilibeck 1993) and other guidelines such as those provided by the BC Ministry of Environment and the Erosion and Sediment Control Association of BC will be used;
- Pre-existing unpaved roads where traffic is expected will be managed for dust suppression during the growing period (June through August). Water will be preferentially used for dust abatement with minimal use of chemicals;
- Alteration of light, moisture, and temperature conditions and changes to surface and subsurface hydrology that may affect rare plant populations will be avoided where feasible;
- Alkaline wing-nerved moss populations within the permit area will be monitored annually from Construction until the end of Closure. Plants subjected to translocation will be monitored annually for up to ten years following their move to document if the translocation was successful. Monitoring of translocated plants may be suspended if monitoring confirms they have not survived;

- KAM will support regional rare plant surveys and research to determine the distribution of these rare plant species throughout the RSA; and
- Comprehensive monitoring plans for rare plants will be developed as part of the Vegetation Management Plan. Reporting of results of rare plant monitoring will be included in the Annual Reclamation Reports.

B.3 Rare and Sensitive Ecosystems

The following mitigation measures will avoid, minimize, or compensate for potential effects to rare and sensitive ecosystems (RSEC).

B.3.1 Pre-Construction

- Priority rock outcrop sites will be visited to confirm the condition of the ecosystem and to confirm if the rare plant association is present. A Conservation Evaluation Form (http://www.env.gov.bc.ca/cdc/documents/Cons_Eval_Form_Aug09.pdf) will be completed to identify of threats and determine future monitoring;
- Additional baseline surveys will occur at wetlands anticipated to be lost to Project Infrastructure Footprints and at potential compensation wetlands within the Local Study Area. These surveys will be conducted in order to further develop the wetland compensation plan and quantify the functions lost at wetlands within the Infrastructure Footprint and those that will be gained through compensation in the Local Study Area;
- Known RSEC occurrences will be used as inputs during the final design and Construction phase. Where feasible, project facilities will be placed so as to avoid direct impacts to these occurrences and habitats;
- Roads and power lines will be designed to minimize the number of water crossings and to avoid running parallel to watercourses; and
- A spatial database and maps of known RSEC locations in the vicinity of Project facilities should will be maintained and consulted to avoid impacts during Operations and maintenance activities. The database will be actively updated as new information becomes available.

B.3.2 Construction

- The four wetlands and four waterbodies along the power line corridor and three wetlands along the waterline outside of the TEM area will be avoided;
- Exclusion areas will be created at all known RSEC occurrences located adjacent to Construction and Operation areas. These areas will be clearly flagged to discourage accidental encroachment with machines. Signage will be added where necessary to indicate the boundaries of the exclusion area;
- Construction personnel will attend a field-based orientation session where the exclusion areas will be explained, and the importance of avoiding disturbance within them will be stressed;

- Erosion prevention and bank stabilization techniques will be used where necessary to minimize potential for secondary loss of trees after initial clearing efforts;
- KAM will avoid use of herbicide sprays within 200 m of known RSEC, and limit such use to direct application rather than broadcast sprays (except when required for invasive species control);
- Vegetation will be sampled and analyzed for metal content. Data from these studies are compared to relevant baseline data;
- A wetland habitat compensation program of at least 28.7 ha will be initiated during project Construction with the aim to conserve and enhance wetland function within the RSA;
- The additional mapped ephemeral wetlands anticipated to be lost to the Infrastructure Footprint (3.5 ha) will be incorporated into the Wetland Compensation Plan. Field Work will be conducted to confirm the classification of these wetlands and amphibian suitability;
- KAM will construct a livestock fence around Inks Lake and the associated wetland fringes around the lake to limit livestock access to sensitive areas. Fencing will enclose 20 ha and provide several access points for cattle in areas less sensitive to trampling. Provisions for gates at these access points would be included to limit access during sensitive periods or if water quality concerns require restrictions on cattle access. Gates will also allow for public access for recreational purposes; and
- Starting one year after construction, KAM will commence a five year monitoring program to monitor for potential alteration of wetland functions compared to baseline survey results. Criteria (performance measures) for the monitoring will be developed through discussions with ECCC, DFO, FLNRO, MOE, Aboriginal Groups and other interested parties. If changes in wetland function are identified and these are shown to be not compatible with the habitat objectives for each wetland, additional mitigation measures will be identified and implemented. By year five, if successful criteria still have not been achieved, a work plan will be developed and additional offsetting works will be undertaken and monitoring will continue until performance measures have been met. The results of compliance and effectiveness monitoring will be compiled annually and submitted for review. After the third year of effectiveness monitoring, a summary report will be written with recommendations based on the success of the offsetting measures.

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