

APPENDIX 18.II

Conceptual Wildlife Effects Monitoring Program

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18.II.1 INTRODUCTION

This conceptual Wildlife Effects Monitoring Program (WEMP) outlines how Fortune proposes to remove or limit the direct and indirect effects to wildlife from the NICO Project. The WEMP also outlines the effects that will be monitored. The WEMP is conceptual at this stage, and detailed study designs, methods, procedures, and data sheets will be developed during the NICO Project permitting phase.

The WEMP is intended to provide a blueprint for wildlife effects monitoring and mitigation at the NICO Project. Ultimately, the WEMP will have 2 audiences: the communities and government who have concerns about effects to wildlife; and the environment staff who carry out the monitoring. As the NICO Project progresses into the permitting stage and the WEMP is further developed, specific work instructions will be provided for the environment staff. These work instructions will provide the necessary information to carry out most of the monitoring, including information on the timing of the surveys, the number of staff required, locations, and methods. For the communities, public, and regulatory authorities participating in the development of the WEMP, the final document should provide background, rationale, objectives, and information on data collection and analysis to determine if the WEMP will adequately monitor effects to wildlife from the NICO Project.

The overall goals of the WEMP are to:

- meet regulatory requirements and corporate commitments for monitoring;
- provide a process for regulators, communities, and other people interested in the NICO Project to participate in the development and review of wildlife effects mitigation and monitoring;
- provide a process to provide results of monitoring to communities, governments, and the public; and
- provide mine managers with clear reasons for making decisions regarding environmental management.

18.II.1.1 Objectives

The WEMP will be designed to achieve the following objectives:

- provide information to test predicted impacts from the NICO Project DAR, and reduce uncertainty;
- implement environmental design features and mitigation to reduce the risks and disturbance to wildlife and wildlife habitat;
- determine the effectiveness of environmental design features and mitigation;
- incorporate local traditional and ecological knowledge, where applicable and available;
- propose action levels or adaptive management triggers that can be used as early warning signs for reviewing and implementing wildlife mitigation practices and policies;
- design studies and data collection protocols that are consistent with other programs in the region; and
- consider existing regional and collaborative programs, such as the Northwest Territories (NWT) Cumulative Impact Monitoring Program and the NWT Environmental Stewardship Framework.

Documents reviewed to develop this monitoring plan included:

- The Snap Lake Wildlife Monitoring Plan (De Beers 2004);
- The Snap Lake Wildlife Management Plan (De Beers 2007);
- The Jericho Diamond Project Wildlife Mitigation and Monitoring Plan (Tahera 2005);
- The Daivik Diamond Mine Wildlife Monitoring Report (DDMI 2010);
- The Ekati Diamond Mine Wildlife Monitoring Report (BHP Billiton 2010);
- Report of the diamond mine monitoring workshop (Marshall 2009);
- Standardized protocols for the NWT Cumulative Impact Monitoring Program (IMG-Golder Corp. 2008); and
- Data Collection Protocols for the Northwest Territories Cumulative Impact Monitoring Program. Valued Components: Caribou Fish Habitat, Population & Harvest Water & Sediment Quality. (Kavik-AXYS Inc. 2008).

In practice, it is difficult to combine the monitoring required to assess the impacts of a mine, with the regional monitoring programs, such as those described by Cumulative Impact Monitoring Program (IMG-Golder Corp. 2008; Kavik-AXYS Inc. 2008). Further, regional monitoring is less effective at providing information that feeds back into mine environmental management. Regardless, Fortune is open to suggestions for contributions to regional monitoring, and has proposed to submit raptor monitoring data to the NWT Raptor Database (described in Kavik-AXYS Inc. 2008), and to the North American Peregrine Falcon Survey.

18.II.1.2 Principles of Environmental Effects Monitoring

There are limitations to wildlife effects monitoring that should be considered in the development and implementation of an effective monitoring program. Monitoring may be undertaken for many purposes, some of which are not compatible with others. For example, site-specific wildlife monitoring data are typically not directly applicable to regional cumulative effects monitoring. Further, there are some effects that simply can not be addressed through monitoring (e.g., changes in survival and reproduction rates). As is often the case in wildlife monitoring, the number of samples required to satisfy statistical requirements may not be attainable (see Marshall 2009 for a summary of these issues for the Snap Lake, Ekati, and Diavik diamond mines).

There are a number of principles related to the development and implementation of the WEMP, which can include the following.

- 1) Monitoring is not research. Monitoring supports decision-making by the operator and regulator, and provides direct feedback to the operator regarding the effectiveness of current mitigation and the potential need for adaptive management. Monitoring also provides information to communities and other people interested in the development on the potential effects to wildlife, and the success of mitigation and adaptive management. In comparison, research is typically completed to test hypotheses and usually tries to answer more fundamental questions regarding properties of ecosystem structure and function.
- 2) Monitoring must address a specific question or objective. Monitoring is only useful if it provides answers to specific compliance or follow-up questions, such as: What is the current status? Are there spatial extent (area) or temporal (time) trends? Is there a change in some environmental parameter?

- 3) Measurement endpoints (indicator variables) must have a clear purpose and are typically associated with effects predictions in the environmental assessment (i.e., the DAR). Measurement endpoints used in monitoring programs can be physical, chemical, or biological attributes of a population, community, or ecosystem, and provide an indication of the amount (magnitude), duration, and spatial extent of the effect. Measurement endpoints are selected because they are of intrinsic importance, provide early warning, are sensitive to the stressors of concern, and provide information about potential effects to ecosystem processes.
- 4) Measurement endpoints should meet the following criteria:
 - a) high signal-to-noise ratio so changes can be distinguished from natural background levels;
 - b) rapid response so changes and potential effects can be detected as early as possible;
 - c) repeatable and reliable response that should be as specific to the stressor of concern as possible;
 - d) ease/economy of monitoring;
 - e) importance to the ecosystem or society; and
 - f) effectiveness of feedback to adaptive management so that information can be acted upon with confidence.
- 5) Define action levels and thresholds where applicable and possible. Monitoring information is most useful when it guides decisions. Therefore, monitoring programs must identify how the information provides the basis for decisions regarding possible adaptive management. The basis is usually a clear threshold where it is determined that a response would be required. Action levels and thresholds determined for use in decision-making will differ depending on the objectives of the monitoring program.
- 6) Not all effects can be detected. Detecting an effect on an environmental receptor or valued component (VC) can be difficult, as the monitoring data will also contain noise from natural variability. Often, the number of samples required to satisfy statistical requirements may be unattainable.

18.II.1.3 Community Participation

Fortune will provide continuous updates on the NICO Project through direct participation and regular communication through community and site visits, regulatory meetings, public information sessions, annual reports, audit results, and the Fortune website.

It is essential that communities are involved with monitoring so they can judge for themselves how well Fortune is doing at reducing effects and looking for ways to improve environmental management. Fortune will achieve this by:

- developing monitoring programs that include input from communities, including people holding local traditional and ecological knowledge;
- developing monitoring programs that reflect community priorities;
- including community members in monitoring activities and hiring local residents as environment staff;

- presenting the results of monitoring with the communities; and
- providing an opportunity for communities to comment on the findings.

18.II.1.4 Valued Components

Valued components represent physical, biological, cultural, social, and economic properties of the environment that are considered to be important by society. For the DAR, VCs included caribou (*Rangifer tarandus*), moose (*Alces alces*), black bear (*Ursus americanus*), wolverine (*Gulo gulo*), marten (*Martes americana*), muskrat (*Ondatra zibethicus*), upland breeding birds (songbirds, shorebirds, and ptarmigan), waterbirds, and raptors. This list was based on concerns and comments from communities and aboriginal organizations, government, and other people interested in the NICO Project. Other factors considered when selecting VCs for the DAR included the following (Salmo 2006):

- required by or compatible with regulatory requirements and existing initiatives;
- easily understood and known to be important to residents, managers, and regulators;
- when taken together, reflect overall environmental and social conditions; and
- can be effectively assessed with one or more practical and efficient indicator variables (measurement endpoints).

For the WEMP, the term VC is only used to refer to those wildlife species that were explicitly assessed in the DAR. Specific effects monitoring will focus on species with measurement endpoints that are applicable to the principles of effective monitoring (i.e., obtain sufficient sample size, cost-effective sampling methods, and sensitive enough to separate NICO Project-related effects from changes due to natural environmental factors, and meet objectives).

Monitoring of animal interactions and direct mortality associated with the NICO Project includes all wildlife populations (Section 18.II.4). Similarly, because habitat is fundamental to the abundance and distribution of animal populations, monitoring of direct changes to habitat encompasses all wildlife species (Section 18.II.4.1). Following the principles of adaptive management, the objectives and focal species of the WEMP may be periodically reviewed by government, community, and regulatory agencies, and changed as necessary.

18.II.1.5 Species at Risk

The *Species at Risk Act*, and the *Species at Risk (NWT) Act* have the goal of protecting species at risk from becoming extirpated or extinct as a result of human activity. While the former was enacted by the Government of Canada, the latter was enacted by the Government of the Northwest Territories (GNWT) and applies to only to wild animals and plants managed by the GNWT (ENR 2010). Species may be considered At Risk as a result of either their national or territorial status, although the *Species at Risk (NWT) Act* has yet to be fully implemented.

Table 18.II.1-1 shows the wildlife species at risk with ranges that are known to overlap or likely overlap with the NICO Project, and their federal and territorial status. In the case of migratory birds, only those birds that breed or winter near the NICO Project were included; other species that may migrate through the area were not included. For all but 2 species it is the federal Committee on the Status of Endangered Wildlife in Canada (COSEWIC) listing that led to the inclusion of the species; only olive-sided flycatcher (*Contopus cooperi*) and common nighthawk (*Chordeiles minor*) triggered the first criteria of being listed At Risk in the NWT. This indicates that the

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risk of extirpation for NWT populations of the remaining 5 species is less than populations elsewhere in Canada. This is likely due to differences in the scales of assessment; COSEWIC must consider the national status of a species, whereas, the NWT General Status Ranks considers populations only in the context of the largely undisturbed NWT. As the *Species At Risk (NWT) Act* is implemented, the NWT General Status Ranks will be updated and listed species will receive legal protection (ENR 2010).

Table 18.II.1-1: Wildlife Species at Risk for the NICO Project

Common Name	Scientific Name	COSEWIC Status	SARA Status	NWT General Status Rank
Wolverine (western population)	<i>Gulo gulo</i>	special concern	no status	sensitive
Horned grebe (western population)	<i>Podiceps auritus</i>	special concern	no status	secure
Peregrine falcon (anatum subspecies)	<i>Falco peregrinus anatum</i>	threatened	Schedule 1	not assessed
Short-eared owl	<i>Asio flammeus</i>	special concern	Schedule 3	sensitive
Common nighthawk	<i>Chordeiles minor</i>	threatened	Schedule 1	at risk
Olive-sided flycatcher	<i>Contopus cooperi</i>	threatened	Schedule 1	at risk
Rusty blackbird	<i>Euphagus carolinus</i>	special concern	Schedule 1	may be at risk

Source: ENR (2010)

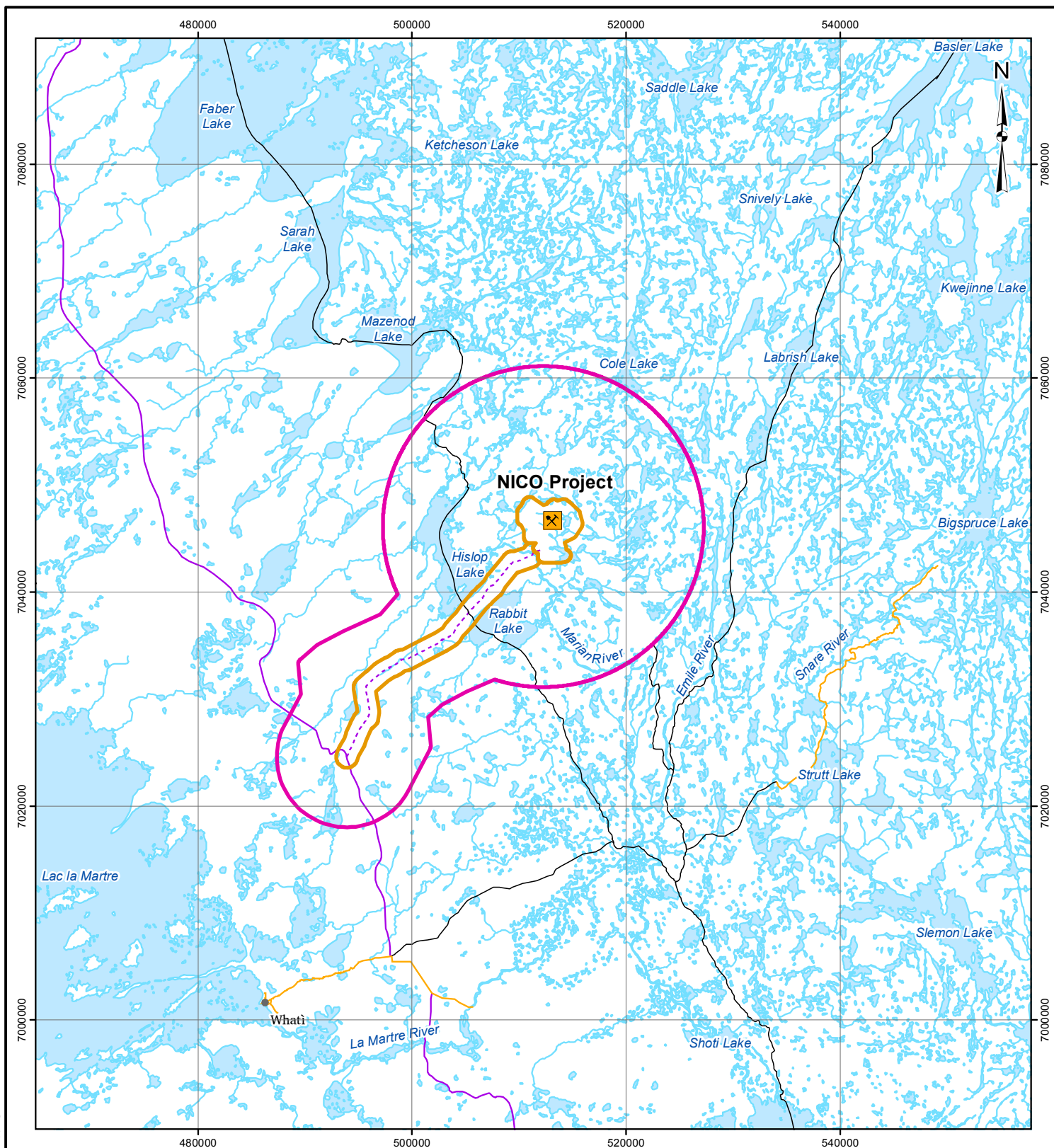
COSEWIC = Committee on the Status of Endangered Wildlife in Canada; SARA = *Species At Risk Act*; NWT = Northwest Territories

18.II.2 STUDY AREAS

The NICO Project includes the anticipated mine site and Lease Boundary, and the 27 kilometre (km) NICO Project Access Road (NPAR). To assess the potential effects of the NICO Project on VCs in the DAR, it was necessary to define appropriate spatial boundaries. The spatial boundaries were delineated based on the predicted extent of the effects from the NICO Project as well as life history attributes of the VCs, and included a local study area (LSA) and a regional study area (RSA).

The LSA was defined by the expected spatial extent of the immediate direct (e.g., NICO Project footprint) and indirect effects (e.g., dust deposition) from the NICO Project on surrounding soil, vegetation, and wildlife. The LSA was defined as a 500 metre (m) buffer around the NICO Project Lease Boundary, and 1000 m buffer around the NPAR (Figure 18.II.1-1).

The RSA was selected to measure the existing baseline conditions at a scale large enough to capture the maximum predicted spatial extent of the combined direct and indirect effects (i.e., the zone of influence [ZOI]) from the NICO Project on vegetation and wildlife. This area is intended to capture effects that extend beyond the immediate NICO Project footprint, such as noise, lights, and smells that can indirectly influence the movement and behaviour of VCs. The RSA was defined by a 15 km radius centered on the proposed mine site, and a 6.5 km buffer around the NPAR (Figure 18.II.1-1).



LEGEND

- | | | | |
|---|-----------------------------------|---|---------------------|
|  | NICO PROJECT |  | LOCAL STUDY AREA |
|  | POPULATED PLACE |  | REGIONAL STUDY AREA |
|  | EXISTING ALL-WEATHER ROAD | | |
|  | EXISTING WINTER ROAD | | |
|  | PROPOSED NICO PROJECT ACCESS ROAD | | |
|  | PROPOSED Tl'ch'q ROAD ROUTE | | |
|  | WATERCOURSE | | |
|  | WATERBODY | | |

REFERENCE

Base data obtained from Atlas of Canada, DMTI, and GeoGratis.
Projection: UTM Zone 11 Datum: NAD 83

10 0 10
SCALE 1:500,000 KILOMETRES



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TITLE

LOCAL AND REGIONAL STUDY AREAS FOR WILDLIFE



FILE No. E-WMMP-001-GIS			
PROJECT No. 09-1373-1004	SCALE AS SHOWN	REV. 0	
DESIGN LD	27 Oct. 2008		
GIS ANK	04 Apr. 2011		
CHECK JG	03 May 2011		
REVIEW JV	03 May 2011		

FIGURE: 18.II.1-1

18.II.3 MITIGATION

18.II.3.1 General Mitigation

Two strategies are used to remove or limit effects to wildlife and wildlife habitat. The first is the use of environmental design features, which are physical structures and policies that have been incorporated into the design of the NICO Project, such as containment structures around fuel storage and skirting around buildings. The second strategy is mitigation, which are actions taken to reduce the magnitude and spatial extent of effects, such as giving wildlife the right-of-way on roads, advising staff of wildlife on-site, and implementing the Emergency Response and Spill Contingency Plan. A summary of the environmental design features and mitigation that will be implemented for the NICO Project include the following:

- limit the spatial extent of NICO Project footprint (i.e., anticipated mine site and NPAR);
- promote natural re-vegetation and practice progressive reclamation;
- remediate and decommission the site when mining operations are complete;
- skirt all buildings to the ground to limit opportunities for animals to find suitable shelter;
- locate noisy equipment inside buildings or underground;
- the incinerator will be housed in an enclosed structure, to improve combustion and reduce the availability of attractants while garbage awaits incineration;
- use double-walled containers or single-walled containers in lined containment areas for all fuel storage;
- provide spill containment supplies in designated areas;
- use a fuel transfer house with double-locked mechanisms;
- use of culverts and other design features that reduce changes to local flows, drainage patterns, and drainage areas;
- capture and reuse site water to reduce fresh water requirements;
- recycle and treat excess water from the Seepage Collection Ponds prior to release;
- use of high efficiency scrubbers in processing equipment to limit emissions of particulate matter;
- use of dust control systems on rock crushing and other dust generating equipment;
- enforcement of speed limits and use water on roads during the summer and fall to suppress dust;
- management and isolation of attractants, particularly food waste;
- reporting of raptor nesting activity observed within 1.5 km of the NICO Project to the Department of Environment and Natural Resources (ENR);
- land clearing only outside of the breeding season for migratory birds (15 May through 31 July) for all facilities where migratory birds may nest;

- reporting of all relevant observations of wildlife (particularly of caribou, fox (*Vulpes vulpes*), wolverine, and black bear) to environment staff;
- effective implementation of the Waste Management Plan, particularly as it relates to the disposal of food waste;
- identifying and monitoring birds nesting on NICO Project infrastructure;
- prohibiting hunting, trapping, harvesting, and fishing by site employees and contractors;
- contacting ENR to receive additional direction regarding new issues that arise;
- providing the right-of-way to wildlife;
- enforcing a minimum flying altitude of 300 m above ground level (except during take-off and landing, and aerial surveys) for cargo and passenger aircraft outside of the NICO Project;
- enforcing a minimum flying altitude of 300 m for helicopters, whenever possible;
- restricting vehicle use to designated roads, and prohibiting recreational off-road use of vehicles;
- use of signage and radio to warn drivers when wildlife move through an area; and
- temporary suspension of surface blasting if large mammals are observed within the danger zone identified by the blast supervisor.

18.II.3.2 Deterrent Actions

The goal of wildlife deterrent actions is to respond to wildlife situations using humane wildlife control methods that keep both humans and wildlife safe. All deterrent actions will start with the least intrusive method, and then increase in intensity until wildlife may need to be relocated or destroyed. Each deterrent action will stop as soon as the animal moves away from the potentially hazardous site or human activity. Deterrent options will only be used to keep wildlife away from hazards.

Wildlife deterrent actions will be undertaken only by designated individuals (such as the environment staff or security staff). These individuals will be required to hold a valid Canadian Possession-Acquisition Firearms License. Training will include Bear Safety and Wildlife Deterrent Training specific to caribou, wolverine, and fox. This training will include basics in wildlife ecology and behaviour, prevention of wildlife-human encounters, contingencies for wildlife-human encounters, proper use of deterrents, and recording and reporting procedures.

For deterrents to be successful there must be:

- knowledgeable, trained personnel who will select corrective deterrent actions based on each wildlife situation;
- consistent application of deterrents;
- effective implementation of the Waste Management Plan, particularly as it relates to the disposal of food waste;

- safe and effective methods to prevent the presence or continuous presence of wildlife within the anticipated NICO Project Lease Boundary;
- procedures to remove wildlife from the Airstrip or roads during an emergency;
- the absence of food, shelter, and other rewards for animals that investigate the site; and
- evaluation of every deterrent action to determine the reason for the animal's presence and the method it used to gain access to a hazardous area.

Records of deterrent actions will be entered in a Wildlife Deterrent Report by NICO Project environment staff and forwarded to ENR.

18.II.3.3 Caribou Protection

The NICO Project is within the winter range of the Bathurst caribou herd. During this time, caribou are often found in dispersed groups, and their daily movements are limited. It is therefore unlikely that the NICO Project would encounter large numbers of migrating caribou. Rather, the baseline data suggests that small numbers of caribou will be present in some winters, and individual groups could stay in the vicinity for days or weeks at a time.

Regardless, it is anticipated that caribou will occasionally interact with the NICO Project and actions may be required to move caribou away from hazardous areas. The appropriate level of action for a situation is one that moves caribou away from hazards with a minimal amount of disturbance to the caribou. The decision to take deterrent action will consider the number of animals, the potential for risk to caribou or human safety, and the potential for interruption of construction, mining, and operational activities. Mitigation to protect caribou includes the following:

- hunting by NICO Project staff and contractors will be prohibited while on-site;
- all incidents involving deterrent action, interaction, and injury of caribou will be reported;
- all sightings of caribou will be reported to the environment staff on-site;
- caribou will not be blocked from crossing NICO Project roads and the Airstrip;
- if caribou are crossing or attempting to cross the NPAR or site roads, then traffic will stop and wait for them to cross; and
- caribou will only be herded away from roads or the Airstrip in specific circumstances, such as an emergency.

18.II.3.4 Waste Management

Adherence to the Waste Management Plan (Appendix 3.IV) is critical for reducing the potential for wildlife-human encounters and the potential wildlife mortalities due to these interactions. The Waste Management Plan is based on the following key principles:

- protection of the health and safety of all site employees, contractors, visitors, and the environment;
- the reduction, reuse, recycling, and recovering of waste materials;

- the proactive management of wastes that may attract wildlife and result in the interaction between humans and wildlife;
- environmental awareness and waste management training;
- compliance monitoring of the waste management system; and
- contractor's compliance with site waste management procedures.

The following wildlife-specific mitigation strategies are included in the Waste Management Plan:

- follow the procedures outlined in the Waste Management Plan (Appendix 3.IV) and the Emergency Response and Spill Contingency Plan (Appendix 3.VI);
- no littering policy;
- no feeding of wildlife policy;
- separate food waste and non-food waste at source;
- disposal of food waste and non-toxic combustible waste according to the Waste Management Plan to limit the presence of food attractants;
- non-food waste products (that cannot be incinerated or landfilled) to be collected, sorted, and placed in designated areas within the Waste Transfer Area until they can be shipped off-site;
- providing contained areas for lunch and coffee breaks with waste containers for food waste;
- clearly identifying all food waste containers, and those for which food waste is not permitted; and
- food waste storage in an isolated area and incinerated quickly.

18.II.3.5 Site Orientation

To limit impacts to wildlife, an education strategy will be implemented that consists of an orientation for site personnel, contractors, and visitors. Wildlife-related components in orientation sessions include the policy that wildlife have the right-of-way, strategies to reduce employee-wildlife interactions, and the prohibition of feeding wildlife. In addition, all site personnel will attend detailed orientation sessions and must review all operating procedures appropriate to their tasks and responsibilities.

Spill response team members will be trained and familiar with emergency and spill response resources, including their location and access, and the Emergency Response and Spill Contingency Plan. All personnel and contractors at the NICO Project site will be familiar with spill reporting requirements. This will be maintained through the orientation program for all on-site personnel. All fuel handling employees and contractors will be fully trained in the safe operation of the facilities, spill prevention techniques, and initial spill response.

18.II.3.6 Relevant Operation Procedures and Management Plans

Relevant operating procedures will be added to the WEMP as they are developed. There are 3 Environmental Management Plans that are relevant to wildlife protection and include the following:

- Waste Management Plan (Appendix 3.IV);

- Hazardous Substances Management Plan (Appendix 3.V); and
- Emergency Response and Spill Contingency Plan (Appendix 3.VI).

18.II.4 MONITORING

In the DAR, the primary effects to the abundance and distribution of wildlife VCs from the NICO Project were related to changes in habitat quantity and quality, and direct mortality (Section 8 and Section 15). Environmental design features and mitigation policies, practices, and procedures are intended to limit the magnitude, duration, and geographic extent of these effects from the NICO Project on wildlife (Section 18.II.3); therefore, the monitoring component of the WEMP is designed to determine the effectiveness of mitigation, reduce uncertainties, and test impact predictions presented in the DAR. The primary predicted residual effects that can influence wildlife include:

- direct habitat effects;
- indirect habitat effects; and
- direct NICO Project-related mortality.

Specific procedures and data sheets for wildlife monitoring will be developed upon the completion of the environmental assessment process.

18.II.4.1 Direct Habitat Loss and Alteration

Construction of the NICO Project will lead to the direct loss and alteration of vegetation and other natural features that currently provide wildlife habitat. This includes various types of forest cover, bedrock open conifer, shrubland, ponds, and wetlands. These local changes in habitat can influence the abundance and distribution of wildlife, particularly species with small seasonal ranges such as muskrats, upland breeding birds, and waterbirds.

These changes will predominantly occur during construction. Following initial construction of the NICO Project and the NPAR, expansion of the NICO Project footprint will be at a much slower rate and smaller spatial extent, and primarily associated with the development of the Open Pit and the Co-Disposal Facility through operations. Therefore, the approach to assessing habitat changes involves documenting the NICO Project footprint at the end of construction and start of operations, by which time most of the alteration to habitat will have occurred.

The objective of this component of the WEMP is to test (verify) the predictions from direct habitat effects in the DAR.

Methods

Following the construction phase, as-built drawings will be created to delineate the NICO Project footprint. The NICO Project footprint includes all mine components, including the Open Pit, Co-Disposal Facility, roads (including the NPAR), accommodations, Mineral Processing Plant and other facilities, and Airstrip. The as-built drawings will be used to compare the actual loss to that predicted in the DAR. On-going monitoring of the final stages of the Open Pit and Co-Disposal Facility are not proposed.

Frequency and Duration

The as-built drawings will be completed within 12 months of the start of mining. This delay is required in the case that satellite imagery is required to delineate the NICO Project footprint. Monitoring will begin at the end construction, and once per year for approximately 3 years into operations (or until the spatial extent of the footprint shows no to little change).

Thresholds

Thresholds will not be considered for habitat loss given that the NICO Project footprint and layout are ultimately governed by the required land use permits and leases to construct the NICO Project. Although the final NICO Project footprint and layout will likely have some variance from that presented in the DAR, these changes should be minor, as the NICO Project must be built as described in the land use permit application.

18.II.4.2 General Wildlife Monitoring

Wildlife is expected to continue to be present in the vicinity of the NICO Project during construction, operation, and closure and some wildlife species are attracted to human activity. Thus, the NICO Project is predicted to lead to a range of incidents with wildlife. For the WEMP, incidents are defined as any wildlife interaction that requires a response by NICO Project personnel, and may include simple deterrent actions, or the injury or death of an animal. Species that are often attracted to industrial developments in the NWT include gulls, ravens, fox, wolverine, and bears. Wolverines are considered a species at risk (Table 18.II.1-1).

A general wildlife monitoring program is proposed to identify the species and number and location of human and NICO Project-wildlife incidents, identify risks to wildlife and construction crews, and to describe general effects to wildlife. General monitoring also includes recording the presence of all wildlife (common and uncommon species, and species at risk) within and around the NICO Project footprint.

The objectives of this component of the WEMP are to:

- keep environment staff apprised of wildlife activity within the NICO Project footprint;
- identify and manage the attraction of wildlife to the NICO Project;
- avoid human-wildlife interactions;
- determine the effectiveness of mitigation; and
- test (verify) the predicted effects from direct NICO Project-related mortality on wildlife.

Methods

Monitoring of wildlife presence and movements within and around the NICO Project (i.e., anticipated mine footprint) will help to keep environment staff apprised of wildlife activity and the potential for problems, and estimate the effectiveness of mitigation. The surveys and regular communication with all staff will provide early-warning of wildlife presence on-site, and the opportunity to manage situations as they develop to prevent incidents. This survey will consist of an inspection of all areas in the NICO Project site, scanning observations of wildlife, and records of recent wildlife sign (e.g., tracks, scat). The survey will be completed on foot, and environment staff will record the area surveyed, and the nature and location of all observations. Environment staff will routinely question staff working outdoors for recent wildlife sightings, problems, and concerns.

NICO Project staff and contractors will be expected to report all observations of caribou, moose, wolverine, wolf, black bear, and fox to environment staff, both at the NICO Project site, and along the NPAR. Environment staff will respond to, investigate, and record the presence and incidents involving deterrent actions, injury, or mortality of animals, and complete follow-up procedures or actions as necessary. Wildlife sighting logs will be maintained at various areas around the NICO Project site for staff to record observations of wildlife. If wildlife mortality occurs, environment staff will conduct an investigation to determine the cause, collect photographs, and store the carcass until further notice from ENR. All wildlife sightings, deterrent actions, injuries, and mortalities will be reported in the annual Wildlife Effects Monitoring Report. In addition, ENR will be notified of caribou, moose, black bears, migratory birds, and species at risk mortalities within 24 hours of the incident.

Frequency and Duration

Surveys for wildlife presence within and around the NICO Project will occur at least twice per week. Investigation and reporting of incidents will be completed as they occur. Both programs will be continuous throughout the construction, operation, and closure.

Thresholds

Wildlife incident reporting will provide information for adaptive management such as identifying areas requiring improvements to wildlife mitigation for reducing interactions and potential mortality risks. The threshold level for wildlife incidents will be a single incident, in that each incident will be investigated to identify the cause. Environment staff may suggest changes to environmental design features, mitigation practices, or provide additional training for staff.

18.II.4.3 Waste Management

Carnivores and scavengers have a keen sense of smell and can be attracted from long distances if food items are frequently present. Mining projects in the Arctic have reported carnivore and scavenger attraction, including wolverine, fox, grizzly bear, raven, and gulls. Carnivores are also attracted to aromatic waste material such as petroleum-based chemicals, grey water, and sewage. In addition, infrastructure may also attract carnivores as it can serve as a temporary refuge to escape extreme heat or cold. Ravens and raptors may also be attracted to infrastructure and anthropogenic food sources. Attraction of wildlife to the NICO Project also increases the risk for accidental mortality of wildlife (e.g., collisions with vehicles) and the potential for human-wildlife interactions, which may result in the removal of individuals by mortality or relocation. The attraction of predators can also increase the risk of mortality to prey populations (e.g., increased songbird nest predation from gulls, ravens, and foxes).

Good waste management practices and staff education are key in decreasing the frequency of attractants at mine sites. A number of environmental design features, mitigation, and management plans will be implemented at the NICO Project to limit the attraction of wildlife, and the associated increased risks of human-wildlife interactions, and wildlife mortality (Section 18.II.3 and Appendix 3.IV). These mitigation strategies are similar to management practices and policies implemented at other mines in the NWT and Nunavut (e.g., De Beers 2008).

The objectives of this component of the WEMP are:

- to identify non-compliance with the Waste Management Plan; and
- to continually improve waste management practices to limit the potential for risks to humans and wildlife.

Methods

In conjunction with the weekly wildlife presence surveys, environment staff will complete inspections of all waste management process components that are accessible to wildlife and that involve attractants. The process is described in the Waste Management Plan (Appendix 3.IV). The inspection will include surveys of waste storage, transfer, incineration, landfills and landfarms, and grey and sewage water treatment. Observations of wildlife and wildlife sign near waste or waste management facilities will be recorded. Wildlife incidents and wildlife deterrent actions will be reported to determine if they were linked to waste management processes. Inspections will be completed by environment staff, and will document the areas inspected, the attractants found, any infractions of the Waste Management Plan, and follow-up actions.

Frequency and Duration

Inspections will be completed at least twice per week throughout the year and during construction, operation, and closure.

Thresholds

Should the inspections identify potential or actual availability of wildlife attractants (food waste in particular), or should observations of wildlife, wildlife sign, or wildlife incidents point to problems in the waste management process, corrective actions will be suggested by the environment staff. Some level of wildlife activity is anticipated regardless of the efficiency of waste management, as wildlife may be present naturally, or be attracted by smells or shelter, even if there is no food reward. Regardless, the potential or actual availability of food waste for wildlife will be the trigger to initiate an investigation and corrective action.

18.II.4.4 Access

The NPAR will create new access, and expand the duration of access beyond that of the existing winter access road. Changes in access often lead to changes in land use, some of which may be of concern to land managers. Check stations on the Tibbitt-to-Contwoyto winter road and occasionally on the Tłı̄chq winter road are used as a means to monitor traffic and land use.

Fortune and the Tłı̄chq Government will discuss the necessity for monitoring NICO Project and non-NICO Project use of the NPAR, land use activities on these roads, and wildlife presence. Options for monitoring the NPAR include a permanent check station, or regular surveys by Fortune environment staff to document non-NICO Project use of the NPAR. Non-NICO Project use may include hunting, trapping, fishing, collecting firewood, or sight-seeing. Any monitoring would be conducted with the approval of the Tłı̄chq Government.

The NPAR will be on Tłı̄chq land, and land required for the NPAR may be leased to Fortune by the Tłı̄chq Government. Although the NPAR will likely be owned and operated by Fortune, it may not be gated; however, Fortune will be obliged to install a gate at the entrance to the NICO Project Lease Boundary to control vehicle access for safety reasons.

18.II.4.5 Species at Risk

Section 79 of the federal *Species at Risk Act* states that all adverse effects to species at risk must be identified, that measures are taken to avoid or lessen those effects, and to monitor the effects. Mitigation must be provided in a way that is consistent with any applicable recovery strategy and action plans. Currently there are no such plans available for the species identified in Table 18.II.4-1.

Table 18.II.4-1: Wildlife Species at Risk for the NICO Project and Proposed Monitoring

Common Name	Proposed Monitoring
Wolverine	habitat loss and general wildlife monitoring
Horned grebe	habitat loss, general wildlife and water bird monitoring
Peregrine falcon	habitat loss, general wildlife and raptor monitoring
Short-eared owl	habitat loss, general wildlife and raptor monitoring
Common nighthawk	habitat loss and general wildlife monitoring
Olive-sided flycatcher	habitat loss and general wildlife monitoring
Rusty blackbird	habitat loss and general wildlife monitoring

Considering the low density of the identified species at risk in the RSA and the small geographic scale of effects anticipated (Sections 15.4 and 15.6), species-specific monitoring and detecting effects to these species is unlikely to be successful. Mitigation and monitoring for the species at risk is therefore considered in the broader context of that proposed for other wildlife. Mitigation outlined in Section 18.II.3 applies to the species at risk, and Table 18.II.4-1 reviews the category of monitoring that applies to each species at risk. Detailed observations of any species at risk will be reported, including the time and date, location, and number.

18.II.4.6 Caribou

Barren-ground caribou are a migratory species that show a large degree of variation in migration routes from year to year. Barren-ground caribou from the Bathurst herd are the most likely ecotype to occur in the RSA, although the Bluenose East and Ahiak barren-ground herds, and the woodland (or boreal) ecotype may also be present occasionally. The RSA is large enough to capture the maximum predicted spatial extent of the combined direct and indirect effects from the NICO Project on caribou. For example, studies on the movements of woodland caribou in the boreal forest of Newfoundland near resource extraction industries indicated that caribou avoided mining activities, with avoidance distances of up to 4 km during the summer and 6 km during the late winter, pre-calving, and calving seasons (Weir et al. 2007). Although their movements are unpredictable at the small scale, there are distinct seasonal differences in distribution and travel rates at the scale of the annual range. Traditional knowledge, baseline studies, and the movements of collared caribou indicate that barren-ground caribou are only present in the RSA during winter.

Caribou that enter the NICO Project site may be at risk from mine infrastructure and activities (e.g., vehicle and aircraft collisions). Mitigation, particularly caribou protection procedures, is anticipated to limit the risks to the health, injury, and mortality of caribou (Section 18.II.3). General wildlife monitoring is expected to determine the effectiveness of mitigation and caribou protection procedures, and provide information for further mitigation and protection if required (Section 18.II.4.2).

In the DAR, it was predicted that the distribution of caribou would be negatively influenced within 15 km of the NICO Project (i.e., anticipated mine site). This ZOI was attributed to a decrease in habitat quality (indirect habitat effects) from presence of vehicles, noise, dust, smells, lights, buildings, and people. The predicted ZOI was based on studies at diamond mines in the arctic tundra, and is greater than the estimates reported for woodland caribou in the forest (4 to 6 km; Weir et al. 2007). The larger ZOI was used in the DAR so that the potential effects to caribou would not be underestimated.

The objectives of this component of the WEMP are:

- to identify and mitigate hazards to caribou that enter the NICO Project site; and
- to test (verify) the predicted ZOI from the NICO Project on caribou distribution.

Methods

Environment staff will document the presence of caribou near construction areas, summarize observations of caribou, communicate this information to construction managers, and carry out any deterrent action that may be necessary (Section 18.II.3.2 and Section 18.II.4.2). Further, movements of satellite collared caribou will be monitored to provide an indication of approaching caribou. The need and methods for monitoring of caribou presence along the NPAR will be discussed with the Tłıchq Government.

Caribou monitoring within the RSA will include aerial surveys and monitoring of collared caribou movements. Regular updates of collared caribou movements and observations from environmental staff will be used to trigger aerial surveys. Aerial surveys will be completed to document the occurrence, abundance, distribution, group size, and composition of caribou in the RSA for the anticipated mine site. Using the same methods as the baseline surveys (Section 8.3.1.2), there will be 15 transects oriented in a north-south direction spaced 2 km apart. The survey width will be 200 m on either side of the aircraft, providing approximately 20% coverage of the RSA. The surveys will be conducted by fixed-wing aircraft, using 2 observers (one on each side of the aircraft). Furthermore, collared caribou movements may be used to support estimated distribution of caribou within the RSA.

Frequency and Duration

Caribou monitoring will be completed in the winter during construction through closure. At least 2 aerial surveys will be completed each year (in December and April), but up to 4 aerial surveys will be conducted each winter if at least 1000 caribou are observed within the RSA (either during aerial surveys or from the ground). Aerial surveys will also be triggered if there is at least one collared caribou within the RSA. Presence of caribou and caribou sign on-site also will be confirmed during General Wildlife Monitoring (Section 18.II.4.2).

Thresholds

Should caribou be present near construction or mining activities, construction managers would be notified and requested to find strategies to avoid the caribou (Section 18.II.3.3).

Generally wildlife will be left undisturbed. Caribou will be given priority over vehicles when crossing roads. In rare cases, caribou may be in areas that present a risk to the animals, humans, or equipment. In these cases, deterrent actions should be considered. Deterrent actions to be taken will begin at the lowest level and may increase to higher levels, as appropriate to the situation (Section 18.II.3.2). The objective is to have caribou voluntarily move away from potentially hazardous situations without causing unnecessary stress or possible injury.

18.II.4.7 Raptors

Raptors are birds of prey and include falcons, eagles, hawks, and owls. Raptor species observed or expected to occur within the RSA include peregrine falcon (anatum subspecies), red-tailed hawk (*Buteo jamaicensis*), bald eagle (*Haliaeetus leucocephalus*), great gray owl (*Strix nebulosa*), and short-eared owl (*Asio flammeus*). Of these, the peregrine falcon and the short-eared owl are considered species at risk (Table 18.II.1-1). There were

14 raptor nests identified within the RSA, most of which were bald eagles. While often considered to be sensitive to disturbance, raptors do habituate to disturbance. For example, there have been several attempts by peregrine falcons, gyrfalcons, rough-legged hawks, and common ravens to nest within both active and inactive open pits at the EKATI and Diavik diamond mines, sometimes successfully raising chicks (DDMI 2007; BHPB 2007).

Monitoring is required to identify and mitigate hazards to nesting raptors within the NICO Project (i.e., anticipated mine site), and to confirm their continued presence in the RSA. Further, the monitoring may contribute to regional monitoring initiatives, such as the North American Peregrine Falcon Survey. Considering the small ZOI anticipated from the NICO Project (Section 15.4.7), and the low density of raptors documented in the RSA during baseline studies (Section 15.2), monitoring is not expected to be able to test impact predictions related to the magnitude and spatial extent of indirect habitat effects. Monitoring for indirect effects does not satisfy the monitoring principles outlined in Section 18.II.1.2. Nonetheless, annual monitoring of nest sites is proposed to contribute to regional monitoring initiatives.

The objectives of this component of the WEMP are:

- to mitigate hazards to raptors attempting to nest within the NICO Project site; and
- to contribute to regional raptor monitoring initiatives.

Methods

Nest site visits will be completed by helicopter using standard fly-by methods to identify occupying species and to count eggs and young. Surveys will not be carried out in the rain, and visits will be kept as short as possible to limit disturbance to the birds. Nest sites will be visited during late May or early June to determine occupancy, and during mid- to late July to determine nest success and productivity. Nests will be considered occupied if at least one adult bird is observed. Nests will be recorded as successful if at least one chick is observed in the nest. The presence of eggs and chicks will be noted, and the number of eggs and chicks will be recorded if possible. Raptor nest monitoring data may be made available to ENR for regional monitoring purposes, or to the North American Peregrine Falcon survey.

Further, environment staff will include surveys for raptor nesting activity within the NICO Project site, as part of the General Wildlife Monitoring (Section 18.II.4.2). Any reports or observations of raptor nesting activity on NICO Project structures or within the Open Pit will be documented and reported. In these cases, the follow-up action will be determined in consultation with ENR, and will consider any hazards to the nest. Ideally, the nest will be allowed to remain intact and NICO Project staff will be requested to avoid disturbing the nest.

Frequency and Duration

The surveys will be completed twice annually during construction through closure. The first survey will be in early June to document raptor nest occupancy, and the second in late July to record productivity. Surveys for raptor nesting activity within the NICO Project site will occur during April and May from construction through closure.

Thresholds

Considering the small ZOI anticipated from the NICO Project, and the low density of raptors, the proposed monitoring is not anticipated to detect NICO Project-related effects. No effects thresholds are proposed; however, should a raptor nest be identified within the NICO Project site, ENR will be contacted to determine the most suitable course of action.

18.II.4.8 Waterbirds

Waterbirds include ducks, geese, loons, and grebes (and the horned grebe, considered a species at risk, Table 18.II.1-1). As a result of the NICO Project, there will be effluent releases downstream and local changes to natural drainages. Some existing small ponds will be lost, and some new Water Management Ponds will be created. Considering the small ZOI anticipated from the NICO Project (Section 15.4.6), and the low density of waterbirds documented in the RSA during baseline studies (Section 15.2), monitoring is not anticipated to be able to test impact predictions related to the magnitude and spatial extent of indirect habitat effects. Monitoring of indirect effects to waterbirds is therefore not proposed, as it would not satisfy the principles of effective monitoring (Section 18.II.1.2).

In the DAR, there were no risks identified to waterbirds from the Co-Disposal Facility or Water Management Ponds; however, ice cover on Water Management Ponds may disappear sooner relative to other waterbodies in the RSA, and waterbirds may concentrate on these ponds, which can expose the animals to increased mortality from interaction with site infrastructure.

The objective of this component of the WEMP is to identify potential risks to waterbirds from the Water Management Ponds within the NICO Project site.

Methods

The 5 Seepage Collection Ponds, and Surge Pond will be surveyed from the ground for the presence of waterbirds as part of General Wildlife Monitoring (Section 18.II.4.2).

Frequency and Duration

Water Management Ponds will be surveyed for waterbirds twice per week during the open-water season (likely May to November or until they have flown south to wintering areas) from construction through closure.

Thresholds

Environment Canada will be informed if there is regular use of Water Management Ponds by waterbirds, or birds are observed to be unhealthy or found dead.

18.II.5 REPORTING AND ADAPTIVE MANAGEMENT

Adaptive management is a structured process of decision making in the face of uncertainty. The objective of adaptive management is to reduce uncertainty through monitoring, or 'learning by doing'. In the case of wildlife monitoring, the 'doing' is the environmental monitoring, and the 'learning' is continual improvements to environmental management and the environmental monitoring plan. This requires the monitoring program to be adaptive and flexible. The monitoring program must be flexible enough to incorporate comments, suggestions, and information based both on science and local traditional and ecological knowledge. If changes to the receiving environment are determined to be greater than the predictions in the DAR, then the most suitable course of action will be determined by Fortune, in consultation with communities and regulatory agencies.

- Adaptive management through the monitoring program may lead to several outcomes if an impact is detected. The monitoring program presented above will evolve over time as monitoring results are analyzed and compared to pre-NICO Project data.
- If negative effects are detected, the options available to Fortune include the following:

- increase monitoring effort;
- implement new monitoring programs to further understand the effects; or
- implement additional mitigation to reduce the effects.

Fortune will actively seek input from regulatory authorities and communities through annual reports. These reports will be an opportunity for Fortune to present the findings of the monitoring program, and for communities and regulatory agencies to provide feedback and direction. The annual reports will contain a summary of methods, current data collected, and a record of wildlife observations, interactions, deterrent actions, and incidents (including mortalities). The report will also suggest changes for future years. Due to the large degree of natural variation inherent in ecosystems, it is often difficult to detect indirect effects until several years of data have been collected. Therefore, a comprehensive analysis and discussion of all data from the monitoring program will be completed every 3 years. The comprehensive report will provide a full analysis of all previous and current data collected, an assessment of the environmental impacts detected, an assessment of the effectiveness of mitigation, and recommendations for future monitoring.

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