

Appendix I Tier 1 Wildlife Management and Monitoring Plan

Dhu-1 Quarry Development Project – Project Description Report

Appendix I Tier 1 Wildlife Management and Monitoring Plan

September 15, 2021

DHU-1 QUARRY DEVELOPMENT PROJECT **DRAFT** TIER 1 WILDLIFE MANAGEMENT AND MONITORING PLAN

1. INTRODUCTION

PURPOSE

The purpose of this Wildlife Management and Monitoring Plan (WMMP) for the Dhu-1 Quarry Development Project (the "Project") is to identify potential impacts to wildlife and wildlife habitat from the Project and to outline how potential impacts to wildlife and wildlife habitat will be mitigated and monitored.

REVISIONS

This WMMP will be revised finalized prior to the commencement of the Project as required by the Government of the Northwest Territories Department of Environment and Natural Resources (GNWT-ENR) and conditions of authorizations issued.

Revision	Date	Summary of Revisions
Rev0		Issued for Construction

RESPONSIBILITIES

This WMMP applies to **Name of Contractor** and its subcontractors for all aspects of the Project. The Project Owner is **Name of Licensee**.

Primary Contacts

Name	Role	Phone / Email
	Project Manager	
	Alternate Project Manager	
	Contractor Project Manager	
	Site Foreman	
	Media	

TRAINING

All Project personnel will receive training on the purpose and procedures provided in this WMMP.

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2. PROJECT DESCRIPTION

OVERVIEW

The GNWT-INF is planning to develop a new quarry (Dhu-1) located approximately 16 km northwest of the Hamlet of Tulita and 3.4 km northeast of the Mackenzie Valley Winter Road (MVWR) at km 966.6. The Project includes:

- Construction of an approximately 4 kilometre (km) winter access road from km 966.6 of the MVWR to Dhu-1 quarry
- Development and operation of the Dhu-1 quarry to produce up to 600,000 m³ of crushed rock (“material”)
- Stockpiling of material
- Construction and operation of temporary facilities to service the Project such as laydown areas, construction camp, explosive storage/mixing facility, fuel storage, equipment maintenance and storage areas, water supply, power generation and waste management
- Stabilization of quarry faces and stockpiles and removal of camp and equipment

The purpose of the Project is to develop a supply of aggregate material future GNWT-INF projects, such as the proposed project to construct a permanent bridge across the Great Bear River at Tulita, NT. The aggregate from Dhu-1 is anticipated to be used as material for construction workspaces, road embankment, rip rap and for concrete production. The Project is anticipated to provide economic benefit through employment and contracting opportunities in Tulita. The Dhu-1 source will remain available as a source of aggregate for future GNWT-INF projects.

The total area of development is approximately 29 ha (the “Site”). The quarry operations will be conducted within a smaller area of approximately 13.0 ha (the “Quarry Area”).

Figure 2.1 shows the location of the Project physical works in relation to Tulita, and Tulita’s location within the Northwest Territories.

PROJECT ACTIVITIES

The winter road, Quarry Area and areas to be used for temporary facilities will require clearing and grubbing. Existing cutlines will be used for the creation of the winter access road where possible. All clearing will take place between September 15 and March 31, outside of migratory bird nesting season. The total area to be cleared is approximately 23 hectares. The winter road will be cleared to 20 metres (m) width. The access road will not be reclaimed at the end of the Project so that it is available for future use.

A temporary camp is anticipated to be required to facilitate quarry development and operation. The camp is anticipated to have a capacity for up to 10 on-site workers and associated camp staff in portable trailers. Potable water will be obtained from the municipal supply of the Hamlet of Tulita. Sewage may be treated and disposed of on-site, placed in a pit privy or stored in a holding tank for future removal from the Site in accordance with GNWT guidelines (GNWT 2015a). Greywater may be stored in an excavated sump or stored in a tank for future removal from the Site in accordance with GNWT guidance (GNWT 2015a).

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A drill and blast method will be used to extract rock material. The quarry will be developed in general accordance with the *Northern Land Use Guidelines for Pits and Quarries* (GNWT 2015c) and the Quarry Operations Plan for the Project. Quarry development and operations will occur when the MVWR is open to traffic from Tulita (approximately January 1 – March 31). Aggregate material will be crushed to various sizes and stockpiled within the Quarry Area until needed for bridge construction. Throughout development, the pit floor will be sloped away from the headwall, maintaining drainage away from the quarry and into the PDA, to prevent development of a pit lake.

After the quarrying and/or aggregate production activities are completed, the temporary construction camp will be removed and all debris will be removed from the site. If approved, any sumps will be filled in, compacted and graded to match the topography of the immediate area. The entire temporary camp area will be graded to loosen any compacted soils if necessary.

The quarry area is expected to continue to be a source of granular materials for future excavation quantities beyond the quantities of this permit. This quarry development area is planned for future use and will not be closed at the end of the quarrying operations.

Following completion of the excavation, processing and stockpiling activities, the quarry site will be cleared of all equipment and debris and the area will be:

- Graded;
- Cut faces will be graded to a slope no greater than 2 m horizontal to 1 m vertical to stabilize the cut areas and to enable future work to take place at this site. No debris or organic materials will be placed over the quarry face to enable future excavation to take place at this site without contaminating valuable granular materials. This material will be considered as stockpiled material and will be available for further use by the GNWT-INF;
- A rock berm will be placed on top of any exposed cut face exceeding three (3) metres in height and in areas where the slope of the blasted rock at the face is steeper than one (1) metre horizontal to one (1) metre vertical.
- Stockpiled overburden and other clearing debris removed during the site preparation/stripping activities will be left in stockpile for future reclamation activities.
- Over-sized rock will be placed into stockpile for future use as rip rap or erosion control materials and will be reported as quarried.
- Stockpile faces will be graded to a slope no greater than 1 m horizontal to 1 m vertical to stabilize the stockpiled material and to provide a safe work area.

No revegetation or other activities will be undertaken at the end of the excavation and removal of pit run gravel and sand under quarry permit.

Closed or depleted areas of the Quarry will be bermed off with a rock berm. Any rock left remaining at the face of the cut will be graded to the appropriate slope of 1 metre horizontal to 1 metre vertical to stabilize loose rock and leave the area in a safe condition.

No reclamation of the winter road will be completed to allow for potential future access to the Site.

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PROJECT SCHEDULE

The anticipated schedule of activities and phases is summarized in Table 2.1. The Project is only accessible by the MVWR and winter access road to be constructed; therefore, will only be constructed, operated and reclaimed during winter. The Project will operate annually over up to five winter seasons 2022-2026. The hours of operation will be during daytime (12 h) only.

Table 2.1 Summary of Project Activities and Timing

Activity	Timing
Construction	
Site Clearing and Staging	January, 2022
Camp Setup	January, 2022
Winter Access Road Construction	January, 2022 to 2026
Operation	
Quarry Development/Material Processing	January 1 – March 31, 2022 to 2026
Camp Operations	January 1 – March 31, 2022 to 2026
Winter Access Road Use	January 1 – March 31, 2022 to 2026
Closure and Reclamation	
Camp Reclamation	March, 2026
Closure of Active Quarry Face	March, 2026
Demobilization	March, 2026
Closure of Quarry Area (material left on Site)	2026 to 2036

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3. WILDLIFE SPECIES AND/OR HABITAT FEATURES OF CONCERN

Species at risk (SAR) are species listed as special concern, threatened, or endangered under the *Species at Risk (NWT) Act* (GNWT 2020) or under Schedule 1 of the federal SARA (GC 2021). Species of conservation concern (SOCC) are species assessed as special concern, threatened, or endangered by the NWT Species at Risk Committee (SARC; GNWT 2020) or COSEWIC (GC 2021).

The regional study area (RSA; a 10 km buffer of the Project) is potentially within the range of 20 wildlife SAR/SOCC, including 5 mammals, 11 birds, and 4 invertebrates (GC 2021; GNWT 2020; Table 3.1).

Table 3.1 Wildlife Species at Risk and Species of Conservation Concern with Potential to Occur in the RSA

Species		Status in NWT ¹		Status in Canada ²	
Common Name	Scientific Name	SARC Assessment	SAR (NWT) Act	COSEWIC	SARA
Mammals					
Little brown myotis	<i>Myotis lucifugus</i>	Special Concern	Special Concern	Endangered	Endangered
Grizzly bear	<i>Ursus arctos</i>	Special Concern	Not Listed	Special Concern	Special Concern
Wolverine	<i>Gulo gulo</i>	Not at Risk	Not Listed	Special Concern	Special Concern
Boreal caribou	<i>Rangifer tarandus caribou</i>	Threatened	Threatened	Threatened	Threatened
Barren-ground caribou	<i>Rangifer tarandus groenlandicus</i>	Threatened	Threatened	Threatened	Not Listed (under consideration)
Birds					
Peregrine falcon	<i>Falco peregrinus anatum/tundrius</i>	Not Assessed	No Status	Not at Risk	Special Concern
Lesser yellowlegs*	<i>Tringa flavipes</i>	Not Applicable	Not Applicable	Threatened	Not Listed
Red-necked phalarope	<i>Phalaropus lobatus</i>	Not Applicable	Not Applicable	Special Concern	Special Concern
Short-eared owl	<i>Asio flammeus</i>	Not Assessed	No Status	Threatened	Special Concern
Common nighthawk	<i>Chordeiles minor</i>	Not Applicable	Not Applicable	Special Concern	Threatened
Olive-sided flycatcher	<i>Contopus cooperi</i>	Not Applicable	Not Applicable	Special Concern	Threatened
Bank swallow	<i>Riparia riparia</i>	Not Applicable	Not Applicable	Threatened	Threatened
Barn swallow	<i>Hirundo rustica</i>	Not Applicable	Not Applicable	Special Concern	Threatened

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Table 3.1 Wildlife Species at Risk and Species of Conservation Concern with Potential to Occur in the RSA

Species		Status in NWT ¹		Status in Canada ²	
Common Name	Scientific Name	SARC Assessment	SAR (NWT) Act	COSEWIC	SARA
Harris's sparrow*	<i>Zonotrichia querula</i>	Not Applicable	Not Applicable	Special Concern	Not Listed
Rusty blackbird	<i>Euphagus carolinus</i>	Not Assessed	No Status	Special Concern	Special Concern
Horned grebe	<i>Podiceps auritus</i>	Not Applicable	Not Applicable	Special Concern	Special Concern
Invertebrates					
Gypsy cuckoo bumble bee	<i>Bombus bohemicus</i>	Data deficient	Not Listed	Endangered	Endangered
Suckley's cuckoo bumble bee*	<i>Bombus suckleyi</i>	Not Assessed	Not Listed	Threatened	Not Listed
Yellow-banded bumble bee	<i>Bombus terricola</i>	Not at Risk	Not Listed	Special Concern	Special Concern
Transverse lady beetle	<i>Coccinella transversoguttata</i>	Not Assessed	Not Listed	Special Concern	Special Concern

NOTES:

¹ Species at risk in NT assessed by SARC and listed under the territorial *Species at Risk (NWT) Act* (GNWT 2020)

² Species at risk in Canada assessed by COSEWIC and listed under Schedule 1 the federal *Species at Risk Act* (GC 2021)

* Species of conservation concern

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4. PROJECT EFFECTS AND MITIGATION MEASURES

The Project has the potential to interact with wildlife and wildlife habitat and the potential effects, pathways, and mitigations proposed to reduce or eliminate the effects on Wildlife are identified in Table 4.1.

Table 4.1 Potential Effects and Mitigations for Wildlife

Effect Name	Effect Pathways	Mitigation Measures
Change in wildlife habitat	<ul style="list-style-type: none"> • Habitat loss from vegetation clearing and sensory disturbance from Project activities (e.g., noise and human presence) has the potential to displace wildlife from their preferred habitats • Vegetation clearing, site excavation and quarry development have the potential to disturb or destroy migratory bird nests 	<ul style="list-style-type: none"> • The Project will limit clearing to areas required for construction and safe operations. • The Project will use previously disturbed areas for project infrastructure and workspaces to the extent practical. • Cleared brush and unsalvageable trees will be windrowed, and mulched where possible. • A qualified person will survey for protected wildlife features (e.g., nests, dens) within 1.5 km of the Project Area prior to construction start and annual operation start. The location of any protected feature observed will be recorded and the appropriate setback and timing restrictions will be applied in discussion with GNWT Environment and Natural Resources. • Vegetation clearing will be undertaken between September 1 and April 15. A qualified person will conduct a nest search in the Project Area if any vegetation clearing occurs outside of these dates. • Wildlife monitors will assess for the presence of nesting birds and wildlife in or near the Project area during Project activities. • If an active nest is found, appropriate setback and timing restrictions will be applied in discussion with GNWT Environment and Natural Resources. • The Project will follow the recommended activity restriction guidelines for sensitive wildlife species summarized in Appendix A, Table A.1 which are generally more conservative than recommendations in the <i>Sahtu Land Use Plan</i> (SLUPB 2013). • Closure and reclamation will promote re-establishment of vegetation ground cover.

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Table 4.1 Potential Effects and Mitigations for Wildlife

Effect Name	Effect Pathways	Mitigation Measures
Change in wildlife mortality risk	<ul style="list-style-type: none"> • Presence of a workforce has the potential to increase wildlife mortality risk through habituation or hunting. • Use of the winter access road and movement of vehicles and equipment have the potential to increase wildlife collisions. • Winter construction and quarry development have the potential to physically disturb or destroy occupied bear dens 	<ul style="list-style-type: none"> • A qualified person will survey for sensitive wildlife features (e.g., nests, dens) within 1.5 km of the Project Area prior to construction start and annual operation start. The location of any protected feature observed will be recorded and the appropriate setback and timing restrictions will be applied in discussion with GNWT Environment and Natural Resources as needed. • An electric fence will be set up around temporary camps if deemed necessary to deter wildlife. • Personnel will not feed, harass, or hunt wildlife while working on the Project. • Personnel will undergo a wildlife awareness program which will include prevention measure for wildlife mortality and reporting procedures for wildlife-related incidents and protocols to follow when a nest, den, or wildlife species of management concern is observed. • Construction and quarry development activities will take place outside of the migratory bird nesting season. • Food waste will be stored and disposed of in a manner to avoid attracting wildlife. • Equipment, waste and contaminated soils will be removed once construction is completed. • Spill contingency measures will be implemented in accordance with the Spill Contingency Plan. The Spill Contingency Plan includes procedures to prevent and respond to spills

CHANGE IN WILDLIFE HABITAT

A change in wildlife habitat can occur through direct effects (e.g., habitat loss) or indirect effects (e.g., sensory disturbance from increase noise and lights) associated with construction and operation. These changes may result in decreased habitat effectiveness and suitability and cause wildlife displacement. However, construction activities (e.g., vegetation clearing) and operation activities will be undertaken in winter from January 1 to March 31 which will eliminate an indirect pathway of effects on many species (e.g., migratory birds).

Vegetation clearing for the winter access road, quarry area, and staging/camp area will result in a direct loss of up to 23 ha of upland forested habitats and will reduce habitat availability for terrestrial species such as black bear and migratory birds. The quarry is situated on an elevated rock formation that is likely to provide limited habitat for SAR such as boreal caribou and grizzly bear. Quarry development activities may also have the potential to disturb or destroy the nests of bank nesting migratory birds between breeding periods, but an annual nest survey will reduce the potential for nest destruction.

Indirect effects resulting from sensory disturbance associated vegetation clearing will be mitigated by timing all clearing and operation activities to occur outside of the primary nesting period for migratory birds (May 15 to August 10; ECCO 2018). Additionally, quarry operation activities are scheduled to occur

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from January to March which will reduce disturbance to species such as boreal caribou or moose during the sensitive late winter and calving periods. Indirect habitat loss through sensory disturbances will be further mitigated through the application of setback distances as appropriate depending on the habitat to be protected (Appendix A, Table A.1). Prior to the start of construction and each operation year, a qualified biologist will conduct a wildlife survey within the LSA (i.e., 1.5 km buffer of the Project footprint). The co-ordinates of any important wildlife feature (e.g., den, raptor nest, mineral lick) will be recorded and species-specific mitigation applied, in discussion with GNWT Environment and Natural Resources (e.g., 1500 m setback from an active grizzly den from October 1 and May 30).

The LSA may support winter foraging habitat for boreal caribou. Temporary habitat loss and/or changes in movement patterns for boreal caribou due to sensory disturbances associated with construction and operation will be reduced through Project scheduling and the use of recommended setback distances, including shutting down Project activities if boreal caribou are observed within 500 m of the Project Area (GNWT 2015).

Wildlife species, such as migratory birds, may use the LSA during the breeding season and will not be subject to sensory disturbance, as Project activities are scheduled for the winter only. Additionally, species such as common nighthawk that breed on disturbed sites may nest on the exposed rock in the quarry

With mitigation, potential changes to wildlife habitat caused by the Project will occur intermittently during winter construction and operation over the medium-term within the LSA, with no changes anticipated in the RSA, and the overall magnitude of the effect is considered low.

CHANGE IN WILDLIFE MORTALITY RISK

A change in wildlife mortality risk may occur due to increased human activity through collision with Project traffic, human-wildlife conflict, and increased access for hunters and predators. Sensory disturbances associated with construction and operation may increase wildlife mortality risk by causing wildlife to abandon dens or young but scheduling will reduce the pathway for disturbance to migratory birds.

Construction activities, such as site clearing, will be undertaken in winter from January 1 to March 31, which is outside of the migratory bird nesting window for this region. Prior to the start of construction and each operation year, a qualified person will conduct a wildlife survey within the LSA. The co-ordinates of any important wildlife feature (e.g., den, raptor nest, mineral lick) will be recorded and species-specific mitigation applied, in discussion with GNWT Environment and Natural Resources if necessary.

Mortality risk will be mitigated through the application of species-specific setback and timing restrictions in Appendix A, Table A.1. If Project activities occur outside of the proposed winter operation schedule. Vehicles and equipment will be limited to 50 km/h within the LSA to reduce the risk of wildlife collisions.

Wildlife fencing may be needed around the camp area to prevent wildlife from accessing the camp area, and to reduce the potential for wildlife-human conflicts. Garbage, especially food waste, will be stored in a manner that prevents attracting wildlife and removed from site. Personnel will not feed, harass, or hunt wildlife while working on the Project. Personnel will undergo a wildlife awareness program which will include prevention measure for wildlife mortality and reporting procedures for wildlife-related incidents and protocols to follow when a nest, den, or wildlife species of management concern is observed.

With mitigation, potential changes to wildlife mortality risk caused by the Project will occur intermittently during winter construction and operation over the medium-term within the LSA, and the overall magnitude of the effect is considered low.

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5. MITIGATION PROGRAM

The mitigation program incorporates the mitigation measures outlined in Table 4.1 and includes adaptive management that will be used to modify the mitigation program, as necessary, to meet the objectives of the WMMP. Adaptive management is defined as the “planned and systematic process for continuously improving environmental management practices by learning about their outcomes” (CEAA 2015). For example, multiple wildlife mortality events may warrant consideration of adaptive management to modify existing mitigation measures to further reduce risks to wildlife (e.g., reduced traffic speeds in key areas).

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6. MITIGATION MONITORING AND REPORTING

Spatial and temporal avoidance of sensitive wildlife features and habitats is the primary mitigation measure employed to reduce Project-effects on wildlife. As such, surveys prior to the start of construction (i.e., vegetation clearing) and start of annual operation will be undertaken to reduce effects to wildlife and habitat and mortality risk and will include a survey for sensitive wildlife features (e.g., nests, dens) within the LSA (i.e., within 1.5 km of Project footprint) prior to construction start and annual operation. This will include annual inspection of the quarry for species such as bank swallow which may colonize exposed cliffs or steep-banked stockpiles during the breeding season. The location of any sensitive feature observed will be recorded and the appropriate setback and timing restrictions will be applied and GNWT ENR and/or ECCC will be engaged, as necessary.

Additional on-site mitigation measures (e.g., fencing, waste management) will be regularly inspected by the contractor and all staff will receive training relating to the WMMP and using a wildlife observation reporting form. A local Wildlife Monitor will record daily wildlife observations and all wildlife observations will be reported to INF at the end of each season. The effectiveness of mitigation measures will be continuously evaluated and if notable Project interactions with wildlife (e.g., problem wildlife) or mortality events occur, adaptive management will be used to modify existing mitigation measures to reduce interactions.

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REFERENCES

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- ECCC (Environment and Climate Change Canada). 2018. General nesting periods of migratory birds. Available at: <https://www.canada.ca/en/environment-climate-change/services/avoiding-harm-migratory-birds/general-nesting-periods/nesting-periods.html>. Accessed July 2021.
- GC (Government of Canada). 2021. Species at risk public registry: Species search. Available at: <https://species-registry.canada.ca/index-en.html#/species?sortBy=commonNameSort&sortDirection=asc&pageSize=10>. Accessed July 2021.
- GNWT (Government of the Northwest Territories). 2015. Northern land use guidelines: Northwest Territories seismic operations. Yellowknife, NT. 48 pp.
- SARC (Species at Risk Committee). 2017. Species Status Report for Porcupine Caribou and Barren-ground Caribou (Tuktoyaktuk Peninsula, Cape Bathurst, Bluenose-West, Bluenose-East, Bathurst, Beverly, Ahlak, and Qamanirjuaq herds) (*Rangifer tarandus groenlandicus*) in the Northwest Territories. Species at Risk Committee, Yellowknife, NT.
- SLUPB (Sahtu Land Use Planning Board). 2013. Sahtu Land Use Plan. Fort Good Hope, NT.

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APPENDIX A TABLES

Table A.1 Recommended Activity Restriction Guidelines for Sensitive Wildlife Species¹

Wildlife Species	Feature or Habitat	Specific Conditions	Sensitive Period²	Recommended Minimum Setback Distance (m)
Ungulates (general)	Mineral/salt lick	General development activities	April 1 – July 15	250
Grizzly bear and black bear	Den	If activity is blasting	Oct 1 – May 30	1500
		General development activities	Oct 1 – May 30	800
	Berry habitat	General development activities when bears are observed foraging	Jul 15 – Sep 15	300
Boreal caribou	Species presence	General development activities	Year round	500
Muskox	Species presence	Shut down distance if muskox are in the area	Apr 1 – Jun 15	500
Cougar	Den	General development activities		750
Wolverine	Den	General development activities	Oct 15 – Jul 15	2000
Lynx	Den	General development activities	Apr 1 – Jul 15	250
Fox	Den	General development activities	May 1 – Jul 15	150
Wolf	Den	General development activities	May 1 – Sep 15	800
Bald eagle	Nest	General development activities	Apr 15 – Aug 31	500
Golden eagle	Nest	General development activities	Apr 15 – Aug 31	800
Northern goshawk and sharp-shinned hawk	Nest	General development activities	Apr 1 – Aug 31	500
Osprey	Nest	General development activities	Apr 1 – Aug 31	1000
Red-tailed hawk	Nest	General development activities	Apr 15 – Aug 31	800
Raptors (general)	Nest	General development activities	Mar 1 – Sep 1	1500
			Sep 2 – Feb 28	500
Common nighthawk	Nest	General development activities	May 15 – Aug 15	200
Olive-sided flycatcher	Nest	General development activities	May 1 – Jul 31	300
Rusty blackbird	Nest	General development activities	May 1 – Jul 31	300
Trumpeter swan	Breeding waterbody	General development activities	Apr 1 – Sep 30	800

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Table A.1 Recommended Activity Restriction Guidelines for Sensitive Wildlife Species¹

Wildlife Species	Feature or Habitat	Specific Conditions	Sensitive Period²	Recommended Minimum Setback Distance (m)
Waterfowl (general)	Staging area	General development activities when large concentrations of birds are present	Spring/Fall	3000
	Nest sites, staging areas, and concentrations	General development activities	Year round	250
		Pedestrians/ATVs	May 1 – Jul 31	30
All other wildlife	Breeding and birthing areas	Varies with region and species; contact GNWT or ECCC office	Breeding and birthing seasons	250

NOTES:

- ¹ Modified from the *Northern Land Use Guidelines: Northwest Territories Seismic Operations* (GNWT 2015).
- ² Sensitive periods are a general guide and specific timing may vary. Year-round avoidance may not always be feasible, and exceptions will be discussed with GNWT Environment and Natural Resources to develop appropriate mitigation.