

ATTACHMENT 2: ENVIRONMENTAL PROTECTION PLAN (EPP) - UPDATED



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**Sahtu Land and Water Board
Environmental Protection Plan**
Suncor Tweed Lake M-47, Tweed Lake A-67
& Bele O-35
Abandonment and Reclamation Program
Colville Lake, Sahtu Region, Northwest Territories

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February 2022	1
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REVISIONS TABLE

This Environmental Protection Plan has been updated as part of an Amendment to Land Use Permit (LUP) S22A-001. The table below indicates what sections have been changed. Most changes have been indicated in *italics* in the body of the document.

Section	Changes
Cover and Footers	Updated project number, date, and added version table.
Executive Summary	Updated to include heli-portable abandonment operations and rationale.
5 Program Description	Abandonment and reclamation activities changed from winter 2023/24 to spring/summer 2025. Reference to winter lease and access construction has been removed. Field visits in summers has been modified from 2024-2026 to 2025-2027.
5.1 Anticipated Program Schedule	Table 5-1 updated removing the Lease and Access Construction, including the new time period for abandonment and reclamation activities, and extending the timeline to 2026/27
5.2.2 Abandonment	Replaced with 5.2.2 Downhole Abandonment (Spring/Summer 2025).
5.2.3 Reclamation	Replaced with 5.2.3 Surface Abandonment and Reclamation (Spring/Summer 2025).
5.4 Site Access/Transportation	Downhole abandonment changed from winter to spring/summer. Winter access description has been kept should it be required in future years.
5.5 Crew Accommodation	Updated camp location for abandonment activities.
5.6 Program Equipment	Reference to an UPDATED Anticipated Equipment List in Appendix 4.
5.7 Water Requirements	Water requirements for spring/summer abandonment work listed separately. Winter access water use has been kept should it be required in future years.
5.8 Waste Management	The Waste Management Plan (WMP) has been updated to reflect planned spring/summer abandonment activities.
5.9 Fuel Storage and Handling	Updated to reflect spring/summer abandonment activities. Winter access fuel use has been kept should it be required in future years.
6.1 Community Engagement	Changed to reference an UPDATED Engagement Log in Appendix 1-B
6.4 Employment Opportunities	Updated to reflect the spring/summer abandonment program.
7.5 Sahtu Land Use Plan – Conformity Requirements	Table 7-1 updated CR#2 to reflect ongoing engagement since 2021.
8.2.2.1 Mitigation Measures (Noise)	Table 8-3 updated to include spring/summer abandonment activities.
8.3.1.1 Mitigation Measures (Soil)	Table 8-4 has been updated to include spring/summer abandonment activities.
8.3.3 Ice Conditions	Added “should winter access be required in future years”
8.3.3.1 Mitigation Measures (Permafrost)	Table 8-5 updated to include spring/summer abandonment activities.
8.3.4.4 Vegetation at Risk	Updated throughout to reflect database updates.
8.3.4.5 GNWT Mitigation Measures	Table 8-6 updated to include spring/summer abandonment activities.
8.3.5 Wildlife	Removed “during the summer/winter” for helicopter activity, since there is some helicopter activity potentially in any given season.
8.3.5.2 Species at Risk	Table 8-7 updated to include an additional column indicating what has changed since Version 1 of this document and Note 3 added.
8.3.5.3 Valued Components	Table 8-8 updated throughout based on changes since Version 1 of this document. Added text for wildlife sweeps for spring/summer work.
8.3.5.5 Birds	Identified potential overlap between spring/summer abandonment activities and bird migration, mating, nesting, and brood-rearing. Spring/summer abandonment activities will be limited to existing worksites updated throughout this section.

Section	Changes
8.3.5.8 Mitigation Measures (Wildlife)	Table 8-9 changed Program Activities changed from “not anticipated” to “may occur” during spring and fall migration. Identified an additional Potential Effect and Proposed Environmental Protection and Mitigation Measures for “Disturbance during critical wildlife periods (migration, nesting, denning, breeding).”
8.4.1.1 Mitigation Measures (Surface and Groundwater)	Table 8-12 water flow/level changes updated to “if winter access is required.”
9.1.1 Program Activities	Updated to reflect planned spring/summer abandonment timing.
9.1.3 Temporal Boundaries of the CEA	Updated timing to “all seasons” and dates out to 2027.
9.3.1 Cumulative Effects on Permafrost	Updated winter road construction and use with “should it be required.”
GNWT (2020) Species at Risk in the NWT 2020 (Guide)	Updated throughout to GNWT (2024)
11 References	Updated throughout document where cited reports or species at risk references had been updated.

EXECUTIVE SUMMARY

EnviroSearch Ltd. (EnviroSearch) was commissioned by Suncor Energy Inc. (Suncor), to prepare and submit an Environmental Protection Plan (EPP) as part of a new Land Use Permit (LUP) and Water Licence (WL) application. The Program area consists of three leases, access road, and a laydown area. The Tweed Lake M-47 and Tweed Lake A-67 wellsites are located 16km southeast of Colville lake in the Sahtu Region of the Northwest Territories and the third lease, Bele O-35 is approximately 63km southeast of A-67 in the Sahtu Region of the Northwest Territories (**See Appendix 1A for wellsite photos**). There will also be winter-only construction required for the 85km access road linking the three wellsites to Colville Lake.

In accordance with requirements of the Sahtu Land and Water Board (SLWB), EnviroSearch was retained by Suncor to examine the effects that the Abandonment Program may have on the environment and the social, economic, and cultural well-being of the residents and community of Colville Lake, NT.

Program components will take place during the summer or winter depending on the activity, between years 2022 - 2026. Initiating the on-site activities will depend on wellsite conditions, availability of equipment, receipt of the LUP and logistical constraints. Suncor anticipates the following wellsite abandonment and reclamation activities:

- Field Scouting using a helicopter for water sources and other environmental data;
- Surface Casing Vent Flow (SCVF), Gas Migration, and Production Casing Pressure Testing;
- Construction of winter access road;
- Transport of equipment to the sites;
- Remediation of impacts identified, as necessary;
- Conducting downhole abandonment and cutting and capping of the wellheads;
- Creation of water diversion and erosion control features, as required;
- Selective seeding and/or tree planting of disturbed areas; (if required and/or approved); and
- Demobilization of equipment.

In late 2024 EnviroSearch Ltd. (EnviroSearch) was commissioned by Suncor Energy Inc. (Suncor), to prepare and submit relevant updates to the original Environmental Protection Plan (EPP) as part of an Amendment to Land Use Permit (LUP) S22A-001 and Water Licence (WL) S22L1-001. The Amendment is being submitted for heli-portable abandonment operations.

Heli-portable abandonment operations provide considerable environmental benefits including:

- 1. Reduced footprint (not requiring 85km of winter-only access, camps, and storage areas);*
- 2. Significant reduction in water use (abandonment and camp only, no access or lease construction);*
- 3. Significant reduction in fuel use/storage requirements;*
- 4. Reduced potential for wildlife encounters/mortality over months of winter road use; and*
- 5. Reduced length of time required for abandonment operations (30 days vs. 3 months).*

Suncor understands that operating in this different time window may require modifications to operations including

- 1. Conducting sweeps for dens and nests to maintain wildlife setback distances;*
- 2. Increased fire hazard awareness/diligence; and*
- 3. Cleaning equipment to prevent introduction of non-native vegetation.*

EnviroSearch has examined the potential effects that this Program may have on the environment and is of the opinion that the Program will result in the restoration of the M-47, A-67 & O-35 wellsites and associated lands to more natural conditions. Net positive impact will be realized in the enhancement of the ecological conditions and functions of the sites. We recommend that the reclamation work be inspected the summer following completion and, if needed, annually throughout the term of the permit, to ensure any areas of concern have recovered.

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EPP APPENDICES

Appendix 1-A	Site Photographs
Appendix 1-B	Stakeholder Engagement Plan and Record
Appendix 1-C	Traditional Land Use Map

Abbreviations and Acronyms

AER..... Alberta Energy Regulator
 CALM..... Circumpolar Active-Layer Monitoring
 CEA..... Cumulative Effects Assessment
 COSEWIC Committee on the Status of Endangered Wildlife in Canada
 DFO..... Department of Fisheries and Oceans Canada
 EC..... Environment Canada
 ENR..... Environment and Natural Resources
 EPP..... Environmental Protection Plan
 ERCB..... Energy Resources Conservation Board
 ERP..... Emergency Response Plan
 GIS..... Geographic Information System
 GNWT..... Government of Northwest Territories
 IBA..... Important Bird Area
 IWA..... Important Wildlife Area
 LUP..... Land Use Permit
 MBCA..... Migratory Birds Convention Act
 MVEIRB ... Mackenzie Valley Environmental Impact Review Board

MVLWB Mackenzie Valley Land and Water Board
 MVRMA Mackenzie Valley Resource Management Act
 NT or NWT Northwest Territories
 NT PAS..... Northwest Territories Protected Areas Strategy
 PWNHC Prince of Wales Northern Heritage Centre
 RSA Regional Study Area
 SARA Species at Risk Act
 SARC..... Species at Risk Committee
 SCP Spill Contingency Plan
 SLUP Sahtu Land Use Plan
 SLUPB Sahtu Land Use Planning Board
 SLWB Sahtu Land and Water Board
 Suncor..... Suncor Energy Inc.
 SCVF..... Surface Casing Vent Flow
 TEK..... Traditional Environmental Knowledge
 VC..... Valued Component
 WMP Waste Management Plan

Units of Measurement

cm centimetre
 dBA decibel
 ha hectare
 hr hour
 kg kilogram
 km kilometre
 km/h kilometres per hour
 km² square kilometres

L litre
 Le_q equivalent continuous noise level
 m metre
 m³ cubic metre
 mASL metres above sea level
 mm millimetre
 mm/yr millimetres per year
 °C degrees Celsius

1 INTRODUCTION

EnviroSearch Ltd. (EnviroSearch) was commissioned by Suncor Energy Inc. (Suncor) to prepare and submit an Environmental Protection Plan (EPP) as part of a new Land Use Permit (LUP) and Water Licence (WL) application for an abandonment and reclamation program. The Program area consists of three leases, M-47, A-67 and Bele O-35, an 85km winter-only access road, and associated sites (the Program). M-47 and A-67 are located 16km southeast of the community Colville Lake, in the Sahtu Region of the Northwest Territories (NT). Bele O-35 is located approximately 63km southwest of the A-67 wellsite in the Sahtu Region of the Northwest Territories.

Program activities are planned for the summer and winter months depending on the tasks being undertaken between 2022 - 2026. Abandonment and reclamation activities include helicopter scouting for water sources and access road availability, pressure testing of production casing, Surface Casing Vent Flow (SCVF) testing, Gas Migration testing, winter access and lease construction for minimal disturbance, downhole and surface abandonment with concurrent reclamation activities, inspection of reclamation work the summer following completion to ensure appropriate ecological function and growth, and any subsequent visits that may be required to monitor the leases.

In accordance with requirements of the Sahtu Land and Water Board (SLWB), EnviroSearch was retained by Suncor to examine the effects that the Abandonment and Reclamation Program may have on the environment and the social, economic, and cultural well-being of the residents and community of Colville Lake, NT.

2 BACKGROUND

2.1 Tweed Lake M-47

2.1.1 M-47 Regulatory History

Drilling of the M-47 well began on January 11, 1985 under Petro-Canada's ownership. In 2009 Suncor purchased Petro-Canada and ownership of the well was subsequently transferred to Suncor. Petro-Canada applied for a Water Licence (WL) in 2003 for water use and waste disposal in oil and gas exploration. The WL (S03L1-020) was granted on February 19, 2004 and expired February 18, 2009. Suncor applied for a Land Use Permit (LUP) in 2014 for resuspension activities. The LUP (S14A-006) was granted on November 17, 2014 and expired on November 16, 2019. The M-47 well was never brought into production.

2.1.2 M-47 Activities Completed

In 2004 a service rig was moved in to perform a fracture stimulation. A lease inspection was performed in June 2010 and September 2013 by Suncor. Surface Casing Vent Flow (SCVF) and casing pressure were tested and no issues were present. The well was resuspended in February 2015 and in August 2019 an OROGO inspection report was completed by Barlon Engineering as well as SCVF testing and Gas Migration (GM) testing which were both negative.

2.2 Tweed Lake A-67

2.2.1 A-67 Regulatory History

The A-67 well was drilled in November 1985 by Petro-Canada. In 2009 Suncor purchased Petro-Canada and ownership of the well was subsequently transferred to Suncor. The A-67 well was never brought into production.

2.2.2 A-67 Activities Completed

In February 1986, a service rig was brought in to install the wellhead, perform pressure tests and fracture stimulation. Lease inspections, including SCVF and pressure tests, were completed in September 2009 and September 2013. In August 2019, an OROGO inspection report was completed by Barlon Engineering. SCVF and gas migration tests were also performed and were both negative.

2.3 Bele O-35

1.1.1 O-35 Regulatory History

Drilling of the O-35 well began on February 14, 1986 by Petro-Canada. In 2009 Suncor purchased Petro-Canada and ownership of the well was subsequently transferred to Suncor. The O-35 well was never brought into production.

1.1.2 O-35 Activities Completed

Lease inspections were performed at Bele O-35 in September 2009 and September 2013. SCVF and pressure tests were performed and both tests were negative. In August 2019, an OROGO inspection report was completed by Barlon Engineering. SCVF and GM tests were conducted and had negative results.

3 COMMUNICATION

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4 METHODOLOGY

This assessment was initiated in January of 2021 and has consisted of a review of published information and available records, Stakeholder Engagement, and a field scout. Meetings were held virtually through 2021 to source local equipment and workforce, gather operational data and field scout. The Stakeholder Engagement Plan is attached in Appendix 1-B.

5 PROGRAM DESCRIPTION

The activities to be completed at Tweed Lake M-47, Tweed Lake A-67 and Bele O-35 wellsites are part of an abandonment and reclamation program being undertaken by Suncor. The program components will take place starting in the summer of 2022 with field scouting for water sources and finishing with abandonment and reclamation activities during *spring/summer 2025*. Field visits in the summers of *2025-2027* may be required to inspect reclamation work and determine if further reclamation or monitoring is necessary. Initiation of on-site activities will depend on wellsite conditions, availability of equipment, *receipt of SLWB approvals*, and logistical constraints.

The historical components associated with the Program have been summarized below:

- Tweed Lake M-47
 - Access: 1.5-2km from A-67 (1.5-2km x 10m)
 - Wellsite: N66° 56' 47.11" W125° 54' 09.42"
 - Wellsite Area: 150m x 150m (2.25ha)
 - Campsite located 160m southwest of wellsite on existing seismic line, 60m x 90m (0.54ha)
 - Fuel storage area on southwest corner of lease on existing seismic line, 30m x 30m (0.09ha)
- Tweed Lake A-67
 - Access from Colville Lake: 16km (16km x 10m)
 - Wellsite: N66° 56' 11.60" W125° 56' 18.88"
 - Wellsite Area: 150m x 150m (2.25ha)
 - Fuel storage site on west side of lease and east of the seismic line, 50m x 50m (0.25ha)
 - Campsite located south of the lease and 135m southeast of the fuel storage site, 60m x 110m (0.66ha)
- Bele O-35
 - Access: 63km from A-67 (63km x 10m)
 - Wellsite: N66° 34' 58.1357" W126° 21' 32.1083"
 - Wellsite Area: 150m x 150m (2.25ha)
 - Fuel storage site directly east of the lease and south of the seismic line, 25m x 25m (0.063ha)
 - Campsite located 387m northeast of the lease, north of the seismic line, 65m x 115m (0.748 ha)

5.1 Anticipated Program Schedule

Suncor is proposing to complete the Program work in a series of phased activities. The anticipated schedule for the individual Program components is detailed in **Table 5-1**.

Table 5-1 Anticipated Program Schedule

Activity	Estimated Timeline											
	2023/24				2025				2026/2027			
	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
Field Scouting Community Engagement (Summers 2021&2022) (No or Limited site work)												
Pressure Test/SCVF/Gas Migration (Site Work) Water Source Scouting												
Abandonment activities (Intensive site work)												
Reclamation monitoring (if necessary) (No or limited site work)												

5.2 Proposed Activities

Suncor anticipates the following abandonment and reclamation activities for the three leases and associated facilities. Field activities associated with this program will begin with field scouting for water sources and access road routes followed by SCVF testing, gas migration and production casing pressure testing of the surface casings and any subsequent activities necessary from the test results. There will be construction of a winter-only access road that will span approximately 83km from Colville Lake, NT to Bele O-35. The Program will conclude with abandonment of the wellsites and reclamation of the leases and associated facilities and any subsequent monitoring that may be required.

5.2.1 Pressure Testing/SCVF/Gas Migration

Gas Migration (GM) is a flow of gas that is detectable at surface outside of the outermost casing string. The GM test will consist of the following activities:

- Establish a background methane level
- Measure methane concentrations above the background level
- If methane is detected, in-soil gas detection must be used to measure the methane concentration (hand auger).

Surface Casing Vent Flow (SCVF) is the flow of gas and/or liquid or any combination outside of the surface casing/casing annulus. The SCVF test will consist of the following activities:

- Bubble test conducted with a hose 2.5cm below the water surface for a minimum of 10 minutes
- If bubbles are present during the test the vent must be shut in until a stabilized pressure is obtained to a maximum of 11 kPa/m X length of surface casing venting depth (m)

Pressure Test is used to determine the pressure on the production casing.

- If pressure is present the operator may safely bleed off the pressure. If the pressure continues to build or cannot be bled off the annulus must be left for 24 hours to vent.

5.2.2 Downhole Abandonment (Spring/Summer 2025)

Wellsite abandonment activities will be conducted for the wellsites. The abandonment phase will consist of the following activities:

- Transport of equipment to the site
- Conducting downhole abandonment
- Cutting and Capping of the well
- Any concurrent reclamation as required
- Demobilization of equipment.

Suncor will fill the wellbores from permanent bridge plugs to surface with fresh water. The freshwater volume required is estimated to be 8m³ per well, which will be transported to site in 1m³ totes from Colville Lake. Abandonment procedures will follow the OROGO Guidelines. This work will take approximately ten (10) days per well on-site (fly in/out from Colville Lake daily).

All viable equipment and structures will be hauled off-site for re-use. Scrap and debris will be hauled off-site for disposal to an approved licenced facility (see Waste Management Plan in **Appendix 6** for additional information) with prior approval.

5.2.3 Surface Abandonment and Reclamation (Spring/Summer 2025)

Surface abandonment requires a cut and cap at 1m depth below natural ground level (GNWT, 2017a). The casing can be cut without excavating around the well using water-jet technology to cut casing and cap with an approved friction cap method. While not anticipated, any disturbed soils at the cut and capped wellhead will be recontoured to natural grade.

Woody debris will be spread back over the recontoured disturbed area to reduce the potential for erosion and promote micro-sites for vegetation establishment. The wellhead and any garbage/debris will be removed. This work will take approximately three to five (3-5) days on-site (immediately after downhole abandonment – fly in/out from Colville Lake daily). The reclamation goal is that the wellsite has a self-sustaining ecosystem compatible with a healthy environment and human activities where possible, according to the Guidelines for the Closure and Reclamation of Advance Mineral Exploration and Mine Sites in the Northwest Territories (MVLWB/AANAC, 2013).

5.3 Equipment Demobilization and Clean-up

Upon completion of the abandonment and reclamation activities, associated equipment will be demobilized from the Program area. Final clean-up and reclamation activities will take place following removal of equipment.

5.4 Site Access/Transportation

The Tweed Lake M-47, Tweed Lake A-67 and Bele O-35 wellsites will be accessed by air and land depending on the season. Projects being undertaken in the summer months will require a helicopter for access to the leases.

Intensive site activity involving civil work, such as the downhole abandonment and erosion control, is anticipated to occur under *spring/summer* site conditions.

Helicopters or fixed-wing may be used for crew changes, movement of equipment, supply flights and for medivac, if required. Pickup trucks and all-terrain vehicles (ATVs) or snowmobiles will be used for ground transportation. It is anticipated that summer reclamation activities may be completed using heli-portable equipment. Should it be required, helicopters will be supplemented by ATVs and other construction equipment.

Should any future activities be undertaken in the winter months, the wellsites will be accessed by a winter-only access road that will be constructed when the Norman Wells to Colville Lake winter access is completed by the GNWT. The access road will be approximately 16km from Colville Lake to A-67, and a further 63km to O-35 (see Program Area Map in **Appendix 2**). Scouting for the access road was completed via helicopter during the summer of 2021.

During winter, all access routes will be snowplowed and ten-metre-wide breaks in snow windrows will be constructed at 400m intervals and at intersecting seismic lines to allow wildlife to cross or exit the road.

5.5 Crew Accommodation

During field scouting, pre-abandonment testing, and any potential community engagement meetings crews will be based in Norman Wells at local accommodations. During abandonment activity crews will be based at *a camp in Colville Lake*.

5.6 Program Equipment

An *UPDATED* Anticipated Equipment List in **Appendix 4** provides a preliminary summary of equipment that may be required to complete the Program work in a safe, timely, and technically acceptable manner.

5.7 Water Requirements

The freshwater volume required for abandonment activities is estimated to be 8m³ per well, which will be transported to site in 1m³ totes from Colville Lake.

Should winter access be required in future, water will be required for construction of ice roads, laydown(s), camp area and wellsite leases.

- Withdrawal of water for winter road and ice pad construction and camp activities: remediation, monitoring and site closure activities; and
- Construction of watercourse crossings with snowfills (one location with a width greater than 5m)

See **Appendix 2 Figure 3 Well Abandonment Planning Map** for water source and proposed *winter* water budget information.

5.8 Waste Management

Suncor has developed a Waste Management Plan (see **Appendix 6**) that identifies the generation and management of each waste stream. This Plan will be adhered to throughout the course of the Program. All food and waste will be stored in sealed containers to prevent the attraction of wildlife.

Waste water management is described in the Waste Management Plan. Sewage and greywater will be stored in tanks at the campsite and fluids resulting from abandonment activities will be collected in totes and stored in a bermed, lined laydown in Colville Lake.

5.9 Fuel Storage and Handling

It is anticipated that fuel types will include oil and gasoline for equipment, diesel for machinery and jet fuel for the helicopter. Fuel for Program activities will be transported via Jerry cans or fuel drums depending on quantity needed. Spill response kits will accompany all fuel types in sufficient quantities according to fuel type and volume. For small fuel containers, such as drums, secondary containment may be used to reduce the risk of a spill. Drip trays will be used to capture minor spills and drips while refuelling equipment. Fuel storage and handling will follow Northern Land Use Guidelines, Camp and Support Facilities. Fuel and hazardous materials must be stored on land at least 100m from the high-water mark of any natural waterbody to reduce the risk of fuel spills into water unless expressly authorized in the LUP or in writing by the Department of Lands Resource Management Officer. Fuel caches should be located on flat, stable terrain, or in a natural depression, away from slopes leading to natural water bodies (GNWT, 2015c).

All fuel stored on-site will be handled and stored in accordance with the guidelines specified under GNWT's *Environmental Protection Act* (1988) *and the Land Use Permit*. On Federal Crown Land, storage of petroleum products in tanks with a capacity greater than 230 L and associated piping and equipment is regulated by Environment Canada's Storage Tank Systems for Petroleum Products and Allied Petroleum Products Regulations (GNWT, 2015c). Personnel will be made aware of Suncor's spill prevention measures (see **Appendix 5** Emergency Response Plan).

Helicopters will utilize fuel reserves from their base daily, as required. It is anticipated that one or two drums (205 L each) of helicopter fuel may be stored on-site, in a designated fuel storage area, for use in the event of emergency.

All fuel stored on-site will be handled and stored in accordance with the guidelines specified under GNWT's *Environmental Protection Act* (1998). Personnel will be made aware of Suncor's spill prevention measures (see **Appendix 5**).

Should winter access be required in future years, fuel will be stored at camp in double walled enviro-tanks of up to 50,000L capacity for Program activities. The maximum amount of fuel stored on-site will be 110,000L (2x50,000L diesel, 1x10,000L gas). The tanks will be filled by fuel truck as needed.

Should winter access be required in future years, the total volume required for the abandonment and reclamation program (over the 5-year term of the LUP) is estimated to be 182m³ (182,000 L). All stored fuel will be removed at the completion of the field season. Fuel transfer will be via pumps and transfer will be monitored to ensure tanks are not over-filled. Absorbent pads and/or drip trays

will be used during refuelling and fuel transfer to contain minor drips and spills. Refuelling operations will take place at least 100m from all waterbodies and watercourses.

5.10 Emergency Response & Safety

5.10.1 Emergency Response & Spill Contingency Planning

Spill response equipment/material will be made available throughout the Program. Parked equipment will be inspected during a daily walk-around to identify and quickly address signs of spills or leaks. Drip trays will be used to capture minor spills and drips while refuelling equipment. Fuel will be stored at a minimum of 100m from the high-water mark of water bodies and watercourses. Similarly, refuelling operations will take place at least 100m from any waterbody. Personnel will be made aware of Suncor's Emergency Response Plan and Corporate Spill Response Contingency Manual (see **Appendix 5**). Should a reportable spill occur, the NT/NU 24-hour Spill Report Line will be contacted at (867) 920-8130; or alternatively the NT/NU Spill Report Form will be completed and emailed to spills@gov.nt.ca. All spills, regardless of volume, will be documented and reports submitted to the GNWT Resource Management Officer upon request.

5.10.2 Fire Safety

Suncor will adhere to the Forest Fire Prevention Suppression Guidelines for Industrial Activities and the Forest Protection Act, where applicable. Care will be taken in ensuring that Program activities do not contribute to seasonal fires and fire load. The Program crew will be equipped with appropriate equipment capable of controlling and extinguishing a fire that might occur as a result of Program activities. Fire extinguishers will be available at each location during site activities and within refuelling vehicles.

Suncor will liaise with the GNWT Environment and Natural Resources (ENR) to obtain current Fire Danger Ratings, expected weather, and to report observed wildfires. In the event of a forest fire, the GNWT Forest Fire Management Division hotline will be called at 1-877-698-3473.

5.10.3 Wildlife Safety

The potential for bear encounters in the area is higher during the summer. Suncor will ensure that employees and contractors working on-site will be made aware of the potential for bear and other wildlife encounters. Information from the GNWT-ENR brochure "*Safety in Grizzly and Black Bear Country*" (see **Appendix 7**) will be incorporated into orientations and reviewed with Program personnel (GNWT, 2017). Workers may be supported by an armed wildlife monitor during summer activities. Hunting will not be permitted by Program personnel and harassment of wildlife will be prohibited.

6 SOCIO-CULTURAL ENVIRONMENT

6.1 Community Engagement

On March 1, 2021 Suncor sent a notification letter and engagement plan to Behdzi Ahda' First Nation Band, K'asho Got'ine Charter Community, Ayonik Land Corporation, Yamoga Land Corporation, Behdzi Ahda' Renewable Resources Council, Fort Good Hope Renewable Resources Council, K'asho Got'ine Dene Band, and Fort Good Hope Metis Nation with initial details and plans for the Land Use Permit application and Water License required for the abandonment program.

Due to COVID-19 restrictions, in-person community-wide engagement has not been held. Alternate plans for community engagement will be made when COVID-19 travel restrictions permit such activities.

The *UPDATED Engagement Plan and Engagement Log* are included in **Appendix 1-B**.

6.2 Traditional Knowledge

Traditional Environmental Knowledge (TEK) information is collected to determine current and traditional uses and sensitivities in a selected area. Suncor is proposing to abandon, reclaim and improve the overall condition of the wellsites and associated infrastructure, returning the disturbed areas to more natural conditions. Program activities are to take place on previously cleared locations, minimizing disturbances to areas that are of potential cultural value.

Suncor (formerly Petro-Canada) has conducted TEK consultations for previous work in the region (in December 2003 for LUP S03A-010 and WL S03L1-020 which has been made public). See **Appendix 1-C Traditional Land Use Map**

Additional TEK consultation in 2014 was requested by elders and community members to remain confidential. Suncor has requested a TEK update from Colville Lake representatives prior to the start of the program.

Specific TEK consultation was declined on December 16, 2003 in Fort Good Hope and deferred to Colville Lake due to the proximity of activities taking place nearer to Colville Lake.

6.3 Incorporating TEK and TLU Information into Proposed Activities

The historical TEK and TLU information has assisted Suncor in planning the Project to have the least amount of impact on the land and the people that use the area. The information was used during Project design in the following ways:

- Suncor will notify the communities of Colville Lake and Fort Good Hope prior to commencing operations. Providing notification will aim to prevent Suncor's winter access from conflicting with trap lines and travel on the land;
- Suncor will only withdraw water for the proposed Project activities from Colville Lake and other approved water sources to avoid conflicts with water sources that were identified as being significant;
- Proposed Project activities will avoid conflict with cabins and burial sites;

- Project personnel will be prohibited from hunting, fishing, and trapping while working on the project; and
- Suncor will ensure that speed limits are posted on access roads and wildlife will be given the right-of-way.

6.4 Employment Opportunities

Suncor recognizes the importance of providing employment and business opportunities to local businesses and individuals. It is anticipated that at peak operation times the following employment opportunities may be available as part of the program, as outlined in **Table 6-1**.

Table 6-1: Employment Opportunities

Operational Component	Approximate Personnel	Potential Local Employment Opportunities	Estimated Days	Personnel Days
Support Abandonment operations – wildlife monitor	1 person	Hire local Colville contractor(s)	30 days	30
Lodging Services	5 people	Hire local Colville contractor(s)	30 days	150

7 INTERACTING ENVIRONMENT

The following sections are based upon a literature review for the Program area and examines the interacting environment; a term used in this EPP to describe the environment, social, and cultural context of the Program.

7.1 National Wildlife Areas

Established through the *Wildlife Area Regulations* (Government of Canada, 1977), National Wildlife Areas can only be designated on lands owned by the federal government. Where lands are not federally owned, Environment and Climate Change Canada may enter into an agreement with the landowner to establish and cooperatively manage a wildlife area, which would not be designated under the Regulations. There is one national wildlife area designated in NT in the Dehcho region, north of Fort Simpson, far south of the Program area (Government of Canada, 2021).

7.2 NT Established and Proposed Conservation Areas

The Northwest Territories Protected Areas Strategy (PAS) was an 8-step process that communities in the NT could use to protect areas with natural and/or cultural significance. Following devolution, many of the responsibilities for land and resource management moved from the federal to territorial government. The GNWT has since set out its vision for land use and management in the *Northern Lands Northern Leadership – The GNWT Land Use and Sustainability Framework* (GNWT, 2014a) and the *Healthy Land, Healthy People: GNWT Priorities for Advancement of Conservation Network Planning 2016-2021* (GNWT, 2016a). The proposed Program is not located within an established or proposed conservation network in the NT (GNWT, 2015a); however, it is adjacent to the protected area around and including Lac Belot. The August 2019 map that is part of the Protected Areas Registry (NT) of the “Established and Candidate Protected Areas under the *Protected Areas Act*” (GNWT, 2019b) does not include the

Program area. The intent of the Program is to abandon, reclaim and improve the overall condition of the Bele O-35, Tweed Lake M-47 and Tweed Lake A-67 wellsites and associated infrastructure, returning the disturbed areas to more natural conditions.

7.3 Sahtu Land Use Plan

The final Sahtu Land Use Plan (SLUP) was adopted by the Sahtu Land Use Planning Board (SLUPB) on April 29, 2013. It was sequentially approved by the Sahtu Secretariat Incorporated, GNWT, and the government of Canada in accordance with Section 43 of the Mackenzie Valley Resource Management Act (MVRMA)(Government of Canada, 1998). The plan came into effect with the final approval from the Minister of Aboriginal Affairs and Northern Development Canada on August 8, 2013. With approval, as per Section 46 of the MVRMA, bodies having the authority under federal or territorial law to issue licences, permits, or other authorizations relating to the use of land or waters or the deposit of waste, shall carry out their powers in accordance with the land use plan (SLUPB, 2013a).

The interactive web map on the SLUPB's website provides zoning classification and links to zone descriptions. The locations of all three of the Program wells fall within the category of General Use Zone, which allows all land use except bulk water removal. Land use is subject to the general conformity requirements of the Plan that are to be implemented through the issuance of licences, permits, other authorizations, and dispositions (SLUPB, 2013b). The purpose of this land use application is to seek proper permitting and satisfy conformity requirements.

7.4 Important Wildlife Areas in the Western Northwest Territories

A search was conducted of the Important Wildlife Areas (IWA) in the Western Northwest Territories. The Northern Sahtu Marten Area was mapped as an IWA; all three of the Program wells are within the IWA. IWAs for peregrine falcons are not available online due to concerns of possible poaching. The Northern Sahtu Marten Area is discussed in the following section.

Unique areas that are important for multiple wildlife species were also researched, including warm and hot springs and mineral licks. These locations were generalized due to their sensitive nature; however, none of these locations were shown to be in the Program area. Information regarding IWAs was obtained through a combination of the *Important Wildlife Areas in the Northwest Territories* report (GNWT, 2012). Areas not formally identified as IWA, but shown as important in the SLUP, are separately discussed below. These animals relate to SLUP Conformity Requirements #7 Fish and Wildlife.

7.4.1 Northern Sahtu Marten Area

The Program area is situated within the Northern Sahtu Marten Area IWA. Criterion #2 was satisfied for this IWA as an area that consistently supports high densities of marten. Additionally, the marten in the IWA are known for their high-quality fur (GNWT, 2012).

7.5 Sahtu Land Use Plan – Conformity Requirements

The Land use Plan (SLUPB, 2013a):

“The Sahtu Land Use Plan (the Plan) provides broad direction to community organizations, governments, regulators and applicants about how land (including water and other resources) will be conserved, developed and used within the Sahtu Settlement Area. The Plan outlines what land use activities are appropriate, where, and under what conditions.”

The Program area is located in the K’asho Got’ine District within the Sahtu Settlement Area. According to Conformity Requirement (CR) #1 – Land Use Zoning, the three wells in the Program area are located in a General Use Zone (GUZ). This zone allows all land use except bulk water removal, subject to the general CRs outlined in the SLUP.

Among the 19 Conformity Requirements included in the SLUP (SLUPB, 2013a and SLUPB, 2013c), Conformity Requirement #7 - Fish and Wildlife identifies specific animals as “species of interest”. “Species of interest” are those species identified by wildlife managers or by community organizations during engagement activities which may be affected by land use. Animals of special interest for the entire Sahtu region include: fish, furbearers, waterfowl, raptors, barren-ground caribou, mountain and boreal woodland caribou, moose, muskox, mountain goat, Dall’s Sheep, grizzly and black bears. Activities of the Program are expected to involve water bodies for water used in winter road construction and well abandonment. According to the SLUP, CR #1, page 30 “For clarity, the Plan’s prohibition on bulk water removal does not prohibit the use of water for other uses, including consumption, travel, road building, oil and gas or mineral exploration and development activities, or hydro-electricity generation” (SLUPB, 2013a).

Not all the listed “species of interest” are considered present in the Program Area. Awareness of “species of interest” during summer inspection and testing, winter road construction from Colville Lake to the well access points, and winter well abandonment will consider: furbearers, waterfowl, raptors, barren-ground caribou, woodland caribou, moose, muskox, grizzly and black bears. Further information regarding mitigation measures are included in **Section 8 Biophysical Components**.

Conformity Requirement #9 – Sensitive Species and Features identifies locations where land use activities require consideration and response for: rare or may- be-at-risk plants, hot and warm springs, mineral licks, karst topography, amphibian sightings, and ice patches. According to Map 4: Sensitive Species and Features of the SLUP (SLUPB, 2013a), none of these species or features have been documented in the Program area (along the proposed access or at any of the three leases).

The SLUP conformity requirements and supporting evidence are listed below in **Table 7-1**.

Table 7-1 SLUP Conformity Requirements

Conformity Requirement	Supporting Evidence
General Conformity Requirements	
CR #1- Land Use Zoning	SDL023 and SDL024 are considered Legacy Land Use under section 2.5(d) of the SLUP; therefore the Program is exempt from the application of CR #1. The Program area is within a GUZ. Although CR #1 does not apply, the proposed land use would not be prohibited in a GUZ.
CR #2- Community Engagement and Traditional Knowledge	No public meetings have been held due to Covid-19 restrictions. A TEK study was initially carried out in 2003 and updated in 2014 (but held confidentially). The 2003 TEK was submitted to the SLWB under previous LUP and WL applications. <i>Engagement regarding the abandonment and reclamation program has been ongoing since 2021 through phone calls, emails, virtual meetings, and in-person meetings with BAFN Leadership and Representatives.</i>
CR #3- Community Benefits	Suncor has filed a Benefits Plan with Industry, Tourism, and Investment (GNWT-ITI). A summary of potential employment opportunities associated with the Program is provided.
CR #4- Archaeological Sites and Burial Sites	In prior assessments, the Prince of Wales Northern Heritage Centre provided advice that a pre-development Heritage Resources Impact Assessment (HRIA) would not be required for a similar program since it will take place on previously disturbed terrain under frozen ground conditions. If a burial site or archaeological site is discovered during Program activities, Suncor will adhere to the SLUP setbacks, 500m and 150m respectively, where the SLUP is in effect. If the setbacks cannot be maintained, protective measures will be developed, in consultation with the Prince of Wales Northern Heritage Centre, affected communities, or in the case of a burial site, the affected families.
CR #5- Watershed Management	Water will be required for access and pad construction and abandonment activities. Water will be sourced primarily from Colville Lake and other (smaller) water sources for access to O-35. Withdrawal will not exceed 10% of the available water under ice or, for flowing water, will not exceed 10% of instantaneous flow. As such, it will not substantially alter the quantity or rate of flow for waters that flow on, through, or adjacent to the Sahtu Settlement Area.
CR #6- Drinking Water	Effects on a downstream drinking water source and community catchments will be negligible for the proposed Program. Part of the Program's winter access will occur inside the Colville Lake Drinking Water Source Watershed. Given the limited water withdrawal volumes, and localized activities proposed as part of the Program, no downstream effects on drinking water sources are anticipated.
CR #7- Fish and Wildlife	Land use activities have been designed using the most current publicly available information. Reasonable steps will be taken to follow setbacks listed in Table 4 of the SLUP.
CR #8- Species Introductions	Suncor and its contractors will conduct operations in a manner that prevents the introduction of non-native vegetative or wildlife species. Mitigation measures to prevent species introduction are provided.
CR #9- Sensitive Species and Features	According to Map 4: Sensitive Species and Features of the SLUP (SLUPB, 2013a), none of these species or features exist in the Program area (along the proposed access or at any of the three leases).
General Conformity Requirements (cont'd)	
CR #10- Permafrost	Permafrost within the vicinity of the Program area has been mapped to be continuous (90-100%) with medium to low ice cover (20% - <10%) in the upper 10-20 m of the ground (GNWT, 2014c).
CR #11- Project-Specific Monitoring	Ongoing monitoring and mitigation measures are described in the "Environmental Protection and Mitigation" tables in the "Mitigation" subsections.
CR #12- Financial Security	Suncor will post a security deposit as required by the SLWB.
CR #13- Closure and Reclamation	Suncor has outlined abandonment and reclamation activities that will be updated as required.
Special Management Conformity Requirements	
CR #14- Protection of Special Values	Not applicable, the Program is not within a Special Management Zone, Conservation Zone or Proposed Conservation Initiative.
CR #15- The Great Bear Watershed	Not applicable, the Program is not within Great Bear Lake Watershed
CR #16- Fish Farming and Aquaculture	Not applicable, the Program is not within Great Bear Lake Watershed
CR #17- Disturbance of Lakebed	Not applicable, the Program is not within Great Bear Lake Watershed
CR #18- Uses of Du K'ets'Edi Conservation Zone (Sentinel Islands)	Not applicable, the Program is not within the Sentinel Islands
CR #19- Water Withdrawal	Not applicable, water withdrawal is not occurring from Lac Belot, Stewart Lake or Tate Lake.

7.6 Canadian Important Bird Areas

Canada's Important Bird and Biodiversity Areas Program is a science-based initiative to identify, conserve, and monitor and a network of sites that provide essential habitat for Canada's bird populations. A search of the Important Birds Areas (IBA) of Canada interactive website (IBA Canada, 2021) indicated that the proposed Program does not fall within a designated IBA.

8 BIOPHYSICAL COMPONENTS

This section examines the ecological, atmospheric, terrestrial and aquatic environments, as well as the potential effects of the Program and the mitigative measures that will put in place.

8.1 Ecoregions

Climate, terrain, vegetation, soils, and wildlife work together to produce unique ecological regions (Ecoregions). Understanding what differentiates one ecoregion from another is important in the management of natural resources within the NT.

The Program area is located within the Boreal Biome, the "northern forest", Canada's largest biome. The ecoregion for the Program area is the Taiga Plains Ecoregion and more specifically the Taiga Plains High Subarctic (HS) Ecoregion. The Taiga Plains High Subarctic Ecoregion is broken down into 14 subregions. Activities of the Program includes field scouting, testing, winter road construction and well abandonment and reclamation and based on the *Ecological Regions of the Northwest Territories* map (GNWT, 2009a) activities will take place in two subregions:

- 3.3.1.8 Colville Plain HS Ecoregion - construction of the wellsites winter access road from the Colville Lake terminus of the GWNT Norman Wells to Colville Lake winter road, to each wellsite; and
- 3.3.1.9 Colville Hills HS Ecoregion – field scouting, testing, and abandonment and reclamation of three Program wells (Bele O-35, Tweed Lake A-67, and Tweed Lake M-47).

The 3.3.1.8 Colville Plain HS Ecoregion is comprised of level to gently undulating low-elevation plain surrounding parts of the Colville Hills HS Ecoregion. Cretaceous marine shales underlie the central portions of the Ecoregion. Medium-to-fine-textured, level to gently undulating till deposits are the dominant landform. The Colville Plain HS Ecoregion contains most of the large named lakes in the Colville area, including Lac Belot, Colville Lake, Lac des Bois, Lac Manoir, and Kilekale Lake. Because the region is surrounded by higher terrain, organized drainage patterns are absent. Small, shallow lakes are especially numerous east of Lac Belot. Polygonal peat plateau and northern ribbed fens are the most common wetland types.

The 3.3.1.9 Colville hills HS Ecoregion is a series of narrow ridges and low hills enclosing Colville Lake and Lac Belot; there are three main ridges. An isolated upland area south of Colville Lake and east of Lac Belot reaches maximum elevations of 400 mASL and is included with the Colville Hills HS Ecoregion because it shared common topographic and geologic attributes. Most of the ridges and hills are forested by open white spruce-lichen stand and well-developed runnel patterns occur on the slopes, particularly in the southern hill outlier. Belot Ridge and the southern hill outlier are composed of Devonian limestones of the Bear Rock formation. Colville and Manoir Ridges are composed of more erosion-resistant Cambrian dolomites. Rock outcrops define the

ridgeline of Belot and Manoir Ridges; till veneers and blankets mantle the bedrock on the Colville Ridge, the southern hill outlier, and the lower slopes of Belot and Manoir Ridges. Lac Belot Ridge includes some notable karst features. The only named lake within the Ecoregion is Tweed Lake, located within the southern hill outlier. There are no permanent watercourses and very few wetlands. Veneer bogs probably occur in association with runnels that are especially prevalent on the southern hill outlier; polygonal peat plateaus occur along the lower slopes of the Colville Ridge near Colville Lake.

8.2 Atmospheric Environment

8.2.1 Climate

Solar radiation by the Earth's surface and atmosphere is key to the climate of the Sahtu. The strength of this radiation is determined primarily by latitude. Snow cover, clouds, and large variation in hours of daylight and sun elevation during the year are also factors. In the winter, the Sahtu is dominated by air flowing from the polar region. In summer, the air circulation pattern alters; arctic air recedes and air flow from the south. The southerly flow, combined with long hours of sunlight make the Sahtu, especially the Mackenzie Valley, the warmest for its latitude in all of Canada. In general, the Sahtu has long, cold winters and relatively short, cool summers. The Ecoregion is classified as having a high subarctic ecoclimate (Auld and Kershaw, 2005).

At Colville Lake, the summers are cool and mostly cloudy and the winters are long, frigid, dry, windy, and overcast. Over the course of the year, the temperature typically varies from -31°C to 19°C and is rarely below -41°C or above 24°C (Weatherspark, 2021).

The NT is experiencing faster changes in climate than most other regions in the world. The winters are warming, and annual precipitation is more variable, rapidly changing from wetter conditions to drought periods (GNWT, 2016b). Additionally, an increase in ground disturbance and vegetation cover can also affect the active-layer in the winter by not freezing completely thereby degrading the permafrost below. In forested regions, the active layer is increasing in thickness and staying unfrozen longer each year. Changes in active-layer depths in the North are being monitored by the Circumpolar Active-Layer Monitoring (CALM, 2018) Program. These changes are not happening at a constant rate and some years, environmental changes can be fast and unpredictable.

8.2.1.1 Air Quality

The GNWT, Environment and Natural Resources Department Air Quality Monitoring Network was examined. Ambient air quality standards exist for carbon monoxide (CO), ground level ozone (O_3), Nitrogen dioxide (NO_2), sulphur dioxide (SO_2), fine particulate matter ($\text{PM}_{2.5}$) and Total Suspended Particulate (TSP) (GNWT, 2014b). Recent air quality surveys were not found for the vicinity of the Program area; however, information was seen for Norman Wells Station for SO_2 , NO_x , NO_2 , NO, O_3 , $\text{PM}_{2.5}$, and PM_{10} . The station reporting indicates there is no CO monitor at Norman Wells. All values are within their respective standards, although the PM_{10} 24-hour average is just below the maximum standard (GNWT, 2021a).

8.2.1.2 Mitigation Measures

As stated in **Table 8-1** below, the Program is not anticipated to have effects on air quality.

Table 8-1: Summary of Potential Air Quality Effects and Proposed Mitigation Measures

Potential Effects	Proposed Environmental Protection and Mitigation Measures
Emissions	<ul style="list-style-type: none"> Program activities are not anticipated to have deleterious effects on air, climate, or atmosphere. Temporary use of gasoline or diesel equipment, which will emit greenhouse gases, are necessary to conduct the Program.

8.2.1.3 Residual Effects

Program-related residual effects on the atmospheric environment are expected to be negligible under normal operating conditions. The short duration, intermittent sources of emissions are temporary and are anticipated to rapidly disperse.

8.2.2 Noise

Baseline noise surveys are not known to have been conducted for Colville Lake or within the vicinity of the Program area. Noise guidelines commonly followed in the NT are outlined in the Alberta Energy Regulator [(AER) formerly ERCB], document Directive 038: Noise Control (AER, 2007). For remote locations, where noise-sensitive receptors (such as occupied dwellings) are located more than 1.5km from the proposed development, ambient noise levels are permitted to cause a five decibel (dBA) increase in equivalent continuous noise level (L_{eq}) above estimated background levels of 35 dBA. At a distance of 1.5km, the noise level of a facility or development should not exceed 40 dBA L_{eq} (AER, 2007). **Table 8-2** identifies examples of noise sources and corresponding dBA levels.

Table 8-2: Noise Level Outputs

Sound Level	dBA	Example of Noise Source
Deafening	120	Gunshot at 1m Range: Threshold of Pain
	115	Hard-Rock Concert
	110	Accelerating Motorcycle at 1m Range
	105	Loud Car Horn at 3m Range
Very Loud	100	Dance Club
	95	Jackhammer at 15m Range
	90	Inside a Noisy Factory
Loud	85	Large Truck Passing at 15m Range
	80	Inside a Noisy Bar
	75	Near the Shoulder of a Major Highway
	70	Vacuum Cleaner at 15m Range
Moderate	65	Normal Human Voice at 1m Range
	60	Hair Dryer at 1m Range
	55	Running Tap Water
	50	Running Air Conditioner
Faint	45	Inside a Typical Office
	40	Inside a Typical Library: Guide 038 Guideline for L_{eq} at 1.5km
	35	Typical Quiet Outdoors
Very Faint	30	Inside a Quiet Bedroom at Night
	25	Inside a Quiet Broadcast Studio
	20	Deep Woods on a Calm Day
Very Faint	15	A Quiet Whisper
	10	Rustling Leaves at 15m Range
	5	At-Rest Human Breathing
	0	Quietest Sound That Can be Heard: Threshold of Human Hearing

Source: (Mackenzie Gas Project, 2004)

8.2.2.1 Mitigation Measures

Table 8-3 below provides a summary of the noise mitigation measures to be employed by Suncor.

Table 8-3: Summary of Potential Noise Effects and Proposed Mitigation Measures

Potential Effects	Proposed Environmental Protection and Mitigation Measures
Increase noise levels	<ul style="list-style-type: none"> Equipment will be properly maintained to minimize noise. Noise will be limited to the winter road construction for wellsite access, abandonment activities at wellsites and helicopter flight path. Noise will be local and temporary.

8.2.2.2 Residual Effects

Program-related residual effects generated by increased noise are expected to be negligible under normal operating conditions. Adherence to the mitigation measures and protocols (**Table 8-3**) is expected to minimize the potential residual effects of the Program.

8.3 Terrestrial Resources

This section examines the terrestrial resources with respect to soil, vegetation, wildlife, and birds as well as the potential effects of the Program, the mitigation measures that will be implemented, and the residual effects of the Program.

8.3.1 Soil

In the 3.3.1.8 Colville Plain HS Ecoregion, imperfectly to poorly-drained till plains surrounding numerous lakes that are often encircled by treeless polygonal peat plateaus are typical of the Ecoregion. Most soils are probably permafrost-affected Turbic Cryosols. Organic Cryosols occur with polygonal peat plateaus. In 3.3.1.9 Colville Hills HS Ecoregion, there is no soil development on bedrock exposures. Most soils are probably permafrost-affected Static and Turbic Cryosols. Organic Cryosols occur with polygonal peat plateaus (Ecosystem Classification, 2009).

8.3.1.1 Mitigation Measures

Table 8-4 provides a summary of the identified potential effects of the Program on soil and the protection and mitigation measures to be employed by Suncor.

Table 8-4: Summary of Potential Soil Effects and Proposed Mitigation Measures

Potential Effects	Proposed Environmental Protection and Mitigation Measures
Soil Contamination	<ul style="list-style-type: none"> Fuel <i>dispensers</i> will be equipped with well maintained hoses, nozzles and pumps to prevent accidental spillage. Parked equipment will be inspected during a daily walk-around to identify and manage signs of spills or leaks. Care will be taken during refuelling. Drip tray and absorbent pans will be used to capture minor spills and drips while fuelling equipment. The drip trays will be monitored for fluid levels and replaced as necessary. Fuel caches will be set-back a minimum of 100m from the high-water mark of any water body or watercourse. Suncor has developed an Emergency Response Plan and Corporate Spill Response Contingency Manual (refer to Appendix 5) that will be adhered to throughout the course of the Program. Spill kits will be kept on-site during operations. Spill response equipment includes waste bags, absorbent pads, and shovels. In the event of a spill, Suncor will implement spill reporting, clean-up and sampling as per regulations and requirements. Should a spill occur, Suncor will endeavour to clean-up the spill before infiltration occurs. Spills, regardless of volume, will be documented and records kept by Suncor. Should a regulatory reportable spill occur, the NT/NU 24-hour Spill Report Line will be contacted at (867) 920-8130, or alternatively the NT/NU Spill Report Form will be completed and emailed to spills@gov.nt.ca.

Potential Effects	Proposed Environmental Protection and Mitigation Measures
Ground Disturbance	<ul style="list-style-type: none"> • Program activities are to take place on previously cleared locations, minimizing additional vegetation removal and related potential effects to terrain, soils and vegetation. The intent of the Program is to complete downhole abandonment and reclamation activities for Bele O-35, Tweed Lake A-67, and Tweed Lake M-47 wellsites and associated infrastructure. • Suncor is proposing to conduct abandonment activities during <i>spring/summer and will minimize ground disturbance by hand-clearing vegetation, if necessary, for the helicopter landing area, laydown area, and around the wellheads.</i> • Reclamation activities will be conducted upon successful completion of abandonment activities.
Erosion	<ul style="list-style-type: none"> • Only existing crossings will be utilized <i>during winter operations.</i> • If ground disturbance does occur, it will be re-contoured and reseeded with an approved mix and inspected within one full growing season. • Where the potential for erosion exists, erosion protection materials (such as coconut matting, silt fencing, and/or rip-rap) will be installed.

8.3.1.2 Residual Effects

Program related residual effects generated by disturbance to the site soils are considered low under normal operating conditions. Adherence to the mitigations and protocols (**Table 8-4**) is expected to minimize the potential residual effects of the Program.

8.3.2 Permafrost

Permafrost is defined by ground temperature, where rocks and soil remain below 0°C for at least two years (GNWT, 2008). The ground in the Program area is defined as extensive continuous permafrost. The transition from continuous to discontinuous permafrost roughly coincides with the position of subarctic boreal-tundra transition (GNWT, 2014c). In the Program area, the temperature of the ground is continuously below 0°C; therefore, the moisture in the ground occurs as ground ice. This ground ice occurs in many forms, most often as fillings in the pores of soils; however, it can also form much more massive bodies, such as ice wedges and layers up to several metres thick. Both the presence of ground ice and surface thaws and freezes have major effects on the landscape on roads, construction, and development in the Sahtu. (Auld and Kershaw, 2005). The highest areas exhibit Low Arctic climate attributes such as earth hummocks, patterned grounds and slope failures due to permafrost melting (Ecosystem Classification Group, 2009). Permafrost degradation is altering the terrestrial and aquatic ecosystems throughout the NT. The rate of change is influenced by how much ice is in the underlying permafrost and by feedback effects from changing vegetation cover and soil moisture, especially following wildfire and other disturbances. (GNWT, 2016b).

8.3.3 Ice Conditions

A winter road from Fort Good Hope to Colville Lake is constructed yearly by the GNWT. *Should winter access be required in future years*, Suncor would construct a winter access road from the Colville Lake terminus to each wellsite (Tweed M-47, Tweed Lake A-67, and Bele O-35) along previously cleared access routes. Winter roads use lake water and compacted snow cover on land surfaces to connect remote regions of the NWT. Communities and mining operations not connected by all-weather roads depend on these winter roads to bring in the annual re-supply of bulk goods and to allow residents seasonal travel outside their communities. The warming climate in the North has delayed freeze-up in the fall and contributed to thinner ice and an earlier spring melt, resulting in a shorter winter road season despite improved technology and more time and effort being applied to construct and maintain roads. Ice conditions also affect load weight limits,

causing the cost of delivering supplies to communities and mines to go up because more trips by smaller trucks are required (GNWT, 2008).

8.3.3.1 Mitigation Measures

Table 8-5 provides a summary of the identified potential effects of the Program on permafrost and the protection and mitigation measures to be employed by Suncor.

Table 8-5: Summary of Potential Permafrost Effects and Proposed Mitigation Measures

Potential Effects	Proposed Environmental Protection and Mitigation Measures
Permafrost Regime Alteration	<ul style="list-style-type: none"> The worksites will be monitored for melting permafrost from solar exposure and rutting. Erosion repairs will be made as required to protect the permafrost. Program activities are to take place on previously cleared locations, minimizing additional vegetation removal and related potential effects to terrain, soils and vegetation. <i>Hand-clearing around the well centre, helicopter landing pad and temporary laydown area will help preserve the vegetative mat and root structures.</i> The intent of the Program is to complete final abandonment activities and reclaim the Tweed Lake M-47, Tweed Lake A-67 and Bele O-35 wellsites. During winter activities, frozen ground conditions will mitigate potential damage to surface soils and permafrost. Winter road construction will use lake and river ice and compacted snow cover on land surfaces for transportation of needed equipment.

8.3.3.2 Residual Effects

Program related residual effects on permafrost are expected to be low under normal operating conditions. Adherence to the above-mentioned mitigations and protocols (**Table 8-5**) are expected to minimize the potential residual effects of the Program.

8.3.4 Vegetation

8.3.4.1 Vegetation in the 3.3.1.8 Colville Plain HS Ecoregion

Imperfectly-to-poorly drained till plains surrounding numerous lakes that are often encircled by treeless polygonal peat plateaus are typical of this region. Northern ribbed fens with thermokarst ponds are more common in this Ecoregion than those farther north. Sedges, cotton-grasses, willows and dwarf birch are typical species. Extensive uneven-aged white spruce – dwarf birch – willow communities with a significant lichen component in more open stands are the dominant vegetation cover. Black spruce and larch are associated species. Cold sites and rigorous climates limit tree growth over much of the area. Closed-canopy, relatively tall conifer stands occur on sites that provide better growing conditions such as southerly slopes, well-drained lakeshores, and alluvial deposits. There is a general east to west gradient of improving growth as closed-canopy conifer stands become more extensive and mixed white spruce – Alaska paper birch stands occur in small patches on ridged till. Rapidly drained and dry sites, such as those found on the glacio-fluvial and eolian deposits scattered throughout the Ecoregion, support open white spruce – lichen stands with sparse shrub understories. On gently rolling terrain mainly to the east, alternating strips of spruce – lichen and spruce – shrub communities perpendicular to slope define runnel patterns. Thick lichen mats with scattered dwarf birch, northern and common Labrador tea, and cloudberry are the dominant cover on polygonal peat plateaus, which are extensive around lakes and particularly in the Lac Manoir area. Northern ribbed fens with thermokarst ponds are more common in this Ecoregion than in more northerly ecoregions, and sedges, cotton-grasses, willows, and dwarf birch are typical species. The Colville Plain HS Ecoregion contains most of the large named lakes in the Colville area. Because the Ecoregion is

surrounded by higher terrain, organized drainage patterns are absent. Polygonal peat plateaus and northern ribbed fens are the most common wetland type (Ecosystem Classification Group, 2009).

8.3.4.2 Vegetation in the 3.3.1.9 Colville Hills HS Ecoregion

Most of the ridges and hills are forested by open white spruce – lichen stands, and well-developed runnel patterns occur on the slopes, particularly in the southern hill outlier. At higher elevations, open spruce woodlands occur and are characteristic of areas further north in the Northern Great Bear Plain HS. Tree line is at about 500mASL; the highest areas exhibit Low Arctic climatic attributes such as earth hummocks, patterned grounds, and slope failures due to permafrost melting. Forest cover across the Ecoregion is reasonably uniform in terms of species composition, but variations exist in stand structure with elevation and slope. Lower to mid slope positions support relatively well-developed white spruce – lichen stands compared to those further upslope and in the surrounding lower terrain. On steep south-facing protected slopes, trembling aspen may occur as scattered, stunted individuals. At increasing elevations, spruce stands become more open and above about 500mASL, grade into treeless shrubby tundra. Tundra communities include willows, dwarf birch, black crowberry, cotton-grasses, sedges, and lichens. There are few wetlands. The only named lake within this Ecoregion is Tweed lake. There are no permanent watercourses, and very few wetlands. Veneer bogs probably occur in association with runnels that are especially prevalent on the southern hill outlier; polygonal peat plateaus occur along the lower slopes of the Colville Ridge near Colville Lake. (Ecosystem Classification Group, 2009).

8.3.4.3 Regulations Pertaining to Vegetation

Regulations found to be the most applicable to vegetation in the NT are summarized below.

The *Species at Risk Act* (SARA) is intended to protect species at risk in Canada (Government of Canada, 2002). Species afforded protection are listed in Schedule 1 of SARA. Section 32(1) of the Act states that no person shall kill, harm, harass, capture, or take listed species. Section 33 states that no person shall damage or destroy the residence of a listed species. Section 36(1) states that no person shall kill, harm, harass, capture, or take a species listed by a provincial or territorial minister, and that no person shall damage or destroy the residence of a species listed by a provincial or territorial minister. Section 79 states that adverse effects on the listed species must be identified and, regardless of significance, be mitigated and monitored. The treatment of other species determined to be at risk will be equivocal to that of SARA-listed species for the purposes of this EPP.

Suncor will ensure that the above legislation is complied with, and that personnel respect and adhere to the mitigation measures in place to reduce the effect of the program on vegetation.

8.3.4.4 Vegetation at Risk

Search results from the SARA Registry for the search criteria “Vascular Plants”, “Moss”, “Lichens” and “Northwest Territories” provided the following list of species at risk:

Hairy Braya <i>Braya pilosa</i>	Mackenzie Hairgrass <i>Deschampsia mackenziana</i>
Nahanni Aster <i>Symphotrichum nahanniense</i>	Tyrrell’s Willow <i>Salix tyrrellii</i>
Yukon Aster <i>Symphotrichum yukonense</i>	Schleicher’s Silk Moss <i>Entodon schleicheri</i>

Tyrrell’s Willow and Yukon Aster were assessed by COSEWIC as “Not at Risk”, while Schleicher’s Silk Moss was judged to be “Data Deficient”.

Vegetation species that are listed in the document *Species at Risk in the NWT 2024* (GNWT, 2024) pertain to the Territories as a whole. The Territorial listing for plants includes:

Hairy Braya <i>Braya pilosa</i>	Arctic Orangebush Lichen <i>Seiophora aurantiaca</i>
Nahanni Aster <i>Symphotrichum nahanniense</i>	Raup's Willow <i>Salix raupii</i>
Drummond Bluebell <i>Mertensia drummondii</i>	Banks Island Alkali Grass <i>Puccinellia banksiensis</i>

Of these plants, Raup's Willow, Banks Island Alkali Grass, Arctic Orangebush Lichen, and Drummond Bluebell have been ranked May Be at Risk by the Northwest Territories General Status Ranking Program (GNWT, 2025). Additionally, these four plants are known to not be in Program area: Raup's Willow is confined to the Western mountains, Banks Island Alkali Grass is found in NT on Banks Island, Arctic Orangebush Lichen is found in the Inuvialuit Settlement Region, NT (Banks Island, Melville Island, Victoria Island and Cape Parry) and the locations of Drummond Bluebell are graphically shown as being along the northern coast of the Territories in *Species at Risk in the NWT 2024* (GNWT, 2024).

The remaining protected species have very localized known and possible ranges (GNWT, 2024):

- Hairy Braya *Braya pilosa* (Endangered) – Cape Bathurst Peninsula and Baillie Islands
- Nahanni Aster *Symphotrichum nahanniense* (Special Concern) – Nahanni National Park Reserve and Southern Mackenzie Mountains
- Mackenzie Hairgrass *Deschampsia mackenzieana* (Special Concern) – East shore of Great Slave Lake (requires verification)

According to *Species at Risk in the NWT 2024* (GNWT, 2024) and the NWT List of Species at Risk (Conference of Management Authorities, 2020a) profiles no protected plant species are known to be present in the Program area.

8.3.4.5 GNWT Mitigation Measures

Table 8-6 provides a summary of the identified potential effects of the Program on vegetation and the protection and mitigation measures to be employed by Suncor.

Table 8-6: Summary of Potential Vegetation Effects and Proposed Mitigation Measures

Potential Effects	Proposed Environmental Protection and Mitigation Measures
Habitat Loss	<ul style="list-style-type: none"> • Program activities are located on previously cleared locations, minimizing additional vegetation removal and related potential effects to terrain, soils and vegetation.
Ongoing compaction	<ul style="list-style-type: none"> • Any required seeding for restoration and/or follow-up inspections will be performed at the direction of GNWT Department of Land's Land Use Inspector.
Changes in species composition	<ul style="list-style-type: none"> • Activity will be restricted to the defined Program area, which will limit the area being disturbed. • <i>During spring/summer abandonment activities, some hand-clearing of vegetation will be required for safety (helicopter landing area and 10m radius around well centre) and operations (equipment laydown area), care will be taken not to disturb the vegetative mat except where necessary (in the immediate vicinity of the wellhead for cut and cap operations).</i> • Frozen ground conditions during the winter Program activities will mitigate potential damage to ground vegetation. • Access ground surface will be monitored for erosion, rutting, and damage.
Species Introduction / Decreased diversity	<ul style="list-style-type: none"> • Care will be taken to clean equipment prior to mobilization into the Program area to limit the likelihood of the introduction of non-native species.

Potential Effects	Proposed Environmental Protection and Mitigation Measures
Potential Forest Fire Hazard	<ul style="list-style-type: none"> • Firefighting equipment will be maintained at fuel storage locations <i>and onsite during abandonment activities.</i> • Fire prevention methods include designated smoking areas and fire bans as conditions warrant. • As per section 10 and 19 (1) of the Forest Protection Act (GNWT, 2010), Suncor will adhere to Forest Fire Prevention and Suppression Guidelines for Industrial Activities (GNWT, 2001). • In the event of a forest fire, the GNWT Forest Fire Management Division hotline will be called at 1-877-698-3473.

8.3.4.6 Residual Effects

The significance of the contribution of the Program to the residual effects on vegetation is expected to be low. The intent of the Program is to complete final abandonment activities and reclaim the Tweed Lake M-47, Tweed Lake A-67, and Bele O-35 wellsites and associated infrastructure.

8.3.5 Wildlife

Program components that may affect wildlife include:

- Increased potential for wildfires due to summer activities; and
- Increased equipment and helicopter activity.

A summary of the influences these Program components may have on wildlife include:

- Sensory disturbance from equipment and helicopter activity;
- A relatively small risk to increased mortality; and
- Additional stress from increased disturbance.

Potential effects will be mitigated through implementation of the measures outlined in **Table 8-9** and through the eventual reclamation of three wellsites and associated infrastructure.

8.3.5.1 Regulations Pertaining to Wildlife

The *Species at Risk Act* (SARA) is intended to protect species at risk in Canada (Government of Canada, 2002). Species afforded protection are listed in Schedule 1 of SARA. Under SARA, it is forbidden to kill, injure, harass, destroy the residence or critical habitat of, capture or take an individual designated as “extirpated”, “endangered”, or “threatened” on federally regulated lands. On territorial land, SARA-listed species are not protected unless the species is federally managed, such as under the *Migratory Birds Convention Act* (MBCA) (Government of Canada, 1994). The MBCA states that without authorization or a permit, the disturbance or destruction of a nest or eggs of a migratory bird is prohibited.

The *Wildlife Act for the Northwest Territories, Plain Language Version* (GNWT, 2018) pertains to the harvesting and management of wildlife in the NT. Section 51(1) of the Act states that no person shall, without a licence or permit, destroy, disturb, or take an egg of a bird, the nest of a bird when the nest is occupied, or the nest of a prescribed (listed in the regulations) bird. Section 51(2) states that no person shall, without a licence or permit, break into, destroy, or damage a den, beaver dam or lodge, muskrat push-up or hibernaculum. Section 52 states that no person shall, without a licence or permit, engage in an activity that is likely to result in a significant disturbance or unnecessarily chase, fatigue, disturb, torment or otherwise harass game or other prescribed wildlife. Section 38 states that no person shall harvest game without a hunting licence or harvest prescribed wildlife without a permit.

Suncor will ensure compliance with the above mentioned Federal and Territorial legislation.

Other relevant documents pertaining to wildlife management and recovery strategies including species-specific (SS) documents and operational guidelines that may affect vegetation and wildlife (as noted):

- COSEWIC Assessment and Status Report (SS);
- COSEWIC Species Search (database) and Species Profile (both SS)
- GNWT Species at Risk in the NWT (Search Site, 'At a Glance' search, Infobase Search (database)) (all SS)
- GNWT Conference of Management Authorities - Management Plan and Recovery Strategy Series. GNWT, Environment and Natural Resources (SS)
- GNWT Species at Risk Committee, Species at Risk Secretariat - Species Status Report (SS)
- GNWT Land - Northern Land Use Guidelines – Access: Roads and Trails (GNWT, 2015d)
- GNWT Land - Northern Land Use Guidelines – NT Seismic Operations Volume (GNWT, 2015b) (in regards to setback distances, minimum flight altitudes, and timing restrictions); and
- GNWT Land - Northern Land Use Guidelines – Camp and Support Facilities Volume (GNWT, 2015c).
- SLUPB – Sahtu Land Use Plan (SLUPB, 2013a).

Suncor will ensure that personnel respect and adhere to the mitigation measures in place to protect wildlife.

8.3.5.2 Species at Risk

Federally, SARA is applicable to determine wildlife species at risk in Canada and came into full effect on December 12, 2002. Section 79 (2) of SARA states that, during an assessment of effects of a project, the adverse effects of the project on a listed wildlife species and its critical habitat must be identified, that measures are taken to avoid or lessen those effects, and that the effects need to be monitored (Government of Canada, 2002). This section applies to all species listed on Schedule 1 of SARA as “Special Concern”, “Threatened”, or “Endangered”. As a matter of best practice, Suncor has considered species on other Schedules of SARA, as well as those under consideration for listing on SARA, including those designated by the Committee on the Status of Endangered Wildlife in Canada (COSEWIC) for this EPP. The SARA Registry has been used to determine listed species present in NT.

Territorially, the Species at Risk Committee (SARC) was established under the *Species at Risk (NWT) Act* (GNWT, 2009b) and is composed of a group of experts that assesses the biological status of species that “May Be at Risk” of extinction in the NT, using both traditional knowledge and scientific information. The committee makes recommendations to the Conference of Management Authorities, who then list species under the Act. Species that are currently on the approved assessment schedule for 2021 – 2025, published in the *SARC Annual Report* (SARC, 2020) and included in **Table 8-7** with the proposed year of assessment listed. The original month of April included in the SARC Annual Report for the appropriate year are depicted as March on **Table 8-7** due to the current *Species at Risk* website.

The NT Species at Risk search capabilities include information on habitat, distribution, population, threats, and status (Conference of Management Authorities, 2020a). Information is continually updated by the NT General Status Ranking information (Working Group on the General Status of NWT Species, 2016). These species-specific profiles have been used to determine if species at risk are present in the Sahtu region and in the Program area. The species included in **Table 8-7** are considered to be “Species at Risk” in the NT by one or more of the above-named organizations. Species included as ‘Yes’ in the ‘Habitat in the Program Area’ column are species mapped as present in the area of the three wells and/or the winter access that comprise the Program area. Those species ranked as “At Risk”, “Sensitive”, and “Secure” are presented in **Table 8-7**.

The NT Species at Risk, Species Monitoring Infobase (database) is a searchable catalogue of referenced information on NT species. It includes information on habitat, distribution, population, threats and status. The Infobase is continually updated by the NT General Status Ranking program.

Table 8-7: Species at Risk in the NT and Program Area

Species	Status in NT				Status in Canada		Status Update or Addition Since V.1 of EPP
	NT General Status Ranking ¹	Habitat in the Program Area ²	SARC Assessment (Proposed Year Assessment)	NWT Legal List	COSEWIC Assessment	Federal Species at Risk Act Listing	
Mammals							
Barren-ground Caribou (<i>Rangifer tarandus groenlandicus</i>)	At Risk	Yes	Threatened	Threatened	Threatened	Under Consideration	<i>Not Applicable</i>
Bowhead Whale (<i>Balaena mysticetus</i>)	Secure	No	Not Applicable	Not Applicable	Special Concern	Schedule 1 Special Concern	<i>Not Applicable</i>
Collared Pika (<i>Ochotona collaris</i>)	Sensitive	No	Not Assessed	No Status	Special Concern	Schedule 1 Special Concern	<i>Not Applicable</i>
Dolphin and Union Barren-ground Caribou (<i>Rangifer tarandus groenlandicus x pearyi</i>)	At Risk	No	Special Concern (March 2023)	Special Concern	Endangered	Schedule 1 Special Concern Under Consideration	<i>Not Applicable</i>
Eastern Red Bat (<i>Lasiursus borealis</i>)	Presence Expected	No	Not Assessed	No Status	Endangered	Under Consideration	<i>Added to COSEWIC in 2023</i>
Grey Whale (<i>Eschrichtius robustus</i>)	Undetermined	No	Not Applicable	Not Applicable	Not at Risk	Schedule 1 Special Concern	<i>Not Applicable</i>
Grizzly Bear (Western Population) (<i>Ursus arctos</i>)	Sensitive	Yes	Special Concern	No Status	Special Concern	Schedule 1 Special Concern	<i>Not Applicable</i>
Hoary Bat (<i>Lasiursus cinereus</i>)	Undetermined	No	Not Assessed	No Status	Endangered	Under Consideration	<i>Added to COSEWIC in 2023</i>
Little Brown Myotis (<i>Myotis lucifugus</i>)	At Risk	Yes	Special Concern	Special Concern	Endangered	Schedule 1 Endangered	<i>Not Applicable</i>

Species	Status in NT				Status in Canada		Status Update or Addition Since V.1 of EPP
	NT General Status Ranking ¹	Habitat in the Program Area ²	SARC Assessment (Proposed Year Assessment)	NWT Legal List	COSEWIC Assessment	Federal Species at Risk Act Listing	
Northern Myotis (<i>Myotis septentrionalis</i>)	At Risk	No	Special Concern	Special Concern	Endangered	Schedule 1 Endangered	Not Applicable
Peary Caribou (<i>Rangifer tarandus pearyi</i>)	At Risk	No	Threatened (March 2022)	Threatened	Threatened	Schedule 1 Threatened	Downgraded on Schedule 1 in 2023
Polar Bear (<i>Ursus maritimus</i>)	Sensitive	No	Special Concern (March 2021)	Special Concern	Special Concern	Schedule 1 Special Concern	Not Applicable
Ringed Seal (<i>Pusa hispida</i>)	Secure	No	Not Applicable	Not Applicable	Special Concern	Under Consideration	Not Applicable
Silver-Haired Bat (<i>Lasionycteris noctivagans</i>)	Undetermined	No	Not Assessed	No Status	Endangered	Under Consideration	Added to COSEWIC in 2023
Wolverine (<i>Gulo gulo</i>)	Sensitive	Yes	Not at Risk	No Status	Special Concern	Schedule 1 Special	Not Applicable
Wood Bison (<i>Bison bison athabasca</i>)	At Risk	No	Threatened	Threatened	Special Concern	Schedule 1 Threatened	Not Applicable
Woodland Caribou Boreal Population (<i>Rangifer tarandus caribou</i>)	At Risk	Yes	Threatened (March 2022)	Threatened	Threatened	Schedule 1 Threatened	Not Applicable
Woodland Caribou Northern Mountain Population (<i>Rangifer tarandus caribou</i>)	Sensitive	No	Special Concern	Special Concern	Special Concern	Schedule 1 Special Concern	Upgraded on the NWT Legal List in 2021
Birds							
American White Pelican (<i>Pelecanus erythrorhynchos</i>)	May Be at Risk	No	Special Concern	Under Consideration	Not at Risk – 1987	No Status	Added to the SARC Assessment in 2023
Bank Swallow (<i>Riparia riparia</i>)	At Risk	Yes	Not Applicable	Not Applicable	Threatened	Schedule 1 Threatened	Not Applicable
Barn Swallow (<i>Hirundo rustica</i>)	Sensitive	No	Not Applicable	Not Applicable	Threatened	Schedule 1 Threatened	Not Applicable
Buff-breasted Sandpiper (<i>Tryngites subruficollis</i>)	Sensitive	No	Not Applicable	Not Applicable	Special Concern	Schedule 1 Special Concern	Not Applicable
Canada Warbler (<i>Cardellina canadensis</i>)	Sensitive	No	Not Applicable	Not Applicable	Special Concern	Schedule 1 Threatened	Not Applicable
Common Nighthawk (<i>Chordeiles minor</i>)	Sensitive	No	Not Applicable	Not Applicable	Special Concern	Schedule 1 Special Concern	Downgraded on Schedule 1 in 2023
Eskimo Curlew (<i>Numenius borealis</i>)	At Risk	No	Not Applicable	Not Applicable	Endangered	Schedule 1 Endangered	Not Applicable
Evening Grosbeak (<i>Coccothraustes vespertinus</i>)	Secure	No	Not Applicable	Not Applicable	Special Concern	Schedule 1 Special Concern	Not Applicable

Species	Status in NT				Status in Canada		Status Update or Addition Since V.1 of EPP
	NT General Status Ranking ¹	Habitat in the Program Area ²	SARC Assessment (Proposed Year Assessment)	NWT Legal List	COSEWIC Assessment	Federal Species at Risk Act Listing	
Harris's Sparrow (<i>Zonotrichia querula</i>)	Sensitive	Yes	Not Applicable	Not Applicable	Special Concern	Under Consideration	Upgraded on Schedule 1 in 2023
Horned Grebe (<i>Podiceps auritus</i>)	Sensitive	Yes	Not Applicable	Not Applicable	Special Concern	Schedule 1 Special Concern	Not Applicable
Hudsonian Godwit (<i>Limosa haemastica</i>)	At Risk	No	Not Applicable	Not Applicable	Threatened	Under Consideration	Not Applicable
Island Red Knot (<i>Calidris canutus islandica</i>)	At Risk	No	Not Applicable	Not Applicable	Not at Risk	Schedule 1 Special Concern	Not Applicable
Ivory Gull (<i>Pagophila eburnea</i>)	At Risk	No	Not Applicable	Not Applicable	Endangered	Schedule 1 Endangered	Not Applicable
Lesser Yellowlegs (<i>Tringa flavipes</i>)	Sensitive	Yes	Not Applicable	Not Applicable	Threatened	Under Consideration	Not Applicable
Olive-Sided Flycatcher (<i>Contopus cooperi</i>)	Sensitive	Yes	Not Applicable	Not Applicable	Special Concern	Schedule 1 Special Concern	Downgraded on Schedule 1 in 2023
Peregrine Falcon (<i>Falco peregrinus anatum/tundrius</i>)	Sensitive	Yes	Not Assessed (March 2022)	No Status	Not at Risk	Not on Schedule 1	Removed from Schedule 1
Rufa Red Knot (<i>Calidris canutus rufa</i>)	At Risk	No	Not Applicable	Not Applicable	Endangered	Schedule 1 Endangered	Not Applicable
Roselaari Red Knot (<i>Calidris canutus roselaari</i>)	-	No	-	-	Non-active	Schedule 1 Threatened	Not Applicable
Red-necked Phalarope (<i>Phalaropus lobates</i>)	Sensitive	Yes	Not Applicable	Not Applicable	Special Concern	Schedule 1 Special Concern	Not Applicable
Rusty Blackbird (<i>Euphagus carolinus</i>)	Sensitive	Yes	Not Applicable	Not Applicable	Special Concern	Schedule 1 Special Concern	Not Applicable
Short-Eared Owl (<i>Asio flammeus</i>)	Sensitive	Yes	Not Applicable	Not Applicable	Threatened	Schedule 1 Special Concern	Upgraded COSEWIC in 2021
Whooping Crane (<i>Grus americana</i>)	At Risk	No	Not Applicable	Not Applicable	Endangered	Schedule 1 Endangered	Not Applicable
Yellow Rail (<i>Coturnicops noveboracensis</i>)	Sensitive	No	Not Applicable	Not Applicable	Special Concern	Schedule 1 Special Concern	Not Applicable
Amphibians and Reptile							
Northern Leopard Frog (<i>Lithobates pipiens</i>)	At Risk	No	Threatened (March 2023)	Threatened	Special Concern	Schedule 1 Special Concern	Not Applicable
Western Toad (<i>Anaxyrus boreas</i>)	At Risk	No	Threatened (March 2024)	Threatened	Special Concern	Schedule 1 Special Concern	Not Applicable

Species	Status in NT				Status in Canada		Status Update or Addition Since V.1 of EPP
	NT General Status Ranking ¹	Habitat in the Program Area ²	SARC Assessment (Proposed Year Assessment)	NWT Legal List	COSEWIC Assessment	Federal Species at Risk Act Listing	
Red-sided Garter Snake (<i>Thamnophis sirtalis</i>)	Sensitive	No	Special Concern	-	Not in SARA Public Registry	-	Upgraded NT Status Ranking and SARC Assessment
Fish							
Bull Trout (<i>Salvelinus confluentus</i>)	Sensitive	No	Not Applicable	Not Applicable	Special Concern	Schedule 1 Special Concern	Not Applicable
Dolly Varden (<i>Salvelinus malma malma</i>)	Sensitive	No	Not Applicable	Not Applicable	Special Concern	Schedule 1 Special Concern	Not Applicable
Northern Wolffish (<i>Anarhichas denticulatus</i>)	At Risk	No	Not Applicable	Not Applicable	Threatened	Schedule 1 Threatened	Not Applicable
Shortjaw Cisco (<i>Coregonus zenithicus</i>)	At Risk	No	Not Applicable	Not Applicable	Threatened	Schedule 2 Threatened	Not Applicable
Insects							
Gypsy Cuckoo Bumble Bee (<i>Bombus bohemicus</i>)	At Risk	No	Data Deficient	No Status	Endangered	Schedule 1 Endangered	Not Applicable
Mckay's Bumble Bee (formerly Western Bumble Bee) (<i>Bombus occidentalis mckayi</i>)	Sensitive	No	Data Deficient	No Status	Special Concern	Special Concern	Upgraded on Schedule 1 in 2023
Suckley's Cuckoo Bumble Bee (<i>Bombus suckleyi</i>)	Undetermined	No	Not Assessed	No Status	Threatened	Under Consideration	Not Applicable
Transverse Lady Beetle (<i>Coccinella transversoguttata</i>)	Secure	Yes	Not Assessed	No Status	Special Concern	Schedule 1 Special Concern	Upgraded on Schedule 1 in 2021
Yellow-banded Bumble Bee (<i>Bombus terricola</i>)	Undetermined	No	Not at Risk	No Status	Special Concern	Schedule 1 Special Concern	Not Applicable
Plants							
Arctic Orangebush Lichen (<i>Seiophora aurantiaca</i>)	May Be at Risk	No	-	-	-	No Status	Added to the NT Status Ranking
Hairy Braya (<i>Braya pilosa</i>)	At Risk	No	Threatened (March 2023)	Threatened	Endangered	Schedule 1 Endangered	Not Applicable
Nahanni Aster (<i>Symphyotrichum nahanniense</i>)	Sensitive	No	Not Assessed	No Status	Special Concern	Schedule 1 Special Concern	Not Applicable
Mackenzie Hairgrass (<i>Deschampsia mackenzieana</i>)	May Be at Risk	No	Not Assessed	No Status	Special Concern	Schedule 1 Special Concern	Not Applicable
Raup's Willow (<i>Salix raupii</i>)	May Be at Risk	No	Not Assessed	No Status	Not Assessed	No Status	Not Applicable
Bank's Island Alkali Grass (<i>Puccinellia banksiensis</i>)	May Be at Risk	No	Not Assessed	No Status	Not Assessed	No Status	Not Applicable

Species	Status in NT				Status in Canada		Status Update or Addition Since V.1 of EPP
	NT General Status Ranking ¹	Habitat in the Program Area ²	SARC Assessment (Proposed Year Assessment)	NWT Legal List	COSEWIC Assessment	Federal Species at Risk Act Listing	
Drummond Bluebell (<i>Mertensia drummondii</i>)	May Be at Risk	No	Not Assessed	No Status	Not Assessed	No Status	<i>Not Applicable</i>

Note 1: Environment Canada has a national role to play in the conservation and recovery of Species at Risk in Canada, as well as responsibility for management of birds described in the Migratory Birds Convention Act (MBCA). Day-to-day management of terrestrial species not covered in the MBCA is the responsibility of the Territorial Government. Populations that exist in National Parks are managed under the authority of the Parks Canada Agency.

Note 2: Dates for Species Assessment have been adjusted from April (listed in SARC Annual Report 2019-2020) to March per the website <https://www.nwt-species-at-risk.ca/SARC/assessment-schedule>

Note 3: **Bolded** font indicates species that have been added to the Species at Risk in the NT list or had a status update since previous EPP.

¹NT General Status Ranking (Working Group on the General Status of NWT Species, 2016) as reflected in Species at Risk Infobase. SARC Assessment, COSEWIC Assessment and Federal Status on Species at Risk Act (Schedule 1) information is from May 2020 Species at Risk in the NWT guide and Species at Risk infobase.

²Program area located in as shown on Program figures (the K’ahsho Got’ine District) south of Colville Lake, east and south of Lac Belot. Information sourced from Species at Risk in the NWT 2020, species-specific descriptions and distribution maps in the NWT Species at Risk www.nwt-species-at-risk.ca.

8.3.5.3 Valued Components (VCs)

Table 8-8 outlines a List of Wildlife Valued Components (VCs) considered by EnviroSearch for this EPP. Those species at risk that are listed in **Table 8-7** and have ranges that overlap with the Program area were identified as VCs and are shown in the following table.

Table 8-8 Listed Wildlife Valued Components

Species	NT Species at Risk	NWT Legal List	COSEWIC	Federal Species at Risk Act Listing
Mammals				
Barren-ground Caribou (<i>Rangifer tarandus groenlandicus</i>)	At Risk	Threatened	Threatened	Under Consideration
Grizzly Bear (Western Population) (<i>Ursus arctos</i>)	Sensitive	No Status	Special Concern	Schedule 1 Special Concern
Little Brown Myotis (<i>Myotis lucifugus</i>)	At Risk	Special Concern	Endangered	Schedule 1 Endangered
Wolverine (<i>Gulo gulo</i>)	Sensitive	No Status	Special Concern	Schedule 1 Special Concern
Woodland Caribou, Boreal Population (<i>Rangifer tarandus caribou</i>)	At Risk	Threatened	Threatened	Schedule 1 Threatened
Birds				
Bank Swallow (<i>Riparia riparia</i>)	At Risk	Not Applicable	Threatened	Schedule 1 Threatened
Harris’s Sparrow (<i>Zonotrichia querula</i>)	Sensitive	Not applicable	Special Concern	Schedule 1 Special Concern
Horned Grebe (<i>Podiceps auritus</i>)	Sensitive	Not Applicable	Special Concern	Schedule 1 Special Concern
Lesser Yellowlegs (<i>Tringa flavipes</i>)	Sensitive	Not Applicable	Threatened	Under Consideration
Olive-Sided Flycatcher (<i>Contopus cooperi</i>)	Sensitive	Not Applicable	Special Concern	Schedule 1 Special Concern

Species	NT Species at Risk	NWT Legal List	COSEWIC	Federal Species at Risk Act Listing
Peregrine Falcon (<i>Falco peregrinus anatum/tundrius</i>)	Sensitive	No Status	Not at Risk	Removed from Schedule 1
Red-necked Phalarope (<i>Phalaropus lobates</i>)	Sensitive	Not Applicable	Special Concern	Schedule 1 Special Concern
Rusty Blackbird (<i>Euphagus carolinus</i>)	Sensitive	No Status	Special Concern	Schedule 1 Special Concern
Short-Eared Owl (<i>Asio flammeus</i>)	Sensitive	No Status	Threatened	Schedule 1 Special Concern
Amphibians – None in Program Area				
Fish – None in Program Area				
Insects				
Transverse Lady Beetle (<i>Coccinella transversalis</i>)	Secure	No Status	Special Concern	Schedule 1 Special Concern
Plants – None in Program Area				

On-site or in-air activities associated with the Program will take place according to requirements identified in Northern Land Use Guidelines – Northwest Territories Siesmic Operations (GNWT, 2015b), and in particular, but not limited to, Section 2.6 Wildlife and Wildlife Habitat. Guidelines and tables in that section identify actions, prohibitions and specifics regarding listed species, sensitive periods, recommended setback distances from habitat and wildlife (**Table 8-10**). Additionally, recommended minimum flight altitude and sensitive periods are identified in **Table 8-11**. Implementation of these guidelines in the field are key to protection of species at risk and conservation of wildlife habitat. Potential residual effects are discussed further in **Section 8** of this EPP. Summer 2021 activities included scouting the area to confirm access routes and determining potential water sources for winter access road construction. The summer 2023 scope included minimal clearing for safe helicopter landing and SCVF, gas migration, and production casing pressure testing. Well abandonment activities proposed for *spring/summer 2025 may include sweeps for dens, nests, dams, or lodge sites and minimal clearing for safe helicopter landing.*

8.3.5.4 Mammals

There are 68 species of terrestrial mammals that occur regularly in the NWT (Working Group on General Status of NWT Species, 2016). According to **Table 8-8**, the following is a list of terrestrial mammal species considered at risk that may be found in the Program area:

Barren-ground Caribou	<i>Rangifer tarandus groenlandicus</i>	Wolverine	<i>Gulo gulo</i>
Grizzly Bear (Western pop.)	<i>Ursus arctos</i>	Woodland Caribou	<i>Rangifer tarandus caribou</i>
Little Brown Myotis	<i>Myotis lucifugus</i>	(Boreal pop.)	

Suncor is providing further information on the species which have potential to be found in the Program area and are listed as species at risk in **Table 8-7** and therefore considered as VCs in **Table 8-8**. Mitigation measures and best practices to minimize impacts of human land use on wildlife are shown on **Table 8-9** Summary of Potential Effects on Wildlife and Proposed Mitigation Measures.

Barren-ground Caribou (*Rangifer tarandus groenlandicus*)

SARA Registry: Under Consideration

NWT Listing: Threatened

Historically, Barren-ground Caribou have had immense cultural, spiritual and economic importance to people in the NWT. Barren-ground Caribou is also a keystone species that plays a crucial role in northern ecosystems.

Barren-ground Caribou are members of the deer family. In the fall, mature males have a striking white neck and mane and a distinct band along the flank separating the brown back from the white belly. Their colours are more faded during the winter. The velvet covering their antlers is brown. The national assessment of Barren-ground Caribou as Threatened includes the Porcupine herd but the NWT assessment and listing do not. Females weigh 85 to 135 kg (187 to 298 lb) while males weigh 100 to 140 kg (220 to 309 lb) (Conference of Management Authorities, 2020b). They are slightly smaller than the closely related boreal woodland caribou. Barren-ground caribou have the largest antlers relative to their size of any species of deer. Both males and females have light-coloured hair around their tails and on their stomachs, and their coats become progressively darker towards the spine. Calves are typically born eight to nine months after the fall rut, on the tundra near the Arctic coast in the NWT and Nunavut and spend the summer on the tundra (Conference of Management Authorities, 2020b).

Barren-ground Caribou migrate long distances northwards in the spring to their traditional calving grounds and southwards in the fall to their winter range. They are highly social, gather together to have their calves, and travel in large groups. Barren-ground Caribou give birth in places where they can minimize exposure to predators and maximize nutrition, such as open tundra and high, rocky areas. In summer, they seek areas with high-quality grasses, sedges, shrubs, and mushrooms to eat and try to avoid insect harassment. Caribou move around in winter to places where food – primarily lichen – is abundant and snow is shallow.

In the mid-1980s to mid-1990s most NWT herds were peaking in abundance, but since the late 1990s their numbers have undergone a dramatic decline. Barren-ground Caribou populations naturally undergo large cycles likely driven by climate interacting with food availability, predation, and parasites. Current threats to Barren-ground Caribou are acting in addition to these natural cycles and the cumulative effects from multiple threats are unprecedented. Potential threats in the Northwest Territories include:

- Climate change impacts on habitat and health;
- Habitat loss and degradation from resource exploration and development;
- Roads that increase access for hunting and predation;
- Increasing frequency and intensity of forest fires that affect the winter range;
- Predators can have a large impact when caribou numbers are low; and
- Unsustainable harvest could have a large impact but there are measures in place to reduce harvest in response to low numbers.

The NWT SARC assessed the territorial status of Barren-ground Caribou in 2017. They assessed Barren-ground Caribou (Tuktoyaktuk Peninsula, Cape Bathurst, Bluenose-West, Bluenose-East, Bathurst, Beverly, Ahiak, and Qamanirjuaq herds) as Threatened in the NWT. Unlike COSEWIC, SARC considered Porcupine caribou separately as a geographically distinct population (Conference of Management Authorities, 2020b). According to “Map 21: Bluenose West Caribou Migration” presented in the SLUP, Background Report, the Bluenose-West herd is known to be

present in the vicinity of the Program area during Fall rut (October 8th – 31st), Fall post-rut (November 1st – 30th), and Winter (December 1st – March 31st) (SLUPB, 2013d).

During the construction of the winter access and abandonment activities at the wellsites, the Wildlife Monitors and field teams will work together to ensure conservation of barren-ground caribou habitat and movement in and through their traditional range. According to the *Recovery Strategy for Barren-ground Caribou (Rangifer tarandus groenlandicus) in the Northwest Territories*, while the barren-ground caribou are general foragers during the snow-free periods, they prefer lichen as their winter forage. Therefore, patches of unburned, lichen rich forest in the winter range are important components of the barren-ground caribou's habitat conservation (Conference of Management Authorities, 2020b). Mitigation measures and best practices to minimize impacts of human land use on barren-ground caribou are shown in **Table 8-9** Summary of Potential Effects on Wildlife and Proposed Mitigation Measures, **Table 8-10** Wildlife Sensitive Periods and Recommended Minimum Setback Distances from Wildlife Habitat and Wildlife Use Areas, and **Table 8-11** Recommended Minimum Flight Altitudes and Sensitive Periods for Wildlife. Potential residual effects for barren-ground caribou are discussed in **Section 9** of this EPP.

Grizzly Bear (*Ursus arctos*)

SARA Registry: Special Concern (Schedule 1)

NWT Listing: No Status

Grizzly bears are omnivorous, exploiting a wide range of food sources. They are larger than black bears and are more heavily built. They can be recognized by their prominent shoulder hump, dish shaped face and long claws. Colour varies from light gold to almost black with pale bears being the most common on the barren-lands (GNWT, 2024). Grizzly bears occupy diverse habitats including open or semi-forested areas, most commonly in alpine and subalpine terrain, on the tundra and less commonly in the boreal forest.

Grizzly bears hibernate in dens throughout the winter months, living off stored fat reserves. However, they can be roused relatively easily while dormant. Grizzly bears do not reproduce until they are between six and eight years of age. They will mate in the summer, with one to two altricial cubs born in February. Because of the mother's weakened condition and the dependent cubs, disturbance to a maternity den greatly increases the chance of mortality of both the adult female and her cubs (Linnell et al, 2000). The NT is home to an estimated 4,000-5,000 grizzly bears with the highest densities found in the Mackenzie and Richardson Mountains. Grizzly bears in the in the NWT, and throughout their range in Canada, are sensitive to population declines because they do not reproduce until later (six and eight years of age), they have small litters (one to three cubs), and there are three to five years between litters (GNWT, 2024). Due to the relatively low densities across the landscape and low reproductive rates, the death of a reproductive-aged female could have population level effects.

Individual bears move great distances, so they may be exposed to negative effects of human developments or activities, even when these activities occur at a considerable distance from the core range (GNWT, 2024). Population estimates in much of the range are highly uncertain; the Canadian population is estimated at 26,000, but the number of mature individuals could be closer to 10,000 (COSEWIC, 2012).

Grizzly bears are also locally important species. SARA states that adverse effects on the listed species must be identified and, regardless of significance, be mitigated and monitored (s.79). The treatment of SARA species must be consistent with COSEWIC species.

Portions of the Program to be carried out in the winter may coincide with grizzly bear denning activities. Personnel, specifically Wildlife Monitors, will be directed to look for evidence of dens. The crew's activity will be restricted to the existing worksites which will limit the area being disturbed as specified in the Northern Land Use Guidelines (GNWT, 2015b). Mitigation measures and best practices to minimize impacts of human land use on grizzly bears are shown in **Table 8-9** Summary of Potential Effects on Wildlife and Proposed Mitigation Measures, **Table 8-10** Wildlife Sensitive Periods and Recommended Minimum Setback Distances from Wildlife Habitat and Wildlife Use Areas, and **Table 8-11** Recommended Minimum Flight Altitudes and Sensitive Periods for Wildlife. Potential residual effects for grizzly bear are discussed in **Section 9** of this EPP.

Personnel will be notified of the potential of bear activity and will be instructed in bear awareness. The GNWT-ENR's brochure "*Safety in Grizzly and Black Bear Country*" (GNWT, 2017b) (see **Appendix 7**) will be reviewed with Program personnel.

Little Brown Myotis (*Myotis lucifugus*)

SARA Registry: Endangered (Schedule 1)

NWT Listing: Special Concern

The little brown myotis is a medium-sized bat that can be found across much of North America. Fur on its back ranges from yellowish-brown to dark brown-black and is often glossy. Fur on its underside is lighter and goes from light brown to tan. The tragus (fleshy projection which covers the entrance of the ear) is short and blunt (Conference of Management Authorities, 2020a). A nocturnal insectivore, it uses echolocation to locate prey in the dark. Mating takes place in fall and may occur again in the winter or the spring. Habitat availability for bats in the NWT has not been quantified; however, both the boreal forest and karst formations (landscape area rich in soluble minerals that is often characterized by caves and sinkholes) are important habitat. The boreal forest provides summer roosts and foraging habitat while caves (potential winter hibernacula) are often found in karst habitat. The Program area is shown on mapping to be in the potential karst habitat. The most northern observation was a single specimen found in 2012 in Colville Lake, in the Sahtú region. It has been suggested that this specimen may be extralimital (occurring far outside known range), although there are unconfirmed reports of bats near Tulita, Norman Wells, and Wrigley, as well as in the Gwich'in region (SARC, 2017).

Migrations of up to several hundred kilometres may be taken in the fall to find appropriate hibernacula, typically in caves. Most known hibernation sites are caves or abandoned mines, but overwintering in rock crevices, buildings, trees, and small cavities in scree fields and tree root wads has also been documented. The two known hibernacula in the NWT (both in the Fort Smith area) are naturally-formed underground caves. (SARC, 2017).

An emergency assessment was conducted by COSEWIC in February 2012 on three Canadian bat species, including the little brown myotis, in response to rapidly declining population sizes. White-nose Syndrome, a disease affecting bats caused by an invasive white fungus, is at least partially responsible for the observed population declines. White nose syndrome disrupts bat hibernation, causing the animals to wake in mid-winter when food and water is scarce, at which time the bats die of starvation or dehydration. Approximately 50% of the global range of this small

bat is found in Canada. The current range of White-nose Syndrome has been expanding at an average rate of 200-250 kilometres per year. At that rate, the entire Canadian population is likely to be affected within 12 to 18 years. There is no apparent containment of the northward or westward spread of the pathogen, and proper growing conditions for it exist throughout the remaining range (COSEWIC, 2013a).

Portions of the Program to be carried out in the winter may coincide with little brown myotis overwintering activities, and portions of the Program to be carried out during the summer may coincide with little brown myotis brood-rearing activities. Personnel, specifically Wildlife Monitors, will be directed to look for evidence of activity near the work area. The crew's activity will be restricted to the existing worksites to avoid disturbing little brown myotis hibernacula or nursery colonies. Mitigation measures and best practices to minimize impacts of human land use on little brown myotis are shown on **Table 8-9** Summary of Potential Effects on Wildlife and Proposed Mitigation Measures, **Table 8-10** Wildlife Sensitive Periods and Recommended Minimum Setback Distances from Wildlife Habitat and Wildlife Use Areas, and **Table 8-11** Recommended Minimum Flight Altitudes and Sensitive Periods for Wildlife.

Wolverine (*Gulo gulo*)

SARA Registry: Special Concern (Schedule 1) NWT Listing: No Status

Wolverines resemble a small stocky bear. Colour varies from brown to black, often with a pale facial mask and yellowish or tan stripes running along its sides from the shoulders and crossing at the tail (GNWT, 2024). Wolverines exist at low population densities and are primarily nocturnal, though they may be active at any time. Wolverines are highly opportunistic feeders, capable of killing large prey, stealing, and scavenging kills from other predators (COSEWIC, 2014a). The coat of the wolverine contains oil that repels water, snow, and frost; therefore, wolverine pelts are highly sought after by humans for making winter clothing. Wolverines are typically solitary, coming together to mate in the summer. Wolverines occupy dens periodically during the winter months, though they do not hibernate. Litters of two to five young are born in early spring and remain with their mother for up to two years (COSEWIC, 2014a). Declines in wolverine populations in Canada have largely occurred due to habitat loss and alteration, decreases in large prey animal population sizes, and increased anthropogenic pressures. Wolverines only breed every two years, have small litters, and their kits can have high mortality rates. As a result, they do not recover easily from population declines (GNWT, 2024).

Ranked as "Sensitive" in the NT, development and other human activities can disturb wolverines and fragment habitat, even if these activities are a considerable distance from their core range (GNWT, 2024). Potential threats to the wolverine in the NT include disturbance of maternal den sites. Wolverines appear to be very sensitive to disturbance at natal den sites and will move or abandon kits if disturbed (Jalkotzy, et al, 1997). The potential for this maternal response and a possible drop in population would indicate residual effects from the Program could be present for this species. Potential residual effects for wolverine are discussed in **Section 9** of this EPP. Mitigation measures and best practices to minimize impacts of human land use on wolverines are shown on **Table 8-9** Summary of Potential Effects on Wildlife and Proposed Mitigation Measures, **Table 8-10** Wildlife Sensitive Periods and Recommended Minimum Setback Distances from Wildlife Habitat and Wildlife Use Areas, and **Table 8-11** Recommended Minimum Flight Altitudes and Sensitive Periods for Wildlife.

Portions of the Program to be carried out in the winter/early spring and summer may coincide with wolverine denning and brood-rearing activities. Personnel and specifically Wildlife Monitors, will be directed to look for evidence of activity near the work area.

Woodland Caribou Boreal Population (*Rangifer tarandus caribou*)

SARA Registry: Threatened (Schedule 1)

NWT Listing: Threatened

Woodland caribou boreal population (*Rangifer tarandus caribou*), also referred to as Boreal Caribou, are members of the deer family and are a subspecies of caribou that were once common across much of Canada. Compared to the barren-ground caribou, boreal caribou are larger and darker, have thicker and broader antlers, longer legs, and a longer face. Boreal caribou look the same as Northern Woodland Caribou but have different habitat preferences and behaviour (GNWT, 2024). Nagy et al. (2005) found boreal caribou to typically occur in small groups ranging from around two individuals in the summer to just fewer than 12 during late winter. Their typical habitat includes almost all forested areas east of the Mackenzie Mountains. Median home range size of these boreal groups was reported to be 2,080km² (Nagy et al., 2005). They are called the “grey ghosts of the forest” because they are secretive and difficult to find. Boreal caribou startle easily, move quickly and are very elusive (GNWT, 2024). Boreal caribou tend to remain in their forested habitat year-round as opposed to migrating across the tundra as do barren-ground caribou. Boreal caribou feed primarily on lichens in the winter and on graminoids in the summer. In the vicinity of the Program area, they mate during the ‘rut’ in the mid September to late October; calves are born in late April to early June. During calving, Boreal caribou space themselves out to avoid predators (SARC, 2012).

The primary threat to most boreal caribou local populations is unnaturally high predation rates as a result of human-caused and natural habitat loss, degradation, and fragmentation. These habitat alterations support conditions that favour higher alternate prey densities (e.g., moose and deer), resulting in increased predator populations (e.g., wolf and bear) that in turn increase the risk of predation to boreal caribou (Environment and Climate Change Canada, 2019).

Additional potential threats in the Northwest Territories include habitat disturbance, both human-caused and natural, that leads to more predators on the landscape; linear features (e.g., seismic lines and roads) that result in increased access by predators and hunters; climate change impacts on the forest landscape over the next 20 to 40 years (GNWT, 2024); and noise and light disturbances that result in short-term behavioural and physiological responses of individual boreal caribou, including a startle response. Sustained or repeated human or mechanical disturbance can result in avoidance of areas and the reduction in use of suitable habitat (Environment and Climate Change Canada, 2019). In studies conducted in northern AB, woodland caribou avoided industrial developments by up to 1km, and avoidance distances appeared to be positively correlated with human activity level (Dyer, O’Neill, Wasel, & Boutin, 2001).

Planned Program activities may occur during important woodland caribou calving or calf rearing periods. Personnel, specifically Wildlife Monitors, will be directed to look for evidence of activity near the work area. The crew’s activity will be restricted to the existing access roads and leases to avoid disturbing caribou.

Even with these mitigations, residual effects may result from increased sensory disturbance. Residual effects from increased helicopter and vehicle traffic, equipment use, and associated site maintenance stimuli can contribute to natural limiting factors that affect year-to-year abundance

of boreal caribou. These residual effects are expected to be low as the Program is small in scale and short in duration. Mitigation measures and best practices to minimize impacts of human land use on boreal caribou are shown on **Table 8-10** Summary of Potential Effects on Wildlife and Proposed Mitigation Measures, **Table 8-11** Wildlife Sensitive Periods and Recommended Minimum Setback Distances from Wildlife Habitat and Wildlife Use Areas, and **Table 8-12** Recommended Minimum Flight Altitudes and Sensitive Periods for Wildlife.

8.3.5.5 Birds

There are over 309 species of birds which may be observed in the NT (Bird Canada, 2021). According to **Table 8-8**, the following is a short list of bird species considered at risk that may occur in the Program area:

Bank Swallow	<i>Riparia riparia</i>	Peregrine Falcon	<i>Falco peregrinus</i>
Harris's Sparrow	<i>Zonotrichia querula</i>	Red-necked Phalarope	<i>Phalaropus lobates</i>
Horned Grebe	<i>Podiceps auritus</i>	Rusty Blackbird	<i>Euphagus carolinus</i>
Lesser Yellowlegs	<i>Tringa flavipes</i>	Short-eared Owl	<i>Asio flammeus</i>
Olive-Sided Flycatcher	<i>Contopus cooperi</i>		

Suncor is providing further information on the species which have potential to be found in the Program area and are listed as species at risk in **Table 8-7** and therefore considered as VCs in **Table 8-8**. It is noteworthy that none of the listed birds winter in the Program area; therefore, activities proposed for winter access road construction or well abandonment will not pose a threat. These VC birds migrate to the NT and are present in summer (Sibley, 2003). *Program activities occurring in the spring and summer may coincide with migration, mating, nesting and brood-rearing activities in all bird species and will, therefore, be restricted to existing worksites.* Of the VC birds, a number are ground or lower-level nesters where nests may be encountered during summer activities in brush, shrub, sedge, sand or gravel mound or attached to other structures, downed-limbs, or ground material. These birds are: bank swallow, Harris's sparrow, lesser yellowlegs, red-necked phalarope, and short-eared owls (various sources cited in species-specific descriptions, to follow).

Bank Swallow (*Riparia riparia*)

SARA Registry: Threatened (Schedule 1)

NWT Listing: Not Applicable

The bank swallow is a small, slender insectivorous songbird with pale brown upper-parts and rump, white under-parts and throat, and a well-defined dark band across its chest. Both males and females have similar plumage. It is distinguishable in flight from other swallows by its quick erratic wing beats and its almost constant buzzy, chattering vocalizations. The species is highly social throughout the year and is conspicuous at colonial breeding sites near open habitats along rivers, streams, lakes, and gravel pits where they search for flying insects (COSEWIC, 2013b). Bank swallows arrive in the NT in the spring and construct their nests on artificial and natural sites with vertical sand-silt banks such as riverbanks, lake and ocean bluffs, sand and gravel mounds, aggregate quarries, and road cuts. A burrow is dug into the side of the sites, which leads to a nest chamber (GNWT, 2024).

The species has shown a *severe long-term decline amounting to a loss of 98% of its Canadian population in the last 40 years* (italics added). The reason for these declines is not well understood but are likely driven by cumulative effects of several threats. Potential threats to the bank swallow

in the NT include large-scale decline or other changes in insect populations, direct and indirect mortality due to severe weather events on their breeding grounds, disturbance or destruction of nests located at sand and gravel mounds or aggregate quarries during nesting season, slumping of riverbanks where bank swallows nest, and habitat loss and degradation from human activities (COSEWIC, 2013b).

Portions of the Program to be carried out in the summer may coincide with bank swallow brood-rearing activities. Bank swallow nests located at sand/gravel mounds or aggregate quarries can be destroyed if material extraction at these sites occurs during the nesting season. Personnel, specifically Wildlife Monitors, will be directed to look for evidence of activity and or nests at ground level near the work area. The crew's activity will be restricted to the existing worksites to avoid disturbing bank swallow nest sites. Mitigation measures and best practices to minimize impacts of human land use on bank swallows are shown on **Table 8-9** Summary of Potential Effects on Wildlife and Proposed Mitigation Measures, **Table 8-10** Wildlife Sensitive Periods and Recommended Minimum Setback Distances from Wildlife Habitat and Wildlife Use Areas, and **Table 8-11** Recommended Minimum Flight Altitudes and Sensitive Periods for Wildlife.

Harris's Sparrow (*Zonotrichia querula*)

SARA Registry: Under Consideration (Schedule 1)

NWT Listing: Not Applicable

The Harris's Sparrow is North America's largest sparrow. It has a chunky body with a barrel-shaped chest that makes its head look a bit small. Males and females have a similar appearance with streaky brown and black plumage, grey or brown cheeks, a white belly, and a pink bill. Breeding adults have a distinctive black bib, face, and crown. It weighs between 26.2 to 48.8 g with a length ranging from 17 to 20 cm. Harris's Sparrows breed near the tree-line in northern Canada. Harris's Sparrow is the only songbird that breeds exclusively in Canada. About half of its breeding range is in the NWT. Their wintering grounds are in the Great Plains of the south-central United States.

Harris's Sparrows arrive on their breeding territories in the NWT in late May to early June. They breed in semi-forested tundra (open tundra mixed with patches of trees and shrubs). Breeding territories typically include coniferous trees. The female Harris's Sparrow builds a nest on the ground in which she lays three to five eggs. Nests are hidden in dense shrubby vegetation dominated by dwarf birch, alder, and willow. The male helps to feed the young. Crowberries, blueberries, and bearberries are important foods for Harris's Sparrows in the spring when they first return to the tundra. They include more insects and seeds in their diet as the season progresses. In late summer Harris's Sparrows form loose flocks before migrating to their wintering grounds.

Harris's Sparrow has undergone a significant long-term population decline. Christmas Bird Counts on the wintering grounds have shown a decline of 59% between 1980 and 2014, including a 16% decline over the last decade (2004-2014). Conversion of lands for agriculture on the wintering grounds, as well as pesticide use, are thought to be factors in the decline.

Potential threats in the Northwest Territories include breeding habitat degradation from climate change and habitat loss and degradation from resource exploration and development. Human activities resulting in declining food sources and increased numbers of predators are also potential threats (Conference of Management Authorities, 2020a).

Portions of the Program to be carried out in the summer may coincide with Harris's sparrow brood-rearing activities. Nests located at ground level can be destroyed if material extraction at these sites occurs during the nesting season. Personnel, specifically Wildlife Monitors, will be directed to look for evidence of activity and or nests at ground level near the work area. The crew's summer activities will be restricted to the existing worksites to avoid disturbing Harris's sparrow nest sites. Mitigation measures and best practices to minimize impacts of human land use on Harris's sparrow are shown on **Table 8-9** Summary of Potential Effects on Wildlife and Proposed Mitigation Measures, **Table 8-10** Wildlife Sensitive Periods and Recommended Minimum Setback Distances from Wildlife Habitat and Wildlife Use Areas, and **Table 8-11** Recommended Minimum Flight Altitudes and Sensitive Periods for Wildlife.

Horned Grebe (*Podiceps auritus*)

SARA Registry: Special Concern (Schedule 1)

NWT Listing: Not Applicable

The horned grebe is a water bird with breeding plumage that is characterized by a black back and head, a white belly with chestnut flanks, and two beige feather tufts ("horns") crowning the head (GNWT, 2024). Horned grebes feed on a variety of aquatic prey, including fish, amphibians, and aquatic insects. Typical habitat includes small ponds, marshes, and wetlands either natural or mad-made. Horned grebes arrive in the NT in May and build floating nests among emergent vegetation in wetland areas. Five to seven eggs are laid in early summer, hatching in mid-June or July. Adult grebes leave the NT for their coastal wintering areas in late summer, with the last individuals leaving their northern ranges at the end of September or early October (COSEWIC, 2009).

Potential threats to the horned grebe in the NT include human activities resulting in increasing numbers of nest and chick predators and climate change causing loss of wetlands and/or changes in water quality (GNWT, 2024).

Portions of the Program to be carried out in the summer may overlap horned grebe breeding and brood-rearing activities. Personnel, specifically Wildlife Monitors, will be directed to look for evidence of activity near the work area. Summer activities during the nesting period include scouting via helicopter to determine future water access for winter access construction. It is expected that areas at or near water bodies will be untouched and nesting birds will be unaffected. Minimal clearing *and the crew's spring/summer activities* will be restricted to the existing worksites to avoid disturbing horned grebe nest sites. Mitigation measures and best practices to minimize impacts of human land use on horned grebe are shown on **Table 8-9** Summary of Potential Effects on Wildlife and Proposed Mitigation Measures, **Table 8-10** Wildlife Sensitive Periods and Recommended Minimum Setback Distances from Wildlife Habitat and Wildlife Use Areas, and **Table 8-11** Recommended Minimum Flight Altitudes and Sensitive Periods for Wildlife.

Lesser Yellowlegs (*Tringa flavipes*)

SARA Registry: Under Consideration (Schedule 1)

NWT Listing: Not Applicable

This medium-sized shorebird has 80% of its breeding range in Canada's boreal region, migrates through the United States and Caribbean, and winters mostly in South America. It has experienced substantial long- and short-term declines, most recently estimated at 25% over three generations (12 years) based on the Breeding Bird Survey, and greater than 50% over 10 years based on International Shorebird Surveys. Declines are expected to continue (COSEWIC, 2020).

Breeding birds have uniform gray to grayish brown upperparts with pale spotting. They have a dark bill, long slender neck, and distinctive bright, long yellow legs. Their distinctive “tu-tu” call can commonly be heard in boreal habitats during the breeding season. Lesser Yellowlegs breed in muskeg and open forests in the boreal ecozone. They typically lay 4 eggs in a slight depression in the ground in dense vegetation near open water. Lesser Yellowlegs are very defensive of their nest site and will approach intruders from great distances in order to distract them. Their nests are notoriously difficult to find as a result.

Potential threats include: loss of wetland breeding habitat in NWT (Conference of Management Authorities, 2020a); loss of wetland and intertidal habitat used on migration and in winter; hunting for sport and subsistence, which has been reduced in some areas but likely remains the most significant threat; and effects of climate change including increased risk of drought in breeding areas, coastal flooding, and greater severity of hurricanes during fall migration (COSEWIC, 2020).

Activities proposed for summer may coincide with the Lesser Yellowlegs’ brood-rearing activities. Nests located at ground level can be destroyed if material extraction at these sites occurs during the nesting season. Personnel, specifically Wildlife Monitors, will be directed to look for evidence of activity and or nests at ground level near the work area. The crew’s activity will be restricted to the existing worksites to avoid disturbing nest sites. Mitigation measures and best practices to minimize impacts of human land use on lesser yellowlegs are shown on **Table 8-9** Summary of Potential Effects on Wildlife and Proposed Mitigation Measures, **Table 8-10** Wildlife Sensitive Periods and Recommended Minimum Setback Distances from Wildlife Habitat and Wildlife Use Areas, and **Table 8-11** Recommended Minimum Flight Altitudes and Sensitive Periods for Wildlife.

Olive-Sided Flycatcher (*Contopus cooperi*)

SARA Registry: Threatened (Schedule 1)

NWT Listing: Not Applicable

The Olive-sided Flycatcher is a deep olive-grey with a white breast and belly. The dark patches on either side of its white belly look like an unbuttoned vest. Its bill is short and stout, the top bill is dark and the bottom one is light with a black tip. Typical habitat includes young boreal forests, including those created by forest fires or clear cuts, and mature conifer stands near open areas containing tall trees or snags for perching (Conference of Management Authorities, 2020a). Olive-sided flycatchers arrive in the NT to breed in early summer. Approximately 54% of its breeding range is in Canada. Females lay two to five eggs, in a nest constructed of twigs and rootlets. Olive-sided flycatchers leave the NT in late summer for their wintering grounds in Central and South America (COSEWIC, 2018).

Potential threats affecting olive-sided flycatchers are uncertain and may be more applicable to their southern breeding and wintering range. The availability of breeding habitat in Canada may be decreasing due to fire suppression as a forest management practice. Extreme weather on breeding grounds may be a potential threat due to decreases in the availability of food which could delay nesting or reduce nestling survival (COSEWIC, 2018).

Summer activities may coincide with olive-sided flycatcher mating and brood-rearing activities. Although olive-sided flycatchers nest in trees, personnel, specifically Wildlife Monitors, will be directed to look for evidence of activity near the work area. The crew’s activity will be restricted to the existing worksites to avoid disturbing olive-sided flycatcher nest sites. Mitigation measures and best practices to minimize impacts of human land use on olive-sided flycatchers are shown

on **Table 8-9** Summary of Potential Effects on Wildlife and Proposed Mitigation Measures, **Table 8-10** Wildlife Sensitive Periods and Recommended Minimum Setback Distances from Wildlife Habitat and Wildlife Use Areas, and **Table 8-11** Recommended Minimum Flight Altitudes and Sensitive Periods for Wildlife.

Peregrine Falcon (*Falco peregrinus*)

SARA Registry: Special Concern (Schedule 1)

NWT Listing: No Status

The Peregrine Falcon is a crow-sized raptor with long, pointed wings. Adults have bluish-grey or darker upperparts, and pale underparts with variable amounts of dark spotting and barring. Immatures have upperparts that vary from pale to slate or chocolate brown, and underparts that are buff with blackish streaks. A dark malar stripe extends from the eye across the cheek and is generally wider on adults. Sexes are best distinguished by size, with females being on average 15-20% longer and 40-50% heavier than males.

The anatum/tundrius Peregrine Falcons in northern Canada nest primarily on cliffs along large river systems. They maintain a nesting territory, although in areas with abundant prey, nest sites can be close together. Adults typically return to previously used nest sites, and those with high productivity are often occupied throughout successive generations. The young usually begin to take flight around 40 days after hatching, with males typically fledging earlier than females. Productivity in northern Canada it has consistently remained at or below 1.5 fledged young per breeding pair.

Although the historical population size was not well documented, given the remoteness of most nest sites, there was an evident dramatic decline in Peregrine Falcon numbers in the middle of the 20th century because of widespread contamination by DDT (dichlorodiphenyltrichloroethane), which resulted in impaired reproduction through thinning of eggshells (COSEWIC, 2017a). The COSEWIC Assessment and Status Report, 2017 assesses the Peregrine Falcon at 'not at risk'.

Potential threats in the NWT include (Conference of Management Authorities, 2020a):

- Human disturbance at nest sites;
- Development along the Mackenzie River as well as resource exploration or development in other areas;
- Climate-related events that can affect survival of chicks, such as heavy rain events and severe black fly infestations; and
- Other potential threats include susceptibility to DDT and other organochlorine pesticide contamination, poaching of eggs for falconry, declining songbird or seabird prey populations, and emerging disease.

Portions of the Program to be carried out in the *spring*/summer may coincide with mating and brood-rearing activities. Personnel, specifically Wildlife Monitors, will be directed to look for evidence of activity near the work area. As nesting pairs often return to a previously used nest, local knowledge of these locations will be particularly helpful. The crew's activity will be restricted to the existing worksites to avoid disturbing nest sites. Mitigation measures and best practices to minimize impacts of human land use on peregrine falcons are shown on **Table 8-9** Summary of Potential Effects on Wildlife and Proposed Mitigation Measures, **Table 8-10** Wildlife Sensitive Periods and Recommended Minimum Setback Distances from Wildlife Habitat and Wildlife Use

Areas, and **Table 8-11** Recommended Minimum Flight Altitudes and Sensitive Periods for Wildlife.

Red-necked Phalarope (*Phalaropus lobates*)

SARA Registry: Special Concern (Schedule 1)

NWT Listing: Not Applicable

The red-necked phalarope is a small shorebird with a thin, needle-like bill. Both sexes have a dark head with a white spot above the eye, white throat and dark back with bold, buff coloured streaking. The bright, chestnut-red stripe that extends down the sides of the neck from behind the ear is distinctive. Females have brighter and bolder colours overall and are slightly larger than males (Conference of Management Authorities, 2020a).

Red-necked Phalaropes can be found throughout much of the NWT during the breeding season, arriving in the territory from late-May to early-June. Typical habitat includes low and sub-arctic tundra, or tundra-forest transition habitats. Nest-sites are typically located in grass-sedge vegetations near freshwater wetlands, lakes, ponds, rivers or streams. Females lay a clutch of four eggs which is then incubated by the male for a period of 19-21 days. Like other phalaropes, they spend much of their life in oceanic environments, effectively making them among the world's smallest "seabirds." Red-necked Phalaropes appear to have experienced significant declines at an important migratory staging area since the 1970s, but the overall population trend is unknown. Red-necked Phalaropes spend most of the year at sea, coming inland during the breeding season and on migration. Red-necked Phalaropes feed on plankton and aquatic invertebrates which they capture with their bills while swimming. They can often be observed spinning in circles, which creates an upward current that draws prey items closer to the surface where they can be captured more easily.

Potential threats affecting red-necked phalarope in the NT are loss and degradation of breeding habitat (Conference of Management Authorities, 2020a).

Portions of the Program to be carried out in the *spring*/summer may coincide with red-necked phalarope mating and brood-rearing activities. Summer activities include helicopter scouting for water sources used for winter access construction, minimal brush clearing, well testing, *and abandonment*. It is not expected that activities will involve any nearby water bodies. Personnel, specifically Wildlife Monitors, will be directed to look for evidence of phalarope activity near the work area. The crew's activity will be restricted to the existing worksites to avoid disturbing nest sites. Fuel caches will be set-back a minimum of 100m from the high-water mark of water bodies. Mitigation measures and best practices to minimize impacts of human land use on red-necked phalaropes are shown on **Table 8-9** Summary of Potential Effects on Wildlife and Proposed Mitigation Measures, **Table 8-10** Wildlife Sensitive Periods and Recommended Minimum Setback Distances from Wildlife Habitat and Wildlife Use Areas, and **Table 8-11** Recommended Minimum Flight Altitudes and Sensitive Periods for Wildlife.

Rusty Blackbird (*Euphagus carolinus*)

SARA Registry: Special Concern (Schedule 1)

NWT Listing: No Status

The Rusty Blackbird (*Euphagus carolinus*) is a medium-sized songbird. Both sexes have pale yellow eyes and a black, slightly curved bill. During the breeding season, the male is uniformly black, with a faint greenish gloss to its body and slight violet gloss to its head and neck. The female is brownish grey with no gloss. The feather edges of both sexes are a distinctive rusty

colour. In winter, the plumage of both sexes is more rust-coloured. In the western provinces, Rusty Blackbirds can easily be confused with Brewer's Blackbirds, which have stouter bills, longer legs and tail, and glossier plumage.

Because 85% of the Rusty Blackbird's breeding range is located in Canada, it is a species for which Canada has a major conservation responsibility. The rusty blackbird feeds primarily on aquatic insects, although it has been known to feed on seeds, vegetation, and occasionally even other birds. The rusty blackbird inhabits forested areas near wetlands and can often be seen foraging in wet vegetation in small flocks (COSEWIC, 2017b). Rusty blackbirds live in the boreal forest of the NT from early May to mid-October. They breed near open water in treed wetlands (bogs, fens, and swamps), often forming loose colonies. Nests are primarily constructed from twigs, grass, and lichens in riparian trees and shrubs, with females laying three to six eggs. Rusty blackbirds spend the winter in the southeastern United States (Conference of Management Authorities, 2020a).

Rusty Blackbirds have exhibited a significant population decline in the past century. Data from the Christmas Bird Count suggest that between 1966 and 2003, the population declined by approximately 85%, but a review of historical accounts indicates the population was declining even prior to this time period (Environment Canada, 2015). Potential threats to the rusty blackbird in the NT comprise of activities that alter forest and wetland habitat including forest clearing, changes in surface water levels or flow patterns, and wetlands drying because of climate change (Conference of Management Authorities, 2020a).

Portions of the Program to be carried out in the summer may coincide with rusty blackbird brood-rearing activities. Personnel, specifically Wildlife Monitors, will be directed to look for evidence of activity near the work area. The crew's activity will be restricted to the existing worksites to avoid disturbing rusty blackbird nest sites. Fuel caches will be set-back a minimum of 100m from the high-water mark of water bodies or watercourses. Mitigation measures and best practices to minimize impacts of human land use on rusty blackbirds are shown on **Table 8-9** Summary of Potential Effects on Wildlife and Proposed Mitigation Measures, **Table 8-10** Wildlife Sensitive Periods and Recommended Minimum Setback Distances from Wildlife Habitat and Wildlife Use Areas, and **Table 8-11** Recommended Minimum Flight Altitudes and Sensitive Periods for Wildlife.

Short-Eared Owl (*Asio flammeus*)

SARA Registry: Special Concern (Schedule 1)

NWT Listing: No Status

The Short-eared Owl is a medium-sized owl, approximately 34-42cm in length. Adults are cryptically coloured (camouflaged) with a brown back and creamy-buff chest with brown streaks. The best field mark is the species' habit of flying low over open habitat with deep, moth-like wing beats (COSEWIC, 2008). There are black spots on the undersides of their wings near the wrists. Females are slightly larger and darker than males with heavier streaking. Short-eared owls are similar in size to a crow with yellow eyes and two small black tufts forming the "ears" on top of the head. Short-eared owls feed primarily on small mammals, hunting at dawn and dusk. In summer, Short-eared owls nest on the ground in grasslands, tundra, bogs, marshes and other open (non-forested) areas. Their habitat includes areas with abundant small mammals to eat (the owls move around as small mammal populations fluctuate).

Short-eared owls typically arrive in the NT in April or May, laying an average of seven eggs by mid-June in nests built on the ground, with owlets hatching in early July. Short-eared owls generally leave the NT by late October.

Potential threats in the NT include habitat loss and degradation from human activities, mainly in their southern range, and climate changes resulting in the alteration of their tundra habitat or prey populations (Conference of Management Authorities, 2020a).

Portions of the Program to be carried out in the summer may coincide with short-eared owl brood-rearing activities. Nests located at ground level can be destroyed if material extraction at these sites occurs during the nesting season. Personnel, specifically Wildlife Monitors, will be directed to look for evidence of activity and or nests at ground level near the work area. The crew's activity will be restricted to the existing worksites to avoid disturbing nest sites. Mitigation measures and best practices to minimize impacts of human land use on short-eared owls are shown on **Table 8-9** Summary of Potential Effects on Wildlife and Proposed Mitigation Measures, **Table 8-10** Wildlife Sensitive Periods and Recommended Minimum Setback Distances from Wildlife Habitat and Wildlife Use Areas, and **Table 8-11** Recommended Minimum Flight Altitudes and Sensitive Periods for Wildlife.

8.3.5.6 Amphibians and Reptiles

None of the amphibious Species at Risk shown on **Table 8-7** are mapped to be present in the Program area.

8.3.5.7 Insects

The following is a list of "Species at Risk" insects that have a range that overlaps with the Program area (**Table 8-8**):

Transverse Lady Beetle *Coccinella transversoguttata*

Transverse Lady Beetle (*Coccinella transversoguttata*)

SARA Registry: Under Consideration

NWT Listing: No Status

Transverse Lady Beetles are small, round beetles (5.0 - 7.8mm) that are native to North America. Adults have orange to red wing covers with black markings, consisting of a black band and four elongate spots, which distinguish them from other species. This charismatic species was once one of the more common and widespread lady beetles in North America, playing an important role as a biological control agent of aphids and other insect pests (COSEWIC, 2016). However, since 1986 it has undergone population declines. In many areas where it was once common it is now absent, below detection limits, or at low numbers. Reasons for the population declines are unclear but introduced non-native lady beetles are probably an important factor that has brought increased competition and predation, as well as new diseases and parasites. Pesticide use may also be a factor. The Transverse Lady Beetle is still common in the NWT, Yukon, and British Columbia where there are fewer non-native lady beetle species.

Potential threats in the NT include the use of pesticides and competition and predation by introduced non-native lady beetle species (GNWT, 2024).

Portions of the Program to be carried out during the summer months may coincide with the active period of transverse lady beetles. Personnel, specifically Wildlife Monitors, will be directed to look for evidence of activity near the work area. The crew's activity will be restricted to previously disturbed areas to avoid disturbing critical habitat.

8.3.5.8 Mitigation Measures

Suncor is committed to limiting the effects of the Program on wildlife and wildlife habitat. **Table 8-9** provides a summary of the identified potential effects of the Program on wildlife and the protection and mitigation measures to be employed.

Table 8-9: Summary of Potential Effects on Wildlife and Proposed Mitigation Measures

Potential Effects	Proposed Environmental Protection and Mitigation Measures
Habitat loss, sensory disturbance and mortality risk	<ul style="list-style-type: none"> The project area will be examined (swept) for den and nest sites prior to start-up of project activities. Work crews will be encouraged to support the work of the Wildlife Monitors. Wildlife will not be approached or fed by Program personnel and Program personnel will not be permitted to hunt on the worksites. Helicopter flights within the region will adhere to the minimum flight altitude and vertical distances as recommended in the Northern Land Use Guidelines (GNWT, 2015b) and in the publication <i>Flying Low? Think Again...</i> (GNWT, 2013), unless safety is a concern. Den, dam, lodge, and nest sites will be actively avoided and will follow Northern Land Use Guidelines (GNWT, 2015b) for minimum setbacks. The Wildlife Monitor will observe and document wildlife and potential wildlife impacts to ensure that appropriate environmental protection measures are being implemented. Species at risk mammal and amphibian observations will be reported to WILDLIFEOBS@gov.nt.ca. Species at risk bird observations will be reported to NWTchecklist@ec.gc.ca. Species at risk insect observations will be reported to NWTBugs@gov.nt.ca.
Habitat loss, sensory disturbance and mortality risk	<ul style="list-style-type: none"> Waste will be managed in accordance with the Program WMP (refer to Appendix 6). Food will be stored securely, and garbage disposed of frequently. Program activities <i>may</i> occur during the spring and fall migration. Program operations will avoid damaging nests (active or inactive) being mindful that nests for numerous species are on the ground. Destruction, or disruption of eggs and/or nests, including inactive nests, is prohibited by the <i>Wildlife Act</i> (s. 51(1)). The deposition of any substance into waters or areas frequented by migratory birds is prohibited under the <i>Migratory Birds Convention Act</i> (Section 5.1). Substances harmful to migratory birds will not be placed in waters or areas frequented by migratory birds or in a place from which the substance may enter such waters or such an area. Program activities will be conducted during summer and winter to minimize activity during critical periods for wildlife (spring and fall). Operations will not be conducted within 30m of any waterbodies not being crossed. Vehicles and other equipment will be limited to travelling 40km/h within the program area, will be required to communicate approach and hazards using radios, and will be instructed to slow down when passing wildlife or on-coming traffic.
Disturbance during critical wildlife periods (migration, nesting, denning, breeding).	<ul style="list-style-type: none"> The leases and surrounding area will be examined (swept) for den and nest sites prior to start-up of project activities If a den, dam, lodge, nest site is found, all minimum setback distances will be adhered to as listed in Northern Land Use Guidelines (GNWT, 2015b) and provided in Table 8-10. If a den, dam, lodge or nest site is observed at one project location, project activities may be halted and crew relocated to one of the other leases while the den, dam, lodge or nest is in use. Minimum flight altitudes will be adhered to as described in Northern Land Use Guidelines (GNWT, 2015b).

Table 8-10: Wildlife Sensitive Periods and Recommended Minimum Setback Distances

Wildlife or Wildlife Habitat	Period	Specific Conditions	Minimum Setback Distance (km)
All wildlife and birds, general	Breeding and birthing seasons	Varies with region and species: contact local GNWT-ENR or Environment Canada office	0.25
Bear dens (grizzly and black bear)	Sept 30 – Mar. 30	All species' dens, general industrial activities	0.8
Bear dens (grizzly and black bear)	May 16 – July 15	All species	0.3
Bears (grizzly and black bear)	July 15 – Sept 15	Berry habitat	0.3
Caribou (barren-ground)	May 15 – Oct 15	Water crossings – general activities	1.0
Caribou (barren-ground and woodland)	Year round	Shut-down distance if caribou are in the area	0.5
Mineral/salt licks	Apr 1 – July 15		0.25
Wolverine dens	Oct 15 – July 15		2.0
Bird staging and nesting areas	When birds are present	Flight line distance to areas	1.5
Nests of bird species at risk	When nests are found	Olive-sided Flycatcher, Rusty Blackbird	0.3
Raptors, general	Mar 1 – Sept 1 Sept 2 – Feb 28	Nest Sites Nest Sites	1.5 0.5
Trees supporting stick and/or cavity nests	Year round	Do not cut down	
Waterfowl	During Migration		0.3
Waterfowl	Year round	Nest sites, staging areas, and concentrations	0.25

This table is excerpted from Northern Land Use Guidelines Northwest Territories Seismic Operations (Sept 16, 2015). Only listed species with potential to be in the project area have been included.

Table 8-11: Summary of Potential Effects on Wildlife and Proposed Mitigation Measures

Species/Group	Habitat Type	Period	Minimum Altitude (m)
All wildlife and birds, general	Varies according to species: contact local GNWT-ENR or Environment Canada office	Breeding and birthing seasons; varies according to region and species; contact local GNWT-ENR or Environment Canada office.	650
Wildlife, general	All habitat types during ferry flights	Year round	300
Wildlife, general	When flying point-to-point in vicinity of caribou and other wildlife species	Year round	610
Wildlife, general	During wildlife surveys	Year round	100
Birds, general	Areas likely to have birds	Year round	650
Birds, general	Areas where birds are known to concentrate (sanctuaries, colonies, moulting areas)	Year round	1,100
Black and grizzly bear	Dens	Oct 15 – May 15	300
Wolverine	Dens	Oct 15 – May 15	300
Raptors	Nest sites	Year round	650
Waterfowl	Nest sites	June 1 – Aug 31	650
Waterfowl	Staging areas	May 10 – Sept 30	650
Waterfowl	Concentrations	Year round	650

This table is excerpted from Northern Land Use Guidelines Northwest Territories Seismic Operations (Sept 16, 2015).

8.3.5.9 Residual Effects

Residual effects of the Program on wildlife and birds are species-specific and will vary with the type, intensity, and duration of the disturbance. Residual effects are not expected to be present for most species. However, barren-ground caribou, grizzly bear, wolverine and boreal caribou may experience residual effects from the Program. These species will be discussed further within Section 9 of this EPP.

The Program is not predicted to result in significant environmental effects since the duration of the disturbance will be short. The predicted effects will be mitigated in the short term by implementing measures described in **Table 8-9**, adapting these mitigations as required, and in the medium to long term, through post-reclamation site recovery. The intent of the Program is to abandon, reclaim and improve the overall condition of the three wellsites and associated infrastructure.

8.4 Aquatic Resources

This section examines the aquatic resources with respect to hydrology, surface water quality, groundwater quality, fish and fish habitat. In addition, the mitigation measures that will be implemented and the residual effects of the Program.

8.4.1 Surface Water and Groundwater Quantity & Quality

The potential for effects on surface water and groundwater quantity and quality from the proposed Program are anticipated to be low. Potential effects of spills and leaks from equipment could lead to surface water effects. Mitigation measures are summarized in **Table 8-12** and are also found in the Emergency Response Plan and Corporate Spill Response Contingency Manual (refer to **Appendix 5**).

8.4.1.1 Mitigation Measures

Table 8-12 provides a summary of the identified potential effects of the Program on surface water and groundwater and the protection and mitigation measures to be employed.

Table 8-12: Summary of Potential Surface Water and Groundwater Effects and Proposed Mitigation Measures

Potential Effects	Proposed Environmental Protection and Mitigation Measures
Water Quality Changes	<ul style="list-style-type: none"> • Materials will not be stored on the surface ice of water bodies or within 100m of the normal high-water mark to minimize the potential for contamination of water resources. • Parked equipment will be inspected during a daily walk-around to identify and manage signs of spills or leaks. • Drip trays and absorbent pans will be used to capture minor spills and drips while fuelling equipment. The drip trays will be monitored for fluid levels and replaced as necessary. Care will be taken during refuelling. • Fuel caches will be set-back a minimum of 100m from the high-water mark of any waterbody or watercourse. • Suncor has developed an Emergency Response Plan and Corporate Spill Response Contingency Manual (refer to Appendix 5) that will be adhered to throughout the course of the Program. • Spill kits will be kept on-site during operations. Spill response equipment includes waste bags, absorbent pads, and shovels. • If a spill occurs, Suncor will implement spill reporting, clean-up and sampling as per regulations and requirements. • Spills, regardless of volume, will be documented and records kept by Suncor. • Should a regulatory reportable spill occur, the NT/NU 24-hour Spill Report Line will be contacted at (867) 920-8130, or alternatively the NT/NU Spill Report Form will be completed and emailed to spills@gov.nt.ca. • If a spill does occur, Suncor will endeavour to clean-up the spill before infiltration occurs. • Effort will be made to avoid wetlands during summer operations. • Ice thickness will be tested prior to watercourse crossings during winter operations. • Operations will not be conducted within 30m of any waterbodies not being crossed. • Waste will be managed in accordance with the Program WMP (refer to Appendix 6).

Potential Effects	Proposed Environmental Protection and Mitigation Measures
Water Flow or Level Changes	<ul style="list-style-type: none"> • Suncor may require >100m³ of water per day <i>if winter access is required</i>. • Domestic water may be drawn from the Colville Lake Water Treatment Plant in Colville Lake. Bottled drinking water may be purchased and transported to the Program site. • The proposed Program is not anticipated to affect the flow or level of surface water or groundwater. • All watercourse crossings will adhere to the <i>Northern Land Use Guidelines – Access: Roads and Trails</i> (GNWT, 2015d).

8.4.1.2 Residual Effects

Program-related residual effects on surface water and groundwater quantity and quality are expected to be negligible under normal operating conditions. Adherence to the above-mentioned mitigations and protocols (**Table 8-12**) is expected to minimize the potential residual effects of the Program.

8.4.2 Fish and Fish Habitat

None of the fish Species at Risk shown on **Table 8-7** are mapped to be present in the Program area.

8.4.2.1 Regulations Pertaining to Fish

Substantial changes to the federal Fisheries Act (Government of Canada, 1985a) were invoked through the passing of the *Jobs, Growth and Long-term Prosperity Act* referred to hereafter as Bill C-38 in June 2012 (Government of Canada, 2012).

Division Five, section 136 of Bill C-38 (an amendment to sections 20 to 22 of the Fisheries Act) states that the owner or person who has the charge, management, or control of an obstruction, or of any other thing that is harmful to fish shall, on the Minister’s request, conduct studies, analyses, samplings, and evaluations. If the Minister considers that doing so is necessary to ensure the free passage of fish or to prevent harm to fish, the owner or person who has the charge, management, or control of an obstruction or any other thing that is harmful to fish shall, on the Minister’s request, remove the obstruction or thing, or shall allow for the passage of fish by means deemed suitable by the Minister. Furthermore, no person shall obstruct more than two-thirds of the width of any river or stream or more than one-third of the width of the main channel at low tide of any tidal stream (Government of Canada, 2012).

Section 139 of Bill C-38 (an amendment to Section 32 of the Fisheries Act) states that no person shall kill fish by means other than fishing.

Section 142 of Bill C-38 (an amendment to Section 35 of the Fisheries Act) states that no person shall carry on any work, undertaking, or activity that results in the harmful alteration or disruption, or the destruction of fish habitat, unless otherwise authorized by the Minister, and the work, undertaking, or activity is carried on in accordance with the conditions established by the Minister.

Section 36 of the Fisheries Act states that no person shall deposit or permit the deposit of a deleterious substance of any type in water frequented by fish or in any place under any conditions where the deleterious substance or any other deleterious substance that results from the deposit of the deleterious substance may enter any such water.

Section 144 of Bill C-38(an amendment to Section 37 of the Fisheries Act) states that if a person carries on, or proposes to carry on any work, undertaking, or activity that results or is likely to result in the alteration, disruption, or destruction of fish habitat, or in the deposit of a deleterious

substance in water frequented by fish or in any place under any conditions where that deleterious substance, or any other deleterious substance that results from the deposit of that deleterious substance, may enter any such waters, the person shall, on the request of the Minister, or without request, provide the Minister with any plans, specifications, studies, procedures, schedules, analyses, samples, evaluations, and other information relating to the work, undertaking or activity, or to the water, place or fish habitat that is or is likely to be affected by the work, undertaking or activity.

Section 145 of Bill C-38 (an amendment to Section 38 of the Fisheries Act) states that every person shall, without delay, notify an inspector, a fishery officer, or an authority prescribed by the regulations, of a harmful alteration or disruption, or a destruction of fish habitat that is not authorized under this Act, or of a serious and imminent danger of such an occurrence; any person shall, as soon as feasible, take all reasonable measures consistent with public safety and with the conservation and protection of fish and fish habitat to prevent the occurrence or to counteract, mitigate, or remedy any adverse effects that result from the occurrence or might reasonably be expected to result from it; and, as soon as feasible after the occurrence or after learning of the danger of the occurrence, the person shall provide an inspector, fishery officer, or an authority prescribed by the regulations with a written report on the occurrence or danger of the occurrence.

Section 7(1) of the *Northwest Territories Fishery Regulations* (Government of Canada, 1985b) states that no person shall catch, kill, molest, or injure fish, by using firearms, spears, arrows, gaffs, lights, sticks, stones, clubs, snares, dip nets, or gill nets except under authority of a license.

Suncor will ensure that the above legislation is complied with, and that personnel respect and adhere to the mitigation measures in place to protect aquatic wildlife.

8.4.2.2 Species at Risk

Suncor is providing further information on the fish species in **Table 8-8** which are listed as “Species at Risk” and have potential to be found in the Program area. Species-specific searches were done on the SARA Registry and the NWT List of Species at Risk (Conference of Management Authorities, 2020a). According to mapping included in the species profiles resulting from the NWT List of Species at Risk, there are no fish that are considered SAR whose habitat is in the Program area.

8.4.2.3 Effect on Fish Habitat

Water quality and fish habitat may be affected by machinery and vehicle traffic near or over the watercourses. Potential effects on fish are limited to the potential contamination of water due to unexpected spills, incidents, or sedimentation due to erosion. Spills and leaks from equipment could lead to reduced fish habitat quality. Mitigation measures are summarized in **Table 8-13** and are also found in Suncor’s Emergency Response Plan and Corporate Spill Response Contingency Manual (refer to **Appendix 5**).

8.4.2.4 Mitigation Measures

Table 8-13 provides a summary of the identified potential effects of the proposed Program on fish habitat and the protection and mitigation measures to be employed by Suncor.

Table 8-13: Summary of Potential Effects on Fish Habitat and Proposed Mitigation Measures

Potential Effects	Proposed Environmental Protection and Mitigation Measures
Changes in Fish Habitat Quality	<ul style="list-style-type: none"> • Effort will be made to avoid wetlands during summer operations. • Winter Operations: Materials will not be stored on the ice surface of waterbodies or within 100m of the normal high-water mark to minimize the potential for contamination of water resources. • Parked equipment will be inspected during a daily walk-around to identify and manage signs of spills or leaks. • Drip trays and absorbent pans will be used to capture minor spills and drips while fuelling equipment. The drip trays will be monitored for fluid levels and replaced as necessary. Care will be taken during refuelling. • Fuel caches will be set-back a minimum of 100m from the normal high-water mark of any water body or watercourse. • Suncor has developed an Emergency Response Plan and Corporate Spill Response Contingency Manual (refer to Appendix 5) that will be adhered to throughout the course of the Program. • Spill kits will be kept on-site during operations. Spill response equipment includes waste bags, absorbent pads, and shovels. • If a spill occurs, Suncor will implement spill reporting, clean-up, and sampling as per regulations and requirements. • Spills, regardless of volume, will be documented and records kept by Suncor. • Should a regulatory reportable spill occur, the NT/NU 24-hour Spill Report Line will be contacted at (867) 920-8130, or alternatively the NT/NU Spill Report Form will be completed and emailed to spills@gov.nt.ca. • If a spill does occur, Suncor will endeavour to clean-up the spill before infiltration occurs. • Ice thickness will be tested prior to watercourse crossings during winter operations. • Domestic water may be drawn from Colville Lake for Tweed Lake M-47 and Tweed Lake A-67. Additional water sources within the program area may be identified for domestic use. Bottled drinking water will be purchased and transported to the Program site. • Non-potable water may be used for road lease construction, and other uses such as showers and toilets. • Program activities will be conducted during appropriate seasons to minimize activity during critical periods for wildlife (fall spawning). • Operations will not be conducted within 30m of any waterbodies not being crossed. • Waste will be managed in accordance with the Suncor's WMP (refer to Appendix 6).

8.4.2.5 Residual Effects

Program related residual effects on fish and fish habitat are expected to be negligible under normal operating conditions. Adherence to the mitigations and protocols (as described in **Table 8-13**) is expected to minimize the potential residual effects of the Program.

9 CUMULATIVE EFFECTS ASSESSMENT

Cumulative Effects are changes to the environment caused by an activity combined with past, present and reasonably foreseeable future activities. This Cumulative Effects Assessment (CEA) follows the protocol outlined by the *Mackenzie Valley Environmental Impact Review Board Environmental Impact Assessment Guidelines March 2004* (MVEIRB, 2004). As such, the assessment involves:

- Establishing spatial and temporal boundaries for the analysis;
- Identifying Valued Components (VCs);
- Determining other past, present, or reasonably foreseeable future developments acting on these VCs;
- Identifying potential residual effects of Program activities in combination with these other developments; and
- Recommending mitigative measures that may be required for the management of cumulative effects in relation to future developments.

Analysis of the cumulative effects associated with the addition of the Program to the existing development in the area was addressed using Geographic Information System (GIS) analysis and a quantitative assessment. This analysis involved defining the current levels of activity in the regional study area relative to the selected Valued Components (VCs) and assessing the significance of the Program to the contribution of these effects following the proposed mitigation.

9.1 Identifying Valued Components & Potential Residual Effects

Residual effects are those impacts arising from the implementation of the proposed Program that cannot be effectively avoided or mitigated. When summed, they may lead to cumulative effects when interacting with other activities on the landscape. The selection of VCs and a preliminary assessment of Program impacts were completed in **Section 8 (Table 8-8)** of this EPP. Of the VCs identified, those with residual effects that may act cumulatively with other developments will be discussed in the CEA.

The Program is not expected to result in significant residual effects for the following:

- Air Quality;
- Noise Levels;
- Soils;
- Vegetation;
- Surface Hydrology;
- Groundwater;
- Birds;
- Insects;
- Fish;
- Amphibians
- Socio-economics; and
- Traditional Land Use.

Residual effects may occur, and cumulative effects will be further assessed for the following:

- Permafrost; and
- Wildlife (**Table 8-8**).

9.1.1 Program Activities Considered in the Cumulative Effects Assessment

Currently proposed Program activities to be considered in the CEA include:

- Construction of winter road access from Colville Lake to *any or all of* the three wellsites (*if required in future years*) increased activity (truck, ATV, snowmobile, equipment, and human) during the winter operating season from November to March, or increased activity (helicopter, equipment, and human and possibly truck, ATV) during the *spring*/summer operating season from *May* through September.
- Abandonment and reclamation activities at each of three wellsites.

9.1.2 Spatial Boundaries of the Cumulative Effects Assessment

A Regional Study Area (RSA) was selected based on:

- An area where potential effects associated with the proposed development and other interacting developments could potentially be observed.

The RSA encompasses:

- Suncor's Bele O-35, Tweed Lake A-67, and Tweed Lake M-47 wellsites and associated wellsite infrastructure;
- The constructed winter road corridor from Colville Lake winter road south, via Tweed Lake A-67, terminating at Bele O-35 wellsite;
- Local wellsite access for Tweed Lake M-47; and
- 5km-wide buffer.

The RSA totals approximately 800km². This represents the study area in which the potential effects of the proposed Program and past, current, and potential interacting development and activity have been assessed.

9.1.3 Temporal Boundaries of the Cumulative Effects Assessment

The proposed Program components will take place during *all seasons*, depending on the activity, between the years 2022 - *2027*. The intent of the Program is to abandon and reclaim the above stated wellsites and associated infrastructure and reclaim the sites to a more natural condition. The CEA considered the current conditions and immediate effects of the proposed Program, and other past, present and future interacting activities, to better depict negative outcomes. However, cumulative effects assessments do not necessarily consider positive effects of a proposed project; the best possible outcome ranking is no interaction, or that the effect is negligible. However, it is important to note that the longer term and positive indirect effects of the Program will include reducing the potential for erosion, re-vegetation, re-establishing natural drainage patterns, and site stabilization.

9.2 Other Development and Activities in the RSA

Identification of other actions that may interact with the above proposed Program components involved the consideration of past, present and reasonably foreseeable future developments within the RSA.

9.2.1 Past Developments

Past actions within the RSA and surrounding landscape, which could potentially interact with the proposed Program include:

- Abandoned oil and gas development;
- Existing oil and gas development;
- Seismic exploration;
- Road construction;
- Community development;
- Linear corridor creation;
- Fire; and
- Wildlife harvesting (i.e. hunting, fishing, trapping).

9.2.2 Current & Foreseeable Future Developments

The proposed Program will conduct abandonment and reclamation activities on existing footprints and facilities. Interactions with potential future projects that are yet to be proposed will also occur and are more difficult to assess; nonetheless, potential future developments are identified in the assessment below.

The following types of developments and activities that may occur within the RSA in the future include:

- MGM Abandonment and Reclamation Program (six wells to abandon (downhole and surface) and two additional to reclaim);
- Periodic inspection activities to assess reclamation effectiveness; and
- Wildlife harvesting.

The ultimate scale and collective effects of these potential future developments depends on many interacting factors beyond the scope of this project-based CEA.

9.3 Contribution of Program to Cumulative Effects on Identified VCs

Interaction matrices were used to depict the possible relationships between the various activities associated with the Program and the VCs within the RSA. These rankings were defined on a scale from 0 to 5, with 0 being no interaction and 5 being the highest level of interaction, and were based on a combination of the magnitude, duration, and extent of each activity (**Table 9-1**, **Table 9-2**, and **Table 9-3**).

Following mitigations, residual effects of Program activities are expected to interact with past, present and future developments to contribute to relatively low ongoing cumulative effects on vegetation, wildlife, permafrost, and noise (**Table 9-4**).

Table 9-1: Magnitude of Program Effects on VCs

Activity	VC								
	Vegetation	Wildlife	Groundwater	Hydrology	Permafrost	Noise	Air Quality	Traditional Land Use	Socio-economics
Winter Road Construction/Use	1	2	0	0	2	1	0	0	0
Abandonment	0	2	1	1	2	1	0	0	0
Reclamation	1	1	0	0	1	1	0	0	0
Monitoring	1	1	0	1	1	1	0	0	0

Table 9-2: Duration of Program Effects on VCs

Activity	VC								
	Vegetation	Wildlife	Groundwater	Hydrology	Permafrost	Noise	Air Quality	Traditional Land Use	Socio-economics
Winter Road Construction/Use	1	2	0	0	2	1	0	0	0
Abandonment	1	2	1	1	1	1	1	0	0
Reclamation	1	1	0	0	1	1	0	0	0
Monitoring	1	1	0	1	0	1	1	0	0

Table 9-3: Spatial Extent of Program Effects on VCs

Activity	VC								
	Vegetation	Wildlife	Groundwater	Hydrology	Permafrost	Noise	Air Quality	Traditional Land Use	Socio-economics
Winter Road Construction/Use	1	2	0	0	3	1	1	1	0
Abandonment	1	2	1	1	2	1	1	0	0
Reclamation	1	1	0	0	1	1	0	0	0
Monitoring	1	1	0	0	0	1	0	0	0

Table 9-4: Summary of the Residual Effects of Program Activities

Activity	VC								
	Vegetation	Wildlife	Groundwater	Hydrology	Permafrost	Noise	Air Quality	Traditional Land Use	Socio-economics
Winter Road Construction/Use	N	L	N	N	L	N	N	N	N
Abandonment	N	L	N	N	L	N	N	N	N
Reclamation	N	N	N	N	N	N	N	N	N
Monitoring	N	N	N	N	N	N	N	N	N

Residual effects were summarized as negligible, low, moderate or high based on the average of magnitude, duration and extent of values in Table 9-1, 9-2 and 9-3.

With the consideration of the magnitude, duration and spatial extent of each Program activity, the associated residual effects of Program activities on vegetation, groundwater, hydrology, noise, air quality, traditional land use, and socio-economics are anticipated to be negligible. The residual effects of Program activities on wildlife and permafrost are anticipated to be low. Of these, Program activities may contribute to cumulative effects on wildlife due to sensory disturbance during potentially sensitive periods from increased helicopter, equipment, and human activity. Thus, a more detailed assessment on affected wildlife VCs are discussed below.

9.3.1 Cumulative Effects on Permafrost

While there is greater possibility of cumulative effects to permafrost, rated from low to moderate due to winter road construction and use (*should it be required*); the residual effect is lowered by relatively short duration. Additional measures will be used including very low traffic volume (exclusive to the project team) and employing standard protective construction methods. Additionally, care will be taken for vehicles to remain on the constructed road to prevent contact with ground surface. Taken together, these actions and approaches will lower the possibility of cumulative effects.

9.3.2 Cumulative Effects on Wildlife VCs

Program actions contributing to cumulative effects on wildlife include: increased helicopter use, equipment, and human activity at the worksites. Specific wildlife VCs that may be affected by residual impacts associated with the Program include:

- Barren-ground and boreal caribou;
- Grizzly bear; and
- Wolverine.

9.3.2.1 Increased Helicopter, Winter Road Construction and Use, Equipment and Human Activity

Increased helicopter, equipment and human activity across the Program area may result in disturbance to wildlife from increased visual and audio stimuli. The construction will use existing (old) clearings for access. Equipment during construction of the winter access road and use during abandonment activities may be disruptive to wildlife. Due to the temporary nature of the increase in traffic and relatively short duration at the worksites, this is not expected to contribute significantly to the cumulative effects of the Program on local wildlife populations. However, Program activity during potentially sensitive periods may influence the use of adjacent habitat for some species.

9.3.2.2 Species-Specific Cumulative Effects Assessment

Barren-ground and Boreal Caribou

Residual effects from increased human activity and associated stimuli can contribute to natural limiting factors that affect year-to-year abundance of caribou in the RSA. These natural limiting factors generally include predation, snow, weather, and insects (Antoniuk, et al., 2009). Stresses from the increase in helicopter and vehicle traffic, equipment use, and human activity throughout the Program will interact with residual impacts of other projects within the RSA and natural factors such as predation, hunting, snow accumulation, winter weather conditions, and spring insect stresses to influence fitness and survival of caribou.

Barren-ground caribou are far ranging and require access and passage during the winter. Construction and use of the winter road, may be disruptive to these movements. Their possible presence in the Program area during fall rut, fall post-rut, and winter will only be affected during winter months. They are in more northerly parts of the Territories in the summer. Careful Wildlife Monitoring will take place to identify presence and take the appropriate response.

Woodland caribou have a low reproductive rate, which makes them particularly sensitive to human activities. A small change in the rate of survival can cause population decline (Antoniuk, et al., 2009). Activities at the Program area are of short duration and, due to well abandonment, will not continue.

The Program will not contribute to the long-term disruption of caribou. However, it is expected that because of the stimuli associated with this activity, caribou use may decrease for the duration of the Program activities, which are short-term and localized. The construction of a winter road may provide an easier route for predation; however, it will be used for an isolated period of 3 months. Short-term human activity in the area might impact local caribou populations to a relatively small extent by temporarily altering the movements and use of the immediate area, but longer-term contributions to the cumulative effects on caribou are not expected.

Grizzly Bear

The greatest contribution of the Program to cumulative effects on grizzly bears will be from potential disturbance during denning. Bears may tolerate disturbance to some degree in the winter during denning, but they have been shown to select or abandon their dens in response to activity. (Linnell, et. al., 2000) suggested bears denning in developed areas generally select dens one to two kilometres from human activity. Activity within one kilometre, and especially 200 metres, has been observed to cause variable responses from denning bears, and could lead to den abandonment and, consequently, potential increased cub mortality (Linnell, et al, 2000). Although unlikely, a disturbance to a sow and cubs during denning or the additive effects of increased activity in an area used for denning could have significant and cumulative effects on the local population due to the relatively low densities and reproductive rate of this species. Longer-term residual impacts leading to grizzly bear avoidance of the area surrounding the Program are unlikely to occur due to the activities being localized and short in duration.

Mitigation to reduce these potential effects includes conducting activities outside of the fall denning period and having a Wildlife Monitor present during the Program. Thus, due to mitigation, it is unlikely that the Program will contribute considerably to cumulative effects on grizzly bears.

Wolverine

Potential effects of the Program on wolverines can be greatest from disturbance during denning. Wolverines appear to be very sensitive to disturbance at natal den sites and will move or abandon kits if disturbed (Jalkotzy, et al, 1997). Jalkotzy, Ross and Nasserden discussed three instances when researchers disturbed wolverines at natal den sites, and the females and their kits abandoned the area. There is little data on wolverine populations in the area, but they occur in low relative densities across large territories. Consequently, disturbance to a natal den site can influence a local population. Wolverines only breed every two years, have small litters, and their kits can have high mortality rates. As a result, they do not recover easily from population declines (GNWT, 2024)

Female wolverines tend to enter natal sites in late February. Thus, due to future winter activity, sensitivity of wolverines, and tendency of wolverines to avoid human activity, the Program may contribute to the cumulative effects on wolverines due to potential disturbance to a den or influencing natal den site selection. Longer-term residual impacts leading to wolverine avoidance

of the area surrounding the Program are unlikely to occur due to the activities being localized and short in duration.

9.3.2.3 Mitigations to Reduce Impacts on Wildlife and “Species at Risk”

Primary mitigations for wildlife and “Species at Risk” include limiting activities during sensitive timing periods. Crew members will be instructed to not approach or disturb animals utilizing the area and avoidance measures will be immediately implemented, as required. Wildlife monitors will conduct continuous patrols during Program activities to identify signs of animal activity. Aircraft will adhere to flight guidelines and recommendations such as minimum flying heights and avoidance of over-flights as described in Northern Land Use Guidelines (GNWT, 2015b). The Program is not expected to directly affect wetlands, waterbodies, or watercourses and, therefore, is not expected to affect fish, waterfowl, or overwintering sites for amphibians.

9.3.2.4 Summary of Cumulative Effects on Wildlife and “Species at Risk”

The contribution of the residual effects associated with the Program to the cumulative effects on wildlife and “Species at Risk” in the RSA were determined to be low due to the temporary nature of the increase in traffic and relatively short duration at the worksites. Ultimately, as discussed, some wildlife species could be affected by activity during potentially sensitive periods which may, in turn, influence the use of adjacent habitat. These residual effects are minimal but may continue to interact with future projects should additional development in the area take place.

Cumulative effects can be defined as impact on environmental and social systems which result from the incremental impacts of the actions when added to other past, present and reasonably foreseeable future actions. Potentially, there will be increased noise and traffic levels; however, the impact will be temporary. Suncor will endeavour to put measures in place that will minimize potential impacts. This Program is designed to abandon, reclaim and improve the overall condition of the Bele O-35, Tweed Lake M-47, and Tweed Lake A-67 wellsites and associated infrastructure and ultimately return the disturbed areas to more natural conditions resulting in the natural recovery of the disturbances and a net positive effect to the ecosystem.

10 CONCLUSION

EnviroSearch has examined the effects that this Program may have on the environment and is of the opinion that the Program can take place without significant effects provided that mitigation measures discussed in this EPP are followed. The intent of the Program is to abandon, reclaim and improve the overall condition of the Bele O-35, Tweed Lake A-67, and Tweed Lake M-47 wellsites and associated lands. Longer-term indirect effects will include reducing the potential for erosion, site re-vegetation, re-establishing natural drainage patterns, and site stabilization. We recommend that the work be inspected the following summer and, if needed, annually throughout the term of the permit, to ensure that areas of concern have recovered.

Respectfully submitted,
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