# Transmission Line 271 Star Lake to Valentine Gold Project

Environmental Preview Report

March 23, 2022

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# Executive Summary

Newfoundland and Labrador Hydro (NL Hydro) is proposing to undertake minor upgrades to their existing Star Lake Terminal Station and construct and operate a new 69 kiloVolt (kV) transmission line (TL271) from the Star Lake Terminal Station to a proposed new terminal station (Valentine Terminal Station) being developed by Marathon Gold Corporation (Marathon) at the proposed Valentine Gold Project mine site. This Project, as proposed by NL Hydro, is located in the central region of the Island of Newfoundland, southwest of the Town of Millertown and is required to supply electrical power to the Valentine Gold Project mine site. The Valentine Gold Project is currently undergoing provincial and federal assessment. If the Valentine Gold Project does not obtain release from both the federal and provincial environmental assessment (EA) processes, this Project is not required and would not be constructed.

The *Environmental Assessment Regulations* under the Newfoundland and Labrador *Environmental Protection Act* require the registration of “an undertaking that will be engaged in the construction of new electric power transmission lines or the relocation or realignment of existing lines where a portion of a new line will be located more than 500 m from an existing RoW”. Additionally, the Project represents “an undertaking that will occur within 200 m of the high water mark of a river that is a scheduled salmon river under the Fisheries Act (Canada)”.

The undertaking was registered on May 5, 2021. Following a public review period, the Minister of Environment and Climate Change determined that an Environmental Preview Report (EPR) is required. This document has been prepared to meet the requirements of the EPR Guidelines issued by the Minister on September 22, 2021.

Pending federal EA approval for the Valentine Gold Project, and regulatory approvals for this Project, construction is scheduled to begin mid-2022, with operations commencing in early 2023. TL271 is expected to be in operation for approximately 21 to 25 years, to support operational and post-mining activities of the Valentine Gold Project. When TL271 is no longer required to supply electrical power to the mine site, it will be decommissioned, which will involve dismantling and removing the poles, anchors and wires from the site.

NL Hydro has evaluated various route options for the transmission line and has selected a proposed route and alternate route, which both take advantage of existing roads and trails in the area, thereby facilitating access for construction, operations and maintenance, and decommissioning with limited requirements for new access. Clearing of the RoW will result in less than 1 $km^2$ of lost habitat, although this is a conservative estimate assuming the RoW width for clearing is 20 m for the entire length of the route and that all vegetation is removed during construction. In reality, clearing of the RoW may be reduced, particularly where the RoW is contiguous with existing resource roads. Furthermore, following clearing, some shrub habitat will remain or be created.

The Project is predicted to have adverse environmental effects on fish and fish habitat, wetlands, caribou, avifauna, other wildlife, and land and resource use (e.g., outfitting industry). However, with the implementation of best management practices and mitigation measures described in this report, including routing of the RoW in close proximity to existing roads to limit new disturbance, these effects are mostly predicted to be localized and temporary (primarily during construction). The information presented in this EPR is consistent with the effects assessment presented in the Environmental Registration where Project effects were predicted to be not significant.

The review of potential cumulative effects on fish and fish habitat, wetlands, avifauna, other wildlife, and land and resource are also relatively localized. This is consistent with the cumulative effects assessment in the Environmental Registration where cumulative effects were predicted to be not significant. However, as assessed in the Valentine Gold Project EIS (Marathon 2020), there already exists a potential significant adverse cumulative effect on caribou. Due to overlap of the Project with a portion of the migration corridor used by the Buchans herd, significant adverse project and cumulative effects identified for the Valentine Gold Project, and uncertainties surrounding how deviations from migratory corridors will affect the herd (Marathon 2020), cumulative environmental effects on the Buchans herd are predicted to be significant, although the contribution of the Project to this cumulative effect will be low. Mitigation proposed to reduce adverse environmental effects on caribou will be implemented to help reduce the Project's contribution to cumulative adverse effects. NL Hydro will also work with Marathon to understand monitoring results associated with the Valentine Gold Project's Caribou Protection and Environmental Monitoring Plan and how this information can be used to determine caribou activity in the vicinity of the Project during sensitive periods (e.g., using telemetry data), as well as inform potential Project-related effects on caribou.

On March 1, 2022, NL Hydro hosted a virtual public information meeting to provide Project details to area stakeholders and interested parties. There were thirteen (13) people who attended the WebEx session. During the question period, there were no comments or questions received. There were also no comments received via email before or after the session. Attendees were reminded that there would be an additional opportunity to provide comment during 35-day public consultation as part of the regulatory review of the EPR.

NL Hydro is committed to supplying electrical power to the proposed Valentine Gold Project through the construction and operation of TL271 in a manner which meets regulatory requirements and reduces adverse effects on the surrounding environment.

# Abbreviations

| | |
|---|---|
| AC CDC | Atlantic Canada Conservation Data Centre |
| AMP | Avifauna Management Plan |
| ATV | all-terrain vehicle |
| CCA | chromated copper arsenate |
| CERP | Corporate Emergency Response Plan |
| cm | centimetre |
| COSEWIC | Committee on the Status of Endangered Wildlife Species in Canada |
| C-SEPP | Contract-Specific Environmental Protection Plan |
| DFO | Fisheries and Oceans Canada |
| EA | environmental assessment |
| EIS | Environmental Impact Statement |
| ELC | Ecological Land Classification |
| ELCA | Ecological Land Classification Area |
| EPP | Environmental Protection Plan |
| EPR | Environmental Preview Report |
| HRIA | Historic Resources Impact Assessment |
| kiloVolt | kV |
| km | kilometre |
| $km^2$ | square kilometre |
| LAA | Local Assessment Area |
| m | metre |
| $m^2$ | square metre |
| mm | millimetre |
| NL | Newfoundland and Labrador |
| NL EPA | Newfoundland and Labrador *Environmental Protection Act* |
| NL ESA | Newfoundland and Labrador *Endangered Species Act* |
| NLDECC | Newfoundland and Labrador Department of Environment and Climate Change |
| NLDFFA | Newfoundland and Labrador Department of Fisheries, Forestry and Agriculture |
| NL Hydro | Newfoundland and Labrador Hydro |
| OSEM | On-Site Environmental Monitor |
| RAA | Regional Assessment Area |
| RoW | right of way |
| SAR | species at risk |
| SARA | *Species at Risk Act* |
| SOCC | species of conservation concern |
| SSAC | Species Status Advisory Committee |
| VC | Valued Component |

# 1.0 INTRODUCTION

Newfoundland and Labrador Hydro (NL Hydro) is proposing to construct and operate a new 69 kiloVolt (kV) transmission line (TL271) from their existing Star Lake Terminal Station to a proposed new terminal station (Valentine Terminal Station) being developed by Marathon Gold Corporation (Marathon) at the proposed Valentine Gold Project mine site in the west-central region of the Island of Newfoundland, southwest of the town of Millertown (Figure 1.1).

The *Environmental Assessment Regulations* under the Newfoundland and Labrador *Environmental Protection Act* (NL EPA) require the registration of "an undertaking that will be engaged in the construction of new electric power transmission lines or the relocation or realignment of existing lines where a portion of a new line will be located more than 500 m from an existing RoW". Additionally, the Project represents "an undertaking that will occur within 200 m of the high water mark of a river that is a scheduled salmon river under the *Fisheries Act* (Canada)".

The undertaking was registered on May 5, 2021. Following a public review period, the Minister of Environment and Climate Change determined that an Environmental Preview Report (EPR) is required. This document has been prepared to meet the requirements of the EPR Guidelines issued by the Minister on September 22, 2021 (refer to Appendix A for a concordance table).

## 1.1 NAME OF UNDERTAKING

Transmission Line 271 (TL271) Star Lake to Valentine Gold Project (the Project)

## 1.2 PROPONENT

| | |
|---|---|
| Name of the Corporate Body: | Newfoundland and Labrador Hydro<br>A Nalcor Energy Company |
| Address: | 500 Columbus Drive<br>PO Box 12400<br>St. John's NL A1B 4K7 |
| Company Representative: | Mrs. Gail Collins<br>Vice President, People and Corporate Affairs<br>(709) 737-1400<br>gailcollins@nlh.nl.ca |
| Principal Contact for Environmental Assessment: | Mr. Chad Evans<br>Environmental Specialist<br>(709) 691-4759<br>chadevans@nlh.nl.ca |

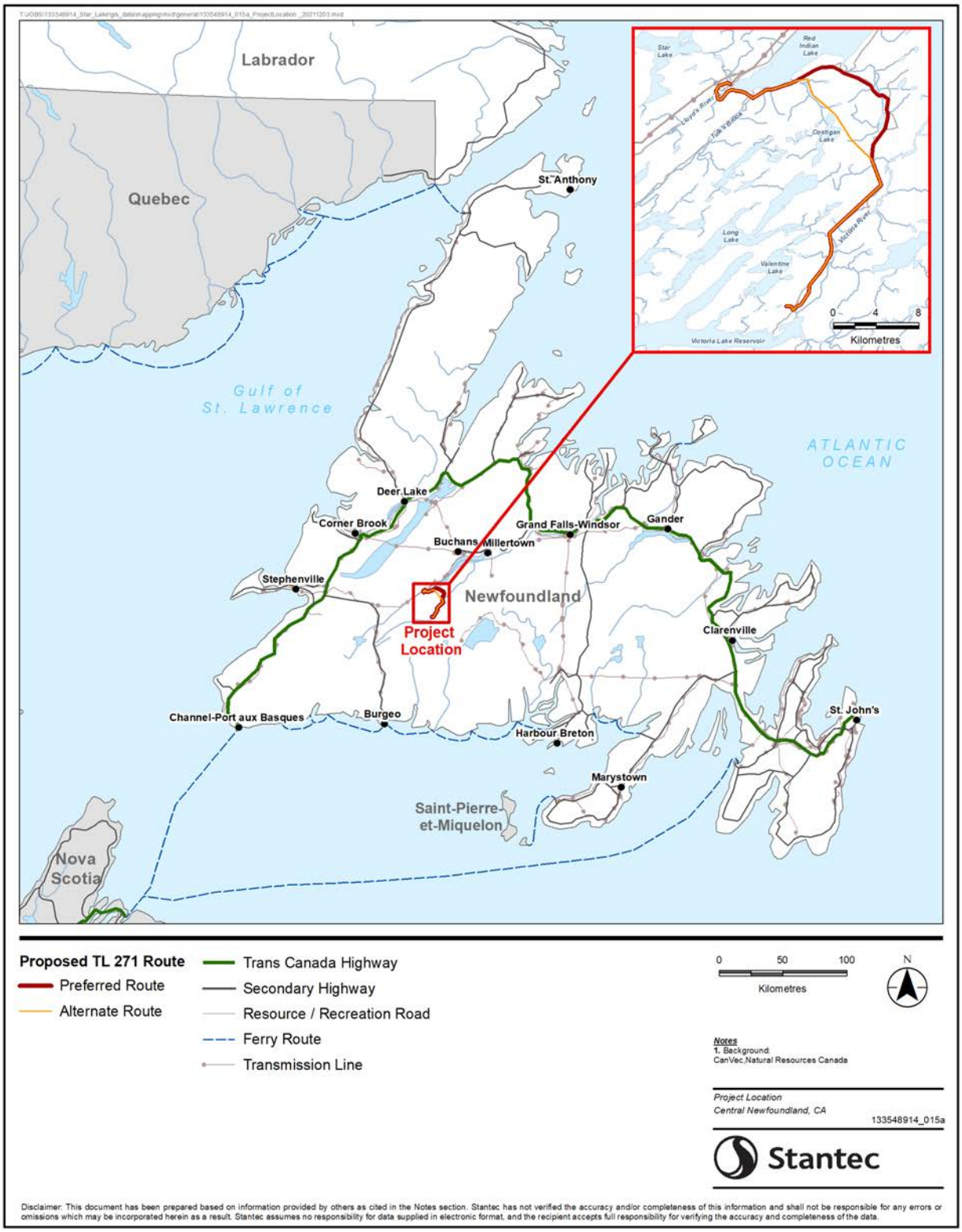



**Figure 1.1 Project Location**

## 1.3 THE UNDERTAKING

NL Hydro is proposing to construct and operate a new 69 kiloVolt (kV) transmission line (TL271) from their existing Star Lake Terminal Station to a proposed new terminal station (Valentine Terminal Station) being developed by Marathon at the proposed Valentine Gold Project mine site (Figure 1.1). Project construction activities will include upgrades to the Star Lake Terminal Station, which will occur within the existing station property, and installation of a new 69 kV wood pole transmission line, with a preferred route of approximately 45 km in length and a right of way (RoW) up to approximately 20 m wide. Operational activities over the life of the Project will include asset inspection and repair as required, and vegetation control. Pending approvals, construction is planned to begin in 2022, with TL271 being operational within the first quarter of 2023. Decommissioning and removal of TL271 is planned to occur once the power requirements for the Valentine Gold Project have been met.

As indicated above, the purpose of the Project is to enable the supply of electrical power to the Valentine Gold Project, allowing NL Hydro to fulfill its future power purchase agreement with Marathon (the Customer). Marathon has indicated that a peak demand of 23 megawatts of power is required for the mine, and that the mine will include a main terminal station and electrical distribution system (including overhead power lines and various substations) to operate various facilities at the mine. The life of the mine is estimated to be 13 years (Ausenco 2021), with commissioning to begin, pending regulatory approvals, in early 2023 (Marathon 2021a). Power from the grid would be transmitted via NL Hydro's Star Lake Terminal Station and TL271, and Marathon will be the sole customer on TL271.

The Valentine Gold Project is currently undergoing environmental assessment (EA) in accordance with the former *Canadian Environmental Assessment Act*, 2012. On March 17, 2022, the project was released from further assessment under the provincial *Environmental Protection Act*, 2002, subject to terms and conditions of approval. If the Valentine Gold Project does not obtain release from the federal EA process, this Project is not required, and NL Hydro will inform NL Department of Environment and Climate Change (NLDECC) of Project cancellation. Therefore, there is no risk seen to conducting concurrent regulatory reviews for both projects.

# 2.0 DESCRIPTION OF UNDERTAKING

## 2.1 CHANGES TO THE PROJECT SINCE THE ENVIRONMENTAL REGISTRATION

Since the Project was presented in the Environmental Registration (April 2020), additional planning and assessment work has been undertaken, resulting in modification of certain aspects of Project design to reduce potential adverse effects. These changes include:

- A new preferred route alignment (previously identified as the alternate route)
- Change in pole design
- Reduced RoW width

During review of the Environmental Registration, which resulted in the Minister of Environment and Climate Change's call for an Environmental Preview Report, regulatory concerns related to the migrating caribou and the potential for cumulative effects with the Valentine Gold Project became increasingly apparent. Newfoundland and Labrador Department of Fisheries, Forestry and Agriculture - Wildlife Division (NLDFFA-Wildlife Division) has expressed a preference for using an alternate route that provides increased distance from the migration route of the Buchans caribou herd. Aquatic and archaeological field work completed by NL Hydro and Stantec in 2021, subsequent to the filing of the Environmental Registration, also provided additional insight into the route options analysis.

As described further in Section 3.1, the new proposed route is more closely aligned with the mine access road, including a realignment of the existing road proposed by Marathon within the mine site. Although this new proposed route is longer by approximately 5 km, there is increased contiguity with existing roads (thereby improving ease of access during construction and operations), less overall new disturbance to habitat, less potential overlap with caribou migration paths, and less overall cumulative effects on caribou and other wildlife. The Costigan Lake branch, which was assessed in the Environmental Registration as part of the proposed route, is now evaluated in this EPR as the alternative route.

The design of the transmission line has changed from using H-frame wood pole structures to a single wood pole design. This design change allows for fibre optic cable to be attached to the transmission line which can be used to provide high speed communications to the mine site in addition to line monitoring between the Valentine Gold Terminal Station and Star Lake Terminal Station. A single pole structure was considered early in the Project design phase but was not carried forward due to supply chain concerns. Additional efforts were made to qualify and approve another vendor that can provide a similar quality insulator and meet the quantity and timeframe requirements for the Project. This design change will result in a reduction of the RoW width from approximately 25 m to 20 m, but will also reduce the typical pole span length from 180 m to 90 m.

Collectively, these changes to the Project design will result in a smaller footprint of disturbance and reduced cumulative environmental effects.

## 2.2 GEOGRAPHICAL LOCATION

The Project is located in a remote location in rural central Newfoundland, approximately 52 km southwest from the town of Millertown and 45 km southwest from the town of Buchans. Located in the Red Indian Lake[1] Subregion of the Central Newfoundland Forest Ecoregion, this region is characterized by boreal forest with mainly coniferous trees and a continental climate. The Project is located primarily on provincial crown land. For the purpose of this EPR, the Project Area comprises a 20 m wide RoW for the proposed and alternate TL271 routes, including access points and the portion of the Star Lake Terminal Station where upgrades will occur.

The proposed route for the transmission line from the Star Lake Terminal Station to the Valentine Terminal Station is shown on Figure 2.1. The proposed (preferred) route leaves the Star Lake Terminal Station, and generally follows the existing station access road and existing road to Lloyd's River. The transmission line will span Lloyd's River, to the east of the existing bridge and then will generally follow the existing forestry road along the southern shoreline of Red Indian Lake, before veering south to follow the mine access road to the Valentine Gold Project. As shown in the Mapbook in Appendix B, the entire route closely follows existing, maintained resource roads, with approximately 3.92 km of the proposed RoW actually overlapping the RoWs of these existing roads.

An alternate route (Figure 2.1), which was represented in the Environmental Registration as the "proposed route" leaves the Star Lake Terminal Station and follows the same route as the preferred route, spanning Lloyd's River and following the existing forestry road along the southern shoreline of Red Indian Lake. However, it then deviates south, cross-country toward Costigan Lake, passing east of the lake where it eventually reaches the access road to the Valentine Gold Project. As like the new preferred route, the line will follow the mine access road until it reaches the proposed Valentine Terminal Station. The level of contiguity (i.e., overlap) of the alternate route with existing resource roads is a bit reduced, with 2.59 km of RoW overlapping existing, maintained resource roads (these overlapping sections occur where the route is common to both the proposed and alternate routes).

Table 2.1 lists GPS coordinates for the Star Lake Terminal Station and preferred and alternative transmission line routes. Approximately 29.3 km (approximately 64%) of the proposed transmission line route is common to both the preferred and alternate route.

### Table 2.1 GPS Coordinates of Project Components

| Location | NAD_1983_UTM_Zone_21N | | | |
|---|---|---|---|---|
| | Latitude | Longitude | Northing | Easting |
| Star Lake Terminal Station | 48.552875 | -57.205108 | 5377773.2684 | 484864.0459 |
| Proposed Valentine Lake Terminal Station | 48.365230 | -57.136268 | 5356904.2630 | 489906.9561 |
| Proposed Route Midpoint | 48.547414 | -57.197122 | 5377132.466 | 484668.212 |
| Alternate Route Midpoint | 48.504856 | -57.048837 | 5371902.039 | 496915.7581 |

[1] Provincial legislation on the renaming of Red Indian Lake has been tabled in the House of Assembly. The proposed Bill seeks to rename the lake in central Newfoundland as Beothuk Lake.

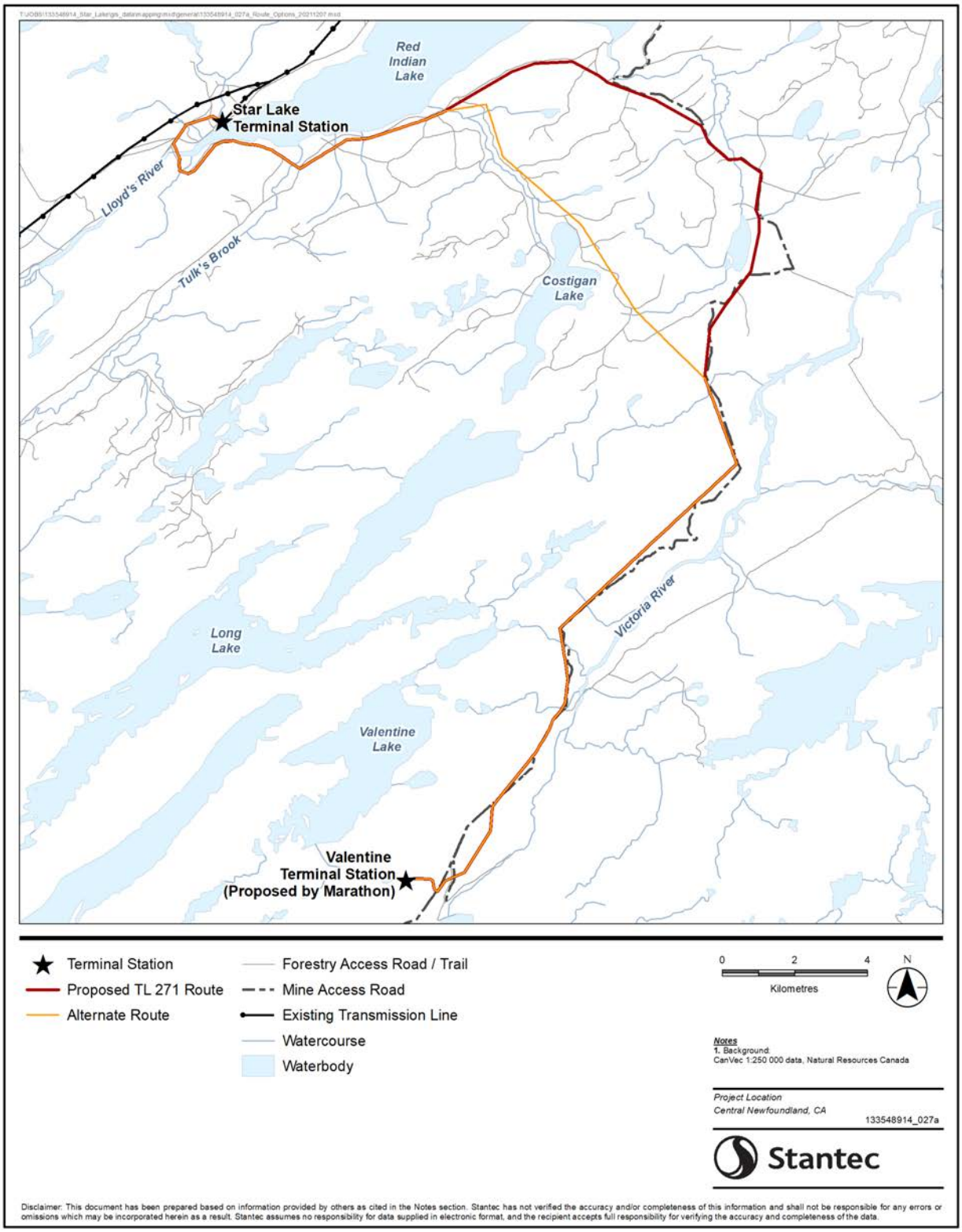



**Figure 2.1 Transmission Line Routing**

For either route, RoW access will be created primarily using existing resource access roads where possible (Section 2.5.2.1). Specific locations of cuts, fill and ditching, as well as pole locations along the RoW are not known at this stage of Project planning and will be identified during detailed design and construction.

## 2.3 PHYSICAL COMPONENTS

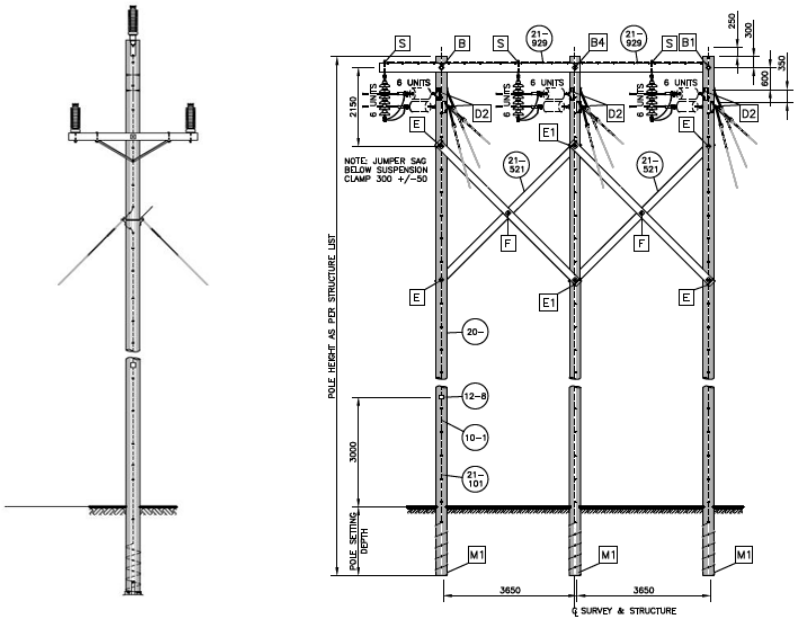
The Project comprises two main components: Star Lake Terminal Station modifications and a new 69 kV TL271.

The Star Lake Terminal Station connects energy generated at the Star Lake Hydroelectric Generating Station to the NL Hydro transmission system, and includes a transformer and associated protection / controls to connect to the electrical grid, via an existing transmission line (TL280) at Buchans, NL. The Star Lake Terminal Station will be expanded to allow connection of an additional TL271 to supply power to the Valentine Terminal Station being proposed by Marathon. Modifications to the Star Lake Terminal Station will occur primarily within the existing station boundaries (which will require a 1-2 m movement of the fence line) and include an extension to the overhead structural steel supports and addition of new high voltage circuit breaker, disconnect switches, and associated protection and controls equipment required for the safe and reliable operation of TL271. Figure 2.2 shows the existing site plan and proposed modifications. Additional information on the Star Lake Terminal Station can be found in Section 2.4.1 of the Environmental Registration.

The transmission line will consist of single wood pole structures (95% of structures) with three-pole dead-ends used at conductor termination locations (approximately every 5 km) and angles above 45 degrees. See Figure 2.3 for a drawing and Photo 1 of a typical single pole structure. Fibre optic cable will be attached to the transmission line to provide high speed communications to the Valentine Gold mine site and facilitate line monitoring between the Valentine Gold Terminal Station and Star Lake Terminal Station.

The RoW will be approximately 20 m wide. A survey of the RoW will be conducted during Project planning and design to help determine specific pole locations and may result in minor modifications to the proposed route. Poles will be treated in accordance with NL Hydro specifications with pentachlorophenol (Penta) or chromated copper arsenate (CCA) for long term protection against fungi and insects. RoW access will be created primarily using existing forest access roads where possible (Section 2.4.2.1). Appendix B shows detailed mapping of the proposed and alternate transmission line routes, including proposed access points using existing resource roads where they may be required.


**Figure 2.2 Star Lake Terminal Station Site Plan with Proposed Modifications**




Typical Single Pole Structure  Typical Three Pole Dead-end Structure

**Figure 2.3  Drawings of Pole Structures to be Used for the Project**

**Photo 1  Typical Single Pole Structure**

## 2.4 PROJECT SCHEDULE

Pending regulatory approvals, construction activities are scheduled to start in 2022 with commissioning and operations in early 2023.

The proposed schedule for construction is outlined in Table 2.2. The start and completion dates are provided primarily to indicate the likely window for the scheduled activity and are not intended to reflect the period of time required for the activity. However, this schedule is contingent upon the Valentine Gold Project's release from the federal EA process with approval conditions. If the Valentine Gold Project does not obtain approval to proceed, this Project will not proceed.

### Table 2.2 Project Construction Schedule

| Activity | Estimated Start[1] | Estimated Completion |
|---|---|---|
| Station Construction | August 2022 | September 2022 |
| Station Commissioning | September 2022 | September 2022 |
| Line Clearing and Access Trail Construction/Upgrades | May 2022 | August 2022 |
| Line Construction | June 2022 | January 2023 |
| Line Commissioning | January 2023 | January 2023 |
| Line Energization | March 2023 | |

Note:
[1] Estimated start dates may be delayed pending regulatory approval of the Valentine Gold Project.

To the extent practical, construction activities will be undertaken in consideration of sensitive time periods for fish and wildlife. Where sensitive periods cannot be avoided, additional mitigation may be required, which would be identified in consultation with applicable regulators. For example, the current construction schedule as shown in Table 2.1 involves clearing the RoW for TL271 during breeding bird season (April 1 to August 31). Prior to clearing, NL Hydro will consult with the NLDFFA-Wildlife Division on the implementation of an Avifauna Management Plan (AMP) (Appendix C) to confirm the necessary mitigation measures are in place to reduce the likelihood of inadvertently destroying nests and/or eggs of migratory birds (known as incidental take). This would include nest searches for avifauna prior to clearing activities, and the establishment of appropriate buffers around active or suspected nests. Project-related activities within an established buffer would be avoided until the birds have left the nest. As currently proposed, line clearing activity may overlap with natal and maternal denning period (April 1 to June 30) for marten, but other construction activities will primarily be outside this window. Clearing and construction activities could potentially overlap with post-calving and fall migration seasons for caribou. However, the timing and location of Project activities will be adjusted to avoid key movement paths during the spring and fall migration of the Buchans caribou herd (Section 5.2).

In-water work (e.g., watercourse crossing installation), if required, will be conducted between June 1 and September 30, 2022. However, in-water work is expected to be limited as most watercourses will be avoided along the RoW or crossed by fording (Section 2.5.2.2).

TL271 is expected to be in operation for approximately 21 to 25 years, to support the operational life of the Valentine Gold Project (Marathon 2020) and allow continued electrical service during post-mining activities at the site. If the life of the mine is extended, TL271 will remain operational, with maintenance conducted as required to maintain reliable service for the mine.

## 2.5 CONSTRUCTION

### 2.5.1 Terminal Station Modifications

Construction activities associated with the terminal station will occur primarily within the existing station footprint, with site preparation and construction consisting of the following activities:

- Excavation and disposal of fractured rock (approximately 5 m x 12 m in size; 140 $m^2$ in rock volume) using an excavator with a pneumatic rock hammer; this work will excavate approximately 600 mm below station grade to allow for placement of fills and new foundations
- Installation of two new foundations for a steel structure
- Removal of inside fence and substation extended to the outer fence to the east (1-2 m)
- Installation of new concrete foundations for 69 kV circuit breaker and breaker access platform
- Installation of buried ground conductors, connected to existing ground grid, covered by 40 $m^2$ of imported crushed stone
- New steel gantry and beam to form box structure, with connection to existing steel gantry structure
- Installation of new 69 kV circuit breaker and disconnect switches
- Removal and relocation of transmission line terminations
- Installation of new conductors, ancillary equipment and control/power cables

These activities will result in minor ground disturbance within the existing station footprint (industrial site) but will require moving the existing fence line by approximately 1-2 m. Limited noise and air emissions are anticipated associated with the operation of vehicles and machinery.

### 2.5.2 Transmission Line Construction

Site preparation and construction associated with the transmission line will consist of the following activities:

- Access trail development (including quarrying if required)
- RoW clearing and construction
- Pole installation and framing
- Conductor stringing
- Testing and commissioning.

Further details on each of these activities are provided below.

### 2.5.2.1 Access Trail Development

The starting point for construction of the transmission line can vary and may start at multiple points depending on final schedule, number of crews, availability of equipment and sensitivities that may need to be taken into consideration. Helicopter support could be required until suitable ground-based access can be established, although this is less likely to be required given the current proposed route, which is less remote and readily accessible by existing resource roads. Existing highways, access roads and trails will be used as appropriate to transport construction equipment and materials to select staging and storage sites along the transmission line route. Access points to the RoW will generally be opportunistic and established to provide options for access to specific segments of a line to avoid excessive travel along the RoW.

Given the proximity of the transmission line to existing roads along much of both route options, the need for access development will be limited. Previously, when the alternate route was being considered as the preferred route, the total estimated length of new access required was 950 m, with the shortest route being approximately 40 m and the longest length being approximately 300 m. The length of new access required for the current proposed route will be substantially less than this, as approximately 75% of the route length is within 50 m of an existing resource road, and approximately 3.92 km of the proposed RoW will actually overlap with the RoW of existing, maintained access roads. It is estimated that there may be approximately 35 to 40 access points along the total length of the route and that the length of any given access trail would be less than 150 m long.

Specific access points will be identified in the field and will avoid watercourse crossings. The requirement for fording along the RoW to facilitate the movement of equipment and materials during construction and operations will be limited given the ability to avoid watercourses through readily available access points along the RoW.

Photos 2 and 3 are examples of access trails similar to what would be required for this Project. Photo 2 is an example of a constructed access point to the TL RoW where the RoW would be contiguous (i.e., overlaps) with an existing access road, similar to what will be required along the majority of the proposed RoW. Where access points are constructed from existing roads, culvert installation may be required to maintain proper drainage within ditches (Photo 3).

As construction of access points will be limited, it is expected that most required borrow material will be sourced from within the RoW during construction. If additional fill is required, existing quarries and borrow pits will be used as necessary. Although none are anticipated to be required, it is acknowledged that new quarries and borrow pits that may be required for Project construction will be identified, permitted, established and decommissioned in accordance with applicable regulatory requirements.

**Photo 2 Typical Access Trail to TL RoW**


**Photo 3 Typical Access to TL RoW from Existing Resource Road**

#### 2.5.2.2 Watercourse Crossings

Potential watercourse crossings for the proposed and alternate routes are shown on the Mapbook in Appendix B. Based on 1:50,000 mapping and field survey data, there are 47 potential watercourses that intersect the proposed RoW and 51 watercourses that intersect the alternate RoW. However, while they may be spanned by the overhead transmission line, many of these watercourses will not require crossings to be installed as they can be avoided during construction and operations using existing access (e.g., existing resource road crossings).

NL Hydro will seek approval for permanent construction of crossings, if required, to allow uninhibited access over the course of the Project. Work in or near watercourses will be conducted in accordance with the terms and conditions of permits from the Water Resources Division and Fisheries and Oceans Canada (DFO). Fording will be conducted in accordance with the provincial environmental guidelines for fording (NLDMAE 2018) and DFO's Interim Code of Practice for temporary stream crossings (DFO 2020a). Potential ford crossings identified for both the proposed and alternate routes have been identified where appropriate based on field assessments conducted by NL Hydro in 2021 in consideration of water depth (shallow), approach grades (low) and channels substrate (stable non-erodible rock or cobbles). Eighteen potential fording sites have been identified for the proposed route; 27 potential fording sites have been identified for the alternate route. Watercourses which were not deemed appropriate as fording sites will be avoided; no culvert installations will be required at these sites. Where fording has been identified, a 30 m buffer cannot be maintained around the watercourse, however, clearing will be limited to the extent practicable. Potential access points to be constructed along the proposed RoW will be designed to avoid watercourse crossings. With the exception of where culverts may be required to maintain drainage along roads (see Photo 3 as an example), no culvert or bridge work is proposed to be conducted for the Project. Culvert requirements will be subject to final field verification of the route and access trails.

Table 2.3 lists potential watercourse crossings which were surveyed for the proposed and alternate transmission line routes. Additional details on these crossings can be found in Appendix D. These potential watercourse crossings are labelled on the Mapbook in Appendix B. In some cases, a potential "watercourse crossing" was identified using available mapping and aerial photography but a subsequent field visit by NL Hydro during the 2021 field season confirmed no observed water at the time of assessment, suggesting only possible overland flows during high precipitation events. In other cases, a perennial watercourse was confirmed, but no crossing was deemed necessary as the stream could be avoided using available roadways. For example, although shown on the Mapbook in Appendix B, Lloyd's River is not considered as a watercourse crossing as the current established crossing will be used for equipment and vehicle access during Project construction, operations and decommissioning. Additionally, there are several watercourses presented in Table 2.3 which can be avoided using existing access.

Photos 4 and 5 show watercourse crossings where fording may be considered along the proposed and alternate routes, respectively. Additional information on the freshwater environment in the Project Area can be found in Section 4.1 and Appendix D.

## Table 2.3 Potential Watercourse Crossings for the Proposed and Alternate Routes

| Proposed Route | | | Alternate Route | | |
|---|---|---|---|---|---|
| **Watercourse Avoided through Alternate Access** | **Potential Fording Sites** | **Ephemeral Watercourse or Overland Drainage[1]** | **Watercourse Avoided through Alternate Access** | **Potential Fording Sites** | **Ephemeral Watercourse or Overland Drainage[1]** |
| WC-001 | WC-003 | WC-002 | WC-001 | WC-003 | WC-002 |
| WC-005 | WC-004 | WC-006 | WC-005 | WC-004 | WC-006 |
| WC-007 | WC-015 | WC-008 | WC-007 | WC-015 | WC-008 |
| WC-011 | WC-017[2] | WC-009 | WC-011 | WC-017[2] | WC-009 |
| WC-012 | WC-019[2] | WC-010 | WC-012 | WC-019[2] | WC-010 |
| WC-014 | WC-020[2] | WC-013 | WC-014 | WC-020[2] | WC-013 |
| WC-018 (Tulk's Brook) | WC-034 | WC-016 | WC-018 (Tulk's Brook) | WC-024 | WC-016 |
| WC-022 | WC-035 | WC-021 | WC-022 | WC-026 | WC-021 |
| AR-01 | WC-036 | | WC-023 | WC-027 | WC-025 |
| AR-02 | WC-037 | | WC-042 | WC-028 | WC-032 |
| AR-03 | WC-038 | | WC-046 | WC-029 | |
| AR-04 | WC-039 | | C0020 | WC-030 | |
| AR-05 | WC-040 | | C001b | WC-031 | |
| AR-05A | WC-041 | | C0017 | WC-033 | |
| AR-06 | WC-043 | | C0016a | WC-033a | |
| AR-07 | WC-044 | | | WC-034 | |
| WC-042 | WC-045 | | | WC-035 | |
| WC-046 | WC-049 | | | WC-036 | |
| C0020 | | | | WC-037 | |
| C001b | | | | WC-038 | |
| C0017 | | | | WC-039 | |
| C0016a | | | | WC-040 | |
| | | | | WC-041 | |
| | | | | WC-043 | |
| | | | | WC-044 | |
| | | | | WC-045 | |
| | | | | WC-049 | |

Notes:
1 Potential watercourse identified during desktop study. Field survey found no water at time of assessment or boggy conditions. No fording required.
2 Site appropriate for fording but can also be avoided due to proximity to existing crossing.

**Photo 4 Potential Fording Site Along Proposed Route (WC-34)**

**Photo 5 Potential Fording Site Along Alternate Route (WC-33A)**

### 2.5.2.3 RoW Clearing and Construction

RoW clearing will include a combination of hand cutting, mechanical harvesting and mechanical mulching with chainsaws being used for small scale clearings (e.g., tree removal adjacent to a watercourse vegetated buffer zone). Vegetation that exceeds 1-2 m at maturity will be removed within the RoW, with the exception of vegetated buffer zones (30 m wide) that will remain along watercourses where a crossing is not required.

Figure 2.4 is a schematic of typical clearing width for a 69kV Single Pole Line. A RoW width of 20 m has been assumed, resulting in a cleared area of approximately 0.91 $km^2$ for the proposed route and 0.81 $km^2$ for the shorter alternate route. Harvested timber will be processed in accordance with provincial regulations and will be either stockpiled along the RoW or in a pre-determined location. Photo 6 is a photo showing a typical RoW for a single pole line.

**Photo 6 Typical RoW for a Single Pole Line**

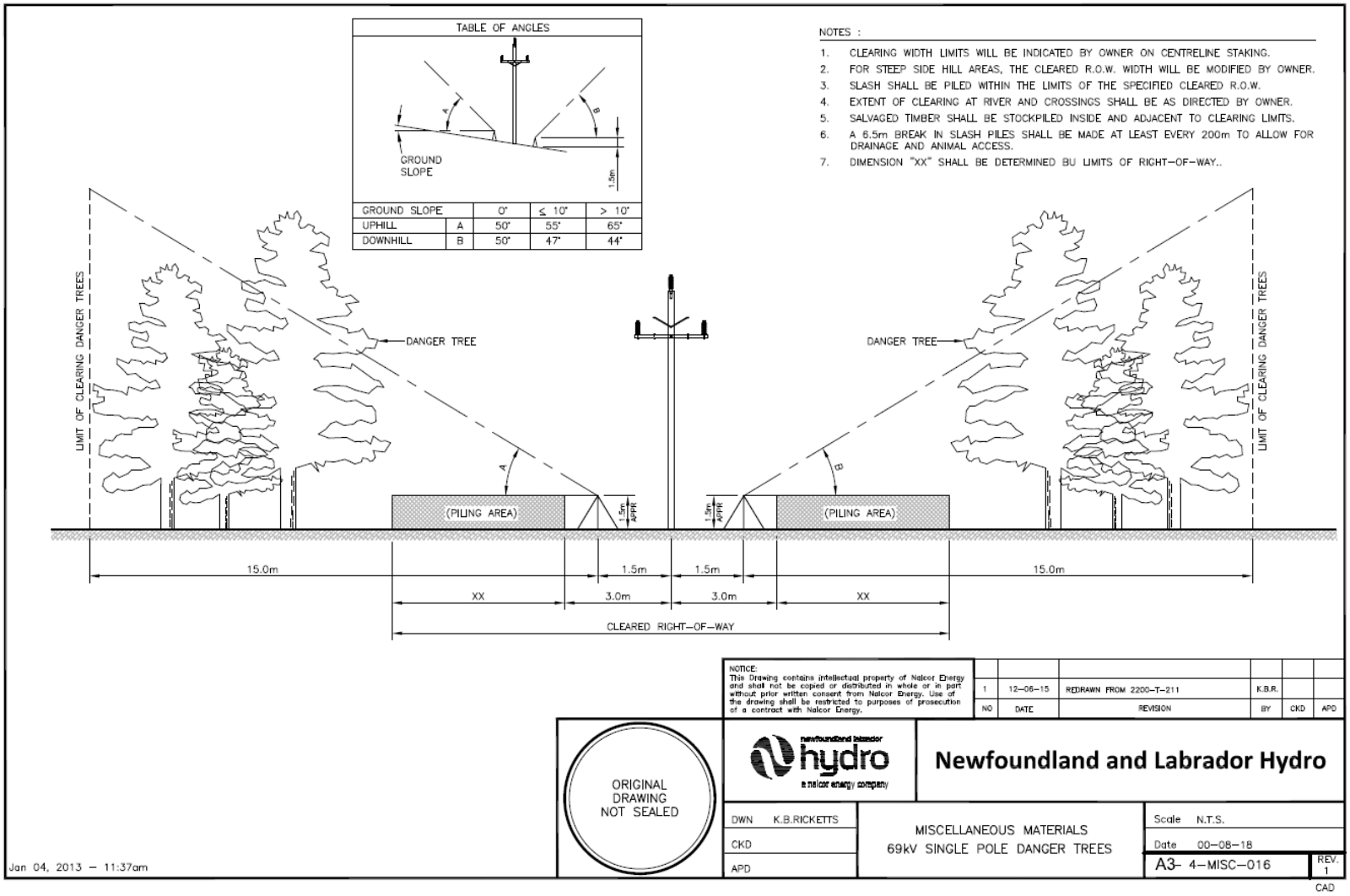



**Figure 2.4 Schematic of Typical Clearing for a 69kV Single Pole Line**

#### 2.5.2.4 Pole Installation and Framing

Once the RoW survey, design, and clearing are completed, structure locations will be staked in the field. Specific pole locations are not known at this time, however, typical span length (i.e., the distance between poles) will be 90 m. Span length may be adjusted to accommodate features, such as waterbodies, wetland, or terrain.

The transmission line will consist of wood pole structures with required anchor points. Poles will be treated in accordance with NL Hydro specifications with Penta or CCA for long term protection against fungi and insects. Anchors will consist of 5’ (1.5 m) and 10’ (3 m) treated logs buried approximately 6’ (1.8 m) deep as per engineering standards. Where shallow bedrock is encountered, an air drill may be required to penetrate the rock and install anchors.

At this time, blasting is not anticipated to be required during construction. Should it be deemed necessary during construction, blasting activity will be completed in accordance with provincial regulation, control measures, applicable permits, and restoration.

Pole installation and framing will be completed by the use of tracked excavators. Access for this equipment will be restricted to pre-determined access points or routes along the RoW.

#### 2.5.2.5 Conductor Stringing

Conductor stringing will involve several crews installing conductor once poles have been erected and necessary framing, such as insulators, cross arms, and bracing, has been installed.

The process involves using tracked equipment to travel the line and pull conductor off a stationary wire spool located at the start of each line segment. Technicians will use aerial equipment, such as booms, to connect the conductor to insulators at each pole location. Once the conductors are in place, the appropriate tension is applied to adjust the line sag and to bring the conductor to the design specifications. After the electrical cable is installed, fibre optic cable will be attached to the transmission line in a similar manner.

#### 2.5.2.6 Testing and Commissioning

Commissioning is the means of verifying and documenting that each component, system and assembly of a facility is built, installed and tested as planned and designed to meet Project requirements. Commissioning for the transmission line is a process of inspection. After the line is tensioned as described above, the RoW is travelled using an all-terrain vehicle (ATV) for ground structure inspection and helicopter for conductor phasing inspection. Once these steps are complete, power can be applied to the line to verify successful transmission of power to the end-user.

### 2.5.3 Women's Employment Plans

Section 2.10 of the Environmental Registration provided an enumeration of occupations required for Project construction and an overview of NL Hydro's corporate values related to diversity and inclusion policies. NL Hydro is committed to developing a Women's Employment Plan to improve employment and training opportunities for women and other under-represented groups on the Project in accordance with NL Hydro's commitment to Gender Equity, Diversity and Inclusion and the requirements of The Office of Women and Gender Equality.

## 2.6 OPERATION AND MAINTENANCE

Operation and maintenance activities will primarily involve asset inspection and vegetation control.

New assets added to the terminal station as part of the Project will be added to the current inspection routine at the station. Major station equipment, such as the circuit breaker and disconnect switches, will have a six-year preventative maintenance schedule for inspection of major components, mechanical function and manufacturer specifications.

Based on the life expectancy of the Project, asset inspection and replacement / refurbishment activities are expected to be limited. NL Hydro does not typically start formal wood pole inspections until Year 20, with refurbishment work typically occurring after the asset is at least 30 years old. Asset inspection and replacement / refurbishment will therefore be limited over the life of the Project. Yearly snowmobile patrols will be completed for visual pole inspection.

Vegetation management activities are subject to approval from the Pesticide Control Section, NLDECC, and will be undertaken in accordance with NL Hydro's Integrated Vegetation Management Program and the Pesticide Control Regulations under the NL EPA.

Vegetation management will involve application of herbicides and manual cutting of brush. The requirement for vegetation control on the RoW will be assessed approximately three to four years after initial RoW clearing, with the first spray application occurring the following year after inspection. After the initial treatment, frequency of spray application would increase to a five- to seven-year frequency as needed. Cutting / brushing activity would occur around watercourse buffers (where spray activity would be prohibited) at the same frequency.

Operation and maintenance activities will be planned to avoid and/or reduce disturbance or harm to migratory birds and their nests, and will be conducted in accordance with the AMP (Appendix C). Incremental lighting associated with the existing Star Lake Terminal Station will be limited to only the amount of lighting required for safe conduct of operation activities in the expanded area, and new exterior lights (if required) will be shielded from above. There will be no lighting associated with the operation of the transmission line.

Asset repair will be conducted as required to provide reliable power supply to the customer. As the line will be designed for current extreme weather standards, asset repair requirements are expected to be limited.

# 2.7 ACCIDENTAL EVENTS AND MALFUNCTIONS

## 2.7.1 Potential Accidents and Malfunctions

An accidental event or malfunction could potentially occur during construction, operations or decommissioning, resulting in asset damage and/or adverse effects on the environment and/or public health and safety.

Project activities during construction, operations (e.g., line inspection) or decommissioning could potentially increase the risk of fire in the natural environment (e.g., through vehicle use or smoking), potentially resulting in effects on human health, damage to vegetation, and adverse effects on wildlife and air and water quality.

A spill or leak of hydraulic fluid, fuel, or antifreeze could occur from machinery use during construction, operations or decommissioning, which could result in contamination of sediment and/or water resources.

Project vehicles during construction, operations or decommissioning could be involved in a traffic accident with other vehicles and/or wildlife.

Severe weather during construction, operations or decommissioning could potentially result in damage to assets (e.g., downing of lines) potentially causing a health and safety hazard and an interruption of service to the Valentine Gold Project.

## 2.7.2 Mitigation and Contingency Measures

NL Hydro has a Corporate Emergency Response Plan (CERP), which provides clear and concise guidance for emergency support actions to be taken under emergency situations that could reasonably be expected to occur. The purpose of the CERP is to reduce the probability of emergency events escalating to catastrophic proportions and to reduce losses. The end goal is the return to normal operation as quickly and as safely as possible. The CERP is intended to provide effective corporate response to emergency situations and guide necessary corporate emergency support actions.

The Project Environmental Protection Plan (EPP) will include contingency plans for fuel and hazardous material spills, wildlife encounters, discovery of historic and archaeological resources, and forest fires.

The following measures will be undertaken to reduce risk of accidental events and malfunctions:

- Terminal station facilities, as well as the transmission line, will be designed for extreme weather standards and are not anticipated to incur damage over the life of the Project. However, in the event of extreme weather that results in malfunction or damage to Project assets, repair will be conducted as needed to maintain an acceptable level of service and reduce environmental damage in accordance with electrical utility practices and standards.
- Equipment will be inspected prior to entering each work site to reduce the potential for drips or leaks of hydraulic oil, fuel or antifreeze.
- Fuel, hazardous and controlled product storage areas, including temporary fuelling and fuel storage facilities, will be designed in accordance with applicable codes and regulations.

- NL Hydro will require the construction contractor to provide a Contract-Specific Environmental Protection Plan (C-SEPP) for review and acceptance by NL Hydro prior to construction start. This C-SEPP will include a site-specific fuel and hazardous materials response plan. NL Hydro also requires a spill kit dedicated to each crew that will be on site during construction.
- Precautions will be taken to prevent fire hazards including proper storage, handling and disposal of flammable materials.
- In the unlikely case of a forest fire, contingency measures will be implemented in accordance with the CERP and contingency plans in the EPP.

# 3.0 PROJECT ALTERNATIVES

The purpose of the Project is to enable the supply of electrical power to the Valentine Gold Project proposed by Marathon. Alternative means of carrying out the Project to meet the stated purpose and rationale for the Project include different transmission line route options and alternative construction materials and methods.

## 3.1 ALTERNATIVE ROUTES

NL Hydro has evaluated various route options for the transmission line (see Figure 3.1). Factors considered in the route selection process included:

- Overall length of RoW (which affects cost and footprint of physical disturbance)
- Constructability (e.g., length of spans, wetlands, terrain stability)
- Proximity to existing roads for access
- Proximity to existing landowners
- Ease of access for line maintenance and improved reliability
- Environmental sensitivities (e.g., watercourses, wetlands, species at risk)
- Known caribou migration corridors

Key routing options are depicted on Figure 3.1 and listed below:

- proposed TL271 route (described in Section 2.2)
- alternate route (which was presented as the proposed route in the Environmental Registration and is also described in Section 2.2)
- western routing alternatives
- the preliminary route presented in the Valentine Gold Project Environmental Registration

These four routing options are compared in Table 3.1 for the following criteria: overall length, constructability, proximity to existing roads for access, proximity to existing landowners (dwellings), ease of access for line maintenance and improved reliability, environmental sensitivities, and proximity to known caribou habitat/migration corridors. Table 3.1 also provides a summary evaluation of the four routes, indicating which routes are technically and economically feasible and therefore have been considered throughout the assessment.

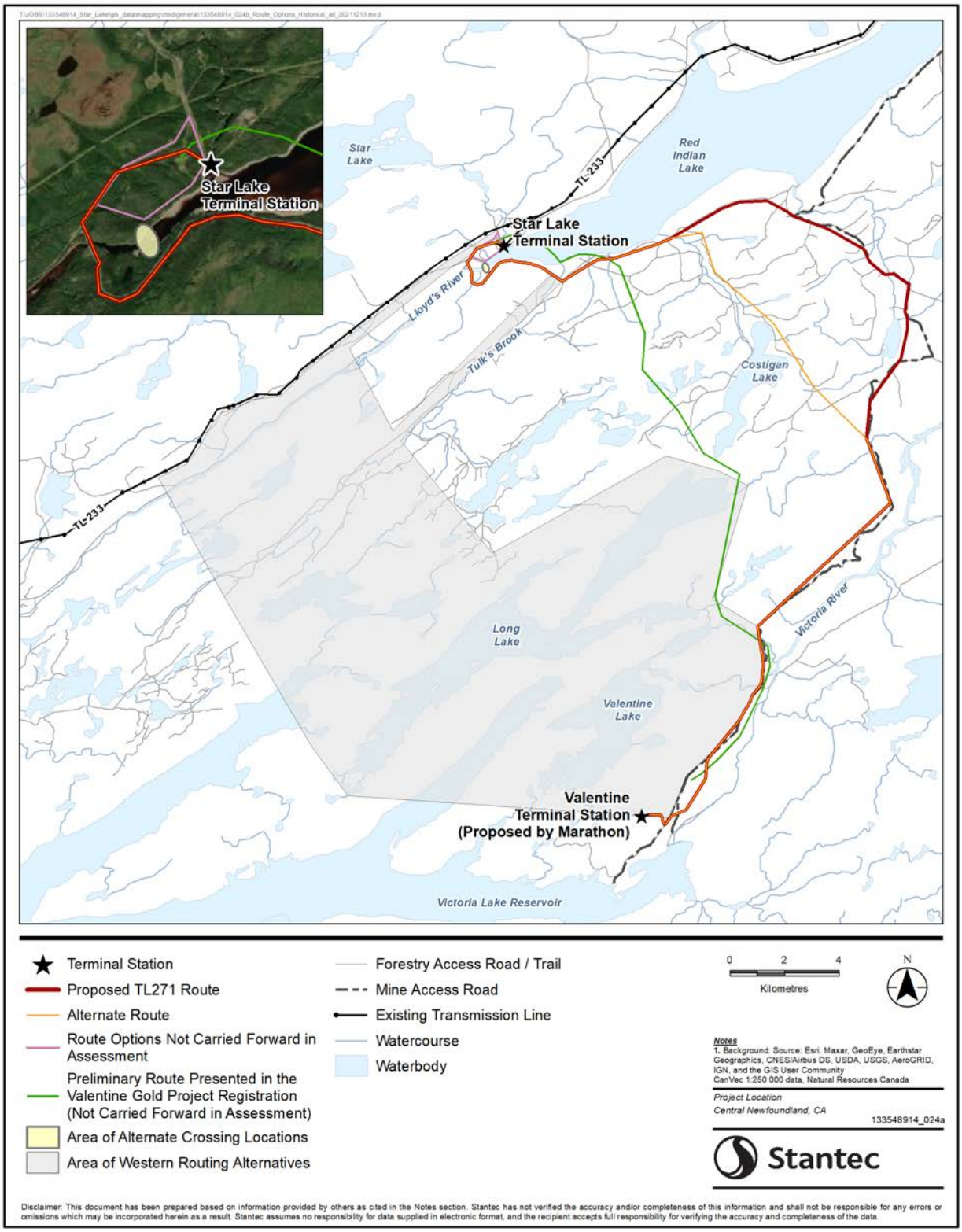



**Figure 3.1 Transmission Line Route Alternatives**

## Table 3.1 Evaluation of Transmission Line Routing Alternatives

| Selection Criteria | Routing Alternatives[1] | | | |
|---|---|---|---|---|
| | **Proposed Route** | **Alternate Route** | **Preliminary VGP Environmental Registration Route** | **Western Routing Alternatives** |
| Overall Length | 45.46 km | 44.84 km | 27.80 km (although route didn't fully extend to current terminus at the mine site) | Length of route options ranged from 42 to 50 km |
| Constructability | Technically feasible; limited requirement for new access | Technically feasible; limited requirement for new access | Crossing at Red Indian Lake would not be technically or economically feasible; also presents potential conflict with navigation | Not technically or economically feasible due to distance from existing access and requirement for large spans or extensive routing around large waterbodies<br>Shortest option to the west of Valentine Lake would require up to a 730 m span of Victoria Lake Reservoir while shortest option northeast of Valentine Lake would require spanning Long Lake in two locations with the longest span being approximately 500 m long<br>Water crossings would require the installation of steel towers, resulting in substantial ground disturbance near the water body to install the required foundations and would also involve use of heavy equipment (e.g., heavy duty drill, crane), requiring more substantial access development |

## Table 3.1 Evaluation of Transmission Line Routing Alternatives

| Selection Criteria | Routing Alternatives[1] | | | |
|---|---|---|---|---|
| | **Proposed Route** | **Alternate Route** | **Preliminary VGP Environmental Registration Route** | **Western Routing Alternatives** |
| Proximity to existing roads for access | The proposed route follows existing roadways for the entire route; approximately 3.92 km of the proposed RoW will be contiguous (overlaps) with the RoW of existing maintained roads (e.g., Star Lake Road, Red Indian Lake Road, mine access road) | The proposed route follows existing roadways, although in some cases, these roadways are resource roads. They are not regularly maintained and are becoming overgrown (see Mapbook in Appendix B for road conditions); approximately 2.59 km of the proposed RoW will be contiguous (overlaps) with the RoW of existing maintained roads | Preliminary route did not identify this as a priority; limited overlap with existing resource roads | Route length paralleling existing resource roads in the area ranged from 48% to 78% |
| Proximity to existing landowners (dwellings) | Dwellings near the Project Area are cabins, with the majority of dwellings located on Red Indian Lake. The proposed route avoids these cabins by taking a northerly route from Star Lake Terminal Station. The proposed route does pass in proximity to cabins along the southern banks for Red Indian Lake, although in these areas, the transmission line parallels an existing road. | Dwellings near the Project Area are cabins, with the majority of dwellings located on Red Indian Lake. The proposed route avoids these cabins by taking a northerly route from Star Lake Terminal Station. The alternate route does pass in proximity to cabins along the southern banks for Red Indian Lake, although in these areas, the transmission line parallels an existing road. | This was not a factor in preliminary routing; route cut cross-country through undeveloped lands. The crossing of Red Indian Lake closer to the Star Lake Terminal Station would be in closer proximity to cabins on the lake and present potential navigational hazard and changes to viewshed for landowners | This was not a factor in preliminary routing; routes cut cross-country through undeveloped lands. Western approach could potentially cause more interaction (e.g., disruption, aesthetic effects) with the outfitter on Lloyd's River |

## Table 3.1 Evaluation of Transmission Line Routing Alternatives

| Selection Criteria | Routing Alternatives[1] | | | |
|---|---|---|---|---|
| | **Proposed Route** | **Alternate Route** | **Preliminary VGP Environmental Registration Route** | **Western Routing Alternatives** |
| Ease of access for line maintenance and improved reliability | Proximity to the mine access road (to be maintained year-round by Marathon) provides good access for line maintenance; limited new access required | Proximity to the mine access road (to be maintained year-round by Marathon) provides good access for line maintenance; limited new access required.<br>Access along other portions of the RoW (e.g., along Costigan Lake) could be somewhat hindered depending on weather and environmental conditions as these resource roads are not necessarily maintained (see Mapbook in Appendix B for road classifications) | Existing access is limited for the majority of the route | Existing access is extremely limited for most of the routes, relying on more remote access roads that would be maintained year-round |
| Environmental sensitivities | Approximately 0.316 $km^2$ potential wetland[3] habitat within RoW (approximately 0.002 $km^2$ of 1:50,000 mapped wetlands)<br>48 potential watercourses; approximately 18 potential crossings via fording; no additional watercourse crossings required as part of new access construction<br>Crosses Lloyd's River at existing bridge crossing | Approximately 0.289 $km^2$ potential wetland habitat[3] within RoW (approximately 0.002 $km^2$ of 1:50,000 mapped wetlands)<br>51 potential watercourses; approximately 27 potential crossings via fording<br>Crosses Lloyd's River at existing bridge crossing | 15 mapped (1:50,000) watercourse crossings including new crossing through Red Indian Lake (level of analysis did not include desktop identification of unmapped watercourses)<br>Approximately 0.245 $km^2$ potential wetland habitat within RoW plus an additional 0.088 $km^2$ of open water habitat (e.g., lakes) within the RoW | Several large waterbodies and wetlands to cross or avoid; routes would result in most disturbance of natural habitat |

## Table 3.1 Evaluation of Transmission Line Routing Alternatives

| Selection Criteria | Routing Alternatives[1] | | | |
|---|---|---|---|---|
| | **Proposed Route** | **Alternate Route** | **Preliminary VGP Environmental Registration Route** | **Western Routing Alternatives** |
| Proximity to known caribou habitat/migration corridors[2] | Approximately 0.34 $km^2$ low use habitat for spring migration; approximately 0.111 $km^2$ low use habitat, 0.019 $km^2$ moderate-low use, and 0.004 $km^2$ moderate-high use habitat for fall migration within the RoW<br>The RoW crossing of Lloyd's River is at an area with steep slopes, where caribou are unlikely to cross during the spring or fall migration; caribou are known to cross both upstream and downstream of this location<br>An assessment of cumulative effects on caribou, particularly in consideration of predicted effects from the Valentine Gold Project and potential implications for caribou migration, indicate the proposed route would have less potential for cumulative effects on caribou including less interaction with alternate migration paths that may occur as a result of the Valentine Gold Project | Approximately 0.24 $km^2$ low use habitat for spring migration; approximately 0.117 $km^2$ low use habitat, 0.019 $km^2$ moderate-low use, and 0.004 $km^2$ moderate-high use habitat for fall migration within the RoW<br>The RoW crossing of Lloyd's River is at an area with steep slopes, where caribou are unlikely to cross during the spring or fall migration; caribou are known to cross both upstream and downstream of this location<br>An assessment of cumulative effects on caribou, particularly in consideration of predicted effects from the Valentine Gold Project and potential implications for caribou migration, indicate the alternate route could have more potential for cumulative effects on caribou including overlap with alternate migration paths that may occur as a result of the Valentine Gold Project | Similar proximity to known caribou habitat/migration corridors as shown for the proposed and alternate routes, although proposed Red Indian Lake crossing for this route option would potentially overlap with caribou crossing location on the lake. In addition, this route does not parallel existing access roads for most of its length and would represent a new linear feature<br>With respect to cumulative effects on caribou, particularly in consideration of predicted effects from the Valentine Gold Project and potential implications for caribou migration, this route would have a higher potential (than the Proposed or Alternate Route) for cumulative effects on caribou including overlap with alternate migration paths that may occur as a result of the Valentine Gold Project | Western route options would require crossing back and forth through the current migratory corridor for the Buchans herd in order to reduce line length and large water crossings. In addition, these routes do not parallel existing access roads for most of their length and would represent new linear features on the landscape |

## Table 3.1 Evaluation of Transmission Line Routing Alternatives

| Selection Criteria | Routing Alternatives[1] | | | |
|---|---|---|---|---|
| | **Proposed Route** | **Alternate Route** | **Preliminary VGP Environmental Registration Route** | **Western Routing Alternatives** |
| Summary of evaluation | Technically and economically feasible; lowest economic cost; lower environmental costs due to routing alongside previously disturbed areas (i.e., existing access roads)<br>**Carry option forward for further assessment** | Technically and economically feasible; lower environmental costs due to routing alongside previously disturbed areas<br>**Carry option forward for further assessment** | Not as technically or economically feasible than other options due to distance from existing access and crossing of Red Indian Lake. Greater potential for effects on migrating caribou.<br>**Do not carry forward for further assessment** | Not technically or economically feasible due to distance from existing access and requirement for large spans or extensive routing around large waterbodies; would require most disturbance of previously undisturbed habitat<br>**Do not carry forward for further assessment** |

Notes:
1 Refer to Figure 3.1.
2 Based on Brownian bridge movement model.
3 Based on Ecological Land Classification data. Wetland habitat assumed to consist of open wetlands (shrub/graminoid fen and shrub bog), wet coniferous forests, alder thicket, black spruce forest, and riparian thicket (refer to Section 4.3 for more information on wetland classifications).

The preliminary route presented in the Valentine Gold Project Environmental Registration focused on reducing the overall length of the RoW. However, using the shortest route between the two endpoints would have resulted in a larger environmental footprint for the Project when considering the need for access along the RoW and the creation of a new linear corridor on the landscape (refer to Table 3.1). Based on knowledge of sensitivities in the Project Area and feedback from regulators during the EA process for the Valentine Gold Project, NL Hydro, in consultation with Marathon, developed routing options with the RoW following existing access roads (previously established linear development) to the extent practical to reduce effects on habitat and wildlife (including caribou migration). In addition, this very preliminary route shows a lengthier crossing for Red Indian Lake to the east that would not be technically or economically preferred due to the amount of in-water work required and potential conflict with navigation and land and resource users. Crossing Lloyd's River instead of Red Indian Lake is preferred based on topography and constructability issues. As indicated in Table 3.1, this route has not been considered in the assessment provided in this EPR.

As a part of the EA process for the Project, additional preliminary routes were considered to the west of the proposed route. These alternatives, located within the shaded grey area shown in Figure 3.1, resulted in increased environmental disturbance with respect to RoW clearing, access trail development, water crossings, wetland disturbance and ultimately resulted in increased interaction with caribou migration paths as compared to the preferred (current proposed) route. These routes also pose technical and economic challenges due to their distance from existing access and requirement for large spans or extensive routing around large waterbodies. As a result of these contributing factors, these routes were not considered feasible for further assessment, as indicated in Table 3.1.

The proposed and alternate route are both considered technically and economically feasible, with a reduced potential for environmental effects from the proposed route. Therefore, they have both been considered in the assessment provided in this EPR.

## 3.2 ALTERNATIVE STRUCTURES

Another Project alternative relates to construction of the transmission line. Wood pole construction is considered to have the least impact with regards to environmental disturbance and has been selected as NL Hydro's preferred option. The other alternative would be steel tower construction although this would result in a much larger ground disturbance for the installation of foundations and a substantial increase in cost for a project with a short lifespan. Also, as noted above, larger structures require special equipment (e.g., cranes) which require more substantial clearance for construction access.

Over the course of Project planning, NL Hydro has considered different wood pole structures including single-pole, H-frame (tangent), and three pole dead-end structures. The typical span length for single-pole structures is approximately 90 m. The typical span length for H-frame structures is longer, at 180 m, although a wider RoW (25 m versus 20 m) is generally required. Supply chain considerations and the inclusion of fibre optic cable along the transmission line influenced the selection of a single pole structure as the preferred construction alternative.

## 3.3 SUMMARY OF PREFERRED ALTERNATIVES

As shown in Table 3.1, the proposed route and alternate route are very similar in consideration of environmental, socio-economic and engineering criteria. The key differentiating factor between the two options are overall route length and associated financial costs. With respect to construction design, the single-pole structure option requires a narrower RoW (20 m RoW width instead of 25 m width) but will require additional disturbance sites due to a reduced pole span length (90 m span instead of 180 m span).

Based on an original design using the alternate (shorter) route (Costigan Lake branch) and double pole H-frame structure (i.e., the Project description provided in the Environmental Registration), the approved capital budget for the Project was $15,814,600. Costs associated with building a single pole transmission line on the proposed (longer) route are anticipated to increase the Project cost by an estimated $794,000. The cost estimate is described as a Class 3, with an expected accuracy of +30%/-20%. The costs are based on budgetary vendor and contractor quotations, and NL Hydro historical cost data. The overall Project budget including this cost increase is fully funded by Marathon.

Despite higher construction costs, a single wood pole design using the current proposed route as presented in this EPR (described in Section 2.0 and depicted in Figure 2.1) is the preferred Project option to reduce environmental effects and improve Project constructability and reliability. However, both the proposed and alternate routes have been carried forward for further assessment in the EPR.

# 4.0 EXISTING ENVIRONMENT

Existing environmental conditions are described within the context of spatial boundaries established for the EA in the Environmental Registration. These spatial boundary terms are described below and presented on Figure 4.1.

- The **Project Area** represents the anticipated area of direct physical disturbance associated with construction, operation and decommissioning of the Project. It comprises the proposed RoW for TL271, including access points and the portion of the Star Lake Terminal Station where upgrades will occur. For the purpose of this EPR, the Project Area also includes the alternate route (and associated access points) for TL271.
- The **Local Assessment Area (LAA)** encompasses the area within which Project-related environmental effects can be predicted or measured for assessment. The LAA encompasses the Project Area as defined above and includes a 500 m buffer to account for the geographic extent of most prevalent effects on a given Valued Component (VC).
- The **Regional Assessment Area (RAA)** is the area established for context in determination of significance of Project-specific effects. It is also the area which informs the assessment of cumulative effects. For the purpose of this assessment, the RAA for caribou (Caribou RAA) includes the combined population ranges of the Buchans, Gaff Topsails, Grey River and La Poile Herds as defined by caribou telemetry data and presented in the Valentine Gold Project Environmental Impact Statement (EIS) (Marathon 2020). The RAA for Fish and Fish Habitat, Wetlands, Migratory Birds, Other Wildlife, and Land and Resource Use falls within the Caribou RAA and is based on the boundaries of the Red Indian Lake subregion within the Central Newfoundland Forest Ecoregion. Unless otherwise noted, the Caribou RAA is also used for the cumulative effects assessment of other VCs, particularly when characterizing other projects and activities in the greater region.
- This assessment also refers to the **Ecological Land Classification (ELC) Area (ELCA),** which used remote sensing and field verification to identify distinct ecological habitats across the landscape and is the area within which detailed habitat data have been collected for the Valentine Gold Project (Marathon 2020). While the extent of the ELC data does not fully cover the Project Area, LAA or RAA (Figure 4.1), the ELCA is used to assess quantitative effects on habitat.

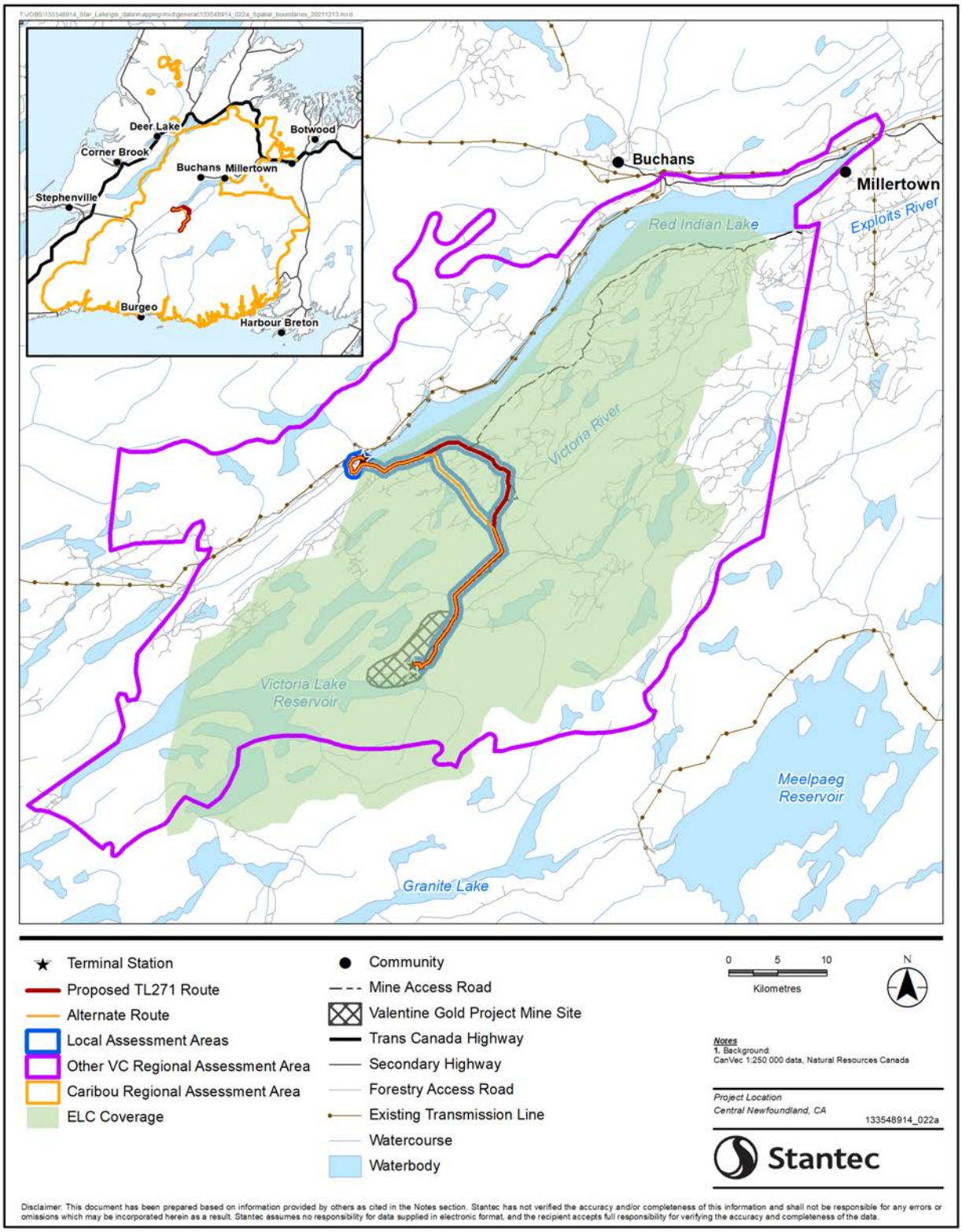



**Figure 4.1 Assessment Boundaries**

## 4.1 FRESHWATER ENVIRONMENT

The Project is located within the Exploits River Watershed which is the largest watershed on the Island of Newfoundland, with a total area of 10,241 km$^2$. The Exploits River is one of the most important Atlantic salmon (*Salmo salar*) rivers on the Island. In addition to Atlantic salmon, ouananiche (landlocked salmon), brook trout (*Salvelinus fontinalis*), Arctic char (*Salvelinus alpinus*), American eel (Anguilla rostrata) and threespine stickleback (*Gasterosteus aculeatus*) are known to occur within the upper Exploits River Watershed (Cunjak and Newbury 2005; Porter et al. 1974). Water discharge from the Exploits River is highly regulated by three dams located in Millertown, Grand Falls-Windsor, and Bishops Falls. The proposed and alternate RoW crosses the Victoria River and Lloyd's River subwatersheds, as well as a number of smaller headwater streams and smaller sub-watershed which flow into Red Indian Lake.

As indicated in the 2021-2022 Newfoundland and Labrador Angler's Guide (DFO 2021), the Exploits River watershed above Red Indian Lake dam is designated as Class 0 scheduled Salmon Rivers. This includes Victoria River, Mary March Brook, Lloyd's River, Tulk's Brook and all other tributary streams flowing into Red Indian Lake. Class 0 is catch and release only. Both the proposed and alternate routes intersect with scheduled salmon waters at multiple locations.

There are approximately 47 potential watercourses that intersect the proposed RoW and 51 potential watercourses that intersect the alternate RoW. However, as discussed in Section 2.5.2.2, some of these watercourses did not exhibit water flow during field assessment and many watercourses will not require crossings as they can be avoided during construction and operations using existing access (e.g., existing resource road already cross these watercourses). Table 2.3 lists potential watercourse crossings for the proposed and alternate transmission line routes. Watercourses are labelled in the Mapbook in Appendix B. Appendix D presents a summary of field data collected for each of the watercourses.

## 4.2 TERRESTRIAL HABITAT

The Red Indian Lake Subregion is characterized by glacial terrain with rolling hills, dense boreal forest and domed bogs (PAA 2008). There are numerous lakes, ponds, streams and rivers in the region. An ELC conducted for the Valentine Gold Project (Marathon 2020) provides approximately 89% coverage of the Project Area, ending at Red Indian Lake near Lloyd's River, and reveals 12 habitat types that occur in the Project Area, including forest habitat types, wetland habitat types, and areas currently or historically subject to human disturbance and use. Six rare vascular plants (Species of Conservation Concern [SOCC] or presumed SOCC) have been recorded near the Project and have the potential to be found within or near the RoW although none are listed provincially or federally. More information on habitat types in the ELC and Project Area can be found in the Flora and Fauna Baseline Study (Appendix D of the Environmental Registration). More information on habitat for species at risk (SAR) can be found in Sections 4.5 and 4.6.

## 4.3 WETLANDS

Wetland habitat in the Project Area consist primarily of open wetlands (shrub/graminoid fen and shrub bog) and wet coniferous forests. Based on habitat descriptions and the nationally accepted definition of wetlands (National Wetland Working Group 1997), the majority of alder thicket and riparian thicket habitat within the Project Area are also likely wetlands. Wetlands are also present within black spruce forest and likely other forest types, although typically in localized areas that are difficult to differentiate using remote sensing. For the purpose of this EPR, ecotypes assumed to consist primarily of wetland habitat include: open wetlands (shrub/graminoid fen and shrub bog), wet coniferous forests, alder thicket, black spruce forest, and riparian thicket.

These primarily wetland habitat types are used by a variety of raptors, passerines, and upland game birds, as well as mammals, and in the case of open wetlands, waterfowl / waterbirds. Wet coniferous forest has high habitat value for various SAR including northern myotis (*Mytois septetrionalis*), American marten (Newfoundland population) (*Martes americana atrata*), olive-sided flycatcher (*Contopus cooperi*), and rusty blackbird (*Euphagus carolinus*). Black spruce forest and open wetlands have high habitat value for caribou.

Although relying on the ELC data may overestimate the amount of wetland habitat within the Project Area, it is considered to be a more accurate field representation than relying on wetlands mapped in the Provincial Land Use Atlas. This conservative approach to wetland delineation and identification is consistent with the approach used by Marathon (2020) for the Valentine Gold Project Environmental Impact Statement. The Mapbook in Appendix B differentiates between mapped (1:50 000) wetlands and wetlands delineated using the ELC approach described above.

Based on 1:50,000 wetland mapping, the area of wetland habitat within the RoW for both the proposed and alternate routes is approximately 0.0021 $km^2$ or approximately 0.2% of the respective RoWs for either the proposed or alternate routes. Table 4.1 shows wetland habitat in the Project Area based on ELC data and estimates predicted direct habitat loss due to RoW construction for the proposed and alternate routes. As shown in Table 4.1, wetland habitat is fairly prevalent in the ELCA (comprises 41.2% of total area). The RoW of the proposed route crosses approximately 0.316 $km^2$ of wetland habitat (34.7% of total RoW), while the RoW of the alternate route would cross approximately 0.289 $km^2$ of wetland habitat (35.7% of the total RoW).

## Table 4.1 Summary of Wetland Habitat in the ELCA and 20 m RoW (Proposed and Alternate Routes)

| Habitat Type | Description | ELCA[1] | | Proposed Route[2] (20 m RoW) | | Alternate Route[3] (20 m RoW) | |
|---|---|---|---|---|---|---|---|
| | | Area ($km^2$) | % | Area ($km^2$) | % | Area ($km^2$) | % |
| Open Wetland – Shrub/Graminoid Fen[4] | • Very moist to wet shrub / herb dominated peatlands on flat areas and in poorly drained basins with neutral to moderately alkaline substrates<br>• Fens are typically associated with groundwater and/or flowing surface water, and therefore may act as headwaters and likely contribute to stream flow support, water cooling, organic nutrient export, and fish habitat<br>• Dense vegetation and prevalence of peat allows this wetland ecotype to store water and retain and stabilize sediments<br>• Contributes to carbon sequestration, though likely not to the same extent as bog ecotypes<br>• Many wildlife species use this ecotype as habitat<br>• High habitat value for caribou; moderate habitat value for rusty blackbird | 280.3 | 15.3 | 0.022 | 2.42 | 0.019 | 2.35 |
| Open Wetland – Shrub Bog[4] | • Very moist to wet shrub / herb dominated peatlands on flat areas and in poorly drained basins with neutral to moderately acidic substrates<br>• Typically associated with other wetland types as part of larger wetland complexes<br>• Performs some nitrate removal and retention, contributes to carbon sequestration, and provides wildlife habitat<br>• High habitat value for caribou; moderate habitat value for rusty blackbird | | | | | | |
| Wet Coniferous Forest | • Very moist to wet conifer forests<br>• Primarily composed of treed fens and bogs that often occur in a transitional zone adjacent to open peatland communities<br>• Provides several hydrologic functions, including water storage and delay, stream flow support, water cooling, and habitat for fish where watercourses are associated with the wetlands<br>• Can also function to retain and stabilize sediments, sequester carbon, and export organic nutrients through watercourses or other outlets<br>• Provides high habitat value for wildlife, such as avifauna and mammals, including moose, black bear, and American marten (Newfoundland population)<br>• High habitat value for rusty blackbird and olive-sided flycatcher<br>• Moderate habitat value for caribou | 130.7 | 7.1 | 0.019 | 2.09 | 0.029 | 3.58 |

## Table 4.1 Summary of Wetland Habitat in the ELCA and 20 m RoW (Proposed and Alternate Routes)

| Habitat Type | Description | ELCA[1] | | Proposed Route[2] (20 m RoW) | | Alternate Route[3] (20 m RoW) | |
|---|---|---|---|---|---|---|---|
| | | Area ($km^2$) | % | Area ($km^2$) | % | Area ($km^2$) | % |
| Alder Thicket | • Alder-dominated communities on moist seepage slopes and riparian areas<br>• Frequently associated with groundwater seepage or discharge<br>• Provides habitat for a variety of wildlife species, particularly as a food source<br>• High habitat value for moose and black bear; moderate habitat value for rusty blackbird<br>• Provide water storage and delay functions, reducing flooding in downstream areas, and provide stream flow support and water cooling | 97.4 | 5.3 | 0.144 | 15.82 | 0.11 | 13.58 |
| Black Spruce Forest | • Moist and moist to somewhat wet conifer-dominated forests<br>• Black spruce-dominated wetlands are likely important for carbon sequestration and wildlife habitat including caribou and olive-sided flycatcher | 233.1 | 12.7 | 0.131 | 13.40 | 0.131 | 16.17 |
| Riparian Thicket | • Shrub thickets located in transitional areas and subject to periodic flooding<br>• Assist in shoreline stabilization and amelioration of flooding by slowing the flow of river water and providing some water storage and delay function<br>• Can provide some organic nutrient export function<br>• More densely vegetated sites contribute to sediment retention and water cooling and may provide fish habitat during periods of flooding.<br>• Provides habitat for aquatic invertebrates, as well as songbirds, some mammals such as beavers, and some waterfowl<br>• High habitat value for moose and black bear; moderate habitat value for rusty blackbird | 15.1 | 0.8 | 0 | 0 | 0 | 0 |
| **Total Wetland Habitat** | | 756.6 | 41.2 | 0.316 | 34.7 | 0.289 | 35.68 |

Notes:

[1] ELCA is depicted on Figure 4.1 and is 1,830.6 $km^2$.

[2] Total area within the 20 m RoW is 0.91 $km^2$.

[3] Total area within the 20 m RoW is 0.81 $km^2$.

[4] Shrub/Graminoid Fen and Shrub Bog are classed together as one ecotype in the ELC.

Source: Marathon 2020; NBDELG 2018

## 4.4 CARIBOU

The Newfoundland Population of woodland caribou (*Rangifer tarandus caribou*) is listed under the *Species at Risk Act* (SARA) and assessed by the Committee on the Status of Endangered Wildlife Species in Canada (COSEWIC) as Special Concern (COSEWIC 2014). Although not listed under the Newfoundland and Labrador *Endangered Species Act* (NL ESA), the Government of NL has developed a Caribou Strategy to address caribou population declines (Government of NL 2020a).

The Newfoundland population of caribou is considered sedentary (Government of NL 2009), though some herds undergo seasonal migrations (Government of NL 2015). The Project Area overlaps with the ranges of the Buchans and Grey River caribou herds (Figure 4.2). The Gaff Topsails herd range extends as far south as Star Lake and does not overlap with the Project Area. The range of the La Poile herd occurs south of the Project Area between Channel-Port Aux Basques in the west and St. Alban's in the east. Animals from the Buchans herd migrate through the Project Area biannually, while resident caribou from the Grey River herd, occur year-round. Figures 4.3 and 4.4 show the ranges of the Buchans and Grey River herds relative to the Project Area. The LAA for the proposed route overlaps with 46.38 $km^2$ of the Buchans herd range and 14.41 $km^2$ of the Grey River herd range. For the alternate route, the LAA overlaps with 41.10 $km^2$ of the Buchans herd range and 18.60 $km^2$ for the Grey River herd range.

Appendix C of the Environmental Registration presents the Caribou Baseline Study which describes caribou habitat use and movement patterns relative to the Project Area, including additional information on the Gaff Topsails and La Poile herd distribution.

The Project overlaps with the Valentine Gold Project along portions of the mine's access road and the portion of the transmission line RoW that passes through the mine site before reaching the Valentine Gold Terminal Station. The primary caribou corridor as presented in the dynamic Brownian Bridge movement model (dBBMM) (Marathon 2020) also overlaps the Project near the mine site and at the Star Lake Terminal Station (Section 5.2.1). Additional data on the movement of caribou has continued to be collected by Marathon since the submission of the Environmental Registration. These data have been collected through both remote cameras near the Valentine Gold Project and GPS collars. Working with NLDFAA-Wildlife Division, additional collars have been deployed (Table 4.2) on both the Buchans and Grey River herds, which has increased the understanding of broader movements and home ranges (Figure 4.5) and remains consistent with the information presented by Marathon in the Valentine Gold Project EIS (Marathon 2020). The remote camera program was designed to better understanding caribou interactions, behaviours and demographics in and around the Valentine Gold Project. Seven of the remote cameras are located within the Project LAA. These new data are presented in Tables 4.3 and 4.4). Based on both collars and remote cameras, it is understood that during the spring migration, caribou move slowly relative to the fall migration, in smaller groups (average less than five caribou) and are more spread-out geographically as they approach the mine site. The existing data for the spring migration also indicates less certainty in the timing and location of caribou movements during migration. This change in migration timing is a key component of the Marathon CPEEMP and information gained will be applied to this Project. In the fall, caribou move very quickly, in larger groups (average approximately ten caribou), within a well-defined corridor, and most of the herd pass through the camera sampling locations within a week.

## Table 4.2 Additional Caribou Collars by Season

| WD Seasons | Dates | # active collars |
|---|---|---|
| Fall Migration/Dispersal | *Nov 4 – Dec 15, 2020 | 25 |
| Winter | Dec 16, 2020 – Mar 31, 2021 | 25 |
| Spring Migration/Pre-calving | Apr 1 – May 19, 2021 | 38 |
| Calving | May 20 – Jun 10, 2021 | 38 |
| Post-calving Migration/Dispersal | Jun 11 – Jun 30, 2021 | 37 |
| Post-calving Rearing | Jul 1 – Aug 31, 2021 | 39 |
| Fall Rut | Sep1 – Oct 31, 2021 | 40 |
| Fall Migration/Dispersal | Nov 1 – Dec 15, 2021 | 53 |
| Winter | *Dec 16, 2021 – Jan 3, 2022 | 47 |

Note:
* incomplete season

## Table 4.3 Caribou Group Composition based on Remote Camera Results for Fall 2019 and Fall 2020

| | Total | |
|---|---|---|
| | **Fall 2019** | **Fall 2020** |
| Total Caribou | 2,071 | 1,847 |
| Total Adults[1] | 1,641 | 1,555 |
| Adult Females | 1,260 | 1,200 |
| Adult Males | 381 | 330 |
| Adult Unknown[2] | N/A | 25 |
| Yearlings | 7 | 42 |
| Calves | 203 | 198 |
| Unknown[3] | 220 | 52 |
| Male:100 Females[4] | 30 | 28 |
| Percent Males[4] (%) | 18 | 18 |
| Calf:100 Females[4] | 16 | 17 |
| Percent Calves[4] (%) | 10 | 11 |
| Percent Yearlings[4] (%) | <1 | 2 |
| Mean Group Size[4, 5] (range in brackets) | 13 (1-164) | 10 (1-178) |
| Number of Collared Caribou | 3 | 10 |

Notes:
1. Total adults = adult females + adult males + adult unknown
2. Adult Unknown = adults of unknown sex
3. Unknown includes caribou of unknown sex and/or age class
4. Numbers rounded to the nearest whole number
5. Mean group size and range based on all cameras

## Table 4.4 Caribou Group Composition based on Remote Camera Results for Spring 2020 and Spring 2021

| | Total | |
|---|---|---|
| | **Spring 2020** | **Spring 2021** |
| Total Caribou | 701 | 374 |
| Total Adults[1] | 638 | 333 |
| Adult Females | 351 | 162 |
| Adult Males | 189 | 131 |
| Adult Unknown[2] | 98 | 40 |
| Yearlings | 52 | 20 |
| Calves | 3 | 12 |
| Unknown[3] | 8 | 9 |
| Male:100 Females[4] | 54 | 81 |
| Percent Males[4] (%) | 27 | 35 |
| Calf:100 Females[4] | 1 | 7 |
| Percent Calves[4] (%) | <1 | 3 |
| Percent Yearlings[4] (%) | 7 | 5 |
| Mean Group Size[4, 5]<br>(range) | 6<br>(1-84) | 2<br>(1-18) |
| Number of Collared Caribou | 0 | 4 |

Notes:

1. Total adults = adult females + adult males + adult unknown
2. Adult Unknown = adults of unknown sex
3. Unknown includes caribou of unknown sex and/or age class
4. Numbers rounded to the nearest whole number
5. Mean group size and range

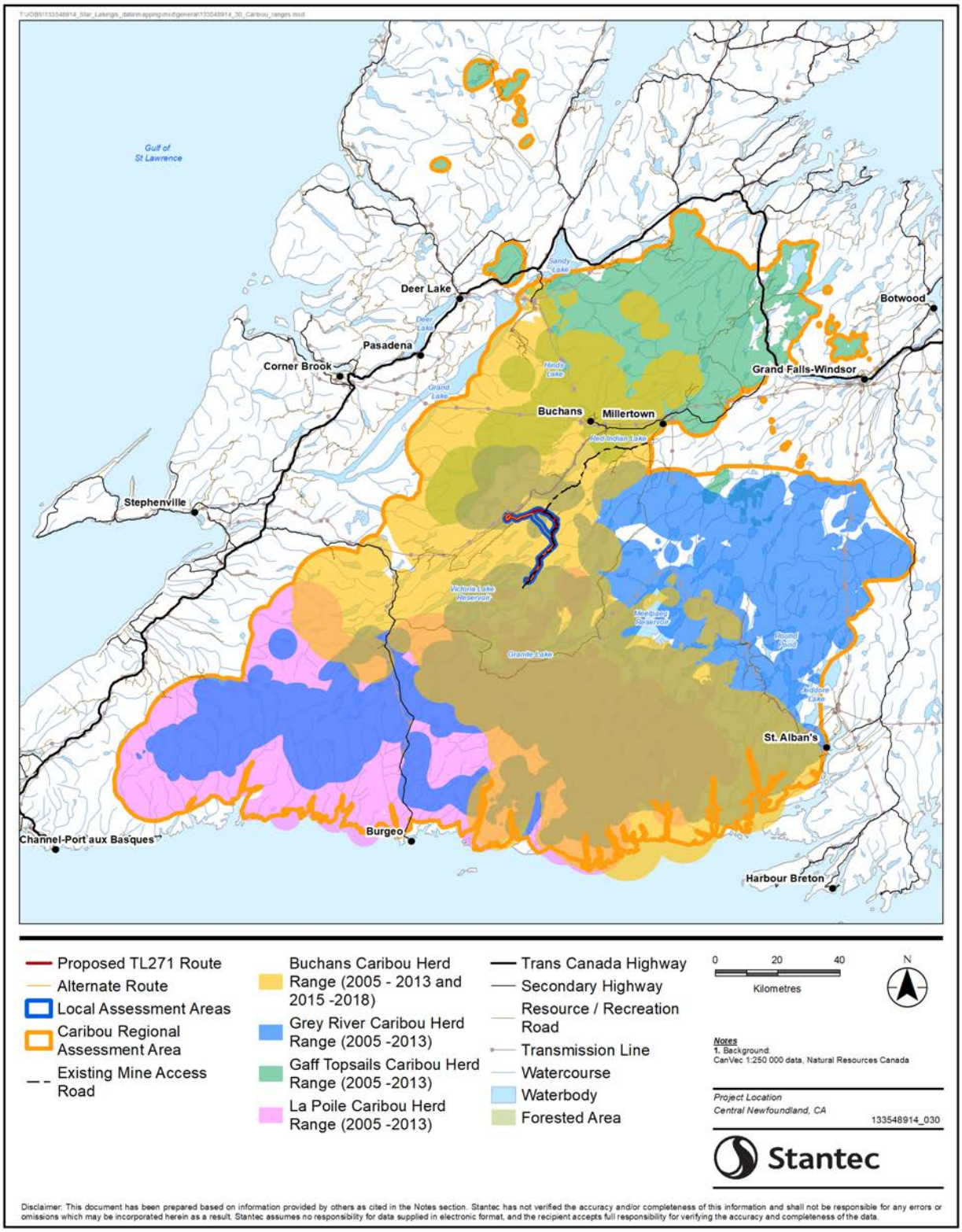



**Figure 4.2 Caribou Herd Ranges within the RAA**

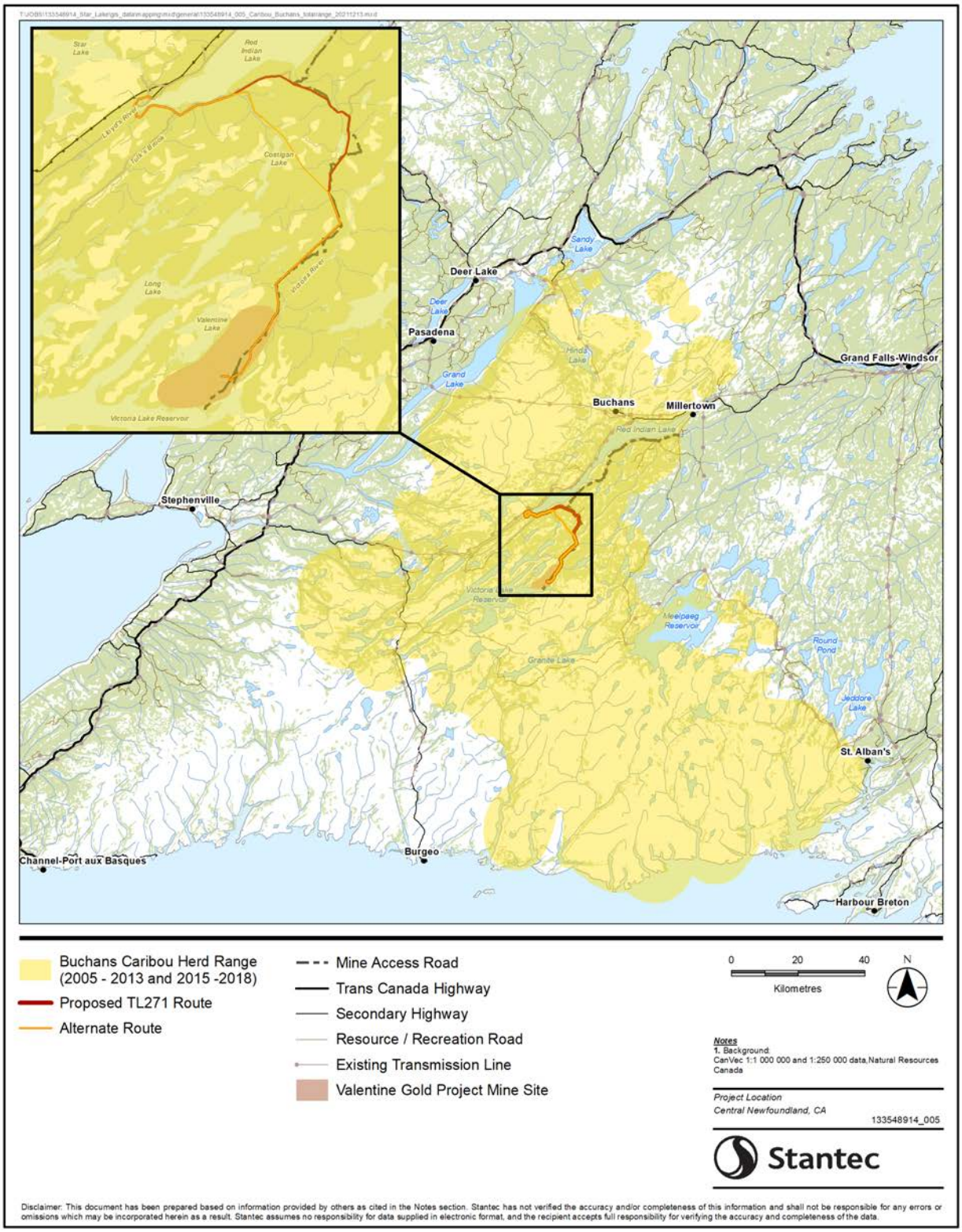



**Figure 4.3 Distribution of the Buchans Caribou Herd**

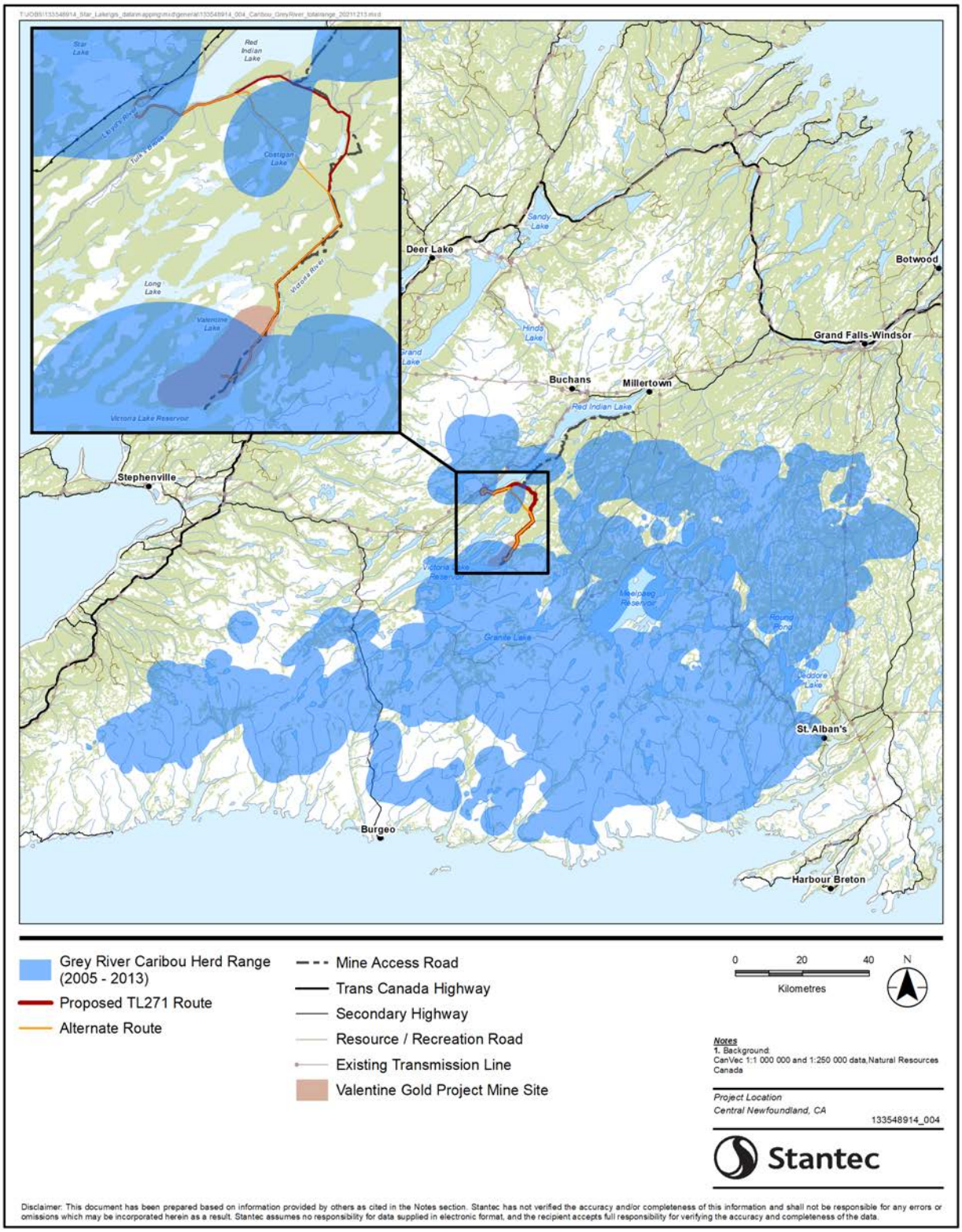



**Figure 4.4 Distribution of the Grey River Caribou Herd**

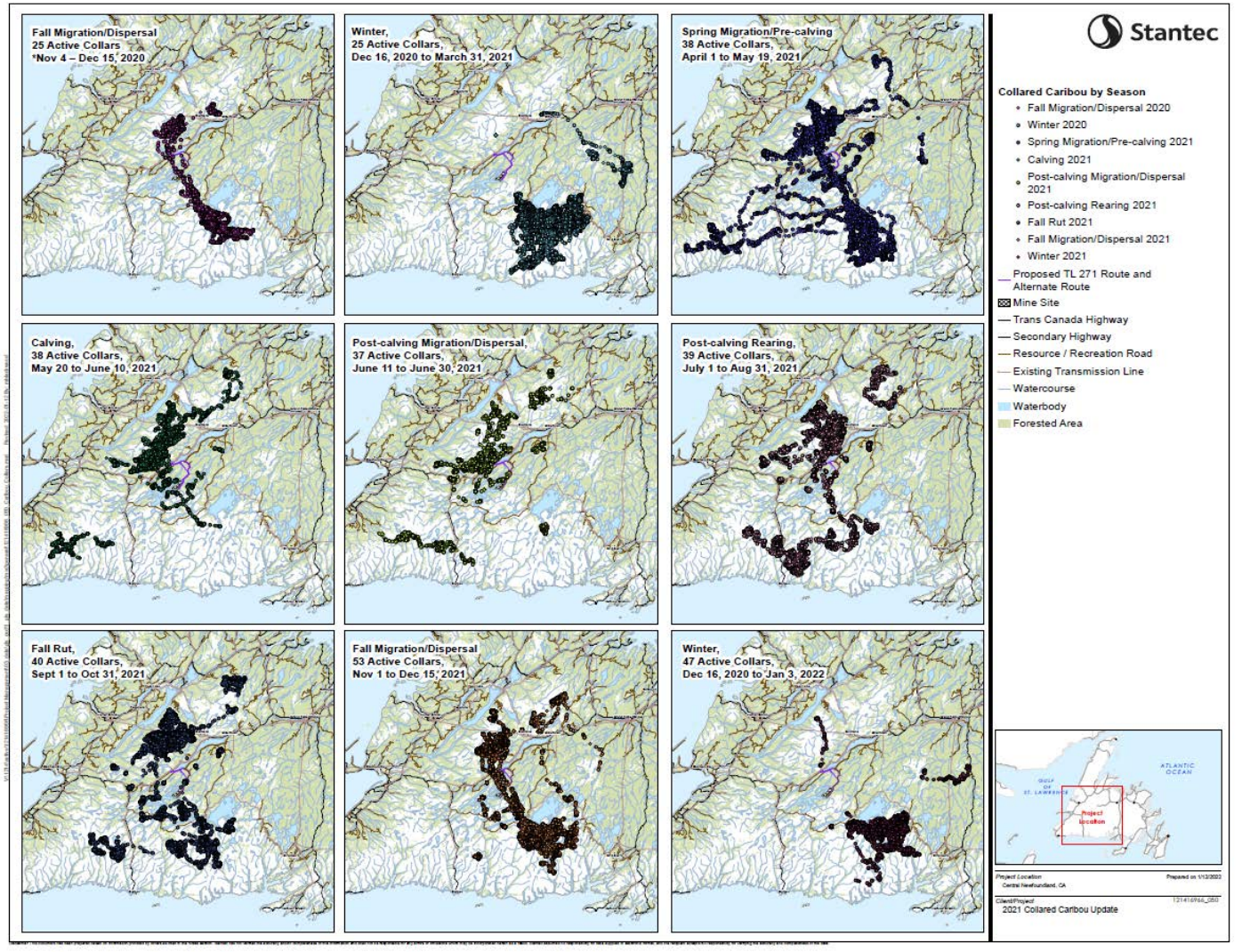



**Figure 4.5 Collared Caribou by Season**

Habitat types in the ELCA ranked as high value to caribou include Balsam Fir Forest, Black Spruce Forest, Kalmia-Black Spruce Woodland and Open Wetlands and ranked as moderate value include Mixedwood Forest, Wet Coniferous Forest, and Open Water (Marathon 2020), based on their selection by caribou (Chubbs et al. 1993; Rettie and Messier 2000; Mahoney and Virgl 2003; Courtois et al. 2004; Leblond et al. 2011; Bastille-Rousseau et al. 2015, 2018; Schaefer et al. 2016). Table 4.5 shows the amount of high and moderate-ranked caribou habitat within the proposed and alternate RoW. High and moderate ranked habitat covers 0.55 km$^2$ and 0.48 km$^2$ of the proposed and alternate RoWs, respectively. Approximately 85.5% of the ELCA represents high or moderate value for caribou. The amount of high or moderate habitat within the proposed or alternate RoWs represents approximately 0.03% of high or moderate habitat present within the ELCA.

## Table 4.5 Amount of High and Moderate Caribou Habitat Value within the Proposed and Alternate RoWs, LAA and ELCA

| Habitat Type | ELCA[1] (km$^2$/ %) | Proposed Route | | Alternate Route | |
|---|---|---|---|---|---|
| | | Area in RoW[2] (km$^2$ / %)[2] | Area within LAA (km$^2$ / %) | Area in RoW (km$^2$ / %)[3] | Area within LAA (km$^2$ / %) |
| **High Habitat Value** | | | | | |
| Balsam Fir Forest | 126.9/6.9 | 0.135/14.84 | 5.12/11.03 | 0.11/12.96 | 4.46/10.86 |
| Black Spruce Forest | 233.1/12.7 | 0.131/14.4 | 6.80/14.65 | 0.13/16.17 | 5.96/14.5 |
| Kalmia-Black Spruce Woodland | 208.8/11.4 | 0.026/2.86 | 2.16/4.67 | 0.03/3.58 | 2.07/5.04 |
| Open Wetlands (graminoid fen, shrub bog) | 280.3/15.3 | 0.022/2.42 | 2.65/5.72 | 0.02/2.35 | 2.11/5.14 |
| **Moderate Habitat Value** | | | | | |
| Mixedwood Forest | 179.3/9.8 | 0.207/22.75 | 8.63/18.60 | 0.16/19.88 | 7.15/17.41 |
| Wet Coniferous Forest | 130.7/7.1 | 0.019/2.09 | 2.07/4.47 | 0.03/3.58 | 2.02/4.91 |
| Open Water | 408.5/22.3 | 0.007/0.07 | 2.292/4.94 | 0.007/0.86 | 2.208/5.37 |

Notes:
1 ELCA is depicted on Figure 4.1 and is 1,830.6 km$^2$.
2 Total area within the 20 m RoW for the proposed route is 0.91 km$^2$.
3 Total area within the 20 m RoW for the alternate route is 0.81 km$^2$.

## 4.5 OTHER WILDLIFE

As described in Section 3.1 and Appendix D of the Environmental Registration, there are thirteen furbearer, four small mammals (including myotis), and three large mammal (including caribou) species with potential to occur in or near the Project Area. Many furbearers and large mammals (e.g., moose [*Alces alces*], American black bear [*Ursus americanus*]) are harvested through hunting and trapping activities. Avifauna species are described separately in Section 4.6.

For the purpose of this EPR, SAR include species listed as Extirpated, Endangered, Threatened, Vulnerable, or Special Concern under the NL ESA or SARA, or assessed as such by COSEWIC. SOCC include species assessed by COSEWIC or the Species Status Advisory Committee (SSAC) as Endangered, Threatened, Vulnerable, or Special Concern but not yet listed under NL ESA or SARA; or considered provincially rare upon review by the Atlantic Canada Conservation Data Centre (AC CDC) (i.e., those species with provincial status ranks [S-ranks] of S1 [critically imperiled], S2 [imperiled], or combinations thereof [e.g., S1S2].

A detailed description of the existing conditions for SAR and SOCC in the RAA can be found in Section 4.3.3 of the Flora and Fauna Baseline Study (Appendix D of the Environmental Registration). Wildlife SAR likely to occur in or near the Project Area include the Newfoundland population of woodland caribou, the Newfoundland population of American marten (*Martes americana atrata),* little brown myotis (*Myotis lucifugus)* and northern myotis (*Myotis septentrionalis).* There are no additional wildlife SOCC. Table 4.6 quantifies suitable habitat for these wildlife SAR along the proposed and alternate routes.

The Newfoundland population of American marten is listed as Threatened under SARA and the NL ESA, and the AC CDC ranks marten as S3 (or Vulnerable). Martens have been recorded in the vicinity of the Project as confirmed by AC CDC (2020) data and observations during field surveys conducted for the Valentine Gold Project (Marathon 2020). Newfoundland marten generally select mature, dense canopy forest patches within a matrix of bogs and scrub (Smith and Schaefer 2002; Payer and Harrison 2003; Poole et al. 2004; Gosse et al. 2005; Hearn et al. 2010) with a high percentage of tall spruce or fir trees and woody debris (Bowman and Robitaille 1997). A mixture of large-diameter mature trees, open shrub layer, and coarse woody debris are important to Newfoundland marten as they provide cover, protection and prey availability (Thompson and Curran 1995; Godbout and Ouellet 2010; Hearn et al. 2010; Caryl et al. 2012). Balsam fir and black spruce forests are considered high-value habitat types for Newfoundland marten in the vicinity of the Project (Marathon 2020). Both the proposed and alternate routes overlap with proposed critical habitat for American marten (0.52 $km^2$ for proposed route and 0.50 $km^2$ for alternate route) (Figure 4.2).

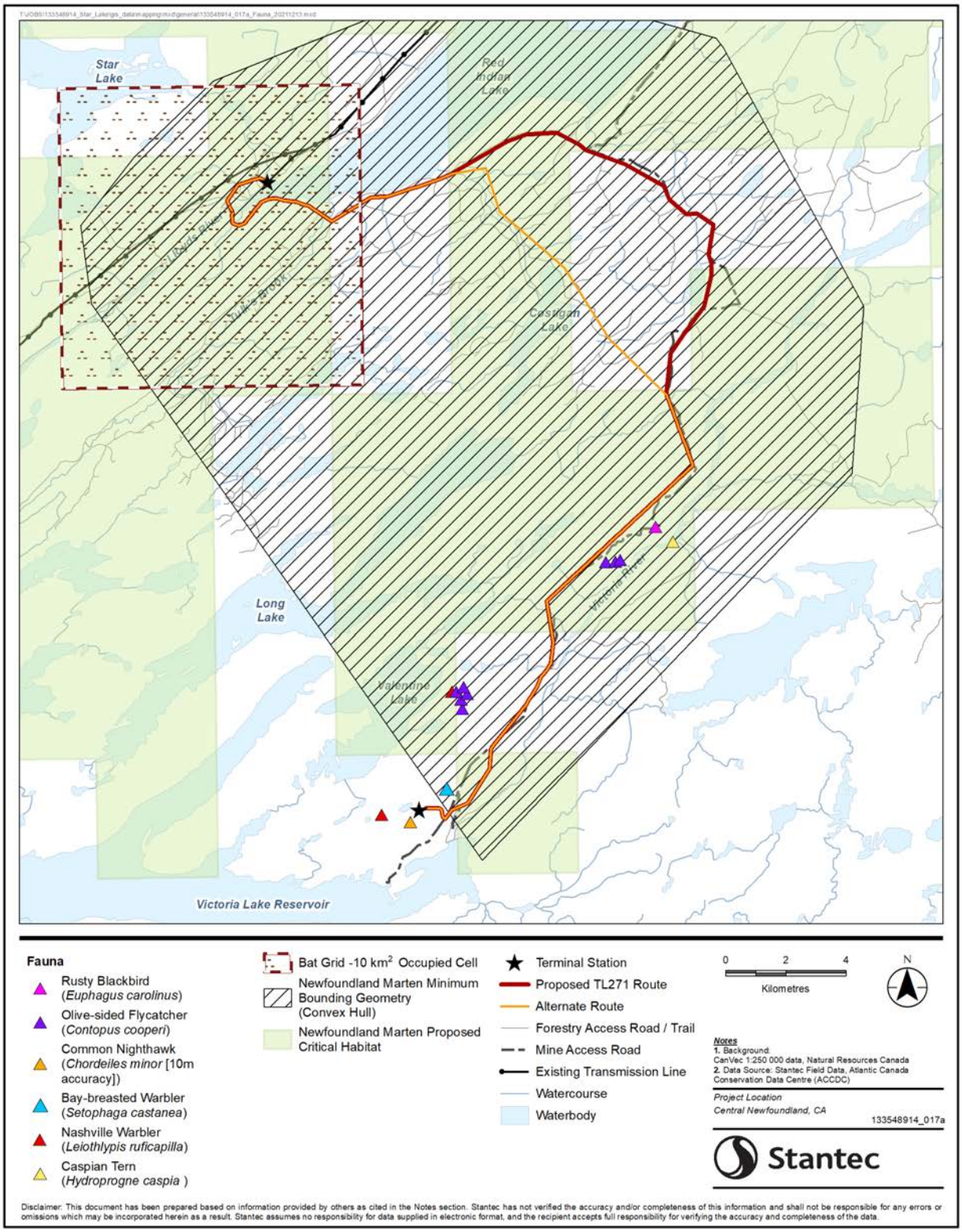



**Figure 4.6 Known Locations of Wildlife SAR/SOCC in the Vicinity of the Project**

## Table 4.6 Habitat Types for Proposed and Alternate Routes and their Use by Other Wildlife Species at Risk

| Habitat Type | ELCA[1] (km²/ %) | Proposed Route | | Alternate Route | | Little Brown Myotis | Northern Myotis | Newfoundland Marten |
|---|---|---|---|---|---|---|---|---|
| | | Area in RoW[2] (km² / %)[2] | Area within LAA (km² / %) | Area in RoW (km² / %)[3] | Area within LAA (km² / %) | | | |
| **Forest Habitat Types** | | | | | | | | |
| Balsam Fir Forest | 126.9/6.9 | 0.135/14.84 | 5.12/11.03 | 0.11/12.96 | 4.46/10.86 | ✓ | ✓ | ✓ |
| Kalmia-Black Spruce Woodland | 208.8/11.4 | 0.026/2.86 | 2.16/4.67 | 0.03/3.58 | 2.07/5.04 | ✓ | ✓ | ✓ |
| Mixedwood Forest | 179.3/9.8 | 0.207/22.75 | 8.63/18.60 | 0.16/19.88 | 7.15/17.41 | ✓ | ✓ | ✓ |
| Regenerating Forest | 139.5/7.6 | 0.098/10.77 | 5.39/11.62 | 0.11/13.09 | 4.94/12.02 | | | ✓ |
| **Wetland Habitat Types** | | | | | | | | |
| Alder Thicket | 97.4/5.3 | 0.144/15.82 | 5.71/12.31 | 0.11/13.58 | 4.76/11.58 | | | |
| Black Spruce Forest | 233.1/12.7 | 0.131/14.4 | 6.80/14.65 | 0.13/16.17 | 5.96/14.5 | ✓ | ✓ | ✓ |
| Open Wetlands (graminoid fen, shrub bog) | 280.3/15.3 | 0.022/2.42 | 2.65/5.72 | 0.02/2.35 | 2.11/5.14 | ✓ | | |
| Riparian Thicket | 15.1/0.8 | 0 | 0.07/0.16 | 0 | 0.05/0.12 | | | |
| Wet Coniferous Forest | 130.7/7.1 | 0.019/2.09 | 2.07/4.47 | 0.03/3.58 | 2.02/4.91 | ✓ | ✓ | ✓ |
| **Sparsely Vegetated, Naturally Non-vegetated, and Anthropogenically Altered / Disturbed Habitat Types** | | | | | | | | |
| Open Water | 408.5/22.3 | 0.007/0.07 | 2.292 | 0.007/0.86 | 2.208 | ✓ | ✓ | |
| Exposed Sand / Gravel Shoreline | 2.9/0.2 | 0 | 0.134 | 0 | 0.134 | ✓ | | |
| Anthropogenic | 8.2/0.5 | 0.035/3.85 | 1.079 | 0.024/2.96 | 0.958 | ✓ | | |

Notes:
1 ELCA is depicted on Figure 4.1 and is 1,830.6 km².
2 Total area within the 20 m RoW for the proposed route is 0.91 km².
3 Total area within the 20 m RoW for the alternate route is 0.81 km².
Source: Modified from Marathon (2020)

The little brown myotis and northern myotis are currently listed as Endangered under SARA, following an emergency listing in 2014. Little brown myotis are predominately associated with open areas, compared to northern myotis that are generally more forest dependent. Little brown myotis typically feed over open areas (e.g., open water) and form maternity colonies in human structures such as barns, attics, or sheds (although less commonly they will utilize forests for these activities). In contrast, northern myotis feed on terrestrial insects in forested areas and form maternity colonies in trees, where females give birth and raise their young. In Newfoundland, tree species used for roosting by northern myotis include balsam fir and white birch and, to a lesser extent, black spruce. The males of both species, who are less restricted in roost choice than are maternity colonies, will roost alone or in small groups and may roost in human structures or in trees. A portion of the RoW (common to the proposed and alternate routes) is within a 10 km grid cell where a hibernaculum for myotis species is known to exist (AC CDC 2020) (Figure 4.5).

## 4.6 AVIFAUNA

Section 5.3.2 and Appendix D of the Environmental Registration describe the avifauna species occurring in the RAA, based primarily on field studies conducted for the Valentine Gold Project (Marathon 2020), publicly available literature and databases. In addition to migratory waterfowl and passerines, the RAA also contains habitat for raptors and upland game birds.

Three avifauna SAR and three avifauna SOCC were identified during field surveys for the Valentine Gold Project, and an additional five SAR have been recorded in the region, based on other data sources [AC CDC, Breeding Bird Surveys or Christmas Bird Counts] (Marathon 2020). Of these, four SAR – olive-sided flycatcher (*Contopus cooperi*), rusty blackbird (*Euphagus carolinus*), gray-cheeked thrush (*Catharus minimus*), and red crossbill (*Loxia curvirostra*) – and two SOCC – Nashville warbler (*Leiothlypis ruficapilla*) and bay-breasted warbler (*Setophaga castanea*) – have the potential to occur in suitable habitats in the RAA during the breeding season for migratory birds on the Island of Newfoundland (April – August). Table 4.7 shows the habitat preferences for the avifauna SAR and their relative occurrence along the proposed and alternate routes.

Olive-sided flycatchers are most often associated with open areas, where they perch in tall trees and forage for flying insects (COSEWIC 2018a). Most often this consists of coniferous forest stands interspersed with bogs or fens of similar size that provide a combination of suitable nesting sites (islands of coniferous forest), open foraging areas (small to medium sized bogs and fens) and perch sites (tall trees and snags). Wet coniferous forest and open wetlands were identified as being of high value to olive-sided flycatcher on the Island of Newfoundland (Marathon 2020), which, when combined, comprise approximately 4.5% of habitats in the proposed RoW and 5.9% in the alternate RoW (Table 4.7).

## Table 4.7 Habitat Types for Proposed and Alternate Routes and their Use by Avifauna Species at Risk

| Habitat Type | ELCA[1] (km²/ %) | Proposed Route | | Alternate Route | | Habitat Preference | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | Area in RoW[2] (km² / %)[2] | Area within LAA (km² / %) | Area in RoW (km² / %)[3] | Area within LAA (km² / %) | Olive-sided Flycatcher | Rusty Blackbird | Grey-cheeked Thrush | Red Crossbill |
| **Forest Habitat Types** | | | | | | | | | |
| Balsam Fir Forest | 126.9/6.9 | 0.134/14.84 | 5.12/11.03 | 0.11/12.96 | 4.46/10.86 | Low | Low | Low | High |
| Kalmia-Black Spruce Woodland | 208.8/11.4 | 0.03/2.86 | 2.16/4.67 | 0.03/3.58 | 2.07/5.04 | Low | Low | Moderate | Moderate |
| Mixedwood Forest | 179.3/9.8 | 0.21/22.75 | 8.63/18.60 | 0.16/19.88 | 7.15/17.41 | Low | Low | Low | Low |
| Regenerating Forest | 139.5/7.6 | 0.098/10.77 | 5.39/11.62 | 0.11/13.09 | 4.94/12.02 | Low | Moderate | High | Low |
| **Wetland Habitat Types** | | | | | | | | | |
| Alder Thicket | 97.4/5.3 | 0.14/15.82 | 5.71/12.31 | 0.11/13.58 | 4.76/11.58 | Low | Moderate | Low | Low |
| Black Spruce Forest | 233.1/12.7 | 0.13/14.4 | 6.80/14.65 | 0.13/16.17 | 5.96/14.5 | Moderate | Low | Moderate | Moderate |
| Open Wetlands (graminoid fen, shrub bog) | 280.3/15.3 | 0.02/2.42 | 2.65/5.72 | 0.02/2.35 | 2.11/5.14 | High | Moderate | Low | Low |
| Riparian Thicket | 15.1/0.8 | 0 | 0.07/0.16 | 0 | 0.05/0.12 | Low | Moderate | Low | Low |
| Wet Coniferous Forest | 130.7/7.1 | 0.02/2.09 | 2.07/4.47 | 0.03/3.58 | 2.02/4.91 | High | High | Moderate | Moderate |
| **Sparsely Vegetated, Naturally Non-vegetated, and Anthropogenically Altered / Disturbed Habitat Types** | | | | | | | | | |
| Open Water | 408.5/22.3 | 0.007/0.07 | 2.292 | 0.007/0.86 | 2.208 | Low | Low | Low | Low |
| Exposed Sand / Gravel Shoreline | 2.9/0.2 | 0 | 0.134 | 0 | 0.134 | Low | Low | Low | Low |
| Anthropogenic | 8.2/0.5 | 0.035/3.85 | 1.079 | 0.024/2.96 | 0.958 | Low | Low | Low | Low |

Notes:
[1] ELCA is depicted on Figure 4.1 and is 1,830.6 km².
[2] Total area within the 20 m RoW for the proposed route is 0.91 km².
[3] Total area within the 20 m RoW for the alternate route is 0.81 km².
Source: Modified from Marathon (2020) Table 10.13

Rusty blackbird is believed to occur irregularly in suitable habitat in Newfoundland (Wildlife Division 2020). While primarily associated with forested wetlands, particularly those with waterbodies such as slow-moving streams and beaver ponds, they are also found in peat bogs, sedge meadows, and scrub edges (COSEWIC 2006; Government of NL n.d.d; Wildlife Division 2020). Incidental sightings of rusty blackbird have been reported from much of insular Newfoundland (Wildlife Division 2020) including during baseline studies for the Valentine Gold Project (Figure 4.6), where a lone male was observed singing within a tall shrub swamp and two other rusty blackbirds were noted during aerial waterfowl surveys (Marathon 2020). High-value habitat (e.g., wet coniferous forests) for rusty blackbird comprises 2% of the proposed RoW.

Preferred breeding grounds for grey-cheeked thrush include dense low coniferous woods such as young regenerating forest, open-canopy old growth forests having a dense understory, and dense, stunted spruce stands (SSAC 2005). Regenerating forests comprise 10.8% of the proposed RoW (13% of alternate RoW). Preferred habitat for red crossbill includes older, mature conifer forests, with the highest abundance likely occurring in western Newfoundland (Government of NL n.d.d). However, this species has the potential to occur in any large stands of coniferous forest. Within the proposed RoW, forested habitat types are predominantly mixedwood and regenerating forests (33.5% of the RoW), while balsam fir forests comprise approximately 14.8% of proposed RoW habitat.

## 4.7 LAND AND RESOURCE USE

The Project is located on provincial crown lands in a rural region of central Newfoundland where there is a history of mineral exploration and mining, hydroelectric development, and forestry. The nearest communities are the Town of Millertown (52 km) and the Town of Buchans (45 km). These communities, along with Buchans Junction, Badger, Grand Falls-Windsor and Bishop's Falls, were established and grew primarily due to natural resource-based industries, including mining, forestry and hydroelectric developments. Logging has taken place in the region since the turn of the twentieth century. However, with the 2009 closure of the pulp and paper mill in Grand-Falls-Windsor, forestry in the area has decreased. Although there are currently no active mines in the area, mineral exploration activity does take place throughout the general region, including south of the Project Area, where Marathon is proposing to develop an open pit gold mine (Valentine Gold Project).

Land use in the general area is characterized by mining and other land and resource uses, including commercial forestry, outfitting, and recreational land use. Although there are currently no active mines in the area, mineral exploration activity does take place throughout the general region, including south of the Project Area, where Marathon is proposing to develop an open pit gold mine (Valentine Gold Project).

Other land and resource use activities in the area include outfitting, camping, fishing, hunting, trapping, and recreational vehicle use (ATV use, snowmobiling). There are approximately 151 seasonal dwellings (registered and unregistered cabins, outfitters) within 5 km of the Project and 15 within a 250 m radius. This includes an active outfitter's camp at Lloyd's River, which is approximately 147 m from the proposed transmission line RoW. The closest permanent residences would be associated with the Town of Buchans, approximately 45 km away.

Angling occurs on a number of waterbodies in the region. Watercourses and waterbodies in the vicinity of the Project Area support established recreational fisheries for brook trout and ouananiche and may support a limited recreational catch and release fishery for sea-run Atlantic salmon, where they reside. There is an active recreational salmon fishery on the Exploits River, which flows northeast from Red Indian Lake. The Exploits River (including tributaries) is a scheduled salmon river, regulated by DFO under the *Fisheries Act* and the *Canada Wildlife Act*. Any stream, brook, or river that flows into Red Indian Lake is considered scheduled waters. Indigenous fishing activity is also known to occur in other watercourses or waterbodies surrounding Red Indian Lake (Stantec 2020). There are no known commercial fisheries in the area. Fishways at the Grand Falls and Bishop's Falls dams, owned by DFO and operated by Environment Resources Management Association, allow upstream migrating Atlantic salmon to get past the dams. Additional fish passage for migrating Atlantic salmon is also provided at Red Indian Lake Dam. A hatchery located near the Grand Falls fishway, operated by Environment Resources Management Association provides brook trout fingerlings for a fish habitat compensation (restocking) program at Star Lake.

Protected areas (e.g., ecological reserves, provincial and national parks, wildlife reserves, wilderness reserves) comprise approximately 6.7 percent of the Island of Newfoundland (Wilderness and Ecological Reserves Advisory Council 2020). There are two provincial protected areas in the RAA: Little Grand Lake Provisional Ecological Reserve (approximately 15 km from the Project Area); and Little Grand Lake Wildlife Reserve (approximately 25 km from the Project Area).

## 4.8 HISTORIC RESOURCES

As part of the overall Historic Resources Impact Assessment (HRIA) for the Project, a Historic Resources Baseline Study was conducted (Appendix E of the Environmental Registration) which consisted of review of archaeological, historic, and ethnohistoric literature, along with reports and site record forms provided by the Provincial Archaeology Office, pertaining to known archaeological sites in the vicinity of the Project Area. Previous archaeological work on the Island of Newfoundland indicates approximately 5,000 years of precontact Indigenous occupation in four distinct periods: two Pre-Inuit and two of Amerindian affiliation. Indigenous occupation was demonstrably intensive along the coast. Interior occupation, primarily by Amerindian groups, but increasingly including some evidence for Pre-Inuit occupation, appears to have been focused on near-coastal interior lakes, and major northeast-southwest -oriented lakes and rivers traversing the deep interior. Historic European archaeological sites are known primarily from coastal areas until the 20th century, although historic Mi'kmaq and Beothuk sites have been recorded, and may be anticipated, in deep interior settings on the Island.

Ethnohistoric evidence indicates that important caribou migration corridors approach and traverse the Project Area, and that there is theoretical potential for precontact sites of all periods, particularly for sites of Maritime Archaic and late precontact Amerindian peoples, but also, to a lesser extent, potential for Pre-Inuit sites. The Project also lies within the territory of the Beothuk prior to the second quarter of the 19th century, so there is potential for historic Beothuk sites, and also for historic Mi'kmaq sites dating to the second half of the 19th century into the 20th century.

Three archaeological surveys undertaken in the vicinity of the Project (including a targeted survey of the northeastern corner of Costigan Lake) found no evidence of archaeological sites (Madden 1975; Schwarz 1993, 2020). However, a desktop archaeological study conducted for the Valentine Gold Project identified registered archaeological sites from a broader area in west-central and south-central Newfoundland including a cluster of historic Beothuk and precontact sites on Red Indian Lake northeast of the Project and a reported wigwam site on Costigan Lake (approximately 750 m from the alternate route RoW). The Historic Resources Baseline Study for this Project (see Appendix E of the Environmental Registration) identified several areas of moderate and high archaeological potential along the proposed RoW as presented in the Environmental Registration. As described in Section 2.1, this route is now considered the alternate route.

As recommended in the Historic Resources Baseline Study (Appendix E of the Environmental Registration) and committed to in Section 3.3 of the Environmental Registration, NL Hydro conducted an archaeological field survey program (Stage 2 assessment) in 2021 to investigate areas of moderate and high archaeological potential within the Project Area (including the current proposed and alternate routes) prior to ground disturbance. Appendix E of this EPR provides additional information on the archaeological field survey program conducted for the Project in 2021. A summary of the methods and results is presented below.

The Stage 2 fieldwork for the HRIA consisted of an archaeological walkover, followed by subsurface testing where warranted, at the 37 locations identified during the desktop assessment; locations encompassed both the proposed and alternate route. Subsurface testing was completed at six (6) of the 37 locations with each high or medium archaeological potential, location being given a label: SL-Arch-XX. There were no finds identified during the testing and no further investigation is recommended. Potential access points along the RoW will avoid new watercourse crossings and are not expected to encounter new locations with moderate or high potential archaeological potential.

The assessments were undertaken as follows:

- The archaeological walkover consisted of walking the terrain in transects at each high potential stream crossing to identify level, well-drained terrain suitable for human habitation and subsurface testing. Walkover included visual surface inspection to identify surface-visible archaeological features (such as housepits) and examination of soil exposures (including treethrows and eroding banks). In each location, walkover was undertaken within a 25 m wide assessment area on each side of the transmission centreline on both sides of each stream crossing. The length of each assessment area varied according to terrain.
- Subsurface testing involved the excavation of test pits in one or two lines depending on conditions, spaced 5 m apart parallel to terrace edges, with shovel and trowel at 5 m intervals as terrain and vegetation cover permit. Test pits measured 25 x 25 cm and were excavated to an archaeologically sterile layer (usually the B Horizon). Sediments were screened through 6 mm mesh, and test pit profiles were recorded.

- After the completion of the Stage 2 field assessment, Project design changes were identified in November 2021 that included sections of re-routed RoW that deviated from what was assessed during the 2021 field program. Specifically, the re-routed RoW deviated from archaeological assessment areas SL-arch-18 and SL-arch-19 (Map 3, Appendix E) and on Map 6 (Appendix E) where additional watercourse crossings can be identified. A follow-up desktop review was undertaken as a result of these Project design changes. For assessment areas SL-arch-18 and SL-arch-19, the re-routed section of RoW is now planned to be located parallel to (west of) the main access road for the Valentine Gold Project, which underwent a concurrent Stage 2 archaeological assessment. As such, HRIA data from the Valentine Gold Project was used to assess the new watercourse crossing locations at VG-arch-15 and VG-arch-16 for this HRIA (Map Sheet 3, Appendix E). Given that these watercourse crossings were archaeologically assessed as part of the Valentine Gold Project, the assessment of the re-routed RoW for the transmission line at SL-arch-15 to SL-arch-19 is considered completed, and no further investigations are recommended for those particular watercourse crossings. In the vicinity of the SL-arch-34 assessment area, the Project RoW deviates from the main access road to the west and crosses three mapped watercourses (now labeled SL-arch-44, SL-arch-45, and SL-arch-46 on Map 6, Appendix E), including the watercourse originally associated with SL-arch-34. LiDAR data for this area has been reviewed, and it has been determined that the topography and character of the watercourses at the transmission line crossing locations are rated as having low potential for archaeological resources and do not need to be re-assessed in the field.

No features, deposits, or artifacts of archaeological significance were identified during the testing, and no further investigations are recommended. Potential access points along the RoW will avoid new watercourse crossings and are not expected to encounter new locations with moderate or high potential archaeological potential.

Mitigation and monitoring for the accidental discovery of heritage resources during the construction and operation of the Project will be detailed under the EPP. It is understood that recommendations are subject to the approval of the Provincial Archaeology Office, Newfoundland and Labrador Department of Tourism, Culture, Arts, and Recreation.

# 5.0 POTENTIAL ENVIRONMENTAL EFFECTS AND MITIGATION

## 5.1 OVERVIEW OF APPROACH

This EPR includes information supplemental to that provided in the Environmental Registration and has been scoped to address the specific requirements of the EPR Guidelines (Appendix A). Section 5 of the Environmental Registration presented an in-depth assessment of Project effects on the following Valued Components (VCs):

- Caribou
- Fish and Fish Habitat
- Avifauna
- Other Species at Risk

Section 6 of the Environmental Registration assessed potential cumulative effects on the same VCs in consideration of other past, present and likely future projects and activities. This included cumulative effects with mining and exploration (including the proposed Valentine Gold Project); forestry; hunting, trapping and outfitting; angling/fishing; off-road vehicle use; hydroelectric development; and other linear features (e.g., roads, powerlines). The following sections outline the scope of the assessment contained within this EPR, including both the assessment of Project effects and potential cumulative effects.

### 5.1.1 Scope of the Assessment

The EPR Guidelines require a discussion of potential direct and cumulative effects of the Project, considering the preferred and alternative transmission line routes, on the following components:

- Caribou
- Fish and Fish Habitat
- Wetlands
- Migratory Birds (Avifauna)
- Other Wildlife (including Species at Risk and Species of Conservation Concern)
- Land and Resource Use (Outfitting Industry and Other Landowners/Users)

In addition, the EPR Guidelines require an assessment of the archaeological potential within the Project footprint.

The following subsections describe potential direct Project effects and cumulative effects for these environmental components focused on EPR Guideline requirements. These subsections are structured to specifically address information requirements presented in the EPR Guidelines. In some cases, the reader is referred to the Environmental Registration document for additional information.

The scope of the Project to be assessed includes the components and activities described in Section 2 and includes the construction, operation and maintenance, and eventual decommissioning of TL271, as well as activities associated with the Star Lake Terminal upgrades to accommodate the new transmission line.

### 5.1.2 Cumulative Effects Approach

Recognizing the overlap of this Project with the Valentine Gold Project and the important contribution the Valentine Gold Project will have regarding adverse cumulative effects on caribou, as well as in the monitoring and management of cumulative effects, the cumulative effects assessment in this EPR draws on recent work undertaken by Marathon related to potential cumulative effects of the Valentine Gold Project in combination with the effects of other existing projects and activities occurring across the ranges of the assessed herds. This additional work was in response to comments received by Marathon from the NLDFFA-Wildlife Division during the regulatory review process of the EIS for the Valentine Gold Project. It is being incorporated here as appropriate to address requirements in the EPR Guidelines and in response to similar concerns the NLDFFA-Wildlife Division has communicated to NL Hydro on this Project. The cumulative effects assessment for caribou presents a detailed account of other projects and activities in the area, which is then cross-referenced as appropriate for the other VCs.

These other projects and activities are depicted on Figures 5.1 and 5.2 as appropriate, and include:

- Mineral exploration and mining
- Forestry
- Hunting, trapping and outfitting
- Hydroelectric development
- Linear features
- Off-road vehicle use

Descriptions of these activities are provided in Section 5.2.2. Angling and fishing is considered in the context of the cumulative effects for Fish and Fish Habitat (Section 5.3.2).

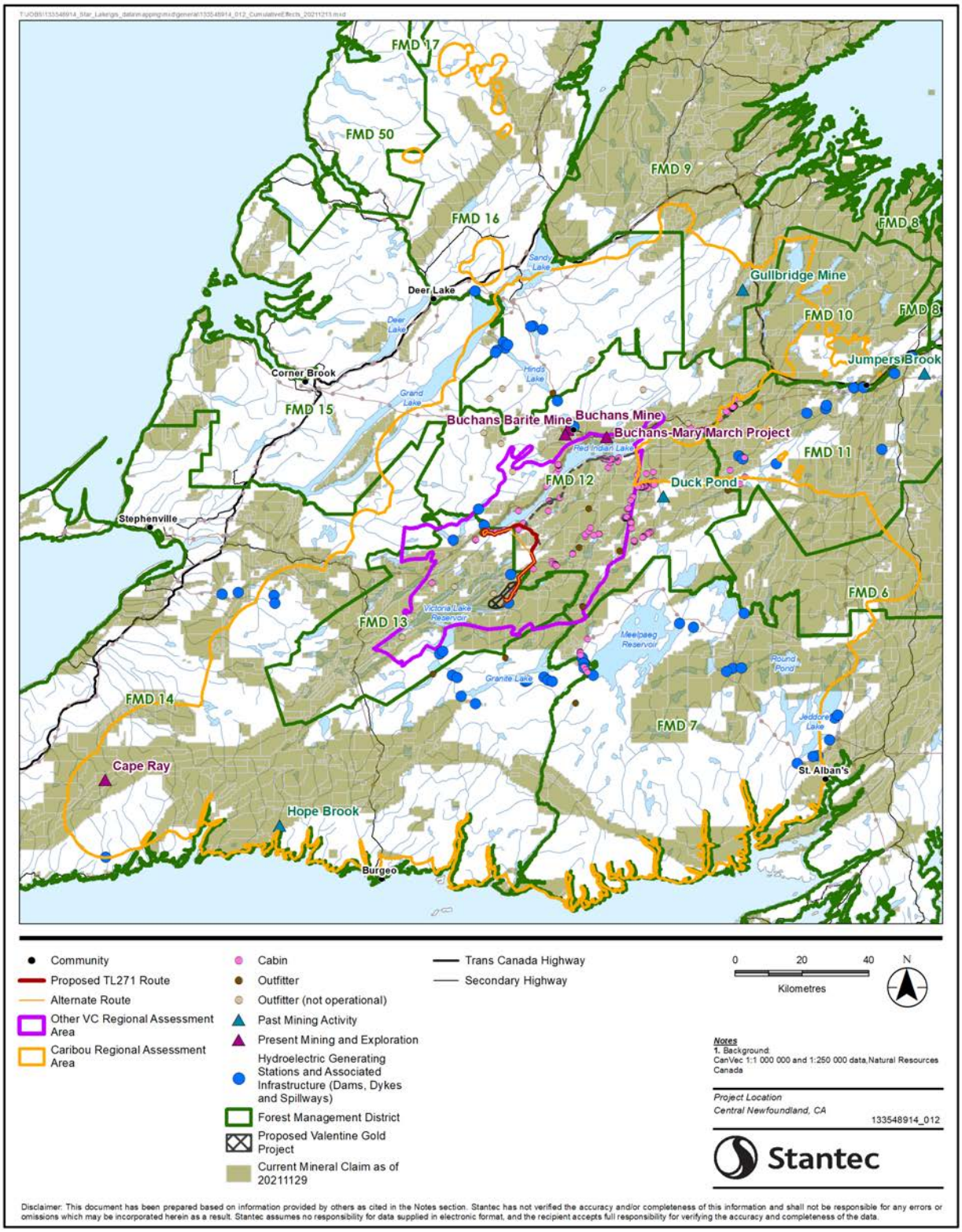



**Figure 5.1 Other Projects and Activities Considered in the Caribou RAA**

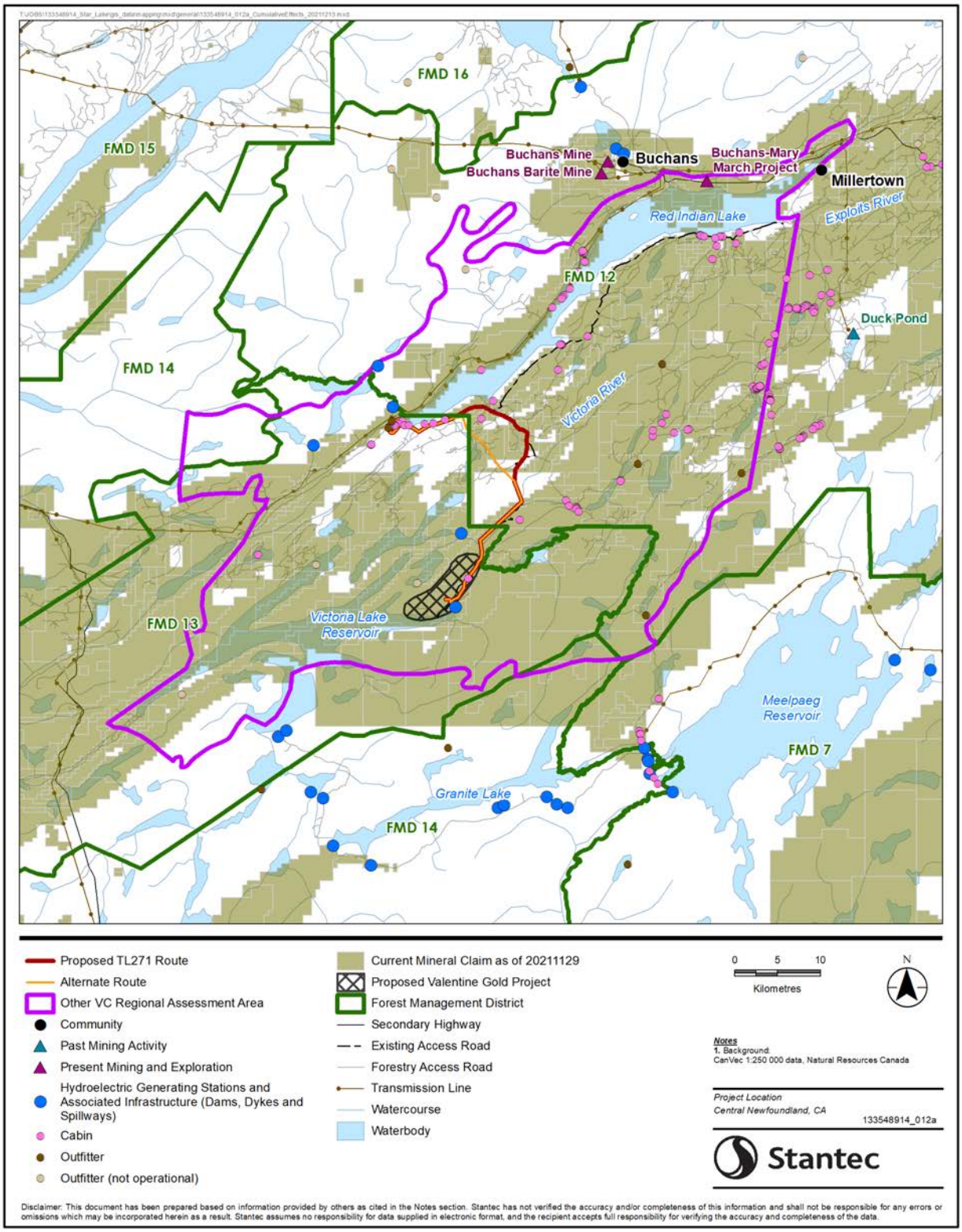



**Figure 5.2 Other Projects and Activities Considered in the Other VC RAA**

# 5.2 CARIBOU

## 5.2.1 Potential Project Effects and Mitigation

Potential Project effects on caribou include a change in habitat, change in caribou movement, and a change in mortality risk. For ease of discussion, the presentation of effects is organized into each of these three effects pathways. However, it is recognized that these effects are interconnected. For example, direct or indirect changes in caribou habitat can change caribou behavior and movement patterns and result in increased energetic costs, indirectly leading to increased mortality risks. The analysis of Project effects on caribou as presented in the Environmental Registration (Section 5.2) has been represented below and updated where applicable to account for effects of both the proposed and alternate routes, including access trails as directed by the EPR Guidelines.

### 5.2.1.1 Effects on Caribou Habitat

Caribou habitat will be changed through Project construction activities, either directly or indirectly. Direct effects on habitat will occur because of vegetation clearing in the RoW, development or upgrade of access trails, and the installation of water crossings (if required). These activities will result in the direct loss of trees, shrubs and understory vegetation, including lichens, which are important to caribou (Government of NL 2020b). Project activities also have the potential to affect caribou habitat indirectly through sensory disturbance (e.g., dust, noise and human activity) associated with RoW clearing, installation of infrastructure, and terminal station upgrades.

Direct and indirect effects on habitat could displace caribou to habitats that are less secure, have lower forage value, or require higher energetic costs for movement, which could lead to reduced reproductive success and survival. Direct effects on habitat will occur during the construction phase and persist throughout the life of the Project until the completion of rehabilitation activities. The duration, magnitude and location of sensory disturbances will vary depending on the type and timing (e.g., during calving) of construction activity. Direct and indirect effects on caribou habitat are discussed below in more detail.

Table 4.5 in Section 4.4 shows the occurrence of high and moderate value caribou habitat within the proposed and alternate RoWs. High and moderate ranked habitat covers 0.55 $km^2$ and 0.48 $km^2$ of the proposed and alternate RoWs, respectively. The amount of high or moderate habitat within the proposed or alternate RoWs which is predicted to be directly impacted during Project construction represents approximately 0.03% of high or moderate habitat present within the ELCA. The value and function of this habitat with respect to caribou migration is discussed in Section 5.2.1.2.

Fragmentation, or the “breaking apart” of contiguous habitat into smaller, isolated habitat patches (Bennett and Saunders 2010), further reduces the availability and the suitability of adjacent habitats for caribou and other wildlife in general (Mullu 2016). Fragmentation creates habitat edges, and subsequent edge effects, which can include changes in microclimate, vegetation structure, and wildlife presence and/or abundance, and behavioral responses (Murcia 1995; Harper et al. 2005). As caribou require large, interconnected tracts of lichen-rich forest (ECCC 2019), linear features, such as roads and transmission lines, can affect connectivity between patches of optimal caribou habitat. In fragmented habitats, caribou have been shown to avoid assemblages of different habitat types and the boundaries between them

(Stuart-Smith et al. 1997; Smith et al. 2000). Caribou are also less likely to use smaller habitat patches in a fragmented landscape (Lesmerises et al. 2013). The transmission line parallels existing resource roads for the majority of both the proposed or alternate RoWs, although as can be seen on the Mapbook in Appendix B, the proposed route more closely follows resource roads that are well-maintained, substantially improving access and reducing the need for new access construction compared to the alternate route.

Project-related change in habitat will have the greatest effect on caribou herds whose home-ranges overlaps the Project Area. An analysis of caribou telemetry data showed overlap between the Project Area and the seasonal ranges of the Buchans and Grey River herds (Table 5.7; see also Figures 4.1 to 4-8 in the Caribou Baseline Study, Appendix E). The spring migration / pre-calving and calving seasonal ranges of the Grey River minimally overlap the proposed route (Table 5.7; Figures 5.1 and 5.2). The Buchans herd also overlap the proposed route for portions of most caribou seasons (Table 5.7; Figures 5.3 and 5.4). Change in habitat for the Gaff Topsails and La Poile herds is not expected, as their calculated seasonal ranges do not overlap the Project Area.

While no additional change in habitat will occur during operations, vegetation management activities in the RoW (e.g., cutting, herbicide application) may cause sensory disturbance and affect habitat indirectly. The extent of sensory disturbance from these activities will vary with the type and intensity of disturbance, season, and spatial scale, and may have a greater effect on caribou during sensitive life cycle periods (e.g., calving).

Caribou habitat is expected to be affected indirectly by sensory disturbance arising from construction, operation, and decommissioning activities. Project effects related to specific activities (e.g., clearing, installation of poles, stringing of conductor) are likely to be confounded with other potential factors (e.g., human activity, dust, noise, and lighting) and therefore activity-specific effects may not be discernable.

Caribou react to both the presence of physical structures in their habitat (visual disturbance) and to sensory disturbances (e.g., dust, noise, light) caused by human activity. Research has shown that caribou avoid anthropogenic activity, infrastructure, and linear features including transmission lines and roads. Caribou have been documented to avoid transmission lines at distances of 2.5 km to 6 km (e.g., Nellemann et al. 2001; Vistnes and Nellemann 2001; Nellemann et al. 2003), while other research has found no avoidance of transmission lines (Reimers et al. 2007, 2020; Plante et al. 2018), or avoidance during construction phases only (Eftestøl et al. 2016) (see Table 5.8 in the Environmental Registration for more information).

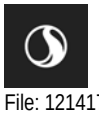
The type and intensity of the disturbance may affect the degree of avoidance by caribou. Although research has shown that caribou avoid inactive roads (Oberg 2001) and roads with little traffic (Dyer et al. 2001), indicating that some avoidance is attributable to the physical presence of the road and not just human activity, the greatest amount of avoidance was of roads with greater disturbance levels (i.e., active roads compared to derelict roads) (Leblond et al. 2013) or during the highest traffic period (Dyer et al. 2001). Other ungulates (i.e., red deer) avoid crossing roads during periods of increased traffic (Kušta et al. 2017). This variability in response to disturbance indicates that the extent of sensory disturbance for caribou may vary due to several factors including location, season, habitat, terrain, intensity, or type of disturbance.

Studies have shown that effects of acoustic emissions on wildlife have the potential to occur above 40 dBA (Shannon et al. 2016). Bradshaw et al. (1997) found that following exposure to simulated blasting noise (sound levels between 90 and 110 dB measured at the source), caribou had an increased rate of movement. Caribou demonstrate a range of reactions to aircraft activity from little response to a strong response (e.g., escape) depending on sound level, altitude and duration of the noise event (AMEC Americas Ltd. 2005). Caribou calf survival has been linked to exposure to overflights (Harrington 2003) and startle responses following sudden noise (see Harrington and Veitch 1991). Research that modelled effects of sudden noise disturbance on caribou indicated that energetic costs associated with repeated disturbance (e.g., movement, flight response) could result in a substantial loss in body mass (Bradshaw et al. 1998). Body weights are also lower in caribou exposed to petroleum development (Cameron et al. 2005). As body weight is correlated with parturition (Cameron et al. 1993), repeated avoidance behavior that results in reduced body weight could also reduce calving rates.

As Project-related activities will be focused on the portion of the RoW under construction, inspection, maintenance or decommissioning, the operation of vehicles and machinery is anticipated to generate noise and dust disturbance that will be of short duration and localized. With the exception of periodic inspection and maintenance activities, the operation phase of the Project is not expected to require vehicle or equipment use or other activities that could result in sensory disturbance beyond existing activities at the terminal station and the physical presence of the transmission line. Snowmobile patrols will be conducted annually to visually inspect the transmission line. The need for vegetation management will be assessed approximately three to five years after initial RoW clearing, with manual cutting and herbicide application occurring thereafter to a five- to seven-year frequency.

Change in habitat attributed to sensory disturbance was based on a 500 m buffer applied around the Project Area, consistent with the federal Scientific Assessment to Inform the Identification of Critical Habitat for Woodland Caribou (*Rangifer tarandus caribou*), Boreal Population, in Canada (Environment Canada 2011). Sensory disturbance within the 500 m buffer is expected to be more substantive than in areas more than 500 m from the Project Area, and habitat within the 500 m buffer is expected to have reduced suitability for caribou during all Project phases. As indicated above, avoidance behaviour for transmission lines and access roads has been shown to extend beyond 500 m and indirect effects may extend into the RAA. These effects, however, are expected to decrease with increasing distance from the Project Area. For example, while Rudolph et al. (2012) detected avoidance of roads by woodland caribou at distances greater than 2 km, the analysis showed that avoidance dissipated exponentially with increasing distance. At distances of 500 m and 1,000 m from roads, the relative probability of caribou occurrence was approximately 60% and 80%, respectively, of the estimated maximum caribou occurrence (see Figure 13 in Rudolph et al. 2012). This suggests that while caribou may avoid habitats beyond the LAA, those habitats would not be lost to all caribou.

Approximately 32 $km^2$ of high and moderate-ranked habitat will be indirectly affected within the LAA associated with the proposed RoW (Table 4.5). Although it appears that approximately 26 $km^2$ of high and moderate-ranked habitat will be indirectly affected within the LAA for the alternate route, the actual level of direct and indirect habitat disturbance for the alternate route would be greater, factoring in the addition of new access trails that would be required for that route option. Project-related sensory disturbance is anticipated to be greatest for the Buchans and Grey River herds as their calculated seasonal ranges overlap the Project Area in one or more seasons.



Decommissioning will include removal of transmission line infrastructure, and rehabilitation of access trails. Vegetation control activities in the RoW will cease. Regenerating habitat is generally considered low-quality for caribou, however, the revegetated areas would mature following decommissioning and are expected to become more suitable for caribou over time.

Sensory disturbance from decommissioning activities, such as removal of infrastructure and transportation along the access trails, could affect caribou habitat indirectly, as caribou may continue to avoid the area while physical activities are occurring. However, sensory disturbance will be of shorter duration than other phases and will gradually return to baseline conditions following decommissioning.

#### 5.2.1.2 Effects on Caribou Movement

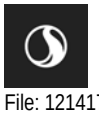
The pathways for change in caribou movement during construction include RoW preparation (i.e., clearing and cutting of vegetation), development or upgrade of access trails, installation of water crossings (if required), and expansion of the Star Lake Terminal Station. The physical placement of Project infrastructure (e.g., RoW, poles, access trails) overlaps the migration corridor and may reduce the permeability of the corridor if caribou perceive them as obstacles. Sensory disturbance associated with construction, primarily from dust, noise, light, and human presence, also has the potential to affect caribou movement indirectly. Sensory disturbance during construction could result in altered movement patterns (e.g., avoidance of existing migration paths).

The continued presence of Project infrastructure (e.g., transmission line, RoW, access trails) during operations could alter caribou movement patterns. Additionally, caribou may avoid maintenance activities during operations (e.g., asset inspection and repair, vegetation clearing in the RoW) because of sensory disturbance (e.g., noise, light, or human presence).

Maintaining connectivity (i.e., allowing movements) between seasonal ranges is vital to sustaining viable populations of migratory ungulates (Monteith et al. 2018) and has been identified in recovery strategies as an important component of caribou persistence (e.g., Government of Alberta 2017; ECCC 2019).

Caribou can exhibit several responses to linear features, including delayed or failed crossing of linear features, such as power lines and roads, and increased activity near a disturbance (Curatolo and Murphy 1986; Wolfe et al. 2000; Dyer et al. 2002; Vistnes et al. 2004). While caribou demonstrate a degree of avoidance to seismic lines (Dyer et al. 2001), seismic lines generally are not barriers to caribou movement (Dyer et al. 2002). Other research has indicated that migrating caribou do not cross elevated pipelines (Smith and Cameron 1985) and generally avoid roads (Baltensperger and Joly 2019). In central Newfoundland, caribou avoided the Star Lake hydroelectric development and altered the timing of migration during its construction (Mahoney and Schaefer 2002a).

Anthropogenic disturbance may also affect selection of migration paths. Migrating caribou select movement routes that provide adequate forage and resting habitat (Saher 2005), are less energetically demanding (e.g., less rugged, open terrain) (Saher and Schmigelow 2005), and have a lower predation risk compared to other potential routes (Bergerud et al. 1990; Ferguson and Elkie 2004). Caribou movement during migration has been found to increase when linear features are encountered (Murphy and Curatolo 1987) and daily movement rates increase with increasing anthropogenic disturbance within



the range (MacNearney et al. 2016). Caribou that encounter linear features during migration may also delay crossing and increase movement rates following crossing (Wilson et al. 2016). Avoidance of the Project and a change in migration pathways could affect caribou energetic costs, predation risks, and/or forage availability during migration (Fullman et al. 2017; Wyckoff et al. 2018).

Project-related changes to existing movement patterns, including an increase in the amount of movement and diversions or delays from existing migration patterns (particularly if they move into more difficult terrain or conditions such as deep snow), could have higher energetic costs and possibly lead to decreases in body condition, pregnancies, and calving rates. Pregnancy rates during the fall are linked to caribou body condition (Gerhart et al. 1997; Russell et al. 1998) and body weight is correlated with parturition (Cameron et al. 1993). Caribou in areas with higher levels of disturbance have been shown to have decreased parturition rates (Cameron et al. 2005) and McCarthy et al. (2011) found that calving rates decreased with increasing disturbance in caribou herds in central Newfoundland.

An analysis of migration patterns for the Buchans herd completed for the Valentine Gold Project (Marathon 2020) identified areas used by GPS-collared Buchans caribou in the spring and fall migration periods. Additional data collected and analyzed (fall 2020, spring and fall 2021) indicated similar patterns (Section 4.4) as presented in the Valentine Gold Project EIS. The assessment defined the ‘migration corridor’ as the area used for migration at the population-level. The corridor contained numerous 'migration paths', which were used by individual caribou. Individual migration paths could be used by one caribou or by several. In both the spring and fall migration periods, caribou followed similar paths through the migration corridor between the calving and winter range (Figures 5.7 and 5.8). During spring migration, caribou used a wider portion of the migration corridor and therefore more dispersed than during fall migration which was narrower and more condensed. As shown in Figures 5.7 and 5.8, the Project Area primarily overlaps with the migration corridor within the Valentine Gold Project mine site (overlapping with moderate-high, moderate-low, and low use areas). The RoW also passes close to high use and moderate-high use areas in the vicinity of Lloyd’s River. Several low use areas overlap with the proposed and alternate routes in the vicinity of Costigan Lake and Red Indian Lake. There is a high use area at the south end of Star Lake where some caribou congregate during both the spring and fall migration periods. While not immediately in the RoW, it is a key area for caribou during the migratory periods.

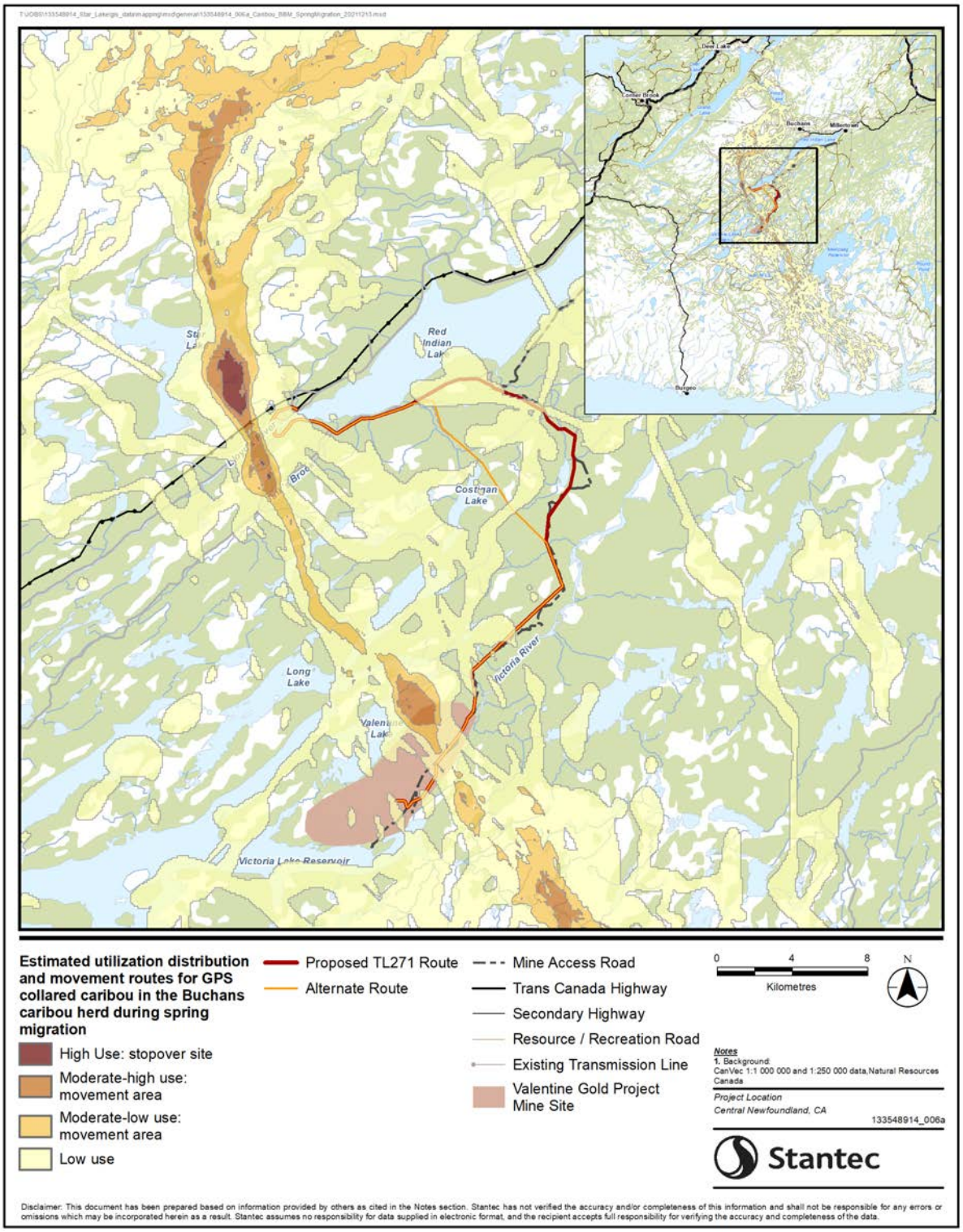



**Figure 5.3 Estimated Utilization Distribution and Migration Corridors of GPS Collared Caribou in the Buchans Herd - Spring Migration**

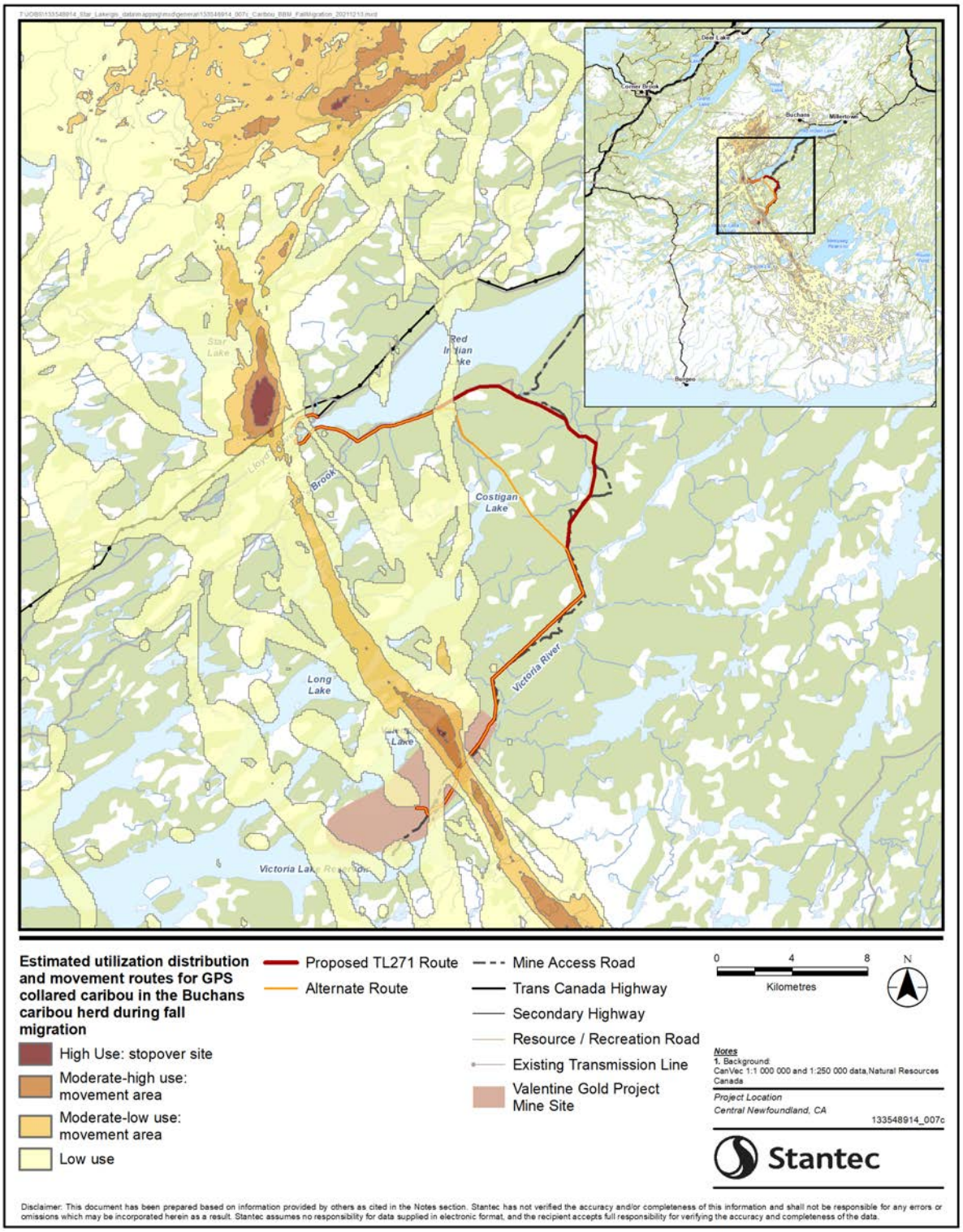



**Figure 5.4 Estimated Utilization Distribution and Migration Corridors of GPS Collared Caribou in the Buchans Herd - Fall Migration**

As the RoW parallels existing roads along most of its length, the RoW will not create, and nor is anticipated to function as, a new linear feature through the migration paths. Approximately 75% of the route length is within 50 m of an existing resource road and approximately 4 km of the proposed RoW will actually overlap with the RoW of existing, maintained resource roads. The proximity of the proposed and alternate routes to existing resource roads also limits the amount of new trails required to access the RoW. Within the Valentine Gold Project mine site, it is anticipated that activities and infrastructure associated with the mine project will be the primary factor affecting caribou movement and that the effects specifically associated with construction and operation of the transmission line may not be discernable. The cumulative effects of the Project in combination with the predicted effects of the Valentine Gold Project are discussed in Section 5.2.2. In the vicinity of Lloyd's River, the RoW is immediately adjacent to the existing road/bridge crossing and is at an area with steep slopes, where caribou are unlikely to cross during the spring or fall migration; caribou are known to cross both upstream and downstream of this location. As described in Section 3.1, the decision to adopt the alternate route presented in the Environmental Registration as the proposed route in this EPR was a result of feedback from NLDFFA-Wildlife Division; the proposed route has less potential for cumulative effects on caribou including less interaction with alternate migration paths that may occur as a result of the Valentine Gold Project. This is discussed further in Section 5.2.2. Mitigation measures such as limiting Project activities during sensitive periods (e.g., calving, migration), and limiting activities to the Project Area, are expected to further reduce Project effects on caribou movement. As stated above, the majority of Project activities (e.g., noise, dust and presence of equipment) would occur during construction, which is anticipated to occur over approximately eight months or one period of spring and fall migration). Maintenance and inspection activities during operation would be periodic, with snowmobile patrols conducted annually to visually inspect the transmission line. The need for vegetation management assessed approximately three to five years after initial RoW clearing. Manual cutting and herbicide application would occur thereafter to a five- to seven-year frequency.

Following decommissioning, vegetation in the RoW may be slow to regenerate and the composition and quantity of vegetation may differ from baseline conditions, leading to continued avoidance of the Project Area if the regenerated habitat is not suitable for caribou migration. Decommissioning activities (e.g., removal of conductors and poles) will likely have a reduced level of sensory disturbance compared to construction but may still cause avoidance by caribou. Indirect effects of sensory disturbance on caribou movement during decommissioning is expected to cease at the end of the phase.

#### 5.2.1.3 Effects on Mortality Risk

Change in caribou mortality risk could be affected by the Project directly (e.g., vehicle collisions) and indirectly (e.g., increased predation risk). Construction and commissioning activities including vegetation clearing, site preparation, construction of infrastructure and construction-related transportation are expected to be the primary pathways through which direct construction-related changes in mortality risk may occur. Project-related transportation and heavy equipment use have the potential to result in vehicle-caribou collisions.

The greatest potential for direct Project-related caribou mortality is expected to occur from collisions with vehicles on resource roads or access trails, although caribou-vehicle collisions are considered to be a low risk for occurrence. The mortality rate from vehicle collisions for adult caribou on the Island of Newfoundland (between 2005 and 2011) was approximately 4% (where the cause of mortality was known) (Lewis and Mahoney 2014). Rates of wildlife-vehicle collisions are influenced by many factors including vehicle speed, traffic volume, animal speed, seasonality, and time of day (Litvaitis and Tash 2008). Project vehicles will be required to comply with posted speed limits, and additional speed restrictions will be implemented during sensitive periods for caribou (e.g., calving and migration).

While almost all animals in the Buchans herd and a portion of the Grey River herd could interact with the Project as a result of their migration and home ranges, the risk of direct mortality resulting from vegetation clearing, site development, and installation of infrastructure is considered low because of the limited exposure of caribou to machinery and equipment as they pass through the Project. Risk to other herds will be negligible, because their calculated ranges do not overlap the Project Area.

Mortality risk for caribou may be affected through indirect mechanisms, such as increased predation risk or increased energy expenditure. While some research on predation risk for caribou on the Island of Newfoundland has been completed, there is little information in general on areas (such as Newfoundland) where black bear and coyote are the primary predators of caribou (Mahoney and Weir 2009; Lewis and Mahoney 2014) in the absence of a breeding wolf population. Regardless, studies have shown that a change in habitat can attract or displace predators, thereby altering predator-prey dynamics. For example, black bear selects for disturbed habitats where there is increased forage availability (Mosnier et al. 2008). Black bear also select anthropogenic edges (Stewart et al. 2013), possibly for efficient access and availability of forage. Coyote selects for disturbed habitats where those disturbed habitats are selected by moose (i.e., where moose are available in disturbed habitats as either prey or carcasses) (Boisjoly et al. 2010). An increase in moose abundance in disturbed areas has been correlated with coyote abundance, and coyote abundance negatively influences caribou calf recruitment (Frenette et al. 2020). In systems such as NL where moose are the primary prey of predators, high predator densities could be supported by abundant moose populations, and caribou are disproportionately preyed upon even if only secondarily to moose (McCutchen 2007; Kittle et al. 2017; Newton et al. 2017).

Predators of caribou have also been shown to select linear features, such as seismic lines (Tigner et al. 2014) and roads (Latham et al. 2013; Hinton et al. 2015; Tomchuk 2019), although avoidance of such features has also been observed (Ellington 2015). Selection of linear features by predators could increase predation of caribou through increased access to caribou range (DeMars and Boutin 2017), particularly in areas such as NL with a reduced risk of predation by wolf and increased risk of predation by black bear (Dussault et al. 2012).

Habitat fragmentation resulting from linear features can also affect caribou mortality risk as caribou may restrict movement between habitat patches. This could increase caribou density within remaining suitable habitat patches, which may increase the risk of predation within those patches (Seip 1991; Wittmer et al. 2005). Predators have also been shown to select for disturbed habitat. Caribou survival also decreases with increasing levels of disturbance within the home range (Courtois et al. 2007).

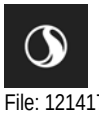
Anthropogenic disturbance may also trigger a physiological stress response in caribou. The levels of stress hormones in caribou have been shown to increase with exposure to anthropogenic disturbance (e.g., Freeman 2008; Renaud 2012; Wasser et al. 2011; Ewacha et al. 2017; Plante et al. 2020). Increased stress may reduce fitness (i.e., the ability of an individual to produce offspring), although the evidence has not been consistent (Bonier et al. 2009). Prolonged stress could potentially lead to poor body condition, which could result in lower survival and reproductive rates (Escribano-Avila et al. 2013). Immune function may also be affected by prolonged stress, which could affect wildlife health through mechanisms, such as increased parasite load or susceptibility to disease (Hing et al. 2016). Increased levels of stress hormones were detected in caribou up to 10 km away from winter recreational activities (i.e., snowmobiling) (Freeman 2008). Recent research on the effects of chronic stress on caribou survival indicate uncertainty (Plante et al. 2020). Project-related physiological stress could affect caribou body condition and health, which could impact individual fitness and, ultimately, population demographics.

Hunting pressure, and therefore mortality risk, can increase with increased access to caribou range. Historical and current access by hunters using linear features may have contributed to decreases in caribou populations through overharvest (Bergerud et al. 1984; Adamczewski et al. 2003; James and Stuart-Smith 2000, Schmelzer et al. 2004; Latham and Boutin 2015). Access to caribou herds via winter roads can contribute to an increase in hunting efficiency (Boulanger et al. 2012) and the likelihood of caribou being hunted increases with proximity to roads (Plante et al. 2017).

As indicated, caribou are known to avoid or use areas less frequently when proximal to anthropogenic disturbance (e.g., Vistnes and Nellemann 2001; Dyer et al. 2002; Weir et al. 2007; Polfus et al. 2011; Boulanger et al. 2012; COSEWIC 2014; Johnson et al. 2015; Eftestøl et al. 2016; Plante et al. 2018). However, some research has found that caribou may select anthropogenically disturbed habitat (Faille et al. 2010; Dussault et al. 2012; St-Laurent and Dussault 2012) and caribou density can increase near human disturbance (Fortin et al. 2013). While selection for disturbed areas appears contradictory, the underlying mechanism may be a function of site fidelity (i.e., the propensity to return to a previously used site). Caribou exhibit a high degree of seasonal site fidelity, particularly during calving (Schaefer et al. 2000; Ferguson and Elkie 2004), which can result in some individuals returning to disturbed locations despite an increased risk of predation or a reduction in forage abundance or quality (Faille et al. 2010; Dussault et al. 2012; Lesmerises et al. 2013). This maladaptive behavior could result in decreased recruitment rates and a population decline if recruitment rates remain low.

Creation of a new linear feature by the Project will be limited, as the proposed transmission line route will parallel existing roads, thereby reducing effects on change in mortality risk. Given the routing of the proposed RoW, there will be little to no new access created for hunters. As such, an increase in mortality risk from hunting is not expected. Although the alternate RoW also parallels existing resource roads, these resource roads are more remote and additional road upgrades and new access would be required for this route option.

The Buchans and Grey River herds have the greatest potential to be affected by an increase in predator density as those herds have overlap with the Project, however Project-related changes in predator abundance or distribution could extend into the RAA and therefore it is possible that other caribou herds may experience changes in predation risk. However, while likely modest, any effect of increased



predation is expected to occur near the Project Area, as much of the effect is associated with linear features (e.g., selection of linear features by black bears and moose) and habitat changes (e.g., selection of regenerating habitat).

Vehicle and equipment traffic during operations is the most likely source of a potential increase in direct mortality risk to caribou, although asset inspection and maintenance are expected to be limited over the life of the Project. Snowmobile patrols will be conducted annually to visually inspect the transmission line. The need for vegetation management will be assessed approximately three to five years after initial RoW clearing, with manual cutting and herbicide application occurring thereafter to a five- to seven-year frequency.

Project effects may also lead to decreased body condition, for example through caribou displacement to lower suitability habitat or through higher energetic costs related to change in movement or reduced forage value. Repeated or persistent use of sub-optimal forage and increased energy requirements over time could result in decreased body condition, which could lead to decreased survival over time (Crête et al. 1996).

The risk of vehicle collisions during decommissioning would be similar to construction phase (limited in geographic extent and duration) and activities are not expected to further affect caribou mortality risk through increased predation or hunting. Transmission line infrastructure will be removed, and vegetation suppression will cease, allowing passive regeneration. Access to the RoW can be rehabilitated and culverts can be removed (if required).

#### 5.2.1.4 Mitigation

Through Project design, the area of disturbance has been limited by selecting a RoW route that parallels existing linear features along most of its length and using existing resource roads for RoW access wherever feasible. The selection of the new proposed route is a key design mitigation to reduce or avoid effects on caribou as it will reduce the area of previously undisturbed habitat by closely following existing resource roads and reducing the need for new access. In addition to standard mitigation measures to be implemented for Project construction, operation and decommissioning, the following measures will be implemented to avoid or reduce adverse effects on caribou:

- The timing and location of Project activities (e.g., RoW clearing) can be adjusted to avoid key migratory paths during the spring and fall migration of the Buchans caribou herd.
- Natural vegetation will be left in place where possible, to act as a buffer to reduce sensory disturbance.
- Although snow clearing isn't part of normal winter operations as snowmobiles and tracked equipment would be used in these conditions, should NL Hydro be required to clear access trails during the winter months as part of construction or operation, snowbanks will be less than 1 m tall to facilitate caribou crossing, and breaks in the snowbanks will be aligned on opposing sides, created at approximately 200 m intervals, to the extent practicable, to provide wildlife crossing opportunities.
- Project vehicles will be required to comply with posted speed limits. Additional speed restrictions will be implemented during sensitive periods for caribou (e.g., calving and migration).

- To reduce the risk of caribou-vehicle collisions, speeds will be reduced and the vehicle stopped (if necessary) to allow caribou to leave the road.
- Caribou-vehicle collisions, near misses, or observations of road mortality will be reported to the OSEM and the NLDFFA-Wildlife Division. Adaptive management measures will be implemented should locations of high frequency caribou-vehicle interactions be identified.
- The OSEM will be notified if caribou are observed within 500 m of Project activities and the environmental manager will determine if the activity should be reduced or delayed (in consultation with NLDFFA-Wildlife Division, as applicable). Personal pets will be prohibited on site during construction.
- Project contractors and staff will be prohibited from fishing, hunting, or otherwise interacting with (e.g., harassment, feeding) wildlife at the site while working on the Project.

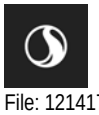
Construction activities will be undertaken in accordance with NL Hydro's EPP. In addition, NL Hydro will require the construction contractor to provide a C-SEPP for review and acceptance by NL Hydro prior to the start of construction. The Project will have full-time OSEMs to inspect worksites and activities for conformance with the EPP, C-SEPP, and government regulations and permits. Compliance monitoring will confirm that mitigation measures are properly implemented.

In addition to this Project-specific mitigation, NL Hydro understands that Marathon is developing a Caribou Protection and Environmental Effects Monitoring Plan (CPEEMP) for the Valentine Gold Project which will include long-term monitoring programs to understand and mitigate potential effects on caribou in the vicinity of the Project (Section 5.2.4.4). Marathon has committed to sharing findings of these monitoring programs with NL Hydro to better understand caribou activity in the vicinity of the Project during sensitive periods (e.g., using telemetry data), and inform mitigation of potential Project-related effects on caribou.

#### 5.2.1.5 Summary

With mitigation, the Project is anticipated to result in residual adverse effects on caribou habitat, particularly during construction (due to combined effects of direct and indirect changes in habitat), but persisting, to a lesser extent, throughout the life of the Project and post-decommissioning. Over time habitats are expected to rehabilitate (post-decommissioning), gradually changing from open shrubby vegetation to forested habitats, thereby reversing most of the habitat loss. Change in habitat will be greatest for caribou from the Grey River and Buchans herds whose ranges overlap with the Project.

Project effects on the movement patterns of the Gaff Topsails and La Poile herds are predicted to be negligible because their ranges do not overlap the Project Area. The Grey River herd has some overlap with the Project Area during the summer season, and changes to movement for this herd are predicted to be adverse but limited. The transmission line RoW overlaps the migration corridor of the Buchans herd and therefore Project-related effects on a change in movement are predicted to be adverse and more substantial for this herd. Potential cumulative effects with the Valentine Gold Project on a change in movement for caribou during migration are discussed in Section 5.2.2. To reduce effects on movement, mitigation measures will reduce sensory disturbance within the Project Area (e.g., limiting activities during sensitive periods, facilitating caribou crossings across snowbanks or ditches) and limit the size of the Project footprint (e.g., limiting RoW width where possible).



With the implementation of mitigation measures, residual effects on change in mortality risk for caribou are expected to be adverse. Caribou herds could experience an increase in mortality risk, although the effects are predicted to be limited to the Buchans and Grey River herds. Direct mortality risks will be limited to the Project Area, however indirect risks will extend into the RAA, based on caribou, predator, and primary prey home range sizes, movement patterns, and expected response to disturbance. Project-related change in mortality risk could occur through an increase in predator density and subsequently an increase in predation rate, although given the Project's contiguity with existing resource roads, the amount of new habitat alteration and fragmentation is predicted to be limited, therefore there is a lower risk of indirect Project-related mortality associated with predation compared to direct mortality risks.

In summary, with mitigation and environmental protection measures, the Project effects on caribou discussed herein are consistent with the effects assessment presented in Section 5.2 of the Environmental Registration for the Project, which predicted that residual effects on caribou would not be significant.

## 5.2.2 Potential Cumulative Effects

### 5.2.2.1 Approach

As part of the regulatory review process for the Valentine Gold Project, Marathon revisited the cumulative effects assessment for caribou that was presented in the EIS (Marathon 2020), with additional focus on the current status of caribou and effects of existing projects and activities. A new document (Marathon 2022) was prepared to consolidate findings from the Valentine Gold Project EIS (Marathon 2020) and subsequent analyses completed by Marathon post-EIS submission to present a focused discussion of potential cumulative effects on the caribou herds in the vicinity of the Project, as requested by the NLDFFA-Wildlife Division to facilitate regulatory review of the Valentine Gold Project. To address the EPR Guidelines for this Project and subsequent feedback provided by NLDFFA-Wildlife Division that the cumulative effects assessment for caribou in this EPR should be consistent with the updated cumulative effects assessment undertaken for the Valentine Gold Project, this section draws heavily on analysis conducted by Marathon with adjustments made as applicable to account for the differences between the two projects and their relative contribution to cumulative effects.

The temporal boundaries for the assessment of cumulative effects on caribou consider the timing of Project activities as described in Section 2.4, with clearing and construction currently planned to occur between May 2022 and January 2023, and operations commencing in early 2023 and occurring approximately 21 to 25 years.

The seasonal distribution of caribou and seasonal changes in caribou vulnerability are also important temporal considerations for the assessment of cumulative effects on caribou. Movement patterns and seasonal ranges of the assessed herds, as well as the increased vulnerability of caribou during sensitive periods (e.g., pre-calving, calving and post-calving) influence the nature and extent of interactions with the Project. It is also important to recognize that cumulative effects may be realized over a longer period of time (e.g., more than one generation) that may extend beyond the life of the Project.

The spatial boundaries for the assessment of cumulative effects on caribou are defined by the Caribou RAA that accounts for the larger movements and distributions of caribou and encompasses the projects and activities outside of the Project Area that have potential to interact cumulatively with the Project (Figure 5.1).

As indicated previously, this Project will interact primarily with the Buchans herd which will migrate through the Project Area in both spring and fall and the Grey River herd, whose calving grounds are primarily located to the south of Victoria Lake Reservoir. This cumulative effects discussion therefore focuses on potential cumulative effects of the Project on these two herds, although cumulative effects on the Newfoundland population of caribou are discussed more generally in a retrospective summary of cumulative effects from other projects and activities in the RAA (Section 2).

#### 5.2.2.2 Caribou Life History and Environmental Context

Caribou were considered abundant on the Island of Newfoundland during the early 1900s, however populations declined rapidly between 1915 and 1920 (Government of NL 2015), possibly resulting from the introduction of parasites associated with reindeer from Norway (Ball et al. 2001). Following this decline, caribou herds remained in relatively low numbers until the 1980s (Government of NL 2015). By the mid-1990s, the population had returned to historical levels, peaking in the late 1990s at an estimated 94,000 caribou (Government of NL 2015) with a density of approximately 150 caribou/100 km$^2$ (Thomas and Gray 2002). Since then, caribou populations have declined by approximately 60% (COSEWIC 2014; Government of NL 2015) to an estimated 30,000 caribou (NLDFLR in Randell 2019), which has led to hunting closures in some Caribou Management Areas (CMAs)[2]. Recent population estimates indicate that the Grey River, Gaff Topsails, and La Poile herds have decreased by 60-80% compared to population peaks recorded in the late 1990s. Provincial surveys in 2016 of these herds indicate that population trends for the assessed caribou herds may be stabilizing (Government of NL 2019a).

The effects of previous activities and natural environmental influences are important in determining present-day environmental conditions in which the proposed Project is situated and predicting future cumulative effects of the Project. Contributing factors affecting caribou populations include predation, hunting, parasites, climate change, habitat loss or alteration, and development (existing and future) within their range. The decline in caribou populations since the late 1990s was precipitated by a combination of food limitation and high calf mortality, primarily a result of establishment of coyote (*Canis latrans*) on the Island of Newfoundland (Government of NL 2015). Woodland caribou require large interconnected, lichen-rich, mature coniferous forests interspersed with barrens and wetlands (Environment Canada 2012; Weir et al. 2014; Government of NL 2020b). Research on the Island of Newfoundland found that when caribou populations were declining in the 2000s, caribou diets showed an increase in the proportion of mosses consumed, and a decrease in the proportion of shrubs, graminoids and lichens consumed (Schaefer et al. 2016). The shift in diet to low-quality forage indicates that the availability of preferred forage was limited by high caribou density (Schaefer et al. 2016).

[2] Caribou hunting closures have been implemented in the Avalon Peninsula CMA in 2002 (Government of NL 2002), Grey River CMA in 2008 (Government of NL 2008), and Northern Peninsula CMA in 2019 (Government of NL 2019b).

Predation is the primary cause of caribou calf mortality on the Island of Newfoundland with approximately 90% of calf deaths attributed to predation (Lewis and Mahoney 2014). While the current adult caribou mortality rate is thought to be similar to historic rates, the decrease in calf survival since the mid-1990s is due to increased predation (Government of NL 2015).

Climate change has the potential to affect caribou populations. Warmer temperatures and changing precipitation will alter landscape-level plant composition and plant and insect phenology (timing of recurring biological events). As the assemblage of plant species in boreal regions change (Boulanger et al. 2017), the habitats selected by caribou may become less suitable as the abundance and distribution of preferred forage plants change. Warmer temperatures may cause plants to undergo spring green-up earlier, which may result in a phenological disconnect in forage biomass availability and seasonal energetic needs of caribou. For example, as the length of time between green-up and calving increases, there has been an observed increase in calf mortality and a decrease in calf production (Post and Forchhammer 2008).

Habitat loss or alteration is an important factor affecting caribou populations across North America (Vors and Boyce 2009), and it is uncertain how anthropogenic disturbance is affecting caribou populations (NLDEC 2015). Other factors, such as parasites (e.g., brain worm, tapeworms, oestrid flies), can reduce caribou health (Hughes et al. 2009) and alter behaviour (Government of NL 2010a), including habitat selection (Skarin et al. 2004).

Defoliating insects and wildfires can have dramatic effects on caribou habitat. Areas burned by forest fire are avoided by caribou, particularly in winter, as caribou may select other undisturbed habitat types with greater thermal cover and higher amounts of forage (e.g., lichen; Schaefer and Pruitt 1991).

#### 5.2.2.3 Other Activities and Projects and Their Effects on Caribou

Past, present, and likely future projects and activities in the RAA that have contributed or may contribute in the future to anthropogenic pressures on caribou include mining and exploration; forestry; hunting, trapping and outfitting; hydroelectric development; linear features; and off-road vehicle use. Figure 5.1 presents notable projects and activities relative to the RAA considered in this cumulative effects discussion. Residual effects on caribou arising from past, present, and likely future activities and projects are predicted to be similar to those resulting from the Project (i.e., potential changes to habitat, movement and mortality risk); however, the specific timing and extent of residual effects from individual projects and activities may differ, resulting in differences in their relative contribution to cumulative effects.

Caribou populations in Newfoundland have fluctuated over the past century due to several contributing factors such as caribou overabundance, predation, hunting, parasites, habitat loss or alteration, and anthropogenic development within their range. This section provides additional detail on the influence of other projects and activities on existing and potential future caribou conditions and the relative contribution of these activities to potential cumulative effects within the RAA.

## Mineral Exploration and Mining

The history of mining in the RAA dates back to prospecting activities in 1905 and construction of the first base metals (copper, zinc, and lead) mine in 1926 by the Buchan Minerals Corporation. The Valentine Lake area has been subject to exploration and mineralogical studies since the 1960s and the first gold exploration activities were undertaken in the early 1980s. While historic mining exploration activities may no longer result in indirect habitat loss or alteration (i.e., sensory disturbance), these activities have altered the landscape and may continue to affect caribou. Past mining operations in the RAA (Figure 5.1) include:

1. Buchans Mine (1962-1983)
2. Duck Pond copper and zinc mine (2005-2015)
3. Hope Brook gold mine (1987-1997)
4. Gullbridge Mine (1967-1971)
5. Beaver Brook antimony mine (restarted in 2019 after previous operations were suspended in 2013)

The future development of mineral deposits is aligned with current Provincial direction as outlined in "Mining the Future: A Plan for Growth in the Newfoundland and Labrador Mining Industry" (Government of NL 2018) and directly linked to mineral exploration that occurs within approved mineral leases. Since the end of 2020, there has been a considerable increase in exploration interest from companies, as reflected in the number and extent of mineral leases approved throughout central Newfoundland, as shown in Figure 5.1. As exploration activities are fundamental to the discovery and subsequent development of mineral deposits, the number of leases and active exploration projects is a key indicator of long-term viability of the mining industry (Natural Resources Canada 2020). However, only a fraction of exploration projects become operating mines.[3] The current area of mineral claims (Figure 5.1) has been updated with information available as of November 2021. On the figure, new leases within and beyond the RAA are presented to illustrate the recent increase in mining activities. While mineral claims now overlap with a larger portion of the range of the assessed herds, exploration activities (and associated habitat disturbance) would only be expected to occur on a portion of the identified mineral claims.

Mining and exploration activities result in habitat loss and sensory disturbance (e.g., noise and light emissions) which may result in changes in caribou habitat availability and use, including caribou movement, and potentially contribute to reduced caribou survival. Mineral exploration activities can alter habitat through the cutting of trails, survey lines, and drill pads. On the rare occasion that mineral exploration proceeds to development, development activities are generally located on lands previously disturbed by exploration, with incremental impacts to wildlife habitat on previously undisturbed land.

Mining and exploration activities can also increase caribou mortality risk through landscape-level changes affecting caribou habitat availability and increasing access for predators and/or hunting activity, and through associated traffic, increasing the risk of vehicle collisions.

[3]A common maxim in the mining industry is that it takes 1,000 grassroots exploration projects to identify 100 targets for advanced exploration, which in turn lead to 10 development projects, 1 of which becomes an operating mine. The area of land involved in activities reduces with each of these stages.

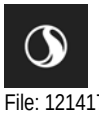
The disturbances from exploration activities and proposed mining development projects that have yet to submit environmental assessment (EA) documents or file other publicly available documents (such as NI 43-101 reports[4]) are difficult to quantify and the anticipated areal extent of direct or indirect habitat loss or alteration is not available. A review of nine exploration and mining projects that have undergone or are undergoing environmental assessment in the province since 2010 demonstrates that the proposed surface footprint of each project is a relatively small area compared with the mineral claim area (i.e., 2-32%; average 13%). Proposed future mining activities would require consideration of potential environmental and socio-economic effects and associated mitigation measures to protect the environment through regulatory environmental assessment and permitting processes. Exploration programs must have an Exploration Approval before the activity can commence, with some exploration activities or activities in designated sensitive areas requiring registration under the provincial *Environmental Assessment Regulations* (Government of NL 2010b).

Within the RAA, the Cape Ray, Buchans Resources Limited, and Marathon Gold leases are examples of active exploration properties. Within the Marathon lease, there are exploration activities ongoing (outside of the Valentine Gold Project's mine site and environmental assessment scope, but within the exploration property) to determine if adjacent areas are appropriate for future development. The primary exploration work is at the 'Berry Deposit', located directly between the proposed Leprechaun and Marathon open pits, and is comprised mostly of drilling. Other, smaller exploration programs are being conducted to the northeast of the Project Area, and are comprised of reconnaissance, prospecting, and some drilling.

Of particular relevance is the Valentine Gold Project, which is the gold mine development for which TL271 is intended to supply power. The proposed Valentine Gold Project will consist primarily of two open pits, waste rock piles, crushing and stockpiling areas, a mill, tailings management facility, personnel accommodations, and supporting infrastructure including roads, on-site power lines, buildings, and water and effluent management facilities. The Valentine Gold Project is currently undergoing provincial and federal EA review. The EIS for the Valentine Gold Project (Marathon 2020) predicted the following effects on caribou:

1. a change in habitat including a direct loss of habitat arising from vegetation clearing and development of the Project Area and an indirect loss or alteration of habitat resulting from sensory disturbance, dust emissions, and habitat fragmentation
2. a change in movement resulting from chronic sensory disturbance and the creation of physical barriers which is anticipated to be limited to avoidance for most herds except for the Buchans Herd, whose migration corridor traverses the Project Area
3. a change in mortality risk (including calf mortality) resulting from direct encounters with Project-related equipment, infrastructure, and traffic and indirectly as a result of altered predator-prey dynamics, higher energetic costs for movement, and hunting pressure

[4] NI 43-101 refers to National Instrument 43-101 Standards of Disclosure for Mineral Reports. These standards govern a mining company's public disclosure of scientific and technical information about its mineral projects using specific language. The reports must be approved by a "qualified person" who is independent of the mining company and the mineral property. NI 43-101 was developed by the Canadian Securities Administrators, and has been passed in provincial and territorial legislation across Canada (CIM 2021).



These adverse effects are predicted to be interconnected and persist through the operations, decommissioning, rehabilitation, and closure phases, and have the potential to reduce caribou survival and negatively affect caribou populations.

Using a conservative assumption that all habitat within the Valentine Gold Project area will be cleared, the amount of high and moderate-ranked caribou habitat that will be directly lost through site preparation (e.g., vegetation clearing and mine construction) will be approximately 28.5 $km^2$. Assuming a 500 m zone of influence for sensory disturbance, indirect habitat loss attributed to sensory disturbance will increase to 57.3 $km^2$ of high and moderate-ranked habitat. When combined with direct habitat change in the Project Area, up to an estimated 85.8 $km^2$ of habitat will be altered. While a sensory disturbance zone of 500 m is based on the federal Scientific Assessment to Inform the Identification of Critical Habitat for Woodland Caribou (Rangifer tarandus caribou), Boreal Population, in Canada (Environment Canada 2011), it is acknowledged that there is uncertainty as to the zone of influence for caribou behaviour and monitoring of caribou behavioural responses is being proposed by Marathon to help improve certainty regarding the zone of influence.

Installation of mine site infrastructure will present obstacles to caribou movement. As described in Section 11.5.2.2 of the Valentine Gold Project EIS, caribou select migration paths that provide adequate forage and resting habitat (Saher 2005), are less energetically demanding (e.g., less rugged, open terrain) (Saher and Schmigelow 2005), and have relatively low predation risk compared to other potential migration paths (Bergerud et al. 1990; Ferguson and Elkie 2004).

Maintaining the functionality of migration paths by preserving connectivity between seasonal ranges is vital to sustaining viable populations of migratory ungulates (Monteith et al. 2018). The Marathon open pit and waste rock pile will be developed within the primary migration corridor for the Buchans herd. This development will create a permanent obstacle, which migrating caribou will be forced to avoid. In addition to the physical obstacle, site activities and associated sensory disturbance will also affect caribou within proximity to the mine site, and direct interaction with project features and activities such as access road or haul road traffic could result in injury or mortality.

Development and operation of the project presents two ‘levels’ of risk to migrating caribou. The higher-level risk is the uncertainty associated with the reaction of caribou to project effects (combination of physical obstacle and sensory disturbance). Marathon’s CPEEMP identify three potential responses for migrating Buchans caribou:

- Caribou may continue to migrate through the existing, preferred corridor, navigating around but close to the Marathon open pit and waste rock pile
- As a result of physical obstacles and sensory disturbance, caribou may avoid the project and migrate along alternate paths that will be longer and result in greater energetic consumption
- As a result of physical obstacles and sensory disturbance, caribou may fail to migrate, subsequently remaining either north or south of the project year-round

These potential responses by migrating caribou may occur at the individual, group, or population level. A mixed response by caribou to the project is also possible, whereby individuals or groups may react differently to the project (e.g., some caribou migrate through the site and other caribou migrate via alternate, longer pathways).

To assist in understanding potential effects of the Valentine Gold Project on migration patterns of the Buchans herd, a Caribou Alternate Migration Pathway Analysis was undertaken by Marathon (Appendix G of the Valentine Gold Project: Amendment to the Environmental Impact Statement [Marathon 2021b]). This GIS-based analysis was supported by literature relating to caribou avoidance of disturbances, the presence of physical obstacles, energetic costs, predation risk, and the use of existing migration paths outside of the identified primary migration path, which are historically used by some caribou from the Buchans herd. While it is considered unlikely that there will be a failure to migrate to the calving grounds, the creation of an obstacle within the preferred migration corridor and potential changes to the timing, movement rate, or use of stopover sites during migration may have effects on caribou recruitment and survival (e.g., increased adult and calf mortality) due to increased energetic costs, decreased forage availability and exposure to higher predation rates (e.g., if predators prefer habitat types that caribou would typically avoid).

Risk of mortality, particularly for caribou calves, could also increase through interactions with Valentine Gold Project infrastructure and equipment. Although most caribou are expected to avoid project activities due to sensory disturbance, project-related traffic could increase risk of caribou mortality. However, direct mortality caused by wildlife-vehicle collisions is expected to occur infrequently, as Valentine Gold Project-related traffic volume on the mine access road is estimated to be incremental to existing traffic volumes and will be managed according to a Traffic Management Plan. In addition to vehicle collision, the Valentine Gold Project may increase mortality risk due to caribou interaction with mine infrastructure (e.g., becoming trapped in a pit), increased energetic costs, or altered predator-prey dynamics.

Predation is the primary cause of caribou calf mortality on the Island of Newfoundland with approximately 90% of calf deaths attributed to predation (Lewis and Mahoney 2014). While the current adult caribou mortality rate is thought to be similar to historical rates, the decrease in calf survival since the mid-1990s has been attributed to an increase in predation (Government of NL 2015). Increased calf mortality (either through direct or indirect interaction with the project) has the potential to affect the Buchans and Grey River herds.

### Forestry

Forestry has been an integral part of the NL economy with a substantial portion of the province's forest industry once concentrated in the central area of the Island of Newfoundland. Forestry is a large landscape-scale activity that includes timber harvesting, construction of forest resource roads, and silviculture activities, such as planting, thinning, and site preparation. Forestry activities in the province are managed through the respective Forest Management District (FMDs). Every five years, each FMD plan is renewed and reviewed through the provincial EA process.

Past forestry practices have altered large tracts of caribou habitat, most extensively within the Gaff Topsails Herd home range. This same range was also that primarily affected by the creation of the railway.

Forestry activities in the RAA have and will continue to result in the loss and alteration of caribou habitat (including direct loss of habitat through harvesting and indirect loss due to sensory disturbance and edge effects), as well as changing the overall function of the landscape through the altered habitats and successional forest regeneration over time. Caribou on the Island of Newfoundland have been shown to avoid recently harvested blocks in summer (Chubbs et al. 1993; Schaefer and Mahoney 2007) and winter (Smith et al. 2000). Caribou home-range size has also been found to increase with increasing clear-cut density, possibly to compensate for a reduction in the availability of suitable habitat (Beauchesne et al. 2014).

The loss of habitat and changes in caribou movement can be compounded by an increase in forestry roads required for harvesting, which also contributes to potential changes in predator-prey dynamics and/or hunting access, which can reduce caribou fitness and survival (e.g., calf recruitment, population demographics).

### Hunting, Trapping, and Outfitting

Hunting, trapping and outfitting in NL provides recreational opportunities for residents and non-residents and contributes to the province's wildlife management programs and economy through local spending and the outfitting industry (NLDFLR 2019). NLDFFA-Wildlife Division determines the number of caribou and other wildlife species that can be sustainably harvested to maintain population levels and limit overabundance (NLDFLR 2019). Hunting and trapping activities in the province are managed by activity (e.g., trapping) and through species and specific management plans.

The RAA overlaps with several CMAs (Figure 11-14 in Section 11.2.2.1 of the EIS). The number of caribou to be harvested from each CMA are determined annually by NLDFFA- Wildlife Division. The harvesting limits are applied to both resident and non-resident licenses. Non-resident licenses are realized through the registered outfitters. Within the RAA, there are 21 registered outfitters, with the closest located on Lloyd’s River at Red Indian Lake (147 m from the proposed transmission line RoW).

Although hunting, trapping, and outfitting activities do not generally result in direct habitat loss or alteration, the creation of trails is possible (e.g., for trapping) and human activity can cause sensory disturbance that results in an indirect change in habitat, albeit likely in a negligible way. These disturbances have the potential to affect caribou habitat use within the RAA and hunting directly affects caribou survival. By the nature of the activity, there is mortality risk to caribou, however, because the province sets the annual quotas for each CMA, the harvest levels are assumed to be sustainable.

### Hydroelectric Development

Hydroelectric developments in the RAA have altered the landscape since they were created beginning in the 1960s by changing watercourse flow patterns, flooding large tracts of land and installing transmission corridors. These developments have affected caribou habitat (e.g., through flooding) and movement patterns by altering caribou migration timing and routes. The current migration corridor of the Buchans

herd, and ranges of the Buchans and Grey River herds, have evolved based on these and other developments and activities in the RAA (e.g., Star Lake development, inundation of the Victoria reservoir). These past developments have shaped current ranges, migratory routes and movement patterns in the RAA, altering the migratory corridor.

Historic migration paths for caribou in central Newfoundland were located at the east end of Victoria Lake Reservoir (Bergerud 1971, 1974; Bergerud et al. 1984), approximately where the Valentine Gold Project is located. By the late 1970s, a portion of the caribou range had been flooded by several hydro developments, some of which overlapped the traditional migration corridor for the Buchans herd (Bergerud et al. 1984).

The Star Lake hydro generating station, which overlaps a portion of the migration corridor for the Buchans herd, was completed in 1998 (Mahoney and Schaefer 2002a). Caribou were shown to avoid the Star Lake generating station and altered their timing of migration during construction (Mahoney and Schaefer 2002a). Subsequent research suggested that the change in timing of migration may have been influenced by the increasing population and forage limitation on the summer range (Mahoney and Schaefer 2002b). Analysis of existing telemetry data show continued use of this traditional migration corridor from 2005 to 2018.

There are no known plans for further expansion of hydroelectric development in the RAA.

### Linear Features

Existing linear features in the RAA include highways, roads (including extensive forestry roads), trails, and power lines (e.g., distribution and transmission lines) and each affect caribou differently depending on their size, level of use, regional density, and age.

There are primary roads in Buchans and Millertown, and provincial highways connect Millertown and Buchans to the Trans-Canada Highway. Access to the RoW is via existing gravel public access roads including the public road from Millertown, which has been in service for many decades, supporting both forestry and hydroelectric development projects and which extends to the Valentine Gold Project mine site.

Within the RAA, there are a number of power lines operated and maintained by Newfoundland Power or NL Hydro with a combined total length of approximately 340 km.

The development and maintenance of linear features results in direct loss of habitat and can lower habitat function, as it may result in an unnatural landscape break. Not all linear features have the same effect; for example, busy highways may present landscape obstacles for movement and/or increased mortality risk for caribou, while forestry roads and power lines may increase mortality risk due to increased predation rates. Use of roads and trails by vehicles (forestry, exploration, recreation) also creates sensory disturbance that influences habitat use.

Increased access to caribou habitat through development, and access to caribou herds, can contribute to an increase in hunter efficiency and harvest rates (Boulanger et al. 2011). Following the construction of the Newfoundland railway across the central part of the Island in the late 1890s, hunters would aggregate

along the railway line to hunt caribou as they migrated south in fall (Bergerud et al. 1984). Between 1900 and 1915, an estimated 15,000 caribou were hunted in this area (Bergerud 1971) as caribou continued to migrate across the railroad (Bergerud et al. 1984). Although the railways have been decommissioned for rail traffic, many of the decommissioned railbeds are now maintained as the Newfoundland T'Railway Provincial Park, a multi-use recreational trail for hiking, biking, off-road vehicles, and hunting.

#### Off-road Vehicle Use

Off-road vehicle use includes snowmobiles and all-terrain vehicles (ATVs) that primarily rely on established trails and other linear features (e.g., resource roads, power lines) in the RAA. The T'Railway Provincial Park provides a trail system for snowmobiles and ATVs (NLTCII 2019) using the decommissioned railbeds across the province. In addition, there are two groomed snowmobile trails in the RAA leading to the communities of Buchans and Millertown.

Off-road vehicle use can affect habitat directly due to from creation of trails, especially in wetland areas, and indirectly through sensory disturbance (e.g., noise). Caribou may avoid off-road vehicle trails or activity which may affect caribou movement, and off-road vehicle trails may be used by predators and hunters.

### 5.2.2.4 Cumulative Effects Assessment

As indicated in Section 5.2.2.2 and 5.2.2.3, the existence of caribou has been sustained on this landscape over time, including through the creation and decommissioning of the railway system, various mining and hydroelectric developments, hunting, and on-going commercial forestry. As future developments such as the Project are proposed, it is important to evaluate the long-term viability of the species within a cumulative effects assessment framework, in recognition of past, present and likely future changes to the landscape and the affected caribou population.

The Environmental Registration evaluated Project residual effects and cumulative effects in the context of three distinct effects on caribou: change in habitat, change in movement and change in mortality, as summarized above. The cumulative effects discussion below is organized in a similar manner. The effects are presented in this way to facilitate an understanding of how caribou behave and move within the current landscape that has been affected previously by anthropogenic and natural conditions, however there are important linkages between these effects, which are recognized throughout the discussion.

Caribou within the RAA have been and will continue to be affected by environmental factors and anthropogenic disturbance. Although caribou in the RAA have shown resilience over a century of development and large areas of undisturbed habitat will persist and continue to support caribou, the Project is predicted to cause changes to caribou habitat, movement, and mortality risk. Based on the assessment of residual Project effects in combination with other past/present/future projects as presented in the previous sections, cumulative effects on caribou are predicted to include:

1. Changes in habitat including a direct loss of habitat arising from vegetation clearing and anthropogenic development, and an indirect loss or alteration of habitat resulting from sensory disturbance, dust emissions, and habitat fragmentation

2. Changes in caribou movement resulting from sensory disturbance and the creation of physical obstacles
3. Changes in mortality risk resulting from direct encounters with people, infrastructure, and traffic, and indirectly due to potentially altered predator-prey dynamics, higher energetic costs for movement, and hunting pressure

The following sections discuss these potential cumulative effects on caribou in more detail.

### Cumulative Effects on Caribou Habitat

Changes to caribou habitat can result from a direct loss or alteration of habitat arising from vegetation clearing and development of infrastructure. An indirect loss or alteration of habitat may result from sensory disturbance (e.g., noise; human activity), dust emissions, and habitat fragmentation. Caribou react negatively to both natural (e.g., forest fire) and anthropogenic (e.g., industrial development) disturbances. Avoidance of disturbed areas that contain suitable habitat could cause a shift in caribou distribution to less suitable habitat and result in increased energetic costs (Section 5.2.1).

As indicated in Section 5.2.1.1, development of the RoW will result in the direct loss of less than 1 $km^2$ of habitat, with high and moderate ranked caribou habitat covering 0.55 $km^2$ and 0.48 $km^2$ of the proposed and alternate RoWs, respectively. This is a conservative assumption assuming removal of all vegetation within the RoW. Indirect effects on habitat may also result from sensory disturbance. Project-related light and noise emissions may result in caribou avoidance, but these effects are associated with specific construction, maintenance and decommissioning activities which will be temporary and localized and for which mitigation measures exist to reduce these effects (e.g., adjusting the timing and location of RoW clearing to avoid key migratory paths during the spring and fall migration of the Buchans caribou herd). It is assumed that other future physical activities within the RAA would also be able to implement similar mitigation.

The development of the Valentine Gold Project is predicted to result in the direct loss or alteration of 34.8 $km^2$ of habitat within the RAA. Combined with the RoW, this represents less than a < 0.1% change from existing conditions in the RAA (41,641 $km^2$). These combined effects on change in habitat include habitats used by caribou, either directly (i.e., for forage, calving, or travel) or indirectly (i.e., as part of landscape connectivity and security). However, it is recognized that indirect habitat loss or alteration will extend beyond the Project Area and that the Valentine Gold Project will affect an existing migration corridor that may disproportionately affect important habitat for the species. The Valentine Gold Project will create an important change in migratory habitat for the Buchans herd, with the potential to affect greater than 50% of the caribou use in the migration corridor.

Anthropogenic disturbances are generally avoided by caribou and have been documented to result in reduced use of areas with varying zones of influence (Section 5.2.1.1). The intensity of sensory disturbance is expected to affect the degree of avoidance by caribou (Lesmerises et al. 2017, 2018), but uncertainty is high given the large range of variability in disturbance types, magnitude and duration of the disturbance, ecological setting, and caribou responses (e.g., Johnson et al. 2015).

As noted in Section 5.2.2.3, the disturbances from mineral exploration or mining development projects that have yet to file publicly available documents are difficult to quantify from a cumulative effects perspective. The Buchans Resources Limited Project is expected to have activities that are similar to the Valentine Gold Project, with similar potential effects on caribou habitat. Although the Buchans Resources Limited Project overlaps with the ranges of the Buchans and Gaff Topsails herds, based on spatial extent its project effects on caribou are likely to be negligible, and therefore have a relatively small contribution to cumulative effects. The proposed Cape Ray Gold Project (Nordmin 2016) is anticipated to result in the direct loss of approximately 18 $km^2$ of habitat. Based on existing telemetry data obtained from NLDFFA-Wildlife Division (locations from Atmospheric Research Geostationary Orbit Satellite and Global Positioning System (GPS) collars, 2005-2018), the summer ranges of the La Poile and Grey River herds are nearest to the Cape Ray Gold Project. The future EA review for the Cape Ray Gold Project will independently determine its project and cumulative effects and whether there is a significant residual adverse effect on caribou habitat.

Vegetation clearing, including forest harvesting, can result in habitat fragmentation, which can have particularly detrimental effects on caribou that have large ranges and require large contiguous patches of habitat. As caribou require large, interconnected tracts of lichen-rich forest (Environment Canada 2011), changes in habitat that affect the interconnectivity between optimal habitats may have effects on caribou habitat use and movement, and ultimately their fitness. Caribou have been shown to avoid assemblages of different habitat types and the boundaries between them (Stuart-Smith et al. 1997; Smith et al. 2000). Past forestry practices have altered large tracts of caribou habitat, most extensively within the Gaff Topsails herd home range. This same range was also that primarily affected by the creation of the railway. While this herd range today has no overlap with the Project, the demands within this range related to past and present forestry activities and newly active mineral claims and associated activities are likely to cause stress on this specific herd. The Project is not predicted to contribute to cumulative effects on this herd.

While linear features such as roads and power lines can fragment habitat and are often avoided by caribou (Dyer et al. 2002; Vistnes et al. 2004), new linear features within the RAA are expected to be limited. The Project will result in some new habitat fragmentation, although this will be limited to relatively short sections of right-of-way that deviate from existing roadways along the route. The Valentine Gold Project will not result in the creation of trails or contribute to habitat fragmentation beyond the project area assessed for that project. The existing mine access road will be widened in some areas and realigned within the mine site.

Although hunting, trapping, and outfitting activities do not generally result in direct habitat loss or alteration, the creation of trails and human activity can cause sensory disturbance that results in an indirect change in habitat. However, these effects on caribou habitat within the RAA are likely to be negligible and not substantially interact with Project effects to result in cumulative effects on caribou habitat.

Factoring in existing and proposed disturbance associated with linear features (e.g., roads and power lines), mineral claims, hydroelectric operations, and forest harvesting, the habitat within the ranges of Buchans and Grey River caribou herds remains relatively undisturbed. There are no established habitat thresholds for caribou on the Island of Newfoundland, however, as a general reference a 65% undisturbed habitat threshold has been used for boreal caribou (ECCC 2020). By way of comparison, the Buchans and Grey River ranges are above this threshold, with approximately 80% undisturbed habitat within their range based on this cumulative effects assessment. The Project will result in a negligible contribution to direct habitat loss (less than 1%); however, effects to habitat function (e.g., as a migratory pathway) could extend beyond the physical footprints and sensory disturbance related to the Project as is predicted to occur as a result of the Valentine Gold Project's infrastructure and activities. Changes to habitat as a result of Valentine Gold Project infrastructure (i.e., presence of the Marathon open pit and waste rock pile which overlap preferred migration paths of the Buchans herd) are discussed below in the context of cumulative changes to caribou movement. Cumulative changes in habitat which may indirectly lead to mortality risk are also discussed below in its respective section.

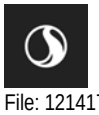
### Cumulative Effects on Caribou Movement

Cumulative changes in habitat can affect habitat use and movement by caribou, thereby reducing caribou fitness. Documented effects of development on caribou movement include delays in crossing linear features, increased movement near disturbance, and avoidance of linear features and development (Murphy and Curatolo 1987; Dyer et al. 2002; Vistnes et al. 2004; MacNearney et al. 2016; Baltensperger and Joly 2019). Caribou select migration paths based on features that include path efficiency, foraging opportunity, and reduced predation risk (Nicholson et al. 2016; Fullman et al. 2017; Baltensperger and Joly 2019). Disruptions to existing migration paths may result in caribou using lower suitability habitat during migration. Long-term effects could include increased energetic demands (Fullman et al. 2017; Wyckoff et al. 2018), lower availability of suitable forage, and higher risk of predation (particularly of calves) which can have long-term population implications.

A change in movement may result from chronic sensory disturbance and the creation of physical obstacles or barriers for caribou. Past and present projects and activities that contribute to cumulative effects on caribou movement in the RAA include mining, mineral exploration, hydroelectric developments, forestry, linear features, hunting, outfitting, and trapping, and off-road vehicle use. While these activities likely contribute cumulatively to affect caribou movements within the RAA, the contributions of the Project to the effects on movement are limited. Other than the Valentine Gold Project, these of past and on-going projects have limited potential to affect caribou movement in proximity to the Project because of where those activities occur within the RAA.

The Valentine Gold Project, and this Project to a lesser extent, is predicted to affect caribou movement through the development of infrastructure that overlaps a key migration corridor, and through an increase in sensory disturbance (e.g., noise, light, and dust) from project activities.

Maintaining the functionality of migration paths by preserving connectivity between seasonal ranges is vital to sustaining viable populations of migratory ungulates (Monteith et al. 2018). The Marathon open pit and waste rock pile will be developed within the primary migration corridor for the Buchans herd. This development will create a permanent obstacle, which migrating caribou will be forced to avoid. In addition



to the physical obstacle, site activities (including access road traffic) and associated sensory disturbance will also affect caribou within proximity to the mine site, and direct interaction with Valentine Gold Project features and activities, such as access road or haul road traffic, could result in injury or mortality. Project-related traffic for TL271 is primarily limited to the construction and decommissioning phases, with limited traffic required during operations and maintenance.

Mitigation measures, such as a suspension of activities for this Project and the Valentine Gold Project and reduction of access road traffic by Marathon during migration periods, delaying blasting activity when caribou are nearby, facilitating caribou crossings across snowbanks or ditches, and aligning crossing points with existing migration paths, will reduce the amount and effect of sensory disturbance. These mitigation measures will not however reduce the physical disruption to the existing migration path. The contribution of residual adverse effects to cumulative effects on caribou movement by the Valentine Gold Project is predicted to be high. There remains uncertainty of how caribou will respond to effects on their migration path and how that will affect the long-term persistence or viability of the Buchans herd, as well as the resident Grey River herd within the RAA.

Future mining projects anticipated within the RAA (i.e., Cape Ray Gold and Buchans Resources Limited Projects) may affect caribou movement if those project sites are avoided by caribou. However, while the activities of those projects are expected to have similar effects as the Valentine Gold Project, neither the Cape Ray Gold nor Buchans Resources Limited mining projects appear to overlap a caribou migration corridor. Though there may still be some avoidance of these projects by caribou, the magnitude of effects is likely to be low if those developments do not overlap with a migration path. As such, the magnitude of effects on change in movement from future projects and activities is expected to be less than for the Valentine Gold Project. It is anticipated that the future developments will also have mitigation measures in place to reduce project-related effects on caribou movement.

The Project is predicted to affect caribou movement, although to a much lesser extent than predicted for the Valentine Gold Project. Power lines are avoided by caribou (Vistnes and Nellemann 2001; Plante et al. 2018), however some research has indicated that the degree of avoidance may decrease following the construction period (Eftestøl et al. 2016). The proposed and alternate routes occur within the range of the Buchans herd and will cross the existing migration corridor within the mine site, where the RoW parallels the mine access road. The RoW also overlaps the migration corridor in proximity to Lloyd's River. Therefore, it is expected that construction of the transmission line could incrementally contribute to cumulative effects. The Caribou Alternate Migration Pathway Analysis completed for the Valentine Gold Project (Appendix A in the Caribou Supplemental Information Report [Marathon 2021]) has been used to help inform planning and design of NL Hydro's proposed transmission line routing, resulting in a reduced interaction with identified potential alternate caribou migration paths compared to proposed routing presented in the Environmental Registration.

NL Hydro and Marathon are working closely together to reduce potential cumulative effects on caribou, and Marathon has committed to sharing caribou monitoring data with NL Hydro to help inform planning, construction, and operational activities associated with the Project.

## Cumulative Effects on Caribou Mortality

Caribou mortality can occur through direct encounters with people or projects and activities (e.g., vehicle collisions) and indirectly from altered predator-prey dynamics, increased energetic costs from a change in movement, and hunting pressure, particularly relating to the creation of linear features. In Newfoundland, calf mortality events result primarily from predation by black bear and coyote and the cause of mortality for adults (n = 47 collared adults) is primarily attributed to predation (51.1%), hunting/poaching (21.3%), and other causes (e.g., injury, accident, natural causes; 23.4%; Lewis and Mahoney 2014). Caribou-vehicle collisions represent a relatively small proportion of mortality events (4.3%; i.e., 2 of 47 individuals); 20 caribou have died from being captured for collaring (Lewis and Mahoney 2014).

Changes to vegetation communities and the creation of edges resulting from clearing activities may temporarily increase moose (*Alces alces*) presence, as these areas can provide high value browse. Selection of this edge habitat by moose could increase their abundance in affected areas and result in an increase in predator populations (e.g., black bear, coyote), which in turn may also increase mortality risk for caribou. Additionally, predators and hunters may use disturbances and linear features to access previously inaccessible, or difficult to access, areas. While increased mortality risk has the potential to directly remove individuals (calves in particular) from the population, indirect consequences include increased stress, increased energetics costs, and reduced body condition in response to increased predation risk which can lead to population-level stressors (e.g., reduced pregnancy rates, calf survival rates).

Residual effects from the Project may combine with effects of past, present and reasonably foreseeable future projects and activities such as mining and exploration activities, hydroelectric developments, forestry, linear features, hunting, outfitting, and trapping, and off-road vehicle use that can affect caribou fitness and increase mortality risk. The Project will contribute to cumulative effects where Project components have the potential to encounter caribou directly (e.g., traffic), and indirectly where mortality risk, including for calves, is elevated through potentially altered predator-prey dynamics or increased hunting pressure.

Direct mortality of caribou may occur because of vehicle-caribou collisions in the RAA, although mortality studies using data from collared adults in Newfoundland suggest that this is an uncommon occurrence (Lewis and Mahoney 2014). Mortality risk due to potential Project-related vehicle-caribou collisions will be highest during construction when Project-related traffic is at its highest. The risk of vehicle collisions on the mine access road during the migratory periods will be mitigated with speed restrictions and adjustment of construction activity to avoid key migratory paths during the spring and fall migration of the Buchans caribou herd. An incremental increase in mortality risk as a result of the Valentine Gold Project is predicted for caribou associated with increased traffic along the mine access road. Most caribou are expected to avoid the Valentine Gold Project mine site during construction and operation and vehicle-caribou collisions at the mine site are less likely, however, will increase during the migration periods.

Increased mortality risk due to vegetation clearing from the Project (as well as for the Valentine Gold Project) is unlikely as caribou are large, highly mobile animals that will likely avoid this activity. Potential for contact with people and machinery is low, however these risks will be higher during migration. Juveniles may be more vulnerable and at greater risk of direct mortality associated with construction

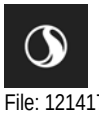
activities. The timing and location of Project activities (e.g., RoW clearing) will be adjusted to avoid key migratory paths during the spring and fall migration of the Buchans caribou herd. Direct mortality risk for adults and juveniles is expected to return to existing conditions after Project decommissioning and post-closure of the Valentine Gold Project.

Other future proposed mining projects in the RAA (e.g., Cape Ray Gold and Buchans Resources Limited Projects) are expected to have similar direct mortality effects on caribou as the Valentine Gold Project. These effects will primarily be associated with site clearing and related activities during the construction phase of each project. Cumulative direct mortality risk to caribou within the RAA may also increase due to vehicle-caribou collisions related to mining activities or vehicle use of linear features (e.g., roads, highways, trails). The Cape Ray Gold Project has a small amount of overlap with the ranges of the La Poile and Grey River herds, whereas the Buchans Resources Limited Project occurs within the range of the Gaff Topsails and Buchans herds. Mitigation measures proposed by Marathon on the Valentine Gold Project, including road safety measures to reduce the risk of collision, restricting public access to the Project, and banning hunting by employees, will reduce caribou mortality risk on that project. It is anticipated that future mining developments in the area will have similar mitigation measures.

Hunting in the RAA contributes to a cumulative direct mortality risk to caribou. However, as indicated in Section 5.2.2.3, hunting of caribou is regulated by NLDFFA and one of the CMAs overlapping the Project Area (CMA 63-Grey River) is closed to hunting. Regulated harvest levels are therefore assumed to be sustainable.

Cumulative changes in habitat may indirectly lead to mortality risk by increasing access to hunters and/or altered predator-prey dynamics, particularly where linear features or other developments provide access to previously inaccessible, or difficult to access areas of the RAA. Disturbance can promote early successional habitats that provide increased forage for moose (i.e., shrubs) which can increase moose densities near the Project and lead to increased predator densities and predation of caribou, including for calves who are particularly vulnerable (James et al. 2004; Mumma et al. 2018). Additionally, linear features may be selected by black bears and coyotes, which could increase the amount of predation on caribou (Latham et al. 2013; Tigner et al. 2014; Hinton et al. 2015; Tomchuk 2019). Following an analysis of transmission line route alternatives, informed in part by an analysis of potential alternate caribou migration paths completed by Marathon, NL Hydro has selected a route that is further from those alternate paths, is aligned with existing established resource roads, and reduces the amount of habitat affected and new linear feature created with the RAA. Therefore, while the Project is a linear feature, it should not function as a new linear feature on the landscape along most of its length, reducing its potential to interact cumulatively and contribute to a cumulative risk to caribou mortality.

The contribution of forestry, linear features, and off-road vehicles and recreation to a cumulative mortality risk are expected to be low for the Buchans and Grey River herds given the RAA remains relatively undisturbed. The contribution of the Project to cumulative mortality effects for caribou is also expected to be low. There are multiple caribou interactions associated with the Valentine Gold Project that could result directly or indirectly in an increased mortality risk, for which mitigation measures will be applied.



### 5.2.2.5 Cumulative Effects Management

Mitigation measures to reduce potential adverse effects of the Project on caribou is presented in Section 5.2.1.4. No additional mitigation is proposed to address cumulative effects on caribou. However, Marathon has developed a CPEEMP which includes mitigation measures aimed at reducing the risk of adverse effects on caribou during the construction, operation, closure and post-closure phases of the Valentine Gold Project and describes the follow-up and monitoring activities that will be undertaken to verify the effects predictions and mitigation effectiveness for that project.

The purpose of Marathon's CPEEMP is to provide specific mitigation measures and monitoring protocols that will reduce the risk of Valentine Gold Project effects on caribou. The goal of avoiding or reducing effects on caribou and their habitat will be achieved by linking the risk of the predicted effects directly to mitigation measures, monitoring mitigation effectiveness through performance indicators, reviewing monitoring results relative to performance targets with specific thresholds, and potentially refining mitigation or monitoring approaches through an adaptive management process.

As part of the CPEEMP, specific measures applicable to limiting cumulative environmental effects on caribou within the RAA include, but are not limited to, the following:

1. Implementation of seasonal alterations and/or operational reductions in mining activity that are timed to coincide with the spring and fall caribou migration periods to reduce project-effects on caribou at a time when migrating caribou are most likely to interact with the Valentine Gold Project
2. Development and implementation of a Rehabilitation and Closure Plan
3. Contribution of detailed annual caribou demographic information within the RAA that will be used by provincial regulators to manage caribou and support conservation initiatives

Marathon has committed to long-term follow-up monitoring of mitigation effectiveness and effects on caribou and has developed a detailed monitoring program, which encompasses various spatial and temporal scales to understand effects on caribou at the individual, group, and herd levels. In particular, the monitoring program focuses on potential changes in caribou habitat and behaviour for the Grey River and Buchans herds. The monitoring program defines measurable performance indicators with defined response thresholds, and describes monitoring techniques (e.g., collars, remote cameras, on-site monitoring, drones) and analytical approaches.

The CPEEMP was developed in consultation with NLDFFA-Wildlife Division and is considered a "live" document that will be reviewed and refined regularly over the life of the Valentine Gold Project, incorporating information from follow-up and monitoring activities as the Project advances, and ongoing review with regulators, scientific experts, Indigenous groups, and stakeholders. As a condition of release of the Valentine Gold Project from the provincial EA process, Marathon will be required to implement, review, and update the CPEEMP in collaboration with the NLDFFA - Wildlife Division. As per the conditions of release, this review should occur twice per year, every year of project operation and prior to each caribou migration, and should include sharing and reviewing of data collected during the most recent migration, including the operational response of the mine site.

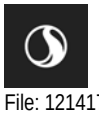
Information acquired by Marathon through monitoring, mitigation, interpretation, and adaptive management will be reported to NLDFFA-Wildlife Division and shared with NL Hydro along with a wider audience, as applicable. The information gathered and results from the strategies applied through Marathon's CPEEMP should help manage cumulative effects on caribou.

#### 5.2.2.6 Cumulative Effects Summary

The caribou population on the Island of Newfoundland has fluctuated considerably over the past century, with relatively recent declines being attributed to unsustainably high numbers that occurred in the 1990s (Government of NL 2015). Recent population estimates indicate that some caribou herds have decreased by 60-80% since the 1990s, although current trends indicate that populations in the RAA may be stabilizing (Government of NL 2019a).

Poor calf survival and poor recruitment rates appear to be important factors in population stabilization for caribou on the island. Predation rates for calves are considerably higher than for adults with approximately 90% of calf deaths attributed to predation (Ballard 1994; Lewis and Mahoney 2014; Mahoney and Weir 2009). Other limiting factors that can affect survival rates for caribou include the presence of parasites, insect harassment, climate change, hunting pressures, and habitat loss. Caribou are subjected to these stressors during migration and during other biologically sensitive periods (e.g., calving), which can affect population viability. Past and present land and resource uses in the RAA have contributed to cumulative effects on the landscape and potentially have contributed to cumulative adverse effects on caribou populations, including indirectly through influencing one or more of the limiting factors described above.

As stated in Section 5.2.1.5, with mitigation, the Project is anticipated to result in residual adverse effects on caribou habitat, particularly during construction (due to combined effects of direct and indirect changes in habitat), but persisting, to a lesser extent, throughout the life of the Project and post-decommissioning. The contribution of Project-related residual effects to cumulative effects on change in habitat is anticipated to be low, as the amount of overlap between the Grey River and Buchans herds and the Project Area is less than 0.01% (there is no overlap with the range of the other two assessed herds), and only a small portion of suitable habitat will be directly or indirectly affected. Project-related effects on a change in movement are predicted to be adverse and more substantial for the Buchans herd; the portion of the transmission line that will overlap with the migration corridor will be within the Valentine Gold Project mine site and in the vicinity of Red Indian Lake and Lloyd's River. Selection of the current proposed route over the route presented in the Environmental Registration (i.e., the route closer to Costigan Lake, Figure 2.1) will serve to reduce the Project's contribution to cumulative effects on caribou movement as the proposed route is more closely aligned with existing resource roads and has less potential interaction/overlap with alternate migration paths that may occur as a result of the Valentine Gold Project (e.g., avoids the Costigan Lake area). The Project may also result in residual effects on change in mortality risk, although this risk is expected to be low based on the low densities of predators and small amount of overlap between the Project Area and caribou range. In addition, vehicle and equipment usage will be primarily associated with construction and decommissioning activities, which are both short-term and localized, and would be required to follow standard mitigation measures, as identified in Section 5.2.1.4. The requirement for vehicle and equipment use during operation would be periodic only.



It is anticipated that the resulting overall cumulative effects will not threaten the long-term persistence or viability of caribou from the Gaff Topsails, Grey River and La Poile herds within the RAA, or result in effects that are contrary to or inconsistent with the goals, objectives and activities of recovery strategies, action plans and management plans for these herds. Therefore, no significant cumulative effects on these herds are predicted to occur because of the Project. Habitat-related effects of the Valentine Gold Project will affect the functionality of the migratory corridor (i.e., direct and indirect loss of habitat) used by the Buchans herd and could result in an indirect increase in mortality risk. The Valentine Gold Project could therefore potentially affect the long-term persistence or viability of the Buchans herd within the RAA. There is uncertainty in how caribou from the Buchans herd will respond to the effect on their primary migration corridor and if/how a change in movement of the Buchans herd may affect other herds. There is also uncertainty in the effectiveness of mitigation measures to reduce the effects. Given these uncertainties, and because the effects of the Valentine Gold Project on their own are predicted to be potentially significant for caribou, the cumulative effects of the Project (in combination with effects of past, present, or reasonably foreseeable future projects and activities) are also predicted to be significant for caribou.

Mitigation measures proposed to reduce adverse environmental effects on caribou (refer to Section 5.1.1.4) will be implemented to help reduce the Project's contribution to cumulative adverse effects. Additionally, NL Hydro will work with Marathon and NLDFFA-Wildlife Division to determine how the CPEEMP developed by Marathon for the Valentine Gold Project (5.2.4.4) can be used to determine caribou activity in the vicinity of the Project during sensitive periods (e.g., using telemetry data), as well as inform and manage potential cumulative effects on caribou.

## 5.3 FISH AND FISH HABITAT

### 5.3.1 Potential Project Effects and Mitigation

Potential Project effects on fish and fish habitat include potential changes in fish habitat and fish health and survival.

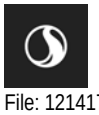
Access trail development and RoW clearing activities during construction may change the quantity and/or quality of surface runoff to fish habitat. This has the potential to affect water quality and/or stream flow conditions from the alteration of the bed and banks, riparian vegetation, sedimentation of watercourses and the entry of deleterious substances. Sedimentation / erosion associated with the loss of riparian vegetation and clearing, or through road dust as a result of Project-related transportation, may negatively affect water quality through changes in total suspended solids (TSS), pH, and trace metals. Smothering of eggs, as well as behavioural or physiological changes in fish, such as inhibition of foraging, can also occur during siltation events resulting from construction and clearing during periods of high rainfall (Sweka and Hartman 2001; Herbert and Merkens 1961; Kjelland et al. 2015). The effect of increased sediment reaching fish habitat may be compounded if it occurs during the spawning, incubation or hatching period of a fish species (DFO 2019).

Construction activities may also require in-water work, fording, and/or the use of industrial equipment in or near water. Similarly, asset inspection and RoW management activities during operations, or dismantling and removal of equipment during decommissioning may require use of equipment in or near water and can affect riparian habitat and water quality through erosion and sedimentation. These activities can potentially alter fish habitat (e.g., change stream flow, affect water quality) and/or affect fish health and survival.

The timing of construction could influence the environmental effects of the Project on fish health and survival (e.g., Project-related sedimentation during the spawning, incubation, or hatching period of a fish species). Work will be conducted to respect DFO timing windows for the Island of Newfoundland, to protect fish and avoid direct mortality of fish larvae or eggs (DFO 2019).

The proposed route includes approximately 17 watercourse crossings to be forded during construction. The remaining watercourses along the RoW will be avoided by using alternate access points (e.g., existing resource roads, nearby bridges) along the RoW to avoid creating new crossings. The alternate route would require approximately 27 fording sites. Prior to construction, the proposed RoW will be surveyed and additional watercourses will be flagged and included in permit applications as applicable. NL Hydro will implement measures to protect fish and fish habitat during all Project phases including measures to prevent the death of fish and the harmful alteration, disruption, or destruction of fish habitat as outlined by DFO for Projects Near Water (DFO 2019). This includes but is not necessarily limited to implementation of the following measures to reduce or eliminate adverse effects on fish and fish habitat:

- Where possible, in-water works will be completed inside the appropriate fisheries timing windows (June 1 – September 30). Work outside the fisheries timing windows will be done in consultation with DFO and the NL Water Resources Division. Work will follow best management practices as provided in a Letter of Advice from DFO.
- Pole placement will avoid watercourses, and access trail construction through watercourses will be avoided where possible.
- Construction activities in waterbodies or watercourses shall be scheduled to occur during low flow or frozen conditions, to avoid sensitive periods for fish, and shall be shut down during heavy precipitation events.
- Works will be conducted on land to the extent feasible. Heavy equipment shall be kept outside the high-water mark of bodies of water, where possible.
- A minimum buffer zone of natural vegetation 30 m from the high-water mark of waterbodies, watercourses and ecologically sensitive areas will be maintained around work areas, where available space poses a constraint, except where specified otherwise (e.g., fording sites). If space is available, then wider buffer zones of 100 m will be maintained between construction areas and watercourses, waterbodies and ecologically sensitive areas.
- Work shall be performed in such a way that deleterious substances, such as sediment, fuel and oil do not enter watercourses and waterbodies.
- Mulching and/or piling of cleared non-merchantable timber, slashing and cuttings will be relocated to areas where it cannot enter watercourses. Excavated rock will be disposed of properly.
- Banks and flood plains of watercourses will be adequately protected from erosion using an applicable erosion prevention method, as outlined in the EPP.



- Fording of streams will follow NL Environmental Guidelines for Fording (NLDMAE 2018) and the DFO Interim code of practice: temporary stream crossings (DFO 2020a) and EPP.
- Watercourse crossings (e.g., spanning of the transmission line, fording and culvert crossings) will comply with permits issued by the NLDECC Water Resources Management Division and will be undertaken in accordance with DFO requirements.
- When working in water, minimum flows will be maintained and obstructions or interference with the movement or migration of fish will be avoided.
- The use of temporary coffer dams or diversion channels for instream work (if required) will follow the DFO Interim code of practice: temporary cofferdams and diversion channels (DFO 2020b).

Construction activities associated with the terminal station will generally be within the existing station footprint (with the exception of moving the existing fence line approximately 2 m). Therefore, effects to fish or fish habitat are not anticipated due to terminal station upgrades. Through careful planning, both the proposed and alternate RoWs has been routed to avoid waterbodies to the extent practically feasible, thereby reducing potential effects to fish habitat. Where the RoW (either the proposed or alternate RoW) and associated access is unable to avoid watercourses, appropriate mitigation and best practices will be implemented and effects are predicted to be within normal variability of baseline conditions. The Project is not anticipated to result in harmful alteration, disruption, or destruction of fish habitat or the death of fish, as defined by the *Fisheries Act*, that cannot be mitigated, authorized, or offset.

The direct Project effects on fish and fish habitat discussed herein are consistent with the effects assessment presented in Section 5.1 of the Environmental Registration for the Project, which predicted that residual effects on fish and fish habitat would not be significant.

### 5.3.2 Potential Cumulative Effects

There is potential for cumulative effects as a result of the Project in combination with other existing and proposed activities (e.g., mining, forestry, fishing) and infrastructure (e.g., hydroelectric developments, roads) linear features and the Valentine Gold Project. As discussed in Section 4.1, inland waters are divided into scheduled salmon rivers, scheduled rainbow and brown trout waters, and nonscheduled inland waters. Angling occurs on a number of waterbodies in the RAA, particularly for Atlantic salmon, ouananiche, and brook trout. Arctic char are also targeted on select waterbodies. Recreational salmon fishing occurs within the RAA, however, only as catch-and-release, with Class 0 salmon rivers present within the RAA. An outfitter operates within the LAA, offering guided, land locked salmon and brook trout fishing tours on Red Indian Lake (Notch Mountain Outfitters 2019). Additional outfitters operating in the RAA offer services for hunting caribou and other species. The Project Area occurs within the Exploits River watershed and is in salmon fishing Zone 4. The proposed and alternate routes cross scheduled salmon rivers at multiple locations.

As discussed in Section 5.3.1, residual effects of the Project on fish and fish habitat include potential changes in fish habitat and in fish health and survival. These residual effects may combine with residual effects of other past, current and proposed future activities in the RAA to result in cumulative effects on fish and fish habitat.

Several watercourses and waterbodies in the RAA have already been modified by hydroelectric development in the region, resulting in alterations of flow and causing a direct change in habitat and fish health and survival. The presence of dam infrastructure creates obstructions to fish passage and can result in stranding of fish or fish injury, also potentially affecting fish health and survival.

In addition, mining and exploration, forestry, hunting, trapping, outfitting, cabin development and fishing activities, may contribute to cumulative effects on fish and fish habitat through the following effects pathways:

- Removal of riparian vegetation
- Alterations to stream flow
- Introduction of sediments and contaminants (e.g., herbicides)
- Direct injury or death of fish from the presence of equipment and/or use of explosives in or near water
- Increased fishing pressure due to increased access

The presence of linear features, such as roads and trails, may increase access to fishing areas and result in a change in fish health and survival from overfishing; however, given fisheries regulations, such as catch quotas and seasonal closures, effects are anticipated to be low, affecting only individual fish and not populations.

As discussed in Section 5.3.1, the contribution of Project-related residual adverse effects, from either the proposed route or alternate route, to cumulative effects on fish habitat or fish health or survival will be limited. As previously described, both routes parallel existing roads for most of their lengths, requiring limited access upgrade/construction, to provide access to the RoW for construction purposes. While the RoW could also be used by ATVs, given its proximity to existing roads and the extensive trail network already present in the area, the Project is not expected to increase fishing activity in the area.

Given the proximity of projects, the Valentine Gold Project will affect watercourses within the same watershed, although that project will be subject to the same regulatory requirements and Marathon will implement best management practices during construction and operations to reduce adverse effects on fish and fish habitat. Marathon will be required to develop and implement an Offset Plan to compensate for loss of fish habitat resulting from development of the Valentine Gold Project (Marathon 2020).

No additional mitigation is proposed to address cumulative effects on fish and fish habitat beyond the mitigation proposed to address Project-related effects. Given the negligible Project-contributions to cumulative effects, it is anticipated that the resulting overall cumulative effects, for both the proposed route and alternate route, will not result in the alteration of fish habitat that exceeds regulatory requirements, or causes a change in the productivity or sustainability of fish populations or fisheries within the cumulative effects RAA.

# 5.4 WETLANDS

## 5.4.1 Potential Project Effects and Mitigation

Potential effects of the Project on wetlands could include a loss or alteration of wetland habitat and/or a change in wetland function. These potential effects could occur as a result of direct disturbance (e.g., clearing, earthworks), or indirect hydrological effects (e.g., redirection of surface water flow through ditching).

During construction, vegetation clearing for the transmission line RoW development will involve clearing trees and shrubs and damage to understory vegetation, potentially changing wetland types and areas. Installation of pole structures within wetlands will result in a loss of wetland area. Development of access points, although predicted to be limited for either the proposed or alternate routes, will involve vegetation clearing but also grubbing and other earthworks activities, such as removal of organic materials and overburden, and infilling. Use of machinery or equipment in and/or near wetlands could also potentially result in the accidental introduction of potentially invasive plants if not properly managed.

Loss or alteration of wetland habitat could result in a decrease in available habitat for plants and wildlife that use wetlands, including SAR and SOCC, such as northern myotis, American marten, olive-sided flycatcher, and rusty blackbird. This change in available habitat can occur within the transmission line RoW, but also within adjacent habitats, though the influence of edge effects. Other wetland functions (e.g., carbon sequestration, hydrologic and water quality functions) may also be lost or altered through changes to wetland vegetation and/or local hydrology. Infilling of wetland habitat or installation of water management structures (e.g., ditches) can alter the wetland hydrology, which may also change wetland area, type, or function.

During the operations phase, vegetation management will involve application of herbicides and manual cutting of brush in areas adjacent to wetland habitat, which could also indirectly affect the edges of wetland habitat. Vegetation management is not undertaken within wetlands (e.g., no herbicide application within wetlands and cutting of vegetation is not generally required within wetland habitat). Traffic within the RoW corridor (for transmission line maintenance or unrelated recreational use) can affect drainage patterns and vegetation regeneration. Decommissioning at the end of Project life (Section 6.0) will involve use of heavy machinery to remove Project components and could potentially result in additional wetland habitat loss or alteration if not properly managed.

Key mitigation to reduce potential adverse effects on wetlands is avoidance of wetland habitat. The proposed and alternate routes reduce impacts on wetlands through use of existing disturbed areas to the extent practicable for transmission line routing and access development. The Mapbook in Appendix B shows the location of wetlands relative to the proposed and alternate routes (including assumed wetland habitat as per the ELC, as well as 1:50,000 mapped wetlands). Table 4.1 shows the area of wetland habitat within a 20 m Row for the proposed and alternate routes.

Additional mitigation measures to be implemented to reduce adverse effects on wetlands include the following:

- Standard dust control measures will be implemented to avoid siltation of wetlands.
- Equipment that arrives on site will be inspected for the presence of soil that could contain seeds and/or propagules of potentially invasive and non-native species prior to the commencement of construction or operation activities. If equipment is found to have soil attached, it will be cleaned (i.e., pressure washed) in an appropriate location to remove the potential seed source. In addition, equipment coming from other regions or provinces will be clean and free of potential seed sources of potentially invasive plants.
- Erosion and sediment control measures will be installed to reduce and control runoff soil erosion and transport of sediment laden water during grubbing and the re-spreading and stockpiling of grubbed materials.
- Swamp mats/corduroy will be used within wetlands to the extent practicable to reduce impacts from machinery operation.
- Equipment will be regularly maintained and inspected. If problems are identified the equipment will be taken out-of-service and repaired to prevent release of hydrocarbons into the environment.
- Where culverts may need to be installed in ditches along existing resource roads to create access points for the transmission line RoW, the culverts will be properly installed to maintain natural cross-drainage and to prevent ponding.
- Boundaries of RoW and road easements and boundaries of borrow sites (if applicable) that are to be developed will be staked.
- Cutting activities will be limited to those areas that are required for construction of access points and RoW clearing.
- If slash piles are to be used, they will be piled so as not to cause unnecessary damage to vegetation outside the right-of-way. A 6.5 m break in slash piles shall be made every 200 m to allow for drainage and animal access.
- Where grubbed materials are re-spread or stockpiled, as many stumps and roots as possible will be left in place to maintain soil cohesion, to dissipate the energy of runoff, and promote natural re-vegetation.
- Wetland material (e.g., soils) and other wet material that is excavated from the site will be piled and graded on well drained ground in low piles. The piles will be seeded or otherwise protected using erosion control methods.
- Drip pans will be placed underneath pumps and generators. The drip pans will be lined with absorbent material. Absorbent material will be kept at all sites where pumps and generators are in use.
- Travel for inspection and maintenance of the transmission line will be restricted to existing or approved access routes.
- Herbicide application will not occur within wetlands. In other habitats, herbicide application will be subject to approval from the Pesticide Control Section, NLDECC, will be undertaken in accordance with NL Hydro’s Integrated Vegetation Management Program and the Pesticide Control Regulations under the NL EPA, and will observe appropriate buffer zones near bodies of water.

Assuming that all the wetland habitat types identified in Table 4.1 within the RoW for the proposed and alternate routes are 100% comprised of wetland habitat that will be directly impacted within the RoW, approximately 0.289 $km^2$ (alternate route) to 0.316 $km^2$ (proposed route) of wetland habitat could be directly impacted during construction of the transmission line. This is a conservative assumption as some wetland habitat within the RoW would not require clearing during construction due to low growth vegetation. These calculations also assume that the RoW width for the entire length of the route is 20 m. The potential direct loss of wetland habitat or change of wetland function for the proposed either route option represents less than 0.017% of total wetland habitat within the ELCA (see Table 4.1). The greatest effects will result from infilling for access trail development or pole placement. While a change in wetland habitats, including area and function, will occur during the construction phase, some effects will be continuous throughout the Project, in consideration of periodic access for maintenance activities. Following Project decommissioning and removal of Project components, some effects to wetlands may be reversible, depending on wetland type and regeneration of plant communities. Some wetlands, such as bogs, may take longer to recover, although due to the nature of the Project (i.e., transmission line), these wetland types would not require as much vegetative clearing during construction or operations.

With the implementation of the mitigation measures outlined above, the Project is expected to have minor disturbances to the vegetation and organic cover, flow drainage patterns and ground slope of wetlands within the LAA and is not predicted to result in a non-conformance of the NL Policy for Development in Wetlands (NLDECC 2001).

### 5.4.2 Potential Cumulative Effects

There is potential for cumulative effects on wetlands as a result of the Project in combination with other existing and proposed activities (e.g., mining, forestry), infrastructure (e.g., hydroelectric developments, roads), linear features, and the Valentine Gold Project. As discussed in Section 5.4.1, residual effects of the Project on wetlands include a change in wetland function, with a potential direct impact on approximately 0.289 $km^2$ to 0.316 $km^2$ of wetland habitat. Residual Project effects on wetlands may combine with residual effects of other past, current, and proposed future activities in the RAA to result in cumulative effects.

Past resource road and trail development and other anthropogenic development in the RAA have affected the landscape, including loss of wetland habitat. However, within the ELCA itself (which represents a portion [57%] of the larger RAA for which detailed habitat mapping exists), anthropogenic development accounts for only 8.2 $km^2$ or 0.05% of the ELCA, while wetland habitat accounts for 756.6 $km^2$ or 41.2% of the ELCA, demonstrating the prevalence of wetland habitat in the area. Construction of the Valentine Gold Project is estimated to affect approximately 30.2 $km^2$ of wetland habitat within the ELCA (Marathon 2020). Effects on wetlands from the Valentine Gold Project will be long-term and irreversible. Some affected wetlands will reform following decommissioning, rehabilitation and closure of the Valentine Gold Project; however, most wetland classes, particularly those with mature trees and/or thick layers of peat, develop over longer timeframes and are therefore regarded as irreversible changes (Marathon 2020).

The Project's contribution to cumulative effects on wetlands is relatively minor (less than 0.017% reduction of wetland habitat within the ELCA using the conservative assumption that development of the RoW will result in direct loss of all wetland habitat).

No additional mitigation is proposed to address cumulative effects on wetland habitat beyond the implementation of standard mitigation measures and best practices outlined above in Section 5.3.1 to address Project-related effects. Given the Project's minor contributions to cumulative effects, it is anticipated that the resulting overall cumulative effects, for either the proposed route and alternate route, will not result in a non-conformance with Section 5.1 of the NL Policy for Development in Wetlands or a loss of more than 10% of wetland area within the RAA.

## 5.5 OTHER WILDLIFE

### 5.5.1 Potential Project Effects and Mitigation

Potential effects from the Project on other wildlife, particularly SAR, include a change in habitat through direct loss of habitat, habitat fragmentation (primarily due to clearing of the RoW and access construction) and sensory disturbance and change in mortality risk (primarily through alteration or destruction of bat roosting sites and hibernaculae and marten denning sites, if present during construction). There is also an increased risk of mortality through wildlife-human conflict, including collisions with vehicles and increased hunting pressure and predator access, and sensory disturbance from Project noise and lighting.

There will be a direct loss of approximately 0.91 $km^2$ of habitat for construction of the transmission line along the proposed route and 0.81 $km^2$ along the alternate route. Direct change in habitat will occur primarily through clearing of the RoW, access trails, and areas for pole installation. This is a conservative assumption as some habitat within the RoW would not require clearing during construction due to low growth vegetation. Table 4.5 summarizes the main habitat types used by other SAR and the amount that will be lost or altered due to the Project for both the proposed route and the alternate route. Both the proposed and alternate routes will affect forest and wetland habitat types used by bats (including Myotis spp.) and marten. Forest and wetland habitat types account for approximately 51.2% and 34.7% of the proposed RoW, respectively and approximately 49.5% and 35.7% of the alternate RoW, respectively.

Project construction activities may also result in a change in habitat through fragmentation (i.e., discontinuity in preferred habitat), leading to altered movement of other wildlife, including SAR, between resulting habitat patches. Utility corridors bisecting established communing routes between foraging and roosting sites can act as barriers to bat movement and result in habitat fragmentation. Species, such as marten, that are dependent on interior and mature forests may be most adversely affected by edges. Many wildlife species select habitats with shrub or tree cover for travel, as these habitats provide increased security cover from predators (including humans). The proposed route for the transmission line is primarily aligned with existing roads and trails to reduce the amount of new edge effects and disturbance caused by Project construction, and the RoW will not create a new linear feature on the landscape.

Sensory disturbances (e.g., noise and lighting from equipment, vehicles, and buildings) will affect habitat use mainly during construction and decommissioning, with only periodic maintenance activity required during operation. Wildlife are expected to avoid habitat subject to high sensory disturbance, although responses are known to vary by species (Schaub et al. 2008; Naguib 2013; Shannon et al. 2016). Implementation of mitigation measures (e.g., alignment of the transmission line with existing linear features, reducing the amount of on-site lighting) is expected to reduce residual Project effects of change in wildlife habitat, including SAR. Sensory disturbance from Project activities will be temporary and geographically limited as activities move along the RoW. Project construction activities are not expected to extend beyond daylight hours so the amount of on-site lighting will be limited, and incremental lighting associated with the Star Lake Terminal Station modification will be low. There is no lighting associated with the operation of the transmission line.

The primary effect mechanism for change in mortality risk associated with the Project is alteration or destruction of bat roosting sites and hibernacula and marten denning sites during site preparation activities, including RoW clearing, RoW access construction, and pole installation and conductor stringing. As currently proposed, line clearing activity may overlap with natal and maternal denning period (April 1 to June 30), but other line construction activities will primarily be outside this window. There is also an increased risk of mortality through wildlife-human conflict, including collisions with vehicles and increased hunting pressure and predator access, and sensory disturbance from Project noise and lighting. Implementation of mitigation measures described below is expected to reduce residual Project effects on wildlife habitat for other wildlife, including SAR. Although there are several interactions that may result in increased mortality risk for other SAR, the interactions are primarily associated with temporary and localized activities occurring during the construction phase (e.g., vegetation clearing) that include the application of mitigation measures to avoid or reduce adverse effects.

In addition to the standard mitigation measures to be implemented for Project construction, operations and decommissioning, the following specific measures will be implemented to avoid or reduce adverse effects on wildlife including SAR/SOCC:

- The discovery of roosts, hibernacula, or dens by on-site personnel will be reported to the On-Site Environmental Monitor (OSEM) and Environmental Services Manager and appropriate action or follow-up will be guided by consultation with a qualified biologist and/or federal or provincial regulators.
- Shrub or scrub (i.e., non-tree) vegetation will be allowed to establish along transmission corridors, to the extent feasible, to promote their use by prey for other SAR.
- Observations of bat colonies, potential hibernacula sites, sick or dead bats will be reported to the provincial Wildlife Division. Bat sightings may also be reported to the toll-free bat hotline.
- Caves, sinkholes, fishers, or other underground cavities that are identified as a result of Project activities will be reported to Wildlife Division and further inspected for signs of previously overwintering bats.
- Whenever possible, buckets, garbage bins, tubs and containers will be kept covered. Bats may be attracted to standing water in open containers and may fly into them. As bats cannot climb slippery surfaces and are unable to fly straight up into the air, they can become trapped.

- Travel for inspection and maintenance of the transmission line will be restricted to existing or approved access routes.
- Hunting or harassment of SAR and other wildlife by on-site Project personnel will be prohibited.
- Work activities will be undertaken in a manner that does not deliberately harass wildlife, including SAR.
- Safe driving practices, including speed limits, will be implemented to avoid collisions with SAR and other wildlife.

Project-related changes to habitat are predicted to have a small measurable effect on habitat availability at the local scale and little or no measurable effect at the regional scale. Activities for all Project phases could potentially overlap with sensitive activity periods for bats and marten. Residual effects on habitat due to direct loss and fragmentation will continue throughout Project construction and operation. Following decommissioning, secondary succession will result in cleared areas, including the RoW, gradually changing from open shrubby vegetation to forested habitats, thereby reversing most of the habitat loss. Although localized changes are predicted in movement patterns of other wildlife, including SAR, adverse effects are spatially limited and reversible.

Mortality risk is predicted to be higher during construction as a result of habitat alteration or potential for wildlife-human contact (including potential collisions with vehicles and sensory disturbance), particularly if clearing activities overlap with sensitive periods for myotis and marten. Change in mortality risk is predicted to be reduced during operations and decommissioning when there is less Project-related traffic and human activity. As noted above, the routing of the transmission line along existing resource roads will reduce habitat alteration and fragmentation and is not predicted to measurably change hunter or predator access.

The Project effects on other wildlife discussed herein are consistent with the effects assessment presented in Section 5.4 of the Environmental Registration for the Project, which predicted that residual effects on other species at risk would not be significant.

### 5.5.2 Potential Cumulative Effects

Residual effects from the Project on other wildlife, including SAR, include a change in habitat through direct habitat loss, fragmentation (primarily due to clearing of the RoW and access construction) and sensory disturbance, and change in mortality risk (primarily through alteration or destruction of bat roosting sites and hibernacula and marten denning sites if present during construction). There is also an increased risk of mortality through wildlife-human conflict, including collisions with vehicles and increased hunting pressure and predator access, and sensory disturbance from Project noise and lighting. These residual effects may combine with residual effects of other past, current and proposed future activities in the RAA to result in cumulative effects on other wildlife, including SAR.

The Project is located in the Central Newfoundland Forest Ecoregion, within which wildlife distribution, abundance, and health for secure species and SAR has been influenced by natural phenomena, such as weather, parasites, disease, competition for food and territory, predation, human activities, including industrial / urban development, hunting, emissions, pesticides, and other pollution.

Past, present and likely future projects and activities which contribute to habitat fragmentation and edge habitat creation will contribute to cumulative effects on other wildlife. Forestry activities in the RAA have had a measurable effect on habitat loss and alteration, through tree harvesting and road development in the region. Mineral exploration and mining, including the proposed Valentine Gold Project have and will continue to contribute to habitat loss and fragmentation through clearing activities. Resource industry-related and recreational traffic (e.g., snowmobiles, ATVs) using existing road networks in the RAA will also contribute to sensory disturbance and create risk of collisions with wildlife. Although the Project will have a limited requirement for upgrading/construction of new access, the increase in traffic in the RAA due to the Project (regardless of whether the proposed or alternate route is selected) is expected to be minor, particularly once Project construction is completed. Sensory disturbance associated with construction noise may interact cumulatively with noise emissions from other nearby land use, including construction activities associated with the Valentine Gold Project, which will overlap with Project construction activities temporally and spatially. Key mitigation to reduce the Project's contribution to adverse cumulative effects on other wildlife will be to reduce the Project footprint to the extent practical and scheduling RoW clearing to avoid sensitive wildlife periods where possible.

Vegetation clearing along the RoW can result in habitat fragmentation, which can have particularly detrimental effects on species with larges ranges, and that require large patches of interior forest or other types of homogenous habitat. Marten, for example, prefer mature forest and require forest habitats with horizontal and vertical structure and northern myotis have been shown to be affected by habitat fragmentation (COSWEIC 2007; Henderson and Broders 2008). As described in Section 5.4 of the Environmental Registration, the Recovery Plan for Newfoundland marten on the Island of Newfoundland identifies critical factors affecting marten mortality including trapping and snaring, and habitat loss or alteration (The Newfoundland Marten Recovery Team 2010). Habitat may be altered and become less suitable for marten through human activities including forest harvesting, mining operations, hydroelectric projects, construction of roads and power lines, and natural disturbances (e.g., infestation by insects, forest fire). Altered habitat may reduce the availability of breeding habitat, including denning sites, as well as resting sites and prey availability (Fuller and Harrison 2005; Godbout and Ouellet 2010), which may affect marten survival (Snyder and Bissonette 1987).

The Recovery Plan for Newfoundland marten also identifies an area of proposed critical habitat of which a portion (approximately 0.52 $km^2$ or 0.50 $km^2$) overlaps segments of the proposed route or alternate route (The Newfoundland Marten Recovery Team 2010). Other past, current and likely future activities in the RAA, including forestry, mineral exploration and mining, road development, and hydroelectric projects (including existing transmission lines), have already, or will likely in the future, contribute to habitat loss and fragmentation of critical habitat for the Newfoundland marten.

Similarly, cumulative habitat loss and fragmentation associated with these activities will result in a cumulative effect on change of habitat and mortality risk for bats (Myotis spp.). As described in Section 5.4 of the Environmental Registration, habitat fragmentation and edge habitat creation can contribute to changes in movement by SAR, including bats. For example, utility corridors bisecting established communing routes between foraging and roosting sites can act as barriers to bat movement (ECCC 2018). The largest threat to little brown and northern myotis in North America is white-nose syndrome. Populations of little brown and northern myotis at known hibernacula in eastern Canada have declined by

94% since the arrival of white-nose syndrome (COSEWIC 2013). A portion of the transmission line RoW is located within a 10 km grid cell where a hibernaculum for myotis species is known to exist (AC CDC 2020) and that hibernaculum site has tested positive for white-nose syndrome (Government of NL 2020d as cited in Marathon 2020). Adverse effects of the Project, as well as from other activities and projects which may affect bat mortality indirectly (e.g., through a change in habitat, or sensory disturbance) or directly (e.g., through wildlife-human conflict including collisions) could interact cumulatively with effects of the white-nose syndrome, resulting in a cumulative change in mortality risk for bats.

Overall, the contribution of the Project to cumulative effects on a change in habitat and mortality risk for other wildlife, including SAR is predicted to be low given that the overall footprint of the Project will be reduced by following existing corridors (e.g., existing roads/trails) and using these corridors for access to the RoW where practical. The loss or alteration of approximately 0.91 $km^2$ or 0.81 $km^2$ of habitat as a result of proposed or alternate RoWs, respectively, clearing will have a small measurable effect on habitat availability at the local scale and little or no measurable effect at the regional scale. In addition, the proposed and alternated routes for the transmission line are primarily aligned with existing roads and trails to reduce the amount of new edge effects and disturbance caused by Project construction, and the RoW will not create a new linear feature on the landscape. The contribution of Project-related residual adverse effects to cumulative effects, therefore, is predicted to be within the normal variability of existing conditions, and is not expected to affect the long-term persistence or viability of other wildlife species within the RAA. The discovery of roosts, hibernacula, or dens by on-site personnel during construction in the RoW will be reported to the OSEM and Project Environmental Manager and appropriate action or follow-up will be guided by consultation with a qualified biologist and/or federal or provincial regulators.

In summary, while future projects are anticipated to have similar effects as the Project, the Project will have a small contribution to the direct and indirect loss or alteration of wildlife habitat in the RAA, including for SAR. It is anticipated that residual adverse effects will not contribute substantially to cumulative effects on other wildlife habitat and will not threaten the long-term persistence, viability, or recovery of populations of other wildlife species in the RAA. In particular, cumulative effects on other SAR are not predicted to result in effects that are contrary or inconsistent with the goals, objectives, or activities of the federal *Recovery Strategy for the Little Brown Myotis (*Myotis lucifugus*), the Northern Myotis (Myotis serptentrionalis), and the Tri-colored Bat (*Perimyotis subflavis*) in Canada* (ECCC 2018), the federal *Recovery Strategy for the American Marten (*Martes americana atrata*), Newfoundland population, in Canada* (Environment Canada 2013), the provincial *Recovery Plan for the Threatened Newfoundland Population of American Marten (*Martes americana atrata*)* (The Newfoundland Marten Recovery Team 2010), or other action plans and management plans.

# 5.6 AVIFAUNA

## 5.6.1 Potential Project Effects and Mitigation

Potential effects of the Project on avifauna include potential changes to habitat and mortality risk.

Clearing of the RoW and access points during Project construction will have direct impacts on habitat, although the amount of habitat lost due to construction/modification of access points is expected to be limited for either the proposed or alternate routes as existing roads will primarily be used for access. The amount of habitat lost or altered due to RoW construction will be approximately 0.91 for the proposed route or approximately 0.81 $km^2$ for the alternate route. In addition to direct loss of habitat during Project construction, changes to habitat quality and use associated with sensory disturbance (e.g., noise, lights) and edge effects could persist through operations and decommissioning phases of the Project. Noise from Project activities could affect bird habitat use, foraging activity, anti-predator behavior, and reproductive success. Sensory disturbance from Project activities will be temporary and geographically limited as construction and maintenance activities move along the RoW. Light stimuli from equipment during construction could also potentially attract or disorient local or migrating birds. Project construction activities are not expected to extend beyond daylight hours, so the amount of on-site lighting will be limited and incremental lighting associated with the Star Lake Terminal Station modification will be low. There is no lighting associated with the operation of the transmission line.

The Project could cause a change in mortality risk for migratory birds due to vegetation clearing, or collisions with vehicles, equipment, or infrastructure during all Project phases, and potential electrocution from electrified power lines during the operations phase. Although NL Hydro does not typically install bird flight diverters on 69.5 kV transmission line infrastructure, the feasibility of installing such devices would be investigated should locations of high mortality risk be identified during the course of operations. Mortality risk could also be increased indirectly due to predation and harvest pressures, which could increase due to improved access or other habitat changes.

Key mitigation to reduce potential adverse effects on migratory birds is reduction of habitat loss and scheduling activities to avoid sensitive time periods (e.g., bird breeding season). The proposed and alternate routes reduce habitat loss through use of existing disturbed areas to the extent practicable for transmission line routing and access trail development. However, the current schedule for clearing overlaps with the breeding bird season (e.g., April 1 to August 31). Therefore, if vegetation clearing must be completed during this timing window, activities will be conducted in accordance with an AMP (Appendix C) to reduce the likelihood of inadvertently destroying nests and/or eggs of migratory birds (known as incidental take).

Additional mitigation measures to be implemented to reduce or eliminate adverse effects on migratory birds are outlined below:

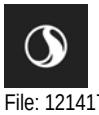
- Adherence to Nalcor's Standard Operating Procedures for Nesting Birds in Vegetated Areas (NAL-ENV-SOP-01) will address activities during the operations and maintenance phases, which outlines procedures for nest avoidance during operations.

- Prior to clearing, NL Hydro will identify locations of bald eagle and osprey nests (i.e., nests that are reused in subsequent years) and determine appropriate mitigation.
- Trees that provide actual or potential avifauna habitat will be retained to the extent feasible and where it is safe to do so.
- Manual clearing of brush would be scheduled to avoid the nesting period where possible.
- Shrub or scrub (i.e., non-tree) vegetation will be allowed to establish along transmission corridors, to the extent feasible and where it is safe to do so, to promote their use by avifauna.
- The discovery of nests by on-site personnel will be reported to the OSEM and Environmental Services Manager and appropriate action or follow-up will be guided by the EPP.
- Hunting or harassment of avifauna and other wildlife by on-site Project personnel will be prohibited.
- Work activities will be conducted in a manner that does not deliberately harass wildlife, including avifauna.
- Safe driving practices including speed limits to avoid collisions with avifauna and other wildlife will be implemented.
- Collisions, near misses or observations of mortalities on site roads and/or involving Project vehicles will be reported to the OSEM and adaptive management measures implemented should locations of high frequency interactions be identified.
- Avian avoidance devices may be installed to reduce bird collisions with Project infrastructure, should high risk areas be identified during the course of operations.
- Ecologically sensitive areas (e.g., wetlands and watercourses) will be avoided to the extent feasible.

Through careful planning and design to parallel existing roads and trails where possible, both the proposed and alternate routes will limit disturbance of new habitat (less than 1 $km^2$ for either route option). This estimate is conservative, as it assumes that all of the 20 m-wide RoW will be cleared; however, in reality, some shrub habitat will remain or be created as a result. These habitat changes would continue through Project operation, but are expected to be reversible following decommissioning. Habitats are expected to recover as secondary succession will result in the site gradually changing from open shrubby vegetation to forested habitats, thereby reversing most of the habitat loss.

It may not be practicable to avoid vegetation clearing during the migratory bird nesting period. Where avoidance is not feasible, the AMP will be implemented to reduce risk of incidental take. Risk of mortality will therefore be low and short term for Project activities associated with construction, operation and decommissioning due to adherence to the AMP (construction) and Nalcor's Standard Operating Procedures for Nesting Birds in Vegetated Areas.

The direct Project effects on avifauna discussed above are consistent with the effects assessment presented in Section 5.3 of the Environmental Registration for the Project, which predicted that residual effects on avifauna would not be significant.



### 5.6.2 Potential Cumulative Effects

Residual effects of the Project on avifauna include a change in habitat and change in mortality risk primarily associated with RoW clearing, collisions with vehicles or infrastructure, and sensory disturbance. These residual effects may combine with residual effects of other past, current and proposed future activities in the RAA to result in cumulative effects on avifauna.

Past, present and likely future projects and activities which contribute to habitat fragmentation and edge habitat creation will contribute to cumulative effects on avifauna. Forestry activities in the RAA have had a measurable effect on habitat loss and alteration for avifauna, through tree harvesting and road development in the region. Mineral exploration and mining, including the proposed Valentine Gold Project have and will continue to contribute to habitat loss and fragmentation through clearing activities. Resource industry-related and recreational traffic (e.g., snowmobiles, ATVs) using existing road networks in the RAA will also contribute to sensory disturbance and create risk of collisions with avifauna. Although the Project will have a limited requirement for upgrading/construction of new access, the increase in traffic in the RAA due to the Project (regardless of whether the proposed or alternate route is selected) is expected to be minor, particularly once Project construction is completed.

Overall, the Project is not predicted to result in a substantial decline in avifauna abundance or a substantial loss of habitat within the region, including for avifauna SAR. The cleared footprint of Project will result in less than 1 $km^2$ of habitat (conservatively assumes all habitat within a 20 m RoW will be lost), although a larger area will be altered due to fragmentation, contributing to a cumulative effect on a landscape that is already fairly fragmented due to past forestry and mining exploration activities and associated access trail development. Design of the transmission line route to closely follow existing roads (particularly for the proposed RoW option) reduces cumulative habitat fragmentation. Sensory disturbance associated with construction noise may interact cumulatively with noise emissions from other nearby land use, including construction activities associated with the Valentine Gold Project which will overlap with Project construction activities temporally and spatially. Key mitigation to reduce the Project's contribution to adverse cumulative effects on avifauna will be to reduce the Project footprint to the extent practical and scheduling RoW clearing to avoid the nesting period, with the implementation of an AMP if this timing window cannot be achieved.

Given the low magnitude of Project-related contributions to cumulative effects on avifauna and abundance of suitable habitat in the RAA , it is anticipated that the resulting overall cumulative effects will not threaten the long-term persistence, viability or recovery of an avifauna species population in the RAA, including effects that are contrary to or inconsistent with the goals, objectives or activities of recovery strategies, action plans and management plans for SAR and their habitats.

# 5.7 LAND AND RESOURCE USE

## 5.7.1 Potential Project Effects and Mitigation

The discussion of land and resource use is focused on potential effects to adjacent land-owners and users, particularly outfitters and recreational users for resource uses (e.g., hunting, trapping, fishing). As noted in Section 4.7, there are a number of seasonal dwellings, including cabins and outfitters within 5 km of the proposed route and alternate route. The construction of the transmission line has the potential to affect these users as a result of sensory disturbances (i.e., noise and dust), change in hunting success and experience, and the presence of workers. In addition, access to some active work areas will be restricted at certain times for safety reasons. However, the proposed and alternate routes for the transmission line have been selected to limit effects on landowners use and enjoyment of their properties. For example, the proposed (and alternate) transmission line route from the Star Lake Terminal takes a northern approach, away from Red Indian Lake to avoid downslope effects to cabin owners on the lake. Where the route follows along the southern extent of Red Indian Lake, the transmission line is parallel with the existing road and located on the opposite side of the road (away from the lake).

Construction activities, such as access trail development, RoW clearing, and pole installation, may affect sensitive receptors (i.e., cabin users) and resource users for harvesting activities (i.e., hunting, trapping, outfitting, and fishing) due to sensory disturbances associated with noise and dust emissions from the use of heavy equipment, transport of materials and increased traffic. The overall experience of hunters, trappers, outfitters, and fishers may be altered as a result of Project activities (i.e., sensory disturbances) and personnel, as the remoteness is a large part of the draw and appeal of these activities, causing them to reduce or stop using certain areas near Project work sites during periods of construction activity. Sources of sound and dust within the Project Area are anticipated to be typical of construction activities. Several mitigation measures will be implemented to reduce potential effects during construction, including effects from sound and dust. To control noise, applicable equipment will have exhaust systems which will be regularly inspected and maintained so mufflers remain operating in accordance with manufacturer's recommendations. Dust from construction activities will be controlled where needed.

Construction activities may result in the behavioral changes and/or mortality of harvested wildlife species due to the presence of sensory disturbances and Project activities, as discussed in Sections 5.2 and 5.5, which may cause a reduction in wildlife hunting success, as well as greater pressure on game resources. Outfitting and recreational hunting, trapping and fishing activities are known to occur in the area, including big game and caribou hunting and salmon fishing. Potential changes in the availability and abundance of wildlife could affect hunting success. As described in the Environmental Registration and discussed above in Sections 5.2, 5.5 and 5.6, with the application of mitigation, Project effects on caribou, avifauna, and other wildlife are not predicted to threaten the long-term persistence, viability or recovery of caribou, avifauna or other wildlife. In-stream work along the RoW (if required) will be reduced to the extent practical, limiting potential effects on fish and fish habitat. With the application of mitigation, Project activities, therefore, are not predicted to result in reduction in wildlife hunting or fishing success.

Project contractors and staff will be prohibited from fishing, hunting, or otherwise interacting with (e.g., harassment, feeding) wildlife at or near the site while working on the Project. Therefore, the presence of Project workers does not increase the competition for species harvested by local hunters, trappers, outfitters, and fishers.

During construction activities, access to some active work areas will be restricted at certain times for safety reasons. NL Hydro will consult with landowners and other interest holders (i.e., outfitters) throughout the Project, as required, so adjacent operations have up to date information on planned construction activities and to help optimize associated planning and scheduling.

Predicted effects on land and resource use during operation are limited. As both routes parallel existing access roads for most of their length, the Project (and presence of the RoW) is not anticipated to change access for land and resource users in the area. Operation and maintenance activities would occur periodically and would be of short duration so noise and presence of workers and equipment would be temporary and infrequent. Effects on wildlife resources during this phase of the Project are therefore also anticipated to be low. The effects of decommissioning would be similar to that of construction and are further discussed in Section 6.2.

In addition to the standard mitigation measures to be implemented for Project construction, operations and decommissioning, as well as mitigation measures identified in other VCs, the following specific measures will be implemented to avoid or reduce adverse effects on land and resource use:

- NL Hydro will consult with landowners and other interest holders (i.e., outfitters) throughout the Project, as required, so adjacent operations have up to date information on planned construction activities and to help optimize associated planning and scheduling.
- Project contractors and staff will be prohibited from fishing, hunting, or otherwise interacting with (e.g., harassment, feeding) wildlife at or near the site while working on the Project.
- Project contractors and staff will not be permitted to bring firearms on site, with exception of approved bear monitors.
- To the extent practical and where local outfitters' facilities are available, NL Hydro will consider use of these facilities to accommodate workers during construction and decommissioning. With the implementation of the mitigation measures, the Project is not predicted to permanently restrict or degrade current land and resource use within the RAA.

### 5.7.2 Potential Cumulative Effects

The key cumulative effects pathways associated with the Project include disturbance effects on resource and recreational users (e.g., wildlife, and fish resources; and hunting, trapping, and angling activities) due to noise disturbance, change in access and loss of wildlife habitat during construction activities. Land use within the RAA has been influenced by past, present and ongoing activities, and land in the RAA is currently used for resource extraction, including hunting and outfitting, trapping, angling / fishing, mining and exploration, forestry and hydroelectric development, as well as recreational activities. As discussed in Sections 5.2, 5.3 and 5.5, past and present activities have also resulted in changes to caribou, fish and other wildlife populations, which in turn can result in adverse effects to land and resource use. Past, present and likely future projects and activities have the potential to contribute to effects on resource and

recreational users. The Project, however, is anticipated to have a limited contribution to cumulative effects given very little new access is being created, sensory disturbance will be limited to the construction phase, and the single pole line in close proximity to existing resource roads will not add to the visual disturbance of the area. Furthermore, as discussed in Sections 5.2, 5.3 and 5.5, no significant cumulative effects are predicted on wildlife resources, with the exception of caribou (and the Project will have limited contribution to cumulative effects on caribou).

Given the proximity of projects, the Valentine Gold Project is predicted to contribute to cumulative effects on land and resource use. The proposed and alternate RoWs will intersect with the mine access road and the RoW will terminate at the mine site. Components and activities of TL271 and the Valentine Gold Project are therefore predicted to overlap spatially and temporally. Activities associated with the Valentine Gold Project potentially have similar pathways as effects arising from the Project, including effects to landowners and resource and recreational users. As noted above, the Project is not anticipated to contribute to cumulative effects on land and resource use. Similarly, negligible to low contribution to cumulative effects was predicted for the Valentine Gold Project, and Marathon will be required to implement various mitigation measures and comply with regulatory requirements, therefore also reducing cumulative effects.

As indicated above, the Project will have a limited contribution to cumulative environmental effects within the RAA, with effects occurring mainly during construction (i.e., short-term) and being reversible. No additional mitigation is proposed to address cumulative effects on land and resource use beyond the mitigation proposed to address potential Project-related effects. The Project and those projects and activities that may interact cumulatively are not likely to result in residual cumulative effects that will conflict with established federal, provincial, or municipal land use designations, policies, or by-laws; or restrict or degrade present land and resource use capacity within the RAA to a point where activities cannot continue at or near current levels over the long-term.

# 6.0 DECOMMISSIONING AND REHABILITATION

At the conclusion of construction, temporary infrastructure will be removed and restoration of sites will be conducted. TL271 will be decommissioned once power for the Valentine Gold Project is no longer required. Typical line decommissioning involves using tracked equipment, such as excavators and tracked off-road construction vehicles, to remove assets. Once the conductors have been removed, the poles can be dropped to ground level and framing/hardware disassembled for removal from the RoW. Removed equipment is either reused, recycled or sent to an appropriate facility for disposal. Once materials have been removed, the access to the RoW can be rehabilitated and culverts / bridges can be removed (if required).

Once TL271 has been removed from service, the expansion at the Star Lake Terminal would no longer be required. The circuit breaker, disconnect switches, conductors, and items, such as oil filled equipment, would be removed and either reused or disposed of via licensed contractors. It is unlikely the steel box structure constructed within the terminal station would be removed as there is no benefit to reverse the modifications made to the Terminal and the inert box structure does not present an environmental risk.

Section 2.6 of the Environmental Registration describes mitigation measures that will be undertaken to reduce potential adverse environmental effects of decommissioning. As required in the EPR Guidelines, additional information is provided below with respect to reducing risk of invasive species and reducing impacts on the outfitting sector.

## 6.1 MEASURES TO REDUCE RISK OF INTRODUCTION OF INVASIVE SPECIES

Measures to prevent the introduction of potentially invasive plant species during decommissioning will include the following:

- Where natural regeneration with local plants is not available or does not meet rehabilitation objectives and seeding is necessary, seed mixes that contain species known to be established in the area, and do not contain potentially invasive species will be used.
- Measures will be implemented to help keep additional materials (required to limit erosion, reduce sedimentation or enhance establishment) weed and disease free. For example, prior to the commencement of decommissioning, equipment will be inspected for the presence of soil that could contain seeds and/or propagules of potentially invasive species. If equipment is found to have soil attached, it will be cleaned (i.e., pressure washed) in an appropriate location to remove the potential seed source.
- Equipment coming from other regions or provinces will be clean and free of potential seed sources of invasive plants.

## 6.2 MEASURES TO REDUCE IMPACTS ON THE OUTFITTING SECTOR

Decommissioning activities will require an increase in vehicle traffic and equipment, which could disturb wildlife, hunting and other outfitting activities. Potential effects from these activities are expected to be similar to or less than construction activities. NL Hydro will communicate proposed decommissioning activities (including proposed schedule) to local outfitters at least six weeks in advance of physical decommissioning activities along TL271. To the extent practical and at the benefit of the outfitter, NL Hydro will arrange to use local outfitters' facilities to accommodate workers during decommissioning.

Mitigation measures will be implemented during decommissioning (as well as during construction and operations) for the protection of wildlife which will also help to reduce impacts on the outfitting sector. These measures include but are not limited to the following:

- Decommissioning activities will be scheduled in consideration of critical periods in fish and wildlife cycles (e.g., migration, spawning, calving).
- Personal pets will be prohibited on site.
- Helicopters (if required) will maintain required buffers to reduce effects on wildlife.
- Project contractors and staff will be prohibited from fishing, hunting, or otherwise interacting with (e.g., harassment, feeding) wildlife at or near the site while working on the Project.
- Project contractors and staff will not be permitted to bring firearms on site, with exception of approved bear monitors.
- Wildlife will not be chased, caught, diverted, followed or otherwise harassed by Project contractors and staff.
- Wildlife sightings and nuisance wildlife will be reported to the OSEM.
- Equipment and vehicles will yield the right-of-way to wildlife and adhere to construction / decommissioning site speed limits.
- Collisions, near misses or observations of mortalities on site roads and/or involving Project vehicles will be reported to the OSEM and adaptive management measures implemented should locations of high frequency interactions be identified.

# 7.0 PROJECT RELATED DOCUMENTS

The following is a list of Project-related documents:

- Transmission Line 271 Star Lake to Valentine Gold Project Environmental Registration Document (April 2021) including the following baseline studies:
  - Water Resources Baseline Study (Appendix B)
  - Caribou Baseline Study (Appendix C)
  - Flora and Fauna Baseline Study (Appendix D)
  - Historical Resources Baseline Study (Appendix E)
- Guidelines for Environmental Preview Report for the Star Lake to Valentine Gold Transmission Line TL271 Project

# 8.0 APPROVAL OF THE UNDERTAKING

As noted in Section 1, the Project required registration as an undertaking under the NL EPA. Following review of the Environmental Registration, the Minister of Environment and Climate Change determined that an EPR is required. This EPR will be subject to public review and comment and an EA Committee will make a recommendation to the Minister whether the EPR is deficient, an Environmental Impact Statement is required, or the undertaking may be released.

Applicable permits, approvals or authorizations may only be issued after the Project is released from the EA process. The permits and authorizations, or amendments to existing permits and authorizations, that may be required for the Project are provided in Table 8.1.

**Table 8.1 Permits and Authorizations that may be Required for the Project**

| Permit or Authorization | Agency | Notes |
|---|---|---|
| Release of the Undertaking under the EA Regulations | NLDECC - EA Division, | The Environmental Registration document represented the “application” for this regulatory process. This EPR will be subject to regulatory and public review before potential release from the EA process. |
| Approval of Capital Works | NL Public Utilities Board | |
| Crown Land Approval for TL271 Easement | NL Department of Fisheries, Forestry and Agriculture (NLDFFA) - Crown Lands Division | NL Hydro will apply via crown lands division to obtain legal easement for TL271. The crown lands review process involves a referral process managed by government agencies, a government review committee and legal survey. |
| Permit to Alter a Waterbody | NLDECC - Water Resources Management Division | May be required for stream and wetland crossings |
| Water Use Licence | NLDECC - Water Resources Management Division | Required if water is being pumped from a local waterbody for Project use |
| Quarry Permit | Newfoundland and Labrador Department of Industry, Energy and Technology – Mineral Lands Division | A permit will be required to dig for, excavate, remove and dispose of Crown quarry material |
| Permit to Cut Crown Timber | NLDFFA - Forest Management | A permit is required for cutting of timber on crown land |
| Pesticide Operator License | NLDECC – Pesticide Control Section | NL Hydro currently holds a Pesticide Operator License 19-043 |
| Letter of Advice | Fisheries and Oceans Canada (DFO) | NL Hydro will submit a request for project review and work with DFO for the applicable approval under the revised *Fisheries Act* for 2022 and beyond. |

# 9.0 PUBLIC INFORMATION MEETING

At the outset of the EPR process, NL Hydro consulted with the EA Division of the NLDECC to review the guidance received and introduce the key changes in the Project that have evolved since the undertaking was originally registered for Environmental Assessment. NL Hydro also had a similar Project briefing session with NLDFFA-WD.

Prior to submission of this EPR, NL Hydro hosted an information session on March 1, 2022 as required in Section 9 and Appendix A of the EPR Guidelines. The session was conducted virtually via WebEx due to the public health concerns associated with gatherings during the COVID 19 pandemic. The goal of the session was to inform area stakeholders and the public at large of the Project details carried forward in the EPR.

Advertisements for the session included the following:

- Telegram print ads: February 24, 25, 26 and 28
- Miawpukek First Nation: direct communication and information placed on band website and social media
- Town of Buchans: information shared on local community television channel, municipal website and Facebook pages
- Town of Millertown: information shared on municipal website and Facebook pages
- Town of Buchans Junction: information shared on municipal Facebook page
- NL Hydro: information shared on company website and social media

Thirteen (13) participants attended the virtual session. Attendees had the option to submit questions at the conclusion of the presentation or via email. There were no comments received via email or during the virtual session. Those in attendance were made aware there would be an additional opportunity to submit comments directly to government during the 35-day public consultation period once the EPR is submitted for review. A copy of the presentation has been included as Appendix F of this EPR.

# 10.0 CONCLUSION

NL Hydro is proposing to construct and operate a new 69 kV transmission line from their existing Star Lake Terminal Station to a new terminal station to be developed by Marathon for the proposed Valentine Gold Project. The Valentine Gold Project was recently released from the provincial EA process with conditions but is still undergoing federal assessment. If the Valentine Gold Project does not obtain release from the federal EA process, this Project is not required, and NL Hydro will inform NLDECC of Project cancellation.

Minor upgrades to the Star Lake Terminal Station and a new transmission line are required to supply electrical power to the Valentine Gold Project mine site. Pending federal EA approval for the Valentine Gold Project, and regulatory approvals for this Project, construction is scheduled to begin mid-2022, with operations commencing in early 2023. TL271 is expected to be in operation for approximately 21 to 25

years, to support operational and post-mining activities of Valentine Gold Project. When TL271 is no longer required to supply electrical power to the mine, it will be decommissioned, which will involve dismantling removing the poles, anchors and wires from the site.

NL Hydro has evaluated various route options for the transmission line and has selected a proposed route and alternate route, which both take advantage of existing roads and trails in the area, thereby facilitating access for construction, operations and maintenance, and decommissioning with limited requirements for new access. Clearing of the RoW will result in less than 1 $km^2$ of lost habitat, although this is a conservative estimate assuming the RoW width for clearing is 20 m for the entire length of the route and that all vegetation is removed during construction. In reality, clearing of the RoW may be reduced, particularly where the RoW is contiguous with existing resource roads. Furthermore, following clearing, some shrub habitat will remain or be created.

The Project is predicted to have adverse environmental effects on fish and fish habitat, wetlands, caribou, avifauna, other wildlife, and land and resource use (e.g., outfitting industry). However, with the implementation of best management practices and mitigation measures described in this report, these effects are mostly predicted to be localized and temporary (primarily during construction). The information presented in this EPR is consistent with the effects assessment presented in the Environmental Registration where Project effects were predicted to be not significant.

The review of potential cumulative effects on fish and fish habitat, wetlands, avifauna, other wildlife, and land and resource are also relatively localized. This is consistent with the cumulative effects assessment in the Environmental Registration where cumulative effects were predicted to be not significant. However, as assessed in the Valentine Gold Project EIS (Marathon 2020), there already exists a significant adverse cumulative effect on caribou. Although the contribution of the Project to cumulative effects on caribou is low, this contribution must be acknowledged as a cumulative significant effect. Due to overlap of the Project with a portion of the migration corridor used by the Buchans herd, significant adverse project and cumulative effects identified for the Valentine Gold Project, and uncertainties surrounding how deviations from migratory corridors will affect the herd (Marathon 2020), cumulative environmental residual effects on change in movement for the Buchans herd are predicted to be significant. Mitigation proposed to reduce adverse environmental effects on caribou will be implemented to help reduce the Project's contribution to cumulative adverse effects. NL Hydro will also work with Marathon to understand monitoring results associated with the Caribou Protection and Environmental Monitoring Plan (CPEEMP) and how this information can be used to determine caribou activity in the vicinity of the Project during sensitive periods (e.g., using telemetry data), as well as inform potential Project-related effects on caribou.

NL Hydro is committed to supplying electrical power to the proposed Valentine Gold Project through the construction and operation of TL271 in a manner which meets regulatory requirements and reduces adverse effects on the surrounding environment.

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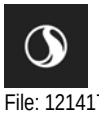

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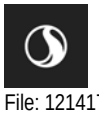

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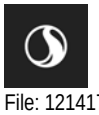

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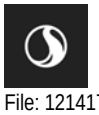

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