

APPENDIX 19A

Wildlife and Wildlife Habitat Technical Data Report

Mackenzie Valley Highway Project Technical Data Report—Wildlife and Wildlife Habitat

Prepared for:

Government of the Northwest Territories

Prepared by:

K'alo-Stantec Limited

March 2023


Project No.: 144903025



K'alo-Stantec


Limitations and Sign-off

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Executive Summary

The Government of the Northwest Territories (GNWT), Department of Infrastructure (INF) is proposing the Mackenzie Valley Highway Project (the Project) that will extend the Mackenzie Highway (Northwest Territories Highway #1) from Wrigley to Norman Wells to replace the Mackenzie Valley Winter Road (MVWR) along this portion. The Project includes construction of approximately 281 kilometres (km) of new all-season highway, and the construction and operation of temporary and permanent quarry and borrow sources. The project highway alignment will pass through the Dehcho Region and a portion of the Tulita District of the Sahtu Region within the Northwest Territories (NT).

The Regional Study Area (RSA; a 15 km buffer of the proposed Project) has the potential to provide habitat for 43 species of mammal, 2 species of amphibian, and numerous invertebrate species. The RSA is also within the range of four mammal species at risk (SAR), three invertebrate SAR, and one mammal and one invertebrate species of conservation concern (SOCC). The Local Study Area (LSA; a 1 km buffer of the Project) is not expected to provide a key source of habitat for wildlife SAR and SOCC because these species are widely distributed habitat generalists and occur within the RSA at low densities. Historical wildlife SAR and SOCC records within the LSA and RSA include observations of little brown myotis (*Myotis lucifugus*), wolverine (*Gulo gulo*), and all four invertebrate species.

The biophysical characteristics of the LSA are influenced by the Mackenzie River valley that defines the landscape and is dominated by coniferous forest habitats interspersed with wetlands and watercourses. Land cover in the Dehcho Region portion of the LSA is dominated by coniferous forest (43.6%), wetlands (19.8%), and open water (19.3%). The LSA in the Sahtu Region is dominated by coniferous forest (28.7%), wetlands (25.2%), and shrubland (20.6%). Since 1960, 18.5% of the LSA within the Dehcho Region and 75.2% of the LSA within the Sahtu Region has been subject to forest fire.

Along with the existing MVWR and communities along it (e.g., Hamlet of Tulita), the LSA contains disturbances from oil and gas exploration and production infrastructure, borrow sources and quarries, a fibre line, and bridges associated with the MVWR. Notably, the Norman Wells Pipeline, commissioned in 1985, conveys crude oil from Norman Wells south to Alberta and is located in the LSA. The RSA is relatively undisturbed, but oil and gas exploration and production infrastructure does exist on the west side of the Mackenzie River near Norman Wells.

The LSA is located partly within four Important Wildlife Areas (IWAs). Two are designated as important habitat for beaver (*Castor canadensis*) and Canada lynx (*Lynx canadensis*) and two others are Sahtu rivers and a culturally sacred site (Bear Rock - Kweteni?aaá). Sensitive wildlife features relied on by mammal SAR (e.g., denning sites, overwintering hibernacula) are not known to occur within the LSA and the likelihood of them occurring is low given the biophysical conditions present.

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Abbreviations

%	percent
>	greater than
COSEWIC	Committee on the Status of Endangered Wildlife in Canada
CZ	Conservation Zone
DLUP	Draft Dehcho Land Use Plan
EOSD NWT	Earth Observation of Sustainable Development of Forests Northwest Territories
GMVFP	Genuine Mackenzie Valley Fur Program
GNWT	Government of the Northwest Territories
GNWT-ENR	Government of the Northwest Territories - Environment and Natural Resources
ha	hectare
INF	Department of Infrastructure
IWA	Important Wildlife Area
km	kilometre
KM	kilometre marker
km ²	square kilometre
LSA	Local Study Area
m	metre
MVH	Mackenzie Valley Highway
MVWR	Mackenzie Valley Winter Road
NT/NWT	Northwest Territories
PDA	Project Development Area
ROW	right-of-way
RSA	Regional Study Area
SAR	Species at Risk
SARA	<i>Species at Risk Act</i>
SLUP	Sahtu Land Use Plan
SMZ	Special Management Zone
SOCC	Species of Conservation Concern

Technical Data Report—Wildlife and Wildlife Habitat

Abbreviations
March 2023

TDR Technical Data Report
the Project Mackenzie Valley Highway Project
TK traditional knowledge
TLRU traditional land and resource use

1 Introduction

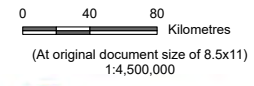
The Government of the Northwest Territories (GNWT), Department of Infrastructure (INF) is proposing the Mackenzie Valley Highway Project (the Project) that will extend the Mackenzie Highway (Northwest Territories Highway #1) from Wrigley to Norman Wells to replace the Mackenzie Valley Winter Road (MVWR) along this portion. The Project includes construction of approximately 281 kilometres (km) of new all-season highway, and the construction and operation of temporary and permanent quarry and borrow sources. The project highway alignment will pass through the Dehcho Region and a portion of the Tulita District of the Sahtu Region within the Northwest Territories (NT).

The Project is subject to an environmental assessment and the requirements of Part 5 of the *Mackenzie Valley Resource Management Act*. This Technical Data Report (TDR) presents the existing conditions for the Wildlife and Wildlife Habitat valued component to support development of the Developer's Assessment Report as required by the Terms of Reference (MVEIRB, 2015). As part of the environmental assessment process, the Developer's Assessment Report will present the GNWT's assessment of effects of the Project on the environment.

This TDR provides an overview of the existing conditions for wildlife and wildlife habitat and excludes caribou (*Rangifer* spp.) and moose (*Alces alces*; see Caribou and Moose TDR [EDI, 2022]), and birds and bird habitat (see Birds and Bird Habitat TDR [K'alo-Stantec, 2023]), which are separately valued components and not discussed further in this TDR.



- Proposed Mackenzie Valley Highway Alignment - Issued for EA 2022
- Granular Borrow / Rock Quarry Site and Access
- Local Study Area
- Regional Study Area
- Community
- All-Season Road
- Winter Road
- District Boundary
- Settlement Area Boundary
- Region Boundary
- Territorial Boundary



Project Location: Wrigley to Norman Wells, NWT
 Prepared by AT on 3/8/2023
 TR by AJ on 3/8/2023

Client/Project: 144903025-0031 REV8

Government of Northwest Territories
 Mackenzie Valley Highway Project

Figure No.
1.1

Title
MVH Project Overview

Notes
 1. Coordinate System: NAD 1983 Northwest Territories Lambert
 2. Data Sources: Centre for Geomatics Government of NWT, Government of Canada, Stantec
 3. Background: World Topographic Map: Esri, FAO, NOAA, USGS, NRCan
 World Imagery: Earthstar Geographics
 World Hillshade: Esri, USGS

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2 Study Areas

The Project is in the Mackenzie Valley region of the NT between the current terminus of the existing all-weather highway in Wrigley (Highway #1, kilometre marker [KM] 690) and Prohibition Creek (located approximately 28 km southeast of Norman Wells). The Project alignment parallels the Mackenzie River to its east and passes through the community of Tulita (KM 938 of the MVWR). The Mackenzie Valley region has the potential to provide habitat for a variety of wildlife species, including mammals, amphibians, and invertebrates.

The local study area (LSA) and regional study area (RSA) used in this TDR are areas where data was collected for characterizing the existing environmental conditions for wildlife and wildlife habitat, excluding moose and caribou, in support of the Project-specific effects assessment and the cumulative effects assessment (Figure 2.1).

2.1 Project Development Area (PDA)

The Project Development Area (PDA) is the area of direct Project disturbance within which works and activities will occur (footprint). This includes a new two-lane gravel highway, 60 metres (m) wide highway right-of-way (ROW), laydown and staging areas, maintenance yards, construction camps and quarry/borrow sites with access roads on a 30 m ROW.

2.2 Local Study Area

The LSA is a 1 km buffer around the Project highway alignment (i.e., centreline), except around quarries and borrow sources where the LSA increases to a 2 km buffer around the PDA. The size of the buffer is based on measurable effects to mammals (Benitez-Lopez et al., 2010) while also considering recommended setback distances for wildlife and wildlife habitat features (Appendix A, Table A.1; GNWT, 2015a). The size of the LSA is also consistent with guidance provided by Environment and Climate Change Canada (Dufour, 2020, pers. comm.).

2.3 Regional Study Area

The RSA is a 15 km buffer around the proposed road alignment that captures a wide-range of wildlife species and wildlife habitats that could potentially be affected cumulatively by the Project and other past, present, and reasonably foreseeable projects. This RSA is consistent with other highway projects in the NT (e.g., Inuvik to Tuktoyaktuk Highway [Kiggiak - EBA Consulting Ltd., 2011]) and follows recommendations from Environment and Climate Change Canada (Dufour, 2020, pers. comm.).



- Proposed Mackenzie Valley Highway Project
- Canyon Creek All Season Access Road (Constructed)
- Prohibition Creek Access Road (Permitted)
- Proposed Great Bear River Bridge
- Local Assessment Area
- Regional Assessment Area
- Community
- All-Season Road
- Winter Road
- District Boundary
- Region Boundary
- Settlement Area Boundary

0 10 20 Kilometres
 (At original document size of 8.5x11)
 1:1,600,000



Project Location: Wrigley to Norman Wells, NWT
 Client/Project: 144903025-0030 REV B
 Prepared by AT on 3/8/2023
 TR by AJ on 3/8/2023

Government of Northwest Territories
 Mackenzie Valley Highway Project
 Figure No. 2.1
 Title: **Wildlife and Wildlife Habitat Study Areas**

Notes
 1. Coordinate System: NAD 1983 Northwest Territories Lambert
 2. Data Sources: Centre of Geomatics of Government of NWT, Government of Canada, Stantec
 3. Background: World Topographic Map: Esri, FAO, NOAA, USGS, NRCAN
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 World Hillshade: Esri, USGS. Imagery date: 2021

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3 Review of Existing Data

The TDR was developed to address the Project Terms of Reference (MVEIRB, 2015) using a literature review of currently available information.

A review of existing traditional knowledge (TK) and traditional land and resource use (TLRU; Section 3.1) information and a review of relevant wildlife literature (Section 3.2) was completed. Results are used to characterize the existing conditions for wildlife and wildlife habitat within the LSA and RSA.

An overview characterizing the mammal, amphibian, and invertebrate communities is provided in Section 3.2.2, with an emphasis on species at risk (SAR) and species of conservation concern (SOCC; defined in Section 3.2.1.1).

3.1 Traditional Knowledge and Traditional Land and Resource Use

Available TK and TLRU contribute to the description of existing conditions for wildlife and wildlife habitat, particularly as it relates to harvested species, species of cultural importance, and the presence of sensitive habitat features in the RSA.

3.1.1 Methods

Existing TK and TLRU information was obtained through several sources, including Project-specific engagement, land use planning documents and regional research projects for the administrative regions traversed by the Project: the Dehcho Region and the Sahtu Region. An overview of the key TK and TLRU resources used to assist in characterizing the existing condition for wildlife and wildlife habitat are presented below and results are presented by the respective regions.

- ***Respect for the Land: the Dehcho Land Use Plan – Draft (DLUP)***: Guidance document that incorporates the cultural, social, and economic factors relating to the management and conservation of natural resources as it relates to development projects within the Dehcho Region (DLUPC, 2006). The DLUP is intended to be a legally binding land use plan that will contain zoning and conformity requirements for all activities requiring an authorization
- ***A Spatial Analysis and Literature Review of Wildlife and Wildlife Habitat in the Dehcho Territory***: A spatial representation of the current knowledge of wildlife and wildlife habitat within the Dehcho Region (EBA Engineering Consultants, 2003).
- ***Project Description Report for the Dehcho Region***: A preliminary screening document summarizing baseline environmental information, including wildlife and SAR/SOCC, as it relates to the Project in the Dehcho Region (Dessau, 2012).

- ***Tulita Renewable Resources Council Traditional Land and Resource Use Study for Tulita District Mackenzie Highway Project 2022:*** Report prepared for Mackenzie Valley Highway (MVH) Project to describe Traditional Land and Resource use within the Tulita District (TRRC, 2022).
- ***Sahtu Land Use Plan (SLUP):*** A document guiding how natural resources will be conserved and developed in the Sahtu Region (SLUPB, 2013). The SLUP is a legally binding land use plan that contains zoning and conformity requirements for all activities requiring an authorization
- ***The Sahtu Atlas – Maps and Stories from the Sahtu Settlement Area in Canada’s Northwest Territories:*** A document containing historical TK and TLRU information from the Sahtu Region (Auld and Kershaw, 2005).
- ***Final Report of the Sahtu Harvest Study:*** A survey of Sahtu Dene and Métis hunters that reported wildlife harvest activities in the Sahtu Region between 1998 and 2005 (SRRB, 2021).
- ***Sahtu Dene and Métis Comprehensive Land Claim Agreement:*** A document outlining the species and areas subject to preferential or exclusive rights for Indigenous Peoples of the Sahtu Region (INAC, 1993). A modern treaty that, among other things, addresses wildlife harvesting rights for Sahtu Dene and Metis
- ***Project Description Report for the Sahtu Region:*** A preliminary screening document summarizing baseline environmental information, including wildlife and SAR/SOCC, as it relates to the Project in the Sahtu Region (5658 NWT Ltd. and GNWT, 2011).
- **Other TK and TLRU Resources:** Documents that provided information on the historical or existing condition for birds and bird habitat:
 - *Rakekée Gok’é Godi: Places We Take Care Of* (SHPSJWG, 2000).
 - *Draft Report on Renewable Resource Assessment of the Pehdzeh Ndeh Area of Interest* (IMG-Golder Corporation, 2006).
 - *Traditional Knowledge Study Report Tulita, NT, Great Bear River Bridge* (EBA Engineering Consultants, 2006).
 - *Boreal Caribou Traditional Knowledge Collection Study: The Sahtu Settlement Area* (McDonald, 2010).
 - *Traditional Knowledge Assessment of Boreal Caribou (Mbedzih) in the Dehcho Region* (Dehcho First Nation, 2011).
 - *Traditional Knowledge Study for the Great Bear River Bridge Project* (TRRC, 2019).

3.1.2 Results

The results are presented by their respective region and are consistent with information summarized in the Cultural and Traditional Land Use TDR (K’alo-Stantec, 2022a).

3.1.2.1 Dehcho Region

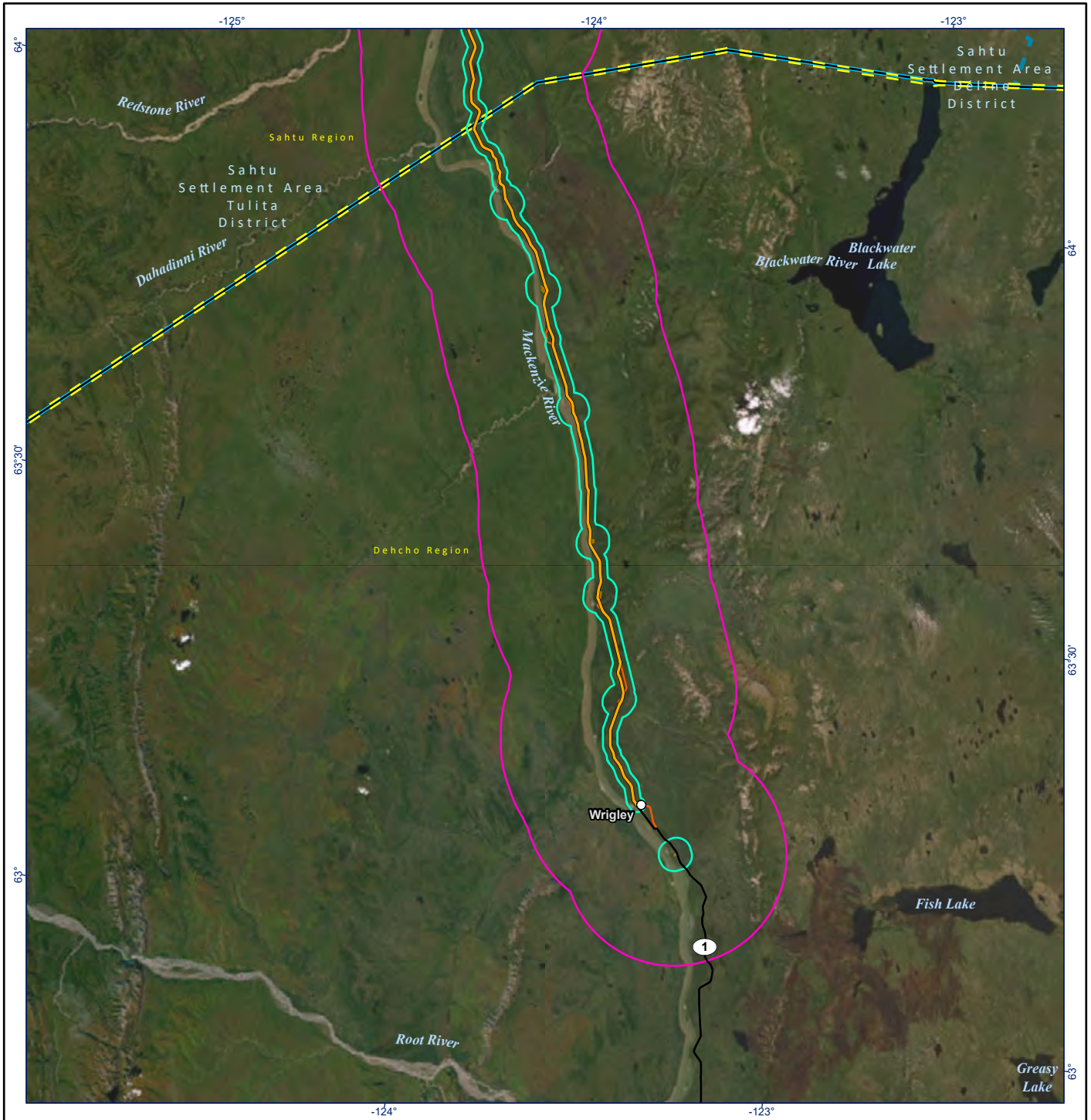
The Project traverses approximately 102 km of the Dehcho Region and includes 26,819.7 hectares (ha) of land within the LSA and 359,038.0 ha within the RSA (Figure 3.1).

The DLUP focuses on protecting Dene culture and traditional land use (e.g., hunting, trapping) as the highest priority for Dehcho First Nation members seeking to maintain existing TLRU opportunities within the territory (DLUPC, 2006). The DLUP identified areas that have significant ecological and cultural values (DLUPC, 2006), which provide habitat for moose, American black bear (*Ursus americanus*), and grey wolf (*Canis lupus*). It is an important cultural area for the community of Wrigley (Desseau, 2012). The Project also traverses the proposed Mackenzie Valley Special Infrastructure Corridor, which has been approved for infrastructure development (primarily the previously proposed Mackenzie Valley Pipeline).

The DLUP also provides guidance for cumulative effects indicators and thresholds for grizzly bear (*Ursus arctos*) and critical lifecycle periods for several sensitive species (e.g., wolverine [*Gulo gulo*]). The activity restrictions presented in Appendix A, Table A.1 are consistent with or more conservative than those proposed in the DLUP. However, the grizzly bear range in the Dehcho Region is limited to montane habitats west and outside the RSA (EBA Engineering Consultants, 2003). Mineral licks are expected to occur throughout the Dehcho Region, particularly to the east of the winter road (IMG-Golder Corporation, 2006), but the locations are kept confidential unless there is a specific threat from development (Dehcho First Nation, 2011). Furbearer habitat exists throughout the Mackenzie Valley, within the LSA (Desseau, 2012), and includes habitat for beaver (*Castor canadensis*), American mink (*Neovision vision*), American marten (*Martes americana*), Canada lynx (*Lynx canadensis*) found in the Blackwater River system (IMG-Golder Corporation, 2006).

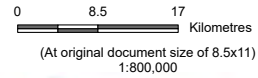
Increased populations of large predators have been reported, resulting in impacts on prey species, particularly ungulates. Cougar (*Puma concolor*) have been increasingly seen (directly or through tracks) throughout the Dehcho Region over the past decade, possibly due to the increase in white-tailed deer (*Odocoileus virginianus*) in the region. An increase in American black bear populations has also been reported (Dehcho First Nations, 2011). Grey wolf populations throughout the Dehcho Region appear to be increasing, due in part that fewer of these animals are trapped or hunted today than in the past, for both cultural and socio-economic reasons (Dehcho First Nation, 2011). The presence of development and linear features is also thought to be contributing to these population increases (Dehcho First Nation, 2011).

Wildlife is a key renewable resource for trapping and hunting, and subsistence harvesting, particularly moose, which is an important food resource among residents (IMG-Golder Corporation, 2006; also see the Cultural and Traditional Land Use TDR [K'alo-Stantec, 2022a]). There is no land claim agreement in the Dehcho Region and, thus, no species or areas are subject to preferential or exclusive rights for Indigenous Peoples of the region.



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- Settlement Area Boundary



Project Location: Wrigley to Norman Wells, NWT
 Prepared by AT on 3/8/2023
 TR by AJ on 3/8/2023

Client/Project: 144903025-0032 REV B

Government of Northwest Territories
 Mackenzie Valley Highway Project

Figure No.

3.1

Title
Project Overview within the Dehcho Region

Notes

1. Coordinate System: NAD 1983 Northwest Territories Lambert
2. Data Sources: Centre of Geomatics of Government of NWT, Government of Canada, Stantec
3. Background: World Topographic Map: Esri, FAO, NOAA, USGS, NRCAN
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 World Hillshade: Esri, USGS

3.1.2.2 *Sahtu Region*

The Project traverses 179 km of the Sahtu Region and includes 48,539.9 ha of land within the LSA and 616,807.0 ha within the RSA (Figure 3.2).

The SLUP focuses on maintaining and/or enhancing ecological and cultural integrity while increasing the decision-making capacity and economic self-sufficiency of the community through sustainable development of natural resources (SLUPB, 2013). A key component of the SLUP is the protection and conservation of species of interest (i.e., species of cultural, conservation, or subsistence importance) and their habitats, and includes recommended activity restriction guidelines for sensitive species. The activity restrictions presented in Appendix A, Table A.1 are consistent with or more conservative than those presented in the SLUP.

The Project primarily traverses through the Deh Cho (Mackenzie River) SMZ No. 63 of the SLUP (2.2% of Sahtu Region) that is an area designated to protect the water quality, riparian habitat, cultural/heritage sites, and areas that are important for wildlife and wildlife harvesting (SLUPB, 2013). The SMZ allows for the continued use of the areas as a riverine and territorial transportation corridor (e.g., barge traffic, winter road) and bulk water removal is the only prohibited land use.

The Bear Rock CZ (No. 32), approximately 4 km northwest of Tulita, is a culturally sacred site located within the LSA (SLUPB, 2013). The CZ is a large karst formation subject to traditional storytelling and provides habitat for a wide variety of wildlife species (see Section 3.2.2.1), including bears and furbearers (SLUPB, 2013).

Mammal species such as American black bear, red fox (*Vulpes vulpes*), Canada lynx, and American marten are common within the Mackenzie River valley and RSA, while grizzly bear (*Ursus actor*), grey wolf, wolverine (*Gulo gulo*), and arctic fox (*Alopex lagopus*) are less common and occur at low densities (Auld and Kershaw, 2005).

The Sahtu Dene and Métis Comprehensive Land Claim Agreement does not identify any wildlife species or areas subject to preferential or exclusive rights for Indigenous Peoples within the Sahtu Region as it relates to species discussed in this TDR (IAAC, 1993).

Important areas for wildlife and wildlife hunting are typically associated with wetlands and watercourses, including the Mackenzie and Great Bear Rivers (SHPSJWG, 2000). According to interviews with Sahtu harvesters, wildlife species commonly found in the area around Tulita include American black bear, American marten, beaver, common muskrat (*Ondatra zibethicus*), North American river otter (*Lontra canadensis*), fox species, rabbit species, grey wolf, wolverine, squirrel species, weasel species, American mink, and Canada lynx (EBA Engineering Consultants, 2006). The area around Brackett Lake supports relatively large populations of wildlife species and the oral tradition records many stories which tell of the importance of this lake (SHPSJWG, 2000).



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- Region Boundary
- Settlement Area Boundary

0 10 20 Kilometres
 (At original document size of 8.5x11)
 1:1,000,000



Project Location Wrigley to Norman Wells, NWT
Client/Project 144903025-0033 REV B
Prepared by AT on 3/8/2023
TR by AJ on 3/8/2023

Government of Northwest Territories
 Mackenzie Valley Highway Project

Figure No. **3.2**

Title
Project Overview within the Sahtu Settlement Area

Notes
 1. Coordinate System: NAD 1983 Northwest Territories Lambert
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Increased populations of grey wolf have been reported, which coincides with reduced trapping activity in the Sahtu Region (McDonald, 2010); however, trapping effort is dependent on fur prices and availability of other employment opportunities (SRRB, 2021). Increased grey wolf populations may also be a result of a noted increase in moose and muskox (*Ovibos moschatus*; previously uncommon in the Sahtu Region) populations, which has been suggested to be a result of an abundance of food availability in the region. It is also suggested that the abundance of other ungulates has benefitted species like caribou by reducing predation pressure (McDonald, 2010).

Harvest composition of large mammals in the Sahtu Region is dominated by barren-ground caribou (88%), followed by moose (8%) and woodland caribou (3%) and other species (1%; e.g., muskox; SRRB, 2021).

Through the Project-specific engagement program, participants indicated:

- Concern that construction and operation of the Project will disturb (physical and sensory disturbance) wildlife year-round, including during blasting.
- Concern how the Project will affect furbearers and traplines and result in greater boat traffic (and disturbance) on the Mackenzie River.
- Concern that the Project will facilitate the introduction of invasive species.
- Muskox are becoming more prevalent and are an important food source.
- There are mostly black bears near Norman Wells and grizzly bears are uncommon and typically stay to the west of the Mackenzie River in mountainous areas; bear dens should be protected, and pre-construction surveys should be undertaken. Known bear dens near Bear Rock.
- Some members find it acceptable to trap beavers and destroy lodges or dam while others do not because they are a keystone species. Care needs to be taken and community members should be given trapped beavers to make use of.
- Bats are present in the area.
- There typically no wildlife collisions on the MVWR and most motorists will give wildlife the right of way, but this should be included in Project monitoring.
- Concern that the Project will increase hunting pressure by non-resident hunters and wildlife need to be protected.
- Muskox near Prohibition Creek and Canyon Creek year-round as there are mineral licks present.
- An area called Salt River Creek contains salt deposits used by wildlife and people.
- The creek at KM 776 contains salt deposits used by wildlife and people.
- Concern that aerial surveys disturb wildlife and remote cameras and snowmobile-based surveys using local support is preferable
- Concern for effects on wildlife migration resulting from the Project and recommend using remote cameras to monitor wildlife movement before and after construction.
- Communities are interested in collaborating with GNWT to address uncertainties around monitoring relating to harvest monitoring and stewardship based on Dene laws, for example.

- Lynn Creek areas is used to hunt rabbit.
- Climate change affects food security and many people will fish if wildlife moves away and this should be monitored.

Recent TLRU information (TRRC, 2022) indicates that:

- Many types of wildlife are harvested within the LSA.
- There are a lot of bear dens within the LSA, along the MVWR, near the north side of the airport, and at Four Mile Creek.
- Rabbits are harvested within the LSA.
- More water and wildlife monitoring should be used in the LSA to mitigate potential project effects.
- There are more muskox in the LSA than before as a result of previous road construction and operation.
- Hunting muskox year-round for food and for hides and crafts within the LSA.
- Previous road construction and operation has impacted wildlife and wildlife abundance in the LSA.
- Previous road construction has interfered with small game hunting and undertaking TLRU activities year-round.
- Previous road construction and operation has made it easier to access valued resources.
- Wolves are harvested within the LSA along the MVWR.
- Beaver and muskrat are typically harvested in the spring (April, May, and June).
- A lot of change in the LSA, 'everything is changing; wolves, fox, bears, are all in the community' when they were not coming into the community before that affect undertaking TLRU.
- There is a mineral lick (described as a salt river) near Bear Rock that attracts wildlife and is of interest to the community.
- Plants and wildlife are still needed to undertake TLRU (e.g., food and hides for personal use).
- Hunting occurs along the shores of Bear River year-round and camping and fishing during the summer.
- Signage should be used to promote highway access and to protect wildlife in the area and help letter
- Country food is an important part of community residents' diet and is shared among the community, family members, and friends in all seasons (particularly during spring and winter). The community relies on it and is in constant need of wildlife/country foods for sustenance.
- The MVWR and pipeline ROW has affected valued resources.
- A speed limit should be set on the highway to mitigation potential Project effects (wildlife fatalities).
- Recommended Tulita be a priority (provide feedback and be the lead) when undertaking Project-related TK studies, monitoring and TK-based monitoring for water, land, and wildlife to improve TK-based monitoring, avoid/mitigate potential Project effects and improve safety.

- Construction and operation of roads in the LSA have intersected many known trails into hunting areas around Tulita which have affect the ability to undertake TLRU.
- Previous road construction has caused change to the weather and increased illnesses (illnesses observed in wildlife) around Trout Lake.
- Harvesting and hunting within the LSA are accessed mostly during the wintertime.
- Unable to hunt along the MVWR during the summertime.

3.2 Literature Review

A literature review was used to establish the existing condition for wildlife and wildlife habitat and identify the presence of sensitive features and SAR or SOCC in the RSA.

3.2.1 Methods

Background information was obtained through several sources, including maps and photographs, territorial and federal databases and guidance documents, and not-for-profit publications and data sources. An overview of some of the key resources used during background review to assist in characterizing the existing condition for wildlife and wildlife habitat is presented below.

- **Maps and photographs:** Topographic mapping and orthographic aerial imagery were used to help identify watercourses, lakes and/or wetlands, and to provide an overall indication of site topography (Digital Globe, 2019).
- **Species at risk public registry:** A database containing the status of species assessed and listed under the federal *Species at Risk Act* (SARA) and by the Committee on the Status of Endangered Wildlife in Canada (COSEWIC), and associated documentation including assessment and status reports, recovery strategies and critical habitat designations, and management strategies (Government of Canada, 2022).
- **GNWT Spatial Data Warehouse Geospatial Portal database:** Online databases used, in part, for screening resource development projects in NT. The databases include information such as SAR ranges and important wildlife areas (e.g., mineral lick areas; GNWT, 2020a).
- **GNWT Species at Risk in the Northwest Territories:** A biennial publication outlining the status and distribution of territorially and federally assessed and listed SAR in NT (GNWT, 2020b).
- **GNWT Species 2016-2020 – General Status Ranks of Wild Species in Northwest Territories:** an overview of the status of the flora and fauna of NT (Working Group on the General Status of NWT Species, 2016).
- **GNWT Wildlife Management Information System (WMIS):** A territorial geo-referenced wildlife database for historical wildlife records (GNWT, 2020c).
- **Important Wildlife Areas in the Western Northwest Territories:** A report outlining the location of known important wildlife areas to help guide development and resource management (Wilson and Haas, 2012).

- **Genuine Mackenzie Valley Fur Program (GMVFP) data:** Data provided by Government of the Northwest Territories - Environment and Natural Resources (GNWT-ENR) summarizing the number of furs and hides that were sold through the GMVFP and excludes the private sale or trading of furs outside of this program (GNWT, 2022a).
- **GNWT aerial bear den survey data:** The Department of Environment and Natural Resources completed an aerial bear den survey within 800 km of the winter road in the Sahtu region in 2022 to identify bear dens that may interact with the Project (GNWT, 2022b).

3.2.1.1 Species at Risk and Species of Conservation Concern

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

3.2.1.2 Habitat Identification

Land cover within the LSA and RSA was quantified using Earth Observation of Sustainable Development of Forests Northwest Territories (EOSD NWT) geospatial data (NRCan and GNWT, 2017). This dataset is part of the Multi-source Vegetation Inventory Project (Natural Resources Canada, 2020) and uses an unsupervised classification and cluster analysis to classify land cover.

The EOSD NWT dataset includes cover type and density classes and forest structure height and volume information based on Landsat imagery collected from 2007 to 2013. Mapping was done at a scale of 1:250,000 and was refined through field evaluation by the GNWT (NRCan and GNWT, 2017). Detailed land cover classification methods for this Project are described in the Vegetation and Wetlands TDR (K'alo-Stantec, 2022b).

3.2.2 Results

Results indicate that 42 mammal species, 2 amphibian species, and a number of invertebrate species have the potential to occur in the RSA (Appendix A, Table A.2; GNWT, 2020c), including seven SAR/SOCC (Table 3.1). The results for wildlife and wildlife habitat are presented by taxonomic grouping, with an emphasis placed on harvested species and species of regulatory and/or conservation importance. These are:

- Mammals
- Amphibians
- Invertebrates
- SAR and SOCC – federally and territorially assessed and listed species (see Section 3.2.1.1)

Table 3.1 Wildlife Species at Risk¹ and Species of Conservation Concern (*) with Potential to Occur in the Regional Study Area

Species		Status in NWT ²		Status in Canada ³	
Common Name	Scientific Name	SARC Assessment	SAR (NWT) Act	COSEWIC	SARA
Mammals					
Little brown myotis	<i>Myotis lucifugus</i>	Special Concern	Special Concern	Endangered	Endangered
Grizzly bear	<i>Ursus arctos</i>	Special Concern	Not Listed	Special Concern	Special Concern
Wolverine	<i>Gulo gulo</i>	Not at Risk	Not Listed	Special Concern	Special Concern
Boreal caribou	<i>Rangifer tarandus caribou</i>	Threatened	Threatened	Threatened	Threatened
Barren-ground caribou	<i>Rangifer tarandus groenlandicus</i>	Threatened	Threatened	Threatened	Not Listed [◊]
Invertebrates					
Gypsy cuckoo bumble bee	<i>Bombus bohemicus</i>	Data deficient	Not Listed	Endangered	Endangered
Suckley's cuckoo bumble bee*	<i>Bombus suckleyi</i>	Not Assessed	Not Listed	Threatened	Not Listed [◊]
Yellow-banded bumble bee	<i>Bombus terricola</i>	Not at Risk	Not Listed	Special Concern	Special Concern
Transverse lady beetle	<i>Coccinella transversoguttata</i>	Not Assessed	Not Listed	Special Concern	Special Concern

Notes:

- ¹ The existing conditions for caribou species are available in the Caribou and Moose TDR (EDI, 2022)
- ² Species at risk in NT assessed by SARC and listed under the territorial *Species at Risk (NWT) Act* (GNWT, 2020b)
- ³ Species at risk in Canada assessed by COSEWIC and listed under Schedule 1 the federal *Species at Risk Act* (Government of Canada, 2021)
- * Species of conservation concern
- ◊ Under consideration for Schedule 1 status change

3.2.2.1 Overview

Wildlife Habitat

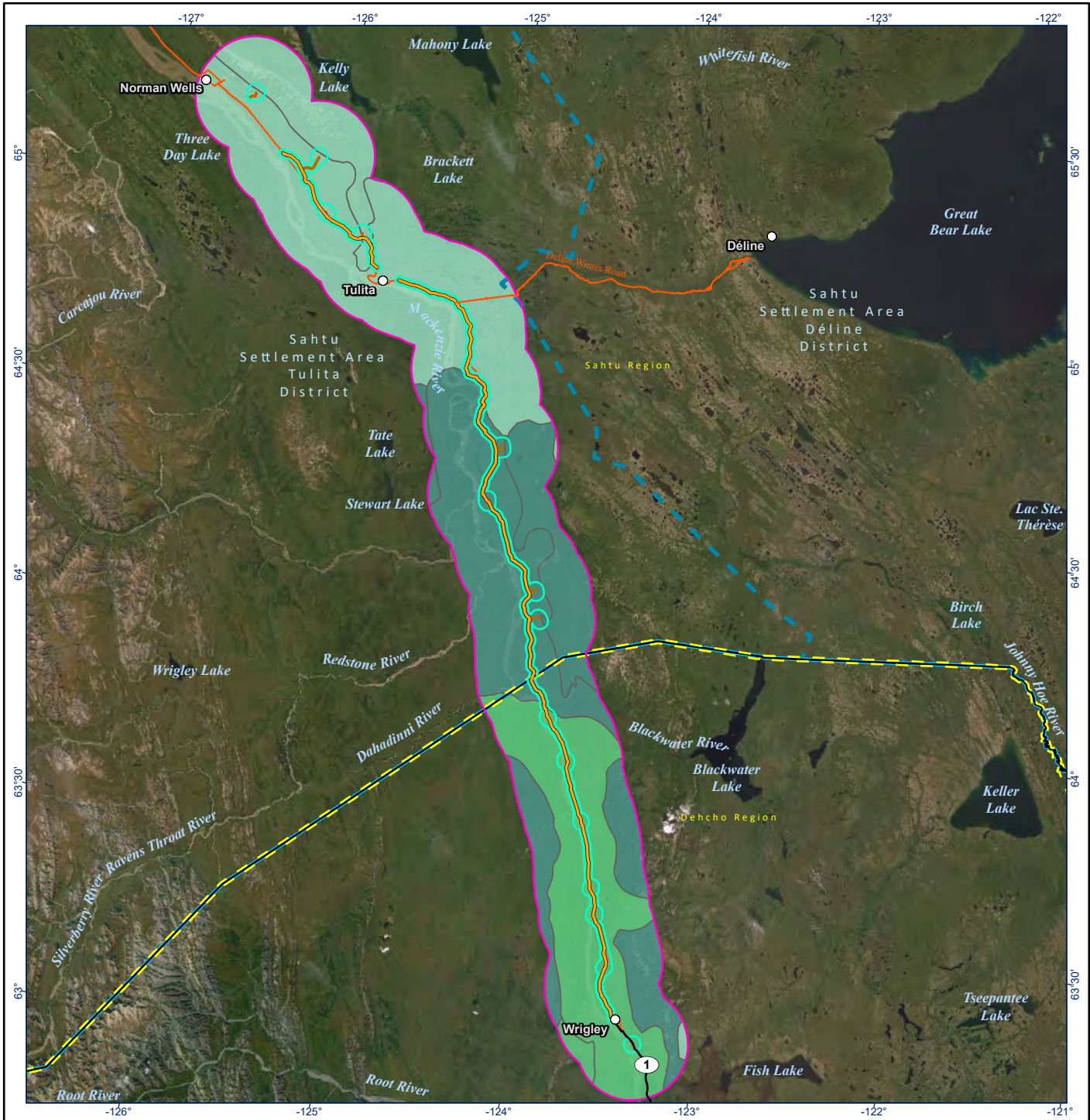
The Project is within the Mackenzie River valley (Mackenzie Valley), a landscape dominated by the Mackenzie River, known as the Deh Cho (meaning Big River) by local Dene First Nations, which is the longest river in Canada (1,738 km) spanning from Great Slave Lake to the Beaufort Sea. The Mackenzie River is a defining feature on the western Canadian landscape and the river basin, at 1.8 million square kilometres (km²) which is approximately 20% of Canada's landmass, is the second largest in North America, second only to the Mississippi River basin (MRBB, 2020).

The LSA is located primarily within the Mackenzie River valley plain and characterized by relatively subdued topographical relief that gives rise to the Mackenzie Mountains to the west and the Franklin Mountains to the east. Within the Mackenzie Valley, the LSA traverses the Boreal and Taiga Cordillera Ecoregions (Central Mackenzie Valley and Central Mackenzie Plains subregions [Level IV]; ECG, 2010) in the south and the Taiga Plains Ecoregion (North Mackenzie Plains Low Subarctic and Norman Range Low Subarctic subregions [Level IV]; ECG, 2007) in the north (Figure 3.3). The Norman Range Low Subarctic subregion, traversed by the Project in a small area, is the only area of notable topographical relief along the LSA and contains the Bear Rock massif, a rock formation rising 400 metres (m) above the Mackenzie River and extending east to join the Franklin Mountains.

Land cover in the Dehcho Region portion of the LSA (26,819.7 ha) is dominated by coniferous forest (43.6%), wetlands (19.8%), and open water (19.3%; e.g., the Mackenzie River; Table 3.2; Figure 3.4), while the LSA that overlaps the Sahtu Region (48,539.9 ha) is dominated by coniferous forest (28.7%), wetlands (25.2%), and shrubland (20.6%; Table 3.2; Figure 3.5). Forest fires within the Dehcho Region have been relatively uncommon and comparably smaller than in the Sahtu Region. From 1960 to 2019, fires within the LSA have burned a total of 4,956.7 ha (18.5%) of land cover in the Dehcho Region and 36,521.7 ha (75.2%) of land cover in the Sahtu Region. However, forest fire prevalence within the RSA has been similar in the Dehcho Region (50.8%) and Sahtu Region (52.8%).

Habitat Disturbance

Except for the existing MVWR and communities along it (e.g., Hamlet of Tulita), the LSA is relatively undisturbed but does contain some disturbance from oil and gas exploration and production infrastructure south of Norman Wells (e.g., Auld and Kershaw, 2005). Notably, the Norman Wells Pipeline conveys crude oil from Norman Wells south to Alberta and is located in the LSA of the Dehcho Region and Sahtu Region. Similarly, the RSA is relatively undisturbed, but oil and gas exploration and production infrastructure exists on the west side of the Mackenzie River near Norman Wells (Auld and Kershaw, 2005). Other existing disturbances include quarries and borrow sources, a fibre line, and bridges associated with the MVWR.



Level III Ecoregion

- Boreal Cordillera, High Boreal
- Taiga Cordillera, Low Subarctic
- Taiga Plains, Low Subarctic
- Proposed Mackenzie Valley Highway Alignment - Issued for EA 2022
- Granular Borrow / Rock Quarry Site and Access

- Local Study Area
- Regional Study Area
- Community
- All-Season Road
- Winter Road
- District Boundary
- Region Boundary
- Settlement Area Boundary

0 10 20 Kilometres
 (At original document size of 8.5x11)
 1:1,600,000



Project Location: Wrigley to Norman Wells, NWT
 Prepared by AT on 2023-03-07
 TR by AJ on 2023-03-07
 Client/Project: 144903025-0034 REV C

Government of Northwest Territories
 Mackenzie Valley Highway Project

Figure No. 3.3

Title: **Ecoregions**

Notes
 1. Coordinate System: NAD 1983 Northwest Territories Lambert
 2. Data Sources: Centre for Geomatics Government of NWT, Government of Canada, Stantec
 3. Background: World Topographic Map: Esri, FAO, NOAA, USGS, NRCAN
 World Imagery: Earthstar Geographics
 World Hillshade: Esri, USGS

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Technical Data Report—Wildlife and Wildlife Habitat

Section 3: Review of Existing Data

March 2023

Table 3.2 Land Cover Classes in the LSA and RSA for the Dehcho Region and Sahtu Region

Land Cover Category	Land Cover Class ¹	Dehcho Region		Sahtu Region	
		LSA	RSA	LSA	RSA
		ha (%)	ha (%)	ha (%)	ha (%)
Upland	Broadleaf Dense	1,037.4 (3.9%)	43,781.3 (12.2%)	2,253.1 (5.2%)	34,259.4 (5.3%)
	Broadleaf Open	114.8 (0.4%)	4,154.7 (1.2%)	1,103.9 (2.3%)	14,627.9 (2.2%)
	Broadleaf Sparse	0.0 (0.0%)	0.0 (0.0%)	0.0 (0.0%)	0.0 (0.0%)
	Coniferous Dense	3,374.9 (12.6%)	25,120.5 (7.0%)	917.8 (1.9%)	18,580.5 (2.9%)
	Coniferous Open	4,600.6 (17.2%)	40,034.2 (11.2%)	6,678.1 (13.8%)	113,316.2 (17.4%)
	Coniferous Sparse	3,725.0 (13.9%)	51,491.5 (14.3%)	6,332.6 (13.0%)	71,845.9 (11.0%)
	Mixedwood Dense	1,035.1 (3.9%)	6,786.9 (1.9%)	387.3 (0.8%)	7,494.4 (1.1%)
	Mixedwood Open	117.1 (0.4%)	2,728.5 (0.8%)	2,514.0 (5.2%)	23,834.7 (3.7%)
	Mixedwood Sparse	0.0 (0.0%)	0.0 (0.0%)	6.3 (<0.1%)	11.7 (<0.1%)
	Shrub Low	567.4 (2.1%)	39,005.2 (10.9%)	7,903.4 (16.3%)	72,607.6 (11.1%)
	Shrub Tall	320.6 (1.2%)	1,616.4 (0.5%)	2,091.3 (4.3%)	16,525.8 (2.5%)
	Herbaceous	50.6 (0.2%)	1,300.1 (0.3%)	210.9 (0.4%)	4,093.2 (0.6%)
	Bryoids	7.0 (<0.1%)	20.4 (<0.1%)	6.2 (<0.1%)	137.0 (<0.1%)
	Rock/Rubble	45.1 (0.2%)	4,916.4 (1.4%)	107.3 (0.2%)	10,285.3 (1.6%)
	Exposed Land	1,338.0 (5.0%)	4,862.2 (1.4%)	1,713.2 (3.5%)	9,897.9 (1.5%)
Total	16,333.6 (60.9%)	225,848.3 (62.9%)	32,495.5 (66.9%)	397,517.4 (61.0%)	

Technical Data Report—Wildlife and Wildlife Habitat

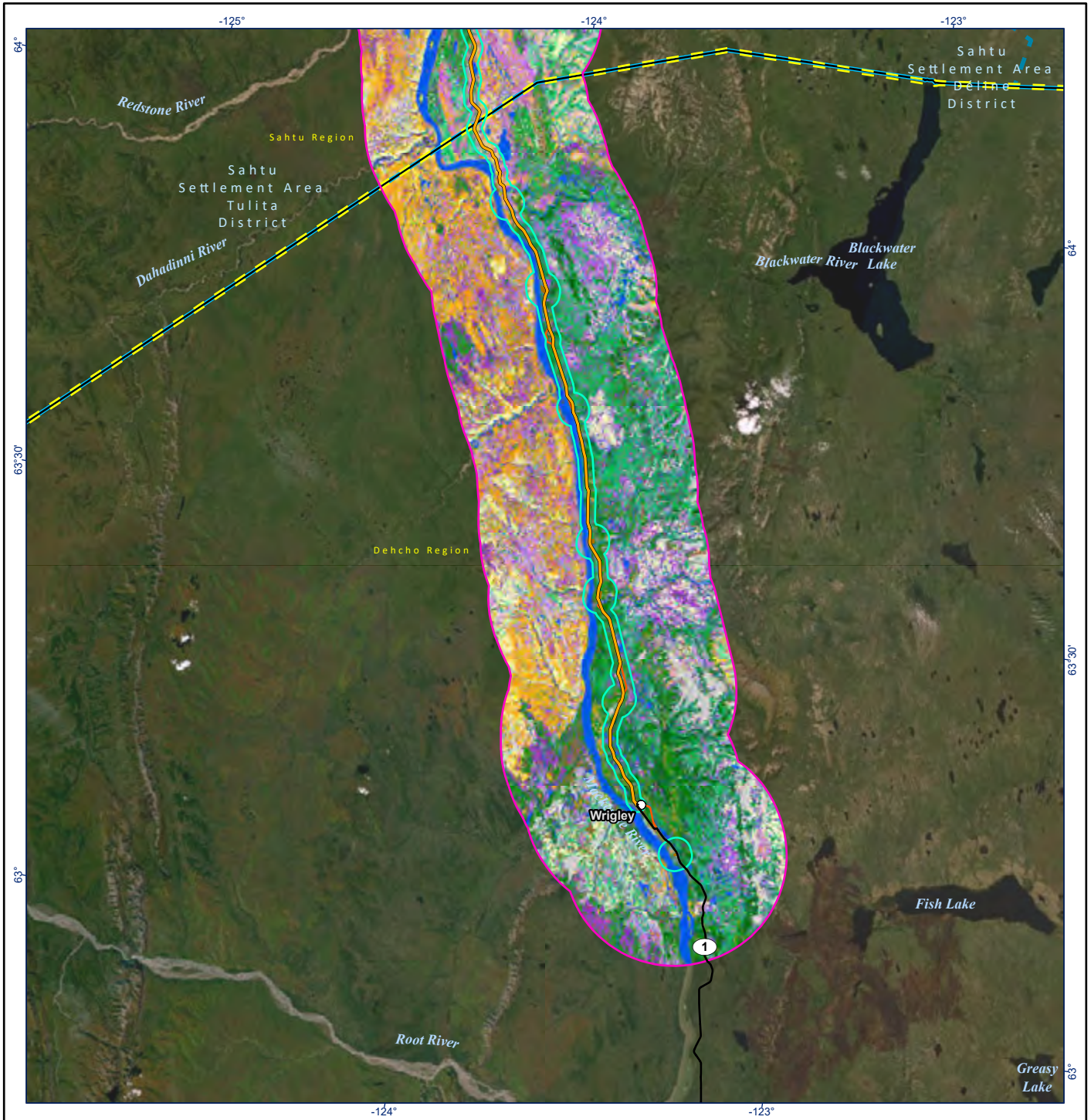
Section 3: Review of Existing Data

March 2023

Land Cover Category	Land Cover Class ¹	Dehcho Region		Sahtu Region	
		LSA	RSA	LSA	RSA
		ha (%)	ha (%)	ha (%)	ha (%)
Wetland	Wetland Herbaceous	856.8 (3.2%)	12,668.3 (3.5%)	2,976.9 (6.1%)	44,854.8 (6.9%)
	Wetland Shrub	2,222.9 (8.3%)	44,730.3 (12.5%)	4,503.7 (9.3%)	55,337.6 (8.5%)
	Wetland Treed	2,218.9 (8.3%)	46,859.8 (13.1%)	4,771.6 (9.8%)	64,769.1 (9.9%)
	Total	5,298.5 (19.8%)	104,258.6 (29.0%)	12,252.1 (25.2%)	164,961.5 (25.3%)
Water		5,187.5 (19.3%)	28,835.2 (8.0%)	3,792.3 (7.8%)	89,302.6 (13.7%)
No Data		0.0 (0.0%)	0.0 (0.0%)	0.0 (0.0%)	163.9 (<0.1%)
GRAND TOTAL		26,819.7 (100%)	359,038.0 (100%)	48,539.9 (100%)	616,807.0 (100%)

Note:

¹ From EOSD NWT (NRCan and GNWT, 2017; K'alo-Stantec, 2022b)



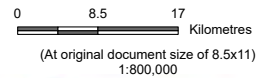
Notes

1. Coordinate System: NAD 1983 Northwest Territories Lambert
2. Data Sources: Centre of Geomatics of Government of NWT, Government of Canada, Stantec
3. Background: World Topographic Map: Esri, FAO, NOAA, USGS, NRCAN
World Imagery: Earthstar Geographics
World Hillshade: Esri, USGS

Land Cover

- Water
- Rock/Rubble
- Exposed Land
- Bryoids
- Shrub - Tall
- Shrub - Low
- Wetland - Treed
- Wetland - Shrub
- Wetland - Herb
- Herb
- Coniferous - Dense
- Coniferous - Open
- Coniferous - Sparse
- Broadleaf - Dense
- Broadleaf - Open

- Mixedwood - Dense
- Mixedwood - Open
- Mixedwood - Sparse
- Proposed Mackenzie Valley Highway Alignment - Issued for EA 2022
- Granular Borrow / Rock Quarry Site and Access
- Local Study Area
- Regional Study Area
- Community
- All-Season Road
- Winter Road
- District Boundary
- Region Boundary
- Settlement Area Boundary

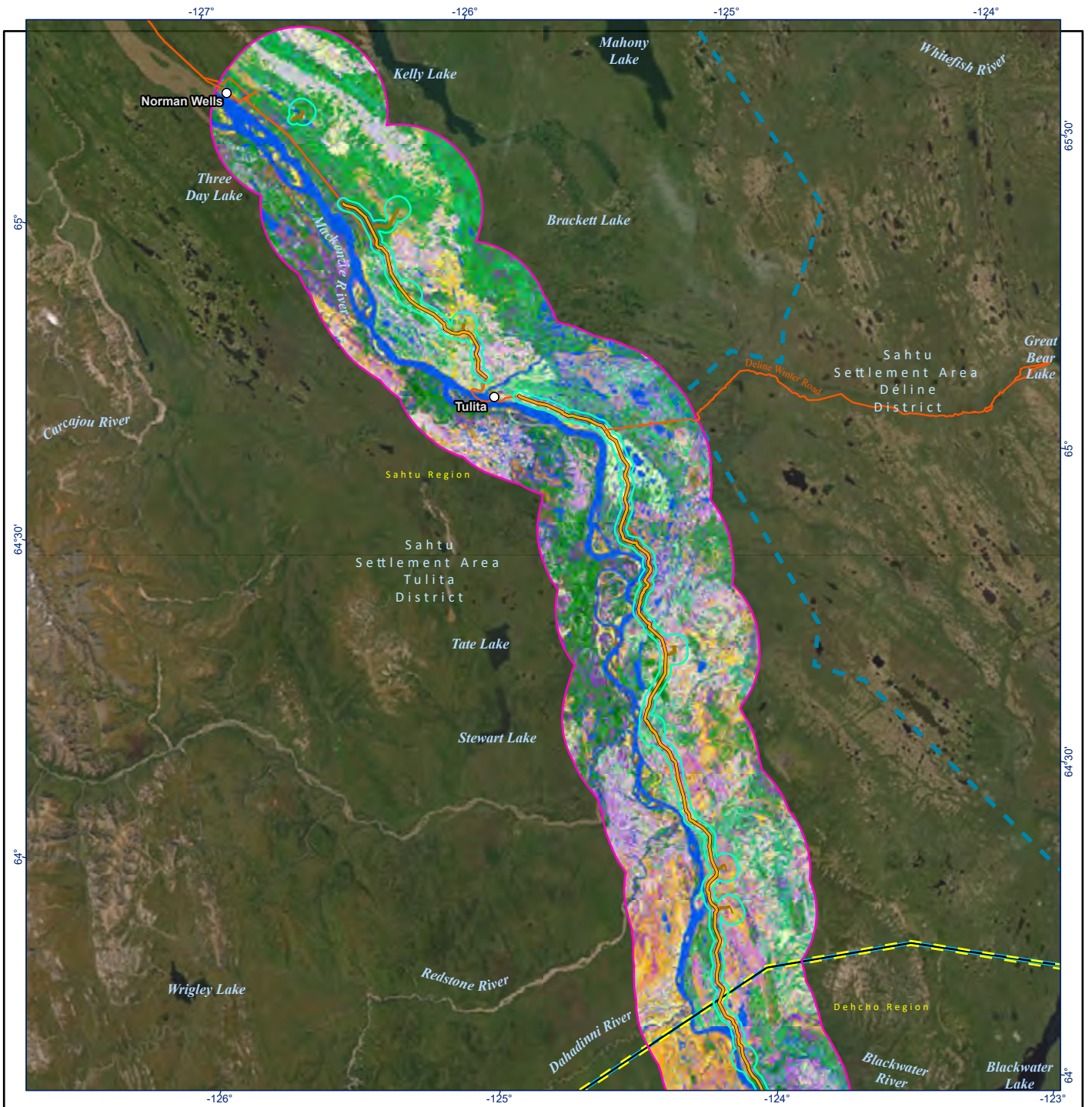


Project Location: Wrigley to Norman Wells, NWT
 Client/Project: 144903025-0035 REV/B
 Prepared by AT on 3/8/2023
 TR by AJ on 3/8/2023

Government of Northwest Territories
 Mackenzie Valley Highway Project

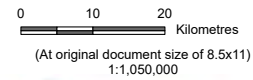
Figure No.
3.4

Land Cover in the Dehcho Region



Land Cover

- Water
- Rock/Rubble
- Exposed Land
- Bryoids
- Shrub - Tall
- Shrub - Low
- Wetland - Treed
- Wetland - Shrub
- Wetland - Herb
- Herb
- Coniferous - Dense
- Coniferous - Open
- Coniferous - Sparse
- Broadleaf - Dense
- Broadleaf - Open
- Mixedwood - Dense
- Mixedwood - Open
- Mixedwood - Sparse
- Proposed Mackenzie Valley Highway Alignment - Issued for EA 2022
- Granular Borrow / Rock Quarry Site and Access
- Local Study Area
- Regional Study Area
- Community
- All-Season Road
- Winter Road
- District Boundary
- Region Boundary
- Settlement Area Boundary



Project Location: Wrigley to Norman Wells, NWT
 Client/Project: 144903025-0036 REV B
 Prepared by AT on 3/8/2023
 TR by AJ on 3/8/2023

Government of Northwest Territories
 Mackenzie Valley Highway Project
 Figure No. **3.5**
 Title **Land Cover in the Sahtu Settlement Area**

Notes

1. Coordinate System: NAD 1983 Northwest Territories Lambert
2. Data Sources: Centre of Geomatics of Government of NWT, Government of Canada, Stantec
3. Background: World Topographic Map: Esri, FAO, NOAA, USGS, NRCAN
 World Imagery: Earthstar Geographics
 World Hillshade: Esri, USGS

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Invasive Wildlife Species

The *NWT Species 2016-2020 – General Status Ranks of Wild Species in the Northwest Territories* (Working Group on the General Status of NWT Species, 2016) report identifies 29 invasive alien invertebrate species that inhabit the NT, including 26 beetle species (order Coleoptera), 1 bee species (order Hymenoptera), and 2 moth and butterfly species (order Lepidoptera); however, there are additional species that have yet to be assessed but are also invasive alien species (GNWT n.d.). Some invasive alien species have the potential to threaten ecosystems by altering and degrading native habitats (e.g., forest defoliation).

While there are no mammal or amphibian species that would be considered alien or non-native species that occur within the RSA, there are some mammal species that have exhibited relatively recent range expansion into the RSA. There have been reports suggesting changes to the number and type of prey species that were once absent or uncommon in the RSA, such as white-tailed deer and muskox (Sections 3.1.2.1 and 3.1.2.2; Dehcho First Nation, 2011; GNWT, 2015b). It is believed that the northerly range expansion of white-tailed deer is responsible for the increased number of cougar observations in the Dehcho Region (Section 3.1.2.1; Dehcho First Nation, 2011) but it is not expected to occur within the LSA (GNWT, 2020c; Appendix A, Table A.2).

Wildlife Health

There are several pathogens expected to regularly occur in the RSA that can affect wildlife, including SAR and SOCC. Most pathogens (e.g., lice, ringworm, warbles, winter ticks, liver flukes, trichinosis) typically affect individuals, whereas other pathogens have the potential to result in more significant population effects, particularly in amphibian species (i.e., chytridiomycosis, ranavirus; GNWT, 2017). Many pathogens may be transmitted to people or other animals (e.g., dogs) but, depending on the pathogen, infected individuals are often safe to consume with proper precautions (GNWT, 2017).

The GNWT maintains a chronic wasting disease surveillance program to monitor for the presence of the disease, which affects cervids (e.g., white-tailed deer, moose, caribou), but it has not been detected in any wild species in the NT (GNWT, 2017). White-nose Syndrome is a fungal disease that affects hibernating bat species and can have significant population effects but, to date, the disease has not been detected in the NT (GNWT, 2017; WSNRT, 2021). It is discussed in greater length in Section 3.2.2.5.

Harvested mammals such as beaver, snowshoe hare, and muskox have been shown to have limited environmental contamination because they are lower on the food chain, consuming primarily plants and invertebrates. Therefore, it is not considered a health risk to consume them (GNWT, 2016a, 2016b, 2016c). However, regular consumption of the organs of older muskox is not recommended because contaminants may bioaccumulate in those tissues (GNWT, 2016c).

Wildlife Mortality

Existing wildlife mortality is primarily related to natural predator-prey interactions and by hunting and trapping; there is TK evidence to suggest that both these mortality pathways have changed over time (e.g., reduce trapping activity; Section 3.1.2). While vehicle-related wildlife mortality data is unavailable for the MVWR, it is unlikely to be a notable contributor to mortality because the road has reduced speed limits compared to an all-season road. However, while the MVWR is only open for part of the year, it may provide year-round access opportunities for both predators and humans.

There is no big game outfitting (i.e., commercial guided hunting) in the RSA (GNWT, 2020d).

Important Wildlife Areas

The LSA in the Dehcho Region overlaps two Important Wildlife Areas (IWAs) for beaver and lynx concentration areas, both which include much of the Mackenzie Valley (Table 3.3; Figure 3.6). There is one other IWA for a mineral lick site occurring within the RSA but outside the LSA in the Dehcho Region. The LSA in the Sahtu Region overlaps small portions of the two IWAs describe above for beaver and lynx concentrations above, as well as IWAs for muskox areas, rivers, the Bear Rock formation (Table 3.3), and one additional IWA in the RSA for beaver areas (Willow Lakes Wetlands; Table 3.3; Figure 3.6).

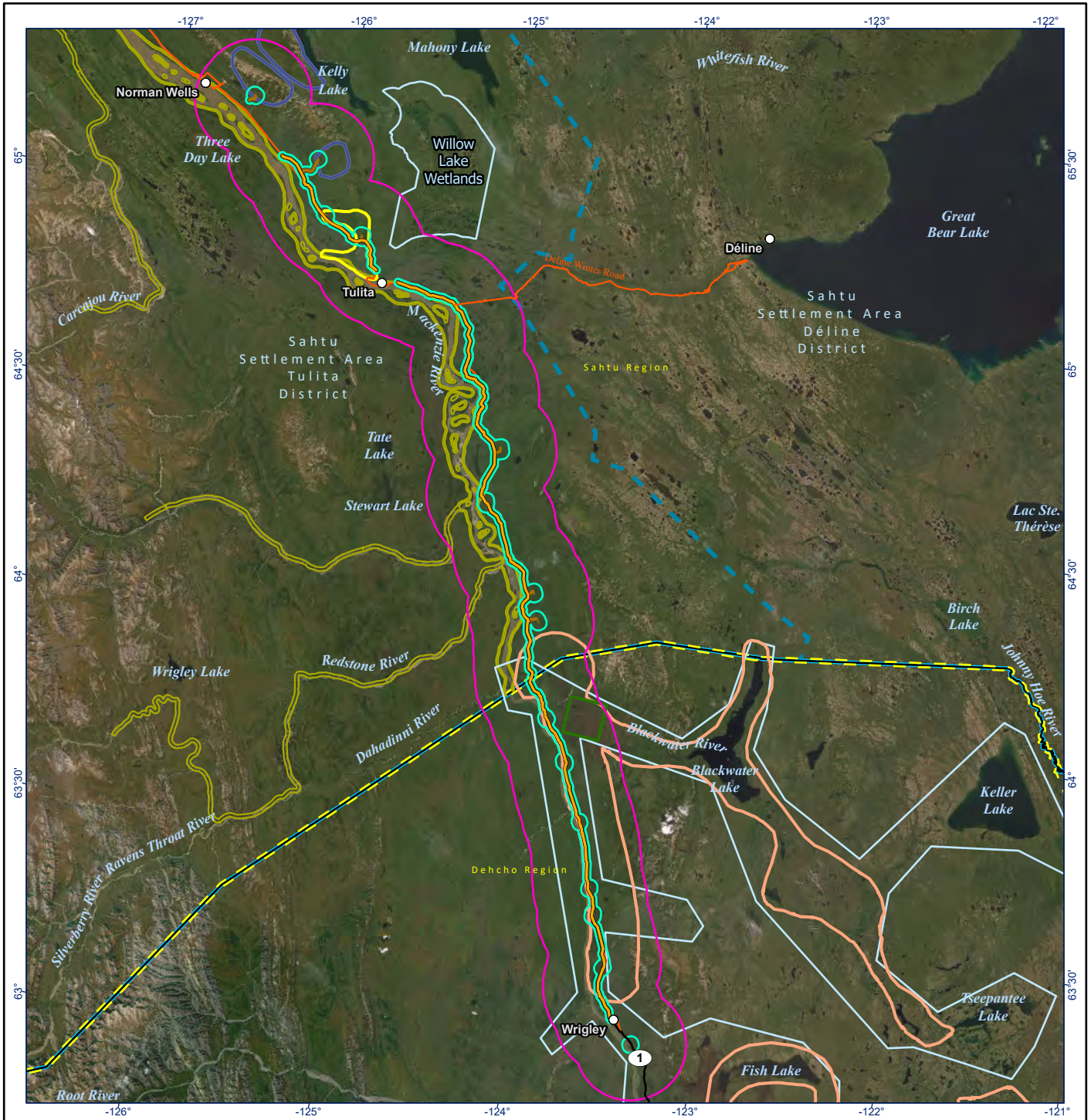
Table 3.3 Important Wildlife Areas in the LSA and RSA for the Dehcho Region and Sahtu Region¹

Important Wildlife Area	Area within the LSA		Area within the RSA	
	Dehcho Region (ha)	Sahtu Region (ha)	Dehcho Region (ha)	Sahtu Region (ha)
Dehcho beaver concentration areas	26,363.5	1,141.0	184,640.6	7,726.9
Dehcho lynx concentration areas	19,205.6	2,149.5	126,653.2	14,749.9
Mineral lick	-	-	9,884.7	-
Sahtu muskox areas	-	1,999.4	-	28,860.0
Sahtu rivers	-	2,435.6	-	33,125.1
Willow Lake wetlands (beaver)	-	-	-	7,082.9
Bear Rock CZ (culturally sacred site ²)	-	3,143.6	-	13,185.3

Notes:

¹ From the GNWT Spatial Data Warehouse Geospatial Portal database (GNWT, 2020a).

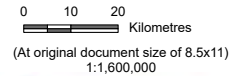
² See Section 3.1.2.2.



Important Wildlife Area

- Bear Rock
- Beaver
- Lynx
- Mineral Lick
- Muskox
- Sahtu River
- Proposed Mackenzie Valley
- Highway Alignment - Issued for EA 2022

- Granular Borrow / Rock Quarry Site and Access
- Local Study Area
- Regional Study Area
- Community
- All-Season Road
- Winter Road
- District Boundary
- Region Boundary
- Settlement Area Boundary



Project Location Wrigley to Norman Wells, NWT
Client/Project 144903025-0045 REV C

Prepared by AT on 2023-03-07
 TR by AJ on 2023-03-07

Government of Northwest Territories
 Mackenzie Valley Highway Project

Figure No.
3.6

Title
Important Wildlife Areas in the RSA

Notes

1. Coordinate System: NAD 1983 Northwest Territories Lambert
2. Data Sources: Centre of Geomatics of Government of NWT, Government of Canada, Stantec
3. Background: World Topographic Map: Esri, FAO, NOAA, USGS, NRCAN
 World Imagery: Earthstar Geographics
 World Hillshade: Esri, USGS

In general, sensitive wildlife features that wildlife rely on (e.g., mineral licks, overwintering hibernacula, denning sites) are not well documented within the LSA despite information suggesting that the LSA and RSA have the potential to support these features (e.g., mineral licks [see Section 3.1.2.1], overwintering hibernacula [see Section 3.2.2.5]). Additionally, denning sites for American black bear, for example, have the potential to occur in forested habitats within the LSA. There are no notable seasonal wildlife movement patterns for wildlife in the LSA.

There are no known movement corridors or migratory routes for wildlife within the LSA.

3.2.2.2 Mammals

The RSA provides habitat for 42 species of mammal, including 23 rodent and small mammal species (e.g., snowshoe hare [*Lepus americanus*]), 13 carnivore species, 5 ungulate species, and 1 bat species (Appendix A, Table A.2; GNWT, 2020c).

Data suggest that American marten is the most harvested furbearer in both the Dehcho Region and the Sahtu Region (Table 3.4).

Table 3.4 Five-year Average (2017 to 2021) of the Number of Furs and Hides Sold Through the Genuine Mackenzie Valley Fur Program

Common Name	Scientific Name	Average Annual Harvest ¹	
		Dehcho Region	Sahtu Region
Black bear	<i>Ursus americanus</i>	1.1	0.3
Gray wolf	<i>Canis lupus</i>	3.4	27.1
Muskox (hide)	<i>Ovibos moschatus</i>	0.0	2.3
American mink	<i>Neovison vison</i>	19.9	14.6
Weasel species	<i>Mustela</i> species	26.1	11.7
American marten	<i>Martes americana</i>	544.4	902.7
Fisher	<i>Pekania pennanti</i>	4.9	0.0
Wolverine	<i>Gulo gulo</i>	11.4	16.4
Red fox	-	2.9	19.6
Arctic fox	<i>Vulpes lagopus</i>	0.0	8.3
Fox (Cross)	<i>Vulpes vulpes</i>	0.4	9.6
Fox (Silver)	-	0.0	3.3
Canada lynx	<i>Lynx canadensis</i>	163.3	4.7
Beaver	<i>Castor canadensis</i>	117.7	26.3
Muskrat	<i>Ondatra zibethicus</i>	23.6	39.6
River otter	<i>Lontra canadensis</i>	1.0	0.3
Squirrel species	-	87.4	13.7
Five-year Average Harvest	-	1,007.6	1,100.4
No. of Harvesters	-	80.4	53.2

Note:

¹ Excludes the private sale or trading of furs outside of the GMVFP.

3.2.2.3 *Amphibians*

The RSA provides habitat for two amphibian species: boreal chorus frog (*Pseudacris maculata*) and wood frog (*Lithobates sylvaticus*; Appendix A, Table A.2; GNWT, 2020c). These species typically occur in or near wetland land cover classes (Table 3.2; Figure 3.4).

3.2.2.4 *Invertebrates*

The riparian, wetland, and terrestrial habitats in the LSA provide habitat for thousands of invertebrate species. Most invertebrate species play important ecological and economic roles (e.g., pollination) but the number and diversity of species precludes formal assessment and a focus here is placed on SAR and SOCC. The RSA has the potential to provide habitat for three SAR and one SOCC species (Table 3.1) that are discussed in greater detail in Section 3.2.2.5.

3.2.2.5 *Species at Risk and Species of Conservation Concern*

The RSA is within the range of four mammal SAR (little brown myotis [*Myotis lucifugus*], grizzly bear, wolverine, and boreal caribou [*Rangifer tarandus caribou*]), three invertebrate SAR (gypsy cuckoo bumble bee [*Bombus bohemicus*], yellow-banded bumble bee [*Bombus terricola*], and transverse lady beetle [*Coccinella transversoguttata*]), and one mammal (barren-ground caribou [*Rangifer tarandus groenlandicus*]) and one invertebrate SOCC (Suckley's cuckoo bumble bee [*Bombus suckleyi*]; Government of Canada, 2021; GNWT, 2020a; Table 3.1). The existing conditions for these species are described in greater detail below. The existing conditions for the caribou species are available in the Caribou and Moose TDR (EDI, 2022).

Little Brown Myotis

Little brown myotis is an aerial insectivore that is federally listed as endangered by SARA (Table 3.1; Government of Canada, 2021), listed as special concern under the *Species at Risk (NWT) Act*, and territorially ranked as at risk (Working Group on the General Status of NWT Species, 2016). Continental bat populations have experienced significant declines, primarily due to the spread of White-nose Syndrome (WNS), a fungal disease that affects hibernating bats and that has resulted in significantly increased mortality rates but has not been detected in the NT (COSEWIC, 2013; GNWT, 2020a; WNSRT, 2021). Other threats to the species include disturbance to, or loss of, overwintering hibernacula, maternal roosting sites, or foraging habitat by anthropogenic activities (e.g., forest harvesting; GNWT, 2020b; CMA, 2020).

Little brown myotis requires different specialized habitats for maternal roosting sites and overwintering hibernacula. Maternal roosting sites include anthropogenic structures or natural features such as tree cavities, which are generally more readily available in the environment, and individuals may travel hundreds of kilometres from overwintering hibernacula to maternal roosting sites for the breeding season (COSEWIC, 2013). Maternal roosting colonies have been documented in both anthropogenic structures (e.g., cabins) and stands of deciduous trees in the NT (Wilson et al., 2014). During the spring, summer, and fall, little brown myotis forage along forest openings, riparian areas, and over waterbodies (COSEWIC, 2013).

Overwintering hibernacula provide prolonged refuge from cold northern winters and are often in limited supply as the internal environmental conditions for hibernacula are relatively restrictive that include natural caves and crevasses and occasionally anthropogenic structures such as abandoned mine shafts or buildings (COSEWIC, 2013; Wilson et al., 2014). There are no known bat hibernacula in the RSA but the relative abundance of karst topography in the NT and presence of known hibernacula outside the RSA (south of Great Slave Lake or in Nahanni National Park Reserve) suggests that hibernacula have the potential to occur within the RSA (Ford, 2009a; CMA, 2020). Additionally, karst features are often remote and there has been relatively little effort to document bat use of those features (Wilson et al., 2014). However, most karst features are generally limited to mountainous areas outside the Mackenzie Valley, such as in the Franklin Mountains and Norman Range, on the eastern edge of the RSA (Ford, 2009b, 2009c). The exception is the Bear Rock formation north of Tulita (i.e., the Bear Rock CZ; see Section 3.1.2.2), which is a notable karst feature in the LSA that has nine documented caves penetrable to 10 m or more (Ford, 2009c) that may provide overwintering habitat for little brown myotis. Additionally, one bat sighting from March 2012 near Tulita was investigated but no landforms suitable for bat hibernation were detected (Critchley and Horne, 2018) but it remains possible for bat hibernacula to exist within the RSA (Wilson et al., 2014; Critchley and Horne, 2018). There are no historical WMIS records for little brown myotis within the LSA or RSA (GNWT, 2020c), but there are reported bat sightings from Wrigley, Tulita, and Norman Wells (CMA, 2020).

Grizzly Bear

Grizzly bear is an omnivorous species that is federally listed as special concern by SARA (Table 3.1; Government of Canada, 2021), is territorially assessed as special concern (SARC, 2017) but has no status under the *Species at Risk (NWT) Act*, and is territorially ranked as sensitive (Working Group on the General Status of NWT Species, 2016). While the species' population is stable to increasing in some areas of the NT, including some northern range expansion, the species generally occurs at low densities throughout the territory with an estimated population of 4,000-5,000 individuals (SARC, 2017). The species' range overlaps the northern portion of the RSA (GNWT, 2020a), where the species is relatively uncommon (Auld and Kershaw, 2005). Threats to grizzly bear in the NT include reduced prey availability (i.e., caribou) and anthropogenic disturbance such as camps and residential and industrial developments that may lead to human-bear conflicts and bear mortality which, combined with their low fecundity rate, results in poor resiliency to population stressors (COSWIC, 2012; SARC, 2017; GNWT, 2020b). The potential for grizzly bear health risks associated with disease or contamination are considered low in the NT (SARC, 2017).

Grizzly bears are habitat generalists, using a wide variety of tundra, alpine, subalpine, and open to semi-forested boreal habitats. Denning site and food availability are key habitat requirements (COSEWIC, 2012; SARC, 2017). Grizzly bears occupy large home ranges (>2,000 km²) and are sparsely dispersed on the landscape, with densities in NT ranging from 1-20 individuals per 1,000 km² (COSEWIC, 2012). Denning sites are sensitive to disturbance and are generally found on well-drained, south-facing slopes where bears may remain in hibernation for over six months (COSEWIC, 2012; SARC, 2017). There are no historical WMIS records for grizzly bear within the LSA or RSA (GNWT, 2020c) and the 2022 aerial bear den survey did not yield any bear den observations (GNWT, 2022b).

The recommended activity restrictions for grizzly bear include a setback of 800 m from general development activities and 1,500 m from blasting activities between October 1 to May 30 (GNWT, 2015a; Appendix A, Table A.1). This is consistent with or more conservative than those presented in the regional land use plans (DLUPC, 2006; SLUPB, 2013).

Wolverine

Wolverine is a carnivorous species that is federally listed as special concern by SARA (Table 3.1; Government of Canada, 2021), is territorially assessed as not at risk (SARC, 2014) and has no status under the *Species at Risk (NWT) Act*, and is territorially ranked as sensitive (Working Group on the General Status of NWT Species, 2016). While the species has experienced population declines, primarily in the southern portions of their range in Canada (due in large part to habitat loss and alteration and loss of caribou populations), the species' population has been stable-to-increasing, with reported northward range expansion in the NT (COSEWIC, 2014a; SARC, 2014). The most recent population estimates suggest that there are approximately 3,000-6,000 resident wolverine in NT and an additional 220-470 transient juveniles that may be present in the fall (SARC, 2014). Threats to wolverine in the NT include habitat loss or alteration, maternal den disturbance, and human-related mortality (GNWT, 2020b).

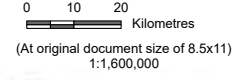
Wolverines are habitat generalists, using a wide variety of boreal and tundra habitats and are typically distributed relative to the availability of a diverse prey base that includes small mammals and large ungulates (e.g., caribou), rather than to the availability of specific habitat types (COSEWIC, 2014a; SARC, 2014). Wolverine occupy large home ranges (50 km²-1,580 km²) and are sparsely dispersed on the landscape, with southern arctic ecozone densities ranging from 3.7 to 10.7 individuals per 1,000 km² (COSEWIC, 2014a). Denning sites are sensitive to disturbance and are generally found where snow cover persists until late-spring and are generally associated with large boulders or fallen logs in boreal habitats; dens in higher elevations may also be associated with snow tunnels or avalanche debris (COSEWIC, 2014a; SARC, 2014).

There is one historical WMIS observation of wolverine within the LSA from 2019 southeast of Tulita and one observation within the RSA from 2006 north of Wrigley (Figure 3.7). NT produced an average of 107 wolverine pelts between 1992/93 to 2010/11, but because the pelts are valued by Indigenous and local resource users, it is difficult to estimate the number of pelts kept by trappers or sold locally and it is likely that the annual harvest is closer to approximately 200 individuals (COSEWIC, 2014a; GNWT, 2020b). Within the RSA, wolverine harvest is relatively low, with reported annual harvest averages of 6 individuals in the Sahtu Region (Bayha and Snortland, 2002, 2003) and 7 individuals in the Dehcho Region (2000-2005; IMG-Golder Corporation, 2006); however, these values underrepresent actual harvest due to survey participation (SARC, 2014).

The recommended activity restrictions for wolverine include a setback of 800 m from general development activities between October 15 to July 15 (GNWT, 2015a; Appendix A, Table A.1). This is consistent with or more conservative than those presented in the regional land use plans (DLUPC, 2006; SLUPB, 2013).



- Wolverine
- Proposed Mackenzie Valley Highway Alignment - Issued for EA 2022
- Granular Borrow / Rock Quarry Site and Access
- Local Study Area
- Regional Study Area
- Community
- All-Season Road
- Winter Road
- District Boundary
- Region Boundary
- Settlement Area Boundary



Project Location: Wrigley to Norman Wells, NWT
 Client/Project: 144903025-0046 REV B

Government of Northwest Territories
 Mackenzie Valley Highway
 Figure No. **3.7**
 Title **WMIS SAR Observations**

Notes
 1. Coordinate System: NAD 1983 Northwest Territories Lambert
 2. Data Sources: Centre of Geomatics of Government of NWT, Government of Canada, Stantec
 3. Background: World Topographic Map: Esri, FAO, NOAA, USGS, NRCAN
 World Imagery: Earthstar Geographics
 World Hillshade: Esri, USGS

Disclaimer: This document has been prepared based on information provided by others as cited in the Notes section. Stantec has not verified the accuracy and/or completeness of this information and shall not be responsible for any errors or omissions which may be incorporated herein as a result. Stantec assumes no responsibility for data supplied in electronic format, and the recipient accepts full responsibility for verifying the accuracy and completeness of the data.

Invertebrates

Three invertebrate SAR (gypsy cuckoo bumble bee [SARA listed as endangered], yellow-banded bumble bee [SARA listed as special concern], and transverse lady beetle [SARA listed as special concern]), and one SOCC (Suckley's cuckoo bumble bee [COSEWIC listed as threatened]) have the potential to occur throughout the RSA (Table 3.1). Critical habitat for the gypsy cuckoo bumble bee has been identified in the (ECCC, 2022). Areas that contain critical habitat have been identified using a 10 km radius of all known or presumed extant site records. One of the areas that contains critical habitat for gypsy cuckoo bumble bee occurs near Norman Wells, NWT. This critical habitat polygon does not overlap the Project PDA or LSA; however, a portion of critical habitat intersects the RSA near Norman Wells.

Gypsy cuckoo bumble bees are a specialist nest parasite of other bees (*Bombus* spp.). They use a broad range of habitat types including open natural and human-modified habitat features to meet life requisites such as reproduction, foraging, mating and dispersal (ECCC, 2022). Critical habitat has been identified where biophysical features and attributes occur within a critical habitat polygon.

The yellow-banded bumble bee has been territorially assessed as not at risk and the gypsy cuckoo bumble bee has been assessed as data deficient (SARC, 2019). All four invertebrate species have broad distributions in Canada and in western NT and are habitat generalists, occupy a variety of habitats such as meadows, riparian areas, and coniferous forests (COSEWIC, 2014b, 2015, 2016, 2020). There are no historical WMIS records for invertebrate SAR or SOCC within the LSA or RSA (GNWT, 2020c), but collections of Suckley's cuckoo bumble bee have occurred in the RSA near Norman Wells in 1969 (ENR, 2017) and collections of gypsy cuckoo bumble bee, yellow-banded bumble bee, and transverse lady beetle have occurred within the RSA near Norman Wells as recently as 2017 (SARC, 2019).

While habitat conversion may have contributed to bumble bee population declines, primary threats to bees, including in the NT, include pesticide use and pathogen-infected farmed bees (COSEWIC, 2014b, 2015, 2020; GNWT, 2020b). The decline in other bee species has also contributed to the decline of the gypsy cuckoo bumble bee and Suckley's cuckoo bumble bee, which are parasitic species that lay eggs in interspecific bumble bee colonies (COSEWIC, 2014a, 2020; GNWT, 2020b). Transverse lady beetle population declines, including in the NT, are thought to be a result of the spread of non-native lady beetles, predation, and the introduction of pathogens (COSEWIC, 2016; GNWT, 2020b).

4 Key Results and Findings

The Project consists of a 281 km all-season highway that largely follows the route of the existing MVWR and includes the construction and operation of temporary and permanent borrow sources. The biophysical characteristics of the LSA are influenced by the Mackenzie River valley that defines the landscape and is dominated by coniferous forest habitats interspersed with wetlands and watercourses. The RSA has the potential to provide habitat for 42 species of mammal, 2 species of amphibian, and a numerous invertebrate species (Appendix A, Table A.2; GNWT, 2020c). The RSA is also within the range of four mammal SAR, two invertebrate SAR, and one mammal and two invertebrate SOCC (GNWT, 2020a, 2020b).

Wildlife habitat in the Dehcho Region portion of the LSA is dominated by coniferous forest (43.6%), wetlands (19.8%), and open water (19.3%), while the LSA that overlaps the Sahtu Region is dominated by coniferous forest (28.7%), wetlands (25.2%), and shrubland (20.6%). Since 1960, 18.5% of the LSA within the Dehcho Region has been subject to forest fire while 75.2% of the LSA within the Sahtu Region has been subject to forest fire.

Other than communities, the Norman Wells Pipeline, and other developments such as borrow sources and quarries, a fibre line, and bridges associated with the MVWR, the LSA and RSA are relatively undisturbed. Oil and gas exploration and production infrastructure in the RSA occurs on the west side of and within the Mackenzie River near Norman Wells (Auld and Kershaw, 2005).

Key results and findings include:

- Many wildlife species are culturally important to local communities (e.g., bears and furbearers), including for trapping (Auld and Kershaw, 2005; DLUPC, 2006; SLUPB, 2013; SRRB, 2021; TRRC, 2022).
- Harvest composition of large mammals in the Sahtu Region is dominated by barren-ground caribou (88%), followed by moose (8%) and woodland caribou (3%) and other species (1%; e.g., muskox; SRRB, 2021).
- The Bear Rock CZ is a large karst formation west of Tulita that is a sacred site and subject to traditional storytelling that also provides habitat for a wide variety of wildlife species (SLUPB, 2013).
- Historical wildlife SAR and SOCC records within the LSA and RSA include observations of little brown myotis, wolverine, and all four invertebrate species.
- The LSA is not expected to provide a notable source of habitat for wildlife SAR and SOCC because these species are widely distributed habitat generalists and occur within the RSA at low densities.

- The LSA is located partly within four IWAs and two are designated as important habitat for beaver and lynx; the others are Sahtu rivers and a culturally sacred site (Bear Rock).
- Sensitive wildlife features that wildlife rely on (e.g., mineral licks, overwintering hibernacula, denning sites) are not well documented within the LSA despite information suggesting that the LSA and RSA have the potential to support these features.

4.1 Additional Studies

It is understood that additional studies are planned to be undertaken to fill the data gaps associated with the limited data availability for sensitive wildlife features in the LSA, including for bear dens and mineral licks prior to Project construction. Additional field-based and TK information will help establish the existing condition and availability of those features within the LSA and support the development of appropriate mitigation measures. The study information will consider the maximum setback distance for the respective feature (GNWT, 2015a; Appendix A, Table A.1).

5 Closure

This TDR was prepared for the sole benefit of GNWT to describe existing conditions related to wildlife and wildlife habitat within the wildlife LSA and RSA. If you have any questions, please do not hesitate to contact the undersigned.

Respectfully submitted,

K'alo-Stantec Limited

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

Wildlife Species	Feature or Habitat	Specific Conditions	Sensitive Period²	Recommended Setback Distance (m)
Ungulates (general)	Mineral/salt lick	General development activities	Year round	1,000
Muskox	Species Presence	Shut down distance if muskox are in the area	Apr 1 – Jun 15	500
Cougar	Den	General development activities	Apr 15 – Jul 15	750
Lynx	Den	General development activities	Apr 1 – Jul 15	250
Grizzly bear, American black bear	Den	If activity is blasting	Oct 1 – May 30	1,500
		General development activities	Oct 1 – May 30	800
	Berry habitat	General development activities when bears are observed foraging	Jul 15 – Sep 15	300
Wolf	Den	General development activities	May 1 – Sep 15	800
Fox	Den	General development activities	May 1 – Jul 15	150
Wolverine	Den	General development activities	Oct 15 – Jul 15	2,000
All other wildlife	Den	Varies with region and species; contact ENR office	Birthing seasons	250

Notes:

¹ Modified from DULUPC, 2006, SLUPB, 2013, and GNWT, 2015a

² Sensitive periods are a general guide and specific timing may vary. Year-round avoidance may not always be feasible, and exceptions will be discussed with NWT Environment and Natural Resources (ENR) to develop appropriate mitigation

Table A.2 Amphibian and Mammal Species with the Potential to Occupy the Ecoregions in the LSA¹

Group	Common Name	Scientific Name
Amphibians	Boreal chorus frog	<i>Pseudacris maculata</i>
	Wood frog	<i>Lithobates sylvaticus</i>
Mammals	American black bear	<i>Ursus americanus</i>
	Barren-ground caribou	<i>Rangifer tarandus groenlandicus</i>
	Boreal caribou	<i>Rangifer tarandus caribou</i>
	Grey wolf	<i>Canis lupus</i>
	Grizzly bear	<i>Ursus arctos</i>
	Moose	<i>Alces alces</i>
	Muskox	<i>Ovibos moschatus</i>
	White-tailed deer	<i>Odocoileus virginianus</i>
	Little brown myotis	<i>Myotis lucifugus</i>
	American mink	<i>Neovison vison</i>
	Ermine (short-tailed weasel)	<i>Mustela erminea</i>
	Least weasel	<i>Mustela nivalis</i>
	American marten	<i>Martes americana</i>
	Fisher	<i>Pekania pennanti</i>
	Wolverine	<i>Gulo gulo</i>
	Red fox	<i>Vulpes vulpes</i>
	Arctic fox	<i>Vulpes lagopus</i>
	Canadian lynx	<i>Lynx canadensis</i>
	Coyote	<i>Canis latrans</i>
	Red squirrel	<i>Tamiasciurus hudsonicus</i>
	Snowshoe hare	<i>Lepus americanus</i>
	Beaver	<i>Castor canadensis</i>
	Muskrat	<i>Ondatra zibethicus</i>
	River otter	<i>Lontra canadensis</i>
	American pigmy shrew	<i>Sorex hoyi</i>
	Arctic ground squirrel	<i>Urocitellus parryii</i>
	Arctic shrew	<i>Sorex arcticus</i>
Bushy-tailed woodrat	<i>Neotoma cinerea</i>	
Cinereus shrew	<i>Sorex cinereus</i>	
Dusky shrew	<i>Sorex monticolus</i>	
Eastern heather vole	<i>Phenacomys ungava</i>	
Least chipmunk	<i>Tamias minimus</i>	

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Group	Common Name	Scientific Name
Mammals (cont'd)	Long-tailed vole	<i>Microtus longicaudus</i>
	Meadow jumping mouse	<i>Zapus hudsonius</i>
	Meadow vole	<i>Microtus pennsylvanicus</i>
	Nearctic brown lemming	<i>Lemmus trimucronatus</i>
	North American deer mouse	<i>Peromyscus maniculatus</i>
	North American porcupine	<i>Erethizon dorsatum</i>
	Northern bog lemming	<i>Synaptomys borealis</i>
	Northern flying squirrel	<i>Glaucomys oregonensis</i>
	Northern red-backed vole	<i>Myodes rutilus</i>
	Root vole	<i>Microtus oeconomus</i>
	Taiga vole	<i>Microtus xanthognathus</i>

Note:

- ¹ Species within ecoregions 3.3.2.2 North Mackenzie Plain, 3.3.2.3 Norman Range, 3.2.2.11 Central Mackenzie Plain, and 6.1.5.1 Central Mackenzie Valley (GNWT, 2020c).

APPENDIX 19B

Recommended Activity Restriction Guidelines for Sensitive Wildlife Species

Appendix 19B RECOMMENDED ACTIVITY RESTRICTION GUIDELINES FOR SENSITIVE WILDLIFE SPECIES

Table 19B.1 Recommended Activity Restriction Guidelines for Sensitive Wildlife Species¹

Wildlife Species	Feature or Habitat	Specific Conditions	Sensitive Period / Timing Restriction ²	Recommended Setback Distance (m)
Ungulates (general)	Mineral/salt lick	General development activities	Year round	1,000
Muskox	Species Presence	Shut down distance if muskox is in the area	Apr 1 – Jun 15	500
Cougar	Den	General development activities	Apr 15 – Jul 15	750
Lynx	Den	General development activities	Apr 1 – Jul 15	250
Grizzly bear, American black bear	Den	If activity is blasting	Oct 1 – May 30	1,500
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Wolf	Den	General development activities	May 1 – Sep 15	800
Fox	Den	General development activities	May 1 – Jul 15	150
Wolverine	Den	General development activities	Oct 15 – Jul 15	2,000
All other wildlife	Den	Varies with region and species; contact the GNWT-ECC office	Birthing seasons	250

Notes:

¹ Modified from SLUPB (2013) and GNWT (2015); most conservative sensitive period and/or recommended setback distance used.

² Sensitive periods are a general guide and specific timing may vary. Year-round avoidance may not always be feasible and exceptions will be discussed with the GNWT-ECC to develop appropriate mitigation.