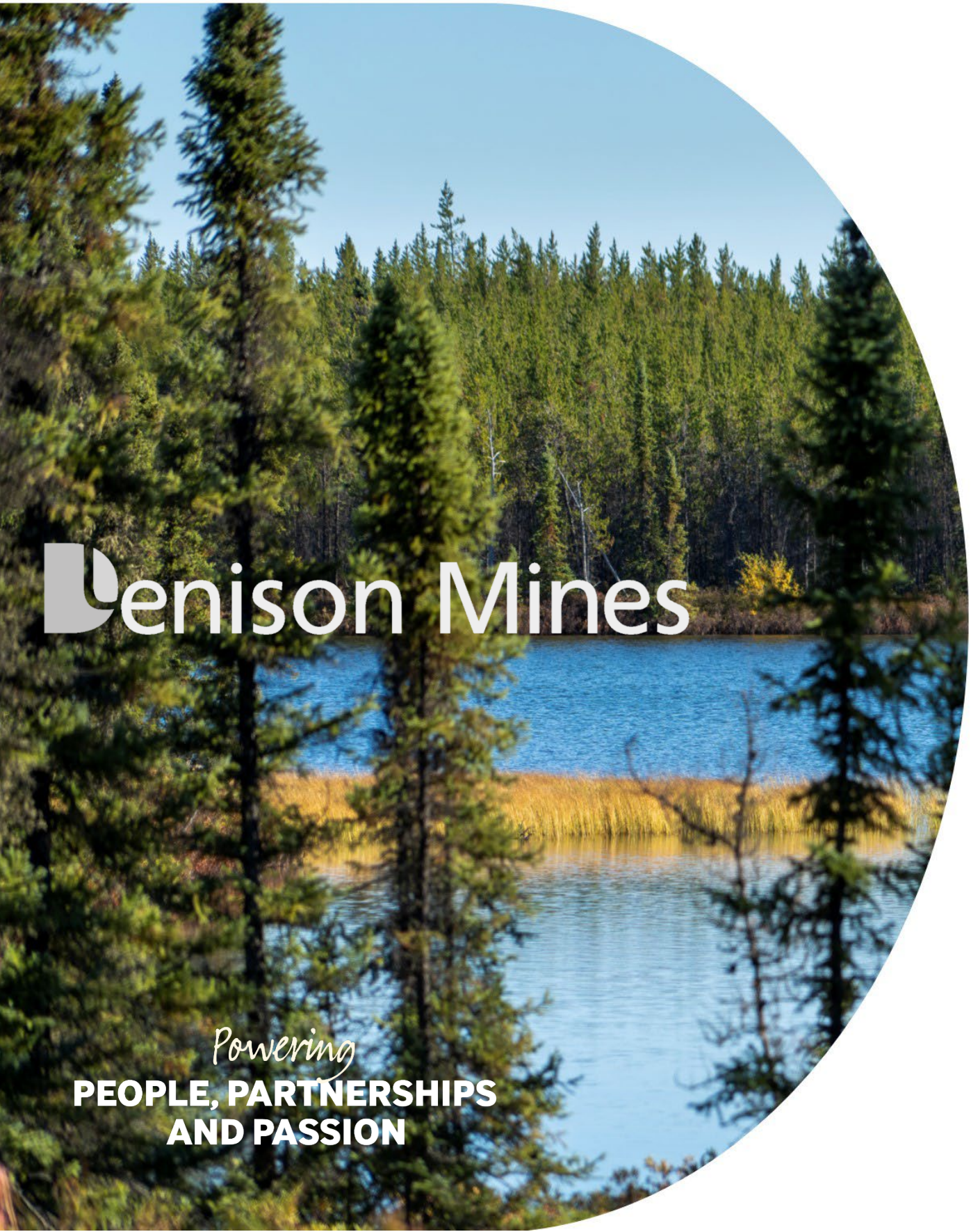
Denison Mines

Wheeler River Project

Final Environmental Impact Statement

November 2024

Powering
PEOPLE, PARTNERSHIPS AND PASSION.


Denison Mines
Powering
PEOPLE, PARTNERSHIPS
AND PASSION

Denison Mines Corp.

Wheeler River Project Caribou Management Framework

Version 3

October 2024

Revision History

Version	Date	Description of Revision
1	June 30, 2023	Conceptual plan to support provincial and federal review of the draft environmental impact statement
2	January 28, 2024	Title updated from Conceptual Caribou Mitigation Plan to Wheeler River Project Caribou Management Framework to reflect the current status and intent of the report. Revisions to incorporate 1. advances in Saskatchewan Ministry of Environment boreal caribou habitat offset calculator; 2. additional local and Indigenous knowledge related to woodland caribou; and, 3. discussions with Saskatchewan Ministry of Environment on Version 1 of the document.
3	September 19, 2024	Updated to incorporate airstrip information and mitigation measures provided as part of federal EIS review comment (IR-149-R1B [round 4]).

Table of Contents

Figures

Acronyms and Abbreviations

Term	Definition
Anthropogenic	Caused or produced by humans
Boreal Caribou	The boreal ecotype of woodland caribou occurs within the boreal forest of Canada. These non-migratory caribou form small aggregations throughout the year and disperse for solitary calving.
CDP	Conceptual Decommissioning Plan
Critical Habitat	The habitat that is necessary for the survival of a listed wildlife species and is identified as the species critical habitat in the recovery strategy or action plans for the species.
Disturbed habitat (per ECCC 2020)	Habitat showing: i) anthropogenic disturbance visible on Landsat at a scale of 1:50,000, including habitat within a 500 m buffer of the anthropogenic disturbance; and/or ii) fire disturbance in the last 40 years, as identified in data from each provincial and territorial jurisdiction (without buffer).
ERFN	English River First Nation
ECCC	Environment and Climate Change Canada
EA	environmental assessment
EIS	environmental impact statement
EMS	Environmental Management System
ENV	Saskatchewan Ministry of Environment
Framework	Caribou Management Framework
ha	hectare
IK	Indigenous knowledge
ISR	in-situ recovery
KML	Kineepik Métis Local
Project	Wheeler River Project

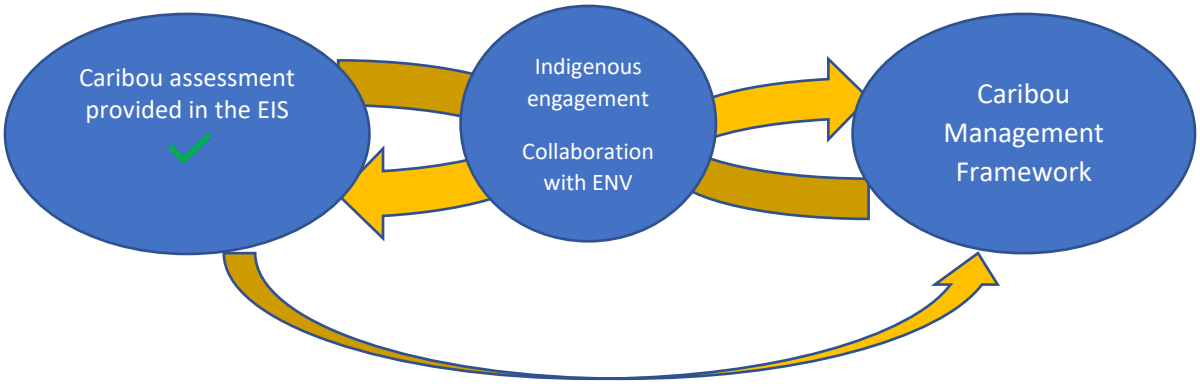
Term	Definition
Recovery strategy	A planning document that identifies what needs to be done to stop or reverse the decline of a species.
Threatened species	A wildlife species that is likely to become endangered if nothing is done to reverse the factors leading to its extirpation or extinction.

1 Introduction

The Wheeler River Project (the Project) environmental impact statement (EIS; Denison 2024) evaluated and assessed potential effects on the boreal population of woodland caribou (*Rangifer tarandus caribou*; referred to herein as caribou or boreal caribou) following standard environmental assessment (EA) methodology. The assessment of potential effects, including the assessment of Project-related and cumulative effects, considered both direct (e.g., habitat loss) and indirect effects (e.g., habitat alteration) on caribou and their habitat, while assuming that caribou were present year-round and during all of their life stages (i.e., calving, rearing, mating, over wintering). In this way, the EIS took a precautionary or conservative approach to understanding / addressing the potential residual effects (i.e., effects remaining after mitigation measures were considered) of the Project on caribou and their habitat. Moreover, this precautionary approach provides the basis for planning to inform/support future Project-related regulatory approvals processes and follow-up monitoring. The EIS concluded that in consideration of proposed measures to avoid and minimize potential effects, as well as in consideration of proposed conceptual site restoration, residual Project-related and cumulative effects on caribou and their habitat were not significant.

This Caribou Management Framework (the Framework), developed by Denison for the Project, follows from the environmental assessment (EA) process, though its objective differs from that of related EA / EIS documentation. The Framework builds on the assessment of potential Project effects, including cumulative effects, and commitments to avoid and minimize such effects described in the EIS and provides a further Project-specific management tool to be employed in relation to caribou and their habitat. The Framework is expected to be advanced through ongoing consultation with the Saskatchewan Ministry of Environment (ENV) as ENV finalizes the caribou range plan for the SK1 conservation unit, the caribou conservation unit in which the Project is located. The EIS is a conservative planning tool, whereas the Framework is a practical, living document intended to contribute to the province's overall caribou conservation strategy. The Framework is not a requirement for EA determination but is provided as a guidance document to help Denison proactively describe and inform the development and implementation of appropriate management measures related to caribou and their habitat.

The Framework is an evergreen document but has been developed based on Denison's current understanding of range plan development for SK1 to date. As needed, the Framework will be updated to be consistent with the management goals defined by ENV for SK1 (once established) and will be developed / refined in consultation with local communities including English River First Nation (ERFN), Kineepik Métis Local (KML) in Pinehouse, and regulators (e.g., ENV) as depicted graphically below.



As noted above, the boreal caribou range plan for SK1 is under development, and it is understood that this Framework will be updated as more range plan details become available. Developing the Framework at this early stage is consistent with and reflects Denison's commitment to continue to work with the province to meet the management objectives and management strategies for the SK1 range. It is envisioned that this Framework will be included as a component of the provincial environmental impact statement and should it be accepted through the issuance of a Ministerial Approval, form the basis of a condition of approval pursuant to *The Environmental Assessment Act*.

2 Regulatory Setting and Indigenous Perspectives Related to Boreal Caribou

A brief review highlighting provincial and federal governments, and Indigenous nations and communities considerations of boreal caribou is provided below for reference. Briefly, in 2002, boreal woodland caribou were recommended for "threatened" status by the Committee on the Status of Endangered Wildlife in Canada (COSEWIC) and were listed as "threatened" under the Species at Risk Act (SARA) when it was proclaimed in 2003. As required under SARA, the Government of Canada developed a Recovery Strategy for the Woodland Caribou Boreal Population in Canada (the Recovery Strategy) which was released in October 2012. Saskatchewan is responsible for managing woodland caribou on provincial and private lands, and as signatory to the Accord for the Protection of Species at Risk in Canada, has a responsibility to prepare a provincial range plan for woodland caribou. Range plans, which involve close collaboration between the provincial government and Indigenous nations and communities, provide a path forward for effective landscape management. They provide the federal government with clear information on the measures, tools and targets for woodland caribou habitat management being deployed, and that they effectively protect woodland caribou habitat.

2.1 Provincial Government

The responsibility for woodland caribou management lies with the Province of Saskatchewan. As noted above, the province is responsible for developing range plans or management plans which build on the federal recovery strategy by setting goals and objectives for maintaining sustainable population levels.

The Saskatchewan Conservation Data Centre is responsible for evaluating and assigning a conservation rank to each taxon, resident or transient, found in the province. Woodland caribou's subnational or S-rank conservation rank is S3. This ranking indicates that, provincially, the species is vulnerable/rare to uncommon which is associated with a moderate risk of extinction or extirpation due to a restricted range, relatively few populations, recent and widespread declines, threats, or other factors.

Based on work completed by McLoughlin et al. (2019), which was confirmed by ENV in November 2023 (SK ENV 2023b), the caribou populations in SK1 are stable. The amended federal recovery strategy identifies 40% undisturbed habitat in the SK1 conservation unit as the disturbance management threshold as well as the maintenance of total anthropogenic disturbance in the range at or below 5% while maintaining the minimum 40% undisturbed habitat (ECCC 2020). The SK1 conservation unit has high levels of natural disturbance (fire), but very low levels of human-caused disturbance. At present, the habitat disturbance level in SK1 is 53% (that is, 47% undisturbed habitat) (SK ENV 2023b). Approximately 50% of SK1 is disturbed by wildfires and 3% by anthropogenic features such as roads, communities, power transmission lines, forestry, mineral exploration, and mining (3%).

The provincial goal is to sustain and enhance woodland caribou populations, and maintain the ecosystems they require, throughout their current range (ENV 2013). Through the woodland caribou range assessment and range planning program, the province is:

- Gaining a better understanding of woodland caribou ecology;
- Working toward meeting objectives identified in provincial and federal strategies; and
- Improving how the province manages the species and related habitat.

The province's woodland caribou range assessment and range planning program incorporates two key components:

- Woodland caribou range assessment, which enhances the understanding of woodland caribou populations and their interactions with the environment; and
- Woodland caribou range planning, which provides a framework, strategies and objectives that allow for better decisions involving habitat management and self-sustaining caribou populations.

Additionally, the province has identified that engagement is a key component of the range plan process and will be completed with representatives from First Nation, Métis, industry, non-governmental organizations, and communities[1].

Although the management objectives and management strategies for caribou in SK1 are not yet defined, Denison is committed to working with ENV as the range plan is developed to ensure this project-specific management framework aligns with the conservation objectives as determined by the province as the primary steward of caribou in the province.

2.2 Federal Government

Boreal caribou have been designated as *threatened* under the federal *Species at Risk Act*. Environment and Climate Change Canada (ECCC) released amended recovery strategy for woodland caribou in 2020 (ECCC 2020). A recovery strategy is a planning document that identifies what should be done to stop or reverse the decline of a species.

The Project is located in the Boreal Shield West ecoregion of the Boreal Shield ecozone. The Boreal Shield West ecoregion stretches from Alberta to Ontario (Figure 2-1).

[1] Woodland Caribou Conservation | Woodland Caribou Program | Government of Saskatchewan

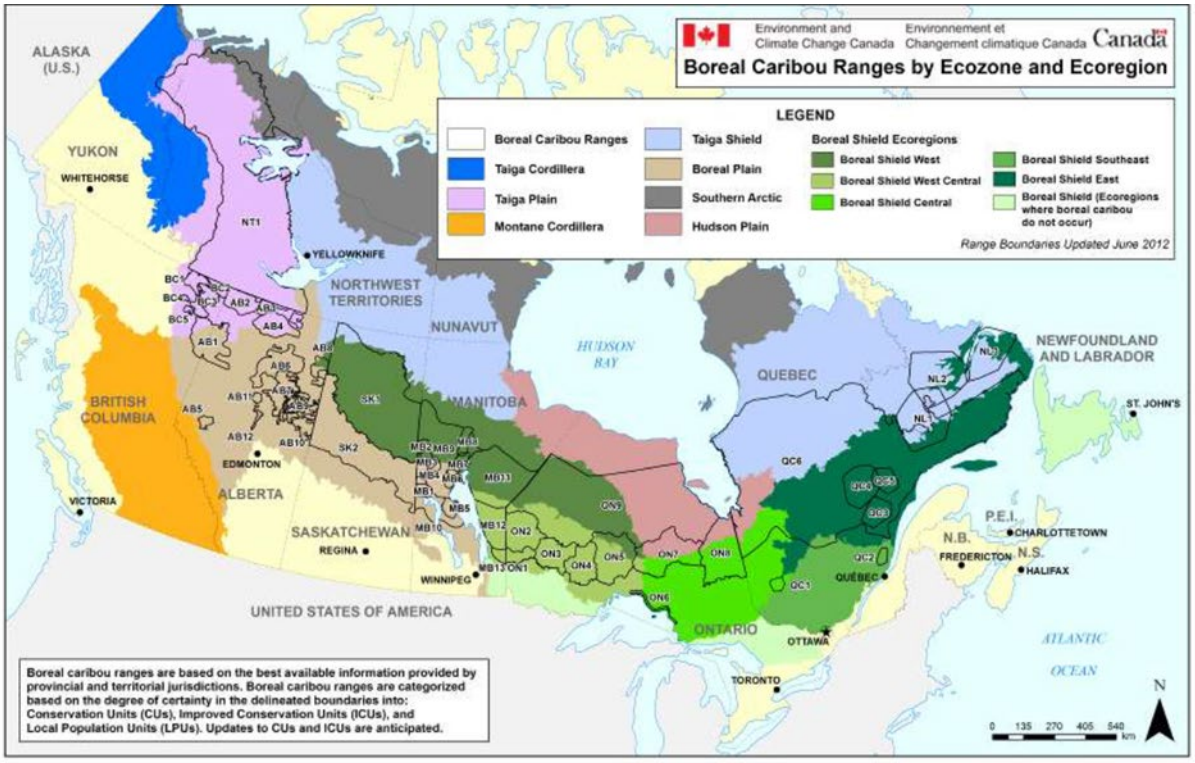


Figure 2-1: Boreal Caribou Distribution Across Ecozones and Ecoregions in Canada (source: ECCC 2020)

The SK1 range comprises more than 18,000,000 hectares (ha) and is characterized by high fire disturbance and low anthropogenic disturbance (ECCC 2020). The likelihood of caribou self-sustainability in the boreal shield range in SK1 is "likely" (ECCC 2020). For SK1, the amended recovery strategy (ECCC 2020) identifies 40% undisturbed habitat in the range as the disturbance management threshold, which provides a measurable probability (71%) for the local population to be self-sustaining. This threshold is considered a minimum threshold because at 40% undisturbed habitat there remains a risk (29%) that the SK1 local population cannot be self-sustaining. Disturbed habitat (ECCC 2020) is habitat showing: i) anthropogenic disturbance visible on Landsat at a scale of 1:50,000, including habitat within a 500 m buffer of the anthropogenic disturbance; and/or ii) fire disturbance in the last 40 years, as identified in data from each provincial and territorial jurisdiction (without buffer). Undisturbed habitat (ECCC 2020) is habitat not showing any: i) anthropogenic disturbance visible on Landsat at a scale of 1:50,000, including habitat within a 500 m buffer of the anthropogenic disturbance; and/or ii) fire disturbance in the last 40 years, as identified in data from each provincial and territorial jurisdiction (without buffer). Disturbance within the 500 m buffer would result in a reduction of the undisturbed habitat.

Studies (e.g., McLoughlin et al. 2019) indicate that the SK1 local caribou population is likely self-sustaining at current levels of disturbance (60% total disturbance), with a 71% probability of persistence. Environment and Climate Change Canada's analyses also indicate that the SK1 local population is sensitive to small increases anthropogenic disturbance and sensitive to small decreases in adult survival. For these reasons, a higher probability of persistence was selected for critical habitat identification in SK1 (71%) than was selected for the other 50 ranges across Canada (60%) (ECCC 2019).

The precise location of the 40% undisturbed habitat within the range is expected to vary over time. The habitat within the SK1 range should exist in an appropriate spatial configuration such that boreal caribou can move throughout the range and access required habitat when needed. The key to this habitat delineation is achieving and maintaining an overall, ongoing range condition that allows for the dynamic habitat supply system, containing the biophysical attributes upon which caribou depend, to remain sustainable. It is this dynamic habitat supply system within the SK1 range that is the habitat condition considered to be necessary for the caribou.

2.3 Indigenous Nations and Communities

Woodland caribou has historically been and continue to be an important part of the culture and diet of Indigenous people in northern Saskatchewan and identified as part of the subsistence harvest by EFRN, and KML. Athabasca Denesųłiné have also described hunting woodland caribou along with Barren-ground caribou and identify deeply with caribou and define their territorial extent with that of the Beverly and Qamanirjuaq caribou ranges. Elders from ERFN have shared that their people have always respected the land and animals and that the tradition to take only what is needed has been passed on through generations (EFRN 2011).

Forest fires are considered the main threat to woodland caribou in the ERFN Traditional Territory. Predators pose a threat as well, but their presence never seemed to have affected the caribou population in the past. In addition, it was pointed out that industry (such as mining and exploration), tourism (in the summer), and hunting by other Indigenous groups may pose additional threats to the caribou population (ERFN 2011).

Knowledge from Indigenous nations and communities will be used to support the management and conservation of caribou in SK1 through the province's range planning process.

3 SK 1 Caribou Population – Background Information

Background information concerning the condition of caribou populations in the SK1 conservation unit is provided below.

3.1 SK1 Conservation Unit

Saskatchewan's boreal woodland caribou range is divided into two woodland caribou conservation units that are based on the boundaries of the boreal ecozones - the Boreal Shield Woodland Caribou Conservation Unit (SK1) and the Boreal Plain Woodland Caribou Conservation Unit (SK2). Per ECCC (2020) information available to delineate boreal caribou ranges varies in certainty and therefore caribou ranges are categorized into three types: conservation units (low certainty), improved conservation units (medium certainty) and local population units (high certainty). ECCC (2020) also recognizes that there will be changes to conservation units and improved conservation units as more information becomes available, which is aligned with the province's range planning work to date in SK2.

While the two conservation units represent important differences in ecological conditions (e.g., habitat types, fire regimes, landforms, etc.) and human land use and management (e.g., overall levels and types of land use, fire management, etc.), the boundary between SK1 and SK2 does not represent a population boundary, as caribou move freely between the two areas, as well as within the individual units.

The Project is located in SK1, with SK1 encompassing the rocky shield, sandy plains and many lakes of northern Saskatchewan. Despite its relatively large size (~176,000 km^2 or 18 million ha), at present the SK1 unit has not been sub-divided into administrative units, as has been the case with SK2 through its range planning process. The province has noted that SK1 is an area with considerable fire disturbance, ecological differences from west to east, and different levels of development.

3.2 Population Trends

3.2.1 Western Science

The SK1 Boreal Shield management unit contains high-quality conifer-dominated caribou habitat with greater than 40-year-old stands of jack pine and black spruce forests suitable for lichen colonization, black spruce swamps, and open muskegs supporting relatively high densities of caribou, at 36.9 caribou/1,000 km^2 or approximately 4,000 caribou across the SK1 Boreal Shield Woodland Caribou Management Unit (McLoughlin et al. 2019).

Research has shown that up to 70% of the year-round diet of caribou may consist of ground and arboreal lichens. If the quantity of available lichen forage is low, caribou can exist without relying entirely on lichens (McLoughlin et al. 2019). Due to their physiology, lichens are resilient to periods of drought and cold temperatures, but because of their slow growth rate, exhibit a slow recovery time after depletion and fire events. In the SK1 range, McLoughlin et al. (2019) found that stand types with the highest potential for adequate lichen biomass for caribou are jack pine and poorly drained black spruce sites.

McLoughlin et al. (2019) observed that, from 2014 to 2018, the caribou population exhibited a high average adult female survival rate and moderate recruitment (0.192 calves per cow in March), ranging from a low of 0.134 calves/cow in March 2016 to 0.244 calves/cow in March 2018. These demographic

parameters led the authors to assess the SK1 boreal shield caribou population as being stable at the time of their study (McLoughlin et al. 2019).

While calving areas have not been documented within the SK1 range, it is recognized that caribou may use open fen and treed bog habitat types for calving during the spring/summer period. In Saskatchewan, caribou habitat used during the calving season in the SK2 range demonstrated a strong selection for treed muskegs, but avoidance of jack pine, mixed hardwood stands, and roads (Dyke 2008).

Neufeld et al. (2021) summarized results from aerial surveys over a period of eight years in an 87,193 km^2 study area in the Athabasca Plain and Churchill River Upland ecoregions in the north, that are inclusive of the Terrestrial Regional Study Areas that were used in the EIS. During 11 of 16 aerial caribou surveys conducted between 2008 and 2015, woodland caribou were detected in the surveyed areas. The average density of the 16 surveys was estimated at 36.9 caribou/1,000 km^2) (95% CI = 26.7 to 47.2 caribou/1,000 km^2). Across the Neufeld et al. (2021) study area and all years, estimated caribou densities were higher in comparison to averages reported for most other boreal woodland caribou ranges in Canada (i.e., caribou density reported in other areas ranged 4.3 to 18.7/1,000 km^2) indicating that caribou can tolerate natural disturbance. One exception to the relatively high caribou densities in northern Saskatchewan was noted: the 2,285 km aerial the Millennium Project in March 2014, 10 km west of the Terrestrial Regional Study Area, resulted in lower woodland caribou densities at 5 caribou/1,000 km2 (Neufeld et al. 2021).

Eight of the sixteen caribou surveys reported the ratios of male to female and calf to female in their results with the average male:female ratio calculated at 0.571 (95% CI = 0.444 to 0.699) and calf:female at 0.195 (0.158 to 0.232). Again, the 2014 Millennium survey reported a different male:female ratio, outside the reported range (1.6), concurring with the reported low caribou densities.

3.2.2 Indigenous and Local Knowledge

Information provided by Indigenous knowledge (IK) holders to Denison as part of the Wheeler River Project EA process generally agrees with the science-based findings that show the population of woodland caribou in northern Saskatchewan is stable; however, some IK perspectives differ from the narrative that holds that caribou populations are stable. The difference in perspectives may stem from changes in distribution, as opposed to density, as caribou alter their movements in response to landscape disturbances.

The ERFN trapper, fisher, and resource harvester (ERFN Trapper), whose ancestral lands overlap with the Wheeler River terrestrial RSA and SK1, shared that they have not observed any changes in woodland caribou numbers (i.e., densities); woodland caribou numbers have remained stable over the years (19 - LK-ERFN Trap-134.156; Denison 2024). The ERFN trapper, fisher, and resource harvester (ERFN Trapper) have also shared that caribou are the most frequently sighted big game between Russell and McDougall lakes, which lie immediately to the east and south of the Wheeler River Project (19-LK-ERFNTrap-134.174; Denison 2024).

Some EFRN Elders have shown concern over woodland caribou populations, worrying that future generations will not experience the same abundance of wildlife that they themselves experienced (EFRN 2011). These concerns partly stem from EFRN observations of changing woodland caribou distribution, which is believed to be influenced by wildfire. According to EFRN Elders, wildfires play a role in calving success and impact caribou distribution and population by disturbing habitat and travel routes. Some Elders have also suggested a decline in caribou populations as a result of these wildfire disturbances (EFRN 2011). Participants in an EFRN traditional knowledge study also shared concerns over the potential decline

of caribou and moose as an effect from increased access leading to more hunting pressure (EFRN and SVS 2022).

3.3 Predation

3.3.1 Western Science

In addition to relatively low predator densities in their study area, McLoughlin et al. (2019) found some spatial separation between caribou and wolves. Caribou did not seem to avoid existing linear features (such as roads, trails, and transmission lines) in the area, while wolves established their territories away from linear features. Unlike caribou, who preferred mature conifer stands, wolves selected for wetlands and patches of deciduous-mixed forest, avoiding stands of mature conifers. Other prey species, such as moose, also occurred at relatively low densities (i.e., 45.7 moose/1,000 km^2) (McLoughlin et al. 2019).

McLoughlin et al. (2019) observed that mortality of adult caribou occurred mostly during the snow-free season and only 1 of 94 collared caribou was harvested by a hunter during the four years of the study.

While predation is believed to be a key limiting factor for woodland caribou (Bergerud 1974; Stuart-Smith et al. 1997, DeMars et al. 2011 from ECCC 2020), Neufeld et al. (2021) suggested that habitat- or disturbance-mediated apparent competition only plays a minor role in the Saskatchewan woodland caribou population. Habitat- or disturbance-mediated apparent competition occurs when natural (e.g., forest fires) and anthropogenic (e.g., human development or activities) disturbances increase the abundance of other ungulates, which in turn may increase predator densities, which then increases predation risk to caribou. Neufeld et al. (2021) concluded that Northern Shield and Taiga ecoregions are of low productivity where caribou may compete with only one ungulate species (i.e., moose) and therefore, caribou and wolf dynamics do not follow general habitat- or disturbance-mediated apparent competition models.

3.3.2 Indigenous and Local Knowledge

The perspective of Indigenous knowledge holders is generally consistent with western-scientific findings that show low impacts of wolf predation on woodland caribou; for instance, EFRN knowledge holders have stated that wolves do act as a predation threat to caribou, but their presence has never caused population declines in the past (EFRN 2011). However, the experiences of some knowledge holders contradict the findings that relate to spatial separation of the two species. The ERFN Trapper has described an increase in trails and roads as more cabins are built in the areas where they typically hunt and trap. According to the ERFN Trapper, trails and roads are used by wolves and caribou alike. As the ERFN Trapper recounts, “wolves travel on bush roads. [I] saw a pack of about 18 wolves recently” (19-LK-ERFNTrap-134.159; Denison 2024). On the other hand, local trappers often see caribou tracks on roads, trails, and hand-cut lines (19-LK-ERFNTrap-134.153; Denison 2024).

The ERFN Trapper believes that wolf populations are increasing, and steps should be taken to curb this growth (21-LK-ERFNTrap-506.2; 21-LK-ERFNTrap-506.3; Denison 2024). One solution put forward was to remediate the extensive network of trails, roads, and cut-lines by blocking access to them (21-LK-ERFNTrap-506.4; Denison 2024). Other IK indicates that wolves are a natural presence on the landscape and not a serious threat to the long-term stability of woodland caribou populations; however, the growing presence of roads, trails, and cut lines poses a potential issue as both caribou and wolves utilize these landscape features, increasing the likelihood of predation opportunities, especially if the wolf population is on an upward trend.

3.4 Harvest

Indigenous peoples in Saskatchewan have an inherent right to harvest woodland caribou for subsistence purposes (ENV 2013). No other harvest of woodland caribou is currently permitted.

Under provincial and federal recovery planning and effective species management, self-sustaining caribou populations will support long-term subsistence use of the species and protect treaty rights. Subsistence harvest levels are assumed to be low but actual numbers are not available because most communities or Indigenous groups are not collecting and/or publishing this information.

The ERFN Country Foods Study (2017), highlights the importance of caribou in the diet of the people of this community. Of the traditional meats harvested by ERFN study participants, woodland caribou was the third most consumed mammal species. The Wheeler River EFRN Traditional Knowledge Study (2022), documented woodland caribou harvesting locations in the study area. Three areas that had been used for woodland caribou hunting in the last ten years were recorded (codes: 1003-10, 1004, 09, 1016-09).

3.5 Overall Status

As noted previously, based on work completed by McLoughlin et al. (2019), which was confirmed by ENV in November 2023 (SK ENV 2023b), the caribou populations in SK1 are stable. The amended federal recovery strategy specifies a unique disturbance threshold of 40% undisturbed habitat for SK1. Habitat disturbance is assessed by the combination of human-caused disturbance (e.g. roads, industrial infrastructure) with a 500 m buffer and wildfire perimeters (less than 40 years old). Based on the federal assessment and recent preliminary disturbance assessment from ENV, an estimated 53% of SK1 is considered disturbed, with 47% undisturbed (ENV 2023b), indicating that the land use and overall disturbance in the conservation unit remains below the recovery strategy disturbance threshold.

4 Mitigation Hierarchy

A generic biodiversity mitigation hierarchy is provided in Figure 4-1. As shown in the hierarchy, an offset can be used to address any residual effects following efforts to avoid, minimize, and restore potential project effects. This generic hierarchy is generally consistent with the approach of ENV to manage effects on caribou and their habitat.

The balance of Section 4 of this Plan outlines Denison's approach to avoid, minimize, and restore caribou habitat per commitments made in the EIS associated with the Project. The discussion of additional management measures through offsetting is provided in Section 5.

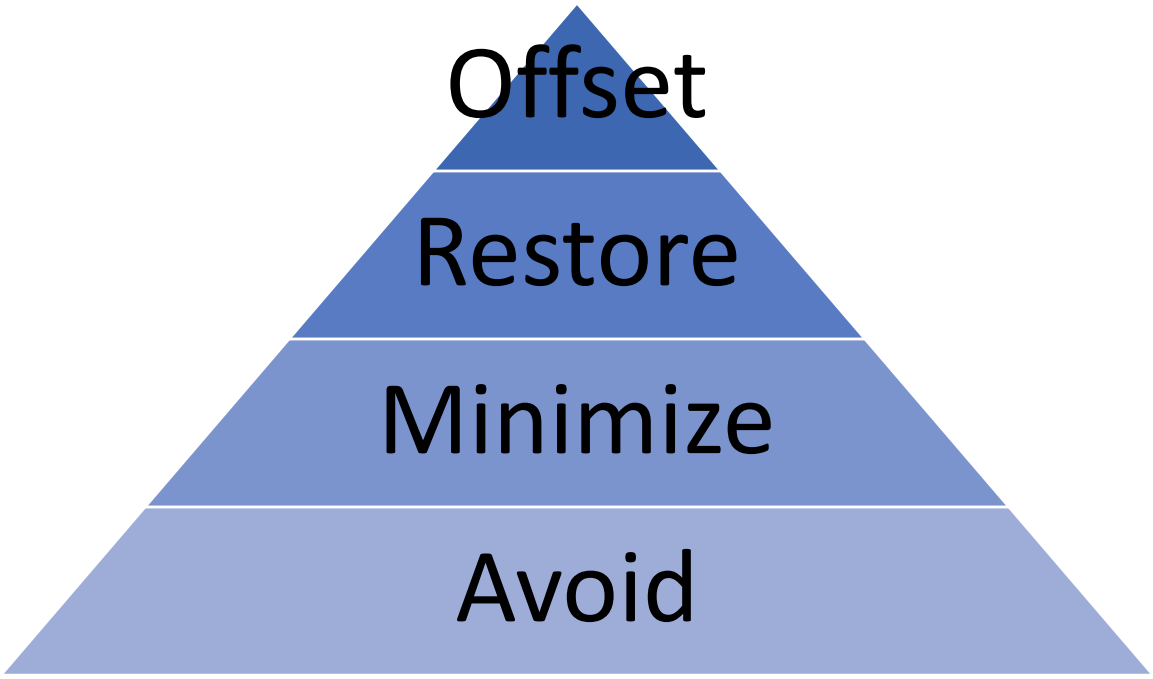


Figure 4-1: Mitigation Hierarchy

4.1 Avoid

Potential adverse effects on the caribou have been avoided to the extent possible through Project design, including:

- Selection of in-situ recovery (ISR) mining avoids some direct and indirect effects compared to conventional underground or open-pit mining methods. In-situ recovery mining avoids the need for spatially expansive infrastructure such as waste rock piles and tailings management facilities reducing the Project footprint (i.e., avoids direct effects on caribou and their habitat). In-situ recovery mining also reduces the potential for interactions between caribou and Project components / activities as it concerns sensory disturbance as it is inherently a less intensive form of mining with reduced noise/light/vibration generation (i.e., avoids indirect effects on caribou and their habitat).
- Site clearing and other works that involve disturbance of vegetation and/or soil will be completed during least-risk timing windows for caribou (for example, outside of

wintering/calving period from April 1-July 31, per ENV 2013), where practical, to avoid disturbance during sensitive time periods.
- Pre-disturbance wildlife surveys will be completed to identify caribou presence and work will be postponed if caribou are present.

4.2 Minimize

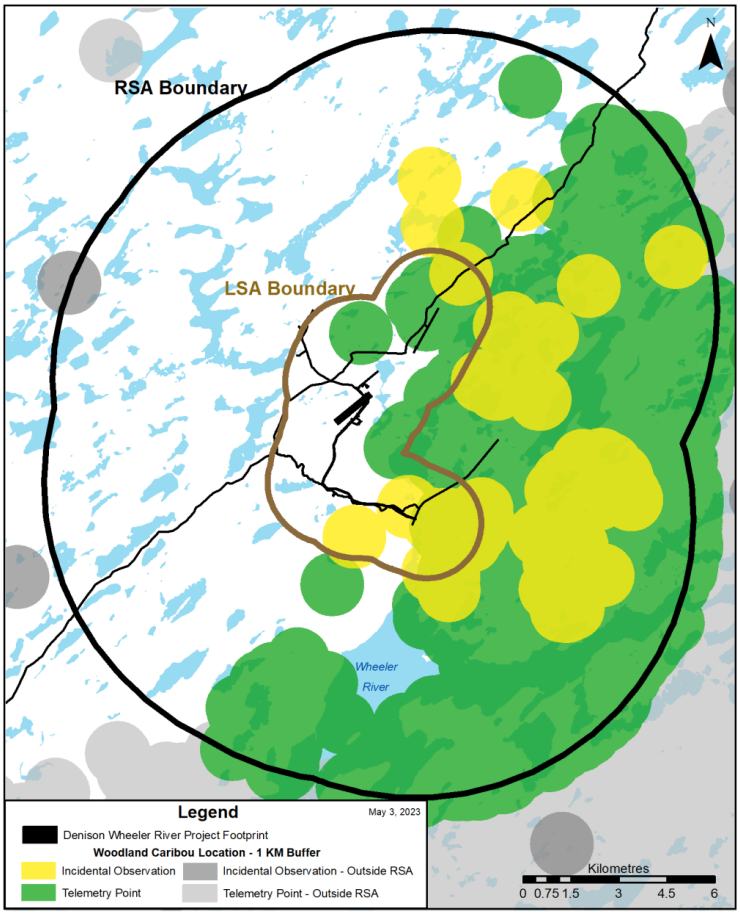
Additional mitigation measures to minimize effects on caribou and their habitat and tailored to Project features have been incorporated into the various Project management and monitoring plans within the Environmental Management System (EMS) including but limited to erosion and sediment controls, soil and vegetation monitoring, Decommissioning Plan, air quality monitoring, fuel spill control and response, Radiation Protection Plan, surface water and effluent monitoring, and Waste Management Plan.

The Project's EMS plans provide direction on monitoring and adaptive management so that if issues are identified, mitigation measures can be developed and implemented in a timely and effective manner. Mitigation measures specific to caribou are applicable during all Project phases, within all seasons and expected to be effective following appropriate implementation. Examples of the measures to minimize Project effects on wildlife in general, and caribou in particular, are highlighted below.

1.1.1 Disturbance Footprint

- Siting Project components in close proximity to the ISR mining area minimizes indirect effects on caribou and their habitat. The Project components are also west of woodland caribou observations from a large-scale caribou collaring program based on tracking data received by the Ministry of Environment (Figure 4-2), although the absence of data does not necessarily mean the absence of caribou and Denison has observed caribou in the area. Appropriate siting is anticipated to minimize the potential for interactions with woodland caribou and Project activities.
- The Project footprint (i.e., the area of maximum physical disturbance) has been reduced to the extent safely practicable, resulting in limited/minimal habitat loss/disturbance and noise propagation.
- Portions of the proposed Project footprint will be developed within previously disturbed areas, including roads currently used for exploration activities, thereby minimizing additional habitat disturbance.

Denison-Wheeler Study Area - Woodland Caribou Location Data



RSA Boundary		
Data Type	**Years**	**Number of Locations**
Incidental Observation	1987, 2017 – 2022	89
Telemetry Point*	2013 – 2016	3,848

*Data from 15 individual woodland caribou cows

LSA Boundary		
Data Type	**Years**	**Number of Locations**
Incidental Observation	2017 – 2022	19
Telemetry Point*	2013, 2015 – 2016	62

*Data from 4 individual woodland caribou cows

NOTE: Absence of data does not mean absence of woodland caribou.

Figure 4-2 Saskatchewan Ministry of Environment Woodland Caribou Location Data Provided to Denison

4.2.1 Wildlife and Habitat Protection

- Project activities have been assessed for their potential to disturb or remove wildlife and/or wildlife habitat (e.g., site clearing, soil disturbance) to determine potential effects on wildlife and wildlife habitat and the assessment, including proposed mitigation measures, for the Project will guide Project activities.
- Pre-disturbance wildlife clearance surveys will be conducted within the Project Area; results of the clearance surveys will inform the development and implementation of appropriate mitigation (e.g., delay of work) to address the identified issue (e.g., presence of caribou).
- Personal firearms for employees and contractors will be prohibited within the Project Area to prevent hunting activities.
- Policies will be implemented prohibiting employees and contractors from feeding, approaching, or harassing wildlife species within the Project Area.
- To support wildlife habitat regeneration, progressive restoration including ecosystem-based revegetation will be conducted on disturbed areas as soon as practicable in accordance with the Decommissioning Plan.

4.2.2 Wildlife Deterrence and Prevention of Wildlife Entrapment

- In addition to installing secure fencing around all contaminated areas to prevent accidental contaminant exposure, buildings and other Project components will be designed and maintained to exclude wildlife from using buildings for refuge or shelter, and to deter wildlife from potentially becoming entrapped.

4.2.3 Sensory Disturbance

- Noise emitting Project activities will be managed to minimize sensory disturbance of wildlife, especially during sensitive time periods, such as calving. This would include:
    - locating excessive noise generating activities such as the concrete batching operation as far away from sensitive wildlife locations as possible;
    - directing the generator discharge openings away from sensitive locations; and
    - making use of available on-site obstructions to control sound exposure at sensitive areas (i.e., locate sources behind buildings).
- The main sources of noise will be related to transport of people and goods, drilling of holes for the freeze wall and wellfield, operation of the batch plant, operation of the processing plant, and operation of the pumphouses. Low sound emission equipment and the use of silencers or mufflers (whenever practical) will be used to reduce noise associated with Project activities. There will be regular maintenance of equipment to ensure it is in proper working order and not emitting noise unduly.
- Lighting will be focused on work sites and not surrounding areas, to minimize light trespass and other light-related pollution sources.
- Facilities will be illuminated only to meet standards set for the protection of workers to avoid over-illumination.
- Battery-powered, light vehicles and mobile equipment, and an AC powered dual rotary drill will be used for ISR wellfield development instead of a traditional diesel-powered unit, where practical, to reduce air emissions and noise levels and improve energy efficiency.

- Fugitive dust sources that could lead to deposition of dust on vegetation and waterbodies (including potential deposition of trace metals and radionuclides) will be reduced by:
    - dust suppression techniques on site roadways, such as road watering and traffic management;
    - directing processing plant exhaust from drying and packaging areas through a stack prior to release outside of the building;
    - designing the stack height based on results of air dispersion modelling to be an appropriate height for optimal dispersion;
    - making a wash bay available to clean items, equipment, and vehicles that may have been in contact with potentially contaminated materials. Contaminated water from the wash bay will be collected in a sump tank and routed to the water treatment plant for treatment and discharge; and,
    - conducting radiological clearance scanning as required for any items, equipment, and vehicles leaving the Project Area.

4.2.4 Transportation Management

- Traffic and access control measures will be implemented, including managing traffic volume by scheduling truck convoys, using high-volume haul trucks, and restricting public access (e.g., private vehicles, snowmobiles, all-terrain vehicles, and foot traffic) to the Project site and roads with both north and south security access gates. It is important to note that if any individual were seeking access around the Project area to undertake Aboriginal and / or Treaty Rights, Denison staff would facilitate this, provided it was safe to do so given Project activities in the area.
- For Project air traffic, as safety allows, planes will be encouraged to use the most direct approach and departure flight paths in order to leave the terrestrial LSA and RSA in an expedient manner.
- The anticipated aircraft traffic at the Project airstrip is expected to include approximately five flights per week during Operation (this was the assumption used in the EIS) and opportunities to optimize the flight schedule will be completed by Denison as the Project advances.
- Denison will operate the airstrip and flights in a safe manner and will also seek to minimize interactions with wildlife by following guidance and best practice from Saskatchewan and other jurisdictions. Mitigation measures likely to be incorporated into the operation of the airstrip, with respect to air traffic, would include, as safety allows, maintaining as direct approach and departure flight paths as possible, and obtaining appropriate altitudes, and leaving the LSA and RSA, as quickly as is safely reasonable. Flight paths can be adjusted based on the location of caribou observations or known important areas during sensitive periods, as is safe and practical to do so. Details related to airstrip and flight management will be developed as part of Project licensing and permitting.
- Appropriate road signage will be installed (e.g., speed limits, identification of wildlife crossings and areas of high activity) along Project roads to minimize the risk of wildlife-vehicle collisions.
- Speed limits will be implemented to reduce the risk of wildlife-vehicle collisions.
- Wildlife will have the right-of-way on Project roads, unless it is unsafe to stop (i.e., if a collision is imminent). Vehicles will not be used to encourage caribou to move off Project roads and processes will be implemented for employees and contractors to slow down and/or stop

vehicles/equipment to allow caribou to move away or off the road before resuming normal road speeds for the area.

- Road watering and regular road maintenance to limit dust dispersion.
- Employees and contractors will report and communicate the location and circumstances of any roadkill observed on or alongside Project roads. Large-bodied wildlife carcasses found will be promptly reported to ENV and disposed of as directed to prevent scavenging.
- Vegetation along Project roads will be managed to reduce attractiveness to wildlife (e.g., forage plants) and maintain appropriate sightlines for drivers to minimize wildlife-vehicle collisions.
- Alternative measures on Project roads for de-icing and winter traction (e.g., sand, gravel) or dust suppression (e.g., water) will be implemented, whenever practicable, to limit the use of specialty chemicals and potential exposure of wildlife including caribou to them.
- Appropriately sized gaps in the roadside snowbanks during winter will be maintained to facilitate caribou crossing and escape and, with that, reducing their risk of vehicle collisions.
- New Project site and access roads will be designed to minimize sightlines for predators, whenever practicable, while still maintaining general road safety.
- Ditches and culverts along Project roads will be designed and maintained to minimize pooling of water as roadside pools may attract caribou.

4.2.5 Water Management, Waste Management, Emissions, and Hazardous Materials Management

- Education on and enforcement of proper water, waste, emissions and hazardous materials management practices will be provided to employees and contractors.
- A freeze wall will be established around the uranium deposit to reduce potential for groundwater disturbance or contamination mitigating the likelihood of exposure of caribou to contaminants in local areas of groundwater discharge to surface.
- The ISR wellfield and processing plant will be designed to re-use most of the solutions inside each circuit, reducing water use requirements to the extent feasible. Make-up water will be preferentially sourced from site runoff (instead of freshwater) where possible.
- Contaminated wastes (e.g., mineralized drill cuttings, process precipitates) will be temporarily stored on double lined pads with leak detection capabilities and an associated monitoring program until final disposal at an approved facility. An adjacent pond will be used to collect contact water from these pads.
- All contact water will be routed to the Industrial Wastewater Treatment Plant for treatment and eventual release to the environment. All treated effluent released to surface water will meet federal and provincial regulatory discharge limits. This will mitigate exposure of caribou to Project-related contaminants released to the environment.
- Surface pipelines will be designed to have secondary containment or catchment and have leak detection systems in place at key locations to mitigate the likelihood of the release of such chemicals to the environment that could result in exposure of caribou to the chemicals.
- Double-walled high-density polyethylene or equivalent piping will be used in the wellfields and will be freeze protected and secured to minimize pipe movement to mitigate the likelihood of the piping failure and the associated release of wellfield chemicals to the environment that could result in exposure of caribou to the chemicals.

- Denison is proposing to segregate and compost organic wastes on site in a composting system, reducing the volume of material in the domestic landfill generating odours and thereby minimizing wildlife attractants.
- Domestic waste will be collected and temporarily stored in wildlife-proof containers to avoid attracting wildlife and reduce the risk for human-wildlife interactions. The wildlife-proof containers will be inspected regularly for evidence of wildlife presence or access to waste disposal facilities. If evidence of wildlife presence or access to waste disposal facilities is detected, modified systems will be implemented and/or off-site waste disposal/incineration frequencies will be increased.
- A "no littering policy" for employees and contractors will be implemented within the Project Area.
- Air emissions will be reduced to the extent practical through implementation of the development of air emissions management and monitoring plans within the EMS.
- All vehicles and equipment will be equipped with industry-standard emission control systems; unnecessary idling of vehicles will be prohibited to reduce emissions.
- The use of hazardous materials will be limited as much as possible.
- Appropriate hazardous materials management practices will be implemented in accordance with industry guidelines to minimize the risk of accidental spills or leakage. This will mitigate the likelihood of release to the environment that could result in exposure of caribou to the hazardous materials.
- Hazardous materials will be handled, stored, and disposed of appropriately and in accordance to avoid attracting wildlife (e.g., wildlife-proof containers, exclusion fencing) to mitigate the likelihood of exposure of caribou to hazardous materials.
- Physical deterrents (e.g., fencing) will be employed around contaminated areas (e.g., waste ponds and waste pads), the domestic landfill, or hazardous materials storage areas to discourage wildlife use / interaction. The deterrents will be monitored and maintained .
- Appropriate spill response kits will be positioned adjacent to areas where hazardous materials are stored in accordance with the Spill Response Plan to mitigate the likelihood of the release of hazardous material to the environment that could result in exposure of caribou to the material.
- A minimum 100 m distance from any waterbody will be maintained for fuel storage, refueling activities, or equipment servicing in accordance with the Spill Response Plan. This will mitigate the likelihood of a fuel spill to water that could result in exposure of caribou to fuel.
- Appropriate fuel, chemical, and materials management practices will be followed in accordance with the Spill Response Plan to minimize the risk of accidental spills or leakage of diesel fuel, other hydrocarbons, and other hazardous materials and mitigate the likelihood of exposure of caribou to such chemicals.
- All vehicles and equipment will be maintained in good working condition (e.g., no leaks) and furnished with industry-standard spill response kits.

1.1.2 Wildlife Education

- Employees and contractors will be provided with wildlife education and awareness training, including education about potential caribou issues on site and training on the mitigation measures summarized with the EMS and specifically in this Plan to avoid or minimize potential Project effects on caribou and caribou habitat.

- Employees and contractors will be educated on waste and hazardous waste management practices / policies that limit human-wildlife interactions and the potential exposure of wildlife to those wastes.
- Designated employees will be trained in appropriate wildlife deterrent techniques to minimize wildlife interactions with the Project.
- Employees and contractors will be requested to report wildlife observations, including prompt reporting of caribou observations and immediate communication to on-site staff. Wildlife encounters and outcomes will be monitored, and logbooks will be used to record wildlife observations. Logbooks and reports will be available to employees. Incidental observations recorded by staff will be entered into Species Detection Loadforms and submitted to the Saskatchewan Conservation Data Centre annually.

4.3 Restore

The temporal bounds for the Project as stated in the EIS are years 1 to 3 for construction, years 3 to 18 for operation, years 18 to 23 for decommissioning, and fifteen years of post-decommissioning monitoring and inspections from years 23 to 38. Importantly, during physical decommissioning (years 18 to 23) the majority of Project components are scheduled to be removed from site which is expected to facilitate restoration activities. Also, because of the selected ISR mining method, there are no large, permanent Project components, such as waste rock piles or tailings management facilities, for which large scale and potentially complex restoration strategies are needed.

Denison's decommissioning commitment is to return the land back to the Province of Saskatchewan for unrestricted surface land use post-closure. The Project's Conceptual Decommissioning Plan (CDP) is included in the final EIS. The details of decommissioning and restoration will be refined over time as the Project proceeds. A Preliminary Decommissioning Plan will be developed by Denison to support licensing and permitting applications. Prior to executing decommissioning activities, Denison will prepare and submit a Detailed Decommissioning Plan to regulators for their review and acceptance, which builds on the Preliminary Decommissioning Plan.

The CDP outlines plans for physical decommissioning (mining area remediation; asset removal; and decontamination, demolition, and disposal), followed by restoration. A summary of the CDP is provided here.

- Ongoing decommissioning of Project components will be completed when possible.
- Denison has committed to progressively restore areas no longer necessary to support/facilitate Operations to limit the amount of disturbance at any given time. Restoration of inactive areas will take place when/as these areas become available. The progress and success of these activities will be assessed regularly at a schedule commensurate with the expectations of the activities per the decommissioning plan. Progressive restoration including ecosystem-based revegetation will be conducted on disturbed areas as soon as safely and logistically practicable with the use of suitable/appropriate native species and in accordance with the decommissioning plan.
- Once the asset removal, decontamination, demolition, and disposal are completed, and the site has been cleared and leveled, restoration activities, including planting, will take place. Currently this would largely be with jack pine seedlings, but the mix of plants will depend on location and available species. Restoration activities monitored until it is deemed self-sustaining and viable wildlife habitat.

- Future discussions will be held with Indigenous and general public Interested Parties to determine the amount of access to the area they wish to maintain in the future (post-decommissioning). Based on results of these discussions, transportation corridors including roads or trails associated with the Project site that are no longer needed will be graded, scarified, and vegetated with native, self-sustaining species as required. Access to facilitate safe post-closure monitoring or requested by appropriate Interested Parties (e.g., to facilitate land use) may be left in place. Access to the site may be restricted by gates and/or berms.
- Laydown areas will be scarified, covered with 0.5 to 1.0 m of stockpiled overburden, and vegetated with native, self-sustaining species. The footprints of other infrastructure, such as the camp, will be scarified and vegetated with native, self-sustaining species as required. The goal of revegetation would be to restore the site to former state, or something similar including tree cover, to the extent possible. The topsoil and brush stockpiled during pre-construction activities will be used during restoration.
- Lessons learned from progressive decommissioning and any site-specific restoration studies will be incorporated into the Detailed Decommissioning Plan. Additionally, information from other northern Saskatchewan mine sites will be examined to help Denison select the restoration tools, including revegetation options, which will contribute towards decommissioning success.

Closure of the entire Project will be completed in accordance with provincial and federal regulations and guidance documents with the fundamental considerations being to confirm physical and chemical stability of the site to protect human health and the environment.

Progressive decommissioning and restoration will be completed throughout the life of the Project, whenever feasible, and reported to the regulatory agencies as part of the annual reporting requirements throughout Operation. Associated activities will focus on the decontamination, demolition, and disposal of unused buildings and infrastructure, as well as the removal of unused equipment and machinery. Progressive decommissioning and restoration are expected to continue and result in positive effects as revegetation is continued and regeneration occurs. Following decommissioning and restoration, wildlife habitat is expected to recover to baseline conditions.

5 Additional Caribou Management Measures

As part of its boreal caribou management efforts, the province is working with industry to develop effective and practical approaches to mitigate potential effects of activities on woodland caribou. To this end, the province describes a hierarchy of controls for caribou habitat management. The final element of this hierarchy of controls is termed offset, whereby restoration of habitats outside the project footprint are used to "offset" for project footprint effects where such footprint effects render a given area as unavailable to be functional habitat for an extended time period.

The ENV is developing a boreal caribou habitat offset calculator to address the above-referenced situation. The calculator's objective is to consistently estimate and calculate appropriate offset requirements for applicable developments. The calculator recognizes that there are a number of key variables influencing both habitat loss and habitat gain calculations. As such, the following key concepts have been integrated into the calculator:

1. **Not all projects are created equal**

   Different types of projects/activities/footprints on the landscape have different potential effects on caribou habitat.

2. **Reach of effects**

   A project's total effect on caribou habitat and associated habitat offset needs to integrate both direct and indirect (zone of influence) concepts. The total project effect includes the area of direct disturbance plus the surrounding indirect effects (Zone of Influence). Similarly, the total offset includes direct habitat gain or restoration plus indirect habitat benefits.

3. **Location matters**

   The location of the project/activity/footprint has different effects on caribou, based on habitat value. Similarly, the location of the offset has different benefits for caribou when habitat value is factored in.

In consideration of these key concepts, the calculator aims to balance functional habitat that is disturbed or removed with restored functional habitat. Through habitat loss and gain calculations, the calculator estimates habitat offset requirements for a project footprint, expressed as an equivalent length/area of linear features. In SK1 and SK2, legacy roads and trails are expected to be the primary candidate features for habitat offsets and restoration activities. It is also noted that the estimated cost to deliver the required offset is calculated. As an optional mechanism for proponents, Saskatchewan is working to establish a mechanism for in-lieu mitigation payments such that the province can allocate resources based on its caribou habitat restoration priorities.

Through refinements to our final project design, Denison is committed to continue working with the province to finalize our habitat offset requirement using the province's habitat offset calculator.

6 References

Denison Mines Corp. (Denison). 2024. Wheeler River Project. Final Environmental Impact Statement. July 2024.

English River First Nation (ERFN). 2011. English River First Nation: English River First Nation, ATK (Aboriginal Traditional Knowledge) Summary Report. Compiled by Environment Canada.

English River First Nation (ERFN) and Shared Value Solutions (SVS). 2022. Wheeler River Project – Summary of Traditional Knowledge Study Results – English River First Nation. Prepared for English River First Nation. March 2022.

Environment Canada. 2011. Scientific Assessment to Inform the Identification of Critical Habitat for Woodland Caribou (Rangifer tarandus caribou), Boreal Population, in Canada: 2011 Update. Ottawa, ON. 102pp. plus appendices.

Environment and Climate Change Canada (ECCC). 2019. Boreal Caribou Science to Inform Recovery: Science Summary Sheet #1. Ottawa, Ontario, Canada. 10p.

Environment and Climate Change Canada (ECCC). 2020. Amended Recovery Strategy for the Woodland Caribou (Rangifer tarandus caribou), Boreal Population, in Canada. *Species at Risk Act* Recovery Strategy Series. Environment and Climate Change Canada, Ottawa. xiii + 143pp.

McLoughlin, P. D., C. Superbie, K. Stewart, P. Tomchuk, B. Neufeld, D. Barks, T. Perry, R. Greuel, C. Regan, A. Truchon-Savard, S. Hart, J. Henkelman, and J. F. Johnstone. 2019. *Population and habitat ecology of boreal caribou and their predators in the Saskatchewan Boreal Shield*. Final Report. Department of Biology, University of Saskatchewan, Saskatoon. 238 pp.

Neufeld, B., C. Superbie, R. J. Greuel, T. Perry, P. A. Tomchuk, D. Fortin, and P. D. McLoughlin. 2021. Disturbance-Mediated Apparent Competition Decouples in a Northern Boreal Caribou Range. *The Journal of Wildlife Management* 85(2): 254–270.

OECD. 2016. Biodiversity Offsets: Effective Design and Implementation. OECD Publishing, Paris. https://doi.org/10.1787/9789264222519-en

Saskatchewan Ministry of Environment (ENV). 2013. Conservation Strategy For Boreal Woodland Caribou (Rangifer tarandus caribou) in Saskatchewan. Saskatchewan Ministry of Environment. Fish and Wildlife Technical Report 2014.

Saskatchewan Ministry of Environment (ENV). 2021. Range Plan for Woodland Caribou in Saskatchewan. Boreal Plain Ecozone – SK2 West Caribou Administration Unit. October 2021.

Saskatchewan Ministry of Environment (ENV). 2023a. Wildlife Species At Risk – Woodland Caribou. https://www.saskatchewan.ca/business/environmental-protection-and-sustainability/wildlife-and-conservation/wildlife-species-at-risk/woodland-caribou (accessed May 2023).

Saskatchewan Ministry of Environment (ENV). 2023b. Woodland Caribou in the Boreal Shield (SK1): Background Information.