



Mitigation Measures and Guidelines for Seismic Exploration Programs in the Boreal Plain (SK2) Caribou Conservation Unit

November 2025

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Cover photo provided by the Canadian Association of Geophysical Contractors.

1 Overview

Saskatchewan's Range Plans for Woodland Caribou¹ outline the province's landscape management approach to achieving and maintaining self-sustaining caribou populations, while acknowledging Traditional land use and allowing for continued economic activity in northern Saskatchewan. Northern industries are playing key roles in achieving self-sustaining caribou populations in Saskatchewan by planning and implementing projects and programs with these outcomes in mind.

This document provides direction on planning mitigation measures for woodland caribou during seismic exploration activities² on provincial Crown resource land in the Boreal Plain (SK2) Caribou Conservation Unit, regulated pursuant to *The Mineral Resources Act, 1985*, *The Seismic Exploration Regulations, 1999*, *The Provincial Lands Act, 2016*, and *The Crown Resource Land Regulations, 2019*.

The objective of mitigation planning for woodland caribou is to avoid or minimize direct and indirect effects of project activities on woodland caribou and woodland caribou habitat. To support this objective, mitigations should aim to achieve the following outcomes:

- Avoid or minimize direct habitat loss from industrial activity, including the overall contribution to cumulative disturbance;
- Avoid or minimize habitat alteration, degradation, and fragmentation resulting from industrial activities to maintain the function and connectivity of woodland caribou habitat;
- Avoid or minimize sensory disturbance to woodland caribou associated with industrial activities, especially during the most sensitive periods; and
- Minimize linear feature density and lines of sight associated with industrial activities to avoid potential increases in predator efficiency and human access.

Proponents must follow the direction in this document when preparing and submitting permit applications to the Ministry of Environment (ENV) for proposed seismic exploration projects in SK2.

Proposed mitigations will be evaluated during normal environmental review of permit applications. Mitigation commitments in applications will be included as conditions of approval in the authorizations and/or permits issued for projects.

2 Woodland Caribou Range and Habitat Management Area Tiers in Saskatchewan

Saskatchewan's woodland caribou range is divided into two caribou conservation units, generally based on the boundaries of the boreal ecozones: the Boreal Shield (SK1) Caribou Conservation Unit in the north and the Boreal Plain (SK2) Caribou Conservation Unit in the south (Figure 1).

¹ Saskatchewan Ministry of Environment. 2019. *Range Plan for Woodland Caribou in Saskatchewan: Boreal Plain Ecozone, SK2 Central Caribou Administrative Unit*. Saskatchewan Ministry of Environment, Regina, SK. 90 pp. Available at: <https://publications.saskatchewan.ca/api/v1/products/101694/formats/112399/download>

Saskatchewan Ministry of Environment. 2021. *Range Plan for Woodland Caribou in Saskatchewan: Boreal Plain Ecozone, SK2 West Caribou Administrative Unit*. Saskatchewan Ministry of Environment, Regina, SK. 109 pp. Available at: <https://publications.saskatchewan.ca/api/v1/products/103593/formats/114947/download>

Saskatchewan Ministry of Environment. 2021. *Draft Range Plan for Woodland Caribou in Saskatchewan: Boreal Plain Ecozone, SK2 East Caribou Administrative Unit*. Saskatchewan Ministry of Environment, Regina, SK. 90 pp.

² Seismic exploration is defined as the use of artificially generated seismic waves for any of the following purposes: searching for minerals, oil or gas; defining geological formations; conducting engineering studies for the purpose of obtaining geological data (Government of Saskatchewan, *The Seismic Exploration Regulations, 1999*).

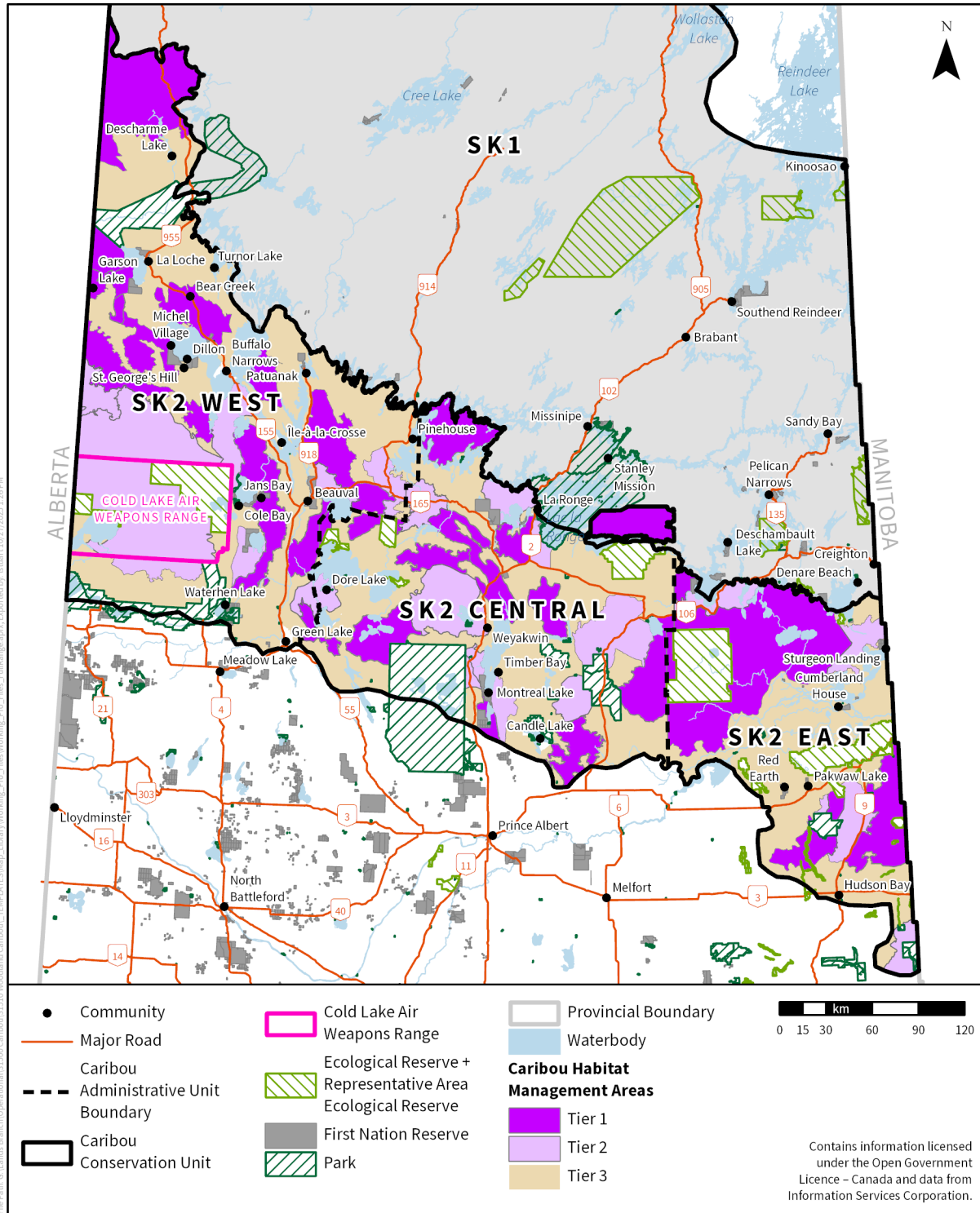


Figure 1. SK2 (Boreal Plain) Caribou Conservation Unit in Saskatchewan. SK2 is subdivided into three caribou administrative units (SK2 West, SK2 Central and SK2 East). Three tiers of caribou habitat management areas have been identified in the SK2 range plans.

The SK2 range is further divided into three caribou administrative units. The SK2 range plans identify three caribou habitat management area (CHMA) tiers:

- **Tier 1:** areas of high to moderate caribou habitat potential with high levels of observed caribou use and low levels of human-caused disturbance. Tier 1 areas are managed primarily to avoid habitat disturbance.
- **Tier 2:** areas of high to moderate caribou habitat potential with observed caribou use and higher levels of wildfire and human-caused disturbance than in Tier 1 areas. Tier 2 areas are managed to minimize habitat disturbance in coordination with industry and land users and to restore habitat.
- **Tier 3:** areas of caribou habitat between Tier 1 and Tier 2 areas that provide general habitat and landscape connectivity. Tier 3 areas are managed to maintain connectivity across the landscape.

2.1 Data availability

Information to support project planning in relation to woodland caribou mitigation includes the following:

Caribou Habitat Management Areas:

- The spatial data layers of CHMAs in SK2 West, Central and East are available for download from the [Saskatchewan GeoHub](#).
- These data layers can also be viewed on [HABISask](#) and are provided as part of the HABITools report function (users must be signed in to view this information).

Woodland caribou habitat potential:

- Woodland caribou habitat potential is defined by Boreal Plain and Boreal Shield ecosites³. Generally, high potential caribou habitat includes sandy jack pine/lichen and black spruce treed bog ecosites.
- The spatial data layer of woodland caribou habitat potential in the Boreal Plain (SK2) is available for download from the [Saskatchewan GeoHub](#) and available for review on [HABISask](#).

Woodland caribou documented occurrences:

- Generalized woodland caribou occurrence information, compiled from surveys (including telemetry and fecal pellet collections) and incidental observations, is available as a spatial data layer package for download from the [Saskatchewan GeoHub](#) and available for review on [HABISask](#).

3 Mitigation Planning Approach

These guidelines use the CHMA tiers as a spatial risk framework (Figure 1). Risks to woodland caribou and woodland caribou habitat are considered greatest in Tier 1 CHMAs, where there is high habitat potential, historical and recent observations of woodland caribou, and low levels of disturbance. Therefore, the mitigation measures and guidelines emphasize avoidance and minimization of potential impacts to woodland caribou and their habitat in Tier 1 areas. The ministry recommends that seismic exploration activities be conducted outside of Tier 1 CHMAs to the greatest extent possible.

The mitigation standards and guidelines also emphasize avoidance or minimization of sensory disturbance to woodland caribou, especially pregnant or lactating cows and calves, during the sensitive timing window for woodland caribou in Saskatchewan, which is April 1 to July 31. During this period, female caribou and calves are most vulnerable to disruptions in movement patterns, habitat use and foraging that can alter predation risk and affect energetic balances, which may result in additional mortality.

³ McLaughlan, M.S., Wright, R.A., and Jiricka, R.D. 2010. Field guide to the ecosites of Saskatchewan's provincial forests. Saskatchewan Ministry of Environment, Forest Service. Prince Albert, SK. 343 pp. Available at: <https://publications.saskatchewan.ca/#/products/31663>

Proponents are encouraged to undertake engagement with potentially affected stakeholders and Rightsholders on all components of the project, including mitigation measures for woodland caribou and caribou habitat. The Government of Saskatchewan's [Proponent Handbook – Voluntary Engagement with First Nations and Métis Communities to Inform Government's Duty to Consult Process](#) provides additional guidance to proponents. Relevant information and documentation from early engagement and outreach efforts by the proponent will inform the government's duty to consult process and help manage project timelines.

3.1 Standard Mitigation Measures

These guidelines define **standard mitigation measures** for each CHMA tier that reflect the key management strategies described in the range plans, including avoidance, minimization, access management and restoration, applied to seismic exploration activities in SK2. These standard mitigation measures provide increased certainty to both proponents and regulators as to how to meet the ministry's expectations for mitigation of potential impacts to woodland caribou in planning and executing seismic exploration projects.

Proposed projects that implement the standard mitigation measures will not be further reviewed by the ministry for woodland caribou-related concerns. The standard mitigation measures will be referenced as conditions of approval in ministry authorizations and/or permits. In most cases, the standard mitigation measures align with approaches taken in adjacent jurisdictions (e.g. the Requirements for Geophysical Exploration in the Cold Lake Sub-Regional Plan⁴).

The tables in *Appendix A* describe standard mitigation measures, organized by CHMA tier, for seismic exploration programs occurring in SK2. Whenever practicable, proponents are encouraged to follow the woodland caribou mitigations described for Tier 1 and 2 CHMAs while operating in Tier 3 areas.

Proposals for seismic exploration activity in Tier 1 CHMAs may be subject to additional review by the ministry for potential overlap with a subset of areas deemed critical for woodland caribou conservation. Projects that pose a risk of adversely affecting caribou or caribou habitat in these areas may not be approved under the standard mitigation measures in *Appendix A*. To avoid proposal re-submission and potential permitting delays, it is recommended that proponents engage in advance with the relevant ministry Land Management and Permitting Region⁵ for projects in Tier 1 habitat to determine if a non-standard mitigation plan will be required.

3.2 Non-Standard Mitigation Plans

If an alternative mitigation approach is preferred that can better achieve the intended outcome of the standard mitigation measures, or if a proponent prefers to not implement all standard mitigation measures for a proposed project in SK2, a non-standard mitigation plan shall be submitted as part of the project permit application. A non-standard mitigation plan will describe how the standard measures were considered and will identify alternative mitigation measures that will achieve the desired result for woodland caribou and their habitat. Non-standard mitigation measures are only required for those components of the proposed project that do not implement the standard mitigation measures.

Non-standard mitigation plans will be reviewed by the Ecological Management Specialist (EMS) assigned to the project (with support from other ministry staff) as part of the project environmental review process. Additional information and/or revisions to the non-standard mitigation plan may be requested by the

⁴ Government of Alberta. 2022. *Cold Lake Sub-Regional Plan*. Alberta Environment and Parks. Available at: <https://open.alberta.ca/publications/cold-lake-sub-regional-plan>

⁵ Ministry of Environment Land Management and Permitting Region boundaries and contact information is available at Sask Interactive Mapping: <https://gisappl.saskatchewan.ca/Html5Ext/index.html?viewer=saskinteractive>.

ministry prior to approval. Commitments made in the finalized non-standard mitigation plan will form part of the permit conditions associated with the project approvals issued by the ministry.

Non-standard mitigation plans should consider the following:

- Reasonable and prudent mitigation measures that support the desired objectives for woodland caribou and their habitat.
- Alignment with the mitigation intentions identified in the standard mitigation measures table (*Appendix A*).
- The mitigation hierarchy:
 - Avoid project impacts by changing the timing or location of project activities; then
 - Minimize project impacts by changing how or where activities are conducted; then
 - Restore habitat impacted by a project (as a form of minimization).
- Offsetting (compensating for project impacts elsewhere) is generally not considered suitable for seismic exploration programs and may only be considered in rare cases.
- Effort for planning and carrying out the plan should be proportional to the timing, scope, and scale of the proposed activities that fall outside the standard mitigation measures.

Acceptance of the mitigation measures proposed in the non-standard mitigation plan will be at the discretion of the EMS who reviews the permit application package.

For seismic programs, it is anticipated that mitigation planning for woodland caribou would be addressed in the relevant sections of project proposals submitted to the Ministry of Environment to obtain authorization for conducting work on Crown resource land. An optional *Woodland Caribou Mitigation Plan Template for Seismic Exploration Programs in the Boreal Plain (SK2) Caribou Conservation Unit* is also available as a companion document. The template outlines the expected components of a non-standard mitigation plan and includes examples of possible alternative mitigation measures for various project components. Proponents may choose to use the template, or they may clearly provide the required information elsewhere in their project proposals.

APPENDIX A – Standard Mitigation Measures for Seismic Exploration Programs in SK2

Table A.1. Standard Mitigation Measures for Seismic Exploration Programs in the SK2 Caribou Conservation Unit: Tier 1 and Tier 2 Caribou Habitat Management Areas.⁶ (page 1 of 3)

Project Component	Standard Mitigation Measures: Tier 1 and Tier 2 Caribou Habitat Management Areas
1. Operating Period	<p>INTENT: Avoid sensory disturbance to caribou, especially pregnant or lactating females with calves, during the sensitive timing window.</p> <p>a. Conduct all project activities outside the sensitive timing window for woodland caribou (April 1 – July 31).</p> <p>i. Winter project demobilization activities initiated before April 1 may be completed in the sensitive timing window.</p>
2. Access	<p>INTENT: Avoid or minimize direct habitat loss, alteration and fragmentation and linear feature density resulting from new ground access.</p> <p>a. Only existing ground access in combination with helicopter access, if necessary, will be used.</p> <p>i. Existing ground access is defined as linear disturbance on the landscape from previous activities where tree/shrub growth does not exceed 2 m in height (excluding where scarification/reforestation/re-vegetation or access control via tree felling or hinging has occurred).⁷</p> <p>ii. Maintenance of existing ground access is permitted if it does not widen or change the route of the access. Slash or mulch generated by maintenance activities must be redistributed along the access prior to permit expiry.</p> <p><u>Additional guidance:</u></p> <ul style="list-style-type: none"> • Limit snow plowing of access roads to only those required for current operations or maintenance and/or emergency access. • Where existing access is re-opened with a mulcher or other mechanical clearing method and where trees are sufficiently tall (>2 m), tree felling/hinging treatments should be applied at intersections with existing linear features >3.5 m wide to deter wildlife and human access. Treatments should extend the length of the access that was re-opened or to 100 m, whichever is less.
3. Clearing	<p>INTENT: Avoid or minimize direct habitat loss and alteration resulting from new clearings.</p> <p>INTENT: Minimize direct habitat loss and alteration through reclamation of new clearings.</p> <p>a. Clearing size for helicopter pads will not exceed 900 m².</p> <p>b. Helicopter pads will be hand cut; no mechanized clearing will be conducted on helicopter pads.</p> <p>c. New clearing associated with staging areas will not exceed 0.5 ha.</p> <p>d. Mechanized clearing/mulching for staging areas will only be conducted on dry or frozen ground.</p> <p>e. No other clearing is permitted, except line cutting as specified under “Line Cutting” and existing access maintenance as specified under “Access”.</p> <p>i. Clearing for temporary work camps, etc. may be considered under a non-standard mitigation plan.</p> <p>f. Reclamation for new clearings, such as helicopter pads or staging areas, will be completed prior to permit expiry.</p> <p>i. Reclamation will consist of rolling back coarse woody debris and snow and redistributing stockpiled slash over the clearing, where material is available.</p> <p>ii. Reclamation is not required if clearing was conducted with a mulcher.</p> <p>iii. Reclamation is not required if it would present significant safety concerns.</p>

⁶ Proposals for seismic exploration activity in Tier 1 CHMAs may be subject to additional review by the Ministry of Environment for potential overlap with a subset of areas deemed critical for caribou conservation. Projects that pose a risk of adversely affecting caribou or caribou habitat in these areas may not be approved under the standard conditions and mitigations in this table. An Ecological Management Specialist will advise the proponent if a non-standard mitigation plan is required in this case.

⁷ Adapted from the Alberta definition of “Existing Linear Disturbance” (Government of Alberta. 2020. Alberta Public Lands Glossary of Terms. Alberta Environment and Parks).

Table A.1. Standard Mitigation Measures for Seismic Exploration Programs in the SK2 Caribou Conservation Unit: Tier 1 and Tier 2 Caribou Habitat Management Areas (page 2 of 3)

Project Component	Standard Mitigation Measures: Tier 1 and Tier 2 Caribou Habitat Management Areas
Clearing (continued)	<p><u>Additional guidance:</u></p> <ul style="list-style-type: none"> • Locate helipads and staging areas in existing locations or natural openings, where possible, to avoid new clearing or minimize the area cleared. • Locate new clearings outside of high potential woodland caribou habitat, where possible. • Minimize impacts to terrestrial lichen in moderate and high potential woodland caribou habitat by conducting activities on top of an adequate snowpack (e.g. >30 cm thick), where possible. • Elevate mulcher drums as high as practical (above the tops of hummocks at minimum) to preserve seedlings and conditions suitable for tree development. • Ensure mulch thickness does not impede the natural regeneration of tree species on cleared areas.
4. Line Cutting	<p>INTENT: Avoid or minimize direct habitat loss, alteration and fragmentation resulting from line cutting. INTENT: Minimize lines of sight associated with receiver and source lines. INTENT: Minimize direct habitat loss and alteration through reclamation of new receiver and source lines.</p> <ol style="list-style-type: none"> a. Receiver lines will be meandering and use tree avoidance techniques. b. Receiver lines will not exceed 1.75 m wide unless required to minimize total project source line access or for emergency preparedness. <ol style="list-style-type: none"> i. Widened receiver lines will not exceed 2.75 m. c. Source lines will not exceed 2.75 m wide, except for clearings required for equipment turn-around (reversing is preferred). <ol style="list-style-type: none"> i. A proposal for source lines wider than 2.75 m to accommodate larger seismic vibroseis machines may be considered under a non-standard mitigation plan. d. Source lines will employ tree avoidance techniques and meander to limit line of sight to less than 100 m. e. Doglegs will be employed at all intersections with linear features >3.5 m wide. f. Snow berms generated through ploughing will not exceed 1 m in height and will provide breaks at least 10 m wide located at least every 200 m along the berm. g. Mechanized clearing/mulching will only be conducted on dry or frozen ground. h. Reclamation and access management treatments will be completed for newly cut lines prior to permit expiry. <ol style="list-style-type: none"> i. Treatments are required at line intersections with linear features >3.5 m wide. ii. Treatments will: <ul style="list-style-type: none"> • Include coarse woody debris rollback and slash piling, where material is available. • Include tree felling and/or tree hinging to deter wildlife and human access, where the average tree height beside the line is >2 m. • Extend at least 100 m from the line intersection with the linear feature (>3.5 m).

Table A.1. Standard Mitigation Measures for Seismic Exploration Programs in the SK2 Caribou Conservation Unit: Tier 1 and Tier 2 Caribou Habitat Management Areas (page 3 of 3)

Project Component	Standard Mitigation Measures: Tier 1 and Tier 2 Caribou Habitat Management Areas
<p>Line Cutting (continued)</p>	<p><u>Additional guidance:</u></p> <ul style="list-style-type: none"> • Use existing seismic lines and natural openings whenever feasible to avoid new line cutting or minimize the area cleared. • Minimize impacts to terrestrial lichen within moderate and high potential woodland caribou habitat by conducting activities on top of an adequate snowpack (e.g. >30 cm thick), where possible. • Elevate mulcher drums as high as practical (above the tops of hummocks minimum) to preserve seedlings and conditions suitable for tree development. • Ensure mulch thickness does not impede the natural regeneration of tree species on cleared areas. • Reclamation of linear features is intended to minimize ongoing human access and wildlife movement to promote habitat regeneration and reduce predator efficiency. Careful attention to reclamation at the intersections of seismic lines and access routes is important to achieving this outcome. • Rollback, slash piling, tree felling and/or tree hinging treatments are encouraged at source line and receiver line intersections to further deter human access and predator movement along linear corridors.
<p>5. Response to Caribou Observations</p>	<p>INTENT: Avoid or minimize sensory disturbance to caribou that are near active work areas.</p> <p>INTENT: Contribute caribou observations to support ongoing adaptive management, planning and policy development.</p> <ol style="list-style-type: none"> a. In active travel and work areas (i.e., excluding daily activity in temporary work camps), unless worker safety will be compromised: <ol style="list-style-type: none"> i. Stationary or mobile motorized equipment will not start up if a caribou is observed up to 500 m away; and ii. Stationary and mobile motorized equipment will idle down if caribou are observed up to 500 m away; and iii. Regular activities will proceed only when at least one of the following conditions is met: <ul style="list-style-type: none"> • Caribou are out of sight of the active travel or work area; • Caribou are more than 500 m away from the active travel or work area; or • At least 30 minutes has elapsed. b. Helicopters or other aircraft will not land within 500 m of an observed caribou, unless required for safety reasons. c. The Ministry of Environment Ecological Management Specialist will be notified if caribou or recent (i.e., since the last rain or snowfall) caribou sign (pellets, tracks, cratering) are observed in the project area. Additional mitigation measures may be recommended by the ministry in higher risk situations (e.g., observations of cow-calf pairs, observations of congregations of caribou or repeated observations of caribou over a short time in the same area). d. All caribou observations will also be submitted to the Saskatchewan Conservation Data Centre Report a Woodland Caribou Sighting website (https://biodiversity.sk.ca/reportcaribou.htm) or using the incidental species observation load form (http://biodiversity.sk.ca/Docs/SKCDCLoadform.xlsx). <p><u>Additional guidance:</u></p> <ul style="list-style-type: none"> • Where safe and practical, fixed wing and helicopter flights should maintain an altitude of at least 300 m above ground level when flying above caribou.

Table A.2. Standard Mitigation Measures for Seismic Exploration Programs in the SK2 Caribou Conservation Unit: Tier 3 Caribou Habitat Management Areas (page 1 of 3)

Project Component	Standard Mitigation Measures: Tier 3 Caribou Habitat Management Areas
<p>1. New Access</p>	<p>INTENT: Avoid or minimize direct habitat loss, alteration and fragmentation and linear feature density resulting from new ground access. INTENT: Minimize lines of sight associated with new access. INTENT: Minimize direct habitat loss and alteration through reclamation of new access.</p> <p>a. New ground access will be reclaimed prior to permit expiry as follows:</p> <ol style="list-style-type: none"> i. Coarse woody debris and snow rollback and stockpiled slash redistribution, where material is available. ii. Reclamation is not required if new access was created with a mulcher. iii. Reclamation is not required if it would present significant safety concerns. <p>b. Tree felling/hinging treatments will be applied to deter wildlife and human access prior to permit expiry.</p> <ol style="list-style-type: none"> i. Treatments are required where: <ul style="list-style-type: none"> • New access intersects with existing linear features >3.5 m wide; and • Trees are sufficiently tall (average tree height beside the line is >2 m). ii. Treatments will extend at least 100 m along the new access from the intersection with the linear feature. <p><u>Additional Guidance</u></p> <ul style="list-style-type: none"> • Reclamation of linear features is intended to minimize ongoing human access and wildlife movement to promote habitat regeneration and reduce predator efficiency. Careful attention to reclamation at the intersections of seismic lines and access routes is important to achieving this outcome.
<p>2. Clearing</p>	<p>INTENT: Avoid or minimize direct habitat loss and alteration resulting from new clearings. INTENT: Minimize direct habitat loss and alteration through reclamation of new clearings.</p> <p>a. Clearing size for helicopter pads will not exceed 900 m².</p> <p>b. Helicopter pads will be hand cut; no mechanized clearing will be conducted on helicopter pads.</p> <p>c. Mechanized clearing/mulching for staging areas or temporary work camps will only be conducted on dry or frozen ground.</p> <p>d. Reclamation for new clearings, such as helicopter pads, temporary work camps or staging areas, will be completed prior to permit expiry.</p> <ol style="list-style-type: none"> i. Reclamation will consist of rolling back coarse woody debris and snow and redistributing stockpiled slash over the clearing, where material is available. ii. Reclamation is not required if clearing was conducted with a mulcher. iii. Reclamation is not required if it would present significant safety concerns. <p><u>Additional guidance:</u></p> <ul style="list-style-type: none"> • Locate helicopter pads, staging areas and temporary work camps in existing locations or natural openings, where possible, to avoid new clearing or minimize the area cleared. • Minimize vegetation clearing for new staging areas and temporary work camps. • Locate new clearings outside of high potential woodland habitat, where possible. • Minimize impacts to terrestrial lichen within moderate and high potential woodland caribou habitat by conducting activities on top of an adequate snowpack (e.g. >30 cm thick), where possible. • Elevate mulcher drums as high as practical (at a minimum of above the tops of hummocks) to preserve seedlings and conditions suitable for tree development. • Ensure mulch thickness does not impede the natural regeneration of tree species on cleared areas.

Table A.2. Standard Mitigation Measures for Seismic Exploration Programs in the SK2 Caribou Conservation Unit: Tier 3 Caribou Habitat Management Areas (page 2 of 3)

Project Component	Standard Mitigation Measures: Tier 3 Caribou Habitat Management Areas
3. Line Cutting	<p>INTENT: Avoid or minimize direct habitat loss, alteration and fragmentation resulting from line cutting.</p> <p>INTENT: Minimize lines of sight associated with receiver and source lines.</p> <p>INTENT: Minimize direct habitat loss and alteration through reclamation of new receiver and source lines.</p> <ol style="list-style-type: none"> a. Receiver lines will be meandering and use tree avoidance techniques. b. Receiver lines will not exceed 1.75 m wide unless required to minimize total project source line access or for emergency preparedness. <ol style="list-style-type: none"> i. Widened receiver lines will not exceed 2.75 m. c. Source lines will not exceed 2.75 m wide, except for clearings required for equipment turn-around (reversing is preferred). <ol style="list-style-type: none"> i. A proposal for source lines wider than 2.75 m to accommodate larger seismic vibroseis machines may be considered under a non-standard mitigation plan. d. Source lines will employ tree avoidance techniques and meander to limit line of sight to less than 100 m. e. Doglegs will be employed at all intersections with linear features >3.5 m wide. f. Snow berms generated through ploughing will not exceed 1 m in height and will provide breaks at least 10 m wide located at least every 200 m along the berm. g. Mechanized clearing/mulching will only be conducted on dry or frozen ground. h. Reclamation and access management treatments will be completed for newly cut lines prior to permit expiry. <ol style="list-style-type: none"> i. Treatments are required at line intersections with linear features >3.5 m wide: ii. Treatments will: <ul style="list-style-type: none"> • Include coarse woody debris rollback and slash piling, where material is available. • Include tree felling and/or tree hinging to deter wildlife and human access, where the average tree height beside the line is >2 m. • Extend at least 100 m from the line intersection with the linear feature (>3.5 m). <p><u>Additional guidance:</u></p> <ul style="list-style-type: none"> • Use existing seismic lines and natural openings whenever feasible to avoid new line cutting or minimize the area cleared. • Minimize impacts to terrestrial lichen within moderate and high potential woodland caribou habitat by conducting activities on top of an adequate snowpack (e.g. >30 cm thick), where possible. • Elevate mulcher drums as high as practical (at a minimum of above the tops of hummocks) to preserve seedlings and conditions suitable for tree development. • Ensure mulch thickness does not impede the natural regeneration of tree species on cleared areas. • Reclamation of linear features is intended to minimize ongoing human access and wildlife movement to promote habitat regeneration and reduce predator efficiency. Careful attention to reclamation at the intersections of seismic lines and access routes is important to achieving this outcome. • Rollback, slash piling, tree felling and/or tree hinging treatments are encouraged at source line and receiver line intersections to further deter human access and predator movement along linear corridors.

Table A.2. Standard Mitigation Measures for Seismic Exploration Programs in the SK2 Caribou Conservation Unit: Tier 3 Caribou Habitat Management Areas (page 3 of 3)

Project Component	Standard Mitigation Measures: Tier 3 Caribou Habitat Management Areas
<p>4. Response to Caribou Observations</p>	<p>INTENT: Avoid or minimize sensory disturbance to caribou that are near active work areas.</p> <p>INTENT: Contribute caribou observations to support ongoing adaptive management, planning and policy development.</p> <p>a. In active travel and work areas (i.e., excluding daily activity in temporary work camps), unless worker safety will be compromised:</p> <ul style="list-style-type: none"> i. Stationary or mobile motorized equipment will not start up if a caribou is observed up to 500 m away; and ii. Stationary and mobile motorized equipment will idle down if caribou are observed up to 500 m away; and iii. Regular activities will proceed only when at least one of the following conditions is met: <ul style="list-style-type: none"> • Caribou are out of sight of the active travel or work area; • Caribou are more than 500 m away from the active travel or work area; or • At least 30 minutes has elapsed. <p>b. Helicopters or other aircraft will not land within 500 m of an observed caribou, unless required for safety reasons.</p> <p>c. The Ministry of Environment Ecological Management Specialist will be notified if caribou or recent (i.e., since the last rain or snowfall) caribou sign (pellets, tracks, cratering) are observed in the project area. Additional mitigation measures may be recommended by the ministry in higher risk situations (e.g., observations of cow-calf pairs, observations of congregations of caribou or repeated observations of caribou over a short time in the same area).</p> <p>d. All caribou observations will also be submitted to the Saskatchewan Conservation Data Centre Report a Woodland Caribou Sighting website (https://biodiversity.sk.ca/reportcaribou.htm) or using the incidental species observation load form (http://biodiversity.sk.ca/Docs/SKCDCLoadform.xlsx).</p> <p><u>Additional guidance:</u></p> <ul style="list-style-type: none"> • Where safe and practical, fixed wing and helicopter flights should maintain an altitude of at least 300 m above ground level when flying above caribou.