

CARIBOU MITIGATION AND MONITORING PLAN

**CONUMA COAL
RESOURCES LIMITED**



Protecting Our House



Brule, Willow Creek and Wolverine Mines

**August 2017
Rev 1**

Version	Description	Date	Prepared By	Reviewed By	Signature
Rev 0	Initial MGT by Walter Energy	Unknown	Unknown	Unknown	
Rev 1	Updated MGT issued to MEM for approval	Aug 2017	Stantec	Jackie Caldwell, Conuma Environmental Manager	

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1.0 Introduction

This Caribou Mitigation and Monitoring Plan (CMMP) has been prepared to meet the following permit condition:

The Permittee shall ensure the Wildlife Management Plan is implemented to prevent and mitigate impacts to wildlife. The Plan shall ensure consideration of the Peace Northern Caribou Plan (2012)¹ and develop a CMMP as part of the Wildlife Plan. A summary of the effectiveness of the Wildlife Plan and specifically the CMMP shall be included in the annual reclamation report.

This draft permit condition applies to Willow Creek Mine (Permit C-153), Brule Mine (Permit C-221), and Wolverine Mine (Permit C-223). The Willow Creek Mine is within the Burnt Pine caribou herd boundary, and the Wolverine Mine is within the Quintette caribou herd boundary (Figure 1). The Brule Mine is not within a caribou herd boundary, but it is within identified South Peace Matrix range for caribou (BC MFLNRO 2016) (Figure 1).

The structure and content of this CMMP is based on the *South Peace Northern Caribou Mitigation and Monitoring Plan Guidance* (BC MOE 2013a) and the *Natural Resource Board Direction: Planning and Approval of Development Activities in the South Peace Northern Caribou Area* (Natural Resource Board 2013).

1.1 Regulatory Context

1.1.1 Federal

The Burnt Pine and Quintette caribou herds are part of the Central Mountain Designatable Unit, and are designated as Threatened under Schedule 1 of the *Species at Risk Act*, and are listed as Endangered by the Committee on the Status of Endangered Wildlife in Canada (SPRP 2017). Under the federal recovery strategy, the Burnt Pine herd is referred to as a subpopulation, and is part of the Pine River Local Population Unit (LPU); the Quintette herd is its own LPU (Environment Canada 2014).

¹ Note that this plan has been superseded by the Implementation Plan for the Ongoing Management of South Peace Northern Caribou (*Rangifer tarandus caribou* pop. 15) in British Columbia (BC MOE 2013b).



Notes

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- Unincorporated Area
- Falling Creek Connector Road
- Highway
- Road
- Railway
- Contour (m)
- Watercourse
- Waterbody
- First Nations Reserve
- Park, Ecological Reserve, or Protected Area
- Municipal Boundary
- Caribou Herd Boundary
- ▨ Ungulate Winter Range
- ▨ Wildlife Habitat Area
- ▨ Critical Habitat (Type 1 Matrix Range)
- ▨ Critical Habitat (Type 2 Matrix Range)
- ▨ Winter Burnt Pine High Elevation Range
- ▨ Winter Moberly High Elevation Range
- ▨ Winter Quintette High Elevation Range
- ▨ Summer Pine River High Elevation Range
- ▨ Summer Quintette High Elevation Range
- ▨ Mine Footprint

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CONUMA COAL RESOURCES LIMITED

Project Location: South of Chetwynd, BC

Client/Project: Conuma Coal Resources Limited Environmental Management Plans Wildlife Management Plan

Figure No. 1

Title: Overview of Willow Creek, Brule and Wolverine Mines in Relation to Caribou Habitat

Prepared on 20170620 by SPARKER
Reviewed on 20170620 by CSRYDIN
GIS Review on 20170620 by NPUREWAL

The federal recovery strategy for Southern Mountain Caribou partially delineates critical habitat for the Pine River and Quintette LPU. Additional mapping of critical habitat is currently underway, and is expected to be available in an amended recovery strategy in late 2017 (ECCC 2017). Critical habitat is defined as the habitat that is necessary for the survival or recovery of a listed wildlife species and that is identified as the species' critical habitat in the recovery strategy or in an action plan for the species (Environment Canada 2014). Critical habitat within the Pine River and Quintette LPU is located within high elevation winter range (HEWR), high elevation summer range (HESR), low elevation winter range (LEWR), and matrix range². The recovery strategy describes the amount of critical habitat as follows:

- In LEWR and Type 1 matrix range with less than 65% undisturbed habitat, critical habitat includes that which is currently suitable as well as adjacent habitats that over time would contribute to the attainment of 65% undisturbed habitat
- In HEWR and/or HESR, critical habitat includes that which is currently suitable as well as adjacent habitat that over time would become suitable through restoration

1.1.2 Provincial

Caribou in BC are blue-listed provincially and are protected under the BC *Wildlife Act*. The provincial government has identified ungulate winter ranges (UWRs) and wildlife habitat areas (WHAs) for caribou. UWRs are areas that contain habitat necessary to meet the winter habitat requirements of a specified ungulate, and are established under the *Forest and Range Practices Act*. WHAs are areas that are necessary to meet a specific life requisite of a species. Within both UWRs and WHAs, activities are managed to limit their impact on the species the UWR or WHA was designated for.

The Province has mapped four types of habitat for caribou: HEWR, HESR, LEWR, and matrix range. HEWR, HESR, and LEWR are the three primary habitats that caribou live in, depending on season. Matrix range are areas that contribute to the predator-prey system within caribou range, but are not main caribou areas (BC MOE 2017).

To meet its commitments to manage and recover species at risk identified under the Accord for the Protection of Species at Risk in Canada and the Canada–British Columbia Agreement on Species at Risk, the BC Ministry of Environment has developed the *Implementation Plan for the Ongoing Management of South Peace Northern Caribou (Rangifer tarandus caribou) population 15 in British Columbia* (BC MOE 2013b). The implementation plan provides strategic direction and management actions required to meet conservation goals and objectives for the South Peace northern caribou (BC MOE 2013a).

Additional direction on caribou management and conservation is provided in the *South Peace Northern Caribou Mitigation and Monitoring Plan Guidance* (BC MOE 2013a) and the *Natural Resource Board Direction: Planning and Approval of Development Activities in the South Peace Northern Caribou Area* (the *Direction*) (Natural Resource Board 2013). BC MOE (2103a) identifies the need to incorporate the following two principles in CMMPs:

² The federal recovery strategy defines two types of matrix habitat: type 1 and type 2. Type 1 matrix range are areas within an LPU that have not been delineated as summer or winter range, and may include seasonal migration areas and areas of lower use compared to delineated seasonal ranges (Environment Canada 2014). Type 2 matrix range are areas surrounding LPUs where predator/prey dynamics influence caribou predation rates. Type 2 matrix range may also include areas with trace occurrences of caribou, dispersal zones between subpopulations, and dispersal zones between LPUs (Environment Canada 2014).

1. Proposed development activities and associated mitigation (including offsetting) can be demonstrated to result in a net neutral or positive effect on the viability of the South Peace northern caribou within 10 years of receiving approval.
2. Proponents are responsible for developing CMMPs and resourcing the management actions required to meet principle 1. The *Direction* also provides proponents the opportunity to be exempt from developing a CMMP, if they can demonstrate the proposed activities meet specific criteria.

1.2 Project Description

The three mines addressed in this CMMP are open pit coal mines located in the Peace River Regional District (see Section 1.4 of WMP).

The Willow Creek Mine is situated between 640 and 1,180 m elevation and overlaps the Bullmoose variant of the Engelmann Spruce–Subalpine Fir moist very cold subzone (ESSFmv2), the Finlay-Peace variant of the Sub-boreal Spruce wet cool subzone (SBSwk2), and the Boreal White and Black Spruce moist warm subzone (BWBSmw). Small-scale mining began at the Willow Creek mine site in 1999 and 2000. The mine was then put under care and maintenance until larger scale mining began in 2004. Operations were shut down in 2006 with a brief period of activation in 2008, and then a return to care and maintenance until the mine was re-opened in 2010. The Falling Creek Connector Road (between Willow Creek and Brule mines) was constructed in 2010. The mine entered into care and maintenance again in 2014; however, coal from Brule Mine continued to be processed at the Willow Creek mine site until mid-2015.

The Brule Mine is situated between 975 and 1,341 m elevation and overlaps the ESSFmv2 and SBSwk2 variants. Brule Mine began operations in 2007, incorporating the entirety of the Dillon Pit small mine (which had begun operations in 2004). The mine produced coal until 2014, when it entered care and maintenance. Mine site operations resumed in September 2016.

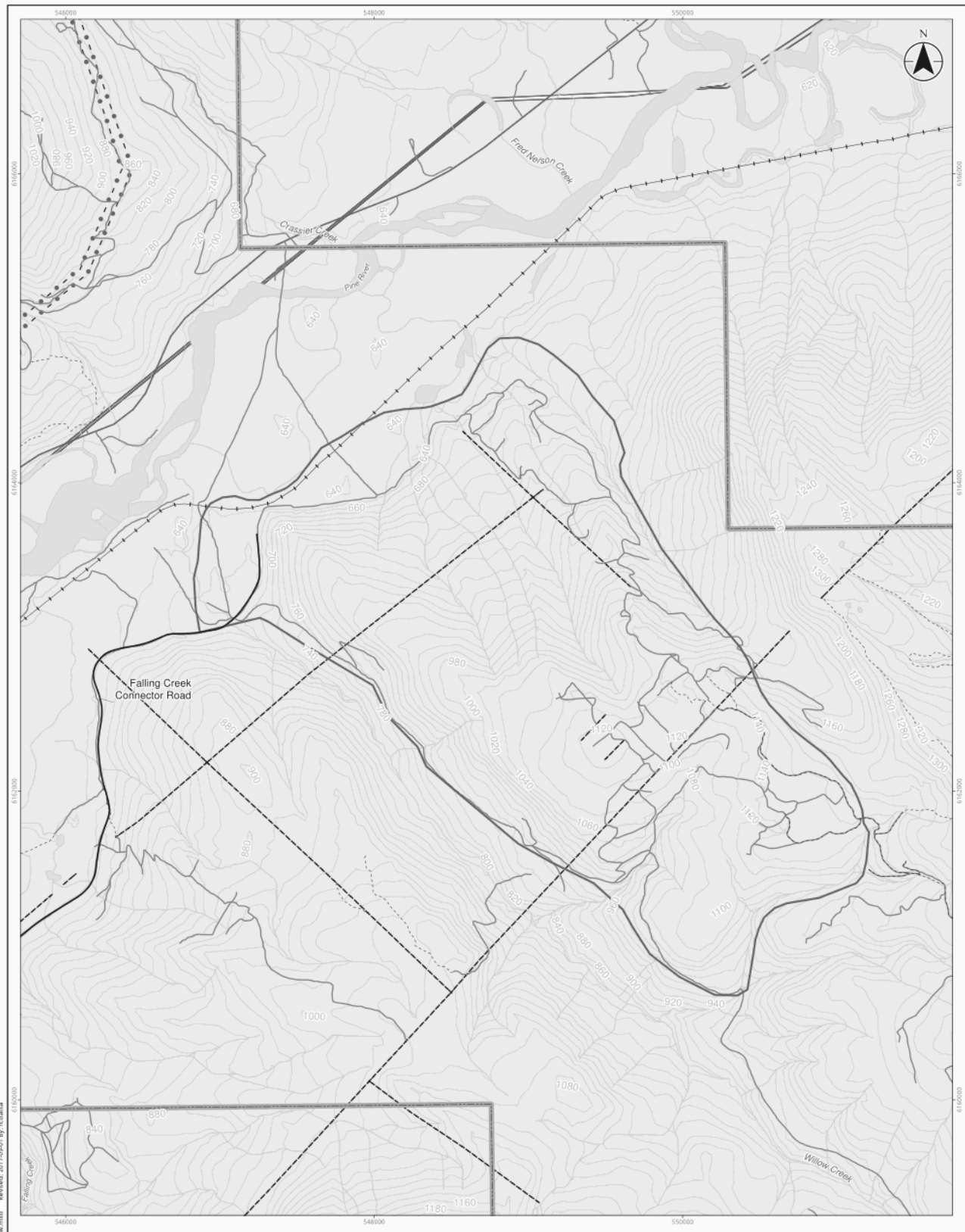
The Wolverine Mine is situated between 823 and 1,372 m elevation and primarily overlaps the ESSFmv2 and SBSwk2 variants, with only a very small portion within the BWBSmw subzone. Wolverine Mine began operations in 2006, and produced coal until 2014, when it entered care and maintenance. Mine site operations resumed in January 2017.

1.3 Boundaries of the Assessment Areas

The general assessment areas for this CMMP are the Burnt Pine and Quintette caribou herd boundaries, and adjacent matrix range (i.e., where Brule Mine is located) (Figure 1). None of the mine footprints overlap HEWR or LEWR, but there is overlap with other caribou habitat types (Table 1; Figures 2, 3 and 4).

Table 1 Overlap of Willow Creek, Brule, and Wolverine Mine Disturbance Areas with Caribou Habitat

Critical Habitat	Willow Creek Mine (Burnt Pine herd) (ha)	Brule Mine (matrix range) (ha)	Wolverine (Quintette herd) (ha)
HEWR	-	-	-
HESR	-	-	3.4
LEWR	-	-	-
Type 1 matrix range	868.9	-	956.6
Type 2 matrix range	-	695.5	-
WHA 9-062	-	-	1.8



- Falling Creek Connector Road
- Lease Boundary
- Highway
- Road
- Trail
- + + Railroad
- - - Cutline
- • - Power Transmission Line, Overhead
- Contour (m)
- Watercourse
- Waterbody
- Mine Footprint
- Critical Habitat (Type 1 Matrix Range)

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Project Location
South of
Chetwynd, BC

Client/Project
Conuma Coal Resources Limited
Environmental Management Plans
Wildlife Management Plan

Figure No.
2

Title
Location of Willow Creek Mine in Relation to Caribou Habitat

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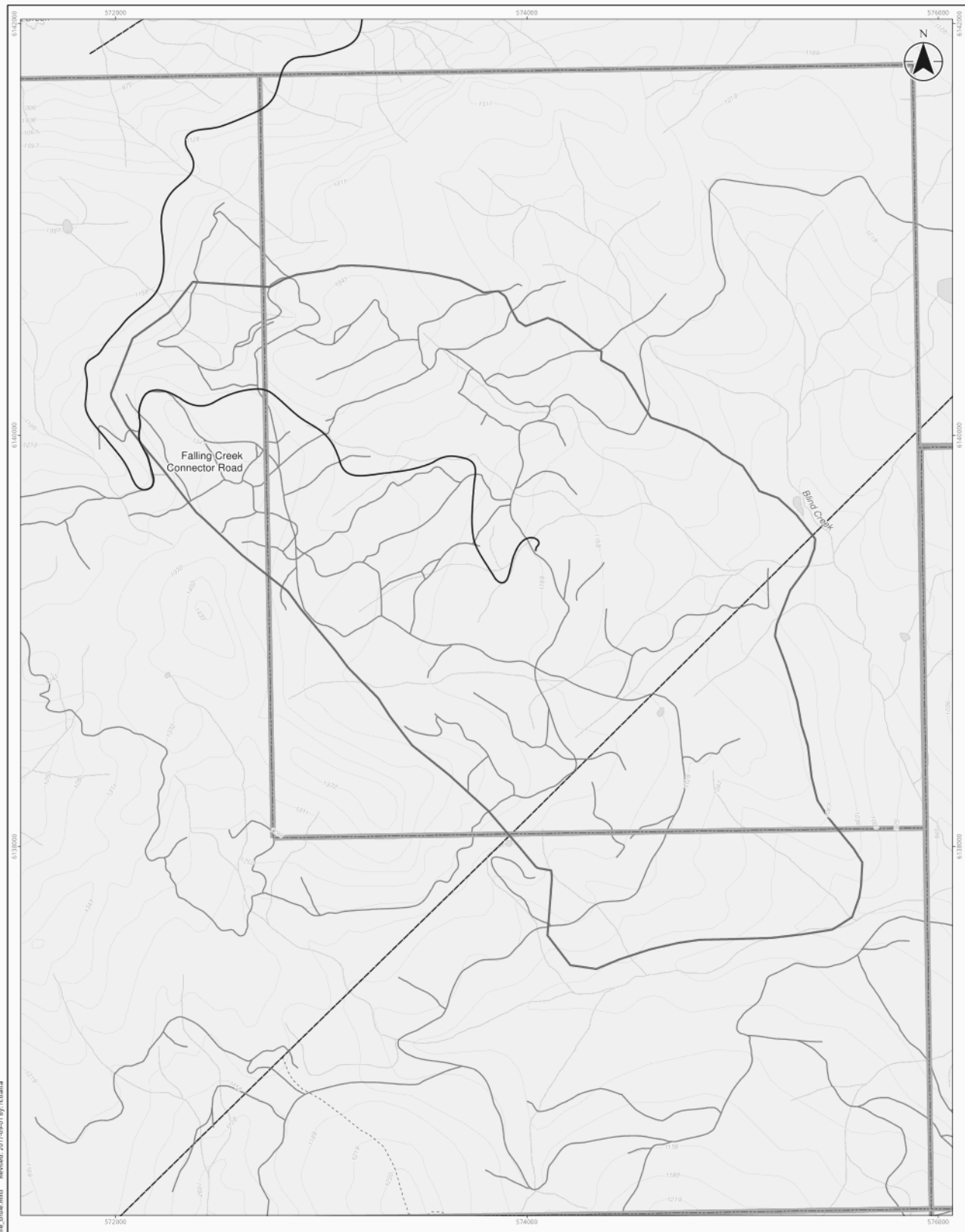
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- Falling Creek Connector Road
- Lease Boundary
- Road
- - - Trail
- - - Cutline
- Contour (m)
- Watercourse
- Waterbody
- Mine Footprint
- Critical Habitat (Type 2 Matrix Range)

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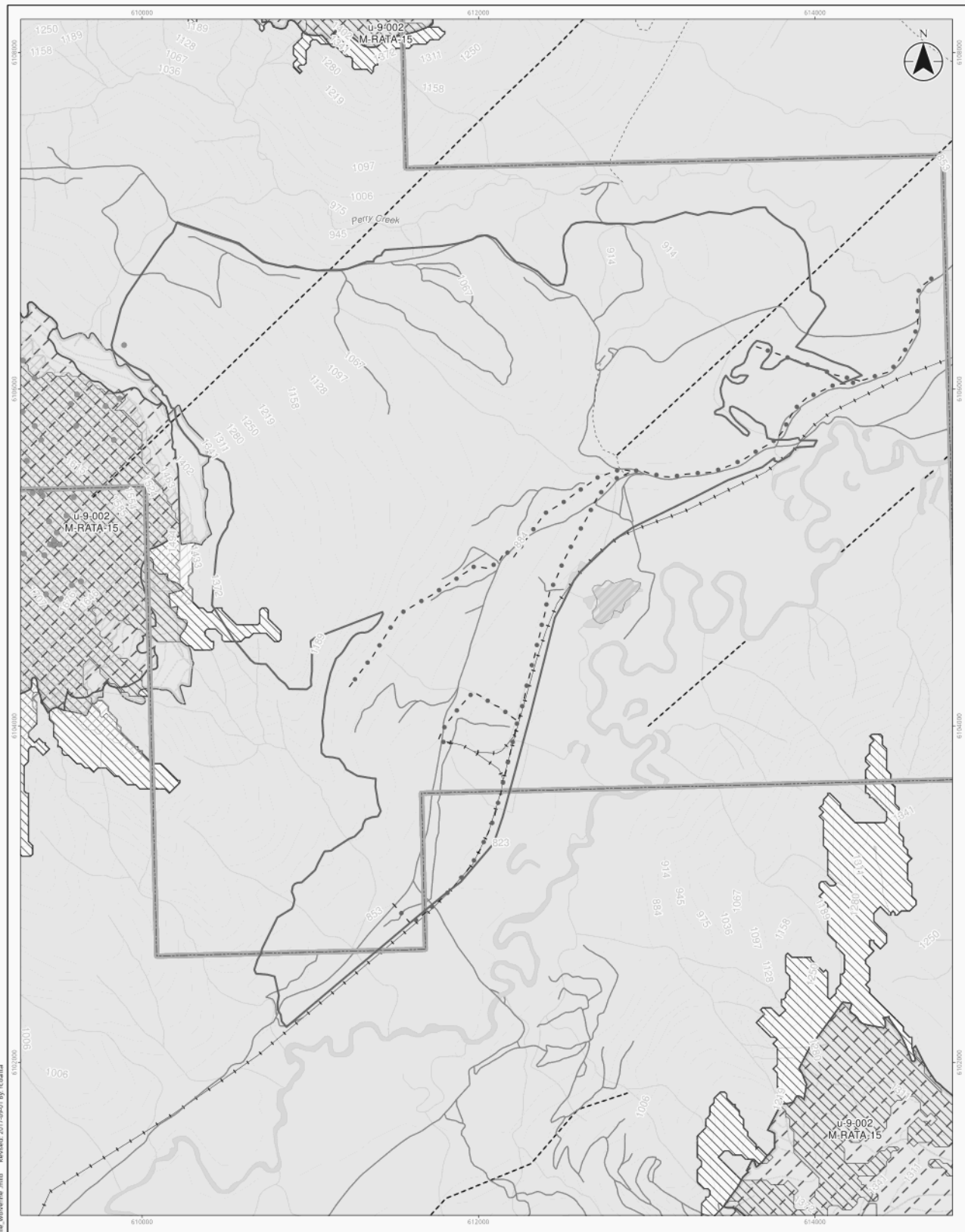
Client/Project: Conuma Coal Resources Limited
 Environmental Management Plans
 Wildlife Management Plan

Figure No. 3
 Title: Location of Brule Mine in Relation to Caribou Habitat

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<ul style="list-style-type: none"> ● Caribou Telemetry --- Powerline --- Lease Boundary --- Road --- Trail --- Railroad --- Cutline --- Contour (m) --- Watercourse Wetland Waterbody 	<ul style="list-style-type: none"> Mine Footprint South Peace Matrix Habitat (Type 1) Ungulate Winter Range Wildlife Habitat Area Winter Quintette High Elevation Range Summer Quintette High Elevation Range
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Project Location
South of
Chetwynd, BC

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Client/Project
Conuma Coal Resources Limited
Environmental Management Plans
Wildlife Management Plan

Figure No.
4

Title
Location of Wolverine Mine in Relation to Caribou Habitat

1.4 Caribou Components

The *Guidance for the Development of Caribou Mitigation and Monitoring Plans* (BC MOE 2013a) identifies two caribou components and a suite of associated indicators that are to be used as the basis for developing a CMMP. The two caribou components, and their associated indicators, are:

1. Amount and condition of habitat, with indicators of:
 - Abundance and distribution of suitable winter habitat (e.g., HEWR and LEWR)
 - Proportion of disturbed habitat
 - Abundance and distribution of early seral habitat
2. Population structure and dynamics, with indicators of:
 - Density of moose
 - Density of wolves
 - Caribou population size
 - Caribou adult survival
 - Caribou calf survival
 - Caribou lambda³

Table 2 summarizes the indicators for the current amount and condition of habitat, and Table 3 summarizes the indicators for the current condition of the population structure and dynamics. The description of the current condition for each indicator is based on the most recent information for each herd.

³ Lambda is the population growth rate; $\lambda = (100 + \text{calf recruitment} - \text{adult mortality})/100$ (Wilson 2012)

Table 2 Amount and Condition of Habitat Indicators within the Pine River (Burnt Pine Herd) and Quintette Local Population Units

Habitat Indicator	Amount and Condition	Information Source	Comment
Abundance and distribution of suitable high elevation winter habitat ¹	<p><u>Burnt Pine Herd</u> Total: 10,942 ha Undisturbed: 10,626 ha</p> <p><u>Quintette Herd</u> Total: 71,276 ha Undisturbed: 65,190 ha</p>	Environment Canada (2012)	<p><u>Burnt Pine Herd</u> HEWR occurs on Howling Wolves Peak, Mt. Le Hudette, and Mt. Stephenson. The closest HEWR is 3.9 km from Willow Creek Mine.</p> <p><u>Quintette Herd</u> HEWR occurs on Mt. Bullmoose, Mt. Spieker, Mt. Collier, Mt. Chamberlain, Quintette Mtn., and Mt. Babcock. The closest HEWR is 0.1 km from Wolverine Mine.</p> <p>Existing disturbance includes coal mines, roads and trails, forestry cut blocks, exploration, burns, and insect kill.</p>
Abundance and distribution of suitable low elevation winter habitat ¹	<p><u>Burnt Pine Herd</u> Total: 0.0 ha Undisturbed: not applicable</p> <p><u>Quintette Herd</u> Total: 28,247 ha Undisturbed: 22,829 ha</p>	Environment Canada (2012)	<p><u>Burnt Pine Herd</u> There is no mapped LEWR within the Burnt Pine herd boundary.</p> <p><u>Quintette Herd</u> LEWR occurs along Meikle Creek, Bullmoose Creek and tributaries, and east of Highway 29. The closest LEWR is 20.8 km from Wolverine Mine.</p> <p>Existing disturbance includes Highway 29, forest service roads, wind energy, cut blocks, transmission lines, roads and trails, burns, and insect kill.</p>
Abundance and distribution of early seral habitat	<p><u>Burnt Pine Herd</u> Total: n/a</p> <p><u>Quintette Herd</u> Total: n/a</p>	Information on seral stage not available	<p>Early seral habitats include cut blocks, transmission lines, pipelines, burns, and insect kill.</p> <p>Wilson (2012) estimates 23.9% early seral habitat within low elevation winter range within the Quintette herd boundary.</p> <p>The amount of early seral habitat in the Burnt Pine herd is unknown.</p>
<p>NOTES:</p> <p>¹ The areas of HEWR and LEWR partially overlap.</p>			

Table 3 Current Condition of Population Structure and Dynamics Indicators

Indicator	Current Condition	Information Source	Comment
Density of moose	<u>Burnt Pine Herd</u> Moose density: n/a <u>Quintette Herd</u> Moose density: 0.28 prey per km ²	Wilson (2012)	Moose density, expressed as moose equivalents per km ² , is a function of the proportion of low elevation early seral conditions (Wilson 2012). Moose density within the Burnt Pine herd boundary is unknown.
Density of wolves	<u>Burnt Pine Herd</u> Wolf density: n/a <u>Quintette Herd</u> Based on a density of 0.28 prey per km ² , wolf density is 9.0 wolves per 1,000 km ² Seip and Jones (2017) estimated the density as 10 wolves per 1,000 km ²	Wilson (2012) Seip and Jones (2017)	Wolf density is expressed as a function of prey density: wolf density = $3.5 + (3.3 * \text{prey density} * 6)$ (Wilson 2012). Prey density was assumed to be 0.28 prey per km ² . Between January and March 2016, 65 wolves were removed from within or adjacent to the Quintette herd boundary. During winter 2017, 25 wolves were removed from within or adjacent to the Quintette herd boundary. Wolf removal information is not available for the Burnt Pine herd.
Caribou population size	<u>Burnt Pine Herd</u> Population = 0; considered extirpated <u>Quintette Herd</u> Population = 49 The population has increased since from 2016, but the trend is uncertain over the long-term.	ECCC (2017) Seip and Jones (2017)	The positive population increase may be related to wolf control program, but ongoing monitoring is required to confirm this (Seip and Jones 2017).
Caribou adult survival	<u>Burnt Pine Herd</u> Population = 0; considered extirpated <u>Quintette Herd</u> Adult mortality is 8%, suggesting that adult survival is 92%	Seip and Jones (2017)	This value for adult survival was interpreted from reported adult mortality.
Caribou calf survival	<u>Burnt Pine Herd</u> Population = 0; considered extirpated <u>Quintette Herd</u> Average calf recruitment rate is 14.2% (2003-2015) Calf recruitment rate was 18% in 2017	Seip and Jones (2017)	The higher than average calf recruitment rate might be attributable to the wolf control program.

Table 3 Current Condition of Population Structure and Dynamics Indicators

Indicator	Current Condition	Information Source	Comment
Caribou lambda (population growth rate)	Burnt Pine Herd Population = 0; considered extirpated <u>Quintette Herd</u> Lambda = 1.08 in 2017	Wilson (2012) Seip and Jones (2017)	A lambda value greater than 1.0 (i.e., population growth) may be related to the wolf control program, but ongoing monitoring is required to confirm this (Seip and Jones 2017).

1.5 Potential Effects

An assessment of potential effects is provided in the respective environmental assessments for the Willow Creek (see Section 6.10.7 in WCC 2010), Brule (see Section 10.3.2.1 in WCCC 2005), and Wolverine (see Section 5.10.2 in WCCC 2007) mines.

2.0 Mitigation Hierarchy

The provincial mitigation hierarchy establishes a structure to guide the development and application of mitigation measures based on four levels: avoid, minimize, restore on-site, and offset (BC MOE 2013a). The expectation is that all practical measures at one level are considered before moving to the next level, and that a rationale is provided for that approach (BC MOE 2014). In practice, the levels will often be considered “holistically and iteratively” (BC MOE 2014).

The mitigation measures in this CMMP follow the mitigation hierarchy to address potential project effects referred to in Section 1.5, with the goal of minimizing adverse residual effects on caribou components. The following subsections address the first three levels of the hierarchy: avoid, minimize, and restore on-site. This section concludes with the identification and characterization of residual project effects on the caribou components.

2.1 Avoid

The first level in the mitigation hierarchy is to avoid adverse effects on caribou components for the duration of operations at the three mines sites. The environmental assessments for the three mines took into consideration caribou habitat; however, due to the inherent nature of mining, mine placement was constrained by the location of coal deposits. As a result, portions of the mine sites occur within caribou habitat (see Table 1). As full avoidance is not achieved, this CMMP also includes the second level of mitigation; minimize.

2.2 Minimize

Minimize is the second level in the mitigation hierarchy, and is considered only when measures to fully avoid adverse effects on caribou components have been exhausted, or where avoidance is not practical for the given situation. Table 4 summarizes caribou-specific mitigation measures that are directly applicable to minimizing effects of the mines on caribou components. These mitigations are adopted from Draft South Peace Northern Caribou Standardized Industry Management Practices (BC MFLNRO 2016). Conuma will provide specific information on caribou and the CMMP to mine personnel as part of training and site orientation.

Table 4 Mitigation Measures Applicable to Minimizing Effects of the Operating Mines on Caribou Components

Mitigation Measure
Conuma will comply with the measures listed in the WMP.
Workers and visitors will follow Conuma’s Standard Operating Policy on caribou encounters.
Conuma will minimize impacts to terrestrial lichen resources, where possible, by: <ul style="list-style-type: none"> Avoiding disturbance of the duff layer and vegetative root mat Conducting activities during winter with an adequate snowpack, but when caribou are not using the area
Minimize snow removal to reduce predator travel along linear corridors. For any linear corridors where snow ploughing is required, breaks in snow berms will be created at approximately 200 m intervals, to the extent practical. Snow berms will typically be less than 1 m tall, and breaks will be aligned on opposing sides.

Mitigation Measure
Wildlife has the right-of-way except where it is judged to be unsafe to do so. If animals are on the road, slow down, stop if necessary, and allow them to leave the roadway.
Conuma anticipates minimal, if any, use of aircraft for mine-related activities; however, if aerial operations are required they will be undertaken in accordance with the Peace Region Guidelines for Aircraft Operations/Wildlife Interactions (BC MOE 2008).
Conuma will avoid placing debris/slash piles on terrestrial lichen sites.
Conuma will avoid using sites that support terrestrial lichens as sources of gravel for building/maintaining roads or for other purposes, to the extent practical.
Conuma will design and maintain open excavations (e.g., trenches, pits, sumps, exploration drill holes) to avoid entrapping caribou and other wildlife. This will be achieved by: <ul style="list-style-type: none"> Using fencing where practical Backfilling/contouring open excavations to a stable angle of repose
Conuma will contain sources of industrial contamination (e.g. sumps, settling ponds) to prevent caribou from accessing and ingesting hazardous material.
Noise will be minimized by regularly inspecting and maintaining exhaust systems for properly installed mufflers and, and checking that machinery is operating as per specifications. Unnecessary idling of equipment will be avoided.
Conuma will maintain known or discovered mineral licks, and associated wildlife trails to licks, in a natural state and make efforts to allow caribou access to these sites during high-use seasons (April to October). If mineral licks are known or discovered, Conuma will, to the extent feasible, implement a minimum 250 m setback around the mineral lick. If mine activities cannot be located outside of a 250 m setback, connectivity to adjacent forested areas will be maintained to the extent possible. Maintain visual screening (i.e. forested cover) to provide security and escape cover around mineral licks and trails.
Firearms are not permitted at the mine sites. This includes the carrying of firearms in private vehicles to and from the mine sites.
Pets are prohibited from being on the mine sites, and in vehicles when traveling to and from these sites.
The personal use of snowmobiles, ATVs, or other motorized recreational vehicles by company employees or contractors is not permitted within the mine sites during workdays or travel to and from these locations.
Conuma will maintain worksites in a tidy manner. Materials such as cables, wires, and fencing will be properly stored so as not to cause entanglement of caribou or other wildlife.
Where feasible, busses will be used to transport workers to and from the mine sites to reduce traffic volumes and vehicle collision risks to caribou.

The measures described in Table 4 are expected to reduce mine-related effects on the caribou components, but not necessarily to no-net potential effects. For example, restrictions on the timing of clearing activities may not reduce the overall size of the mine footprints. Also, restrictions related to overflights and the frequency, duration, and timing of human presence in and around HEWR, UWR, and WHA may minimize some intermittent or short duration sensory disturbance effects on caribou; but, they will not reduce the indirect effects of the mine operation itself. As the minimization measures do not result in a measurable reduction in mine-related effects on the caribou components, the CMMP moves directly to the third level, restore on-site.

2.3 Restore On-Site

Restore on-site is the third level in the mitigation hierarchy. Although planning for restoration and the implementation of restoration measures may begin at the start of a project, the effects will largely persist until restoration is complete and effective (BC MOE 2013a). Restoration measures will be carried out within the mine footprints, specifically within the area of the permit or other form of authorization (BC MOE 2013a).

2.3.1 Proposed Mitigation Measures

Following the BC MOE (2013a) guidance document, the three restore on-site measures, in order of preference, are:

- Restore: return caribou components to original or pre-existing structure, composition, pattern, and ecosystem processes, productivity, and services
- Remediate: eliminate, limit, correct, or counteract any contamination or associated adverse effects of a contaminant on caribou components
- Reclaim: ensure stabilization of the terrain and restoration of functional utility of the ecosystem with regard to caribou habitat and other caribou components

This CMMP has restoration and reclamation measures only. No requirement for remediation has been identified at this time because contamination is not expected. The restoration and reclamation measures are described in the Reclamation Plan (EMS- MGT-9.6).

2.3.1.1 Restoration

All major activities directly related to the mine sites will cease at the end of mine production. After which, there will be a lower level of activity while closure and reclamation occur. A lower, intermittent and diminishing level of activity, associated with environmental monitoring and site maintenance, will follow closure and reclamation (i.e., the post-closure phase). The Reclamation Plan (EMS- MGT-9.6) describes measures related to the reclamation of wildlife habitat, including caribou habitat, during the closure and post-closure phases.

2.3.1.2 Reclamation

Reclamation is the key mitigation measure for a mine development with respect to wildlife habitat and is a requirement under the *Health, Safety and Reclamation Code for Mines in British Columbia* (MEM 2017). Reclamation prescriptions and actions are described in the Reclamation Plan (EMS- MGT-9.6).

2.4 Residual Effects and Characterization

An assessment of residual effects is provided in the respective environmental assessments for the Willow Creek Mine (see Section 6.10.7 in WCC 2010), Brule Mine (see Section 10.3.6 in WCCC 2005), and Wolverine Mine (see Section 5.10.4.3 in WCCC 2007).

3.0 Monitoring and Reporting

The purpose of the monitoring component of the CMMP is to confirm that mitigation measures are implemented as planned and are effective at meeting the intended principle of a net neutral or positive effect on caribou components over a 10-year timeframe (BC MOE 2013a). Conuma has identified implementation monitoring,

reclamation monitoring, and caribou monitoring programs that are applicable to the CMMP. These monitoring programs are described below.

3.1 Implementation Monitoring

Implementation (i.e., compliance) monitoring of the CMMP will be undertaken by Conuma as a condition of the *Mines Act* permits. In summary, implementation monitoring will be undertaken to confirm that:

If key caribou, or caribou habitat features, are discovered during pre-disturbance surveys or during construction and operations, appropriate mitigation measures will be implemented

A detailed implementation monitoring program will be developed for the mines, and will include mine-specific monitoring where relevant (e.g., high elevation range features at Wolverine mine). The monitoring programs will describe (BC MOE 2013a):

- Obligations resulting from the mitigation plan
- Scope and frequency of monitoring required to assess implementation
- Data collection and analysis methods to be used (using standard protocols where available)
- Reporting structure

The monitoring programs will be developed in consultation with relevant regulatory agencies and Aboriginal groups.

3.2 Reclamation Monitoring

Reclamation monitoring will be used to evaluate and document the effectiveness of reclamation treatments. Details of the reclamation monitoring program are provided in the Reclamation Plan (EMS-MGT-9.6).

3.3 Effectiveness Monitoring

Effectiveness monitoring will be used to assess whether caribou use of reclaimed areas is successful. The monitoring will also be used to evaluate whether other ungulates (e.g., moose; deer) and predators (e.g., wolf, grizzly bear) are using reclaimed areas. Conuma will develop an effectiveness monitoring program that will:

- Monitor use of reclaimed habitat areas by ungulates and predators
- Monitor caribou use of reclaimed areas

A detailed effectiveness monitoring program will be developed for the mines, and will include mine-specific monitoring where relevant (e.g., high elevation range at Wolverine mine). The monitoring program will describe (BC MOE 2013a):

- Purpose and objectives
- Monitoring questions (to clearly indicate how objectives will be assessed)
- Indicators of effectiveness (e.g., tree growth rates; seedling survival, lichen cover, temporal relevance)
- Study design and methods
- Results

The monitoring programs will be developed in consultation with relevant regulatory agencies and Aboriginal groups.

As part of the effectiveness monitoring program, mine workers and mine site visitors will be required to report sightings of caribou to assist with site management. If caribou are sighted on or near the site, the observation will be verbally reported to the Environmental Manager or designate(s) as soon as possible. Supporting information for observations (e.g., exact location, number of animals, size, gender, age, behaviour, and movements and direction of movements) and reports of caribou sign (e.g., tracks; droppings; antlers; carcass) will also be required. This component of the effectiveness monitoring program will be summarized by Conuma and be available for distribution to provincial regulatory agencies should it be requested. For more information on reporting of wildlife sightings, refer to the WMP (Section 5.0).

3.4 Reporting

Reclamation reporting will be carried out annually and submitted to the BC Ministry of Energy and Mines per Part 9, Section 13.1(5) of the Code. Details on the reclamation reporting requirements are provided in the Reclamation Plan (EMS-MGT-9.6). The report will also include a summary of the effectiveness of mitigation measures implemented as part of the CMMP. Annual reclamation reporting will continue until all permit conditions are met and the Ministry of Energy and Mines has released the mine sites.

Caribou monitoring reporting will also be carried out annually and submitted to the BC Ministry of Forests, Lands and Natural Resource Operations and BC Ministry of Environment. The reports will be available to Aboriginal groups upon request.

4.0 Conclusion

Conuma believes that this CMMP is consistent with the guidance provided in BC MOE (2013a). Mitigation measures included in this CMMP follow the mitigation hierarchy of avoid, minimize, and restore on-site. Mitigations are specific to potential mine-related effects, with the goal of avoiding or reducing residual adverse effects on caribou components (e.g., habitat conditions, population structure and dynamics). Loss of high elevation range and matrix range is expected to remain after measures to avoid, minimize, and restore on-site have been implemented. Conuma will develop an offset measures plan for project effects on high elevation range (i.e., Wolverine mine). The offset measures plan will be consistent with provincial guidance (BC MOE 2013a), with the intent of achieving a net neutral or beneficial outcome for caribou within 10 years.

5.0 Definitions and Acronyms

CMMP	Caribou Mitigation and Monitoring Plan
HESR	High Elevation Summer Range
HEWR	High Elevation Winter Range
LEWR	Low Elevation Winter Range
LPU	Local Population Unit
UWR	Ungulate Winter Range
WHA	Wildlife Habitat Area

6.0 References

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http://www.env.gov.bc.ca/wld/speciesconservation/nc/documents/Final_Wilson%20%202012%20%20PNCP%20management%20model.pdf. Accessed June 2017.

WILDLIFE MANAGEMENT PLAN

**CONUMA COAL
RESOURCES LIMITED**



Protecting Our House



Brule Mine

March 2019

Rev 0

Revision	Description	Author	Quality Check	Independent Review
Rev 0	New	Stantec Consulting Ltd.	Stantec Consulting Ltd.	Conuma

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1.0 Introduction

The Wildlife Management Plan (WMP) for Brule Mine (the mine) is a component of the Conuma Coal Resources Limited (Conuma) Environmental Management System. The WMP is a living document that will be updated periodically. The WMP incorporates and updates information from the following management plans:

- Willow Creek, Brule and Wolverine Mines Wildlife Management Plan (Conuma 2017)
- Brule Mine Wildlife Protection Plan (Western Canadian Coal Corp. 2005)

1.1 Scope and Objectives

The scope of the WMP is the protection of wildlife and wildlife habitat. The WMP has been developed to address construction and operation activities associated with Brule Mine.

The objective of the WMP is to provide a suite of measures that will reduce mine-related effects on wildlife and wildlife habitat. The WMP addresses the following topics: roles and responsibilities, general restrictions related to wildlife, habitat protection, wildlife movement, mortality risk and incidental take, wildlife health and safety, caribou, communication strategy, reporting wildlife observations and incidents, monitoring, and reporting. Contact numbers for enforcement and regulatory agencies relevant to the WMP are provided in Section 8.0.

1.2 Regulatory Framework

Table 1 identifies the permit conditions for wildlife protection for Brule Mine (Permit C-221) and indicates which section(s) of the WMP address each condition.

Table 1 Wildlife Protection Permit Conditions for Brule Mine

Section	Condition Number	Condition	Cross-reference to Wildlife Management Plan
Section D: Protection of the Land and Watercourses	C-221: 13(a)	The Permittee shall ensure the Wildlife Management Plan is implemented to prevent and mitigate impacts to wildlife. The Plan shall ensure consideration of the Peace Northern Caribou Plan (2012) and develop a Caribou Management and Mitigation Plan (CMMP) as part of the Wildlife Plan. A summary of the effectiveness of the Wildlife Plan and specifically the CMMP shall be included in the annual reclamation report.	Section 3.0, Section 3.6, Section 4.0, Section 5.0, Section 6.0, Section 7.0,
	C-221: 13(b)	The Permittee shall, where reasonably possible, avoid wildlife sensitive periods for construction activities and, where avoidance is not reasonably possible, minimize the adverse impacts of these activities.	Section 3.2, Section 3.4
	C-221: 13(c)	The Permittee shall take reasonable steps to minimize physical impact to wildlife and wildlife habitat on the mine site. The Permittee shall take any corrective action necessary to protect wildlife from harm.	Section 3.2, Section 3.4, Section 3.5
	C-221: 13(d)	The Permittee shall implement a policy of no fishing and hunting for the mine lease area for all employees and contractors while on company business or while commuting to and from the mine.	Section 3.1

With respect to wildlife and wildlife habitat, the following provincial and federal Acts are applicable:

- *Species at Risk Act*
- *Migratory Birds Convention Act*
- British Columbia (BC) *Wildlife Act*
- *BC Forest and Range Practices Act*
- *BC Mines Act*

At present no wildlife permits under the BC *Wildlife Act* have been identified as being required for Brule Mine. If a wildlife permit is needed (e.g., amphibian salvage) a permit application will be prepared by a Qualified Professional and submitted through FrontCounter BC. Conuma is aware the approval period can be lengthy (over 30 days)¹ and will plan accordingly.

1.3 Company Profile

Conuma is a privately-owned company that was incorporated in BC in 2016.

Conuma's head office is in Tumbler Ridge, BC.

Mailing Address	PO Box 2140, Tumbler Ridge, BC V0C 2W0
Physical Address	Suite 200, 235 Front Street
Telephone	250.242.3764

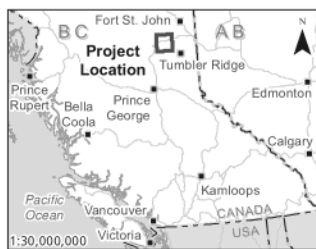
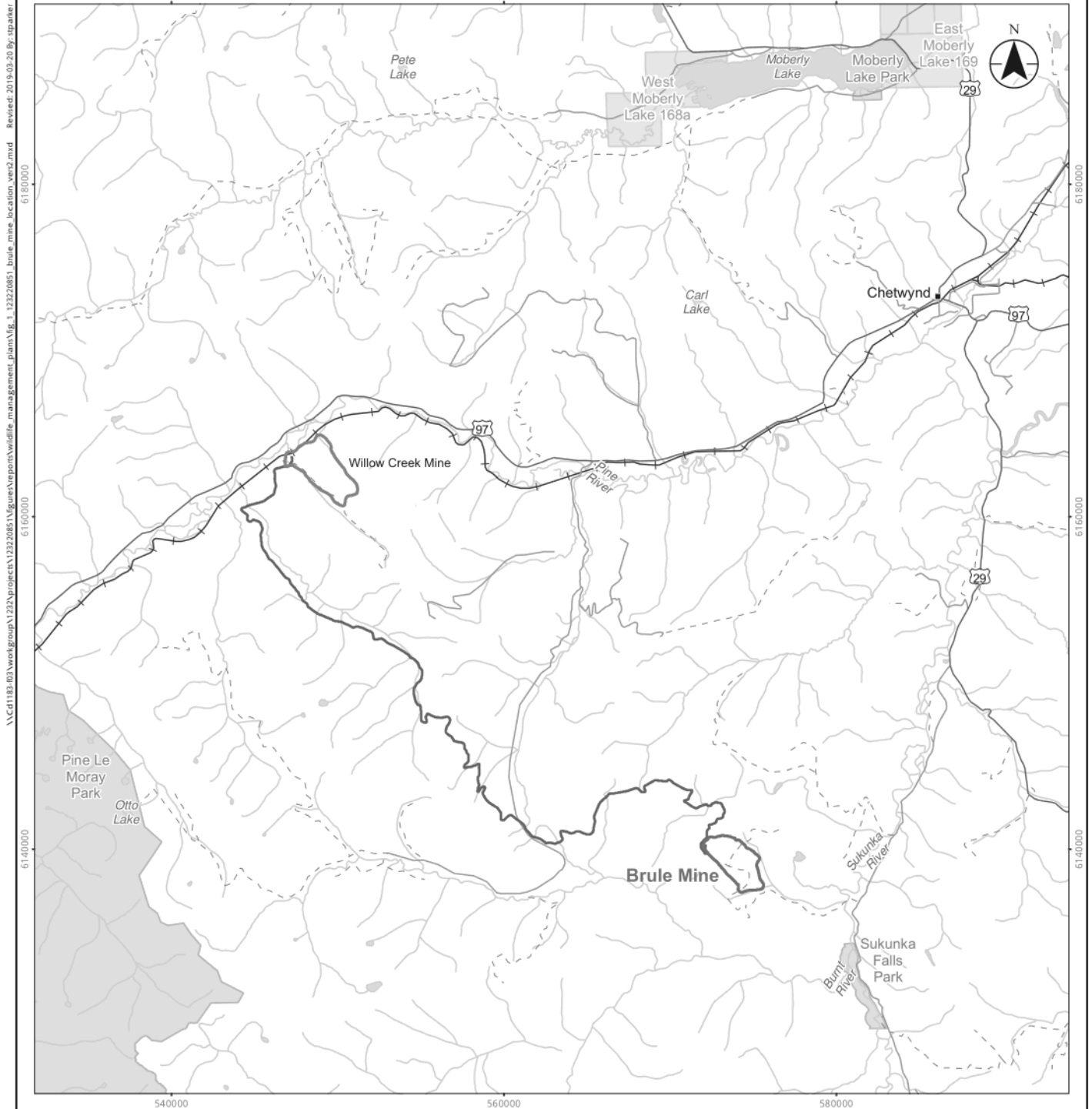
Brule Mine is under the direction of a Mine Manager and the implementation and day-to-day direction of the on-site environmental programs are the responsibility of the Environmental Manager or designate(s) (see Section 2.0).

1.4 Location

Brule Mine is an open-pit coal mine in the Peace River Regional District; it is approximately 95 kilometres (km) by road northwest of Tumbler Ridge, BC (Figure 1). Mine access from Tumbler Ridge is via Highway 29 for approximately 70 km, along the Sukunka Forest Service Road for 16 km, and then 9 km along the Blind Creek Road. The main office is located at 15 km on the Blind Creek Road.

Brule Mine began operation in 2004 (as Dillon Mine). The mine was in care and maintenance from July 2014 to September 2016, when it was re-opened. The coal produced from the mine is transported by truck along the Falling Creek Connector Road to the Willow Creek Mine Plant and loadout facility for processing and rail shipping.

¹ From FrontCounter BC at: <http://www.frontcounterbc.gov.bc.ca/guides/fish-wildlife/general-permit/what-happens-after-you-apply/>



Notes
 1. Coordinate System: NAD 1983 UTM Zone 10N
 2. Data Sources: Data BC, Government of British Columbia; Natural Resources Canada

- City, Town, Village, or District Municipality
- Highway
- Road
- - - Resource Road
- + - - Railway
- Watercourse
- Waterbody
- First Nations Reserve
- Park, Ecological Reserve, or Protected Area
- Falling Creek Connector Road
- Willow Creek Mine Footprint
- Brule Mine Footprint

0 5 10 15 km
 1:350,000 (at original document size of 8.5x11)

Stantec **CONUMA COAL RESOURCES LIMITED**

Project Location: South of Chetwynd, BC
 Project Number: 123220851
 Prepared by: SPARKER on 20190220
 Discipline Review by: CBRYPDEN on 20190220
 GIS Review by: TCARDINAL on 20190220

Client/Project/Report
 Conuma Coal Resources Limited
 Brule Mine Wildlife Management Plan

Figure No.
1

Title
Brule Mine Location

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2.0 Roles & Responsibilities

Key roles accountable for environmental management and compliance with the WMP are the Mine Manager and Environmental Manager, with much of the work to be carried out by the environmental staff under their supervision. The Environmental Manager will be a Qualified Professional. Other Qualified Professionals will be engaged as needed.

Mine Manager

- Is accountable for the mine site
- Provides personnel, equipment, and other assistance to facilitate the protection of the environment
- Has the authority to issue a stop work order if deemed necessary

Environmental Manager

- Oversees compliance with regulations, Acts, guidelines, permits, and policies
- Provides expertise for decisions regarding the protection of the environment
- Oversees that appropriate monitoring and inspections are performed as required or needed
- Provides the environmental department staff with the training, knowledge, experience, and tools to complete their assigned duties
- Consults with other Qualified Professionals, where relevant
- Has the authority to issue a stop work order if deemed necessary

Environmental Staff

- Participates in required training
- Understands and can perform assigned tasks and duties
- Reports to the Environmental Manager any discrepancies, concerns, or questions regarding tasks, duties, or procedures in a prompt manner

Qualified Professional

Per the Province of BC², “a qualified person is one who possesses the specified knowledge, skills, training, experience and other requirements to perform a specified type of work as:

- Set out in legislation
- Set out in government policy or
- Required by an organization satisfactory to government that has the responsibility for specifying the requirements.

The requirements include holding an accreditation bestowed by:

- Government;
- A Professional association constituted under an Act, or
- Other organization satisfactory to government.

² <https://www2.gov.bc.ca/gov/content/industry/natural-resource-use/doing-business-on-the-land-base/qualified-persons-in-the-nrs>

Attainment of the requirements is either:

- Verified through a process undertaken by government, a professional association or other organization satisfactory to government, to confirm that all requirements are met, or
- Self-assessed by members of a professional association constituted under an *Act*, where a code of ethics requires members to operate only within their area of expertise.”

3.0 Wildlife Protection Measures

Brule Mine overlaps the Bullmoose variant of the Engelmann Spruce–Subalpine Fir moist very cold subzone (ESSFmv2) and the Finlay-Peace variant of the Sub-boreal Spruce wet cool subzone (SBSwk2). Wildlife species most likely to be encountered in the mine site area include ungulates (moose, mule deer, white-tailed deer, and Rocky Mountain elk); large predators and furbearers (grizzly bear, black bear, wolverine, fisher, American marten, ermine, snowshoe hare, gray wolf, coyote, cougar, Canada lynx, and red squirrel); bats (little brown myotis, long-eared myotis, hoary bat, and silver-haired bat); amphibians (western toad and wood frog); reptiles (common gartersnake, western terrestrial gartersnake); and a variety of migratory and non-migratory birds. Mountain goat may also be encountered in the mine site area but such encounters are considered less likely. Caribou are very unlikely to be encountered in the mine site area (see Section 3.6).

The following sections provide detailed measures for wildlife protection applicable to Brule Mine. For the purposes of the WMP, ‘mine site’ is defined by the features that are present or active during construction or operation of the mine including, but not limited to, outbuildings (e.g., machine shop, explosives magazine, office), parking areas, water management infrastructure, access roads, pits, stockpiles, and waste rock dumps; and ‘mine personnel’ includes Conuma employees and contractors.

3.1 General Restrictions

The following are general restrictions for mine personnel, and to some extent the public, that are intended to protect wildlife in and around the mine site. Violation of any of these restrictions will be subject to disciplinary actions applied in accordance with Conuma’s ‘Progressive Discipline Policy’. Visitors, or members of the public violating these restrictions at the mine site will be asked to leave. Report unauthorized activities on or near the mine site to the Environmental Manager or designate(s).

- Firearms are prohibited. This includes the carrying of firearms in private vehicles to and from the mine site on workdays.
- Feeding wildlife is prohibited, including during travel to and from the mine site. This is Conuma’s policy, and is, with respect to ‘dangerous’ wildlife, a violation of the BC *Wildlife Act*. Feeding wildlife may result in wildlife becoming habituated to human foods and human presence. This can lead to the creation of ‘conflict wildlife’³ and can have serious consequences for individual animals and humans (see Section 3.5.5). This restriction on feeding wildlife includes bird feeders as these may be an attractant to bears.

³ Animals are considered ‘conflict wildlife’ if they pose a threat to human safety and/or cause damage to facilities and equipment.

- Harassment of wildlife is prohibited, including during travel to and from the mine site. Harassment of wildlife can lead to the abandonment of habitat or the disruption of critical activities (e.g., nesting), and may result in injury to wildlife and/or humans. This restriction extends to both ground-based and air-based activities.
- Conuma does not anticipate using helicopters or fixed-wing aircraft for mine-related activities; however, if required, helicopter or fixed-wing aircraft operations will be undertaken in accordance with the Peace Region Guidelines for Aircraft Operations/Wildlife Interactions (BC MOE 2008). Conuma does anticipate using drones for reclamation monitoring. Conuma will consult with the BC Ministry of Forests, Lands, Natural Resource Operations and Rural Development (MFLNRORD) regarding the use of drones around wildlife.
- Deliberate destruction or disruption of wildlife nests, eggs, and sensitive wildlife features is prohibited, including during travel to and from the mine site. This is Conuma's policy but may also be a violation of the BC *Wildlife Act*, the *Migratory Birds Convention Act* (for migratory birds), or the *Species at Risk Act*. The Environmental Manager or designate(s) will be aware of the importance of sensitive wildlife features⁴, and will be responsible for measures intended to avoid or reduce adverse effects to known features from mine-related activities or mine personnel; this would include keeping knowledge of the location of features restricted to a limited number of mine personnel (to prevent vandalism).
- Hunting and fishing by mine personnel is prohibited when working on the Brule Mine property and during travel to and from the mine site on workdays
- Pets are prohibited, including during travel to and from the mine site on workdays. This is Conuma's policy, and is, with respect to dogs, a violation of the BC *Wildlife Act*. Pets (particularly dogs) may harass or kill wildlife, and may endanger humans during wildlife encounters (e.g., bear-dog interactions).
- Littering is prohibited. All garbage must be returned to temporary, wildlife-proof storage containers. This is Conuma's policy. The Environmental Manager or designate(s) must direct that litter, particularly food waste, found in and around the mine site is removed and properly disposed of. Note that this includes organic wastes (e.g., orange peels, apple cores). Also see Garbage and Other Attractants (Section 3.5.3).
- Outdoor cooking and outdoor cooking appliances are prohibited

3.2 Habitat Protection

The following measures are intended to avoid or reduce potential mine-related effects on wildlife habitat that may either occur directly (habitat loss) or indirectly (habitat avoidance due to sensory disturbance):

- Conform to the General Restrictions (Section 3.1). The restrictions on harassment and habitat destruction are particularly important with respect to wildlife habitat use. Harassment of wildlife can lead to the abandonment of habitat or the disruption of critical activities (e.g., nesting), and may result in injury to wildlife and/or humans.
- Felling of trees and vegetation clearing will be limited to the least amount of area that is required to accommodate the planned activity, considering user safety and operational requirements. For further direction on this measure refer to the Brule Mine Vegetation Management Plan (VMP) (EMS-9.5b-MGT).

⁴ BC MOECCS (2019) defines wildlife habitat features as: fisheries sensitive features; significant mineral licks and wallows; nests of bald eagle, osprey, great blue heron, or other bird species at risk; and other localized features that the Minister considers to be a wildlife habitat feature.

- Adhere to setbacks from riparian areas (e.g., creeks, rivers, and wetlands) and other environmentally sensitive areas that have been established under the direction of the Environmental Manager or designate(s). For further information on this measure refer to the Brule Mine VMP (EMS-9.5b-MGT).
- Vegetation will not be cleared without approval of the Environmental Manager or designate(s). This restriction is intended to avoid unnecessary clearing of vegetation (and potential destruction of wildlife habitat). The Environmental Manager or designate(s) will provide on-site supervision to confirm this recommendation is followed.
- Use existing clearings, trails, and roads, where feasible, to reduce habitat disturbance. For additional information see the Brule Mine VMP (EMS-9.5b-MGT)
- For areas not recently logged (i.e., logged areas greater than one year old) and not being actively logged, Conuma will undertake a pre-disturbance survey, under the supervision of a Qualified Professional, to identify occupied, active, or protected wildlife habitat features (e.g., dens⁵, cavities [including those that might be occupied by raptors or owls], mineral licks, protected nests, other nests [e.g., owl nests]) and important wildlife habitats (e.g., wetlands, terrestrial lichen ecosystems) that may be affected by the mine. Before undertaking a pre-disturbance survey, Conuma will consult with the BC MFLNRORD on survey requirements and appropriate mitigation measures (e.g., setbacks, timing windows) should wildlife habitat features be identified. This consultation will include consideration of scenarios where mine design requirements may limit options for avoidance or setbacks. The critical use periods for wildlife habitat features are:
 - Mineral licks—April to October (BC MFLNRO 2014, 2016)
 - Wallows—September to November (BC MFLNRO 2014)
 - Bear dens—October to end of winter (i.e., March to May [BC MFLNRO 2014])
- Findings of pre-disturbance surveys will be reported to the Environmental Manager or designate(s) verbally and supported by written communication and site maps, where relevant. These findings will be provided to the BC MFLNRORD and Indigenous groups upon request.
- Retain actual or potential wildlife trees (i.e., standing dead or dying trees with special characteristics that provide specific habitat for wildlife [e.g., denning, nesting, roosting]) wherever feasible and safe to do so as determined by a certified wildlife/danger tree assessor. Wildlife trees will be identified during pre-disturbance surveys and georeferenced using a hand-held GPS.
- Avoid or reduce damage to, or removal of, lichen-bearing trees and terrestrial lichen ground cover
- Report the discovery ('chance find') of active or inactive nests that are protected year-round under the BC *Wildlife Act* (e.g., osprey, bald eagle, and peregrine falcon nests) during mine activities to the Environmental Manager or designate(s), who will, in consultation with the BC MFLNRORD or a Qualified Professional, determine appropriate nest-specific mitigation measures. Mitigation measures related to active bird nests are provided in Section 3.4.
- Report the discovery (chance find) of occupied or active wildlife habitat features (e.g., active dens, occupied cavities, active stick nests, mineral licks, wallows) during mine activities to the Environmental Manager or designate(s). The feature will be evaluated for potential mitigation measures (e.g., temporary setbacks) in consultation with the BC MFLNRORD or a Qualified Professional.

⁵ Understood to include bear, wolf, fox, and other furbearer dens

- Conuma will consider the following timing windows for caribou and mountain goat, and related guidance, when planning activities during the construction phase of the mine:
 - Mountain goat (BC MFLNRO 2014):
 - Critical—January 15 to July 15
 - Low-risk—July 16 to October 31
 - Caution—November 1 to January 14
 - Caribou (BC MFLNRO 2016):
 - Critical—January 15 to July 15
 - Low-risk—July 16 to September 14
 - Cautionary—September 15 to January 14
- Maintain vegetation cover as screening to reduce sensory (noise and visual) disturbance to wildlife adjacent to areas of concentrated activity (e.g., pits and waste rock dumps), where feasible. The Environmental Manager or designate(s), in consultation with a Qualified Professional, will provide direction on this measure after considering safety considerations (e.g., where vegetation screening might impede worker/drive sight lines). The pre-disturbance survey will also be a means through which areas that might be suitable for vegetation screening are identified.
- Reduce noise by regularly inspecting and maintaining exhaust systems for properly installed mufflers and checking that machinery is operating per specifications. Avoid unnecessary idling of equipment. Conuma will provide direction on what is considered excessive idling as part of the site orientation.
- Inspect exhaust systems as part of the daily pre-start inspection and the equipment maintenance plan; address deficiencies as required
- Report wildlife observations from the mine site and roads (when travelling to and from the mine site). This information is useful in tracking wildlife use of habitats near the mine site and will contribute to a baseline database on wildlife on the Brule Mine property. Mine personnel are required to report wildlife observations, including notes on habitat use, to the Environmental Manager or designate(s), who in turn will record the information in the Wildlife Log. Also see Reporting Wildlife Observations and Incidents (Section 5.0).

3.3 Wildlife Movement

The following measures are intended to avoid or reduce mine-related effects on wildlife movement that may either occur directly (physical impediments to movement) or indirectly (disruption of daily movements):

- Environmental Manager or designate(s) will direct road maintenance crews to create 'breaks' in the ploughed snow banks along roadways to provide wildlife crossing points. The Environmental Manager or designate(s) will consider the locations of wildlife trails, topography, road safety, variation in intensity and volume of snowfall accumulation, and guidelines from the Province (i.e., BC MFLNRO 2014, 2016) when directing the placement of wildlife crossing points and the height of snow banks at those crossing points. The target interval will be 200 m (per BC MFLNRO 2016) and the target snow bank height will be 1 m or less. These targets, primarily directed at ungulates, allow wildlife to exit road corridors more easily.

- Environmental Manager or designate(s) will direct construction crews to create wildlife crossing points along open ditches. The Environmental Manager or designate(s) will consider ditch function and design, ditch length, topography, and guidance from a Qualified Professional and/or the BC MFLNRORD when directing the placement of wildlife crossing points.
- Follow Conuma's Standard Operating Procedure for Caribou Encounters (see Appendix A)

3.4 Mortality Risk and Incidental Take

The following measures are intended to address mine-related mortality of wildlife, including incidental take of birds⁶:

- Conform to the General Restrictions (Section 3.1)
- Conform to measures related to wildlife health and safety (Section 3.5)
- Conform to measures related to habitat protection (Section 3.2)
- Bird nests are protected under the federal *Migratory Birds Convention Act* and the BC *Wildlife Act* while they are actively being used (i.e., nest-building, egg-laying, incubation, brooding, and rearing and fledging young). Schedule vegetation clearing and/or grubbing to avoid the migratory bird nesting period for the region (i.e., April 19 to August 24 [for the A4 nesting zone, all habitats, based on ECCC 2019b]), If vegetation clearing and/or grubbing must occur during the migratory bird nesting period, then the Environmental Manager or designate(s) will direct that a 'nest sweep' be completed. Specifically:
 - Qualified Professional will undertake a nest sweep in the portions of the mine site to be cleared of vegetation and a 30-m buffer area around the clearing areas, where feasible
 - Nest sweep will be completed no more than 7 days before clearing and/or grubbing is scheduled to commence. Seven days is the maximum length of time that can elapse before another nest sweep is needed; emphasis will be placed on commencing clearing and/or grubbing activities as soon as possible following the nest sweep, preferably within 24 to 48 hours.
 - If an active bird nest is discovered, the Qualified Professional in consultation with the Environmental Manager or designate(s) will establish a nest-specific setback and restricted activity period
 - If clearing and/or grubbing activities do not commence within 7 days of the nest sweep, the Qualified Professional will undertake another nest sweep
 - Findings of nest sweeps will be reported to the Environmental Manager or designate(s) verbally and supported by written communication and site maps, where relevant. These findings will be provided to the BC MFLNRORD and Indigenous groups upon request
- Some species (e.g., owls) may nest before the identified migratory bird nesting period begins (i.e., before April 19). Report the discovery of active nests during mine activities to the Environmental Manager or designate(s), who will:
 - Stop work in the area around the nest
 - Consult with a Qualified Professional to determine an appropriate setback and restricted activity period

⁶ The inadvertent harming, killing, disturbance or destruction of migratory birds, nests and eggs is known as incidental take (ECCC 2019a).

- In the Peace Region, the amphibian breeding period is mid-April to mid-August depending on annual weather conditions. Following breeding, the dispersal of amphibians from breeding sites typically occurs from mid-July to mid-September. Risk timing windows for western toad are not well defined (i.e., 'summer' is identified as the caution timing window in BC MFLNRO 2014). Conuma will consult with the BC MFLNRORD on the appropriate regional timing windows for western toad. Where potential amphibian breeding and dispersal habitats intersect vegetation clearing areas, mitigation measures may include timing constraints, installation of geotextile fencing, or amphibian salvage and relocation. Where western toad dispersal routes intersect access roads or the coal haul route, mitigation measures such as underpasses/culverts, drift fencing, or translocation of toads may be required. Conuma will consult with the BC MFLNRORD on the methods and timing of applicable surveys and mitigation measures.
- Conform to engineering requirements for ditches and engineered embankments/dams/sediment ponds per the direction of the Vice-President of Technical Services or designate(s). Detailed engineering design of these structures will consider the need to prevent hazards to, or entrapment of, wildlife, particularly ungulates.
- Use existing clearings, trails, and roads, where feasible, to reduce the creation of new access and linear development on the Brule Mine property
- Brule Mine Reclamation Plan (EMS-9.6b) includes re-establishing functional ecosystems that support low predator density and limit predator and human access by:
 - Re-establishing forest cover to reduce the amount of early seral habitat that is preferred by moose, elk, and deer
 - Permanently deactivating linear features, not required at post-closure, to limit predator and human access

3.5 Wildlife Health and Safety

The following sections address key components of wildlife health and safety, including bear awareness and conflict wildlife.

3.5.1 Traffic

The following measures are intended to avoid or reduce the incidence of wildlife-vehicle collisions and near misses:

- Wildlife collision prevention pamphlets will be available from the Environmental Manager or designate(s). Pamphlets will be distributed during orientation sessions and as requested. The Environmental Manager will be familiar with the Wildlife Collision Prevention Program (<http://www.wildlifecollisions.ca/Default.aspx>).
- Report wildlife observations from roads (when travelling to and from the mine site). This information is useful in identifying areas where potential wildlife-vehicle collisions could occur. Mine personnel are required to report wildlife observations, including notes on road use, to the Environmental Manager or designate(s), who in turn will record the information in the Wildlife Log. Also see Reporting Wildlife Observations and Incidents (Section 5.0).
- Obey traffic signs. Provide signage that warns/reminds mine personnel (and other road users) to be vigilant for wildlife on roads. Signage will be targeted at areas where potential problems are anticipated or known to occur (e.g., areas of poor visibility, areas where wildlife are known to cross).

- Maximum speed limit on roads and trails on the Brule Mine property is 40 km/h
- Maximum speed limit on forest service or public gravel roads is 60 km/h or per posted signage
- Wildlife has the right-of-way except where it is determined to be unsafe to do so. If animals are on the road, slow down, stop if necessary, and allow them to leave the roadway
- Restrict access to seasonally or permanently deactivated trails using safe practices (e.g., high visibility barriers, signage)
- Follow Conuma's Standard Operating Procedure for Caribou Encounters (see Appendix A)
- Verbally report wildlife carcasses observed along access roads (including highways) to the Environmental Manager or designate(s) as soon as possible. A wildlife carcass along the road may attract other wildlife (e.g., bears) to the road corridor and increase the risk of wildlife-vehicle collisions. Conuma will relay reports of wildlife carcasses along highways to the BC Ministry of Environment and Climate Change Strategy, Conservation Officer Service.
- Wildlife-vehicle collision that results in the death or injury of wildlife must be reported as soon as possible. If an animal is killed due to a collision with a vehicle, the Environmental Manager or designate(s) will notify the BC Ministry of Environment and Climate Change Strategy, Conservation Officer Service⁷, so that the carcass can be removed in a timely manner, disposed of appropriately, and an Incident Report prepared (see Section 5.2). If an animal is injured due to a collision with a vehicle, the Environmental Manager or designate(s) will: seek direction from the BC Ministry of Environment and Climate Change Strategy, Conservation Officer Service; mobilize trained personnel if required (e.g., if the injured animal must be destroyed); and prepare an Incident Report (see Section 5.2). Note that some injured animals may pose a safety hazard (e.g., bears).
- Near miss between a vehicle and an animal will be reported as an 'incident' (see Section 5.2). Knowing where near misses have occurred is important for identifying areas that may require warning signs.
- Re-vegetation planning for erosion control and roadsides will avoid or reduce the use of vegetation species that are attractants for bears and other wildlife (see Brule Mine Reclamation Plan [EMS-9.6b]). Also see Garbage and Other Attractants (Section 3.5.3) and the Brule Mine VMP (EMS-9.5b-MGT).

3.5.2 Health

The following measures are intended to reduce mine-related adverse effects on wildlife health (including non-vehicle related accidents and consumption of toxic substances):

- Follow Conuma's procedures on the safe and prompt clean-up of chemical spills. Note that any chemical is a potential toxin to wildlife, whether spilled on the ground or in the water. The Environmental Manager or designate(s) is to confirm the prompt and effective handling of spills, leaks and other releases from mine activities and equipment, per the Brule Mine Chemical Handling and Spill Prevention Plan (EMS-7.2b-MGT) and the Brule Mine Emergency Response Plan (EMS-11.5b-MGT). It may be necessary to temporarily fence chemical spill sites to prevent wildlife access during clean-up and site remediation.
- Maintain the mine site, through proper management of industrial materials, debris, and works, in a manner that avoids or reduces the risk that wildlife will encounter potential hazards, such as ropes, wires, holes, and chemicals.

⁷ RCMP is to be notified if damage is greater than \$1,000 or there are human injuries

- Avoid attracting wildlife to contact water ditches and sediment ponds by controlling the growth of vegetation around the edges. Visual and auditory wildlife deterrents (e.g., predator decoys, scare cannons) will be deployed around the biochemical reactor cells and aerator ponds, and revegetation at these locations will be limited to native grasses to control erosion per the Brule Mine Reclamation Plan (EMS-9.6b).
- Conform to mitigation measures in the Brule Mine Selenium Management Plan (EMS-9.9b-MGT)
- Report observations of wildlife in and around potential sources of contaminants (e.g., sediment ponds, fueling sites) to the Environmental Manager or designate(s); such observations will be followed up on, as appropriate, to prevent wildlife access to contaminants.
- Report discoveries of injured or dead bats or bats flying in winter or early spring (i.e., November 1 to May 31, the white-nose syndrome surveillance period identified by the BC Wildlife Health Program) to the Environmental Manager or designate(s), who will contact the BC Community Bat Program (1-855-922-2287 or info@bcbats.ca) for direction on the appropriate protocol for collection and submission of the specimen(s). Do not handle bats, dead or alive, with bare hands due to risk of rabies.

3.5.3 Garbage and Other Attractants

Food waste and other garbage is the typical wildlife attractant that is implicated in the development of conflict wildlife, especially with respect to conflict bears. However, there are other attractants that may create conflicts: chemicals (e.g., road salt) and associated refuse (e.g., empty fuel containers), wildlife carcasses (e.g., road kills, hunter kills), and roadside vegetation (e.g., clover). Attractants that draw wildlife to a site (e.g., the road corridor) and/or habituate wildlife to human activities are serious concerns that can lead to unsafe conditions and risks to wildlife and human safety, and potential damage to equipment and facilities.

While bears tend to be the greatest concern with respect to access to garbage, other animals (e.g., foxes, coyotes) may be attracted to uncontained garbage sources. The following are measures directed at avoiding or reducing wildlife conflicts related to food waste and garbage:

- Conform to the General Restrictions (Section 3.1)
- Sewage, food waste, and waste associated with mechanical maintenance and repairs (e.g., motor oil) will be managed and disposed of appropriately per the direction of the Environmental Manager or designate(s) and in accordance with the Brule Mine Waste Management Plan (EMS-7.3b-MGT) and the Brule Mine Chemical Handling and Spill Prevention Plan (EMS-7.2b-MGT)
- Temporary (small) storage containers for garbage and recycling are not to be placed outdoors; porches and decks of buildings are considered outdoors with respect to this direction
- Report wildlife incidents related to garbage or human food attractants to the Environmental Manager or designate(s) as soon as possible
- Report improperly disposed of garbage, particularly food wastes, to the Environmental Manager or designate(s) as soon as possible. The Environmental Manager or designate(s) will confirm that improperly disposed of garbage found in and around the mine site is removed and properly disposed.
- Environmental Manager or designate(s) will include garbage handling on the regular site inspection checklist. Items to check include cleanliness of waste transfer areas, condition of bear-proofing measures (e.g., metal lids on bins), and evidence of non-conforming garbage storage (e.g., temporary storage containers placed outdoors).

- Seeding along road corridors cannot be undertaken without approval of the Environmental Manager or designate(s). Inappropriate seed mixes can attract ungulates and bears to roadsides and create both traffic safety and conflict wildlife situations. If seeding of roadsides is proposed (e.g., to control erosion) the Environmental Manager or designate(s) should confirm that appropriate seed mixes are used. The use of appropriate seed mixes (e.g., weed free) will also control the introduction of invasive plant species in and around the mine site. For additional information see the Brule Mine VMP (EMS-9.5b-MGT).

3.5.4 Bear Awareness

The objectives of the bear awareness component of the WMP are to reduce the incidence of human-bear conflicts and the associated safety risk to humans and mortality risk to black and grizzly bears. Conuma is aware that grizzly bear is a species at risk (i.e., designated as Special Concern and on Schedule 1 of the *Species at Risk Act* [SRPR 2019]) and that grizzly bears are sensitive to disturbance and human-caused mortality risk in areas of industrial and road development. The following measures support the bear awareness objectives:

- Conform to the General Restrictions (See Section 3.1)
- Conform to all requirements for the management of garbage and other attractants (See Section 3.5.3)
- Conform to all requirements regarding conflict wildlife (See Section 3.5.5)
- Mine personnel are required to participate in the site orientation program, which includes bear safety components such as garbage management, reporting bear sightings, and incident response. Mine personnel who might encounter bears because of their work requirements (e.g., surveyors, water samplers working along creeks) are required to participate in an additional Bear Safety orientation.
- Bear Aware pamphlets will be available to mine personnel and site visitors. The Environmental Manager or designate(s) will distribute these pamphlets during site orientations, and as requested.
- Bear safety videos will be available for viewing by mine personnel, through a request to the Environmental Manager or designate(s)
- Mine personnel working in the field may carry commercially available personal bear deterrent devices (i.e., bear spray) but will require an orientation on the use of these devices; contact the Environmental Manager or designate(s) for additional information. Restrictions on the use and transport of personal bear deterrent devices must be followed (e.g., do not transport bear spray inside aircraft).
- Report bear observations from the mine site and roads (when travelling to and from the mine site). This information is useful in tracking bear use of habitats near the mine site and could contribute to a baseline database on bears on the Brule Mine property. The Environmental Manager or designate(s) will require mine personnel to record bear observations, including notes on habitat use. This measure is additional to the requirement to report bear conflicts (e.g., property destruction, garbage feeding, aggressive or unusual behavior).
- As soon as possible notify (verbally) the Environmental Manager or designate(s) of any conflict bear or bear safety issue (e.g., bear-human interaction). The Environmental Manager or designate(s) will initiate the appropriate actions in response to a conflict bear or bear safety concern (see Section 3.5.5).

3.5.5 Conflict Wildlife

While bears tend to be the highest profile conflict wildlife, other species may be attracted to industrial and camp facilities, and access road corridors, and become a concern with respect to human and equipment safety and efficiency. In addition, some species may be more aggressive under certain conditions or at specific times of the year. For example, moose and elk may be more aggressive when they have calves or during rutting season.

The following mitigations are intended to avoid or reduce the development of conflict wildlife:

- Conform to all requirements for garbage management (see Section 3.5.3). Mine personnel must have received a waste management orientation.
- Conform to the General Restrictions (Section 3.1). The restrictions on feeding wildlife is particularly important with respect to preventing conflict wildlife.
- Be 'Bear Aware'. Mine personnel must have received a Bear Aware orientation
- Verbally report wildlife incidents to Environmental Manager or designate(s) as soon as possible. Wildlife incidents include property destruction, garbage feeding, and aggressive or unusual behavior, particularly as they occur on site. Note that observations of wildlife (e.g., bears) on site are not necessarily indicative of a conflict—the animal may simply be 'passing' through. However, prompt notification of the Environmental Manager or designate(s) will allow the observation to be properly assessed as to whether the animal poses a conflict or not. The Environmental Manager or designate(s) may choose to broadcast notification of certain wildlife incidents (e.g., aggressive bear encounter) over the radio.
- Verbally report wildlife carcasses observed on and near the mine site to Environmental Manager or designate(s) as soon as possible. Wildlife carcasses, whether from natural causes, vehicle collisions, or hunter kills, can attract wildlife, most notably bears and ravens. When these attractants are along road corridors or near the mine site, they may increase the risk of wildlife-vehicle incidents (e.g., a bear staying along a road corridor to feed on a carcass) or bear-human interactions (e.g., a bear defending a carcass).
- Environmental Manager or designate(s) is to confirm that the BC Ministry of Environment and Climate Change Strategy, Conservation Officer Service is notified, and that the responsibility for the timely removal and appropriate disposal of the carcass is assigned as soon as possible.

The measures above should avoid or reduce the development of conflict wildlife. However, in the event a conflict wildlife situation arises, the following will apply:

- As soon as possible notify (verbally) the Environmental Manager or designate(s) of any conflict wildlife issue. Note that reporting wildlife incidents as they occur (see Section 5.2) will allow proactive rather than reactive measures to be taken to prevent a serious outcome (e.g., human injury, destruction of the conflict animal). The Environmental Manager or designate(s) should broadcast notification of conflict wildlife incidents over the radio.
- Environmental Manager or designate(s) will initiate the appropriate actions in response to a conflict wildlife issue. Any direct intervention (nonlethal or lethal) with respect to conflict wildlife will be undertaken by authorized personnel in consultation with, and as approved and/or directed by, the BC Ministry of Environment and Climate Change Strategy, Conservation Officer Service.
- Do not attempt to deal with a conflict wildlife issue on your own. Conflict wildlife can be dangerous. Only trained personnel will be directly involved in conflict wildlife interventions. All nonessential personnel will be removed from the site as directed by the Environmental Manager or designate(s).
- Follow Conuma's Standard Operating Procedure for Dangerous Wildlife (see Appendix B)

3.6 Caribou

The Brule Mine is not within an identified caribou herd boundary, but it is within matrix range (critical habitat) for caribou, specifically Type 2 matrix range as defined in the federal Recovery Strategy for Southern Mountain Caribou⁸. Type 2 matrix range provides for an overall ecological condition that will allow for low predation risk, defined as wolf population densities less than 3 wolves/1000 km² (Environment Canada 2014).

As identified in Table 1, the permit for Brule Mine includes a condition to “ensure consideration of the Peace Northern Caribou Plan (2012)⁹ and develop a Caribou Management and Mitigation Plan (CMMP) as part of the Wildlife Plan”. Conuma is developing a standalone CMMP for the Brule Mine; this CMMP will be available in May 2019. The caribou-specific mitigation measures in the Brule Mine CMMP are supplemental to the wildlife protection measures (Section 3.0) in this WMP.

4.0 Communication Strategy

The Environmental Manager is responsible for communicating the requirements of the WMP to mine personnel and site visitors. The Environmental Manager or designate(s) will:

- Provide a map that shows the mine site. This map will be posted and/or discussed with individuals in response to queries regarding the spatial extent of the restrictions on and around the Brule Mine property.
- Communicate WMP requirements to mine personnel through:
 - Orientation sessions
 - Daily tailgate or safety meetings (wildlife-related topics include wildlife encounter and bear safety refreshers, waste handling reminders, and review of recently reported incidents or observations)
 - Signage at the entrance to the Brule Mine property and warning signs (e.g., wildlife crossing area)
 - Distribution of wildlife collision prevention and other information pamphlets
 - ‘All Staff’ bulletins regarding temporally or spatially localized hazards
- Make hardcopies of the WMP and CMMP available at Conuma’s Tumbler Ridge office and on site (i.e., in the Mine Office)
- Where specific instructions are required regarding waste or other materials management (e.g., for designated contractors), provide this through a customized orientation and terms of contract.
- Post site-specific warnings related to conflict wildlife as required
- Provide biweekly bulletins on ‘wildlife to watch for’, including notification of significant seasonal activities (e.g., bear den emergence, fall rutting, nesting) and updated on recent wildlife observations
- Provide information sheets on wildlife habitat feature identification, bats, and caribou to mine personnel as part of site orientation, and at other times as appropriate

⁸ Type 2 matrix range is the area surrounding local population units (herds) where predator/prey dynamics influence caribou predation rates; and may also include areas with trace occurrences of caribou, dispersal zones between subpopulations, and dispersal zones between local population units (Environment Canada 2014)

⁹ BC MFLNRO 2012

- Establish a line of communication between key on-site personnel (i.e., Mine Manager, Loss Prevention, Environmental Manager or designate[s]) and relevant authorities to facilitate effective and rapid response to conflict wildlife incidents (see Section 3.5.5)
- Where specific instructions are required regarding clearing boundaries and setbacks, provide this directly through on-the-ground supervision and identification (i.e., flagging) supported by written information, including site maps, where relevant

5.0 Reporting Wildlife Observations and Incidents

Mine personnel and site visitors are required to submit information on their observations of wildlife or wildlife incidents. A wildlife observation may be an observation of sign (e.g., tracks, scat, nests, burrows), or of one or more animals behaving in a 'normal' way. In contrast, a wildlife incident may include close or aggressive encounters, unusual behavior in and around the mine site, traffic accidents or near misses, and observations of dead (e.g., road kill) or injured animals.

Wildlife observations and incident reports provide information that may identify:

- Potentially dangerous situations requiring intervention (i.e., conflict wildlife) (see Section 3.5.5)
- Situations that require notification to the BC Ministry of Environment and Climate Change Strategy, Conservation Officer Service (e.g., road kill) (see Sections 3.5.1 and 3.5.5)
- Weaknesses in waste management and conflict wildlife prevention measures (see Section 3.5.5)
- Areas that may require warning signs (e.g., poor visibility road corners) (see Section 3.5)

5.1 Wildlife Observations

Wildlife observations, including observations of wildlife habitat features (e.g., dens, cavities, mineral licks, nests), provide information on wildlife habitat use and behavior patterns in relation to the mine site and the Brule Mine property more generally. Wildlife observations will be entered in the Wildlife Log by the Environmental Manager or designate(s).

To maintain mine personnel interest in reporting wildlife observations, a biweekly summary of wildlife observations (non-spatially explicit) will be posted and discussed at health and safety meetings. Knowledge of the location of sensitive wildlife habitat features (e.g., mineral licks) will be restricted to a limited number of mine personnel, at the discretion of the Environmental Manager or designate(s) (to prevent vandalism).

5.2 Wildlife Incidents

Mine personnel are required to verbally notify the Environmental Manager or designate(s) of wildlife incidents as soon as possible. The Environmental Manager or designate(s) are to emphasize the importance of the direct verbal reporting of wildlife incidents. Following the verbal report of a wildlife incident, completion of an Incident Report may be requested. Wildlife incidents must also be entered in the Wildlife Log.

Wildlife incident reports will follow Conuma's environmental incident reporting standards (see SOP-MIN-011-4 Incident Reporting) and will include information on species involved or habitat affected, as relevant. Wildlife incident reports will be provided to the BC MFLNRORD and Indigenous groups upon request.

While there is a distinction between wildlife observations and wildlife incidents that will be communicated to mine personnel, there is the potential for overlap, especially regarding observations of certain wildlife (i.e., bears) in the immediate vicinity of the mine site, and thus all wildlife observation reports will be reviewed by the Environmental Manager or designate(s) for evidence of a potential conflict (e.g., habituation).

6.0 Monitoring

The Environmental Manager is responsible for monitoring mine personnel and public compliance with the measures for wildlife protection described in the WMP (see Section 2.0). A wildlife monitoring program is in progress for Brule Mine; the program will continue into post-closure for areas of the mine site that will continue to be inspected by mine personnel (e.g., water quality stations, reclamation monitoring). The wildlife monitoring program is compatible with and integrated into the mine's overall environmental monitoring and site inspection program.

Mine personnel and site visitors are required to report any wildlife observations, encounters, or concerns to the Environmental Manager or designate(s) by radio, in person or by written record (see Section 5.0).

The Environmental Manager or designate(s) will evaluate this information with respect to effectiveness of the mitigation measures described in Section 3.0, to the extent practical.

The Environmental Manager or designate(s) maintains a log of reported or observed infractions and/or questions or complaints. The Environmental Manager or designate(s) also regularly review the Wildlife Log and wildlife-related incident reports for indications of non-compliance with the WMP. Where issues with compliance are discovered the Environmental Manager or designate(s) will respond appropriately.

7.0 Reporting

The permit conditions for wildlife protection require that a summary of the effectiveness of the WMP and the CMMP be included in the annual reclamation report (see Table 1). Additionally, summary reports of wildlife-related mitigation measures, incidents, observations, and chance finds will be generated annually and will form the basis of adaptive management strategies to address compliance issues and conflict wildlife. These summary reports will be provided to the BC MFLNRORD and Indigenous groups upon request.

8.0 Contacts

BC Ministry of Environment and Climate Change Strategy, Conservation Officer Service

- 1-877-952-7277 (24 hours)

Report All Poachers and Polluters (RAPP) hotline

- 1-877-952-7277 (24 hours)

The RAPP hotline should also be used to report human-wildlife conflicts where public safety may be at risk.

RCMP (non-emergency), Chetwynd Detachment

- 250-788-9221

RCMP (non-emergency), Tumbler Ridge Detachment

- 250-242-5252

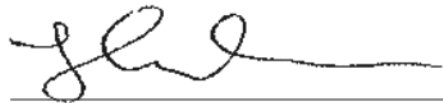
BC Ministry of Forests, Lands, Natural Resource Operations & Rural Development, Peace Natural Resource District Office, Dawson Creek, BC

- General Office number: 250-784-1200

9.0 Closure

This plan was prepared and reviewed by the following qualified professionals from Stantec Consulting Ltd.:

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10.0 Definitions and Acronyms

BC	British Columbia
CMMP	Caribou Mitigation and Monitoring Plan
Conuma	Conuma Coal Resources Limited
ESSFmv2	Bullmoose variant of the Engelmann Spruce–Subalpine Fir moist very cold subzone
km	kilometre
m	metre
MFLNRORD	Ministry of Forests, Lands, Natural Resource Operations and Rural Development
SBSwk2	Finlay-Peace variant of the Sub-boreal Spruce wet cool subzone
VMP	Vegetation Management Plan
WMP	Wildlife Management Plan

11.0 References

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- Conuma (Conuma Coal Resources Ltd.). 2017. Willow Creek, Brule and Wolverine Mines Wildlife Management Plan, Rev 1, EMS-MGT-9.7. Tumbler Ridge, BC.
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- ECCC (Environment and Climate Change Canada). 2019a. Avoiding Harm to Migratory Birds: Overview. Last updated May 25, 2017. Available at: <https://www.canada.ca/en/environment-climate-change/services/avoiding-harm-migratory-birds/overview.html>. Accessed March 2019.
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- SRPR (Species at Risk Public Registry). 2019. A to Z Species Index. Available from: http://www.registrelep-sararegistry.gc.ca/sar/index/default_e.cfm. Accessed March 2019.
- Western Canadian Coal Corp. 2005. Wildlife Protection Plan. Section 4.11. Brule Mine EA Certification Application. Vancouver, BC.

Appendix A. Conuma's Standard Operating Procedure for Caribou Encounters

Standard Operating Procedure

Caribou Encounters

EMS-9.7.2-SOP

March 2019, Rev 2

Version	Description	Date	Manager	JOHSEC
Rev 0	Create SOP	May 2017	Jackie Caldwell, Environmental	NA
Rev 1	Update SOP	February 2019	Michelle Marshall, Environmental	
Rev 2	Update SOP	March 2019	Michelle Marshall, Environmental	

Training Requirements & Acknowledgment

Specific Training Required:

1. Trainee must read and understand the operating procedures outlined in this SOP.
2. Trainee must demonstrate proper operating techniques and procedures outlined in this SOP.

Date Training Completed: _____ Date Permit Issued: (if needed) _____

_____ has met the minimum qualifications to perform this task as outlined above, and has demonstrated through Instructor/Supervisor observation that he/she can competently perform this task.

Trainer Signature: _____ Date: _____

Supervisor Signature: _____ Date: _____

I have completed the above training requirements for: (SOP Title) _____

Trainee's Signature: _____ Date: _____

Personal Protective Equipment (PPE) that may be Required:

1. Appropriate means of Communication; Radio, SPOT, or Cell phone
2. Personal First Aid Kit
3. Survival Kit plus food & water
4. Bear Spray (season appropriate)

Consideration of Safety & Potential Physical and Chemical Hazards Associated with Job

Physical and Natural Hazards:

5. NA

Remember - this is a Standard Procedure.

Occasionally steps may change due to unusual circumstance.

When steps must be altered or skipped, the Supervisor must be notified of the situation.

1. Purpose

To avoid or reduce adverse effects on caribou due to mine-related activities at Conuma Coal Resources Ltd. (Conuma) operations within caribou range.

Caribou are protected from capture and killing under the BC *Wildlife Act*, and hunting of Southern Mountain caribou is currently prohibited. The caribou population that occurs in the South Peace region of BC is provincially red-listed and federally designated as Threatened on Schedule 1 of the *Species at Risk Act*.

Due to the sensitive nature of caribou and the small population size of the local herds, all encounters have the potential to further stress the local population. Encounters with mine personnel can induce negative response from caribou, such as displacement from secure habitat, disruption of feeding or resting, increased level of stress hormones, injury, or mortality. This Standard Operating Procedure clearly describes the steps to be taken by personnel if caribou are encountered, to avoid or reduce further stress to the local population.

2. Scope

This procedure applies to all personnel at Conuma's properties at the mine site and during travel and hauling to and from site. This includes employees and contractors. This procedure is meant to be used in conjunction with the most current Wildlife Management Plan and Caribou Mitigation and Monitoring Plan specific to the mine site.

Conuma mine properties occur within the ranges of Quintette and Burnt Pine caribou herds. The Wolverine River and Perry Creek watersheds (Wolverine Mine) and Murray River watershed (Hermann Expansion) are within the Quintette caribou herd range and the Falling Creek Connector Road and Willow Creek Mine are within the Burnt Pine caribou herd range. Although the Burnt Pine herd is extirpated, it is still possible that caribou may be encountered as a rare event along the Falling Creek Connector Road corridor. The Brule Mine occurs within matrix habitat between the Burnt Pine and Quintette herd ranges, and it is unlikely that caribou will be encountered.

3. Definitions

Caribou/Southern Mountain caribou	An ungulate, member of the deer family, lives in mountain regions, boreal, and arctic. Southern Mountain caribou is a subpopulation of caribou that lives in southern two-thirds of British Columbia and west-central Alberta.
Caribou range/local population unit	Area of seasonal habitat use by caribou in all seasons within a herd range, as delineated by the Province; local population units are delineated in the federal recovery strategy and reflect likely larger historical subpopulations that have become fragmented
Critical habitat	Habitat that is necessary for the survival or recovery of a species at risk and that is identified in the federal recovery strategy. For Southern Mountain caribou, critical habitat includes high elevation winter and summer ranges, low elevation winter range, and matrix habitat (Type 1 and Type 2 matrix range).
Personnel	Refers to the person performing the task; employees or contractors
Red-listed	At risk in British Columbia and requiring investigation; includes a species or population that is extirpated, endangered, or threatened in British Columbia
Threatened, Schedule 1 of <i>Species at Risk Act</i>	At risk in Canada; a species or population that is likely to become endangered if limiting factors are not reversed

4. Requirements and Responsibilities

The Employee or contractor is responsible for recording wildlife encounters and sightings.

- a) Environmental Manager
 - Provide information to all mine personnel and contractors working in areas with potential for encounters with caribou
 - Make available to all mine personnel and contractors the applicable, and up-to-date, Wildlife Management Plan and Caribou Mitigation and Monitoring Plan specific to the mine site
 - Ensure wildlife reports at Loss Prevention are current and maintained consistently
 - Ensure Wildlife Log is maintained consistently and accurately
 - Submit caribou encounters and sightings to the Ministry of Forests, Lands and Natural Resource Operations and Rural Development, Northeast Region Ecosystems Section
- b) Mine Supervisor
 - Report all caribou sightings to Loss Prevention
 - Ensure mine personnel/contractors minimize contact with caribou as outlined in this procedure
- c) All Mine Personnel / Contractors
 - Report all caribou sightings to Supervisor as soon it is possible and safe to do so
 - Avoid contact with caribou as outlined in this procedure

5. Procedure

- a) Driving—Caribou on Road
 - 1) Stop vehicle
 - 2) DO NOT sound horn or other alarms to frighten caribou from area
 - 3) Turn off high beams
 - 4) Use radio to notify other road users/mine personnel of encounter location
 - 5) Report encounter to Loss Prevention; include location, time, and number of animals, sex,

- approximate age, whether the caribou was collared, and circumstances of encounter
- 6) Allow caribou to move off the road:
 - Wait for caribou to move from road on their own volition
 - Backtrack to take a different route if possible
 - 7) Once the caribou is no longer visible, proceed with caution, moving slowly (half original speed recommended) until clear of encounter area
 - 8) Pass on information on encounter to oncoming shift to inform workers in encounter area
- b) Driving—Caribou near Road
- 1) Slow vehicle to half speed, slower if caribou could present collision risk
 - 2) DO NOT sound horn or other alarms to frighten caribou from area
 - 3) Turn off high beams
 - 4) Allow caribou to move away from the area before resuming original speed
 - 5) Report encounter to Supervisor (if on mine property)
 - 6) Use radio to notify other road users/mine personnel of encounter location
 - 7) Report encounter to Loss Prevention (Supervisor will do this for mine site encounters); include location, time, and number of animals, sex, approximate age, whether the caribou was collared, and circumstances of encounter
 - 8) Pass on information on encounter to oncoming shift to inform workers in encounter area
- c) Caribou in, or observed within 100 m of, Active Mine Area / Construction Site
- 1) Stop work, including vehicles and equipment, as soon as it is safe to do so
 - 2) DO NOT sound horn or other alarms to frighten caribou from area
 - 3) Turn off bright lights if safe to do so
 - 4) Report encounter to Supervisor
 - 5) Use radio to notify other mine personnel of encounter location
 - 6) Report encounter to Loss Prevention (Supervisor will do this for mine site encounters); include location, time, and number of animals, sex, approximate age, and circumstances of encounter
 - 7) Allow caribou to move off active mine site or construction area
 - 8) Once the caribou is no longer visible, proceed with caution
 - 9) Pass on information on encounter to oncoming shift to inform workers in encounter area
- d) Injured or Dead Caribou
- 1) Stop vehicle
 - 2) Under safe conditions, park the vehicle (pull off the road and do not create a hazard for other vehicles or wildlife)
 - 3) Do not approach injured or dead animals
 - 4) From the location of the animal, verbally report the location and details to the Supervisor by radio
 - 5) The Supervisor will notify the Conservation Officer Service as necessary

6. References

- a) South Peace Northern Caribou Standardized Industry Management Practices. Prepared by BC Ministry of Forests, Lands and Natural Resource Operations. Draft Version 5.0. October 2016.
<https://www2.gov.bc.ca/gov/content/environment/plants-animals-ecosystems/wildlife/regional-wildlife/northeast>
- b) A Compendium of Wildlife Guidelines for Industrial Development Projects in the North Area, British Columbia. Interim Guidance, November 19, 2014.
<https://www2.gov.bc.ca/gov/content/environment/natural-resource-stewardship/laws-policies-standards-guidance/best-management-practices>
- c) Guidelines for Managing Impacts from Mining Exploration on Wildlife & Habitat. Guidelines Fact Sheet. BC Ministry of Environment Guidelines Series, Peace Region, October 2008.
<https://www2.gov.bc.ca/gov/content/environment/plants-animals-ecosystems/wildlife/regional-wildlife/northeast>

Appendix B. Conuma's Standard Operating Procedure for Dangerous Wildlife

Standard Operating Procedure

Dangerous Wildlife

EMS-9.7.2-SOP

February 2019, Rev 0

Version	Description	Date	Manager	JOHSEC
Rev 0	Create SOP	February 2019	Michelle Marshall, Environmental	NA

Training Requirements & Acknowledgment

Specific Training Required:

1. Trainee must read and understand the operating procedures outlined in this SOP.
2. Trainee must demonstrate proper operating techniques and procedures outlined in this SOP.

Date Training Completed: _____ Date Permit Issued: (if needed) _____

_____ has met the minimum qualifications to perform this task as outlined above, and has demonstrated through Instructor/Supervisor observation that he/she can competently perform this task.

Trainer Signature: _____ Date: _____

Supervisor Signature: _____ Date: _____

I have completed the above training requirements for: (SOP Title) _____

Trainee's Signature: _____ Date: _____

Personal Protective Equipment (PPE) that may be Required:

1. Appropriate means of Communication; Radio, SPOT, or Cell phone
2. Personal First Aid Kit
3. Survival Kit plus food & water
4. Bear Spray (season appropriate)

Consideration of Safety & Potential Physical and Chemical Hazards Associated with Job

Physical and Natural Hazards:

5. NA

Remember - this is a Standard Procedure.

Occasionally steps may change due to unusual circumstance.

When steps must be altered or skipped, the Supervisor must be notified of the situation.

1. Purpose

To avoid human-wildlife conflict with potentially dangerous wildlife during mine-related activities at Conuma Coal Resources Ltd. (Conuma) operations.

Encounters between mine personnel and dangerous wildlife can lead to human-wildlife conflict such as equipment damage, bodily harm, or human fatality. This Standard Operating Procedure (SOP) clearly describes the steps to be taken by personnel to avoid human-wildlife conflict if dangerous wildlife is encountered.

2. Scope

This procedure applies to all personnel, including employees and contractors, at Conuma's properties at the mine site and during travel and hauling to and from site. This procedure is meant to be used in conjunction with the most current Wildlife Management Plan specific to the mine site.

Conuma mine properties occur within the ranges of several dangerous wildlife species. These species utilize a broad range of habitats within the properties including forested areas, alpine and subalpine parkland, wetlands and watercourses, and natural and harvested openings. Encounters with dangerous wildlife can vary throughout the year, season, or time of day, with the potential for human-wildlife conflict being relatively high during mating season, protection of young (e.g., cubs, calves), and defense of food resources (e.g., carcasses). While encounters with dangerous wildlife generally do not result in human-wildlife conflict, the scope of this SOP is to describe measures to be taken during encounters to reduce the likelihood of a human-wildlife encounter.

3. Definitions

Dangerous wildlife	Species that can be involved in a human-wildlife conflict, such as grizzly bear, black bear, ungulates (i.e., deer, moose, elk, mountain goat, caribou), canids (i.e., gray wolf, coyote), wolverine, and cougar
Encounter	A sighting of dangerous wildlife; the encounter could lead to a human-wildlife conflict
Human-wildlife Conflict	An encounter that results in equipment damage, bodily harm, or human fatality
Personnel	Refers to the person performing the task; employees or contractors

4. Requirements and Responsibilities

The Employee or contractor is responsible for recording dangerous wildlife encounters.

a) Environmental Manager

- Provide information to all mine personnel and contractors working in areas with potential for encounters with dangerous wildlife
- Make available to all mine personnel and contractors the applicable, and up-to-date, Wildlife Management Plan specific to the mine site
- Ensure wildlife reports at Loss Prevention are current and maintained consistently
- Ensure Wildlife Log is maintained consistently and accurately

- b) Mine Supervisor
 - Report all dangerous wildlife encounters to Loss Prevention
 - Ensure mine personnel/contractors avoid contact with dangerous wildlife as outlined in this procedure
- c) All Mine Personnel/Contractors
 - Report all dangerous wildlife encounters to Mine Supervisor as soon it is possible and safe to do so
 - Avoid contact with dangerous wildlife as outlined in this procedure

5. Procedure

- a) Driving—Dangerous Wildlife on Road
 - 1) Stop vehicle
 - 2) DO NOT sound horn or other alarms to frighten wildlife from area unless animal exhibits aggressive behavior (e.g., attempt to climb in or on vehicle or equipment)
 - 3) Turn off high beams
 - 4) Use radio to notify other road users/mine personnel of encounter location
 - 5) Report encounter to Loss Prevention; include location, time, and number of animals, sex, approximate age, and circumstances of encounter
 - 6) Allow dangerous wildlife to move off the road:
 - Wait for dangerous wildlife to move from road on their own volition
 - Backtrack to take a different route if possible
 - 7) Once the dangerous wildlife is no longer visible, proceed with caution, moving slowly (half original speed recommended) until clear of encounter area
 - 8) Pass on information on encounter to oncoming shift to inform workers in encounter area
- b) Driving—Dangerous Wildlife near Road
 - 1) Slow vehicle to half speed, slower if dangerous wildlife could present collision risk
 - 2) DO NOT sound horn or other alarms to frighten dangerous wildlife from area unless animal exhibits aggressive behavior (e.g., attempt to climb in or on vehicle or equipment)
 - 3) Turn off high beams
 - 4) Allow dangerous wildlife to move away from the area before resuming original speed
 - 5) Report encounter to Supervisor (if on mine property)
 - 6) Use radio to notify other road users/mine personnel of encounter location
 - 7) Report encounter to Loss Prevention (Supervisor will do this for mine site encounters); include location, time, and number of animals, sex, approximate age, and circumstances of encounter
 - 8) Pass on information on encounter to oncoming shift to inform workers in encounter area
- c) Dangerous Wildlife in Active Mine Area/Construction Site, Other
 - 1) Stop vehicle or equipment
 - 2) DO NOT sound horn or other alarms to frighten dangerous wildlife from area unless animal exhibits aggressive behavior (e.g., attempts to climb in or on vehicle or equipment)
 - 3) Turn off bright lights if safe to do so
 - 4) Report encounter to Supervisor
 - 5) Use radio to notify other mine personnel of encounter location
 - 6) Report encounter to Loss Prevention (Supervisor will do this for mine site encounters); include location, time, and number of animals, sex, approximate age, and circumstances of encounter
 - 7) Allow dangerous wildlife to move off active mine site or construction area
 - 8) Once the dangerous wildlife is no longer visible, proceed with caution, moving slowly
 - 9) Pass on information on encounter to oncoming shift to inform workers in encounter area

- d) Worker on Foot—Dangerous Wildlife Encounter
 - 1) STOP
 - 2) Do not make sudden movements; identify shortest path to an accessible vehicle or building that increases the distance between yourself and the animal; use handheld radio to call for assistance if needed
 - 3) Do not stare directly at the animal; begin to walk slowly (do not run) away from the animal and do not turn your back on the animal
 - 4) If animal begins to approach, ready your bear spray by removing from holster/vest and removing the safety clip; continue to back away and talk to the animal in a calm voice
 - 5) If the animal charges, make yourself look large, make loud noises, and use bear spray as required
 - 6) Once in a vehicle or building, report encounter to Supervisor
 - 7) Use radio to notify other mine personnel of encounter location
 - 8) Report encounter to Loss Prevention (Supervisor will do this for mine site encounters); include location, time, and number of animals, sex, approximate age, and circumstances of encounter
 - 9) Allow animal to move out of the area before proceeding with task; this may require waiting several hours as some animals may linger in an area for extended periods
 - 10) Pass on information on encounter to oncoming shift to inform workers in encounter area
- e) Injured or Dead Dangerous Wildlife
 - Stop vehicle
 - Under safe conditions, park the vehicle (pull off the road and do not create a hazard for other vehicles or wildlife)
 - Do not approach injured or dead animals
 - From the location of the animal, verbally report the location and details to the Supervisor by radio
 - The Supervisor will notify the Conservation Officer Service as necessary

6. References

None applicable

CARIBOU MITIGATION AND MONITORING PLAN

**CONUMA COAL
RESOURCES LIMITED**



Protecting Our House



Brule, Willow Creek and Wolverine Mines

**August 2017
Rev 1**

Version	Description	Date	Prepared By	Reviewed By	Signature
Rev 0	Initial MGT by Walter Energy	Unknown	Unknown	Unknown	
Rev 1	Updated MGT issued to MEM for approval	Aug 2017	Stantec	Jackie Caldwell, Conuma Environmental Manager	

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1.0 Introduction

This Caribou Mitigation and Monitoring Plan (CMMP) has been prepared to meet the following permit condition:

The Permittee shall ensure the Wildlife Management Plan is implemented to prevent and mitigate impacts to wildlife. The Plan shall ensure consideration of the Peace Northern Caribou Plan (2012)¹ and develop a CMMP as part of the Wildlife Plan. A summary of the effectiveness of the Wildlife Plan and specifically the CMMP shall be included in the annual reclamation report.

This draft permit condition applies to Willow Creek Mine (Permit C-153), Brule Mine (Permit C-221), and Wolverine Mine (Permit C-223). The Willow Creek Mine is within the Burnt Pine caribou herd boundary, and the Wolverine Mine is within the Quintette caribou herd boundary (Figure 1). The Brule Mine is not within a caribou herd boundary, but it is within identified South Peace Matrix range for caribou (BC MFLNRO 2016) (Figure 1).

The structure and content of this CMMP is based on the *South Peace Northern Caribou Mitigation and Monitoring Plan Guidance* (BC MOE 2013a) and the *Natural Resource Board Direction: Planning and Approval of Development Activities in the South Peace Northern Caribou Area* (Natural Resource Board 2013).

1.1 Regulatory Context

1.1.1 Federal

The Burnt Pine and Quintette caribou herds are part of the Central Mountain Designatable Unit, and are designated as Threatened under Schedule 1 of the *Species at Risk Act*, and are listed as Endangered by the Committee on the Status of Endangered Wildlife in Canada (SPRP 2017). Under the federal recovery strategy, the Burnt Pine herd is referred to as a subpopulation, and is part of the Pine River Local Population Unit (LPU); the Quintette herd is its own LPU (Environment Canada 2014).

¹ Note that this plan has been superseded by the Implementation Plan for the Ongoing Management of South Peace Northern Caribou (*Rangifer tarandus caribou* pop. 15) in British Columbia (BC MOE 2013b).



Notes

1. Coordinate System: NAD 1983 UTM Zone 10N
2. Data Source: DataBC, Government of British Columbia; Natural Resources Canada
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- Unincorporated Area
- Falling Creek Connector Road
- Highway
- Road
- Railway
- Contour (m)
- Watercourse
- Waterbody
- First Nations Reserve
- Park, Ecological Reserve, or Protected Area
- Municipal Boundary
- Caribou Herd Boundary
- ▨ Ungulate Winter Range
- ▨ Wildlife Habitat Area
- ▨ Critical Habitat (Type 1 Matrix Range)
- ▨ Critical Habitat (Type 2 Matrix Range)
- ▨ Winter Burnt Pine High Elevation Range
- ▨ Winter Moberly High Elevation Range
- ▨ Winter Quintette High Elevation Range
- ▨ Summer Pine River High Elevation Range
- ▨ Summer Quintette High Elevation Range
- ▨ Mine Footprint

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Stantec

CONUMA COAL RESOURCES LIMITED

Project Location: South of Chetwynd, BC

Client/Project: Conuma Coal Resources Limited Environmental Management Plans Wildlife Management Plan

Figure No. 1

Title: Overview of Willow Creek, Brule and Wolverine Mines in Relation to Caribou Habitat

Prepared on 20170620 by SPARKER
Reviewed on 20170620 by CERYDIN
GIS Review on 20170620 by NPUREWAL

123220851

The federal recovery strategy for Southern Mountain Caribou partially delineates critical habitat for the Pine River and Quintette LPU. Additional mapping of critical habitat is currently underway, and is expected to be available in an amended recovery strategy in late 2017 (ECCC 2017). Critical habitat is defined as the habitat that is necessary for the survival or recovery of a listed wildlife species and that is identified as the species' critical habitat in the recovery strategy or in an action plan for the species (Environment Canada 2014). Critical habitat within the Pine River and Quintette LPU is located within high elevation winter range (HEWR), high elevation summer range (HESR), low elevation winter range (LEWR), and matrix range². The recovery strategy describes the amount of critical habitat as follows:

- In LEWR and Type 1 matrix range with less than 65% undisturbed habitat, critical habitat includes that which is currently suitable as well as adjacent habitats that over time would contribute to the attainment of 65% undisturbed habitat
- In HEWR and/or HESR, critical habitat includes that which is currently suitable as well as adjacent habitat that over time would become suitable through restoration

1.1.2 Provincial

Caribou in BC are blue-listed provincially and are protected under the BC *Wildlife Act*. The provincial government has identified ungulate winter ranges (UWRs) and wildlife habitat areas (WHAs) for caribou. UWRs are areas that contain habitat necessary to meet the winter habitat requirements of a specified ungulate, and are established under the *Forest and Range Practices Act*. WHAs are areas that are necessary to meet a specific life requisite of a species. Within both UWRs and WHAs, activities are managed to limit their impact on the species the UWR or WHA was designated for.

The Province has mapped four types of habitat for caribou: HEWR, HESR, LEWR, and matrix range. HEWR, HESR, and LEWR are the three primary habitats that caribou live in, depending on season. Matrix range are areas that contribute to the predator-prey system within caribou range, but are not main caribou areas (BC MOE 2017).

To meet its commitments to manage and recover species at risk identified under the Accord for the Protection of Species at Risk in Canada and the Canada–British Columbia Agreement on Species at Risk, the BC Ministry of Environment has developed the *Implementation Plan for the Ongoing Management of South Peace Northern Caribou (Rangifer tarandus caribou) population 15 in British Columbia* (BC MOE 2013b). The implementation plan provides strategic direction and management actions required to meet conservation goals and objectives for the South Peace northern caribou (BC MOE 2013a).

Additional direction on caribou management and conservation is provided in the *South Peace Northern Caribou Mitigation and Monitoring Plan Guidance* (BC MOE 2013a) and the *Natural Resource Board Direction: Planning and Approval of Development Activities in the South Peace Northern Caribou Area* (the *Direction*) (Natural Resource Board 2013). BC MOE (2103a) identifies the need to incorporate the following two principles in CMMPs:

² The federal recovery strategy defines two types of matrix habitat: type 1 and type 2. Type 1 matrix range are areas within an LPU that have not been delineated as summer or winter range, and may include seasonal migration areas and areas of lower use compared to delineated seasonal ranges (Environment Canada 2014). Type 2 matrix range are areas surrounding LPUs where predator/prey dynamics influence caribou predation rates. Type 2 matrix range may also include areas with trace occurrences of caribou, dispersal zones between subpopulations, and dispersal zones between LPUs (Environment Canada 2014).

1. Proposed development activities and associated mitigation (including offsetting) can be demonstrated to result in a net neutral or positive effect on the viability of the South Peace northern caribou within 10 years of receiving approval.
2. Proponents are responsible for developing CMMPs and resourcing the management actions required to meet principle 1. The *Direction* also provides proponents the opportunity to be exempt from developing a CMMP, if they can demonstrate the proposed activities meet specific criteria.

1.2 Project Description

The three mines addressed in this CMMP are open pit coal mines located in the Peace River Regional District (see Section 1.4 of WMP).

The Willow Creek Mine is situated between 640 and 1,180 m elevation and overlaps the Bullmoose variant of the Engelmann Spruce–Subalpine Fir moist very cold subzone (ESSFmv2), the Finlay-Peace variant of the Sub-boreal Spruce wet cool subzone (SBSwk2), and the Boreal White and Black Spruce moist warm subzone (BWBSmw). Small-scale mining began at the Willow Creek mine site in 1999 and 2000. The mine was then put under care and maintenance until larger scale mining began in 2004. Operations were shut down in 2006 with a brief period of activation in 2008, and then a return to care and maintenance until the mine was re-opened in 2010. The Falling Creek Connector Road (between Willow Creek and Brule mines) was constructed in 2010. The mine entered into care and maintenance again in 2014; however, coal from Brule Mine continued to be processed at the Willow Creek mine site until mid-2015.

The Brule Mine is situated between 975 and 1,341 m elevation and overlaps the ESSFmv2 and SBSwk2 variants. Brule Mine began operations in 2007, incorporating the entirety of the Dillon Pit small mine (which had begun operations in 2004). The mine produced coal until 2014, when it entered care and maintenance. Mine site operations resumed in September 2016.

The Wolverine Mine is situated between 823 and 1,372 m elevation and primarily overlaps the ESSFmv2 and SBSwk2 variants, with only a very small portion within the BWBSmw subzone. Wolverine Mine began operations in 2006, and produced coal until 2014, when it entered care and maintenance. Mine site operations resumed in January 2017.

1.3 Boundaries of the Assessment Areas

The general assessment areas for this CMMP are the Burnt Pine and Quintette caribou herd boundaries, and adjacent matrix range (i.e., where Brule Mine is located) (Figure 1). None of the mine footprints overlap HEWR or LEWR, but there is overlap with other caribou habitat types (Table 1; Figures 2, 3 and 4).

Table 1 Overlap of Willow Creek, Brule, and Wolverine Mine Disturbance Areas with Caribou Habitat

Critical Habitat	Willow Creek Mine (Burnt Pine herd) (ha)	Brule Mine (matrix range) (ha)	Wolverine (Quintette herd) (ha)
HEWR	-	-	-
HESR	-	-	3.4
LEWR	-	-	-
Type 1 matrix range	868.9	-	956.6
Type 2 matrix range	-	695.5	-
WHA 9-062	-	-	1.8



- Falling Creek Connector Road
- Lease Boundary
- Highway
- Road
- Trail
- + + Railroad
- - - Cutline
- • - Power Transmission Line, Overhead
- Contour (m)
- Watercourse
- Waterbody
- Mine Footprint
- Critical Habitat (Type 1 Matrix Range)

0 0.5 1 km
1:24,000 (At original document size of 11x17)

Stantec

Project Location
South of
Chetwynd, BC

Client/Project
Conuma Coal Resources Limited
Environmental Management Plans
Wildlife Management Plan

Figure No.
2

Title
Location of Willow Creek Mine in Relation to Caribou Habitat

CONUMA COAL RESOURCES LIMITED

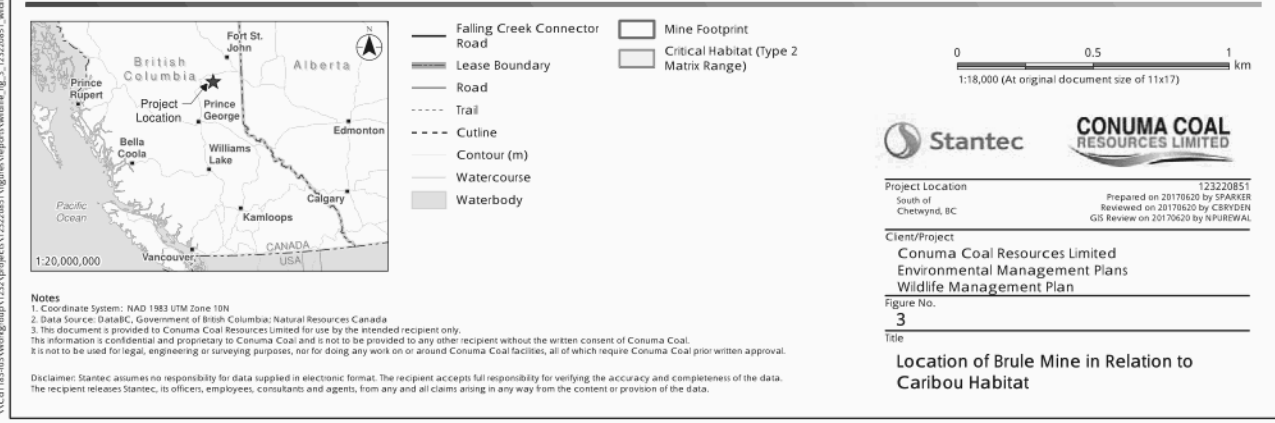
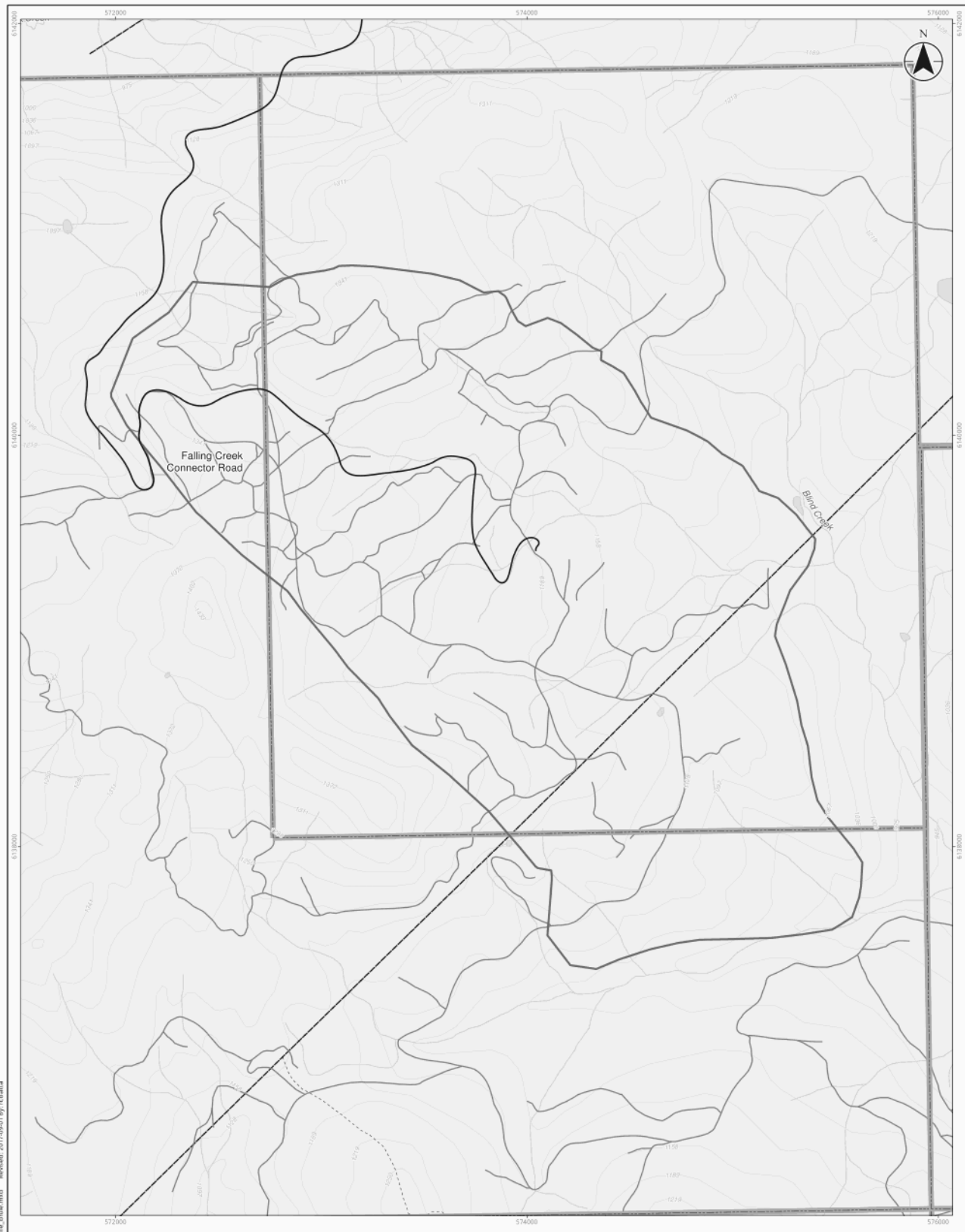
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Prepared on 20170620 by SPARKER
Reviewed on 20170620 by CERYDIN
GIS Review on 20170620 by NPUREWAL

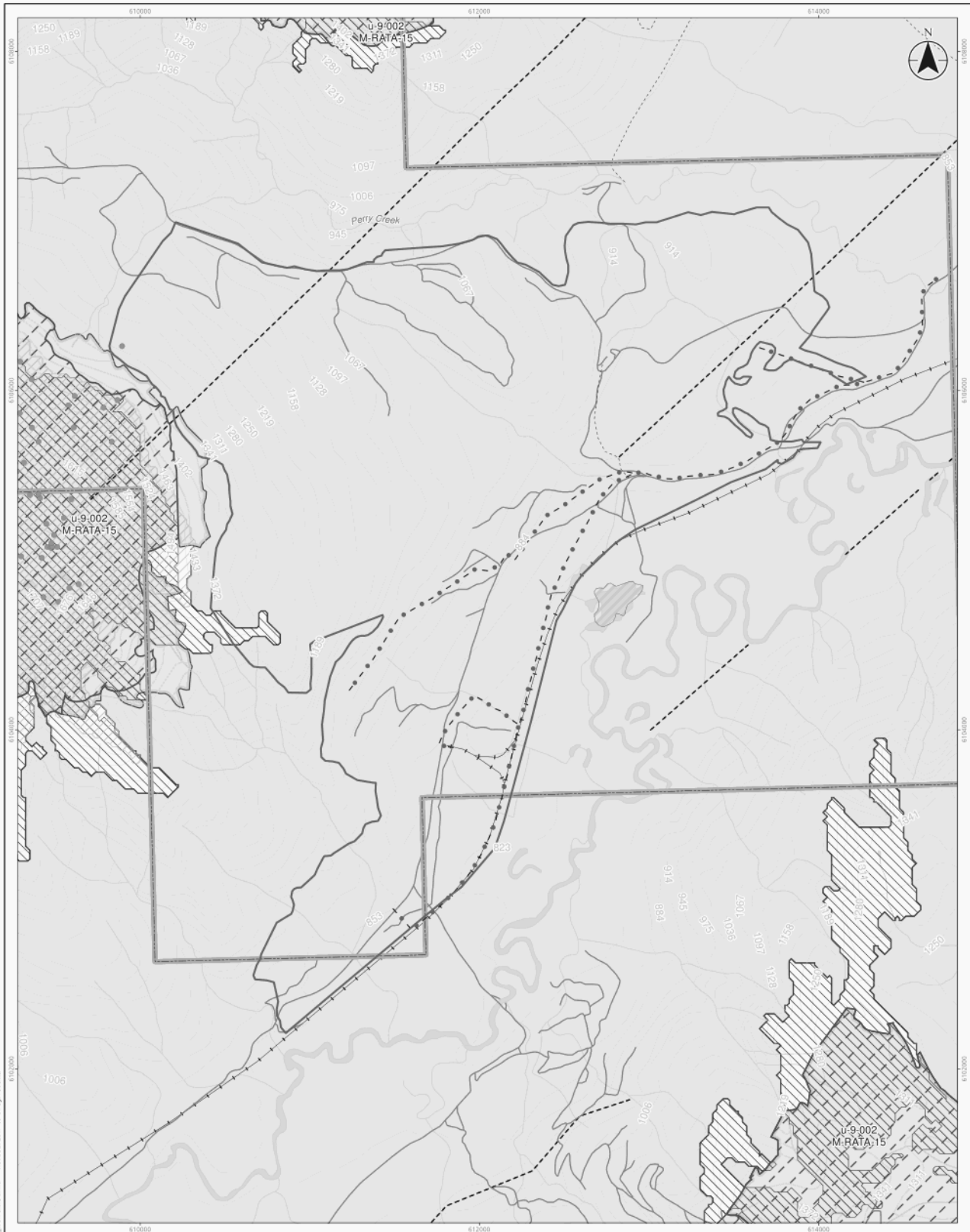
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- Caribou Telemetry
- - - Powerline
- Lease Boundary
- Road
- - - Trail
- + - - Railroad
- - - Cutline
- Contour (m)
- Watercourse
- Wetland
- Waterbody
- Mine Footprint
- South Peace Matrix Habitat (Type 1)
- Ungulate Winter Range
- Wildlife Habitat Area
- Winter Quintette High Elevation Range
- Summer Quintette High Elevation Range

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1:22,000 (At original document size of 11x17)



Project Location
South of
Chetwynd, BC

Prepared on 20170620 by SPARKER
Reviewed on 20170620 by CERYDIN
GIS Review on 20170620 by NPUREWAL

Client/Project
Conuma Coal Resources Limited
Environmental Management Plans
Wildlife Management Plan

Figure No.

4

Title

Location of Wolverine Mine in Relation to
Caribou Habitat

Notes
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1.4 Caribou Components

The *Guidance for the Development of Caribou Mitigation and Monitoring Plans* (BC MOE 2013a) identifies two caribou components and a suite of associated indicators that are to be used as the basis for developing a CMMP. The two caribou components, and their associated indicators, are:

1. Amount and condition of habitat, with indicators of:
 - Abundance and distribution of suitable winter habitat (e.g., HEWR and LEWR)
 - Proportion of disturbed habitat
 - Abundance and distribution of early seral habitat
2. Population structure and dynamics, with indicators of:
 - Density of moose
 - Density of wolves
 - Caribou population size
 - Caribou adult survival
 - Caribou calf survival
 - Caribou lambda³

Table 2 summarizes the indicators for the current amount and condition of habitat, and Table 3 summarizes the indicators for the current condition of the population structure and dynamics. The description of the current condition for each indicator is based on the most recent information for each herd.

³ Lambda is the population growth rate; $\lambda = (100 + \text{calf recruitment} - \text{adult mortality})/100$ (Wilson 2012)

Table 2 Amount and Condition of Habitat Indicators within the Pine River (Burnt Pine Herd) and Quintette Local Population Units

Habitat Indicator	Amount and Condition	Information Source	Comment
Abundance and distribution of suitable high elevation winter habitat ¹	<p><u>Burnt Pine Herd</u> Total: 10,942 ha Undisturbed: 10,626 ha</p> <p><u>Quintette Herd</u> Total: 71,276 ha Undisturbed: 65,190 ha</p>	Environment Canada (2012)	<p><u>Burnt Pine Herd</u> HEWR occurs on Howling Wolves Peak, Mt. Le Hudette, and Mt. Stephenson. The closest HEWR is 3.9 km from Willow Creek Mine.</p> <p><u>Quintette Herd</u> HEWR occurs on Mt. Bullmoose, Mt. Spieker, Mt. Collier, Mt. Chamberlain, Quintette Mtn., and Mt. Babcock. The closest HEWR is 0.1 km from Wolverine Mine.</p> <p>Existing disturbance includes coal mines, roads and trails, forestry cut blocks, exploration, burns, and insect kill.</p>
Abundance and distribution of suitable low elevation winter habitat ¹	<p><u>Burnt Pine Herd</u> Total: 0.0 ha Undisturbed: not applicable</p> <p><u>Quintette Herd</u> Total: 28,247 ha Undisturbed: 22,829 ha</p>	Environment Canada (2012)	<p><u>Burnt Pine Herd</u> There is no mapped LEWR within the Burnt Pine herd boundary.</p> <p><u>Quintette Herd</u> LEWR occurs along Meikle Creek, Bullmoose Creek and tributaries, and east of Highway 29. The closest LEWR is 20.8 km from Wolverine Mine.</p> <p>Existing disturbance includes Highway 29, forest service roads, wind energy, cut blocks, transmission lines, roads and trails, burns, and insect kill.</p>
Abundance and distribution of early seral habitat	<p><u>Burnt Pine Herd</u> Total: n/a</p> <p><u>Quintette Herd</u> Total: n/a</p>	Information on seral stage not available	<p>Early seral habitats include cut blocks, transmission lines, pipelines, burns, and insect kill.</p> <p>Wilson (2012) estimates 23.9% early seral habitat within low elevation winter range within the Quintette herd boundary.</p> <p>The amount of early seral habitat in the Burnt Pine herd is unknown.</p>
<p>NOTES:</p> <p>¹ The areas of HEWR and LEWR partially overlap.</p>			

Table 3 Current Condition of Population Structure and Dynamics Indicators

Indicator	Current Condition	Information Source	Comment
Density of moose	<u>Burnt Pine Herd</u> Moose density: n/a <u>Quintette Herd</u> Moose density: 0.28 prey per km ²	Wilson (2012)	Moose density, expressed as moose equivalents per km ² , is a function of the proportion of low elevation early seral conditions (Wilson 2012). Moose density within the Burnt Pine herd boundary is unknown.
Density of wolves	<u>Burnt Pine Herd</u> Wolf density: n/a <u>Quintette Herd</u> Based on a density of 0.28 prey per km ² , wolf density is 9.0 wolves per 1,000 km ² Seip and Jones (2017) estimated the density as 10 wolves per 1,000 km ²	Wilson (2012) Seip and Jones (2017)	Wolf density is expressed as a function of prey density: wolf density = $3.5 + (3.3 * \text{prey density} * 6)$ (Wilson 2012). Prey density was assumed to be 0.28 prey per km ² . Between January and March 2016, 65 wolves were removed from within or adjacent to the Quintette herd boundary. During winter 2017, 25 wolves were removed from within or adjacent to the Quintette herd boundary. Wolf removal information is not available for the Burnt Pine herd.
Caribou population size	<u>Burnt Pine Herd</u> Population = 0; considered extirpated <u>Quintette Herd</u> Population = 49 The population has increased since from 2016, but the trend is uncertain over the long-term.	ECCC (2017) Seip and Jones (2017)	The positive population increase may be related to wolf control program, but ongoing monitoring is required to confirm this (Seip and Jones 2017).
Caribou adult survival	<u>Burnt Pine Herd</u> Population = 0; considered extirpated <u>Quintette Herd</u> Adult mortality is 8%, suggesting that adult survival is 92%	Seip and Jones (2017)	This value for adult survival was interpreted from reported adult mortality.
Caribou calf survival	<u>Burnt Pine Herd</u> Population = 0; considered extirpated <u>Quintette Herd</u> Average calf recruitment rate is 14.2% (2003-2015) Calf recruitment rate was 18% in 2017	Seip and Jones (2017)	The higher than average calf recruitment rate might be attributable to the wolf control program.

Table 3 Current Condition of Population Structure and Dynamics Indicators

Indicator	Current Condition	Information Source	Comment
Caribou lambda (population growth rate)	Burnt Pine Herd Population = 0; considered extirpated <u>Quintette Herd</u> Lambda = 1.08 in 2017	Wilson (2012) Seip and Jones (2017)	A lambda value greater than 1.0 (i.e., population growth) may be related to the wolf control program, but ongoing monitoring is required to confirm this (Seip and Jones 2017).

1.5 Potential Effects

An assessment of potential effects is provided in the respective environmental assessments for the Willow Creek (see Section 6.10.7 in WCC 2010), Brule (see Section 10.3.2.1 in WCCC 2005), and Wolverine (see Section 5.10.2 in WCCC 2007) mines.

2.0 Mitigation Hierarchy

The provincial mitigation hierarchy establishes a structure to guide the development and application of mitigation measures based on four levels: avoid, minimize, restore on-site, and offset (BC MOE 2013a). The expectation is that all practical measures at one level are considered before moving to the next level, and that a rationale is provided for that approach (BC MOE 2014). In practice, the levels will often be considered “holistically and iteratively” (BC MOE 2014).

The mitigation measures in this CMMP follow the mitigation hierarchy to address potential project effects referred to in Section 1.5, with the goal of minimizing adverse residual effects on caribou components. The following subsections address the first three levels of the hierarchy: avoid, minimize, and restore on-site. This section concludes with the identification and characterization of residual project effects on the caribou components.

2.1 Avoid

The first level in the mitigation hierarchy is to avoid adverse effects on caribou components for the duration of operations at the three mines sites. The environmental assessments for the three mines took into consideration caribou habitat; however, due to the inherent nature of mining, mine placement was constrained by the location of coal deposits. As a result, portions of the mine sites occur within caribou habitat (see Table 1). As full avoidance is not achieved, this CMMP also includes the second level of mitigation; minimize.

2.2 Minimize

Minimize is the second level in the mitigation hierarchy, and is considered only when measures to fully avoid adverse effects on caribou components have been exhausted, or where avoidance is not practical for the given situation. Table 4 summarizes caribou-specific mitigation measures that are directly applicable to minimizing effects of the mines on caribou components. These mitigations are adopted from Draft South Peace Northern Caribou Standardized Industry Management Practices (BC MFLNRO 2016). Conuma will provide specific information on caribou and the CMMP to mine personnel as part of training and site orientation.

Table 4 Mitigation Measures Applicable to Minimizing Effects of the Operating Mines on Caribou Components

Mitigation Measure
Conuma will comply with the measures listed in the WMP.
Workers and visitors will follow Conuma’s Standard Operating Policy on caribou encounters.
Conuma will minimize impacts to terrestrial lichen resources, where possible, by: <ul style="list-style-type: none"> Avoiding disturbance of the duff layer and vegetative root mat Conducting activities during winter with an adequate snowpack, but when caribou are not using the area
Minimize snow removal to reduce predator travel along linear corridors. For any linear corridors where snow ploughing is required, breaks in snow berms will be created at approximately 200 m intervals, to the extent practical. Snow berms will typically be less than 1 m tall, and breaks will be aligned on opposing sides.

Mitigation Measure
Wildlife has the right-of-way except where it is judged to be unsafe to do so. If animals are on the road, slow down, stop if necessary, and allow them to leave the roadway.
Conuma anticipates minimal, if any, use of aircraft for mine-related activities; however, if aerial operations are required they will be undertaken in accordance with the Peace Region Guidelines for Aircraft Operations/Wildlife Interactions (BC MOE 2008).
Conuma will avoid placing debris/slash piles on terrestrial lichen sites.
Conuma will avoid using sites that support terrestrial lichens as sources of gravel for building/maintaining roads or for other purposes, to the extent practical.
Conuma will design and maintain open excavations (e.g., trenches, pits, sumps, exploration drill holes) to avoid entrapping caribou and other wildlife. This will be achieved by: <ul style="list-style-type: none"> Using fencing where practical Backfilling/contouring open excavations to a stable angle of repose
Conuma will contain sources of industrial contamination (e.g. sumps, settling ponds) to prevent caribou from accessing and ingesting hazardous material.
Noise will be minimized by regularly inspecting and maintaining exhaust systems for properly installed mufflers and, and checking that machinery is operating as per specifications. Unnecessary idling of equipment will be avoided.
Conuma will maintain known or discovered mineral licks, and associated wildlife trails to licks, in a natural state and make efforts to allow caribou access to these sites during high-use seasons (April to October). If mineral licks are known or discovered, Conuma will, to the extent feasible, implement a minimum 250 m setback around the mineral lick. If mine activities cannot be located outside of a 250 m setback, connectivity to adjacent forested areas will be maintained to the extent possible. Maintain visual screening (i.e. forested cover) to provide security and escape cover around mineral licks and trails.
Firearms are not permitted at the mine sites. This includes the carrying of firearms in private vehicles to and from the mine sites.
Pets are prohibited from being on the mine sites, and in vehicles when traveling to and from these sites.
The personal use of snowmobiles, ATVs, or other motorized recreational vehicles by company employees or contractors is not permitted within the mine sites during workdays or travel to and from these locations.
Conuma will maintain worksites in a tidy manner. Materials such as cables, wires, and fencing will be properly stored so as not to cause entanglement of caribou or other wildlife.
Where feasible, busses will be used to transport workers to and from the mine sites to reduce traffic volumes and vehicle collision risks to caribou.

The measures described in Table 4 are expected to reduce mine-related effects on the caribou components, but not necessarily to no-net potential effects. For example, restrictions on the timing of clearing activities may not reduce the overall size of the mine footprints. Also, restrictions related to overflights and the frequency, duration, and timing of human presence in and around HEWR, UWR, and WHA may minimize some intermittent or short duration sensory disturbance effects on caribou; but, they will not reduce the indirect effects of the mine operation itself. As the minimization measures do not result in a measurable reduction in mine-related effects on the caribou components, the CMMP moves directly to the third level, restore on-site.

2.3 Restore On-Site

Restore on-site is the third level in the mitigation hierarchy. Although planning for restoration and the implementation of restoration measures may begin at the start of a project, the effects will largely persist until restoration is complete and effective (BC MOE 2013a). Restoration measures will be carried out within the mine footprints, specifically within the area of the permit or other form of authorization (BC MOE 2013a).

2.3.1 Proposed Mitigation Measures

Following the BC MOE (2013a) guidance document, the three restore on-site measures, in order of preference, are:

- Restore: return caribou components to original or pre-existing structure, composition, pattern, and ecosystem processes, productivity, and services
- Remediate: eliminate, limit, correct, or counteract any contamination or associated adverse effects of a contaminant on caribou components
- Reclaim: ensure stabilization of the terrain and restoration of functional utility of the ecosystem with regard to caribou habitat and other caribou components

This CMMP has restoration and reclamation measures only. No requirement for remediation has been identified at this time because contamination is not expected. The restoration and reclamation measures are described in the Reclamation Plan (EMS- MGT-9.6).

2.3.1.1 Restoration

All major activities directly related to the mine sites will cease at the end of mine production. After which, there will be a lower level of activity while closure and reclamation occur. A lower, intermittent and diminishing level of activity, associated with environmental monitoring and site maintenance, will follow closure and reclamation (i.e., the post-closure phase). The Reclamation Plan (EMS- MGT-9.6) describes measures related to the reclamation of wildlife habitat, including caribou habitat, during the closure and post-closure phases.

2.3.1.2 Reclamation

Reclamation is the key mitigation measure for a mine development with respect to wildlife habitat and is a requirement under the *Health, Safety and Reclamation Code for Mines in British Columbia* (MEM 2017). Reclamation prescriptions and actions are described in the Reclamation Plan (EMS- MGT-9.6).

2.4 Residual Effects and Characterization

An assessment of residual effects is provided in the respective environmental assessments for the Willow Creek Mine (see Section 6.10.7 in WCC 2010), Brule Mine (see Section 10.3.6 in WCCC 2005), and Wolverine Mine (see Section 5.10.4.3 in WCCC 2007).

3.0 Monitoring and Reporting

The purpose of the monitoring component of the CMMP is to confirm that mitigation measures are implemented as planned and are effective at meeting the intended principle of a net neutral or positive effect on caribou components over a 10-year timeframe (BC MOE 2013a). Conuma has identified implementation monitoring,

reclamation monitoring, and caribou monitoring programs that are applicable to the CMMP. These monitoring programs are described below.

3.1 Implementation Monitoring

Implementation (i.e., compliance) monitoring of the CMMP will be undertaken by Conuma as a condition of the *Mines Act* permits. In summary, implementation monitoring will be undertaken to confirm that:

If key caribou, or caribou habitat features, are discovered during pre-disturbance surveys or during construction and operations, appropriate mitigation measures will be implemented

A detailed implementation monitoring program will be developed for the mines, and will include mine-specific monitoring where relevant (e.g., high elevation range features at Wolverine mine). The monitoring programs will describe (BC MOE 2013a):

- Obligations resulting from the mitigation plan
- Scope and frequency of monitoring required to assess implementation
- Data collection and analysis methods to be used (using standard protocols where available)
- Reporting structure

The monitoring programs will be developed in consultation with relevant regulatory agencies and Aboriginal groups.

3.2 Reclamation Monitoring

Reclamation monitoring will be used to evaluate and document the effectiveness of reclamation treatments. Details of the reclamation monitoring program are provided in the Reclamation Plan (EMS-MGT-9.6).

3.3 Effectiveness Monitoring

Effectiveness monitoring will be used to assess whether caribou use of reclaimed areas is successful. The monitoring will also be used to evaluate whether other ungulates (e.g., moose; deer) and predators (e.g., wolf, grizzly bear) are using reclaimed areas. Conuma will develop an effectiveness monitoring program that will:

- Monitor use of reclaimed habitat areas by ungulates and predators
- Monitor caribou use of reclaimed areas

A detailed effectiveness monitoring program will be developed for the mines, and will include mine-specific monitoring where relevant (e.g., high elevation range at Wolverine mine). The monitoring program will describe (BC MOE 2013a):

- Purpose and objectives
- Monitoring questions (to clearly indicate how objectives will be assessed)
- Indicators of effectiveness (e.g., tree growth rates; seedling survival, lichen cover, temporal relevance)
- Study design and methods
- Results

The monitoring programs will be developed in consultation with relevant regulatory agencies and Aboriginal groups.

As part of the effectiveness monitoring program, mine workers and mine site visitors will be required to report sightings of caribou to assist with site management. If caribou are sighted on or near the site, the observation will be verbally reported to the Environmental Manager or designate(s) as soon as possible. Supporting information for observations (e.g., exact location, number of animals, size, gender, age, behaviour, and movements and direction of movements) and reports of caribou sign (e.g., tracks; droppings; antlers; carcass) will also be required. This component of the effectiveness monitoring program will be summarized by Conuma and be available for distribution to provincial regulatory agencies should it be requested. For more information on reporting of wildlife sightings, refer to the WMP (Section 5.0).

3.4 Reporting

Reclamation reporting will be carried out annually and submitted to the BC Ministry of Energy and Mines per Part 9, Section 13.1(5) of the Code. Details on the reclamation reporting requirements are provided in the Reclamation Plan (EMS-MGT-9.6). The report will also include a summary of the effectiveness of mitigation measures implemented as part of the CMMP. Annual reclamation reporting will continue until all permit conditions are met and the Ministry of Energy and Mines has released the mine sites.

Caribou monitoring reporting will also be carried out annually and submitted to the BC Ministry of Forests, Lands and Natural Resource Operations and BC Ministry of Environment. The reports will be available to Aboriginal groups upon request.

4.0 Conclusion

Conuma believes that this CMMP is consistent with the guidance provided in BC MOE (2013a). Mitigation measures included in this CMMP follow the mitigation hierarchy of avoid, minimize, and restore on-site. Mitigations are specific to potential mine-related effects, with the goal of avoiding or reducing residual adverse effects on caribou components (e.g., habitat conditions, population structure and dynamics). Loss of high elevation range and matrix range is expected to remain after measures to avoid, minimize, and restore on-site have been implemented. Conuma will develop an offset measures plan for project effects on high elevation range (i.e., Wolverine mine). The offset measures plan will be consistent with provincial guidance (BC MOE 2013a), with the intent of achieving a net neutral or beneficial outcome for caribou within 10 years.

5.0 Definitions and Acronyms

CMMP	Caribou Mitigation and Monitoring Plan
HESR	High Elevation Summer Range
HEWR	High Elevation Winter Range
LEWR	Low Elevation Winter Range
LPU	Local Population Unit
UWR	Ungulate Winter Range
WHA	Wildlife Habitat Area

6.0 References

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