Crown Mountain Coking Coal Project

Figure 15.4-19
High-Quality Bighorn Sheep Year-round Habitat in the Terrestrial Local Study Area

LEGEND

- High-Quality Bighorn Sheep Year-round Habitat
- Terrestrial Local Study Area
- Project Footprint
- Highway
- Arterial/Collector Road
- Local/Resource Road
- Railway
- Transmission Line
- Watercourse
- Waterbody
- Wetland
- Provincial Park/Protected Area
- British Columbia/Alberta Border

0 2 4
Kilometres

Scale 1:85,000

Map Drawing Information:
Data Provided By NWP Coal Canada Ltd, Dillon Consulting Limited, Keefer Ecological Services Ltd, Province of British Columbia GeoBC Open Data, Government of Alberta Open Data, Natural Resource Canada.
Imagery Provided By Landsat 8 (Aug 2018), and GeoBC Ortho Imagery (Aug 2016).

Map Created By: PR
Map Checked By: JM
Map Coordinate System: NAD 1983 UTM Zone 11N

NWP Coal Canada Ltd

Project: 12-6231
Status: FINAL
Date: 2022-01-14

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Crown Mountain Coking Coal Project

Figure 15.4-20
High-Quality Mountain Goat Year-round Habitat in the Terrestrial Local Study Area

LEGEND

- High-Quality Mountain Goat Year-round Habitat
- Terrestrial Local Study Area
- Project Footprint
- Highway
- Arterial/Collector Road
- Local/Resource Road
- Railway
- Transmission Line
- Watercourse
- Waterbody
- Wetland
- Provincial Park/Protected Area
- British Columbia/Alberta Border

0 2 4
Kilometres

Scale 1:85,000

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The Project will result in a predicted loss of 202 ha of high-quality habitat, representing 3.3% of the total amount of high-quality bighorn sheep habitat available in the Terrestrial LSA (6,192 ha). Loss will be at the mine site, primarily along the ridge on the east side of the valley, though some in avalanche chutes on the west side of the Mine Rock Storage Facility. There will be no loss of bighorn sheep habitat along Erickson Ridge where winter range is known to occur. On a proportional basis, the availability of high-quality bighorn sheep habitat is lower within the Project footprint compared to the Terrestrial LSA as whole (16% for Project footprint and 26% for the Terrestrial LSA), meaning high-quality habitat is more common outside the Project footprint than it is within.

The Project will result in a predicted loss of 50 ha of high-quality mountain goat habitat, representing 2.2% of the total amount available in the Terrestrial LSA (2,313 ha). Loss will be at the mine site, primarily along the ridge on the east side of the valley, though some in avalanche chutes on the west side of the Mine Rock Storage Facility. There will be no loss of mountain goat habitat along Erickson Ridge. On a proportional basis, the availability of high-quality mountain habitat is lower within the Project footprint compared to the Terrestrial LSA as whole (4% for Project footprint and 10% for the Terrestrial LSA), meaning high-quality habitat is more common outside the Project footprint than it is within.

Clearing will begin in Construction and Pre-Production with initial portions of the 1,283 ha Project footprint (including the buffer) prepared for the mine site facilities, a portion of the North Pit, the Interim Sediment Pond, roads, the conveyor, the powerline and the rail loadout. During Operations, progressive clearing of the pits, Mine Rock Storage Facility, and Main Sediment Pond will continue through to Year 15. Bighorn sheep and mountain goat habitat loss will have a continuous adverse effect until progressive reclamation begins in Year 10 of Operations. With progressive reclamation between Years 10 and 15 and continued reclamation in the Reclamation and Closure phase, the effect of habitat loss will begin to decline.

Post mine reclamation will restore a mosaic of coniferous forest, open alpine tundra, rock outcrops, shrub and graminoid dominated brushland, talus slopes, wetlands, and riparian areas (described in Section 15.4.3.3.1 and in the Ecological Restoration Plan, Chapter 33, Section 33.4.1.3). Most of the high elevation ecosystems will provide habitat for bighorn sheep and mountain goat over time. Reclamation will begin in Year 10 of Operations for limited areas and then accelerating at the end of Operations. Within 5 years of closure, graminoids, forbs, and some shrubs will have become established and will begin to provide food for elk, though the quality will be variable and may be limited in many areas. Food availability will progressively improve at 25 and 50 years post-closure. Highwalls are to be left in their post-mine configuration with the intention of creating escape terrain habitat features for bighorn sheep and mountain goats (if the highwall slopes are steep enough). The Project footprint is ultimately expected to be a landscape similar in structure and composition to the pre-Project landscape.

Habitat degradation of ungulate habitat can occur from potential introduction and spread of invasive species, changes in vegetation vigour from dust deposition, and surface water runoff from the Project footprint that can contain suspended solids and affect vegetation. Mitigation for each of these effects was described in Chapter 13 and found to have no residual effects to each of the ecosystem VCs. Effects of habitat degradation on ungulates was therefore considered to be nil, or so small in magnitude relative to direct habitat loss that it was not quantified further.

The Project footprint includes a buffer area intended to account for uncertainty in precise boundaries of disturbance. Not all of the buffer area will be disturbed, and the calculations of habitat loss are therefore conservative and may be overestimated.

The residual effect to bighorn sheep and mountain goat from habitat loss and degradation is characterized as follows:

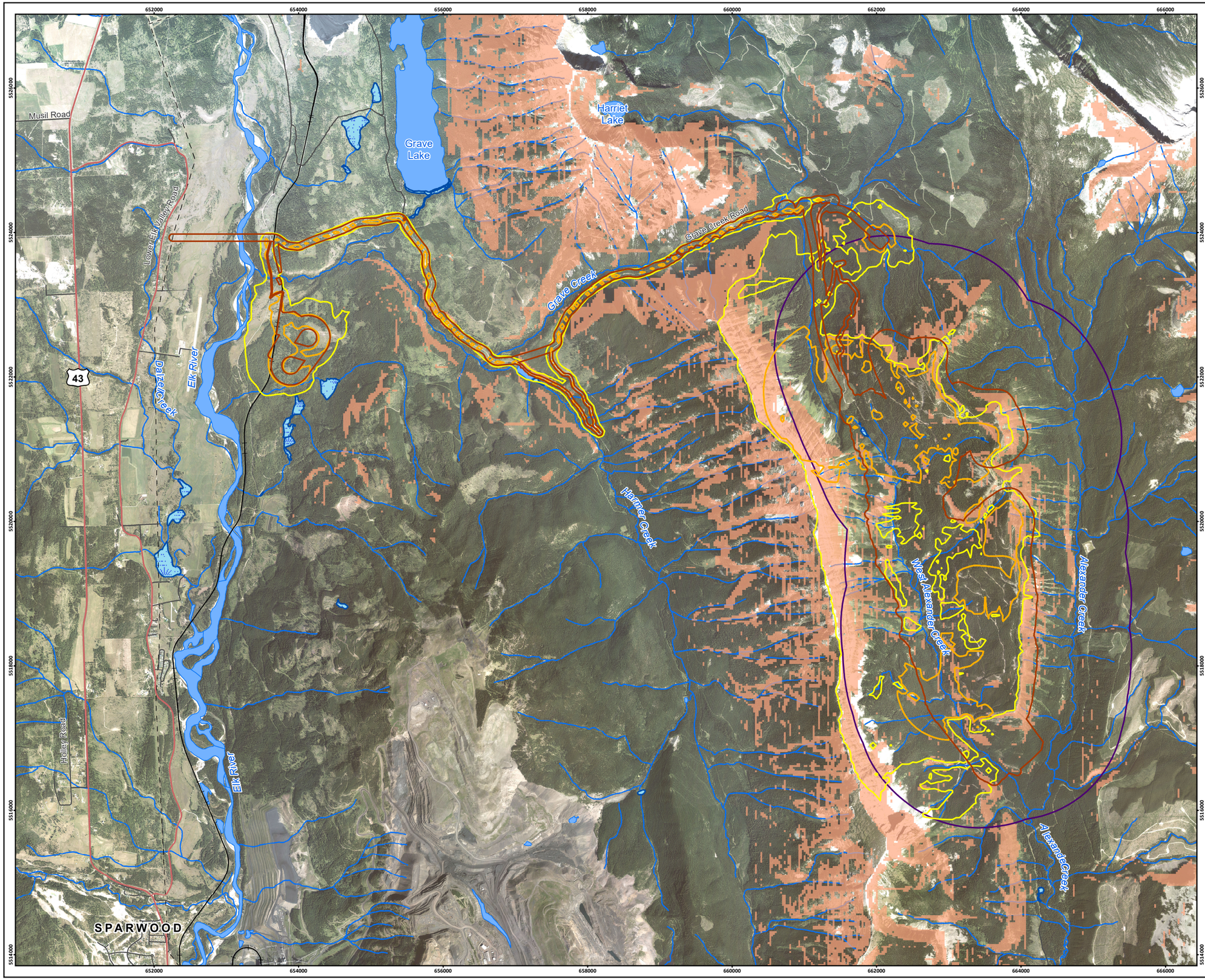
- Duration: *Long-term and permanent*, as some lost habitat will be restored prior to the end of the Post-Closure phase though not fully restored after the Post-Closure phase.
- Magnitude: *Low*, there will be a 3.3% loss of high-quality bighorn sheep habitat and 2.2% loss of high-quality mountain goat habitat in the Terrestrial LSA due to the development of the Project footprint.
- Geographic Extent: *Discrete*, as the effect of habitat loss will be within the Project footprint only.
- Frequency: *Continuous*, the effect of habitat loss and degradation is expected to be continuous until lost habitat is restored.
- Reversibility: *Reversible long-term*, the effect of habitat loss is anticipated to begin to be reversible once the Project footprint is restored.
- Context: *Low*, as habitat for bighorn sheep and mountain goat is highly specific.

Sensory Disturbance

Bighorn sheep and mountain goat habitat may be functionally lost or disturbed due to sensory disturbance. This is in addition to direct habitat loss from clearing. Sensory disturbance includes behavioural responses to Project-related noise, vibration, light, dust, and human presence. Sensory disturbance from noise and vibration has the potential to extend further than light, dust, and human presence and is the focus of the residual effects assessment, for conservatism. Potential effects arising from vibration, light, dust, and human presence would be expected to be less than those arising from noise.

Continuous Project-related noise at ≥ 45 dBA (nighttime threshold) will affect up to 1,118 ha outside the Project footprint. This overlaps with up to 338 ha of high-quality bighorn habitat and 190 ha of high-quality mountain goat habitat (Figure 15.4-21, Figure 15.4-22, and Table 15.4-25) when Project-related noise is at its peak in Year 10 of Operations. This represents 5.5% and 8.2% of high-quality habitat for bighorn sheep and mountain goat, respectively, in the Terrestrial LSA. A much smaller amount of high-quality habitat may be affected in daytime using the ≥ 55 dBA daytime threshold. Peak noise from blasting could affect 266 ha of high-quality bighorn sheep habitat and 88 ha of high-quality mountain goat habitat (Figure 15.4-21, Figure 15.4-22, and Table 15.4-25). This represents 4.3% and 3.8% of high-quality habitat for bighorn sheep and mountain goat, respectively, in the Terrestrial LSA.

Bighorn sheep and mountain goat may be displaced within the noise zones of influence. Habitat is not lost, but animals may spend less time in areas affected by noise, effectively degrading the quality of habitat or eliminating availability completely. Bighorn sheep can habituate to human disturbance and are known to occur in close proximity to active mine sites if forage availability is high. The effect of sensory disturbance on bighorn sheep may therefore be less relative to other ungulates. The noise zone of influence overlaps with high-quality mountain goat habitat along the east side of Erickson Ridge and mountain goats may be displaced from this area. Mountain goats are known to have higher sensitivity to noise relative to other ungulates.



Crown Mountain Coking Coal Project

Figure 15.4-21
High-Quality Bighorn Sheep Year-round Habitat in Relation to the Project Footprint and Noise Contours

LEGEND

- High-Quality Bighorn Sheep Year-round Habitat
- Continuous Project Related Noise - 45 dBA Contours
- Continuous Project Related Noise - 55 dBA Contours
- Offsite Peak Noise Levels From Blasting >108 dB
- Project Footprint
- Arterial/Collector Road
- Local/Resource Road
- Railway
- Transmission Line
- Watercourse
- Waterbody
- Wetland
- British Columbia/Alberta Border

0 1 2
Kilometres

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Scale 1:50,000

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