

Crown Mountain Coking Coal Project

LEGEND

- Northern Goshawk Call-playback Survey Location
- Northern Goshawk Habitat Assessment Survey Location
- Migration Standwatch Survey Location
- Watercourse
- Waterbody
- Wetland
- Terrestrial Local Study Area
- Project Footprint
- Provincial Park/Protected Area
- British Columbia/Alberta Border
- Highway
- Arterial/Collector Road
- Local/Resource Road
- Railway
- Transmission Line

Figure 15.7-3
Raptor Survey Locations

0 2 4
Kilometres

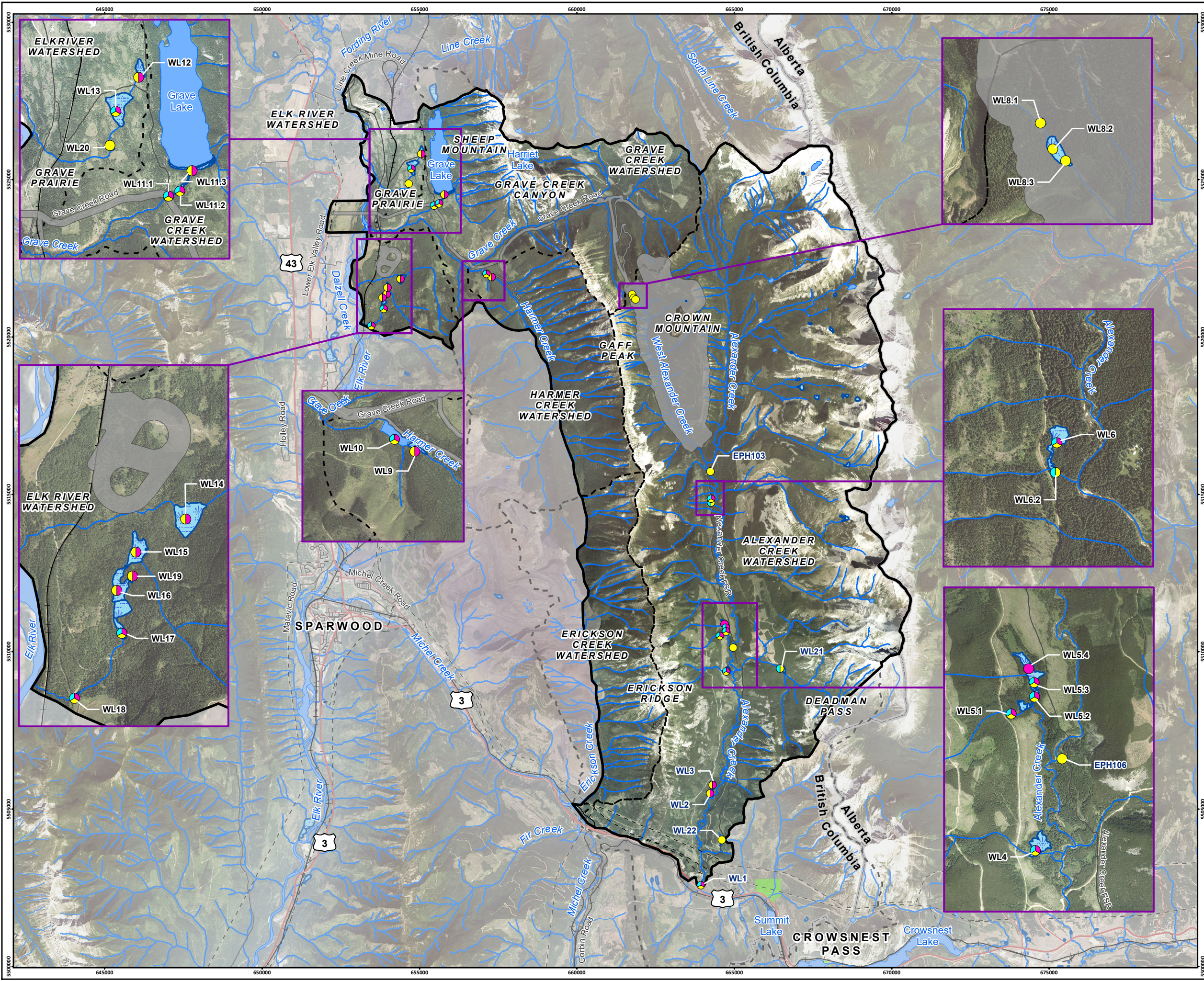
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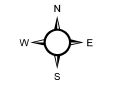
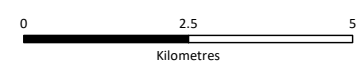


Crown Mountain Coking Coal Project

Figure 15.7-4
Wetland and Ephemeral Area Bird Survey Locations

LEGEND

- Fall Survey
- Spring Survey
- Summer Survey
- Wetland
- Terrestrial Local Study Area
- Project Footprint
- Highway
- Arterial/Collector Road
- Local/Resource Road
- Railway
- Transmission Line
- Watercourse
- Waterbody
- Watershed
- Provincial Park/Protected Area
- British Columbia/Alberta Border



Scale 1:115,000

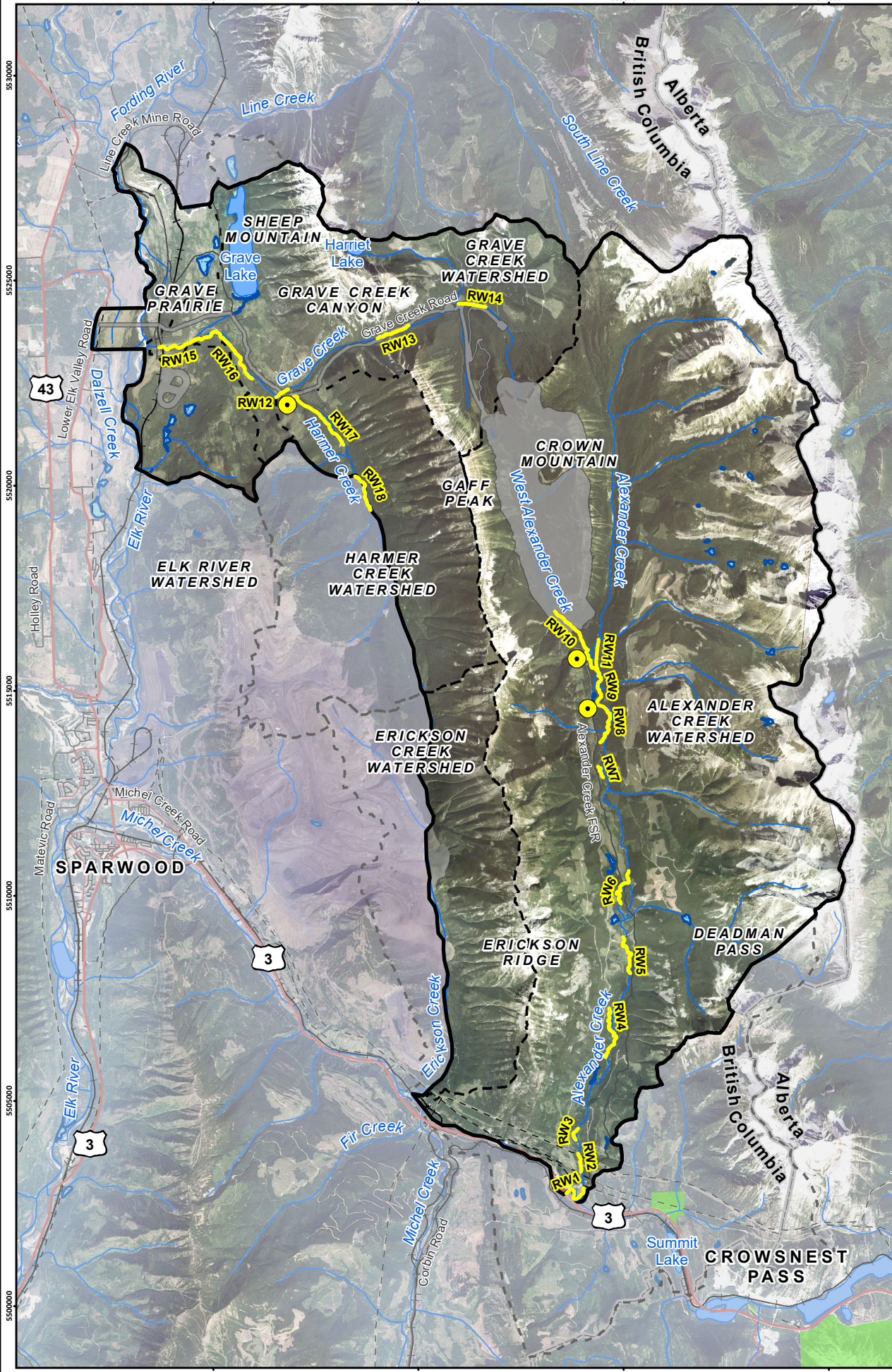
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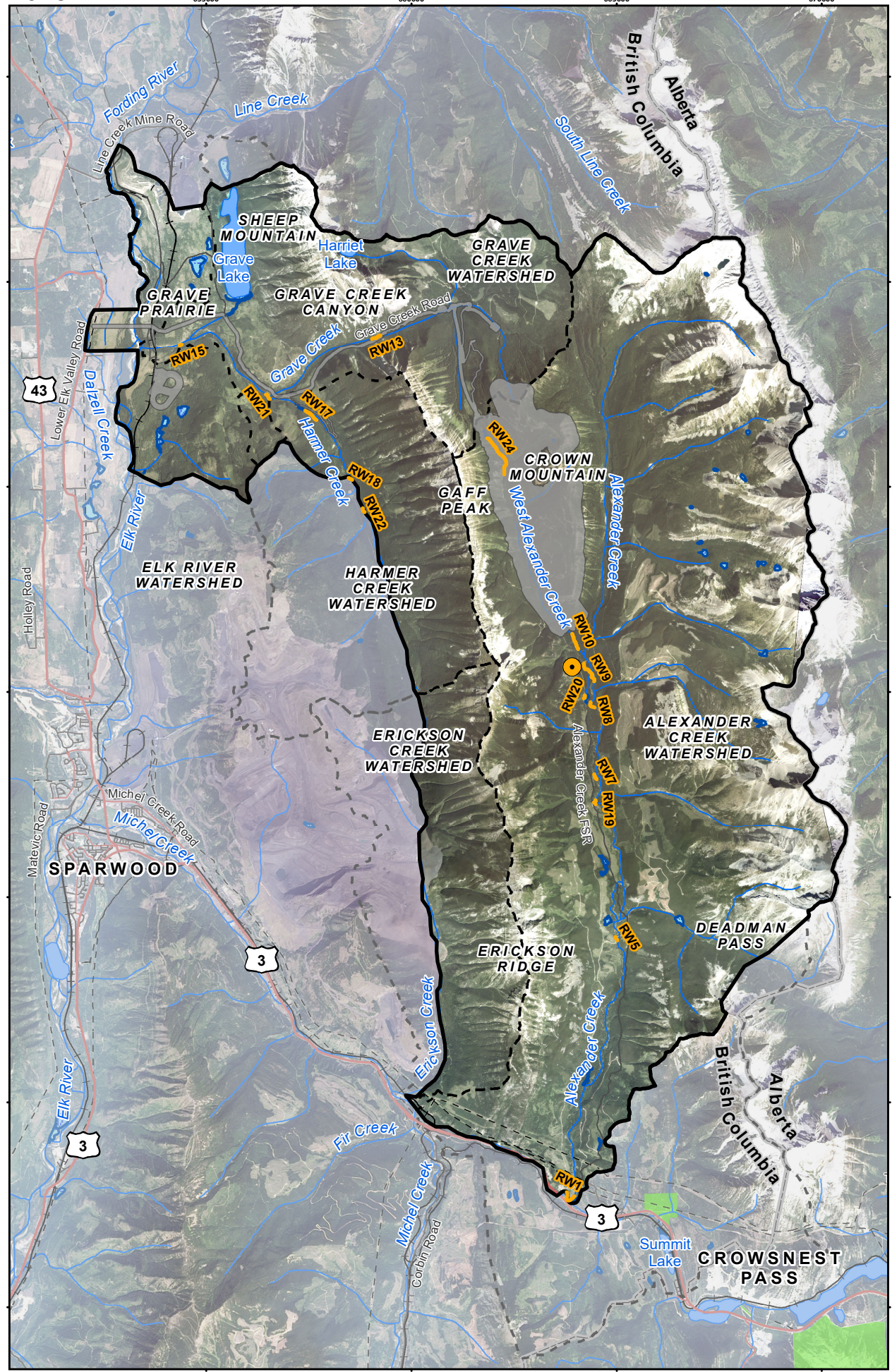
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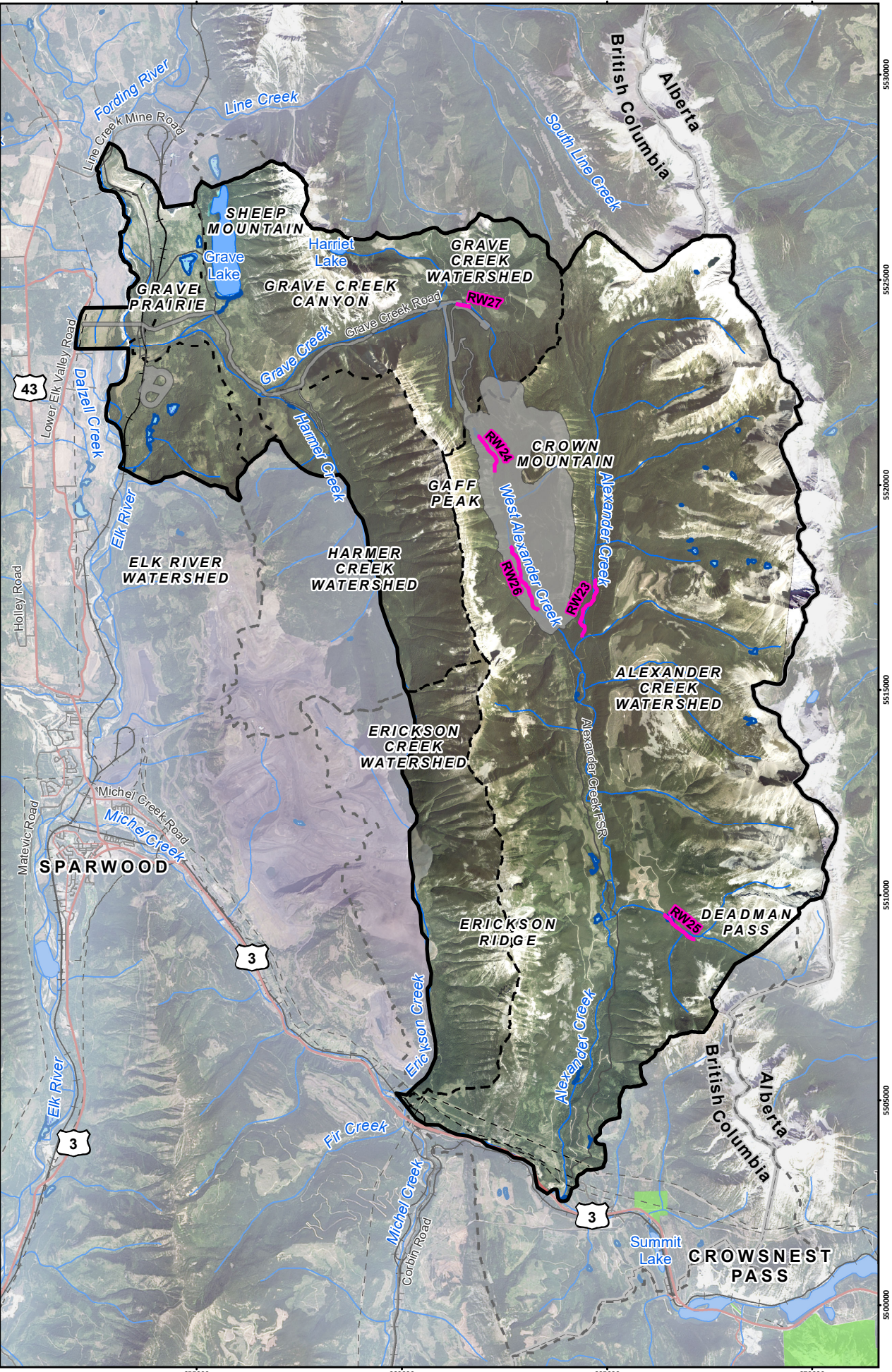
2017



2018



2019

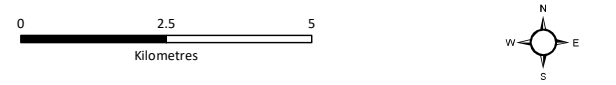


Crown Mountain Coking Coal Project

Figure 15.7-5
Riverine Bird Survey Locations

LEGEND

- 2017 Egg Collection Location
- 2018 Egg Collection Location
- 2017
- 2018
- 2019
- Terrestrial Local Study Area
- Project Footprint
- Highway
- Arterial/Collector Road
- Local/Resource Road
- Railway
- - - Transmission Line
- Wetland
- Watershed
- Provincial Park/Protected Area
- British Columbia/Alberta Border



Scale 1:130,000

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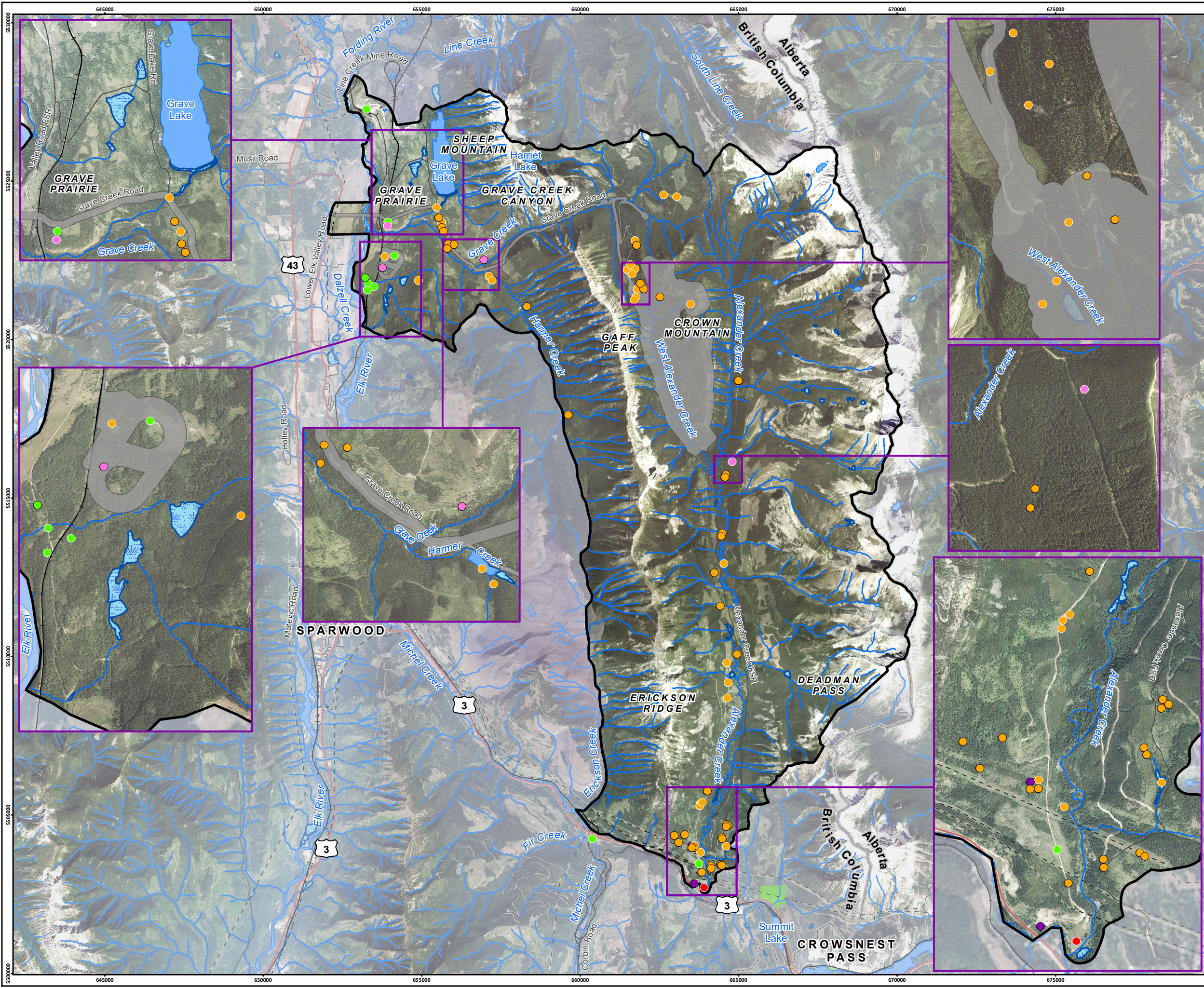
Table 15.7-4: Breeding Birds Observed During Point Count Surveys or Incidentally

Common Name	Scientific Name	Conservation Status (Federal; Provincial)	Number of Planned Observations	Number of Incidental Observations	Total Number Observed
American Dipper	<i>Cinclus mexicanus</i>	Yellow	1	0	1
American Robin	<i>Turdus migratorius</i>	Yellow	80	7	87
American Three-toed Woodpecker	<i>Picoides dorsalis</i>	Yellow	1	0	1
Barn Swallow	<i>Hirundo rustica</i>	SARA 1-T; Blue	0	1	1
Barred Owl	<i>Strix varia</i>	Yellow	0	1	1
Black-capped Chickadee	<i>Poecile atricapillus</i>	Yellow	1	1	2
Black-headed Grosbeak	<i>Pheucticus melanocephalus</i>	Yellow	1	0	1
Boreal Chickadee	<i>Poecile hudsonica</i>	Yellow	15	3	18
Brown Creeper	<i>Certhia americana</i>	Yellow	1	0	1
Brown-headed Cowbird	<i>Molothrus ater</i>	Yellow	20	1	21
Calliope Hummingbird	<i>Selasphorus calliope</i>	Yellow	0	2	2
Canada Goose	<i>Branta canadensis</i>	Yellow	1	1	2
Cassin's Finch	<i>Carpodacus cassinii</i>	Yellow	2	0	2
Cassin's Vireo	<i>Vireo cassinii</i>	Yellow	12	3	15
Cedar Waxwing	<i>Bombycilla cedrorum</i>	Yellow	5	3	8
Chipping Sparrow	<i>Spizella passerina</i>	Yellow	36	7	43
Clark's Nutcracker	<i>Nucifraga columbiana</i>	Yellow	1	0	1
Common Loon	<i>Gavia immer</i>	Yellow	1	0	1
Common Nighthawk	<i>Chordeiles minor</i>	SARA 1-T; Yellow	0	1	1
Common Raven	<i>Corvus corax</i>	Yellow	27	3	30
Common Yellowthroat	<i>Geothlypis trichas</i>	Yellow	3	0	3
Dark-eyed Junco	<i>Junco hyemalis</i>	Yellow	114	5	119

Common Name	Scientific Name	Conservation Status (Federal; Provincial)	Number of Planned Observations	Number of Incidental Observations	Total Number Observed
Downy Woodpecker	<i>Picoides pubescens</i>	Yellow	2	0	2
European Starling	<i>Sturnus vulgaris</i>	Exotic	0	1	1
Evening Grosbeak	<i>Coccothraustes vespertinus</i>	SARA 1-SC; Yellow	2	2	4
Fox Sparrow	<i>Passerella iliaca</i>	Yellow	6	1	7
Golden-crowned Kinglet	<i>Regulus satrapa</i>	Yellow	63	7	70
Gray Jay	<i>Perisoreus canadensis</i>	Yellow	7	6	13
Great Blue Heron	<i>Ardea herodias</i>	Blue	2	0	2
Great Horned Owl	<i>Bubo virginianus</i>	Yellow	0	1	1
Hammond's Flycatcher	<i>Empidonax hammondi</i>	Yellow	20	4	24
Harlequin Duck	<i>Histrionicus</i>	Yellow	0	1	1
Hairy Woodpecker	<i>Picoides villosus</i>	Yellow	8	3	11
Hermit Thrush	<i>Catharus guttatus</i>	Yellow	85	16	101
House Wren	<i>Troglodytes aedon</i>	Yellow	2	0	2
Least Flycatcher	<i>Empidonax minimus</i>	Yellow	4	2	6
Lincoln's Sparrow	<i>Melospiza lincolni</i>	Yellow	20	1	21
MacGillivray's Warbler	<i>Geothlypis tolmiei</i>	Yellow	51	2	53
Marsh Wren	<i>Cistothorus palustris</i>	Yellow	1	0	1
Mountain Bluebird	<i>Sialia currucoides</i>	Yellow	0	3	3
Mountain Chickadee	<i>Poecile gambeli</i>	Yellow	31	11	42
Northern Flicker	<i>Colaptes auratus</i>	Yellow	8	3	11
Northern Waterthrush	<i>Parkesia noveboracensis</i>	Yellow	28	2	30
Olive-sided Flycatcher	<i>Contopus cooperi</i>	SARA 1-T; Blue	36	27	63
Orange-crowned Warbler	<i>Oreothlypis celata</i>	Yellow	32	2	34

Common Name	Scientific Name	Conservation Status (Federal; Provincial)	Number of Planned Observations	Number of Incidental Observations	Total Number Observed
Pacific Wren	<i>Troglodytes pacificus</i>	Yellow	24	3	27
Pacific-slope Flycatcher	<i>Empidonax difficilis</i>	Yellow	1	0	1
Pileated Woodpecker	<i>Dryocopus pileatus</i>	Yellow	2	5	7
Pine Grosbeak	<i>Pinicola enucleator</i>	Yellow	6	1	7
Pine Siskin	<i>Carduelis pinus</i>	Yellow	178	3	181
Purple Finch	<i>Carpodacus purpureus</i>	Yellow	2	0	2
Red Crossbill	<i>Loxia curvirostra</i>	Yellow	24	0	24
Red-breasted Nuthatch	<i>Sitta canadensis</i>	Yellow	62	6	68
Red-naped Sapsucker	<i>Sphyrapicus nuchalis</i>	Yellow	9	5	14
Red-tailed Hawk	<i>Buteo jamaicensis</i>	Yellow	5	1	6
Red-winged Blackbird	<i>Agelaius phoeniceus</i>	Yellow	16	0	16
Ruby-crowned Kinglet	<i>Regulus calendula</i>	Yellow	78	6	84
Ruffed Grouse	<i>Bonasa umbellus</i>	Yellow	15	3	18
Rufous Hummingbird	<i>Selasphorus rufus</i>	Yellow	4	4	8
Song Sparrow	<i>Melospiza melodia</i>	Yellow	7	1	8
Sora	<i>Porzana carolina</i>	Yellow	6	0	6
Spotted Sandpiper	<i>Actitis macularius</i>	Yellow	3	1	4
Spruce Grouse	<i>Falciennis canadensis</i>	Yellow	2	0	2
Swainson's Thrush	<i>Catharus ustulatus</i>	Yellow	182	7	189
Tennessee Warbler	<i>Oreothlypis peregrina</i>	Yellow	4	0	4
Townsend's Solitaire	<i>Myadestes townsendi</i>	Yellow	4	12	16
Townsend's Warbler	<i>Setophaga townsendi</i>	Yellow	109	2	111
Tree Swallow	<i>Tachycineta bicolor</i>	Yellow	9	1	10

Common Name	Scientific Name	Conservation Status (Federal; Provincial)	Number of Planned Observations	Number of Incidental Observations	Total Number Observed
Unidentified Chickadee	-	-	3	0	3
Unidentified Flycatcher Species	-	-	1	0	1
Unidentified Hummingbird	-	-	3	0	3
Unidentified Songbird Species	-	-	4	0	4
Unidentified Woodpecker Species	-	-	2	0	2
Varied Thrush	<i>Ixoreus naevius</i>	Yellow	46	7	53
Vesper's Sparrow	<i>Poocetes gramineus</i>	Yellow	3	0	3
Violet-green Swallow	<i>Tachycineta thalassina</i>	Yellow	5	2	7
Warbling Vireo	<i>Vireo gilvus</i>	Yellow	106	3	109
Western Tanager	<i>Piranga ludoviciana</i>	Yellow	18	3	21
Western Wood-pewee	<i>Contopus sordidulus</i>	Yellow	13	0	13
White-crowned Sparrow	<i>Zonotrichia leucophrys</i>	Yellow	7	2	9
White-winged Crossbill	<i>Loxia leucoptera</i>	Yellow	8	2	10
Willow Flycatcher	<i>Empidonax traillii</i>	Yellow	17	1	18
Wilson's Warbler	<i>Cardellina pusilla</i>	Yellow	33	2	35
Yellow Warbler	<i>Setophaga petechia</i>	Yellow	6	0	6
Yellow-rumped Warbler	<i>Setophaga coronata</i>	Yellow	130	9	139
		Total	1,887	201	2,088



Crown Mountain Coking Coal Project

Figure 15.7-6
Species of Conservation Concern Observations

LEGEND

- Survey Observation
- Incidental Observation
- Barn Swallow
- Common Nighthawk
- Evening Grosbeak
- Great Blue Heron
- Olive-sided Flycatcher
- ▭ Terrestrial Local Study Area
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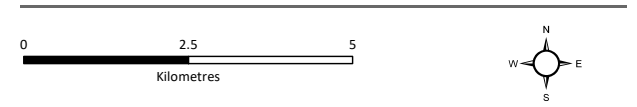
Crown Mountain Coking Coal Project

Figure 15.7-7
Breeding Landbird Average Relative Abundance and Species Richness

LEGEND

Average Species Richness	Average Abundance
● 0 (No Birds Detected)	○ 0 (No Birds Detected)
● 0.1 - 2.9 (Lowest)	○ 0.1 - 7.9 (Lowest)
● 3 - 5.9	○ 8 - 15.9
● 6 - 8.9	○ 16 - 23.9
● 9 - 12.9 (Highest)	○ 24 - 31.9 (Highest)

- ▭ Terrestrial Local Study Area
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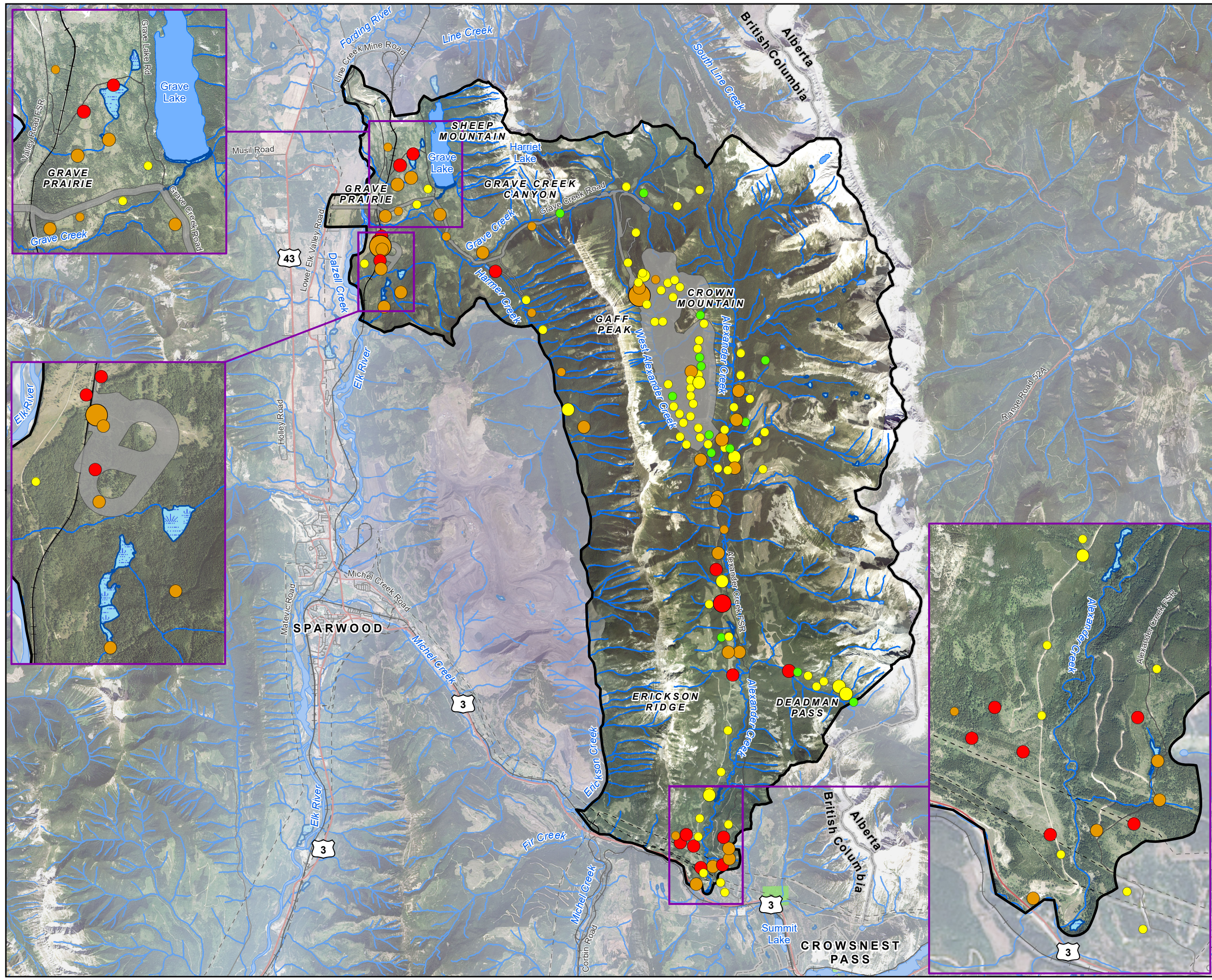


Table 15.7-5: Bird Species Observed During the Spring and Fall Migration Surveys

Common Name	Scientific Name	Total Number Observed in Spring	Total Number Observed in Fall	Number of Incidental Observations	Total Number Observed
American Dipper	<i>Cinclus mexicanus</i>	1	0	0	1
American Robin	<i>Turdus migratorius</i>	127	6	21	154
American Three-toed Woodpecker	<i>Picoides dorsalis</i>	5	0	1	6
Belted Kingfisher	<i>Megaceryle alcyon</i>	1	2	1	4
Black-billed Magpie	<i>Pica hudsonia</i>	0	0	3	3
Black-capped Chickadee	<i>Poecile atricapillus</i>	3	20	6	29
Bohemian Waxwing	<i>Bombycilla garrulus</i>	0	40	0	40
Brewer's Blackbird	<i>Euphagus cyanocephalus</i>	0	1	0	1
Brown Creeper	<i>Certhia americana</i>	0	1	1	2
Brown-headed Cowbird	<i>Molothrus ater</i>	15	0	6	21
Calliope Hummingbird	<i>Selasphorus calliope</i>	0	0	1	1
Canada Goose	<i>Branta canadensis</i>	3	0	4	7
Cassin's Finch	<i>Haemorhous cassinii</i>	6	13	1	22
Cedar Waxwing	<i>Bombycilla cedrorum</i>	0	12	0	12
Chipping Sparrow	<i>Spizella passerina</i>	8	0	0	8
Clark's Nutcracker	<i>Nucifraga columbiana</i>	0	0	3	3
Clay-coloured Sparrow	<i>Spizella pallida</i>	1	0	0	1
Common Raven	<i>Corvus corax</i>	8	4	14	26
Common Yellowthroat	<i>Geothlypis trichas</i>	0	0	1	1
Cooper's Hawk	<i>Accipiter cooperii</i>	1	1	0	2
Dark-eyed Junco	<i>Junco hyemalis</i>	97	59	3	156

Common Name	Scientific Name	Total Number Observed in Spring	Total Number Observed in Fall	Number of Incidental Observations	Total Number Observed
Downy Woodpecker	<i>Dryobates pubescens</i>	3	2	8	13
European Starling ¹	<i>Sturnus vulgaris</i>	12	0	0	12
Evening Grosbeak ²	<i>Coccothraustes vespertinus</i>	1	0	0	1
Fox Sparrow	<i>Passerella iliaca</i>	5	0	1	6
Golden-crowned Kinglet	<i>Regulus satrapa</i>	38	9	2	49
Gray Jay	<i>Perisoreus canadensis</i>	5	0	4	9
Gray-crowned Rosy-finch	<i>Leucosticte tephrocotis</i>	0	0	1	1
Hammond's Flycatcher	<i>Empidonax hammondii</i>	19	0	3	22
Hairy Woodpecker	<i>Dryobates villosus</i>	4	5	4	13
Hermit Thrush	<i>Catharus guttatus</i>	1	3	1	5
Hooded Merganser	<i>Lophodytes cucullatus</i>	2	0	0	2
Lincoln's Sparrow	<i>Melospiza lincolni</i>	12	0	1	13
Mallard	<i>Anas platyrhynchos</i>	2	0	2	4
Merlin	<i>Falco columbarius</i>	0	0	1	1
Mountain Bluebird	<i>Sialia currucoides</i>	9	1	2	12
Mountain Chickadee	<i>Poecile gambeli</i>	48	13	0	60
Northern Flicker	<i>Colaptes auratus</i>	13	1	30	44
Northern Goshawk	<i>Accipiter gentilis</i>	0	1	0	1
Northern Harrier	<i>Circus hudsonius</i>	0	0	2	2
Northern Waterthrush	<i>Parkesia noveboracensis</i>	2	0	1	3
Olive-sided Flycatcher ³	<i>Contopus cooperi</i>	0	1	5	6
Orange-crowned Warbler	<i>Leiothlypis celata</i>	14	0	0	14

Common Name	Scientific Name	Total Number Observed in Spring	Total Number Observed in Fall	Number of Incidental Observations	Total Number Observed
Osprey	<i>Pandion haliaetus</i>	0	0	1	1
Pacific Wren	<i>Troglodytes pacificus</i>	1	0	0	1
Pileated Woodpecker	<i>Dryocopus pileatus</i>	0	0	2	2
Pine Grosbeak	<i>Pinicola enucleator</i>	0	0	2	2
Pine Siskin	<i>Spinus pinus</i>	97	20	24	141
Purple Finch	<i>Haemorhous purpureus</i>	1	0	0	1
Red Crossbill	<i>Loxia curvirostra</i>	0	20	0	20
Red-breasted Nuthatch	<i>Sitta canadensis</i>	11	10	11	32
Red-naped Sapsucker	<i>Sphyrapicus nuchalis</i>	19	0	25	44
Red-tailed Hawk	<i>Buteo jamaicensis</i>	0	0	3	3
Red-winged Blackbird	<i>Agelaius phoeniceus</i>	14	0	2	16
Ruby-crowned Kinglet	<i>Regulus calendula</i>	90	10	17	117
Ruffed Grouse	<i>Bonasa umbellus</i>	4	0	7	11
Rufous Hummingbird	<i>Selasphorus rufus</i>	0	0	1	1
Savannah Sparrow	<i>Passerculus sandwichensis</i>	9	0	1	10
Sharp-shinned Hawk	<i>Accipiter striatus</i>	3	1	3	7
Song Sparrow	<i>Melospiza melodia</i>	3	1	0	4
Steller's Jay	<i>Cyanocitta stelleri</i>	0	0	2	2
Townsend's Solitaire	<i>Myadestes townsendi</i>	2	0	2	4
Townsend's Warbler	<i>Setophaga townsendi</i>	9	0	3	12
Tree Swallow	<i>Tachycineta bicolor</i>	58	0	2	60
Unidentified Chickadee	-	0	2	0	2

Common Name	Scientific Name	Total Number Observed in Spring	Total Number Observed in Fall	Number of Incidental Observations	Total Number Observed
Unidentified Hummingbird	-	1	0	1	2
Unidentified Songbird	-	1	0	2	3
Unidentified Sparrow	-	0	2	1	3
Unidentified Woodpecker	-	2	1	12	15
Varied Thrush	<i>Ixoreus naevius</i>	5	3	4	12
Vesper's Sparrow	<i>Pooecetes gramineus</i>	6	0	0	6
Warbling Vireo	<i>Vireo gilvus</i>	3	0	2	5
Western Tanager	<i>Piranga ludoviciana</i>	0	0	1	1
White-crowned Sparrow	<i>Zonotrichia leucophrys</i>	4	2	0	6
White-throated Sparrow	<i>Zonotrichia albicollis</i>	0	1	0	1
White-winged Crossbill	<i>Loxia leucoptera</i>	26	7	9	42
Wild Turkey	<i>Meleagris gallopavo</i>	0	0	2	2
Wilson's Snipe	<i>Gallinago delicata</i>	0	0	2	2
Wilson's Warbler	<i>Cardellina pusilla</i>	2	0	1	3
Yellow-headed Blackbird	<i>Xanthocephalus xanthocephalus</i>	0	0	2	2
Yellow Warbler	<i>Setophaga petechia</i>	0	10	0	10
Yellow-rumped Warbler	<i>Setophaga coronata</i>	41	12	8	61
Total		878	297	289	1,464

Breeding landbirds were observed at all 138 point count survey locations. The relative abundance across the survey locations ranged from 1 to 39 birds, with an average abundance 7.8 (standard error = 0.3) and the species richness ranged from 1 to 14, with an average richness of 5.9 (standard error = 0.2). In general, the Grave Prairie area, west of Grave Lake, and Alexander Creek had the highest average relative abundance, species richness, and diversity of breeding landbirds (Figure 15.7-7). Most birds were observed in the lower elevation MSdw subzone, which contain food sources for breeding birds (e.g., insects and seeds), has temperatures that are more consistent and warm, and experiences longer periods of warm weather compared to the other BEC subzones in the Terrestrial LSA. Areas of the Terrestrial LSA with lower average relative abundance, species richness, and diversity were found near Upper Grave Creek, across Crown Mountain, and in the upper reaches of Alexander Creek. Higher elevations are found across these areas and food sources may be more limited, with cooler conditions and shorter periods of warm weather.

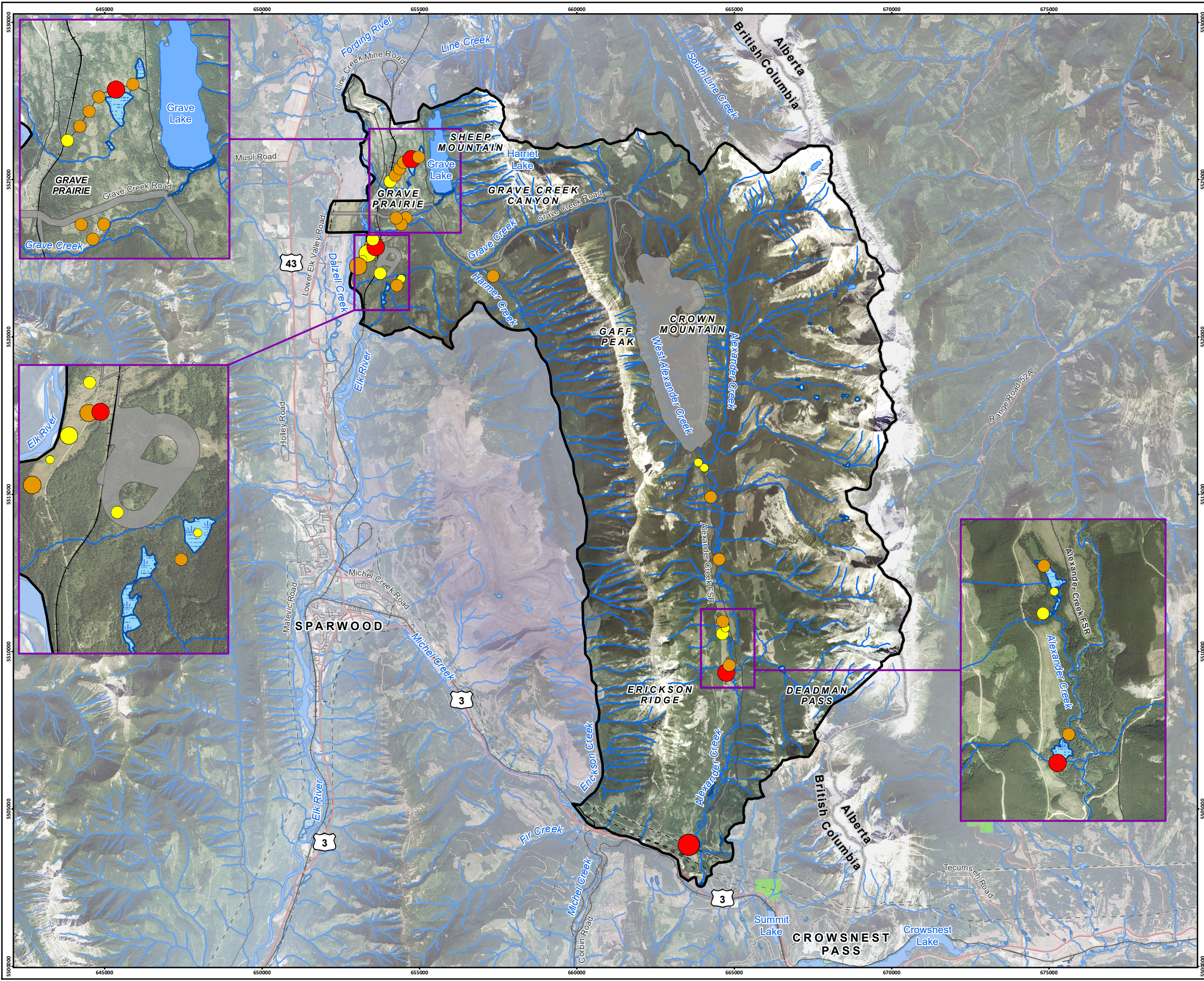
Within the Terrestrial LSA, breeding landbird communities were found to be the most abundant, species-rich, and diverse in grasslands, mixed shrub forests, and wetlands. Grasslands and mixed shrub forests surveyed during the breeding bird program only occur in MSdw subzone; however, wetlands occur in both the MSdw and ESSFdk1 subzones. Grasslands and mixed shrub forests typically occur in areas of low elevation and tend to warm up quickly each spring. They likely contain abundant food resources including insects, seeds, and berries, and plentiful nesting habitat such as dense shrubs like wild rose, willows, and cattails.

Migration Surveys

During the landbird migration surveys in 2018 and 2019, 51 species were observed during the spring surveys and 33 species were observed during fall surveys (Table 15.7-5). The surveys detected 1,175 individual landbirds: 878 in the spring and 297 in the fall. Across both seasons, the species observed most frequently were Dark-eyed Junco, American Robin (*Turdus migratorius*), and Pine Siskin. Two species of conservation concern (Evening Grosbeak and Olive-sided Flycatcher) were observed during the migration seasons. Landbird communities were found to be the most abundant, species-rich, and diverse in the MSdw subzone in mixed shrub forests in the spring and in wetlands in the fall.

During the spring, the average relative abundance at each point count location ranged from 2.5 to 19.0 birds, and the average across all locations was 7.7 birds (standard error = 0.6; Figure 15.7-8). On average, there were 2.0 to 7.4 bird species observed per location, with an average of 4.5 (standard error = 0.3) species observed across all survey locations. In general, the highest average relative abundance occurred within the Grave Prairie area, west of Grave Lake, and along Alexander Creek (Figure 15.7-8).

During the fall, the average relative abundance at each point count location ranged from 0.0 to 29.5 birds, and the average across all locations was 6.0 birds (standard error = 1.7). On average, there were 0.0 to 4.5 bird species observed per location, with an average of 2.0 species (standard error = 0.3) observed across all survey locations. The point count survey locations with the highest average abundance and species richness were distributed across the Grave Prairie area, west of Grave Lake, and along Alexander Creek south of the confluence with West Alexander Creek (Figure 15.7-9).



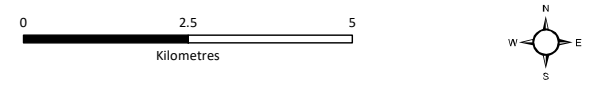
Crown Mountain Coking Coal Project

Figure 15.7-8
Spring Landbird Average Relative Abundance and Species Richness

LEGEND

Average Species Richness	Average Abundance
● 0 (No Birds Detected)	○ 0 (No Birds Detected)
● 0.1 - 1.9 (Lowest)	○ 0.1 - 4.9 (Lowest)
● 2 - 3.9	○ 5 - 9.9
● 4 - 5.9	○ 10 - 14.9
● 6 - 7.9 (Highest)	○ 15 - 19.9 (Highest)

- ▭ 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



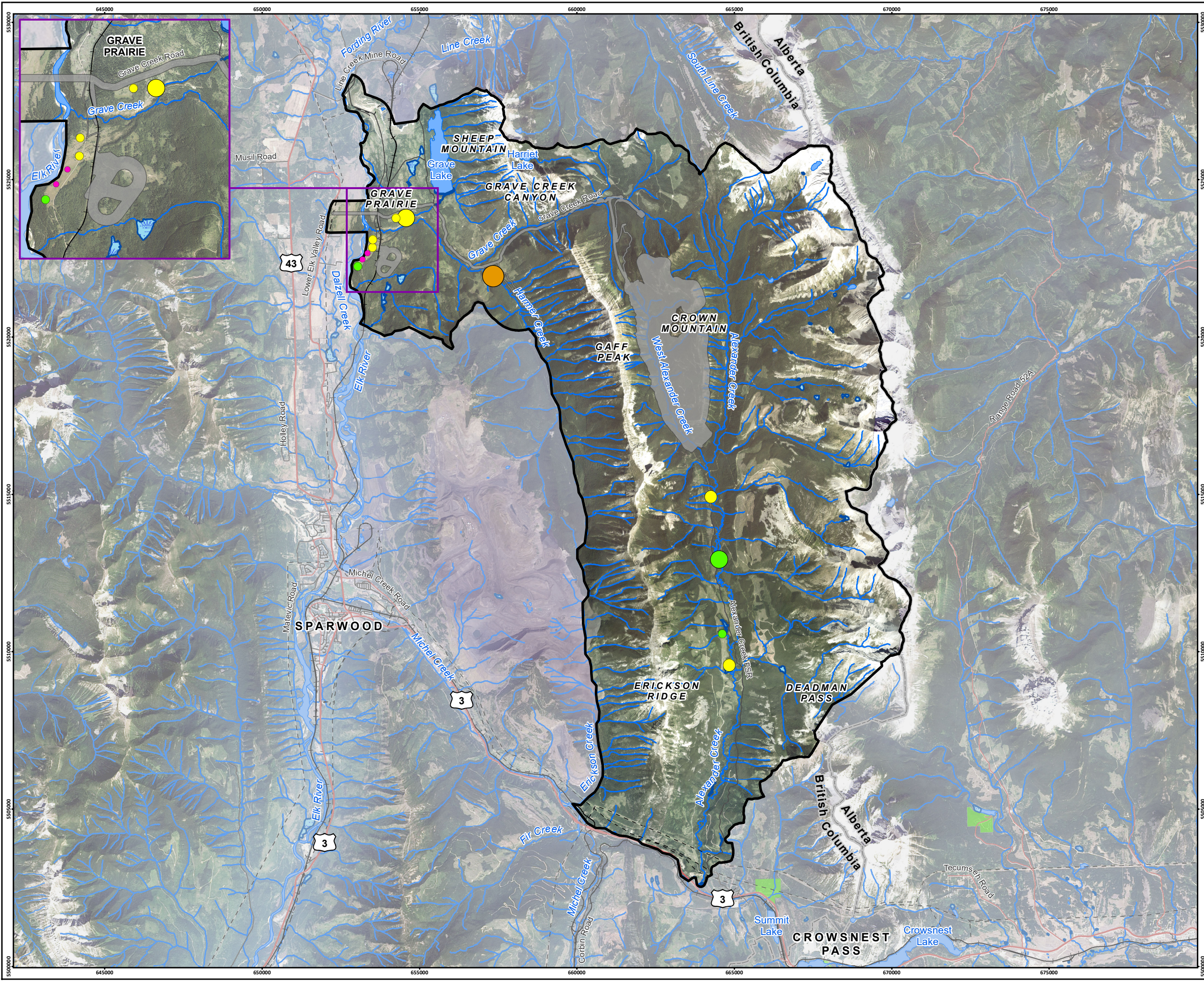
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Map Drawing Information:
Data Provided By NWP Coal Canada Ltd, Dillon Consulting Limited, Province of British Columbia
GeoBC Open Data, Government of Alberta Open Data, Natural Resource Canada.
Imagery Provided By Landsat 8 (Aug 2018), and GeoBC Orthoimagery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

Map Created By: RB
Map Checked By: HEB
Map Coordinate System: NAD 1983 UTM Zone 11N



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Date: 2022-01-12



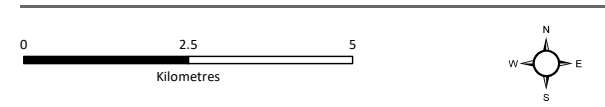
Crown Mountain Coking Coal Project

Figure 15.7-9
Fall Landbird Average Relative Abundance and Species Richness

LEGEND

Average Species Richness	Average Abundance
● 0 (No Birds Detected)	○ 0 (No Birds Detected)
● 0.1 - 1.9 (Lowest)	○ 0.1 - 4.9 (Lowest)
● 2 - 3.9	○ 5 - 9.9
● 4 - 5.9	○ 10 - 14.9
● 6 - 7.9 (Highest)	○ 15 - 19.9 (Highest)

- ▭ 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



Scale 1:115,000

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Although it is difficult to distinguish migrating birds from residents, for those that have winter ranges that overlap the Project, it is likely that most of the birds observed in the Terrestrial LSA during these times were migratory. Most of the survey locations were located in or near a water feature, such as a wetland or river, or a grassland opening. These areas tend to be warmer in the spring, with snow melting away earlier than in surrounding areas, and the ground and vegetation were more accessible.

Woodpeckers

Six species of woodpecker were observed across the Terrestrial LSA over the course of the four survey years (2014, 2017 to 2019). A total of 196 woodpeckers were observed in 130 locations across the spring, summer, and fall surveys. Six species were observed: 13 American Three-toed Woodpecker; 12 Downy Woodpecker; 27 Hairy Woodpecker; 6 Pileated Woodpecker; 64 Red-naped Sapsucker; and 57 Northern Flicker, in addition to 17 unidentified woodpeckers. Woodpeckers were distributed throughout the Terrestrial LSA, but the largest number of individuals was observed within the Grave Prairie area and to the west and southwest of Grave Lake (Figure 15.7-10). Figures showing incidental observations of each woodpecker species are provided in Appendix 15-F. Habitat types associated with woodpeckers were widely varied and included: cutblocks, forest, grassland, wetland, mixed shrub forest, and alpine; however, higher species abundance and richness was observed within forests, grasslands and wetlands, and lower in mixed shrub forest and alpine habitats.

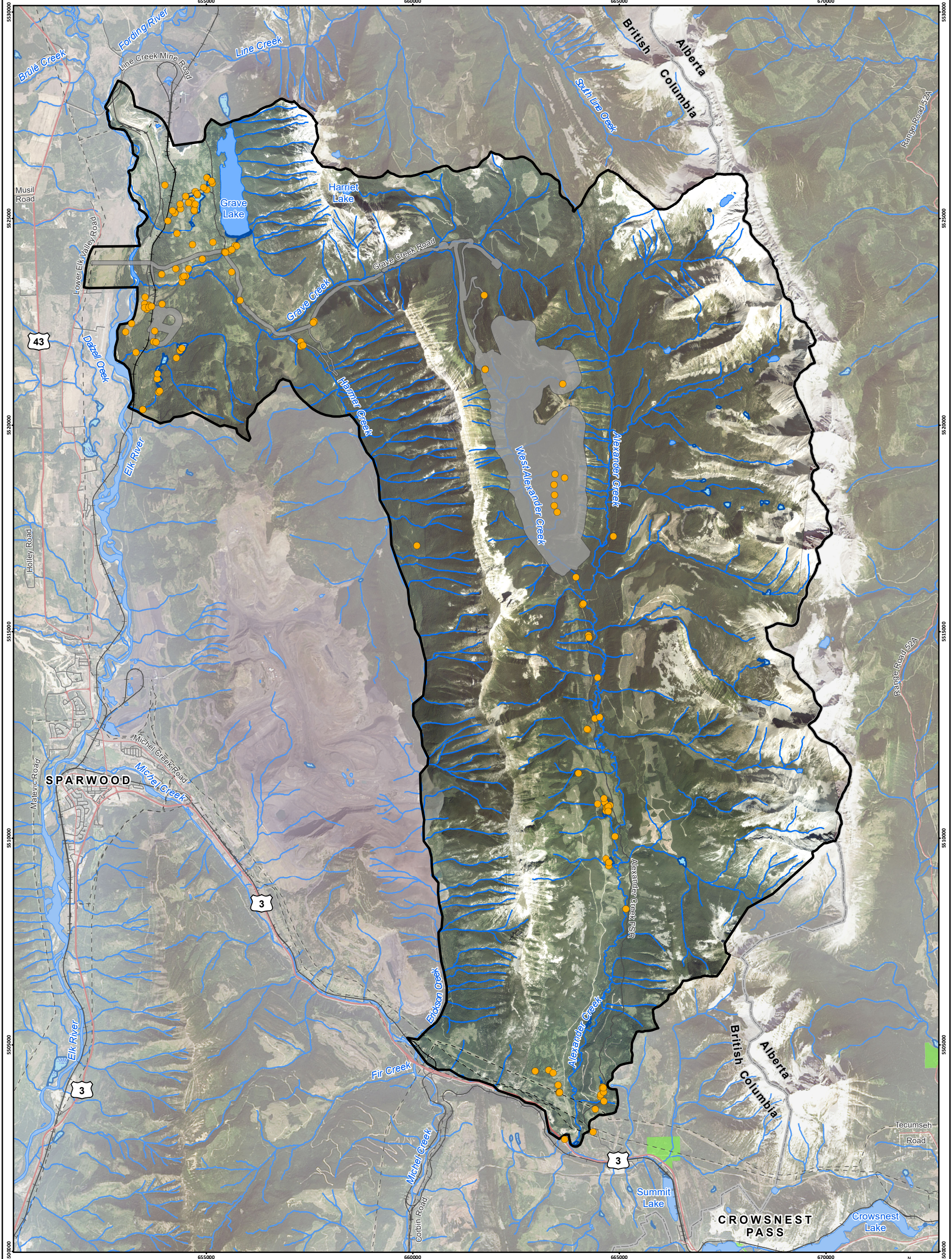
In 2017 and 2019, 295 wildlife trees were observed, of which 21 showed signs of woodpecker activity. Wildlife trees were found across the Terrestrial LSA and were noted in higher numbers in the Grave Prairie area and along Alexander Creek, with observations generally clustered together. Wildlife tree observations generally coincided with woodpecker observations.

Raptors

Migratory Raptor Surveys

During the standwatch surveys in 2018 and 2019, 14 species of raptors and Turkey Vulture and 38 individual raptors were observed; an additional 75 individual raptors were incidentally observed (Table 15.7-6). Seven raptor species were observed during the migration standwatch surveys: Bald Eagle, Golden Eagle, Osprey, Red-tailed Hawk, Cooper's Hawk, Northern Goshawk, and Turkey Vulture.

In addition, incidental observations during the spring and fall included American Kestrel, Barred Owl, Broad-winged Hawk (*Buteo platypterus*), Great Horned Owl, Merlin, Northern Harrier, Peregrine Falcon, and Sharp-shinned Hawk. Spatial results are presented in Appendix 15-E. The only known migrant raptor species was a Broad-winged Hawk observed in fall 2019. Red-tailed Hawk were the most frequently observed resident species in the spring and Golden Eagle were the mostly frequently observed resident species in the fall. The highest average raptor abundance and species richness was observed along southern Alexander Creek in the spring and along the upper reaches of Grave Creek in the fall. Incidental raptor results during the summer breeding season and owl survey results are provided in Appendix 15-E.



Crown Mountain Coking Coal Project

LEGEND

- Incidental Woodpecker Observation
- 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

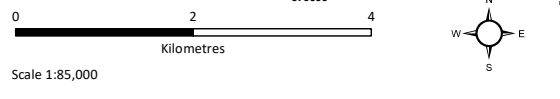


Figure 15.7-10
Incidental Woodpecker Observations in the Terrestrial LSA

Scale 1:85,000

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Map Created By: RB
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Map Coordinate System: NAD 1983 UTM Zone 11N

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Table 15.7-6: 2018 and 2019 Raptor Migration Standwatch Survey Results and Incidental Raptor Observations

Species	Scientific Name	Number Observed During Standwatch Surveys		Number Observed Through Incidental Observations		Total Number of Observations
		Spring	Fall	Spring	Fall	
		2018-2019	2018-2019	2018-2019	2018-2019	
American Kestrel	<i>Falco sparverius</i>	0	0	1	0	1
Bald Eagle	<i>Haliaeetus leucocephalus</i>	4	0	1	0	5
Barred Owl	<i>Strix varia</i>	0	0	1	0	1
Broad-winged Hawk	<i>Buteo platypterus</i>	0	0	0	1	1
Cooper's Hawk	<i>Accipiter cooperii</i>	0	1	1	1	3
Golden Eagle	<i>Aquila chrysaetos</i>	5	3	0	0	8
Great Horned Owl	<i>Bubo virginianus</i>	0	0	1	0	1
Merlin	<i>Falco columbarius</i>	0	0	0	3	3
Northern Goshawk	<i>Accipiter gentilis atricapillus</i>	1	0	2	2	5
Northern Harrier	<i>Circus hudsonius</i>	0	0	2	2	4
Osprey	<i>Pandion haliaetus</i>	1	0	5	6	12
Peregrine Falcon	<i>Falco peregrinus</i>	0	0	1	0	1
Potential Northern Goshawk	<i>Accipiter gentilis atricapillus</i>	0	1	0	0	1
Red-tailed Hawk	<i>Buteo jamaicensis</i>	10	0	18	7	35
Sharp-shinned Hawk	<i>Accipiter striatus</i>	0	0	5	5	10
Turkey Vulture	<i>Cathartes aura</i>	2	0	10	0	12
Unidentified Eagle	---	3	0	0	0	3
Unidentified Raptor	---	7	0	0	0	7

Northern Goshawk Surveys

During the 2014 and 2017 to 2019 bird community baseline program, 10 Northern Goshawk were observed within the Terrestrial LSA (Figure 15.7-11). Given the low number of observations, relative abundance could not be determined. Goshawk were recorded throughout the Terrestrial LSA with observations along Alexander Creek, West Alexander Creek, the Elk River, the Grave Prairie area, upper Grave Creek, and Deadman Pass (Figure 15.7-11). No Northern Goshawk nests were observed during the habitat assessments. Of the 10 Northern Goshawk observations, two occurred outside of the summer nesting period (June/July), three in May during the pre-laying/incubation phase, and three in September during the post-breeding season. One adult was observed soaring in May 2018, and one juvenile Northern Goshawk was observed in July of 2014.

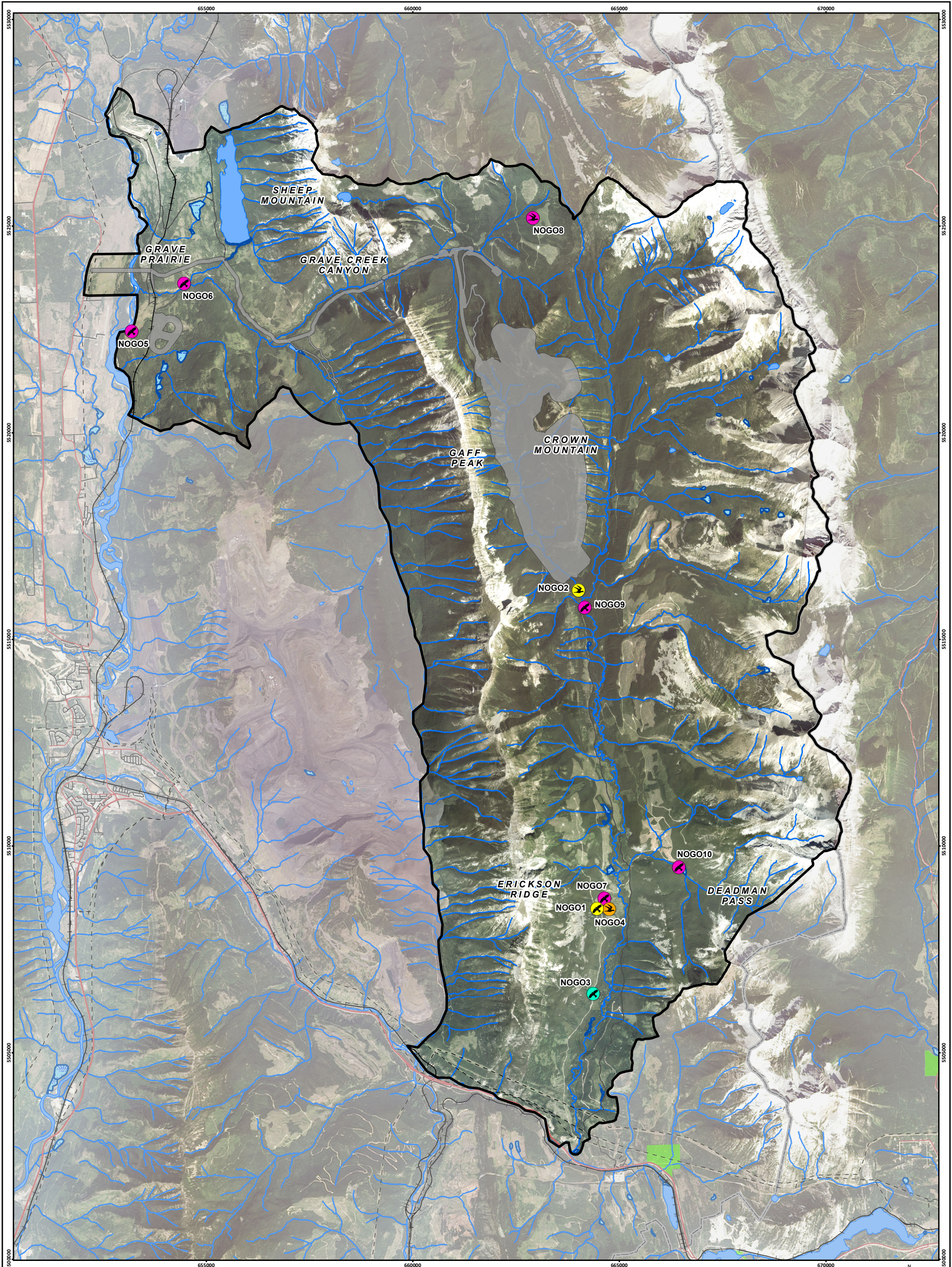
The majority of the Northern Goshawk observations occurred in forested areas; however, Northern Goshawk were also observed in areas with edge habitats between forests and grasslands, and creeks and wetlands. Habitat surrounding the concentrated Northern Goshawk observations around the southern portion of Alexander Creek (Figure 15.7-11) included a mixture of mature coniferous forest with some mature deciduous trees, primarily along drainages, and recently harvested cutblocks that were replanted or contained natural regrowth of dense young conifers. Canopy cover at the habitat assessment stations was most often less than 40%. The structural stage ranged from 5 (young forest) to 6 (mature forest), with mature (generally 80 to 140 years old) being the most dominant stage observed. Most sites had less than 10% of trees with diameter at breast height (DBH) greater than 40 cm. Only one site was observed to have sparse understory with flyways present; the remainder had few or some flyways. The habitat assessment stations with the highest overall habitat suitability ratings were located near Alexander Creek, West Alexander Creek, and upper Alexander Creek. In general, the Terrestrial LSA offers primarily low to moderate quality Northern Goshawk habitat.

Waterbirds

Wetland Bird Surveys

A total of 583 individual waterbirds of 23 species were recorded in the Terrestrial LSA during the spring wetland surveys in April and May 2018 and 2019 (Table 15.7-7). Red-winged Blackbird, Mallard, and Northern Shoveler (*Anas clypeata*) were the most abundant species in the wetlands during the spring surveys. A total of 259 individual wetland birds of 14 species were recorded in the Terrestrial LSA during the summer wetland and ephemeral area surveys in June and July 2014 and 2017 to 2019. Mallard, Spotted Sandpiper, and Red-winged Blackbird were the most abundant wetland bird species observed in the summer (Table 15.7-7). A total of six birds, five Mallards and one Hooded Merganser (*Lophodytes cucullatus*), were the only wetland bird species observed in the fall.

Higher abundance areas in the spring occurred at two wetlands near the Elk River, two wetlands near Grave Creek, and one wetland along Harmer Creek (Figure 15.7-12). Higher abundance areas in the summer occurred at two wetlands near the Elk River, one wetland on the shore of Grave Lake, two wetlands along Harmer Creek, and one wetland along Alexander Creek (Figure 15.7-13). For more detailed waterbird survey results, refer to Appendix 15-E.



Crown Mountain Coking Coal Project

LEGEND



















- | | | | |
|---|------------------------------|---|---------------------------------|
|  | Survey Observation |  | Arterial/Collector Road |
|  | Incidental Observation |  | Local/Resource Road |
|  | 2014 |  | Railway |
|  | 2017 |  | Transmission Line |
|  | 2018 |  | Watercourse |
|  | 2019 |  | Waterbody |
|  | Terrestrial Local Study Area |  | Wetland |
|  | Project Footprint |  | Provincial Park/Protected Area |
|  | Highway |  | British Columbia/Alberta Border |

Figure 15.7-11
Northern Goshawk Observations

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Kilometres

Scale 1:85,000

Map Drawing Information:
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Map Created By: RB
Map Checked By: HEB
Map Coordinate System: NAD 1983 UTM Zone 11N



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

Table 15.7-7: Summary of Waterbird Observations in Wetlands

Group	Species	Scientific Name	Number Observed During Spring Surveys (April – May, 2018 and 2019)	Number Observed During Summer Surveys (July 2014, 2017 - 2019)	Number Observed During Fall Surveys (October 2018, September 2019)	Total Number of Observations
Blackbirds and Allies	Red-winged Blackbird	<i>Agelaius phoeniceus</i>	123	52	-	175
	American Wigeon	<i>Mareca americana</i>	19	2	-	21
	Blue-winged Teal	<i>Spatula discors</i>	2	-	-	2
	Cinnamon Teal	<i>Spatula cyanoptera</i>	2	-	-	2
Dabbling Ducks	Green-winged Teal	<i>Anas crecca</i>	30	-	-	30
	Mallard	<i>Anas platyrhynchos</i>	119	68	5	192
	Northern Pintail	<i>Anas acuta</i>	3	-	-	3
	Northern Shoveler	<i>Spatula clypeata</i>	91	-	-	91
	Ruddy Duck	<i>Oxyura jamaicensis</i>	7	-	-	7
	Barrow's Goldeneye	<i>Bucephala islandica</i>	5	3	-	8
	Bufflehead	<i>Bucephala albeola</i>	49	1	-	50
	Common Merganser	<i>Mergus merganser</i>	3	4	-	7
	Hooded Merganser	<i>Lophodytes cucullatus</i>	11	16	1	28
	Redhead	<i>Aythya americana</i>	2	-	-	2
Diving and Sea Ducks	Ring-necked Duck	<i>Aythya collaris</i>	39	-	-	39
	Canada Goose	<i>Branta canadensis</i>	26	-	-	26
	Common Loon	<i>Gavia immer</i>	2	1	-	3

Group	Species	Scientific Name	Number Observed During Spring Surveys (April – May, 2018 and 2019)	Number Observed During Summer Surveys (July 2014, 2017 - 2019)	Number Observed During Fall Surveys (October 2018, September 2019)	Total Number of Observations
Rails and Cranes	American Coot	<i>Fulica americana</i>	8	2	-	10
	Sandhill Crane	<i>Antigone canadensis</i>	2		-	2
	Sora	<i>Porzana carolina</i>	5	12	-	17
Riverine Birds	Harlequin Duck	<i>Histrionicus histrionicus</i>	4	14	-	18
Shorebirds	Solitary Sandpiper	<i>Tringa solitaria</i>	-	2	-	2
	Spotted Sandpiper	<i>Actitis macularius</i>	7	66	-	73
	Wilson's Snipe	<i>Gallinago delicata</i>	23	6	-	29
---	Unidentified Duck	---	1	10	-	11
Total Individuals			583	259	6	848
Total Species			24	15	2	25