RC BioSolutions Ltd.
#3 Lindman Close
Sylvan Lake, Alberta T4S 2M5
Telephone (403) 887-0455
Fax (403) 887-0412

https://www.rcbio.ca

Rocky View County

Environmental Screening Report and Wildlife Habitat Modeling

Bearspaw Area Structure Plan (ASP) Boundary

Prepared for:
Rocky View County

Project number:
23080

February 2024

DISTRIBUTION:

1 Copy	Rocky View County
1 Copy	RC BioSolutions Ltd.

Submitted To:

Rocky View County

Andrew Chell, RPP/MCIP, Senior Planner (Policy), Planning
262075 Rocky View Point | Rocky View County | AB | T4A 0X2

Submitted By:

RC BioSolutions Ltd.

#3 Lindman Close
Sylvan Lake, Alberta T4S 2M5
Telephone: (403) 887-0455
Fax: (403) 887-0412

February 2024

Lead Authors:
Calvin Kluke, M.Sc.
Krista Bird, Ph.D., P.Biol.

Contributions (Field and Report) By:
Richard Carson, B.Sc., P.Biol., R.P.Bio.
Jesse Bird, B.Sc.

February 15, 2024

Andrew Chell, RPP/MCIP, Senior Planner (Policy), Planning
262075 Rocky View Point
Rocky View County, Calgary, AB
T2E 8J6

Dear Andrew Chell:

Project No: 23080

Regarding: Rocky View County - Environmental Screening Report - Bearspaw Area Structure Plan (ASP) Boundary

At the request of Rocky View County, RC BioSolutions Ltd. has completed an Environmental Screening Report and Wildlife Habitat Modeling for the Bearspaw Area Structure Plan (ASP) Boundary.

If you have any questions or comments regarding the report, please contact our office at your convenience.

Sincerely,
RC BioSolutions Ltd.

Krista Bird, Ph.D., P.Biol.
Senior Wildlife Biologist and Regulatory Specialist
krissy.bird@rcbio.ca

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Appendix A. Wildlife Modelling Maps

1 Project Description

1.1 Purpose and Scope

RC BioSolutions Ltd. (RC Bio) was contracted by Rocky View County to provide an Environmental Screening Report and Wildlife Habitat Modeling for the Bearspaw Area Structure Plan (ASP) area (Figure 1). The purpose of this Environmental Screening is to complete desktop level investigations, determine the existing environmental conditions of the area, and to assess potential and actual environmental impacts that may occur as a result of disturbance based on the type and scope of the proposed development. We have also been requested to complete wildlife habitat modelling to determine areas with high wildlife potential and wildlife habitat corridors that should be protected. This report is also meant to address the Regional Evaluation Framework (REF) policy surrounding Environmentally Sensitive Areas. The intention of the Environmentally Sensitive Area policies is to identify and mitigate the effects of development on larger patterns of ecosystem functions and services (i.e. regionally significant natural area components).

The existing Bearspaw ASP is being reviewed due to changes in the community and planning framework (e.g. approximately 34% population increase between 2006 and 2018; Rocky View County 2023b). Additionally, the existing Bearspaw ASP is over 20 years old and the area has undergone significant changes since the previous ASP was developed. The County has completed Phase 1 (project initiation and background analysis) of the process for updating the Bearspaw ASP and is scheduling fall 2024 for the release of the draft ASP document (Rocky View County 2023a). All plans should comply with the *Municipal Government Act*. All Area Structure Plans must now comply with the new Regional Evaluation Framework (CMRB Land Use & Servicing Committee 2023) to meet the practices and procedures of the Calgary Metropolitan Region Board (CMRB).

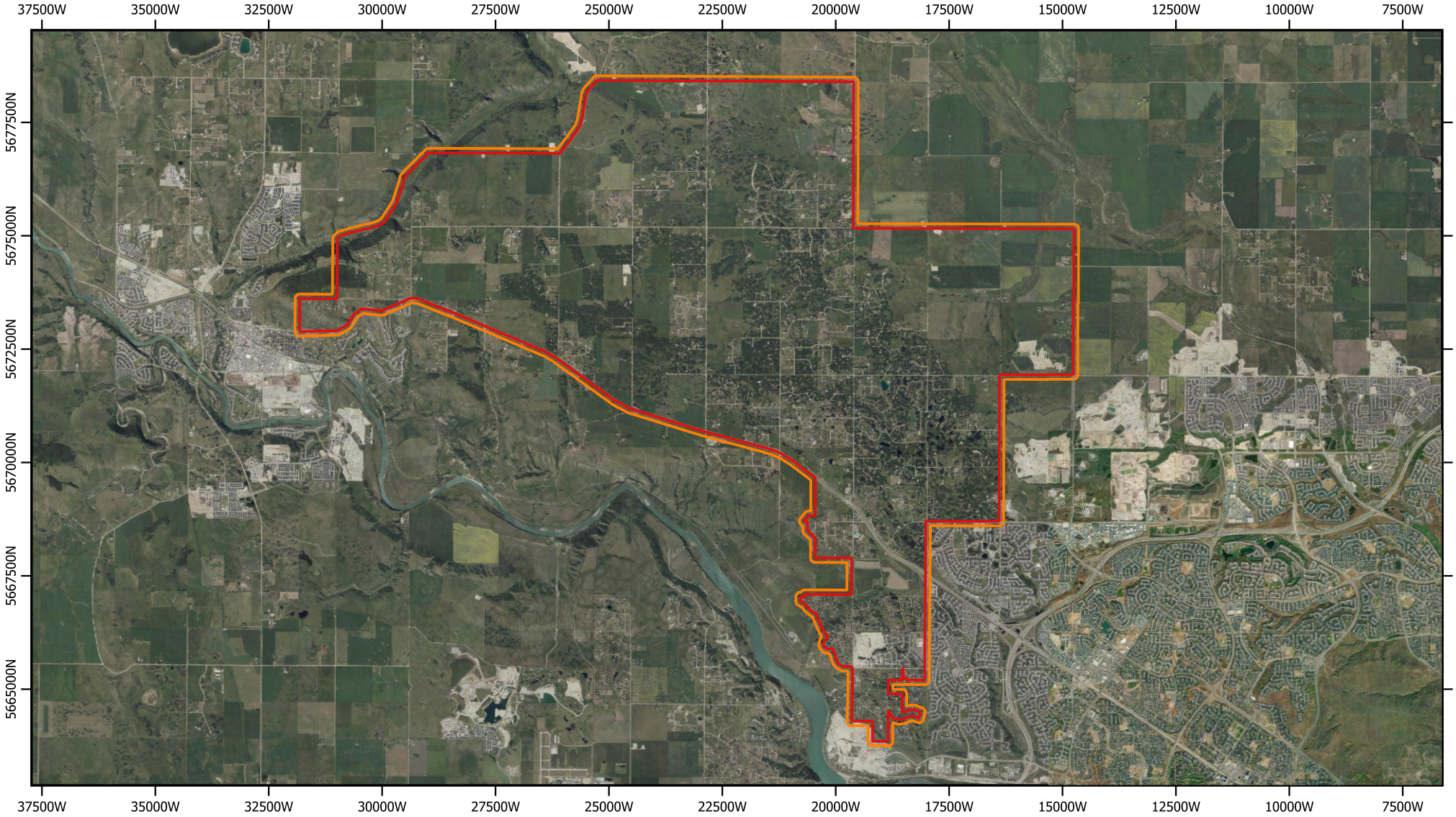
As per the CMRB Land Use & Servicing Committee (2023) Regional Evaluation Framework Interpretation Guide, Environmentally Sensitive Areas are defined within the Growth Plan as “key natural area components of the regional landscape, providing essential ecosystem functions and services. These functions and services include flood mitigation, drinking water supply, maintenance of regional biodiversity, preservation and connectivity of unique habitats and landscapes, and provision of culturally and economically valued resources and opportunities.” The Environmentally Sensitive Areas definition found in the Growth Plan glossary also notes that these areas:

- Maintain the provision of water quality and quantity and provide protection against drought and flood events. Includes water courses, water bodies, and riparian areas.
- Provide habitat for identified local species of interest, designated species of conservation concern (SCC), or identified focal species groups.
- Provide rare, unique or biologically diverse ecosystems or unique landforms.
- Contribute to other important Ecosystems Services or functions at the local scale.
- Include provincial Environmentally Significant Areas.

For the purposes of this report, we will not use the abbreviation “ESA” for Environmentally Sensitive Areas because the provincial Environmentally Significant Areas uses the same acronym. As such, we will not use “ESA” for either environmentally significant areas or environmentally sensitive areas to avoid confusion and will use the full name in every instance.

1.2 Location and Size

The project is located west of Calgary, east of Cochrane, north of Glenbow Ranch Provincial Park, and south of Township Roads 262 and 264 in Rocky View County, Alberta. The project area is 10,102.94 hectares (ha) in size and falls fully or in part within 176 quarter sections (Figure 1). As per the CMRB Land Use & Servicing Committee (2023) Regional Evaluation Framework Interpretation Guide, a 100 m buffer has been added to the Bearspaw ASP area for all desktop searches. This makes the study area a total of 10,737.28 ha.



LEGEND

- Bearspaw ASP Boundary
- ASP Boundary: 100 m buffer

NAD83 / Alberta 3TM ref merid 114 W

Scale: 1 : 120000

N

0 1 2 3 km

Rocky View County 2022 Imagery and ESRI World Imagery

Rocky View County

Environmental Screening Report and Wildlife Habitat Modeling

Bearspaw Area Structure Plan (ASP) Boundary

Bearspaw Area Structure Plan Boundary

RC BioSolutions Ltd.

Lead: Krissy Bird
Drawn by: Jesse Bird

Date: 14 Dec 2023
Project #: 23080

Figure No.
#1

2 Biophysical Inventory

2.1 Land Use

The current land use of the project footprint is residential, agricultural, and limited commercial and institutional (Rocky View County 2023b). As per the Bearspaw ASP Overview (Rocky View County 2023c), Bearspaw has predominantly developed as a mix of country residential and agricultural community. Business land use is currently limited to the Highway 1A corridor and Butterfield Acres Petting Farm located on the southeast edge of the ASP boundary. Agricultural land use is abundant throughout the Bearspaw project area.

A Draft Land Use Strategy is currently being developed for public review (Rocky View County 2023).

2.2 Biological Resources

2.2.1 Natural Subregion

The project is located within the Foothills Parkland Natural Subregion of Alberta and is near to the Central Parkland, and Foothills Fescue to the east, and Montane to the west. This area is unique due to its short growing seasons that discourage cultivation, resulting in more native species than other parkland Natural Subregions. The historically dominant upland vegetation would have been mountain rough fescue, bluebunch fescue, and oatgrass in sloping grassland areas, and aspen, balsam poplar, white spruce, and Douglas fir with understories of snowberry, silverberry, and white meadowsweet in forested areas.

The land use surrounding the site is generally tilled soils and remnant grassland to the north, with residential, commercial, and recreational development to the west (Town of Cochrane) and east (City of Calgary), and relatively undisturbed native rough fescue grasses (Glenbow Ranch Provincial Park; Rocky View County 2018) to the south.

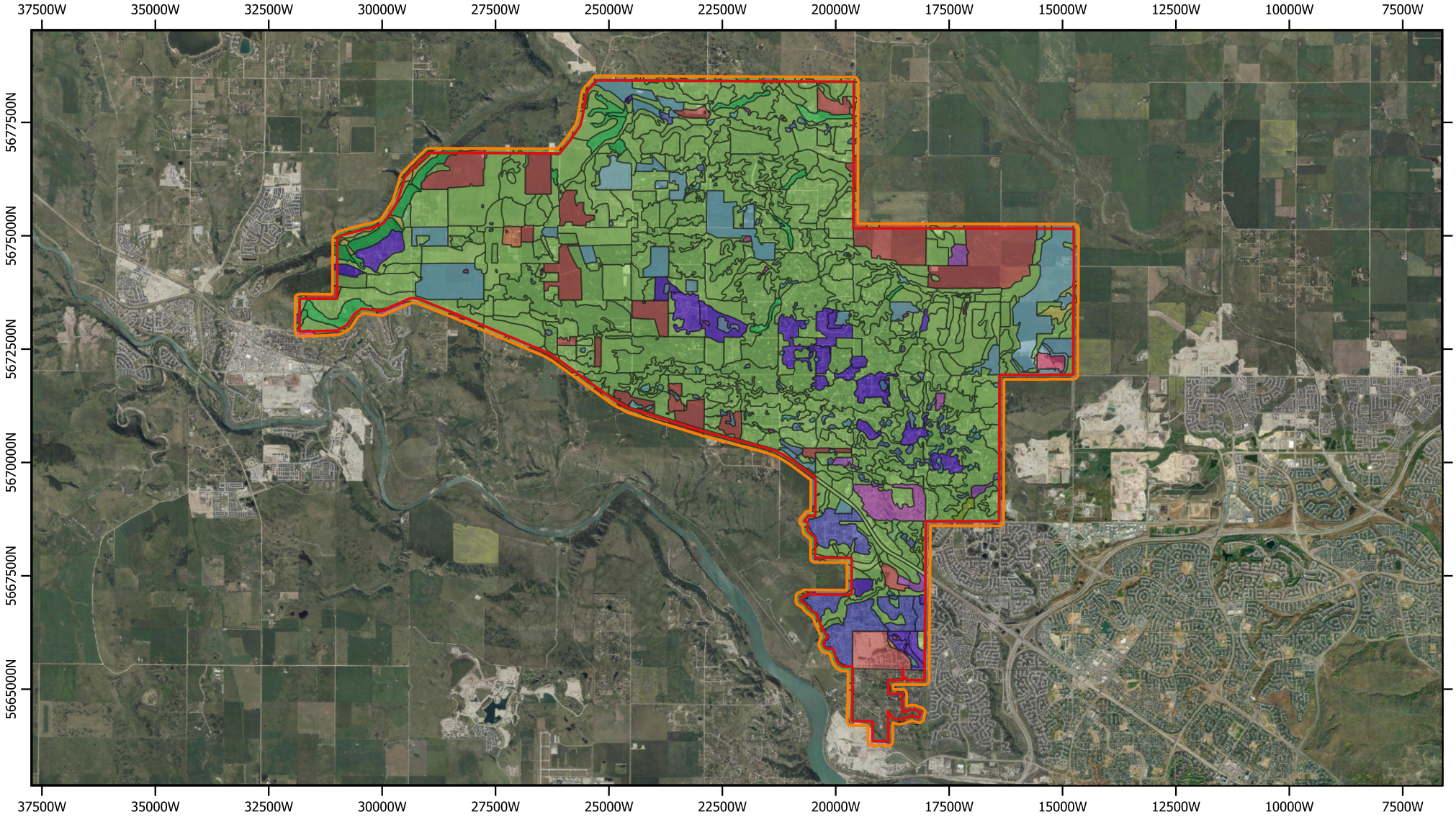
2.2.2 Vegetation – Plant Community Composition

2.2.2.1 Methodology

The Grassland Vegetation Inventory (GVI) database (Government of Alberta 2011) and the Annual Crop Inventory from 2022 (Agriculture and Agri-Food Canada 2022) was utilized to determine vegetation/habitat types.

2.2.2.2 Results

According to the GVI, the project area (including 100 m buffer) is primarily composed of loamy (60.47% of total area), tame pasture or hay (non-irrigated; 7.98%), and crop (non-irrigated; 7.43%) GVI site types. A total of 17 GVI categories occur within the project area and 100 m buffer (Table 1; Figure 2). The GVI data set for the majority of this area was last updated April 2011, so any changes to the landscape since that time have not been captured.



LEGEND

- Bearspaw ASP Boundary
- ASP Boundary: 100 m buffer

GVI

- Clayey
- Crop (Non-irrigated)
- Developed
- Lentic (Open Water)
- Lentic (Seasonal)
- Lentic (Semi-Permanent to Permanent)
- Lentic (Temporary)
- Loamy
- Overflow
- Pits
- Rural
- Sandy
- Shallow to Gravel
- Subirrigated
- Tame Pasture or Hay (Non-irrigated)
- Thin Breaks
- Urban

NAD83 / Alberta 3TM ref merid 114 W

Scale: 1 : 120000

N

0 1 2 3 km

Rocky View County

Environmental Screening Report and Wildlife Habitat Modeling

Bearspaw Area Structure Plan (ASP) Boundary

Rocky View County 2022 Imagery and ESRI World Imagery

Vegetation Types from Grassland Vegetation Inventory (GVI)

RC BioSolutions Ltd.

Lead: Krissy Bird
Drawn by: Jesse Bird

Date: 14 Dec 2023
Project #: 23080

Figure No.
#2

Table 1 – GVI categories present within the project area and 100 m buffer.

GVI Category	Description[1]	Area/Percentage Occurring in Project Area and 100 m buffer
Clayey – Cy	Often associated with glaciolacustrine and lacustrine landforms. Includes clayey-textured soils like silty clay. Generally >40% clay.	374.54 ha (3.59%)
Crop (Non-irrigated) – CN	Relies on direct rainfall for crop growth. Crops include row crops (potatoes, sugar beets, corn, and vegetables), small grains (wheat, barley, oats, triticale, & mixed grains), oilseeds (canola & flax), sod, pulses (peas, lentils, fababeans, etc.), fallow (do not exhibit visible vegetation), & tree/shrub farms or nurseries.	775.27ha (7.43%)
Developed – Dev	The Developed site type represents man-made developments that are very difficult to return to crop, pasture, hay, or native/natural conditions. Developed site types do not include Urban or Rural developments. This site type includes both active and inactive operations.	17.67 ha (0.17%)
Lentic (Open Water) – LenW	Permanent open water areas typically larger than 1 ha. Bordering zones may include peripheral “deep marsh”, “shallow marsh”, “wet meadow”, “low prairie”, and “fen”. Lentic wetlands that are larger than 1 ha, but have open water zones smaller than 1 ha will be mapped as Lentic (semi-permanent to permanent). Typically, can be lakes, reservoirs, dugouts, or beaver ponds.	106.74 ha (1.02%)
Lentic (Seasonal) – LenS	Wetlands with surface water persisting more than 3 weeks. Water is normally gone by early July. Typically have lush vegetation due to a higher water table. Deepest parts are “shallow marsh” with peripheral areas potentially being “wet meadow” or “low prairie”. Typically have no salt crust.	9.66 ha (0.09%)
Lentic (Semi-Permanent to Permanent) – LenSP	Marshes and lakes where water persists throughout the year in most years, except during extreme drought. Dominated by “deep marsh” and “shallow marsh” zones with emergent vegetation (cattails & bulrushes). “Wet meadow” & “low prairie” zones are usually present. Isolated pockets of “fen” zones can occur. Sites are often adjacent to Lentic (Open Water).	60.27 ha (0.58%)
Lentic (Temporary) – LenT	Wetlands where surface water is usually retained for only a brief period in early spring and occasionally for several days after heavy rain in late spring, summer, & fall. Vegetation is classed as dead “dry wet meadow” or “low prairie”, with no salt crust.	3.17 ha (0.03%)
Loamy – Lo	Often associated with morainal landforms (undulated to hummocky terrain). Includes loam, silt loam, silt, clay loam, sandy clay loam, & silty clay loam soils. Relies on soils surveys for proper identification.	6312.10 ha (60.47%)
Overflow – Ov	Often occurs in valley bottoms in association with lotic site types and are typically below steeper valley slopes. Overflow sites are generally confined to fan-and-apron landscapes, but they can also occur in terraced settings near streams. Lotic sites commonly have more lush vegetation growth due to a high-water table and regular flooding in	43.32 ha (0.42%)

GVI Category	Description[1]	Area/Percentage Occurring in Project Area and 100 m buffer
	the riparian zone, while Overflow sites are typically higher and drier.	
Pits – Pit	Represent locations where vegetative cover and overburden are removed to create a significant non-natural landscape expression in order to extract surficial deposits (including both active and inactive operations). Unused pits or quarries that have been flooded are classified as a Lentic Open Water site type.	20.79 ha (0.20%)
Rural – Ru	Ares with people living in sparsely populated lands laying outside urban areas or areas being used by a relatively small number of people on a temporary basis where the native vegetation surface cover has been removed or severely altered by anthropogenic activity.	228.22 ha (2.19%)
Sandy – Sy	Typically ranges from morainal to glaciofluvial areas. Includes sandy-loam-textured soils. Reliance on soil survey information is important when identifying this site type.	14.93 ha (0.14%)
Shallow to Gravel – SwG	Often occurs on terraces, valley bottoms and as caps on remnant bedrock uplands. Terraces with gravels close to the surface or at the surface often show evidence of exposed gravels and sparse vegetation growth.	33.59 ha (0.32%)
Subirrigated – Sb	Has water close to the surface, but is not a wetland or a creek. Water table is close to the surface during growing season, but rarely above. Often has patches or bands of lush vegetation. Does not have depressional edges.	13.18 ha (0.13%)
Tame Pasture or Hay (Non-irrigated) – PN	Areas of grasses, legumes, or grass-legume mixtures planted for livestock grazing or hay crops. Relies directly on rainfall for crop growth.	833.33 ha (7.98%)
Thin Breaks – TB	Often associated with Badlands/Bedrock, Limy and Overflow and can be considered a transition between Limy and Badlands/Bedrock. Typically occur on moderate to steep valley slopes including slumps, and as plains with thin surficial sediments overlying bedrock. Typically partially vegetated, with thin, eroded and immature soils on gentle to steep landscapes.	263.05 ha (2.52%)
Urban – Ur	Areas where much of the land is covered by structures and the population density is high. Includes cities, towns, summer villages, town sites, hamlets, cottage developments, strip developments, cemeteries, and shopping centers.	105.11 ha (1.01%)

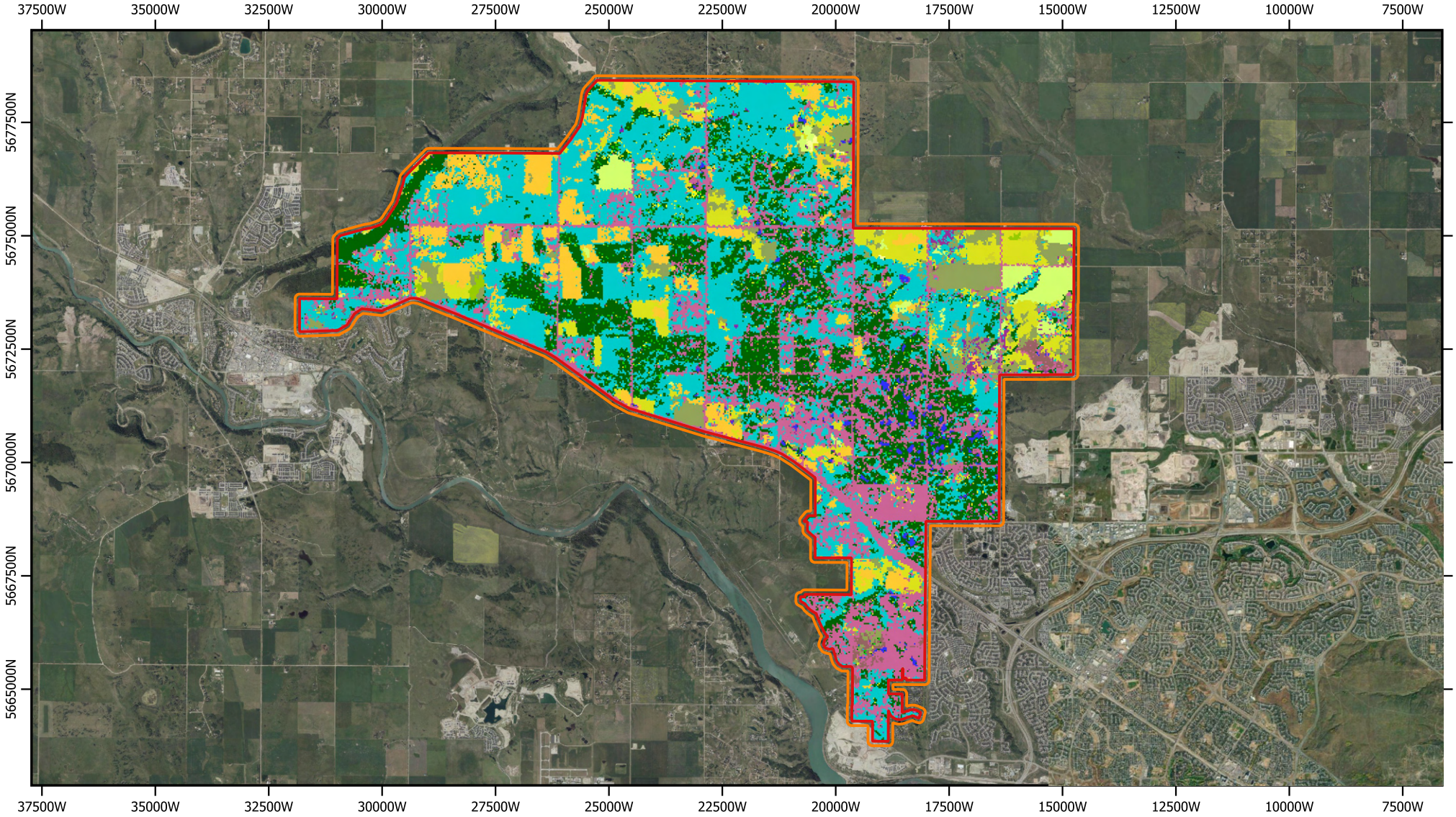
[1] Descriptions are from Government of Alberta (2011)

Additionally, 17 land classes were identified within the project area and 100 m buffer using the 2022 Annual Crop Inventory (Table 2; Figure 3). The three predominant land classes (grassland, urban/developed, and coniferous) accounted for a combined total of 73.33% of the project area and 100 m buffer. Other classes represented various agricultural uses (22.52%), in addition to small portions (<1% per class) representing treed and wetted areas (Table 2).

Table 2 – 2022 Annual Crop Inventory classes present within the project area and 100 m buffer.

Annual Crop Inventory Class	Description[1]	Area/Percentage Occurring in Project Area and 100 m Buffer
Barley	N/A	773.82 ha (7.21%)
Broadleaf	Predominantly broadleaf/deciduous forests or treed areas.	89.91 ha (0.84%)
Canola/Rapeseed	N/A	243.99 ha (2.27%)
Coniferous	Predominantly coniferous forests or treed areas	2074.32 ha (19.32%)
Corn	N/A	6.21 ha (0.06%)
Exposed Land/Barren	Land that is predominately non-vegetated and non-developed. Includes: glacier, rock, sediments, burned areas, rubble, mines, other naturally occurring non-vegetated surfaces. Excludes fallow agriculture	98.37 ha (0.92%)
Grassland	Predominantly native grasses and other herbaceous vegetation, may include some shrubland cover.	3586.59 ha (33.4%)
Mixedwood	Forest that is a combination of both the coniferous and broadleaf classes.	4.14 ha (0.04%)
Oats	N/A	10.44 ha (0.1%)
Other Grains	N/A	16.56 ha (0.15%)
Pasture/Forages	Periodically cultivated. Includes tame grasses and other perennial crops such as alfalfa and clover grown alone or as mixtures for hay, pasture or seed.	831.78 ha (7.75%)
Peas	N/A	1.26 ha (0.01%)
Shrubland	Predominantly woody vegetation of relatively low height (generally +/-2 meters). May include grass or wetlands with woody vegetation, regenerating forest.	60.3 ha (0.56%)
Spring Wheat	N/A	533.7 ha (4.97%)
Urban/Developed	Land that is predominantly built-up or developed and vegetation associated with these land covers. This includes road surfaces, railway surfaces, buildings and paved surfaces, urban areas, industrial sites, mine structures, golf courses, etc.	2212.56 ha (20.61%)
Water	Water bodies (lakes, reservoirs, rivers, streams, salt water, etc).	78.57 ha (0.73%)
Wetland	Land with a water table near/at/above soil surface for enough time to promote wetland or aquatic processes (semi-permanent or permanent wetland vegetation, including fens, bogs, swamps, sloughs, marshes etc).	112.5 ha (1.05%)

[1] Descriptions are from Annual Crop Inventory Data Product Specifications (ISO 19131; Agriculture and Agri-Food Canada 2023).



LEGEND

- Bearspaw ASP Boundary
- ASP Boundary: 100 m buffer

ACI

- 20 - Water
- 30 - Exposed land/barren
- 34 - Urban/developed
- 50 - Shrubland
- 80 - Wetland
- 110 - Grassland
- 122 - Pasture/forages
- 133 - Barley
- 134 - Other grains
- 136 - Oats
- 146 - Spring wheat
- 147 - Corn
- 153 - Canola/rapeseed
- 162 - Peas
- 210 - Coniferous
- 220 - Broadleaf
- 230 - Mixedwood

NAD83 / Alberta 3TM ref merid 114 W

Scale: 1 : 120000

N

0 1 2 3 km

Rocky View County 2022 Imagery and ESRI World Imagery

Rocky View County

Environmental Screening Report and Wildlife Habitat Modeling

Bearspaw Area Structure Plan (ASP) Boundary

Vegetation Types from the Annual Crop Inventory (ACI)

RC BioSolutions Ltd.

Lead: Krissy Bird
Drawn by: Jesse Bird

Date: 14 Dec 2023
Project #: 23080

Figure No.
#3

2.2.3 Vegetation – Rare Plants

2.2.3.1 Methodology

A search was completed for plant species considered endangered or threatened according to the Alberta Conservation and Information Management Systems (ACIMS 2022) database and/or the SARA and COSEWIC (Government of Canada 2023a,b).

Native plant species are considered wildlife under the National Wildlife Policy for Canada and must be protected. In Alberta, protection of rare and endangered vascular plant species is an important part of environmental planning due to anthropogenic activities becoming more common. Depending on the location of future projects, vegetation assessments and rare plant surveys may be required. If needed, these surveys must be completed during appropriate survey times according to the Government of Alberta standards. The rare plant surveys will be conducted according to the procedures outlined by the Alberta Native Plant Council's "Guidelines for Rare Plant Surveys".

Rare plants are those listed on the provincial (Alberta Conservation Information Management System; ACIMS) or national (Committee on the Status of Endangered Wildlife in Canada; COSEWIC) lists. Within Alberta, a rare plant is defined as a plant with few recorded collection locations (five or fewer) or with one of the following distribution patterns: (1) widespread, but rare throughout its range, (2) widespread, but only small populations in Alberta due to being at the periphery of the range, (3) disjunct species that is widely scattered, but found as localized populations, and (4) endemic species that are rare because they are geographically restricted, but may occur in large numbers in those patches (Packer and Bradley 1984).

In Alberta rare plants are rated within the ACIMS database and follow the NatureServe ranking methodology (ACIMS 2022):

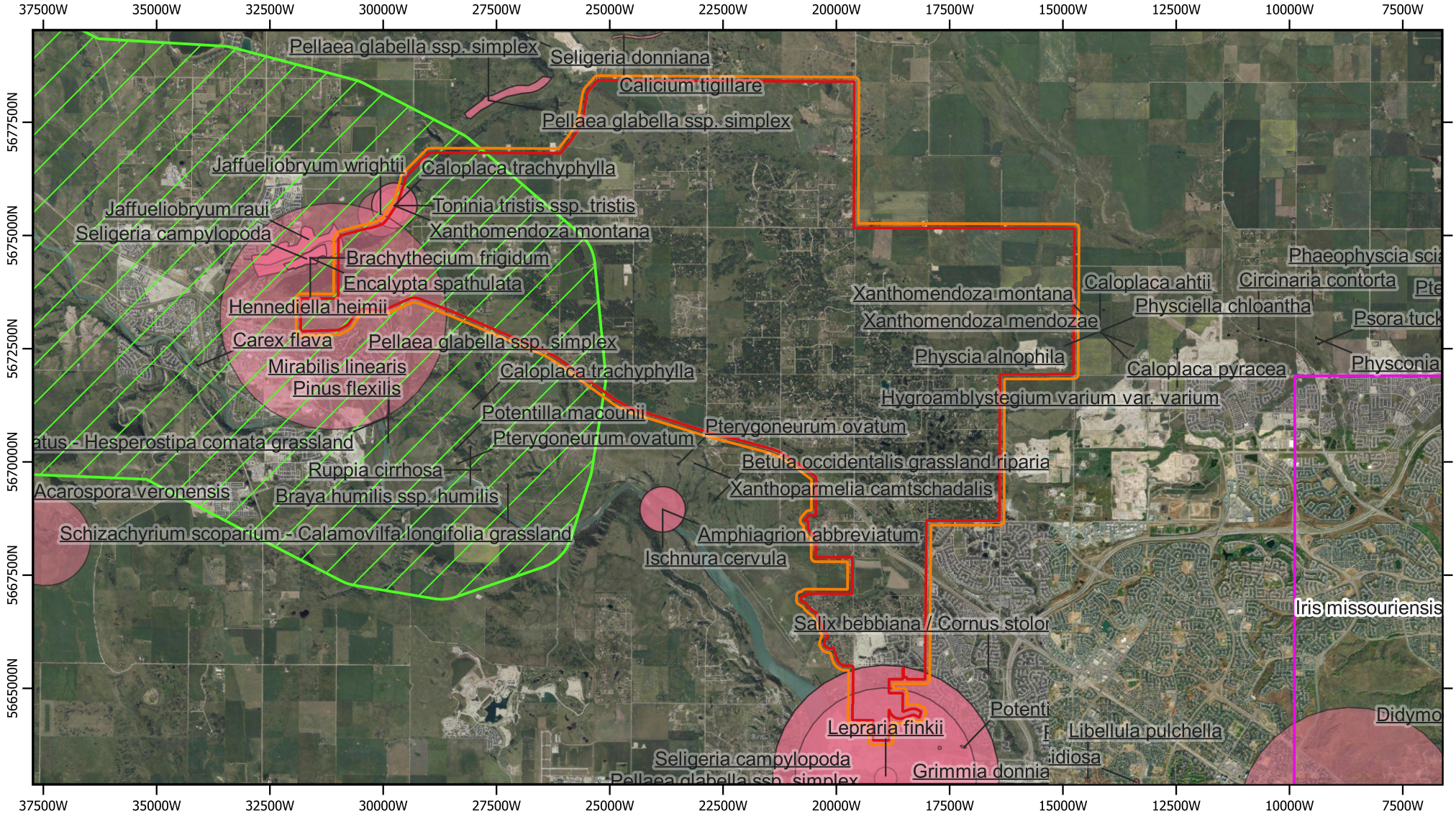
- S1: Known from five or fewer occurrences in the province or especially vulnerable to extirpation due to other factors.
- S2: Known from 20 or fewer occurrences or vulnerable to extirpation because of other factors.
- S3: Known from 100 or fewer occurrences or vulnerable to extirpation because of other factors.
- S4: Apparently secure, taxon is uncommon, but rare, and there is potentially some cause for long-term concern due to declines or other factors.
- S5: Secure, the taxon is common, widespread, and abundant.
- SU: Currently unrankable due to lack of information or due to substantially conflicting information about status or trends.
- S#: A numeric range rank (e.g., S2S4) is used to indicate any range of uncertainty about the status of the species.

S1, S2, and some S3 species are considered rare enough to be tracked by the Natural Heritage Information Centre.

Rare vascular plants within the Foothills Fescue Grassland Natural Subregion are found across all moisture conditions, but are most common in very dry and very wet sites. Moisture conditions, combined with soil type, sunlight, and exposure create specific habitats to find rare and endangered species, which include: (1) native grasslands, (2) wetlands, (3) groundwater seepage areas (springs, seeps), (4) steep eroding slopes, (5) disturbed ground, (6) stream banks, and (7) sandstone outcrops. Within the proposed development areas, there are no groundwater seepage areas, stream banks, steep eroding slopes, or sandstone outcrops. There are multiple wetlands on site.

2.2.3.2 Results

A literature review was completed using the Alberta Conservation Information Management Systems (ACIMS) Rare Plant Tracking List (ACIMS 2022) and Community Tracking list (ACIMS 2022). The purpose of this review is to identify potential rare plants and plant communities that can occur within the project area. One rare plant (*Iris missouriensis*) listed as sensitive has been documented within a significant distance (10 kilometers [km]) of the project area (Table 2). *Iris missouriensis* prefers moist meadows in the transitional area between drier upland slopes, wet meadows, or seepage springs. *Iris missouriensis* generally occurs on flat areas or gentle slopes with abundant subsurface moisture. It is often found around moist depressions with willow thickets (COSEWIC 2010). Ninety-three species of non-sensitive tracked species were found within 20 km of the project footprint, with 12 occurring within the project area and 100 m buffer (Table 3, Figure 4).



LEGEND

- Bearspaw ASP Boundary
- ASP Boundary: 100 m buffer
- Non Sensitive Plants
- Sensitive Plants
- Endangered and Threatened Plants Ranges

NAD83 / Alberta 3TM ref merid 114 W

Scale: 1 : 120000

N

0 1 2 3 km

Rocky View County 2022 Imagery and ESRI World Imagery

Rocky View County

Environmental Screening Report and Wildlife Habitat Modeling

Bearspaw Area Structure Plan (ASP) Boundary

Rare Plants

RC BioSolutions Ltd.

Lead: Krissy Bird
Drawn by: Jesse Bird

Date: 14 Dec 2023
Project #: 23080

Figure No.
#4

Table 3 – Sensitive and Non-Sensitive Species found within 20 km of the project area.

Scientific Name	Common Name	S Ranking
SENSITIVE SPECIES		
Iris missouriensis	Western blue flag	S2
NON-SENSITIVE SPECIES		
Acarospora socialis	Bright cobblestone lichen	SU
Acarospora veronensis	Cobblestone lichen	SU
Almutaster pauciflorus	Marsh Alkali Aster	S3
Brachythecium frigidum	Northern ragged moss	S1S2
Braya humilis ssp. humilis	Low braya	SU
Buellia dispersa	button lichen	SU
Calicium notarisii	Soot lichen	SU
Calicium tigillare	Soot lichen	S2S4
Caloplaca ahtii	Firedot lichen	SU
Caloplaca decipiens	Orange firedot lichen	SU
Caloplaca pyracea	Firedot lichen	SU
Caloplaca subsoluta	Firedot lichen	SU
Caloplaca trachyphylla *	Desert firedot lichen	S2S4
Caloplaca variabilis	Variable orange lichen	SU
Candelariella rosulans	Goldspeck lichen	SU
Carex crawei	Crawe's sedge	S3
Carex flava	Yellow sedge	S2S3
Chaenotheca chrysocephala	Stubble lichen	S1S3
Circinaria contorta	Chiseled sunken disc lichen	SU
Circinaria hispida *	Desert vagabond lichen	S1
Cirsium scariosum var. scariosum	Meadow thistle	S2
Cladonia portentosa ssp. pacifica	Reindeer lichen	S1S2
Corispermum pallasii	Pallas' bugseed	S2
Corispermum villosum	Hairy bugseed	S2
Didymodon fallax *	False beard moss	S2S3
Diploschistes actinostomus	Crater lichen	SU
Diplotomma alboatrum *	Lichen	SU
Encalypta spathulata	Spathulate candlesnuffer moss	S2S3
Fissidens grandifrons	Large-leaved Pocket Moss	S2S3
Flavopunctelia soredica	Powder-edged speckled greenshield lichen	S2S3
Gentiana fremontii	Marsh gentian	S3
Grimmia donniana *	Donn's grimmia moss	S1S2
Gyalolechia flavovirescens	Sulphur-firedot lichen	S2S4

Scientific Name	Common Name	S Ranking
Hennediella heimii	Heim's Chain-teeth Moss	S2S3
Homalothecium nevadense	Nevada curl moss	S1S2
Hygroamblystegium varium	Willow feather moss	S2S3
Hygroamblystegium varium var. varium	N/A	S1S2
Imbribryum muehlenbeckii	Muehlenbeck's bryum moss	S2S3
Jaffueliobryum raui *	Rau's Long-awn Moss	S2
Jaffueliobryum wrightii *	Wright's Long-awn Moss	S1S2
Lecanora flowersiana	Flowers' rim lichen	SU
Lecidella latypiza	Disk lichen	SU
Lepraria finkii	Fluffy dust lichen	S2S3
Lichinella nigritella	Black rocklicorice lichen	SU
Limprichtia cossonii	Cosson's hook moss	SU
Lithospermum occidentale	Western false gromwell	S3
Machaeranthera tanacetifolia	Tansy aster	S1
Melanohalea olivacea	Spotted camouflage lichen	S1S2
Mirabilis linearis	Narrowleaf umbrellawort	S2
Myriolecis crenulata	Rim-lichen	SU
Myriolecis dispersa	Mortar rim-lichen	SU
Orthotrichum pumilum	Dwarf bristle moss	S2S3
Pellaea gastonyi	Gaston's cliff brake	S2
Pellaea glabella ssp. simplex *	Smooth cliffbrake	S2
Phaeophyscia adiastola	Powder-tipped shadow lichen	S2
Phaeophyscia hirsuta	Hairy shadow lichen	S2
Phaeophyscia nigricans	Powder-headed Shadow Lichen	S2S3
Phaeophyscia sciastra	Dark shadow lichen	S3
Physcia alnophila	Outward-looking Rosette Lichen	SU
Physciella chloantha	Cryptic rosette lichen	SU
Physconia enteroxantha	Yellow-edged frost lichen	S3
Physconia isidiigera	Bottlebrush frost lichen	S2
Physconia perisidiosa	Crescent frost lichen	S3
Pinus flexilis	Limber pine	S2
Placidium lachneum	Earth lichen	S1S2
Polysporina arenacea	Cobblestone lichen	S2
Potentilla lasiodonta	Sandhills cinquefoil	S3
Porpidia zeoroides	N/A	SU
Potentilla hudsonii	Hudson's cinquefoil	S1S2
Potentilla lasiodonta	Sandhills cinquefoil	S3
Potentilla macounii	Macoun's cinquefoil	S1
Psora tuckermanii	Brown-eyed scale lichen	S2S3

Scientific Name	Common Name	S Ranking
Rhodobryum ontariense	Ontario Rhodobryum moss	S1S2
Ribes inerme var. inerme	White stem gooseberry	S2
Riccia cavernosa	Cavernous crystalwort	S2S4
Rinodina castanomelodes	Pepper-spore lichen	SU
Rorippa curvipes	Blunt-leaved watercress	S3
Ruppia cirrhosa	Widgeon-grass	S3
Scapania apiculata	Pointed Earwort	SU
Scapania glaucocephala var. glaucocephala	Glaucous-headed liverwort	S2S4
Schistidium flaccidum *	Pulvinate bloom moss	S2
Schistidium tenerum	Thread bloom moss	S2S3
Seligeria campylopoda *	Bent-foot Bristle Moss	S2S3
Seligeria donniana	Donian bristle moss	S2S3
Solitaria chrysophthalma	Firedot lichen	SU
Splachnum vasculosum	Rugged Dung Moss	S1S2
Toninia tristis ssp. tristis *	Blister lichen	SU
Tortula cernua	Narrow-leafed chain-teeth moss	S1
Verrucaria muralis	Speck lichen	SU
Xanthocarpia lacteal	Firedot lichen	SU
Xanthomendoza mendozae	Orange foliose lichen	SU
Xanthomendoza montana *	Small-footed Sunburst Lichen	S3
Xanthoparmelia camtschadalis	Kamchatka xanthoparmelia lichen	SU
Xanthoparmelia subdecipiens	Fatty-acid rock-shield lichen	S2

* Species found within the Project Area and 100 m buffer

Early and late season rare plant surveys will be required for Biophysical Impact Assessments (BIA) containing any of the seven habitat types of areas listed above, particularly wetlands. Early season rare plant surveys should occur in June and late season rare plant surveys should occur in August.

2.2.4 Vegetation – Weeds

2.2.4.1 Methodology

There are no databases of weeds for the project area.

2.2.4.2 Results

As there is no database for weeds, a list of restricted, noxious, and nuisance weeds as per *Alberta Weed Act* (Province of Alberta 2011) can be completed during a BIA vegetation field survey.

2.2.5 Wildlife

Wildlife habitat present in the Foothills Parkland Natural Subregion contains rolling to hilly native grasslands, with hay lands found on undulating terrain and willow shrublands or aspen woodlands in low-lying areas. The Foothills Parkland Natural Subregion is a transitional area that contains many of the same wildlife species found in the Rocky Mountain Natural Region including Dusky Flycatcher (*Empidonax oberholseri*), MacGilliray's Warbler (*Geothlypis tolmiei*), Lazuli Bunting (*Passerina amoena*), and White-crowned Sparrow (*Zonotrichia leucophrys;* Natural Subregions Committee 2006). Clay-coloured Sparrow (*Spizella pallida*), Alder Flycatcher (*Empidonax alnorum*), and moose (*Alces alces*) occur in areas containing tall willow shrubbery (Natural Subregions Committee 2006). Aspen woodlands may contain populations of Black-headed Grosbeaks (*Pheucticus melanocephalus*) and Blue Grouse (*Dendragapus obscurus*; Natural Subregions Committee 2006).

2.2.5.1 Basic Wildlife Desktop Methodology

A desktop review of provincial databases was conducted to identify wildlife species present in the area listed as "endangered", "threatened", or of "special concern" by either federal or provincial governments (Government of Canada 2022a,b; Government of Alberta 2022). Databases reviewed include Alberta Environment and Park's (AEP) General Status of Alberta Wild Species (Government of Alberta 2022), AEP Fisheries and Wildlife Management Information System (FWMIS) database (AEP 2022a), and the Database of Wildlife Species Assessed by SARA Wildlife Species Search (Government of Canada 2022b). FWIMS searches were completed for the project area and 100 m buffer, in addition to a 5 km radius surrounding the buffered project area. Complete FWMIS data requested by RC BioSolutions in 2023 was also used to capture the common species in the area.

2.2.5.2 Basic Wildlife Desktop Results

Within 5 km of the project area, 42 species were provincially listed: 26 bird species, 12 mammal species, two amphibian species, and two reptile species (Table 4; Figure 5). Peregrine Falcon (*Falco peregrinus*), grizzly bear (*Ursus arctos*), and Northern leopard frog (*Lithobates pipiens*) are species listed under the *Alberta Wildlife Act* (either threatened or endangered) and found within 5 km of the project area. Additionally, multiple species are listed under COSEWIC and SARA:

- Bank Swallow (*Hirundo rustica*) – Provincially 'Sensitive', and COSEWIC/SARA 'Threatened'.
- Barn Swallow (*Hirundo rustica*) – Provincially 'May be at Risk', COSEWIC 'Special Concern', and SARA 'Threatened'.
- Horned Grebe (*Podiceps auritus*) – Provincially 'Sensitive' and COSEWIC/SARA 'Special Concern'.
- Loggerhead Shrike (*Lanius ludovicianus*) – Provincially 'Sensitive' and COSEWIC/SARA 'Threatened'.

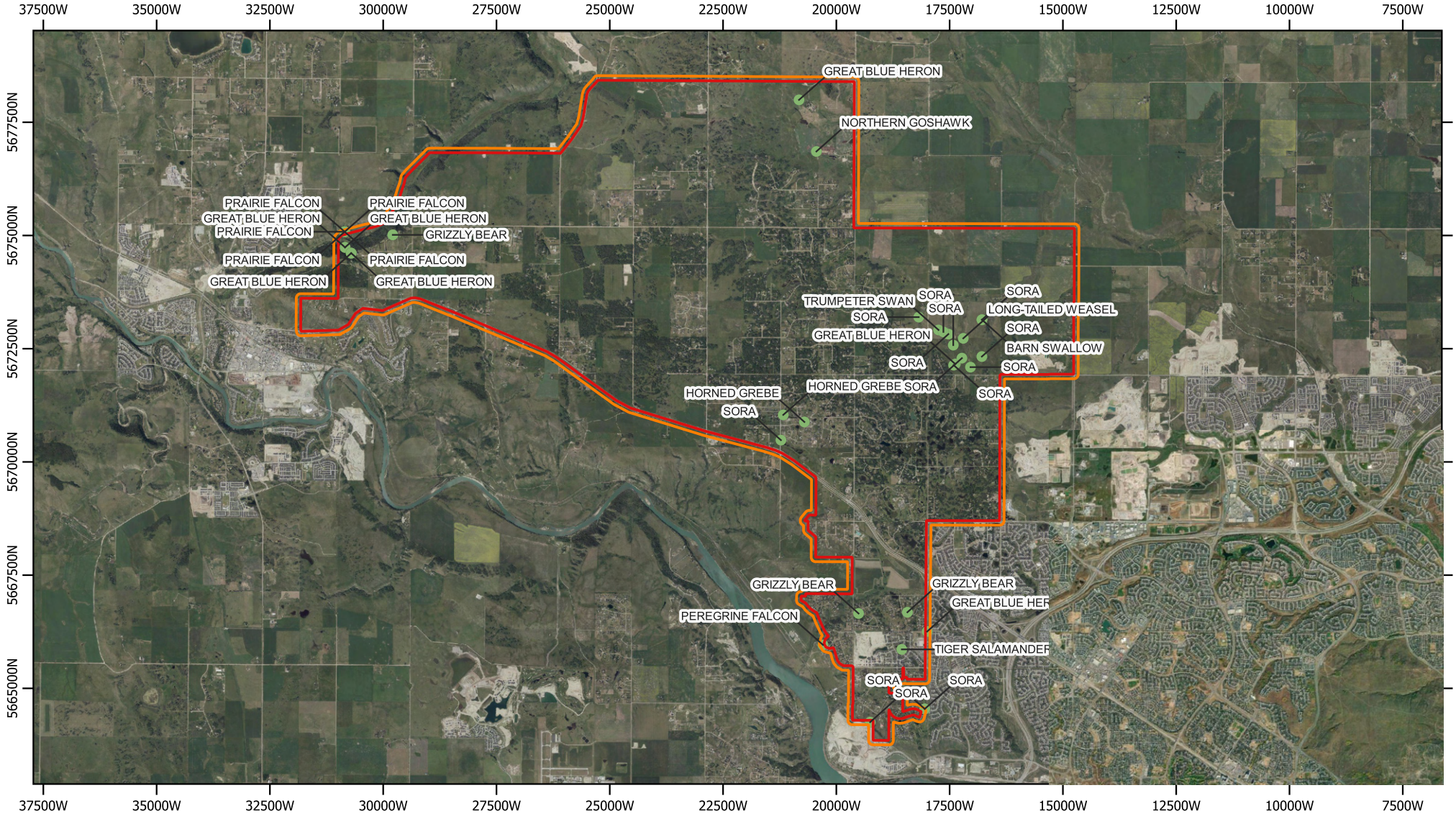
- Sprague's Pipit (*Anthus spragueii*) – Provincially 'Sensitive', and COSEWIC/SARA 'Threatened'.
- American badger (*Taxidea taxus taxus*) - Provincially 'Sensitive', and COSEWIC/SARA 'Special Concern'.
- Grizzly bear (*Ursus arctos*) – Provincially 'At Risk', and COSEWIC/SARA 'Special Concern'.
- Hoary bat (*Lasiurus cinereus*) – Provincially 'Sensitive' and COSEWIC 'Endangered'.
- Little brown bat/myotis (*Myotis lucifugus*) – Provincially 'May be at Risk' and COSEWIC/SARA 'Endangered'.
- Silver-haired bat (*Lasionycteris noctivagans*) - Provincially 'Sensitive' and COSEWIC 'Endangered'.
- Northern leopard frog (*Lithobates pipiens*) – Provincially 'At Risk', and COSEWIC/SARA 'Special Concern'.
- Tiger salamander (*Ambystoma mavortium*) – Provincially 'Secure', and COSEWIC/SARA 'Special Concern'.

It is important to note that several listed species were present in the online FWMIS search, but not the requested FWMIS data with exact data locations. It is likely that the database was cleaned of erroneous data points, but the online database was overlooked. These species include:

- Baird's Sparrow (*Ammodramus bairdii*) – Provincially 'Sensitive', and COSEWIC/SARA 'Special Concern'.
- Eastern red bat (*Lasiurus borealis*) – Provincially 'Sensitive' and COSEWIC 'Endangered'
- Piping Plover (*Charadrius melodus*) – Provincially 'At Risk' and COSEWIC/SARA 'Endangered'.
- Woodland caribou (*Rangifer tarandus caribou*) – Provincially 'At Risk' and COSEWIC 'Endangered'.

Using the FWIMT, it was determined that the following Wildlife Sensitivity Layers are located within the ASP Amendment area boundary (Figure 6):

- Sensitive Raptor Range – Bald Eagle, Golden Eagle, Prairie Falcon (covers entire ASP area). Ferruginous Hawk Range is approximately 37 km to the southeast of the project area.
- Sharp-tailed Grouse Survey Area (covers entire ASP area).
- Key Wildlife and Biodiversity Zone (southern edge of the ASP boundary, buffered around Bow River).
- Grizzly Bear Support Zone is approximately 3 km west of the ASP boundary.
- Mountain Goat and Bighorn Sheep Areas Disease Buffer (covers entire ASP area).



LEGEND

- Sensitive or Listed Wildlife Species
- Bearspaw ASP Boundary
- ASP Boundary: 100 m buffer

NAD83 / Alberta 3TM ref merid 114 W

Scale: 1 : 120000

N

0 1 2 3 km

Rocky View County 2022 Imagery and ESRI World Imagery

Rocky View County

Environmental Screening Report and Wildlife Habitat Modeling

Bearspaw Area Structure Plan (ASP) Boundary

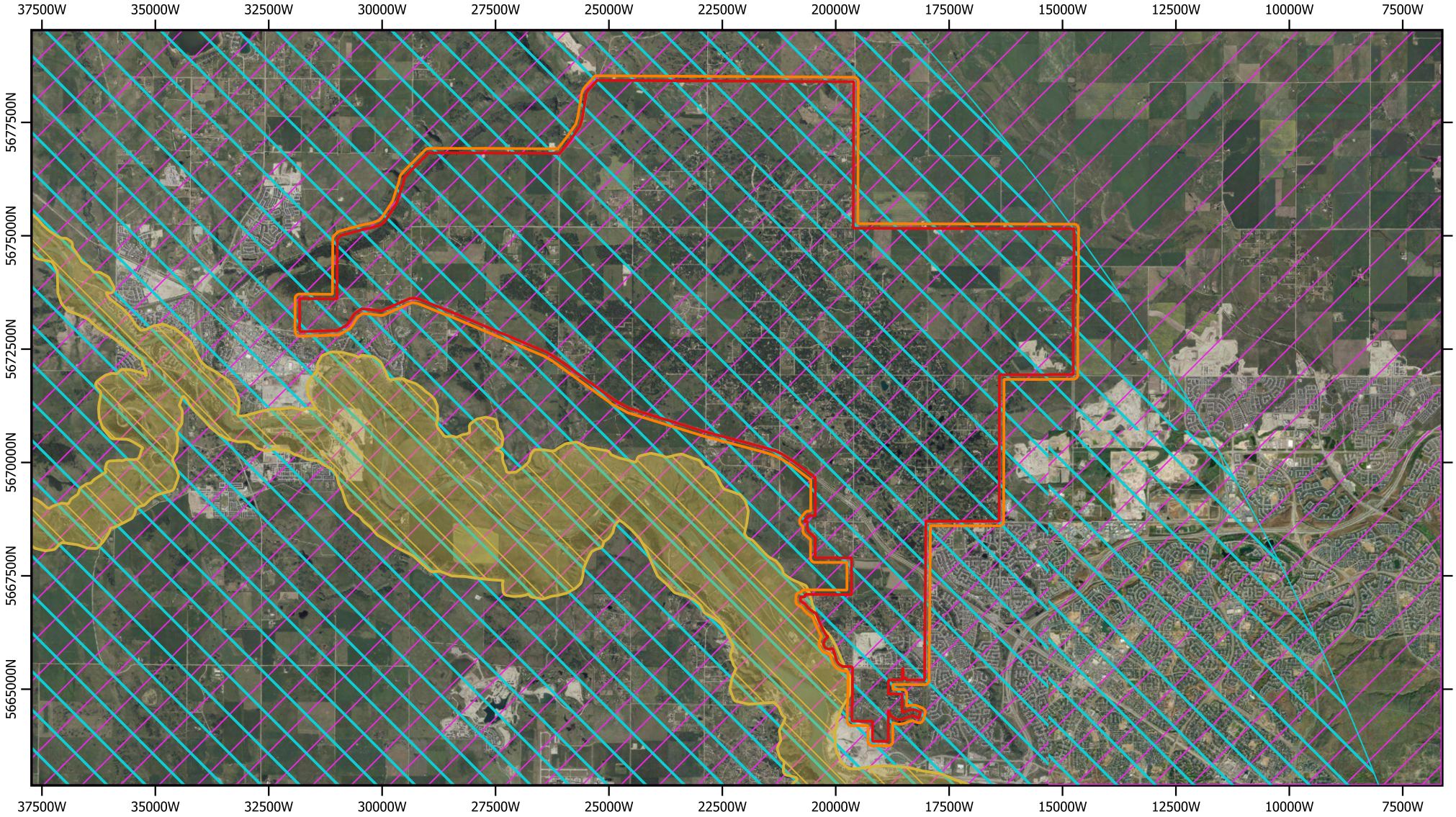
Sensitive or Listed Wildlife Species

BioSolutions Ltd.

Lead: Krissy Bird
Drawn by: Jesse Bird

Date: 14 Dec 2023
Project #: 23080

Figure No.
#5



LEGEND

- Bearspaw ASP Boundary
- ASP Boundary: 100 m buffer
- Key Wildlife and Biodiversity Zones
- Mountain Goat and Sheep Areas Disease Buffer
- Bald Eagle
- Falcon
- Golden Eagle
- Leopard Frog
- Sharp-tailed Grouse

NAD83 / Alberta 3TM ref merid 114 W

Scale: 1 : 120000

N

0 1 2 3 km

Rocky View County 2022 Imagery and ESRI World Imagery

Rocky View County

Environmental Screening Report and Wildlife Habitat Modeling

Bearspaw Area Structure Plan (ASP) Boundary

Sensitive Wildlife Layers

RC BioSolutions Ltd.

Lead: Krissy Bird
Drawn by: Jesse Bird

Date: 14 Dec 2023
Project #: 23080

Figure No.
#6

Table 4 – Wildlife species found in the FWMIS database for the project area within a 5 km buffer

Common Name	Species Name	Status		
		Alberta[1]	COSEWIC[2]	SARA[3]
BIRDS				
Alder Flycatcher	*Empidonax alnorum*	Secure	N/A	N/A
American Coot	*Fulica americana*	Secure	Not at Risk	N/A
American Crow	*Corvus brachyrhynchos*	Secure	N/A	N/A
American Goldfinch	*Spinus tristis*	Secure	N/A	N/A
American Kestrel	*Falco sparverius*	Sensitive	N/A	N/A
American Robin	*Turdus migratorius*	Secure	N/A	N/A
American Wigeon	*Mareca americana*	Secure	N/A	N/A
Bald Eagle	*Haliaeetus leucocephalus*	Sensitive	Not at Risk	N/A
Baltimore (Northern) Oriole	*Icterus galbula*	Secure	N/A	N/A
Bank Swallow	*Riparia riparia*	Sensitive	Threatened	Threatened
Barn Swallow*	*Hirundo rustica*	May be at Risk	Special Concern	Threatened
Barrow's Goldeneye	*Bucephala islandica*	Secure	N/A	N/A
Belted Kingfisher	*Megaceryle alcyon*	Secure	N/A	N/A
Black-and-white Warbler	*Mniotilta varia*	Secure	N/A	N/A
Black-Billed Magpie	*Pica hudsonia*	Secure	N/A	N/A
Black-Capped Chickadee	*Poecile atricapillus*	Secure	N/A	N/A
Blue Jay	*Cyanocitta cristata*	Secure	N/A	N/A
Blue-Winged Teal	*Spatual discors*	Secure	N/A	N/A
Bohemian Waxwing	*Bombycilla garrulus*	Secure	N/A	N/A
Bonaparte's Gull	*Chroicocephalus philadelphia*	Secure	N/A	N/A
Brewer's Blackbird	*Euphagus cyanocephalus*	Secure	N/A	N/A
Brown-Headed Cowbird	*Molothrus ater*	Secure	N/A	N/A
Bufflehead	*Bucephala albeola*	Secure	N/A	N/A
California Gull	*Larus californicus*	Secure	N/A	N/A
Canada Goose	*Branta canadensis*	Secure	N/A	N/A
Canvasback	*Aythya valisineria*	Secure	N/A	N/A
Cassin's Vireo	*Vireo cassinii*	Undetermined	N/A	N/A
Cedar Waxwing	*Bombycilla cedrorum*	Secure	N/A	N/A
Chipping Sparrow	*Spizella passerina*	Secure	N/A	N/A
Clark's Nutcracker	*Nucifraga columbiana*	Sensitive	N/A	N/A
Clay-Colored Sparrow	*Spizella pallida*	Secure	N/A	N/A
Cliff Swallow	*Petrochelidon pyrrhonota*	Secure	N/A	N/A
Common Goldeneye	*Bucephala clangula*	Secure	N/A	N/A

Common Name	Species Name	Status		
		Alberta[1]	COSEWIC[2]	SARA[3]
Common Grackle	*Quiscalus quiscula*	Secure	N/A	N/A
Common Merganser	*Mergus merganser*	Secure	N/A	N/A
Common Raven	*Corvus corax*	Secure	N/A	N/A
Common Yellowthroat	*Geothlypis trichas*	Sensitive	N/A	N/A
Cooper's Hawk	*Accipiter cooperii*	Secure	Not at Risk	N/A
Dark-Eyed Junco	*Junco hyemalis*	Secure	N/A	N/A
Double-Crested Cormorant	*Phalacrocorax auritus*	Secure	Not at Risk	N/A
Downy Woodpecker	*Dryobates pubescens*	Secure	N/A	N/A
Eared Grebe	*Podiceps nigricolli*	Sensitive	N/A	N/A
Eastern Kingbird*	*Tyrannus tyrannus*	Sensitive	N/A	N/A
Eastern Phoebe	*Sayornis phoebe*	Sensitive	N/A	N/A
European Starling	*Sturnus vulgaris*	Exotic/Alien	N/A	N/A
Fox Sparrow	*Passerella iliaca*	Secure	N/A	N/A
Franklin's Gull	*Leucophaeus pipixcan*	Secure	N/A	N/A
Gadwall	*Mareca strepera*	Secure	N/A	N/A
Golden-Crowned Kinglet	*Regulus satrapa*	Secure	N/A	N/A
Gray Catbird	*Dumetella carolinensis*	Secure	N/A	N/A
Gray Jay	*Perisoreus canadensis*	Secure	N/A	N/A
Gray Partridge	*Perdix perdix*	Exotic/Alien	N/A	N/A
Great Blue Heron*	*Ardea herodias*	Sensitive	N/A	N/A
Great Horned Owl	*Bubo virginianus*	Secure	N/A	N/A
Greater Scaup	*Aythya marila*	Secure	N/A	N/A
Green-Winged Teal	*Anas crecca*	Secure	N/A	N/A
Hairy Woodpecker	*Dryobates villosus*	Secure	N/A	N/A
Hermit Thrush	*Catharus guttatus*	Secure	N/A	N/A
Horned Grebe*	*Podiceps auritus*	Sensitive	Special Concern	Special Concern
Horned Lark	*Eremophila alpestris*	Secure	N/A	N/A
House Finch	*Carpodacus mexicanus*	Secure	N/A	N/A
House Sparrow	*Passer domesticus*	Exotic/Alien	N/A	N/A
House Wren	*Troglodytes aedon*	Secure	N/A	N/A
Killdeer	*Charadrius vociferus*	Secure	N/A	N/A
Le Conte's Sparrow	*Ammospiza leconteii*	Secure	N/A	N/A
Least Flycatcher*	*Empidonax minimus*	Secure	N/A	N/A
Lesser Scaup	*Aythya affinis*	Secure	N/A	N/A
Lincoln's Sparrow	*Melospiza lincolnii*	Secure	N/A	N/A
Loggerhead Shrike	*Lanius ludovicianus*	Sensitive	Threatened	Threatened
Long-Eared Owl	*Asio otus*	Secure	N/A	N/A
Mallard	*Anas platyrhynchos*	Secure	N/A	N/A

Common Name	Species Name	Status		
		Alberta[1]	COSEWIC[2]	SARA[3]
Marbled Godwit	*Limosa fedoa*	Secure	N/A	N/A
Merlin	*Falco columbarius*	Secure	Not at Risk	N/A
Mountain Bluebird	*Sialia currucoides*	Secure	N/A	N/A
Mourning Dove	*Zenaida macroura*	Secure	N/A	N/A
Northern Flicker	*Colaptes auratus*	Secure	N/A	N/A
Northern Goshawk*	*Accipiter gentilis*	Sensitive	Not at Risk	N/A
Northern Harrier	*Circus hudsonius*	Secure	Not at Risk	N/A
Northern Pintail	*Anas acuta*	Secure	N/A	N/A
Northern Pygmy-Owl	*Glaucidium gnoma*	Sensitive	N/A	N/A
Northern Rough-Winged Swallow	*Stelgidopteryx serripennis*	Secure	N/A	N/A
Northern Saw-Whet Owl	*Aegolius acadicus*	Secure	N/A	N/A
Northern Shoveler	*Spatula clypeata*	Secure	N/A	N/A
Osprey	*Pandion haliaetus*	Secure	N/A	N/A
Peregrine Falcon	*Falco peregrinus*	At Risk (Threatened)	Not at Risk	Not on Schedule 1
Pied Billed Grebe	*Podilymbus podiceps*	Sensitive	N/A	N/A
Pileated Woodpecker	*Dryocopus pileatus*	Sensitive	N/A	N/A
Pine Siskin	*Spinus pinus*	Secure	N/A	N/A
Prairie Falcon*	*Falco mexicanus*	Sensitive	Not at Risk	N/A
Purple Finch	*Carpodacus purpureus*	Secure	N/A	N/A
Red-Breasted Nuthatch	*Sitta canadensis*	Secure	N/A	N/A
Red-Eyed Vireo	*Vireo olivaceus*	Secure	N/A	N/A
Redhead	*Aythya americana*	Secure	N/A	N/A
Red-Tailed Hawk	*Buteo jamaicensis*	Secure	Not at Risk	N/A
Red-Winged Blackbird	*Agelaius phoeniceus*	Secure	N/A	N/A
Ring-Billed Gull	*Larus delawarensis*	Secure	N/A	N/A
Ring-Necked Duck	*Aythya collaris*	Secure	N/A	N/A
Rock Dove	*Columba livia*	Exotic/Alien	N/A	N/A
Ruby-Crowned Kinglet	*Regulus calendula*	Secure	N/A	N/A
Ruddy Duck	*Oxyura jamaicensis*	Secure	N/A	N/A
Ruffed Grouse	*Bonasa umbellus*	Secure	N/A	N/A
Savannah Sparrow	*Passerculus sandwichensis*	Secure	N/A	N/A
Sharp-Shinned Hawk	*Accipiter striatus*	Secure	Not at Risk	N/A
Sharp-Tailed Grouse	*Tympanuchus phasianellu*	Sensitive	N/A	N/A
Solitary Sandpiper	*Tringa solitaria*	Secure	N/A	N/A
Song Sparrow	*Melospiza melodia*	Secure	N/A	N/A

Common Name	Species Name	Status		
		Alberta[1]	COSEWIC[2]	SARA[3]
Sora*	*Porzana carolina*	Sensitive	N/A	N/A
Spotted Sandpiper	*Actitis macularius*	Secure	N/A	N/A
Sprague's Pipit	*Anthus spragueii*	Sensitive	Threatened	Threatened
Swainson's Hawk	*Buteo swainsoni*	Secure	N/A	N/A
Tree Swallow	*Tachycineta bicolor*	Secure	N/A	N/A
Trumpeter Sawn*	*Cygnus buccinator*	Sensitive	Not at Risk	N/A
Upland Sandpiper	*Bartramia longicauda*	Sensitive	N/A	N/A
Vesper Sparrow	*Pooecetes gramineus*	Secure	N/A	N/A
Warbling Vireo	*Vireo gilvus*	Secure	N/A	N/A
Western Meadowlark	*Sturnella neglecta*	Secure	N/A	N/A
Western Wood-pewee	*Contopus sordidulus*	May Be at Risk	N/A	N/A
White-Breasted Nuthatch	*Sitta carolinensis*	Secure	N/A	N/A
White-Crowned Sparrow	*Zonotrichia leucophrys*	Secure	N/A	N/A
White-Throated Sparrow	*Zonotrichia albicollis*	Secure	N/A	N/A
Wilson's Phalarope	*Phalaropus tricolor*	Secure	N/A	N/A
Wilson's Snipe	*Gallinago delicata*	Secure	N/A	N/A
Yellow Warbler	*Dendroica petechia*	Secure	N/A	N/A
Yellow-Headed Blackbird	*Xanthocephalus xanthocephalus*	Secure	N/A	N/A
Yellow-Rumped Warbler	*Dendroica coronata*	Secure	N/A	N/A
MAMMALS				
American Badger	*Taxidea taxus*	Sensitive	Special Concern	Special Concern
Beaver	*Castor canadensis*	Secure	N/A	N/A
Big Brown Bat	*Eptesicus fuscus*	Secure	N/A	N/A
Black Bear	*Ursus americanus*	Secure	Not at Risk	N/A
Bobcat	*Lynx rufus*	Sensitive	N/A	N/A
Canada lynx	*Lynx canadensis*	Sensitive	Not at Risk	N/A
Cougar*	*Puma concolor*	Secure	Data Deficient	N/A
Coyote	*Canis latrans*	Secure	N/A	N/A
Deer Mouse	*Peromyscus maniculatus*	Secure	N/A	N/A
Gray Wolf	*Canis lupus*	Secure	Not at Risk	N/A
Grizzly bear*	*Ursus arctos*	At Risk (Threatened)	Special Concern	Special Concern
Hoary Bat	*Lasiurus cinereus*	Sensitive	Endangered	Not on schedule 1
Little Brown Bat/Myotis	*Myotis lucifugus*	May Be at Risk	Endangered	Endangered
Long-Eared Bat	*Myotis evotis*	Sensitive	N/A	N/A
Long-tailed Weasel*	*Mustela frenata*	May be at Risk	Not at Risk	N/A
Marten	*Martes americana*	Secure	N/A	N/A

Common Name	Species Name	Status		
		Alberta[1]	COSEWIC[2]	SARA[3]
Meadow Vole	*Microtus pennsylvanicus*	Secure	N/A	N/A
Moose	*Alces alces*	Secure	N/A	N/A
Mule Deer	*Odocoileus hemionus*	Secure	N/A	N/A
Muskrat	*Ondatra zibethicus*	Secure	N/A	N/A
Northern Pocket Gopher	*Thomomys talpoides*	Secure	N/A	N/A
Porcupine	*Erethizon dorsatum*	Secure	N/A	N/A
Prairie Vole	*Microtus ochrogaster*	Secure	N/A	N/A
Raccoon	*Procyon lotor*	Secure	N/A	N/A
Red Fox	*Vulpes vulpes*	Secure	N/A	N/A
Red Squirrel	*Tamiasciurus hudsonicus*	Secure	N/A	N/A
Richardson's Ground Squirrel	*Spermophilus richardsonii*	Secure	N/A	N/A
Sagebrush Vole	*Lemmiscus curtatus*	Secure	Data Deficient	N/A
Short-tailed Weasel/Ermine	*Mustela erminea*	Secure	N/A	N/A
Silver-haired Bat	*Lasionycteris noctivagans*	Sensitive	Endangered	Not on schedule 1
Snowshoe Hare	*Lepus americanus*	Secure	N/A	N/A
Wapiti	*Cervus elaphus*	Secure	N/A	N/A
Western small footed Bat	*Myotis ciliolabrum*	Sensitive	N/A	N/A
White-Tailed Deer	*Odocoileus virginianus*	Secure	N/A	N/A
White-Tailed Jack Rabbit	*Lepus townsendii*	Secure	N/A	N/A
Yellow-Bellied Marmot	*Marmota flaviventris*	Secure	N/A	N/A
AMPHIBIANS & REPTILES				
Boreal Chorus Frog	*Pseudacris maculata*	Secure	N/A	N/A
Columbia Spotted Frog	*Rana luteiventris*	Sensitive	Not at Risk	N/A
Northern leopard frog	*Lithobates pipiens*	At Risk (Threatened)	Special Concern	Special Concern
Red-sided garter snake	*Thamnophis sirtalis*	Sensitive	N/A	N/A
Tiger Salamander	*Ambystoma mavortium*	Secure	Special Concern	Special Concern
Wandering garter snake	*Thamnophis elegans*	Sensitive	N/A	N/A
Wood Frog	*Lithobates sylvatica*	Secure	N/A	N/A

(1) General Status of Alberta's Wild Plants and Animals (Government of Alberta 2022)
(2) Status listed by the Committee on the Status of Endangered Wildlife in Canada (Government of Canada 2022a)
(3) Species at Risk Act (Government of Canada 2022b)
* Species found within the project area and 100 m buffer

It is recommended that any future development require a Biophysical Impact Assessment (BIA). The following wildlife surveys would be required:

- Breeding Bird
- Sensitive Raptor

- Amphibian (when wetlands are present)
- Sharp-tailed Grouse (depending on the parcel)
- Water Bird
- Species at Risk (vary depending on the parcel and the available habitat)
- Incidental Wildlife/Wildlife Habitat

These surveys should be completed between the beginning of March and the end of June, depending on the species and weather conditions (Government of Alberta 2013).

TCS (2019) performed wildlife habitat modeling for the Springbank ASP (immediately to the south) for three focal species (1) moose (*Alces alces*), (2) deer (*Odocoileus* sp.), and (3) Short-eared Owls (*Asio flammeus*). All three were used as umbrella species for other sensitive wildlife species:

- Moose – Moose prefer forested, shrubland, and wetland habitat types, while avoiding agricultural and urban areas. Relevant associated species may include: black bear, cougar, bobcat, Western Wood-peewee, and Olive-sided Flycatcher.
- Deer – Deer are generalists that prefers deciduous and mixedwood forests, and shrublands. They have a positive association with agricultural areas and rural/urban features. Relevant associated species may include: coyote and other disturbance tolerant species.
- Short-eared Owls – This species prefers native prairie or tame pasture and avoids annual cropland, urban areas, and forests. Relevant associated species may include: Sprague's Pipit, American badger, and other grassland obligate species.

2.2.5.3 Wildlife Habitat Modelling Methodology

Structural landscape connectivity for wildlife in the Bearspaw ASP area was modelled using Circuitscape version 4.0.5 (McRae et al. 2013). Circuitscape uses circuit theory to model movement routes of animals across fragmented landscapes and to identify important areas for habitat connectivity (McRae et al. 2016). Circuitscape models the landscape into a large "circuit board" with each individual pixel being assigned a resistance value, which reflects how difficult it is for a wildlife species to move through the 'circuit board' (landscape). A theoretical 'current' is then applied to randomly placed 'nodes' within the landscape and the current moves through the landscape according to how 'conductive' different parts of the landscape are. The resulting current density of each pixel represents the likelihood that that pixel will be used by an animal that is randomly walking across the landscape (Bowman & Cordes 2015). Areas with high current density represent the most connective (or best) corridors that support movement of the wildlife species of interest in the model (and any other species that share the same habitat). Protecting these corridors can help to mitigate the negative effects of habitat loss and fragmentation in anthropogenically modified landscapes and conserve wildlife biodiversity (McRae et al. 2016).

A combination of multiple habitat and disturbance databases was used to make shapefiles and raster files converted to a raster file that was then used as the base map for Circuitscape modelling. These included (1) Habitat Classes – comprising of the Annual Crop Inventory (Government of Canada 2023) and the Grassland Vegetation Inventory (GVI; Government of Alberta 2011a), (2) Anthropogenic Disturbance – comprising of the Human Footprint data (ABMI 2022) and Annual Crop Inventory (Government of Canada 2023), and (3) Wetlands – comprising of the ABMI Wetland Inventory (ABMI 2021) and Annual Crop Inventory (Government of Canada 2023). The GVI database did not fully cover the ASP area and 20% buffer (see below). In those cases, the GVI and ACI vectorized data were merged together to provide full coverage of the modelling area.

Movement simulations were based on the habitat preferences and habitat barriers for several focal species: (1) Moose (*Alces alces*; forest/wetland/riparian species), (2) Deer (*Odocoileus* sp.; generalist species), and (3) badger (*Taxidea taxus*; grassland species), (4) porcupine (*Erethizon dorsatum*; forest species), and (5) frogs – boreal chorus frog (*Pseudacris maculata*), wood frog (*Rana sylvatica*), and Northern leopard frog (*Rana pipiens*; wetland/riparian amphibian species) (Table 5). These species were chosen because of the availability of distribution and habitat data, their presence in or near the ASP area (based on FWMIS data), and their contrasting habitat preferences. These species were also chosen to function as "umbrella species" for other wildlife. No birds or bats were selected due to their ability to fly, which allows them to cross large areas of disturbance easier than mammals (non-bats), amphibians, or reptiles. Sensitive species identified in the ASP area, with the exception of Northern leopard frogs, were not selected as model species due to the lack of FWMIS data to check the models, but also because their habitat preferences are often similar to other species that were chosen as target species.

A literature review of habitat preferences for the target species was used to assign resistance values to the land-use map categories using a 1-100 scale (1, 25, 50, 75, and 100) with 1 being optimal habitat with little resistance and 100 being impermeable habitat (Table 6).

Table 5 – Target species used for wildlife habitat modelling with their general habitat preferences.

Target Species for Model	General Habitat Preferences
Moose	Prefers forested, shrubland, wetland, and riparian habitat types. Avoids agricultural and urban areas. Relevant associated species could include: black bear, cougar, bobcat, Western Wood-peewee, and Olive-sided Flycatcher.
Deer (White-tailed Deer and Mule Deer)	A generalist species that prefers deciduous forest, mixedwood forests, and shrublands. These species have a positive association with agricultural and recreational areas, as well as rural/urban features. Relevant associated species could include: coyote, red fox, and other disturbance tolerant species.
American Badger	Prefers native prairie or tame pasture and avoids annual cropland, urban areas, and forests. May or may not be associated with certain wetland classes. Relevant associated species could include: Sprague's Pipit, Short-eared Owl, and other grassland obligate species.
Porcupine	Prefers coniferous and mixedwood forests. They can also be found in grasslands, deciduous forest, and shrub communities. Relevant associated species could include: Little brown bat, Hoary bat, Northern Flicker, and other forest obligates.
Frogs – Boreal Chorus Frog, Wood Frog, and Northern Leopard Frog	Prefers wetland and riparian habitat. These species were selected to represent small wildlife that may have greater difficulty traversing larger areas and fragmented habitat. Relevant associated species could include: boreal chorus frog, wood frog, and Northern leopard frog

Table 6 - Resistance values assigned to each land-use type for each target species model.

Land-use Type	Resistance Values				
Forest and Shrubland:	**Moose**	**Deer**	**Badger**	**Frogs**	**Porcupine**
Broadleaf/Deciduous forest (ACI)	1	1	75	50	1
Coniferous forest (ACI)	25	25	100	50	1
Mixedwood forest (ACI)	1	1	75	50	1
Shrubland (ACI)	1	1	50	25	25
Grassland and Agriculture:					
Grassland (ACI)	50	1	1	50	75
Pasture/Forage (ACI)	50	1	25	50	75
Annual Cropland (ACI)	75	25	50	75	100
Hydrology:					
Marsh (ABMI)	1	50	25	1	25
Swamp (ABMI)	1	50	25	1	25
Open Water (ABMI)	25	50	75	25	50
Unknown Wetland (ACI)	1	50	25	1	25
Water (River, Lake, Stream, etc.) (ACI)	25	50	50	25	50
Lotic (Deciduous) (GVI)	1	25	50	1	25
Lotic (Herbaceous) (GVI)	1	25	50	1	25
Lotic (River) (GVI)	1	50	75	50	75
Lotic (Shrub) (GVI)	1	25	50	1	25
Lentic (Open Water - Lake/Reservoir) (GVI)	25	50	50	25	50
Lentic (Seasonal wetland) (GVI)	1	25	25	1	25
Lentic (Semi-permanent to permanent wetland) (GVI)	1	50	25	1	25
Lentic (Temporary wetland) (GVI)	1	25	25	1	25
Anthropogenic:					
Urban/developed (ACI)	75	50	75	75	75
Exposed land/barren (ABMI HFP)	50	50	50	100	100
Golfcourse (ABMI HFP)	50	25	50	50	75
Greenspace (vegetated) (ABMI HFP)	25	25	50	50	50
Recreation (ABMI HFP)	25	25	50	50	50
Highway/ Heavy Traffic (NRN)	75	75	75	100	75
Small Road (NRN)	25	25	50	50	50
Industrial (ABMI HFP)	100	100	100	100	100
Mining/ Gravel Pit Operations (ABMI HFP)	100	75	100	100	100

A patch-free model was used in Circuitscape with starting and ending nodes outside of the ASP project boundary. This methodology is suitable for showing the broad movement of individuals across the landscape. A 20% (by area) rectangular buffer zone was created around the ASP boundary to define the habitat modelling boundary and to place the nodes. Enough space between the ASP area and the nodes is required to remove any artificially biased data or create

data “hotspots”. A buffer of 20% of the ASP area, corresponding to 1,400 m, with node focal points spaced of 5,000 m apart, was applied outside the ASP area to mitigate for hotspots and provide a realistic result. A total of 13 node focal points were created and a buffer area. See Table 7 for the full Circuitscape model specifications.

Table 7 - Circuitscape specifications.

Option	Input
Input Data Type:	Raster
Modelling Mode:	Pairwise: iterate across all pairs in focal node file
Input Resistance Data:	ASP Boundary + 20% buffer raster file
Pairwise Mode Options:	.txt file containing 13 focal node points spaced 5,000 meters apart in the 20% buffer area
Advanced Mode Options:	None
Output Options:	Current Maps by species
Options - Calculation Options:	None
Options - Mapping Options:	Write cumulative & max current maps only
Options - Optional Input Files:	None

2.2.5.4 Wildlife Habitat Modelling Results

The following are a few guidelines on interpreting the wildlife habitat mapping provided:

- Wildlife habitat corridors do not indicate the direction in which the wildlife species move. Circuitscape modelling does not provide direction of use. Instead, it provides areas through which wildlife likely move and/or utilize.
- Wildlife habitat corridors shown in Appendix A reveal the areas that are most likely to be used by each species type based on their habitat preferences.
- Modelling was somewhat able to be verified using FWMIS data for some species, but very little location specific data was available for most species within the ASP area.

2.2.5.4.1 Moose (and Forest/Wetland/Shrubland Species)

In general, the habitat connectivity for moose and other forest/wetland/riparian/shrubland species is of low quality in the ASP area (Appendix A, Figure A1). Moose tend to favour forest and treed wetland habitats, of which there is very little of in the ASP area. When these habitats do exist (dark and light green polygons), they tend to be fairly small and not fully connected. If moose were to travel through the ASP area, the areas of highest habitat connectivity are primarily in the forested area in the northwest that run alongside Bighill Creek, and the farmland in the east that exhibits no development and contains multiple un-named drainages (Appendix A, Figure A-2). There are some areas of forest/riparian/wetland connectivity throughout the ASP area in the acreages, which moose could also utilize to move in a north-south direction between the river valleys. Only two moose locations were provided in FWMIS within the project area and one was in the extreme south near the small habitat corridor south of the highway and the other

was in the acreage development immediately west of the farmland with the majority of moose corridors.

2.2.5.4.2 Deer (and other Generalist Species)

Habitat connectivity throughout the ASP area is much stronger for deer and other generalist species than moose (Appendix A, Figure A3). Most of the project area offers low resistance to generalist movement (green and light green). However, low resistance translates to generalists being able to move across most locations resulting in limited areas showing high connectivity (high value wildlife corridors tend not to show up if the animals are not restricted in their movement). There are limited areas showing high connectivity throughout the ASP area, where deer can utilize a network of connected grassland, pastures, crop, and deciduous forest. It is important to note that while deer may utilize more open habitats for foraging in the spring and summer, they tend to rely on more forested and sheltered habitats during the critical winter period, meaning that their habitat map would more closely resemble the one for moose during this time. Most of the high use corridors show up in the extreme south near the river and in the northeast in riparian areas with little development (Appendix A, Figure A4). Most FWMIS generalist points show up in the northeast corridor hot spot, with a single point in the center of the ASP, north of the highway, in the acreage developments.

2.2.5.4.3 Badger (and Grassland Species)

Availability of suitable habitat for grassland species is mainly concentrated in several paths travelling through the ASP area and avoiding the forested river valley areas to the north and south (Appendix A, Figure A5). Preferential habitat is primarily concentrated in the west, away from residential development (green and light green polygons). One of the areas with the highest connectivity is a stretch of native grassland interspersed with wetlands and some forest/shrub habitat located in the west portion of the ASP area (Appendix A, Figure A6). There are also several corridors in the east outside of residential develop that appear to be influenced by grassland areas to the north of the project ASP area (Appendix A, Figure A6). Finally, there are corridors in the south near the river that appear to be utilized by grassland species avoid residential and industrial areas. No FWMIS data was available for grassland obligates within the ASP.

2.2.5.4.4 Porcupine (and Forest Species)

Forest species habitat is primarily located in the center of the project area associated with acreage development and along Bighill Creek in the northwest (Appendix A, Figure A7). As this habitat type is most concentrated in the ASP, the corridors are the most defined being along Bighill Creek and throughout the center of the project area radiating in the northwest to southeast direction (may be unidirectional or bidirectional, as Circuitscape does not provide information on the direction of wildlife movement (Appendix A, Figure A8). In this case, movement likely occurs in both direction between the river and the Bighill Creek areas. The only porcupine FWMIS data location occurred in the eastern area that is devoid of human development and contains the most wildlife corridors across all five types of wildlife.

2.2.5.4.5 Frogs (and Small Wetland/Riparian Species)

Amphibian habitat is limited to wetlands and riparian areas within the ASP (Appendix A, Figure A9). Due to the quality of the wetland data and lack of accurate wetland classifications in the government databases, we adopted the conservative approach and assessed all wetlands and riparian areas as being frog habitat, while in reality, this is not true. As such, areas of wetland complexes, as well the riparian draws in the east appear to be where the most frog connectivity is located (Appendix A, Figure A10). Frogs are small animals dependent on wet habitats so movement ability is limited. Finer scale movement studies are better suited for species like these, but with finer scale assessments, you also require more accurate habitat data. FWMIS data points occur in several patches across the ASP, but appear to be more associated with new developments requiring BIAs than reflecting areas of amphibian abundance.

2.2.6 Aquatics

Fish habitat within the Foothills Parkland Subregion is limited, with open water accounting for <1% of the total area. Potential fish habitat is primarily found in small streams (e.g., Bigspring Creek) and a few small lakes. Table 8 contains fish species known to occur in the Subregion, most of which are found in Bow River and Elbow rivers, and their tributaries.

2.2.6.1 Methodology

A desktop review of provincial databases was conducted to identify wildlife species present in the area listed as “Endangered”, “Threatened”, or of “Special Concern” by either federal or provincial governments (Government of Canada 2022a,b; Government of Alberta 2022). Databases reviewed include Alberta Environment and Park’s (AEP) General Status of Alberta Wild Species (Government of Alberta 2022), AEP Fisheries and Wildlife Management Information System (FWMIS) database (AEP 2022a), and the Database of Wildlife Species Assessed by SARA Wildlife Species Search (Government of Canada 2022b).

2.2.6.2 Results

Two fish species were found within the project area, and an additional 18 fish species were found within 5 km of the project area (Table 8). Within 5 km of the project boundary, one fish species was provincially listed as ‘Sensitive’ (lake trout; *Salvelinus namaycush*), one as ‘May Be at Risk’ (spoonhead sculpin; *Cottus ricei*), and one as ‘At Risk’ (bull trout; *Salvelinus confluentus*). No federally or provincially listed fish species were identified within the ASP boundary.

Bull trout in the 5 km buffer belong to the Saskatchewan-Nelson Rivers populations, which are federally designated as ‘Threatened’ by the Committee on the Status of Endangered Wildlife in Canada (COSEWIC), with a current ‘Schedule 1’ (Threatened) status under the SARA (DFO 2023a). According to the DFO ‘Aquatic Species at Risk Map’, no critical habitat for an aquatic species was identified within the project area or 5 km buffer (DFO 2023b).

Table 8 – Fish species found in the FWMIS database for the project area within a 5 km buffer

Common Name	Species Name	Status		
		Alberta[1]	COSEWIC[2]	SARA[3]
Brook stickleback*	*Culaea inconstans*	Secure	N/A	N/A
Brook trout	*Salvelinus fontinalis*	Exotic/Alien	N/A	N/A
Brown trout	*Salmo trutta*	Exotic/Alien	N/A	N/A
Bull trout	*Salvelinus confluentus*	At Risk	Threatened	Threatened
Bull trout X brook trout hybrid	*Salvelinus confluentus* X *Salvelinus fontinalis*	N/A	N/A	N/A
Burbot	*Lota lota*	Secure	N/A	N/A
Cutthroat trout	*Oncorhynchus clarkii*			
Fathead minnow	*Pimephales promelas*	Secure	N/A	N/A
Lake chub	*Couesius plumbeus*	Secure	N/A	N/A
Lake trout	*Salvelinus namaycush*	Sensitive	N/A	N/A
Longnose dace*	*Rhinichthys cataractae*	Secure	N/A	N/A
Longnose sucker	*Catostomus catostomus*	Secure	N/A	N/A
Mountain whitefish	*Prosopium williamsoni*	Secure	N/A	N/A
Mountain sucker	*Catostomus platyrhynchus*	Secure	N/A	N/A
Northern pike	*Esox lucius*	Secure	N/A	N/A
Pearl dace	*Margariscus margarita*	Undetermined	N/A	N/A
Rainbow trout	*Oncorhynchus mykiss*	Secure	N/A	N/A
Spoonhead sculpin	*Cottus ricei*	May be at Risk	Not at Risk	N/A
Trout-perch	*Percopsis omiscomaycus*	Secure	N/A	N/A
White sucker	*Catostomus commersoni*	Secure	N/A	N/A

(1) General Status of Alberta's Wild Plants and Animals (Government of Alberta 2023)
(2) Status listed by the Committee on the Status of Endangered Wildlife in Canada (Government of Canada 2023a)
(3) Species at Risk Act (Government of Canada 2022b)
* Species found within the project area and 100 m buffer

2.3 Environmentally Significant Areas (ESA) and Protected Areas Database Search

Environmentally Significant Areas (ESAs) are defined as: (1) areas that are important to the long-term maintenance of biological diversity, soil, water, or other natural process at multiple scales and (2) areas that contain rare or unique elements or that include elements that may require special management consideration due to their conservation needs. The Alberta Parks Environmentally Significant Areas database includes maps, a final report, and GIS shapefile data.

2.3.1 Methodology

The most current version of the Environmentally Significant Areas (Fiera Biological Consulting 2014) shapefile was obtained from Alberta Environment and Parks (2016) and is presented on the map “as is”.

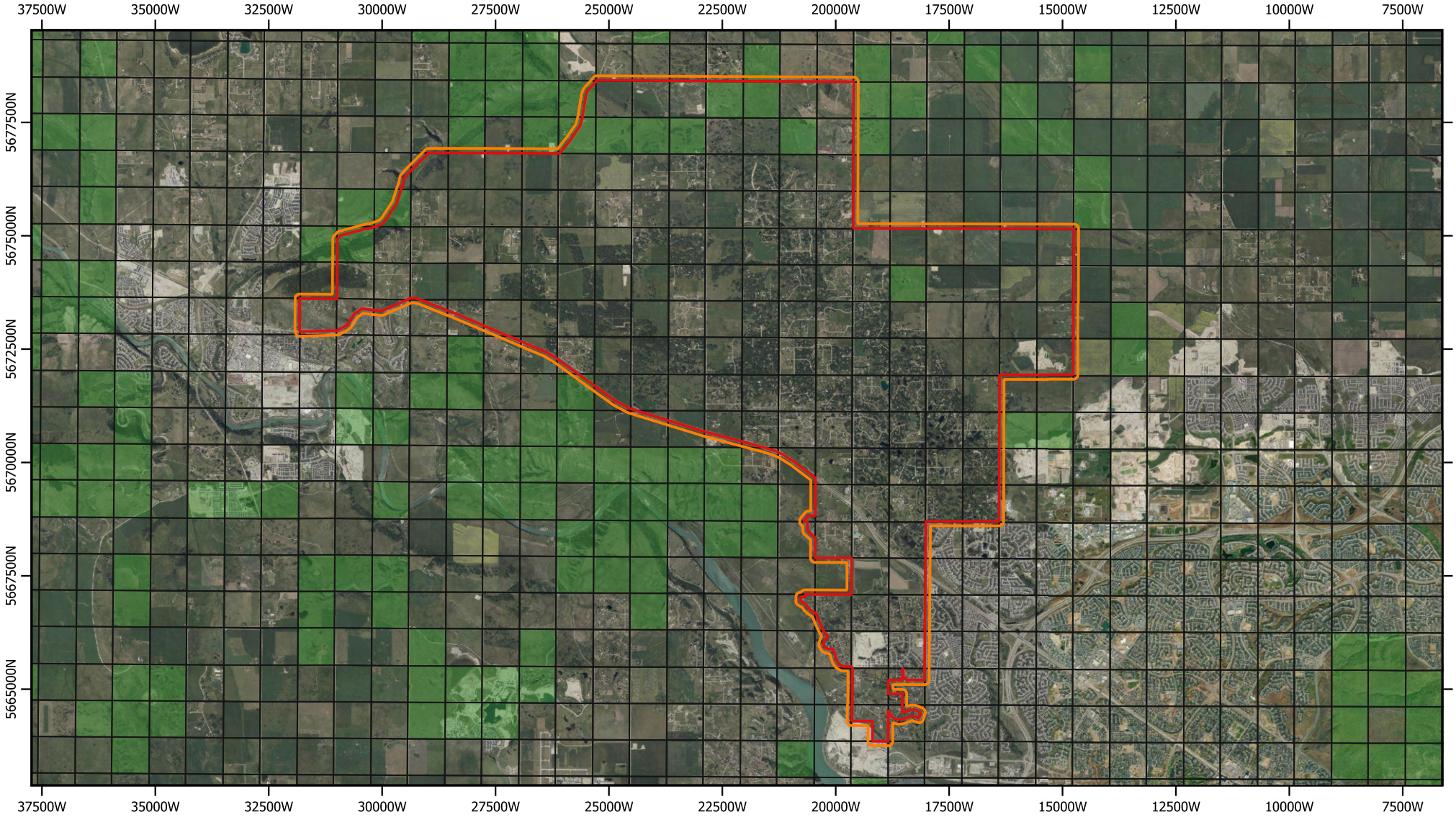
The Parks and Protected Areas of Alberta (AEP 2023b) database was also searched.

2.3.2 Results

There are 13 quarter sections classed as Environmentally Significant Areas within the project area and an additional 10 Environmentally Significant Area quarter sections in the 100 m buffer (Fiera 2014; Figure 7). The majority of quarter sections are located around Bigspring Creek and Bighill Creek along the northern edge of the ASP boundary.

Quarter sections classed as Environmentally Significant Areas within the project area are NE-23-26-3-W5M, NW-12-26-4-W5M, NW-21-26-3-W5M, NW-23-26-3-W5M, NW-33-25-3-W5M, SE-13-26-4-W5M, SE-21-26-3-W5M, SE-22-26-3-W5M, SE-7-26-2-W5M, SW-21-26-3-W5M, SW-22-26-3-W5M, SW-24-26-3-W5M.

There were no parks, protected areas, or natural heritage areas located within the project area. Glenbow Ranch Provincial Park is located south of the ASP boundary on the north bank of Bow River. Additionally, Bighill Springs Provincial Park is located approximately 1.5 km north of the ASP boundary.



LEGEND

- Sensitive or Listed Wildlife Species
- Bearspaw ASP Boundary
- ASP Boundary: 100 m buffer

Provincial ESA

- No
- Yes

NAD83 / Alberta 3TM ref merid 114 W

Scale: 1 : 120000

N

0 1 2 3 km

Rocky View County 2022 Imagery and ESRI World Imagery

Rocky View County

Environmental Screening Report and Wildlife Habitat Modeling

Bearspaw Area Structure Plan (ASP) Boundary

Environmentally Significant Areas (Provincial)

RC BioSolutions Ltd.

Lead: Krissy Bird
Drawn by: Jesse Bird

Date: 14 Dec 2023
Project #: 23080

Figure No.
#7

2.4 Hydrology, Waterbodies, and Wetlands

2.4.1 Methodology – Hydrology, Waterbodies, and Wetlands

The following base layers were used to delineate hydrology for the ASP area:

- The hydrology shapefile provided by Rocky View County, which provides a line file of watercourses.
- ABMI Wetland Inventory (ABMI 2021) which provides polygons classified into five broad classes (bogs, fens, marshes, shallow open waters and swamps) based on the Alberta Wetland Classification System (AESRD 2015a).
- GVI database using polygons containing lentic (still water) site types. Lentic site types are classified by GVI based on water permanence (e.g. seasonal, semi-permanent to permanent, temporary) and whether the polygon contains open water.
- Fish and Wildlife Management Information System (FWMIS) Hydrology Polygons (AEP 2023a).

Due to the fact that only existing databases were used for wetland delineation, wetland classifications are not given because they were not provided in the databases. If multiple delineations for a single wetland were provided by the different databases, all delineations are shown in different colours, as ground truthing has not been completed and the true wetland delineation is currently unknown.

2.4.2 Results – Hydrology

Approximately 66% of the project area falls within the Nose Creek sub-basin, which flows north toward Nose Creek. The remaining 34% of the project area flows south toward Bow River as part of the Bow River and Bighill Creek sub-basin. A stormwater management plan will be part of the new updated Bearspaw ASP.

No sources of natural spring water were discovered within the project area or 100 m buffer (Stewart 2009). Future ground truthing would likely be required to identify all sources of natural springs. Confirming of alluvial aquifers and or any other shallow groundwater features would also be required.

2.4.3 Results – Watercourses

The project area contains two named watercourses: Bigspring Creek, which flows along the northern edge of the ASP boundary, and Bighill Creek which flows along the northwestern edge. An additional 56 unnamed watercourses were identified within the ASP boundary. All unnamed watercourses east of Range Road 35 and north of Township Road 262 were tributaries to Bigspring Creek, and all those west of Range Road 35 and north of Retreat Road were tributaries to Bighill Creek. All unnamed watercourses east of Bearspaw Road and north of Burma Road were unnamed tributaries to West Nose Creek, and all other unnamed watercourses in the ASP boundary were unnamed tributaries to Bow River.

2.4.4 Results – Wetlands

The desktop assessment for wetlands was completed using the ABMI Wetland Inventory (ABMI 2021) and GVI database (Government of Alberta 2011).

ABMI wetland polygons are segmented by their assigned wetland class and more than one wetland class is often included within a wetland area. According to the ABMI Wetland Inventory, 787 wetlands or wetland segments are present in the project area and 100 m buffer. After combining intersecting polygons (representing a single wetland area) the total number of wetlands was 413 (Figure 8). Wetland classes present included marsh, open water, or swamp, accounting for a combined total of approximately 1.7% of the ASP area (Table 9).

Table 9 – Wetland classes present in the project area and 100 m buffer based on the ABMI Wetland Inventory.

Wetland Class	Description[1]	Total Area/Percentage Occurring in the Project Area and 100 m Buffer
Marsh	A mineral wetland with water levels near, at or above the ground surface for variable periods during the year, and which supports graminoid vegetation in the deepest portion of the wetland in the majority of years.	81.92 ha (0.76%)
Open Water	A mineral wetland with water levels near, at or above the ground surface for variable periods during the year, which is less than two metres deep at midsummer and that contains an open water zone in the deepest wetland zone covering greater than 25% of the total area in the majority of years.	52.12 ha (0.49%)
Swamp	A mineral wetland with water levels near, at or above the ground surface for variable periods during the year which contains either more than 25% tree cover of a variety of species or more than 25% shrub cover.	48.21 ha (0.45%)

[1] Descriptions are from Alberta Wetland Classification System (AESRD 2015)

Additionally, 158 wetlands were identified in the GVI database for the project area and 100 m buffer (Figure 9). GVI identified wetlands accounted for 1.7% of the total project area and 100 m buffer, and represented four GVI site types (Table 10). Additionally, 86 of the GVI wetland polygons intersected with one or more wetlands in the ABMI Wetland Inventory, suggesting some level of agreement between the two datasets in these areas.

Table 10 – Wetland site types present in the project area and 100 m buffer based on the GVI database.

Wetland Site Type	Description[1]	Total Area/Percentage Occurring in the Project Area and 100 m Buffer
Open Water	Permanent open water zones that are larger than 1.0 hectare. Bordering zones may include peripheral deep-marsh, shallow-marsh, wet-meadow, low-prairie and fen zones.	107.78 ha (1.00%)
Seasonal	Wetlands with water persisting more than three weeks, and usually disappearing by early July. The deepest parts are dominated by the shallow-marsh zone. Peripheral wet-meadow and low-prairie zones are usually present. Lentic Seasonal basins in GVI have relatively lush vegetation compared to Lentic Temporary due to a higher water table and do not have a visible salt crust.	10.36 ha (0.10%)
Semi-Permanent to Permanent	Marshes and lake where water persists throughout the year in most years, except during periods of extreme drought. Lentic Semi to Permanent wetlands are dominated by the deep=marsh and shallow-marsh zones consisting of emergent vegetation like cattails and bulrushes.	60.18 ha (0.56%)
Temporary	Wetlands surface where water is ually retained for only a brief period in the early spring before the bottom ice seal disappears, and occasionally for several days after heavy rainstorms in late spring, summer and fall. Typically have low prairie vegetation and no salt crust.	3.18 ha (0.03%)

[1] Descriptions from Grassland Vegetation Inventory (GVI) Specifications 5th edition (ASRD 2011)

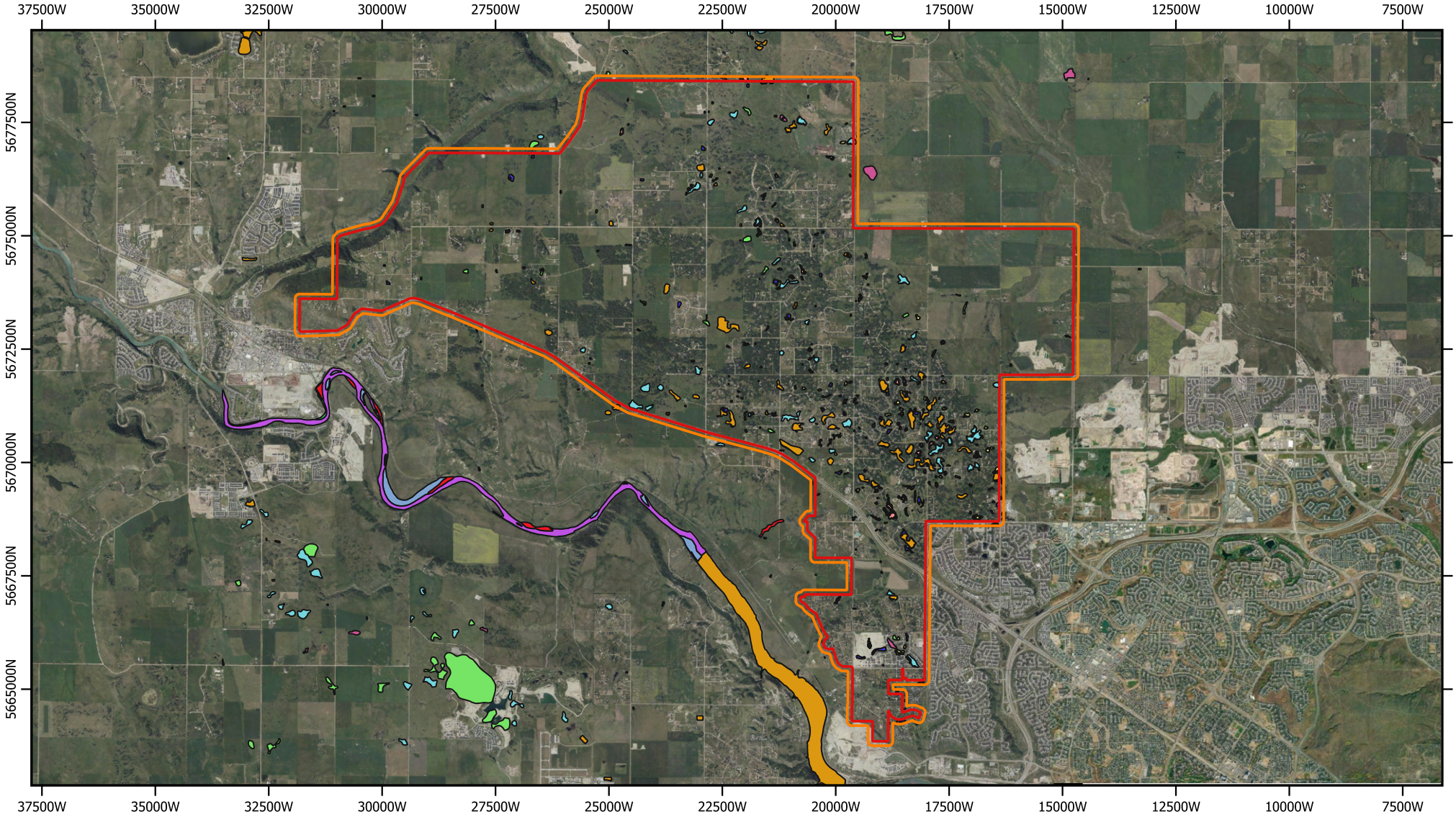
Notably, there are a number of issues with the selected databases.

- Not all wetlands were identified in aerial photography.
- Some waterbodies identified from the database shapefiles are likely not wetlands or ephemeral wetlands (appear upland).
- No missing waterbodies were added, nor were any potential waterbodies removed if they were likely not present, as no field ground-truthing was conducted. Historical imagery was also not used to determine if waterbodies validity due to the scope of this assessment.

Ground truthing the wetlands in the field will be required to finalize the delineation and classification of the wetlands and a full permanency assessment will be required to determine the permanence of the wetlands, which was not part of the scope of this assessment.

It is recommended that since this was a coarse-scale desktop assessment using only available wetland and watercourse databases, that all parcels considering development require a Biophysical Impact Assessment (BIA) to be completed using the Rocky View County Servicing Standards (2013) and conduct field-based wetland assessments using the appropriate AEP Directives (Government of Alberta 2015a, 2015b, 2015c, 2016, 2017, 2018).

Removal of all wetlands will require *Water Act* approval, with seasonal and semi-permanent wetlands requiring a permanency assessment under the *Public Lands Act* for removal. Ephemeral wetlands may not be visible in imagery so the field-based wetland assessment needs to identify these water bodies, as they also require *Water Act* Approval for their removal. However, compensation is not required for the removal of ephemeral wetlands. Please note that the final boundaries of all wetlands in the project area may be modified once field ground truthing has been completed.



LEGEND

- Bearspaw ASP Boundary
- ASP Boundary: 100 m buffer

ABMI Wetlands

- Marsh
- Open water
- Swamp

Lentic Water (GVI)

- Lentic (Open Water)
- Lentic (Seasonal)
- Lentic (Semi-Permanent to Permanent)
- Lentic (Temporary)

Lotic Water (GVI)

- Lotic (Deciduous)
- Lotic (Herbaceous)
- Lotic (River)
- Lotic (Shrub)

NAD83 / Alberta 3TM ref merid 114 W

Scale: 1 : 120000

N

0 1 2 3 km

Rocky View County 2022 Imagery and ESRI World Imagery

Rocky View County

Environmental Screening Report and Wildlife Habitat Modeling

Bearspaw Area Structure Plan (ASP) Boundary

Waterbodies and Wetlands

RC BioSolutions Ltd.

Lead: Krissy Bird
Drawn by: Jesse Bird

Date: 14 Dec 2023
Project #: 23080

Figure No.
#8

2.5 Topography

2.5.1 Methodology

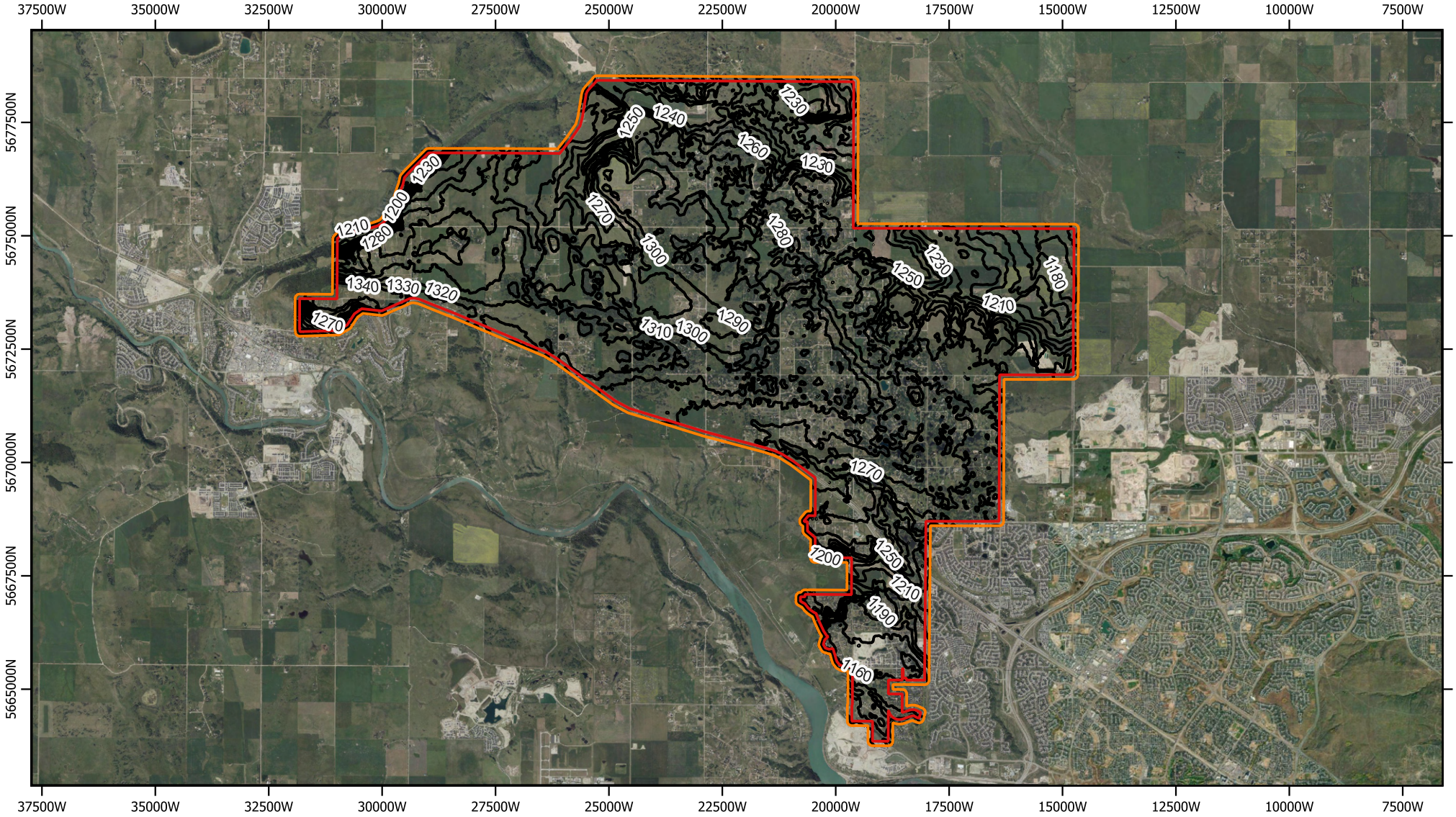
We examined the two-meter contour shapefile provided by Rocky View County, which displays the contours that show sloped areas and basins.

2.5.2 Results – Project Footprint

The local topography within the project area is generally elevated through the central portion of the ASP area, and slopes towards the Bow River in the south, and West Nose Creek in the northeast. The highest elevation is located in the southwestern portion of the project area near Highway 1. Topography in the remainder of the ASP area consists of undulating terrain and defined or partially-defined drainage ways. The elevation ranges from approximately 1,150 to 1,338 meters (Figure 9).

2.5.3 Results – Regional Context

Regionally, the topography is relatively flat to undulating with slopes near the Bow River (Strong and Thompson 1995). The project area is similar to the regional topography of the surrounding area. The topography of the entire region is generally slightly rolling with small to large low-lying prairie pothole wetlands.



LEGEND

- Bearspaw ASP Boundary
- ASP Boundary: 100 m buffer
- Contours (10 meters)

NAD83 / Alberta 3TM ref merid 114 W

Scale: 1 : 120000

N

0 1 2 3 km

Rocky View County

Environmental Screening Report and
Wildlife Habitat Modeling

Bearspaw Area Structure Plan (ASP) Boundary

Rocky View County 2022 Imagery and ESRI World Imagery

Topography

RC BioSolutions Ltd.

Lead: Krissy Bird
Drawn by: Jesse Bird

Date: 14 Dec 2023
Project #: 23080

Figure No.
#9

2.6 Soils

2.6.1 Methodology

Soil types within the ASP boundary were examined using the soils shapefile derived from the Soil Survey of the Calgary urban perimeter (MacMillan 1987) provided by Rocky View County.

2.6.2 Results

Fourteen soil series (Antler, Bow Valley, Bearspaw, Durvargan, DeWinton, Fish Creek, Happy Valley, Lloyd Lake, Leighton Centre, Pothole Creek, Rough Broken, Strathcona, Spy Hill, and Sarcee) occur within the Project Area (MacMillan 1987; Table 11; Figure 10).

Table 11 – Soil Series Present Within the Project Area

Soil Series	Description[1]	Area/Percentage Occurring in Project Area
Antler – ATL1	Antler soils are defined as a deep, well-drained, black grassland soil overlying till. ATL1 occurs on areas of gently undulating or rolling topography, primarily containing Antler soil, and may contain minor (15%) of Gleysolic or other contrasting soils.	170.75 ha (1.62%)
Antler – ATL3	Antler soils are defined as a deep, well-drained, black grassland soil overlying till. ATL3 typically occurs on moderately or strongly sloping hillsides covered in till, consisting of Antler soils (30-50%), but contains thinner, less developed, coarser and drier soils than most other Antler soils.	51 ha (0.48%)
Antler – ATL5	Antler soils are defined as a deep, well-drained, black grassland soil overlying till. ATL5 occurs on undulating, ridged or hummocky landscapes, and consists of ~30% Antler soil, ~30%less-strongly developed, and up to 15% poorly to imperfectly drained soils. ATL5 areas are often cultivated to barley, rye canola, alfalfa, hay and occasionally wheat.	284.01 ha (2.7%)
Bow Valley – BOV1	Bow Valley soils are thin, gravelly, rapidly drained black grassland soil. BOV1 typically occurs on level to inclined glaciofluvial terraces, usually containing 30-50 cm of relatively stone-free capping over gravel.	1.48 ha (0.01%)
Bearspaw – BPW1	Bearspaw soils are thin, weakly developed, black grassland formed on glaciolacustrine sediments. BPW1 occurs on hummocky glaciolacustrine landscapes, containing ~50% Bearspaw soil, ~30% Lloyd Lake soils, and ~15% DeWinton soils.	226.35 ha (2.15%)
Dunvargan – DVFS1	Dunvargan soils are deep, well-drained, black, grassland soil formed on till. DVFS1 soils occur in rough, hummocky with complexly mixed morainal and glaciolacustrine parent materials. DVFS1 soils consist of well drained Dunvargan	285.46 ha (2.71%)

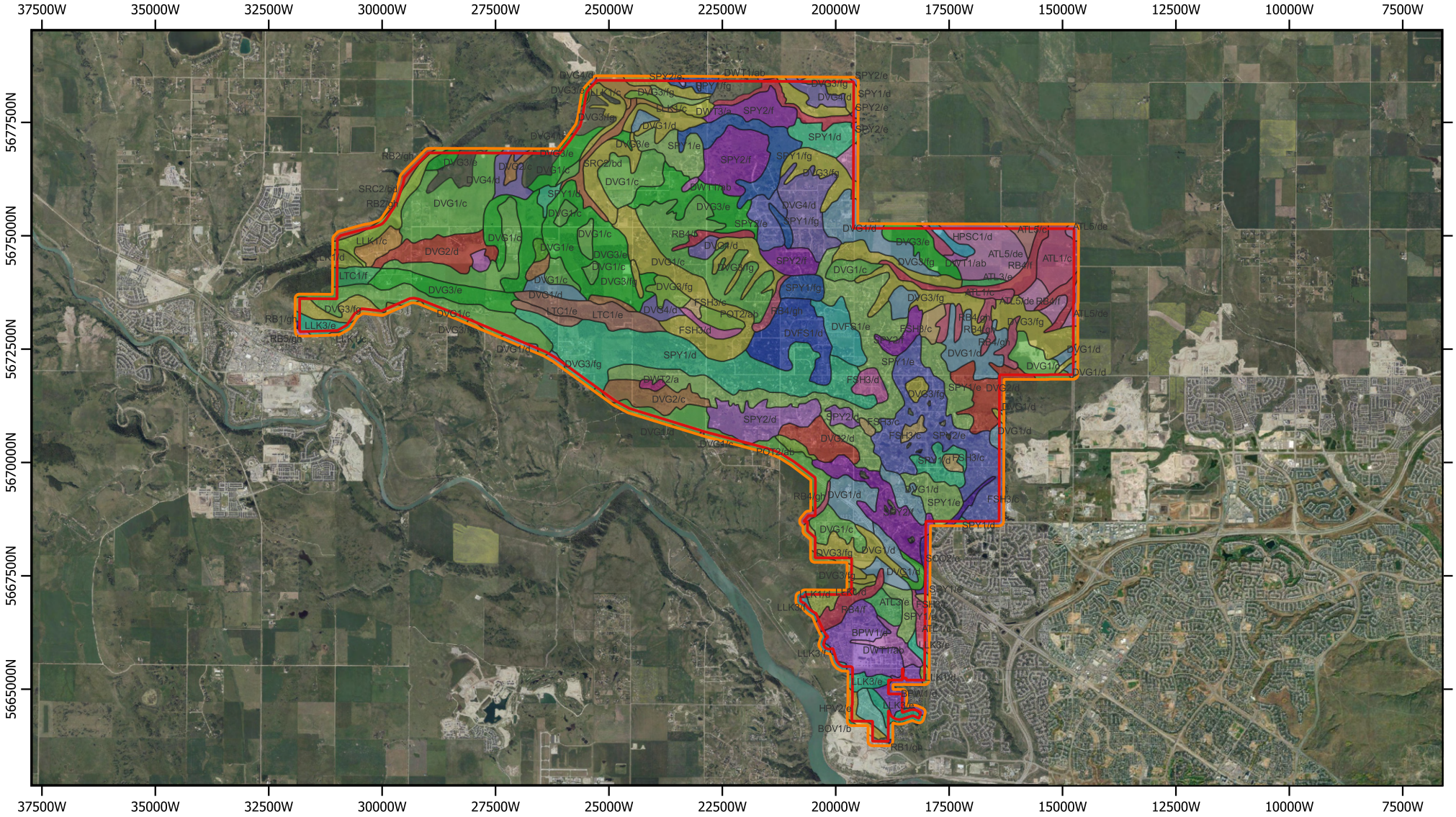
Soil Series	Description[1]	Area/Percentage Occurring in Project Area
	soils (40%), fine clayey, moderately well-drained Fish Creek glaciolacustrine soil (40%), and wet, clayey Pothole Creek soil (20%). Land use is typically fast maturing grains, green feed, forage and pasture.	
Dunvargan – DVG1	Dunvargan soils are deep, well-drained, black, grassland soil formed on till. DVG1 soils occur on gently sloping, rolling, or undulating morainal topography, consisting of well-drained Dunvargan soils (70%), similar but slightly leached soil (20%), and thick poorly drained soil (10%). DVG1 soils are typically used for improved pasture, course grains or forage crops.	2048.12 ha (19.45%)
Dunvargan – DVG2	Dunvargan soils are deep, well-drained, black, grassland soil formed on till. DVG2 soils occur in terrain that is gently undulating to slightly hummocky and consist of Dunvargan or similar soils (80%) and unnamed wet soils and open water (20%).	480.62 ha (4.56%)
Dunvargan – DVG3	Dunvargan soils are deep, well-drained, black, grassland soil formed on till. DVG3 occurs on sloping till-covered hillsides, consisting mainly of Dunvargan soil (50%), and soils that are thinner, less-strongly developed and more shallow to bedrock than most Dunvargan soils.	2156.1 ha (20.48%)
Dunvargan – DVG4	Dunvargan soils are deep, well-drained, black, grassland soil formed on till. DVG4 soils are found on slightly hummocky or ridged morainal landscapes and are composed of deep, well-drained Dunvargan soil (40%), thinner, Rego Black soil (30%) and thin or eroded phases of these two main soil type (30%). Land use is similar to DVG1.	310.02 ha (2.94%)
DeWinton – DWT1	DeWinton soils are poorly drained, weakly developed depressional soil formed on recent slough deposits overlying till or bedrock. DWT1 soils occur in wet, clay-infilled depressions of low-lying morainal and glaciofluvial landscapes. DWT1 soils consist primarily of DeWinton and closely related wet, black, depressional soils. Land use is limited due to wetness and potential for flooding.	73.31 ha (0.7%)
DeWinton – DWT2	DeWinton soils are poorly drained, weakly developed depressional soil formed on recent slough deposits overlying till or bedrock. DWT2 soils occur in wet, low-lying, clay-infilled depressions of the morainal landscape and consist of DeWinton soil (40%) and unnamed lithic soil with bedrock contact.	10.68 ha (0.1%)
DeWinton – DWT3	DeWinton soils are poorly drained, weakly developed depressional soil formed on recent slough deposits overlying till or bedrock. DWT3 occurs in low-lying, wet,	21.12 ha (0.2%)

Soil Series	Description[1]	Area/Percentage Occurring in Project Area
	clay-infilled portions of glaciofluvial channels, consisting of ~50% DeWinton soil, ~30% peaty phase DeWinton soil, and ~20% poorly drained Terric Mesisol.	
Fish Creek – FSH3	Fish Creek soils are deep, moderately well-drained, black grassland soil formed on clayey glaciolacustrine sediments. FSH3 occurs on undulating to gently sloping glaciolacustrine landscapes, consisting of ~50% Fish Creek soil, with till relatively near to the surface, often forming the subsoil parent material.	145.71 ha (1.38%)
Happy Valley – HPAD1	Happy Valley soils are weakly developed, rapidly drained, black to dark brown grassland soil formed on sandy to coarse loamy glaciofluvial sediments. HPAD1 soils are found on nearly level morainal landscapes covered by coarse loamy glaciofluvial material. HPAD1 consists of Happy Valley soils (40%), we-drained Academy soil (20%), silty Eastbow soil (20%), and variable amounts of Midnapore or Rockyview soils (20%). HPAD1 soils are often cultivated mainly to wheat, barley or canola, or left to pasture.	38.66 ha (0.37%)
Happy Valley – HPSC1	Happy Valley soils are weakly developed, rapidly drained, black to dark brown grassland soil formed on sandy to coarse loamy glaciofluvial sediments. HPSC1 soils occur on glaciofluvial fans, terraces and abandoned channels that contain a mixture of sandy and gravelly soils. HPSC1 soils consist of sandy Happy Valley soil (60%), gravelly Strathcona soil (30%) and silty Eastbow soil (10%).	22.67 ha (0.22%)
Happy Valley – HPV2	Happy Valley soils are weakly developed, rapidly drained, black to dark brown grassland soil formed on sandy to coarse loamy glaciofluvial sediments. HPV2 soils occur on inclined sloping or ridged glaciofluvial landscapes and consist of sandy Happy Valley soil (50%), silty Eastbow soil (20%), and sandy to course loamy soils (30%). HPV2 soils are often associated with pasture, or used for hay.	26.08 ha (0.25%)
Lloyd Lake – LLK1	Lloyd Lake soils are deep, well-drained black grassland soils formed on glaciolacustrine sediments. LLK1 occurs on smooth undulating to gently sloping glaciolacustrine landscapes, consisting of ~30-55% Lloyd Lake soil, and ~18-40% Bearspaw soil.	159.8 ha (1.52%)
Lloyd Lake – LLK3	Lloyd Lake soils are deep, well-drained black grassland soils formed on glaciolacustrine sediments. LLK3 occurs on gentle to strong glaciolacustrine slopes underlain by till, consisting of ~40% silty Lloyd Lake soil, ~30% Bearspaw soil, and the remainder of till parent material.	140.3 ha (1.33%)
Leighton Centre – LTC1	Leighton Centre soils are deep, well-drained, dark gray	184.48 ha (1.75%)

Soil Series	Description[1]	Area/Percentage Occurring in Project Area
	forested soil formed on till. LTC1 occurs on north- and eat-facing hillsides in the foothills and uplands south and west of Calgary, and consists of ~40% Leighton Centre and similar dark-colored forested soils, ~20% soils with black surface horizons <5 cm thick, and scattered soils formed in thick accumulations of black slopewash.	
Pothole Creek – POT2	Pothole Creek soil is a wet, clayey soil with a black surface horizon. POT2 occurs on low-lying portions of glaciolacustrine basins and valleys, consisting of ~60% Pothole Creek soil, and ~40% Fish Creek soil.	98.96 ha (0.94%)
Rough Broken – RB1	Rough Broken soils are composed of numerous combinations of soils occurring on steep valley sides (>20% slope). RB1 soils occur on steep till covered slopes, consisting of thin, dark-colored grassland soils.	2.04 ha (0.02%)
Rough Broken – RB2	Rough Broken soils are composed of numerous combinations of soils occurring on steep valley sides (>20% slope). RB2 soils occur on steep slopes with a thin veneer of colluvial material overlying bedrock, and consist of buried topsoil horizons and oriented pebbles.	84.17 ha (0.8%)
Rough Broken – RB4	Rough Broken soils are composed of numerous combinations of soils occurring on steep valley sides (>20% slope). RB4 soils occur on steeply sloping, v-shaped, intermittent drainage ways and gullies, consisting of till, poorly drained scattered deposits of fine loamy alluvium, and thin, dark-colored grassland soils.	364.8 ha (3.46%)
Rough Broken – RB5	Rough Broken soils are composed of numerous combinations of soils occurring on steep valley sides (>20% slope). RB5 soils occur on steep slopes formed on fine silty to clayey glaciolacustrine sediments, consisting of black grassland soils similar to Lloyd Lake soils, and sandy to silty unaltered glaciolacustrine sediments.	3.63 ha (0.03%)
Strathcona – SCO1	Strathcona soils are thin, very rapidly drained, black grassland soil. SCO1 soils occur on upland glaciofluvial landforms, consisting primarily of Strathcona soil (90%), and some soils with more sand and less gravel.	18.47 ha (0.18%)
Strathcona – SCO2	Strathcona soils are thin, very rapidly drained, black grassland soil. SCO2 soils are found on upland glaciofluvial landforms and consist of 50-70% Strathcona soil, with the remainder of unnamed black soils with thin topsoil horizons.	39.64 ha (0.38%)
SPY1	Spy Hill soils are thin, well-drained, black grassland soils that form on strongly calcareous, fine loamy till. SPY1 is found on hummocky and ridged till landscapes and consists of Spy Hill soils (50%), soils with thin projfile	1795.35 ha (17.05%)

Soil Series	Description[1]	Area/Percentage Occurring in Project Area
	development and no subsurface oxidized horizons (30%), dark gray soils (10%) and wet soils (<15%). SPY1 soils are often associated with aspen forest or improved pasture.	
SPY2	Spy Hill soils are thin, well-drained, black grassland soils that form on strongly calcareous, fine loamy till. SPY2 soils are found on hummocky till landscapes, consisting of Spy Hill soil (40%), dark gray topsoil (30%), and poorly drained soils (30%).	1200.59 ha (11.4%)
Sarcee – SRC2	Sarcee soils are deep, well to rapidly drained, dark-colored transitional soil. SRC2 occurs on poorly drained, strongly dissected lower terraces and stream channels, consisting of ~40% Sarcee soils, ~30% well-drained soils, and ~30% poorly drained soils.	84.2 ha (0.8%)

[1] Descriptions are from MacMillan (1987)



LEGEND

Bearspaw ASP Boundary

ASP Boundary: 100 m buffer

Soils

ATL1/c	DVFS1/e	DVG4/d	HPV2/e	RB1/gh	SPY1/e
ATL3/e	DVG1/c	DWT1/ab	LLK1/c	RB2/gh	SPY1/fg
ATL5/c	DVG1/d	DWT2/a	LLK1/d	RB4/f	SPY2/d
ATL5/de	DVG1/e	DWT3/a	LLK3/e	RB4/gh	SPY2/e
BOV1/b	DVG2/c	FSH3/c	LLK3/f	RB5/gh	SPY2/f
BPW1/d	DVG2/d	FSH3/d	LTC1/e	SCO1/d	SRC2/bd
DVFS1/d	DVG3/e	HPAD1/c	LTC1/f	SCO2/e	
	DVG3/fg	HPSC1/d	POT2/ab	SPY1/d	

NAD83 / Alberta 3TM ref merid 114 W

Scale: 1 : 120000

N

0 1 2 3 km

Rocky View County 2022 Imagery and ESRI World Imagery

Rocky View County

Environmental Screening Report and Wildlife Habitat Modeling

Bearspaw Area Structure Plan (ASP) Boundary

Soils Data from MacMillan (1987).

RC BioSolutions Ltd.

Lead: Krissy Bird
Drawn by: Jesse Bird

Date: 14 Dec 2023
Project #: 23080

Figure No.
#10

2.7 Archaeological

2.7.1 Methodology

Historical resources were assessed using the most recent listing of historical resources (Alberta Arts, Culture and Status of Women 2023).

2.7.2 Results

A total of 104 historical listings were identified in the project area, falling fully or in part within 166 quarter sections in the project area. An additional 16 historical listings were identified within the 100 m buffer.

Fifty-five listings within the project area were classed as HRV5a (high potential to contain an archeological historic resource), five classed as HRV5p (high potential to contain a palaeontological historic resource and 24 classed as HRV5a,p (high potential to contain archeological and palaeontological historic resources; Alberta Arts, Culture and Status of Women 2023; Figure 11). Additionally, 20 listings were classed as HRV4, indicating the site contains a historic resource that may require attention; the primary historic resource was archaeological for 18 of the sites (HRV4a), and paleontological for two sites (HRV4p). A *Historical Resources Act* approval is required for all quarter sections with an HRV of 5, 4 or 3.

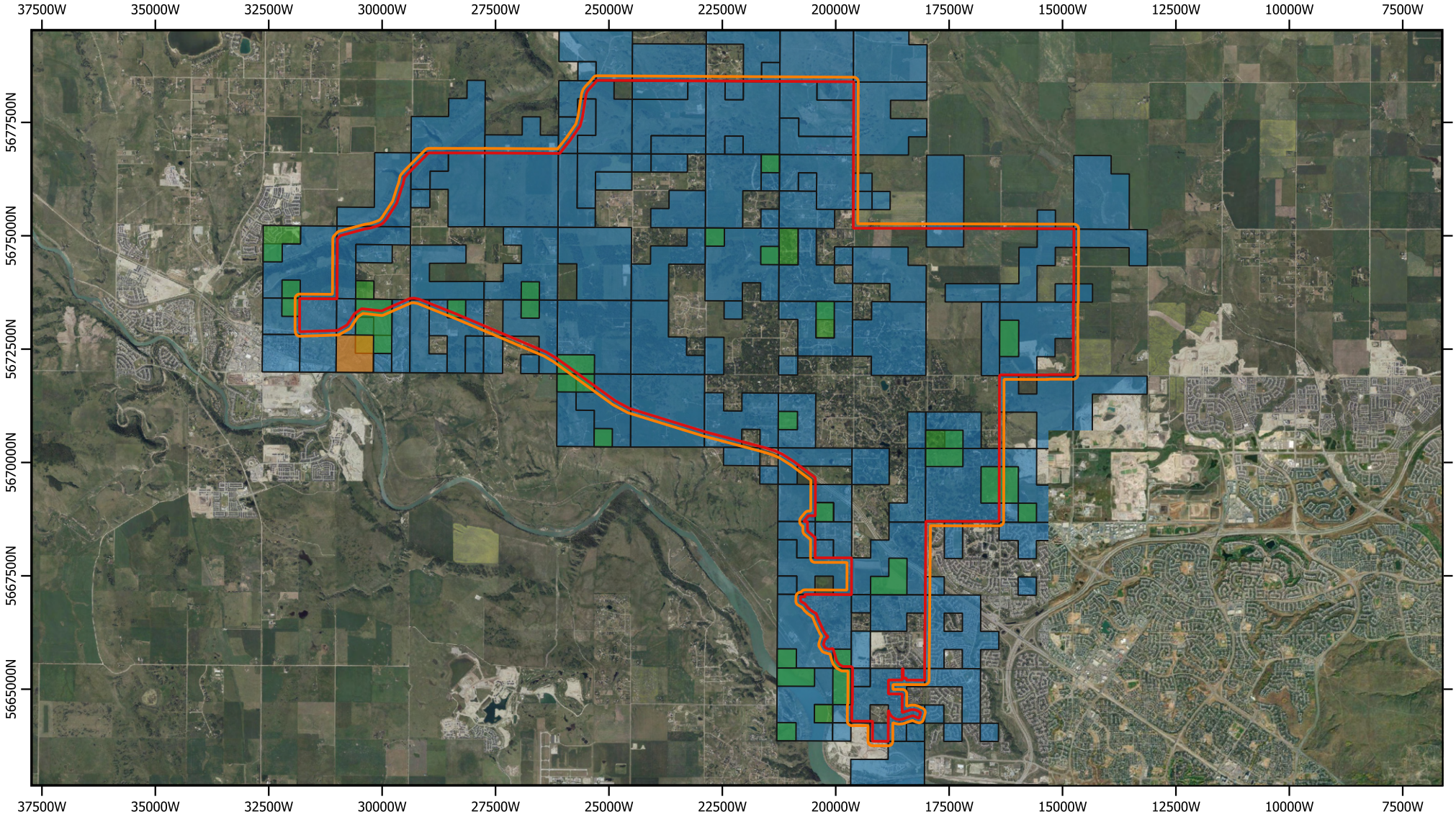
2.8 Other Features

2.8.1 Methodology

To determine other features on the landscape, we assessed the 2022 air photo provided by Rocky View County.

2.8.2 Results

Within the project area, there is a mixture of open fields used for agricultural activities and anthropogenic features within developed acreages. Some of the anthropogenic features include homes, barns, garages, corrals, stables, various other buildings pertaining to homestead/farming activities, and dugouts. In addition to Highway 1, a number of small roads lead to various homes and buildings throughout the site. Powerlines exist throughout the project area.



LEGEND

- Bearspaw ASP Boundary
- ASP Boundary: 100 m buffer

HRV Listings

- 1
- 3
- 4
- 5

NAD83 / Alberta 3TM ref merid 114 W

Scale: 1 : 120000

N

0 1 2 3 km

Rocky View County 2022 Imagery and ESRI World Imagery

Rocky View County

Environmental Screening Report and Wildlife Habitat Modeling

Bearspaw Area Structure Plan (ASP) Boundary

Historical Resources

RC BioSolutions Ltd.

Lead: Krissy Bird
Drawn by: Jesse Bird

Date: 14 Dec 2023
Project #: 23080

Figure No.
#11

2.9 Environmentally Sensitive Areas

2.9.1 Methodology

As per the CMRB Land Use & Servicing Committee (2023) Regional Evaluation Framework, Environmentally Sensitive areas are required to be determined to assist with Regional Evaluation Framework (REF) reviews. They are identified using the following questions:

- Areas maintaining the provision of water quality and quantity and providing protection against drought and flooding events.
    - ■ Yes ☐ No
    - Please briefly describe – There are a number of watercourses throughout the project area that maintain the provision of water quality and quantity to larger watercourses (i.e., Bow River), provide protection against drought and flooding events, and supply water for the City of Calgary via the Glenmore Reservoir.
    - Does this finding require an Environmental Study be conducted?
        - ■ Yes ☐ No
- Area providing habitat for identified local species of interest, designated species of conservation concerns (SCC), or identified local species group.
    - ■ Yes ☐ No
    - Please briefly describe – Since most of the upland habitat has been converted to agriculture or residential developments, the most valuable habitat in the project area is the relatively undisturbed riparian area around Bighill Creek and relatively undisturbed forested, wetland and grassland areas. Tall grasses, shrubs and large trees in areas with minimal disturbance provide nesting and foraging habitat for bird SCC found in the project area. Aquatic and riparian zones also provide breeding and foraging habitat for SCC such as great blue heron and bank swallow.
    - Does this finding require that an Environmental Study be conducted?
        - ■ Yes ☐ No
- Area providing rare, unique, or biologically diverse ecosystems or unique landforms.
    - ■ Yes ☐ No
    - Please briefly describe – The only areas in the project area that potentially provide rare, unique, or biologically diverse ecosystems are the river corridors, since most of the upland has been converted to agriculture or residential and industrial developments.
    - Does this finding require that an Environmental Study be conducted?
        - ■ Yes ☐ No
- Areas contributing to other important ecosystem functions or services at a regional or local scales.
    - ■ Yes ☐ No
    - Please briefly describe – The only areas in the project area that contribute to important ecosystem functions or services at the regional or local scales are the stream corridors, as they likely provide water to support the Bow River system and provide habitat for numerous species.

- Does this finding require that an Environmental Study be conducted?
    - ■ Yes ☐ No

2.9.2 Results

Based on this checklist, there are 7 potential Environmentally Sensitive Areas for the Project Area. Several of the selected Environmentally Sensitive Areas occur within residential land parcels but were selected regardless due to their ecological value.

Selected Environmentally Sensitive Areas were broken down into five categories:

- Aquatic habitat (A)
- Riparian habitat (R)
- Wetland habitat (W)
- Forest habitat (F)
- Grassland habitat (G)

Environmentally Sensitive Areas include the corridor of Bighill Creek located on the northwestern edge of the ASP boundary (Figure 12; A and R habitat types), as they:

- Maintain the provision of water quality and quantity and provide protection against drought and flooding events.
- Provide habitat for identified local species of interest, designated species of conservation concerns (SCC), or identified local species group.
- Provide rare, unique, or biologically diverse ecosystems or unique landforms.
- Contribute to other important ecosystem functions or services at a regional or local scales.

Most wetlands in the Project Area have been impacted, so wetland areas that were minimally impacted and/or associated with riparian corridors containing wildlife habitat were selected as Environmentally Sensitive Areas (Figure 12; W habitat type), as they:

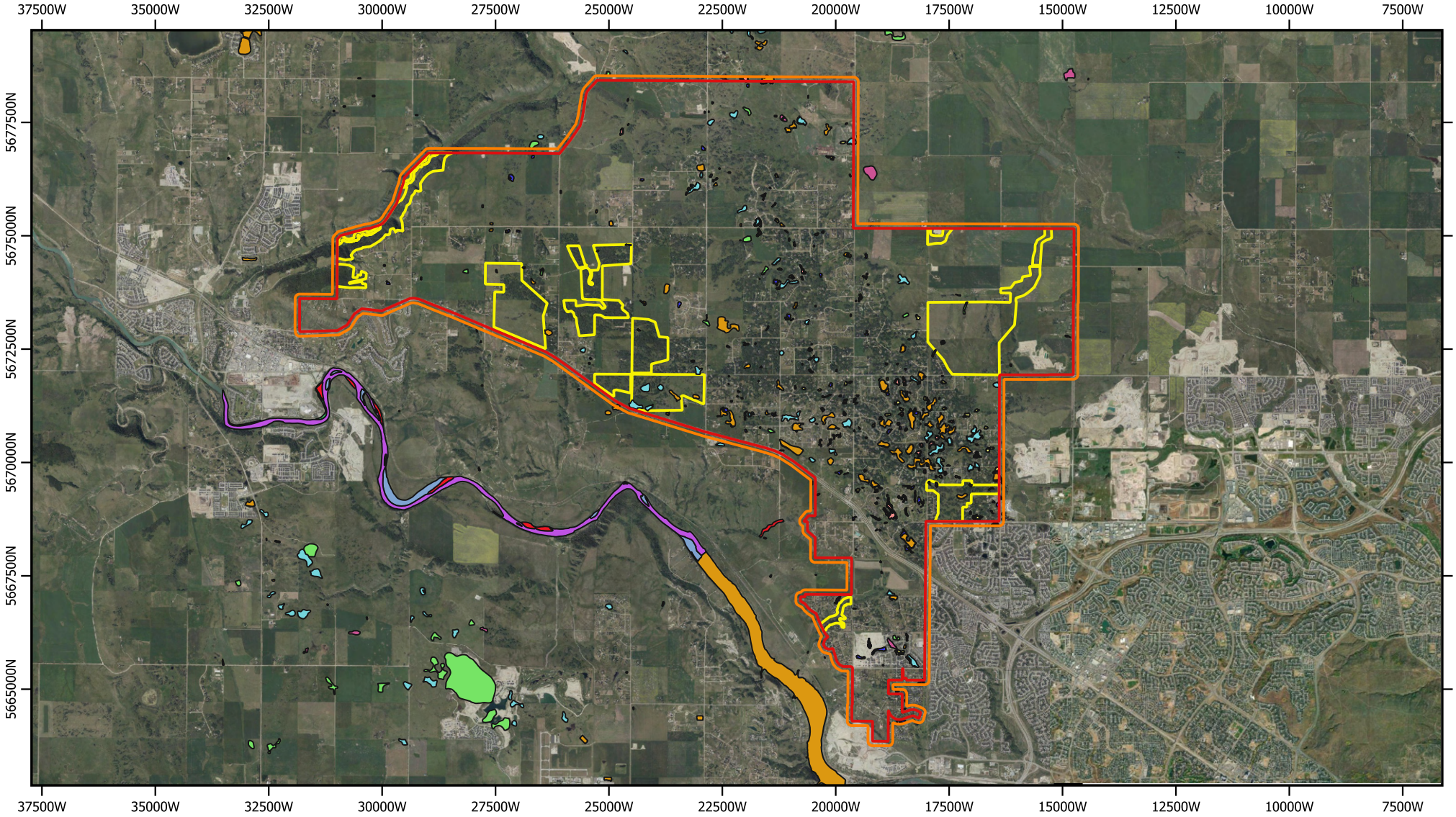
- Maintain the provision of water quality and quantity and provide protection against drought and flooding events.
- Provide habitat for identified local species of interest, designated species of conservation concerns (SCC), or identified local species group.
- Provide rare, unique, or biologically diverse ecosystems or unique landforms.
- Contribute to other important ecosystem functions or services at a regional or local scales.

Finally, areas of intact grassland or forest were selected as Environmentally Sensitive Areas (Figure 12; G and F habitat types), as they:

- Provide habitat for identified local species of interest, designated species of conservation concerns (SCC), or identified local species group.
- Provide rare, unique, or biologically diverse ecosystems or unique landforms.
- Contribute to other important ecosystem functions or services at a regional or local scales.

2.10 Future Environmental Work

For future development projects, further surveys will be required for a full Biophysical Impact Assessment (BIA), and those include: wildlife surveys, species at risk surveys, wildlife habitat surveys, aquatic surveys (if fish and fish habitat may be present), vegetation assessments, rare plant habitat assessments, and wetland surveys that will be completed during appropriate survey times according to the Government of Alberta standards. The rare plant surveys will be conducted according to the procedures outlined by the Alberta Native Plant Council's (2000) Guidelines for Rare Plant Surveys, with early season surveys recommended in June and late season surveys recommended in August. Wetland surveys are required to be completed during the 'growing season', which is defined by AEP as between May 1 and September 30. Wildlife surveys need to be completed within the Government of Alberta standards for timing of wildlife, which is typically between March and late June, depending on the species of concern at each site.



LEGEND

- Bearspaw ASP Boundary
- ASP Boundary: 100 m buffer
- Environmentally Sensitive Areas

ABMI Wetlands

- Marsh
- Open water
- Swamp

Lentic Water (GVI)

- Lentic (Open Water)
- Lentic (Seasonal)
- Lentic (Semi-Permanent to Permanent)
- Lentic (Temporary)

Lotic Water (GVI)

- Lotic (Deciduous)
- Lotic (Herbaceous)
- Lotic (River)
- Lotic (Shrub)

NAD83 / Alberta 3TM ref merid 114 W

Scale: 1 : 120000

N

0 1 2 3 km

Rocky View County

Environmental Screening Report and Wildlife Habitat Modeling

Bearspaw Area Structure Plan (ASP) Boundary

Rocky View County 2022 Imagery and ESRI World Imagery

Environmentally Sensitive Areas (Rocky View County)

RC BioSolutions Ltd.

Lead: Krissy Bird
Drawn by: Jesse Bird

Date: 14 Dec 2023
Project #: 23080

Figure No.
#12

3 Impacts, Mitigation, and Monitoring

3.1 Impact Assessment Methodology

For developing the ASP amendment area (project area), a general impact assessment methodology has been used to evaluate the impact of development on the following Valued Ecosystem Components (VECs): biological resources (vegetation and wildlife), hydrology, topography, soils, and archaeological resources.

3.2 Impact Assessment Results

A summary of potential environmental impacts for each VEC, as well as mitigation measures and residual impacts (post-mitigation), are described in detail below.

3.2.1 Potential Impacts to Vegetation

One rare and sensitive plant species, and several non-sensitive plants and plant communities have been identified within 10 km of the project area. Rare plants have the potential to be found within the project footprint associated with wetlands, moist meadows, and areas associated with seepage springs. Since the project area is primarily cropland, development of these areas will have minimal impact to biodiversity, native species, or rare species. Disturbance will likely cause invasive species to increase, as the soil disturbance can create ideal conditions for weeds to establish. Weeds must be controlled through weed control during construction activities during development and maintenance once the project is completed.

Due to number of wetlands present, rare plant surveys must need to be completed prior to development during the appropriate survey times (ideally June and August). County Servicing Standards (Rocky View County 2013) require on-site vegetation surveys to be completed between May and September. If rare plants are detected, specific mitigation measures will be determined based on the findings of the survey. If rare plants occur within impact zones, and the impact zones cannot be changed to avoid the plants, the rare plants can either be moved, collected for propagation, or have seeds collected, depending on the species of rare plant.

3.2.2 Potential Impacts to Wildlife

The site is already heavily impacted due to the presence of agriculture and acreages, and residential developments. As such, there currently is little, high quality wildlife habitat within the project footprint. Most of the land within the project footprint is agriculture, with few trees, which generally only provides habitat for more common species. Creek corridors on site will have a higher potential for wildlife habitat.

The impacts to wildlife, outside of the wetland areas, will likely be minimal, depending on the time of year construction occurs. Any work between April 15th and August 28th that requires clearing (trees, shrubs, grassland, and wetlands) has the potential to disturb nesting birds and other wildlife and requires nest sweeps completed by qualified wildlife biologists (Government of Canada 2023c). Mitigation measures can include changing the timing of construction, wildlife sweeps, and working within specific hours of operation will mitigate the impact to all wildlife in

the region. The listed wildlife species found within the project area trigger the need for a wildlife surveys to be completed prior to construction and a wildlife sweep to occur prior to the initiation of construction activities. If listed wildlife species are found on site during construction, site-specific mitigation measures will need to be developed by a qualified wildlife biologist, to reduce the impact to these species.

Most wildlife in the area is already exposed to regular human disturbance, and the plant community is likely invaded with non-native species, as much of the area is currently used for agriculture and residential use. Wildlife movements and habitat availability likely will change substantially as a result of development, due to limited undisturbed habitat of all habitat types. As more habitat is removed, connectivity will decrease and wildlife use of the area will decrease as a result. During development, there may be a temporary increase in sensory disturbance to wildlife occupying the area when construction is occurring. Also, the removal of vegetation during construction may reduce nesting opportunities for grassland birds and habitat for small mammals.

It is recommended that prior to development, wildlife surveys be conducted due to the presence of wildlife species of concern being found within the project area during a FWMIS search. The recommended surveys include:

- Breeding Bird
- Sensitive Raptor
- Amphibian (when wetlands are present)
- Sharp-tailed Grouse (depending on the parcel)
- Water Bird
- Species at Risk (vary depending on the parcel and the available habitat)
- Incidental Wildlife

3.2.2.1 Sensitive Raptor Recommendations

The entire ASP Area is located in a Sensitive Raptor Range for Bald Eagle, Golden Eagle, and Prairie Falcon. Before new development occurs in areas likely to contain suitable nesting habitat, a sensitive raptor survey should be conducted by a qualified wildlife biologist according to standards in the Sensitive Species Inventory Guidelines for prairie raptors (Government of Alberta 2013). Survey efforts should focus on areas that can act as potential nesting sites such as trees, stream banks, cliffs, or holes in cliffs. If an active nest is identified, a setback distance of 50 – 1000 m should be applied around the nest where activity is restricted (Government of Alberta 2021). The distance of the setback depends on the time of year and level of disturbance. For more details refer to the *Master Schedule of Standards and Conditions* (Government of Alberta 2021).

3.2.2.2 Sharp-tailed Grouse Recommendations

The entire ASP Area is located in a Sharp-tailed Grouse Survey Area. If development is to occur in an area with suitable Sharp-tailed Grouse habitat, surveys for active leks should be conducted by a qualified wildlife biologist according to standards in the Sensitive Species

Inventory Guidelines (Government of Alberta 2013). Leks are areas where male birds gather in the spring to perform mating displays. Suitable habitat in the project area is very limited, but could include: open prairie, margins of watercourses, margins of farmland, shrublands, shrubby sandhills, coulees, and open aspen groves. If an active lek is identified, a setback distance of 100 - 500 m should be applied around the lek where activity is restricted (Government of Alberta 2021). The distance of the setback depends on the time of year and level of disturbance. For more details refer to the *Master Schedule of Standards and Conditions* (Government of Alberta 2021).

3.2.2.3 Key Wildlife and Biodiversity Zones

A Key Wildlife and Biodiversity Zone is located along a small portion of the project area located along with southern edge of ASP boundary (buffered around the Bow River). Key Wildlife Biodiversity Zones are considered to be important for winter ungulate habitat as well as having higher potential for biodiversity, and typically occur along major river valleys. The Key Wildlife and Biodiversity Zone within the ASP boundary has been previously disturbed through residential development. The Government of Alberta (Government of Alberta 2015d) has developed a set of recommended guidelines for industrial land use within these zones which are summarized below:

1. New permanent access is not recommended. Where permanent access is essential, an access management plan and associate approval from AEP will be required. The access management plan should aid in minimizing disturbance to wildlife and habitat degradation and limit public vehicle traffic.
2. Where temporary access is required, it should be designed and managed to minimize disturbance to wildlife and degradation of associated habitat.
3. No construction is permitted within the applicable restricted period, which varies depending on the project location:
    - No construction between January 15th and April 30th in Key Wildlife and Biodiversity Zones north of Highway #1 (Along the Bow River valley).
    - No construction between December 15th and April 30th in Key Wildlife and Biodiversity Zones south of Highway #1 (Along the Elbow River valley).
4. Relaxation of the restricted activity period requires approval from AEP, but it still expected that other mitigation measures are put in place to protect the wildlife resource.

It is recommended that any new industrial developments taking place within Key Wildlife and Biodiversity Zones in the ASP Area should follow all of the government recommended guidelines. If construction must take place within the restricted time window, then consultation with AEP and associated approval is required before work proceeds.

3.2.2.4 Wildlife Corridors

The primary wildlife corridors present within the project area are associated with Bighill Creek (moose and porcupine), the riparian areas in the undeveloped portion of the east (all five species groups), and a tract of native grassland (badger). These corridors likely provide contiguous habitat for smaller and more mobile species (e.g. birds or bats depending on the

habitat type). They may also provide non-fragmented movement corridors for larger animals such as moose.

3.2.2.5 Migratory Birds

The ASP Area is located in Nesting Zone B4 within the Prairie Potholes (BCR 11) Bird Conservation Region within the Map of Nesting Zones in Canada (Government of Canada 2023c). In this nesting zone, birds are presumed to be actively nesting between April 15th and August 28th (Government of Canada 2023c), with some variation between different bird species and habitat types. Destroying habitat in areas attractive to migratory birds has a high risk of disturbing or destroying migratory bird nests or eggs during this timing window. Between April 15th and August 28th, it is recommended to avoid any habitat impacting disturbing activity (e.g. stripping and grading, tree clearing, wetland removal, vegetation removal, etc.) to comply with the Migratory Birds Convention Act (Government of Canada 1994). If it is necessary to disturb potential nesting habitat within the restricted activity period (RAP), a nest sweep should be conducted by a qualified wildlife biologist to ensure that nesting habitat is avoided and nesting birds or other wildlife species are not disturbed. If a nest is observed during the nest sweep, an appropriate species-dependent setback must be placed around the nest. These setbacks should be determined in consultation with Environment and Climate Change Canada and AEP, and this setback must be maintained until the nest is no longer occupied.

Some wildlife protected under provincial and/or federal legislation may begin breeding prior to April 15th so a wildlife sweep may be required, depending on the habitat present. Appropriate setbacks remain in effect if an active nest, or other wildlife feature (e.g. den, hibernaculum, etc.), are identified, regardless of the time of year. Specifically, owls and some waterfowl may begin nesting before April 15th, especially in forested or wetland areas.

3.2.3 Potential Impacts to Aquatics

There are two confirmed fish bearing watercourses within the project area (Bighill Creek and unnamed tributary to Bow River). Bighill Creek contains both sport and non-sport fish species, while the unnamed tributary to Bow River is only known to contain brook stickleback (a non-sport fish species). Some unnamed watercourses within the project boundary appear to lack a defined channel (based on satellite and aerial imagery), but require ground truthing to confirm. Therefore, a fish and fish habitat survey should be completed by a Qualified Aquatic Environmental Specialist to confirm the presence or absence of fish habitat prior to any works with potential to disturb fish or fish habitat (including riparian areas).

3.2.4 Potential Impacts to Hydrology, Waterbodies, and Wetlands

3.2.4.1 Hydrology Impacts

Depending on the finalized development plan for the project area, it is unknown the exact impact to the hydrology of the area. Natural surface water absorption would likely be very limited in unvegetated areas.

3.2.4.2 Watercourse Impacts

According to FWMIS, there are a total of 58 watercourses within the project area. However, site visits are required for a number of the smaller watercourses to determine whether flowing water is present. Potential impacts to watercourses include increased sedimentation, changes to the bed and banks of the watercourse, and changes to stream course and volume. There may be other ephemeral drainages within the project area, but those would require ground truthing to determine their location.

3.2.4.3 Wetland Impacts

Wetlands provide many valuable ecosystem functions including:

- Improving water retention to prevent flooding.
- Improving water quality.
- Suitable habitat for a wide variety of plants and animals.
- Stopover areas for migratory waterfowl.

It is recommended that high value wetlands in the project area be retained in order to utilize their ecosystem benefits. The Government of Alberta has developed a process for assessing the value of wetlands in terms of their relative abundance on the landscape, supported biodiversity, ability to improve water quality, importance to flood reduction, and human uses (Government of Alberta 2015a,b,c, 2017, 2018). It is recommended that any developments intending to impact wetlands in the project area perform a detailed field-based assessment to determine the value of wetlands by using the Alberta Wetland Rapid Evaluation Tool – Actual (ABWRET-A) or Alberta Wetland Rapid Evaluation Tool – Desktop (ABWRET-D), depending on the level of disturbance.

The ABWRET assigns a value category (A, B, C, or D) to each wetland based on different functions including: hydrology, water quality, ecology (habitat), and human use. Each wetland is assigned a final value based on how the wetland's functions compare to other wetlands in the region, with Class A being the highest value and Class D being the lowest value. In locations where high valued (Class A) wetlands are identified, they should be protected wherever possible. Determining the ABWRET value of the wetlands in the project area was not possible from the desktop review of wetland databases that was completed for this report, but high value wetlands tend to be larger, more permanent waterbodies (semi-permanent or permanent) that provide a high water quality and hydrology value and/or provide high quality wildlife and rare plant habitat. The Alberta Wetland Policy should be followed, which includes minimization and avoidance of wetlands as the primary strategy for their protection, and wetland replacement is only used when wetland impacts cannot be avoided.

3.2.5 Potential Impacts to Topography

This project will have a negligible impact to the topography at the regional scale. There will be an impact at the local scale if grading occurs. No mitigation measures are required.

3.2.6 Potential Impacts to Soils

Soils within the project area have been previously disturbed in most areas (agriculture) and are undisturbed (native profile) primarily in undisturbed riparian and wetland areas. Development of the area will result in additional soil disturbance. Development requires stripping of topsoil and subsoil material. It also has the potential for excavation, removal, and/or recontouring of lower subsoil material. This results in a significant risk for loss of soil volume and quality, destruction of soil structure, erosion, admixing, and compaction. Loss of soil structure and minor admixing is mostly unavoidable regardless of mitigation measures. Soil structure can gradually redevelop in disturbed soils, but the natural soil profile can never be re-established. Admixing is also irreversible since soil cannot be un-mixed. Other potential impacts to soil include: compaction, clodding, erosion, significant admixing, soil loss, and reduced soil quality, but these impacts can be mitigated by soil handling practices.

Development on a larger scale, such as the project area, can impact the subsurface and surface drainage by: compaction, recontouring, culvert/ditches, etc. If drainage is impeded or redirected, ponding or flooding may occur at location locations onsite or may affect adjacent properties. To limit impacts to the soils and risks to adjacent properties, an ECO Plan should be created for projects that explicitly outline site-specific impacts and mitigations for soils.

3.2.7 Potential Impacts to Archaeology

Much of the project area was determined to have a high potential to contain a historical resource. A *Historical Resources Act* approval is required for any quarter section with an HRV of 3, 4 or 5. If any historical resources are encountered during development of these quarter sections, construction will be halted immediately, and the appropriate authorities will be contacted.

3.2.8 Potential Impacts to Environmentally Sensitive Areas

The Environmentally Sensitive Areas comprise corridors associated with the Bighill Creek, located along the northwestern edge of the ASP boundary. This creek and riparian corridor provide a host of valuable ecosystem functions with potential to be impacted by future development:

- Maintaining the provision of water quality and quantity and provide protection against drought and flooding events.
- Providing habitat for identified local species of interest, designated species of conservation concerns (SCC), or identified local species group.
- Providing rare, unique, or biologically diverse ecosystems or unique landforms.
- Contributing to other important ecosystem functions or services at a regional or local scales.

Most wetlands in the Project Area have been impacted, so wetland areas that were minimally impacted and/or associated with relatively undisturbed forested or grassland areas containing wildlife habitat were selected as Environmentally Sensitive Areas (Figure 9), as they:

- Maintain the provision of water quality and quantity and provide protection against drought and flooding events.
- Provide habitat for identified local species of interest, designated species of conservation concerns (SCC), or identified local species group.
- Provide rare, unique, or biologically diverse ecosystems or unique landforms.
- Contribute to other important ecosystem functions or services at a regional or local scales.

Finally, areas of intact grassland or forest were selected as Environmentally Sensitive Areas, as they:

- Provide habitat for identified local species of interest, designated species of conservation concerns (SCC), or identified local species group.
- Provide rare, unique, or biologically diverse ecosystems or unique landforms.
- Contribute to other important ecosystem functions or services at a regional or local scales.

Impacts to these sensitive habitats should be minimized to maintain ecosystem health and function within the project area (Table 12). Recommended mitigation measures include:

- As per the Rocky View County Plan goal to, “practice sound land use planning in order to protect agricultural operations, native habitat, environmentally sensitive areas, and wildlife corridors” (Rocky View County 2023c);
- As per the South Saskatchewan Regional Plan (Government of Alberta 2018), municipalities are encouraged to retain at least a 20 m buffer around permanent watercourses, as per the Government of Alberta. (2012) *Stepping Back from the Water. A Beneficial Management Practices Guide for New Development Near Water Bodies in Alberta’s Settled Region;* however, a field study is needed to determine the appropriate buffer strip width based on the individual riparian characteristics;
- As per the Rocky View County Plan key direction to, “continue to protect significant wetlands and natural areas” (Rocky View County 2023c).

Consideration should be made for Policy C-419 *Riparian Land Conservation and Management* (Rocky View County 2010).

Table 12 - Potential Impacts and Mitigation Measures to Environmentally Sensitive Areas

Name/Description of the Environmentally Sensitive Area	Potential Impacts of Proposed Development	Recommended Mitigation Measures	Identify Mitigation Measure
1 – Aquatic and Riparian Habitat	• Impact water quality & quantity • Impact protection against drought & flood • Impact habitat for local species of interest & species of conservation concern • Impact rare, unique, or biologically diverse ecosystems • Impact the contribution to important ecosystem functions or services at both the regional and local scale	• Retain riparian habitat with at least a 20 m buffer	• 20 m buffer as per the Government of Alberta (2012) Stepping Back from the Water. A Beneficial Management Practices Guide for New Development Near Water Bodies in Alberta's Settled Region
2 – Forest and Riparian Habitat	• Impact water quality & quantity • Impact protection against drought & flood • Impact habitat for local species of interest & species of conservation concern • Impact rare, unique, or biologically diverse ecosystems	• Retain creeks with a minimum 20 m buffer • Potential Environmental Reserve pending further field investigation	• Creeks with a 20 m buffer, as per the Government of Alberta (2012) Stepping Back from the Water. A Beneficial Management Practices Guide for New Development Near Water Bodies in Alberta's Settled Region
3 – Forest Habitat	• Provide habitat for identified local species of interest, designated species of conservation concerns (SCC), or identified local species group. • Provide rare, unique, or biologically diverse ecosystems or unique landforms.	• Potential Environmental Reserve pending further field investigation	• *"Practice sound land use planning in order to protect agricultural operations, native habitat, environmentally sensitive areas, and wildlife corridors*" (Rocky View County 2023c)

Name/Description of the Environmentally Sensitive Area	Potential Impacts of Proposed Development	Recommended Mitigation Measures	Identify Mitigation Measure
	• Contribute to other important ecosystem functions or services at a regional or local scales.		
4 – Forest and Grassland Habitat	• Provide habitat for identified local species of interest, designated species of conservation concerns (SCC), or identified local species group. • Provide rare, unique, or biologically diverse ecosystems or unique landforms. • Contribute to other important ecosystem functions or services at a regional or local scales.	• Potential Environmental Reserve pending further field investigation	• *"Practice sound land use planning in order to protect agricultural operations, native habitat, environmentally sensitive areas, and wildlife corridors*" (Rocky View County 2023c)
5 – Forest, Grassland, and Wetland Habitat	• Impact protection against drought & flood • Impact habitat for local species of interest & species of conservation concern • Impact rare, unique, or biologically diverse ecosystems • Impact the contribution to important ecosystem functions or services at both the regional and local scale	• Retain wetlands with at least a 50 m buffer • Potential Environmental Reserve pending further field investigation	• Wetlands with a 50 m buffer, as per the Government of Alberta (2012) Stepping Back from the Water. A Beneficial Management Practices Guide for New Development Near Water Bodies in Alberta's Settled Region • "*Continue to protect significant wetlands and natural areas*" (Rocky View County 2023c).
6 – Forest, Grassland, and Wetland Habitat	• Impact protection against drought & flood • Impact habitat for local species of interest & species of conservation concern • Impact rare, unique, or	• Retain wetlands with at least a 50 m buffer • Potential Environmental Reserve pending	• Wetlands with a 50 m buffer, as per the Government of Alberta (2012) Stepping Back from the Water. A Beneficial Management Practices Guide for New Development Near Water Bodies in Alberta's Settled Region • "*Continue to protect significant wetlands and natural areas*" (Rocky View County 2023c).

Name/Description of the Environmentally Sensitive Area	Potential Impacts of Proposed Development	Recommended Mitigation Measures	Identify Mitigation Measure
	biologically diverse ecosystems • Impact the contribution to important ecosystem functions or services at both the regional and local scale	further field investigation	
7 – Aquatic, Forest, and Riparian Habitats	• Impact water quality & quantity • Impact protection against drought & flood • Impact habitat for local species of interest & species of conservation concern • Impact rare, unique, or biologically diverse ecosystems • Impact the contribution to important ecosystem functions or services at both the regional and local scale	• Retain watercourse with a 20 m buffer • Potential Environmental Reserve pending further field investigation • Retain current water flows into the Bow River with a site-specific stormwater plan	• Watercourse with a 20 m buffer, as per the Government of Alberta (2012) Stepping Back from the Water. A Beneficial Management Practices Guide for New Development Near Water Bodies in Alberta's Settled Region • "*Continue to protect significant wetlands and natural areas*" (Rocky View County 2023c).
8 – Forest, Grassland, and Wetland Habitat	• Impact protection against drought & flood • Impact habitat for local species of interest & species of conservation concern • Impact rare, unique, or biologically diverse ecosystems • Impact the contribution to important ecosystem functions or services at both the regional and local scale	• Retain wetlands with at least a 50 m buffer • Potential Environmental Reserve pending further field investigation • Avoid habitat fragmentation	• Wetlands with a 50 m buffer, as per the Government of Alberta (2012) Stepping Back from the Water. A Beneficial Management Practices Guide for New Development Near Water Bodies in Alberta's Settled Region • "*Continue to protect significant wetlands and natural areas*" (Rocky View County 2023c).
9 – Grassland	• Provide habitat for identified local	• Potential	• *"Practice sound land use planning in order to protect agricultural*

Name/Description of the Environmentally Sensitive Area	Potential Impacts of Proposed Development	Recommended Mitigation Measures	Identify Mitigation Measure
Habitat	species of interest, designated species of conservation concerns (SCC), or identified local species group. • Provide rare, unique, or biologically diverse ecosystems or unique landforms. • Contribute to other important ecosystem functions or services at a regional or local scales.	Environmental Reserve pending further field investigation • Avoid habitat fragmentation	*operations, native habitat, environmentally sensitive areas, and wildlife corridors*" (Rocky View County 2023c)
10 – Aquatic, Grassland, and Riparian Habitat	• Impact water quality & quantity • Impact protection against drought & flood • Impact habitat for local species of interest & species of conservation concern • Impact rare, unique, or biologically diverse ecosystems • Impact the contribution to important ecosystem functions or services at both the regional and local scale	• Retain riparian habitat with at least a 20 m buffer • Potential Environmental Reserve pending further field investigation • Avoid habitat fragmentation	• 20 m buffer as per the Government of Alberta (2012) Stepping Back from the Water. A Beneficial Management Practices Guide for New Development Near Water Bodies in Alberta's Settled Region • *"Practice sound land use planning in order to protect agricultural operations, native habitat, environmentally sensitive areas, and wildlife corridors*" (Rocky View County 2023c)

3.3 Impact Assessment Conclusions

Wildlife movements and habitat availability are expected to change substantially due to developing the project area. If the riparian areas and remaining grasslands and forested areas are undisturbed, movement patterns will still be impacted due to the mosaic of available habitat being reduced across the landscape. Most wildlife in the area is already exposed to regular human disturbance, and the plant community is already likely invaded with non-native species, due to agriculture being the primary land use. There may be a temporary increase in sensory disturbance to wildlife occupying the area during construction of the various projects. Removal of vegetation during construction may reduce breeding opportunities for birds, and habitat for small mammals, though much of the surrounding areas to the west, north and south are likely of similar or higher quality habitat. However, river riparian habitat is limited. Due to the presence of wildlife habitat and the potential for sensitive species, it is recommended that wildlife surveys be conducted before development can proceed during the recommended time periods according to the Government of Alberta (2013). Sensitive species are known to be in the project area, so it is necessary for a nest sweep to occur prior to the initiation of construction activities during the restricted activity period of April 15th and August 28th. If nests or listed species are found on site during construction, specific mitigation measures and setback buffers must be developed by a qualified wildlife biologist to reduce the impact to these species.

Due to the presence of wetlands and the potential for rare plants associated with the wetlands, wetland and rare plant surveys must be conducted before development can proceed. Areas determined to be Environmentally Sensitive Areas and should be retained as Environmental Reserves (or something similar) since they maintain the provision of water quality and quantity and provide protection against drought and flooding events, provide habitat for identified local species of interest, designated species of conservation concerns (SCC), or identified local species group, provide rare, unique, or biologically diverse ecosystems or unique landforms, and contribute to other important ecosystem functions or services at a regional or local scales. If wetlands within the project area are removed, stormwater ponds and/or a stormwater system will be required to capture the surface runoff from the site. If wetlands are to be removed, multiple regulatory applications and approvals will be required including a permanency assessment, ABWRET-A submission, and a *Water Act* approval submission, which will include compensation for lost wetland area.

3.4 Recommendations

Due to the potential for impact on wetlands, wildlife, vegetation, and historical resources, it is recommended that a Biophysical Impact Assessment (BIA) be completed for all projects proceeding within the project area following the Rocky View County (2013) Servicing Standards guidelines. The County should consider a study to delineate and classify the Environmentally Sensitive Areas to properly determine setbacks and future protection steps, such as environmental reserves. If any wetlands are to be impacted, a Wetland Assessment and Impact Report (WAIR) and *Water Act* Approval application will be required, which consists of:

- Wetland delineation and permanency assessments (with submission to the AEP Public Lands Water Boundaries Unit).
- Full wetland surveys using the AEP ABWRET-A system.
- Wetland Assessment and Impact Report (WAIR) and submission under the *Water Act* to pay compensation for all non-ephemeral wetlands removed (both planned and historic).
- All historically removed wetlands that were removed without proper approval will have to be reported to AEP once the full extent is known.
- A Biophysical Impact Assessment be completed prior to development proceeding with an emphasis on:
    - Wetlands surveys.
    - Vegetation surveys (rare plants, vegetation communities, and weeds).
    - Wildlife surveys (breeding birds, amphibians, raptors, water birds, incidental wildlife, and wildlife habitat).

4 Closure

We trust that the information presented herein satisfies the requirements of the Environmental Screening Report and Wildlife Habitat Modelling. If you have any questions or comments regarding the report, please contact our office at your convenience.

Sincerely,

RC BioSolutions Ltd.

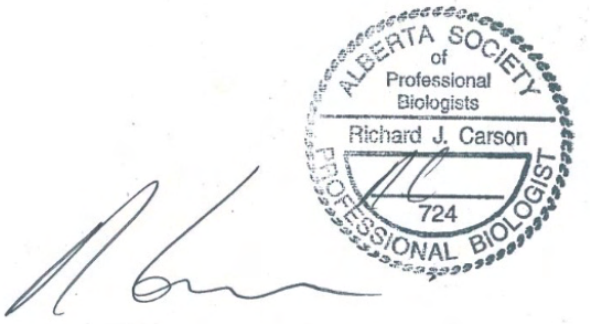
Report Prepared by:

Krista Bird, Ph.D., P. Biol.
Senior Wildlife Biologist and Regulatory Specialist
RC BioSolutions Ltd.
krissy.bird@rcbio.ca

Calvin Kluke, M.Sc., BIT.
Fisheries Biologist
RC BioSolutions Ltd.

Jesse Bird, B.Sc.
GIS and Mapping Specialist

Report Reviewed by:



Richard Carson, B.Sc., P.Biol., R.P.Bio.
Senior Fisheries Biologist and
Regulatory Specialist
RC BioSolutions Ltd.
richard.carson@rcbio.ca

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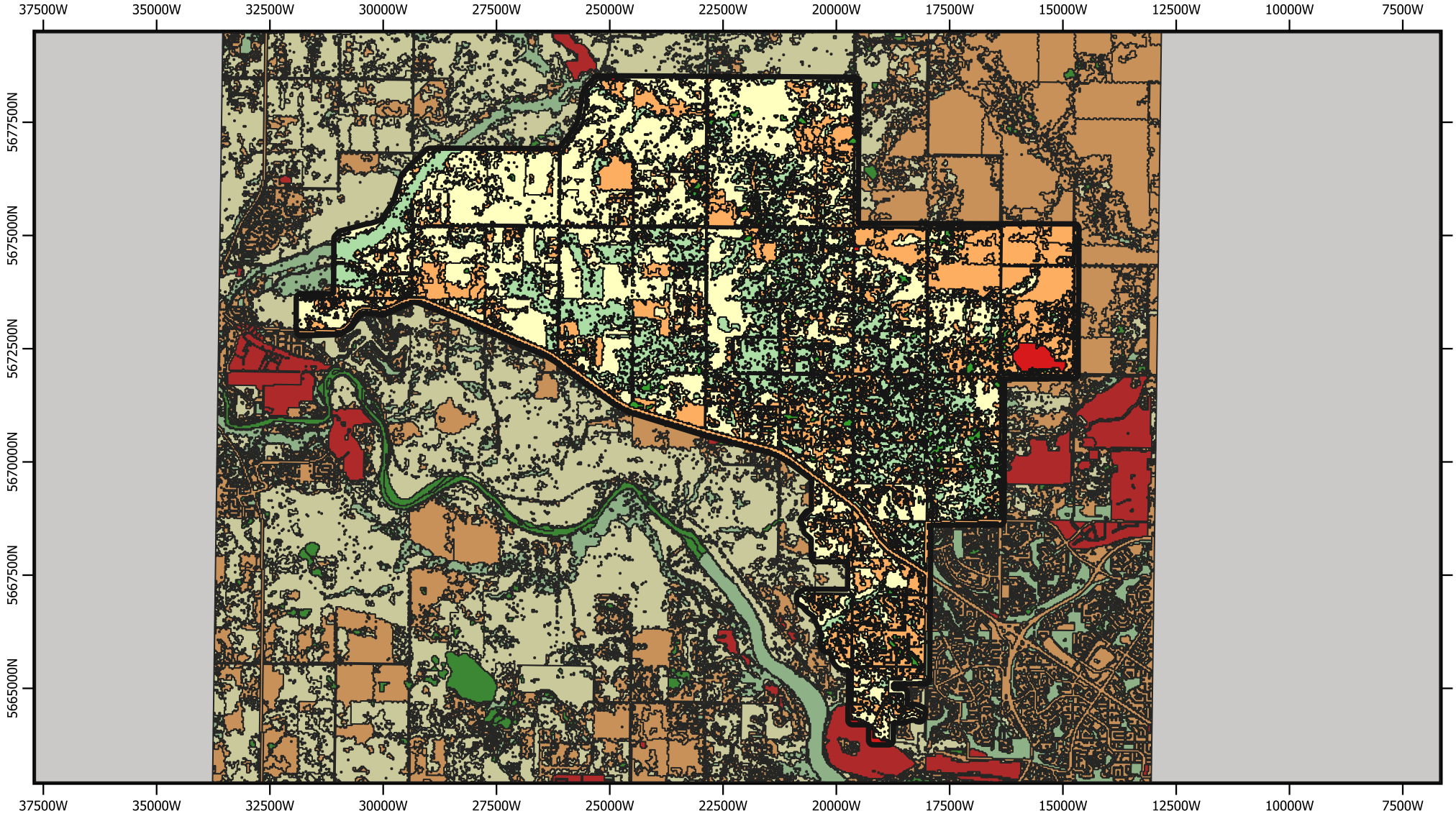
Appendix A

Wildlife Modelling Maps

A1 – Moose (and Forest/Wetland/Riparian/Shrubland Species) Habitat Resistance
A2 – Moose (and Forest/Wetland/Riparian/Shrubland Species) Habitat Connectivity
A3 – Deer (and Generalist Species) Habitat Resistance
A4 – Deer (and Generalist Species) Habitat Connectivity
A5 – American Badger (and Grassland Species) Habitat Resistance
A6 – American Badger (and Grassland Species) Habitat Connectivity
A7 – Porcupine (and Forest Species) Habitat Resistance
A8 – Porcupine (and Forest Species) Habitat Connectivity
A9 – Frogs (and Wetland/Riparian Amphibian Species) Habitat Resistance
A10 – Frogs (and Wetland/Riparian Amphibian Species) Habitat Connectivity



LEGEND

Resistance

- 1
- 25
- 50
- 75
- 100

NAD83 / Alberta 3TM ref merid 114 W

Scale: 1 : 120000

N

0 1 2 3 km

Rocky View County

Environmental Screening Report and
Wildlife Habitat Modeling

Bearspaw Area Structure Plan (ASP) Boundary

Rocky View County 2022 Imagery and ESRI World Imagery

Moose (and Forest/Wetland/Riparian/Shrubland Species) Habitat Resistance

RC BioSolutions Ltd.

Lead: Krissy Bird
Drawn by: Jesse Bird

Date: 14 Dec 2023
Project #: 23080

Appendix
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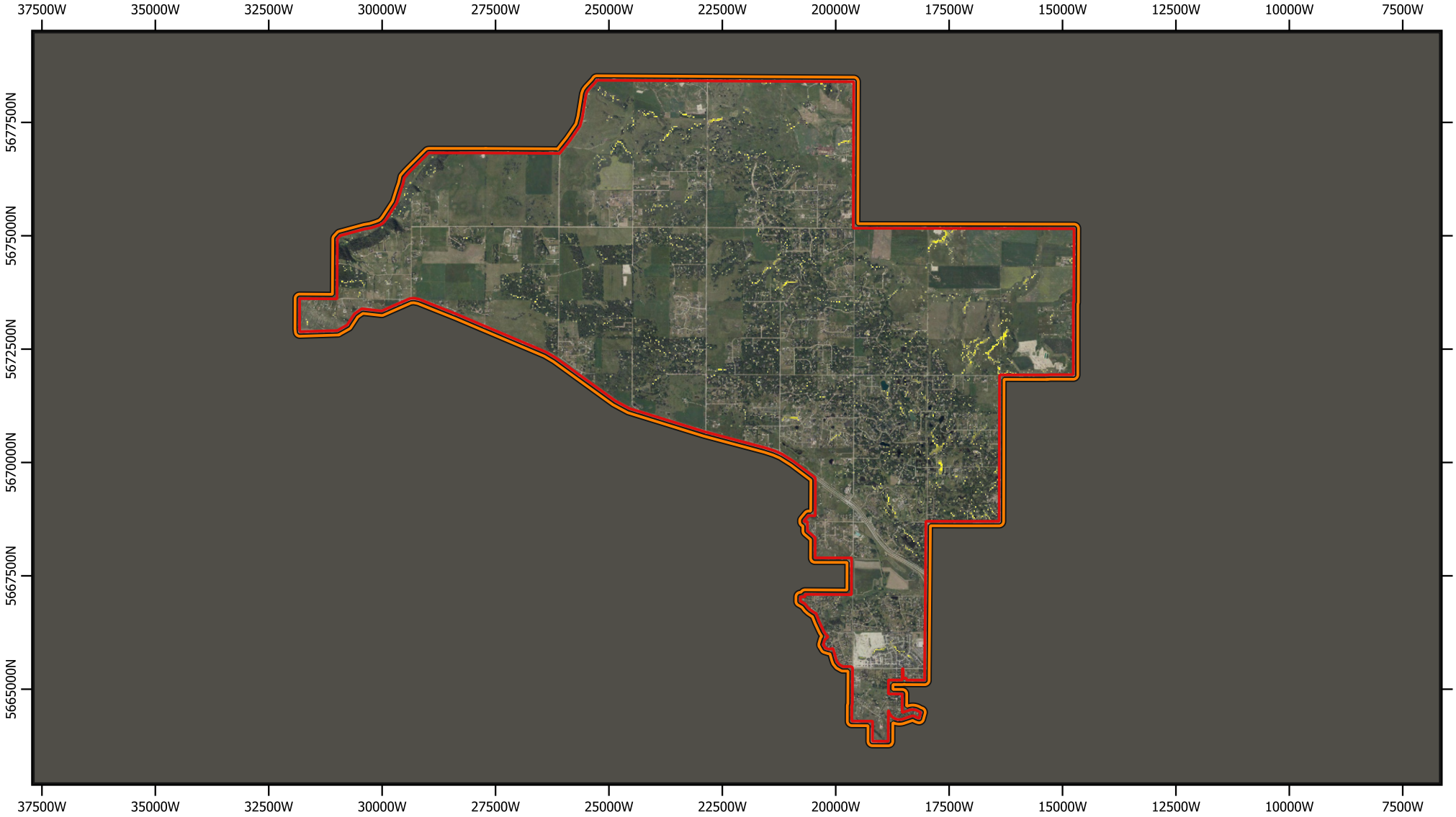

LEGEND

Connectivity Scale

Highest Connectivity

Lowest Connectivity

NAD83 / Alberta 3TM ref merid 114 W

Scale: 1 : 120000

N

0 1 2 3 km

Rocky View County 2022 Imagery and ESRI World Imagery

Rocky View County

Environmental Screening Report and Wildlife Habitat Modeling

Bearspaw Area Structure Plan (ASP) Boundary

Moose (and Forest/Wetland/Riparian/Shrubland Species) Habitat Connectivity

RC BioSolutions Ltd.

Lead: Krissy Bird
Drawn by: Jesse Bird

Date: 14 Dec 2023
Project #: 23080

Appendix
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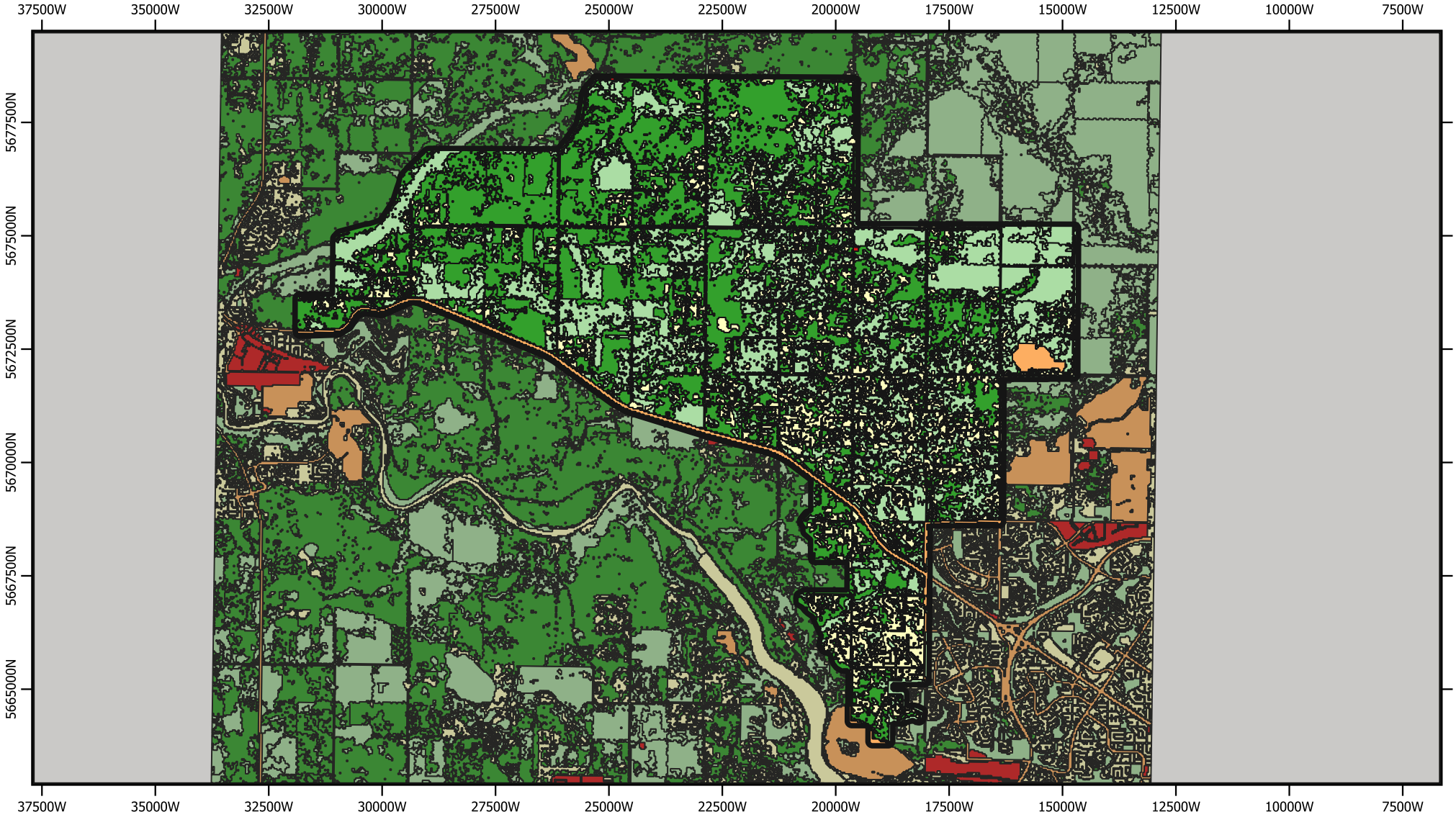

LEGEND

Resistance

- 1
- 25
- 50
- 75
- 100

NAD83 / Alberta 3TM ref merid 114 W

Scale: 1 : 120000

N

0 1 2 3 km

Rocky View County

Environmental Screening Report and
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Bearspaw Area Structure Plan (ASP) Boundary

Rocky View County 2022 Imagery and ESRI World Imagery

Deer (and Generalist Species) Habitat Resistance

RC BioSolutions Ltd.

Lead: Krissy Bird
Drawn by: Jesse Bird

Date: 14 Dec 2023
Project #: 23080

Appendix
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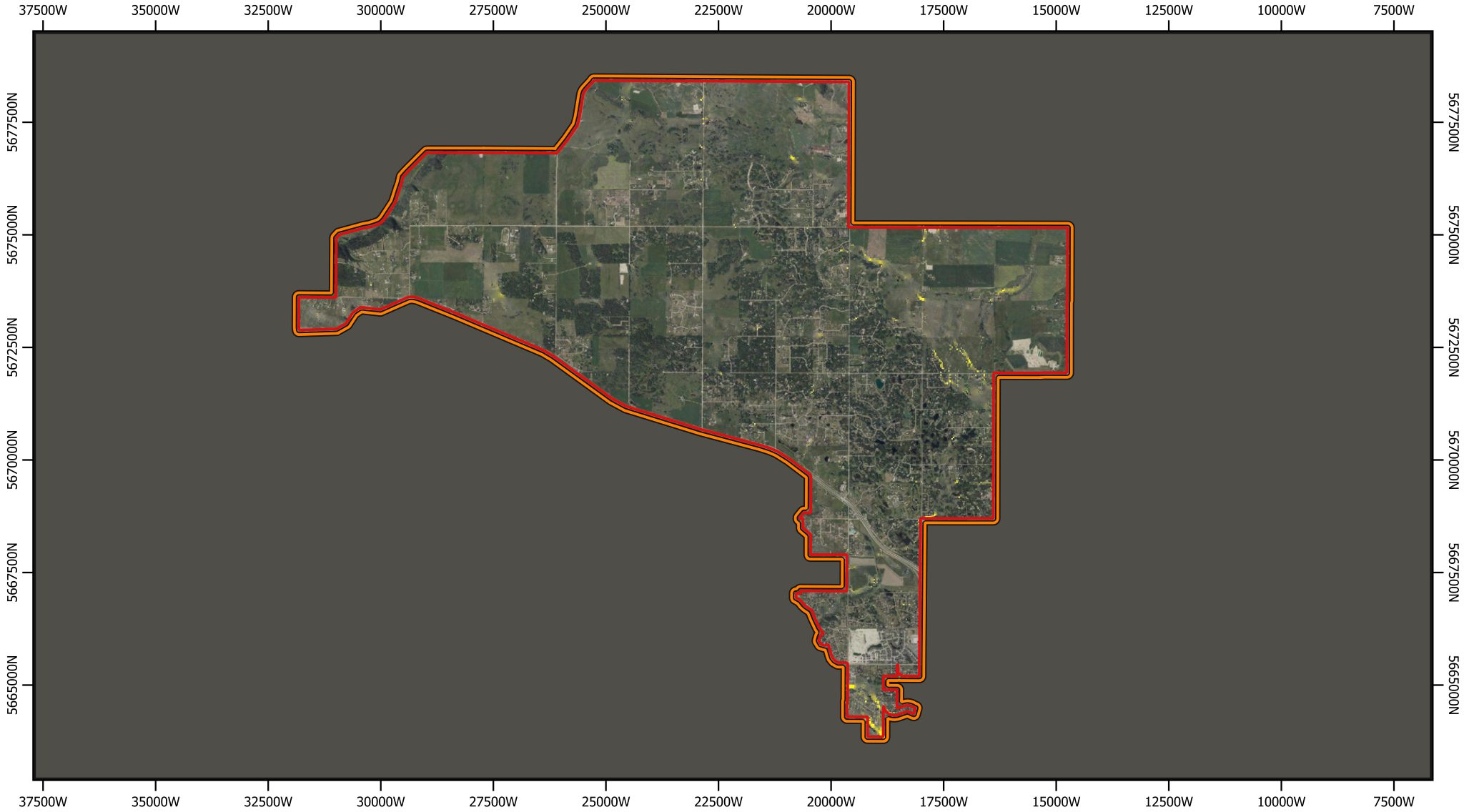

LEGEND

Connectivity Scale

Highest Connectivity

Lowest Connectivity

NAD83 / Alberta 3TM ref merid 114 W

Scale: 1 : 120000

N

0 1 2 3 km

Rocky View County

Environmental Screening Report and
Wildlife Habitat Modeling

Bearspaw Area Structure Plan (ASP) Boundary

Rocky View County 2022 Imagery and ESRI World Imagery

Deer (and Generalist Species) Habitat Connectivity

RC BioSolutions Ltd.

Lead: Krissy Bird
Drawn by: Jesse Bird

Date: 14 Dec 2023
Project #: 23080

Appendix
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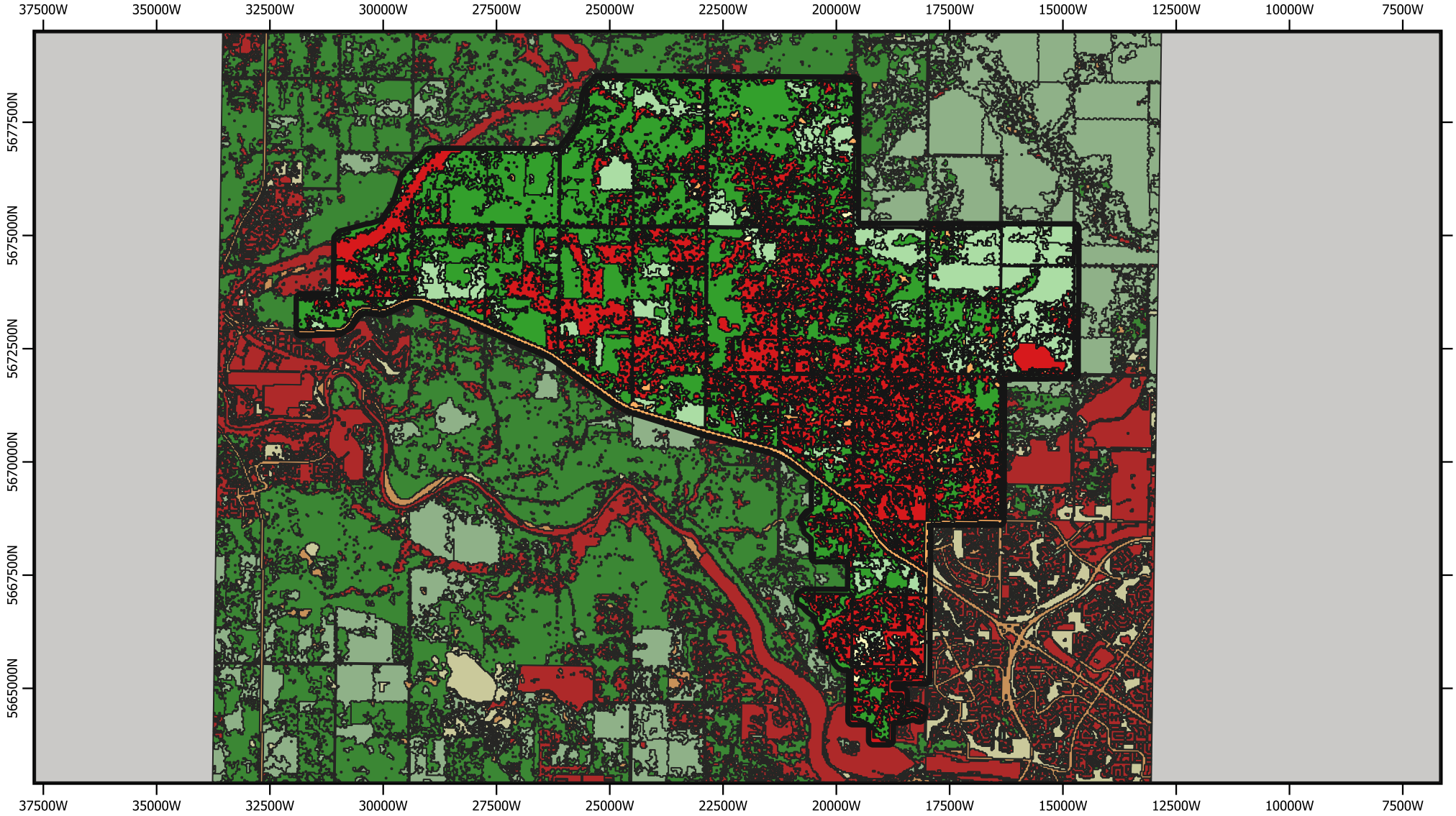

LEGEND

Resistance

- 1
- 25
- 50
- 75
- 100

NAD83 / Alberta 3TM ref merid 114 W

Scale: 1 : 120000

N

0 1 2 3 km

Rocky View County

Environmental Screening Report and
Wildlife Habitat Modeling

Bearspaw Area Structure Plan (ASP) Boundary

Rocky View County 2022 Imagery and ESRI World Imagery

American Badger (and Grassland Species)
Habitat Resistance

RC BioSolutions Ltd.

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Drawn by: Jesse Bird

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Project #: 23080

Appendix
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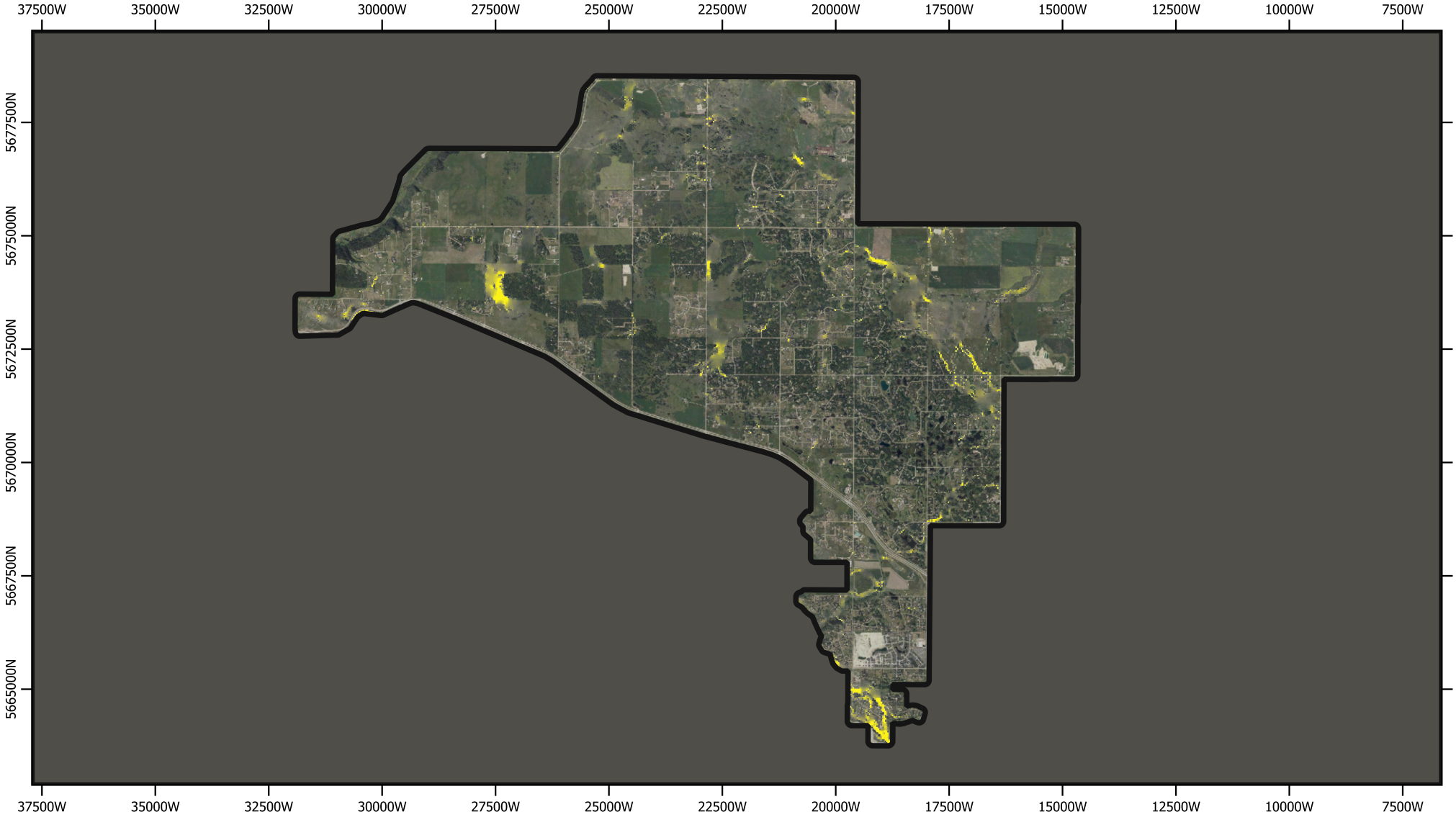

LEGEND

Connectivity Scale

Highest Connectivity

Lowest Connectivity

NAD83 / Alberta 3TM ref merid 114 W

Scale: 1 : 120000

N

0 1 2 3 km

Rocky View County

Environmental Screening Report and
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Bearspaw Area Structure Plan (ASP) Boundary

Rocky View County 2022 Imagery and ESRI World Imagery

American Badger (and Grassland Species) Habitat Connectivity

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Drawn by: Jesse Bird

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Project #: 23080

Appendix
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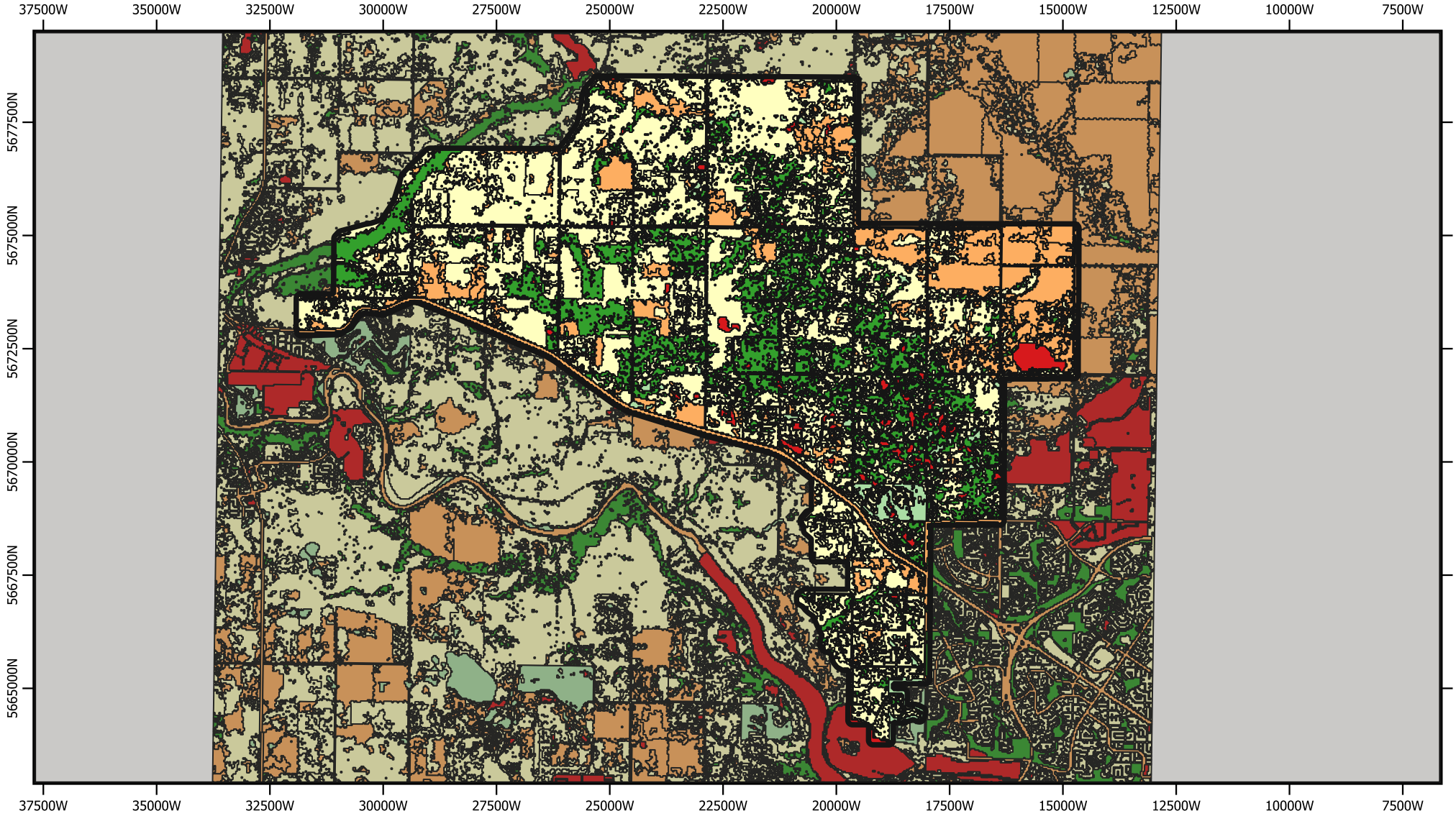

LEGEND

Resistance

- 1
- 25
- 50
- 75
- 100

NAD83 / Alberta 3TM ref merid 114 W

Scale: 1 : 120000

N

0 1 2 3 km

Rocky View County

Environmental Screening Report and
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Bearspaw Area Structure Plan (ASP) Boundary

Rocky View County 2022 Imagery and ESRI World Imagery

Porcupine (and Forest Species) Habitat Resistance

RC BioSolutions Ltd.

Lead: Krissy Bird
Drawn by: Jesse Bird

Date: 14 Dec 2023
Project #: 23080

Appendix
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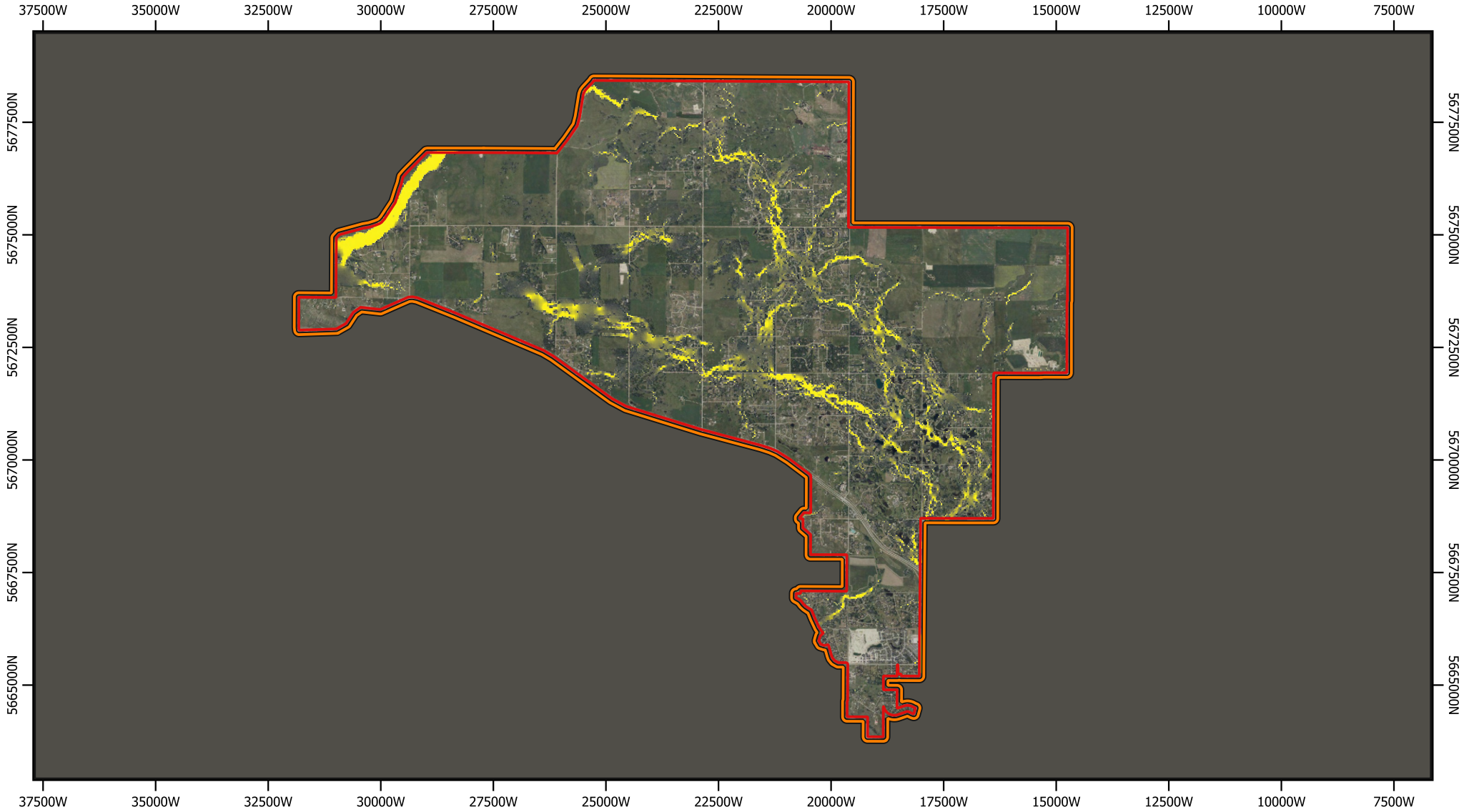

LEGEND

Connectivity Scale

Highest Connectivity

Lowest Connectivity

NAD83 / Alberta 3TM ref merid 114 W

Scale: 1 : 120000

N

0 1 2 3 km

Rocky View County

Environmental Screening Report and
Wildlife Habitat Modeling

Bearspaw Area Structure Plan (ASP) Boundary

Rocky View County 2022 Imagery and ESRI World Imagery

Porcupine (and Forest Species) Habitat Connectivity

RC BioSolutions Ltd.

Lead: Krissy Bird
Drawn by: Jesse Bird

Date: 14 Dec 2023
Project #: 23080

Appendix
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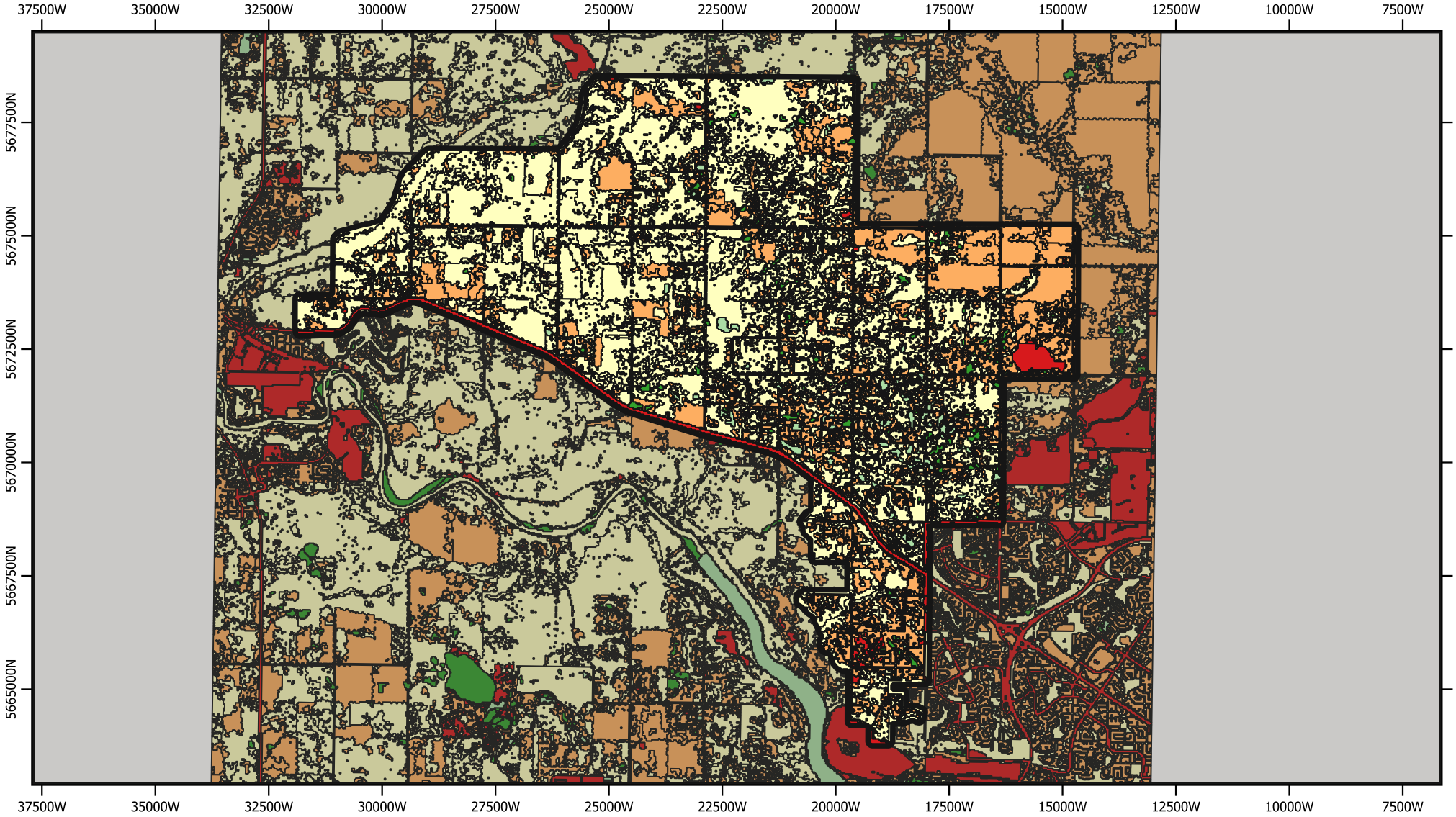

LEGEND

Resistance

- 1
- 25
- 50
- 75
- 100

NAD83 / Alberta 3TM ref merid 114 W

Scale: 1 : 120000

N

0 1 2 3 km

Rocky View County

Environmental Screening Report and
Wildlife Habitat Modeling

Bearspaw Area Structure Plan (ASP) Boundary

Rocky View County 2022 Imagery and ESRI World Imagery

Frogs (and Wetland/Riparian Amphibian Species) Habitat Resistance

RC BioSolutions Ltd.

Lead: Krissy Bird
Drawn by: Jesse Bird

Date: 14 Dec 2023
Project #: 23080

Appendix
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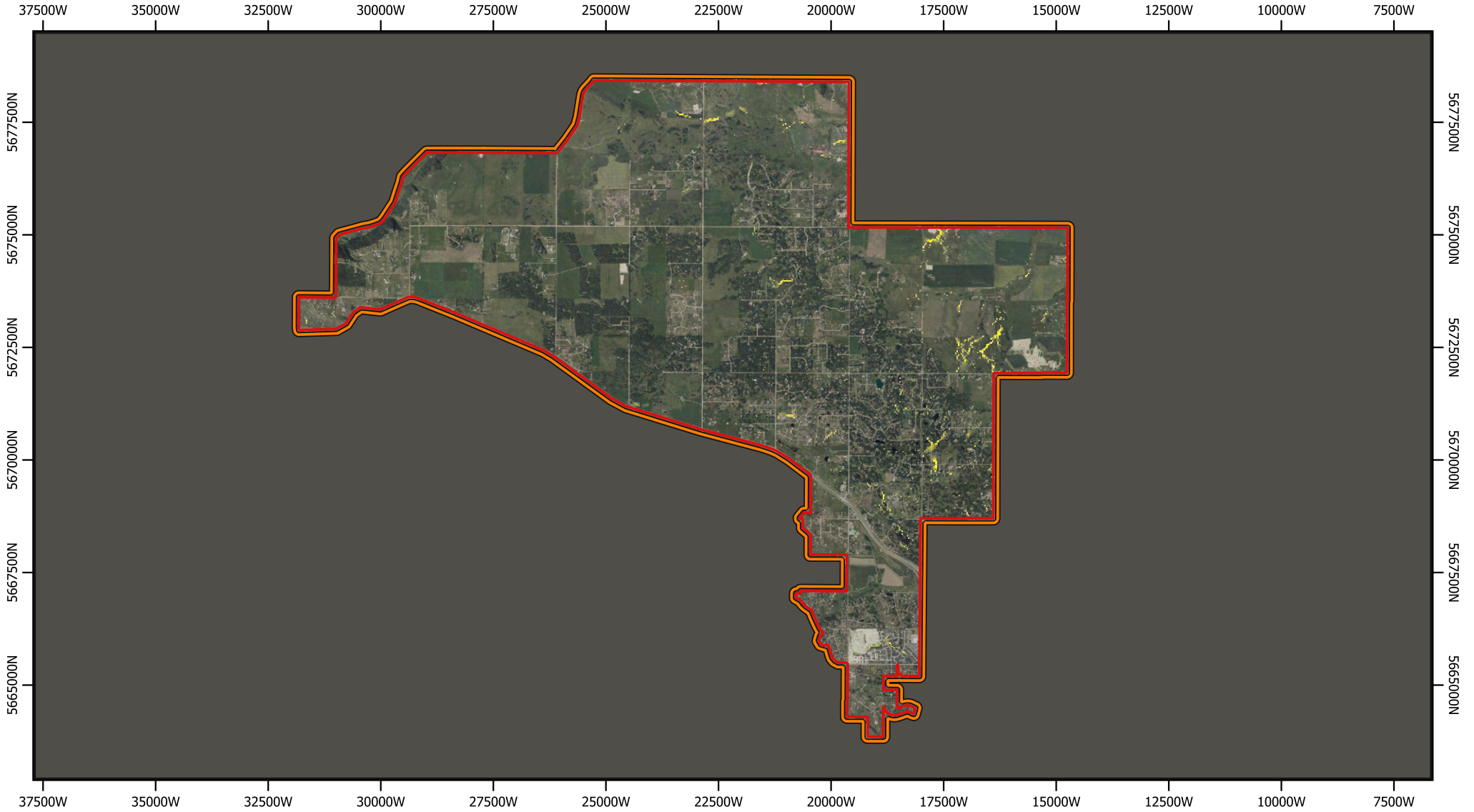

LEGEND

Connectivity Scale

Highest Connectivity

Lowest Connectivity

NAD83 / Alberta 3TM ref merid 114 W

Scale: 1 : 120000

N

0 1 2 3 km

Rocky View County

Environmental Screening Report and
Wildlife Habitat Modeling

Bearspaw Area Structure Plan (ASP) Boundary

Rocky View County 2022 Imagery and ESRI World Imagery

Frogs (and Wetland/Riparian Amphibian Species) Habitat Connectivity

RC BioSolutions Ltd.

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Appendix
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