



Klohn Crippen Berger

Town of Drumheller

Drumheller Resiliency and Flood Mitigation Program



Terrestrial Vegetation and Wildlife Assessment



Platinum
member

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Town of Drumheller
Box 1179
224 Centre Street
Drumheller, Alberta
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Darwin Durnie
Chief Resiliency and Flood Mitigation Officer

Dear Mr. Durnie:

Drumheller Resiliency and Flood Mitigation Program
Terrestrial Vegetation and Wildlife Assessment

We are pleased to present the above-referenced high-level terrestrial vegetation and wildlife assessment for the Drumheller Resiliency and Flood Mitigation Program (DRFMP) to provide a summary of key environmental features and a discussion of potential mitigation measures to be considered during planning of the structural mitigation design works.

Yours truly,

KLOHN CRIPPEN BERGER LTD.



Rob Cheetham, P.Eng.
Associate, Senior Civil Engineer

KM:cw

Town of Drumheller

Drumheller Resiliency and Flood Mitigation Program

Terrestrial Vegetation and Wildlife Assessment

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1 INTRODUCTION

1.1 Project Understanding

With the approval of Bylaw 15.19 in November of 2019, the Drumheller Town Council established the Drumheller Resiliency and Flood Mitigation Office for administering and managing flood readiness for the Town of Drumheller including overseeing drought management and directing infrastructure projects related to the Drumheller Resilience and Flood Mitigation Program (DRFMP). The purpose of the DRFMP is to improve flood readiness of the town, protect residences and property, and mitigate future flooding disasters along the Red Deer River.

An assessment identified several neighbourhoods along the river which require flood mitigation measures or improvement to existing infrastructure to mitigate flood risks. With over 100 km of riverbank through the Town of Drumheller and four historic flood years in the past twenty years (1991, 2005, 2013, and 2018), it is the Council's vision for the Office to implement a proactive flood mitigation strategy through "Changing the Channel" on flood readiness that will protect Drumheller's people, property, economic growth, environment and cultural heritage.

Klohn Crippen Berger Ltd. (KCB) was retained to provide a high-level assessment of the terrestrial environment along five reaches of the Red Deer River through the Town of Drumheller (Figure 1). The five reaches requiring a terrestrial assessment were as follows:

1. 55th Street
2. Midland
3. Newcastle
4. Centennial Park
5. Willow Estates

These five reaches encompass areas where potential structural flood mitigation works may be proposed in the future, such as new dike construction, upgrades to existing dykes, new pedestrian bridge construction, and/or riverbank erosion protection.

1.2 Project Setting

The Town of Drumheller is situated along the Red Deer River within the Northern Fescue Natural Subregion of the Grasslands Natural Region of Alberta. The subregion is characterized by cultivated land interspersed with graminoid prairie pothole wetlands, watercourses, and lakes. Mosaics of buckbrush (*Symphoricarpus occidentalis*) and rose (*Rosa* spp.) dominated shrublands and prairie grasslands are found on remnant undeveloped areas. Forests are uncommon and limited to river valleys. Badlands, coulees, and ravines associated with the Red Deer River in the Saskatchewan River drainage are unique landscape features that provide habitat for rare plants and animals (NRC 2006).

The mean annual daily temperature at the Sleepy Hollow weather station (located approximately 17 km northwest of the town center) is 3.3°C, with climate normals ranging from -12.7°C in January to 17.4°C in July (Environment Canada 2020). The mean annual precipitation is 409.1 mm, of which 321.1 mm falls as rain. The average annual snowfall is 87.6 cm, with heaviest snowfalls typically occurring during March (Environment Canada 2020). The Northern Fescue Natural Subregion is cooler and moister than other Grasslands natural subregions and is therefore more similar climactically to the Central Parkland Natural subregion to the north (NRC 2006).

The predominant land use in the Northern Fescue Natural Subregion is agriculture, recreation, and oil and gas activities (NRC 2006).

1.3 Study Area

The assessment and characterization of plant and wildlife habitat focused on study areas surrounding the five assessed reaches (Figure 1). The reaches were defined within the bank and riparian vegetated belt of the Red Deer River between the Dinosaur Trail Golf and Country Club to the northwest and the Willow Estates neighbourhood to the southeast.

At the desktop level study, a broader review of areas with similar biophysical qualities within the Town of Drumheller and greater Red Deer River Valley provided greater context for the characterization of baseline conditions. Regional data sources were consulted to obtain additional data pertinent to the desktop study, where relevant.

2 METHODS

2.1 Review of Existing Information

The first step in the assessment process included understanding the existing vegetation and wildlife habitat conditions within the study area of each reach, based on a review of existing information. Various sources of information were reviewed to interpret the biophysical conditions of the study areas and highlight possible environmental sensitivities. The sources included:

- high-resolution orthophoto from 2019 supplied by the Town of Drumheller;
- the publications of the Alberta Natural Regions Committee (NRC 2006) for data on topography, soils, and vegetation;
- the Agricultural Region of Alberta Soil Inventory Database (AGRASID) (Version 3.0) to obtain soil information for the Terrestrial Study Area (ASIC 2001);
- the Alberta Conservation Information Management System (ACIMS) to identify the potential for tracked plant species and communities within the Terrestrial Study Area (ACIMS 2017);
- Alberta Environment and Parks' (AEP) Fish and Wildlife Management Information System (FWMIS 2020) to identify potential wildlife constraints within a 6 km radius of the town center of Drumheller;
- raw wildlife observation data from the Alberta Biodiversity Monitoring Institute (ABMI 2013);
- bird species observations recorded at nearby eBird Hotspots - Midland Provincial Park, McMullen Island, Newcastle Park (eBird 2020); and
- secondary publications such as field guides and atlas publications.

Additional government sources were reviewed to determine the conservation status or legal protection of wildlife and vegetation species whose ranges are known to overlap the five reaches through the Town of Drumheller. A description of each conservation classification system is provided in Appendix I. The various sources reviewed included:

- the ACIMS lists of tracked vascular plants, non-vascular plants, and plant communities (ACIMS 2017);
- the Species at Risk Public Registry for species listed under the *Species at Risk Act (SARA)* (S.C. 2002, c. 29) and species assessed by the Committee on the Status of Endangered Wildlife in Canada (COSEWIC) (GoC 2019);
- AEP's Wild Species General Status Listing (AEP 2015); and
- the List of Endangered and Threatened species currently listed under Alberta's *Wildlife Act* (R.S.A. 2000, c. W-10) and other species assessed by the Endangered Species Conservation Committee and its Scientific Subcommittee (GoA 2017).

2.2 Habitat Classification System and Mapping

For this assessment, a Drumheller-specific vegetation classification system (Table 2.1) was created by modifying the urban land inventory systems used in Edmonton (urban Primary Land Vegetation Inventory (uPLVI) (City of Edmonton 2014)) and Calgary (Habitat geospatial dataset (City of Calgary 2020) and Landcover geospatial dataset (City of Calgary 2018)). The vegetation system is hierarchical, starting with a primary classification of vegetated versus non-vegetated and subsequently categorized down to a dominant habitat classification definition.

The vegetation classification system is specific to the assessed reaches and is not meant to be a comprehensive system covering all of the Town of Drumheller. Dominant habitat polygons were digitized using ArcGIS 10.6.1 software and classified based on interpretation of the Town of Drumheller's 2019 orthophoto prior to the site visit. These preliminary dominant habitat unit boundaries and classifications were updated based on the results of the site visit.

Table 2.1 Habitat Classification System

Primary Classification	Secondary Classification	Habitat Category	Dominant Habitat Classification	Habitat Classification Definition
Vegetated	Woodland	Forest	Balsam Poplar	A contiguous or combined area of ≥ 0.25 ha or $\geq 10\%$ of the site, is forested, where balsam poplar trees are the predominant life forms (i.e. $\geq 70\%$ aerial cover is balsam poplar).
			Manitoba Maple	A contiguous or combined area of ≥ 0.25 ha or $\geq 10\%$ of the site, is forested, where Manitoba maple trees are the predominant life forms (i.e. $\geq 70\%$ aerial cover is Manitoba maple).
	Naturally Non-wooded	Grassland	Grassland	A contiguous or combined area of ≥ 0.25 ha or $\geq 10\%$ of the site is grassland, where grasses and forbs are the predominant life forms (can be composed of native and non-native species).
			Shrubland	Upland Shrub
		Riparian Shrub		A contiguous or combined area of ≥ 0.25 ha or $\geq 10\%$ of the site with a continuous canopy cover of shrubs associated with waterbodies (e.g. willows and water birch) at the interface between aquatic and terrestrial.
	Modified	Agriculture	Agricultural Pasture	Agricultural fields used for pasture or fallow.
			Manicured	Manicured Grass
Manicured Park				A managed landscape of planted trees and manicured grass generally used for recreation activities.
Non-vegetated	Modified	Bare Ground	Bare Ground	Human-disturbed areas with minimal vegetation growth where natural vegetation/topsoil has been removed.
		Building/Paved	Buildings/Paved	Human-disturbed areas where natural vegetation/topsoil has been removed and replaced with hard impermeable materials and/or buildings.

2.3 Ground-Based Surveys

A high-level field survey of vegetation communities and wildlife habitat was conducted on October 28, 2020 on public and private lands along the five provided reaches (Figure 1). Surveys conducted this late in the autumn are not effective for compiling a list of observed species as migrant wildlife species have left and plants have died or become dormant to overwinter. Therefore, species detection surveys such as rare plant or breeding bird surveys were not conducted. Field surveys focused on verifying or updating vegetation communities, assessing the dominant woody vegetative cover, and classifying the suitability of the habitat for native species biodiversity and rare species. Observed non-migratory wildlife species and evidence of wildlife activity including dens, burrows, inactive nests, nesting cavities, tracks, and scat were noted during the site visit. Microhabitats with potential to support rare plants or rare plant communities were recorded.

2.4 Habitat Ranking System

Assemblages of native and non-native plants supply food and structure for residences, breeding and foraging opportunities, thermal cover, migration (travel corridors), and hibernation for animals. Native plants provide a higher nutritional value for wildlife than non-native plants. Native insects that provide the primary nutritional component during the breeding season, and native plants have evolved with native insects (Richie 2016). Complex communities of plants, both in structure (i.e. assemblages of grasses, forbs, and woody plants) and biodiversity (e.g. grasslands with many types of grasses and wildflowers) provide more microhabitats and in turn support higher animal biodiversity and abundance. Additionally, landscape features such as rock outcrops, south-facing slopes, water bodies, and river terraces provide unique habitat for both plants and animals. Therefore, requirements of habitat for both plants and animals are considered in the evaluation of overall wildlife habitat ranking.

The finalized dominant habitat classifications were assigned a habitat value rank based on the ability of that habitat to support plant and animal biodiversity (Table 2.2). The ranking system is broken into five habitat rank values (0 to 4) with 4 being highly suitable wildlife habitat and 0 providing no wildlife habitat value. These rankings are relative to each other in the context of the five reaches evaluated using the Drumheller-specific, urban vegetation classification system developed for this assessment.

Table 2.2 Habitat Value Rankings

Habitat Value Ranking					
Dominant Habitat Classification	4	3	2	1	0
	Riparian Shrub	Upland Shrub	Manicured Park	Agricultural Pasture	Bare Ground
	Balsam Poplar	Grassland	Manitoba Maple	Manicured Grass	Buildings/Paved

Habitat value rankings were modified up or down based on site-specific conditions noted during the field survey. Site features that influenced the habitat value rankings included age of tree stands, dominant vegetation species, density of understory plant cover, proximity to water features, the presence and amount of fallen woody debris or dead standing trees (snags), and the observations of

nests, nesting cavities, burrows, dens or other animal residences. Anthropogenic features such as artificial bird houses, bat boxes or abandoned structures such as bridges or barns would also increase the value of the habitat. Because habitat changes throughout the habitat patch from edge to interior, the size and proximity to other unmodified habitat patches was considered in the habitat value ranking. Disturbance, either anthropogenic or natural, caused a decrease in habitat value ranking in some habitats.

3 TERRESTRIAL ASSESSMENT RESULTS

3.1 Desktop Findings

3.1.1 Wildlife and Wildlife Habitat

FWMIS

The Red Deer River is designated as a Provincial Sanctuary Restricted Area (FWMIS 2020). This designation means that the Red Deer River is listed in Schedule 11: Part 3 of the Wildlife Act Regulations, prohibiting hunting of migratory game birds until after October 31 of the open season (GoA 1997). The restricted area includes all islands located in the river and all lands up to 100 yards (approximately 91 m) back from the edge of the water (GoA 1997).

The five reaches are within the sensitive breeding ranges of five bird species including the prairie falcon (*Falco mexicanus*), golden eagle (*Aquila chrysaetos*), ferruginous hawk (*Buteo regalis*), burrowing owl (*Athene cunicularia*), and sharp-tailed grouse (*Tympanuchus phasianellus*). Provincially tracked wildlife species previously reported within a 6 km radius of Drumheller's town center includes the following species (FWMIS 2020; AEP 2015):

- Bald Eagle (*Haliaeetus leucocephalus*) – 'Sensitive'
- Bank Swallow (*Riparia riparia*) – 'Sensitive'
- Burrowing Owl – 'At Risk'
- Canadian Toad (*Anaxyrus hemiophrys*) – 'May Be at Risk'
- Least Flycatcher (*Empidonax minimus*) – 'Sensitive'
- Northern Leopard Frog (*Lithobates pipiens*) – 'At Risk'
- Prairie Rattlesnake (*Crotalus viridis*) – 'May Be at Risk'
- Sharp-tailed Grouse – 'Sensitive'
- Short-eared Owl (*Asio flammeus*) – 'May Be at Risk'
- Swift Fox (*Vulpes velox*) – 'At Risk'
- Western Small-footed Bat (*Myotis ciliolabrum*) – 'Sensitive'

Of the 11 provincially tracked wildlife species previously reported, six are tracked federally (GoC 2019):

- Bank Swallow – 'Threatened'
- Burrowing Owl – 'Endangered'
- Northern Leopard Frog – 'Special Concern'
- Prairie Rattlesnake – 'Special Concern'

- Short-eared Owl – ‘Special Concern’
- Swift Fox – ‘Threatened’

eBird and ABMI

The potential occurrence of breeding birds and species of special concern within the Terrestrial Study Area was primarily determined through a review of data compiled from three eBird hotspots that overlap with the five reaches, including the Midland Provincial Park (PP), McMullen Island, and Newcastle Park (eBird 2020). Species lists of breeding birds from ABMI survey stations 1410 and 1411 were considered when populating the list of potential breeding species (ABMI 2013).

Midland PP is located between the Midland and 55th Street reaches. The Midland PP is situated on the north bank of the Red Deer River and extends north into the coulees around the Royal Tyrrell Museum (Figure 1). The McMullen Island Day Use Area is encompassed within the Midland PP (Figure 1). It is in place of the historic Newcastle Mine, known to be the first operating coal mine in the valley back in the early 1900’s. The day use area is adjacent to the Red Deer River, on the south side of North Dinosaur Trail (Secondary Highway 838). A paved trail through the McMullen Island Day Use Area connects the Town of Drumheller’s River Park Trail System with the Badlands Interpretive Trail near the Royal Tyrrell Museum. Newcastle Park, also known as the Newcastle Beach Recreation Area, is a sports and picnic area on the south bank of the Red Deer River, off 2nd Avenue W and 10th Street W (Figure 1). The Newcastle Park eBird hotspot overlaps with the Newcastle reach.

The query of eBird hotspots established a list of 157 potential breeding bird species within the river valley through Drumheller (Appendix II: Table II-1). Of the potential species, 33 are provincially tracked species of conservation concern. Of the 33 tracked species, 12 species have been afforded a legal status for protection under the *Alberta Wildlife Act* (2000) and/or the *SARA* (2002), including:

- Bank Swallow – Federally listed as ‘Threatened’;
- Barn Swallow (*Hirundo rustica*) – Federally listed as ‘Threatened’;
- Bobolink (*Dolichonyx oryzivorus*) – Federally listed as ‘Threatened’;
- Chestnut-collared Longspur (*Calcarius ornatus*) – Provincially listed as ‘At Risk’ and Federally listed as ‘Endangered’;
- Common Nighthawk (*Chordeiles minor*) – Federally listed as ‘Threatened’;
- Ferruginous Hawk (*Buteo regalis*) – Provincially listed as ‘Endangered’ and Federally listed as ‘Threatened’;
- Horned Grebe (*Podiceps auratus*) – Federally considered a species of ‘Special Concern’;
- Loggerhead Shrike (*Lanius ludovicianus*) – Provincially considered a species of ‘Special Concern’ and Federally listed as ‘Threatened’;
- Long-billed Curlew (*Numenius americanus*) – Provincially and Federally considered a species of ‘Special Concern’;

- Peregrine Falcon (*Falco peregrinus*) – Provincially listed as ‘Threatened’ and Federally considered a species of ‘Special Concern’;
- Sprague’s Pipit (*Anthus spragueii*) – Provincially considered a species of ‘Special Concern’ and Federally listed as ‘Threatened’; and
- Western Grebe (*Aechmophorus occidentalis*) – Provincially listed as ‘Threatened’ and Federally considered a species of ‘Special Concern’.

3.1.2 Rare Plants and Rare Vegetation Communities

The search of the ACIMS element records identified three lichen species historically observed within the Town of Drumheller (Table 3.1). No rare vegetation communities were identified.

Table 3.1 ACIMS Occurrences in the Town of Drumheller

Common Name	Scientific Name	ACIMS Rank ¹	Wildlife Act Designation ²	Global Rank ³	COSEWIC Status ⁴	SARA Designation ⁵
Disc lichen	<i>Lecidella carpathica</i>	S1S2	Not Listed	G5	Not Listed	Not Listed
Sand-loving Iceland lichen	<i>Cetraria arenaria</i>	S1S2	Not Listed	G4	Not Listed	Not Listed
Rock-posy lichen	<i>Rhizoplaca subdiscrepans</i>	SU	Not Listed	G4	Not Listed	Not Listed

Notes:

¹ ACIMS 2017

² *Wildlife Act* (2000)

³ NatureServe 2020

⁴ Committee on the Status of Endangered Wildlife in Canada (GoC 2019)

⁵ *Species at Risk Act* (2002)

Disc lichen and rock-posy lichen grow on rock substrates (CNALH 2020a, 2020b) whereas sand-loving Iceland lichen grows directly on soil (WDNR 2020). Disc lichen is associated with non-calciferous rocks but can be also found growing on wood or bark (CNALH 2020a). Rock-posy lichen is always found on rock, but is less restricted by rock type, and can grow on volcanic or sedimentary rock, including calciferous rock types (CNALH 2020b). Sand-loving Iceland lichen grows on thin and/or sandy soils and is associated with pine (*Pinus* spp.) and ground juniper (*Juniperus communis*) in forested or shrubby areas, and prairie grass assemblages in open prairie habitats (WDNR 2020).

A list of rare plants and rare plant communities known to occur in the Northern Fescue Natural Subregion and could be found within the study area of each reach has been compiled (Appendix III: Table III-1).

3.2 Field Studies Findings

Vegetation communities, translated into dominant habitat classes, have been defined within the study area of each reach and have been assigned a preliminary and final habitat rank. A polygon number assigned to each unique dominant habitat classification area (or group of areas) is displayed on the maps of dominant habitats (Figures 2-1 to 2-6). Details of each area including explanation of

habitat rank modifications are provided (Appendix IV: Table IV-1). The overview of habitat value for each reach displayed in Figures 3-1 to 3-6.

Plant Habitat

Native vegetation communities in study areas are limited to habitat classifications with the secondary classification of Naturally Non-wooded or Woodland. A restricted number of native species could be found in modified habitat classes but these plants would be limited in growth and reproduction by grazing, mowing, trimming, trampling, and other disturbances. Most remnant habitat patches in an urban environment are too small to support rare plant communities. Generally, individual rare plants are rare because their habitat is rare. Therefore, microhabitats such as rock outcrops, bare soil, seeps, and those found in uncommon and undisturbed habitats such as wetlands, old-growth forests, and native grasslands would be most likely to support rare plants.

3.2.1 55th Street

Wildlife and Wildlife Habitat

The 55th Street reach is positioned on the north bank of the Red Deer River between the Dinosaur Trail Golf and Country Club and the Midland PP (Figure 2-1). The riparian habitat along the riverbank is between 45 m to 60 m in width, providing a suitable wildlife corridor with abundant thermal cover. A river terrace is present in the riparian zone, providing additional cover on the floodplain bench for wildlife to move unseen from the residential properties on the river terrace (Appendix V: Photo 1). The riparian shrub habitat is dominated by balsam poplar (*Populus balsamifera*) saplings, sandbar willow (*Salix interior*) and red-osier dogwood (*Cornus sericea*) but has been infiltrated by sweet-clover (*Melilotus* sp.).

The residential properties are small farm properties with pastures, tilled land, and long yards so that anthropogenic disturbances are offset from the riparian zone but horticultural species such as caragana (*Caragana arborescens*) and common lilac (*Syringa vulgaris*) were present in the natural areas near these properties. The connectivity of the 55th Street reach riparian habitat with the Midland PP is disrupted by the highway embankment of North Dinosaur Trail (Secondary Hwy 838). Wildlife tracks were observed in the exposed substrate at the toe of the bank between the 55th Street reach and the Midland PP. However, at high water events, larger wildlife species would be forced to cross the road to move between habitats. Game trails were evident through the floodplain bench.

Mature balsam poplar trees are present on the river terrace (Figure 2-1: Habitat Polygon 3) and transition to riparian shrub habitat on the floodplain bench (Figure 2-1: Habitat Polygons 11-14). Wildlife habitat features observed during the ground survey through the 55th Street reach included cavities in the mature balsam poplars (Appendix V: Photo 2), dense shrub cover in the riparian shrub habitat, bird houses and feeders in the residential properties backyards, and large burrows in the vertical face of the river terrace (Appendix V: Photo 3). A thorny buffaloberry (*Shepherdia argentea*) bush was observed on the floodplain bench, providing potentially suitable habitat for a loggerhead shrike (*Lanius ludovicianus*). The mature balsam poplar trees were noted to provide suitable roost habitat for bat species.

The resident of 5575 North Dinosaur Trail within the 55th Street reach indicated that his pasture (Figure 2-1: Habitat Polygon 1) has American badgers (*Taxidea taxus*) and Richardson's ground squirrels (*Urocitellus richardsonii*) (pers. comm. on Oct.28, 2020). Burrows of various sizes were observed during the ground survey (Appendix V: Photo 4) and most appeared to have recent activity.

Wildlife species observed in the 55th Street reach during the ground survey included:

- Mule Deer (*Odocoileus hemionus*);
- Coyote (*Canis latrans*);
- Black-capped chickadee (*Poecile atricapillus*);
- Red-breasted nuthatch (*Sitta canadensis*); and
- White-breasted nuthatch (*Sitta carolinensis*).

No wetlands suitable as breeding habitat for amphibians were observed in the 55th Street reach. Aerial imagery shows ponded habitat is available in the golf course. Suitability of these wetlands was not assessed during the ground survey but could theoretically provide suitable breeding habitat for amphibians. The riparian zone would thereby provide suitable foraging habitat for amphibians should they breed in the golf course. A seasonal, fluvial drainage channel is present through the grassland habitat. Based on the observation of scour along the lengths of the channel and the lack of instream vegetation, this was not considered suitable amphibian breeding habitat. The American badger and Richardson's ground squirrel burrows may provide overwintering habitat for Canadian toads.

The river terrace through the 55th Street reach is a predominantly south facing bank that could potentially provide suitable thermal conditions for a hibernaculum. Habitat available within the 55th Street reach is not highly suitable for a snake hibernaculum due to the proximity to North Dinosaur Trail (Secondary Hwy 838) and the frequent flooding of the floodplain bench in recent years. An incidental observation of a snake is possible, but the presence of a hibernaculum is considered unlikely.

Rare Plant Habitat

Disc or rock-posure lichens are unlikely to be found in this reach no exposed rock faces were identified as suitable habitat in the 55th Street reach study area. Bare soil on the face of the river terrace (Figure 2-1) can potentially provide habitat for sand-loving Iceland lichen although this species was not observed during the site visit. The banks of the ephemeral watercourse and any potential seepage locations along the Red Deer River also provide microhabitat opportunities for rare plants.

Habitat Classes and Rankings

Nine of the ten dominant habitat classifications were identified in the 55th Street study area (Table 3.2). No modifications to the habitat classes were made within this reach. The riparian zone is valued as 4 due to the presence of undisturbed riparian shrub and balsam poplar habitat.

Table 3.2 55th Street Dominant Habitat Classification and Wildlife Habitat Rankings

Primary Classification	Secondary Classification	Dominant Habitat Classification	Area (ha)	Habitat Ranking
Non-Vegetated	Developed	Bare Ground	0.2	0
		Buildings/Paved	0.8	0
Vegetated	Modified	Agricultural Pasture	5.4	1
		Manicured Grass	1.9	1
		Manicured Park	2.5	2
	Natural Non-Wooded	Grassland	1.9	3
		Riparian Shrub	0.9	4
		Upland Shrub	0.4	3
	Woodland	Balsam Poplar	2.1	4
	TOTAL			16.0

3.2.2 Midland

Wildlife and Wildlife Habitat

The Midland reach is positioned on the north bank of the Red Deer River between the McMullen Island Day Use Area (as part of the Midland PP) and a large, vegetated, uninhabited island across from the Newcastle Park Environmental Reserve (ER) (Figures 2-2 and 2-3). The habitat connectivity along the Midland reach is disrupted due to the residential properties’ proximity to the riverbank edge and existing flood mitigation measures. A flood control barrier in the form of a stone wall runs approximately 500 m along the length of North River Drive. A paved, pedestrian walking path runs parallel to the stone wall at the top of the bank. Recently, vegetation has been cleared along the length of the wall and replaced with riprap armouring (represented as ‘bare ground’ in Figure 2-2: Habitat Polygon 20; Appendix V: Photos 5 and 6). Wildlife tracks were observed in the exposed substrate at the toe of the bank along the Midland reach. However, during high water events, larger wildlife species would be forced to move through the residential properties.

Available habitat at the west end of the Midland reach provides an extension of naturalized, undisturbed habitat from the McMullen Island Day Use Area (Figure 2-2). Mature forest growth, surrounding wetland habitat within the McMullen Island Day Use Area blends into dense shrub cover along the historic rail trackbed (now a part of the Drumheller’s River Park Trail System; Appendix V: Photo 7), before giving way to grassland habitat (Figure 2-2: Habitat Polygon 22). This habitat provides moderately suitable habitat for a variety of breeding bird species and abundant thermal cover for mammals. A single row of mature balsam poplars was present along a drainage channel, adjacent to 25th Street (Figure 2-2: Habitat Polygon 16). Cavities were observed in these mature trees (Appendix V: Photo 8).

Towards the east end of the Midland reach, a mature balsam poplar forest is present with a flanking Manitoba maple stand at the river’s edge (Figure 2-3: Habitat Polygons 19 and 26, respectively). The forest contains a dense shrub understory. Cavities within the mature trees were abundant throughout this stretch of riparian habitat. The mature trees were also noted to provide suitable roost habitat for bat species. Standing dead trees, referred to as snags, were also found in the balsam

poplar forest (Figure 2-3; Appendix V: Photo 9). The riparian zone ranges from 30 m to 90 m in thickness, providing suitable thermal cover for larger mammals. Additionally, the pedestrian trail does not extent through the last 300 m of the balsam poplar forest. The east end of the Midland reach is immediately adjacent to the large, vegetated, uninhabited island. This island would provide suitable habitat for breeding bird species that have a sensitivity to anthropogenic disturbances, especially within the urban environment. The surrounding riparian habitat to the island, that which would be included in the Midland reach and the Newcastle ER across the river, would provide suitable foraging habitat for those breeding species.

Additional habitat features observed during the ground survey included bird houses and feeders in residential properties along the riverbank and the abandoned rail line bridge. The bridge could be considered a suitable nesting structure for species such as barn swallows, cliff swallows (*Petrochelidon pyrrhonota*), and Eastern phoebes (*Sayornis phoebe*).

Wildlife species observed in the Midland reach during the ground survey included:

- Black-capped chickadee;
- Blue Jay (*Cyanocitta cristata*);
- Dark-eyed Junco (*Junco hyemalis*);
- Eastern Gray Squirrel (*Sciurus carolinensis*);
- House Sparrow (*Passer domesticus*);
- Mule Deer;
- Northern Flicker (*Colaptes auratus*); and
- Rock Pigeon (*Columba livia*).

No wetlands suitable as breeding habitat for amphibians were observed in the Midland reach. The two drainage channels present within the Midland reach do not provide suitable breeding habitat for amphibians based on the observation of scour along the lengths of the channels and the lack of instream vegetation. However, suitable breeding habitat is available within the McMullen Island Day Use Area. Due to the connectivity disruption along the bank adjacent to the flood mitigation barrier, if amphibians were present in the McMullen Island Day Use Area, the Midland reach is considered to provide limited suitable foraging habitat and overwintering potential.

Similarly, the Midland reach provides limited suitable habitat for a snake hibernaculum. Suitable banks, fissures, sinkholes, rocky outcrops, or mammal burrows were not observed during the ground survey. Although the riprap bank is south facing along the flood mitigation barrier, proximity to residential properties and roadways and the narrow extent of the bank limited the suitability of the habitat.

Rare Plant Habitat

No exposed rock faces were identified as suitable habitat for disc or rock-rose lichens in the Midland reach study area. The substrate of the Bare Ground habitat (Figure 2-2: Habitat Polygon 20) is riprap and is not suitable for any rare lichens previously observed in Drumheller. The banks of the drainage ditch (Figure 2-2), the ephemeral watercourse (Figure 2-3) and any potential seepage locations along the Red Deer River also provide microhabitat opportunities for rare plants.

Habitat Classes and Rankings

Habitat classes available with the Midland reach are summarized in Table 3.3 and displayed on Figures 3-2 and 3-3. Modifications to habitat values were applied to the balsam poplar habitats on the western extent of the Midland reach (Figure 2-2: Habitat Polygons 16 and 17) due to their proximity to the roadway/pedestrian trail, narrow extent, and sparse understory, especially when compared to the balsam poplar habitat located at the eastern extent of the reach (Figure 2-3: Habitat Polygon 19). The balsam poplar habitat present in Habitat Polygon 18 (Figure 2-3) was also modified for these reasons. The value of the Manitoba maple habitat available in Habitat Polygon 26 was increased due to its position between the wide stretch of balsam poplar forest and the river.

Table 3.3 Midland Dominant Habitat Classification and Wildlife Habitat Rankings

Primary Classification	Secondary Classification	Dominant Habitat Classification	Area (ha)	Habitat Ranking
Non-Vegetated	Developed	Bare Ground	0.1	0
		Buildings/Paved	0.1	0
Vegetated	Modified	Manicured Grass	0.5	1
		Manicured Park	0.3	2
	Natural Non-Wooded	Grassland	2.6	3
		Upland Shrub	0.3	3
	Woodland	Balsam Poplar	1.4	3
		Balsam Poplar	3.2	4
		Manitoba Maple	0.1	2
		Manitoba Maple	0.9	3
TOTAL			9.6	

3.2.3 Newcastle

Wildlife and Wildlife Habitat

The Newcastle reach is positioned on the south side of the Red Deer River across from the Midland reach (Figures 2-3 and 2-4). Encompassed within the Newcastle reach is the Newcastle ER and the Newcastle Beach Recreation Area. These areas together provide one of the largest green spaces along the river valley through the Town of Drumheller. This green space is partially disjointed in connectivity to the surrounding riparian habitat along the Red Deer River. Neighbouring residential communities extend to the river's edge with a sliver of vegetation remaining within the riparian zone. Along Riverside Avenue W, to the west of the ER, the vegetation adjacent to the roadway has been heavily pruned (Figure 2-3: Habitat Polygon 34). Along the backs of the yards neighbouring the ER, the

riparian vegetation has been removed and replaced with manicured lawn (Figure 2-3 and 2-4: Habitat Polygon 35). Some residents have constructed patios with campfires at the top of bank.

The ER is an open woodland dominated by mature balsam poplars (Figure 2-4: Habitat Polygon 30). Within the ER, cavities were abundant amongst the mature trees. Nests of passerine bird species (songbirds, sparrows, and finches) from the recent breeding season were observed in the shrubby understory. One nest was found within a caragana shrub (Appendix V: Photo 10). Snags were also observed within the ER (Appendix V: Photo 11).

The habitat within the Newcastle Beach Recreation Area was predominately classified as 'manicured park' (Figure 2-4: Habitat Polygon 39). The canopy consisted of mature balsam poplars and Manitoba maples, but the understory was manicured lawn. Sports fields are also present within the park. The habitat surrounding Newcastle boat launch has been recently altered due to river conveyance improvement works initiated by the Drumheller Resiliency and Flood Mitigation Office in the spring of 2020. Brush grubbing along the length of Newcastle Beach was deemed necessary to ensure operational readiness of the diking system. During higher water events, the shrub habitat on the inside bend of the river was causing water flows to slow, encouraging deposition of silt and gravel; thereby creating a side bar that ultimately diminished the channel capacity through this reach (The Drumheller Mail 2020). In the spring of 2020, 6,200 m³ of riverbed material from the Newcastle Beach was removed and the surrounding riparian shrub habitat was mulched to improve the conveyance through this reach (Town of Drumheller 2020). As part of the brush grubbing, the beach area was groomed, stumps were ground, and grass seed with hydro mulching was sprayed over the disturbed areas outside of the parking lot (Blanke 2020). Aerial imagery shown in Figure 2-4 does not display the change in bank line and shrub coverage. Habitat polygons on Figure 2-4 near the Newcastle Beach Boat Launch are an approximation of the physical changes noted during ground survey. In place of riparian shrub habitat, the habitat polygons were labeled as 'bare ground' where vegetation has yet to establish (Figure 2-4: Habitat Polygon 32) and 'buildings/paved' where the parking area was extended (Figure 2-4: Habitat Polygon 33).

An additional habitat feature observed during the ground survey included a rocky outcrop providing small mammal burrows on the west end of the Newcastle reach (Figure 2-3; Appendix V: Photo 12). The upland shrub habitat up the bank from the rocky outcrop primarily consisted of saskatoon bushes (*Amelanchier alnifolia*). During the ground survey, it was observed that the bushes were heavily grazed by ungulates (Figure 2-3: Habitat Polygon 43; Appendix V: Photo 13). Similar to other reaches, wildlife tracks were observed in the exposed substrate at the toe of the bank along the Newcastle reach.

Wildlife species observed in the Newcastle reach during the ground survey included:

- Black-capped chickadee;
- Black-billed Magpie (*Pica hudsonia*);
- Blue Jay;
- Downy Woodpecker (*Dryobates pubescens*);

- Eastern Gray Squirrel;
- House Sparrow; and
- White-breasted nuthatch.

No wetlands suitable as breeding habitat for amphibians were observed in the Newcastle reach. A seasonal, ephemeral watercourse is present at the eastern extent of the Newcastle reach. This aquatic habitat was assessed to provide limited suitability as breeding habitat for amphibians due to the direct connectivity with the Red Deer River, a fish bearing watercourse, and the fluvial nature of the discharge through the watercourse. Similarly, the Newcastle reach does not provide suitable habitat for a snake hibernaculum. The bank is north facing and does not provide suitable thermal conditions to support overwintering.

Rare Plant Habitat

No exposed rock faces were identified as suitable habitat for disc or rock-rose lichens in the Newcastle reach study area. However, a rocky outcrop supporting small mammal burrows may be suitable habitat; however, no lichens were observed during the field survey. Exposed sand at the Newcastle Beach Boat Launch (Figure 2-3) could provide the surface substrate for sand-loving Iceland lichen, but due to regular surface disturbance by people and the river, its establishment is unlikely. The ephemeral watercourse (Figure 2-3) and any potential seepage locations along the Red Deer River could also provide microhabitat opportunities for rare plants.

Habitat Classes and Rankings

Habitat classes available with the Newcastle reach are summarized in Table 3.4 and displayed on Figures 3-3 and 3-4. The environmental reserve provides the largest area (2.4 ha) of the highest habitat value (4) through the Newcastle reach. The habitat ranking of three Habitat Polygons were modified within the Newcastle reach (Figure 2-3). The balsam poplar habitat within polygon 29 was decreased by two rankings due to the isolated nature of the small patch, the proximity to surrounding roadways, and the presence of manicured lawn beneath the trees. Shrub habitat within polygon 43 was decreased by one ranking due to the heavily browsed nature of the shrubs due to ungulate presence. The final polygon modified was a Manitoba maple stand (Habitat Polygon 41) surrounding a gas pipeline crossing. The surrounding habitat had been recently mulched and only a few remaining trees were present at the time of the ground survey. The habitat ranking was decreased by one value.

Table 3.4 Newcastle Dominant Habitat Classification and Wildlife Habitat Rankings

Primary Classification	Secondary Classification	Dominant Habitat Classification	Area (ha)	Habitat Ranking
Non-Vegetated	Developed	Bare Ground	0.9	0
		Buildings/Paved	2.9	0
Vegetated	Modified	Manicured Grass	2.3	1
		Manicured Park	6.0	2
	Natural Non-Wooded	Riparian Shrub	0.2	4
		Upland Shrub	0.2	2
		Upland Shrub	0.4	3
	Woodland	Balsam Poplar	0.1	2
		Balsam Poplar	2.4	4
		Manitoba Maple	0.04	1
		Manitoba Maple	2.3	2
	TOTAL			17.7

3.2.4 Centennial Park

Wildlife and Wildlife Habitat

Centennial Park is in the downtown core of Drumheller, stretching from the Gordon Taylor Bridge to behind the Badlands Community Facility (Figure 2-5). It is a destination for tourists because of the 26 m tall Tyrannosaurus Rex dinosaur (“Worlds Tallest Dinosaur”) that stands off 1st Ave W. The Drumheller’s River Park Trail System joins to the grounds of the park where grassed lawns are dotted with picnic tables and sitting benches. Amenities surrounding the park grounds includes a skateboard park, the Aquaplex indoor pool, an outdoor spray park, and the Memorial Arena. It was noted by the field biologist during the ground survey that the ventilation fans on the arena produced a constant hum of noise.

Wildlife habitat available within Centennial Park is primarily ‘manicured park’ (Table 3.5) with mature trees in the canopy and manicured lawn throughout (Appendix V: Photo 14). At the time of the ground survey, evidence of recent tree and shrub clearing was observed along the riparian zone within the park grounds. The remaining shrub habitat is sparse sandbar willow (*Salix interior*) and red-osier dogwood (*Cornus sericea*) that with a high abundance of sweet-clover (*Melilotus sp.*).

According to an online news article from *Drumheller Online*, flood mitigation works within Centennial Park begun in the spring of 2020 where diseased trees and vegetation in place of future flood mitigation projects were removed (Blanke 2020). Targeted trees also included balsam poplars planted back in the 1960’s that had become a threat to public safety due to their age. Some stretches of the riparian vegetation were said to be “thinned” to provide better viewing opportunities of the badlands for trail users (Blanke 2020).

Due to the traffic of trail users through the park, outdoor recreation opportunities, the manicured nature of the available vegetation, and the hum of the ventilation fans from the arena, Centennial Park does not provide highly suitable habitat for wildlife species. Species tolerant of human activities

would utilize the available habitat. A cluster of American crow (*Corvus brachyrhynchos*) nests were observed in the balsam poplar stand represented by Habitat Polygon 46 in Figure 2-5 (Appendix V: Photo 15). Beaver activity was observed throughout the riparian zone, with the base of most large trees protected by wire cylinders (Appendix V: Photo 16). Wildlife tracks were observed in the exposed substrate at the toe of the bank along the Centennial reach. The mature trees throughout the park could provide suitable roost habitat for bat species. Bird species commonly found in human habitations observed in the Centennial Park reach during the ground survey included:

- Black-capped chickadee;
- Black-billed Magpie;
- Blue Jay; and
- White-breasted nuthatch.

No wetlands suitable as breeding habitat for amphibians were observed in the Centennial reach. Similarly, the Centennial reach does not provide suitable habitat for a snake hibernaculum. The bank is north facing and does not provide suitable thermal conditions to support overwintering.

Rare Plant Habitat

No exposed rock faces were identified as suitable habitat for disc or rock-rose lichens in the Centennial reach study area. The substrate of the Bare Ground habitat (Figure 2-5: Habitat Polygon 47) is regularly driven over and is not suitable soil substrate for sand-loving Iceland lichen. The Centennial reach study area supports minimal native plant habitat but bare soil or seepage along the Red Deer River may provide microhabitat opportunities for rare plants.

Habitat Classes and Rankings

Habitat classes available with the Centennial reach are summarized in Table 3.5 and displayed on Figure 3-5. The primary habitat ranking through this reach was classified as a value of 2. The habitat ranking of one stand of balsam poplars (Figure 2-5: Habitat Polygon 46) was modified to a value of 3 due to the isolated nature of the forest patch from other similarly suitable habitat and the anthropogenic disturbances present within the park.

Table 3.5 Centennial Park Dominant Habitat Classification and Wildlife Habitat Rankings

Primary Classification	Secondary Classification	Dominant Habitat Classification	Area (ha)	Habitat Ranking
Non-Vegetated	Developed	Bare Ground	1.2	0
		Buildings/Paved	5.8	0
Vegetated	Modified	Manicured Grass	0.4	1
		Manicured Park	3.0	2
	Natural Non-Wooded	Upland Shrub	0.1	2
	Woodland	Balsam Poplar	0.5	3
		Manitoba Maple	0.9	2
TOTAL			11.9	

3.2.5 Willow Estates

Wildlife and Wildlife Habitat

The Willow Estates reach is on the east end of the Drumheller downtown core, adjacent to the Drumheller Valley Secondary Highschool (Figure 2-6). The western extent of the reach is a mature balsam poplar forest (Figure 2-6: Habitat Polygon 57). The eastern extent of the reach is largely disturbed due to adjacent landowner’s pruning activities (Figure 2-6: Habitat Polygons 61 and 62). The Drumheller River Park Trail System extends through the balsam poplar forest and comes to an end at 19th Street E.

The balsam poplar forest contained mature trees with abundant available cavities. A snag was also observed within the forest (Appendix V: Photo 17). The thickness of the tree cover ranged from 20 m to 100 m, providing suitable thermal coverage for wildlife species. Suitable rooting trees were available for bat species. The bank along this stretch of the reach was as high as 2 m at some points, providing additional cover for wildlife species moving along the toe of the bank, where tracks were observed during the ground survey. Burrows were not observed in the riverbank. Large trees were observed to have wire cylinders around the base to deter beaver activity.

Along the backs of the residential yards on the eastern extent of the Willow Estates reach, numerous bird houses and feeders were observed (Appendix V: Photo 18). The manicured lawn was observed to provide forage habitat for passerine birds during the ground surveys (Appendix V: Photo 19). The surrounding shrub and Manitoba maple riparian zone has been manicured by adjacent landowners to maintain views of the river (Appendix V: Photos 20 and 21). Firepit/picnic areas have been established behind some yards. Species tolerant of human activities would utilize the available habitat but otherwise, the habitat did not provide highly suitable habitat.

The ‘riparian shrub’ habitat surrounding the ephemeral watercourse provided highly suitable habitat for breeding birds (Figure 2-6: Habitat Polygon 63; Appendix V: Photo 22). A higher density of bird nests from the most recent breeding season were observed during the ground survey.

Wildlife species observed in the Willow Estates reach during the ground survey included:

- American Wigeon (*Mareca americana*);
- Bald Eagle;
- Black-capped chickadee;
- Black-billed Magpie;
- Blue Jay;
- Canada Goose (*Branta canadensis*);
- Dark-eyed Junco;
- Eastern Gray Squirrel;
- House Sparrow;
- Rock Pigeon; and
- White-breasted nuthatch.

No wetlands suitable as breeding habitat for amphibians were observed in the Willow Estates reach. A seasonal, ephemeral watercourse is present at the eastern extent of the Willow Estates reach. This aquatic habitat was assessed to provide limited suitability as breeding habitat for amphibians due to the direct connectivity with the Red Deer River, a fish bearing watercourse, and the fluvial nature of the discharge through the watercourse. Similarly, the Willow Estates reach provides limited suitable habitat for a snake hibernaculum. The riverbank is northeast facing and does not provide suitable thermal conditions to support overwintering. The ephemeral watercourse at the eastern extent of the reach has some suitable south facing banks. Rocky outcrops were present and have the potential to provide burrows for small mammals or reptiles.

Rare Plant Habitat

No exposed rock faces were identified as suitable habitat for disc or rock-rose lichens in the Centennial reach study area. The substrate of the Bare Ground habitat (Figure 2-5: Habitat Polygon 47) is regularly driven over and is not suitable soil substrate for sand-loving Iceland lichen. The Centennial reach study area supports minimal native plant habitat but bare soil or seepage along the Red Deer River may provide microhabitat opportunities for rare plants.

Habitat Classes and Rankings

Habitat classes available with the Willow Estates reach are summarized in Table 3.6 and displayed on Figure 3-6. The balsam poplar habitat in polygon 57 (Figure 2-6) and the riparian shrub habitat in polygon 63 (Figure 2-6) provide the highest habitat ranking value (4). The mature balsam poplar forest provides that largest area of high habitat value (3.2 ha). Modifications were made to ranking of Habitat Polygons 61 and 62 (Figure 2-6) due to the anthropogenic disturbances to the riparian vegetation.

Table 3.6 Willow Estates Dominant Habitat Classification and Wildlife Habitat Rankings

Primary Classification	Secondary Classification	Dominant Habitat Classification	Area (ha)	Habitat Ranking
Non-Vegetated	Developed	Bare Ground	0.1	0
Vegetated	Modified	Manicured Grass	1.4	1
	Natural Non-Wooded	Riparian Shrub	0.2	3
		Riparian Shrub	0.5	4
	Woodland	Balsam Poplar	3.2	4
		Manitoba Maple	0.3	1
TOTAL			5.8	

3.3 Species at Risk

Provincial and federal legislation and regulations protect wildlife and their residences from destruction and disturbance, especially during the breeding season. Effects to wildlife and wildlife habitat are regulated by the provincial *Wildlife Act* (2000) and the federal *Migratory Birds Convention Act (MBCA)* (S.C. 1994, c. 22) and *SARA* (2002). As per the *Wildlife Act* Regulations, species identified as ‘Endangered’ and ‘Threatened’ are afforded legal protection against harm, killing, trafficking, and disturbance of nests and dens (GoA 1997). In addition to listed species, the *Wildlife Act* (2000) protects the active nests and dens of most wildlife in Alberta. Likewise, it is prohibited to kill, possess, or damage the residence of species listed as ‘Endangered’ or ‘Threatened’ under *SARA* (2002). The regulations of the *MBCA* are designed to preserve migratory birds and protect them and their residences from destruction and disturbance. Species protected include migratory game birds, most songbirds, and other non-game birds such as loons, grebes, bitterns, herons, gulls, and terns (*MBCA* 1994).

4 EFFECTS ASSESSMENT

4.1 Project Effects

The installation of structural flood mitigation works above the floodplain of the Red Deer River can have effects on terrestrial plants, rare plant communities, wildlife and wildlife habitat.

These potential effects may include:

- temporary disturbance and avoidance of wildlife habitat as a result of noise generated during construction or installation of fences or other movement barriers;
- loss of habitat due to the disturbance of soil and removal of vegetation;
- direct mortality of plants and animals during clearing; and
- degradation of habitat quality by a decrease in habitat patch size, an increase in edge habitat, introduction of non-native or weedy plant species, landscaping, or loss of topsoil.

4.2 Mitigation Measures

The period between September 1 and March 15 is when habitat clearance and construction activity present the lowest risk to wildlife (Table 4.1). The period between mid-May through to mid-July is the highest probability of active nests affecting Project development schedules. Should construction activity be required between mid-February through to the end of August, surveys for active nests should be conducted by a qualified biologist to avoid a contravention of the *Wildlife Act* (2000) or *MBCA* (1994). The clearance of grasses between April and August should be avoided as nesting by waterfowl may be present in the early spring.. The requirement to comply with provincial and federal regulations comes with a high risk of a delay in schedule if activity is scheduled during the breeding period for wildlife.

Most of the potential effects can be effectively minimized or eliminated by following established best practices and through the implementation mitigation measures such as:

- minimize the construction footprint of construction as much as is feasible;
- locate project infrastructure and temporary workspaces such as laydown areas in previously cleared/disturbed areas if possible;
- consider wildlife corridors and habitat connectivity when planning flood mitigation infrastructure type and placement;
- incorporate wildlife habitat and features into flood mitigation designs;
- avoid clearing vegetation during the nesting and natal period of wildlife (Table 4.1);
- conduct wildlife and vegetation surveys at an appropriate time of year to identify active wildlife breeding sites, bird nests, snake and toad hibernaculum, mammal dens, and rare plant locations within the project construction footprint and an appropriate buffer area;

- implement setbacks, as recommended by regulators, around active wildlife residences and breeding areas to allow breeding/rearing/nursing activities to conclude;
- prepare and implement mitigation or avoidance plan for any identified rare plants and or rare plant communities;
- minimize barriers to wildlife movement within the work area, such as equipment, facilities, fencing, lights, or safety barriers;
- minimize the use of artificial lighting and turn it off when not required;
- implement measures to minimize detrimental effects to trees and shrubs adjacent to the area that requires clearing;
- avoid removing large mature trees or replace removed trees with artificial habitat structures such as bat boxes or nest stands for raptors;
- salvage topsoil and coarse woody debris (removed woody vegetation) from the project footprint to be used as reclamation material during revegetation;
- protect stored topsoil from wind or water erosion;
- monitor soil stockpiles during the growing season for evidence of erosion or the growth of unwanted vegetation or weeds;
- remove unwanted vegetation, control noxious weeds and destroy prohibited noxious weeds as listed in the *Weed Control Act* (S.A. 2008, c. W-1);
- develop and implement a habitat restoration plan for areas that are temporarily disturbed to restore to an equivalent or greater habitat rank;
- consider specific plant species such as thorny buffaloberry to create habitat opportunities for sensitive wildlife species;
- revegetate with native species appropriate to the Foothills Fescue Natural Subregion and the Red Deer River Valley following construction activities;
- revegetate areas of disturbance as soon as is feasible after construction;
- implement strategies into an Erosion and Sediment Control (ESC) Plan to control erosion of replaced topsoil (i.e. silt fencing, erosion control matting, staked burlap rolls, willow staking, hydroseeding), and increase the success rate of revegetation (i.e. coconut matting to protect seed from ingestion by wildlife and from desiccation);
- remove soil from vehicles and equipment, including tracks and tires, to limit or eliminate the spread of unwanted plant species into the construction area; and
- verify that imported fill material is clean and free of weed seeds and propagules.

Table 4.1 Regulatory Compliance Risk Schedule

Environmental Element	Component	Activity	Habitat	Environmental Constraints Risk Associated with Construction Works														
				Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.			
Wildlife and Wildlife Habitat	Migratory Birds	Breeding	Riparian and Wetland	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green
	Owls	Breeding	Large, Mature Trees	Green	Green	Yellow	Orange	Orange	Orange	Orange	Orange	Orange	Orange	Orange	Orange	Orange	Orange	Orange
	Sharp-tailed Grouse	Breeding/Lek	Grassland & Shrubland	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green
	Mammals	Breeding	Riparian	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green
	Bats	Roost and Nursery	Large, Mature Trees	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green
	Amphibians	Hibernation	Upland Forest and Burrows	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green
	Snakes	Over-wintering Hibernacula	Rocky Slopes	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green
Breeding		Riparian	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	

Low Risk (Green): There are no environmentally sensitive activities ongoing during these times.
Medium (Yellow): Environmentally sensitive activities are ongoing, but may be effectively managed through pre-construction surveys, construction monitoring, and implementation of recommended mitigation measures.
High (Orange): Environmentally sensitive activities are ongoing and will require pre-construction surveys and construction monitoring. May incur additional costs for environmental surveys and Project delays even after application of mitigation measures and setbacks.
Extreme (Red): These are regulated RAPs and may require extensive biological surveys, professional justification, and a mitigation plan to support proposed works during these time periods.

Notes:
 Time period restrictions for wildlife and wildlife habitat are based on the AEP Recommended Land Use Guidelines for Protection of Selected Wildlife Species and Habitat within Grassland and Parkland Natural Regions of Alberta (AEP 2011), Alberta Sensitive Species Inventory Guidelines (AEP 2013b), the federal *MBCA* (1994), and the provincial *Wildlife Act* (2000).

5 RECOMMENDATIONS

The terrestrial vegetation and wildlife assessment and subsequent evaluation of potential project effects were limited because the reporting timeline did not allow for field surveys to be conducted during ecologically appropriate times of the year, flood control designs have not been completed, and construction methods have not been identified. Therefore, only general project effects and mitigations have been provided. It is recommended that additional biophysical studies be conducted during active breeding/growing seasons to better characterize potential effects with higher confidence, and to identify site-specific temporal and spatial constraints that may restrict project design options or create unplanned construction delays. Recommended biophysical surveys, appropriate survey time frames, and survey frequency have been outlined in Table 5.1.

Table 5.1 Recommended Biophysical Surveys

Biophysical Survey	Time Frame	Frequency	Purpose	Survey Protocol
Rare Plant and Rare Plant Community	June 1 – June 30 August 1 – August 31	1 survey 1 survey	To identify rare plants or rare plant communities.	ANPC 2012
Auditory Amphibian	April 15 – June 15	3 survey rounds	To determine species present and breeding habitats.	GoA 2013
Owl Call Playback	March 15 – April 15	2 survey rounds	To determine species nesting.	GoA 2012
Raptor Call Playback	May 1 – June 30	2 survey rounds	To determine species nesting.	GoA 2013
Breeding Bird	May 15 – July 1	2 survey rounds	To determine species present during the breeding season.	GoA 2013
Hibernaculum/Den Area Search	April 1 – June 15	2 survey rounds	To visually observe the presence of active hibernacula or dens	GoA 2013
Bat Ultrasonic Detection	July	1 survey round	To determine relative levels of bat activities in different habitats.	ASRD 2006

Reclaiming temporary project disturbances to equivalent or higher habitat value to maintain or increase biodiversity within the Town of Drumheller requires pre-construction planning. A pre-disturbance assessment of soil resources and vegetation communities conducted within the project construction footprint could be conducted to inform a complete reclamation plan including a comprehensive soil management plan and a habitat restoration plan.

6 CLOSING

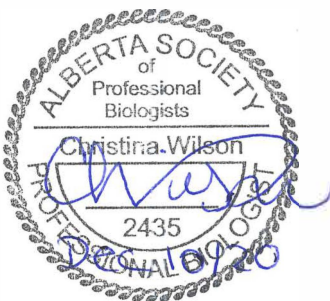
This report is an instrument of service of Klohn Crippen Berger (KCB). The report has been prepared for the exclusive use of Town of Drumheller (Client) for the specific application to the Terrestrial Vegetation and Wildlife Assessment, and it may not be relied upon by any other party without KCB's written consent.

KCB has prepared this report in a manner consistent with the level of care, skill and diligence ordinarily provided by members of the same profession for projects of a similar nature at the time and place the services were rendered. KCB makes no warranty, express or implied.

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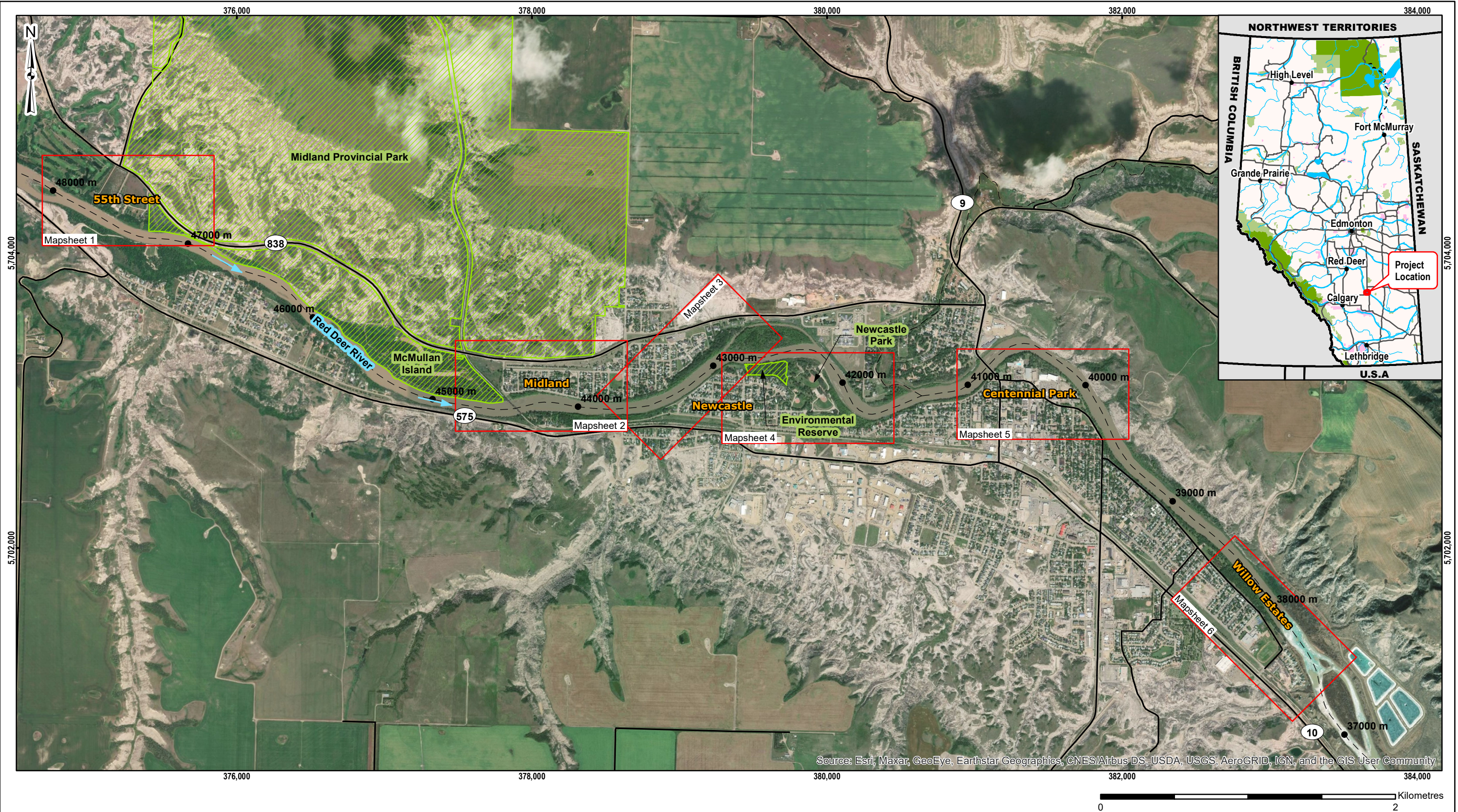
REFERENCES

- Alberta Biodiversity Monitoring Institute (ABMI). 2013. ABMI Data Portal - Species & Habitat Data (Sites 1410 and 1411). Accessed online November 2020 at: <http://www.abmi.ca/home/data/species-habitat-data.html>.
- Alberta Conservation Association (ACA). 2020. Alberta Volunteer Amphibian Monitoring Program Identification Keys for Amphibians and Reptiles of Alberta. Accessed online Sept. 2020 at: <https://www.ab-conservation.com/avamp/identification-keys/>
- Alberta Conservation Information Management System (ACIMS). 2017. Alberta Environment and Parks, Edmonton, Alberta. Accessed June 2020 at: <https://www.albertaparks.ca/albertaparksca/management-land-use/alberta-conservation-information-management-system-acims/>
- Alberta Environment and Parks (AEP). 2015. Alberta Wild Species General Status Listing - 2015. Accessed June 2020 at: <https://open.alberta.ca/publications/alberta-wild-species-general-status-listing-2015>
- Alberta Native Plant Council (ANPC). 2012. ANPC Guidelines for Rare Vascular Plant Surveys in Alberta – 2012 Update. Alberta Native Plant Council, Edmonton, AB. Available at <https://anpc.ab.ca/wp-content/uploads/2015/01/Guidelines-For-Rare-Plant-Surveys-in-AB-2012-Update.pdf>
- Alberta Soil Information Centre (ASIC). 2001. AGRASID 3.0: Agricultural Region of Alberta Soil Inventory Database (Version 3.0). Edited by J.A. Brierley, T.C. Martin, and D.J. Spiess. Agriculture and Agri-Food Canada, Research Branch; Alberta Agriculture, Food and Rural Development, Conservation and Development Branch.
- Alberta Sustainable Resource Development (ASRD). 2006. Handbook of Inventory Methods and Standard Protocols for Surveying Bats in Alberta. Alberta Fish and Wildlife Division. Accessed online at: <https://open.alberta.ca/publications/4795089>
- Blanke, Jason. "Flood mitigation work will be starting in Centennial Park." *Drumheller Online*, 17 June 2020. Access online November 2020 at: <https://drumhelleronline.com/local/flood-mitigation-work-will-be-starting-in-centennial-park>
- City of Edmonton. 2014. Urban Primary Land and Vegetation Inventory (uPLVI). Interpretation Manual. Fourth edition. Prepared for: Parks and Biodiversity Section, Sustainable Development, the City of Edmonton, Alberta. Prepared by: Greenlink Forestry Inc. Edmonton Alberta.
- Consortium of North American Lichen Herbaria (CNALH). 2020a. *Lecidella carpathica*. Accessed online November 2020 at <https://lichenportal.org/cnalh/taxa/index.php?taxon=53978&clid=1034>.
- CNALH. 2020b. *Rhizoplaca subdiscrepans*, Accessed online November 2020 at <https://lichenportal.org/cnalh/taxa/index.php?taxon=Rhizoplaca+subdiscrepans&formsubmit=Search+Terms>.

- The City of Calgary. 2018. Citywide Landcover polygons [spatial dataset]. Updated May 10, 2018. Available at: <https://data.calgary.ca/Environment/Citywide-Land-Cover/as2i-6z3n>
- The City of Calgary. 2020. Habitat polygons [spatial dataset]. Updated November 12, 2020. Available at: <https://data.calgary.ca/Environment/Habitat/7tax-5vsg>
- The Drumheller Mail. "Flood mitigation maintenance work underway at Newcastle Beach." *DrumhellerMail.com*, 04 Mar 2020. Accessed online November 2020 at: <https://www.drumhellermail.com/news/32515-flood-mitigation-maintenance-work-underway-and-newcastle-beach>
- Committee on the Status of Endangered Wildlife in Canada (COSEWIC). 2019. COSEWIC wildlife species assessment process. Accessed online November 2020 at: <http://cosewic.ca/index.php/en-ca/assessment-process>
- eBird. 2020. Bird species observations recorded at eBird Hotspots - Midland Provincial Park, McMullen Island, Newcastle Park. Accessed online November 2020 at: <https://ebird.org/hotspots>
- Environment Canada. 2020. National Climate Data and Information Archive. Accessed online November 2020 at: http://www.climate.weatheroffice.gc.ca/climate_normals/index_e.html
- Fish and Wildlife Management Information System (FWMIS). 2020. Fish and Wildlife Internet Mapping Tool (FWIMT) Fish and Wildlife Report. Alberta Environment and Parks. Accessed online November 2020 at: <https://www.alberta.ca/access-fwmis-data.aspx>
- Government of Alberta (GoA). 1997. Alberta Regulation 143 – Wildlife Regulation under the Alberta *Wildlife Act*, R.S.A. 2000, c. W-10. With amendments up to and including Alberta Regulation 170/2019. Edmonton: Queen's Printer for Alberta. Current as of November 29, 2019.
- Government of Alberta (GoA). 2011. Recommended Land Use Guidelines for Protection of Selected Wildlife Species and Habitat within Grassland and Parkland Natural Regions of Alberta. Fish and Wildlife Division, Sustainable Resource Development. Last updated April 28, 2011. Accessed online June 2020 at: <https://open.alberta.ca/publications/3054250>
- GoA. 2012. Alberta Wildlife Animal Care Committee Class Protocol #006. Alberta Wildlife Animal Care Committee. Accessed online November 2020 at: <https://open.alberta.ca/publications/class-activity-call-playback-for-owls>
- GoA. 2013. Sensitive Species Inventory Guidelines. Accessed online November 2020 at: <https://open.alberta.ca/publications/sensitive-species-inventory-guidelines>
- GoA. 2017. Species assessed by the Conservation Committee: Alberta species at risk. Endangered Species Conservation Committee (ESCC) and Scientific Subcommittee (SSC). Fish and Wildlife Policy Branch. Last updated May 1, 2017. Accessed online November 2020 at: <https://open.alberta.ca/publications/species-assessed-by-the-conservation-committee-alberta-species-at-risk>

- Government of Canada (GoC). 2019. Species at Risk Public Registry. Government of Canada. Last updated 2019-12-06. Accessed online June 2020 at: <https://www.canada.ca/en/environment-climate-change/services/species-risk-public-registry.html>
- Migratory Birds Convention Act (MBCA)*. 1994. In *Statutes of Canada, 1994*, Chapter 22. Ottawa: Queen's Printer for Canada. Current to May 17, 2020.
- Natural Regions Committee (NRC). 2006. Natural Regions and Subregions of Alberta. Compiled by D.J. Downing and W.W. Pettapiece. Government of Alberta Pub. No. T/852.
- NatureServe. 2020. NatureServe Explorer [web application]. NatureServe, Arlington, Virginia. Accessed November 18, 2020 at <https://explorer.natureserve.org/>.
- Smith, H.C. 1993. Alberta Mammals: An Atlas and Guide. Edmonton, Alberta: Provincial Museum of Alberta.
- Species at Risk Act (SARA)*. 2002. In *Statutes of Canada, 2002*, Chapter 29. Ottawa: Queen's Printer for Canada. Current to May 17, 2020.
- Stebbins, R.C. 2003. A Field Guide to Western Reptiles and Amphibians – 3rd Ed. Peterson Field Guides. New York, New York: Houghton Mifflin Company.
- Town of Drumheller. 2020. Drumheller Flood Mitigation and Climate Adaptation System – Changing the channel on flood readiness. 2020 Semi-Annual Report. January – June 2020.
- Wildlife Act*. 2000. In *Revised Statutes of Alberta, 2000*, Chapter W-10. Edmonton: Queen's Printer for Alberta. Current to February 20, 2018.
- Weed Control Act*. 2008. In *Statutes of Alberta, 2009*, Chapter W-5.1. Edmonton: Queen's Printer for Alberta. Current to December 15, 2017.
- Wisconsin Department of Natural Resources (WDNR). 2020. Sand Loving Iceland Lichen (*Cetraria arenaria*). Accessed online November 2020 at <https://dnr.wi.gov/topic/EndangeredResources/Lichens.asp?mode=detail&SpecCode=NLTEST5590>.

FIGURES



Source: Esri, Maxar, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

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- Legend**
- Provincial Park or Environmental Reserve
 - Stations
 - Centreline

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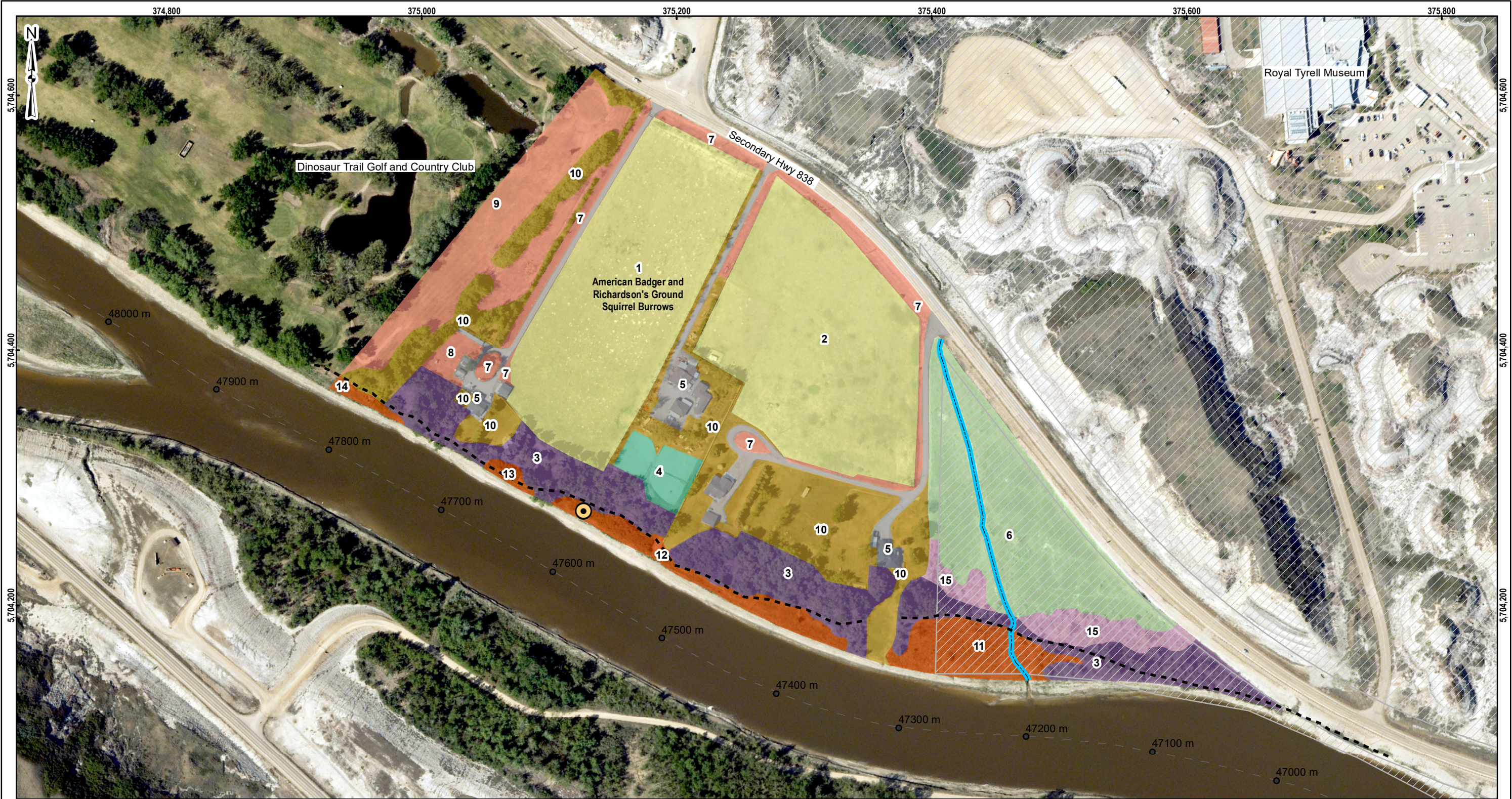
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Klohn Crippen Berger

PROJECT
 DRUMHELLER RESILIENCY AND FLOOD MITIGATION PROGRAM
 TERRESTRIAL VEGETATION AND WILDLIFE ASSESSMENT

PROJECT OVERVIEW		
SCALE 1:25,000	PROJECT No. A03409A02	FIG No. 1



- Legend**
- Animal Burrow
 - River Terrace
 - Ephemeral Watercourse
 - Midland Provincial Park
 - Stations
 - Centreline
 - Agricultural Pasture
 - Balsam Poplar
 - Bare Ground
 - Buildings/Paved
 - Grassland
 - Manicured Grass
 - Manicured Park
 - Riparian Shrub
 - Upland Shrub



NOTES:
 1. HORIZONTAL DATUM: NAD83
 2. GRID ZONE: UTM Zone 12N
 3. IMAGE SOURCE: Town of Drumheller, 2019

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 TERRESTRIAL VEGETATION AND WILDLIFE ASSESSMENT

TITLE
DOMINANT HABITAT CLASSIFICATION
 (MAPSHEET 1 of 6)

SCALE: 1:3,000 PROJECT No. A03409A02 FIG No. 2-1

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Legend

Snag (Wildlife Tree)	Grassland
Stormwater Drainage Channel	Manicured Grass
Midland Provincial Park	Manicured Park
Stations	Upland Shrub
Centreline	Modified Habitat Rank
Dominant Habitat Classification	
Balsam Poplar	
Bare Ground	



NOTES:
 1. HORIZONTAL DATUM: NAD83
 2. GRID ZONE: UTM Zone 12N
 3. IMAGE SOURCE: Town of Drumheller, 2019

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TITLE
DOMINANT HABITAT CLASSIFICATION
 (MAPSHEET 2 of 6)

SCALE 1:3,000	PROJECT No. A03409A02	FIG No. 2-2
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- Legend**
- Animal Burrow
 - Snag (Wildlife Tree)
 - Ephemeral Watercourse
 - Stations
 - Centreline
 - Dominant Habitat Classification: Balsam Poplar
 - Buildings/Paved
 - Grassland
 - Manicured Grass
 - Manicured Park
 - Manitoba Maple
 - Upland Shrub
 - Modified Habitat Rank

NOTES:
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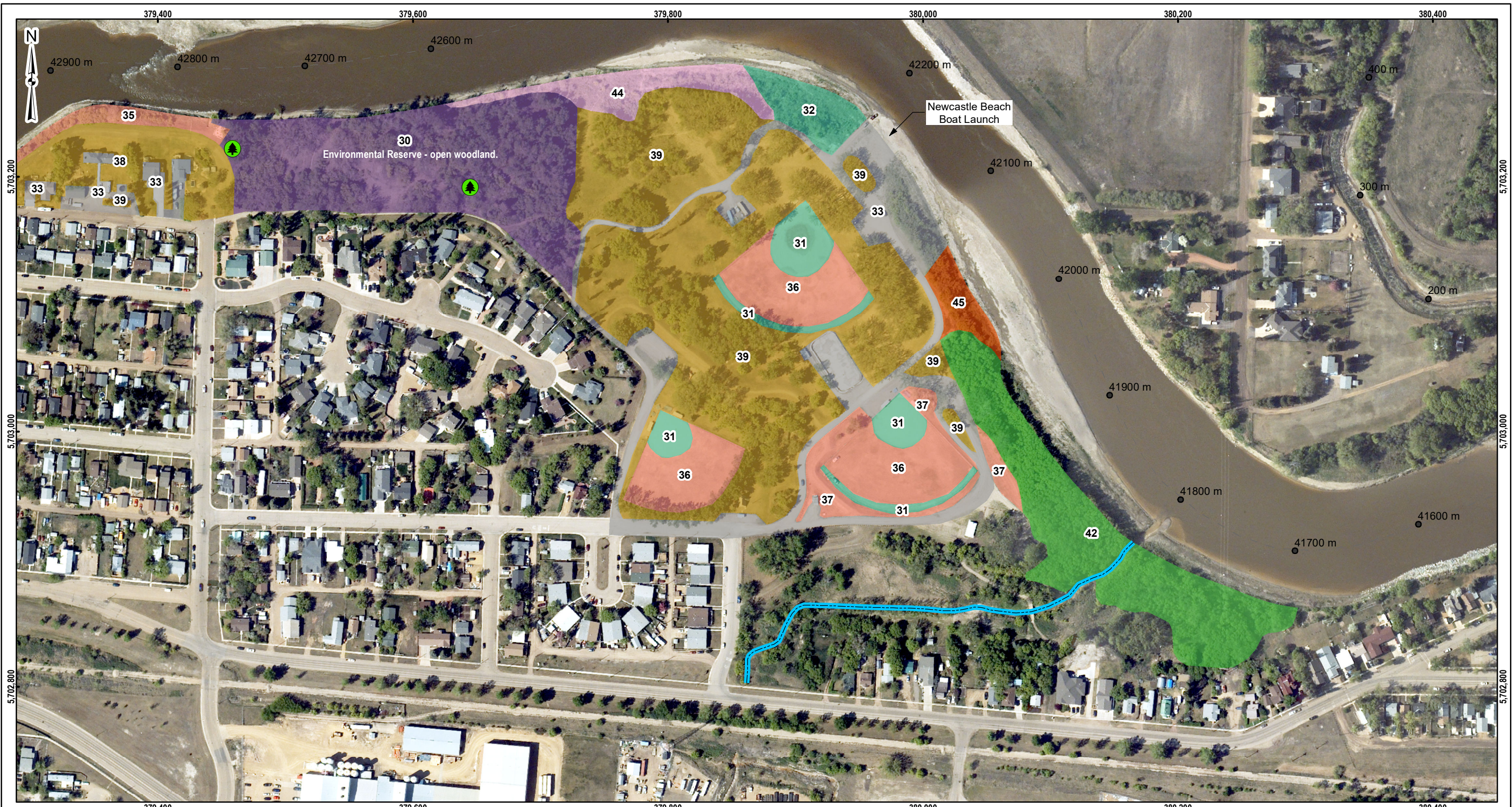
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TITLE
DOMINANT HABITAT CLASSIFICATION
 (MAPSHEET 3 of 6)

SCALE: 1:3,000 PROJECT No. A03409A02 FIG No. 2-3

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Legend

- Snag (Wildlife Tree)
- Ephemeral Watercourse
- Stations
- Centreline
- Dominant Habitat Classification**
- Balsam Poplar
- Bare Ground
- Buildings/Paved
- Manicured Grass
- Manicured Park
- Manitoba Maple
- Riparian Shrub
- Upland Shrub



NOTES:
 1. HORIZONTAL DATUM: NAD83
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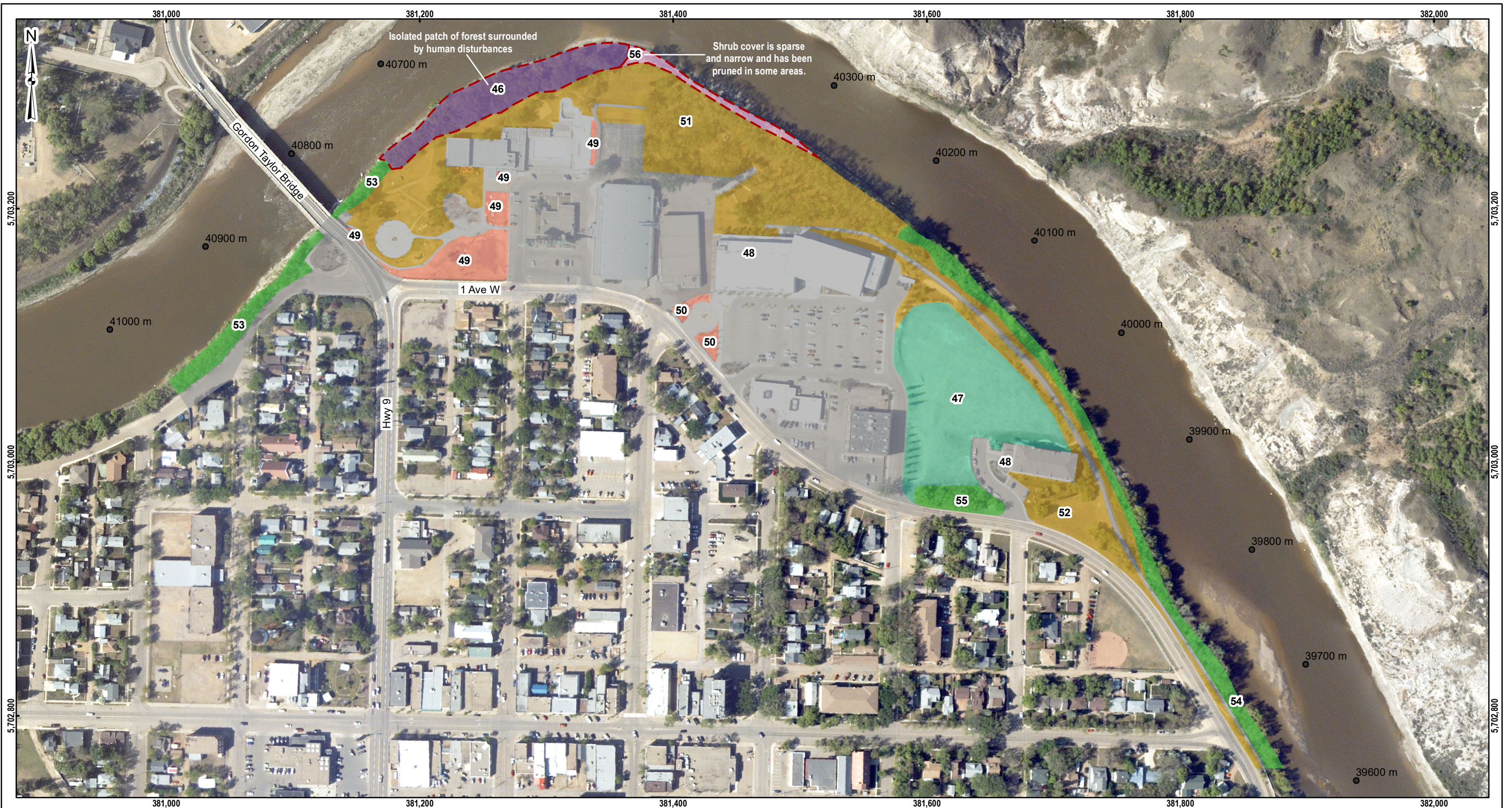
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TITLE
DOMINANT HABITAT CLASSIFICATION
 (MAPSHEET 4 of 6)

SCALE: 1:3,000 PROJECT No. A03409A02 FIG No. 2-4

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Legend

- Stations
- Centreline

Dominant Habitat Classification

- Balsam Poplar
- Bare Ground
- Buildings/Paved
- Manicured Grass
- Manicured Park
- Manitoba Maple
- Upland Shrub
- Modified Habitat Rank



NOTES:
 1. HORIZONTAL DATUM: NAD83
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TITLE
DOMINANT HABITAT CLASSIFICATION
 (MAPSHEET 5 of 6)

SCALE: 1:3,000 PROJECT No. A03409A02 FIG No. 2-5



- Legend**
- Snag (Wildlife Tree)
 - Ephemeral Watercourse
 - Stations
 - Centreline
 - Balsam Poplar
 - Bare Ground
 - Manicured Grass
 - Manitoba Maple
 - Riparian Shrub
 - Modified Habitat Rank

NOTES:
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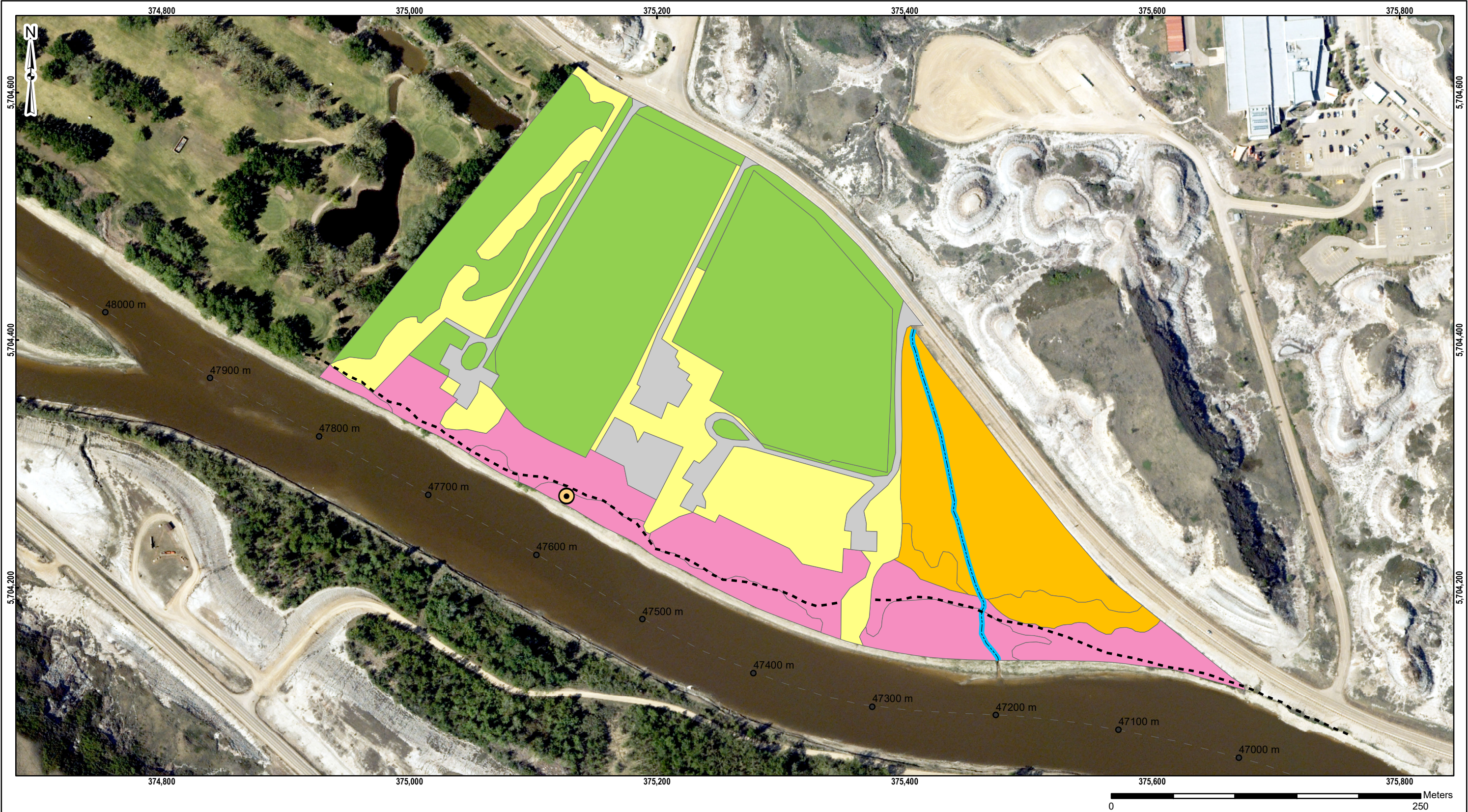
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TITLE
DOMINANT HABITAT CLASSIFICATION
 (MAPSHEET 6 of 6)

SCALE: 1:3,000 PROJECT No. A03409A02 FIG No. 2-6

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Legend

- Animal Burrow
- River Terrace
- Ephemeral Watercourse
- Stations
- Centreline

Wildlife Habitat Rank

- 0
- 1
- 2
- 3
- 4

NOTES:

1. HORIZONTAL DATUM: NAD83
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3. IMAGE SOURCE: Town of Drumheller, 2019

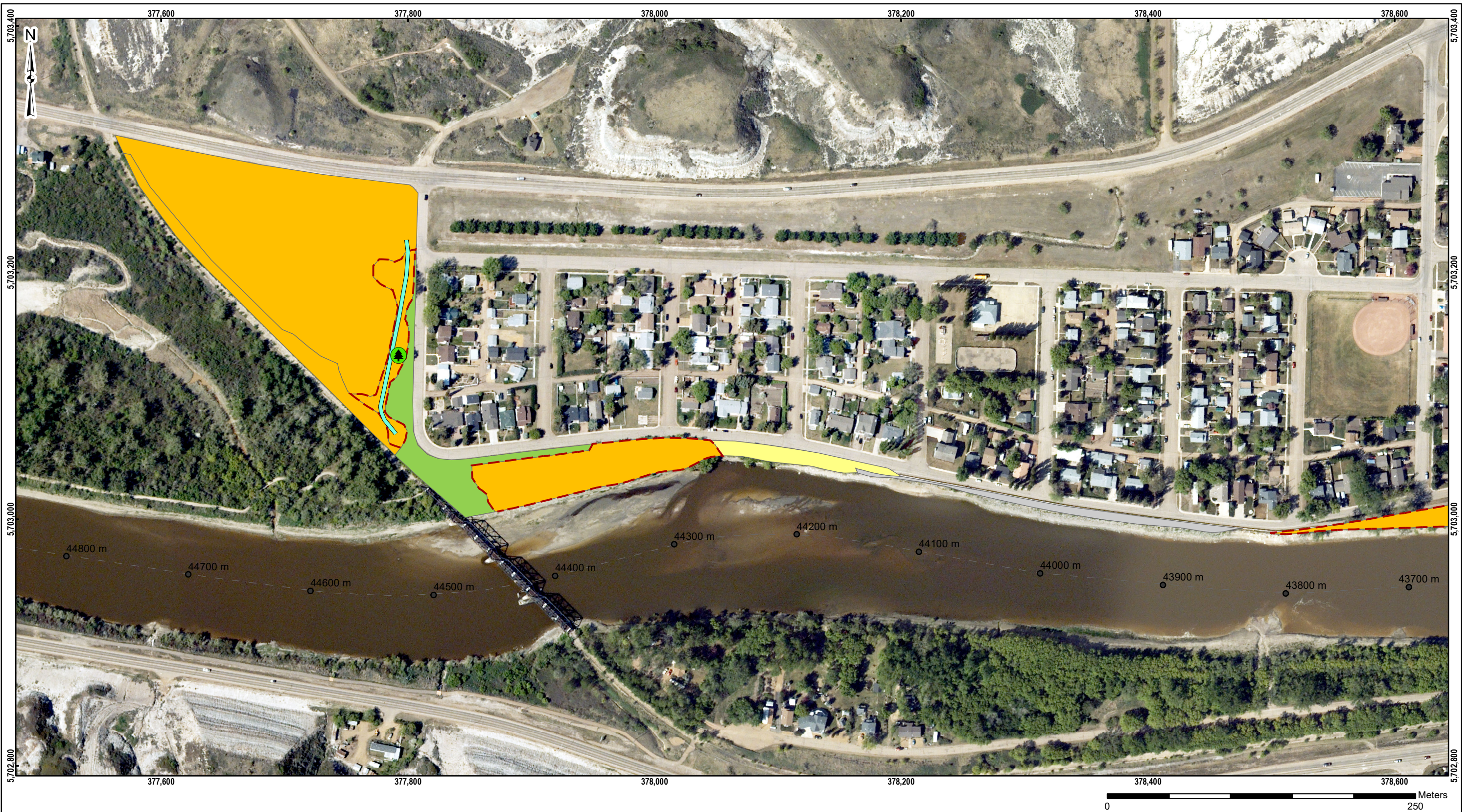
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TITLE
WILDLIFE HABITAT RANKING
 (MAPSHEET 1 of 6)

SCALE: 1:3,000 PROJECT No. A03409A02 FIG No. 3-1

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Legend

- Snag (Wildlife Tree)
- Stormwater Drainage Channel
- Stations
- Centreline

Wildlife Habitat Rank

- 0
- 1
- 2
- 3
- Modified Habitat Rank

NOTES:
 1. HORIZONTAL DATUM: NAD83
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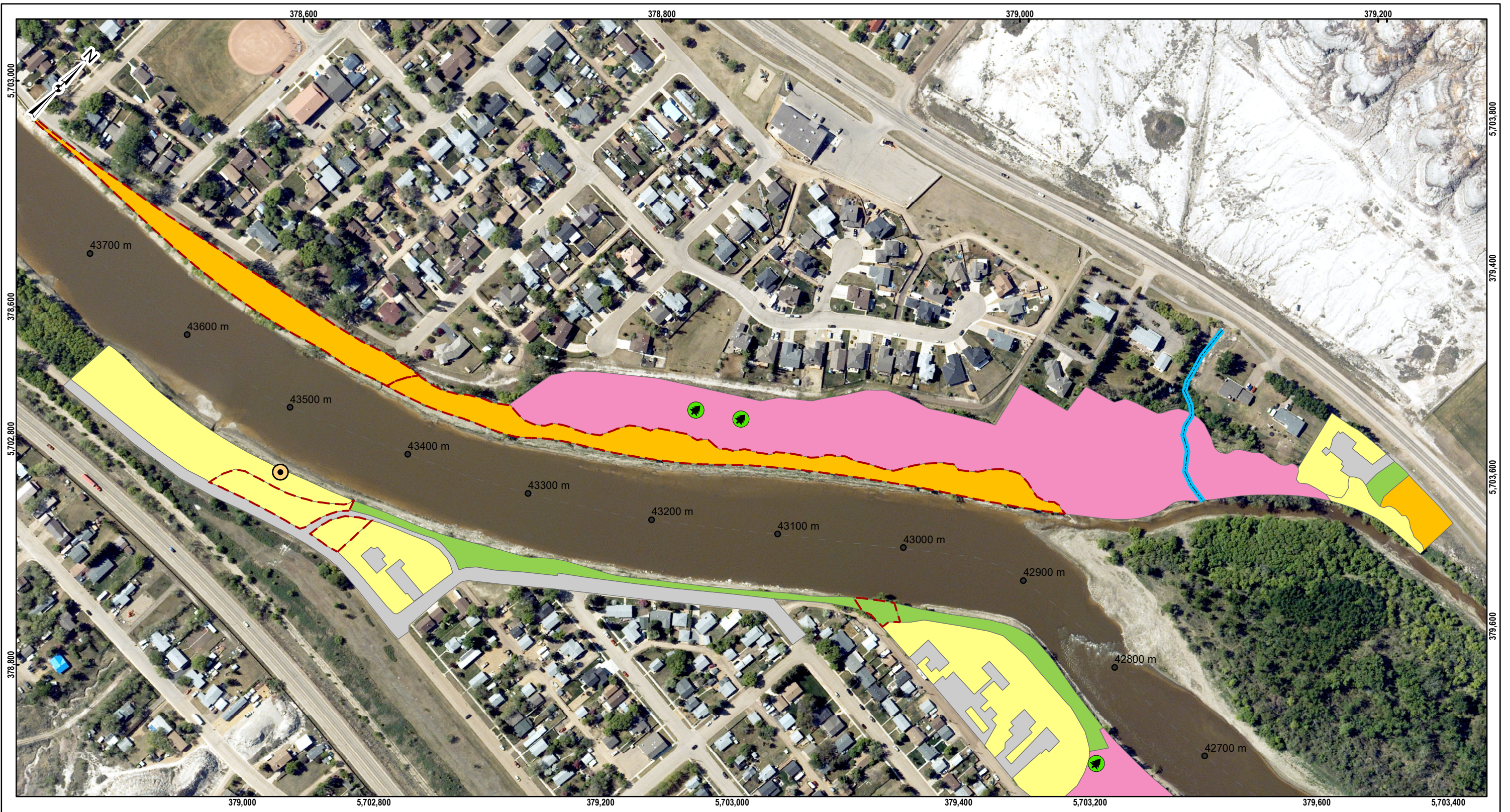
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TITLE
WILDLIFE HABITAT RANKING
 (MAPSHEET 2 of 6)

SCALE: 1:3,000 PROJECT No. A03409A02 FIG No. 3-2

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Legend

	Animal Burrow		Wildlife Habitat Rank
	Snag (Wildlife Tree)		0
	Ephemeral Watercourse		1
	Stations		2
	Centreline		3
	Modified Habitat Rank		4

NOTES:
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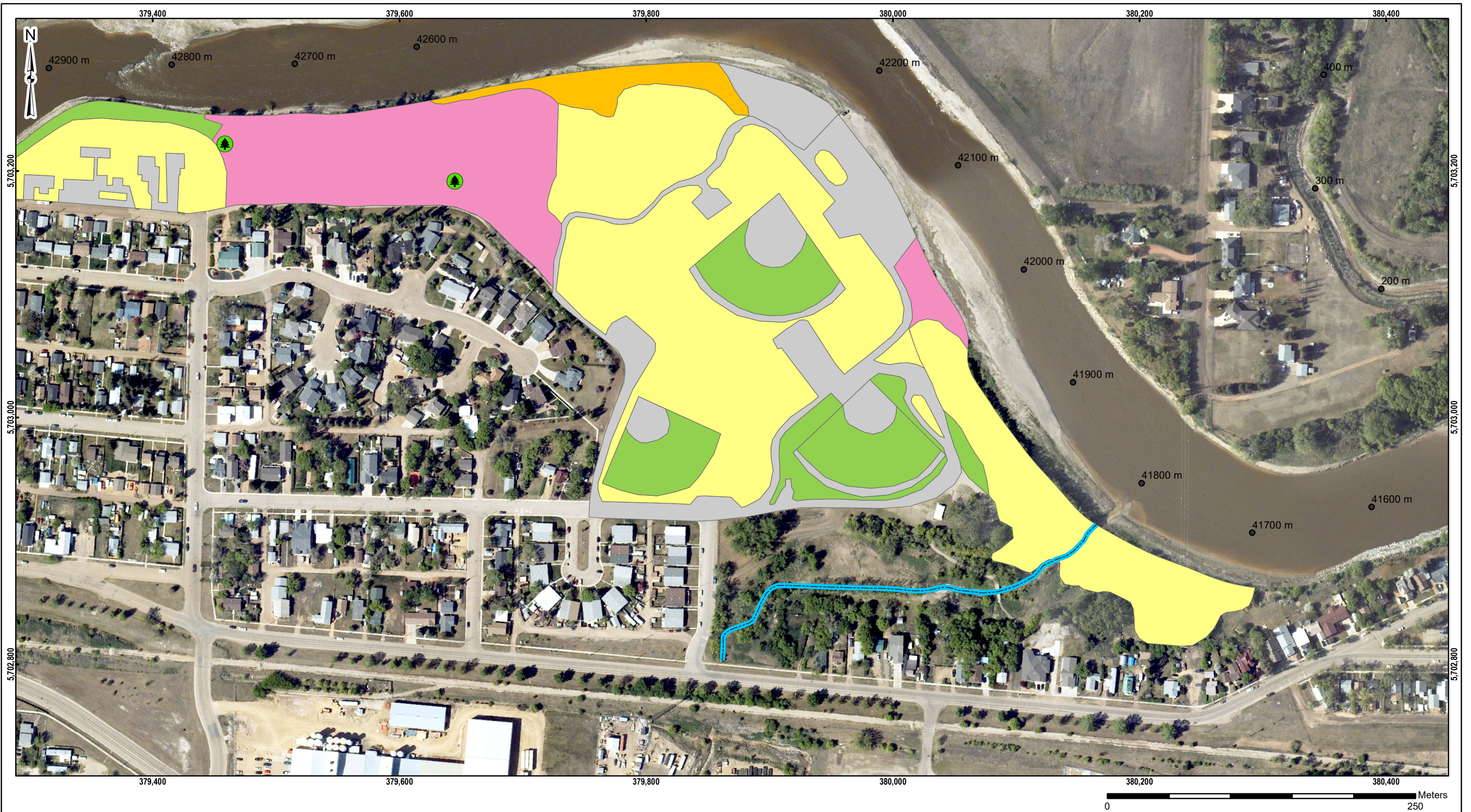
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TITLE
WILDLIFE HABITAT RANKING
 (MAPSHEET 3 of 6)

SCALE: 1:3,000 PROJECT No. A03409A02 FIG No. 3-3

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Legend

- Snag (Wildlife Tree)
- Ephemeral Watercourse
- Stations
- Centreline

Wildlife Habitat Rank

- 0
- 1
- 2
- 3
- 4

NOTES:
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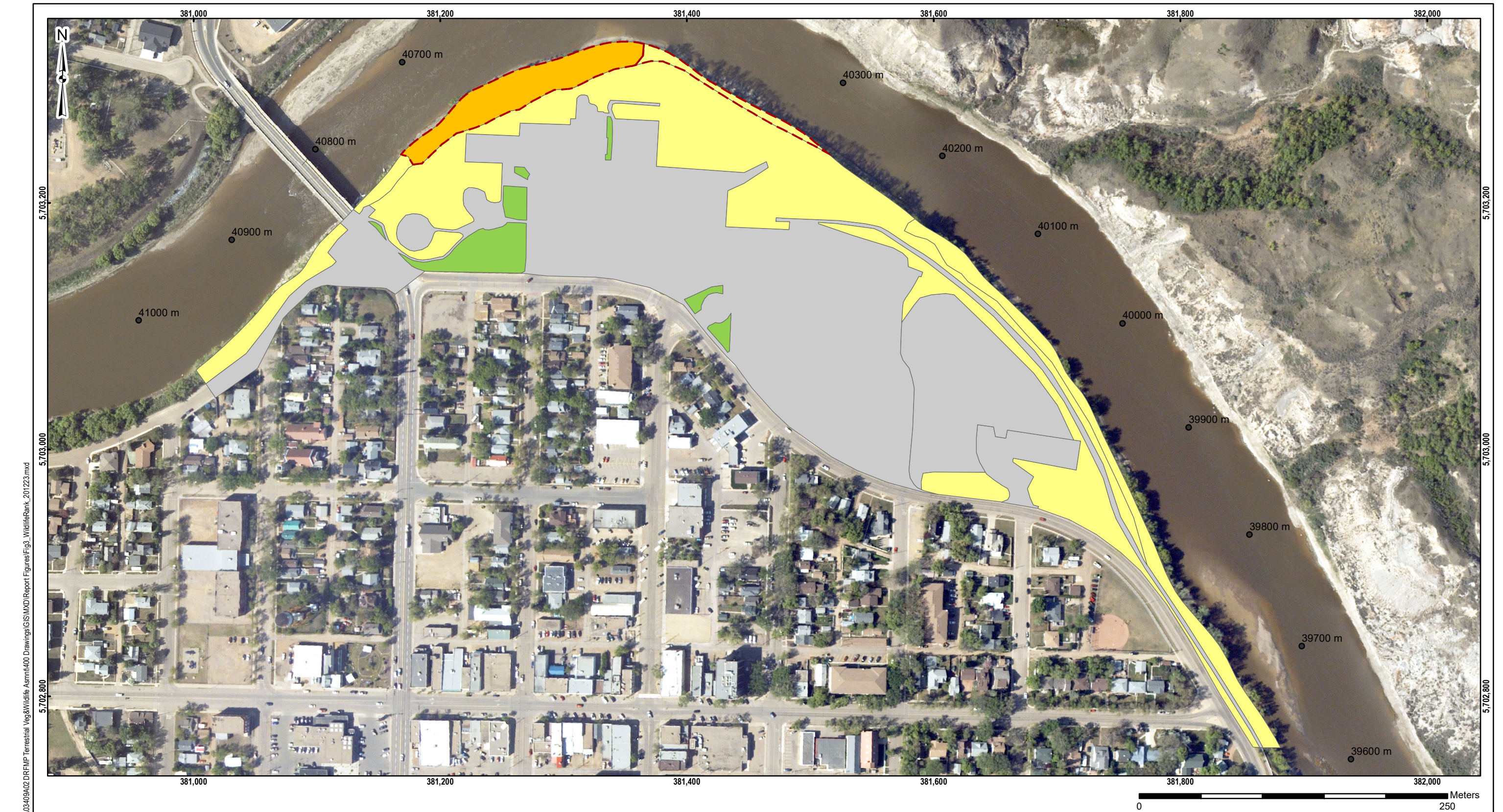
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TITLE
WILDLIFE HABITAT RANKING
 (MAPSHEET 4 of 6)

SCALE: 1:3,000 PROJECT No. A03409A02 FIG No. 3-4



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Legend

- Stations
- Centreline

Wildlife Habitat Rank

- 0 (Grey)
- 1 (Green)
- 2 (Yellow)
- 3 (Orange)
- Modified Habitat Rank (Red dashed line)

NOTES:

1. HORIZONTAL DATUM: NAD83
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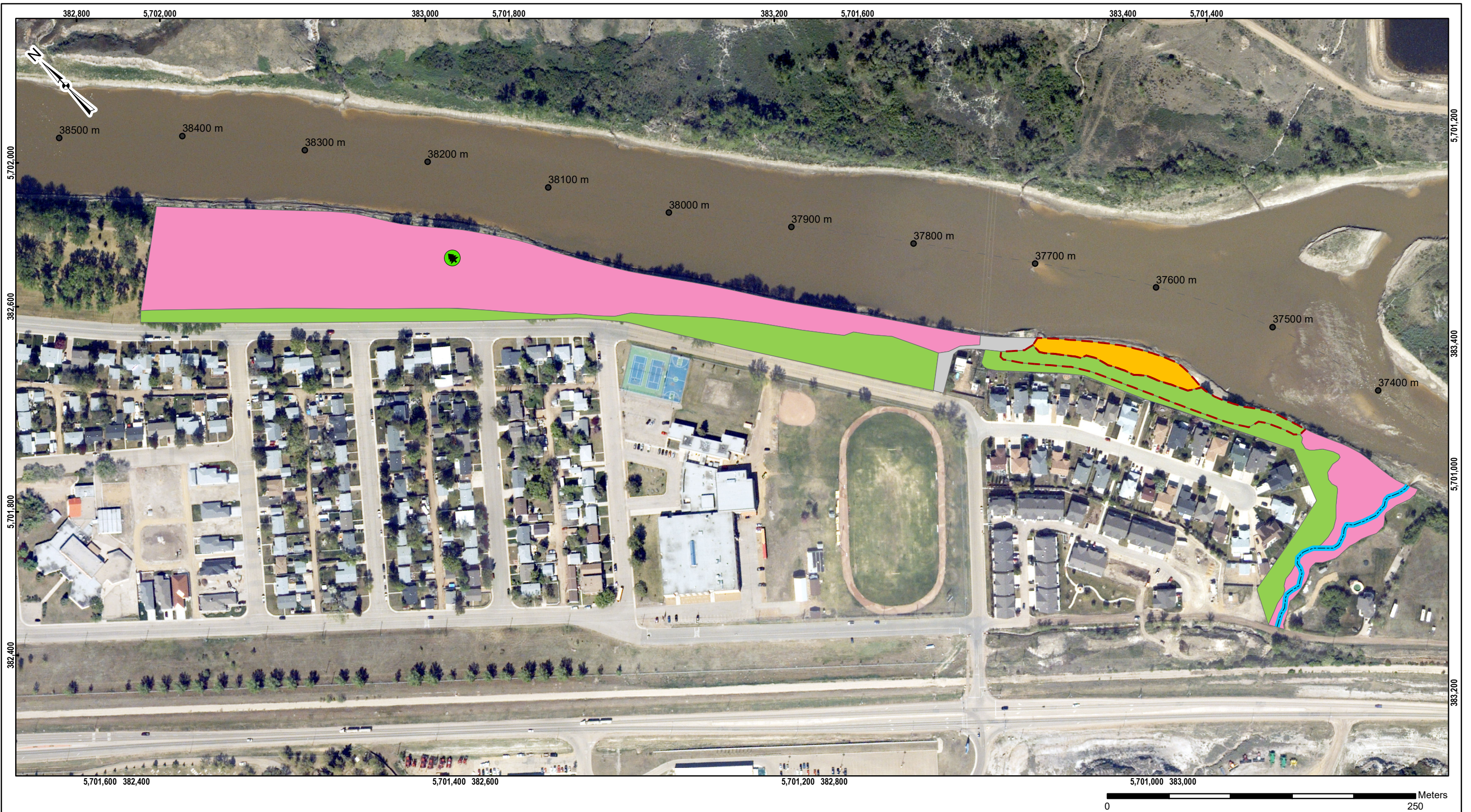
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TITLE
WILDLIFE HABITAT RANKING
(MAPSHEET 5 of 6)

SCALE: 1:3,000 PROJECT No. A03409A02 FIG No. 3-5

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Legend

- Snag (Wildlife Tree)
- Ephemeral Watercourse
- Stations
- Centreline

Wildlife Habitat Rank

- 0
- 1
- 3
- 4
- Modified Habitat Rank

NOTES:
 1. HORIZONTAL DATUM: NAD83
 2. GRID ZONE: UTM Zone 12N
 3. IMAGE SOURCE: Town of Drumheller, 2019

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TITLE
WILDLIFE HABITAT RANKING
 (MAPSHEET 6 of 6)

SCALE: 1:3,000 PROJECT No. A03409A02 FIG No. 3-6



APPENDIX I

Status Classification System

Appendix I Conservation Status Classifications

I-1 OVERVIEW

Plant and animal species that are at risk of extinction in Canada and in Alberta are legally protected under the *Species at Risk Act (SARA)* (S.C. 2002, c. 29) and the *Wildlife Act* (R.S.A. 2000, c. W-10), respectively. For a species to be listed under one or both Acts, a similar process is applied federally and provincially to evaluate a species which involves an assessment of the species population and habitat status, historical trends, and immediate and anticipated threats. The assessments are conducted by the scientific community, includes Aboriginal traditional knowledge and uses the standardized criteria of the International Union for Conservation of Nature (IUCN) Red List categories (IUCN 2001).

Species are generally chosen to be assessed for potential listing under *SARA* or the *Wildlife Act* based on the results of the *General Status of Wild Species* evaluations which occur on a provincial and federal level every five years.

I-2 THE GENERAL STATUS OF WILD SPECIES

The General Status of Wild Species is a report released every five years by the National General Status Work Group (NGSWG) to maintain a current account of wild species populations in Canada by monitoring, assessing, and reporting regularly on the status of all wild species. Additionally, information provided by the provincial general status evaluation process informs the process for assigning each species a national (N) rank and associated conservation status as described in Table I-2.1. NGSWG members include a representative from each province and from the three federal agencies with wildlife mandates (Canadian Wildlife Service, Department of Fisheries and Oceans, and Parks Canada). Additional provincial or territorial specialists representing their jurisdiction's Conservation Data Centre (CDC) are also members of the NGSWG. The conservation status is used to set priorities for detailed status assessments and potentially legislative protection for at risk species at the provincial and national level.

Table I-2.1 Conservation Status Ranking System (CESCC 2016)

Rank	Conservation Status	Definition
NX	Presumed Extirpated	Species is believed to be extirpated from the jurisdiction (nation, province, territory, or ocean region). Not located despite intensive searches of historical sites and other appropriate habitat, and virtually no likelihood that it will be rediscovered.
NH	Possibly Extirpated	Known from only historical records but still some hope of rediscovery. There is evidence that the species may no longer be present in the jurisdiction, but not enough to state this with certainty. Examples of such evidence include: (1) that a species has not been documented in approximately 20-40 years despite some searching and/or some evidence of significant habitat loss or degradation; (2) that a species has been searched for unsuccessfully, but not thoroughly enough to presume that it is no longer present in the jurisdiction.
N1	Critically Imperiled	At very high risk of extirpation in the jurisdiction due to very restricted range, very few populations or occurrences, very steep declines, severe threats, or other factors.
N2	Imperiled	At high risk of extirpation in the jurisdiction due to restricted range, few populations or occurrences, steep declines, severe threats, or other factors.
N3	Vulnerable	At moderate risk of extirpation in the jurisdiction due to a fairly restricted range, relatively few populations or occurrences, recent and widespread declines, threats, or other factors.
N4	Apparently Secure	At a fairly low risk of extirpation in the jurisdiction due to an extensive range and/or many populations or occurrences, but with possible cause for some concern as a result of local recent declines, threats, or other factors.
N5	Secure	At very low or no risk of extirpation in the jurisdiction due to a very extensive range, abundant populations or occurrences, with little to no concern from declines or threats.
NU	Unrankable	Currently unrankable due to lack of information or due to substantially conflicting information about status or trends.
NNR	Unranked	Conservation status not yet assessed.
NNA	Not Applicable	A conservation status rank is not applicable because the species is not a suitable target for conservation activities. It includes exotic species (that have been moved beyond their natural range as a result of human activity), hybrids, or long distance migrants (accidental species occurring infrequently and unpredictably outside their usual range).
N#?	Inexact Numeric Rank	Denotes inexact numeric rank. This designation should not be used with any of the NX, NH, NU, NNR or NNA conservation status ranks.

In Alberta, the *General Status of Wild Species* report only assesses vertebrate species while other taxonomic groups such as plants, lichens, invertebrates, and fungi are managed under the federal General Status Program. Vertebrates in Alberta are given the rankings presented in Table I-2.2 in the *General Status of Wild Species* report released every five years.

Table I-2.2 Alberta General Status Ranks for Vertebrates (GoA 2011)

General Status Rank	Definition
Extinct / Extirpated	Any species no longer thought to be present in Alberta (extirpated) or no longer believed to be present anywhere in the world (extinct).
At Risk	Any species known to be at risk after formal detailed status assessment and designation as endangered or threatened in Alberta.
May Be At Risk	Any species that may be at risk of extinction or extirpation, and is therefore a candidate for detailed risk assessment.
Sensitive	Any species that is not at risk of extinction or extirpation but may require special attention or protection to prevent it from becoming at risk.
Secure	A species that is not at risk, may be at risk, or sensitive.
Undetermined	Any species for which insufficient information, knowledge or data are available to reliably evaluate its general status.
Secure	Any species whose general status has not been evaluated.
Not Assessed	Any species whose general status has not been evaluated.
Exotic / Alien	Any species that has been introduced as a result of human activities.
Accidental / Vagrant	Any species occurring infrequently and unpredictably in Alberta; i.e., outside its usual range.

I-3 SPECIES AT RISK ACT

A detailed species evaluation, conducted by Committee on the Status of Endangered Wildlife in Canada (COSEWIC), gathers information from the greater scientific community including the National General Status Working Group (NGSWG), and incorporates Aboriginal traditional knowledge. COSEWIC is an independent advisory panel to the Minister of Environment and Climate Change Canada that meets twice a year to assess the status of wildlife species at risk of extinction. Members of the committee of experts from provincial wildlife agency representatives, federal government delegates from the Canadian Wildlife Service, Parks Canada, Department of Fisheries and Oceans, and the Canadian Museum of Nature, non-government science members, species specialists, and aboriginal traditional knowledge spokespersons (COSEWIC 2019).

COSEWIC designates the evaluated species in the status categories described in Table I-3.1. A wildlife species that has been assessed as Extirpated, Endangered, Threatened or Special Concern is considered a Species at Risk. The assessment and supporting evidence justifying the COSEWIC status is sent to the Minister of Environment and Climate Change to add the species to the Schedule 1 list under the *SARA*. Once listed, these species are afforded the legal protection of *SARA* and mandatory recovery planning is initiated.

Table I-3.1 COSEWIC Status Categories (COSEWIC 2019)

Status	Definition
Extinct (X)	A wildlife species that no longer exists.
Extirpated (XT)	A wildlife species that no longer exists in the wild in Canada, but exists elsewhere.
Endangered (E)	A wildlife species facing imminent extirpation or extinction.
Threatened (T)	A wildlife species that is likely to become Endangered if nothing is done to reverse the factors leading to its extirpation or extinction.
Special Concern (SC)	A wildlife species that may become Threatened or Endangered because of a combination of biological characteristics and identified threats.
Not at Risk (NAR)	A wildlife species that has been evaluated and found to be not at risk of extinction given the current circumstances.
Data Deficient (DD)	A category that applies when the available information is insufficient (a) to resolve a wildlife species' eligibility for assessment or (b) to permit an assessment of the wildlife species' risk of extinction.

I-4 ALBERTA'S WILDLIFE ACT

When the *General Status of Wild Species* exercise indicates a vertebrate species as 'At Risk' or 'May Be At Risk' (Table I-2.2), or other species as N1 or N2 (Table I-2.1), a provincial detailed status assessment and report is prepared by species experts and given to the Scientific Subcommittee (SSC) of the Endangered Species Conservation Committee (ESCC). The SSC studies and assesses the population trends, size, and distribution of the species considered at risk within the detailed status report and provides the ESCC with a scientific perspective on the most appropriate detailed status designation. The ESCC then considers the SSC's status recommendation and presents the recommendation to the Minister of the *Wildlife Act* (R.S.A. 2000, c. W-10). The species and their status are approved by the Minister and then ratified in the Alberta legislature to be listed in Schedule 6 of the Wildlife Regulation and subsequently afforded the protection of an endangered species under the *Act*. The ESCC is then responsible to prepare a recovery plan for species listed as 'Endangered' or 'Threatened' in Schedule 6. Special consideration is given to some species designated as 'Species of Special Concern' by the ESCC. For these species, a conservation management plan is developed to manage the population and habitat of that species in Alberta.

I-5 ALBERTA CONSERVATION INFORMATION MANAGEMENT SYSTEM (ACIMS)

Alberta Conservation Information Management System (ACIMS) is a biodiversity data center that collects, analyzes and disseminates information on biological elements including invertebrates, lichens, non-vascular plants, vascular plants and ecological communities. ACIMS is a Conservation Data Center (CDC) and is a member of the National General Status Working Group (NGSWG) responsible for completing species status assessments to inform COSEWIC.

ACIMS maintains a list of all elements in Alberta and their provincial subnational (SRank) rankings based on NatureServe methodology (Faber-Langendoen *et al.* 2012). The Subnational Conservation Status Ranks are listed in Table I-5.1.

Table I-5.1 ACIMS/NatureServe Subnational Conservation Status Ranks (ACIMS 2018)

Rank	Definition
SX	<ul style="list-style-type: none"> ▪ Taxon is believed to be extirpated from the province. ▪ Not located despite intensive searches of historical sites and other appropriate habitat. ▪ Virtually no likelihood that it will be rediscovered.
SH	<ul style="list-style-type: none"> ▪ Known from only historical records but still some hope of rediscovery. ▪ Evidence that the taxon may no longer be present but not enough to state this with certainty.
S1	<ul style="list-style-type: none"> ▪ Known from five or fewer occurrences or especially vulnerable to extirpation because of other factor(s).
S2	<ul style="list-style-type: none"> ▪ Known from twenty or fewer occurrences or vulnerable to extirpation because of other factors.
S3	<ul style="list-style-type: none"> ▪ Known from 100 or fewer occurrences, or somewhat vulnerable due to other factors, such as restricted range, relatively small population sizes, or other factors.
S4	<ul style="list-style-type: none"> ▪ Apparently secure. ▪ Taxon is uncommon but not rare. ▪ Potentially some cause for long term concern due to declines or other factors.
S5	<ul style="list-style-type: none"> ▪ Secure - taxon is common, widespread, and abundant.
S#S#	<ul style="list-style-type: none"> ▪ A numeric range rank is used to indicate any range of uncertainty about the status of the taxon. Example - S2S3 or S1S3. ▪ Ranges cannot skip more than two ranks. Example - SU is used rather than S1S4.
SU	<ul style="list-style-type: none"> ▪ Taxon is currently unrankable due to lack of information or substantially conflicting information. Example - native versus non-native status not resolved.
SNR	<ul style="list-style-type: none"> ▪ Not ranked ▪ Conservation status not yet assessed.
SNA	<ul style="list-style-type: none"> ▪ Not applicable. ▪ A conservation status rank is not applicable because the species or ecosystem is not a suitable target for conservation activities. Example - introduced species.
S#?	<ul style="list-style-type: none"> ▪ Inexact numeric rank ▪ Applied when a specific rank is most likely appropriate but for which some conflicting information or unresolved questions remain. Example – S2? Believed to be 6-20 occurrences but some uncertainty.

REFERENCES

- Alberta Conservation Information Management System (ACIMS). 2018. Accessed online June 2020 at: <https://albertaparks.ca/albertaparksca/management-land-use/alberta-conservation-information-management-system-acims/tracking-watch-lists/species-conservation-ranks/>
- Canadian Endangered Species Conservation Council (CESCC). 2016. Wild Species 2015: The General Status of Species in Canada. National General Status Working Group: 128 pp. Accessed online June 2020 at: <https://www.wildspecies.ca/reports>
- Committee on the Status of Endangered Wildlife in Canada (COSEWIC). 2019. COSEWIC wildlife species assessment process. Accessed online June 2020 at: <http://cosewic.ca/index.php/en-ca/assessment-process>
- Faber-Langendoen, D., J. Nichols, L. Master, K. Snow, A. Tomaino, R. Bittman, G. Hammerson, B. Heidel, L. Ramsay, A. Teucher, and B. Young. 2012. NatureServe Conservation Status Assessments: Methodology for Assigning Ranks. NatureServe, Arlington, VA. [Accessed online June 2020 at: <https://www.natureserve.org/biodiversity-science/publications/natureserve-conservation-status-assessments-methodology-assigning>]
- Government of Alberta (GoA). 2011. Definitions of General Status Categories: General Status of Alberta Wild Species. Fish and Wildlife Division Sustainable Resource Development. Last updated March 2011. Accessed online June 2020 at: <https://www.alberta.ca/general-status-of-alberta-wild-species-background-and-categories.aspx>
- International Union for Conservation of Nature (IUCN). 2001. IUCN Red List Categories and Criteria: Version 3.1. IUCN Species Survival Commission. IUCN, Gland, Switzerland and Cambridge, U.K. Accessed online June 2020 at: <https://www.iucnredlist.org/resources/categories-and-criteria>
- Species at Risk Act*. 2002. In *Statutes of Canada, 2002*, Chapter 29. Ottawa: Queen's Printer for Canada. Current to May 17, 2020.
- Wildlife Act*. 2000. In *Revised Statutes of Alberta, 2000*, Chapter W-10. Edmonton: Queen's Printer for Alberta. Current to February 20, 2018.

APPENDIX II

Wildlife Tables

Appendix II
Wildlife Tables

Table II-1: Potential breeding bird species that may overlap the five reaches

Species ^{1,2,3}	Scientific Name	AEP ⁴	AB Wildlife Act ⁵	COSEWIC ⁶	SARA ⁷
Alder Flycatcher	<i>Empidonax alnorum</i>	Sensitive	Not Listed	Not Listed	Not Listed
American Avocet	<i>Recurvirostra americana</i>	Secure	Not Listed	Not Listed	Not Listed
American Coot	<i>Fulica americana</i>	Secure	Not Listed	Not at Risk	No Status
American Crow	<i>Corvus brachyrhynchos</i>	Secure	Not Listed	Not Listed	Not Listed
American Goldfinch	<i>Spinus tristis</i>	Secure	Not Listed	Not Listed	Not Listed
American Kestrel	<i>Falco sparverius</i>	Sensitive	Not Listed	Not Listed	Not Listed
American Redstart	<i>Setophaga ruticilla</i>	Secure	Not Listed	Not Listed	Not Listed
American Robin	<i>Turdus migratorius</i>	Secure	Not Listed	Not Listed	Not Listed
American White Pelican	<i>Pelecanus erythrorhynchos</i>	Sensitive	Not Listed	Not at Risk	No Status
American Wigeon	<i>Mareca americana</i>	Secure	Not Listed	Not Listed	Not Listed
Bald Eagle	<i>Haliaeetus leucocephalus</i>	Sensitive	Not Listed	Not at Risk	No Status
Baltimore Oriole	<i>Icterus galbula</i>	Sensitive	Not Listed	Not Listed	Not Listed
Bank Swallow	<i>Riparia riparia</i>	Sensitive	Not Listed	Threatened	Threatened
Barn Swallow	<i>Hirundo rustica</i>	Sensitive	Not Listed	Threatened	Threatened
Belted Kingfisher	<i>Megasceryle alcyon</i>	Secure	Not Listed	Not Listed	Not Listed
Black Tern	<i>Chlidonias niger</i>	Sensitive	Not Listed	Not at Risk	Not Listed
Black-and-white Warbler	<i>Mniotilta varia</i>	Secure	Not Listed	Not Listed	Not Listed
Black-billed Magpie	<i>Pica hudsonia</i>	Secure	Not Listed	Not Listed	Not Listed
Black-capped Chickadee	<i>Poecile atricapillus</i>	Secure	Not Listed	Not Listed	Not Listed
Blue Jay	<i>Cyanocitta cristata</i>	Secure	Not Listed	Not Listed	Not Listed
Blue-headed Vireo	<i>Vireo solitarius</i>	Secure	Not Listed	Not Listed	Not Listed
Blue-winged Teal	<i>Anas discors</i>	Secure	Not Listed	Not Listed	Not Listed
Bobolink	<i>Dolichonyx oryzivorus</i>	Sensitive	Not Listed	Threatened	Threatened
Brewer's Blackbird	<i>Euphagus cyanocephalus</i>	Secure	Not Listed	Not Listed	Not Listed
Broad-winged Hawk	<i>Buteo platypterus</i>	Sensitive	Not Listed	Not Listed	Not Listed
Brown Thrasher	<i>Toxostoma rufum</i>	Secure	Not Listed	Not Listed	Not Listed
Brown-headed Cowbird	<i>Molothrus ater</i>	Secure	Not Listed	Not Listed	Not Listed
Bufflehead	<i>Bucephala albeola</i>	Secure	Not Listed	Not Listed	Not Listed
California Gull	<i>Larus californicus</i>	Secure	Not Listed	Not Listed	Not Listed
Canada Goose	<i>Branta canadensis</i>	Secure	Not Listed	Not Listed	Not Listed
Canvasback	<i>Aythya valisineria</i>	Secure	Not Listed	Not Listed	Not Listed
Cedar Waxwing	<i>Bombycilla cedrorum</i>	Secure	Not Listed	Not Listed	Not Listed
Chestnut-collared Longspur	<i>Calcarius ornatus</i>	At Risk	Not Listed	Endangered	Threatened
Chipping Sparrow	<i>Spizella passerina</i>	Secure	Not Listed	Not Listed	Not Listed
Clay-colored Sparrow	<i>Spizella pallida</i>	Secure	Not Listed	Not Listed	Not Listed
Cliff Swallow	<i>Petrochelidon pyrrhonota</i>	Secure	Not Listed	Not Listed	Not Listed
Common Goldeneye	<i>Bucephala clangula</i>	Secure	Not Listed	Not Listed	Not Listed
Common Grackle	<i>Quiscalus quiscula</i>	Secure	Not Listed	Not Listed	Not Listed
Common Merganser	<i>Mergus merganser</i>	Secure	Not Listed	Not Listed	Not Listed
Common Nighthawk	<i>Chordeiles minor</i>	Sensitive	Not Listed	Special Concern	Threatened
Common Raven	<i>Corvus corax</i>	Secure	Not Listed	Not Listed	Not Listed
Common Yellowthroat	<i>Geothlypis trichas</i>	Sensitive	Not Listed	Not Listed	Not Listed
Cooper's Hawk	<i>Accipiter cooperii</i>	Secure	Not Listed	Not at Risk	Not Listed
Dark-eyed Junco	<i>Junco hyemalis</i>	Secure	Not Listed	Not Listed	Not Listed
Double-crested Cormorant	<i>Phalacrocorax auritus</i>	Secure	Not Listed	Not at Risk	Not Listed
Downy Woodpecker	<i>Dryobates pubescens</i>	Secure	Not Listed	Not Listed	Not Listed
Eared Grebe	<i>Podiceps nigricollis</i>	Secure	Not Listed	Not Listed	Not Listed
Eastern Kingbird	<i>Tyrannus tyrannus</i>	Sensitive	Not Listed	Not Listed	Not Listed
Eastern Phoebe	<i>Sayornis phoebe</i>	Sensitive	Not Listed	Not Listed	Not Listed
Eurasian Collared-Dove	<i>Streptopelia decaocto</i>	Exotic	Not Listed	Not Listed	Not Listed
European Starling	<i>Sturnus vulgaris</i>	Exotic	Not Listed	Not Listed	Not Listed
Ferruginous Hawk	<i>Buteo regalis</i>	At Risk	Endangered	Threatened	Threatened
Fox Sparrow	<i>Passerella iliaca</i>	Secure	Not Listed	Not Listed	Not Listed
Franklin's Gull	<i>Leucophaeus pipixcan</i>	Secure	Not Listed	Not Listed	Not Listed
Gadwall	<i>Anas strepera</i>	Secure	Not Listed	Not Listed	Not Listed
Golden Eagle	<i>Aquila chrysaetos</i>	Sensitive	Not Listed	Not at Risk	No Status
Golden-crowned Kinglet	<i>Regulus satrapa</i>	Secure	Not Listed	Not Listed	Not Listed
Gray Catbird	<i>Dumetella carolinensis</i>	Secure	Not Listed	Not Listed	Not Listed

Gray Partridge	<i>Perdix perdix</i>	Exotic	Not Listed	Not Listed	Not Listed
Great Blue Heron	<i>Ardea herodias</i>	Sensitive	Not Listed	Not Listed	Not Listed
Great Horned Owl	<i>Bubo virginianus</i>	Secure	Not Listed	Not Listed	Not Listed
Greater Yellowlegs	<i>Tringa melanoleuca</i>	Secure	Not Listed	Not Listed	Not Listed
Green-winged Teal	<i>Anas crecca</i>	Secure	Not Listed	Not Listed	Not Listed
Hairy Woodpecker	<i>Dryobates villosus</i>	Secure	Not Listed	Not Listed	Not Listed
Hermit Thrush	<i>Catharus guttatus</i>	Secure	Not Listed	Not Listed	Not Listed
Horned Grebe	<i>Podiceps auritus</i>	Sensitive	Not Listed	Special Concern	Special Concern
Horned Lark	<i>Eremophila alpestris</i>	Secure	Not Listed	Not Listed	Not Listed
House Finch	<i>Carpodacus mexicanus</i>	Secure	Not Listed	Not Listed	Not Listed
House Sparrow	<i>Passer domesticus</i>	Exotic	Not Listed	Not Listed	Not Listed
House Wren	<i>Troglodytes aedon</i>	Secure	Not Listed	Not Listed	Not Listed
Killdeer	<i>Charadrius vociferus</i>	Secure	Not Listed	Not Listed	Not Listed
Lark Sparrow	<i>Chondestes grammacus</i>	Secure	Not Listed	Not Listed	Not Listed
Least Flycatcher	<i>Empidonax minimus</i>	Sensitive	Not Listed	Not Listed	Not Listed
LeConte's Sparrow	<i>Ammodramus leconteii</i>	Secure	Not Listed	Not Listed	Not Listed
Lesser Scaup	<i>Aythya affinis</i>	Secure	Not Listed	Not Listed	Not Listed
Lesser Yellowlegs	<i>Tringa flavipes</i>	Secure	Not Listed	Not Listed	Not Listed
Lincoln's Sparrow	<i>Melospiza lincolni</i>	Secure	Not Listed	Not Listed	Not Listed
Loggerhead Shrike	<i>Lanius ludovicianus</i>	Sensitive	Special Concern	Threatened	Threatened
Long-billed Curlew	<i>Numenius americanus</i>	Sensitive	Special Concern	Special Concern	Special Concern
Mallard	<i>Anas platyrhynchos</i>	Secure	Not Listed	Not Listed	Not Listed
Marbled Godwit	<i>Limosa fedoa</i>	Secure	Not Listed	Not Listed	Not Listed
Marsh Wren	<i>Cistothorus palustris</i>	Secure	Not Listed	Not Listed	Not Listed
Merlin	<i>Falco columbarius</i>	Secure	Not Listed	Not at Risk	No Status
Mountain Bluebird	<i>Sialia currucoides</i>	Secure	Not Listed	Not Listed	Not Listed
Mourning Dove	<i>Zenaidura macroura</i>	Secure	Not Listed	Not Listed	Not Listed
Mourning Warbler	<i>Oporornis philadelphia</i>	Secure	Not Listed	Not Listed	Not Listed
Northern Flicker (Yellow-shafted)	<i>Colaptes auratus</i>	Secure	Not Listed	Not Listed	Not Listed
Northern Goshawk	<i>Accipiter gentilis</i>	Sensitive	Not Listed	Not at Risk	No Status
Northern Harrier	<i>Circus cyaneus</i>	Secure	Not Listed	Not at Risk	No Status
Northern Pintail	<i>Anas acuta</i>	Secure	Not Listed	Not Listed	Not Listed
Northern Rough-winged Swallow	<i>Stelgidopteryx serripennis</i>	Secure	Not Listed	Not Listed	Not Listed
Northern Saw-whet Owl	<i>Aegolius acadicus</i>	Secure	Not Listed	Not Listed	Not Listed
Northern Shoveler	<i>Anas clypeata</i>	Secure	Not Listed	Not Listed	Not Listed
Orange-crowned Warbler	<i>Oreothlypis celata</i>	Secure	Not Listed	Not Listed	Not Listed
Osprey	<i>Pandion haliaetus</i>	Sensitive	Not Listed	Not Listed	Not Listed
Ovenbird	<i>Seiurus aurocapilla</i>	Secure	Not Listed	Not Listed	Not Listed
Peregrine Falcon	<i>Falco peregrinus</i>	At Risk	Threatened	Not at Risk	Special Concern
Philadelphia Vireo	<i>Vireo philadelphicus</i>	Secure	Not Listed	Not Listed	Not Listed
Pied-billed Grebe	<i>Podilymbus podiceps</i>	Sensitive	Not Listed	Not Listed	Not Listed
Pileated Woodpecker	<i>Dryocopus pileatus</i>	Sensitive	Not Listed	Not Listed	Not Listed
Pine Siskin	<i>Spinus pinus</i>	Secure	Not Listed	Not Listed	Not Listed
Prairie Falcon	<i>Falco mexicanus</i>	Sensitive	Special Concern	Not at Risk	Not Listed
Purple Martin	<i>Progne subis</i>	Sensitive	Not Listed	Not Listed	Not Listed
Red Crossbill	<i>Loxia curvirostra</i>	Secure	Not Listed	Not Listed	Not Listed
Red-breasted Nuthatch	<i>Sitta canadensis</i>	Secure	Not Listed	Not Listed	Not Listed
Red-eyed Vireo	<i>Vireo olivaceus</i>	Secure	Not Listed	Not Listed	Not Listed
Redhead	<i>Aythya americana</i>	Secure	Not Listed	Not Listed	Not Listed
Red-necked Grebe	<i>Podiceps grisegena</i>	Secure	Not Listed	Not at Risk	No Status
Red-tailed Hawk	<i>Buteo jamaicensis</i>	Secure	Not Listed	Not at Risk	No Status
Red-winged Blackbird	<i>Agelaius phoeniceus</i>	Secure	Not Listed	Not Listed	Not Listed
Ring-billed Gull	<i>Larus delawarensis</i>	Secure	Not Listed	Not Listed	Not Listed
Ring-necked Duck	<i>Aythya collaris</i>	Secure	Not Listed	Not Listed	Not Listed
Ring-necked Pheasant	<i>Phasianus colchicus</i>	Exotic	Not Listed	Not Listed	Not Listed
Rock Pigeon	<i>Columba livia</i>	Exotic	Not Listed	Not Listed	Not Listed
Rock Wren	<i>Salpinctes obsoletus</i>	Secure	Not Listed	Not Listed	Not Listed
Rose-breasted Grosbeak	<i>Pheucticus ludovicianus</i>	Secure	Not Listed	Not Listed	Not Listed
Ruby-crowned Kinglet	<i>Regulus calendula</i>	Secure	Not Listed	Not Listed	Not Listed
Ruby-throated Hummingbird	<i>Archilochus colubris</i>	Secure	Not Listed	Not Listed	Not Listed
Ruddy Duck	<i>Oxyura jamaicensis</i>	Secure	Not Listed	Not Listed	Not Listed
Ruffed Grouse	<i>Bonasa umbellus</i>	Secure	Not Listed	Not Listed	Not Listed
Sandhill Crane	<i>Grus canadensis</i>	Sensitive	Not Listed	Not Listed	Not Listed
Savannah Sparrow	<i>Passerculus sandwichensis</i>	Secure	Not Listed	Not Listed	Not Listed

Say's Phoebe	<i>Sayornis saya</i>	Secure	Not Listed	Not Listed	Not Listed
Sharp-shinned Hawk	<i>Accipiter striatus</i>	Secure	Not Listed	Not at Risk	No Status
Song Sparrow	<i>Melospiza melodia</i>	Secure	Not Listed	Not Listed	Not Listed
Sora	<i>Porzana carolina</i>	Sensitive	Not Listed	Not Listed	Not Listed
Spotted Sandpiper	<i>Actitis macularius</i>	Secure	Not Listed	Not Listed	Not Listed
Spotted Towhee	<i>Pipilo maculatus</i>	Secure	Not Listed	Not Listed	Not Listed
Sprague's Pipit	<i>Anthus spragueii</i>	Sensitive	Special Concern	Threatened	Threatened
Swainson's Hawk	<i>Buteo swainsoni</i>	Secure	Not Listed	Not Listed	Not Listed
Swainson's Thrush	<i>Catharus ustulatus</i>	Secure	Not Listed	Not Listed	Not Listed
Tennessee Warbler	<i>Oreothlypis peregrina</i>	Secure	Not Listed	Not Listed	Not Listed
Tree Swallow	<i>Tachycineta bicolor</i>	Secure	Not Listed	Not Listed	Not Listed
Turkey Vulture	<i>Cathartes aura</i>	Secure	Not Listed	Not Listed	Not Listed
Veery	<i>Catharus fuscescens</i>	Secure	Not Listed	Not Listed	Not Listed
Vesper Sparrow	<i>Poocetes gramineus</i>	Secure	Not Listed	Not Listed	Not Listed
Violet-green Swallow	<i>Tachycineta thalassina</i>	Secure	Not Listed	Not Listed	Not Listed
Warbling Vireo	<i>Vireo gilvus</i>	Secure	Not Listed	Not Listed	Not Listed
Western Grebe	<i>Aechmophorus occidentalis</i>	At Risk	Threatened	Special Concern	Special Concern
Western Kingbird	<i>Tyrannus verticalis</i>	Secure	Not Listed	Not Listed	Not Listed
Western Meadowlark	<i>Sturnella neglecta</i>	Secure	Not Listed	Not Listed	Not Listed
Western Tanager	<i>Piranga ludoviciana</i>	Sensitive	Not Listed	Not Listed	Not Listed
Western Wood-Pewee	<i>Contopus sordidulus</i>	May be at Risk	Not Listed	Not Listed	Not Listed
White-breasted Nuthatch	<i>Sitta carolinensis</i>	Secure	Not Listed	Not Listed	Not Listed
White-crowned Sparrow	<i>Zonotrichia leucophrys</i>	Secure	Not Listed	Not Listed	Not Listed
White-throated Sparrow	<i>Zonotrichia albicollis</i>	Secure	Not Listed	Not Listed	Not Listed
White-winged Crossbill	<i>Loxia leucoptera</i>	Secure	Not Listed	Not Listed	Not Listed
Willet	<i>Tringa semipalmatus</i>	Secure	Not Listed	Not Listed	Not Listed
Wilson's Phalarope	<i>Phalaropus tricolor</i>	Secure	Not Listed	Not Listed	Not Listed
Wilson's Snipe	<i>Gallinago delicata</i>	Secure	Not Listed	Not Listed	Not Listed
Wilson's Warbler	<i>Wilsonia pusilla</i>	Secure	Not Listed	Not Listed	Not Listed
Wood Duck	<i>Aix sponsa</i>	Secure	Not Listed	Not Listed	Not Listed
Yellow Warbler	<i>Setophaga petechia</i>	Secure	Not Listed	Not Listed	Not Listed
Yellow-bellied Sapsucker	<i>Sphyrapicus varius</i>	Secure	Not Listed	Not Listed	Not Listed
Yellow-breasted Chat	<i>Icteria virens</i>	Secure	Not Listed	Not at Risk	No Status
Yellow-headed Blackbird	<i>Xanthocephalus xanthocephalus</i>	Secure	Not Listed	Not Listed	Not Listed
Yellow-rumped Warbler	<i>Setophaga coronata</i>	Secure	Not Listed	Not Listed	Not Listed

Notes:

Species list was compiled from sources 1-3 listed below.

¹ Alberta Biodiversity Monitoring Institute - Breeding bird survey data from sites 1410 and 1411 (ABMI 2020).

² eBird Hotspots (eBird 2020).

³ Fish and Wildlife Management Information System (FWMIS 2020).

⁴ Alberta Environment and Parks' Wild Species General Status Listing (AEP 2015).

⁵ *Wildlife Act* (R.S.A. 2000, c. W-10).

⁶ Committee on the Status of Endangered Wildlife in Canada (GoC 2019).

⁷ *Species at Risk Act* (S.C. 2002 c. 29).

Table II-2: Potential mammal species that may overlap the five assessed reaches

Species ^{1,2}	Scientific Name	AEP ³	AB Wildlife Act ⁴	COSWEIC ⁵	SARA ⁶
American Badger	<i>Taxidea taxus taxus</i>	Sensitive	Data Deficient	Special Concern	Special Concern
American Mink	<i>Mustela vison</i>	Secure	Not Listed	Not Listed	Not Listed
Beaver	<i>Castor canadensis</i>	Secure	Not Listed	Not Listed	Not Listed
Big Brown Bat	<i>Eptesicus fuscus</i>	Secure	Not Listed	Not Listed	Not Listed
Common Porcupine	<i>Erethizon dorsatum</i>	Secure	Not Listed	Not Listed	Not Listed
Coyote	<i>Canis latrans</i>	Secure	Not Listed	Not Listed	Not Listed
Deer Mouse	<i>Peromyscus maniculatus</i>	Secure	Not Listed	Not Listed	Not Listed
Dusky Shrew	<i>Sorex monticolus</i>	Secure	Not Listed	Not Listed	Not Listed
Ermine	<i>Mustela erminea</i>	Secure	Not Listed	Not Listed	Not Listed
Hoary Bat	<i>Lasiurus cinereus</i>	Sensitive	Not Listed	Not Listed	Not Listed
House Mouse	<i>Mus musculus</i>	Exotic/Alien	Not Listed	Not Listed	Not Listed
Least Chipmunk	<i>Tamias minimus</i>	Secure	Not Listed	Not Listed	Not Listed
Least Weasel	<i>Mustela nivalis</i>	Secure	Not Listed	Not Listed	Not Listed
Little Brown Myotis	<i>Myotis lucifugus</i>	May Be At Risk	Not Listed	Endangered	Endangered
Long-eared Myotis	<i>Myotis evotis</i>	Secure	Not Listed	Not Listed	Not Listed
Long-tailed Weasel	<i>Mustela frenata</i>	May Be At Risk	Not Listed	Not at Risk	No Status
Masked Shrew	<i>Sorex cinereus</i>	Secure	Not Listed	Not Listed	Not Listed
Meadow Vole	<i>Microtus pennsylvanicus</i>	Secure	Not Listed	Not Listed	Not Listed
Meadow Jumping Mouse	<i>Zapus hudsonius</i>	Secure	Not Listed	Not Listed	Not Listed
Moose	<i>Alces alces</i>	Secure	Not Listed	Not Listed	Not Listed
Mule Deer	<i>Odocoileus hemionus</i>	Secure	Not Listed	Not Listed	Not Listed
Muskrat	<i>Ondatra zibethicus</i>	Secure	Not Listed	Not Listed	Not Listed
Northern Pocket Gopher	<i>Thomomys talpoides</i>	Secure	Not Listed	Not Listed	Not Listed
Nuttall's Cottontail	<i>Sylvilagus nuttallii pinetis</i>	Secure	Not Listed	Not at Risk	Not Listed
Prairie Shrew	<i>Sorex haydeni</i>	Secure	Not Listed	Not Listed	Not Listed
Raccoon	<i>Procyon lotor</i>	Secure	Not Listed	Not Listed	Not Listed
Red Fox	<i>Vulpes vulpes</i>	Secure	Not Listed	Not Listed	Not Listed
Red Squirrel	<i>Tamiasciurus hudsonicus</i>	Secure	Not Listed	Not Listed	Not Listed
Richardson's Ground Squirrel	<i>Spermophilus richardsonii</i>	Secure	Not Listed	Not Listed	Not Listed
Sagebrush Vole	<i>Lagurus curtatus</i>	Secure	Not Listed	Data Deficient	Not Listed
Silver-haired Bat	<i>Lasionycteris noctivagans</i>	Sensitive	Not Listed	Not Listed	Not Listed
Snowshoe Hare	<i>Lepus americanus</i>	Secure	Not Listed	Not Listed	Not Listed
Southern Red-backed Vole	<i>Clethrionomys gapperi</i>	Secure	Not Listed	Not Listed	Not Listed
Striped Skunk	<i>Mephitis mephitis</i>	Secure	Not Listed	Not Listed	Not Listed
Thirteen-lined Ground Squirrel	<i>Spermophilus tridecemlineatus</i>	Undetermined	Not Listed	Not Listed	Not Listed
Western Jumping Mouse	<i>Zapus princeps</i>	Secure	Not Listed	Not Listed	Not Listed
Western Small-footed Myotis	<i>Myotis ciliolabrum</i>	Sensitive	Special Concern	Not Listed	Not Listed
White-tailed Deer	<i>Odocoileus virginianus</i>	Secure	Not Listed	Not Listed	Not Listed
White-tailed Jack Rabbit	<i>Lepus townsendii</i>	Secure	Not Listed	Not Listed	Not Listed

Notes:

Species list was compiled from sources 1 and 2 listed below.

¹ Range maps sourced from "Alberta Mammals: An Atlas and Guide" (Smith 1993).

² Alberta Biodiversity Monitoring Institute - Incidental Observations and Snow Tracking Data from Sites 1410 and 1411 (ABMI 2020).

³ Alberta Environment and Parks' Wild Species General Status Listing (AEP 2015).

⁴ Wildlife Act (R.S.A. 2000, c. W-10).

⁵ Committee on the Status of Endangered Wildlife in Canada (GoC 2019).

⁶ Species at Risk Act (S.C. 2002, c. 29).

Table II-3: Potential herptile species that may overlap the five reaches

Species ^{1,2}	Scientific Name	AEP ³	AB Wildlife Act ⁴	COSWEIC ⁵	SARA ⁶
Boreal Chorus Frog	<i>Pseudacris maculata</i>	Secure	Not Listed	Not Listed	Not Listed
Canadian Toad	<i>Bufo hemiophrys</i>	May Be At Risk	Data Deficient	Not at Risk	Not Listed
Northern Leopard Frog	<i>Lithobates pipiens</i>	At Risk	Threatened	Special Concern	Special Concern
Plains Spadefoot	<i>Spea bombifrons</i>	May Be At Risk	Not Listed	Not at Risk	Not Listed
Wood Frog	<i>Lithobates sylvatica</i>	Secure	Not Listed	Not Listed	Not Listed
Western Tiger Salamander	<i>Ambystoma mavortium</i>	Secure	Not Listed	Special Concern	Special Concern
Plains Garter Snake	<i>Thamnophis radix</i>	Sensitive	Not Listed	Not Listed	Not Listed
Common Garter Snake (Red-sided Garter Snake)	<i>Thamnophis sirtalis</i>	Sensitive	Not Listed	Not Listed	Not Listed
Wandering Garter Snake	<i>Thamnophis elegans</i>	Sensitive	Not Listed	Not Listed	Not Listed
Bullsnake	<i>Pituophis catenifer sayi</i>	Sensitive	Not Listed	Special Concern	Not Listed
Prairie Rattlesnake	<i>Crotalus viridis</i>	Sensitive	Special Concern	Special Concern	Special Concern

Notes:

Species list was compiled from sources 1 and 2 listed below.

¹ "A Field Guide to Western Reptiles and Amphibians" - 3rd Ed. Peterson Field Guides (Stebbins 2003).

² Alberta Conservation Association - Alberta Volunteer Amphibian Monitoring Program Identification Keys for Amphibians and Reptiles of Alberta (ACA 2020).

³ Alberta Environment and Parks' Wild Species General Status Listing (AEP 2015).

⁴ *Wildlife Act* (R.S.A. 2000, c. W-10).

⁵ Committee on the Status of Endangered Wildlife in Canada (GoC 2019).

⁶ *Species at Risk Act* (S.C. 2002, c. 29).

APPENDIX III

Alberta Conservation Information Management System (ACIMS) Species

Appendix III
Alberta Conservation Information Management System (ACIMS) Species

Table III-1. Rare Plants and Plant Communities in the Northern Fescue Natural Subregion (ACIMS 2017)

Plant Type	Common Name	Scientific Name	Provincial (S) Rank	National (N) Rank	Global (G) Rank
Community	plains rough fescue - western porcupine grass grassland	Festuca hallii - Hesperostipa curtisetia grassland	S2S3	NNR	GNR
Community	plains rough fescue - green needle grass grassland	Festuca hallii - Nassella viridula grassland	S1	NNR	GNR
Community	plains rough fescue - June grass / juniper / forb grassland	Festuca hallii - Koeleria macrantha / Juniperus horizontalis / forb grassland	S2	NNR	GNR
Community	round-leaved hawthorn / cow parsnip - common nettle - western Canada violet shrubland	Crataegus chrysoarpa / Heracleum maximum - Urtica dioica - Viola canadensis shrubland	S1S2	NNR	GNR
Community	Nevada bulrush - (seaside arrow-grass) emergent marsh	Amphiscirpus nevadensis - (Triglochin maritima) emergent marsh	S2S3	NNR	GNR
Community	plains rough fescue grassland	Festuca hallii grassland	S1	NNR	GNR
Community	salt grass - western wheat grass meadow	Distichlis stricta - Paspopyrum smithii meadow	S2	NNR	GNR
Community	western wheat grass - low sedge meadow	Paspopyrum smithii - Carex duriuscula meadow	S2S3	NNR	GNR
Community	western porcupine grass - plains rough fescue grassland	Hesperostipa curtisetia - Festuca hallii grassland	S2S3	NNR	GNR
Community	aspen / northern gooseberry - common wild rose forest	Populus tremuloides / Ribes oxycanthoides - Rosa woodsii forest	SU	NNR	GNR
Community	Nuttall's salt-meadow grass community	Puccinellia nuttalliana community	S3?	NNR	G3?
Community	samphire emergent marsh	Salicornia rubra emergent marsh	S2	NNR	G2G3
Liverwort	liverwort	Mannia fragrans	SU	N3N4	G5
Liverwort	liverwort	Riccia beyrichiana	SU	NNR	G5
Liverwort	liverwort	Riccia cavernosa	S2S4	N3N4	G5
Moss	moss	Ptychostomum marraii	S1	N1N3	G3G4
Moss	long-stalked beardless moss	Hennediella heimii	S2S3	N5	G5
Moss	fallacious screw moss	Didymodon fallax	S2S3	N5	G5
Moss	alkaline wing-nerved moss	Pterygoneurum kozlovii	S2	N2	G2G3
Lichen	vagabond lichen	Circinaria hispida	S2S3	N2N3	G3
Lichen	cobblestone lichen	Polysporina arenacea	S2	NNR	GNR
Lichen	sulphur-firedot lichen	Caloplaca flavovirescens	S2S3	N5	G5
Lichen	cladonia lichen	Cladonia ramulosa	S2	NNR	G5?
Lichen	lichen	Diplotomma albostrum	SU	NNR	GNR
Lichen	sulphur lichens	Fulgensia fulgens	S2S3	N3	G3G5
Lichen	rim-lichen	Lecanora wisconsinensis	S1	NNR	GNR
Lichen	disk lichen	Lecidea confluens	S2	NNR	G3G5
Lichen	disk lichen	Lecidea lithophila	S2	NNR	G3G5
Lichen	disk lichen	Lecidella carpathica	S1S2	NNR	G5?
Lichen	alternating dog-lichen	Peltigera polydactylon	S3	N5	G5
Lichen	rock-posy lichen	Rhizoplaca subdiscrepans	SU	N4	G4G5
Lichen	rock-shield lichen	Xanthoparmelia subdecipliens	S2?	NNR	G5
Lichen	flat fruited pelt lichen	Peltigera horizontalis	S2S4	N5	G5
Lichen	sand-loving Iceland lichen	Cetraria arenaria	S1S2	N4N5	G4
Forb	dwarf fleabane	Erigeron radicans	S3	N2N3	G3G4
Forb	few-flowered aster	Almutaster pauciflorus	S3	N4	G4
Forb	slender mouse-ear-cress	Transberingia bursifolia ssp. virgata	S2	N1N2	G3
Forb	blunt-leaved watercress	Rorippa curvipes	S3	NNR	G5
Forb	slender cress	Rorippa tenerima	S3	N3N4	G5
Forb	spiked lobelia	Lobelia spicata	S1	N5?	G5
Forb	spreading pearlwort	Sagina decumbens	SH	NNR	G5
Forb	Powell's saltbush	Atriplex powellii	S2	N1N2	G4
Forb	taraxia	Taraxia breviflora	S1	N1N2	G5
Forb	lance-leaved loosestrife	Lysimachia hybrida	S3	N5?	G5
Forb	early buttercup	Ranunculus glaberrimus	S3	N5?	G5
Forb	low cinquefoil	Potentilla plattensis	S2	N4	G4
Forb	clammy hedge-hyssop	Gratiola neglecta	S3	N5	G5
Forb	Canada toad-flax	Nuttallanthus texanus	S2	N3	G4G5
Forb	crowfoot violet	Viola pedatifida	S3	N4	G5
Graminoid	awned nut-grass	Cyperus squarrosus	S2	N4N5	G5
Graminoid	pale bulrush	Scirpus pallidus	S1	N4?	G5
Fern	field grape fern	Botrychium campestre	S3	N2	G3G4

APPENDIX IV

Habitat Classification and Ranking Details

Appendix IV
Habitat Classification and Ranking Details

Table IV-1. Habitat Classification and Ranking Details

DRFMP Reach	Polygon Number	Modification Level	Primary Classification	Secondary Classification	Habitat Category	Dominant Habitat Classification	Category Habitat Rank	Habitat Rank Modification	Final Habitat Rank	Vegetation Notes	Wildlife Notes	Map Label
55th Street	1	Semi-Natural	Vegetated	Modified	Agriculture	Agricultural Pasture	1	No modification	1			American Badger and Richardson's Ground Squirrel Burrows
55th Street	2	Semi-Natural	Vegetated	Modified	Agriculture	Agricultural Pasture	1	No modification	1		Actively grazed horse pasture.	
55th Street	3	Natural	Vegetated	Woodland	Forest	Balsam Poplar	4	No modification	4			
55th Street	4	Disturbed	Non-vegetated	Modified	Bare Ground	Bare Ground	0	No modification	0		Land tilled. No vegetation.	
55th Street	5	Disturbed	Non-vegetated	Modified	Buildings/Paved	Buildings/Paved	0	No modification	0			
55th Street	6	Natural	Vegetated	Naturally Non-wooded	Grassland	Grassland	3	No modification	3			
55th Street	7	Semi-Natural	Vegetated	Modified	Manicured	Manicured Grass	1	No modification	1			
55th Street	8	Semi-Natural	Vegetated	Modified	Manicured	Manicured Grass	1	No modification	1		Landowner has numerous bird feeders and bird houses on the property. Comments from the landowner suggest that a swallow species nested this last year in their purple martin house.	
55th Street	9	Semi-Natural	Vegetated	Modified	Manicured	Manicured Grass	1	No modification	1		Golf course manicured grass. No shrubby understory. Manicured grass around tree trunks.	
55th Street	10	Semi-Natural	Vegetated	Modified	Manicured	Manicured Park	2	No modification	2	Manicured yards and golf course		
55th Street	11	Natural	Vegetated	Naturally Non-wooded	Shrubland	Riparian Shrub	4	No modification	4	Sandbar Willow and Balsam Poplar saplings		
55th Street	12	Natural	Vegetated	Naturally Non-wooded	Shrubland	Riparian Shrub	4	No modification	4	Sandbar Willow and Red-osier Dogwood	Vertical face of the river terrace provides suitable habitat for burrowing species. Vertical face ranges between 1-2 m tall, with rooted vegetation interwoven into the bare, eroded face.	
55th Street	13	Natural	Vegetated	Naturally Non-wooded	Shrubland	Riparian Shrub	4	No modification	4	Sandbar Willow and Red-osier Dogwood		
55th Street	14	Natural	Vegetated	Naturally Non-wooded	Shrubland	Riparian Shrub	4	No modification	4			
55th Street	15	Natural	Vegetated	Naturally Non-wooded	Shrubland	Upland Shrub	3	No modification	3	Manitoba Maple, Thorny Buffaloberry, Saskatoon, Upland Willows, Red-osier Dogwood, Roses	The high density of roses makes the habitat value slightly less than the adjacent riparian shrub. Additionally, it is more "edge" habitat than the riparian.	
Midland	16	Natural	Vegetated	Woodland	Forest	Balsam Poplar	4	-1	3			Narrow belt of Balsam Poplar, adjacent to roadway.
Midland	17	Natural	Vegetated	Woodland	Forest	Balsam Poplar	4	-1	3	Balsam Poplar and Manitoba Maple		Narrow belt of Balsam Poplar, adjacent to roadway and
Midland	18	Natural	Vegetated	Woodland	Forest	Balsam Poplar	4	-1	3	Some very old poplars		Narrow belt of Balsam Poplar, adjacent to roadway and
Midland	19	Natural	Vegetated	Woodland	Forest	Balsam Poplar	4	No modification	4			
Midland	20	Disturbed	Non-vegetated	Modified	Bare Ground	Bare Ground	0	No modification	0	Substrate is mostly rip rap, vegetation has been cleared recently, tansy and yellow clematis	Area had recently undergone mulching and mowing with the addition of riprap. Although there was remnants of weedy species, habitat considered bare ground due to the addition of riprap and the level of disturbance from clearing.	
Midland	21	Disturbed	Non-vegetated	Modified	Buildings/Paved	Buildings/Paved	0	No modification	0			
Midland	22	Natural	Vegetated	Naturally Non-wooded	Grassland	Grassland	3	No modification	3			
Midland	23	Semi-Natural	Vegetated	Modified	Manicured	Manicured Grass	1	No modification	1			
Midland	24	Semi-Natural	Vegetated	Modified	Manicured	Manicured Park	2	No modification	2	Manitoba maples with mowed understory		
Midland	25	Semi-Natural	Vegetated	Modified	Manicured	Manicured Park	2	No modification	2			
Midland	26	Natural	Vegetated	Woodland	Forest	Manitoba Maple	2	1	3			Habitat positioned between a wide stretch of old growth Balsam Poplar forest and the river.
Midland	27	Natural	Vegetated	Woodland	Forest	Manitoba Maple	2	No modification	2			
Midland	28	Natural	Vegetated	Naturally Non-wooded	Shrubland	Upland Shrub	3	No modification	3	Species unknown	Adjacent to a historic CNR railway line that adjoins to the Midland rail bridge. On the other side of the railway line is the	
Newcastle	29	Natural	Vegetated	Woodland	Forest	Balsam Poplar	4	-2	2	Grass understory was not mowed at time of field survey		Small, isolated patch of Balsam Poplar, bordered by roadways, and has a manicured grass understory.
Newcastle	30	Natural	Vegetated	Woodland	Forest	Balsam Poplar	4	No modification	4	Some white spruce, caragana, Manitoba maple, some areas with sparse cover; little shrub understory (grass)	Large, mature Balsam poplars. Understory is less dense than other Balsam poplar forested areas. Considered more of an open woodland. Some conifer species mixed in but predominantly deciduous. Abundant cavities present in mature trees. Some trampled paths were evident through the ER for pedestrian access to the waterfront. Paved pedestrian trail provided along the back of the landowner properties. Numerous yards backing onto the ER had bird feeders and bird houses.	Environmental Reserve - open woodland.
Newcastle	31	Disturbed	Non-vegetated	Modified	Bare Ground	Bare Ground	0	No modification	0		Ball diamonds have shale through the infield and a shale warning track around the outfield fence. Outfield is manicured grass.	
Newcastle	32	Disturbed	Non-vegetated	Modified	Bare Ground	Bare Ground	0	No modification	0			
Newcastle	33	Disturbed	Non-vegetated	Modified	Buildings/Paved	Buildings/Paved	0	No modification	0			
Newcastle	34	Semi-Natural	Vegetated	Modified	Manicured	Manicured Grass	1	No modification	1	Shrubs had been recently removed; mostly grasses remain;		Narrow strip of habitat adjacent to roadway and has recently undergone
Newcastle	35	Semi-Natural	Vegetated	Modified	Manicured	Manicured Grass	1	No modification	1	Manitoba maple cut this year, now manicured to the river	Anthropogenic disturbance due to landowners building patios and firepits on the bermed edge of the riverbank.	
Newcastle	36	Semi-Natural	Vegetated	Modified	Manicured	Manicured Grass	1	No modification	1	Mowed grass associated with ball diamond.		
Newcastle	37	Semi-Natural	Vegetated	Modified	Manicured	Manicured Grass	1	No modification	1			
Newcastle	38	Semi-Natural	Vegetated	Modified	Manicured	Manicured Park	2	No modification	2	Manicured yards		
Newcastle	39	Semi-Natural	Vegetated	Modified	Manicured	Manicured Park	2	No modification	2		Understory of park trees is manicured grass. Picnic tables and pedestrian trails are present.	
Newcastle	40	Natural	Vegetated	Woodland	Forest	Manitoba Maple	2	No modification	2	Sandbar willow and sweetclover at edge of bank; Red-osier		
Newcastle	41	Natural	Vegetated	Woodland	Forest	Manitoba Maple	2	-1	1	Surrounding Manitoba maple cut this year except at this		Small, isolated patch of Manitoba Maple remaining at gas pipeline crossing.

DRFMP Reach	Polygon Number	Modification Level	Primary Classification	Secondary Classification	Habitat Category	Dominant Habitat Classification	Category Habitat Rank	Habitat Rank Modification	Final Habitat Rank	Vegetation Notes	Wildlife Notes	Map Label
Newcastle	42	Natural	Vegetated	Woodland	Forest	Manitoba Maple	2	No modification	2			
Newcastle	43	Natural	Vegetated	Naturally Non-wooded	Shrubland	Upland Shrub	3	-1	2	Saskatoon, heavily browsed. Some balsam poplar.		Shrubs have been heavily grazed by ungulates.
Newcastle	44	Natural	Vegetated	Naturally Non-wooded	Shrubland	Upland Shrub	3	No modification	3			
Newcastle	45	Natural	Vegetated	Naturally Non-wooded	Shrubland	Riparian Shrub	4	No modification	4			
Centennial Park	46	Natural	Vegetated	Woodland	Forest	Balsam Poplar	4	-1	3	Red-osier dogwood understory, Manitoba maple		Isolated patch of forest surrounded by human disturbances.
Centennial Park	47	Disturbed	Non-vegetated	Modified	Bare Ground	Bare Ground	0	No modification	0		Area used to be a baseball diamond with surrounding forest. The Badlands Community Facility was built in place of the ball diamond, opening its doors in March 2012 and the bare area currently present adjacent to the facility was cleared following the construction of the facility and has remained bare without development. Some weed growth was present.	
Centennial Park	48	Disturbed	Non-vegetated	Modified	Buildings/Paved	Buildings/Paved	0	No modification	0			
Centennial Park	49	Semi-Natural	Vegetated	Modified	Manicured	Manicured Grass	1	No modification	1			
Centennial Park	50	Semi-Natural	Vegetated	Modified	Manicured	Manicured Grass	1	No modification	1		Technically these are flower beds with mulch	
Centennial Park	51	Semi-Natural	Vegetated	Modified	Manicured	Manicured Park	2	No modification	2	Planted poplar (hybrid?) in long row along NE bank; between Manitoba maple and sidewalk, shrubs cut back	Understory of park trees is manicured grass. Picnic tables dotted throughout the park grounds. Arena fans produce a constant hum of noise. Some conifer species present but predominately deciduous. Trunks of large trees are protected with beaver cages. Some beaver cages were observed to be damaged and beaver activity was evident on the base of some trees despite the deterrent.	
Centennial Park	52	Semi-Natural	Vegetated	Modified	Manicured	Manicured Park	2	No modification	2			
Centennial Park	53	Natural	Vegetated	Woodland	Forest	Manitoba Maple	2	No modification	2		Steep banks are present along this stretch. Vegetated riparian area is unsuitable as a wildlife corridor. Wildlife tracks evident along the mud flats at the base of the bank. No burrows observed in the banks.	
Centennial Park	54	Natural	Vegetated	Woodland	Forest	Manitoba Maple	2	No modification	2		Has recently undergone mulching and pruning in some areas.	
Centennial Park	55	Natural	Vegetated	Woodland	Forest	Manitoba Maple	2	No modification	2			
Centennial Park	56	Natural	Vegetated	Naturally Non-wooded	Shrubland	Upland Shrub	3	-1	2	Red-osier dogwood, roses, a few thorny buffaloberry		Shrub cover is sparse and narrow and has been pruned in some areas.
Willow Estates	57	Natural	Vegetated	Woodland	Forest	Balsam Poplar	4	No modification	4	Some Manitoba maple, understory white spruce	Recreation path extends through the entire length.	Abundant suitable cavities available in large, mature trees.
Willow Estates	58	Disturbed	Non-vegetated	Modified	Bare Ground	Bare Ground	0	No modification	0			
Willow Estates	59	Semi-Natural	Vegetated	Modified	Manicured	Manicured Grass	1	No modification	1			
Willow Estates	60	Semi-Natural	Vegetated	Modified	Manicured	Manicured Grass	1	No modification	1		Manicured lawn present between the back of yards and the riparian vegetation. Yards backing onto the manicured lawn had numerous bird houses and feeders. Some bird baths were observed. Lawn clippings were observed to be discarded in the shrub understory of the riparian vegetation. Likely highly suitable for voles and mice.	
Willow Estates	61	Natural	Vegetated	Woodland	Forest	Manitoba Maple	2	-1	1	A few large poplars but mostly replaced with Manitoba maple; landowners are cutting shrubs and trees		Adjacent landowners have heavily pruned shrub understory and established firepit/picnic areas.
Willow Estates	62	Natural	Vegetated	Naturally Non-wooded	Shrubland	Riparian Shrub	4	-1	3	Red-osier dogwood and sandbar willow; landowners are cutting shrubs and trees in this area		Adjacent landowners have heavily pruned shrubs.
Willow Estates	63	Natural	Vegetated	Naturally Non-wooded	Shrubland	Riparian Shrub	4	No modification	4		Highly suitable songbird habitat available along the ephemeral watercourse. A variety of shrub species and heights available. Numerous nests from last season were observed during the ground survey. Shrub understory was dense.	Highly suitable songbird habitat.

APPENDIX V

Photographs

Appendix V Photographs

Photo 1 River terrace present along the 55th Street reach.



Photo 2 Cavities present within mature balsam poplars on 55th Street river terrace.



Photo 3 **Animal burrows found in the vertical face of the 55th Street river terrace.**



Photo 4 **American badger and Richardson's ground squirrel burrows in 55th Street reach.**



Photo 5 Cleared vegetation by flood control barrier present along Midland reach.



Photo 6 Armoured bank by flood control barrier present along Midland reach.



Photo 7 Historic rail trackbed adjacent to Midland reach.



Photo 8 Cavities present in mature trees at western extent of Midland reach.



Photo 9 Snag present in mature balsam poplar forest at eastern extent of Midland reach.



Photo 10 Bird nest present in caragana shrub in the ER of the Newcastle reach.



Photo 11 Snag present in the ER of the Newcastle reach.



Photo 12 Rocky outcrop present at the western extent of the Newcastle reach.



Photo 13 **Saskatoon bushes heavily grazed by ungulates at the western extent of the Newcastle reach.**



Photo 14 **Manicured park habitat throughout the Centennial reach.**



Photo 15 Cluster of American crow nests in Centennial Park.



Photo 16 Beaver activity and wire cylinders around the base of mature trees in Centennial Park.



Photo 17 Snag present in balsam poplar forest on western extent of the Willow Estates reach.



Photo 18 Bird houses and feeders present in residential backyard in the Willow Estates reach.



Photo 19 **Manicured lawn present between residential yards and riparian habitat in the Willow Estates reach.**



Photo 20 **Pruning of native vegetation in riparian zone of the Willow Estates reach.**



Photo 21 Pruning of native vegetation in riparian zone of the Willow Estates reach.



Photo 22 Riparian shrub habitat along ephemeral watercourse in the Willow Estates reach.

