Denison Mines Corp.
Wheeler River Operation

Biodiversity Management Plan

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Approval for Use

Version	Date	Description of Activities	Author	Reviewer	Approver
1	January 2024	Draft for CNSC Review			
2	April 2025	Implemented changes as per CNSC information requests	Ecometrix	J.Switzer, S.Benson, R.Nagel	J.Switzer

Revision History

Version	Date	Description of Revision
1	January 2024	Draft for CNSC Review
2	April 2025	Response to CNSC Information Requests

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Acronyms and Abbreviations

Term	Definition
BdMP	Biodiversity Management Plan
CNSC	Canadian Nuclear Safety Commission
COPC	Constituent of Potential Concern
EA	Environmental Assessment
EIS	Environmental Impact Statement
EMP	Environmental Management Program
KPI	Key Performance Indicator
LSA	Local Study Area
MP	Measurable Parameter
RSA	Regional Study Area

1 Introduction

1.1 Background Information

This *Biodiversity Management Plan* (BdMP) supports the *Environmental Management Program* (EMP) for the Wheeler River Operation (the Operation).

The purpose of the BdMP is to support the *Environmental Management Program* by establishing the requirements for managing biodiversity throughout all Project phases, outline the mitigative approaches for reducing effects on biodiversity of flora and fauna, and outline monitoring programs to confirm effectiveness of mitigation measures and verify Environmental Impact Statement (EIS) conclusions as they relate to biodiversity.

The BdMP has been conceptualized in accordance with Denison's Environment, Health, Safety and Sustainability Policy (Denison, 2021a), applicable CSA standards and guidance and regulatory/statutory obligations, as well as commitments made to Indigenous Nations and communities through agreements and ongoing engagement (Denison, 2021b). In addition, the development of this BdMP is guided by the Towards Sustainable Mining (TSM) Biodiversity Conservation Management Protocol framework provided by The Mining Association of Canada (MAC,2020).

This Plan is considered a "living" document and will be updated as needed in support of environmental management activities during future permitting, development, and operation phases.

1.2 Scope

The BdMP applies during site preparation and construction, as well as commissioning phases of the Operation. The biodiversity monitoring identified in this Plan is intended to apply to future phases of the Operation but may change over the lifecycle of the Operation based on the results of the monitoring and changes in operations.

The BdMP is implemented at varying spatial scales as defined in the EIS documentation since potential environment interactions are both activity and environmental component specific. Conceptually, as presented in the EIS, the following spatial scales have been defined:

- Project Area: the area within which the Project and all components/activities are located (i.e., the Project footprint; the area of maximum physical disturbance).
- Local Study Area (LSA): the area that surrounds the Project Area where both direct and indirect interactions resulting from Project activities can be reasonably measured.
- Regional Study Area (RSA): the area that surrounds and includes the LSA, established to assess the potential, largely indirect interactions of the Project in a regional context and is the scale on which cumulative effects may occur.

For reference, the Terrestrial Study Areas and Aquatic Study Areas as depicted in the EIS are shown in Figure 1-1 and Figure 1-2, respectively.

The Operation has the potential to interact with many aspects of the environment. For the purpose of the plan such interactions can be divided into two categories - those with the Terrestrial Environment and those with the Aquatic Environment. Each of these main categories consists of several sub-categories on which potential Operation interactions have been evaluated as part of the EIS and for which mitigations have been proposed. The scope of the BdMP applies to the area of the Operation that

will undergo changes during site preparation, construction and/or commissioning phases of the Operation to accommodate the advancement of the Operation and the associated monitoring.

The BdMP applies to individuals working for or on behalf of Denison, including employees and contractors, which have a role and/or accountability for the development, implementation and maintenance of this Plan.

Denison will make reasonable efforts that suitably qualified (licenced where applicable) contractors are used for the transport of materials, supplies and waste materials, and that contractors have appropriate controls and management plans in place to reduce the likelihood of incidents during transport. Similarly, Operation components under the management and maintenance by third parties are outside the scope of this BdMP. The scope of the BdMP applies to Operation infrastructure and management under the care and maintenance of Denison.

Monitoring components are inclusive of both terrestrial and aquatic environments and include:

- Vegetation communities (including wetlands)
- Plants
- Terrestrial wildlife
- Species at Risk
- Aquatic habitat
- Fish species
- Benthic invertebrates

The rationale for their inclusion, monitoring objectives and key indicators is provided in Section 5, Monitoring and Evaluation.

1.3 Objectives

At a high level, the BdMP supports the *Environmental Management Program*, and acts to highlight potential Operation-related impacts on the environment as it concerns biodiversity, the associated mitigation measures for these impacts, and subsequent monitoring to determine mitigation success, in accordance with the current development plan of the Project.

The specific objectives of the BdMP are as follows:

- Protecting and conserving biodiversity in the area of the Operation;
- Maintaining benefits from ecosystem services in the area of the Operation;
- Respecting the mitigation hierarchy by avoiding or mitigating biodiversity loss, with the objective of maintaining and promoting the sustainability of diversity of species, habitats and ecosystems and the integrity of ecological functions, as documented in the Environmental Impact Statement (EIS), and its supporting documents;
- Being responsive to regulatory/statutory requirements, including for example requirement associated with invasive species, species at risk, sustainable use of resources, wildlife management, waste management, pollution prevention and water management;

- Being responsive to commitments made to Indigenous Nations and communities regarding management of biodiversity through agreements and ongoing engagement;
- Proposing a monitoring framework to ensure mitigation measures are properly implemented;
- Proposing a reporting and communications framework that would guide the collation and dissemination of information related to the BdMP; and
- Proposing an adaptive management framework that describes the way information generated by the BdMP would be considered understanding that the BdMP is a living document that will evolve over time.

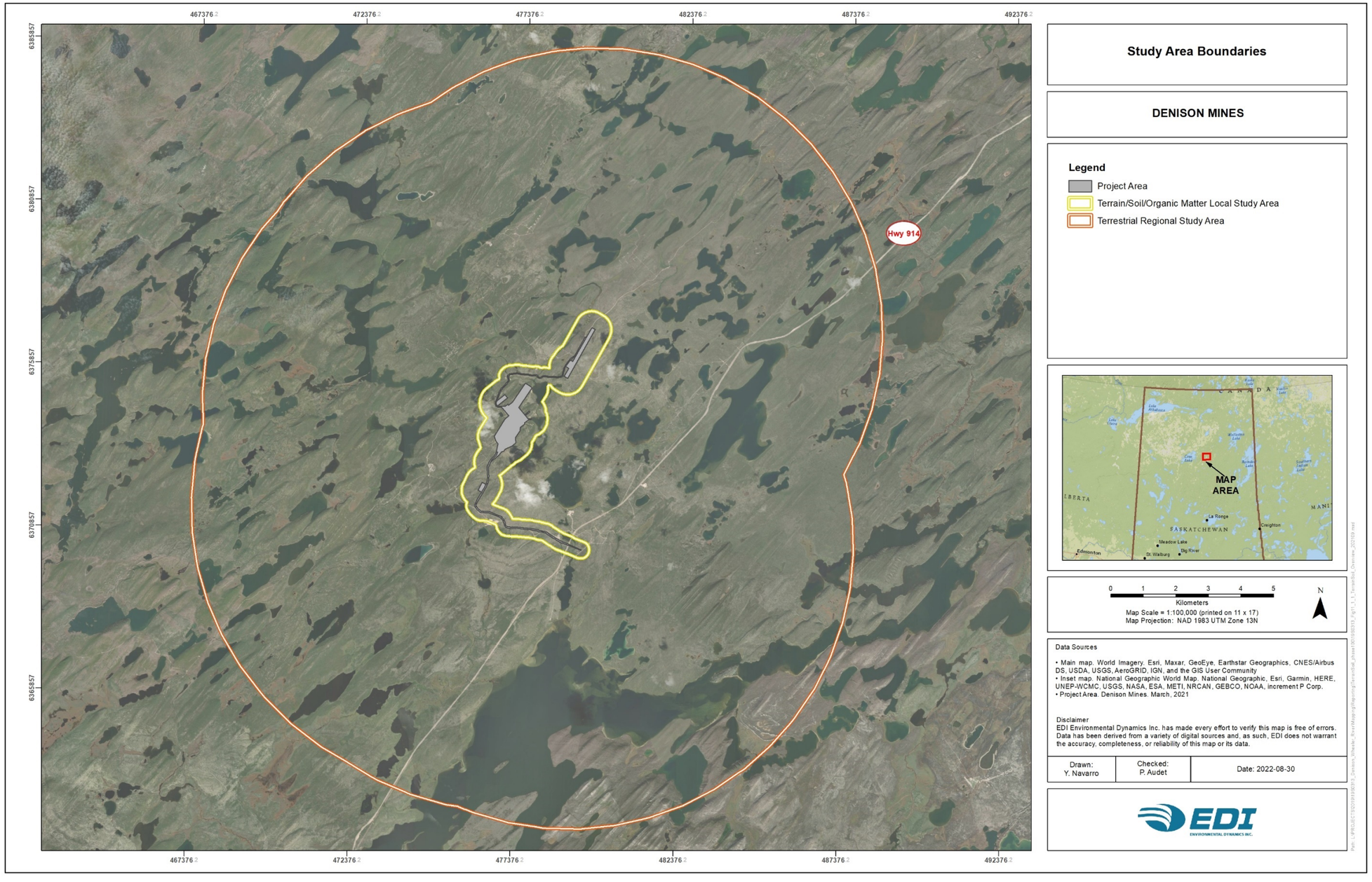

Figure 1-1: Terrestrial Local and Regional Study Areas

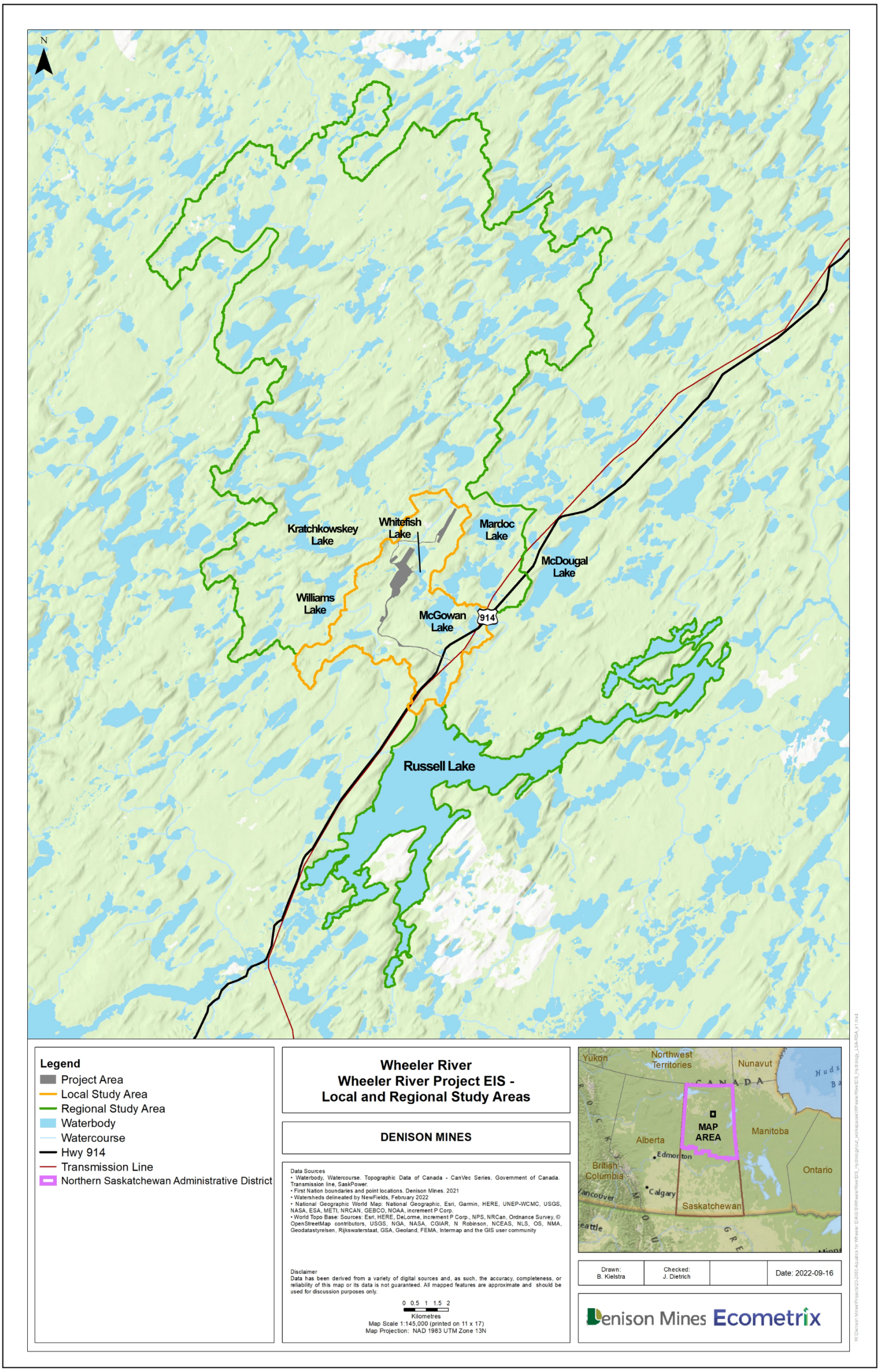

Figure 1-2: Aquatic Local and Regional Studie Areas

1.4 Context to Developing the BdMP

This section of the BdMP provides an overview of the corporate, regulatory, and other guidance that together create the context for development of the BdMP.

There is no direct federal or provincial regulatory requirements call for the development of a BdMP. As part of the *Management System Program* for the Operation, the BdMP provides useful support as a component of the EMP. Provision for a BdMP was made in the EIS though discussion of various biological management and monitoring plans. The BdMP encompasses high-level aspects of the EMP, EIS and Environmental Risk Assessment (ERA) where biodiversity is a concern, and it is seen as a key document where various Operation-specific mitigations are collated so that there can be an accounting of, and the means to assess, the success of mitigations associated with biodiversity management and protection.

From a corporate perspective, the BdMP is informed by Denison's Environmental, Health, Safety and Sustainability Policy and its Indigenous Peoples Policy, which can be found at the following website:

https://denisonmines.com/about-us/corporate-governance/corporate-policies/

1.4.1 Relevant Guidance

In addition to regulatory requirements from federal and provincial acts and regulations, which are summarized in other documentation such as the EIS and ERA, Denison has consulted other guidelines, policies, standards, and codes in developing this BdMP, as follows:

- Canadian Environmental Assessment Agency
    - Determining Whether a Designated Project is Likely to Cause Significant Adverse Environmental Effects under the Canadian Environmental Assessment Act, 2012 (CEAA 2018)
    - Reference Guide Considering Aboriginal Traditional Knowledge in Environmental Assessments Conducted under the Canadian Environmental Assessment Act, 2012 (CEAA 2015b)
- The Federal Policy on Wetland Conservation (Government of Canada 1991)
- Various CNSC regulatory documents, including:
    - REGDOC-2.9.1 Environmental Protection – Environmental Principles, Assessments and Protection Measures (CNSC 2020)
    - REGDOC-3.2.2 Indigenous Engagement (CNSC 2019b)
- Various Canadian Standards Association standards, including:
    - N288.4-19 Environmental monitoring programs at nuclear facilities and uranium mines and mills (CSA 2019)
    - N288.5-22 Effluent monitoring programs at nuclear facilities and uranium mines and mills (CSA 2022)

1.5 Indigenous and Local Knowledge and the BdMP

Section 2, Roles and Responsibilities of the BdMP discusses Indigenous Knowledge (IK) and Local Knowledge (LK). Denison recognizes that IK systems offer an alternative source of knowledge, often complementary to western science. Inclusion of IK and LK alongside western scientific knowledge has been considered throughout the BdMP. Details regarding how IK and LK are defined, their role in understanding existing conditions, and the methods by which they are gathered, are provided in detail in the EIS document. A brief definition of each is provided below.

Indigenous Knowledge (IK) also can be understood as the unique and collective knowledge of Indigenous peoples that may include, but is not limited to, the environmental, cultural, economic, political, and spiritual conditions of a community or region (CEAA 2015). *Local knowledge (LK)* is defined as specialized knowledge developed through long-term association, interaction, and cumulative experience (IAAC 2020). It is context-specific and unique. Local knowledge can be held by individuals, organizations, or communities. Local knowledge holders can be Indigenous or non-Indigenous (IAAC 2021).

1.5.1 Integration of Indigenous and Local Knowledge

Denison has actively solicited Indigenous Knowledge and Local Knowledge from various interested parties through its engagement activities. Prior to sharing and collecting Indigenous Knowledge, local protocols and procedures developed by the Indigenous Communities of Interest (COI) for the management of Indigenous Knowledge were consulted and followed. Consideration was also given to consent processes directed by the community to approve what information becomes publicly accessible and included in the EIS. For all sources of Indigenous Knowledge, guidance was sought on how specifically the knowledge should be treated and respected through a funding agreement process.

Denison has recorded and stored information regarding Indigenous Knowledge, Local Knowledge, and engagement activities in an Engagement Database. Within the database, records are given unique identification numbers. These numbers are referenced throughout the EIS, but particularly in Parts II and III, to indicate where specific information from the database has been integrated into the assessment.

As of the publication of this version of the BdMP the following is noted with respect to the availability and integration of IK:

- Denison has received permission to use and reproduce English River First Nation (ERFN) land use mapping located in the Project Terms of Reference (Denison 2019).
- Denison also has received permission to use two ERFN summary documents of a health and socioeconomic study (ERFN and SVS 2022a) and a Traditional Knowledge study (ERFN and SVS 2022b) as per ‘Permitted Purposes’ defined in an ERFN/Denison Participation and Funding Agreement. Denison fully funded both studies.
- The Kineepik Métis Local #9 of Pinehouse has provided permission (Denison 2019) to use Geographic Information System (GIS) data collected as part of 2011 and 2018 use and occupancy studies (Tobias and Associates 2018a).

2 Roles and Responsibilities

The BdMP applies to individuals working for or on behalf of Denison, including employees and contractors, which have a role and/or accountability for the development, implementation, and maintenance of this Plan.

Denison will make reasonable efforts that suitably qualified (licenced where applicable) contractors are used for the transport of materials, supplies and waste materials, and that contractors have appropriate controls and management plans in place to reduce the likelihood of incidents during transport. Similarly, Operation components under the management and maintenance by third parties are outside the scope of this BdMP. The scope of the BdMP applies to Operation infrastructure and management under the care and maintenance of Denison.

All persons working for or on behalf of Denison Mines Corp., including employees and contractors, have a role in the successful implementation and maintenance of the BdMP. The responsibilities specific to key roles for the management, monitoring, and implementation of the BdMP are provided in Table Table 2-1: Roles and Responsibilities.

Table 2-1: Roles and Responsibilities

Title	Role(s) and Responsibility(ies)
Vice President, Environment, Sustainability & Regulatory	Ensures adequate resources and commitment at the corporate level are available to enable implementation of the BdMP. Accountable for the overall environmental performance, including the outcomes of this BdMP.
General Manager (Wheeler River)	Directs overall operations in the Project site, ensuring adequate resources are available to enable implementation of the BdMP.
Environmental Manager/Coordinator (Wheeler River)	Ensures the day to day implementation of this BdMP. Ensure that all relevant records are effectively maintained on site. Ensure employees are competent and appropriately qualified through training and awareness programs. Directs monitoring programs related to the BdMP. Responsible for reporting associated with the BdMP.
Environmental Technologist / Technician (Wheeler River)	Implements BdMP monitoring at direction of Environmental Coordinator. Responsible for accurately collecting and reporting data in a timely fashion. Observes operations and reports any unusual conditions related to environment.
Equipment Operators (Wheeler River)	Complete applicable training in clearing activities, soil salvage, soil handling, and erosion and sediment control. Conduct clearing/grubbing and soil salvage/handling activities according to defined criteria.
Employees (Wheeler River)	Follow direction provided by the General and Environmental Managers. Show due care not to cause environmental harm. Notify Supervisor/Environmental Manager of any environmental non-compliance.
Construction Manager (construction phase)	Collaborate with the Environmental Manager to provide wildlife and vegetation awareness training to Operation personnel and contractors. Collaborate with the Environmental Manager to plan soil handling activities with respect to invasive plant management.
Contractors / Construction personnel	Ensure operations are undertaken in accordance with instructions.

	Ensure appropriate notification and response in the event of an environmental incident. Show due care not to cause environmental harm.

3 Supporting Baseline Information

Section 3 of the BdMP discusses the existing environmental conditions at a summary level within the spatial context described in Section 1.2, Scope. The characterization of existing conditions establishes the basis on which change that may result from the implementation of the Operation can be examined and is therefore foundational to the BdMP. For reference, a brief overview of these existing conditions is provided below. More detailed information regarding the terrestrial environment (vegetation and ecosites, wetlands, wildlife and wildlife resources, avian species and avian resources, and species at risk) and the aquatic environment (fish and fish habitat and benthic invertebrates) is presented in the EIS and its supporting documents.

The Operation is located in the Wheeler River Upland Landscape Area of the Athabasca Plain Ecoregion (McLaughlan et al. 2010). This area experiences a largely natural fire regime, and much of the vegetation in the area is in various stages of post-fire regeneration. Open stands of jack pine and jack pine-black spruce forests dominate the drier upland areas with a thin ground cover of lichen and blueberry. Black spruce, and less commonly tamarack, are the dominant forest types in wetter lowland areas, including bogs and fens, where Labrador tea is a common ground cover. White spruce, aspen, balsam poplar, birch, and willow are less common.

3.1 Terrestrial Environment

3.1.1 Vegetation Communities and Ecosites

Project baseline studies for vegetation presented a description of the ecosystems/habitat types (i.e., ecosite classifications) within the Terrestrial RSA. Vegetation communities and ecosystems are represented by provincial ecosite classifications for the Boreal Shield Ecozone in accordance with the Field Guide to the Ecosites of Saskatchewan's Provincial Forests (McLaughlan et al. 2010). These ecosite classifications were summarized within a 1:20,000 interpreted ecosite mapping product compiled within the Terrestrial RSA with the use of the following inputs:

- 1:5,000 anthropogenic features mapping;
- historical fires data;
- provincial Predicted Ecosite Mapping;
- current and historical imagery; and
- field sampling/ground truthing sites (Omnia 2020, see Appendix 9-B).

As the Boreal Shield Ecozone experiences a largely natural fire regime, much of the vegetation within the Terrestrial RSA (70.6%) is comprised of post-fire regeneration (i.e., shrubby structural stages). Twenty (20) upland ecosites were identified within the RSA with relative percentages by area estimated for each ecosite code.

The assessment also identified fourteen (14) wetland ecosite types within the RSA which included swamps, bogs, fens, and shallow open water ecosite codes. The area of these wetlands was also estimated to provide a relative aerial percentage of representation within the RSA.

This cataloguing of ecosite presence and relative aerial composition across the RSA provides the basis for understanding landscape change and succession over the course of the construction and operation of the Wheeler River Operation.

3.1.2 Plants

Baseline surveys conducted in 2020 included an investigation of plant structural diversity and species richness (Omnia 2020). The purpose of the detailed vegetation and wildlife habitat characterization field surveys was to describe and quantify the ecological and botanical conditions within recurring mapped Ecosite types and regeneration forests. By sub-sampling sites representative of each mapped Ecosite type and regeneration stage, information was obtained to describe, evaluate, and map the relative ecological importance and integrity of landscapes in the study area. The data collected at sampling sites also allowed for an evaluation of structural and compositional diversity and species richness components.

Structural diversity is a measure of the manner in which species are arranged vertically into categories within an ecosystem (Kimmins 1997). Vegetation structure is therefore based on size and physical features (e.g. trees, tall shrubs, forbs, etc.) rather than taxonomy. The structural complexity of an ecological community is positively correlated with the diversity of animal life (Meffe et al. 1997). This is especially true for vertebrate wildlife species that require unique and variable reproductive, forage, and cover opportunities or “niches” for survival and reproduction.

Areas with high structural diversity also tend to provide greater amounts of hiding cover. The number of species present and their relative abundance are measures of species diversity and richness (Kimmins 1997). A fundamental principle of conservation biology is to protect sites that support high levels of local “species richness” (the number of organisms present in an area) (Noss 1990; Council on Environmental Quality 1993). Ecosystems that support a high level of diversity of plant species tend to be structurally diverse and productive (Meffe et al. 1997) and these areas in turn support a wide variety and abundance of insect and animal forms (Omnia 2020).

Methods of obtaining structural diversity and species richness for representative ecosites are further detailed in the Wheeler River Project Terrestrial Environment Wildlife Vegetation Baseline Inventory (Omnia 2020). This information may be used to assess similar metrics through the construction and operation phases of the Wheeler River Operation.

3.1.3 Terrestrial Wildlife

3.1.3.1 Fur-bearers and Ungulates

Terrestrial animals in the area include moose, woodland caribou, grey wolf, mink, pine-marten, snowshoe hare, black bear, fox, and a variety of migratory and year-round resident birds such as ducks, grouse, songbirds, and raptors. Previous winter track count surveys were undertaken by Omnia (2020) under the following objectives:

- Determine the presence/not-absence of winter-active animals;
- Determine the relative abundance of winter-active animals;
- Enhance the project specific area understanding of species-Ecosite affiliations; and
- Provide a scientifically defensible baseline for potential follow-up/monitoring requirements.

Ungulates, carnivores, small mammal, and game birds were detected at varying levels of abundance across different ecosites. These surveys were also augmented by a small mammal trapping program across different ecosites. The species richness and species-specific catch per unit effort was recorded and can be used for comparative purposes in the future. This information may be used to assess similar metrics through the construction and operation phases of the Wheeler River Operation.

3.1.3.2 Amphibians

Baseline nocturnal amphibian call surveys were undertaken by Omnia (2020) in both 2016 and 2018 at representative ecosites and wetlands following provincial protocols. The species detected and the detection rate (i.e., species detected per ecosite plot) was recorded and can be used for comparative purposes with respect to future understanding of amphibians' contribution to overall biodiversity in the RSA and LSA.

3.1.3.3 Avian Species

Breeding songbird point count call surveys was undertaken by Omnia during baseline studies for the Project. These surveys were conducted for the purpose of:

- Document the diversity of breeding songbirds within the project area;
- Describing the relative abundance and diversity of breeding songbirds by Ecosite/vegetation cover types; and
- Determine the presence/not-absence of known or potential avian species at risk.

Point counts were established within representative habitat types (Ecosites/vegetation cover types) in the project area and spaced at least 250 m apart. Point counts were predominantly located at minimum 100 m from any anthropogenic features.

Analysis of breeding songbird data included species richness and diversity, species presence, relative abundance (by species and habitat), habitat use, and detection of species at risk. A total of 101 survey points were completed across 21 Ecosites/vegetation cover types. A total of 319 indicated pairs, representing a mean detection rate of 3.2 pairs per survey point, and a Shannon-Wiener diversity index of 2.9 with an evenness value of 0.8, were observed in the project area. Thirty-six unique species were detected during the survey.

Aerial waterfowl and raptor stick nest surveys were also conducted to assess presence/not-absence, diversity and abundance of breeding waterfowl and occurrence of active, inactive, and old raptor nests. These results taken in tandem with the breeding bird surveys provided a more holistic understanding of avian biota in the study area.

This information along with more detailed results for each ecosite type can provide the basis for comparison during construction and operation phases, thereby allowing for a continued assessment of biodiversity within the RSA.

3.1.3.4 Species at Risk

Species currently listed under the Species at Risk Act (SARA) are listed in Table 3-1: Wildlife Species At Risk Considered in the Wheeler River Project EIS. These have been discussed within the EIS and potential impacts assessed. Continued monitoring of the presence/non-presence, relative abundance of these species was conducted as part of baseline surveys. The surveys discussed previously in Sections 3.1.3

provide the basis for future biodiversity monitoring. It should be noted that the SAR identified below have not been specified as requiring a Project specific management of compensation plan. The exception to this is for Woodland Caribou for which a Conceptual Management Plan has been prepared. The implementation of this and any other species-specific compensation or management plan will be required and reported on outside the scope of the BdMP. However, the results of these additional plans can be incorporated into the overall performance criteria of the BdMP.

Table 3-1: Wildlife Species At Risk Considered in the Wheeler River Project EIS

Common Name	Scientific Name	Provincial Status	SARA Schedule 1 Designation
Nine-spotted Lady Beetle	*Coccinella ovemnotata*	S4	Endangered
Transverse lady beetle	*Coccinella transversoguttata*	S4	Special Concern
Yellow-banded bumble bee	*Bombus terricola*	S4	Special Concern
Northern leopard frog	*Lithobates pipiens*	S3	Special Concern
Little brown myotis	*Myotis lucifugus*	S4B, S4N	Endangered
Northern myotis	*Myotis septentrionalis*	S3	Endangered
Wolverine	*Gulo gulo*	S2	Special Concern
Woodland caribou	*Rangifer tarandus caribou*	S3	Threatened
Bank Swallow	*Riparia riparia*	S4B, S5M	Threatened
Barn Swallow	*Hirundo rustica*	S4B	Threatened
Common Nighthawk	*Chordeiles minor*	S4B	Special Concern
Horned Grebe	*Podiceps auritus*	S5B	Special Concern
Olive-sided Flycatcher	*Contopus cooperi*	S4B	Special Concern
Rusty Blackbird	*Euphagus carolinus*	S3B, SUN	Special Concern
Short-eared Owl	*Asio flammeus*	S3B, S2N	Special Concern
Yellow Rail	*Coturnicops noveboracensis*	S3B	Special Concern

3.2 Aquatic Environment

3.2.1 Fish and Aquatic Habitat

Baseline fish and fish habitat surveys in the LSA and RSA were performed in a combination of lentic (lakes and ponds) and lotic (streams and rivers) environments. Aquatic habitat surveys were undertaken in September 2016, coincident with biological sampling (fish and benthos) that was conducted at that time and included the collection of bathymetric and water quality data, as well as observations of physical shoreline and lake/pond/stream substrate features. (Ecometrix 2020).

At lake and pond locations, aquatic habitat data collected included bathymetry, adjacent land uses and terrain, aquatic, riparian, and adjacent vegetation, and shoreline features, including locations and descriptions of inlets and outlets and substrate characterization. The distribution of aquatic macrophyte species in lake locations was documented, with distinction being made between emergent, floating, and submergent communities. Photographic documentation demonstrating the nature of the aquatic habitats present within the subject waterbodies was obtained (Ecometrix 2020).

At stream locations, aquatic habitat characterization involved the assessment of physical, biological, and chemical characteristics. Recorded data included mean channel width, depth, and flow velocity, bank stability, stream morphology (i.e., pool, riffle, run, and flat), stream gradient, channel type, canopy cover, instream cover, and substrate type. Additional notes were collected on the surrounding terrain characteristics, dominant terrestrial vegetation, dominant aquatic vegetation, adjacent land use, amount of sediment overlaying substrates, and the amount of algae overlaying substrates (Ecometrix 2020).

The information collected by consultants was amalgamated with information provided by local resource users and Indigenous groups to create comprehensive habitat mapping that identified sensitive (spawning, nursery, and overwintering). This information was provided in the EIS and provides the basis for future comparisons of habitat availability for key species.

3.2.2 Fish Species

Fish surveys were completed in the LSA and RSA for identified river, stream, and lake features that support a variety of fish species, including Lake Trout, Lake Whitefish, Northern Pike, Walleye, Yellow Perch, Arctic Grayling, and several sucker and forage fish species. The survey of representative habitats provided using multiple gear types and techniques provided a baseline assessment of fish species richness, diversity and relative abundance (i.e. catch-per-unit-effort). These results provide a baseline for the study area for future comparison during construction and operation phases for the Wheeler River Operation.

3.2.3 Benthic Invertebrates

Benthic macroinvertebrate samples were collected from selected lakes for taxonomic analysis in 2016. Samples were collected at the same locations from which sediment quality samples were collected. Supporting environmental/limnology measurements, including pH, water temperature, conductivity, secchi depth, and general sediment descriptions, were recorded at each location. Detailed benthic invertebrate collection data are provided in Ecometrix (2020). Taxonomic identification of the samples allowed for the assessment of several benthic invertebrate community endpoints including:

- total invertebrate density (i.e., number of individuals per m2);

- invertebrate richness (i.e., number of unique families);
- Simpson's Diversity (D);
- Bray-Curtis Dissimilarity Index (B-C);
- Simpson's Evenness (E);
- relative and absolute density of invertebrate taxa groups based on their feeding strategy (i.e., functional feeding groups);
- density of major invertebrate taxonomic groups (i.e., sum of individuals within each group); and
- relative density of major invertebrate taxonomic groups (i.e., proportion of individuals within each group relative to the total).

The information collected during baseline for the benthic invertebrate community was done in a repeatable fashion, which will allow for the periodic assessment of change over time. Furthermore, the endpoints assessed provide a reasonable approach to investigating changes in biodiversity over time.

4 Implementation of Mitigation Measures

The BdMP addresses planning, management and/or monitoring activities, over the construction and operation phases of the Operation to meet objectives as listed in Section 1.2, Scope. The proper planning and timely implantation of mitigations measures will limit the environmental effects on terrestrial and aquatic habitats and biodiversity.

4.1 General Approach

Standard practices and general environmental protection measures for mining projects will address project-related effects. Many of these are Project design related and are listed in this section. The list in this section is not exhaustive and additional details are provided in the EIS.

Potential adverse effects on Vegetation and Ecosystems, Listed Plant Species, and Wetlands VCs will be avoided or minimized to the extent possible through Project design:

- The Project Area (i.e., the area of maximum physical disturbance) has been reduced to the extent practicable resulting in limited vegetation disturbance, considering human safety.
- Much of the proposed Project footprint will be developed within previously disturbed areas, including roads currently used for exploration activities, thereby minimizing additional habitat disturbance.
- The powerline to the main substation at the site is short (approximately 7 km) and will be tied into the existing provincial power line adjacent to Highway 914.
- During Operation, progressive reclamation will be completed where possible, and the progress and success of these activities will be assessed annually[1].
- Cleared brush will be stockpiled, when possible, to be used in progressive reclamation.
- Ongoing decommissioning of Project components will be completed when possible.

[1] KML and NVP 2022.

- Dust deposition on vegetation and waterbodies (including potential deposition of COPC) will be reduced by:
    - directing processing plant exhaust from drying and packaging areas through a scrubber prior to release outside of the building;
    - designing the stack height based on results of air dispersion modelling to be an appropriate height for optimal dispersion;
    - controlling access to the property with both a north and south security gate;
    - making a wash bay available to clean items, equipment, and vehicles that may have been in contact with potentially contaminated materials. Contaminated water from the wash bay will be collected in a sump tank and routed to the water treatment plant for treatment and discharge;
    - conducting radiological clearance scanning as required for any items, equipment and vehicles leaving the Project Area; and
    - watering and traffic controls on roads.
- Bulk storage tanks for processing chemicals such as sulphuric and/or hydrochloric acid, sodium hydroxide, and hydrogen peroxide will sit inside appropriately designed and sized secondary containment basins, physically separated from the containment basins for other chemical systems.
- Surface pipelines will be designed to have secondary containment or catchment and have leak detection systems in place at key locations.
- A freeze wall will be established around the uranium deposit to reduce groundwater disturbance.
- Mining solution and process water will be reused throughout the mining process, reducing freshwater use requirements to the extent feasible and reducing the volume of treated effluent requiring discharge. Make-up water will be preferentially sourced from site runoff where possible.
- Double-walled high-density polyethylene (HDPE) or equivalent piping will be used in the wellfields and will be freeze protected and secured to minimize pipe movement.
- Contaminated wastes (e.g., mineralized drill cuttings, solid impurities removed from mining solution, dewatered reject solids) will be properly contained on a double lined waste pad with leak detection capabilities and an associated monitoring program. An adjacent pond will be used to collect runoff from the pad and water in the waste pond will be piped to the water treatment plant. Such waste will be disposed of either on site or off site at an approved facility.
- The ISR wellfield and processing plant will be designed to re-use most of the solutions inside each circuit; any excess water will be treated and then released to a surface water body once acceptable water quality is achieved. All treated effluent released to surface water will meet federal and provincial regulatory discharge limits.

As not all effects on Vegetation and Ecosystems, Listed Plant Species, and Wetlands can be addressed through design, additional mitigation measures are planned, as described in the following subsections.

4.2 Vegetation Communities, Ecosites and Plants

Mitigation measures specific to the Vegetation, Ecosites (including wetlands), and Plant Species, discussed in the following subsection are applicable during all Operation phases and expected to be effective immediately following implementation and managed through the EMP.

Disturbance Reduction

- Disturbance to vegetation and soils will be avoided by clearly delineating Project Area boundaries (e.g., with the use of fencing, staking, or flagging), adhering to construction plans and schedules, and by restricting off-site machine use.
- Wetland boundaries in the proximity of planned disturbances will be clearly delineated (e.g., with the use of fencing, staking, or flagging) to facilitate avoidance to the extent practicable.
- Should they occur, areas prone to potential instability and areas in proximity to water bodies and drainage features will be identified and appropriate setbacks will be established and maintained.
- Temporary workspaces or laydown areas will be sited and constructed within existing disturbance or on previously compacted soils, where practicable. In areas requiring clearing only, grubbing will be avoided, and roots and groundcover will be retained to the extent feasible.
- Pre-construction listed plant surveys will be completed within the Project Area.
- Listed plants located adjacent to planned disturbances will be clearly delineated (e.g., with the use of fencing, staking, or flagging) to facilitate avoidance to the extent practicable and reduce the potential for accidental encroachment outside of the Project footprint.
- Should Listed Plants be identified within the Vegetation LSA prior to Construction, site- and species-specific mitigation measures to avoid and/or limit Project effects will be determined by a Qualified Vegetation Ecologist. Specific mitigation measures will depend on the species, its life history characteristics, time of year, and the location of the occurrence in relation to Project activities.
- Herbicide use will be avoided within 100 m of any known listed plant occurrences. Where herbicide use is unavoidable, use will be restricted to direct application instead of broadcast spraying and completed by qualified personnel.

Soil Handling and Reclamation

- Construction activities will be sequenced (i.e., site clearing, grading preparations, major earthworks, and construction of infrastructure/facilities) so that surface vegetation, mineral soil and organic matter can be salvaged for later use in Project Decommissioning.
- Soil resources within the Project Area will be stripped/salvaged and stockpiled within the Project Area in accordance with relevant soil management BMPs, i.e., providing guidance on ground-truthing soil conditions, flagging potential hazards and sensitivities, and modifying practices in relation to environmental conditions and avoiding or minimizing inadvertent/incidental disturbance.
- A soil monitoring program/protocol (or equivalent) will be undertaken to verify soil salvage volumes and reclamation suitability.

- Soil stockpiling locations will be sited to reduce soil handling and travel distances and designed to minimize the potential for soil degradation and downgradient effects, e.g., having defined height and width that optimize soil storage and stockpile stability, and having integrated erosion control measures and surface water management features (if/where necessary). Sediment and erosion control measures will be implemented in accordance with BMPs and commensurate to site conditions and sensitivities.
- Sediment and erosion control measures and surface water management features will be installed and maintained at the Project. Erosion controls (e.g., sediment fencing, check-damns and/or sediment ponds) will be installed as necessary and at the discretion of construction personnel commensurate to site conditions and sensitivities to manage/mitigate erosion and sedimentation.
- Progressive reclamation and ecosystem-based revegetation will be conducted on disturbed areas as soon as practicable with the use of suitable native species and in accordance with the Preliminary Decommissioning Plan.

Surface Water Management

- Snow melt and runoff will be controlled within the Project Area to prevent the potential release of contaminated runoff from affecting vegetation in adjacent areas.
- Sediment and erosion control measures will be implemented in accordance with the EMS.
- Surface water management features (e.g., culverts and ditches) will be constructed and maintained (as per Project design specification) along access roads and facility sites to facilitate surface drainage continuity and hydrologic connectivity—especially in proximity to wetlands, water crossings, and waterbodies.
- Hydrologic connectivity is expected to be maintained across the Project Area with the engineering, construction, and maintenance of surface water management features (e.g., culverts and ditches) as appropriate and as per Project design specifications along access roads and at facility sites.

Invasive Plant Management

- Equipment and vehicles will arrive at the Project Area clean, and will be inspected for soil, plant material, and seeds, and cleaned as appropriate, to limit the potential for the introduction of invasive plants and noxious weeds.
- Areas with a high risk for the potential spread of invasive plants and noxious weeds (i.e., within or adjacent to existing infestations) will be avoided to the extent practicable; if work must occur in these areas, invasive plant management will be implemented before starting work.
- Gravel, fill, straw matting, or similar materials to be used for erosion control will be inspected to minimize the potential for seeds or propagules of invasive plants being brought to site.
- All employees and contractors on the Project will receive an employee orientation appropriate to the work they are undertaking, including instruction on the definition of invasive plants and their potential effects, mitigation measures to avoid the introduction and spread of invasive plants, and training on the presence and identification of common invasive plant species and those known to occur within the Project Area.

- Invasive plant monitoring will be conducted periodically by personnel skilled in invasive plant identification during all Project phases to assess, evaluate, and document invasive plant occurrences within the Project Area. Invasive plant surveys will be completed during a biologically appropriate time of year (e.g., when invasive plants can be identified) within areas identified as most susceptible to invasive plant introduction and spread, including roads, ROW, debris, and vegetation management areas (e.g., slash piles, timber decks, exposed soil or stockpiles) and other regularly disturbed habitats.
- Three general treatment options may be used alone or in combination to control of invasive plants in the Project Area:
    - mechanical control – involves the physical removal of the plants;
    - chemical control – involves application of synthetic and/or natural herbicides; and,
    - biological control measures – involves use of living organisms (e.g., rusts, insects) to control selected invasive plant species.
- The type of treatment option selected for an invasive plant occurrence will be based on a combination of specific information including the identity of the invasive plant species and its provincial designation, the size and extent of the occurrence, time of year, the proximity of the occurrence to other susceptible areas (e.g., rare plant occurrences, wetlands, waterbodies), and the available control options. Where possible, control of invasive plants will be completed in consultation with a qualified professional to minimize potential effects on native vegetation, ecosystems, and wetlands.
- Seed used during re-vegetation will be certified weed free, with a valid “Certificate of Seed Analysis”.

4.3 Terrestrial Wildlife

In addition to the measures listed above that will mitigate impacts to vegetation and ecosites, the following will be implemented to further mitigate potential impacts to terrestrial wildlife including mammals, amphibians, and avian species.

Wildlife Education

- Employees and contractors will be provided with wildlife education and awareness training, including education about potential wildlife issues on site and training on the mitigation measures summarized in the Woodland Caribou management framework to avoid or minimize potential Project effects on wildlife and wildlife habitat.
- Employees and contractors will be educated on waste management policies that limit human-wildlife interactions.
- Designated employees will be trained in appropriate wildlife deterrent techniques to minimize wildlife interactions with the Project.
- Employees and contractors will be requested to report wildlife observations, including prompt reporting of caribou observations and immediate communication to on-site staff. Wildlife encounters and outcomes will be monitored, and logbooks will be used to record wildlife observations. Logbooks and reports will be available to employees.

Wildlife and Habitat Protection

- Personal firearms for employees and contractors will be prohibited within the Project Area to prevent hunting activities.
- If any individual were seeking access around the Project area to undertake Aboriginal and / or Treaty Rights, Denison staff would facilitate this, provided it were safe to do so given activities in the area.
- Policies will be implemented prohibiting employees and contractors from feeding, approaching, or harassing wildlife species within the Project Area.
- To support wildlife habitat regeneration, progressive reclamation and ecosystem-based revegetation will be conducted on disturbed areas as soon as practicable in accordance with the Preliminary Decommissioning Plan.

Work Timing Windows

- Project activities will be assessed for their potential to disturb or remove wildlife and/or wildlife habitat (e.g., site clearing, soil disturbance) to determine potential effects on wildlife and wildlife habitat and whether additional mitigation measures may be required. If sensitive wildlife features are found, they will be documented (e.g., photographs, GPS location recorded). The data collected would inform the development and implementation of appropriate mitigation measures (e.g., appropriate set-back distance for Project activities and/or consideration of timing windows as per the Saskatchewan Activity Restriction Guidelines for Sensitive Species (SK MOE 2017), in consideration of applicable laws and regulations (e.g., *Migratory Birds Conservation Act, Wildlife Act*).
- Site clearing and other works that involve disturbance of vegetation and/or soil will be completed during least-risk timing windows for wildlife (Appendix A; outside of denning and calving periods) to avoid disturbance during sensitive time periods, whenever practicable.
- Pre-construction wildlife clearance surveys will be conducted within the Project Area in accordance with a wildlife monitoring plan and the Woodland Caribou management framework. This would include surveying for important wildlife features that would include wolverine den sites. Pre-clearing wildlife surveys will be conducted within the Project Area in accordance with a wildlife monitoring plan and the Woodland Caribou management framework.

Wildlife Deterrence and Prevention of Wildlife Entrapment

- In addition to installing secure fencing around all contaminated areas, buildings and other Project components will be designed and maintained to exclude wildlife from using buildings for refuge or shelter, and to deter wildlife from potentially becoming entrapped.
- Buildings and other Project infrastructure will be designed and maintained to exclude birds (e.g., barn swallows) and bats as much as possible. This may include installing solid barriers (e.g., corner slope panels or wooden panels) or flexible barriers (e.g., netting, tarps, or geotextiles) under roof eaves or other exterior surfaces.

Sensory Disturbance

- Noise emitting Project activities will be managed to minimize sensory disturbance of wildlife, especially during sensitive time periods (such as denning and calving) in accordance with wildlife programs and the Woodland Caribou management framework.

- Low sound emission equipment, regular maintenance of equipment, and the use of silencers or mufflers (whenever practical) will be used to reduce noise associated with Project activities.
- Excessive noise-generating activities will be avoided whenever practicable.
- Lighting will be focused on work sites and not surrounding areas, to minimize sensory disturbance of wildlife.
- Dust generation and subsequent deposition on vegetation and in waterbodies (including potential deposition of trace metals and radionuclides) will be limited through dust suppression techniques such as road watering and traffic management.
- Should wildlife habitat features (i.e., dens, burrows, or lodges) be identified during pre-clearing wildlife surveys, they will be marked, and, prior to commencement of any construction-related activities, further action will be determined in accordance with federal and provincial regulations.

Road and Traffic Management

- Traffic and access control measures will be implemented in accordance with erosion and sediment controls established under the EMS, including reducing traffic volume by scheduling truck convoys, using high-volume haul trucks, and restricting public access to the Project site and roads (e.g., private vehicles, snowmobiles, all-terrain vehicles, and foot traffic). It is important to note that if any individual were seeking access around the Project area to undertake Aboriginal and / or Treaty Rights, Denison staff would facilitate this, provided it were safe to do so given activities in the area.
- Appropriate road signage will be installed (e.g., speed limits, wildlife crossings) along Project roads to minimize the risk of wildlife-vehicle collisions.
- Speed limits will be implemented to reduce the risk of wildlife-vehicle collisions.
- Wildlife will have the right-of-way on Project roads, unless it is unsafe to stop (i.e., if a collision is imminent). Vehicles will not be used to encourage wildlife to move off Project roads.
- Processes will be implemented for employees and contractors to slow down and/or stop vehicles/equipment to allow animals to move away or off the road before resuming normal road speeds for the area.
- Employees and contractors will report and communicate the location and circumstances of any roadkill observed on or alongside Project roads. Large bodied wildlife carcasses found will be reported to SK MOE and disposed of as directed to prevent scavenging.
- Vegetation along Project roads will be managed to reduce attractiveness to wildlife (e.g., forage plants) and maintain appropriate sightlines for drivers to minimize wildlife-vehicle collisions.
- Alternative measures on Project roads for de-icing and winter traction (e.g., sand, gravel) or dust suppression (e.g., water) will be implemented, whenever practicable.
- Appropriately sized gaps in the roadside snowbanks during winter will be maintained to facilitate wildlife crossing and escape And, with that, reducing their risk of vehicle collisions.
- New Project site and access roads will be designed to minimize sightlines for predators, whenever practicable, while still maintaining general road safety.

- Ditches and culverts along Project roads will be designed and maintained to minimize pooling of water as roadside pools may attract wildlife.

4.4 Aquatic Environment

Measures to mitigate adverse effects on the aquatic environment including fish habitat, fish species and benthic invertebrates are not inconsistent with those identified above for general design practices and the terrestrial environment. However, additional measures are expected specific to the aquatic environment and are listed below.

- Avoid more sensitive habitats to the extent practicable.
- Maintain existing drainage patterns with the use of culverts, where applicable.
- Maintain access roads by periodically re-grading and ditching to improve water flow, reduce erosion, and manage vegetation growth.
- Inspect culverts periodically. Remove accumulated material and debris upstream and downstream of the culverts to prevent erosion, flooding, habitat damage, property damage, and mobilization of sediment.
- Attenuate peak discharges and augment baseflows to the environment through the use of Project water storage features (i.e., runoff, process water, contact water, monitoring/effluent ponds).
- Maximize the recycle and re-use of process water to reduce freshwater intake and release to Whitefish Lake.
- Design the discharge diffuser/outfall to have the smallest footprint possible while still providing effective mixing and dilution and discharge flows that do not detrimentally affect sediments.
- Adhere, as applicable, to the Interim Code of Practice: End-of-Pipe Fish Protection Screens for Small Water Intakes in Freshwater (DFO 2020a).
- Adhere, as applicable, to the Interim Code of Practice for Temporary Cofferdams and Diversion Channels (DFO 2020b).
- Adhere, as applicable, to the Interim Code of Practice for Temporary Stream Crossings (DFO 2020c).
- Plan in-water works, undertakings, or activities to respect timing windows to protect fish and fish habitat, including their eggs, juveniles, spawning adults, the organisms upon which they feed, and the areas where they migrate. In-water works should be deferred based on the specific waterbody and known species that inhabit the waterbody (Saskatchewan Restricted Activity Timing Windows for the Protection of Fish and Fish Habitat [DFO 2020d]).
- Spring spawning species (northern Saskatchewan) – avoid work between May 1 and July 15.
- Fall spawning species (northern Saskatchewan – Lake Trout present) – avoid work between September 1 and July 15).
- Fall spawning species (northern Saskatchewan – Lake Trout absent) – avoid work between October 1 and July 15).

- Where possible, conduct instream work during periods of low flow (e.g., summer or winter) to further reduce risk to fish.
- Design treated effluent discharge or freshwater intake infrastructure to prevent entrainment or impingement of fish.
- Implement erosion and sediment control measures for the site to reduce potential sedimentation of waterbodies and potential lethal affects to fish, larvae, and eggs.
- Develop site-specific effluent treatment to treat COPC to appropriate release limits in accordance with provincial standards and licence/permit conditions.
- Discharge effluent under a scenario that will meet provincial and federal discharge criteria, as identified through permitting. Scenarios may include:
    - discharging at a fixed rate while maintaining an appropriate minimum dilution ratio (i.e., discharge when able to meet the required dilution ratio and cease discharge during periods when unable to meet the necessary dilution ratio);
    - discharging under a variable waste load allocation (i.e., discharge an appropriate effluent volume based on flow in the receiver to maintain a minimum dilution ratio); and
    - managing discharge via a hybrid of the two previous options (i.e., discharge effluent at a fixed rate to maintain the required dilution ratio, but the fixed rate is varied on a seasonal basis based on flow).
- Collect and monitor contact water to determine whether treatment is required prior to release to the environment. This will inform optimal levels of treatment.
- Maintain the water management system in place during Decommissioning until such time that water quality is suitable to release to the environment.
- Monitor and manage effluent, including contingency for effluent treatment as may be required, so that water discharge objectives are achieved, as defined by applicable provincial and federal regulatory instruments.
- Design and implement an environmental code of practice that defines actions levels and appropriate steps to mitigate elevated concentrations of chemical and radiological constituents
- Workforce members will be transported to/from site via a fly-in/fly-out rotation and will, therefore, not use ground travel options during shift changes, which will eliminate fishing on local lakes during commutes to/from the site and during time off work. Denison site vehicles will not be available for recreational purposes. While at the Project site and off duty, workers may opt to fish local waterbodies. To protect sustainable use of resources, only catch and release of fish will be encouraged, and fish storage or cooking facilities will not be provided.

5 Monitoring and Evaluation

5.1 The purpose of the BdMP monitoring is to evaluate and document performance scope and objectives as described in Section Scope

The BdMP applies during site preparation and construction, as well as commissioning phases of the Operation. The biodiversity monitoring identified in this Plan is intended to apply to future phases of the Operation but may change over the lifecycle of the Operation based on the results of the monitoring and changes in operations.

The BdMP is implemented at varying spatial scales as defined in the EIS documentation since potential environment interactions are both activity and environmental component specific. Conceptually, as presented in the EIS, the following spatial scales have been defined:

- Project Area: the area within which the Project and all components/activities are located (i.e., the Project footprint; the area of maximum physical disturbance).
- Local Study Area (LSA): the area that surrounds the Project Area where both direct and indirect interactions resulting from Project activities can be reasonably measured.
- Regional Study Area (RSA): the area that surrounds and includes the LSA, established to assess the potential, largely indirect interactions of the Project in a regional context and is the scale on which cumulative effects may occur.

For reference, the Terrestrial Study Areas and Aquatic Study Areas as depicted in the EIS are shown in Figure 1-1 and Figure 1-2, respectively.

The Operation has the potential to interact with many aspects of the environment. For the purpose of the plan such interactions can be divided into two categories - those with the Terrestrial Environment and those with the Aquatic Environment. Each of these main categories consists of several sub-categories on which potential Operation interactions have been evaluated as part of the EIS and for which mitigations have been proposed. The scope of the BdMP applies to the area of the Operation that will undergo changes during site preparation, construction and/or commissioning phases of the Operation to accommodate the advancement of the Operation and the associated monitoring.

The BdMP applies to individuals working for or on behalf of Denison, including employees and contractors, which have a role and/or accountability for the development, implementation and maintenance of this Plan.

Denison will make reasonable efforts that suitably qualified (licenced where applicable) contractors are used for the transport of materials, supplies and waste materials, and that contractors have appropriate controls and management plans in place to reduce the likelihood of incidents during transport. Similarly, Operation components under the management and maintenance by third parties are outside the scope of this BdMP. The scope of the BdMP applies to Operation infrastructure and management under the care and maintenance of Denison.

Monitoring components are inclusive of both terrestrial and aquatic environments and include:

- Vegetation communities (including wetlands)
- Plants
- Terrestrial wildlife
- Species at Risk
- Aquatic habitat
- Fish species

- Benthic invertebrates

The rationale for their inclusion, monitoring objectives and key indicators is provided in Section 5, Monitoring and Evaluation.

Objectives and Section 1.3. As such, monitoring is expected to fulfill the following objectives:

- Verification of the accuracy of the EIS for the Operation with respect to biodiversity;
- Determine the effectiveness of the measures taken to mitigate adverse effects of the Operation on biodiversity; and
- Confirm compliance with environmental approvals, permits and authorizations.

Indicators should be used as proxies to monitor impacts on biodiversity. Using indicators is a way to balance costs and results, and they should be selected using the SMART philosophy (specific, measurable, achievable, relevant, and timely). Biodiversity indicators must also be sufficiently sensitive to provide a warning of change before irreversible damage occurs – effectively they must serve to indicate where no significant change is occurring, and also where the threshold between insignificant and significant change lies. Monitoring objectives, key performance indicators and measurable parameters are provided for each monitoring component for the terrestrial and aquatic environments (Table 5-2). It should be noted that for the purposes of the BdMP. For reference it is noted that the BdMP is a “Plan” level document and as such considers the concept of Operation specific biodiversity management, providing relatively high-level guidance pertaining to monitoring, reporting, and communications. This Plan is considered a “living” document and will be update as needed in support of environmental management activities during future permitting, development, and operation phases.

Table 5-1: Monitoring Objectives, Key Performance Indicators and Measurable Parameters

Monitoring Component	Monitoring Objective	Key Performance Indicator	Measurable Parameter
Terrestrial Environment			
Vegetation Communities and Ecosites	To investigate the occurrence, composition, and extent of vegetation communities / ecotypes (including wetlands) within the study area temporally (phases of the project) and spatially	Vegetation Community / Ecosite type complexity and succession over time for within the study area	Count of ecosite types occurring within the defined study area over time
		Aerial extent (total area) of ecotypes within a given study area	Sum of the aerial extent of each ecosite type (including wetlands) within the defined study area over time
Plants	To investigate the species composition within the study area over time and spatially	Species Richness	Total number of plant species recorded within the study area and by ecosite over time
		Structural Diversity	Species composition / diversity by ecotype or habitat type
		Occurrence of invasive species	Total number of invasive plant species in the study area and tracking of expansion (aerial extent)
Terrestrial Wildlife	Assess the frequency and severity of wildlife to project interactions throughout the life of the mine	Wildlife to Project Interactions	Recording Project-related wildlife-vehicle collisions or near misses. Maintaining a wildlife observation log for the Project and associated infrastructure (e.g., access roads)
	Monitoring wildlife use and efficacy of project mitigation measures	Avian species	Periodic breeding bird surveys to describe the relative abundance and diversity of breeding

Monitoring Component	Monitoring Objective	Key Performance Indicator	Measurable Parameter
			songbirds by Ecosite/vegetation cover types
			Periodic aerial waterfowl and raptor surveys to assess presence/not-absence, diversity and abundance of breeding waterfowl and occurrence of active, inactive, and old raptor nests
		Small Mammal Surveys	Small mammal trapping program across different ecosites to determine species richness and species-specific catch per unit effort across differing ecosites
		Fur-bearers and ungulates	Winter track count surveys to determine the presence/not-absence of winter-active animals and determine the relative abundance of winter-active animals
		Amphibian species	nocturnal amphibian call surveys at representative ecosites and wetlands to determine species presence and the detection rate (i.e. species detected per ecosite plot)
Species at Risk	Investigate the continued use of SAR and provincially rare species within the LSA and	Listed or rare species as listed in Table 3-1 and as revised annually	occurrence, relative abundance as assessed during other key performance indicator program

Monitoring Component	Monitoring Objective	Key Performance Indicator	Measurable Parameter
	identify any new SAR listed as potentially occurring in the area		studies (e.g., breeding bird surveys).
			Use of compensatory or re-habilitated structures or habitats
			Any parameters as identified and managed via the project and species-specific compensation or management plan (e.g. Woodland Caribou Management Plan)
Aquatic Environment			
Aquatic Habitat	To investigate the occurrence, composition, and extent of sensitive fish habitats (i.e, spawning, nursery, and overwintering habitats) within the Regional Study Area (RSA) temporally (phases of the project) and spatially	Aerial extent (total area) of sensitive habitats within a given study area (i.e., RSA)	Sum of the aerial extent of each sensitive habitat type within the defined study area over time
Fish Species	To investigate occurrence and abundance of fish species in key habitats	Species richness	Count of species within a given water body over time
		Species composition / diversity	Diversity index of species within a given water body over time
		Species abundance	Relative abundance measured as catch-per-unit-effort within a given water body or habitat over time
Benthic Invertebrates	To investigate occurrence and abundance of fish species in key habitats	Taxa Richness	Total count of taxa per given area
		Taxa Diversity	Simpson's Diversity and Simpson's Evenness
		Taxa Density	Number of organisms per unit area

Monitoring should be implemented at pre-selected sampling locations within the RSA/LSA consistent with those samples during baseline surveys (as able), and as feasible, include sampling locations at a control (reference) site. The collection of data at a control site will enable assessment of the amplitude and source of impacts (i.e. caused by mining activities or due to natural variation).

It is proposed to use remote sensing (LiDAR, multi-spectral imaging and EM38) to monitor the entire target area including control areas. The remotely sensed data will provide information for quantitative comparison of key surface condition parameters in ecosites. Repeat capture and analysis of the multi-spectral imagery will also highlight areas of changes in land cover beyond those found in control areas. Targeted field work can be undertaken in a complimentary way to examine the causes for any changes identified through remote sensing.

Evaluation of each of these measurable parameters should be specific to the parameter and finalized through focused operating protocols and study designs. However, where possible, quantitative means will be employed (i.e., percent change, statistical significance, trend analysis etc.).

In addition to directed field surveys for different biota and habitat types, the following should be considered.

5.2 Vegetation Communities and Ecosites

In order to confirm the effectiveness of mitigation and to verify the conclusions of the EIS/EA for upland vegetation and wetlands, a monitoring program will be conducted to assess potential disturbance to upland vegetation and wetlands during construction and operation, and will include:

- Project footprint tracking through construction and operation.
- Monitoring of the limits of clearing will occur. A visual examination will occur to ensure limits are clearly marked and that the clearing works stay within demarcated areas.
- Annual spatial mapping of the actual Project footprint using GIS with comparison to plan.
- Assess presence of invasive species and target removal through manual, mechanical and/or chemical methods and proper disposal.
- Verification of wetland effects.

Programs to monitor surface water and groundwater during operation of the site will be undertaken (detailed in the environmental monitoring plans). This program will confirm predicted effects of the Project with respect to ground and surface water quality, changes in drainage patterns and surface water flow.

If this program indicates additional mitigation measures are required for water management as part of adaptive management, monitoring of the vegetation communities within the Project development area may be implemented to determine indirect effects during construction and operation phases due to groundwater drawdown and/or changes in surface water.

5.3 Wildlife and Wildlife Habitat

In order to confirm the effectiveness of mitigation and to verify the conclusions of the EIS/EA for wildlife, monitoring will be conducted to assess potential effects to wildlife and wildlife habitat, and will include:

- Recording Operation-related wildlife-vehicle collisions or near misses:
    - Drivers of Operation-related vehicles will be encouraged to report wildlife-vehicle collisions, near misses or observations of a wildlife road mortality including details such as the circumstances of collision (date, time, road conditions, lighting, weather); characteristics of the animal(s) struck by the vehicle (species, number, injury severity); and location (detailed description of the location of incident, the surrounding habitat, UTM if possible).
- Maintaining a wildlife observation log for the Operation and associated infrastructure (e.g., access roads):
    - Operation personnel and contractors will be encouraged to report sightings of wildlife on and around the Operation during construction and operation. In particular, discovery of occupied habitat features (e.g., active dens, beaver dams) for direction on follow-up actions.
    - Operation personnel and contractors working in active zones (e.g., mine site) to relay wildlife sightings to other workers as soon as possible (e.g., by radio).
    - Operation personnel and contractors to report wildlife incidents and encounters related to garbage or other attractants so that corrective action can be initiated.
    - Report SAR occurrences at the Operation site to the appropriate government agency.
- Monitoring wildlife use of the water management ponds, open aquatic areas and other key Operation locations:
    - During operation of the mine, use of open aquatic areas associated with the Operation such as water management ponds / collection ponds will be monitored for use by wildlife, with an emphasis on waterfowl and large mammals such as moose. Wildlife observed will be recorded (species, number, behaviour).

5.4 Aquatic Environment

In order to confirm the effectiveness of mitigation and to verify the conclusions of the EIS/EA for the aquatic biota, monitoring will be conducted to assess potential effects to aquatic biota and their habitat, and will include:

- Reporting as required under the Erosion and Sediment Control Plan during construction and operation;
- Reporting as required under the *Spill Management Plan* and *Environmental Monitoring Plan*;
- During operation of the mine, use of open aquatic areas associated with the Operation such as water management ponds / collection ponds will be monitored for use by aquatic biota; and,
- Information as collected via the Metal and Diamond Mining Effluent Regulation Environmental Effects Monitoring program (MDMER EEM) and specifically any biological monitoring studies will be used to support aquatic biodiversity monitoring.

6 Reporting and Communication

The results of associated monitoring plans will be reported to CNSC and the Saskatchewan Ministry of the Environment (Sask ENV), as required. The annual report will meet any applicable reporting requirements in the facility licence and/or provincial approvals for the Project.

Communications associated with the BdMP with Interested Parties (Indigenous Peoples / Groups, general public groups, other members of the public) are described by the *Public and Indigenous Information Program* (PIIP). The PIIP outlines Denison's policy, principles, and plan to communicate with Indigenous groups and members of the public in support of the development and maintenance of meaningful relationships in relation to the Operation, while also ensuring that information related to the health, safety and security of persons and the environment, and other issues associated with the lifecycle of nuclear facilities are effectively communicated more broadly. Denison's Public Disclosure Protocol is also defined within this Program.

7 Adaptive Management

Adaptive management is a planned and systematic process for continuously improving environmental management practices by learning from their outcomes. Adaptive management provides the flexibility to address/accommodate new circumstances, to adjust monitoring, implement new mitigation measures or modify existing measures.

Denison's adaptive management process includes:

- conceptualizing issues to identify solutions, sources of uncertainty and risks;
- designing specific implementation strategies with measurable indicators with predefined thresholds of acceptable and unacceptable levels of change;
- implementing the strategy;
- tracking and reporting on monitoring activities and results;
- investigating incidents and unexpected results, including results that exceed any thresholds and/or action levels (i.e., environmental performance criteria) that will be established as early warning signs to potentially changing site conditions, and/or non-conformance and non-compliance events. Such thresholds and/or actions levels would be developed based on predictions that have been made as part of effects assessment as detailed herein;
- developing and implementing corrective and preventative measures; and
- establishing a feedback loop through continued monitoring and updated monitoring and follow up programs, as necessary.

Denison is committed to the continual improvement of its environmental management and performance. As part of the adaptive management, the BdMP will be assessed annually to verify implementation and the continued suitability, adequacy, and effectiveness of the plan. The review will identify elements of this BdMP in need of revision and evaluate performance against established performance objective.

8 References

8.1 Internal

Document Number	Document Name
09	Environmental Management Program
33	Environmental Monitoring Plan
06	Management System Program
15	Public and Indigenous Information Program

8.2 External

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Appendix A Saskatchewan Activity Restriction Guidelines for Sensitive Species

If sensitive wildlife features are found, they will be documented (e.g., photographs, GPS location recorded). The data collected would inform the development and implementation of appropriate mitigation measures (e.g., appropriate set-back distance for Project activities and/or consideration of timing windows as per the Saskatchewan Activity Restriction Guidelines for Sensitive Species (SK MOE 2017), in consideration of applicable laws and regulations (e.g., *Migratory Birds Conservation Act, Wildlife Act*). The provincial list of timing windows (SK MOE 2017) is below.

Government of Saskatchewan

April 2017

Saskatchewan Activity Restriction Guidelines for Sensitive Species

These guidelines aim to assist proponents during the planning of proposed projects. Pre-planning and avoidance of key habitats of sensitive species during sensitive periods is preferred. If your project activities fall within the listed set-back distances, please contact the Ministry of Environment at centre.inquiry@gov.sk.ca early in the planning stage to minimize impacts to sensitive species.

Taxon, Taxa	Key Wildlife Features	Restricted Activity Periods	Setback Distances by Disturbance Category with Examples Provided		
			Low E.g., foot traffic, vehicles <1 ton including ATVs, operating oil or gas wells, pipelines) *FOOT TRAFFIC ONLY (FTO) is indicated for select taxa)	**Medium** E.g., vehicles >1 ton, plough-in pipeline, operating compressor station or battery. *In the case of FTO, small vehicles and ATVs are a medium disturbance.	**High** E.g., road, battery or compressor station construction, seismic, drilling rigs, trench-in pipeline, blasting, mines, gravel pit, quarries, rock crushing, asphalt batching, renewable energy projects.
AMPHIBIANS					

Great Plains Toad (*Anaxyrus cognatus*)	Breeding and overwintering habitat	Year Round	10 m	400 m	500 m
Canadian Toad (*Anaxyrus hemiophrys*)	Breeding and overwintering habitat	Year Round	0 m FTO	90 m	90 m
Plains Spadefoot (*Spea bombifrons*)	Breeding and overwintering habitat	Year Round	0 m FTO	90 m	90 m
Northern Leopard Frog (*Lithobates pipiens*)	Breeding and overwintering habitat	Year Round	10 m	200 m	500 m
REPTILES					
Snapping Turtle (*Chelydra serpentina*)	Nesting Site	Mar. 15-June 30	0 m FTO	400 m	400 m
Eastern Yellow -bellied Racer (*Coluber constrictor flaviventris*)	Hibernacula	Apr. 1-Sept. 30	100 m	200 m	1000 m
		Oct. 1-Mar. 31	0 m FTO	200 m	200 m
Smooth Greensnake (*Opheodrys vernalis*)	Hibernacula	Apr. 1-Sept. 30	50 m	200 m	200 m
		Oct. 1-Mar. 31	0 m FTO	200 m	200 m
Plains Hog-nosed Snake (*Heterodon nasicus*)	Hibernacula	Apr. 1-Sept. 30	50 m	200 m	200 m
		Oct. 1-Mar. 31	0 m FTO	200 m	200 m
Prairie Rattlesnake (*Crotalus viridis viridis*)	Hibernacula	Apr. 1-Sept. 30	100 m	200 m	200 m
		Oct. 1-Mar. 31	0 m FTO	200 m	200 m
Greater Short-horned Lizard (*Phrynosoma hernandesi*)	Eroded Slopes (blue-shale outcrops)	Mar.15-Nov. 15	50 m	200 m	200 m
BIRDS *Breeding Bird is characterized by: territorial behaviour; calling to competing male, mate or young; singing; courtship displays; carrying food or nest materials etc., and; presence of nest or young found incidentally.					
Trumpeter Swan (*Cygnus buccinator*)	Breeding Bird*	Apr. 1-July 31	500 m	1000 m	1000 m
Greater Sage-Grouse (*Centrocercus urophasianus)*	SARA Emergency Protection Order (EPO)	Year Round	Refer to the Emergency Protection Order (EPO)		
	Non-EPO Lek	Year Round	500 m	3200 m	6400 m
	Habitat	Year Round	1000 m	1000 m	1000 m
Sharp-tailed Grouse (*Tympanuchus phasianellus*)	Lek	Mar. 15-May 15	200 m FTO	400 m	400 m
Loons (*Gavia sp.*) and Colonial Nesting Grebes (Eared, Western, and Clark's[1] Grebes)	Breeding Bird* or Breeding Grebe Colony	May 15-July 15	100 m	200 m	200 m
American Bittern (*Botaurus lentiginosus*)	Breeding Bird*	May 1-July 15	100 m	150 m	350 m

Colonial Nesting Birds (American White Pelican, Double- crested Cormorant, Great Blue Heron, Great Egret, Snowy Egret, Little Blue Heron, Cattle Egret, Black-crowned Night-Heron, [2]White-faced Ibis and Glossy Ibis	Nesting Colony	Apr. 1-July 31	500 m	1000 m	1000 m
Osprey (*Pandion haliaetus*)	Nest Site	May 1-Aug. 15	500 m	1000 m	1000 m
Cooper's Hawk (*Accipiter cooperii*)	Nest Site	Apr. 1-July 31	200 m	400 m	400 m
Ferruginous Hawk (*Buteo regalis*)	Nest Site	Mar. 15-July 15	500 m	750 m	1000 m
Golden Eagle (*Aquila chrysaetos*)	Nest Site	Feb. 15-July 15	500 m	1000m	1000 m
Bald Eagle (*Haliaeetus leucocephalus*)	Nest Site	Mar. 15-July 15	500 m	750 m	1000 m
Whooping Crane (*Grus americana*)	Staging Area	May 1-Nov. 1	500 m	1000 m	1000 m
Yellow Rail (*Coturnicops noveboracensis*)	Breeding Bird*	May 1-July 15	100 m	150 m	350 m
Snowy Plover (*Charadrius nivosus*)	High-water Mark	May 1-July 31	200 m	400 m	600 m
		Aug. 1-Sept. 30	100 m	400 m	600 m
Piping Plover (*Charadrius melodus circumcinctus*)	High-water Mark	May 1-July 31	200 m	400 m	600 m
		Aug. 1-Sept. 30	100 m	400 m	600 m
Mountain Plover (*Charadrius montanus*)	Breeding Bird*	May 1-July 31	200 m	400 m	500 m
Long-billed Curlew (Numenius americanus)	Breeding Bird*	Apr. 15-July 15	100 m	200 m	200 m
Red Knot (Calidris canutus rufa)	Staging Area	May 15-Jun. 30 Aug. 1-Aug. 31	500 m	500 m	1000 m
Gulls and Terns (Laridae), Except [3]Ring-billed and California Gulls	Nesting Colony	May 1-July 15	200 m	400 m	400 m
Short-eared Owl (Asio flammeus)	Breeding Bird*	Mar. 25-Aug. 1	100 m	300 m	500 m
Great Gray Owl (Strix nebulosa)	Nest Site	Mar. 1-July 15	100 m	400 m	400 m
Barred Owl (Strix varia)	Nest Site	Mar. 1-July 15	100 m	400 m	400 m
Burrowing Owl (Athene cunicularia)	Breeding Bird*	Apr.1-July 15	200 m	300 m	500 m

		July 16-Oct. 15	100 m	200 m	500 m
		Oct. 16-Mar. 31	10 m	200 m	500 m
Western Screech Owl (Megascops kennicottii)	Nest Site	Mar. 1-July 15	100 m	400 m	400 m
Eastern Screech-Owl (Megascops asio)	Nest Site	Mar. 1-July 15	100 m	400 m	400 m
Northern Hawk Owl (Surnia ulula)	Nest Site	Mar. 1-July 15	100 m	400 m	400 m
Common Poorwill (Phalaenoptilus nuttallii)	Breeding Bird*	May 1-Aug. 31	0 - 50 m	100 m	200 m
Eastern Whip-poor-will (Antrostomus vociferus)	Breeding Bird*	May 1-Aug. 31	0 - 50 m	100 m	200 m
Common Nighthawk (Chordeiles minor)	Breeding Bird*	May 1-Aug. 31	0 - 50 m	100 m	200 m
Chimney Swift (Chaetura pelagica)	Breeding Bird*	May 1-July 31	0 - 50 m	150 m	300m
Red-headed Woodpecker (Melanerpes erythrocephalus)	Breeding Bird*	Apr. 15-June 30	0 m FTO	100 m	100 m
Peregrine Falcon (Falco peregrinus anatum)	Nest Site	Apr. 1-Aug. 15	300 m	500 m	1000 m
Prairie Falcon (Falco mexicanus)	Nest Site	Mar. 15-July 15	500 m	750 m	1000 m
Olive-sided Flycatcher (Contopus cooperi)	Breeding Bird*	May 1-Aug. 31	0 - 50 m	150 m	300m
Loggerhead Shrike (Lanius ludovicianus excubitorides)	Breeding Bird*	May 1-Aug. 15	50 m	250 m	400 m
Sage Thrasher (Oreoscoptes montanus)	Breeding Bird*	May 15 – July 31	100m	200 m	200 m
Sprague's Pipit (Anthus spragueii)	Breeding Bird*	Apr. 21 Aug. 31	50 m	200 m	250 m
Chestnut-collared Longspur (Calcarius ornatus)	Breeding Bird*	May 1-July 31	25 m	100 m	200 m
McCown's Longspur (*Rhynchophanes mccownii*)	Breeding Bird*	May 1-July 31	25 m	100 m	200 m
Canada Warbler (*Cardellina canadensis*)	Breeding Bird*	May 1-July 31	0 - 50 m	150 m	300 m
Rusty Blackbird (*Euphagus carolinus*)	Breeding Bird*	May 1-July 31	0 - 50 m	150 m	300 m
MAMMALS					
Black-footed Ferret (*Mustela nigripes*)	Residence or Prairie Dog Colony	Year Round	0 m FTO	250 m	500 m

Black-tailed Prairie Dog (*Cynomys ludovicianus*)	Colony	Year Round	0m FTO	250 m	500 m
Ord's Kangaroo rat (*Dipodomys ordii*)	Den	Year Round	50 m	250 m	500 m
Swift Fox (*Vulpes velox*)	Den	Feb. 15-Aug. 31	500 m	500 m	2000 m
	Den	Sept. 1-Feb. 14	100 m	500 m	2000 m
Bats (*Vespertilionidae*)	Roost/Foraging Site	Year Round	100 m	500 m	500 m
PLANTS Federal and provincial plants of concern					
1. Those plants listed under *SARA* as endangered, threatened, special concern or extirpated. 2. Those plants listed in the *Wildlife Act, 1998*.	Occurrence	Year Round	0 m FTO	30 m All examples of Low and Medium except FTO	300 m
1. Those plants listed on the SKCDC tracking list (e.g.,usually ranked S1, S2, S3, SX, SH).	Occurrence	Year Round	0 m FTO	30 m	
FISH Proponents should be aware of the following listed fish species and the waters in which they live. Contact the Department of Fisheries and Oceans (contacts below) if your project is in, or near, these waters.					
Bigmouth Buffalo (*Ictiobus cyprinellus*)	The Qu'Appelle basin, including the waters of Buffalo Pound, Last Mountain, Pasqua, Echo, Mission, Katepwa (The Fishing Lakes), Crooked and Round lakes.				
Chestnut Lamprey (*Ichthyomyzon castaneus*)	The waters of the Qu'Appelle River below the outlet of Round Lake and the upper Assiniboine basin including the Whitesand River and Shell River.				
Lake Sturgeon (*Acipenser fulvescens*)	The waters of the North Saskatchewan, South Saskatchewan and Saskatchewan Rivers (including large connected waters such as the Torch River) and the waters of the Churchill River below the confluence of the Reindeer River.				
Shortjaw Cisco (*Coregonus zenithicus*)	The waters of Reindeer Lake, Lake Athabasca, Black, Giles Lake and Wapata lake.				

[1]Western Grebe (*Aechmophorus occidentalis*), Clark's Grebe (*Aechmophorus clarkii*) and Eared Grebe (*Podiceps auritus*)

[2]American White Pelican (*Pelicanus erythrorhynchos*), Double-crested Cormorant (*Phalacrocorax auritus*), Great Blue Heron (*Ardea herodias*), Great Egret (*Ardea alba*), Snowy Egret (*Egretta thula*), Little Blue Heron (*Egretta caerulea*), Cattle Egret (*Bubulcus ibis*), Black-crowned Night-Heron (*Nycticorax nycticorax*), White-faced Ibis (*Plegadis chihi)*, and Glossy Ibis (*Plegadis falcinellus*)

[3]Gulls (*Larus sp., Leucophaeus sp., Chroicocephalus sp.* and Ross's Gull, (*Rhodostethia rosea*), except California Gull (*Larus alifornicus*) and Ring-billed Gull (*Larus delawarensis*)