KGS GROUP
CONSULTING ENGINEERS

NorfolkTreherne

MUNICIPALITY OF NORFOLK TREHERNE

ROAD 54W REALIGNMENT
MANITOBA ENVIRONMENT ACT PROPOSAL

FINAL

KGS Group 17-2571-003
October 2017

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October 27, 2017 File No. 17-2571-003

Environmental Approvals Branch
Manitoba Sustainable Development
Suite 160, 123 Main Street
Winnipeg, Manitoba
R3C 1A5

ATTENTION: Ms. Tracey Braun
Director

RE: Environment Act Proposal
Municipality of Norfolk Treherne – Road 54W Realignment

Dear Ms. Braun:

On behalf of the Municipality of Norfolk Treherne, KGS Group is pleased to submit four (4) paper copies and one (1) electronic copy of the final Environment Act Proposal to obtain a licence for the realignment of a section of Road 54W. The road realignment is required due to significant movement of the road due to bank failures caused during flooding of the Assiniboine River in 2011. Manitoba Emergency Measures Organization declared the flood of 2011 a natural disaster eligible for Disaster Financial Assistance. Communication with Manitoba Sustainable Development indicated that because the road is located within a Wildlife Management Area that an Environment Act Licence is required for a Class 2 Development under Manitoba Regulation 164/88. In order to mitigate potential impacts to migratory bird species, project-related tree clearing is to be completed prior to mid-April in accordance with the *Migratory Birds Convention Act*. Therefore, to prevent the project from being delayed by a year, as it is funded under Disaster Financial Assistance, we hope that the project can be reviewed in time to allow it to move forward in the spring of 2018.

As part of the licensing process, a Manitoba Conservation Environment Act Proposal Form with the $7,500.00 application fee has been included with the Environmental Assessment report.

Please do not hesitate to contact the undersigned if you have any questions or require additional information.

Yours truly,

Dan Leitch, M.Sc.
Environmental Scientist

DL/jr
Enclosure

cc: Jackie Jenkinson, Municipality of Norfolk Treherne

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EXECUTIVE SUMMARY

Kontzamanis Graumann Smith MacMillan Inc. (KGS Group) was retained by the Municipality of Norfolk Treherne to prepare an Environment Act Proposal (EAP) for the realignment of a 2-lane municipal road within the Whitemud Watershed Wildlife Management Area (WMA). The road realignment is required due to significant movement of the road due to bank failures caused during flooding of the Assiniboine River in 2011. The 2011 flood event initiated evaluation by the Manitoba Emergency Measures Organization (MEMO) who declared the flood of 2011 a natural disaster eligible for Disaster Financial Assistance (DFA). The municipality has submitted a claim for damages to MEMO in order to access DFA funding.

The subject road, designated as Road 54W, runs north-south on the north bank of a large meander loop of the Assiniboine River. The project is located approximately 13 km north of the town of Treherne, Manitoba. Currently, this gravel road provides the only means of access/egress to agricultural land and one private residence located in the meander loop. Traffic on this road consists of numerous trucks and farm equipment during the growing and harvest seasons and year-round travel by the resident. The road is a public road and also provides emergency, fire and police access to these properties.

The project is considered a Class 2 development under Manitoba Regulation 164/88 as the new alignment is within a previously undisturbed area within the Whitemud Watershed WMA. Project and environment interactions were assessed to identify potential environmental effects associated with the road realignment project.

The project includes realignment of two road sections referred to as Site #94 and Site #93. Site #94 will include horizontal realignment with relocation of the road to the west for a distance of approximately 200 m to bypass the current scarp threatening the road to the east. Site #93 will include horizontal realignment with relocation of the road to the west for a distance of approximately 150 m to bypass the current scarp threatening the road to the east. A right-of-way (ROW) of 18.3 m (60 feet) will be cleared to accommodate a 7.6 m (25 feet) wide road surface with 5 m (16.4) wide ditches on each side. Trees will be felled within the new ROW with slash from tree clearing hauled off site for disposal. Following tree clearing, the ROW will be grubbed and stripped of topsoil and unsuitable material. The prepared mineral soil base will be compacted and embankment fill placed on the road, followed by a geotextile, a 200-mm layer of C-base (3” down), a 200-mm layer of B-base (1” down) and a 75-mm thick A-base gravel road surface. Realignments also include drainage restoration works such as ditching and positive grading aimed at reestablishing the surface drainage to typical municipal standards. The segments of road which are abandoned as a result of the new alignments will be stripped of gravel and re-vegetated with native vegetation. Additionally, gully restoration may occur at the location of an erosion gully east of Road 54W at Site #94. Additional erosion protection measures which may be implemented include the installation of a geotextile, a geomembrane, and riprap in order to improve drainage and minimize future erosion at the site.

Inquiries with the government bodies have indicated that there are no major environmental constraints such as rare species or heritage resources on the site. Rare species in the broader region include the norther prairie skink and the Mapleleaf mussel however no evidence of their presence was encountered at the project site. Appropriate habitat for Mapleleaf mussel was encountered within the Assiniboine River adjacent to the project. Based on the available information on the project and the environment, the assessment of environmental effects

outlined in this environmental assessment report, and the application of proposed mitigation measures and the conduct of required follow-up, the proposed realignment of Road 54W will not likely result in any significant residual adverse environmental effects.

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1.0 INTRODUCTION

Kontzamanis Graumann Smith MacMillan Inc. (KGS Group) was retained by the Municipality of Norfolk Treherne to prepare an Environment Act Proposal (EAP) for the realignment of a 2-lane municipal road within the Whitemud Watershed Wildlife Management Area (WMA). The road realignment is required due to erosion and bank failure encroaching on the road (Appendix A: Photos 1-4).

The subject road, designated as Road 54W, runs north-south on the north bank of a large meander loop of the Assiniboine River. Sites #91, #93 and #94 are located in SE 24-9-10W approximately 13 km north of the town of Treherne, Manitoba. Currently, this gravel road provides the only means of access/egress to agricultural land and one private residence located in the meander loop (Appendix B – Figure R-01). Traffic on this road consists of numerous trucks and farm equipment during the growing and harvest seasons and year-round travel by the resident. The road is a public road and also provides emergency, fire and police access to these properties.

Based on information provided to KGS Group, Road 54W had experienced significant movement (failure or movement of the road surface) during the 2011 flood on the Assiniboine River. The 2011 flood event initiated evaluation by the Manitoba Emergency Measures Organization (MEMO) which designated the sites as #91, #93 and #94 in response to a claim for damages submitted by the Municipality of Norfolk Treherne.

KGS Group recently completed a Feasibility Study (July 27, 2017) to evaluate potential remediation options for MEMO sites #91, #93/A, and #94 to extend the lifetime of Road 54W. The following remedial works were recommended as a result of that study:

1. Drainage restoration works along Road 54W;
2. Relocation of Road 54W to the west at Site #94 and at Site #93;
3. Riprap the eastern shoreline below Sites #91 and #93/A (approximately 375 m);
4. Regrade and revegetate bank below Site #91; and
5. Possible gully restoration below Site #94.

Based on KGS Group's discussion with Manitoba Sustainable Development (MSD) Environmental Approvals Branch the project is considered a Class 2 development under Manitoba Regulation 164/88 as the new alignment is within a previously undisturbed area within a WMA.

In addition to the road realignment, an approximately 375 m long riprap blanket is proposed along the lower eastern shoreline adjacent to Sites #91 and Site #93 to provide additional protection against erosion. Additionally, a treeless section of the bank above the riprap near Site #91 will be regraded and revegetated to help stabilize the bank (Appendix A – Photos 5-6). This does not require environmental approval under the Environment Act license, however submissions will be made to Transport Canada and Fisheries and Oceans Canada (DFO). This component of the project won't be discussed any further within this EAP.

Project alternatives were evaluated during previous studies as described in Section 2.5. Alternatives to repairing the road to extend its lifespan include closing the road to public access.

2.0 DESCRIPTION OF DEVELOPMENT

The following sections have been structured to address the requirements of the Description of Development as outlined in the EAP Form.

2.1 STATUS OF TITLE

The project is located within the Municipality of Norfolk Treherne approximately 13 km north of the town of Treherne and 24 km SSE of the town of MacGregor. Road 54W is a north-south municipal road. The location of proposed road realignment is within the southeast quarter of Section 24 of Township 9, Range 10 WPM (SE 24-9-10W). The Status of Title is provided in Appendix C.

2.2 MINERAL RIGHTS

The owner of mineral rights beneath the subject properties described above will remain with the Crown.

2.3 EXISTING AND ADJACENT LAND USE

Land use in the project area will not change as a result of the project. Land adjacent to the proposed road realignment sections is forested and is part of the Whitemud Watershed WMA. The gravel road provides access/egress to agricultural land and one private residence to the south. The road is a public road and also provides emergency, fire and police access to these properties. As the road dead ends to the south, the road is the only access to lands to the south. Agricultural fields are located 80 m north of the northern section to be realigned and 750 m south of the southern section to be realigned. The Assiniboine River is located between 50 m and 250 m east and west of the road.

The land use adjacent the property is as follows:

- West – forested, Assiniboine River
- North – road, bordered by forest for 100 m. then agriculture (Appendix A: Photos 7-9)
- East – forested, Assiniboine River
- South – road, bordered by forest, agricultural field 750 m away (Appendix A: Photo 10)

2.4 LAND USE DESIGNATION AND ZONING

The municipal road 54W is situated on Crown land within the Municipality of Norfolk Treherne. The legal land description is SE 24-9-10W. The project is within one of thirteen widely spaced land units which make up the Whitemud Watershed WMA. WMAs are Crown land designated by *The Manitoba Wildlife Act* for "better management, conservation and enhancement of the wildlife resource of the province." They exist for the enjoyment of people and for the benefit of wildlife. They provide for a variety of wildlife-related forms of recreation including birding, wildlife watching, hunting, trapping, off-road vehicles, and watercraft. Each WMA has its own set of restrictions in place to protect the integrity of the area [(1)]. WMAs are protected under the Protected Areas Initiative which prohibits activities such as mining, logging, oil, petroleum, natural gas or hydro-electric development, as well as other activities that significantly and adversely affect habitat in certain circumstances.

2.5 PREVIOUS STUDIES AND ACTIVITIES

2011 Disaster Financial Assistance (DFA) Individual Site Damage Reports – MEMO, April 11, 2011.

Separate DFA reports were produced for Sites #91, #93 and #94. The cause of damage at each site was noted to be the spring 2011 flooding. Descriptions of the damage are provided. The report identifies the need for an engineer's report.

MEMO, RM of South Norfolk – Flood Damage Report, Stantec Consulting Limited, October 2011.

In the summer of 2011, Stantec Consulting Limited conducted an assessment of eight sites to evaluate road damage due to the spring flood of 2011. The assessment of each site included a site inspection, proposed repairs and flood damage cost estimates. Recommendations for Site #93 are to reinstate the road by removing affected material and replace it with compacted backfill at a 4H:1V slope. At Site #94 repairs to the road were deemed as unpractical. The solution presented was to re-route the road to the west.

RM of South Norfolk, Disaster Assistance Flood Sites #93 & 94, Denis Andrews Consulting, September 2012.

The purpose of the report was to provide additional comment and help oversee the work for Sites #93 and #94. The report included observations, a site assessment, consideration of options and recommendations. An aerial photo review was completed and the report includes a figure illustrating geotechnical instabilities along the entire section of the municipal road adjacent to Sites #93 and #94. The geotechnical instabilities are also shown to extend to the south. Considered options and recommendations included: (1) move the road laterally; (2) control surface water drainage; (3) stabilize the slope(s); and (4) close the road to public access. Moving the road laterally was not recommended due to the limitations in some areas where the road could be moved as well as the potential to negatively impact historical/existing slope instabilities. The control of surface water drainage was considered to be major works, requiring detailed design and implementation. The report concluded that further engineering would be required to properly design and implement the works. The option to stabilize the slope(s) was deemed as not a feasible option considering the lack of significant infrastructure at risk. Closing the road to public access was deemed as the most feasible option.

RM of South Norfolk, Engineer's Flood Damage Report – Sites #93 and #94, AMEC Environment and Infrastructure, September 2013.

AMEC Environmental and Infrastructure completed a geotechnical assessment of Sites #93 and #94 for Stantec Consulting Ltd. The reporting included a review of background information including aerial photography, a visual site inspection of each site, flood impact discussion, site restoration evaluation options and cost estimates. Based on an aerial photo review, AMEC identified the historical slope failures adjacent to the existing municipal road at Sites #93A and #94. Based on a visual inspection of each site, active movements at each site were noted near the existing municipal road as well as for a distance downslope towards the Assiniboine River. A historic failure was noted as being located south of the sites #93A and #94 on the east side of the road. The failure mechanism for Site #94 was deemed to be a result of the ponded surface water at the top of the slope which had saturated the bank and initiated the failure scenario. The failure mechanism for Site #93A was deemed to not have a specific trigger relative to surface water and ponding, but was concluded that movements were related to high flows at flood level which would have created erosion and saturation of the lower bank. Three potential options were presented for Site #94 with probable cost estimates: (1) re-grade the slope to the east; (2)

re-locate the existing roadway (no land acquisition included); and (3) drainage control. Two potential options were presented for Site #93A: (1) stabilize the slope both west and east of the road; and (2) lower the road grade. AMEC noted the requirements for further detailed investigations, analysis and design to provide more accurate cost estimates for the actual work.

RM of South Norfolk, Road Rehabilitation Project, MEMO – Site #93, Amec Foster Wheeler, March 2015.

Amec Foster Wheeler completed an aerial photo review, geotechnical investigation including installation of groundwater instrumentation and monitoring, site survey, slope stability modelling and evaluation of slope stabilization options for Site #93A. Based on the test hole drilling completed, the stratigraphy at the site was interpreted to consist of sand underlain by alluvial clay. Investigation depths terminated at 20 m placing the bottom of the testholes above the river elevation. Based on a review of geological maps the depth to bedrock appeared to be approximately 45 m below the elevation of the municipal road. Numerous historical failures were identified based on an aerial photo review dating back to the earliest photos reviewed from 1949. The approximate geometry of each failure was illustrated within the report. Slope stability analysis was completed based on an assumed stratigraphy below the depth of the investigations completed. The water table in the sand and clay was assumed based on groundwater monitoring; however till/bedrock pressures were never obtained. Based on the slope stability analysis, a rockfill shear key along the midbank area in combination with bank regrading and a riprap blanket was concluded to provide a factor of safety of 1.24 (lower bank slip surface) and 1.31 (global slip surface) versus the existing unstable conditions at a Factor of Safety of 1.0. The construction cost was estimated to be in the range of $4.4M to $5.0M, not including engineering. The report identified risks associated with the construction of such deep rockfill columns and concluded that an economically feasible solution could not be achieved. In order to provide a proper long term solution, the requirement for a more detailed geotechnical investigation was recommended. The investigations would include test holes along mid and lower bank with installation of slope monitoring equipment to determine the slip surface geometry.

RM of Norfolk Treherne, Secondary Review of Engineering Assessment and Reports and Assessment of Potential Remediation Options – Road Rehabilitation Project at MEMO Sites #93 and #94 (Final – Rev 1). KGS Group January 2017.

KGS Group completed a secondary review and assessment of previous reporting as well as an assessment of potential remediation options in relation to Sites #94 and #93 in 2016. As part of the assessment the entire section of the road spanning from Site #94 to Site #91 was considered for remediation. The potential remedial options considered were: (1) realignment of Road 54W; (2) riprap erosion protection; (3) realignment and riprap erosion protection; (4) realignment, riprap erosion protection and rockfill column construction (full bank stabilization); and (5) regrading of the riverbank. All potential remediation options listed also included drainage restoration works such as ditching and positive grading aimed at reestablishing the surface drainage to typical municipal standards. Each potential remediation option was classified in terms of its feasibility with respect to short and long term risks. Associated Class D construction cost estimates were also provided. Following the assessment and discussions with Municipality of Norfolk Treherne the most feasible option selected was realignment of the road in combination with some level of erosion protection along the lower shoreline. KGS Group recommended that a detailed geotechnical investigation be completed in order to better understand the nature of the slope movements which would include surveying, drilling investigations, groundwater instrumentation installation and monitoring and slope stability analysis. Given that the full bank stabilization option could not be considered as a feasible option and the understanding that the selected option carries some associated risk, it was agreed that a feasibility study should be completed to facilitate the municipality's decision making with regards to the decision to move forward with the potential road and riverbank remediation works.

RM of Norfolk Treherne, MEMO – Sites #91, #93/A and #94 – Feasibility Study. KGS Group. July 2017.

To facilitate the Municipality's decision making with respect to moving forward with the road and riverbank remediation works, a feasibility study was conducted to evaluate alternative potential remediation options for MEMO Sites #91, #93/A and #94. Alternatives considered include road realignment, shoreline erosion control protection, and drainage restoration works. The report includes analysis of historical aerial imagery which shows that the shoreline at most locations have regressed at a rate of 0.21 to 0.51 m/year since 1945. In discussion with the Municipality

of Norfolk Treherne, the most feasible option selected was realignment of the road in combination with erosion protection along the lower shoreline. Recommendations include drainage restoration, relocation of the road at Sites #93 and #94, riprap along the eastern shoreline at Sites #93 and #91, and construction of a trench drain in the upslope ditch at Site #91. The report includes cost estimates and a proposed construction schedule.

2.6 PROPOSED DEVELOPMENT

2.6.1 Road Construction and Drainage

The project includes two sections of road to be realigned:

1) Site #94 - Horizontal realignment of Site #94 would include relocation of the road to the west for a distance of approximately 200 m to bypass the current scarp threatening the road to the east.

2) Site #93 - Horizontal realignment of Site #93 would include relocation of the road to the west for a distance of approximately 150 m to bypass the active scarp threatening the road to the east.

A right-of-way (ROW) of 18.3 m (60 feet) will be cleared to accommodate a 7.6 m (25 feet) wide road surface with 5 m (16.4) wide ditches on each side. Trees will be felled within the ROW with slash from tree clearing hauled off site for disposal. Following tree clearing, the ROW will be grubbed and stripped of topsoil and unsuitable material. Once a mineral soil base is prepared, it will be compacted to appropriate construction standards. Following compaction, embankment fill will be placed on the road, followed by a geotextile, a 200-mm layer of C-base (3” down), and then a 200-mm layer of B-base (1” down). A 75-mm thick A-base gravel road surface would then be placed and compacted to appropriate construction standards. Realignments also include drainage restoration works such as ditching and positive grading aimed at reestablishing the surface drainage to typical municipal standards.

Additionally, gully restoration may occur at the location of an erosion gully east of Road 54W downslope of Site #94 (Photo 11). The gully extends down the slope towards the river and continues to erode as shown by leaning trees and a lack of vegetation. Additional erosion protection measures which may be implemented include the installation of a geotextile, a geomembrane, and riprap in order to improve drainage and minimize future erosion at the site.

Segments of road which are abandoned as a result of the new alignments will be stripped of gravel and re-vegetated with native vegetation. The root systems from trees will assist in stabilizing the slopes.

2.6.2 Operation and Maintenance

The road provides the only means of access/egress to agricultural land and one private residence located in the meander loop. Traffic on this road consists of numerous trucks and farm equipment during the growing and harvest seasons and year-round travel by the resident. The road is a public road and also provides emergency, fire and police access to these properties. Ongoing maintenance of Road 54W will be required by the municipality as with all other municipal roads (e.g. grading, snow clearing, maintenance of road-side ditches).

2.6.3 Schedule

The project schedule includes completing Regulatory and Environmental Approvals submission by October 2017. Construction drawings and the tender package should be completed by November 2017. Assuming the necessary approvals are received, on site work would include riprap installation on the eastern shorelines and any required tree clearing for the road realignment in January/February 2018 when the ground is frozen. The schedule has been set so that all tree clearing can be completed prior to the spring breeding bird period, otherwise the project would be substantially delayed. All other construction works would be completed in May and June 2018. The scheduled completion date is June 30, 2018.

2.6.4 Funding

The project will be funded by DFA administered by MEMO in response to claim for damages submitted by the RM of Norfolk Treherne. Under the Manitoba Emergency Measures Act, the Manitoba Government declared the flood of 2011 as natural disaster eligible for DFA.

2.7 STORAGE OF GASOLINE AND ASSOCIATED PRODUCTS

Gasoline and associated products may be temporarily used and stored at the site during construction of the proposed road realignment. However, there is no requirement for these products to be used or stored at the site once construction has been completed.

2.8 OTHER APPROVALS

Additional approvals will be required under Transport Canada and DFO associated with the riverbank stabilization work.

The Assiniboine River is on the list of Scheduled Waters under the Navigation Protection Act and the proposed riverbank stabilization is not considered a Minor Works. As such, a Notice of Works form is being prepared for submission to Transport Canada to assess the potential impact on navigation. It is anticipated that the project will not significantly impact navigation because the work will be conducted during the winter months outside of the navigation season and the riprap placement between the ordinary high water level and the winter level will be subcut.

The Fisheries Act requires that projects avoid causing serious harm to fish unless authorized by the Minister of DFO. The project will not include infilling and based on our experience and involvement in past riverbank stabilization projects, serious harm to fish and fish habitat is not anticipated. Because of the length of shoreline that will be permanently altered a Request for Review will be prepared and submitted to DFO. Additionally, the endangered Mapleleaf mussel is known to occur in the Assiniboine River. As such, a substrate survey was conducted which concluded that sections of the Assiniboine River near the project site contain suitable habitat, although there was no presence of Mapleleaf mussel (Appendix D).

3.0 PHYSICAL ENVIRONMENT

3.1 LOCATION, PHYSIOGRAPHIC SETTING AND CLIMATE

The project is located within the Municipality of Norfolk Treherne approximately 13 km north of the town of Treherne and 24 km SSE of the town of MacGregor. Road 54W is a north-south gravel municipal road. The location of proposed road realignment is within SE 24-9-10W.

The project area is located within the Stockton Ecodistrict of the Aspen Parkland Ecoregion and Prairies Ecozone [(2)]. The Stockton Ecodistrict lies along the Assiniboine River and includes the river valley. The Assiniboine River Valley has local topographic relief of up to 30 to 60 m, locally steep valley walls and a strongly meandering river. The ecodistrict is within the Grassland Transition Ecoclimatic Region which is characterized by short, warm summers and long, cold winters. The project is located 90 km east of Brandon where the nearest climate data is recorded and which also falls within the ecodistrict. In Brandon, mean monthly air temperatures range from 19.2°C in July to -18.1°C in January [(2)]. The average annual precipitation reported in Brandon is 472.7 mm, with 399.6 mm falling as rain.

3.2 GEOLOGY AND HYDROGEOLOGY

The Aspen Parklands Ecoregion is composed of Upper Cretaceous shaly sediments and is covered almost entirely by glacial deposits. Surface deposits range from kettled to gently undulating loamy glacial till, to level to gently undulating sandy glaciofluvial and glaciolacustrine deposits [(2)]. Based on review of geological maps, bedrock is approximately 45 m below the road elevation [(3)].

The Stockton Ecodistrict consists of well drained black chernozemic soils developed on strongly calcareous, fine loamy sediments. Sandy and duned areas are characterized by droughty humic regosols. Local areas of imperfectly drained saline Gleyed Rego Black Chernozems and Gleyed Black Solonetzic soils occur in areas along the base of the hills to the south. Most of the cultivated soils have been affected to some degree by wind erosion. At the project site, exposed soils assessed by geological engineers on the upper and mid-bank areas consisted of silty clays, silts and sands [(3)]. Soils were assessed to have a medium to high plasticity. Based on the

test hole drilling completed by Amec Foster Wheeler (2015), the stratigraphy at the site was interpreted to consist of sand underlain by alluvial clay [(3)].

Local geology was assessed based on five water well records within the vicinity (<1.4 km) of the project [(4)] (Appendix E). Well logs show a topsoil layer of 1-2 feet followed by a mixture of sand and silty sand to a depth of 20-25 feet with clay beneath that. Groundwater was recorded within the sand layers at depths ranging from 13-54 feet below the ground surface (Appendix E). It is assumed that nearby residents use groundwater as a potable water source. Additionally, based on the hand auger test holes completed by KGS Group, the soil stratigraphy along the proposed road re-alignments was shown to consist of topsoil (up to 0.6 m thick) which was underlain by a layer of sandy silt to silty sand.

3.3 SURFACE WATER

The Stockton Ecodistrict is a relatively long and narrow pro-glacial lacustrine plain lying near the Pembina Hills and Tiger Hills which are located to the south. The mean elevation of the district is about 366 m above sea level. The Assiniboine Valley has locally steep valley walls and is a strongly meandering river. East of Brandon within the ecodistrict the valley is a trough which is generally about 1.5 km across and 30 to 60 m deep. The Stockton Ecodistrict falls into two drainage divisions. The project falls in the Brandon division of the Assiniboine River watershed, which is part of the Nelson River drainage system. Water Survey of Canada maintains a gauge on the Assiniboine River near Holland (Station #05MH005) located 16 km upstream of the project site. Historical data at this stations shows that flows peak in April and May with a mean peak of approximately 200 m^3/sec. The volume generally drops throughout the summer to approximately 25 m^3/sec by fall and remains low throughout the winter. The river has a high variability in flow with spring peaks ranging from as low as 20 m^3/sec and as high as 1,400 m^3/sec [(5)]. Based on a rating curve developed from 2011 hydrometric data at the PR 242 bridge and water level measurements at the project site, the ordinary high water level (Q50%) at the project site was calculated to be 280.5 m above sea level (masl) (Appendix B – Figure R-01). The normal summer river level was calculated to be 278.7 masl while the normal winter river level was calculated to be 279.0 masl. Note that normal winter levels are typically higher due to flow releases from Shellmouth Dam, combined with effects of an ice cover on the river.

3.4 VEGETATION

Vegetation within the Stockton Ecodistrict generally consists of grassland with hazel, junipers, white spruce, scrub trembling aspen and scrub bur oak on well drained sites. Imperfectly drained sites generally consist of trembling aspen, balsam poplar, and dense alder and dogwood. Vegetation on poorly drained sites consists of willow, alder and dogwood with grass and sedge groundcover. As is common in most of the Aspen Parkland Ecoregion, the vegetation in this ecodistrict has also been strongly modified by cultivation, with only minor areas of native vegetation remaining in an unaltered state [(2)]. Agriculture in the region is dominated by the production of spring wheat and other cereal grains by continuous cropping and dryland methods. Oilseeds, hay, and increasingly potatoes are also grown in the region. Potato production has increased dramatically in Manitoba and is especially prevalent on sandy soils where irrigation is feasible [(2)].

The vegetation along the proposed road realignment at Site #94 consists of a canopy of burr oak and trembling aspen with a thick understory of alder, trembling aspen and Saskatoon shrubs (Appendix A – Photos 12-15). Along the proposed realignment at Site #93 the vegetation consists primarily of trembling aspen, Manitoba maple, and green ash trees, with smaller portions of burr oak, and elm trees. The understory consists primarily of dogwood, with components of alder and Saskatoon shrubs (Appendix A – Photos 16-20). Down the slope from the road, vegetation adjacent to the Assiniboine River consists of early successional species such willow and thistle (Appendix A – Photos 21-22). Numerous areas of exposed soil are present near the riverbank.

3.5 MAMMALS

Mammal species typical of the Aspen Parkland Ecoregion include white-tail deer, coyote, red fox, ground squirrel, cottontail rabbit, hare, striped skunk, redback vole and deer mice [(2)]. During a site visit in September 2017 wildlife or wildlife signs (e.g. tracks, scat) observed included white-tailed deer, coyote, and beaver. Other workers conducting geotechnical investigations have also encountered black bear near the project site.

The Manitoba Conservation Data Centre (CDC) has developed a list of species of conservation concern that have been documented within the Aspen Parkland ecoregion [6] (Appendix F). Most of the listed species are globally secure and abundant, but in Manitoba some are rare and may be vulnerable to extirpation. Mr. Chris Friesen, Biodiversity Information Manager, Manitoba CDC completed a search of the CDC rare species database and found no occurrences of provincially or federally listed mammal species (Manitoba *Endangered Species and Ecosystem Act* and *Species At Risk Act* (SARA)) in the project area [7] (Appendix G).

3.6 BIRDS

Bird species typical of the Aspen Parkland Ecoregion include ferruginous hawk, sparrow hawk, red-tailed hawk, mourning dove, black-billed magpie, red-winged blackbird, killdeer, meadowlark and various species of ducks [2]. During the September 2017 site visit, avian species observed include ruffed grouse, red-tailed hawk, and blue jay.

A search of the CDC rare species database found no occurrences of provincially or federally listed birds (Manitoba *Endangered Species and Ecosystem Act* and SARA) in the project area (Appendix G).

To provide additional site specific information about birds at the project site, the Manitoba Breeding Bird Atlas (MBBA) was reviewed. The project is within square 14NA21 of Region 2 of the MBBA. A total of 89 bird species have been recorded within this square (Appendix H). Of the identified bird species, 5 are provincially considered species of conservation concern within the Aspen Parkland Ecoregion (see Appendix F for full list). These species include the barred owl, horned lark, bank swallow, barn swallow, and bobolink. None of these species are classified by the federal SARA as Schedule 1 species, therefore are not federally protected.

The barred owl (*Strix varia*) is provincially widespread for its breeding population (S4B) and is globally secure (G5). It is a large brown to grey owl with barring on its chest. It is provincially listed as a species of conservation concern but is not provincially listed by *The Endangered Species and Ecosystems Act* or federally by SARA. Habitat includes dense forest, swamps, and wooded river valleys. They are often found in expansive forested areas bordering streams, marshes and meadows [8]. They nest in cavities of large trees and eat small animals such as

mice, birds and amphibians. Their range spans from the Pacific Ocean to the Atlantic Ocean as they can be found in all provinces except Newfoundland and Labrador. As they tend to prefer older forests which have large dead trees they are sensitive to logging activity [(9)].

The horned lark (*Eremophila alpestris*) is provincially uncommon for its breeding population (S3B) and is globally secure (G5). It is a small songbird with feathers on its head which sometimes resemble horns. It is provincially listed as a species of conservation concern but is not provincially listed by *The Endangered Species and Ecosystems Act* or federally by SARA. Their preferred habitat is open country with little to no vegetation, including bare agricultural fields, prairies, dunes, and heavily grazed pastures. They build their nest on bare ground. Their range includes every province and territory as well as almost all of the United States and into Mexico. The population decline over the past several decades is not well understood but it is thought to relate to loss of agricultural fields to reforestation and development and human encroachment on their habitat [(9)].

The barn swallow (*Hirundo rustica*) is a provincially common bird (S4B) listed as threatened by the Committee on the Status of Endangered Wildlife in Canada (COSEWIC), however is not listed on Schedule 1 of SARA. They are not listed under Manitoba's *Endangered Species and Ecosystems Act*. They are a medium-sized song bird which is found throughout the world, and is particularly associated with rural human settlements. While still provincially common, their population has declined in recent years. The reduction in population is attributed to a reduction in nesting habitat due to shift from conventional farming to modern farming, declines in insect populations, increased climate impacts on breeding grounds (particularly cold snaps). They frequently nest on artificial structures such as barns, outbuildings, houses, bridges and culverts. Egg-laying starts in May in southern Canada [(10)].

The bank swallow (*Riparia riparia*) is a provincially common bird (S5B) listed as threatened by COSEWIC, however is not listed on Schedule 1 of SARA. They are not listed under Manitoba's *Endangered Species and Ecosystems Act*. They are a small song bird with an extensive global distribution. They breed in a variety of natural and artificial sites including vertical banks, riverbanks, aggregate pits, road cuts, and stock piles of soil. While still provincially common, their population has declined in recent years. The reduction in population is thought to relate to several factors including a reduction in breeding and foraging habitat (especially through erosion

control projects, flood control, aggregate management activities, conversion of pastureland to cropland, and afforestation), nest destruction during aggregate extraction, climate change, and pesticide use. Bank swallows are colonial breeders, and breed between May and August [(11)].

The bobolink (*Dolichonyx oryzivorous*) is a provincially widespread bird (S4B) listed as threatened by COSEWIC, however is not listed on Schedule 1 of SARA. It is not listed under Manitoba's *Endangered Species and Ecosystems Act*. It is a medium-sized passerine which breeds across the southern regions of all provinces. Its habitat includes grasslands, wet prairie, graminoid peatlands, abandoned fields dominated by tall grasses, remnants of uncultivated virgin prairie, no-till cropland, small-grain fields, restored surface mining sites and irrigated fields in arid regions [(12)]. It primarily nests in forage crops. The bobolink population has declined since the late 1960s as a result of incidental mortality from agricultural operations, habitat loss and fragmentation, pesticide exposure and bird control at wintering roosts [(12)].

3.7 AMPHIBIANS AND REPTILES

Reptile and amphibian species typical of the Aspen Parkland Ecoregion include red-sided and western plains garter snakes, western painted turtle, gray salamander and various frogs and toads [(2)]. During the September 2017 site visit both wood frog and northern leopard frog were observed near the project site (Appendix A – Photo 23). While the wood frog is common and widespread, the northern leopard frog is provincially listed as a species of conservation concern and is federally listed under the SARA as a species of special concern (Appendix F).

A search of the CDC rare species database found no occurrences of provincially or federally listed amphibians or reptiles (Manitoba *Endangered Species and Ecosystem Act* and SARA) in the project area (Appendix G). It was noted however that the prairie skink has been reported in the adjacent areas, although not in the project area. The prairie skink is listed as endangered under Manitoba's *Endangered Species and Ecosystems Act* and federally under SARA (Appendix F).

The northern prairie skink (*Plestiodon septentrionalis septentrionalis*) is one of three subspecies of prairie skink, and is the only subspecies found in Canada. It is provincially very rare (S1) and globally secure (G5). The prairie skink is a small brown lizard with short legs. Their diet includes

invertebrates such as grasshoppers, spiders, and beetles. Critical habitat consists of "open native grassland habitat and adjacent trees and shrubs which provide a range of thermal conditions for activity and shelter in the active season, and loose sandy soils which accommodate shallow burrowing during the active season and deeper burrowing in winter" [(13)]. They enter their winter hibernaculum in mid-September and emerge in mid to late April. Population size and trends are not known as they are very difficult to survey. The species is only found in two regions in Canada with the majority in the Brandon Sandhills area and a smaller population in the Lauder Sandhills. While there are no recorded sightings of the prairie skink in the project area, critical habitat has been identified north of the project site as described in the SARA Proposed Recovery Strategy [(13)] (Appendix I). Numerous 1 km x 1 km standardized UTM grid squares are shown which highlight the general geographic area which contain critical habitat. A portion of the project area falls within a 1 km x 1 km grid identified as an area which contains critical habitat [(13)] (Appendix I). Within each grid, critical habitat only exists where specific habitat criteria are met. While the project area does fall within a grid which contains critical habitat, suitable habitat was not found at the project location. The SARA Recovery Strategy additionally lists legal land descriptions of quarter sections which contain critical habitat. The list does not include the quarter section on which the project is located (SE 24-9-10W). The adjacent quarter section to the north (NE 24-9-10W) is listed as containing critical habitat (Appendix I). This is supported by on-site observations which showed several open areas containing grassland and agriculture present north of the project site which may provide suitable habitat (Appendix A – Photos 7-9). In particular an area of what appears to be native grassland is present approximately 750 m north of the project site (Appendix A – Photo 8). Threats to the prairie skink include residential and commercial development, agriculture, transportation and service corridors, biological resource use, human intrusions and disturbance, and natural system modifications.

The northern leopard frog (*Lithobates pipiens)* is provincially widespread (S4) and globally secure (G5) but is federally listed as a species of special concern under SARA as it has experienced a considerable contraction of range and the loss of populations in the past, particularly in the west [(14)]. It is not provincially listed under *The Endangered Species and Ecosystems Act*. The population decline has been accompanied by increased isolation of remaining populations, which fluctuate widely in size, with some showing signs of recovery. The northern leopard frog uses a variety of habitats to meet its needs. They overwinter in well-

oxygenated water bodies which do not freeze solid [14]. Breeding and larval life generally occurs in pools, ponds, marshes and lakes between April and June. A typical breeding pond is 30 to 60 m in diameter and 1.5 to 2.0 m deep which have abundant vegetation and no fish. Moist upland meadows and native prairie are used during the summer [14]. While northern leopard frogs were observed near the project location, they were not seen near the road and appropriate habitat was not observed along the proposed road realignment. The species is adversely affected by habitat conversion, including wetland drainage and eutrophication, game fish introduction, collecting, pesticide contamination and habitat fragmentation that curtails recolonization and rescue of declining populations.

3.8 FISH AND AQUATIC HABITAT

The project falls within the Assiniboine River watershed. As is common of rivers in the prairie region, the Assiniboine River has a low velocity, a meandering course, and has relatively warm and turbid water. The river is generally shallow and gently contoured and has fine sediment substrates. Common fish species include catfish, walleye, mooneye, goldeye, white sucker, carp, yellow perch, northern pike, burbot, and freshwater drum [15].

A search of the CDC rare species database found no occurrences of provincially or federally listed aquatic species (Manitoba *Endangered Species and Ecosystem Act* and SARA) in the project area (Appendix G). It was noted however that the Mapleleaf mussel is known to be present in the Assiniboine River. The Mapleleaf mussel is listed as endangered under Manitoba's *Endangered Species and Ecosystems Act* and federally under SARA (Appendix F). An aquatic habitat assessment was conducted along the Assiniboine River adjacent to the project site to determine if suitable habitat is present for the Mapleaf mussel. The assessment confirmed that several areas in the Assiniboine River adjacent to the project site contain suitable habitat for Mapleleaf mussel. No Mapleleaf mussel shells were found however (Appendix D).

The Mapleleaf mussel (*Quadrula quadrula*) is a mollusc which is ranked as provincially rare (S2) and globally secure (G5). Populations in Manitoba are listed as endangered under *The Endangered Species and Ecosystems Act* and federally by SARA. In an assessment in 2016, COSEWIC downgraded the species designation to threatened but legislative changes have not yet been made (Appendix D). Both provincial and federal legislation provide regulations for the

protection of the species and the habitats upon which they depend. In Manitoba, populations of Mapleleaf mussel have been documented in the Red River, the lower reaches of the Assiniboine and Roseau rivers, and recently in the Bloodvein River on the east side of Lake Winnipeg. Their range in the Assiniboine River is believed to extend upstream to Lake of the Prairies. The Mapleleaf mussel is a medium to large freshwater mussel (up to 125 mm in length), which inhabits medium to large rivers with low to moderate current in substrates of firmly packed, coarse gravel and sand, and to a lesser extent firmly packed clay/mud. Threats include habitat loss, invasive species, water quality degradation, and agriculture runoff [(16)].

In October 2017, a substrate sampling program was undertaken to determine if suitable habitat for the Mapleleaf mussel exists in the project area (Appendix D). A brief visual mussel survey was conducted on the shoreline of the Assiniboine River within the designated study area. Empty mussel shells were collected, photographed and used to identify the various species present at the study site and live mussels found in the river were photographed but were not removed from their location. During the cursory shoreline survey empty shells from at least five mussel species were identified. The mussel species identified were the Fatmucket (*Lampsilis siliquoidea*), Black Sandshell (*Ligumia recta*), White Heelsplitter (*Lasmigona complanata*), Plain Pocketbook (*Lampsilis cardium*) and Cylindrical Papershell (*Anodontoides ferussacianus*. Mapleleaf shells or live individuals were not found on the shoreline or observed in the river at the study site, however, several areas within the study reach are considered to have habitat suitable for Mapleleaf mussels including substrates adjacent to the bank stabilization area (Appendix D).

3.9 SOCIOECONOMIC

The largest centre in the ecodistricit is Brandon, which is located 90 km west of the project site. There are several smaller communities near the project site at the eastern section of the ecodistrict including Treherne, Rathwell, and Holland. Treherne is the largest centre near the project site. Other nearby communities north of the project site within the adjacent ecodistrict include Lavenham, Rosendale, and Ladysmith. Swan Lake is the only First Nation community in the ecodistrict [(2)]. The project is within the Municipality of Norfolk Treherne which formed on January 1, 2015 when the Town of Treherne and R.M. of South Norfolk amalgamated.

Treherne is an unincorporated urban centre located 100 km west of Winnipeg and is roughly half way between Winnipeg and Brandon along Provincial Highway #2. The main economic activity of the region is agriculture. Treherne has a population of 615 people [(17)]. Treherne is a major rural service centre in south central Manitoba and has a grocery store, pharmacy, post office, community resource centre, and a credit union. There is an active volunteer fire department and Royal Canadian Mounted Police detachment. Treherne has an elementary school for kindergarten to grade 8 and a Collegiate for Senior 1 to Senior 4 [(18)].

3.10 HERITAGE RESOURCES

Ms. Heather McClean of Manitoba Sport, Culture and Heritage, Historic Resources Branch, examined the project location in conjunction with Branch records for areas of potential concern and reported that there are no known heritage resources located within the study area [(19)] (Appendix G).

4.0 POTENTIAL ENVIRONMENTAL EFFECTS ASSESSMENT

An environmental effect includes any change that the project may cause to the environment (biological, physical, social and economic). Environmental effects were identified from interactions between project activities and environmental components. This assessment focusses on the effects of new road construction and associated activities. It is anticipated that upgrades to the road will have a positive effect on road users as the road repairs and realignment will improve the safety of the road and extend its lifespan. Mitigation measures and follow-up activities were identified for environmental effects determined to be adverse.

4.1 AIR QUALITY

Road construction activities will result in temporary increases in fugitive dust levels, greenhouse gases and vehicle emissions in the local area. Dust may be generated during construction activities such as tree clearing, grubbing, excavating, and spreading and compaction of road materials as well as from vehicle and construction equipment accessing the site. Increased volatile organic carbon (VOC) levels will result from fuels and other hazardous substances used during construction activities. During construction it is anticipated that the contractor will transport fuel storage tanks to site in order to fuel equipment. It is unlikely that Manitoba's air quality guidelines would be exceeded during construction and any effects would be very short term. Therefore the potential adverse effects on air quality were assessed to be negligible. The effects will be mitigated by using an approved dust suppressant such as water, controlling construction vehicle speeds, limiting construction activities during high wind events, and re-establishing vegetation on disturbed areas. Mitigation measures to control increased greenhouse gases and vehicle emissions include requiring a high standard of maintenance for shipping vehicles, limiting unnecessary long-term idling, using low sulphur-containing fuels, using appropriate dispensing equipment and limiting fueling of vehicles and equipment.

4.2 SOILS

Soils in the project area may become contaminated during construction from leaks and accidental spills or releases of fuels or other hazardous substances and waste. Potential spills would be restricted to a small area and immediately cleaned up. The potential adverse effects

on soil quality were assessed to be minor. Proposed mitigation includes preventing leaks, spills and releases by providing secondary containment for fuel storage, requiring drip trays for equipment, providing fuel handling training for operators, providing spill clean-up equipment and materials, complying with provincial fuel storage and dispensing regulations, storing hazardous materials in approved containers, providing an emergency (spill) response plan and periodic inspection for leaks, spills and releases. If a spill should occur the contractor would be responsible to notify the MSD Emergency Response Program (204-944-4888) and the appropriate clean-up would be determined according to the size of spill and quantity of contamination. Small spills could be treated on site with regular working of the soil to aerate. Larger spills, however, would be assessed and delineated following Phase III Environmental Site Assessment standards and a remediation program would be developed to ensure that the site is cleaned to meet MSD soil remediation criteria.

4.3 GROUNDWATER

Groundwater in the project area may become contaminated during site preparation and construction from leaks, accidental spills, or releases of fuels or other hazardous substances. Groundwater quality at the site has not been tested for hydrocarbons. Potential spills would be restricted to a small area and immediately cleaned up. The soil in the area is a mix of silty clays, silts and sands with the groundwater at depths ranging from 13-54 feet below the ground surface. It is assumed that nearby residents (approximately 700 m away) use groundwater as a potable water source. The potential adverse effects on groundwater quality were assessed to be minor. Proposed mitigation includes preventing leaks, spills and releases by providing secondary containment for fuel storage, requiring drip trays for equipment, providing fuel handling training for operators, providing spill clean-up equipment and materials, complying with provincial fuel storage and dispensing regulations, storing hazardous materials in approved containers, providing an emergency (spill) response plan and periodic inspection for leaks, spills and releases.

4.4 SURFACE WATER

Surface water in the project area may become contaminated during construction from leaks and accidental spills or releases of fuels or other hazardous substances. Additionally, erosion of

soils may result in the transport of sediment to the Assiniboine River. No surface water is immediately adjacent to the road realignment. The Assiniboine River is generally greater than 100 m from the road realignment, but gets as close approximately 50 m in one location. The potential adverse effects on water quality were assessed to be minor. Exposed soils and road building materials will be monitored to ensure erosion is not resulting in the transport of material to any waterbodies. If transport of material is observed, appropriate sediment and erosion control measures will be implemented (e.g. silt fence). Additional proposed mitigation includes preventing leaks, spills and releases by providing secondary containment for fuel storage, requiring drip trays for equipment, providing fuel handling training for operators, providing spill clean-up equipment and materials, complying with provincial fuel storage and dispensing regulations, storing hazardous materials in approved containers, providing an emergency (spill) response plan and periodic inspection for leaks, spills and releases.

4.5 VEGETATION

The project will result in the loss of vegetation due to ROW clearing for the new realignments. Vegetation which will be removed consists of undisturbed forest within the Whitemud Watershed WMA. As no rare or protected plant species were identified in the project area and the overall project footprint is small the potential adverse effects on vegetation were assessed to be negligible. Mitigation measures include minimizing disturbance of vegetation by limiting construction activities to designated and previously disturbed areas as much as possible and re-vegetating disturbed or reclaimed areas after construction.

4.6 MAMMALS

Realignment of Road 54W will result in the loss and disturbance of vegetation and mammal habitat. Given that the CDC found no occurrences of rare or endangered plant and wildlife species at the project area, and the overall project footprint is small, the potential adverse effects on mammals were assessed to be negligible. Mitigation measures include minimizing loss and disturbance of vegetation and mammal habitat by limiting construction activities to designated and previously disturbed areas as much as possible, and re-vegetating disturbed or reclaimed areas after construction.

4.7 BIRDS

Realignment of Road 54W will result in the loss and disturbance of vegetation and avian habitat. The realigned road sections are being constructed in a new location which consists of undisturbed forest within the Whitemud Watershed WMA which provides habitat for a variety of bird species. As discussed in Section 3.6, a review of the MBBA identified the presence of 5 bird species of conservation concern in the general area including the barred owl, horned lark, bank swallow, barn swallow, and bobolink. None of these species are protected provincially by *The Endangered Species and Ecosystem Act* or federally by SARA. Based on habitat requirements previously discussed for these 5 species of conservation concern, only the barred owl could use the project area. The forest is not particularly expansive however as the broader area has extensive agriculture. Additionally, the CDC found no occurrences of rare or endangered bird species at the project area (Appendix G). Therefore the potential effects on birds as a result of the project are expected to be minor. Mitigation measures to implement include minimizing loss and disturbance of vegetation and avian habitat by limiting construction activities to designated and previously disturbed areas as much as possible and re-vegetating disturbed or reclaimed areas after construction. In particular, tree clearing will be completed in the winter in accordance with the *Migratory Birds Convention Act*, specifically outside of critical nesting and rearing periods of mid-April to late-August for nesting zone B4.

4.8 AMPHIBIANS AND REPTILES

Road realignment will result in the disturbance of the forest area at the project site and loss of potential amphibian and reptile habitat. While the CDC found no occurrences of rare or endangered amphibian or reptile species in the project area, the prairie skink has been reported in adjacent areas (Appendix G) and the northern leopard frog was also identified near the project site during a site visit. While the project site does contain sandy soils, it is heavily forested and does not contain open grasslands which are preferred by the prairie skink (Appendix A – Photos 12-20). Similarly, while northern leopard frogs were observed near the site, the project area does not contain appropriate overwintering or spring breeding habitat along the proposed alignment. Due to the lack of suitable habitat, the limited project footprint, and the project schedule, the impacts of road realignment on amphibians and reptiles was assessed to be minor. Mitigation measures will include minimizing loss and disturbance of

vegetation, limiting construction activities to designated areas, reporting sightings of rare species, sediment and erosion control measures as required, and re-vegetating disturbed and reclaimed areas to restore wildlife habitat.

4.9 FISH AND AQUATIC HABITAT

Fish and aquatic habitat could be adversely affected from run-off of contaminated surface water from the construction site, as discussed in Section 4.4. However, as previously noted, no surface water is immediately adjacent to the road realignment and the Assiniboine River is generally more than 100 m from the construction area. Additionally, the CDC has no records of rare species at the project site and the aquatic habitat assessment did not identify the presence of any Mapleleaf mussel. Therefore the potential impacts of the project to fish and aquatic habitat were assessed as negligible. The mitigation measures proposed to prevent impacts to surface water will mitigate potential impact associated with run-off to fish and aquatic habitat.

4.10 EMPLOYMENT / ECONOMY

The overall scale of the project is relatively small, however the project may create temporary construction employment opportunities and increase the economy in the local and surrounding areas associated with purchase of construction materials, fuel, supplies and lodgings. Improvements to Road 54W and the subsequent increase in the roads lifespan will also contribute positively to the employment and economy in the immediate area as it provides access to one residence and an agricultural field. Given the small area accessed by the road, the impacts are highly localized. As the effect is positive, no mitigation or follow-up has been proposed.

4.11 HUMAN HEALTH AND WELL BEING

Soil, surface water and groundwater in the project area may become contaminated during construction activities, from leaks and accidental spills or releases of hazardous substances, which could adversely affect human health. Any potential spills would be immediately cleaned up as previously described with no migration off-site. Therefore the potential adverse effects of the project on human health were assessed to be negligible. Proposed mitigation measures

include preventing leaks, spills and releases by providing secondary containment for fuel storage, requiring drip trays for equipment, providing spill clean-up equipment and materials, providing fuel handling training for operators, complying with provincial fuel storage and dispensing regulations, storing hazardous materials in approved containers, and providing an emergency (spill) response plan.

4.12 PUBLIC AND WORKER SAFETY

The existing road is failing and may pose a danger to the public associated with erosion and steep slopes adjacent to the road in places. The road is only used by a small number of people however does provide access to a residence and an agricultural field. The proposed road realignment will improve the road safety by moving the road away from areas which are most likely to fail in the near future. During construction, access along Road 54W will be maintained until construction of the new alignment is complete. The increased road safety which would result from road improvements is an overall positive and the potential hazard to public safety during construction was assessed as negligible. No additional mitigation is proposed.

The potential hazards to worker health and safety include use of heavy machinery and handling and storage of fuels and hazardous materials (e.g. greases and lubricants). The potential hazard to worker safety will therefore only be for a short period and was assessed as minor. Proposed mitigation includes providing appropriate personal protective equipment (PPE) for workers, providing fuel handling training for operators, complying with provincial fuel storage and dispensing regulations, storing hazardous materials in approved containers, with *Manitoba Workplace Safety and Health Act* and regulations, conducting safety briefings with workers and providing employee training.

4.13 HERITAGE RESOURCES

Ms. Heather McClean of Manitoba Sport, Culture and Heritage, Historic Resources Branch examined the project location in conjunction with Branch records and indicated that there are no known heritage or archaeological resources located within the study area (Appendix G). Therefore the potential for the project to impact archaeological or heritage resources is considered negligible and no specific mitigation measures or follow-up are

proposed. If any archaeological or heritage artifacts are uncovered during the project, the proponent will contact the Branch.

5.0 ENVIRONMENTAL MANAGEMENT PRACTICES

Environmental management practices proposed to be employed to prevent or mitigate environmental effects that were determined to be adverse, as described in Section 4.0, are summarized in the following sections. Mitigation is defined under the *Canadian Environmental Assessment Act* as the elimination, reduction and control of the adverse effects of a project and includes restitution for any damage to the environment caused by such effects through replacement, restoration, compensation or any other means. Mitigation measures must be technically and economically feasible, and implemented.

5.1 AIR QUALITY

Applying an approved dust suppressant such as water, controlling construction vehicle speeds, limiting construction activities during high wind events, and re-establishing vegetation on disturbed areas will mitigate increased fugitive dust levels generated during road realignment activities. By controlling fugitive dust levels it is unlikely that Manitoba's air quality guidelines would be exceeded during construction activities.

Requiring a high standard of maintenance for construction equipment and vehicles, limiting unnecessary long-term idling, using low sulfur-containing fuels, using appropriate dispensing equipment and limiting fueling, will mitigate increased levels of greenhouse gases and vehicle emissions from equipment and increased VOC levels from fuels and other substances during construction activities.

5.2 SOILS

Preventing leaks, spills and releases by providing secondary containment for fuel storage, requiring drip trays for equipment, providing fuel handling training for operators, providing spill clean-up equipment and materials, complying with provincial fuel storage and dispensing regulations, storing hazardous materials in approved containers, providing an emergency (spill) response plan and periodic inspection for leaks, spills and releases will mitigate potential soil contamination from leaks and accidental spills during construction.

5.3 GROUNDWATER

The mitigation measures outlined in Section 5.2 above for soil contamination will also mitigate groundwater contamination from leaks, spills and releases.

5.4 SURFACE WATER

The mitigation measures outlined in Section 5.2 for soil contamination will also mitigate surface water contamination from leaks, spills and releases. If construction activities result in erosion of soils, erosion and sediment control measures will be implemented (e.g. silt fence) to mitigate release of sediments to surface water.

5.5 VEGETATION

Limiting the area cleared during construction, limiting construction activities to designated and previously disturbed areas as much as possible, and re-vegetating disturbed or reclaimed areas after construction will minimize loss and disturbance of vegetation and mitigate effects on vegetation.

5.6 MAMMALS

Limiting the area cleared during construction, limiting construction activities to designated and previously disturbed areas as much as possible, and re-vegetating disturbed or reclaimed areas after construction will mitigate effects on mammals and mammal habitat.

5.7 BIRDS

Mitigation measures to implement include minimizing loss and disturbance of vegetation and avian habitat by limiting construction activities to designated and previously disturbed areas as much as possible, re-vegetating disturbed or reclaimed areas after construction and completing tree clearing in the winter in accordance with the *Migratory Birds Convention Act*, specifically outside of critical nesting and rearing periods of mid-April to late-August for nesting zone B4.

5.8 AMPHIBIANS AND REPTILES

Limiting the area cleared during construction, limiting construction activities to designated and previously disturbed areas as much as possible, sediment and erosion control measures as required, and re-vegetating disturbed or reclaimed areas after construction will minimize loss and disturbance to amphibians and reptiles and their habitat.

5.9 FISH AND AQUATIC HABITAT

The mitigation measures outlined in Section 5.2 for soil contamination will also mitigate surface water contamination from leaks, spills and releases and will therefore mitigate aquatic habitat near the project site. If construction activities result in erosion of soils, erosion and sediment control measures will be implemented (e.g. silt fence) to mitigate release of sediments to surface water and associated impacts on fish and fish habitat.

5.10 HUMAN HEALTH AND WELL-BEING

The mitigation measures outlined in Section 5.2 for soil contamination will also mitigate human health and well-being concerns related to soil, surface water and groundwater contamination from leaks, spills and releases.

5.11 PUBLIC AND WORKER SAFETY

Appropriate PPE will be worn by workers working on the road construction. Providing fuel handling and hazardous materials training and appropriate PPE for workers, storing hazardous materials in approved containers, complying with *Manitoba Workplace Safety and Health Act* and regulations, conducting safety briefings with workers and providing employee training will mitigate the threat to worker health and safety during construction.

5.12 RESIDUAL ENVIRONMENTAL EFFECTS

The significance of residual environmental effects, the effects remaining after the implementation of mitigation measures, was evaluated following procedures outlined in the

Canadian Environmental Assessment Agency, Operation Policy Statement "Determining Whether a Designated Project is Likely to Cause Significant Adverse Environmental Effects under the *Canadian Environmental Assessment Act*, 2012" [(20)]. The degree of change from the existing conditions and the value of the environmental components being affected determine the significance of an adverse effect. Criterion for this determination include:

- **Societal value** of the affected environmental components – includes nature and degree of protection provided
- **Ecological value** – includes rarity and uniqueness, fragility, importance within ecosystem, importance to scientific studies
- **Duration** – length of time the project activity will last
- **Frequency** – rate of reoccurrence of the project activity causing the effect
- **Geographic extent** – area over which the effect will occur
- **Magnitude** – predicted disturbance compared to existing conditions
- **Timing** – when the predicted disturbance may occur (e.g. at critical life stages)
- **Reversibility** – time the environmental component will take to recover after the source of the effect ceases

Based on the available information on the project and the environment, the assessment of environmental effects outlined in this environmental assessment report, and the application of proposed mitigation measures and the conduct of required follow-up, the construction related to the realignment of Road 54W will not likely result in any significant residual adverse environmental effects.

6.0 FOLLOW-UP ACTIVITIES

Follow-up is defined under the *Canadian Environmental Assessment Act* as a program to verify the accuracy of the environmental assessment of a project and determine the effectiveness of measures taken to mitigate the adverse environmental effects of the project. Follow-up activities include monitoring, surveillance, inspection, and may include data collection, analysis, evaluation, and reporting. Monitoring of implementation of the standard mitigation measures identified for environmental effects determined in Section 4.0 to be adverse are described in the following sections.

6.1 SOILS

Follow-up proposed during operation includes periodic inspections of equipment and storage containers for leaks, spills and releases, periodic observation for potential soil contamination, and adherence to contract specifications.

6.2 GROUNDWATER

Follow-up proposed includes periodic inspection for leaks, spills and releases during operation, as per Section 6.1 above.

6.3 SURFACE WATER

Follow-up proposed includes periodic inspection for leaks, spills and releases during operation, as per Section 6.1 above. Periodic inspections will also occur for erosion, with erosion and sediment control measures implemented as required.

6.4 BIRDS

Follow-up proposed include monitoring to ensure that construction activities remain restricted to designated and previously disturbed areas as much as possible, ensuring that tree clearing occurs outside of the critical nesting and rearing period in accordance with *Migratory Birds*

Convention Act, reporting sightings of rare species, and ensuring that reclaimed sites are appropriately revegetated.

6.5 AMPHIBIANS AND REPTILES

Follow-up proposed include monitoring to ensure that construction activities remain restricted to designated and previously disturbed areas as much as possible, reporting sightings of rare species, and ensuring that reclaimed sites are appropriately revegetated.

6.6 PUBLIC AND WORKER SAFETY

Follow-up proposed includes recording any occurrence of workplace accidents, confirming compliance with provincial fuel storage and dispensing regulations and updating training and safety guidelines as required.

7.0 STATEMENT OF LIMITATIONS

7.1 THIRD PARTY USE OF REPORT

This report has been prepared for the Municipality of Norfolk Treherne to whom this report has been addressed and any use a third party makes of this report, or any reliance on or decisions made based on it, are the responsibility of such third parties. KGS Group accepts no responsibility for damages, if any, suffered by any third party as a result of decisions made or actions undertaken based on this report.

7.2 ENVIRONMENTAL STATEMENT OF LIMITATIONS

KGS Group prepared the environmental conclusions and recommendations for this report in a professional manner using the degree of skill and care exercised for similar projects under similar conditions by reputable and competent environmental consultants. The information contained in this report is based on the information that was made available to KGS Group during the investigation and upon the services described, which were performed within the time and budgetary requirements of the Municipality of Norfolk Treherne. As the report is based on the available information, some of its conclusions could be different if the information upon which it is based is determined to be false, inaccurate or contradicted by additional information. KGS Group makes no representation concerning the legal significance of its findings or the value of the property investigated.

8.0 REFERENCES

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APPENDIX A

SITE PHOTOS

Photo 1 – Slope failure encroaching Road 54W at Site #94 (looking south).

Photo 2 – Slope failure encroaching Road 54W at Site #94 (looking north).

Photo 3 – Slope failure encroaching Road 54W at Site #93.

Photo 4 – Slope failure encroaching Road 54W at Site #93 (looking up at road).

Photo 5 –Bank slip adjacent to road at Site #91 (looking north).

Photo 6 – Bank slip adjacent to road at Site #91 (looking up at road).

Photo 7 –Agricultural field 75 m north of the project site.

Photo 8 – Grassland area 750 m north of the project site.

Photo 9 –Agricultural fields 1,700 m north of project site.

Photo 10 – Agricultural field at southern end of Road 54W.

Photo 11 – Erosion gully downslope from Site #94 (looking east).

Photo 12 – North side of proposed realignment at Site #94 (looking south).

Photo 13 – Forest along proposed realignment at Site #94.

Photo 14 – Forest along proposed realignment at Site #94.

Photo 15 – South side of proposed realignment at Site #94 (looking north).

Photo 16 – North side of proposed realignment at Site #93 (looking south).

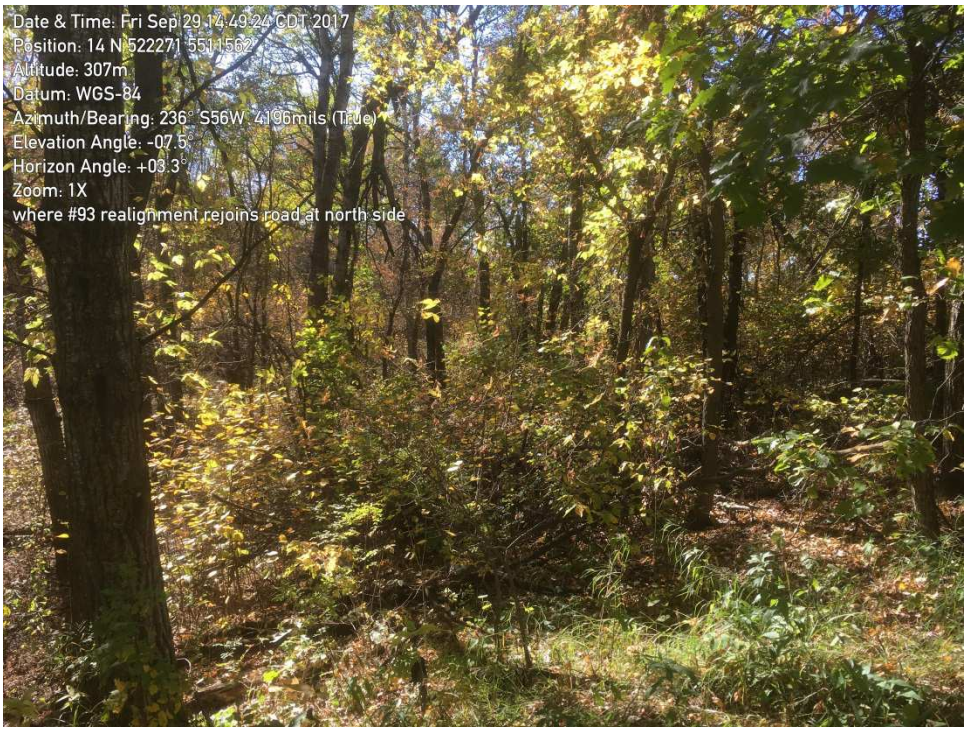


Photo 17 – Forest at north side of proposed realignment at Site #93.

Photo 18 – Forest along proposed realignment at Site #93.

Photo 19 – Forest along proposed realignment at Site #93.

Photo 20 – South side of proposed realignment at Site #93 (looking north).

Photo 21 – Southern limit of proposed riprap area (looking north).

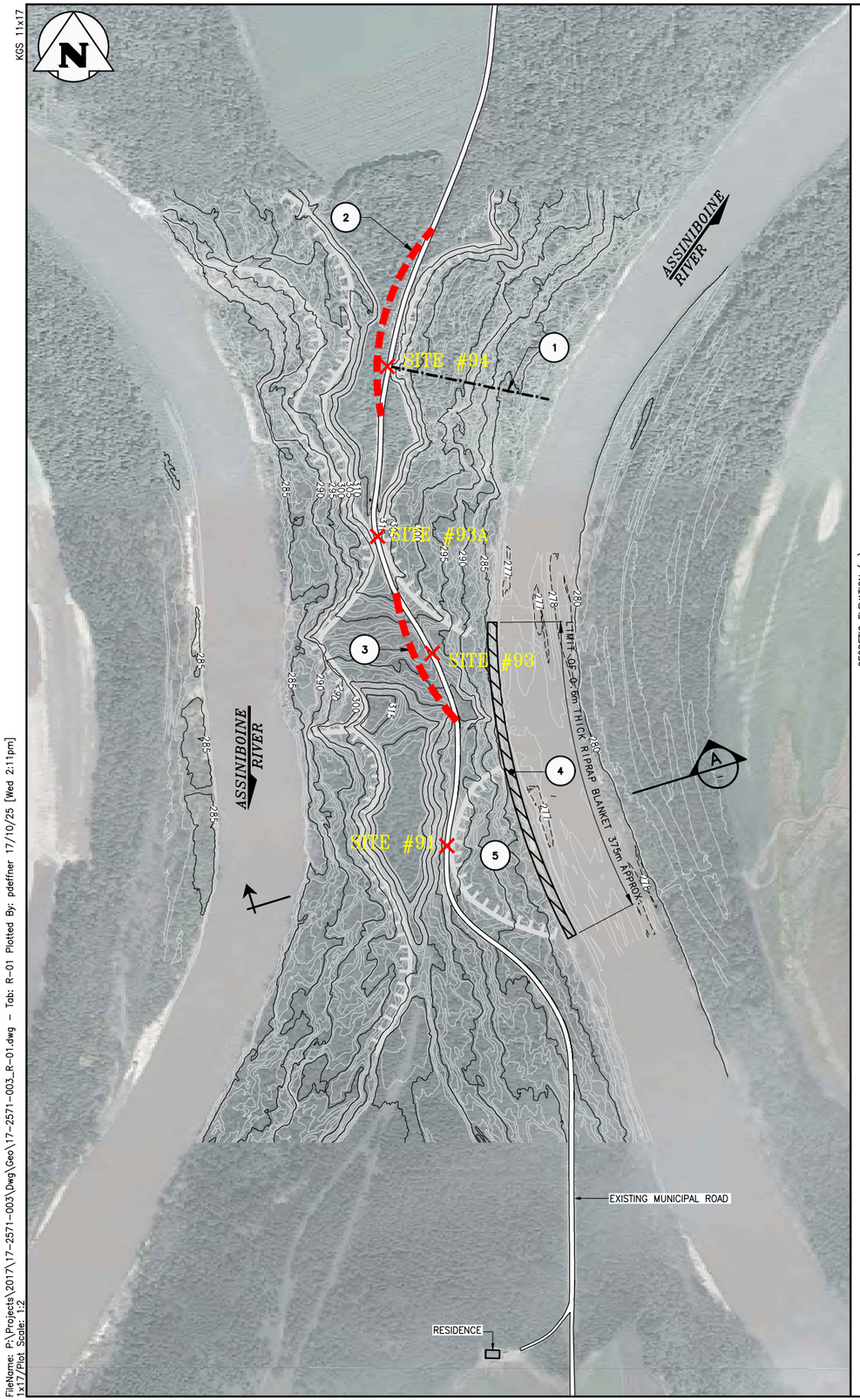
Photo 22 – Northern limit of proposed riprap area (looking south).

Photo 23 – Northern leopard frogs observed in small pool near river.

APPENDIX B

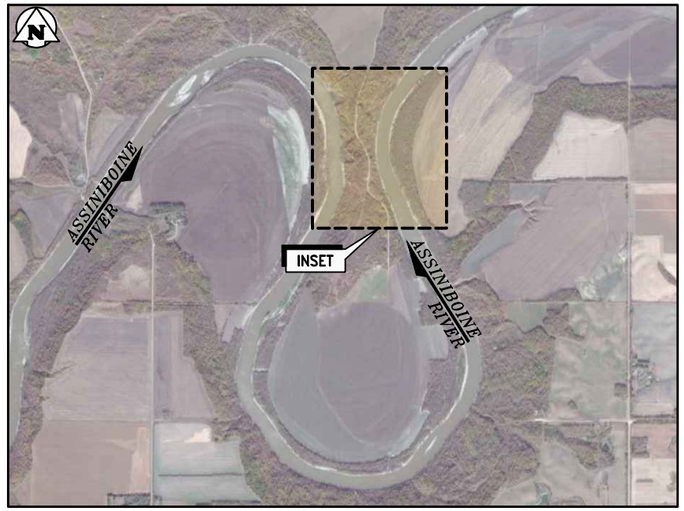
SITE FIGURE

KGS 11x17

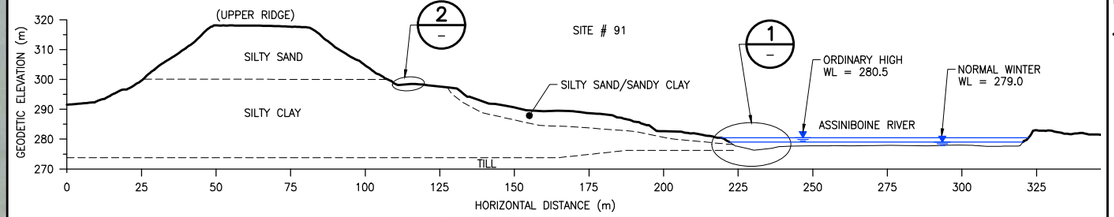


CONSTRUCTION ITEMS:

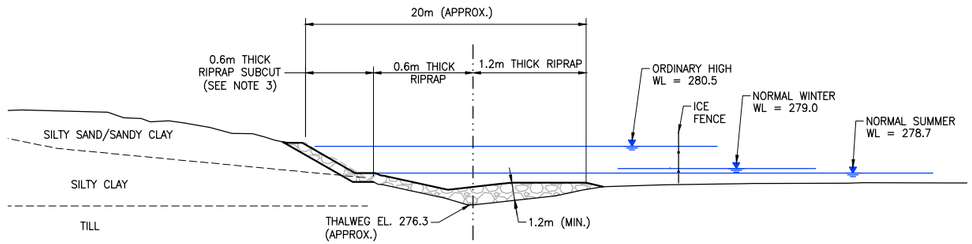
1. SITE #94 – OPTIONAL GULLY RESTORATION TO IMPROVE DRAINAGE
2. SITE #94 – RELOCATE ROAD TO THE WEST (200m±).
3. SITE #93 – RELOCATE ROAD TO THE WEST (150m±).
4. RIPRAP EAST – SITES #91 AND #93 (375m±).
5. SITE # 91 – SLOPE REGRADING (TO SEAL TENSION CRACKS) AND REVEGETATION



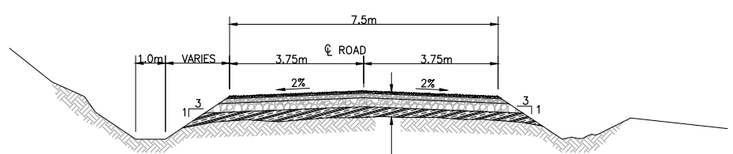
SITE MAP
SCALE: 1:40000 METRIC (11x17)



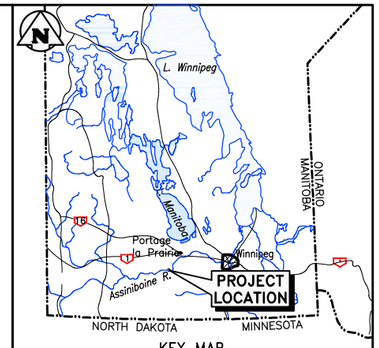
A – TYPICAL SECTION
SCALE: 1:1000 (24x36)



1 – TYPICAL RIPRAP CONSTRUCTION SECTION
SCALE: 1:200 (24x36)



2 – TYPICAL ROAD CONSTRUCTION DETAIL
SCALE: N.T.S.



KEY MAP

LEGEND:

- 300 — GEODETIC CONTOURS 5m INTERVALS LIDAR 2014
- GEODETIC CONTOURS 1m INTERVALS LIDAR 2014
- 278 — GEODETIC BATHYMETRIC CONTOUR 1m
- GEODETIC BATHYMETRIC CONTOUR 0.25m
- SITE LOCATION AS IDENTIFIED IN BACKGROUND DOCUMENTS
- HORIZONTAL REALIGNMENT
- RIPRAP BLANKET
- EXISTING HEAD SCARP
- DRAINAGE WORKS (DRAINAGE SWALE OR PIPE)

NOTES:

1. THE MUNICIPAL ROAD RE-ALIGNMENT AND RIPRAP SHOWN ARE APPROXIMATE.
2. RIPRAP GEOMETRY TO BE CONFIRMED WITH STABILITY ANALYSIS AND IS ANTICIPATED TO BE SIMILAR AS SHOWN.
3. RIPRAP TO BE SUBCUT BETWEEN TOP OF BANK AND WATER LEVEL AT TIME OF CONSTRUCTION.
4. THE UPPER LIMIT OF THE RIPRAP BLANKET WILL BE DESIGNED TO SUIT FIELD CONDITIONS, MINIMIZE TREE REMOVAL AND TO PRODUCE A SMOOTH GEOMETRY PARALLEL TO THE SHORELINE.

PRELIMINARY
NOT TO BE USED FOR CONSTRUCTION

REFERENCE:

1. IMAGERY FROM GOOGLE EARTH AUGUST 2011.

100 0 100 200m
SCALE PLAN: 1:3000 (24x36)

5 0 5 10 15m
SCALE DETAILED SECTION: 1:200 (24x36)

NO.	YY/MM/DD	DESCRIPTION	DESIGN BY	DESIGN CHECK
0	17/10/27	ISSUED FOR REGULATORY APPROVALS	DL	SFM

REVISIONS / ISSUE

CLIENT: NorfolkTreherne

PROJECT: MNT MANITOBA EMERGENCY MEASURES ORGANIZATION SITES #91, #93 AND #94 TREHERNE MANITOBA

DWG. DESCRIPTION: SHORELINE RIPRAP AND MUNICIPAL ROAD REALIGNMENT

KGS GROUP CONSULTING ENGINEERS

DESIGN BY:	DL	DATE (YY/MM/DD):	17/10/24
DESIGN CHECK:		DATE:	
DRAWN BY:	PwD	DATE:	17/10/24
DWG CHECK:		DATE:	

DWG. NO. 17-2571-003 | R-01 | REV: 0

FileName: P:\Projects\2017\17-2571-003\Dwg\Geo\17-2571-003_R-01.dwg – Tab: R-01 Plotted By: pdeffner 17/10/25 [Wed 2:11pm]
11x17/Plot Scale: 1:2

APPENDIX C

STATUS OF TITLE

STATUS OF TITLE

Title Number **2361854/4**
Title Status **Accepted**
Client File Treherne

The Property Registry
A Service Provider for the Province of Manitoba

1. REGISTERED OWNERS, TENANCY AND LAND DESCRIPTION

HER MAJESTY THE QUEEN IN RIGHT OF THE PROVINCE OF MANITOBA

IS REGISTERED OWNER SUBJECT TO SUCH ENTRIES RECORDED HEREON
IN THE FOLLOWING DESCRIBED LAND:

PARCELS A, B, C, D, E, F, AND G PLAN 48232 MLTO
IN SE 1/4 24-9-10 WPM

The land in this title is, unless the contrary is expressly declared, deemed to be subject to the reservations and restrictions set out in section 58 of *The Real Property Act.*

2. ACTIVE INSTRUMENTS

No active instruments

3. ADDRESSES FOR SERVICE

DEPT. OF JUSTICE (WINNIPEG MB)
DIRECTOR /CIVIL LEGAL SERVICES
7TH FLOOR 405 BROADWAY
WINNIPEG MB
R3C 3L6

4. TITLE NOTES

No title notes

5. LAND TITLES DISTRICT

Morden

6. DUPLICATE TITLE INFORMATION

Duplicate not produced

7. FROM TITLE NUMBERS

OS1/4 All

8. REAL PROPERTY APPLICATION / CROWN GRANT NUMBERS

1132703

9. ORIGINATING INSTRUMENTS

Instrument Type:	**Real Property Application**
Registration Number:	**1132703/4**
Registration Date:	2009-01-19
From/By:	HER MAJESTY THE QUEEN IN RIGHT OF THE PROVINCE OF MB
To:	
Amount:	

10. LAND INDEX

Lot A Plan 48232
IN SE 24-9-10W

Lot B Plan 48232
IN SE 24-9-10W

Lot C Plan 48232
IN SE 24-9-10W

Lot D Plan 48232
IN SE 24-9-10W

Lot E Plan 48232
IN SE 24-9-10W

Lot F Plan 48232
IN SE 24-9-10W

Lot G Plan 48232
IN SE 24-9-10W

CERTIFIED TRUE EXTRACT PRODUCED FROM THE LAND TITLES DATA STORAGE SYSTEM OF TITLE NUMBER 2361854/4

APPENDIX D

AQUATIC HABITAT ASSESSMENT

ASSINIBOINE RIVER BANK STABILIZATION

TREHERNE, MB

AQUATIC HABITAT ASSESSMENT

October 2017

Prepared for

KGS Group

by

North/South Consultants Inc.
Aquatic Environment Specialists

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Winnipeg, Manitoba, R3Y 1G4
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1.0 INTRODUCTION

KGS Group is performing engineering services involving stabilization of a 375 m stretch of shoreline on the Assiniboine River near Treherne, MB (Figure 1). North/South Consultants Inc. (NSC) was retained to conduct an aquatic habitat assessment of the project reach of the river. Habitat sampling included substrate mapping using hydro-acoustic equipment and a ponar dredge to validate the data. In addition, a brief shoreline mussel survey was carried out in consideration of the potential presence of the endangered Mapleleaf mussel (*Quadrula quadrula)*.

2.0 METHODS

2.1 HABITAT MAPPING

A boat-based hydro-acoustic survey of the aquatic habitat was conducted on a 600 m reach of the Assiniboine River on October 5, 2017. A Lowrance® Elite7 TI consumer grade dual-beam echo-sounder equipped with Eagle dual 83/200 kHz frequency sonar transducer and 455kHz side imagery transducer were used to record acoustic data. Due to a malfunction with the Lowrance integrated global positioning system (GPS), positional information was obtained using a handheld Garmin GPS78S. Longitudinal survey transects were navigated from a 14 foot Jon boat with a 6 hp outboard motor. Surveys were conducted at boat speeds of approximately 5 to 10 km/h. Surveys consisted of tracking acoustic data around the perimeter and through the centre of the study site, with cross sections across the entire area. Acoustic data from the Lowrance HDS7 unit were logged to micro SD flash cards.

Collected acoustic data was exported to a comma delimited file (i.e., CSV file), which was then imported into Microsoft Excel for additional processing. Canvec vector data was downloaded for use in mapping analysis.

River bottom substrate samples were taken at various locations throughout the study area and were used to validate the results of the hydro-acoustic imaging. Samples were collected using a Petite Ponar dredge and photos of each sample were taken using a GPS-linked Nikon camera.

Riverine fish habitat features were noted within the study reach including flow pattern, cover and bank condition. Representative photos were taken of habitat features within the study reach.

2.2 MUSSEL SURVEY AND IDENTIFICATION

A brief visual mussel survey was conducted on the shoreline of the Assiniboine River within the designated study area. Empty mussel shells were collected, photographed and used to identify the various species present at the study site. Any live mussels found in the river were recorded but were not removed from their location.

3.0 RESULTS

3.1 PHYSICAL ENVIRONMENT

The banks of the Assiniboine River in the study area were mainly steep with eroding sections (photos 1-4). Riparian vegetation within the first 20 m of the shoreline consisted primarily of grasses and shrubs with a large area of deciduous forest continuing 20 m past the shoreline. Flow conditions were low consisting mainly of shallow run habitat with several sections of shallow riffle upstream of the study site (photo 5). Shoreline substrate consisted of a mix of sand and silt interspersed with small sections of exposed gravel. The study reach was devoid of instream vegetation but had many large fallen trees within the channel (photo 6).

3.2 HABITAT MAPPING

All substrate classes had fine sediments (clay/sand) present as either a primary or secondary component and were divided up into five different classes: Sand, Sand/Gravel, Gravel/Sand, Clay/Sand, and Sand/Clay. Sand was the dominant substrate type, found largely within the main channel as well as along the bank stabilization area. Sand/Clay and Clay/Sand also occurred along the west bank, whereas coarser substrates (Gravel/Sand and Sand/Gravel) were restricted to the shallow areas along the east bank at the downstream end of the study area. A substrate map of the project area is provided in Figure 2. Sediment samples taken throughout the study area validated the results from the hydro-acoustic imaging (Figure 3; photos 7-9).

3.3 FISH COMMUNITY

Reaches of the Assiniboine River provide year-round habitat for approximately 23 fish species, including species that are sought after for recreational fishing such as Walleye (*Sander vitreus*), Sauger (*Sander canadensis*), Channel Catfish (*Ictalurus punctatus*), and Northern Pike (*Esox lucius*). The fish community in the Assiniboine River has not been studied extensively; however, species that have been documented within the river are presented in Table 1. The proposed bank

stabilization site contains habitat suitable for various life stages of both forage and large bodied fish species but the habitat is not rare or limiting and is readily available both upstream and downstream of the site. Large woody debris present along both the west and east banks provide instream cover for fish which is otherwise lacking from the study reach. It is expected that many of the fish species could use the study site for foraging throughout the open water season. Due to the substrate consisting mainly of fine material such as sand it is unlikely to be used by key species such as Walleye for spawning.

3.4 MUSSELS

During the cursory shoreline survey empty shells from at least five mussel species were identified but shell quality limited the identification of many of specimens. The mussel species identified were the Fatmucket (*Lampsilis siliquoidea*; photo 10), Black Sandshell (*Ligumia recta*; photo 11), White Heelsplitter (*Lasmigona complanata*; photo 12), Plain Pocketbook (*Lampsilis cardium*; photo 13) and Cylindrical Papershell (*Anodontoides ferussacianus*; photo 14). No live mussels were observed in the river near the proposed bank stabilization site.

The Mapleleaf mussel is listed as "Endangered" by both *The Endangered Species and Ecosystems Act (*Manitoba) and the federal *Species at Risk Act.* In an assessment in 2016, COSEWIC downgraded the species designation to "Threatened" but legislative changes have not yet been made.

Mapleleaf are typically found in medium to large rivers, in substrates of firmly packed, coarse gravel and sand, and to a lesser extent firmly packed clay/mud (COSEWIC 2006). Areas with shifting substrates (i.e., active erosion or deposition) do not represent suitable habitat for Mapleleaf (Watson 2000). Mapleleaf has been documented in the lower reaches of the Assiniboine River and their range within the Assiniboine River is believed to stretch from Lake of the Prairies to its confluence with the Red River in Winnipeg, MB (Pip, pers. comm. in COSEWIC 2006). Although Mapleleaf shells or live individuals were not found on the shoreline or observed in the river at the study site, several areas within the study reach are considered to have habitat suitable for Mapleleaf mussels including substrates adjacent to the bank stabilization area.

4.0 REFERENCES

COSEWIC 2006. COSEWIC assessment and status report on the Mapleleaf Mussel *Quadrula quadrula* (Saskatchewan-Nelson population and Great Lakes-Western St. Lawrence population) in Canada. Committee on the Status of Endangered Wildlife in Canada. Ottawa. vii + 58 pp.

McCulloch, B.R. and W.G. Franzin. 1996. Fishes of the Canadian portion of the Assiniboine River drainage. Canadian Technical Report of Fisheries and Aquatic Sciences. 2087: v + 62 p.

Watson, E. T. 2000. Distribution and Life History of the Unionidae (Bivalvia: Mollusca) in the Assiniboine River Drainage in Manitoba, with special reference to *Anodontoides ferussacianus.* Master of Science Thesis, University of Manitoba, Winnipeg, MB. 159 pp.

Table 1. Fish species of the Assiniboine River, Manitoba[1].

FAMILY	SYSTEMATIC NAME	COMMON NAME
Petromyzontidae	*Icthyomyzon castaneus*	Chestnut Lamprey
Acipenseridae	*Acipenser fulvescens*	Lake Sturgeon
Hiodontidae	*Hiodon tergisus*	Mooneye
	Hiodon alosoides	Goldeye
Umbridae	*Umbra limi*	Central Mudminnow
Catostomidae	*Catostomus commersoni*	White Sucker
	Carpiodes cyprinus	Quillback
	Moxostoma anisurum	Silver Redhorse
	Moxostoma macrolepidotum	Shorthead Redhorse
	Moxostoma erythrurum	Golden Redhorse
Cyprinidae	*Cyprinus carpio*	Common Carp
	Macrhybopsis storeriana	Silver Chub
	Platygobio gracilis	Flathead Chub
	Semotilus atromaculatus	Creek Chub
	Notropis atherinoides	Emerald Shiner
	Notropis dorsalis	Bigmouth Shiner
	Notropis hudsonius	Spottail Shiner
	Notropis blennius	River Shiner
	Notropis heterodon	Blackchin Shiner
	Notropis heterolepsis	Blacknose Shiner
	Notropis stramineus	Sand Shiner
	Cyprinella spiloptera	Spotfin Shiner
	Luxilus cornutus	Common Shiner
	Notemigonus crysoleucas	Golden Shiner
	Rhinichthys cataractae	Longnose Dace
	Rhinichthys atratulus	Eastern Blacknose Dace

[1] McCulloch and Franzin 1996

Table 1. Continued

FAMILY	SYSTEMATIC NAME	COMMON NAME
Cyprinidae	*Chrosomus neogaeus*	Finescale Dace
	Pimephales promelas	Fathead Minnow
Ictaluridae	*Ictalurus punctatus*	Channel Catfish
	Ameiurus melas	Black Bullhead
	Noturus flavus	Stonecat
	Notorus gyrinus	Tadpole Madtom
Esocidae	*Esox lucius*	Northern Pike
Percopsidae	*Percopsis omiscomaycus*	Trout-perch
Gadidae	*Lota lota*	Burbot
Centrarchidae	*Ambloplites rupestris*	Rock bass
Gasterosteidae	*Culaea inconstans*	Brook Stickleback
	Pungitius pungitius	Ninespine Stickleback
Percidae	*Sander canadensis*	Sauger
	Sander vitreus	Walleye
	Perca flavescens	Yellow Perch
	Etheostoma nigrum	Johnny Darter
	Percina maculate	Blacksided Darter
	Percina shumardi	River Darter
Sciaenidae	*Aplodinotus grunniens*	Freshwater Drum

[1] McCulloch and Franzin 1996

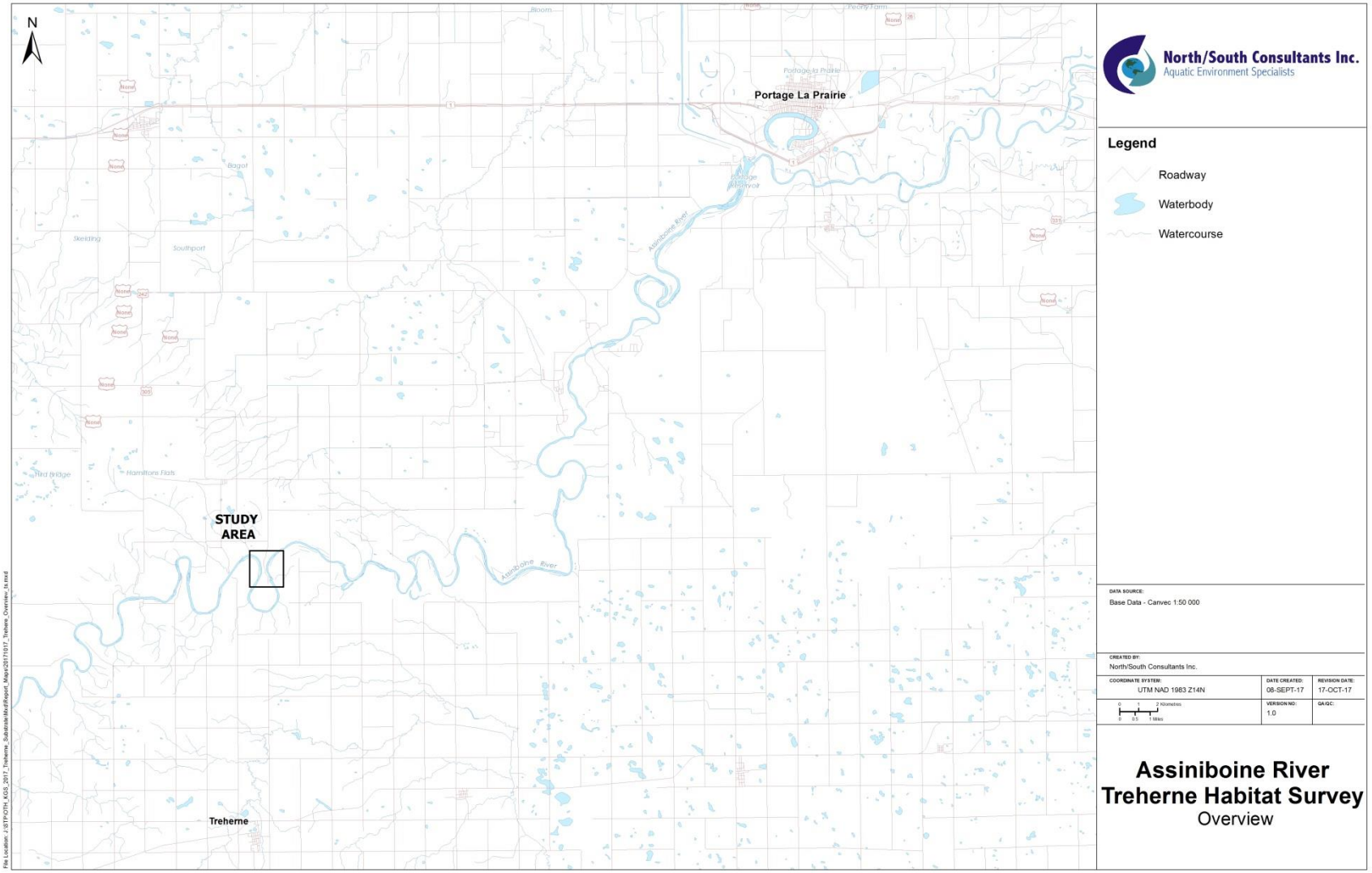


Figure 1. Assiniboine River bank stabilization site location.

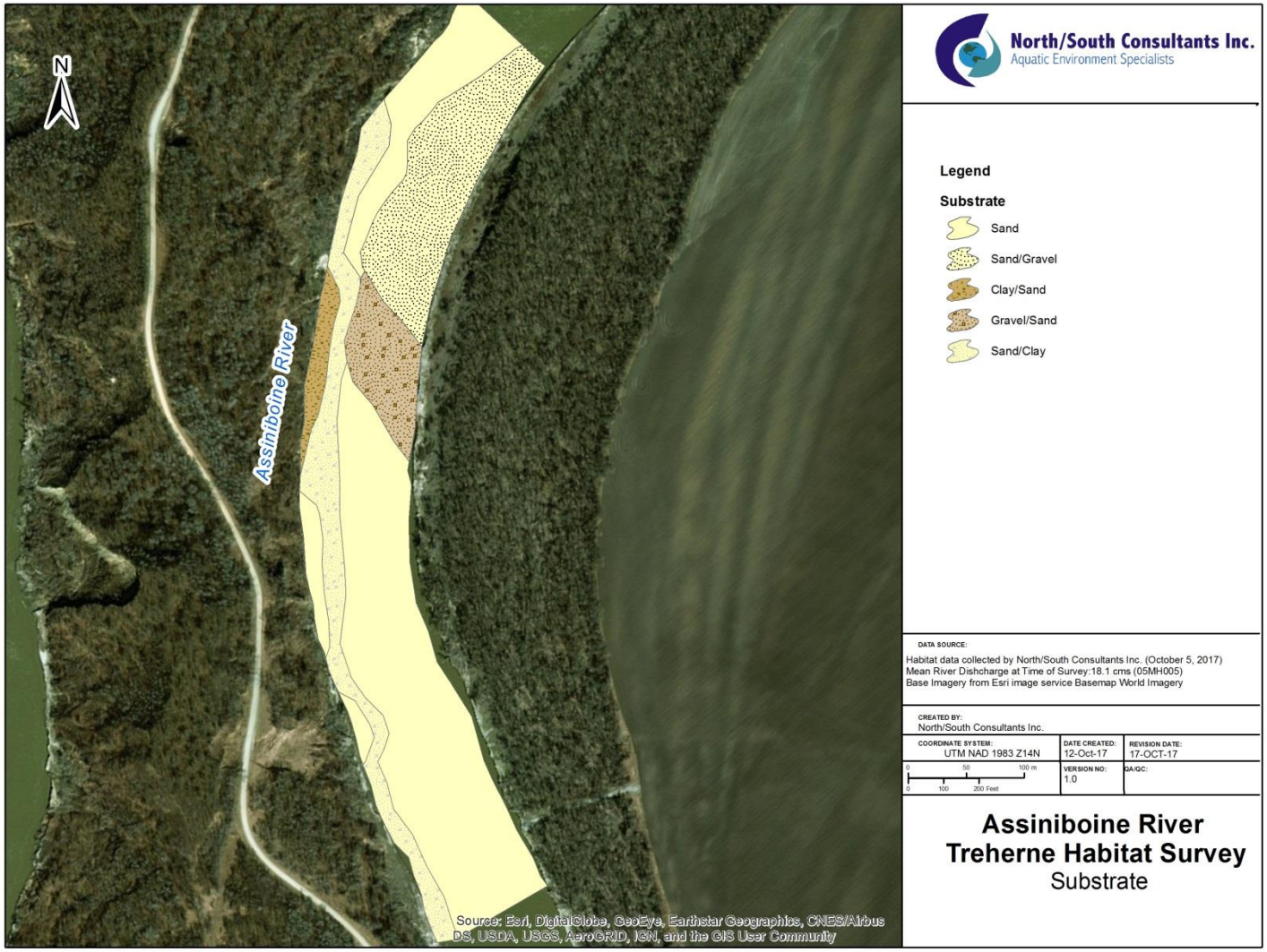


Figure 2. Substrate of the Assiniboine River at the bank stabilization site.

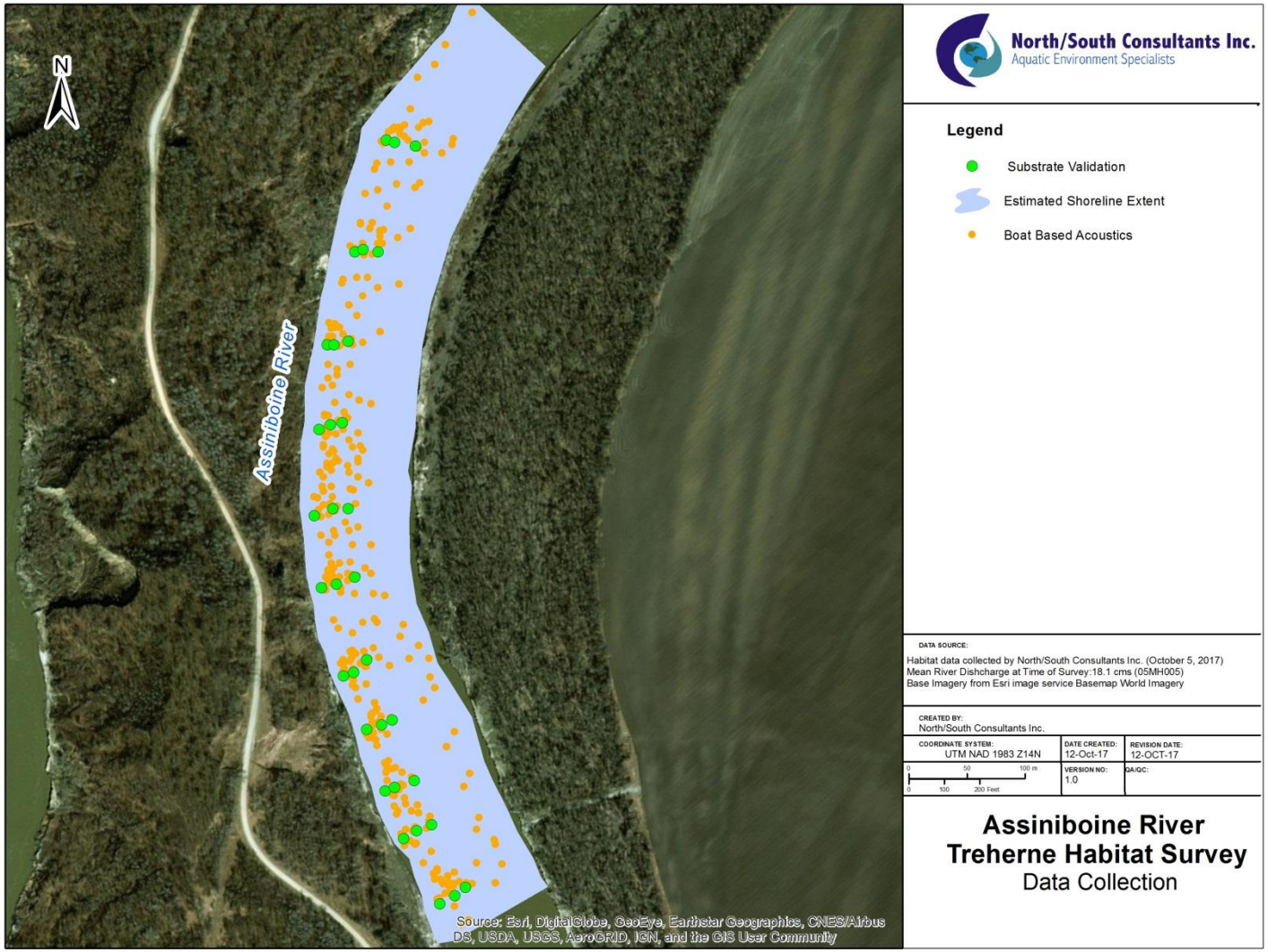


Figure 3. Data collection validation.

Photo 1. The Assiniboine River looking downstream at the proposed bank stabilization site on the left side of the photo (October 5, 2017).

Photo 2. The Assiniboine River looking directly at the proposed bank stabilization site (October 5, 2017).

Photo 3. The Assiniboine River looking at part of the proposed bank stabilization site (October 5, 2017).

Photo 4. The Assiniboine River showing the eroding banks at the bank stabilization site (October 5, 2017).

Photo 5. The Assiniboine River looking upstream beyond the bank stabilization site showing the riffle section and large exposed boulders (October 5, 2017).

Photo 6. Trees and woody debris within The Assiniboine River.

Photo 7. Ponar substrate grab consisting of sand from Ponar #12.

Photo 8. Ponar substrate grab consisting of clay, sand and some gravel from Ponar #25.

Photo 9. Ponar substrate grab consisting of gravel and sand from Ponar #27

Photo 10. Fatmucket (*Lampsilis siliquoidea*)

Photo 11. Black Sandshell (*Ligumia recta*)

Photo 12. White Heelsplitter (*Lasmigona complanata)*

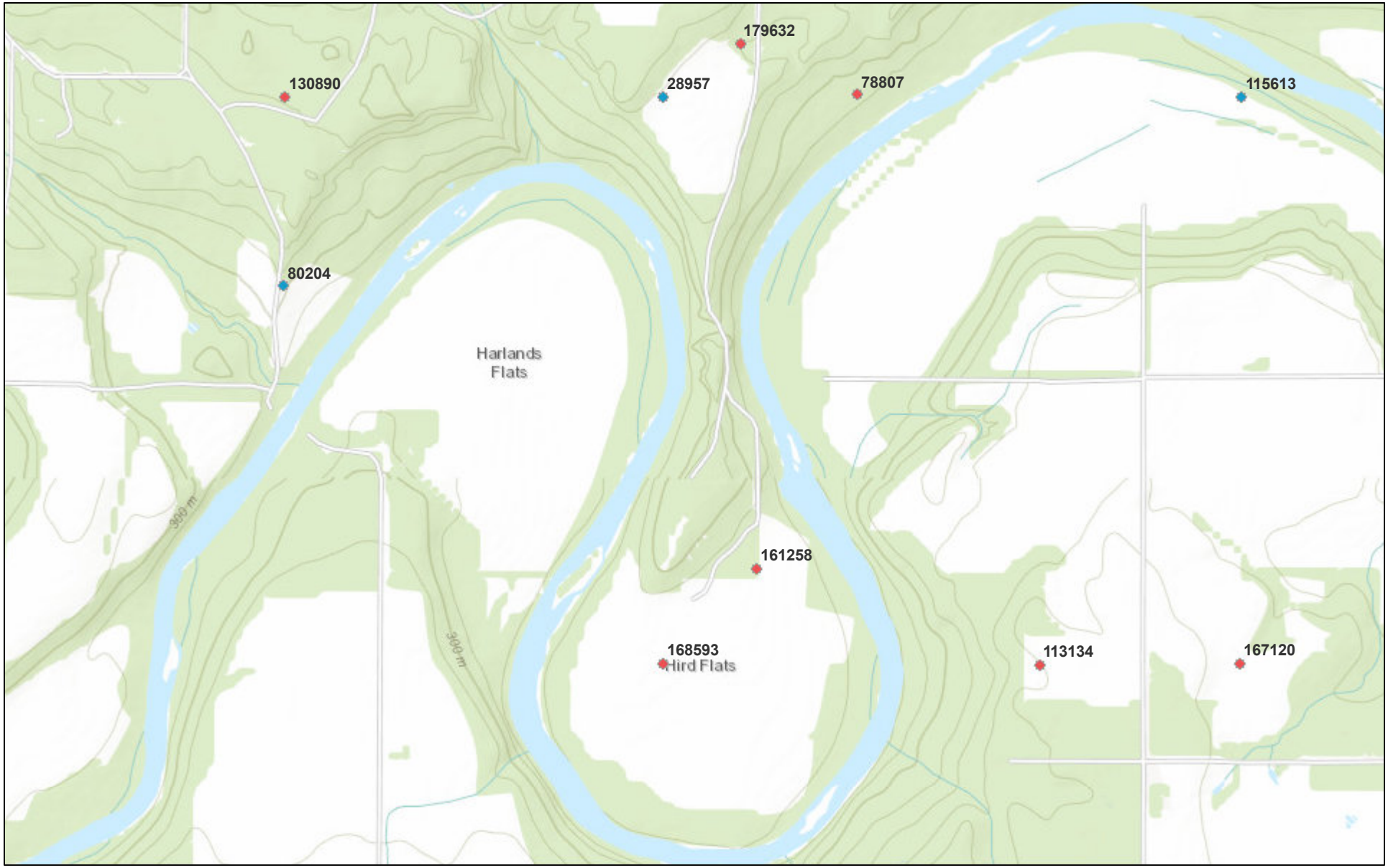
Photo 13. Plain Pocketbook (*Lampsilis cardium*)

Photo 14. Cylindrical Papershell (*Anodontoides ferussacianus)*

APPENDIX E

GW DRILL LOGS

GW Drill Well Locations



October 11, 2017

GW Drill

- PRODUCTION
- TEST WELL

1:36,112

0 0.3 0.6 1.2 mi

0 0.35 0.7 1.4 km

Sources: Esri, HERE, DeLorme, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey,

Web AppBuilder for ArcGIS

Province of Manitoba, Esri, HERE, Garmin, INCREMENT P, USGS, METI/NASA, EPA, USDA, AAFC, NRCan |

Location: NE13-9-10W

Well_PID: 161258
Owner: BEV FERT
Driller: Paddock Drilling Ltd.
Well Name:
Well Use: PRODUCTION
Water Use: Domestic
UTMX: 522450
UTMY: 5510494
Accuracy XY: 1 EXACT [<5M] [GPS]
UTMZ: 310
Accuracy Z: 4 FAIR - Shuttle at Centroid
Date Completed: 2010 Aug 09

WELL LOG

From (ft.)	To (ft.)	Log
0	1.0	TOPSOIL
1.0	10.0	SILTY SAND
10.0	24.0	FINE - MEDIUM COARSE SAND, ROUGH 23-25
24.0	30.0	SANDY GREY TILL
30.0	40.0	FINE GREY SAND, CLAY LAYERS THROUGHOUT

WELL CONSTRUCTION

From (ft.)	To (ft.)	Casing Type	Inside Dia.(in)	Outside Dia.(in)	Slot Size(in)	Type	Material
0	19.0	CASING	30.00			WIRE WOUND	FIBERGLASS
19.0	39.0	PERFORATIONS			0.040	SAW CUT	
0	10.0	GRAVEL PACK					WASHED SAND
10.0	12.0	CASING GROUT					BENTONITE
12.0	39.0	GRAVEL PACK					WASHED SAND

Top of Casing: 1.000 ft. above ground

PUMPING TEST

Date: 2010 Aug 09
Rate: 5.000 Imp. gallons/minute
Water level before pumping: 23.0 ft. below ground
Pumping level at end of test: 36.0 ft. below ground
Test duration: 1 hours, minutes
Water temperature: ?? degrees F

REMARKS

PUMP TEST IS RECOVERY

Location: SE13-9-10W

Well_PID: 168593
Owner: CAROL BADIOU
Driller: Watkins & Argue Construction Co.
Well Name:
Well Use: PRODUCTION
Water Use: Domestic,Livestock
UTMX: 522051
UTMY: 5510083
Accuracy XY: 3 ACCURATE [50-350M] [WITHIN 1/4-SECTION]

UTMZ: 287
Accuracy Z: 4 FAIR - Shuttle at Centroid
Date Completed: 1990 Mar 29

WELL LOG

From (ft.)	To (ft.)	Log
0	20.0	EXISTING WELL
20.0	31.0	30" GALVANIZED
31.0	35.0	SILT & CLAY
35.0	50.0	GREY CLAY

WELL CONSTRUCTION

From (ft.)	To (ft.)	Casing Type	Inside Dia.(in)	Outside Dia.(in)	Slot Size(in)	Type	Material
0	20.0	CASING	42.00				CEMENT
20.0	31.0	CASING	30.00				GALVANIZED
30.0	50.0	PERFORATIONS	16.00				
30.0	50.0	GRAVEL PACK					WASHED SAND

Top of Casing:

No pump test data for this well.

REMARKS

TREHERNE, MB

Location: NE-24-9-10W

Well_PID: 28957
Owner: J GERBRAND
Driller: PARKVILLE CAISSONS
Well Name:
Well Use: PRODUCTION
Water Use: Domestic,Livestock
UTMX: 522043.324
UTMY: 5512515.14
Accuracy XY: UNKNOWN
UTMZ:
Accuracy Z:
Date Completed: 1976 Nov 17

WELL LOG

From (ft.)	To (ft.)	Log
0	40.0	SAND& LITTLE WATER
40.0	44.0	SAND SOME WATER

WELL CONSTRUCTION

From (ft.)	To (ft.)	Casing Type	Inside Dia.(in)	Outside Dia.(in)	Slot Size(in)	Type	Material
0	44.0	casing	42.00				STEEL

Top of Casing: 0 ft. below ground

No pump test data for this well.

Location: NE24-9-10W

Well_PID: 179632
Owner: LYLE JONES
Driller: Paddock Drilling Ltd.
Well Name:
Well Use: PRODUCTION
Water Use: Domestic
UTMX: 522371.386
UTMY: 5512744.224
Accuracy XY: 1 EXACT [<5M] [GPS]
UTMZ: 329
Accuracy Z: 4 FAIR - Shuttle at Centroid
Date Completed: 2013 Jul 08

WELL LOG

From (ft.)	To (ft.)	Log
0	2.0	SANDY TOPSOIL
2.0	13.0	CLAYEY BROWN SAND
13.0	20.0	MEDIUM FINE BROWN SAND, GREY AT 18 FEET
20.0	25.0	SILTY GREY CLAY

WELL CONSTRUCTION

From (ft.)	To (ft.)	Casing Type	Inside Dia.(in)	Outside Dia.(in)	Slot Size(in)	Type	Material
0	24.0	CASING	30.00			CORRUGATED	FIBERGLASS
10.0	24.0	PERFORATIONS			0.040	SAW CUT	
9.0	24.0	GRAVEL PACK					WASHED SAND
8.0	9.0	CASING GROUT					BENTONITE
0	8.0	GRAVEL PACK					WASHED SAND

Top of Casing: 1.000 ft. above ground

PUMPING TEST

Date: 2013 Jul 08
Pumping Rate: 7.995 Imp. gallons/minute
Water level before pumping: 13.0 ft. below ground
Pumping level at end of test: 22.0 ft. below ground
Test duration: 1 hours, minutes
Water temperature: ?? degrees F

REMARKS

SOUTH NORFOLD, PUMP TEST IS RECOVERY

Location: NW-19-9-9W

Well_PID: 78807
Owner: D MCMASTER
Driller: Watkins & Argue Construction Co.
Well Name:
Well Use: PRODUCTION
Water Use: Domestic
UTMX: 522875.425

UTMY: 5512526.27
Accuracy XY: UNKNOWN
UTMZ:
Accuracy Z:
Date Completed: 1994 Jul 11

WELL LOG

From (ft.)	To (ft.)	Log
0	10.0	BROWN SAND
10.0	32.0	SANDY BROWN CLAY
32.0	35.0	BLACK CLAY
35.0	45.0	BLUE CLAY
45.0	71.0	SANDY BROWN CLAY, MOSTLY SAND
71.0	75.0	GREY CLAY

WELL CONSTRUCTION

From (ft.)	To (ft.)	Casing Type	Inside Dia.(in)	Outside Dia.(in)	Slot Size(in)	Type	Material
0	66.0	casing	5.00			INSERT	PVC
66.0	71.0	perforations	5.00		0.015	WIRE WOUND	S. S.
55.0	73.0	gravel pack				NO. 20-40	SILICA S.

Top of Casing: 1.000 ft. below ground

PUMPING TEST

Date: 1994 Jul 11
Pumping Rate: 1.003 Imp. gallons/minute
Water level before pumping: 54.0 ft. below ground
Pumping level at end of test: 70.0 ft. below ground
Test duration: 4 hours, minutes
Water temperature: ?? degrees F

REMARKS

25 FT E OF HOUSE, EC=680, H=26, FE=1, CHLORINATED, HOLE PLUG

APPENDIX F

RARE SPECIES LISTS

Sustainable Development

Get Started

About the Manitoba CDC

Species and Plant Community Database

- Ecoregions
  - **Aspen Parkland**
  - Boreael Transition
  - Churchill River Upland
  - Coastal Hudsun Bay Lowlard
  - Hayes River Upland
  - Hudson Bay Lowland
  - Interlake Plain
  - Kazan River Upland
  - Lac Seul Upland
  - Lake of the Woods
  - Lake Manitoba Plain
  - Maguse River Upland
  - Mid-Boreal Lowland
  - Mid-Boreal Upland
  - Sewlwyn Lake Upland
  - Southwest Manitoba Upland
- Conservation Rankings

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Occurrence of Species by Ecoregion

Apen Parkland

Updated December 1, 2016

Category	Scientific Name	Common Name	Rank
Amphibian	Ambystoma mavortium	Western Tiger Salamander	S4S5
Amphibian	Anaxyrus cognatus	Great Plains Toad	S2
Amphibian	Lithobates pipiens	Northern Leopard Frog	S4
Amphibian	Spea bombifrons	Plains Spadefoot Toad	S2S3
Animal Assemblage	Colonial Waterbird Nesting Area		SNR
Animal Assemblage	Snake Hibernaculum	Snake Hibernaculum	SNR
Bird	Accipiter cooperii	Cooper's Hawk	S4B
Bird	Aechmophorus occidentalis	Western Grebe	S4B
Bird	Ammodramus bairdii	Baird's Sparrow	S1B
Bird	Ammodramus savannarum	Grasshopper Sparrow	S3B
Bird	Anthus spragueii	Sprague's Pipit	S2B
Bird	Ardea herodias	Great Blue Heron	S5B
Bird	Asio flammeus	Short-eared Owl	S2S3B
Bird	Athene cunicularia	Burrowing Owl	S1B
Bird	Bubulcus ibis	Cattle Egret	S2B
Bird	Buteo regalis	Ferruginous Hawk	S1B
Bird	Calamospiza melanocorys	Lark Bunting	S1B
Bird	Calcarius ornatus	Chestnut-collared Longspur	S2B
Bird	Cardellina canadensis	Canada Warbler	S3B
Bird	Chaetura pelagica	Chimney Swift	S2B
Bird	Charadrius melodus	Piping Plover	S1B
Bird	Chlidonias niger	Black Tern	S4B
Bird	Chordeiles minor	Common Nighthawk	S3B
Bird	Contopus cooperi	Olive-sided Flycatcher	S3B
Bird	Contopus virens	Eastern Wood-pewee	S4B
Bird	Coturnicops noveboracensis	Yellow Rail	S3B
Bird	Cygnus buccinator	Trumpeter Swan	S1B
Bird	Dolichonyx oryzivorus	Bobolink	S4B
Bird	Empidonax traillii	Willow Flycatcher	S3B
Bird	Eremophila alpestris	Horned Lark	S3B,SUM
Bird	Falco peregrinus anatum	Peregrine Falcon	S1B
Bird	Hirundo rustica	Barn Swallow	S4B
Bird	Ixobrychus exilis	Least Bittern	S2B
Bird	Lanius ludovicianus excubitorides	Loggerhead Shrike	S1B
Bird	Larus delawarensis	Ring-billed Gull	S5B
Bird	Melanerpes erythrocephalus	Red-headed Woodpecker	S3B
Bird	Numenius borealis	Eskimo Curlew	SNA
Bird	Nycticorax nycticorax	Black-crowned Night-heron	S4B

Bird	Phalacrocorax auritus	Double-crested Cormorant	S5B
Bird	Pipilo maculatus	Spotted Towhee	SUB
Bird	Plegadis chihi	White-faced Ibis	S1B
Bird	Podiceps auritus	Horned Grebe	S4B
Bird	Podiceps nigricollis	Eared Grebe	S4B
Bird	Riparia riparia	Bank Swallow	S5B
Bird	Sayornis saya	Say's Phoebe	S3B
Bird	Sterna forsteri	Forster's Tern	S4B
Bird	Strix varia	Barred Owl	S4
Bird	Vermivora chrysoptera	Golden-winged Warbler	S3B
Fish	Ichthyomyzon castaneus	Chestnut Lamprey	SU
Fish	Ichthyomyzon unicuspis	Silver Lamprey	SU
Fish	Macrhybopsis storeriana	Silver Chub	S5
Fish	Notropis dorsalis	Bigmouth Shiner	S4
Invertebrate	Copablepharon grandis	Pale Yellow Dune Moth	S1
Invertebrate	Copablepharon longipenne	Dusky Dune Moth	S1
Invertebrate	Danaus plexippus	Monarch	S3S4B
Invertebrate	Erynnis martialis	Mottled Dusky Wing	S1
Invertebrate	Fusconaia flava	Wabash Pigtoe	S3
Invertebrate	Hesperia dacotae	Dakota Skipper	S2
Invertebrate	Hesperia ottoe	Ottoe Skipper	S1
Invertebrate	Hypochlora alba	Sage Grasshopper	S3S5
Invertebrate	Lasmigona complanata	White Heelsplitter	S3
Invertebrate	Lasmigona compressa	Creek Heelsplitter	S2
Invertebrate	Quadrula quadrula	Mapleleaf Mussel	S1
Invertebrate	Schinia avemensis	Golden-edged Gem	S1
Invertebrate	Schinia bimatris	White Flower Moth	S1
Invertebrate	Schinia verna	Verna's Flower Moth	S1
Invertebrate	Strophitus undulatus	Creeper	S5
Mammal	Mustela frenata	Long-tailed Weasel	S3
Mammal	Odocoileus hemionus	Mule or Black-tailed Deer	S3
Other	Ramalina sinensis	Fan Ribbon Lichen	SU
Plant	Achnatherum hymenoides	Indian Rice Grass	S2
Plant	Achnatherum richardsonii	Richardson Needle Grass	S1S2
Plant	Acmispon americanus	Prairie Trefoil	S2S3
Plant	Agalinis aspera	Rough Agalinis	S2
Plant	Alisma gramineum	Narrow-leaved Water-plantain	S1
Plant	Ambrosia acanthicarpa	Sandbur	S1
Plant	Andropogon hallii	Sand Bluestem	S2
Plant	Aristida purpurea var. longiseta	Red Three-awn	S1?
Plant	Arnica fulgens	Shining Arnica	S2
Plant	Artemisia cana	Silver Sagebrush	S1
Plant	Asarum canadense	Wild Ginger	S3S4
Plant	Asclepias lanuginosa	Hairy Milkweed	S2S3
Plant	Asclepias verticillata	Whorled Milkweed	S3
Plant	Asclepias viridiflora	Green Milkweed	S3
Plant	Astragalus gilviflorus	Cushion Milkvetch	S1
Plant	Astragalus pectinatus	Narrow-leaved Milkvetch	S2
Plant	Atriplex argentea	Silver Saltbush	S2
Plant	Bidens amplissima	Vancouver Island Beggar-ticks	SNA
Plant	Boltonia asteroides var. recognita	White Boltonia	S2S3
Plant	Botrychium campestre	Prairie Moonwort	S1
Plant	Bouteloua curtipendula	Side-oats Grama	S2
Plant	Bouteloua dactyloides	Buffalograss	S1
Plant	Bromus kalmii	Wild Chess	S2S3
Plant	Bromus porteri	Porter's Chess	S2S3
Plant	Calamagrostis montanensis	Plains Reed Grass	S3
Plant	Callitriche heterophylla	Larger Water-starwort	S1?
Plant	Carex brevior	Fescue Sedge	S3S4

Plant	Carex cristatella	Crested Sedge	S1?
Plant	Carex cryptolepis	Northeastern Sedge	S1
Plant	Carex echinodes	Quill Sedge	SNR
Plant	Carex emoryi	Emory's Sedge	S2?
Plant	Carex gravida	Heavy Sedge	S1
Plant	Carex hallii	Hall's Sedge	S1S2
Plant	Carex hystericina	Porcupine Sedge	S3
Plant	Carex parryana	Parry's Sedge	S3
Plant	Carex pedunculata	Stalked Sedge	S3
Plant	Carex prairea	Prairie Sedge	S3S4
Plant	Carex sterilis	Dioecious Sedge	S2
Plant	Carex supina ssp. spaniocarpa	Weak Sedge	S2S3
Plant	Carex tetanica	Rigid Sedge	S3
Plant	Carex torreyi	Torrey's Sedge	S3S4
Plant	Carex xerantica	White-scaled Sedge	S2
Plant	Celtis occidentalis	Hackberry	S1?
Plant	Chenopodium subglabrum	Smooth Goosefoot	S1
Plant	Circaea canadensis ssp. canadensis	Large Enchanter's-nightshade	S2
Plant	Clematis ligusticifolia	Western Virgin's-bower	S1
Plant	Clematis virginiana	Virgin's-bower	S2?
Plant	Coreopsis tinctoria	Common Tickseed	S1
Plant	Corispermum americanum var. americanum	American Bugseed	S3
Plant	Corispermum hookeri var. hookeri	Hooker's Bugseed	S1
Plant	Corispermum pallasii	Pallas' Bugseed	SH
Plant	Corispermum villosum	Hairy Bugseed	S1S2
Plant	Cornus alternifolia	Alternate-leaved Dogwood	S3
Plant	Coryphantha vivipara	Pincushion Cactus	S1?
Plant	Cryptotaenia canadensis	Canadian Honewort	S1
Plant	Cycloloma atriplicifolium	Winged Pigseed	S2S3
Plant	Cymopterus glomeratus	Plains Cymopterus	S2S3
Plant	Cyperus houghtonii	Houghton's Umbrella-sedge	S2S3
Plant	Cyperus schweinitzii	Schweinitz's Flatsedge	S2
Plant	Cypripedium candidum	Small White Lady's-slipper	S1
Plant	Dalea villosa var. villosa	Hairy Prairie-clover	S2S3
Plant	Desmodium canadense	Beggar's-lice	S2
Plant	Dichanthelium linearifolium	White-haired Panic-grass	S2?
Plant	Dichanthelium wilcoxianum	Sand Millet	S2?
Plant	Drosera anglica	Oblong-leaved Sundew	S3S4
Plant	Eleocharis engelmannii	Engelmann's Spike-rush	S1S2
Plant	Elymus hystrix	Bottle-brush Grass	S2
Plant	Epilobium brachycarpum	Annual Willowherb	SU
Plant	Eragrostis hypnoides	Creeping Teal Love Grass	S3
Plant	Erigeron caespitosus	Tufted Fleabane	S1
Plant	Eriogonum flavum	Yellow Eriogonum	S2S3
Plant	Erythranthe geyeri	Smooth Monkeyflower	S1
Plant	Euphorbia geyeri	Prostrate Spurge	S2
Plant	Festuca hallii	Plains Rough Fescue	S3
Plant	Festuca subverticillata	Nodding Fescue	S1
Plant	Galium aparine	Cleavers	S3
Plant	Hackelia floribunda	Large Flowered Stickseed	SU
Plant	Halerpestes cymbalaria	Seaside Crowfoot	S5
Plant	Helianthus nuttallii ssp. rydbergii	Tuberous-rooted Sunflower	S2
Plant	Heliotropium curassavicum	Seaside Heliotrope	SH
Plant	Hypoxis hirsuta	Yellow Stargrass	S3S4
Plant	Juncus interior	Inland Rush	S1
Plant	Krascheninnikovia lanata	Winterfat	S1?
Plant	Leersia oryzoides	Rice Cutgrass	S3
Plant	Lemna turionifera	Turion Duckweed	S1

Plant	Leucophysalis grandiflora	Large White-flowered Ground-cherry	S3S4
Plant	Linum sulcatum	Grooved Yellow Flax	S3
Plant	Lomatium foeniculaceum	Hairy-fruited Parsley	S3
Plant	Lomatium macrocarpum	Long-fruited Parsley	S2S3
Plant	Lomatium orientale	White-flowered Parsley	S1S2
Plant	Lomatogonium rotatum	Marsh Felwort	S2S3
Plant	Malaxis monophyllos	White Adder's-mouth	S2?
Plant	Malaxis paludosa	Bog Adder's-mouth	S1?
Plant	Menispermum canadense	Canada Moonseed	S3
Plant	Mentzelia decapetala	Gumbo-lily	SH
Plant	Mertensia lanceolata	Tall Lungwort	S2
Plant	Musineon divaricatum	Leafy Musineon	S1S2
Plant	Myosurus minimus	Least Mousetail	S1?
Plant	Nassella viridula	Green Needle Grass	S3S4
Plant	Orobanche ludoviciana	Louisiana Broom-rape	S2
Plant	Osmorhiza claytonii	Hairy Sweet Cicely	S2?
Plant	Ostrya virginiana	Hop-hornbeam	S2
Plant	Oxytropis sericea	Early Yellow Locoweed	S1
Plant	Parietaria pensylvanica	American Pellitory	S3S4
Plant	Penstemon nitidus	Smooth Blue Beard-tongue	S2
Plant	Penstemon procerus	Slender Beard-tongue	S1S2
Plant	Phlox hoodii	Moss Pink	S3
Plant	Phryma leptostachya	Lopseed	S3
Plant	Piptatheropsis micrantha	Little-seed Rice Grass	S2
Plant	Plagiobothrys scouleri var. scouleri	Scouler's Popcornflower	S1
Plant	Plantago elongata ssp. elongata	Linear Leaved-plantain	S2
Plant	Platanthera orbiculata	Round-leaved Bog Orchid	S3S4
Plant	Poa arida	Plains Bluegrass	S4
Plant	Poa cusickii	Mutton-grass	S2
Plant	Poa fendleriana	Mutton Grass	S2
Plant	Polanisia dodecandra ssp. dodecandra	Clammyweed	S1
Plant	Polanisia dodecandra ssp. trachysperma	Clammyweed	S1
Plant	Polygala verticillata	Whorled Milkwort	S2
Plant	Polygala verticillata var. isocycla	Whorled Milkwort	S2
Plant	Potamogeton amplifolius	Large-leaved Pondweed	S3
Plant	Potamogeton illinoensis	Illinois Pondweed	S1?
Plant	Potentilla gracilis var. flabelliformis	Graceful Cinquefoil	S1
Plant	Potentilla plattensis	Platte River Cinquefoil	S2
Plant	Rhynchospora alba	White Beakrush	S3
Plant	Rhynchospora capillacea	Horned Beakrush	S2S3
Plant	Sanguinaria canadensis	Blood-root	S2
Plant	Sceptridium multifidum	Leathery Grape-fern	S3
Plant	Schedonnardus paniculatus	Tumble-grass	S2
Plant	Selaginella densa	Prairie Spike-moss	S3
Plant	Shinnersoseris rostrata	Annual Skeletonweed	S1S2
Plant	Sisyrinchium campestre	White-eyed Grass	S3
Plant	Sisyrinchium mucronatum	Michaux's Blue-eyed Grass	S1
Plant	Sporobolus neglectus	Annual Dropseed	S2S3
Plant	Thermopsis rhombifolia	Golden Bean	S2S3
Plant	Townsendia exscapa	Silky Townsend-daisy	S2
Plant	Tradescantia occidentalis	Western Spiderwort	S1
Plant	Uvularia sessilifolia	Small Bellwort	S2
Plant	Verbena bracteata	Bracted Vervain	S3
Plant	Vitis riparia	Riverbank Grape	S3S4
Reptile	Chelydra serpentina	Snapping Turtle	S3
Reptile	Heterodon nasicus	Western Hognose Snake	S1S2
Reptile	Opheodrys vernalis	Smooth Green Snake	S3S4

Reptile	Plestiodon septentrionalis	Northern Prairie Skink	S1
Reptile	Storeria occipitomaculata	Northern Redbelly Snake	S3S4
Reptile	Thamnophis radix	Western Plains Garter Snake	S4
Reptile	Thamnophis sirtalis parietalis	Red-sided Garter Snake	S4

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Species At Risk

Species Listed Under *The Endangered Species and Ecosystems Act*

Animals

Animals		
Endangered:	**Fact Sheets:**	
Baird's Sparrow (*Ammodramus bairdii*)	PDF 223KB	PDF, French
Burrowing Owl (*Athene cunicularia*)	PDF 294KB	PDF, French
Chestnut-collared Longspur *(Calcarius ornatus)*		
Dusky Dune Moth *(Copablepharon longipenne)*		
Eskimo Curlew (*Numenius borealis*)		
Ferruginous Hawk (*Buteo regalis*)	PDF 247KB	PDF, French
Gold-edged Gem *(Schinia avemensis)*		
Ivory Gull *(Pagophila eburnea)*		
Least Bittern *(Ixobrychus exilis)*		
Little Brown Bat *(Myotis lucifugus)*		
Loggerhead Shrike	PDF 181KB	PDF, French

(*Lanius ludovicianus*)		
Mapleleaf Mussel *(Quadrula quadrula)*		
Northern Long-eared Bat *(Myotis septentrionalis)*		
Pale Yellow Dune Moth *(Copablepharon grandis)*		
Peregrine Falcon (*Falco peregrinus*)	PDF 245KB	PDF, French
Piping Plover (*Charadrius melodus*)	PDF 187KB	PDF, French
Poweshiek Skipperling *(Oarisma poweshiek)*		
Prairie Skink *(Eumeces septentrionalis)*		
Red Knot rufa subspecies (Calidris canutus rufa)		
Ross's Gull (*Rhodostethia rosea*)		
Trumpeter Swan *(Cygnus buccinator)*		
Whooping Crane (*Grus americana*)		
Uncas Skipper (*Hesperia uncas*)		
Verna's Flower Moth *(Schinia verna)*		
White Flower Moth *(Schinia bimatris)*		

Threatened:

Boreal Woodland Caribou (*Rangifer tarandus caribou*)		
Chimney Swift *(Chaetura pelagic)*		
Canada Warbler *(Cardellina canadensis)*		
Common Nighthawk *(Chordeiles minor)*		
Dakota Skipper *(Hesperia dacotae)*		
Golden-winged Warble *(Vermivora chrysoptera)*		
Great Plains Toad (*Bufo cognatus*)	PDF 227KB	PDF, French
Mule Deer (*Odocoileus hemionus*)		
Olive-sided Flycatcher (*Contopus cooperi*)		
Ottoe Skipper *(Hesperia ottoe)*		

Polar Bear (*Ursus maritimus*)	
Red-headed Woodpecker *(Melanerpes erythrocephalus)*	
Sprague's Pipit (*Anthus spragueii*)	
Short-eared Owl *(Asio flammeus)*	
Whip-poor-will *(Caprimulgus vociferus)*	
Western Hognose Snake *(Heterodon nasicus)*	
Extirpated:	
Greater Prairie-Chicken (*Tympanuchus cupido*)	
Grizzly Or Brown Bear (*Ursus arctos*)	
Kit or Swift Fox (*Vulpes velox*)	
Long-Billed Curlew (*Numenius americanus*)	
Muskox (*Ovibos moschatus*)	
Plains Bison *(Bison bison bison)*	
Pronghorn (*Antilocapra americana*)	
Riding's Satyr (*Neominois ridingsii*)	

Plants

Ecosystems

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Canada

Species at Risk Public Registry

A to Z Species Index

The Act establishes Schedule 1 as the official list of wildlife species at risk. However, please note that while Schedule 1 lists species that are extirpated, endangered, threatened and of special concern, the prohibitions do not apply to species of special concern. The SARA and You guides can help you determine the presence of these SARA Schedule 1 species in any region of Canada.

Total: 61 record(s) found.

Species Index

Common name *	Scientific name	Population	Taxon	Range	COSEWIC status	Schedule	SARA status
			All	Manitoba	All	Schedule	All

Filter Again

* A common name search will search all common names in English and French as well as aliases and former names which are not displayed below.

Baird's Sparrow	Ammodramus bairdii		Birds	Alberta, Saskatchewan, Manitoba	Special Concern	Schedule 1	Special Concern
Bigmouth Buffalo	Ictiobus cyprinellus	Saskatchewan - Nelson River populations	Fishes	Saskatchewan, Manitoba	Special Concern	Schedule 1	Special Concern
Buff-breasted Sandpiper	Tryngites subruficollis		Birds	Yukon, Northwest Territories, Nunavut, British Columbia, Alberta, Saskatchewan, Manitoba, Ontario, Quebec	Special Concern	Schedule 1	Special Concern
Buffalograss	Bouteloua dactyloides		Vascular Plants	Saskatchewan, Manitoba	Special Concern	Schedule 1	Special Concern
Burrowing Owl	Athene cunicularia		Birds	British Columbia, Alberta, Saskatchewan, Manitoba	Endangered	Schedule 1	Endangered
Canada Warbler	Cardellina canadensis		Birds	Yukon, Northwest Territories, British Columbia, Alberta, Saskatchewan, Manitoba, Ontario, Quebec, New Brunswick, Prince Edward Island, Nova Scotia	Threatened	Schedule 1	Threatened
Caribou	Rangifer tarandus	Boreal population	Mammals	Yukon, Northwest Territories, British Columbia, Alberta, Saskatchewan, Manitoba, Ontario, Quebec,	Threatened	Schedule 1	Threatened

				Newfoundland and Labrador			
Carmine Shiner	Notropis percobromus		Fishes	Manitoba	Threatened	Schedule 1	Threatened
Chestnut-collared Longspur	Calcarius ornatus		Birds	Alberta, Saskatchewan, Manitoba	Threatened	Schedule 1	Threatened
Chimney Swift	Chaetura pelagica		Birds	Saskatchewan, Manitoba, Ontario, Quebec, New Brunswick, Nova Scotia, Newfoundland and Labrador	Threatened	Schedule 1	Threatened
Common Nighthawk	Chordeiles minor		Birds	Yukon, Northwest Territories, British Columbia, Alberta, Saskatchewan, Manitoba, Ontario, Quebec, New Brunswick, Prince Edward Island, Nova Scotia, Newfoundland and Labrador	Threatened	Schedule 1	Threatened
Dakota Skipper	Hesperia dacotae		Arthropods	Saskatchewan, Manitoba	Endangered	Schedule 1	Threatened
Dusky Dune Moth	Copablepharon longipenne		Arthropods	Alberta, Saskatchewan, Manitoba	Endangered	Schedule 1	Endangered
Eastern Whip-poor-will	Antrostomus vociferus		Birds	Saskatchewan, Manitoba, Ontario, Quebec, New Brunswick, Nova Scotia	Threatened	Schedule 1	Threatened
Eskimo Curlew	Numenius borealis		Birds	Yukon, Northwest Territories, Nunavut, Alberta, Saskatchewan, Manitoba, Ontario, Quebec, New Brunswick, Prince Edward Island, Nova Scotia, Newfoundland and Labrador	Endangered	Schedule 1	Endangered
Ferruginous Hawk	Buteo regalis		Birds	Alberta, Saskatchewan, Manitoba	Threatened	Schedule 1	Threatened
Flooded Jellyskin	Leptogium rivulare		Lichens	Manitoba, Ontario, Quebec	Special Concern	Schedule 1	Threatened
Gattinger's Agalinis	Agalinis gattingeri		Vascular Plants	Manitoba, Ontario	Endangered	Schedule 1	Endangered
Gold-edged Gem	Schinia avemensis		Arthropods	Alberta, Saskatchewan, Manitoba	Endangered	Schedule 1	Endangered
			Birds		Threatened	Schedule 1	Threatened

Golden-winged Warbler	Vermivora chrysoptera			Manitoba, Ontario, Quebec			
Great Plains Toad	Anaxyrus cognatus		Amphibians	Alberta, Saskatchewan, Manitoba	Special Concern	Schedule 1	Special Concern
Greater Prairie-Chicken	Tympanuchus cupido		Birds	Alberta, Saskatchewan, Manitoba, Ontario	Extirpated	Schedule 1	Extirpated
Grizzly Bear	Ursus arctos	Prairie population	Mammals	Alberta, Saskatchewan, Manitoba	Non-active	Schedule 1	Extirpated
Hairy Prairie-clover	Dalea villosa		Vascular Plants	Saskatchewan, Manitoba	Special Concern	Schedule 1	Special Concern
Horned Grebe	Podiceps auritus	Western population	Birds	Yukon, Northwest Territories, Nunavut, British Columbia, Alberta, Saskatchewan, Manitoba, Ontario	Special Concern	Schedule 1	Special Concern
Least Bittern	Ixobrychus exilis		Birds	Manitoba, Ontario, Quebec, New Brunswick, Nova Scotia	Threatened	Schedule 1	Threatened
Little Brown Myotis	Myotis lucifugus		Mammals	Yukon, Northwest Territories, British Columbia, Alberta, Saskatchewan, Manitoba, Ontario, Quebec, New Brunswick, Prince Edward Island, Nova Scotia, Newfoundland and Labrador	Endangered	Schedule 1	Endangered
Loggerhead Shrike migrans subspecies	Lanius ludovicianus migrans		Birds	Manitoba, Ontario, Quebec	Non-active	Schedule 1	Endangered
Loggerhead Shrike Prairie subspecies	Lanius ludovicianus excubitorides		Birds	Alberta, Saskatchewan, Manitoba	Threatened	Schedule 1	Threatened
Mapleleaf	Quadrula quadrula	Saskatchewan – Nelson Rivers population	Molluscs	Manitoba	Threatened	Schedule 1	Endangered
Monarch	Danaus plexippus		Arthropods	Northwest Territories, British Columbia, Alberta, Saskatchewan, Manitoba, Ontario, Quebec, New Brunswick, Prince Edward Island, Nova Scotia, Newfoundland and Labrador	Endangered	Schedule 1	Special Concern

Northern Leopard Frog	Lithobates pipiens	Western Boreal/Prairie populations	Amphibians	Northwest Territories, Alberta, Saskatchewan, Manitoba	Special Concern	Schedule 1	Special Concern
Northern Myotis	Myotis septentrionalis		Mammals	Yukon, Northwest Territories, British Columbia, Alberta, Saskatchewan, Manitoba, Ontario, Quebec, New Brunswick, Prince Edward Island, Nova Scotia, Newfoundland and Labrador	Endangered	Schedule 1	Endangered
Olive-sided Flycatcher	Contopus cooperi		Birds	Yukon, Northwest Territories, British Columbia, Alberta, Saskatchewan, Manitoba, Ontario, Quebec, New Brunswick, Prince Edward Island, Nova Scotia, Newfoundland and Labrador	Threatened	Schedule 1	Threatened
Ottoe Skipper	Hesperia ottoe		Arthropods	Manitoba	Endangered	Schedule 1	Endangered
Pale Yellow Dune Moth	Copablepharon grandis		Arthropods	Alberta, Saskatchewan, Manitoba	Special Concern	Schedule 1	Special Concern
Peregrine Falcon anatum/tundrius	Falco peregrinus anatum/tundrius		Birds	Yukon, Northwest Territories, Nunavut, British Columbia, Alberta, Saskatchewan, Manitoba, Ontario, Quebec, New Brunswick, Nova Scotia, Newfoundland and Labrador	Special Concern	Schedule 1	Special Concern
Piping Plover circumcinctus subspecies	Charadrius melodus circumcinctus		Birds	Alberta, Saskatchewan, Manitoba, Ontario	Endangered	Schedule 1	Endangered
Polar Bear	Ursus maritimus		Mammals	Yukon, Northwest Territories, Nunavut, Manitoba, Ontario, Quebec, Newfoundland and Labrador, Arctic Ocean	Special Concern	Schedule 1	Special Concern
Poweshiek Skipperling	Oarisma poweshiek		Arthropods	Manitoba	Endangered	Schedule 1	Threatened

Prairie Skink	Plestiodon septentrionalis		Reptiles	Manitoba	Endangered	Schedule 1	Endangered
Red Knot rufa subspecies	Calidris canutus rufa		Birds	Northwest Territories, Nunavut, British Columbia, Alberta, Saskatchewan, Manitoba, Ontario, Quebec, New Brunswick, Prince Edward Island, Nova Scotia, Newfoundland and Labrador	Endangered	Schedule 1	Endangered
Red-headed Woodpecker	Melanerpes erythrocephalus		Birds	Saskatchewan, Manitoba, Ontario, Quebec	Threatened	Schedule 1	Threatened
Riddell's Goldenrod	Solidago riddellii		Vascular Plants	Manitoba, Ontario	Special Concern	Schedule 1	Special Concern
Ross's Gull	Rhodostethia rosea		Birds	Nunavut, Manitoba	Threatened	Schedule 1	Threatened
Rough Agalinis	Agalinis aspera		Vascular Plants	Manitoba	Endangered	Schedule 1	Endangered
Rusty Blackbird	Euphagus carolinus		Birds	Yukon, Northwest Territories, Nunavut, British Columbia, Alberta, Saskatchewan, Manitoba, Ontario, Quebec, New Brunswick, Prince Edward Island, Nova Scotia, Newfoundland and Labrador	Special Concern	Schedule 1	Special Concern
Short-eared Owl	Asio flammeus		Birds	Yukon, Northwest Territories, Nunavut, British Columbia, Alberta, Saskatchewan, Manitoba, Ontario, Quebec, New Brunswick, Prince Edward Island, Nova Scotia, Newfoundland and Labrador	Special Concern	Schedule 1	Special Concern
Silver Chub	Macrhybopsis storeriana		Fishes	Manitoba, Ontario	Non-active	Schedule 1	Special Concern
Small White Lady's-slipper	Cypripedium candidum		Vascular Plants	Manitoba, Ontario	Threatened	Schedule 1	Endangered
Smooth Goosefoot	Chenopodium subglabrum		Vascular Plants	Alberta, Saskatchewan, Manitoba	Threatened	Schedule 1	Threatened
Snapping Turtle	Chelydra serpentina		Reptiles	Saskatchewan, Manitoba,	Special Concern	Schedule 1	Special Concern

				Ontario, Quebec, New Brunswick, Nova Scotia			
Sprague's Pipit	Anthus spragueii		Birds	Alberta, Saskatchewan, Manitoba	Threatened	Schedule 1	Threatened
Verna's Flower Moth	Schinia verna		Arthropods	Alberta, Saskatchewan, Manitoba	Threatened	Schedule 1	Threatened
Western Prairie Fringed Orchid	Platanthera praeclara		Vascular Plants	Manitoba	Endangered	Schedule 1	Endangered
Western Silvery Aster	Symphyotrichum sericeum		Vascular Plants	Manitoba, Ontario	Threatened	Schedule 1	Threatened
Western Spiderwort	Tradescantia occidentalis		Vascular Plants	Alberta, Saskatchewan, Manitoba	Threatened	Schedule 1	Threatened
White Flower Moth	Schinia bimatris		Arthropods	Manitoba	Endangered	Schedule 1	Endangered
Whooping Crane	Grus americana		Birds	Northwest Territories, Alberta, Saskatchewan, Manitoba	Endangered	Schedule 1	Endangered
Wood Bison	Bison bison athabascae		Mammals	Yukon, Northwest Territories, British Columbia, Alberta, Manitoba	Special Concern	Schedule 1	Threatened
Yellow Rail	Coturnicops noveboracensis		Birds	Northwest Territories, British Columbia, Alberta, Saskatchewan, Manitoba, Ontario, Quebec, New Brunswick	Special Concern	Schedule 1	Special Concern

Date modified: 2017-09-25

APPENDIX G

GOVERNMENT CORRESPONDENCE

Dan Leitch

From: Friesen, Chris (SD) <Chris.Friesen@gov.mb.ca>
Sent: Monday, September 25, 2017 9:31 AM
To: 'Dan Leitch'
Subject: RE: CDC data request: Municipality of Norfolk Treherne

Dan

Thank you for your information request. I completed a search of the Manitoba Conservation Data Centre's rare species database and found no occurrences at this time for your area of interest. However, please note that there have been reports of Prairie Skinks in this area and Mapleleaf Mussels are known to occur in the Assiniboine River. Both of these species are listed as Endangered under Manitoba's Endangered Species and Ecosystems Act.

The information provided in this letter is based on existing data known to the Manitoba Conservation Data Centre at the time of the request. These data are dependent on the research and observations of CDC staff and others who have shared their data, and reflect our current state of knowledge. **An absence of data in any particular geographic area does not necessarily mean that species or ecological communities of concern are not present**; in many areas, comprehensive surveys have never been completed. Therefore, this information should be regarded neither as a final statement on the occurrence of any species of concern, nor as a substitute for on-site surveys for species as part of environmental assessments.

Because the Manitoba CDC's Biotics database is continually updated and because information requests are evaluated by type of action, any given response is only appropriate for its respective request. Please contact the Manitoba CDC for an update on this natural heritage information if more than six months pass before it is utilized.

Third party requests for products wholly or partially derived from Biotics must be approved by the Manitoba CDC before information is released. Once approved, the primary user will identify the Manitoba CDC as data contributors on any map or publication using Biotics data, as follows as: Data developed by the Manitoba Conservation Data Centre; Wildlife & Fisheries Branch, Manitoba Sustainable Development.

This letter is for information purposes only - it does not constitute consent or approval of the proposed project or activity, nor does it negate the need for any permits or approvals required by the Province of Manitoba.

We would be interested in receiving a copy of the results of any field surveys that you may undertake, to update our database with the most current knowledge of the area.

If you have any questions or require further information please contact me directly at (204) 945-7747.

Chris Friesen
Coordinator
Manitoba Conservation Data Centre
204-945-7747
chris.friesen@gov.mb.ca
http://www.manitoba.ca/conservation/cdc/

From: Dan Leitch [mailto:DLeitch@kgsgroup.com]
Sent: September-21-17 12:45 PM
To: Friesen, Chris (SD) <Chris.Friesen@gov.mb.ca>
Subject: CDC data request: Municipality of Norfolk Treherne

Chris:

KGS Group is performing engineering services involving stabilization of the Assiniboine River bank north of the town of Treherne and associated road realignment. We are requesting information regarding the locations of any plant, wildlife or aquatic Species at Risk occurrences on or near the project land. The information will be used to assess potential project impacts on species at risk and their habitat (if any) and to develop appropriate mitigation measures and follow-up.

The project location is shown in the red square of the attached pdf (centered at 14U 522275E, 5511562N) and is also defined in the attached shape file.

Our preference is to receive the data by email and for the data to be presented in Microsoft Excel Spreadsheet (providing the location of each occurrence).

Thanks,
Dan

Dan Leitch, M.Sc.
Environmental Scientist
KGS Group
3rd Floor - 865 Waverley St.
Winnipeg, MB, R3T 5P4

204-896-1209 ext. 324 (office)
204-299-7247 (mobile)
204-896-0754 (fax)

Dan Leitch

From: McClean, Heather (SCH) <Heather.McClean@gov.mb.ca>
Sent: Thursday, September 21, 2017 2:32 PM
To: 'Dan Leitch'
Subject: RE: Heritage data request: Municipality of Norfolk Treherne

HI Dan – a search of the database reveals that there are no known heritage resources located within the study area.

Thanks.

Heather McClean
Heritage Resources Registrar
Historical Assessment Services
Historic Resources Branch
Main Floor, 213 Notre Dame Avenue
Winnipeg MB R3B 1N3
Heather.McClean@gov.mb.ca
Phone: (204) 945-7146
Fax: (204) 948-2384

From: Dan Leitch [mailto:DLeitch@kgsgroup.com]
Sent: September-21-17 2:19 PM
To: McClean, Heather (SCH) <Heather.McClean@gov.mb.ca>
Subject: Heritage data request: Municipality of Norfolk Treherne

Heather:

KGS Group is performing engineering services involving stabilization of the Assiniboine River bank north of the town of Treherne and associated road realignment. We are requesting a location and description of any known heritage or archaeological resources located on or near the project land. The information will be used to assess potential project impacts on heritage and archaeological resources (if any) and to develop appropriate mitigation measures and follow-up.

The project location is shown in the red square of the attached pdf (centered at 14U 522275E, 5511562N) and is also defined in the attached shape file.

Our preference is to receive the data by email and for the data to be in Excel or ArcView format (or PDF mapsheet).

If you have any questions don't hesitate to contact me, thanks.

Cheers,
Dan

Dan Leitch, M.Sc.
Environmental Scientist
KGS Group
3rd Floor - 865 Waverley St.

Winnipeg, MB, R3T 5P4

204-896-1209 ext. 324 (office)
204-299-7247 (mobile)
204-896-0754 (fax)

APPENDIX H

MANITOBA BREEDING BIRD ATLAS

Atlas des oiseaux nicheurs du MANITOBA Breeding Bird Atlas

Square Summary (14NA21)

#species				#hours	#pc done	
poss	prob	conf	total		road	offrd
29	20	40	89	61.6	26	16

Region summary (#2: South Central)

#squares	#sq with data	#species	#pc done	target #pc
201	194	199	3467	753

Target number of point counts in this square: 15 road side, 0 off road.
Approximate time allocation for general atlassing:: Young broadleaf forest: 2%, Mature broadleaf forest: 26%, Open Wetland: 1%, Agriculture / open country: 62%, Urban / unclassified: 6%. Refer to the atlas PDF maps and online resources to locate habitats.

SPECIES	Code	%	SPECIES	Code	%	SPECIES	Code	%
Canada Goose	FY	92	Clark's Grebe †		<1	American Avocet		5
Wood Duck	FY	62	American White Pelican §		4	Spotted Sandpiper	H	50
Gadwall		57	Double-cr. Cormorant §		6	Willet		33
American Wigeon		13	American Bittern		41	Upland Sandpiper		50
Mallard	FY	98	Great Blue Heron §		23	Marbled Godwit		36
Blue-winged Teal	P	78	Cattle Egret ‡¤		0	Wilson's Snipe		79
Northern Shoveler		69	Black-crown. N.-Heron §		3	American Woodcock ‡		3
Northern Pintail		44	White-faced Ibis ‡¤		0	Wilson's Phalarope		36
Green-winged Teal		47	Turkey Vulture	FY	42	Bonaparte's Gull ‡		0
Canvasback		39	Osprey		0	Franklin's Gull §		14
Redhead		40	Bald Eagle		23	Ring-billed Gull §		4
Ring-necked Duck		31	Northern Harrier	P	76	Herring Gull §		1
Lesser Scaup		21	Sharp-shinned Hawk		5	Caspian Tern §		2
Bufflehead		13	Cooper's Hawk		12	Black Tern §		47
Common Goldeneye		6	Northern Goshawk ‡		1	Common Tern §		2
Hooded Merganser		29	Broad-winged Hawk	FY	6	Forster's Tern §		10
Common Merganser		1	Swainson's Hawk		29	Rock Pigeon	AE	82
Ruddy Duck		29	Red-tailed Hawk	AE	93	Mourning Dove	FY	98
Gray Partridge		39	Ferruginous Hawk †		<1	Black-billed Cuckoo	M	54
Ring-necked Pheasant ‡¤		<1	American Kestrel	CF	75	Eastern Screech-Owl		1
Ruffed Grouse	FY	24	Merlin		42	Great Horned Owl	M	52
Sharp-tailed Grouse	H	34	Peregrine Falcon ¤		<1	Northern Hawk Owl ¤		0
Wild Turkey	FY	31	Yellow Rail ¤		2	Burrowing Owl †		<1
Common Loon ‡		2	Virginia Rail		20	Barred Owl ¤	M	1
Pied-billed Grebe		44	Sora	H	82	Great Gray Owl ¤		<1
Horned Grebe ¤		6	American Coot	H	59	Long-eared Owl ¤	M	4
Red-necked Grebe §		11	Sandhill Crane		6	Short-eared Owl ¤		2
Eared Grebe §		13	Piping Plover †		0	Northern Saw-whet Owl	S	10
Western Grebe §		10	Killdeer	DD	94	Common Nighthawk ¤		3

[continuous pages] next page >>

Manitoba Breeding Bird Atlas - Summary Sheet for Square 14NA21 (page 2 of 3)

SPECIES	Code	%	SPECIES	Code	%	SPECIES	Code	%
Whip-poor-will ¤		1	Gray Jay		1	Brown Thrasher		64
Chimney Swift ¤		3	Blue Jay	P	61	European Starling		90
Ruby-throated Hummingbird	FY	37	Black-billed Magpie	CF	81	Sprague's Pipit ‡¤		<1
Belted Kingfisher		30	American Crow	FY	97	Cedar Waxwing	H	74
Red-headed Woodpecker ¤		34	Common Raven	FY	79	Golden-winged Warbler ‡¤		3
Yellow-bellied Sapsucker	AE	65	Horned Lark	S	74	Tennessee Warbler		5
Downy Woodpecker	P	60	Purple Martin §		31	Orange-crowned Warbler		14
Hairy Woodpecker	CF	55	Tree Swallow	NY	82	Nashville Warbler		1
Am. Three-toed Woodp. ‡		0	North. Rgh-wing Swallow		9	Yellow Warbler	M	97
Black-backed Woodpecker ‡		0	Bank Swallow §	H	55	Chestnut-sided Warbler	S	26
Northern Flicker	FY	90	Cliff Swallow §	AE	63	Cape May Warbler		<1
Pileated Woodpecker	P	21	Barn Swallow	AE	98	Yellow-rumped Warbler	S	8
Olive-sided Flycatcher ¤		<1	Black-capped Chickadee	CF	63	Blackburnian Warbler ‡	S	<1
Eastern Wood-Pewee	S	47	Red-breasted Nuthatch	H	7	Black-and-white Warbler	S	32
Yellow-bellied Flycatcher ‡		1	White-breasted Nuthatch	CF	51	American Redstart	M	55
Alder Flycatcher	S	45	Brown Creeper		2	Ovenbird	M	34
Willow Flycatcher ‡¤		3	House Wren	NY	96	Northern Waterthrush	S	23
Least Flycatcher	A	96	Winter Wren ‡		1	Connecticut Warbler ‡		0
Eastern Phoebe	NY	55	Sedge Wren	S	72	Mourning Warbler		2
Say's Phoebe ‡¤		5	Marsh Wren	AE	62	Common Yellowthroat	S	94
Great Crested Flycatcher	FY	48	Golden-crowned Kinglet		0	Eastern Towhee		14
Western Kingbird		62	Ruby-crowned Kinglet		2	Chipping Sparrow	NY	89
Eastern Kingbird	CF	96	Eastern Bluebird	NY	44	Clay-colored Sparrow	A	97
Loggerhead Shrike †		<1	Mountain Bluebird		3	Vesper Sparrow	A	97
Yellow-throated Vireo		43	Veery	S	37	Lark Sparrow	FY	63
Blue-headed Vireo		1	Swainson's Thrush		4	Savannah Sparrow	S	98
Warbling Vireo	S	95	Hermit Thrush		7	Grasshopper Sparrow ‡¤		7
Philadelphia Vireo ‡		3	American Robin	CF	100	Baird's Sparrow †		0
Red-eyed Vireo	M	85	Gray Catbird	NY	91	Le Conte's Sparrow		40

<< previous page [continuous pages] next page >>

Manitoba Breeding Bird Atlas - Summary Sheet for Square 14NA21 (page 3 of 3)

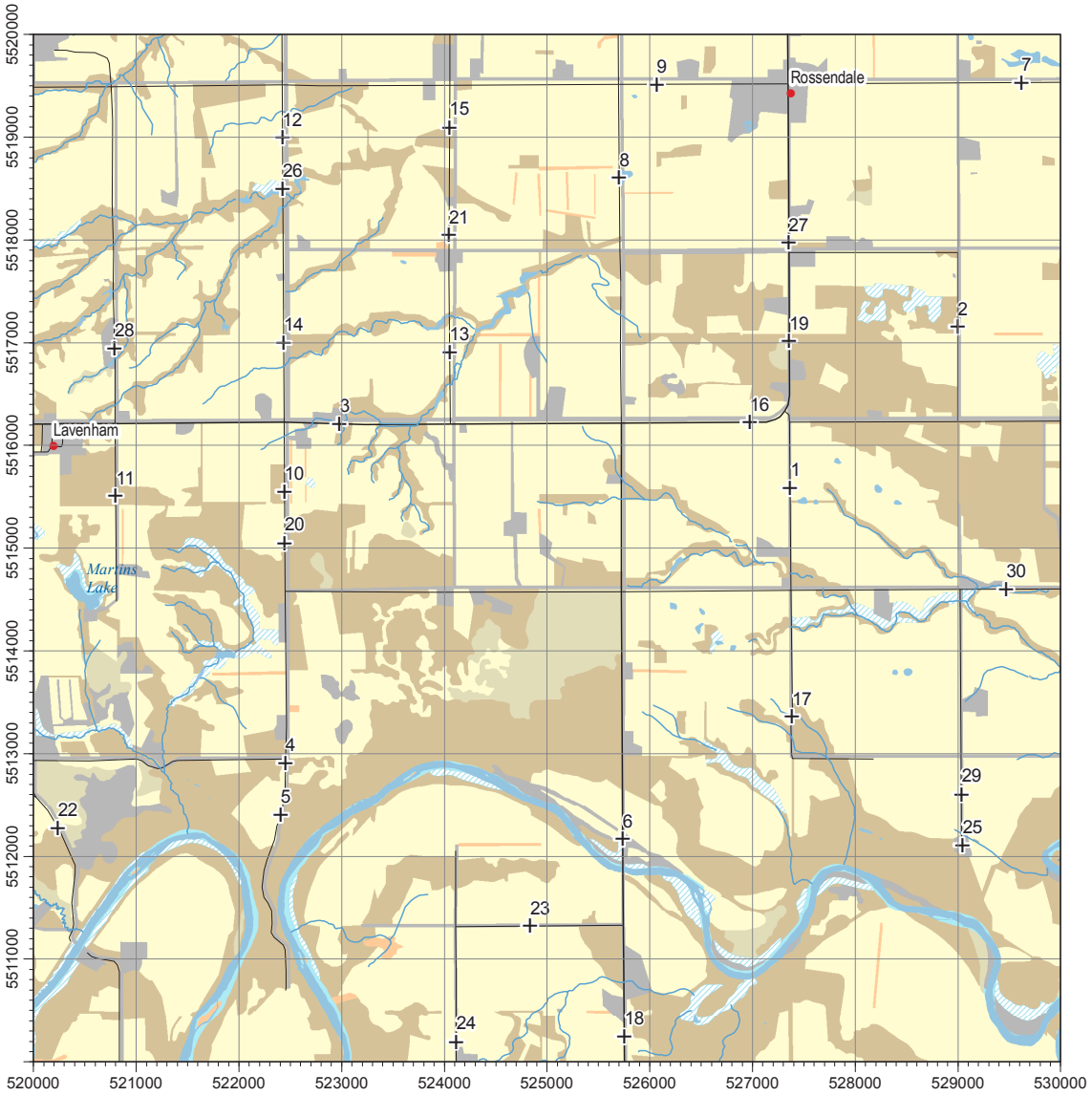
SPECIES	Code	%
Nelson's Sparrow		25
Song Sparrow	S	99
Lincoln's Sparrow		4
Swamp Sparrow		26
White-throated Sparrow	S	7
Dark-eyed Junco	S	11
Chestnut-collared Longspur ‡¤		<1
Scarlet Tanager ¤	S	10
Rose-breasted Grosbeak	FY	53
Indigo Bunting	P	26
Bobolink	S	89
Red-winged Blackbird	FY	99
Western Meadowlark	AE	97
Yellow-headed Blackbird		69
Brewer's Blackbird		95
Common Grackle	CF	94
Brown-headed Cowbird	P	98
Orchard Oriole		54
Baltimore Oriole	T	88
Purple Finch	CF	15
House Finch		15
Red Crossbill †		1
White-winged Crossbill ¤	S	1
Pine Siskin	H	14
American Goldfinch	FY	98
Evening Grosbeak ‡	P	3
House Sparrow	H	89

This list includes all species found during the Manitoba Breeding Bird Atlas (2010-2014) in the region #2 (South Central). Underlined species are those that you should try to add to this square (14NA21). They have not yet been reported during the atlas, but were reported in more than 50% of the squares in this region during the project so far. "Code" is the code for the highest breeding evidence for that species in square 14NA21 during the project so far. The % columns give the percentage of squares in that region where that species was reported during the project (this gives an idea of the expected chance of finding that species in region #2). Rare/Colonial Species Report Forms should be completed for species marked: § (Colonial), ‡ (regionally rare), † (rare in Manitoba) or ¤ (rare in Manitoba, documentation only required for confirmed records). Current as of 26/09/2017. An up-to-date version of this sheet is available from http://www.birdatlas.mb.ca/mbdata/summaryform.jsp?squareID=14NA21?lang=en

<< previous page [continuous pages]

Region / Région: 2

Square / Parcelle: 14NA21



MANITOBA BREEDING BIRD ATLAS

Predefined point count coordinates
Coordonnées des points d'écoute prédéterminés

POINT	EASTING UTM Est	NORTHING UTM Nord
1	527368	5515588
2	528998	5517156
3	522981	5516210
4	522453	5512913
5	522409	5512407
6	525738	5512170
7	529620	5519533
8	525703	5518608
9	526071	5519515
10	522444	5515555
11	520800	5515509
12	522425	5519000
13	524052	5516908
14	522435	5517000
15	524052	5519100
16	526974	5516227
17	527384	5513364
18	525753	5510249
19	527359	5517016
20	522447	5515055
21	524046	5518050
22	520239	5512282
23	524835	5511324
24	524114	5510200
25	529046	5512111
26	522428	5518500
27	527354	5517976
28	520792	5516948
29	529035	5512608
30	529471	5514602

6° Universal Transverse Mercator (UTM) Projection; Zone 14, Central Meridian -99°; North American Datum 1983 (NAD 83)
Projection universelle transverse de Mercator (UTM) 6° Zone 14, méridien central -99°; Système de référence géodésique nord-américain 1983 (NAD 83)

0 1 km

Legend	Légende
Expressway or highway	Autoroute ou route nationale (asphaltée)
Regional or local road	Route régionale ou locale (asphaltée ou non)
Rail line	Chemin de fer
Utility corridor	Ligne de transport d'énergie
Watercourse	Rivière ou ruisseau
Mature broadleaf forest	Forêt de feuillus (mature)
Young broadleaf forest	Forêt de feuillus (jeune)
Mature coniferous forest	Forêt de conifères (mature)
Young coniferous forest	Forêt de conifères (jeune)
Mature mixed forest	Forêt mixte (mature)
Young mixed forest	Forêt mixte (jeune)
Shrubland / other	Milieu arbustif / autre
Open wetland	Milieu humide (marais)
Agriculture / open country	Milieu agricole
Urban / unclassified	Mileu urbanisé / non classifié
Water	Eau

Cartographic production by Bird Studies Canada
Production cartographique par Études d'oiseaux Canada

Note: This map is only for use by atlas participants in the context of the project. The project partners are in no way responsible for any inaccuracies, mistakes or omissions in the information that appears on this map.

Avis : cette carte ne doit être utilisée que par les participants au projet de l'Atlas des oiseaux nicheurs du Manitoba, et uniquement dans le cadre du projet. Les responsables du projet d'atlas ne peuvent être tenus responsables de toute inexactitude, erreur ou omission concernant les informations apparaissant sur cette carte.

April 2010 / Avril 2010

http://www.birdatlas.mb.ca/

14NA21

South Central

Region / Région: 2

APPENDIX I

NORTHERN PRAIRIE SKINK RECOVERY PLAN EXCERPTS

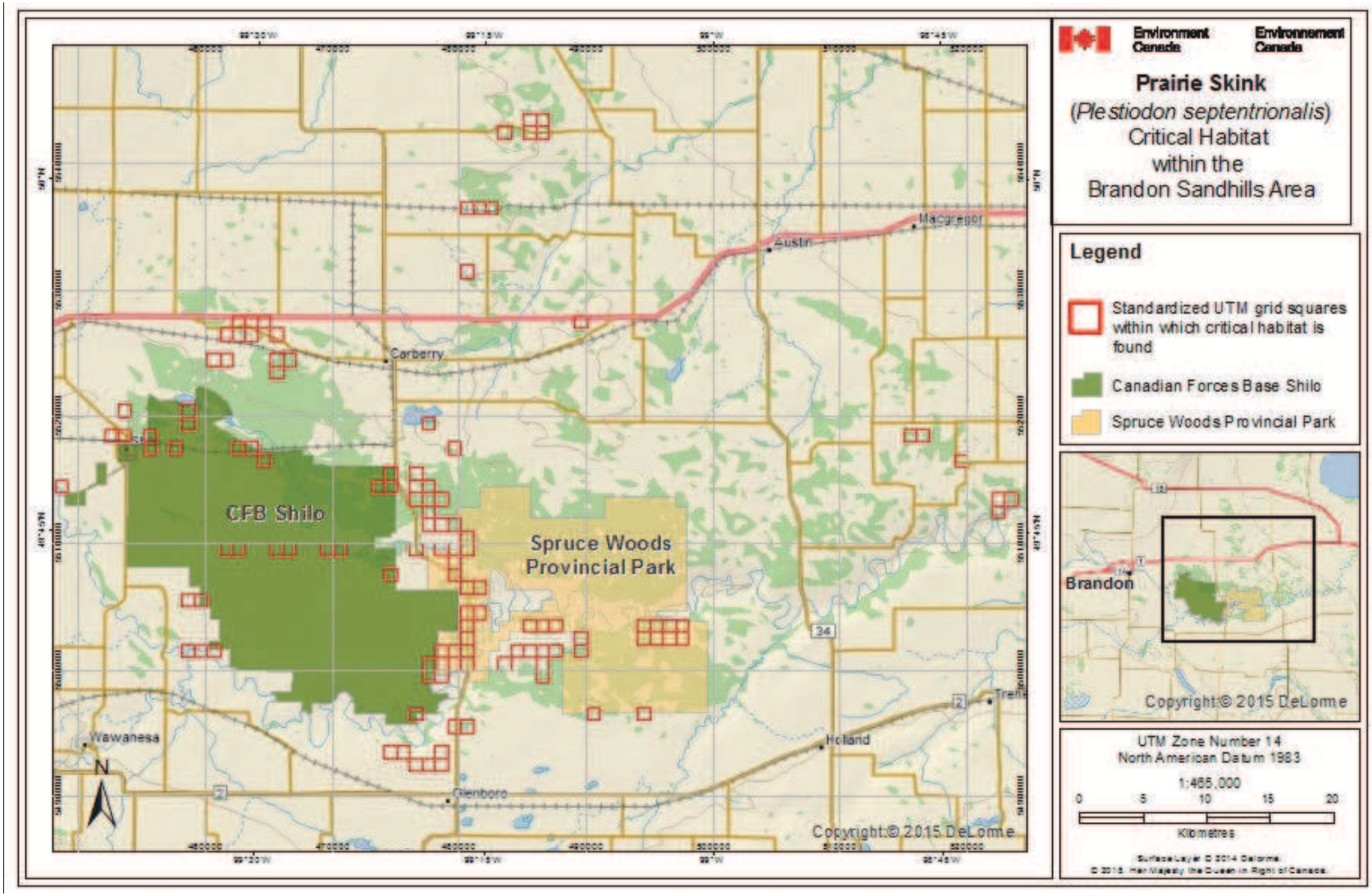


Figure 2. *Critical habitat for the Prairie Skink in the Brandon Sandhills area of southwest Manitoba occurs within the 1 km x 1 km UTM grid squares (red outline) where the criteria set out in Section 7.1 are met. This standardized national grid system indicates the general geographic area containing critical habitat and detailed critical habitat polygons are not shown. Based on the identification criteria, the grid squares indicated contain approximately 5.13 km^2 of critical habitat.*

Appendix B: Legal Land Description of Quarter Sections that Contain Critical Habitat for Prairie Skink in Southwest Manitoba.

Note: within these quarter sections, critical habitat exists only where the criteria set out in Section 7 are met.

Quarter	Section	Township	Range	Meridian
NE	8	6	24	W1
NE	12	9	16	W1
NW	12	9	16	W1
NW	8	9	15	W1
SE	17	9	15	W1
SW	17	9	15	W1
NE	8	9	15	W1
NE	11	9	16	W1
SE	5	9	15	W1
SW	34	8	16	W1
NE	15	8	16	W1
SW	16	9	15	W1
NW	34	8	16	W1
SE	22	8	16	W1
SW	22	8	16	W1
SW	23	8	16	W1
NW	14	8	16	W1
SW	4	9	15	W1
SW	6	10	15	W1
NE	28	9	17	W1
NW	21	7	14	W1
NW	33	7	14	W1
SW	21	7	14	W1
NE	21	7	14	W1
SW	35	7	14	W1
SE	21	7	14	W1
NW	20	7	14	W1
SW	27	7	14	W1
SE	15	9	14	W1
SW	14	9	14	W1
SE	17	9	14	W1
SW	32	9	14	W1
SE	15	9	15	W1
SE	26	8	14	W1

Quarter	Section	Township	Range	Meridian
SW	26	8	14	W1
NE	26	8	14	W1
NE	10	9	14	W1
NW	26	8	14	W1
SW	14	9	15	W1
SE	29	8	13	W1
SE	35	8	14	W1
SW	35	8	14	W1
NE	35	8	14	W1
SE	32	9	14	W1
NE	31	9	14	W1
SW	33	9	14	W1
SE	31	9	14	W1
SE	10	9	14	W1
SE	29	9	14	W1
SE	22	8	13	W1
NW	5	9	14	W1
NW	27	8	13	W1
SW	23	9	14	W1
SW	31	9	14	W1
NE	29	9	14	W1
NE	3	9	14	W1
NW	10	9	14	W1
NE	27	8	13	W1
SE	2	9	14	W1
SE	16	8	14	W1
SW	23	8	14	W1
NE	23	8	14	W1
SW	20	8	13	W1
SW	22	8	14	W1
SW	27	9	14	W1
NW	28	9	14	W1
SW	28	8	13	W1
NW	14	8	14	W1
NE	9	8	14	W1
SE	28	8	13	W1
SE	21	8	13	W1
SW	15	8	14	W1
NE	15	8	14	W1
NE	14	8	14	W1
NE	10	9	15	W1
NE	28	9	14	W1

Quarter	Section	Township	Range	Meridian
SW	28	9	14	W1
SE	28	9	14	W1
SW	22	9	14	W1
NE	16	8	13	W1
SW	16	8	13	W1
SE	17	8	13	W1
NW	16	8	13	W1
SE	22	9	14	W1
NE	6	9	14	W1
SW	21	8	13	W1
SW	18	8	13	W1
NW	10	8	14	W1
NW	18	8	13	W1
NE	21	9	14	W1
SW	21	9	14	W1
NW	36	8	14	W1
SW	1	9	14	W1
NE	3	10	14	W1
NW	3	10	14	W1
NW	32	7	12	W1
SE	29	8	12	W1
SW	29	8	12	W1
NW	20	8	12	W1
NE	21	8	12	W1
NE	20	8	12	W1
NW	21	8	12	W1
SW	5	8	12	W1
SW	2	8	13	W1
SW	2	10	10	W1
SE	3	10	10	W1
NW	19	9	9	W1
SW	30	9	9	W1
SW	9	10	10	W1
NW	35	9	10	W1
SE	8	10	10	W1
NE	24	9	10	W1
NW	9	10	10	W1
SE	30	12	13	W1
SE	23	11	14	W1
SW	28	12	13	W1
NE	23	11	14	W1
SE	2	12	14	W1

Quarter	Section	Township	Range	Meridian
NW	28	12	13	W1
SE	29	12	13	W1
NW	2	11	13	W1
SW	1	12	14	W1
NE	2	11	13	W1
SE	1	12	14	W1
NW	26	10	16	W1
NE	26	10	16	W1
NW	6	11	15	W1
NW	32	10	15	W1
NE	1	10	16	W1
SE	1	11	16	W1
SW	29	10	15	W1
NE	29	10	15	W1
NW	29	10	15	W1
NE	6	11	15	W1
SE	6	11	15	W1
NW	5	11	15	W1
SE	5	11	15	W1
SE	30	10	15	W1
SE	35	10	16	W1
SW	35	10	16	W1
SW	16	10	14	W1
NW	9	10	14	W1
SW	18	10	16	W1
SW	8	10	16	W1
SE	7	10	16	W1
SE	16	10	16	W1
NE	6	10	16	W1
NW	5	10	16	W1
NW	4	10	16	W1
SE	13	10	17	W1

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